

DEPARTMENT OF OTOLARYNGOLOGY / HEAD AND NECK SURGERY

10 YEARS OF EXCELLENCE

ANNUAL REPORT 2011



UNC

DEPARTMENT OF OTOLARYNGOLOGY/
HEAD AND NECK SURGERY

MISSION

The Mission of the Department of Otolaryngology/Head and Neck Surgery is to improve health care by enhancing the field of Otolaryngology/Head and Neck Surgery and by advancing its clinical applications.

OBJECTIVES

To provide excellent otolaryngologic/head and neck surgical patient care that can serve as a national model.

To provide outstanding undergraduate and postgraduate education that disseminates otolaryngology/head and neck surgery knowledge and facilitates more contributions to the knowledge base.

To carry out basic science, clinical, and health services research that advance the field of otolaryngology/head and neck surgery.





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A MESSAGE FROM THE CHAIR

This has been a wonderful year in Otolaryngology/Head and Neck Surgery at the University of North Carolina at Chapel Hill. We have started three fellowships and plan to add a fourth one this coming year. We have also graduated four outstanding residents, all of whom have secured prestigious positions in Academic Otolaryngology. I continue to be impressed with the prowess of our residents and fellows in extending the reach of our program across the academic spectrum. They have participated in outstanding research and in some cases have even secured NIH funding during their training.



In terms of opportunities, our international outreach has never been so vital to our mission. Dr. Carol Shores and Dr. Brent Senior have both continued their impressive commitment to international outreach and have involved residents and fellows in these efforts. They both serve as beacons for a continued commitment of our trainees to outreach in their careers.

Certainly, our research and clinical missions continue to be primary in our academic mission. Both areas have enjoyed significant success this year with several new innovative programs in Skull Base Surgery, Head and Neck Oncology, and Neuro-Otology. Each of our faculty members has embraced the concept that new ideas which have merit should be pursued.

We continue to extend the impact of Otolaryngology/Head and Neck Surgery in the State of North Carolina as well as the Southeast. We have developed a national presence in many clinical arenas and hope to continue this trend in the future. I would like to extend a special thank you to Nicolette DeGroot who has joined our team as the Communications Specialist, and has been instrumental in developing this report. I hope you enjoy it!

A handwritten signature in black ink, reading "Harold C. Pillsbury, III". The signature is written in a cursive, flowing style.

Harold C. Pillsbury, III, MD, FACS
Thomas J. Dark Distinguished Professor of Otolaryngology/Head and Neck Surgery
Chair, Otolaryngology/Head and Neck Surgery

A MESSAGE FROM THE DEAN

We have many accomplishments to celebrate this year. Our health care system, an academic medical center, provides education for thousands of North Carolina's physicians, nurses and health care professionals. Today, graduates of the UNC School of Medicine practice in each of North Carolina's 100 counties, many in rural and underserved areas. Each and every day we strive to meet the needs of our local, state, national, and global communities and the work we do here at the School touches countless lives across the globe.

Nationally, our efforts have again enabled our school to continue to be recognized as one of the best in the country. U.S. News & World Report's 2011 graduate school rankings placed our school second in primary care and 20th overall for research. *Your hard work and devotion to patient care have also resulted in the Ear, Nose and Throat department ranking 20th among the top hospitals in the U.S. in the 2011-12 U.S. News & World Report Best Hospitals rankings.*

In an Association of American Medical Colleges competitive analysis, our school ranked above average in 7 of 9 categories on our ability to provide high quality medical education as judged by recent graduates. We exceed our peers in graduating a workforce that will address the priority health needs of the nation by ranking above the 50th percentile in 6 of 7 categories. These rankings are a direct result of our hardworking faculty, staff and students.

North Carolina's health care challenges are changing, expanding and growing, and we will be responsive to those needs. We will continue to provide excellent care to North Carolina's patients, regardless of their ability to pay. We will continue to train the next generation of North Carolina's physicians. And we will continue to conduct ground-breaking research that leads to innovative treatments.

In the meantime, I am pleased to look back on all we have accomplished so far and I look forward to the many future successes for our school and for our system. Thank you for your service to our students, our organization and the practice of medicine.

A portrait of William L. Roper, MD, MPH, Dean of the UNC School of Medicine. He is a middle-aged man with glasses, wearing a dark suit jacket, a white shirt, and a red bow tie. He is standing outdoors in front of a classical building with white columns and a pediment. The photo is framed with rounded corners.

William L. Roper

William L. Roper, MD, MPH
Dean, School of Medicine
Vice Chancellor for Medical Affairs
CEO, UNC Health Care System

THE UNC SCHOOL OF MEDICINE



The University of North Carolina at Chapel Hill School of Medicine

OUR VISION

To be the nation's leading public school of medicine.

Patient Care

As a key component of the UNC Health Care System, the School of Medicine will provide superb care to North Carolinians and others whom we serve. We will maintain our strong tradition of reaching under served populations. Excellence in education and research will enhance our delivery of the very best medical care, which will be presented in an environment that is exceptionally welcoming, collegial, and supportive both for those receiving and those providing the care.

Research

We will achieve excellence in research and in its translation to patient care by developing and supporting a rich array of outstanding research programs, centers, and resources. Proximity to the clinical programs of UNC Hospitals, to UNC-Chapel Hill's other premier health affairs Schools (Dentistry, Nursing, Pharmacy, and Public Health) and the other departments, schools, and programs on the UNC-Chapel Hill campus affords an exceptional opportunity for innovative, world-class research collaborations.

OUR MISSION

Our mission is to improve the health of North Carolinians and others whom we serve. We will accomplish this by achieving excellence and providing leadership in the interrelated areas of patient care, education, and research.

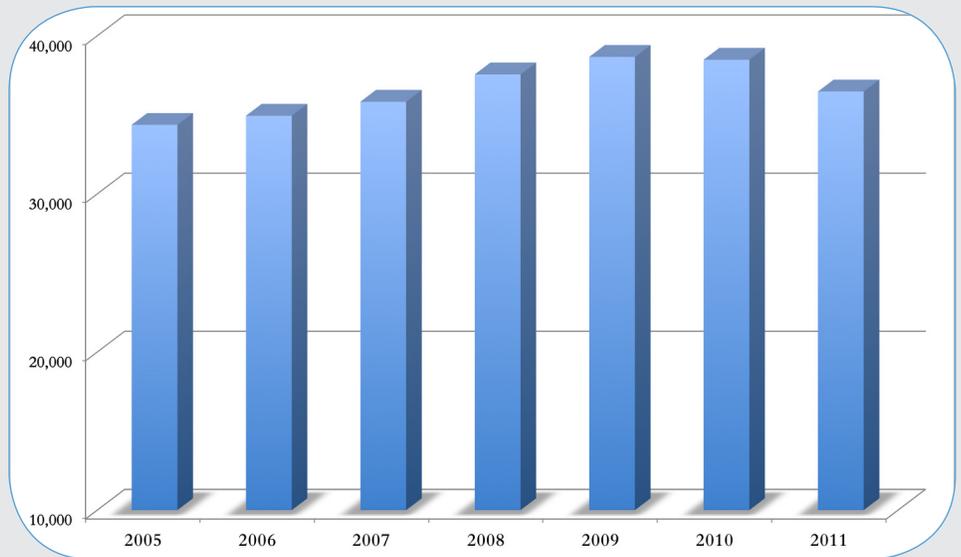
Education

We will achieve excellence in educating tomorrow's health care professionals and biomedical researchers by providing exceptional support for outstanding teaching and research faculty. We will offer an innovative and integrated curriculum in state-of-the-art facilities. The School will attract the very best students and trainees from highly diverse backgrounds.

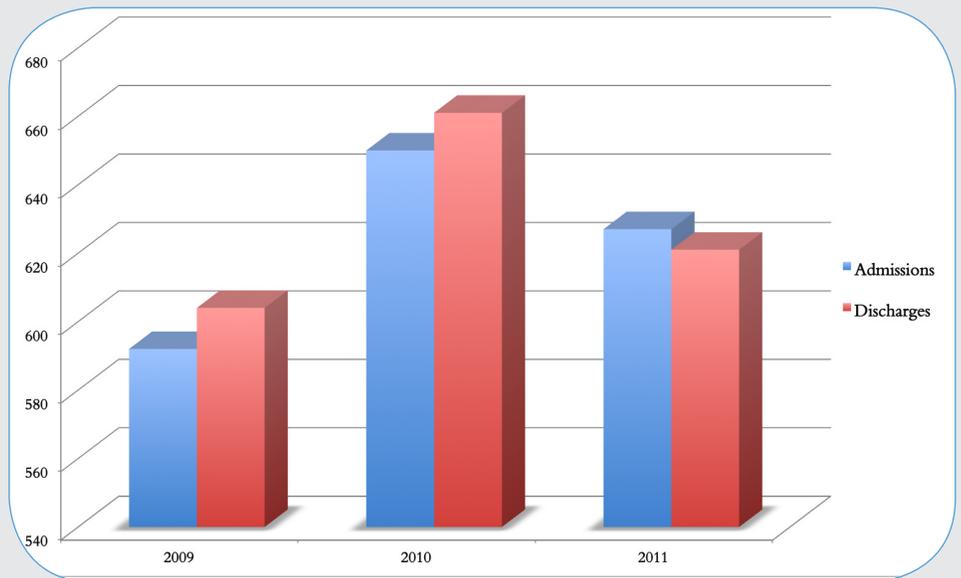
In all of these missions, we will strive to meet the needs of our local, state, national, and global communities.

2011 ENT STATISTICAL DATA

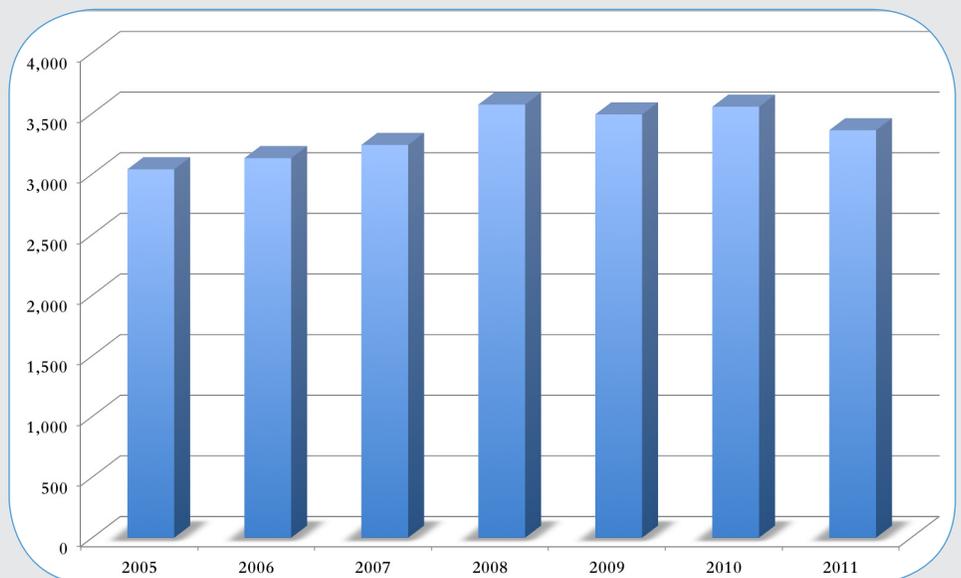
OUTPATIENT VISITS



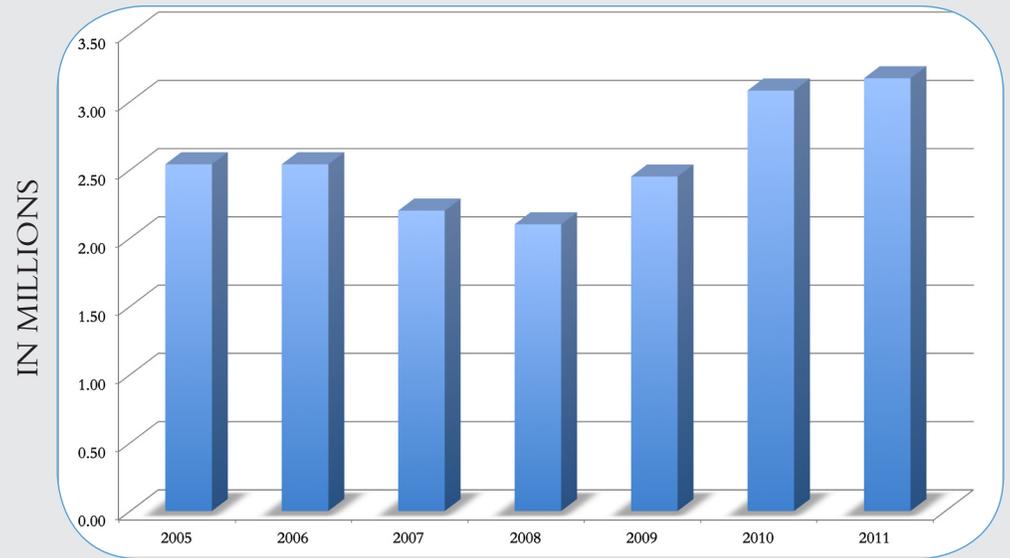
INPATIENT ADMISSIONS & DISCHARGES



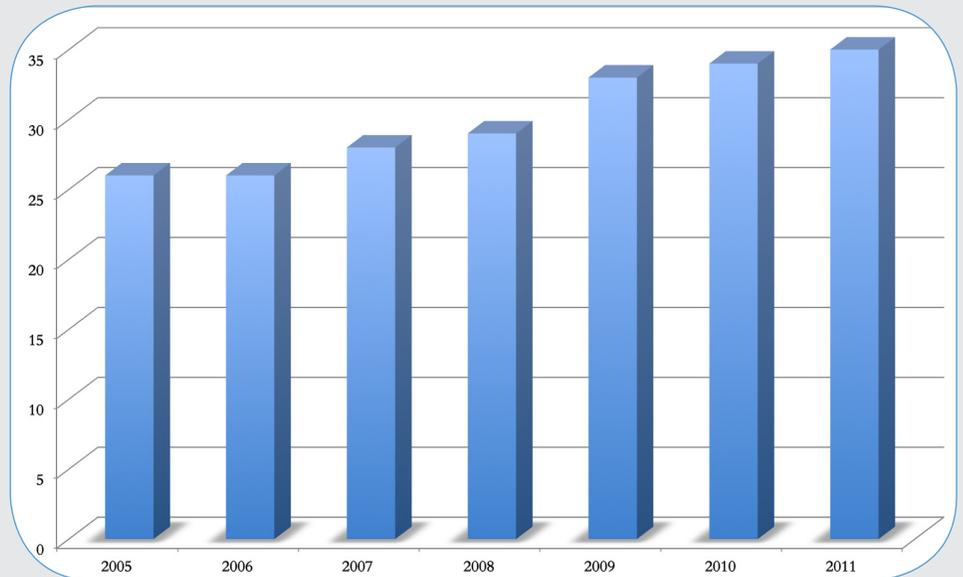
OR CASES



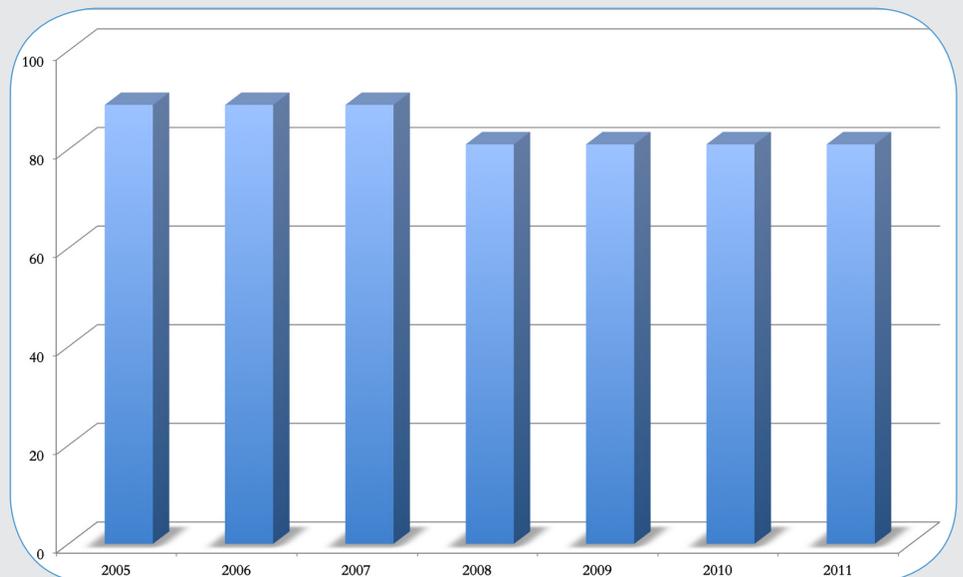
GRANT FUNDING



FACULTY



STAFF



PHILANTHROPY 2011

NEW GIFTS, PLEDGES AND BEQUESTS FOR 2010 - 2011

119 INDIVIDUALS GAVE
\$632,002.12

7 FOUNDATIONS GAVE
\$217,098.64

8 CORPORATIONS GAVE
\$29,195.62

BEQUESTS/PLANNED GIFTS
\$567,242.41

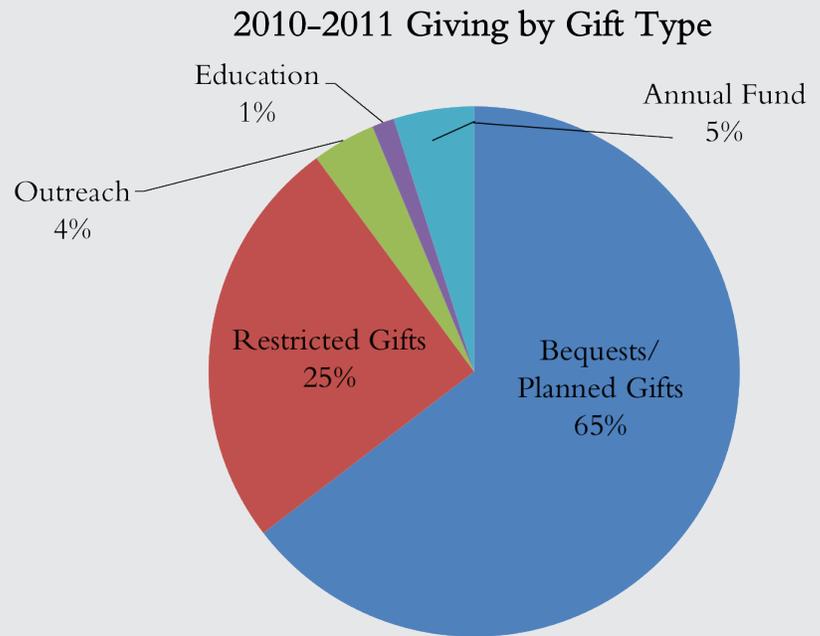
RESTRICTED GIFTS
\$222,236.61

ANNUAL FUND
\$43,017.36

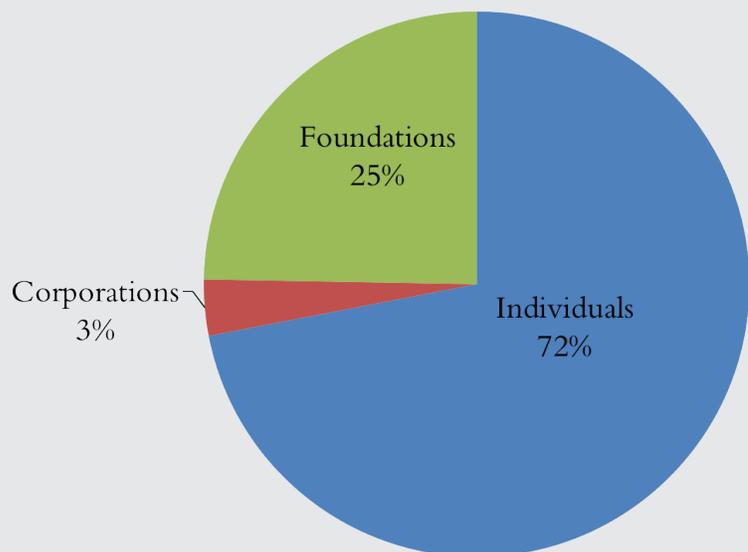
OUTREACH
\$33,862.50

EDUCATION
\$11,937.50

TOTAL
\$878,296.38



2010-2011 Giving by Donor Type



During 2010–2011, more than 130 individuals, corporations and foundations contributed over \$875,000 to help the Department of Otolaryngology/Head and Neck Surgery provide world-class patient care while simultaneously achieving significant accomplishments in education, research, and outreach across North Carolina and beyond. Particularly in tough economic times we are extremely grateful for the private support that we have received.

Dr. and Mrs. Jeffrey E. Abrams	Ms. Susanne Gomolski	Mr. and Mrs. Steven C. Peterson	Dr. Robert S. Webbie
Mr. and Mrs. Alan Adrian	Mr. and Mrs. Jamey Gray	Dr. and Mrs. Harold C. Pillsbury III	Mr. and Mrs. David L. Weinstock
Mr. and Mrs. Oliver Adunka	Ms. Geneva Green	Mr. and Mrs. Walter C. Plunkett	Dr. and Mrs. Mark C. Weissler
Dr. John W. Alldredge	Mr. and Mrs. Michael R. Gross	Mr. Steven P. Preissler	Mr. and Mrs. Robert C. Whitefield
Ms. Jane G. Allen	Dr. and Mrs. Eldad Hadar	Ms. Javeria S. Qureshi	Ms. Jane Y. Woodbury
Mr. and Mrs. Robert A. Baillie	Mr. and Mrs. Jack R. Haley II	Dr. Seth Reice and Ms. Sheila R. Evans	Drs. Jonathan R. Workman and Vanessa Albernaz
Mr. and Mrs. Dennis Baker	Drs. Stuart M. and Marie N. Hardy	Mr. Chad Resnik	Ms. Helen Young
Mr. and Mrs. Robert H. Barnett	Dr. Paula J. Harmon	Ms. Jennifer M. Ring	Dr. and Mrs. Adam M. Zanation
Dr. Karen A. Bednarski	Dr. and Mrs. D. Neil Hayes	Ms. Colleen Roganovich	Dr. Carlton J. Zdanski and Mrs. Mary Beth Owen-Zdanski
Ms. Elizabeth E. Branch	Dr. and Mrs. John T. Henley, Jr.	Dr. Austin S. Rose	Alamance Ear, Nose & Throat, LLP
Dr. George M. Brinson	Mr. V. Ross Highsmith	Dr. and Mrs. Jackson Roush	American Academy of Otolaryngology
Dr. and Mrs. Craig A. Buchman	Mr. and Mrs. Perry C. Hinkle	Ms. Patricia A. Schmidtke	Anonymous
Dr. and Mrs. Paul S. Camnitz	Mr. and Mrs. Donald D. Hong	Mr. Thomas J. Schopler	Aspire Project Services
Dr. Jeffrey P. Campbell	Dr. and Mrs. N. Neil Howell	Ms. Elizabeth Schopler	Chapel Hill Ear, Nose & Throat
Mr. Stephen Carter and Ms. Marcia J. Klafehn	Mr. and Mrs. Daniel Hung	Dr. and Mrs. Brent A. Senior	Ear and Skull Base Institute, P. C.
Ms. Robin M. Chan	Drs. Raleigh O. and Janine C. Jones	Dr. George F. Sheldon	GoodSearch
Mrs. Elizabeth S. Chen	Ms. Kristen P. Kelly	Drs. William W. and Mrs. Linda J. Shockley	Hear The World Foundation
Dr. and Mrs. Bhishamjit S. Chera	Ms. Tamara A. Kimball	Dr. Carol G. Shores and Mr. Russell Shores	Schwab Charitable Fund
Dr. Baishakhi Choudhury	Ms. Ivy Ku	Mr. and Mrs. Michael H. Shoun	Terry & Mickey Pils Charitable Lead Annuity Trust UA
Ms. Amy W. Clark	Ms. Nicole Kugel	Mr. and Mrs. George N. Small	The Edge Family Foundation
Dr. and Mrs. Charles S. Coffey	Dr. Jeffrey B. Lacour	Dr. Jessica K. Smyth	The Estate of Thomas J. Dark
Ms. Donna E. Cook	Mr. Leroy Lee	Dr. Michael E. Stadler	The Harris-Legacy Foundation, Inc.
Ms. Cynthia M. Dowdy, Ph. D	Ms. Clara N. Lee and Mr. William C. Miller	Mr. and Mrs. Fred Stadler	The Honorable Verla C. Insko and Mr. Chester A. Insko
Dr. and Mrs. Brian W. Downs	Ms. Yi-Kung Laurie Chang Lin	Mr. David Stella	The NCFI\Barnhardt Foundation
Drs. Amelia F. and Craig L. Drake	Ms. Ginger W. Long	Mr. Thomas A. Suberman	The Nickolas Bunn Boddie, Sr. & Lucy Mayo Boddie Foundation
Dr. Charles S. Ebert, Jr.	Dr. and Mrs. Henry J. MacDonald, Jr.	Ms. Cynthia A. Suggs	The Soo Foundation, Inc.
Ms. Patricia G. Elsayed	Ms. Catherine J. Maxwell and Mr. Richard B. Fewel	Ms. Karen Sullivan	The Tom Barnhardt Family Foundation
Drs. Gloria H. and William L. Fan	Mr. William McCarron	Dr. and Mrs. Joshua B. Surowitz	Thought Leader Select, LLC
Mr. Jack J. Fan	Drs. Karen and Aneil K. Mishra	Mr. Jared A. Tomlinson	Wal-Mart Foundation
Mr. David Fleischman	Dr. and Mrs. William H. Moretz	Ms. Eileen Tong	
Mr. Stephen H. Ferguson	Mr. Glen Newsome	Ms. Judy Tseng	
Dr. C. Gaelyn Garrett	Dr. Krishna G. Patel	Dr. and Mrs. Peter A. Wallenborn III	
E. Getker	Mr. Stephen D. Peck and Ms. Suzanne J. Anderson	Dr. Pell A. Wardrop	
Dr. and Mrs. M. Miles Goldsmith			



The THE DEPARTMENT *ment*

DEPARTMENT OF OTOLARYNGOLOGY/ HEAD AND NECK SURGERY

Administration

Harold C. Pillsbury, MD, FACS (Department Chair)
Craig A. Buchman, MD, FACS (Vice Chair for Clinical Affairs)
Brent A. Senior, MD, FACS, FARS (Vice Chair for Academic Affairs)
Carolyn H. Hamby (Clinical Academic Department Administrator)

Division of Facial Plastic and Reconstructive Surgery

William W. Shockley, MD, FACS (Chief)

Division of Head and Neck Oncology/Head and Neck Cancer Research

Mark C. Weissler, MD, FACS (Chief)
William W. Shockley, MD, FACS Andrew F. Olshan, PhD
Carol G. Shores, MD, PhD, FACS D. Neil Hayes, MD, MPH
Brian Kanapkey, MA Sean Gallagher, RN
Adam M. Zanation, MD Susan Hayden, RN
Trevor G. Hackman, MD

Division of Otolaryngology/Neurotology and Skull Base Surgery The UNC Ear and Hearing Center

Craig A. Buchman, MD, FACS (Division Chief, Center Director)
Harold C. Pillsbury, MD, FACS
Oliver F. Adunka, MD
Benjamin Wei, MD, PhD, FRACS (Fellow 2011-2012)

UNC Skull Base Center

Craig A. Buchman, MD, FACS (Director)
Harold C. Pillsbury, MD, FACS Oliver F. Adunka, MD
William W. Shockley, MD, FACS Adam M. Zanation, MD
Brent A. Senior, MD, FACS, FARS Charles S. Ebert, MD, MPH

Division of Pediatric Otolaryngology

Carlton J. Zdanski, MD, FACS, FAAP (Chief)
Amelia F. Drake, MD, FACS (Executive Associate Dean of Academic Programs)
Austin S. Rose, MD
James M. Ruda, MD (Fellow, 2011-2012)

Division of Voice and Swallowing Disorders / The UNC Voice Center

Robert A. Buckmire, MD (Division Chief, Center Director)
Mark C. Weissler, MD, FACS
Ellen S. Markus, MA, CCC-SLP, DMA
Linda F. Hube, MS, CCC-SLP

Division of Rhinology, Allergy, and Endoscopic Skull Base Surgery

Brent A. Senior, MD, FACS, FARS (Chief)

Harold C. Pillsbury, MD, FACS

Brett E. Dorfman, MD (WakeMed ENT)

Adam M. Zanation, MD

Michael O. Ferguson, MD (WakeMed ENT)

Charles S. Ebert, Jr., MD, MPH

Esa A. Bloedon, MD (WakeMed ENT)

Julia S. Kimbell, PhD

Allen F. Marshall, MD (WakeMed ENT)

Austin S. Rose, MD

Mitchell R. Gore, MD, PhD (Fellow 2011-2012)

UNC Head and Neck Robotic Surgery Program

Adam M. Zanation, MD (Director)

Division of Auditory Research

Joseph W. Hall, PhD (Chief)

Paul B. Manis, PhD

Douglas C. Fitzpatrick, PhD

John H. Grose, PhD

Patricia A. Roush, AuD

Emily Buss, PhD

Margaret T. Dillon, AuD, CCC-A

Shuman He, MD, PhD

Division of Research Training and Education

Paul B. Manis, PhD (Chief)

Joseph W. Hall, PhD

Douglas C. Fitzpatrick, PhD

Xiaoying Yin, MD

Julia S. Kimbell, PhD

John H. Grose, PhD

D. Neil Hayes, MD, MPH

Emily Buss, PhD

W. Paul Biggers Carolina Children's Communicative Disorders Program

Craig A. Buchman, MD, FACS (Medical Administrative Director)

Harold C. Pillsbury, MD, FACS (Executive Director)

Carlton J. Zdanski, MD, FACS | Oliver F. Adunka, MD

Holly F.B. Teagle, AuD, CCC-A (Program Director)

Hannah R. Eskridge, MSP, CCC-SLP, LSLC Cert. AVT (CASTLE Director)

The Adult Cochlear Implant Program

Marcia Clark Adunka, AuD, CCC-A (Director)

English R. King, AuD, CCC-A (Clinical Audiologist)

Margaret T. Dillon, AuD, CCC-A (Cochlear Implant Research Audiologist)

Sleep and Snoring Surgery

Brent A. Senior, MD, FACS, FARS

WakeMed Faculty Physicians

Michael O. Ferguson, MD (Chief)

Brett E. Dorfman, MD

Esa A. Bloedon, MD

Allen F. Marshall, MD

Fellowship Program Directors

Pediatric Otolaryngology: Austin S. Rose, MD

Advanced Head and Neck Oncology: Adam M. Zanation, MD; Trevor G. Hackman, MD

Rhinology and Skull Base Surgery: Charles S. Ebert, MD, MPH; Adam M. Zanation, MD

Neurotology: Oliver F. Adunka, MD

NEW FACULTY APPOINTMENTS



Margaret T. Dillon, AuD, CCC-A

Margaret began her appointment as Assistant Professor in March of 2011. She earned her doctorate of audiology from the Division of Speech and Hearing Sciences at the University of North Carolina at Chapel Hill. She spent her clinical externship at UNC Hospitals with adult cochlear implants under the direction of Marcia C. Adunka, AuD. Dr. Dillon is a co-investigator and clinical coordinator on several multi-center clinical trials involving electric-acoustic stimulation and middle ear vibratory stimulation. She is interested in cochlear implant speech processing strategies, as well as objective and subjective outcomes of cochlear implantation.



Shuman He, MD, PhD

Shuman began her appointment as Assistant Professor on February 14, 2011. She earned her MD in Clinical Medicine from Shandong Medical University in China, and PhD in Speech and Hearing Sciences from University of Iowa. She followed up with a post-doctoral fellowship at The University of North Carolina at Chapel Hill. Dr. He is interested in assessing auditory processing capacities of children using objective measures. Her research involves recording auditory evoking responses elicited by acoustical and/or electrical stimulus from normal-hearing children, as well as from children with hearing impairments. The long-term goal of her research is to identify objective tools that can be used by clinicians working with infants and young children with impaired hearing.

FACULTY MEMBERS



Harold C. Pillsbury, MD, FACS

Professor and Chair

Thomas J. Dark Distinguished Professor of Otolaryngology/Head and Neck Surgery

Executive Director of the W. Paul Biggers, MD, Carolina Children's Communicative Disorders Program

MD: George Washington University

Residency: University of North Carolina School of Medicine

Special Interests: Otolaryngology-head and neck surgery, neurotology, facial plastic surgery, otolaryngologic allergy, cochlear implantation, acoustic tumors, skull base surgery, laser utilization in head and neck cancer



Oliver F. Adunka, MD

Assistant Professor

Director, Neurotology Fellowship

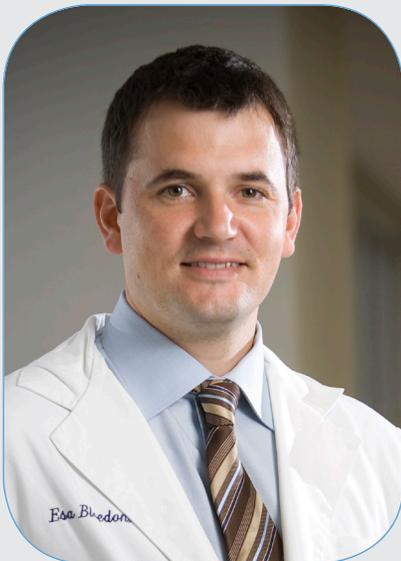
MD: Medical University of Vienna, Austria

Residency: J. W. Goethe University, Frankfurt, Germany

Fellowship (Otology/Neurotology and Skull Base Surgery): UNC

Department of Otolaryngology/Head and Neck Surgery

Special Interests: Otology, neurotology, lateral skull base surgery, acoustic tumors, cochlear implants, hearing preservation



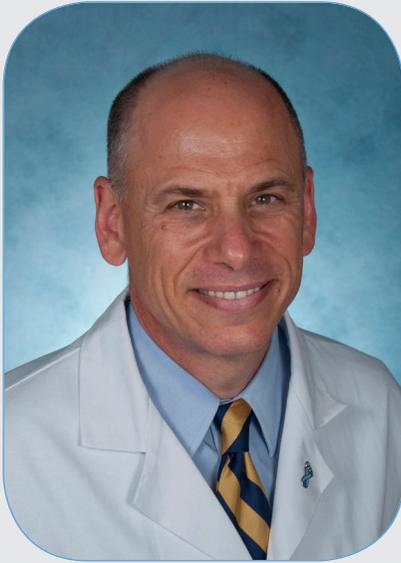
Esa A. Bloedon, MD

Otolaryngology/Head and Neck Surgery, Wake Medical Center

MD: Thomas Jefferson Medical College, Philadelphia, PA

Residency: Thomas Jefferson University Hospital

Special Interests: General and pediatric otolaryngology, endoscopic sinus surgery, thyroid and parathyroid disease, rhinology



Craig A. Buchman, MD, FACS

Professor

Harold C. Pillsbury Distinguished Professor

Chief, Division of Otolaryngology/Neurotology and Skull Base Surgery

Vice Chair for Clinical Affairs

Medical Administrative Director, CCCDP

MD: University of Florida

Research Fellowship (Otolaryngology): University of Pittsburgh School of Medicine, Children's Hospital of Pittsburgh

Residency: University of Pittsburgh School of Medicine

Fellowship (Otolaryngology/Neurotology and Skull Base Surgery): House Ear Institute and Clinic, Los Angeles

Special Interests: Otolaryngology/neurotology and skull base surgery, lateral skull base surgery, acoustic tumors, cochlear implants, hearing preservation



Robert A. Buckmire, MD

Associate Professor

Director, UNC Otolaryngology/Head and Neck Surgery Residency Program

Chief, Division of Voice and Swallowing Disorders

Director, UNC Voice Center

MD: University of Virginia School of Medicine

Residency: University of North Carolina School of Medicine

Fellowship (Laryngology): Vanderbilt University Voice Center

Special Interests: Voice and swallowing disorders, diagnostic laryngeal EMG, laryngeal framework surgery, microsurgical treatment of laryngeal pathology, and micro-laryngeal, laser-control mechanisms



Emily Buss, PhD

Associate Professor

MS, PhD (Psychology): University of Pennsylvania

Post-doctoral Research Fellowship (Psychoacoustics): University of North Carolina at Chapel Hill

Special Interest: Normative psychoacoustics, development, speech perception, binaural hearing, auditory prostheses and sensorineural hearing loss



Margaret T. Dillon, AuD, CCC-A

Assistant Professor

AuD: University of North Carolina at Chapel Hill

Clinical Externship (Adult Cochlear Implants): UNC Hospitals

Special Interests: Cochlear implantation, hearing preservation, middle ear implantation, signal processing outcomes



Brett E. Dorfman, MD

Assistant Professor

Otolaryngology/Head and Neck Surgery, Wake Medical Center

MD: Emory University School of Medicine

Residency: Duke University Medical School

Special Interests: Rhinology, allergy, sinus surgery, care of the professional voice



Amelia F. Drake, MD, FACS

Professor

Newton D. Fischer Distinguished Professor of Otolaryngology/Head and Neck Surgery

Associate Program Director, UNC Otolaryngology/Head and Neck Surgery Residency Program

Director, UNC Craniofacial Center

Executive Associate Dean for Academic Programs, UNC School of Medicine

MD: University of North Carolina School of Medicine

Residency: University of Michigan

Fellowship (Pediatric Otolaryngology): Cincinnati Children's Hospital

Special Interests: Pediatric otolaryngology, pediatric airway disorders, craniofacial anomalies



Charles S. Ebert, Jr., MD, MPH

Assistant Professor

Co-Director, UNC Rhinology and Skull Base Surgery Fellowship

Associate Director, UNC Otolaryngology/Head and Neck Surgery
Residency Program

MD: University of North Carolina School of Medicine

MPH: University of North Carolina School of Public Health

Residency: University of North Carolina School of Medicine

Fellowship (Rhinology): Georgia Nasal and Sinus Institute

Special Interests: Chronic sinusitis, allergic fungal sinusitis, primary and revision sinus surgery, sinonasal tumors, computer guided surgery, allergic disease, and other nasal disorders; investigation into the genetic alterations in chronic eosinophilic rhinosinusitis.



Hannah R. Eskridge, MSP, CCC-SLP, LSLS Cert. AVT

Clinical Instructor

Director, Center for the Acquisition of Spoken language Through Listening
Enrichment (CASTLE)

BS (Elementary Education): College of Charleston

MSP: University of South Carolina

Special Interests: Pediatric hearing loss, cochlear implants, speech/language and audition development after cochlear implantation



Michael O. Ferguson, MD

Associate Professor

Otolaryngology/Head and Neck Surgery, Wake Medical Center

Director, WakeMed Faculty Physicians ENT-Head and Neck and Facial Plastic
Surgery

Associate Director, WakeMed Otolaryngology/Head and Neck Surgery
Residency Program

MD: University of North Carolina School of Medicine

Residency: University of North Carolina School of Medicine

Special Interests: General and pediatric otolaryngology, rhinology, allergy, sinus surgery, head and neck oncology



Douglas C. Fitzpatrick, PhD

Assistant Professor

PhD (Anatomy): University of North Carolina at Chapel Hill

Special Interests: Physiology and anatomy of the auditory system, cochlear implants, electrical stimulation of the central auditory system, binaural hearing, auditory information processing



John H. Grose, PhD

Professor

MSc: University of Southampton, United Kingdom

PhD (Audiology): Northwestern University

Special Interest: Psychoacoustics



Trevor G. Hackman, MD

Assistant Professor

Co-Director, UNC Advanced Head and Neck Oncology Fellowship

MD: University of Pittsburgh

Residency: University of Pittsburgh

Fellowship (Head & Neck/Microvascular): Washington University St. Louis

Special Interests: Head and neck surgical oncology, endocrine surgery, parotid surgery, transoral laser microsurgery, open and endoscopic skull base surgery, head and neck reconstruction, minimally invasive head and neck surgery, sinus surgery



Joseph W. Hall, PhD

Professor

Chief, Division of Auditory Research

MS (Audiology): University of North Carolina at Chapel Hill

PhD (Experimental Psychology): University of North Carolina at Greensboro

Special Interests: Clinical psychoacoustics, cochlear implantation



D. Neil Hayes, MD, MPH

Assistant Professor

MD: University of North Carolina School of Medicine

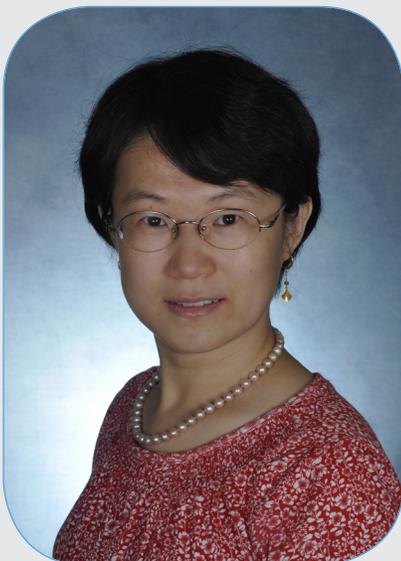
MPH: Harvard School of Public Health

Residency (Internal Medicine): Boston University School of Medicine

Fellowship (Hematology/Oncology): Tufts New England Medical Center

Post-Doctoral Fellowship: Dana Farber Cancer Institute

Special Interests: Clinical research in head and neck and lung cancer; clinical application of genomic testing; cancer therapeutics and chemotherapy.



Shuman He, MD, PhD

Assistant Professor

MD: Shandong Medical University

PhD (Speech and Hearing Sciences specialized in auditory electrophysiology): The University of Iowa

Residency (Otolaryngology): Shandong Provincial Hospital

Post-Doctoral Training (Psychoacoustics and Auditory Electrophysiology): The University of North Carolina at Chapel Hill

Special Interests: Cochlear Implantation, Auditory Electrophysiology



Julia S. Kimbell, PhD

Associate Professor

PhD (Mathematics): Duke University

Post-Doctoral Training: CIIT Centers for Health Research

Special Interests: Research in biomathematical modeling; the effects of nasal anatomy and respiratory airflow patterns on the uptake and deposition of inhaled gases and particles in the nasal passages of rodents, primates, and humans



Paul B. Manis, PhD

Professor

Chief, Division of Research Training and Education

PhD (Neuroscience): University of Florida

Postdoctoral Training (Neurobiology): Vanderbilt University School of Medicine

Special Interests: Cellular basis of auditory information processing; central nervous system plasticity



Allen F. Marshall, MD

Assistant Professor

Otolaryngology/Head and Neck Surgery, Wake Medical Center

MD: University of North Carolina School of Medicine

Residency: University of North Carolina School of Medicine

Special Interests: Adult and pediatric general otolaryngology, including rhinology, allergy, endoscopic sinus surgery, thyroid and salivary gland surgery, ear disease, and hearing



Andrew F. Olshan, PhD

Professor

Chair, Department of Epidemiology, UNC School of Public Health

MS, PhD (Epidemiology): University of Washington

Special Interests: Molecular epidemiology of head and neck and childhood cancer



Austin S. Rose, MD

Associate Professor

Director, UNC Pediatric Otolaryngology Fellowship Program

Co-Director, Newton D. Fischer Society Annual Meeting

MD: University of North Carolina

Residency: University of North Carolina School of Medicine

Fellowship (Pediatric Otolaryngology): Johns Hopkins University

Special Interests: Pediatric Otolaryngology, Pediatric Rhinology, Allergy and Sinus Surgery



Patricia A. Roush, AuD

Associate Professor

Director of Pediatric Audiology

MA (Audiology): University of Iowa

AuD: University of Florida

Special Interests: Pediatric Audiology



Brent A. Senior, MD, FACS, FARS

Professor

Chief, Division of Rhinology, Allergy, and Endoscopic Skull Base Surgery

Vice Chair for Academic Affairs

MD: University of Michigan

Residency: Boston University and Tufts University

Fellowship (Rhinology and Sinus Surgery): University of Pennsylvania Medical Center

Special Interests: Endoscopic minimally invasive management of sinusitis, CSF rhinorrhea, and tumors of the anterior skull base; surgical management of sleep apnea and snoring; allergy



William W. Shockley, MD, FACS

Professor

W. Paul Biggers Distinguished Professor of Otolaryngology/Head and Neck Surgery

Chief, Division of Facial Plastic and Reconstructive Surgery

MD: Indiana University

Residency: University of Cincinnati

Fellowship (Head and Neck Surgical Oncology): Methodist Hospital, Indianapolis, Indiana

Special Interests: Facial plastic and reconstructive surgery, rhinoplasty, skin cancer, salivary and thyroid gland surgery



Carol G. Shores, MD, PhD, FACS

Associate Professor

Otolaryngology/Head and Neck Surgery

PhD (Biochemistry): University of North Carolina at Chapel Hill

MD: University of North Carolina School of Medicine

Residency: University of North Carolina School of Medicine

Special Interests: Head and neck surgical oncology, including salivary malignancies, thyroid surgery, and surgical airway management.



Holly F.B. Teagle, AuD

Assistant Professor

Program Director, W. Paul Biggers, MD, Carolina Children's Communicative Disorders Program

MA (Audiology): University of Iowa

AuD: University of Florida

Special Interests: Cochlear implants in children, childhood development after cochlear implantation, cochlear implant device efficacy and clinical management issues, audiology



Mark C. Weissler, MD, FACS

Professor

Joseph P. Riddle Distinguished Professor of Otolaryngology/Head and Neck Surgery

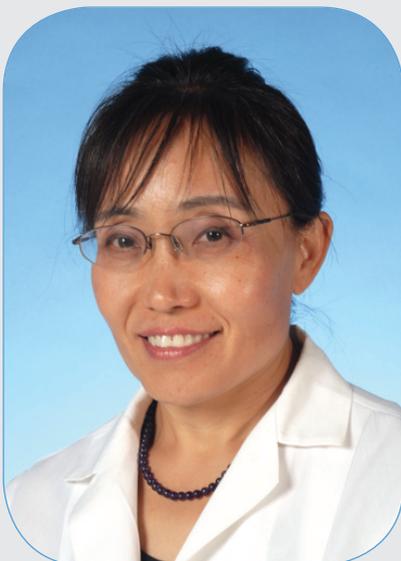
Chief, Division of Head and Neck Oncology

MD: Boston University

Residency: Harvard University

Fellowship (Head and Neck Oncologic Surgery): University of Cincinnati

Special Interest: Head and neck cancer, thyroid cancer, salivary gland neoplasms, skull base tumors, laser utilization in head and neck surgery, voice disorders, laryngeal/tracheal stenosis, head and neck trauma



Xiaoying Yin, MD

Assistant Professor

MD: Xi'an Medical University, Xi'an, China

Residency (Pathology): Xi'an Medical University, Xi'an, China

Fellowship (Pathology): University of Pittsburgh

MS (Molecular Biology): University of Pittsburgh

Special Interests: Cancer cachexia, tumor vaccines in head and neck cancer



Adam M. Zanation, MD

Assistant Professor

Director, UNC Otolaryngology/Head and Neck Surgery Medical Student Affairs

Co-Director, UNC Rhinology and Skull Base Surgery Fellowship

Co-Director, UNC Advanced Head and Neck Oncology Fellowship

MD: University of North Carolina School of Medicine

Residency: University of North Carolina School of Medicine

Fellowship (Skull Base Surgery and Oncology/Rhinology): University of Pittsburgh Medical Center

Special Interests: Skull base tumors, sinonasal tumors, CSF rhinorrhea, robotic and minimally invasive head and neck tumor surgery, parotid tumors, head and neck sarcomas, rhinology, sinus surgery



Carlton J. Zdanski, MD, FACS, FAAP

Associate Professor

Chief, Division of Pediatric Otolaryngology

Surgical Director, North Carolina Children's Airway Center

MD: University of North Carolina School of Medicine

Residency: University of North Carolina School of Medicine

Fellowship (Pediatric Otolaryngology): Children's Hospital of Pittsburgh

Special Interests: Pediatric otolaryngology, reconstructive airway surgery, cochlear implantation, microtia repair, cleft palate, pediatric head and neck masses



Drs. Scott Shadfar, Michael Ferguson and Joseph Roche perform a Parotidectomy on a patient at Wake Medical Center.

group size and our persistent focus on clinical training, the residents continue to thrive under the careful guidance of our physicians. The continuity of care and the repetition that the residents receive working so closely with each individual attending makes for an ideal training ground for the building blocks of our specialty. The six-month experience of the second year residents has them arriving with almost no clinical experience and leaving with confidence and clinical competence in a wide range of bread and butter surgical procedures. The third year residents get their first real look at sinus and nasal surgery, middle ear surgery and the management of thyroid disease. And as always, our fourth year residents leave with a wealth of knowledge in the realm of head and neck surgical oncology.

Four physicians who hold faculty appointments in the UNC Department of Otolaryngology/Head and Neck Surgery practice in Wake County at WakeMed Health and Hospitals. They are Drs. Esa Bloedon, Brett Dorfman, Michael Ferguson (Director and Chief) and Allen Marshall. All four members are board certified and all practice across the spectrum of otolaryngology. The group is proud of our proficiency in all subspecialties—whether it be acute pediatric care, complex facial trauma, airway emergencies, head and neck oncology, endocrine disorders, complex sinus disease, or just bread and butter ENT, WakeMed ENT welcomes the opportunity to provide comprehensive care to the citizens of Wake County and beyond.

The WakeMed group continues to cherish our teaching relationship with the UNC residents. We are confident that we provide a unique training experience for the residents that few programs can boast. Given our relatively small

To make an appointment with one of the WakeMed ENT physicians, please call (919) 350-1630 or (919) 350-2800.



Dr. Kibwei McKinney, Traci Sasser, RN and Dr. Alan Marshall

STAFF MEMBERS

Carolyn Hamby, Clinical Academic Departmental Administrator
Leslie Nelson, Director of Development

Administrative Academic Affairs

Jonna Apple
Kathy Bogie
Nicolette DeGroot
Ellen Doutt
Cheryl Goodrich
Kelly Hair
Kathy Harris
Dawn Wilson
Donna Woodard

Nursing Staff (UNC Healthcare)

Samylia Alston, CNA
Shannon Boughton, RN
Diane Burden, CNA
Katie Chandler, RN
Sherry Egado, CNA
Robin Gunter, RN
Joanne Griffin-McClain, LPN
Denise Hager, LPN
Elaine Hinkle, RN, BSN
Jo Ann Kelly, RN
Lynda Lucas, RN
Teresa McInerney, RN
Tonya Oakley, RN
Patricia Perry, CNA
Soon Young Rondinelli, RN
Karen Short, RN
B. J. Squires, RN
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Tara Steplowski

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CCCDP

Erin Cobbler
Deb Hatch
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Cynthia Poole
Erin Thompson

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Jason Shropshire

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Anna Bradshaw (Supervisor)
Phyllis Dixon
Michelle Handy
Patricia Longest

Patient Business Associates

Anna Bradshaw (Supervisor)
Issbel Armstrong
Wendy Boyd
Katherine Eng
Jessica Hill
Earlene Howze
Angel Jeffries
Paige McDaniel
Allison Turner
Brenda Vernon
Sandra Yates



Carolyn H. Hamby, CADA

I have the pleasure to work with a group of extremely talented individuals in the Clinic and in the Administrative Office. I have the utmost respect for the hard work they do each and every day.

On any given day, we could see up to 200 patients and it is heartwarming to see how the staff comes together as a team to make sure our patients get the best care that is possible. We have been recognized at our Carolina Pointe Office as one of the Top 5 Best Clinics at UNC, and this is no surprise to me. Even during the economic challenges we have experienced over the last numerous years, we still have had very little turnover.

I do not take full credit for such a wonderful group. I have to give a large amount of credit to our faculty and residents. Our physicians work extremely hard, and this reflects throughout the clinic. They are outstanding, and treat staff with respect which makes my job much easier.

I truly care for each of our staff members and have enjoyed getting to know them on a personal level as well as a professional level. They make me proud to be a part of such an outstanding team.

*Carolyn H. Hamby, CADA
Associate Chair for Administration*



Administrative Academic Affairs Staff, left to right in tree: Donna Woodard (Administrative Assistant to Drs. Weissler, Buchman, and Adunka), Jonna Apple (Administrative Assistant to Drs. Shockley, Shores, and Hackman), Kathy Harris (Executive Assistant to Dr. Pillsbury), Dawn Wilson (Administrative Assistant to Drs. Zdanski, Rose, and Zanation), Ellen Doult (Residency Program Coordinator and Administrative Assistant to Drs. Drake and Ebert), Kelly Hair (Accounting Manager), and Kathy Bogie (Administrative Assistant to Drs. Senior and Buckmire). In front of tree: Nicolette DeGroot (Creative Director), and Cheryl Goodrich (Human Resources Manager).



Carolina Pointe Staff: Robin H. Gunter, RN, BSN, Katherine Eng, Joanne Griffin-McClain, LPN, Angel Jeffries, and Pat Perry, CNA



ENT Main Clinic Staff. Back row: Elaine Hinkle, RN, Diane Burden, CNA, Shannon Boughton, RN, Denise Hager, LPN. Front row: Tonya Oakley, RN, Lynda Lucas, RN and Samyilia Alston, CN



Terry McInernery, RN, Karen Short, RN, Sandy Yates, PBA and Sherry Egodo, CNA



Sean Gallagher, RN, Jo Ann Kelly, RN, Susan Hayden, RN, Melodie Pellot-Hernandez, and Katie Chandler, RN

FAREWELL TO BARBARA ESTERLY, RN

By Nicolette DeGroot

HAPPY AND CONTENT: Barbara by the Crepe myrtle in the front yard of her Pittsboro home

Picture yourself for a moment in retirement: how will YOU spend all that extra time? Common responses are to spend more time with family, travel, and pick up those old hobbies again. But what about biking and, Zumba? Could you imagine yourself at 64 years of age dancing to the popular fast-paced workout, Zumba? Retired nurse, Barbara Esterly can, and has been keeping busy since April 25, 2011: her final day with ENT.

Barbara Esterly was a nurse for 10 years at UNC, with ENT for the entire time. I came up with the idea to meet with Barbara since her retirement, to photograph and casually interview her for the Department



Barbara Esterly, RN, retired ENT nurse Judy Miles, RN and Elaine Hinkle, RN, at Carolina Pointe, circa 2008.

publications. I visited Barbara at her cozy home in a lush, green part of Pittsboro. A charming inhabitant, an overexcited but loveable Boston terrier, Bonnie, greeted me in the driveway. She accompanied me all the way up to the front door, as if she were my dog when Barbara answered the door. Barbara later tells me that Bonnie goes with her anytime she travels with her husband. She even has her very own car seat, Barbara chuckles. During

our meeting, Bonnie was secured away in a room with a window, out from which she peered at me, jealously.

Five months into her retirement, Barbara has the look of deep satisfaction and relaxation that only comes from sleeping in everyday. The alarm used to wake me up every morning at 5:20am, she says, but now I sleep until 7am. Barbara tells me that she did not have to set her alarm for a month after retirement, that is, until the Newton D. Fischer Society meeting in June!

Prior to her employment at UNC Hospitals, Barbara worked in long-term care for 16 years. Following her husband, Charlie, in his career move, Barbara started looking for a position in an outpatient setting, and applied to UNC ENT. The Esterlys made the move from Lynchburg, Virginia to RTP in 2001. The first time Barbara stepped foot inside of UNC Hospitals, she felt pretty overwhelmed. I had never worked at a large medical center before. For me, it was pretty intimidating, Barbara confesses. But after interviewing with Elaine Hinkle and Dr. Pillsbury, I knew this was the place where I wanted to be.

I asked Barbara to share a memorable story about her start with ENT:

Not long after I started working in ENT, I was assisting 5th year resident Michael Ferguson, who was doing an excisional lip biopsy on a young adult female patient. Minutes into the procedure, the patient fainted. As Dr. Ferguson and I were focusing on getting the patient to respond, the patient's boyfriend, who was standing next to me, fainted! Luckily I was able to break his fall to the floor. I can just remember thinking, What have I gotten myself into?



Barbara was Dr. Brent Senior's nurse during her time with UNC. I cannot begin to describe how much I loved working with him! Barbara reminisces. When I first started, I had no idea what an important part the nose and sinuses play in a person's everyday life! But I soon found out. Dr. Senior taught me a lot. Not only is he a world-renowned, brilliant surgeon and teacher, he is a very patient and caring person. Barbara considers her career with ENT as her second life away from home, and she most enjoyed the clinic days when Dr. Senior saw patients. Although the clinic could be extremely busy, at the end of the day, she always felt she had done something worthwhile that helped a large number of people. She enjoyed getting to know the patients, usually through spending a great deal of time on the phone with them.

At her retirement celebration on April 22, Barbara was showered with gifts. She received flowers and a beautiful mantel clock from the ENT Department, and a large framed certificate of retirement from UNC Healthcare and the State of North Carolina. Barbara received a gift certificate from ENT Nursing, and a breakfast from the staff at Caroline Pointe. Even patients and other colleagues showed their appreciation with notes and cards. The entire time Barbara worked for UNC, she always felt grateful to be a nurse with ENT. The staff, attendings, residents, nursing assistants, and administration personnel were all fantastic to work with, Barbara says. Everyone was very professional and friendly. It was a great place to work. I will miss everyone and the professional and personal relationships I made while there. Thank you, Dr. Pillsbury, for allowing me to be a part of UNC ENT.

Barbara holds her mantel clock and stands with her husband, Charlie, and daughters, Beth and JoEllen, respectively.

Since April, Barbara and her husband have been able to see their family more. During the summer, they travelled to Clayton, NC and Richmond, VA to see their daughters, Beth and JoEllen, and grandchildren. We've enjoyed going to their soccer games and swim meets, travelling to New York and New England to visit family, and we plan to drive cross country one day, Barbara says. I catch up on news while I have my coffee every morning in the screened-in back porch. We work on things around the house, and I have picked up reading and knitting once again. But don't let that fool you: Barbara is staying physically active too. We have been doing a lot of biking, and I have been going to the Duke Health & Fitness Center regularly. I tried Zumba for the first time. And although it was a workout, and was hard to keep up with the instructor, it was so much fun to dance and listen to the music, Barbara exclaims. I see that I'm not synchronizing but I just chuckle to myself. I am definitely going back. I am not worried what people think of me.

Barbara impressed me with her active retirement life. She is establishing a new identity apart from ENT, and staying busy with her new hobbies. After complimenting me on the recent issue of the Heads Up newsletter layout, she tells me that she likes to stay current of the news of ENT. But don't think that she is sitting at home wishing for the hectic hospital life again: Barbara Esterly is out trying new things, but is content sticking around the house, playing with her new Dell laptop. Best of days ahead to you, Barbara!



ENT Clinic Patient Business Associates: Earlene Howze, Wendy Boyd and Tery Armstrong



*Carolina Pointe Patient Business Associate
LeSonia Foxxx*

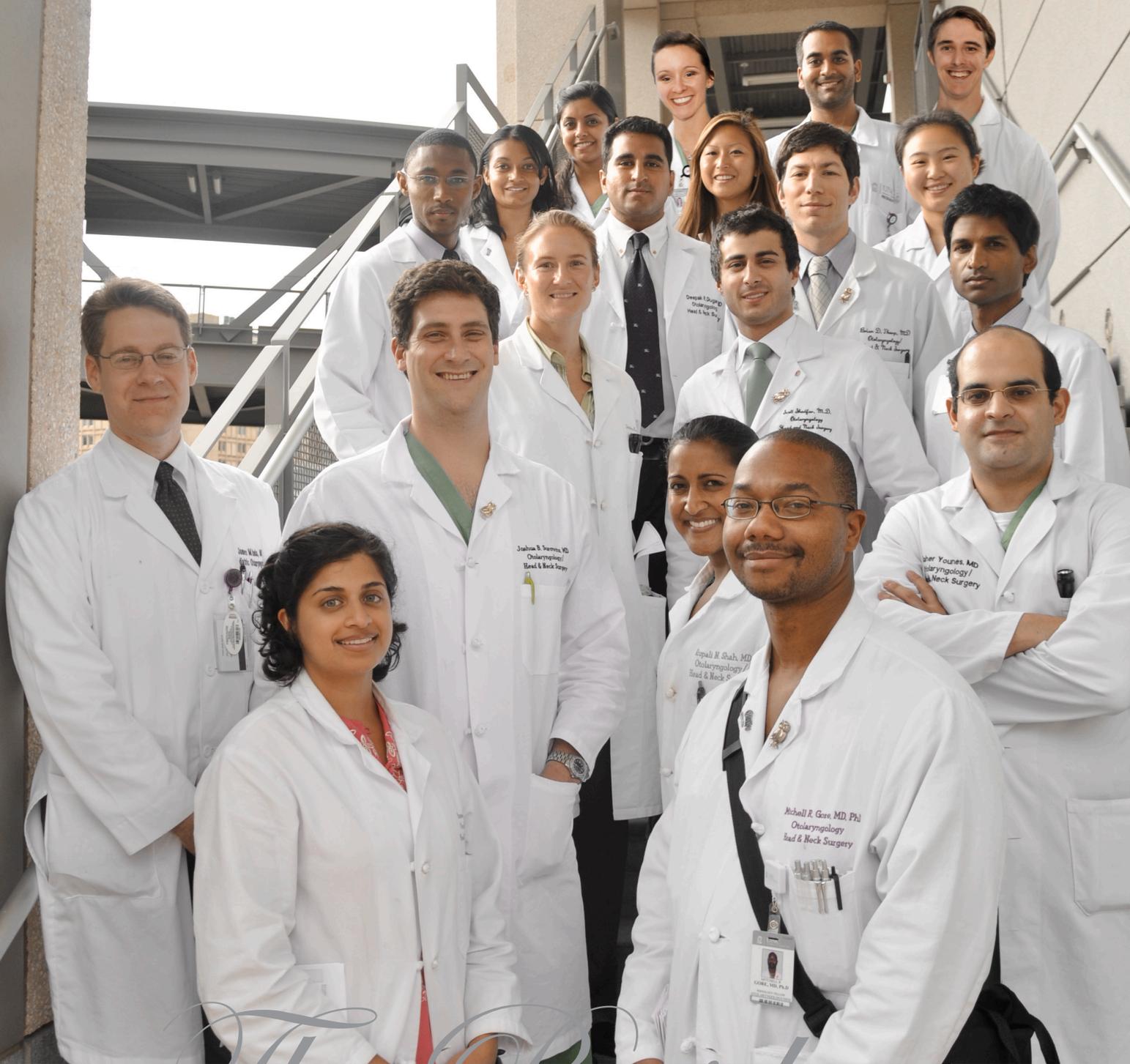


Carolyn H. Hamby, CADA and Anna Bradshaw



ENT Clinic Patient Business Associates: Paige McDaniel, Jessica Hill, and Alison Turner

Top Row: Drs Madan, Klatt-Cromwell, A. Dugar, and Campbell
Row Two: Drs Choudhury, Kim and Hang
Row Three Drs Slaughter, D. Dugar and Thorp
Row Four: Drs Smyth, Shadfar and Patel
Row Five: Drs Ruda, Surowitz, Shah and Younes
Row Six: Drs Eapen and Gore



The Residents

THE CHIEFS: REFLECTIONS ON THE PROGRAM



Dr. Stadler

Michael E. Stadler, MD: It has been a true honor to have had the opportunity to work with and learn from everyone in the department here at UNC over the past five years. The time has flown by, yet the range of experiences has been incredible. I still vividly recall my first impressions as a visiting fourth-year medical student and quickly realized that this is where I wanted to start my training as a future head and neck surgeon. It is a thought I have never come to regret.

I want to first thank the boss for giving my wife and

I the chance to train here at UNC together and for his unparalleled support for the residents over the years. I want to thank the administrative and clinic staff, audiologists, speech pathologists, nursing assistants, and nurses for their constant assistance and support in patient care...a job that we all know is often thankless and forever challenging. I want to thank each and every one of my mentors and attendings for their personal and professional guidance, technical expertise and training, and clinical judgment in patient care that has been so profoundly eye opening for me over these years. I am forever indebted to you all. And lastly, I want to thank my work family...my fellow residents. You have all taught me so much and most of all, have put up with me over these years. This experience would not have been the same without you.

I will miss you all as I take this next step in my professional journey. I will be heading to Washington University in St. Louis for a year-long fellowship in Head and Neck Oncologic Surgery and Reconstruction. Yet, I will always have fond memories of my time here at UNC and will always be a Tar Heel at heart. Thank you, friends.

Deidra A. Blanks, MD: It is an honor and privilege to be completing my Otolaryngology residency at UNC Chapel Hill. I decided late in my fourth year of medical school to pursue an ENT residency. However, I did not match and had to pursue a general surgery internship. I was offered the opportunity the next year to interview at UNC for a second year residency position. I will never forget the drive back to Winston Salem when I received the phone call that I would be an ENT resident at one of the top programs in the country. I would be completing the T32 grant and following in the footsteps of two future



Dr. Blanks

academic leaders. The grant allowed me to spend two years in the lab where I learned both the trials and joys of research. My research allowed me the opportunity to attend meetings across the country and meet people who would become friends and mentors for life.

I have been at UNC for six years now and I have found this residency to challenge and push its residents

to succeed. Yet, I have also found a program that offers friendship, laughter and compassion for patient care. I will always be thankful for the support from the professors, nurses and the entire UNC staff. Thanks to your dedication and encouragement I will be completing my fellowship at the University of Missouri with LaFerriere and Kienstra Facial Plastics Surgery.



Dr. Harmon

Paula J. Harmon, MD: WHAT DOESN'T KILL YOU WILL MAKE YOU STRONGER! I want to express my sincere gratitude and respect for the program that has helped to mold me into the physician that I am and the physician that I will become. After long hours and long days, we have grown to become a small family.

Throughout the years the nursing staff, administrators and assistants have adopted me as their Wild Child and I truly needed and appreciated that. During my early years they embraced me and continued this support throughout my senior years. This did not go unnoticed.

UNC's superb groups of fellow residents are second to none. Thank you for allowing me to be me and being such good friends, residents and associates. To

the attending physicians, UNC has always been on top of my list, but now I know why. Your professionalism, enthusiasm, support, advice and genuine care are the reasons that people are fighting to get into this program. YOU ALL ARE AMAZING! There is no trouble that you can get into that I can't get you out of... From mentorship to parking tickets...Dr. Pillsbury you have been my rock at this hospital and throughout this program and personally. Dr. Shores, I truly appreciate the opportunity to travel to Malawi; these are the memories and experiences that will never fade. Dr. Drake, you have grown to be my dear friend, mentor, and role model. I aspire to become a world-renown pediatric otolaryngologist as you have so gracefully done.

I would also like to thank my family, my husband (Dale) and Lil' Paul for putting up with the lack of extra time and breaks so that I can better myself and the field of otolaryngology.

Dr. Harmon will embark on her journey to becoming a world-renown pediatric otolaryngologist starting with fellowship at the University of Alabama at Birmingham starting in July.



Dr. Gore

Mitchell R. Gore, MD, PhD: These past five years of residency at UNC have been some of the best of my life. I still remember doing Dr. Pillsbury's clinic as a third year medical student and telling him of

my interest in otolaryngology. I vividly remember Match day the next year, opening my envelope with my wife and having her read it too to make sure it really said

UNC! Needless to say, training here at UNC has been an honor. Every day I am amazed at the compassion, knowledge, and professionalism exemplified by our attendings here at UNC. Getting to finally put in a Grillo stitch, my first time under the microscope doing a free flap, these are experiences I'll always remember. The times I've spent with my fellow residents will always stick with me. The residents here are some of the finest people I have known, and I feel grateful every day to have been able to train with such an incredible group of residents. It goes without saying that I will miss Michael, Paula, and Diedra. I couldn't be more excited to be the first Rhinology/Anterior Skull Base fellow next year, and I will always be grateful to Dr. Pillsbury and everyone here at UNC for such a great residency experience.

THE JUNIOR RESIDENTS



Adam P. Campbell, MD

(2016)

BS (Communication Studies): Vanderbilt University, Nashville, TN, 2002-2006

University of Florence (Italian Language & History), Aug – Dec 2004

MD: UNC School of Medicine, 2006 – 2011



Baishakhi Choudhury, MD

(Research Track, 2016)

BS (Psychology/Computer Science):

SUNY at Binghamton University, 2002

Post-Bac Research Fellow, National Cancer Institute, NIH, 2002-2005

MD: SUNY at Buffalo School of Medicine and Biomedical Sciences, 2009



John P. Dahl, MD, PhD, MBA

(2014)

BS (Biology): Villanova University, 1997
MBA: The Pennsylvania State University, 2000
PhD (Pharmacology): The Pennsylvania State University, 2001
MD: Jefferson Medical College, 2009



Anand R. Dugar, MD

(2016)

BS (Science): The Pennsylvania State University, 1997-1999
MD: Jefferson Medical College, 2000-2004
Residency-Internship (Internal Med): Penn Hospital, 2004-2005
Residency (Anesthesiology): Univ of Pittsburgh Med Ctr, 2005-2008



Deepak Raj Dugar, MD

(2015)

BA (Biology)/MD Seven-Year Program:
George Washington University, 2010



Rose J. Eapen, MD

(Research Track, 2012)

BS (Neural Science): New York University, 2001
MD: Duke University Medical School, 2005

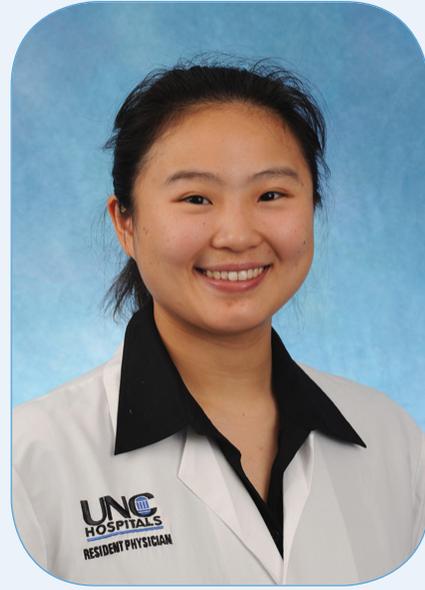


Alexander Farag, MD

(2014)

BA (Chemistry): The College of Wooster, 2004

MD: The University of Toldedo College of
Medicine, 2009

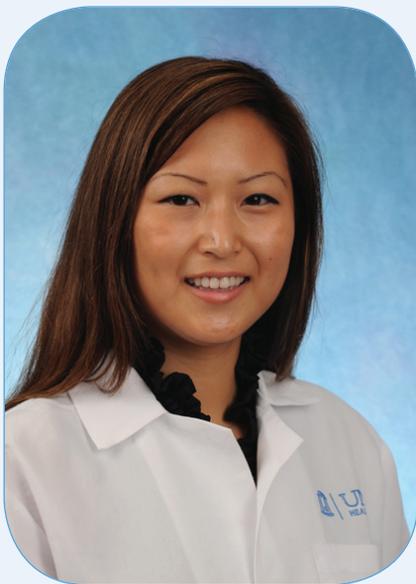


Anna Hang, MD

(2015)

BS (Chemistry): University of Illinois at
Urbana-Champaign, 2006

MD: Uniformed Services University of the
Health Sciences, 2010



Grace G. Kim, MD

(Research Track, 2017)

BS (Biology): Carengie Mellon University 2003

Post-BS: University of Pennsylvania, 2004-2006

MD: University of Medicine and Dentistry of New
Jersey, Robert Wood Johnson Medical School, 2010



Cristine N. Klatt-Cromwell, MD

(2016)

BS (Biochemistry/Spanish, Medical Humanities):
Univ of Oklahoma, Norman, OK 2003-2007

MD: Univ of Oklahoma College of Medicine,
Oklahoma City, OK, 2007-2011



Gitanjali Madan, MD

(Research Track, 2018)

BS (Biology/English): UNC-CH, 2000-2004

MSc (Physiology/Biophysics): Georgetown University, Washington, DC, 2005-2006

MD: UNC School of Medicine, 2006-2011



Kibwei A. McKinney, MD

(Research Track, 2016)

BA (Human Biology, Spanish): Stanford University, 2001

MD: University of Pennsylvania, 2008



Mihir R. Patel, MD

(Research Track, 2013)

BA (Chemistry, Philosophy):

Duke University, 1997

MD: University of North Carolina School of Medicine, 2006



Joseph P. Roche, MD

(Research Track, 2014)

BS (Biology): St. Mary's University of Minnesota, 2002

MD: Medical College of Wisconsin, 2007



Scott A. Shadfar, MD

(2013)

BS (Biochemistry, Chemistry): Oklahoma City University, 2003
MD: University of Oklahoma College of Medicine, 2008



Rupali N. Shah, MD

(2012)

BS/BA (Microbiology, Political Science): University of Georgia, 2003
MD: Emory University School of Medicine, 2007



Keimun A. Slaughter, MD

(2015)

BS (Biology/Pre-Med): University of Georgia, 2000-2004
MD: Morehouse School of Medicine, 2005-2009
Residency (General Surgery): Duke University Medical Ctr, 2009-2011



Jessica K. Smyth, MD

(2013)

BS (Chemistry): US Military Academy, 2000
MD: Uniformed Services University of Health Sciences, 2004
Residency (General Surgery): San Antonio Uniformed Services Health Education Consortium, 2005
Physician: Aerospace Medicine, Kuwait and Pope AFB, 2005-2008



Joshua B. Surowitz, MD

(2012)

BS (Biomedical Engineering):
University of Miami, 2000

MD: University of North Carolina School of Medicine, 2007

Research Fellow: UNC Dept. of OHNS
(NIH-funded), 2006-2007



Brian D. Thorp, MD

(2014)

BS (Biology): James Madison University, 2005

MD: Eastern Virginia Medical School, 2009



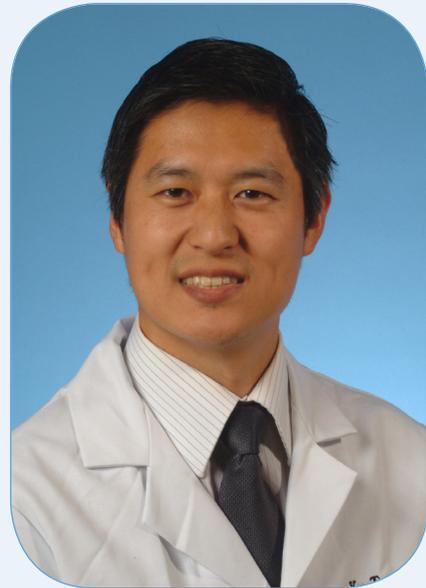
Maher N. Younes, MD

(2012)

BS (Biology): American University of Beirut, 1997

MD: American University of Beirut, 2001

Post-Doc Research Fellowship (Head and Neck
Cancer): MD Anderson Cancer Center, University
of Texas, 2002-2007



Yu-Tung Wong, MD

(2013)

BS (Engineering): Harvey Mudd College, 1996

MS (Engineering): Harvey Mudd College, 1997

Pre-Med: University of California-Irvine, 2004

MS (Applied Anatomy)/MD: Case Western Reserve
University School of Medicine, 2008



ENT Residents at Joint Surgical Advocacy Conference (JSAC) 2011



This three-day conference offers residents, fellows, and practicing physicians from the surgical community the opportunity to join their colleagues in a collaborative advocacy effort.

The conference program provides attendees with advocacy training, pre-scheduled meetings with Members of Congress and their staffers, various political briefings, and myriad networking opportunities. Attending JSAC is the perfect opportunity for members to start developing or strengthen their advocacy skills and learn about how potential healthcare reform will impact their practices and patients.





Educational Programs

EDUCATIONAL PROGRAMS

MEDICAL STUDENTS

Dr. Adam Zanation serves as Director of Medical Student Affairs within the Department of Otolaryngology/Head and Neck Surgery. This includes being fourth year Acting Internship and Critical Care Selective rotation coordinator. Dr. Zanation also meets with all 4th year students interested in Otolaryngology/Head and Neck Surgery to mentor them through the residency application process. Dr. Austin Rose serves as coordinator for the Otolaryngology Third Year Surgery rotations. Dr. Charles Ebert, coordinates the Head and Neck Surgery Specialty 4th Year Selective and Dr. Oliver Adunka serves as the second year Otolaryngology/Head and Neck Surgery course coordinator.

First-year medical students are provided a two-week intensive course in head and neck anatomy. This involves a series of one-hour lectures and includes three, four-hour afternoon sessions, including three-dimensional dissections of the head and neck, as well as multiple radiologic demonstrations. Clinical faculty members from around the state also participate in these demonstrations, donating time from their practice. This rounds out the students' experience in head and neck anatomy and has been very well received over the years.

During the second year of medical school, the *Special Senses Courses* is offered to medical students over a ten-week period during the fall semester. Mechanisms of disease are emphasized, covering a spectrum of diseases, disorders, and problems encountered in Otolaryngology/Head and Neck Surgery. This section of the curriculum is presented in coordination with the curriculum of Neurology and Ophthalmology. Small group sessions focus on case studies, differential diagnosis, and treatment options. Additionally, second-year medical students participate in physical diagnosis sessions in the OHNS Clinic over an eight-week period. During this time, the basics of the physical examination of the head and neck are taught by the faculty and residents.



Drs. Alisha West and Austin Rose (right) with medical students, Lindsay Bridges (MSIII) and Nene Ugoeke (MSIV)

In the third year, there are approximately 90–100 medical students rotating on the OHNS service. During this time, students attend clinics with OHNS faculty and gain exposure to operative procedures. Students make rounds each morning and are responsible for keeping up with assigned patients. At the beginning of the surgical rotation, all third year students participate in a soft tissue course entitled *Soft Tissue Laboratory: Principles and Techniques of Wound Closure*. The OHNS residents and faculty serve as instructors as the fundamentals of suture techniques are introduced to the students.

During the fourth year of medical school, approximately 15–20 acting interns and 4th year students rotate through the OHNS service throughout the year. This constitutes a high level of activity and responsibility, with the involvement of all the housestaff and attending faculty. Many of these students apply for residency positions in OHNS throughout the country. The Department offers many resources for medical student research. During the summer between first and second years of medical school, numerous students spend 6–8 weeks in short-term research projects throughout the department. Usually, 2–5 medical students also decide to take a year between third and fourth year of medical school to perform dedicated research within the departments. These students and their mentors garner competitive funding through the NIH T32 programs, the UNC School of Medicine Research Programs, and the Doris Duke Medical Research Program. During this year the students explore both research and the inner workings of an academic Otolaryngology/Head and Neck Surgery department. When they apply for residency, these students are some of the most competitive and sought-after applicants due to this experience.

RESIDENCY PROGRAM

Dr. Robert A. Buckmire serves as the Director of the Residency Program and Drs. Charles S. Ebert and Amelia F. Drake serve as the Associate Program Directors at UNC Hospitals. Dr. Michael O. Ferguson serves as the Associate Program Director at Wake Medical Center. Responsibilities include implementing the six clinical competencies, as per ACGME guidelines, as well as ensuring the smooth transition of the residents through their specialty training.

Responsibilities

The residency program in Otolaryngology/Head and Neck Surgery is structured to have four residents for five years of Otolaryngology/Head and Neck Surgery, one of which does seven years on the NIH T32 Training Grant. The first year, the intern year, includes six months of General Surgery, E. R., Anesthesiology, OHNS, and Surgery Intensive Care. Second-year residents participate in six months at Wake Medical Center in Raleigh, and six months of research in the OHNS laboratories. A rotation in Audiology is incorporated into the research block. The third and fourth-year house officers spend three months each at Wake Medical Center in Raleigh, as well as participate in the services of Head and Neck Oncology/Facial Plastics, Pediatric Otolaryngology/Otology, and Rhinology/Laryngology.

The clinical program consists of graduated responsibilities for residents at each level. Senior residents attend either the Annual Meeting of the American Academy of Otolaryngology-Head and Neck Surgery or the Combined Otolaryngology Spring Meeting. Most OHNS residents attend at least one other meeting during the year as scientific presenters. Upper level residents learn to balance clinical and administrative responsibilities with on-call duties and academic pursuits, such as completing publications from their basic research experiences or conducting clinical research projects.

Chief resident responsibilities include: supervising

the OHNS service, organizing and distributing the educational conference schedule, and assigning residents to specific clinics, call duties, consult responsibilities and operative cases.

Resident Education

A curriculum of lectures spans the academic year. During the summer months, our residents design and coordinate a head and neck anatomy dissection course. This entails preparation and prosection of common procedures performed in OHNS. Attending physicians take the residents through the technical aspects of the procedure, and the discussion covers the indications, surgical options, technical highlights, and pitfalls, as well as complications associated with the procedure performed.



Drs Anand Dugar, Cristine Klatt-Cromwell, Gita Madanjali, and Adam Campbell

A Temporal Bone Course and Competition is scheduled in the spring. In addition, there are weekly conferences that include Journal Club, Head and Neck Conference, Radiology, Pathology, Patient of the Month Program, Morbidity and Mortality, Speech Pathology, Audiology, and Research Conferences.

Finally, most residents participate in outside educational meetings. The third year residents attend the North Carolina/South Carolina Otolaryngology meeting as well as the Carolinas Airway Course, the fourth year residents attend an off-site didactic temporal bone course, and fifth year residents attend the annual meeting of the American Academy of Otolaryngology-Head & Neck Surgery. Many residents attend the Triological

meetings or the American Academy of Otolaryngologic Allergy depending on their interest.

Research Opportunities

Each resident in the Department is required to design and carry out a research project during the PGY-2 year. Many have chosen to undertake projects within the established laboratories in the Department, while others have chosen to work in related disciplines such as microbiology, molecular biology, tumor biology, audiology, or cochlear physiology. The Department also has affiliations with the Dental Research Center and the Department of Anatomy and Cell Biology. The quality of resident research has been consistently high, tends to be collaborative and has resulted in numerous awards and publications.

The Department of Otolaryngology/Head and Neck Surgery has a number of laboratories engaged in both

auditory and head and neck oncology research. Auditory research currently has separate laboratories engaged in human psychoacoustics, cochlear implant performance and modeling, information processing and plasticity in the auditory brainstem and midbrain, the neural basis of sound localization, and inflammatory mechanisms in viral otitis media.

Head and neck oncology research includes clinical research in the form of trials involving management of patients with squamous cell carcinoma, investigation of the mechanisms and treatment of cancer cachexia, analysis of genetic mechanisms of head and neck cancer, and studies in the pathogenesis, diagnosis, treatment, and epidemiology of head and neck squamous cell carcinoma. In addition to auditory and head and neck cancer studies, research is also currently being carried out in the area of dysphagia, robotics, allergies, and sinonasal disorders. The options for research by residents are limited only by imagination.

NIH TRAINING GRANT

Since 2001, the Department has held a training grant from the National Institutes on Deafness and Other Communication Disorders (NIDCD) for research training in Otolaryngology/Head and Neck Surgery. With the inception of this training grant, the Department joined an elite group of about a dozen institutions that offer 2-year research training positions during residency. The grant also guarantees the Department's continued support and promotion of medical student research experiences at UNC. The training grant further extends the burgeoning research support within the Department, by providing stipends for medical students (2 for the summer and 1 for a whole year, each year of the grant) and one resident for two years for research training each year. We are currently in our second 5-year cycle of this grant.

This past year, we supported two medical students in the summer training program. Kristine Falk and Hira

Hasnain (both MS-I's) worked as a team with Doug Fitzpatrick on Electrophysiological recording during a cochlear implantation: Using a gerbil model to improve efficiency, and Electrophysiological recording during cochlear implantation in a noise-exposed animal model. Their projects were specifically to evaluate cochlear potentials during electrode insertion in animals that had a controlled (noise-induced) hearing loss, and thus a different pattern of potential generators than normal animals. This work is important for translating and interpreting the results of the intraoperative monitoring methods in a clinical setting in patients with hearing loss. The goal of the first part of the project was to determine the optimal noise-exposure conditions for placing the transition between damaged and preserved hair cells in the basal turn in a gerbil model, and then to use this animal model during cochlear implantation in order to detect the optimal electrode insertion depth while preserving residual hearing. The results showed that the optimal noise-exposure conditions in order to have the transition zone between preserved and damaged hair cells be in the basal turn is to noise expose the gerbil at

a 16 kHz frequency cutoff, using 115 dB for 4 hours. This allowed the transition zone to occur between the 10-20 kHz frequency locations in the cochlea, which was ideal, as the deepest insertion of the electrode is the 10 kHz frequency location point within the cochlea. In the second part of the project, the goal was to create a more efficient stimulus set for intraoperative recording to assess cochlear health during a cochlear implantation procedure. An electrode at the round window niche took recordings of the cochlear microphonic (CM) and the compound action potential (CAP) in response to (1) Multi-tone complex, (2) Band-pass noise, (3) Clicks, and (4) FM sweeps. Because of the effects of cochlear filtering and the geometry of current flow within the

cochlear implant patients with residual hearing. With the development of combined electric and acoustic stimulation, preservation of residual hearing has become an important consideration during cochlear implantation. Using an animal model, they have developed algorithms and procedures for an intraoperative monitoring system under the hypothesis that real-time information about cochlear functional status during the electrode insertion process will improve outcomes of hearing preservation cochlear implantations. Combined with other methods, Ahmed explored the use of an extracochlear recording system to overcome dependence of signal strength on the distance from the recording electrode, thus better reflecting the status of intact hair cells and nerve fibers

as the electrode advances during the insertion process. Due to the increased distance between the hair cells and the extracochlear recording electrode (as compared to an intracochlear electrode), there is diminished signal quality which would require more averaging and time to obtain measurements.

However, in this

cochlea, the multi-tone complexes, noises and FM sweeps tones did not provide any advantage over pure tones played individually at each frequency.

In the 1-year training position, Mr. Ahmed Faisal worked with Drs. Fitzpatrick, Adunka and Charles Finley on a project to improve the measurement of intraoperative cochlear potential measurement to optimize hearing preservation during cochlear implantation using an animal model. His project title was Electrophysiological characterization of an animal model for noise-induced hearing loss: Implications for

study we have used lock-in amplifier technology, which operates on the basis of detection of signals of a known test frequency through synchronization with an internal oscillator. This method allows for monitoring of signal levels below baseline noise levels, potentially allowing recordings to be made with minimal averaging to overcome the diminished signal quality. We also expect that this recording method will be advantageous in the operating room as it can be used to overcome background electrical noise typical of this environment.

The purpose of this project is to develop an



Baishakhi Choudhury, MD contributes to Adunka-Fitzpatrick research in the Glaxo Building lab

intracochlear recording system that will ultimately allow surgeons to assess intracochlear trauma during cochlear implantation. Previous studies have shown that cochlear trauma and poor electrode placement can lead to decreased speech perception in cochlear implant recipients. A translational model (using the gerbil) was developed to test electrophysiological markers including the compound action potential (CAP) and cochlear microphonic (CM) to identify patterns of damage caused by electrode interaction with intracochlear structures. In normal hearing gerbils, he compared the sensitivity of making measurements of the cochlear microphonic using a lock-in amplifier with those using standard averaging techniques.

Mr. Maxwell Pike (MS3) is back with Dr. Fitzpatrick for a 1-year research experience.

Recent advances in cochlear implant technology have broadened patient selection criteria, and patients with substantial residual hearing but impaired communication skills have become eligible for implantation. Recent research demonstrates that individuals who retain residual hearing perform especially well when acoustic stimulation is combined with the cochlear implant on the same ear. In these cases, the combination of electric and acoustic hearing (termed electric-acoustic hearing – EAS) has been shown to improve speech discrimination scores, especially with background noise – a weakness of conventional cochlear implantation. We will identify indications that discriminate among reversible damage that can be expected to recover after surgery and irreversible damage that will not. We will also consider the interaction of electrical stimulation using electrodes near to or overlapping with surviving hair cells.

The most important indication to the surgeon is whether hearing is preserved during the implant procedure. The experiments in the first aim will identify physiological markers of reversible and irreversible types of cochlear

damage. The second most important goal of a hearing preservation surgery is to place the electrode as close as possible to surviving hair cells while maintaining the integrity of acoustic hearing. A deep insertion is desired to stimulate the full complement of surviving auditory nerve cells and axons. It is at present unknown whether electrical stimulation in close proximity to hair cells will compromise sensibility to auditory stimulation. The experiments in this aim will measure the effect of electrical stimulation at different distances from surviving hair cells on the responses of the hair cells to acoustic stimulation. The hypothesis is that electrical stimulation will degrade but not remove the response to ongoing auditory stimulation, so that stimulation of apical electrodes in close proximity to hair cells can be tolerated.



Kibwei McKinney, MD

The crown jewel of the training grant is the 2-year research program for selected residents. Dr. Kibwei McKinney has just completed his second year and has returned to the clinic. Dr. McKinney worked with Drs. Kimbell and Zanation on the characterization of post-surgical changes in nasal airflow in functional endoscopic sinus surgery using a computational fluid dynamics model. The computational fluid dynamics model provides an objective measure related to the clinical response of patients who have previously undergone functional endoscopic sinus surgery for treatment of

chronic rhinosinusitis. Traditionally, objective measures have been shown to be poor predictors of a successful response to surgery. They utilized CFD techniques to create 3-dimensional computational models from pre- and post-operative CT scans using computer aided design software. From these models, they quantified several objective measures, including nasal airflow and heat and water transfer rates from the mucosa and will correlate these to pre- and post-surgical subjective reports, documented through a quality of life clinical inventory.

Dr. McKinney has also been involved in the ongoing mouse cancer cachexia project, testing treatment through NF-Kappa-B inhibition using the novel compound Resveratrol, an NF-KB inhibitor. Cachexia was induced by implanting C26 adenocarcinoma cells implanted into 6-8 week old CD2F-1 mice. The experiment has now culminated and statistical analysis is being performed to quantify the effect of treatment on measures of cachexia.

Dr. Baishakhi Choudhury has just entered her second year of training, and is continuing to work with Dr. Fitzpatrick on the gerbil cochlear implant project. She recently presented at the Asilomar Cochlear Implant Conference (2011), and her work Intraoperative monitoring in EAS surgery: animal and human findings, has been selected for presentation at the 2011 Hearing Preservation Conference, being held from October 13-16th in London, UK.

Dr. Choudhury is involved in several projects:

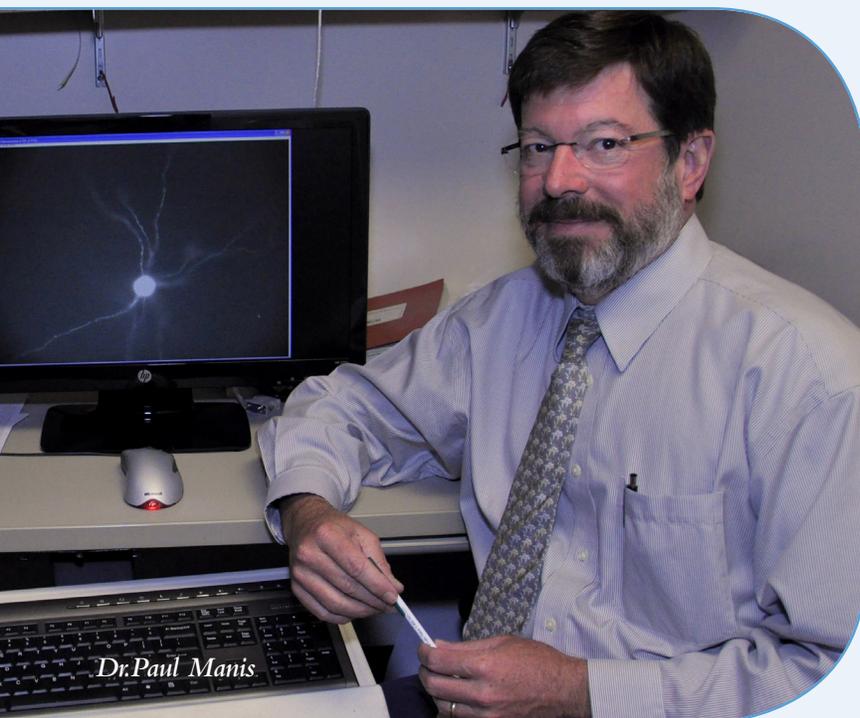
1. Effects of remote intracochlear damage on residual hearing of a noise induced hearing loss (NIHL) gerbil model. Clinical evidence suggests that intracochlear damage during cochlear implantation negatively affects residual hearing. The goal of this project is to examine the feasibility of using acoustically evoked intracochlear recordings in the setting of NIHL to detect intracochlear trauma due to electrode placement. Gerbils undergo noise exposure to produce sloping hearing loss similar to that found in electro-acoustic stimulation implant

candidates. After exposure and one-month recovery, each animal's thresholds are recorded via far field ABRs and baseline near-field recordings are obtained at the round window. Subsequently, electrode insertions are performed to produce basal trauma while acoustically generated cochlear microphonic (CM) and compound action potentials (CAPs) were recorded after stepwise electrode advancement. Once electrophysiological patterns suggest damage, the animal is sacrificed and histologically processed. Hair cell counts as well as mechanical intracochlear damage are correlated with physiological changes. Thus far we have demonstrated electrophysiologic and histologic patterns consistent with the degree of noise exposure. As in normal-hearing animals, electrophysiologic markers remain suitable to detect intracochlear trauma. Remote trauma in the basal cochlea shows a decline in residual hearing.

2. The use of probiotics in the treatment of allergy induced eustachian tube dysfunction (ETD) in the rat model. Influencing the makeup of the gut flora with probiotics has been under investigation for the prevention and treatment of allergic conditions with some promising results, and further study is necessary to clarify specific strains and dosages of probiotics that would be most efficacious. The goal of this project is to determine whether administration of probiotics orally has a role in prevention and/or treatment of allergic eustachian tube dysfunction (ETD) in the rat model. We propose to use a well-established model of allergic eustachian tube dysfunction in the Brown Norway rat for this study. A group of rats will be provided probiotics treated water for a period of 30 days after which they will then undergo OVA sensitization (subcutaneous) and transtympanic OVA challenge and objective measurements of ET dysfunction will be made and compared to allergic and non allergic controls. Another group of rats will be provided probiotics treated water after OVA sensitization and transtympanic OVA challenge, for a period of 30 days, after which they will undergo a second transtympanic OVA challenge and subsequent

objective measurements of ETD will be performed. We expect to see an attenuated allergy induced ETD in both the prevention and treatment groups.

3. The Treatment of Otitis Media with Effusion using CpG Oligodeoxynucleotides A candidate for a non-antibiotic therapy is a class of compounds known as CpG oligodeoxynucleotides (CpG ODNs). CpG ODNs modulate immune responses that result in



inflammation by modifying naive T-lymphocyte differentiation. They have a potent effect on early and late phase allergic airway responses. The first aim of this project is to establish both allergic and infectious ETD and OME in our rat model and measure the ability of CpG ODNs to modulate the products of the immune response in the middle ear. The second aim is to measure dynamic ET function using the same model and methods. We plan to use a similar model of allergy induced eustachian tube dysfunction used in project 2 above, except in addition an infectious component will also be introduced by administering transtympanic LPS during OVA challenge. After inducing a combined allergic and infectious eustachian tube dysfunction by previously established methods of subcutaneous

OVA sensitization and transtympanic OVA challenge and LPS, we will have a treatment group of rats that receive transtympanic CpG ODNs. We plan to measure products of the immune response in the middle ear such as IL4, IL5, IgE, IgG, and IL12 by ELISA in both treatment and control groups as well as measure dynamic ET function. We expect to see an attenuated Eustachian tube dysfunction in the treatment group as well as a biased Th1 immune response in the middle ear in the treatment group.

Dr. Grace Kim started in July, 2011. She is working in the laboratory of Dr. John Serody, of the Department of Microbiology and Immunology, in the Lineberger Cancer Center. Her project is investigating myeloid derived suppressor cells in the context of the HPV status of cancer patients. The myeloid cells surrounding the tumor are harvested and cultured, where they can be followed in suppressor function studies. Grace is the first of our research residents to receive one of the coveted NIH Loan Repayment Program awards. These highly competitive awards help to repay trainees' medical school loans, based on their continued participation in basic and translational research, and in academic medicine.

The trainees have been actively submitting papers for both their basic research and in the clinical arena, as well as attending a variety of conferences to present their work. Additional success in the program is evident in the number of applicants we have had from institutions outside UNC Chapel Hill, attesting to the national stature of the program and the strength of the research opportunities.

So far, in the first 9 years this grant has provided research support for 10 residents for 2-year research projects, 13 medical students for a 1-year research experience, and 15 medical students for a short-term (summer) research stint. Dr. Paul Manis, the Director of Research Training and Education, is the Program Director and Principal Investigator for this grant.

VISITING PROFESSORS

Every year the Department invites guest lecturers from across the United States and abroad to present a wide range of both clinical and research interest. These visiting professors also participate in our conferences during their visits. This year we welcomed twelve exceptional speakers.

Timothy L. Smith, MD, MPH, FACS

Chief, Division of Rhinology and Sinus Surgery
Director, Oregon Sinus Center
Director, Clinical Research
Otolaryngology/Head and Neck Surgery
Oregon Health and Science University
Portland, Oregon

November 30 - December 1, 2010

*Evidence Based Medicine and Selecting Patients
for Sinus Surgery*

Endoscopic Frontal Sinus Surgery

Jonas Johnson, MD

Professor and Chair
Department of Otolaryngology
University of Pittsburgh School of Medicine
Pittsburgh, Pennsylvania
December 14-15, 2010

*The Importance of Surgery in the Era of
Chemoradiation Therapy*

*Contemporary Challenge of Integrating New
Knowledge and Technology into Today's
Practice of Medicine*

Randal S. Weber, MD

Professor and Chairman
Otolaryngology/Head and Neck Surgery
University of Texas, MD Anderson Cancer Center
Houston, Texas

January 25-25, 2011

*Improving the Quality of Head and Neck
Cancer in the U. S.*

*The Role for Salvage Surgery for Head and
Neck Cancer*

Mark Wax, MD

Professor
Otolaryngology/Head and Neck Surgery
Oregon Health and Science University
Portland, Oregon

February 22-23, 2011

Lifelong Learning from Residency to Emeritus

Technological Advancements in Otolaryngology

Cliff Megerian, MD

Professor and Vice Chairman
Otolaryngology/Head and Neck Surgery
Director of Otology, Neurotology, and Lateral Skull
Base Surgery
University Hospital/Case Western Reserve University
Cleveland, Ohio

March 8-9, 2011

*Mechanisms of Hearing Loss in the Hydropic
Mouse Model*

*Endolymphatic Sac Tumors: Medical and
Surgical Implications*

Noam A. Cohen, MD, PhD

Assistant Professor
Otorhinolaryngology/Head and Neck Surgery
University of Pennsylvania Health Systems
Philadelphia, Pennsylvania

March 22 - 23, 2011

*Altered Cilia Function in Chronic
Rhinosinusitis*

*Topical Therapies for Recalcitrant Chronic
Rhinosinusitis*

Michael McKenna, MD

Professor of Otolaryngology and Laryngology
Harvard Medical School
Boston, Massachusetts
April 5 - 6, 2011

Progress toward understanding the Etiology of Otosclerosis and Implications for Future Treatment

Evolution and Management of Vestibular Schwannomas

Bruce H. Haughey, MD

Professor, Otolaryngology/Head and Neck Surgery
Director, Division of Head and Neck Surgical Oncology
Washington University
St. Louis, Missouri
May 24 - 25, 2011

Surgical Management of Supraglottic Malignancy 2011

Surgical Options for Oropharynx Cancer in the HPV Era

James Y. Suen, MD

Professor and Chairman
Otolaryngology/Head and Neck Surgery
University of Arkansas for Medical Sciences
Little Rock, Arkansas
April 19 - 20, 2011

Vascular Anomalies: What You Need to Know
Diagnosis and Management of Vascular Malformations

Wendell Yarbrough, MD

Associate Professor,
Otolaryngology/Head and Neck Surgery
Vanderbilt Ingram Cancer Center
Vanderbilt University
Nashville, Tennessee
June 7 - 8, 2011

Translational Cancer Research: How to Impact Therapy of HNSCC
LZAP, NF-kB, and Cancer

Dennis H. Kraus, MD

Professor, Department of Otorhinolaryngology
Cornell University Medical Center
New York City, New York
May 10 - 11, 2011

Temporal Bone Resection A Head and Neck Surgeon's Perspective
A Comprehensive Review of Management of the Neck: The Evolution Continues

David White, MD

Director, Division of Pediatric Otolaryngology,
Otolaryngology/Head and Neck Surgery
Medical University of South Carolina
June 21 - 22

Laryngeal Obstruction in the Neonate
Evaluation and Treatment of Velopharyngeal Insufficiency



ENT residents listen to Dr. Bruce Haughey during his visiting professorship

FELLOWSHIP PROGRAMS

PEDIATRIC OTOLARYNGOLOGY FELLOWSHIP PROGRAM

As the Division of Pediatric Otolaryngology grows, there has clearly developed an excellent opportunity for training at the fellow level. Dr. Austin Rose serves as founder and Director of the Pediatric Otolaryngology Fellowship Program, which began in 2009 with Dr. Laura Rosenthal as our first fellow. She earned her MD from the University of Illinois, followed by residency training in Otolaryngology-Head & Neck Surgery at the Henry Ford Hospital in Detroit. She is interested in all aspects of pediatric otolaryngology, but has particular interests in the management of patients with craniofacial anomalies, such as cleft lip and palate. After a very successful year, Dr. Rosenthal completed her fellowship here at UNC on July 1, 2010 and went on to Chicago where she joined the faculty as an Assistant Professor at Loyola University.

After graduating from our residency program, Dr. Alisha West followed Dr. Rosenthal as the next fellow in July of 2010. We know Alisha well from her great work as a resident here at UNC, and were thrilled at the opportunity to continue working with her during her training at the fellowship level. Upon completion of her fellowship here at UNC, Dr. West was appointed to the faculty at the University of California – Los Angeles.

On July 1st, 2011 we were privileged to welcome Dr. James Ruda to the fellowship program. He joined us, having just completed his residency at the prestigious Cleveland Clinic in Cleveland, Ohio. He looks forward to a broad experience in Pediatric ENT including several week-long rotations with our colleagues in Pediatric Plastic & Reconstructive Surgery for added experience with cleft lip and palate patients. Just two months into his fellowship, Jim has already authored an excellent chapter on the Evaluation and Management of Velopalatal Insufficiency which will be featured in the upcoming edition of Otolaryngology Clinics – Pediatric Otolaryngology Challenges in Multi-System Disease.

As the only Pediatric Otolaryngology Fellowship in the state, the program helps to bolster the Division's position as the premier group for Pediatric Otolaryngology care and training in North Carolina. UNC is home to a free-standing Children's Hospital, Pediatric Airway Center, Craniofacial Center, and Pediatric Cochlear Implant Program, offering pediatric otolaryngologists entering the field many ways to get involved and expand upon their residency training. In addition to clinical responsibilities, there are also opportunities for research, as well as rotations in pediatric anesthesia, pediatric pulmonary medicine and pediatric genetics. With three full-time faculty and approximately 2000 cases per year in the Children's Hospital OR and Ambulatory Care Center outpatient operating rooms, the position offers a great deal of clinical and operative experience.



James Ruda, MD



Alisha West, MD



Laura Rosenthal, MD

NEUROTOLOGY FELLOWSHIP

The Division of Otolaryngology/Neurotology of the Department of Otolaryngology/Head and Neck Surgery has opened and filled the position of a Neurotology Fellow. Dr. Oliver Adunka will serve as the fellowship director. The fellowship will provide the unique opportunity to train with the Department's busy neurotologists, Drs. Buchman, Adunka, and Pillsbury. We are very fortunate that we were able to attract Benjamin Wei, MD, PhD, FRACS from Melbourne, Australia, who started this position in April 2011 and will stay until June 2012. Dr. Wei has established a mouse model to study the effects of cochlear implantation on patient's susceptibility to acquire meningitis. His work was pivotal in our understanding of meningitis development.

RHINOLOGY AND SKULL BASE SURGERY FELLOWSHIP

The Rhinology and Skull Base Surgery Fellowship began on July 1, 2011 and is co-directed by Drs. Adam Zanation and Charles Ebert. Drs. Brent Senior, American Rhinologic Society past-President, and Julie Kimbell comprise the remaining faculty. Our fellowship is a one-year fellowship program that provides comprehensive training in the medical and surgical management of sinonasal inflammatory disease, anterior and central skull base lesions (endoscopic and/or open management), allergic disease, and orbital pathology. Emphasis is also placed on research that ranges from basic science translational work to clinical trials. Our goal is to provide the highest-quality, broad-based training that will impart fellows with the knowledge and expertise to develop a successful tertiary Rhinology/skull base surgery practice.

ADVANCED HEAD AND NECK ONCOLOGY

The Department of Otolaryngology/Head and Neck Surgery will open an Advanced Head and Neck Oncology Fellowship on July 1, 2013, with Travis Newberry, MD as fellow. Co-directors of the fellowship, Drs. Trevor Hackman and Adam Zanation, are pleased to offer this unique one-year opportunity, which will provide the highest quality training in the medical and surgical management of all areas of Head and Neck Oncology. This includes ablative aerodigestive tumor surgery, transoral laser and robotic surgery, endocrine surgery, skull base oncology, facial reconstructive surgery and microvascular surgery.

THE JUDITH GRAVEL FELLOWSHIP IN PEDIATRIC AUDIOLOGY

In 2010 the UNC Pediatric Audiology program was invited by Hear the World Foundation to host an annual fellowship named for the late Judith Gravel who died in 2009. Dr. Gravel was recognized internationally for her expertise in pediatric audiology and her commitment to the advancement of educational opportunities for clinicians and students. The Gravel Fellowship is awarded each year to a 4th year AuD student whose externship is at UNC Hospitals, focusing on the needs of infants and young children with hearing loss and their families. The first Gravel Fellow was Nicole Suddeth from UNC and the 2011-2012 Fellow is Ashley Timboe from the University of Washington, Seattle. Applications are being reviewed for 2012-2013.

OUTREACH

UNC-LED TEAM TRAVELS TO VIETNAM

By *Drs. Michael E. Stadler, MD and Deidra A. Blanks*

Early April 2011, through the sponsorship of Resource Exchange International –Vietnam, Dr. Brent Senior, MD, FACS from the University of North Carolina at Chapel Hill participated in his 14th humanitarian mission to Vietnam. He led our team of 11, including AAO-HNS members Drs. Michael Sillers, Robert Cullen, Gi Soo Lee, Lamont Jones, Harold Pine, and resident members Drs. Michael Stadler, Deidra Blanks, and Robert Deeb. We also had the pleasure of being joined by otolaryngologist Dr. Do-Il Kim from South Korea and Dr. Cynthia Tung, a pediatric anesthesiologist from Boston.

Our team spent a week working at six different hospitals, both in Ho Chi Minh City and Hanoi. Dr. Senior performed the first Minimally-Invasive Pituitary Surgery (MIPS) in Ho Chi Minh City at the Gia Dinh Hospital, which was broadcast and translated in real-time to a large satellite audience in hopes of helping teach the technique for future implementation. In addition, we worked alongside the local Vietnamese Otolaryngology surgeons to workup and perform over 20 procedures, including complex head and neck cancer surgery, chronic ear, pediatric, and revision sinus surgery. While the facilities and equipment may not have always been ideal for the complexity of surgical procedures performed, the creativity and ingenuity of the host surgeons and our team always seemed to prevail. From this aspect, much



Drs Brent Senior, Deidra Blanks, and Michael Stadler

of the learning on the mission was done on our end, as we were continually amazed at the amount that could be accomplished with only limited resources.

In addition to treating patients, a large component of the mission was based on the exchange of information. Our team members gave six hours of fully-translated, daily lectures with lively accompanying discussions that followed. As residents, we also had the unique opportunity to have a dedicated question and answer session with the Otolaryngology residents from Vietnam so that we could each share the unique experiences as trainees in our respective systems of education. These interactions were truly amazing and a wonderful component to the trip.

It was quite helpful for all of us to have the knowledge and perspective of Dr. Senior, and his long history of 14 previous mission trips to the country. We left Vietnam not only amazed at the country's astounding beauty, but also quite impressed with the advances that it continues to make with respect to its delivery of Otolaryngology healthcare. We were so honored to have the opportunity to participate in our own small way towards this growth, and thank the AAO-HNSF Humanitarian Efforts Committee and Alcon for the grants that helped make this happen.

Drs Brent Senior, Deidra Blanks, Michael Stadler, are pictured here with the Research Exchange International group. Drs Robert Cullen (past UNC ENT resident) and Harold Pine stand in back row.



MALAWI SURGICAL INITIATIVE



In August 2009, the Kamuzu Central Hospital accepted the first class of general surgery residents, Gift Mulima, Rahim Ibrahim and Tiyamike Chilunjike. The program was the culmination of years of effort by Dr. Arturo Muyco, the Chief of General Surgery at KCH, and its collaborative effort with the UNC Departments of Surgery and Otolaryngology/Head & Neck Surgery and the Haukland University Hospital (Bergen, Norway) Departments of Surgery and Orthopedic Surgery.

Chifundo Kajombo, Enock Ludzu and Judith Mkwaila joined the program as categorical general surgery residents in 2011, along with Boston Munthali and Kumbukani Manda, who will move to orthopedics after completing 2 years of general surgery training. This year, Charles Mabedi came to the program as a categorical general surgery resident.

The College of Surgeons of Southern, Eastern and Central Africa (COSECSA) certifies general surgery training programs in this region, and initially granted a 2 year provisional certification. In August 2011, representatives of COSECSA came to KCH for a site visit, leading to a full 5 year accreditation for the program. In addition, KCH has been approved to train orthopedic residents for at least one year.

The PGY3 resident took the written Masters of the College of Surgery (COSECSA) exam in September 2011 and will take the practical exam in December 2011. Upon passing these exams, they will be awarded Masters of the College of Surgery and will be eligible for Fellowship after completing the final three years of residency.

Drs Carol Shores and Anthony Charles (Assistant Professor, UNC Department of Surgery, Division



Carol G. Shores, MD, PhD

of Acute Care Surgery) attended the COSECSA regional meeting in August 2011 in Malawi, and will be inducted into COSECSA at the Annual meeting in Lusaka Zambia in December 2011.

In past years, several visiting UNC affiliated surgeons have come to KCH to help teach the surgery residents in the clinic, wards, operating theater and classroom.

- Timothy Weiner, MD, Professor of Surgery, Division of Pediatric surgery provided instruction in pediatric surgery in April 2011.
- Joseph Fulton, MD, Assistant Professor of Surgery, Division of Vascular Surgery spent the month of May 2011 in Malawi with his wife and children, teaching the surgery residents how to perform arterovenous fistulas for vascular access for dialysis.
- Carlton Zdanski, MD, Associate Professor UNC Department of Otolaryngology/Head & Neck Surgery and Krishna Patel, MD former resident of the Department of Otolaryngology/Head & Neck Surgery (currently at Medical University of South Carolina) had their second visit to

KCH in June 2011, building on the base of teaching in cleft lip and palate repair and pediatric otolaryngology.

- Kamil Erfanian, MD Assistant Professor Department of Surgery Division of Plastic and Reconstructive Surgery and Shay Dean MD, former UNC Division of Plastic and Reconstructive Surgery fellow (now in private practice, Los Angeles, CA) reinforced training in cleft lip and palate repair in September 2011 and began teaching the residents how to care for burn patients, both acutely and longer term contracture management.

This year, KCH designated and remodeled an area of the hospital as a pediatric and adult burn unit. Michelle Kiser, MD, PGY3 UNC Department of Surgery and her family are living in Malawi this year. Dr.Kiser is studying effective methods of burn management and pain control in this low-income setting. Two clinical officers and two nurses are being specially trained to staff this unit, and the surgery residents will be trained in acute and long term care of burn patients.



FREE ORAL, HEAD & NECK CANCER SCREENING AT UNC

The Multidisciplinary Head & Neck Oncology Program at UNC Health Care participated in the annual Oral, Head & Neck Cancer Awareness Week May 8-14, 2011 sponsored by the Head and Neck Cancer Alliance. Free head & neck cancer screenings were provided in the ENT Clinic at UNC Hospitals on Wednesday May 11th, 2011 from 1-4pm, without an appointment. The screenings were provided by Drs. Mark Weissler, Carol Shores, Trevor Hackman, and the residents of the Department of Otolaryngology. In the lobby of UNC Hospitals, staff of the multidisciplinary team provided information about Head and Neck cancer, including smoking cessation and nutrition.



"In this era of emphasis on cost effective medicine, it is increasingly important for people to take responsibility for their own health through healthy living and the avoidance of tobacco and excessive alcohol," says Dr. Weissler.

40,000 Americans will develop an oral, head and neck cancer this year. Warning signs and symptoms for oral, head and neck cancer include ulcers in the mouth that will not heal, a lump in the neck, difficulty swallowing, or a change in voice. Risk factors include smoking or

chewing tobacco, alcohol consumption, and a history of cancer in the affected area.

In this era of emphasis on cost effective medicine, it is increasingly important for people to take responsibility for their own health through healthy living and the avoidance of tobacco and excessive alcohol says Dr. Weissler. Screening clinics such as this, are one way to increase awareness and to educate people about healthy living.



Pictured from left to right are Shannon Boughton, RN, Carol Shores, MD, Adam Zanation, MD, Mark Weissler, MD, Mitchell Gore, MD, Trevor Hackman, MD, Sean Gallagher, RN, BSN, MA (Nurse Navigator), Karen Short, RN and Joseph Roche, MD



Clinical Programs

CLINICAL PROGRAMS

PEDIATRIC OTOLARYNGOLOGY

The Division of Pediatric Otolaryngology includes three fellowship-trained pediatric Otolaryngologists: Amelia F. Drake, MD; Carlton J. Zdanski, MD; and Austin S. Rose, MD. Together, they care for infants and children with problems relating to the ears, nose and throat. They see patients in the NC Children's Hospital, the UNC ENT Clinic in the North Carolina Neurosciences Hospital and the UNC Ear, Nose & Throat Clinic at Carolina Pointe.

Many children presenting to UNC have complicated medical problems and multi-system diseases that require the careful coordination of physicians and specialists in different disciplines. For this reason, our work in Pediatric Otolaryngology is often carried out in conjunction with other providers in the fields of Pediatric Pulmonary Medicine, Pediatric Anesthesia, Pediatric Gastrointestinal Medicine and Pediatric Hematology-Oncology, as well as Pediatric Speech & Language Pathology and Audiology. Over the last few years, the North Carolina Children's Airway Center, directed by Dr. Zdanski, has helped to better organize and facilitate this coordination of care. In a similar manner, the UNC Craniofacial Clinic, led by Dr. Drake and housed in the UNC School of Dentistry, has helped to coordinate the care of patients with cleft lip and palate and other craniofacial disorders from the entire Southeast United States, and as far away as Switzerland, since 1963.

In addition to their clinical work, the faculty of the Division of Pediatric Otolaryngology dedicates

significant time to both teaching and research responsibilities. Dr. Drake serves as the Department's Residency Program Associate Director and both Drs. Rose and Zdanski serve on the American Board of Otolaryngology's Task Force for New Materials. In addition, Dr. Rose is a current Course Co-Director of the annual Newton D. Fischer Society meeting and Director of the Division's Pediatric Otolaryngology Fellowship Program.

Recent publications have included research in the areas of pediatric tracheotomy, noise-induced hearing loss, the radiographic appearance of esophageal foreign bodies, the use of high-resolution ultrasound in the diagnosis of pediatric recurrent respiratory papillomatosis and the description of a new approach to the treatment of sinonasal giant cell granuloma.



In addition to work recognized both locally and nationally, the Division has been well represented internationally, with presentations to audiences overseas, such as at the International Cleft Congress in Brazil in

September 2009 and the European Society of Pediatric Otolaryngology in Pamplona, Spain in 2010. They participate in medical mission trips to Malawi, the West Bank and Vietnam. The faculty has also worked to strengthen its ties with international colleagues in Pediatric Otolaryngology by hosting a number of visiting physicians from around the world, including the United Kingdom, Israel and Thailand.

As in the past year, the future should prove exciting for the Division of Pediatric Otolaryngology as it continues to provide state of the art care, expand its services and renew its commitment to research and education in the field.

THE NORTH CAROLINA CHILDREN'S AIRWAY CENTER

The North Carolina Children's Airway Center again helped The North Carolina Children's Hospital achieve a ranking of 10th in the nation among children's hospitals caring for children with respiratory disorders and to help the Department of OHNS to its top 20 ranking in Ear, Nose, and Throat Disorders by US News & World Report in their 2011 issue of America's Best Children's Hospitals. The Center was awarded a generous grant from The Duke Endowment from 2007 to 2010 for the creation of a center to care for children with complex congenital or acquired airway problems and it continues to grow in clinical, educational, and research endeavors.

The Center is a unique endeavor, supported by the Department of Otolaryngology/Head and Neck Surgery, the Department of Pediatrics' Division of Pulmonology and includes members from across multiple divisions and departments within the UNC Healthcare system. The Center seeks first and foremost to provide comprehensive cutting edge care for children with these unique problems in an efficient and timely manner. Additionally, the Center instructs families, medical students, clinicians and healthcare providers, and supports research in pediatric airway disorders. The North Carolina Children's Airway Center officially opened its doors in September 10, 2007. Since then, hundreds of children have been evaluated and treated by the multi-disciplinary team, multiple protocols established for the evaluation of children with airway problems, several collaborative research projects have been established and grants awarded, and multiple presentations at national, state, and local level given. In addition, the Carolina's Pediatric Airway Course has been established in collaboration with the Medical University of South Carolina teaching residents and practicing surgeons within the Southeastern United States. Outreach efforts extend to Africa where Dr. Zdanski is visiting faculty, Department of Surgery, Kamuzu Central

Hospital, Lilongwe, Malawi and involved in the teaching of airway endoscopy and surgery to surgical residents and clinical officers.

The Center's core organizational structure includes Surgical Director Carlton J. Zdanski, MD; Medical Director George Retsch-Bogart, MD; Respiratory Therapist Mark Hall, RT (currently performing military service in Iraq); Tracheostomy Nurse Cynthia Reilly, PNP; OHNS pediatric nurse Tonya Oakley; Speech Pathologists Leah Thompson, SLP, and Krisi Brackett, SLP; Administrative Coordinator Amanda Gee; Administrative Assistant Dawn Wilson; and Program Coordinator Kathy Abode, RN.

This past year, the NC Children's Airway Center was integral in helping the Department and University receive the 3.6 million dollar National Institutes of Health R01 grant, Predictive Modeling for Treatment of Upper Airway Obstruction in Young Children (HL105241-01). The grant is a multidisciplinary effort including the Department of OHNS, the Division of Pediatric Pulmonology in the Department of Pediatrics, the Department of Physics and Astronomy and will be enrolling patients from 2010-2014.

The North Carolina Children's Airway Center provides an individualized, coordinated approach to each patient and the full range of pediatric medical and surgical services, including otolaryngology, pulmonology, anesthesia, radiology, ICU care, feeding and swallowing, nutrition, tracheostomy care, social work, respiratory therapy, speech and communication, are available to patients of the Airway Center. The clinicians at the Center have an interest in caring for all children with airway problems, including those with existing tracheotomies or with new airway problems. If you have a patient you would like to refer to the North Carolina Children's Airway Center, please feel free to contact the OHNS Clinic at 919-966-6485 and ask for Tonya Oakley, RN, or call the Consultation Center at 800-862-6264, and request Dr. Zdanski.

FACIAL PLASTIC AND RECONSTRUCTIVE SURGERY



Dr. William W. Shockley and Elaine Hinkle, RN

The Division of Facial Plastic and Reconstructive Surgery offers services for patients with reconstructive and cosmetic problems related to the face, ears and neck. Resident education is a top priority, focusing on the principles of soft tissue surgery, facial plastic surgical techniques and the management of patients with these special needs.

Rhinoplasty Clinic

In recent years we have established a Rhinoplasty Clinic devoted to patients with post-traumatic nasal deformities, congenital nasal anomalies, patients with nasal valve problems, and patients who have nasal obstruction and/or cosmetic deformities. The clinic offers a wide range of reconstructive procedures including rhinoplasty, septorhinoplasty, nasal valve repair and correction of other deformities such as saddle nose deformities and soft tissue injuries. The most significant change that we have seen in the past couple of years is a significant increase in the number of revision cases that are referrals to UNC, especially with respect to septorhinoplasty and nasal valve repair.

Microtia Program

Our Microtia Program has been remarkably successful. Dr. Shockley and Dr. Zdanski offer a multidisciplinary approach to the treatment of these complex congenital anomalies. Patients are seen initially by both Dr. Zdanski and Dr. Shockley. Management decisions are made as to whether further anatomical imaging will be required with respect to their atresia abnormalities. Those with multiple anomalies and clinical syndromes are managed through the Craniofacial Clinic. Hearing evaluation by Audiology is critical in these young children and our Otolaryngology colleagues play a critical role in this process. Once the patient has been fully evaluated, the family can be counseled about the multiple options that exist with respect to aural rehabilitation. Luckily, many patients have a normal ear on the opposite side with normal hearing on that side. Once the patient is deemed a candidate for microtia repair the optimal age and timing of the repair is outlined for the family. In most patients this is at 6–8 years old.

For Grade III microtias we are using the traditional four stage technique popularized by Dr. Burt Brent. We now have several children in the program at various stages of their reconstructive procedure. We have found many advantages to the two-team approach including saving operating time by being able to operate on two sites simultaneously. This allows harvesting the rib graft while removing the cartilaginous remnant and creating an appropriate recipient pocket for the auricular framework. In addition we offer two esthetic perspectives with respect to the shape and size of the final reconstructed cartilaginous framework. We have been very pleased with the early success of this program and are grateful to our referring physicians.

Facial Plastic Surgery Clinic

The Facial Plastic Surgery Clinic sees a wide range of patients. Through this clinic we manage patient with post-traumatic facial deformities, facial scars, skin cancer and Mohs defects, long standing facial paralysis, and those that have had reconstructive or cosmetic surgeries elsewhere with unsatisfactory results. For those patients with cosmetic concerns, proper skin care, Botox and

fillers may allow for improvement with minimal to no downtime. For others, facial cosmetic surgery may be the best method for facial rejuvenation. These procedures include brow lift, face lift, blepharoplasty, mentoplasty, and other facial plastic procedures. With the increased incidence of skin cancer and the improved access to Mohs surgery a number of patient are seen with facial and nasal defects. Those with nasal, lip and ear defects present special anatomical problems, given the unique configuration of these specialized structures. Patients with major nasal defects may require multi-stage procedures, such as forehead flaps, cartilage graft reconstruction, and repair of internal nasal lining defects. Even patients with major rhinectomy defects following resections for life threatening and advanced cancers have been successfully reconstructed using multi-staged procedures to rebuild the surrounding cheek and, lip, along with their nasal defects.

Resident Education

Resident education remains one of the primary goals of the Division of Facial Plastic and Reconstructive Surgery. We typically have two conferences per month devoted to Facial Plastic Surgery. We are blessed to have many physicians involved with the education of our residents. In

addition to the lectures and discussions provided by Dr. Shockley we also have many others who contribute each year. Special recognition goes to Dr. Madison Clark who comes three to four times a year from his practice at Alamance

Regional Hospital, providing superb presentations relating to the many facets of facial plastic surgery. Other practitioners who contribute on a regular basis include Dr. Cynthia Gregg (Cary), Dr. Charles Finn (Chapel Hill), and Dr. Jeff Kilpatrick (Pinehurst) and Dr. Brian Downs (Morganton).

We also have visiting professors who offer a special expertise in facial plastic surgery. In recent months we had Dr. James Suen (University of Arkansas) who provided us with a tremendous amount of information relating to hemangiomas and vascular malformations.

In addition to lectures and didactic discussions we also take the residents through a popular facial plastic surgery text, reviewing chapters over a wide range of subjects.

We typically provide a Review Course in Facial Plastic Surgery in the spring. This is done in conjunction with Neal Goldman at Wake Forest University School of Medicine. The course is open to Otolaryngology residents and Plastic Surgery residents, as well as fellows in Plastic Surgery and Ophthalmic Plastic and Reconstructive Surgery.



Dr. Baishakhi Choudary instructs medical students during a soft tissue course

RHINOLOGY, ALLERGY AND SINUS SURGERY

Sinusitis is one of the most common diseases occurring in the United States with nearly 36 million cases diagnosed every year. Originally established in 1979 by W. Paul Biggers, MD, and Libby Drake, RN, the Division of Rhinology, Allergy, and Endoscopic Skull Base Surgery provides a complete range of services for management of sinusitis, allergy, and tumors and other diseases affecting the skull base. These services include the latest in medicine, immunotherapy, and surgery.

The Division is led by Brent A. Senior, MD, with other members including Adam M. Zanation, MD; Charles S. Ebert, MD; Harold C. Pillsbury, MD; Brett E. Dorfman, MD (WakeMed); and Michael O. Ferguson, MD (WakeMed). Together, they perform a full range of minimally invasive surgery for management of diseases of the nose and paranasal sinuses, including Functional Endoscopic Sinus Surgery (FESS), a minimally invasive technique used to restore sinus ventilation and normal function in the setting of chronic infection. Recent advances in these minimally invasive techniques developed by UNC surgeons now allow for performance of endoscopic surgery for many tumors of the nose and sinuses and skull base, including, tumors extending into the orbit and brain. Recent technological applications, including the latest in powered instrumentation and drills, computer image guidance, and balloon sinus dilation, aid in these techniques and provide significant advantages over traditional approaches. In addition, the division was among the first in the world to obtain and utilize intraoperative CT imaging for real-time surgical use.

As a leader in the field, the Division is proud to treat extremely complicated sinonasal inflammatory disorders such as allergic fungal rhinosinusitis. Allergic Fungal Sinusitis (AFS) is a refractory subtype of chronic rhinosinusitis, and is noted for its difficulty to manage through typical medical regimens. Almost universally, a diagnosis of AFS requires operative intervention, with the

goals of removing anatomic obstruction, clearing infection and inflammatory debris from the sinus cavities, creating patent sinus outflow tracts, and preserving the mucociliary function of healthy sinonasal mucosa. Our Division has become a leading innovator of postoperative adjuvant medical therapy for AFS. This treatment may include the use of systemic and topical corticosteroids in irrigation solution or gels, immunotherapy directed at fungal-specific antigens, and/or systemic and topical antibiotics. The efficacy of these regimens is variable and the goal is to lengthen the time to recurrence rather than to cure the underlying disease. Therefore, long-term follow-up with serial physical and endoscopic examination is necessary to monitor for disease progression.

Gina Stoffel, RN at our Main Campus clinic with Robin Gunter and Joanne McClain RN at our Carolina Pointe facility provide full allergy service to over 400 patients a month. The opening of the Carolina Pointe satellite clinic has been a great success providing unparalleled walk-up convenience and free parking right at the front door. New testing methods including the multi-test 11 screen, have opened doors for diagnosis in younger children, while the imminent initiation of sublingual immunotherapy (SLIT), allowing shots to be given as drops under the tongue, will allow for painless treatment of children and adults who are apprehensive about traditional allergy injection therapy.

We are also leaders in the use of in-office minimally invasive surgical treatments for sinusitis. One such technology is balloon catheter dilation of the sinus openings. This technology allows for a thin balloon catheter (similar to an angioplasty catheter for the heart) to be placed into the opening of a sinus and inflated. When the sinus balloon catheter is inflated, it gently restructures and dilates the opening of the passageway while maintaining the integrity of the sinus mucosal lining. Thus, patients avoid general anesthesia and have quicker recovery times.

A major activity of the Division is co-sponsorship of educational programs in rhinology, sinus and endoscopic skull base surgery. One such effort is the Southern States Rhinology Course held each spring on Kiawah Island, South Carolina. Jointly sponsored by the Medical

University of South Carolina, Georgia Health Sciences University, Emory University, and the Georgia Nasal and Sinus Institute, the course attracted over 80 participants from around the world in addition to over 30 residents. The course provided an opportunity to participate in laboratory dissections while hearing renowned rhinologists over the course of this two-day meeting. The next course will take place May 3-5, 2012; more information on this annual course can be found at www.southernstatesrhinology.org.

In 2011, the Division sponsored the first 360 Degree UNC Skull Base Surgery Course. This course brought 24 senior residents and fellows from all over the nation. Residents from Neurosurgery and Otolaryngology were paired in a novel team approach to learning and dissections. The course encompassed both endoscopic and transcranial approaches. This plans to be an annual course housed at UNC and was very well received by all attendees.

Research remains a major focus for the Division.

This year, numerous residents and medical students participated in Division research activities resulting in several presentations at major national and international otolaryngology meetings including the Annual Meeting of the AAO/HNS, the Annual Meeting of the American Rhinologic Society, the Annual Meeting of the North American Skull Base Society, as well as the Combined Otolaryngology Section Meeting. Cooperative work with the Division of Pulmonary Medicine is ongoing and yielding new insights into the molecular basis of inflammatory diseases of the nose and paranasal sinuses. In addition, we have an ongoing collaborative project with the Department of Biostatistics in the UNC Gillings School of Public Health to specifically characterize the genetic expression profiles of patients with Allergic Fungal Rhinosinusitis through a comparative analysis of healthy and diseased specimens of sinonasal mucosa. Through both of these collaborations, we have received funding through the North Carolina Translational and Clinical Sciences Institute funded through Clinical and Translational Science Awards. Other topics of division research have included investigations in the use of image guidance

during endoscopic surgery, cost effective analyses of endonasal, endoscopic surgical approaches to the skull base versus traditional open approaches, attempting to quantify the impact of Functional Endoscopic Sinus Surgery and endoscopic skull base surgery via patient-rated quality of life (QOL) measures, examine the use of specific strains of probiotics in the prevention and treatment of allergy-induced Eustachian tube dysfunction, as well as the treatment of otitis media with effusion using CpG oligodeoxynucleotides in an allergic rat model, leading to numerous grants, submitted manuscripts and publications in peer-reviewed journals.

Julie Kimbell, PhD who joined the Division in 2010 as a researcher, has developed several cutting edge projects in the realm of computer modeling of airflow through the nasal cavity and paranasal sinuses in healthy noses and in the presence of sinus and nasal disease. Her work has also helped us to understand how medications are distributed in the nose and sinuses as well as the potential impact of airflow on disease development or progression.

As a result of the Division of Rhinology, Allergy, and Skull Base Surgery's leadership in the realm of nasal, sinus, and skull base disease, UNC Otolaryngology/Head and Neck Surgery was named the first recipient of a National Center of ENT Excellence Award in 2004 by BrainLAB, AG, of Munich, Germany, one of the world's leading image guidance technology companies.

Treatment of Snoring and Obstructive Sleep Apnea

Snoring is a ubiquitous problem in the United States, affecting more than 50% of middle aged men and 40% of middle aged women. Obtrusive snoring can be associated with more severe medical conditions, including obstructive sleep apnea, or upper airway resistance syndrome (UARS), and treatments for these disorders of sleep are needed to prevent long-term problems with heart and lung disease.

For simple snoring, not associated with OSA or UARS, radiofrequency treatment of the palate is our procedure

of choice. Now available in the United States for over 10 years, it is a time tested office-based procedure that is fast, with little pain, and rapid recovery. The procedure involves the placement of a tiny needle electrode into the palate, delivering radiofrequency energy in the form of heat energy to the surrounding tissue. Research performed in the Department has resulted in an alteration of the technique yielding fewer treatment sessions and improved outcomes. Indeed 70% of patients will be cured after two treatment sessions using our technique, while the side effects of this procedure are minimal. The relatively minor amount of post-procedure pain is the major advantage of this technique over other snoring therapies. And as opposed to other minimally invasive treatments, no implants are required with no risk of implant extrusion.

Obstructive Sleep Apnea Treatments

Nearly one-fourth of middle-aged men and one-tenth of middle-aged women have problems with sleep disordered breathing ranging from simple snoring to severe breathing disorders during sleep, such as obstructive sleep apnea. In addition to excessive daytime sleepiness, obstructive sleep apnea has been associated with increased risk of several serious medical problems including hypertension, heart attack, stroke, and even premature death, mandating diagnosis and treatment. For diagnosis, surgeons in the Department of Otolaryngology/Head and Neck Surgery perform a careful upper airway evaluation, including an upper airway endoscopic exam, while working with a multi-disciplinary team of sleep medicine specialists in the Departments of Neurology and the Division of Pulmonary Medicine, as well as dentists from the University of North Carolina School of Dentistry, and surgical colleagues in the Department of Oral and Maxillofacial Surgery, work to develop a personalized treatment plan for patients with sleep apnea. Options for treatment and services provided include the following:

Septoplasty

Septoplasty consists of manipulation of the bone and cartilage of the center wall of the nose, allowing for the repair of deviations causing nasal obstruction. Avoiding the need for packing of the nose or placement of splints makes this outpatient operation a remarkably painless procedure

with rapid recovery. In some cases the procedure may be combined with turbinate reduction allowing for the reduction of the bulky tissues on the side wall of the nose contributing to nasal blockage, performed either in the office or in the operating room.

Radiofrequency Tongue Base Reduction

Patients with obstructive sleep apnea frequently have obstruction at the level of the tongue base. Many procedures are available to improve this obstruction, including genioglossus advancement, hyoid suspension, mandibulomaxillary advancement, and tongue base reduction using radiofrequency.

Radiofrequency tongue base reduction is a minimally invasive procedure utilizing radiofrequency energy to heat tissue surrounding a small needle which is inserted into the tongue base. The heated tissue is resorbed by the body, creating a small area of scar, thereby reducing the size of the tongue base. This procedure has proven safe with few complications, as well as effective by several studies, in properly selected individuals.

Uvulopalatopharyngoplasty

Uvulopalatopharyngoplasty (UPPP) involves removing the uvula and portions of the palate and is frequently combined with tonsillectomy. This surgical procedure is usually performed with an overnight hospital stay and results in significant improvement in obstructive sleep apnea (OSA) which occurs in about half of all individuals undergoing the surgery.

Genioglossus Advancement and Hyoid Repositioning

Working with colleagues in the Department of Oral and Maxillofacial Surgery, genioglossus advancement is a procedure frequently performed for obstructive sleep apnea in the presence of blockage in the upper airway caused by the position of the back of the tongue. The procedure requires making an incision between the lower lip and the gum in the mouth. A small window of bone in the jaw is then cut and advanced slightly, thereby pulling the tongue forward and increasing the space in the breathing passage in the back of the throat. Repositioning of the hyoid bone over the front of the neck is frequently performed

at the same time as genioglossus advancement in order to augment its effect.

Pioneering Minimally Invasive Skull Base Tumor Treatments: Minimally Invasive Pituitary Surgery and Expanded Endoscopic Skull Base Surgery

In March 2000, Brent Senior, MD, along with Matthew Ewend, MD of the Department of Surgery, Division of Neurosurgery, became the first team in North Carolina to perform Minimally Invasive Pituitary Surgery (MIPS) to treat pituitary adenomas. In contrast to traditional open approaches, the nose is used as a corridor to the tumor, so no facial or oral incisions are involved, dramatically reducing the overall morbidity of the procedure. Sinus endoscopes are used to directly access and open the sphenoid sinus. The scope is held in position and the sella is then accessed using a typical two-handed technique. The tumor is removed using only the endoscopes, allowing for visualization at angles deep in the sella for removal of residual tumor that may otherwise be missed using microscopic approaches. Recovery is rapid and no packing is typically used. Tumor removal is potentially more complete given the ability of the angled endoscopes to see behind and under otherwise obstructing structures. "Hydroscopy," a technique developed by Drs. Senior and Ewend, is then performed in order to assess for residual tumor. Drs. Senior and Ewend have become recognized experts in this exciting area, lecturing nationally and internationally on the topic, in addition to authoring publications in several books and journals. They have performed over 400 of these procedures, placing University of North Carolina at the forefront of minimally invasive approaches to skull base tumors.

In 2008, Dr. Adam Zanation joined Dr. Senior in the Division of Rhinology following his fellowship in Minimally Invasive Skull Base Surgery at the University of Pittsburgh. Teaming up with Dr. Anand Germanwala in the Division of Neurosurgery, they are advancing minimally invasive skull base surgery to new and exciting levels for patients with a variety of skull base, brain, spine, orbital tumors, and even certain brain aneurysms. The

role of expanded endonasal skull base surgery is growing; allowing for treatment of more advanced skull base tumors. These tumors include sinonasal cancers, meningiomas, craniopharyngiomas, optic nerve and orbital tumors, and petrous apex lesions. In the last year, UNC performed over 100 expanded endoscopic tumor surgeries. In a very special case in 2008, Drs. Zanation and Germanwala performed the first endoscopic endonasal clipping of a ruptured aneurysm in the world. The one year follow up of this patient revealed complete obliteration of the aneurysm. The manuscript describing this novel approach has been accepted to the prestigious journal *Neurosurgery* and will be published in this up coming year. This case illustrates the potential of the minimally invasive endoscopic approach and shows that UNC is expanding the limits in this new field.

As techniques and experience lead us to utilize the endoscopic corridor for more complex skull base lesions, the natural progression is to utilize this approach for pediatric skull base tumors. Drs. Zanation and Senior along with our Pediatric Otolaryngology Attendings (Drs. Austin Rose and Carlton Zdanski) have successfully performed numerous pediatric skull base surgeries together. Dr. Zanation's lab has recently published one of the first papers on endoscopic pediatric skull base surgery and reconstruction in *Laryngoscope* 2009, which illustrates the hurdles and offers solutions that these pediatric cases present. Two additional follow-up manuscripts in pediatric endonasal and skull base surgery have been accepted for publication this past year. What is clear is that all pieces of this multidisciplinary puzzle are integral and needed to optimize patient care. Drs. Rose and Carlton Zdanski and the UNC Skull Base Surgery Program are all currently working together to provide the most advanced pediatric tumor care and advance the research in pediatric skull base tumor surgery.

Drs. Senior and Zanation are known nationally for their teaching efforts in the areas of pituitary and endoscopic skull base surgery. Both lecture and hold courses at the AAOHNS annual meeting, both are invited faculty for national and international skull base meetings and course. UNC is planning our first Skull Base Surgery Course for the up coming year.

THE UNC MULTIDISCIPLINARY HEAD & NECK ONCOLOGY PROGRAM

The Multidisciplinary Head & Neck Oncology Program offers the full range of cutting-edge diagnostic and therapeutic techniques for the treatment of all benign and malignant tumors of the Head & Neck including, but not limited to, tumors of the oral cavity, pharynx, and larynx, soft tissues, thyroid, nose and sinuses, ear and temporal bone, skull base, salivary glands, and the cerebello-pontine angle. The Program's main goal is to cure head and neck cancer while maintaining optimal speech and swallowing function and achieving the best possible cosmetic result. We have extensive experience in minimally invasive endoscopic skull base surgery, transoral laser resection, transoral robotic surgery and microvascular free flap reconstruction. A Minimally Invasive Head and Neck Surgery Center has been formed and is starting to support quality of life and functional outcomes research.

The team consists of surgeons, medical oncologists, radiation oncologists, pathologists, diagnostic and interventional radiologists, dentists, epidemiologists, prosthetic specialists, nutritionists, speech and swallowing specialists, nurses, and social workers. The exchange of knowledge and opinions among team members ensures that the best possible treatment plan is developed for each patient. Each week, the Program holds an interactive conference attended by Program members from each discipline. Mark C. Weissler, MD; William W. Shockley, MD; Carol Shores, MD, PhD; Adam M. Zanation, MD, and Trevor G. Hackman, MD, serve as the Program's Head & Neck oncologic surgeons. Dr. Bhishamjit Chera is the H&N radiation oncologist and Dr.'s David Neil Hayes, MPH, MD; Juneko Grilley-Olson, MD and Jared Weiss, MD serve as the H&N medical oncologists. Robert Hollowell, Jr., DDS, MS and Lauren Patton, DDS serve as the programs dental experts. This conference has the ability to be webcast around the state so that Head & Neck physicians elsewhere can participate directly and discuss their patients. Patients from Wake Med in Raleigh are also regularly presented at this conference.

Our weekly tumor board now routinely discusses over 35 patients per week, actively undergoing multidisciplinary cancer therapy at UNC. In 2009, 675 new patients came through the Multidisciplinary Head & Neck Cancer Program at UNC Hospitals.

The program now performs many ultrasound examinations in the ENT clinic for the evaluation and ultrasound guided needle biopsy of thyroid and other neck masses. Trans-nasal esophagoscopy and laryngeal video stroboscopy are also available for the evaluation of Head and Neck patients with special problems. Mr. Brian Kanapkey from speech pathology works hand in hand with the surgeons in the management of post-treatment speech and swallowing dysfunction. Dr. Glen Minsley from dental prosthetics assists our patients with prosthetic management of head and neck defects. Dr. Bill Shockley has a special interest in the rehabilitation of facial palsy resulting from cancer therapy.

Sean Gallagher, RN, MA and Susan Hayden, RN serve as our nurse navigators for head and neck cancer patients. They assist patients as they navigate through their complex treatment protocols. They work closely with the patients and their families to insure that they are well informed about the multiple treatment modalities utilized in modern cancer treatment.

Ms. Laura Lyndon Miller and Cynthia Smith are our program coordinators. They arrange for initial consultations at UNC from referring physicians, gathering all the outside medical information on these often complex patients.

Elizabeth Sherwood, RN, MS, ANP-C, assists with psychological support through the trying period of treatment and follow-up. She is the Coordinator of Survivorship Programs and helps our patients by providing support during and after treatment as they transition from active treatment to surveillance. We offer a Symptom Management Clinic, which assists with follow-up of medications (i.e., anti-depressant, anti-anxiety) and emotional/mental health issues, as well as the whole range of side effects folks deal with related to surgery, chemotherapy, and radiation.

Dale Flowers, RN, OCN serves as the Clinical Trials



Back Row: Glenda Blackwood, BA (Program Assistant Head & Neck/ Medical Oncology), and Drs. Mark Weissler and Bishamjit Chera (Radiation Oncology). Middle Row: Dr. D. Neil Hayes, Laura Lyndon Miller, Susan Hayden, RN (Nurse Navigator Head & Neck Oncology), Valerie Jewells, DO (Neuro Radiology), Dr. Rebecca Varley (Pathology), and Dr. Carol G. Shores. Front Row: Drs. Adam M. Zanation, Benjamin Huang, (Neuro Radiology), Sean Gallagher, RN (Nurse Navigator Head & Neck Oncology), Mary Fleming, NP (Nurse Practitioner Head & Neck Oncology), and Dr. Juneke Grilley-Olson (Medical Oncology).

Nurse and works with Dr. Neil Hayes and others in medical oncology to assist patients to navigate through the complexities of treatment on the wide variety of experimental protocols available.

Xiaoying Yin, MD, MS is a full time basic science researcher in the Head and Neck laboratory within the Lineberger Cancer Center. Dr. David Neil Hayes along with Dr.

Yin received a University Cancer Research Fund competitive grant in 2009 which continues to study Genomic Classification of Head and Neck Cancer in Paraffin Samples. The purpose of this research is to identify molecular fingerprints of clinically apparent subtypes of squamous cell cancer of the head and neck.

Each year we run a very successful oral cancer screening day. Under the auspices of the Head and Neck Cancer Alliance, formerly the Yul Brynner Foundation, physicians spend an afternoon in the Oto-HNS clinic screening the public for oral cancer and other diseases of the head and neck. The oncology nurse navigators and program coordinators put on an exhibit in the hospital lobby and provide information about head & neck cancer and smoking cessation. This was the busiest year ever, with over 100 people from 12 counties in North Carolina taking advantage of this special event.

Clinical Trials

The Head and Neck Oncology Program continues to strive for a goal of having at least one clinical trial open for all of the clinical cancer scenarios seen frequently in our group. Present open (and pending) clinical trials are listed below.

OPEN

- Phase II study of erlotinib, cisplatin and radiotherapy versus cisplatin and radiotherapy in patients with Stage III and IV SCCHN. First line trial
- Phase II Randomized Trial of the Combination of Cetuximab and Sorafenib or Cetuximab alone in Patients with Refractory, Recurrent and/or Metastatic Squamous Cell Carcinoma of the Head and Neck.
- Phase II Trial of Dasatinib for Recurrent or metastatic c-KIT expressing Adenoid Cystic carcinoma and for Non-Adenoid Cystic Malignant salivary Tumors.
- Phase II study to evaluate the pharmacokinetics and drug-drug interaction of Cetuximab and Cisplatin in patients with recurrent or metastatic Carcinoma of the Head and Neck
- A Randomized Phase II Study of Adjuvant Concurrent Radiation and Chemotherapy versus Radiation Alone in Resected High-Risk Malignant Salivary Gland Tumors
- A Phase II Study of Capecitabine and Lapatinib in Squamous Cell Carcinoma of the Head and Neck

PENDING

- Randomized Phase II Trial of Everolimus versus Placebo as Adjuvant Therapy in Patients with Locally Advanced Squamous Cell Cancer of the Head and Neck
- Phase II trial of Cediranib alone or Cediranib and Lenalidomide in iodine 131-refractory differentiated thyroid cancer
- A Phase II study of carboplatin, nab-paclitaxel and cetuximab for induction chemotherapy for locally advanced squamous cell carcinoma of the head and neck
- Phase I/II Clinical Trial Of Combined Re-irradiation With Pemetrexed And Erlotinib Followed by Maintenance Erlotinib For Recurrent And Second Primary Squamous Cell Carcinoma of the Head and Neck
- Identification of a Gene Expression Signature Profile for Panitumumab Sensitivity in Untreated Locally Advanced Squamous Cell Cancer of the Head and Neck
- Selective IMRT for Locally Advanced Head and Neck Carcinoma, with Concurrent Panitumumab

THE UNC ROBOTIC HEAD AND NECK SURGERY PROGRAM

In March 2010, Dr. Adam Zanation performed North Carolina's first Transoral Robotic Head and Neck Surgery (TORS). This surgery was the culmination of over 12 months of work to set up a Robotic Head and Neck Surgery Program with the help of the CARES (Computer and Robotic Enhanced Surgery) Center at UNC. In this past year, Dr. Trevor Hackman has also become credentialed in TORS, giving the UNC Department of Otolaryngology/Head and Neck Surgery two active TORS surgeons. Currently, UNC has performed robotic surgeries for transoral tumor resections, complex obstructive sleep apnea surgery and even skull base tumor surgery.

In December 2008, Dr. Zanation met with Dr. John Boggess of the Department of Obstetrics and Gynecology to discuss a future robotics program for Otolaryngology/Head and Neck Surgery. Dr. Boggess is internationally renowned for his techniques and research with robotic assisted surgery for Gynecologic

Oncology. With Dr. Boggess' mentorship and support, Dr. Zanation began training with the *da Vinci* Robotic Surgery System in the Fall of 2009. Our first patient had a base of tongue procedure without complications.

The *da Vinci* robotic surgery system is a three dimensional endoscope-based robot with three articulating instrument arms. As the surgeon operates, state-of-the-art robotic and computer technologies scale, filter and seamlessly translate the surgeon's hand movements into precise micro-movements of the *da Vinci* instruments. The primary advantage of the system is high definition 3D visualization, flexibility with complex instrument movements in tight spaces, and the ability to access areas of aerodigestive tract without incisions or splitting the mandible. This has the potential to reduce surgical morbidity and provide better patient functional outcomes.

Dr. Carlton Zdanski (Pediatric Otolaryngology) and Dr. Zanation have been working together on pediatric Transoral Robotic Surgeries. They performed the first reported Pediatric TOR surgery for a tumor and have in the last year performed two pediatric tumor TORS operations. The two of them, have also performed complex TORS for laryngeal cleft repair, down to 2 months of age. By combining the expertise in

pediatric otolaryngology and TORS/head and neck surgery, Drs. Zanation and Zdanski are hoping to advance the care of children that need minimally invasive surgery.

The UNC Robotics Program is currently seeing patients for selected head and neck cancers, tongue base related obstructive sleep apnea, and skull base tumors. Future research plans involve expanding robotic indications for skull base surgery and merging other technologies with the robotic interface. For patient referrals call Laura Miller at the Head and Neck Oncology Program at 919-966-9717.



Drs Adam M. Zanation and Carlton J. Zdanski stand in front of the daVinci robot

SPEECH PATHOLOGY: THE HEAD AND NECK CANCER VOICE RESTORATION AND SWALLOWING CLINIC

The Voice Restoration and Swallowing Clinic consists of a multidisciplinary team providing evaluations and therapy for a wide variety of head and neck cancer patients. Speech pathology services in the area of head and neck cancer are coordinated by speech pathologist Brian Kanapkey with additional coverage by Linda Hube and Leslie Johnson.

In 2009, Byron Kubik joined the Head and Neck Cancer Clinic Speech Pathology Team as a Clinical Fellow. He has been working on expanding speech pathology services into the head and neck oncology program. Working with Dr. Neil Hayes and Dr. Bhishanjit Chera, he has established more comprehensive protocols for continued evaluation and treatment of speech and swallowing deficits for head and neck cancer patients receiving chemo and radiation therapy. Byron recently accepted a head and neck cancer opportunity in Indianapolis, In. We plan to continue collaboration with Byron and wish him well in his new endeavors.

Patients treated in the speech pathology clinic include but are not limited to those patients with partial and total laryngectomy with or without tracheoesophageal puncture, oral cavity cancers, neck cancers, skull base tumors, short and long term tracheostomy, and chemotherapy and radiation injury patients.

The ENT surgeons within the UNC ENT Clinic, along with oncology physicians, evaluate cancers and provide proper surgical and/or chemotherapy and radiation treatment for these patients. The speech pathologist works on order from the ENT physician or oncologist and provides evaluation and treatment for the functional disorders that result from cancer treatment. Functional deficits affecting maintenance of proper nutrition by

mouth and aspiration risks are treated by the speech pathologist.

The latest in technology for swallowing therapy, such as surface electromyography for biofeedback and VitalStim electrical stimulation is used here at UNC. There is also a new unit, known as Experia, that combines the feedback element and stimulation into one. Both techniques allow for excellent data keeping for research analysis. In this way, the physicians and speech pathology team in the UNC ENT Clinic help to contribute new information in the area of swallowing rehabilitation after treatment for head and neck cancer.

Recently, a dual valve TEP prosthesis was introduced to the total laryngectomy market. The prosthesis is a new design that was pioneered here at UNC Healthcare by Brian Kanapkey. Product evolution and eventual manufacture was a result of collaboration between Kanapkey and Dr. Eric Blom of CENTA in Indianapolis, Indiana. Dr. Blom is largely responsible for historical development as well as the current state of the TEP prosthesis in the U.S. The professional collaboration between Blom and Kanapkey continues with hopes of continued contributions to the advancement of TEP prostheses and related products. Kanapkey and Kubik are currently working on a project that will bring another product to market over the next 1-2 years. The product is very useful for head and neck cancer patients and may have even more of a broad-based use.

In yet another collaboration, Brian Kanapkey and Byron Kubik of the Department of Speech Pathology, have developed a new device for treating trismus that is being patented and prototyped by a national company. The company plans to market the device internationally after patenting and appropriate trials take place. Thus far, patient data regarding the device's use and effectiveness have shown significant success in alleviating trismus.

Yet another role filled by the Head And Neck Clinic Speech Pathologist is teaching about tracheotomy before and after surgery. Speech Pathology is part of the team seeing this population for the purpose of providing

educational information, thus helping patients make more informed decisions.

The Head And Neck Clinic Speech Pathologist also provides therapy to help restore optimal communication to the patient who has had laryngectomy and oral cavity resections and reconstruction. Additionally, Botox injection(s) evaluations are available to those who fail to develop TEP speech post-operation.

Finally, a program for remediation of oversized TEP

was developed by Brian Kanapkey using silicone for creation of extended tracheoesophageal flanges to stop around the prosthesis leakage. This process reduces pulmonary aspiration and risk of aspiration pneumonia from around the prosthesis leaks. Brian was asked to speak on this subject at a conference for the Advanced Clinician in Milwaukee, WI earlier this year. He was also a member of a panel on the subject of TEP problems with other head and neck professionals from University of Iowa, Mass Eye and Ear, and M.D. Anderson Center in Houston, TX. The Symposium was well attended and is annual.

THE UNC VOICE CENTER

The UNC Voice Center is comprised of a multidisciplinary team of highly-experienced physicians and speech pathologists providing specialized diagnostic and therapeutic services to dysphonic patients with all descriptions of voice disorders and laryngeal pathologies, including laryngeal dystonia, vocal cord paralysis and paresis, cysts, polyps, nodules, and other pathologies of the larynx in both casual and professional voice users. Evaluation and management of airway problems including Vocal Cord Dysfunction

is also available. Available voice and speech services include behavioral assessment, videolaryngostroboscopy, acoustic and aerodynamic measurements, assessment of vocal ergonomics, and spirometric evaluation.

Beyond the treatment of voice disorders, the Voice Center also acts as an information resource to the referring medical community along with providing educational materials, seminars, and outreach programs on voice science, care of the voice, and state of the art diagnosis and treatment of voice disorders.

Diagnostic voice evaluations are performed at The UNC Hearing and Voice Center at Carolina Pointe, which celebrated its fourth anniversary in April this year, and is conveniently located at 5915 Farrington Road adjacent to the intersection of Highway 54 and Interstate 40. The Voice Center expanded its presence at Carolina Pointe in the fall of 2009 and is now providing diagnostic voice evaluations one and one-half days each week, as well as all voice therapy services. (The Voice Center continues to provide one half day service at UNC in the Neuroscience Hospital for appropriate patient evaluations). In celebration of our recent move, The Voice Center sponsored an Open House on May 14th, 2010, which highlighted the art work of Marjorie Labadie. Ms. Labadie is a former voice patient who developed a series of art pieces



Dr. Ellen Markus, Linda Hube and Dr. Robert Buckmire

about her experience with an initially devastating voice disorder, entitled *Finding My Voice*. The UNC Voice Center Team presented a case study with guest speaker, Ms. Labadie at the state Speech & Hearing convention in April, 2011.

The Voice Center Team

The Voice Center Director, Dr. Robert Buckmire joined the faculty in September of 2004 after completing a post-graduate fellowship in Laryngology and Care of the Professional Voice, and a subsequent faculty position at the University of Pittsburgh. His special clinical and research interests include care of the professional voice, the application of robotics to microlaryngeal surgery, diagnostic laryngeal electromyography, laryngeal framework surgery and the diagnosis and treatment of swallowing disorders.

Dr. Mark Weissler has maintained an active practice in laryngology since 1986 with special emphasis on the treatment of laryngeal dystonias, benign and malignant

laryngeal neoplasms, vocal fold paralysis, and laryngeal and tracheal stenosis.

Dr. Ellen Markus is the Voice Center Coordinator. She has a Master's Degree in Speech Pathology and a Doctorate in Vocal Music Performance and specializes in working with singers, from amateur to professional. She has taught singing for over 35 years and co-founded the UNC Voice Wellness Clinic in 1991 with Dr. Mark Weissler. She specializes in rehabilitating singers who have experienced vocal injury, as well as working with all other types of voice disorders. She has lectured regionally and nationally on the care and prevention of voice disorders.

Linda Hube, who holds a Master's Degree in Speech Pathology, has a background in theatre and vocal music and special training in voice and swallowing disorders. She has a special interest in the behavioral approach to the treatment of Spasmodic Dysphonia and vocal tremor and has lectured on the topic at both regional and international symposia.

THE UNC HOSPITALS HEARING AND VOICE CENTER AT CAROLINA POINTE

The UNC Hospitals Hearing and Voice Center at Carolina Pointe is a community-based Audiology and Speech Pathology clinic that works in close collaboration with the UNC Ear, Nose and Throat Physicians and Associates. Our location is one of true convenience as we are situated at the intersection of Highway 54 and Interstate 40 at 5915 Farrington Road.

In addition to the voice program, which is comprised of two full time speech pathologists with special interests in the diagnosis and treatment of voice disorders as well as vocal development of both the professional and amateur singer, the audiology team at the UNC Hospitals Hearing and Voice Center provides comprehensive



English R. King, AuD tests a patient in the sound booth at Carolina Pointe

diagnostic and therapeutic audiology services for both pediatric and adult populations. Along with behavioral audiometry, a full complement of other assessment modalities is available including, tympanometry, acoustic reflexes, and otoacoustic emissions. From a therapeutic perspective, the audiology team provides auditory intervention and support to patients in the form of traditional amplification, Bone Anchored Hearing Aids (BAHAs), Vibrant Soundbridge middle ear implants, and cochlear implants.

Over the past five years, the audiology program at the UNC Hospitals Hearing and Voice Center has experienced consistent growth and development in the forms of new service offerings as well as with the addition of new clinical staff. The team of participating audiologists includes Drs. Marcia Clark-Adunka, English King, and Jill Ritch. In May 2011, UNC

Dr. Ritch is a pediatric audiologist, who offers clinical support in the area of pediatric diagnosis and management of children with hearing loss. She specializes in the fitting and application of hearing aids and assistive listening devices for pediatric patients. Similarly, Drs. Clark-Adunka and King specialize in the evaluation of adults with severe and profound sensorineural hearing loss, who qualify for cochlear implantation. The adult cochlear implant program at UNC is amongst the largest of its kind in the world and provides some of the most innovative and cutting edge approaches to hearing loss rehabilitation. Dr. Angela Byrd contributes her clinical skills in the fitting of state of the art hearing aid technology for the adult patient population. She commits her time to the growth and development of the adult hearing aid dispensing program. Dr. Pearce's clinical contributions are recognized throughout all service areas, including

diagnostic audiology of both adult and pediatric patients, hearing aid consultations, and the evaluation and programming of adult cochlear implant recipients.

The UNC Hospitals Hearing and Voice Center is open Monday through Friday, from 8:00 AM to 5:00 PM. For more information regarding available services, appointments or referrals, please call (919) 490-3716. The Hearing and Voice Center at Carolina Pointe has been voted as a Top Five Clinic of UNC Healthcare by its patients in the surrounding community, and we would be pleased to offer our services to you.



Marcia Clark Adunka, AuD fits a patient with a cochlear implant external processor

welcomed the arrival of two new doctoral clinicians to the audiological staff of Carolina Pointe. Drs. Angela Byrd and Ellen Pearce joined UNC Healthcare and the Carolina Pointe clinical staff. We are truly pleased to have them aboard to offer their support and expertise to patients in the surrounding community.

THE UNC EAR AND HEARING CENTER

The UNC Ear and Hearing Center, directed by Dr. Craig Buchman, is an organization with a shared mission:

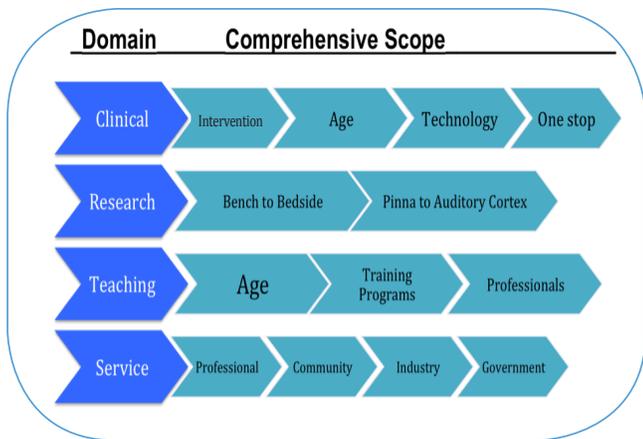
To preserve and/or restore the hearing of all individuals through high-quality patient care, research, teaching, and service.

Moreover, the organization is intended to be a *fully-integrated center* that provides an interactive and comprehensive scope of effort across all domains of academic health center mission.

Fully Integrated Program



What is a fully-integrated Hearing Program?



Clinical services include consultation, diagnosis, disease treatment, medical/surgical intervention, rehabilitation

and follow-up for patients with the entire range of diseases of the ear and related structures. These services transcend all ages, technologies, and interventions with the intent of providing one-stop care for all patients. Necessarily, the Center represents a comprehensive multidisciplinary effort to service delivery and patient care. Professionals trained in every aspects of hearing disorders staff the Center including pediatric and adult audiologists and otolaryngologists, neurosurgeons, geneticists, auditory/verbal therapists, speech pathologists, teachers of the hearing-impaired and a designated Ear & Hearing Center nurse. This effort requires participation from a variety of departments within UNC's School of Medicine, UNC Hospitals, as well as professionals from the State of North Carolina's Departments of Health and Human Services (DHHS) and Public Instruction (DPI) and Beginnings.

Over the last decade, this group has worked together to eliminate redundant evaluations by related providers. We have created one-stop visits for very complex interdisciplinary visits. In addition to creating convenience, this organization has reduced the time needed for information transfer, intervention provision, as well as the number of anesthetics a child requires for evaluation (e.g. radiographic and electrophysiological hearing studies carried out in the same setting). These changes have improved patient safety, efficiency, and effectiveness while reducing costs. Significant research benefits have also been realized from analysis of the multi-dimensional data sets that are generated through this alliance.

Extensive audiology services, in conjunction with Otolaryngology-Head & Neck physicians, are an integral part of the Ear & Hearing Center. Newborn to geriatric hearing screening; comprehensive audiological assessment, hearing aid evaluation, fitting, and dispensing; and cochlear implantation evaluation and mapping are offered. American Sign Language interpreter service is also readily available through "DeafTalk," a video interpreting system. Diagnostic exams available include behavioral, evoked response, and vestibular testing. Patient education, on a wide

variety of hearing related conditions, has been developed for patients and families.

Comprehensive medical and surgical care for a variety ear, hearing, balance, facial nerve disorders, and skull base tumors located from the outer ear to the brainstem are treated commonly. Surgeries include tympanostomy tubes, tympanoplasty, mastoidectomy, ossicular reconstruction, stapedectomy, cochlear implantation, osseointegrated implants, active middle ear implants, acoustic neuroma and lateral skull base surgeries, and auditory brainstem implants (ABI) among others. In addition to rehabilitative audiology, speech and language therapy, educational services, and vestibular therapy are readily available from highly experienced individuals.

Central to the mission of the Ear & Hearing Center is the provision of research to help solve the problems of the patients we serve. A vision that all patients can teach us something about hearing loss is a cornerstone. Our scope of research includes both clinical and basic science efforts that span the entire auditory system (from pinna to cortex). Like the clinical domain, Ear & Hearing Center research is an integrated, multidisciplinary effort across departments within the School of Medicine. A clear focus on translational projects helps to bridge the gap between the research bench and the patient. Another key aspect to improving patient care is the routine collection of a variety of outcome measures during routine visits. Development of this research infrastructure makes it possible to capture data to

identify therapeutic efficacy and improve patient care through quality improvement initiatives.

For the purposes of education and awareness, Center staff participate in 1) community-based efforts in the promotion of hearing wellness for schools and other groups, 2) professional organizations focused on the hearing impaired and related disorders, 3) development and involvement in local, national and international events promoting the goals of the Center and academic interests of the University and the hearing-impaired community at large. We also participate extensively in the education of professionals at all levels and disciplines including audiology, speech pathology,



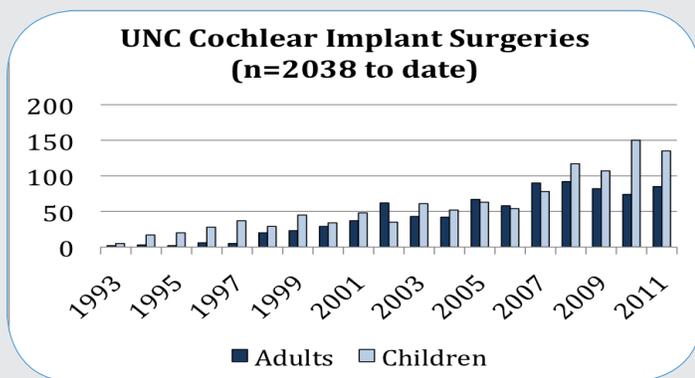
teachers of the hearing impaired, as well as physicians and physicians in training.

In the last year, the Ear & Hearing Center at UNC has been very busy locally, nationally, and internationally. Clinically, our team of professionals evaluated more than 400 children with newly identified hearing losses from around the Southeastern United States and abroad. Given our extensive experience and unique multidisciplinary approach, we continue to see a number of tertiary referrals for the diagnosis and management of challenging pediatric hearing loss

cases. Last year alone, over 100 new hearing aid fittings and 120 cochlear implants were performed in the pediatric population alone. It has not been unusual for amplification to be undertaken before 3 months of age at UNC and cochlear implantation to occur before 12 months. Professionals from the Ear & Hearing Center continue to collaborate closely with professionals from around the state to provide additional services for these children.

The UNC Ear & Hearing Center commonly provides care to children with a variety of hearing disorders. In addition to common hearing loss etiologies, our group is following exceedingly large cohorts of children with hearing loss related to auditory neuropathy spectrum disorder (>200) and developmental inner ear malformations (>200). Moreover, in collaboration with the UNC Craniofacial Center, children with microtia and external auditory canal atresia are comprehensively evaluated and managed.

The Ear & Hearing Center also evaluated more than 300 new adult patients with hearing loss for possible cochlear implantation last year, implanting nearly 100 new patients.



Hearing Preservation Cochlear Implantation at UNC

Recent advances in surgical techniques and device technology has allowed surgeons at UNC to place cochlear implants in to patients with more residual hearing than ever before. Patients with hearing loss no longer need to be deaf before considering

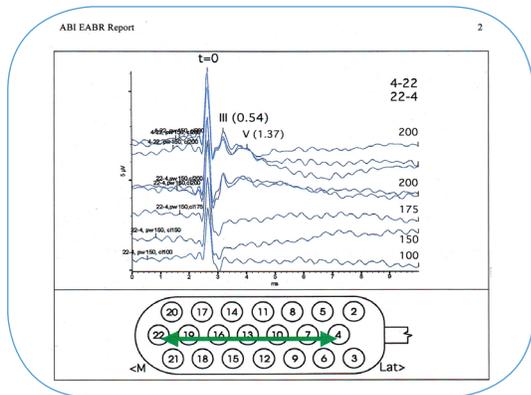
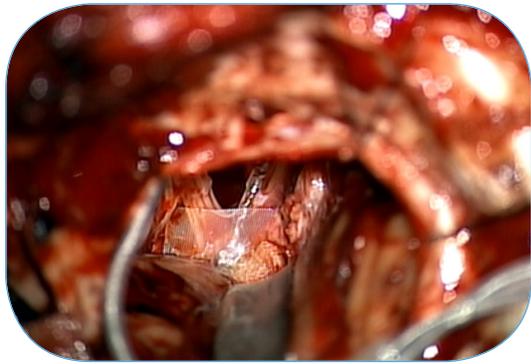
cochlear implantation. Surgeons have begun to test the effects of combining hearing-preserving cochlear implantation with amplification (also called Electro-acoustic stimulation or EAS) in an effort to serve a greater number of patients with sensorineural hearing loss. UNC has performed more than half of total EAS surgeries carried out in the US to date. Preliminary results from these studies are very encouraging. Many of these patients have significant improvements for hearing in noise when compared to their performance with their hearing aid alone.

Another area of interest is bilateral cochlear implantation. Drs. Buchman and Pillsbury have been actively involved in bilateral implantation in selected patients more than 8 years. In their early studies, bilateral implants showed a distinct advantage for both hearing in noise and sound localization abilities. While not for all patients, bilateral implantation is more common than ever, now being extended to the pediatric population as well. Today, more than 200 patients have received bilateral implants at UNC. Many of our previously implanted recipients are requesting second side implantation with the hope of improvements in sound localization and hearing in noise. Our research clearly demonstrates that bilateral implantation improves hearing-in-noise and these gains can continue as long as 4 years following implantation.

Acoustic Neuroma and Lateral Skull Base Tumor

More than 100 patients with acoustic neuroma and other skull base tumors were also evaluated last year (See Skull Base Surgery Center). Hearing preservation and restoration for these patients has become commonplace using a variety of innovative techniques that include observation with periodic imaging, middle fossa surgical excision, Cyberknife stereotactic radiosurgery, cochlear implantation, osseointegrated implantation, active middle ear implantation as well as brainstem implantation. Combining these modalities for the patients benefit is of critical importance to our group of professionals and those that we serve.

Auditory Brainstem Implantation at UNC



While cochlear implants are useful for most patients with severe to profound sensorineural hearing loss, occasionally patients may not benefit from implantation because of disorders related to the cochlear nerve or cochlea. In such cases, direct brainstem stimulation may provide improvements in communication abilities. Such brainstem stimulation is being used at UNC for patients with tumors resulting from neurofibromatosis type II of the brainstem. More recently, Dr. Buchman together with Dr. Matthew Ewend from the UNC's Department of Neurosurgery has applied this technology to a non-tumor patient. The figure above demonstrates an intraoperative photo (left) and the electrophysiological responses (right) from an ABI placed in the lateral recess of the 4th ventricle of the brainstem in a patient deafened from meningitis and unable to hear with a cochlear implant. This patient has now been using his device for more than 4 years with significant demonstrated benefits. For this patient, the brainstem implant has provided dramatic improvements in sound awareness and enhanced lip-reading abilities, thereby improving quality of life substantially. From these experiences, we are working towards providing this

technology for deaf children born without cochlear nerve or cochleas in an attempt to restore their sound awareness, and improve their communication abilities.

In another related area, Drs Adunka and Buchman have been participating in a clinical trial to provide patients with persistent conductive or mixed hearing loss that is not amenable to conventional surgical treatment or amplification with a device that can directly stimulate the fluids of the inner ear through the round window. This approach bypasses the ear canal and hearing bones (ossicular chain). Through a surgical approach that is similar to the cochlear implant, the device is placed directly on the round window membrane of the inner ear. The patient wears an external, quarter size, processor that drives the internal device. Nine patients have been implanted thus far at UNC. These patients have noticed significant gains in their hearing. Three individuals that previously had no ear canal since birth are now able to hear with their affected ear. While this technology remains experimental, the potential future applications remain very exciting.

The UNC Ear & Hearing Center professionals have also been very active in local, regional, national, and international professional educational programs and awareness initiatives for patients with hearing loss. UNC is a world leader in this arena. As an example, at the recent Cochlear Implants in Children Meeting (CI2011) held in Chicago this summer, UNC had more presentations and was more widely represented than any other institution from around the world. Similarly, our professionals are commonly invited as lecturers on a wide variety of clinical and basic science topics that include newborn infant hearing screening programs, pediatric hearing loss, amplification, cochlear implantation, electrophysiological assessment of hearing in children, auditory neuropathy spectrum disorder (ANSD), inner ear malformations, electrical stimulation of the auditory system, and psychoacoustics among others.

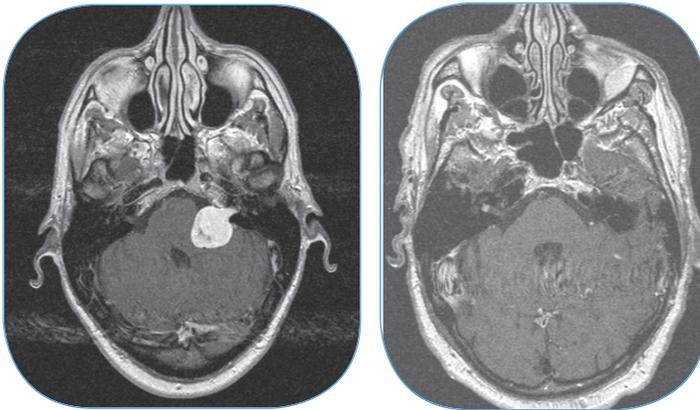
THE UNC SKULL BASE CENTER

This is a matrix organization comprised of a variety of disciplines that allows the institution to leverage the considerable collective talents of the group for the benefit of skull base tumor patients throughout the region. The multidisciplinary skull base team at UNC is in full operation. The group is now routinely meeting to discuss a variety of skull base lesions and their management. We remain strongly committed to the concept of offering patients a balanced and unbiased opinion with all avenues being explored. The scope and experience of this group is vast, thereby providing patients the opportunity for a truly comprehensive evaluation.

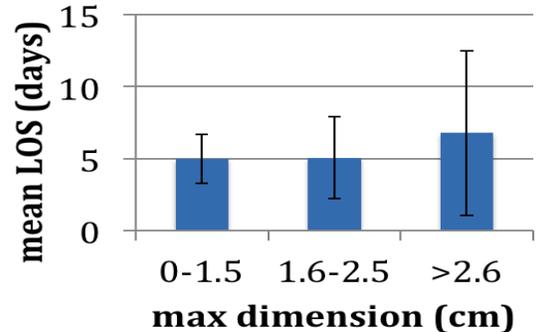
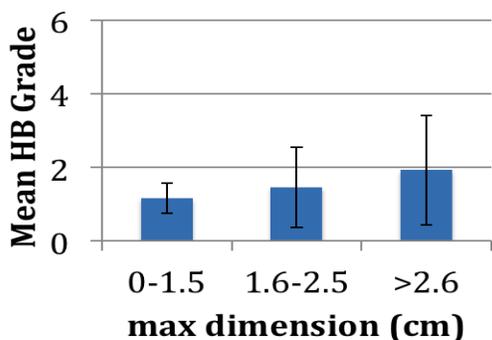
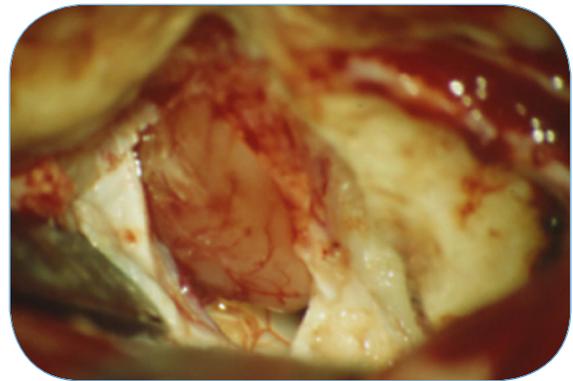
UNC continues to be a world leader in endoscopic skull base surgery generally and minimally invasive pituitary surgery (MIPS) specifically, with nearly 70 of these surgeries performed in the last year. With this extensive experience, past UNC research has shown that MIPS results in shorter hospital stays and less overall complications compared to traditional open approaches. More recently, in work completed just this last year, a study of 50 patients undergoing MIPS at an average of two years follow-up showed no significant detrimental impact of the surgery on patient's sinonasal quality of life. Additional recent UNC research has shown a similar benefit with regards to the economics of this surgery, with a marked reduction in total healthcare costs related to MIPS compared to traditional techniques. With decreased length of stay and lower nursing costs, savings were found to be nearly 24%, averaging over 3000 dollars less for each procedure.

Acoustic Neuroma Surgery at UNC

Typical Small (Left) and Medium (Right) Size Acoustic Neuromas



Intraoperative View of a Left Acoustic Neuroma treated with a Middle Fossa Surgery with Successful Hearing Preservation

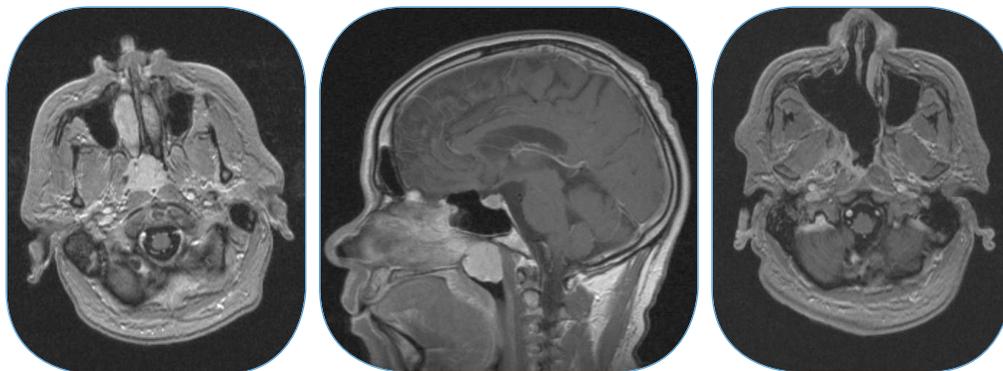


UNC also is a national presence in the field of Expanded Endonasal Skull Base Surgery. While the endoscopic pituitary practice has continued to grow, additional tumors such as meningiomas, craniopharyngiomas and sinonasal/skull base cancers are also approached with an endoscopic minimally invasive approach. UNC's Skull Base Center is one of only a few in the country that offers expertise in both endoscopic and traditional transfacial or transcranial skull

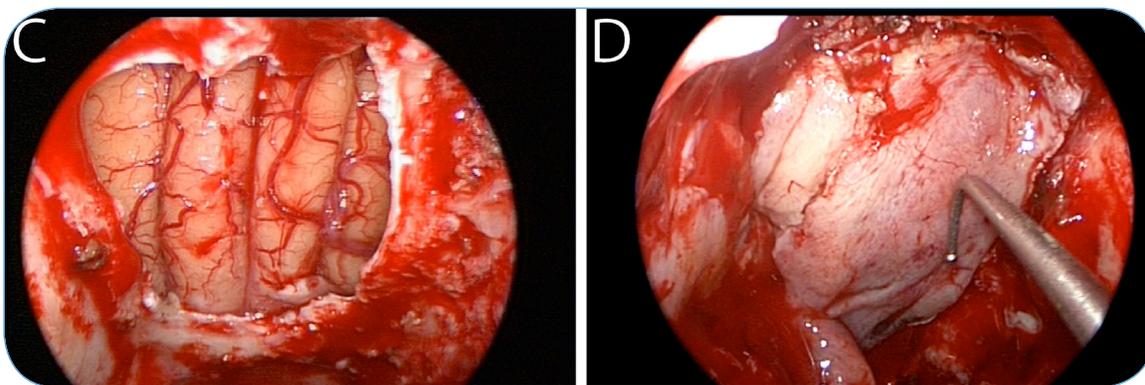
base surgery. This ability to offer all surgical options at the highest level allows for the best-individualized care. Within the UNC Skull Base Center, Dr. Zonation was the first surgeon in the world to perform an endoscopic endonasal clipping of a cerebral aneurysm. He also developed the endoscopic pericranial flap floor skull base cancer reconstruction. Additionally, UNC has the world's largest prospective series of nasoseptal flap skull base reconstructions (over 300).

Endoscopic Skull Base Surgery at UNC-Chapel Hill

Typical Expanded Skull Base Surgery Case: Endoscopic Nasopharyngectomy for Mucoepidermoid Carcinoma. [Shown are Pre (axial and sagittal) and 2-Year (axial) Post Operative MRIs]



Intraoperative view of an Endoscopic Transcribiform Resection with Intradural Resection of an Esthesioneuroblastoma (C) and Pedicled Nasoseptal Flap Skull Base Reconstruction (D)



UNC is also a leader in the comprehensive management of acoustic neuroma (a.k.a vestibular schwannoma). This relatively common benign nerve sheath tumor arises along the cochleovestibular nerves between the brainstem and inner ear. The UNC Skull Base Team evaluates more than 75 patients per year with these lesions. While surgical excision used to be indicated for nearly all of these cases

in the past, today an eclectic approach is more appropriate with some patients being managed with observation and periodic imaging, some choosing stereotactic radiosurgery, and some still undergoing surgical excision. We have begun to focus our efforts beyond tumor control towards hearing restoration through cochlear implantation and brainstem implantation in selected patients.

Quality Improvement initiatives are a main focus of the Skull Base Center's teams at UNC. The group is very active at maintaining outcomes databases for patient diseases, treatment types, functional results, quality-of-life, and cost-utility metrics. Examples of two data queries for (1) the last 125 acoustic neuroma patients treated surgically and (2) the last 300 endoscopic skull base nasoseptal flap reconstructions.

The charts show mean House-Brackmann (HB) facial function scores (1=normal; 6=paralysis) and length of stay (LOS) in the hospital for our most recent 125 patients with surgically treated acoustic neuromas by tumor size. For patients with tumors smaller than 2.5 cm, the mean length of stay is just under 5 days. Importantly, over 92% of patients have normal or near normal facial function with more than 70% of patients having a total tumor removal. While tumor size is a predictor of outcome to some extent, a recent paradigm shift towards functional preservation has made outcomes excellent for patients with even the largest of tumor. Complications remain uncommon.

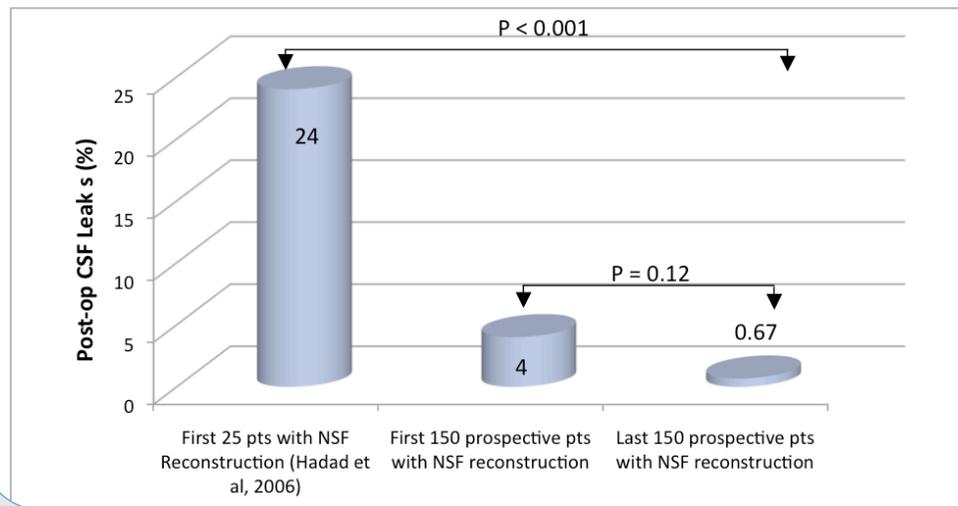
UNC has the largest known prospective cohort of vascularized endoscopic skull base reconstructions (N=300 per Dr. Zanation's data). The primary goal of endoscopic skull base reconstruction is to prevent post-operative CSF leaks. Table 1 shows the results of these CSF leak outcomes stratified by intraoperative

CSF leak quality (high or low flow). The overall post-operative CSF leak rate is 2.3% with an overall meningitis rate of 0.33% (Table 1). Both of these results are significantly better than outcomes associated with traditional transcranial skull base reconstructions.

Table 1: Results of Nasoseptal Flap Skull Base Reconstructions Stratified by CSF Flow Rate

	<u>CSF Leak Quality</u>		
	Total	High-Flow	Low-Flow
Intra-operative CSF Leaks	300	101 (33%)	199 (66%)
Overall post-operative CSF Leak	7/300 (2.3%)	5/101 (4.95%)	2/199 (1.0%)
Post-operative CSF Leaks - First 150 patients	6/150 (4%)	4/59 (6.7%)	2/91 (2%)
Post-operative CSF Leak - Last 150 patients	1/150 (0.67%)	1/42 (2.4%)	0/108 (0%)
Overall Meningitis Incidence	1/300 (0.33%)	1/101 (1%)	0/199 (0%)

Figure 1: Learning Curve for Nasoseptal Flap Skull Base Reconstruction



Also, it was noted that there is likely a long-term learning curve associated with endoscopic skull base reconstructions. If one compares the first 25 nasoseptal flaps ever published upon and the first 150 patients and the last 150 patients from the UNC series, there is a significant improvement in outcomes with more experience (Figure 1). Outcomes for the last 150 patients show a CSF leak rate of only 0.67%.

Background and Philosophy

Historically, the complex anatomical relationships of many important structures within the base of the skull have made treatment paradigms particularly morbid for afflicted patients. Recent advances in surgical approaches, cranial nerve monitoring, endoscopic visualization, intraoperative imaging and navigation, neuroendovascular techniques, as well as intraoperative and stereotactic radiation have allowed dramatic improvements in patient outcomes and quality of life. Many of these improvements have been directly attributable to close collaborations between a variety of medical disciplines including Neurosurgery, Otolaryngology-Head & Neck Surgery, Radiation Oncology, Neurointerventional Radiology, and rehabilitative disciplines. For example, surgical approaches developed by rhinologists and neurotologists have allowed neurosurgeons access to tumors and other lesions involving the skull base without the need for traumatic brain retraction, resection, or in some instances, skin incisions. Moreover, working together, surgeons and radiation therapists have been able to apply precise anatomic knowledge to the delivery of highly focused radiation in an effort to avoid collateral tissue damage.

Skull base lesions are uncommon and clinical trials for treating many of these lesions are lacking. Patients are frequently left to seek opinions from a variety of clinical specialists including medical and radiation oncologists as well as surgeons in an attempt to find a consensus regarding optimal therapy. However, opinions are frequently divergent and dictated by the practitioner's area of expertise rather than by patient factors. This creates significant uncertainty among both patients as well as referring physicians during difficult times.

Nationwide, there are very few dedicated skull base centers that provide a truly multidisciplinary approach to the management of such tumors. Most centers use either a surgery-centric or radiosurgery-centric model depending on the institution's expertise and interest. This institutional bias might not serve the patients' best interests. At UNC, we are fortunate to have a unique skull base program that combines professional

experience and skills, cutting edge technologies and facilities, and a burning desire to provide a balanced and unbiased opinion of the treatment options that serves the patient's best interests. Cooperation through mutual respect for one another's skills and opinions forms the backbone for this eclectic treatment philosophy.

Both Neurosurgery and Otolaryngology-Head & Neck Surgery have recently added new faculty members with special interests and training in this area. Radiation Oncology has also recently added the Cyberknife Radiosurgical System to the radiation-based treatment armamentarium. This system has a dedicated nurse coordinator for patient care. The Cyberknife System has a number of distinct advantages over its competition in that it allows for precise frameless delivery of either single dose or fractionated dose radiation to tumors throughout the body including the skull base.

Dr. Craig Buchman serves as Director of the UNC Skull Base Center. Others from the Department of Otolaryngology-Head and Neck Surgery who are directly involved include Drs. Oliver Adunka, Carlos Ebert, Trevor Hackman, Harold Pillsbury, Brent Senior, William Shockley, and Adam Zonation, as well as nurses B.J. Squires, RN, Shannon Boughton, RN and Sean Gallagher, RN.

Other UNC Disciplines Involved:

- Neurosurgery: Drs. Matthew Ewend, Anand Germanwala, Deana Sesaki-Adams
- Radiation Oncology: Dr. David Morris
- Endocrinology: Dr. Julie Sharpless
- Ophthalmology: Jonathan Dutton
- Neuroradiology: Drs. Mauricio Castillo, Benjamin Huang, Valerie Jewells, Keith Smith, Sten Solander
- Neurology: Dr. Robert Greenwood
- Medical Oncology: Dr. Neil Hayes and Jing Wu
- Nursing: Sharon Cush, RN, Pasha Lemnah, RN
- Rehabilitation: Diane Meyer, PT

THE UNC ADULT COCHLEAR IMPLANT PROGRAM

The Adult Cochlear Implant Program at the University of North Carolina at Chapel Hill in collaboration with UNC Healthcare represents the largest cochlear implant center in North Carolina and is among the nations busiest and most progressive. The program has been in existence since the late 1970s and has managed to grow and thrive throughout the years under the direction and leadership of Dr. Harold C. Pillsbury, Chairman of the Department of Otolaryngology. Additional team members include, Craig A. Buchman, MD; Oliver F. Adunka, MD; Marcia Clark Adunka, AuD; English King, AuD; Meg Dillon, AuD, and a valuable team of researchers, including Joseph Hall, PhD; John Grose, PhD; Emily Buss, PhD; and Charles Finley, PhD.

The number of adult cochlear implant patients evaluated and treated at UNC Hospitals continues to increase with each passing year, and we as clinicians are proud of the growth we are experiencing and the level of care and services we can deliver. Cochlear implants represent a dynamic field in the realm of hearing healthcare, and we can now offer this technology to patients with more significant residual hearing. Candidacy criteria was once isolated to patients with only severe and profound degrees of hearing loss. The picture of a current candidate now includes patients with moderate to severe and profound sensorineural hearing loss. Not only have the audiometric requirements changed to reflect a new type of candidate but the speech perception test battery

for determining candidacy has evolved to include more challenging, real-world listening tasks. With all of these changes in testing materials, we can better examine and classify the limitations of those with hearing loss and simultaneously determine true candidacy for cochlear implantation.

With the continued growth of the adult cochlear implant population at UNC Healthcare, the program expanded its clinical workspace to include treatment facilities at the UNC Hearing and Voice Center at Carolina Pointe. The traditional patient care associated with cochlear implants, including hearing evaluations via speech perception testing as well as mapping and programming of external hardware, are routinely performed at our satellite location, while new candidate

evaluations and intraoperative monitoring of cochlear implant surgeries remain closely tied to the main hospital campus location. The growth and development of our satellite location for cochlear implant treatment has not only provided

our adult patients with comprehensive clinical care options but also served to reduce commute times for our patrons. In addition to our physical expansion, we have also expanded our clinical staff to include a third, full-time clinical audiologist to serve the ever-growing needs of the adult cochlear implant population. Dr. Ellen Pearce completed her fourth year externship with UNC Hospitals in May of 2011 and she later joined our staff in June of this year. We are privileged to welcome her to the UNC family and have her participation in the clinical setting!

As a research hospital, we not only have aims to provide



Carolina Pointe Adult Cochlear Implant Team: LeSonia Foxxx, Marcia Clark Adunka, AuD, Meg Dillon, AuD, Ellen Pearce, AuD and English King, AuD



Meg Dillon, AuD conducting a diagnostic assessment on an EAS recipient

quality clinical services but also to participate in cutting-edge research endeavors. In January 2007, UNC embarked on a new clinical trial sponsored by MED-EL Corporation, entitled Electric Acoustic Stimulation (EAS). This study incorporates a hybrid cochlear implant system; a partially inserted cochlear implant array to stimulate the high frequency region of hearing within the cochlea and an acoustic hearing aid to maximize hearing in the low frequencies. The UNC Adult Cochlear Implant program continues to lead the U.S. commitment to this clinical trial via patient enrollment and monitoring of patient outcomes as defined by the study protocol. The outcomes have been robust for all study participants; demonstrating improved hearing in noise performance as well as improvements in music appreciation for all hybrid recipients.

An extension to the current EAS protocol was made available in March 2010, to include potential patients with normal to near normal low frequency hearing out to 1500 Hz. The second arm of this clinical trial signifies growth in the area of cochlear implantation and a more defined bridge between the technologies associated with traditional amplification and electrical implants. Our commitment to this trial will be ongoing as we continue to seek and enroll more qualified participants. By pursuing these research avenues and being dedicated to new advances in science, we are better able to serve our patients and their families. As hearing care professionals of UNC, this remains our primary mission. If you would like to receive information regarding our EAS investigational trial or other clinical trials associated with hearing, please contact the clinic at 919-843-1692.

One of the primary goals of the UNC Adult Cochlear Implant team is to provide community education regarding developments in cochlear implantation as well as to participate in the exchange of knowledge with peers and colleagues in the field. Our team members have been active participants in a number of hearing and cochlear implant conferences throughout the U.S. and abroad. We have been able to share our current research outcomes in a number of these venues, including CI 2011 in Chicago, IL, with presentations and posters, encompassing Long-Term Results of Electric Acoustic Stimulation, Electrode insertion for hearing preservation, Hearing Preservation in EAS Recipients: Cochleostomy vs Round Window Surgical Approaches, Analysis of the cochlear implant alone listening condition and speech performance in noise by electric-acoustic stimulation subjects, and Effects of Intracochlear electrode placement in cochlear function in an animal model. All of our contributions were well received.

UNC research in the adult cochlear implant population continues to focus on the benefits of cochlear implants in patients with unilateral hearing loss, electric acoustic stimulation, bilateral cochlear implantation, stressed listening paradigms to evaluate real world listening with a cochlear implant, subjective benefits of CI recipients as measured by patient satisfaction questionnaires, and benefits and limitations of depth of insertion with traditional cochlear implants. These topics are currently under investigation via our skilled team of otologists, audiologists and hearing researchers. Please stay tuned to learn more about our research outcomes.

PEDIATRIC AUDIOLOGY

The UNC Pediatric Audiology Program, under the direction of Patricia A. Roush, AuD, is committed to providing optimal care for infants and children with hearing loss throughout North Carolina. Dr. Roush is joined by a team of pediatric audiologists that includes Corinne MacPherson, AuD, Sarah Martinho, AuD, Jill Ritch, AuD, and Nissele Franco, AuD. Audiologist Dr. Paula Johnson, who provided excellent care to infants and children with hearing loss at UNC for the past five years, was married in June, 2011, and moved to Brisbane, Australia where she will continue to work as a pediatric audiologist. We were pleased to welcome Laura Fleenor McCall, AuD, as a new member of our pediatric audiology team in August 2011. Dr. McCall completed a 4th year internship in the UNC Pediatric Audiology Program in 2007. Following graduation from East Tennessee State University, she worked as a pediatric audiologist at Pediatric ENT of Atlanta before moving back to North Carolina.

At UNC, screening coordinator, Chris Ryan, RN, oversees hearing screening performed by nursing staff in the well baby nursery. Audiologist Patricia Reitz, M.S., conducts screening for infants in the neonatal intensive care nursery. Infants who do not pass the screening at UNC and many from other birthing hospitals throughout North Carolina are seen by the UNC Pediatric Audiology Team for comprehensive diagnostic hearing assessment using auditory brainstem response evaluation (ABR), otoacoustic emissions (OAE), and other measures. Using a battery of physiologic tests audiologists are able to estimate an infant's hearing thresholds so that hearing aid fitting can be initiated. The goal is to complete the hearing aid fitting as soon as possible following confirmation of the hearing loss. For infants with uncomplicated birth histories, pediatric audiologists are typically able to move from diagnosis to hearing aid fitting in less than three weeks. This is in contrast to the situation that existed prior to the advent of universal newborn hearing screening when, only a few years ago; the

average age of diagnosis was over 18 months. Infants born with permanent hearing loss can now have the benefit of auditory stimulation within weeks of birth.

The number of children with hearing loss followed by the UNC team continues to grow with over 1000 children who wear hearing aids receiving care by the pediatric audiology team, and over 600 children with cochlear implants followed by the UNC pediatric cochlear implant team. In addition to children with 'typical' sensorineural hearing loss, the UNC pediatric audiology team, working in collaboration with the UNC pediatric cochlear implant team, is following over 200 children diagnosed with auditory neuropathy spectrum disorder (ANSD), a condition that affects approximately 10% of children with permanent hearing loss. ANSD is a hearing impairment in which outer hair cell function is spared but neural transmission in the auditory pathway is disordered. While not a new problem, newer test techniques in recent years have made diagnosis of ANSD possible. This disorder presents new challenges in management for pediatric audiologists. The UNC pediatric team, in conjunction with UNC otolaryngologists, has developed an evidence-based protocol for evaluation and management so that infants diagnosed with this disorder will have early and effective treatment. In addition to providing direct service to these patients, faculty members are contributing to the education of other professionals. Dr. Roush contributed an invited chapter entitled Auditory Neuropathy Spectrum Disorder in Children in the recently published *Comprehensive Handbook of Pediatric Audiology* (Plural Publishing, 2010). The pediatric audiology team is also collaborating with Dr. Craig Buchman, Dr. Shuman He, and members of the UNC Pediatric Cochlear Implant team in ongoing research on this complex disorder.

Members of the team are also engaged in a number of other research projects. In August 2008, UNC, in collaboration with the University of Iowa and Boys Town National Research Hospital in Nebraska, began a five-year study entitled Moderators of Functional

Outcomes in Children with Mild to Severe Hearing Loss. Dr. Patricia Roush and her colleague, Dr. Melody Harrison, a speech-language pathologist in the Division of Speech and Hearing Sciences, Department of Allied Health Sciences, are directing the UNC component. The primary aim of the study is to investigate how hearing loss affects communication, educational performance, social skills, and psychological development. Results from the study will provide important information regarding the effects of early intervention and amplification in infants and children up to nine years of age, whose hearing losses range from mild to severe. The study, funded by an \$8.9 million grant from the National Institute on Deafness and Other Communication Disorders, NIH, differs from most other research on childhood hearing loss by focusing on children with milder degrees of hearing loss who use amplification. Across the three sites, 450 children with mild to severe hearing loss and 150 children with normal hearing will be enrolled. The project is now in year four and to date over 100 children with hearing loss have been enrolled and tested at UNC by research assistants, Shana Jacobs, AuD, audiologist and Thomas Page, M.S., speech language pathologist. An additional 200 children have been evaluated at Boys Town and the University of Iowa.

Work also continues on a clinical research project involving a new hearing aid technology called 'frequency compression,' a hearing aid processing strategy that allows access to higher frequency sounds not available using conventional amplification. Dr. Roush is collaborating on this work with Department of Otolaryngology faculty member Dr. Emily Buss and colleagues Dr. Lori Leibold and Dr. Andrea-Hillock Dunn from the Division of Speech and Hearing Sciences, and Dr. Lisa DiMaria from the CCCDP staff.

During the past year, Dr. Roush gave several invited presentations on topics related to hearing loss in infants. In October 2010, a presentation entitled: Auditory Neuropathy Spectrum Disorder was given at the Institut Raymond Dewar in Montreal Quebec. In February 2011, she delivered an invited

presentation at the Michigan Early Hearing Detection and Intervention program in Lansing, Michigan, and in April she traveled to Chicago to present at the American Academy of Audiology Annual Conference. In July, 2011, she and Dr. Holly Teagle, Director of the Carolina Children's Communicative Disorders Program (CCCDP) gave a half day invited workshop on the topic of Auditory Neuropathy Spectrum Disorder to audiologists, speech pathologists and early intervention specialists at the Alexander Graham Bell Association of the Deaf Annual Conference in Washington, D.C.

Finally, the UNC pediatric audiology team was honored to be selected as the site for the Judith Gravel Fellowship in Pediatric Audiology. The fellowship was established in 2010 by Hear the World, an international foundation based in Stafa, Switzerland, to honor the late Judith Gravel who died in 2009. Dr. Gravel was recognized internationally for her expertise in pediatric audiology and her commitment to the advancement of educational opportunities for clinicians and students. The Gravel Fellowship is awarded each year to a 4th year AuD student who completes their externship at UNC Hospitals with a focus on the needs of infants and young children with hearing loss and their families. The first recipient of the Gravel Fellowship was Nicole Duncan, a student from UNC's audiology program. Dr. Duncan graduated from UNC in 2011 and is now working as a pediatric audiologist in Bar Harbor, Maine. The 2011-12 recipient of the Gravel Fellowship is Ashley Timboe, an AuD student from the University of Washington, Seattle.

The UNC Pediatric Audiology Team looks forward to an exciting new academic year with continued excellence in patient care and clinical research.

THE W. PAUL BIGGERS, MD CAROLINA CHILDREN'S COMMUNICATIVE DISORDERS PROGRAM

The Pediatric Cochlear Implant Program, the Carolyn J. Brown Center for the Acquisition of Spoken Language through Listening Enrichment (CASTLE), and the CCCDP Financial Assistance Program are all part of The W. Paul Biggers, MD Carolina Children's Communicative Disorders Program (CCCDP). Located at a satellite clinic in Durham, the CCCDP and CASTLE are unique programs of the Department of Otolaryngology. Dr. Harold Pillsbury serves as Executive Director of the CCCDP, Dr. Craig Buchman is the Medical Director, Dr. Holly Teagle is the CCCDP Program Director and Ms. Hannah Eskridge is the CASTLE Director. They are joined by Drs. Carlton Zdanski and Oliver Adunka, surgeons, and a staff of talented and dedicated speech-language pathologists, teachers of the hearing impaired, audiologists and support staff. Together they form a dynamic team which has been recognized nationally for providing quality care to families of children with

hearing loss. The program is also unique in its ability to provide financial assistance to families in North Carolina and for its ongoing programs to mentor and train educators and speech and hearing specialists from around North Carolina and surrounding states.

The North Carolina General Assembly has provided for the core budget of the CCCDP with a recurring grant this year totaling \$577,688. With separate funding and a distinct budget, CASTLE is a public-private partnership funded by the Oberkotter Foundation, the Barnhardt Family Foundation, Cape Fear Memorial Foundation, The Triangle Community Foundation, private family contributions and the State of North Carolina. State funding for CASTLE has been provided since 2004, with \$526,707 allocated in 2010-2011. Other in-house funding and awareness raising efforts include staff and patient family participation in the Great Human Race 5k in March, a benefit concert performance by the Chapel Hill Women's Voices Chorus, featuring staff member Lisa Park in July, and the ever-popular and growing CASTLE Summer Fun and Fundraiser in August. This event features staff member Robert Humphreys' band, The Nomads, a Chapel Hill favorite, and a silent auction. This year Dr. Carlton Zdanski did a superb job accompanying the band on his trombone.



The UNC Pediatric Cochlear Implant Team

The UNC pediatric cochlear implant program at UNC continues to experience tremendous growth, making it one of the largest centers in the county. UNC surgeons and staff at the CCCDP care for over 1,000 children. Between July 1, 2010 and June 30, 2011, 140 surgeries were performed. These included children receiving their first or second side devices, and 15 revision surgeries. This last year, many other children transferred into the programs that were implanted elsewhere. The program is



providing ongoing support for children who live in North Carolina, Virginia, and South Carolina.

Early identification of hearing loss, a thorough medical work-up followed by intensive audiological management, and appropriate intervention are all critical aspects of patient care that make eventual success with a cochlear implant possible. The pediatric audiologists at UNCH provide the important groundwork in diagnosis and hearing aid management for the child. When a child is referred as a potential candidate for cochlear implantation, the Team strives to identify the unique strengths and needs of the patient during the evaluation process. Counseling and plans for subsequent intervention are aimed at enabling each child the opportunity to reach his or her full potential to communicate. Excellent clinical care begins with communication and collaboration among team members. The relationship between the patient and the program is long-term, usually lasting throughout childhood, so the collaborative approach must be maintained at a high level. The Team is committed to monitoring each patient's performance with care, as well as to staying abreast of technological changes and state-of-the-art methods to ensure the best possible result for each child. CASTLE teaches children who are deaf to listen and talk, and trains school professionals and early intervention educators to support the success of such children in age-appropriate

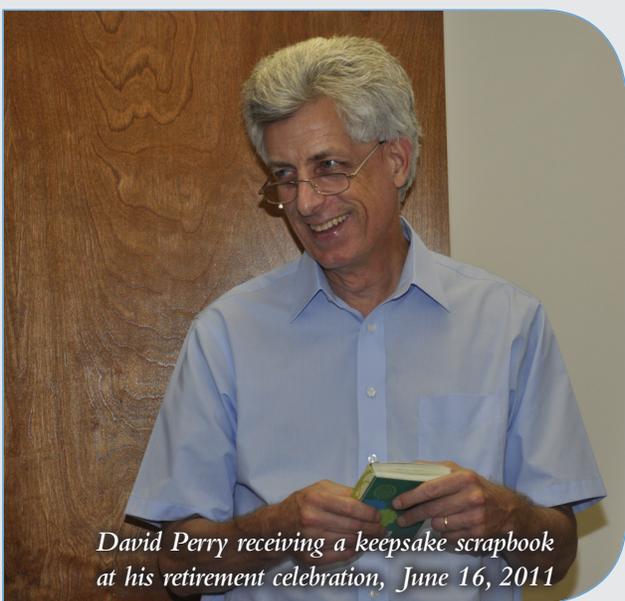
mainstream classrooms. Advanced hearing technologies are now providing these children with access to sound with hearing aids by as early as two to three months of age and with cochlear implants by twelve months of age.

Holly F. B. Teagle, AuD, CCC-A, Assistant Professor, and the other CCCDP audiologists, who include Lisa Park, AuD, CCC-A, Deborah Hatch, AuD, CCC-A, and Jennifer Woodard, AuD, CCC-A, provide audiological management for the children, ensuring their implant devices are carefully programmed and well-maintained to obtain the maximal benefit. Lillian Henderson, MSP, CCC-SLP, LSLS Cert AVT and Maegan Evans, PhD, CCC-SLP, LSLS Cert AVEd provide speech/language evaluations for children before and after receiving cochlear implants.

The commitment to following implant patients, to supporting a team approach, and to assuring that the technology is used to its full potential are all critical aspects of the CCCDP mandate. It was for this reason that The Carolyn J. Brown Center for Acquisition of Spoken Language Through Listening Enrichment (CASTLE) was created in 2001. Hannah Eskridge, MSP, CCC-SLP LSLS Cert AVT, Clinical Instructor and CASTLE Director, is supported by a staff of experienced teachers and speech-language pathologists: Maegan Evans, PhD, CCC-SLP, LSLS Cert AVEd, Sandra Hancock, MS, CCC-SLP, LSLS Cert AVT,

Lillian Henderson, MSP, CCC-SLP, LSLS Cert AVT, Francisca Casillas Hernandez, MA, Chrissy Krammer, MS, CCC-SLP, Sindy Poole, BS, Erin Thompson, MA, CCC-SLP, LSLS Cert AVT, and teaching assistant Velma Grose.

Other staff critical to the daily function of the CCCDP and CASTLE are Robert Humphreys, Financial Officer, and Lori Parker, Receptionist and Scheduling Assistant. Both Robert and Lori go above and beyond to help families and support the programs. After 11 years of service, David Perry, who coordinated the CCCDP financial assistance program and provided support to the Directors in development and grant writing, retired to fulfill a long-planned dream to move



David Perry receiving a keepsake scrapbook at his retirement celebration, June 16, 2011

to Guyana where his wife Loreen will complete her doctoral studies in Leadership and Policy Studies. David will be assisting Loreen as she starts a new

career in capacity building and leadership training for indigenous Amerindian Village Councils. David's commitment to good causes and caring nature will benefit many more people. Our new Administrative Support specialist is Melchee Johnson. We welcome her to the CCCDP and CASTLE family.

Collaborative Research

The diverse characteristics of the large clinical population of cochlear implant candidates seen by the Pediatric Cochlear Implant Program have been the impetus for the research projects the CCCDP team has undertaken or plans to pursue. Study of

special populations of children contributes to our overall understanding of the many variables affecting outcomes. Currently, projects underway include studies of children with a common etiology or characteristic of hearing loss, such as auditory neuropathy, cochlear malformation, CMV, or a genetic marker. Management issues also provide questions for study, including outcomes for children with bilateral cochlear implants, or children who use a hearing aid in addition to a cochlear implant.

Funded research includes a multi-centered NIH-sponsored project, Childhood Development after Cochlear Implantation, which is in its seventh year. This promises to be a landmark study that will impact the direction of future cochlear implant patient management. Thirty children and their parents were initially enrolled in this study at the UNC site; they have been followed to document spoken language as well as psychosocial and academic development. With continued funding, we hope to follow this cohort of children into adulthood.

Research affiliations with the manufacturers of cochlear implants have resulted in a project with MedEl Corporation to norm test materials, a post-market performance study with Cochlear Corporation, and a bilateral cochlear implant study with Advanced Bionic Corporation. Our program is widely recognized for its depth of experience and expertise, not only among patients and professionals, but across the industry.

CASTLE

The mission of CASTLE is to provide a quality listening and spoken language program for children with hearing loss; to empower parents as primary teachers and advocates; and to train and mentor specialists in listening and spoken language.

CASTLE is dedicated to providing quality auditory-based early intervention and preschool services to the families of children who are deaf or hard of hearing throughout North Carolina, especially those who reside in the rural areas and/or have limited

financial resources. The program focuses on educating, encouraging, and empowering parents as the primary teachers of their children, in order to promote healthy parent-child bonding and to maximize the amount of time a child spends in a language-rich environment. The several facets of CASTLE include the following:

- **Speech/language diagnostic evaluations determine need and eligibility for a variety of available programs.**
- **Individual therapy is provided for infants and toddlers with hearing loss, as well as older children, including both auditory-verbal therapy and preschool speech/language therapy, to facilitate language and speech development at home.**
- **A model preschool program to prepare deaf and hard-of-hearing children for kindergarten, is focused primarily on listening and talking – the development of spoken language. An infant/toddler program called ‘Mommy & Me’ is also offered.**
- **Family Learning Center where, in a simulated home environment, parents of infants and toddlers learn from therapists how to develop listening and language skills during normal daily activities.**

CASTLE offers training and hands-on experience for professionals and graduate students in teaching children who are deaf or hard of hearing how to listen and talk. This includes practical experience with supervision in an auditory-based approach for teachers and therapists working in the field. The program is focusing particular effort on supporting school professionals in rural areas where training opportunities are limited. In this way, CASTLE is building the capacity of early intervention and public school programs to fully support the ability of children who are deaf to develop spoken language while living at home and attending local schools. Currently in North Carolina there are almost 2,000 children with hearing loss in the public school system. However, most professionals working with children who are deaf have been and are still being trained to teach children through sign language. Teaching listening and speech to children with hearing loss requires an entirely different set of skills. Our ability to improve services in the public schools implies massive cost-savings to the public sector.

Our training program consists of many different elements that include workshop presentations, internships on-site at CASTLE, school observations and attendance at IEP (individual education planning) meetings. Our most intensive training takes place when we are mentoring/coaching a professional in their own setting. Funding is currently being sought to install video-conferencing technology, which will allow distance coaching and will greatly improve the effectiveness and efficiency of the Training and Mentoring Program.

Other Training and Therapy Services

In addition to these aspects of the program, other projects have been developed or expanded in recent years:

The CCCDP and CASTLE are proud to be part of a NC Consortium working to provide free training to NC professionals. This consortium sponsored 20 one- and two-day workshops this past year. As part of this consortium, a training protocol called Recognition of Achievement for Best Practices in teaching Spoken Language to Children who are Deaf or Hard of Hearing has been developed. This protocol requires participation in workshops and modules focused on the development of listening and spoken language skills as well as an intensive mentoring experience provided by CASTLE staff or staff from the Office of Education Resource Support Program.

The 13th annual Carolina Summer Institute was a resounding success. With special fundraising, CASTLE was able to provide \$13,000 in scholarship aid, and the two week Institute again had full enrollment. Forty-seven participants came this year from North Carolina, Georgia, Florida, Indiana, Michigan, Ohio, Texas, Utah, and Trinidad.

This year the annual CCCDP Fall Conference, co-sponsored by the North Carolina A.G. Bell Association, featured Becky Clem, MA, CCC-SLP, LSLC Cert AVT, a pediatric SLP for 30 years who specializes in working

with babies and young children with cochlear implants. The Conference was attended by 120 professionals and parents from across the state.

The Financial Assistance Program

The CCCDP Financial Assistance Program, which is funded by the North Carolina General Assembly, provides supplies and clinical support to families who have children with hearing loss. The CCCDP was first proposed to the North Carolina General Assembly by W. Paul Biggers, MD, in the spring of 1992, and was funded later that year. It continues to respond to

Qualifying children are accepted into the CCCDP financial assistance program based on such criteria as family size, income, other medical expenses, and the limitations of insurance and other resources such as Medicaid. Since its inception, the program has provided financial assistance to 1,507 children from 92 North Carolina counties. From June 1, 2010 to May 31, 2011, 65 children were enrolled for the first time. A total of 481 children were enrolled at some point during this period.

Of the 65 new children accepted into the CCCDP Financial Assistance Program between June 1, 2010 and May 31, 2011, 40 were cochlear implant patients or candidates. Nineteen of the new children have received cochlear implants since June 1, 2010, with a total of forty cochlear implant surgeries being provided for enrolled children this year. There are also children enrolled in the program who received their cochlear implant surgeries at other implant centers prior to being enrolled. The CCCDP accepts these children into the Financial Assistance Program to help their families with the substantial costs of accessories, loss and damage coverage on external equipment, as well as UNC-provided cochlear implant programming and speech therapy. Insurance companies, and even Medicaid, often will not cover these items or services.



Velma Grose assisting a pediatric cochlear implant recipient

rapidly growing demands from across North Carolina. Financial assistance is provided for certain equipment and devices to qualifying children from birth to age 21. It funds such technologies as frequency transposition hearing aids, digital programmable hearing aids, cochlear implant equipment, assistive listening devices, and UNC-provided diagnostic services for children whose families need financial support to meet their children's special needs. The CCCDP financial assistance program helps families with the substantial costs of hearing related accessories, loss and damage coverage on external equipment, as well as UNC-provided cochlear implant programming and speech therapy.

The UNC Pediatric Cochlear Implant Program and the CCCDP and CASTLE programs are truly unique: No other state offers this level of support for children and families and for students and professionals who work with children who have hearing loss. The collaboration between UNC Healthcare, the University, the North Carolina General Assembly, and a number of private individuals and organizations have directly benefitted children and families in the State by providing excellent clinical care, expert educational and therapeutic services and support, a venue for conducting important research, and the financial assistance needed by so many families.



Top: CASTLE Financial Officer, Robert Humphreys, shakes his groove thang at the annual Silent Auction fundraising event held at Southern Village, Chapel Hill. Robert reported the success of the event: "A beautiful day on the Green at Southern Village and a Great time was had by all, especially the kids of CASTLE; and the community responded with over \$10,000 raised by donations and silent auction bids. Hope you can make it next year!"



Left: The Second Annual Sounds of Celebration Cochlear Implant Picnic was another huge success, bringing families of children and adults having cochlear implants together for a day of music, food and several performers. The crowd favorite, Juggleboy, took the stage with a dizzying array of fire-twirling, basketball juggling, and a final death-defying feat: balancing on an wheel-less skateboard perched atop a cylinder, and suspended four feet off the ground between two ladders on a plank, juggling a basketball, fire torch and a knife! You had to be there to believe it!



Research

RESEARCH

Oliver F. Adunka, MD's

main research interest are the basic mechanisms of inner ear hearing loss in various clinical settings. These issues seem especially important since the inception of electric acoustic stimulation of the auditory system, a paradigm that combines electric stimulation via a cochlear implant with acoustic stimulation via conventional hearing aids. Mostly, this new stimulation mode can be achieved through hearing preservation during cochlear implantation. In other words, despite the surgical insertion of a cochlear implant electrode into the cochlea, its function can be preserved.

Dr. Adunka helped to bring this paradigm to UNC and he has been the principal investigator of the electric-acoustic stimulation (EAS) clinical trial; a multi-center North American trial in which UNC performed the first surgeries and is leading enrollment. In an ongoing collaboration with MED-EL North America, UNC has completed the first arm of the study and has moved to the second arm, which includes subjects with more residual hearing. Preliminary results have been able to demonstrate the safety and effectiveness of this new stimulation paradigm.

The experiences gained from this clinical trial have also helped to shape some of the animal research, attempting to improve and optimize hearing preservation procedures. Specifically, in an ongoing collaboration with Drs. Fitzpatrick and Buchman, Dr. Adunka has continued to work on a series of animal experiments using gerbils focusing on the acute effects of intracochlear trauma and electrode insertion on early auditory potentials, which include cochlear microphonics from hair cells and compound action potentials from the spiral ganglion. These potentials



have demonstrated to be quite useful at least in the animal setting.

First experiments revealed a peculiar configuration of electrophysiologic markers so that imminent intracochlear trauma can be predicted when still reversible. Subsequent data showed that these recording algorithms could be markedly abbreviated so that a near real-time intraoperative feedback might be possible in the future. Also, it was possible to use a micro-endoscope during these experiments further correlating functional and morphologic parameters during these experiments. These electrophysiologic markers have been correlated with morphological data from both histological evaluations as well as from microendoscopic imaging during the experiments. Current research projects involve the effects of longer electrode arrays and how to implement this technology in the long-term. Also, in a close collaboration with an implant manufacturer, these data will be used to implement this technology into future cochlear implants.

Recent data from preliminary human experiments show that these potentials remain robust and potentially useful in a real surgical setup. Eventually, the researchers attempt to optimize intracochlear electrode placements so that intracochlear trauma can be minimized while

electrode insertion depths are maximized.

Dr. Adunka has been heading the histological temporal bone laboratory. A special sawing, grinding, polishing system allows sectioning of non-decalcified bone and hard materials such as electrode contacts but also prosthetic implants commonly used in dentistry or orthopedic surgery. Current efforts focus on the evaluation of recent electrode prototype that allow for less traumatic insertions into the cochlea. This lab will move to Thurston Bowles and will be part of the planned surgical laboratory.

In collaboration with Dr. Craig Buchman, clinical research projects include various topics in pediatric and adult cochlear implantation such as ongoing research on cochlear nerve deficiency and auditory neuropathy. Of note, UNC has identified and enrolled more subjects with absent or small cochlear nerves than any other center. Clinical research has been focusing mainly on diagnostic algorithms. Also, recent work has focused on collecting imaging and clinical data on several types of inner ear malformations. This data has been recently published. Further analyses are currently in progress.

During his research efforts, Dr. Adunka has mentored medical students including Faisal Ahmad, MS III, who has completed a research year between his 3rd and 4th

year of medical school. In this year, Faisal has been extremely productive helping mainly with animal experiments centered around intraoperative hearing preservation. As a clinical project, Faisal has been working on cochlear implant performance data of postlingually deaf children.

Also, Christine DeMason, MS III, has joined Dr. Fitzpatrick's lab for the past year and like Faisal, Christie has been extremely productive working on multiple projects. Christie presented data from our lab at a recent cochlear implant conference in Chicago, IL. Besides this project, Christie and Faisal have both helped Dr. Ebert and his collaborators with multiple allergy related projects and Drs. Prazma and Fitzpatrick on other research projects.

Over the past 3 years, Dr. Adunka has developed a multi-client pediatric hearing loss database. Data that has been collected from the CCCDP, the CASTLE, and the pediatric hearing aid group have been merged and the database in its current form contains information on more than 2,500 pediatric patients with conventional hearing aids and/or cochlear implants. This database has been integrated into the clinical algorithm and data entry and analysis is ongoing. More recently, speech production data has been added to the database and data entry is ongoing.

Craig A. Buchman, MD is actively involved in research in a number of hearing-related topics. Together with a number of co-investigators from UNC and abroad, he is actively studying topics such as cochlear nerve deficiency, auditory neuropathy spectrum disorder (ANS), CMV-related hearing loss, inner ear malformations, and a number of hearing restorative device-related topics. In the field of cochlear implantation, Dr. Buchman and colleagues continue to study the effects of combining electrical stimulation from a cochlear implant with the natural acoustic signal from patients with preserved residual hearing following

implant surgery in an attempt to improve hearing performance for patients. Also, ongoing investigations continue into the safety and efficacy of bilateral cochlear implants as well as the reliability of a variety of cochlear implant devices in both adults and children. Newer areas of study include a clinical trial for auditory brainstem implants (ABI) in adults without NF2 and use of the round window membrane for implantation of the Vibrant MedEl device for conductive and mixed hearing losses.

Investigators at UNC continue to be very interested in the field of ANSD in children. Here at UNC, we

have a particularly robust clinical experience with this disorder as we are currently following more than 200 affected children. What is clear from our current research is that the findings of ANSD on hearing testing can be associated with a variety of medical conditions. We have learned that some children with ANSD can occasionally have absent or severely deficient cochlear nerves on MRI and that these children may not benefit from hearing restorative interventions. By contrast, most children with ANSD can benefit from either hearing aids or cochlear implants depending on their native hearing abilities. Identifying which children can benefit from the various intervention strategies is a major area of investigation. Dr. Buchman, together with Drs Grose, He and Roush have recently begun to use a variety of electrophysiological test together with imaging studies to try and better characterize which children with ANSD can benefit from amplification and those that require cochlear implantation or no intervention. We have also begun collaborations with other institutions to develop a multi-site investigation in this population of children.

Congenital inner ear malformations are very common among children with hearing loss. At UNC, we are following more than 200 children with inner ear deformities. Unique to this group of children is the fact that many have an increased risk for progressive or profound hearing loss and cochlear implantation can be significantly more challenging when compared to children with normal inner ear anatomy. We are actively trying to identify those children with inner ear malformations that are best served with cochlear implants and those that might be better served with other communicative assistance such as a brainstem implant or manual modes of communication.

Dr. Buchman continues to collaborate with audiologists at UNC, Boystown and the University of Iowa in an NIH funded study of children with less than severe hearing loss. The OCHL (Outcomes of Children with Hearing Loss) Study, lead by Patricia Roush locally, is charged with identifying factors that predict success for young children with hearing loss. Dr. Buchman is specifically studying the influence of medical factors on outcomes in this group of children.

Together with the Office of Technology Development at UNC, Dr. Buchman and Dr. Adunka have applied for a US and International Patent to provide intracochlear measurements of acoustically evoked auditory potentials. This new technology should provide improved means to monitor hearing during hearing preservation cochlear implantation. Also, this method might be helpful in the direct assessment of hair cell function rather than to gather in-direct data via conventional audiometric evaluation. The patent application has recently been published with the US Patent and Trademark Office.



Drs. Buchman and Roush are pictured with Dr. Richard Seewald (left), Director Emeritus of Canada's National Centre for Audiology in London, Ontario.

Robert A. Buckmire, MD has several ongoing clinical and research projects involving voice and swallowing. The Voice center currently partners with both academic departments and local industry on research projects. In a collaborative effort with the Department of Biomedical Engineering (UNC/NC State), Joe Giallo II, was granted a Doctor of Philosophy degree in November 2008 for a project and thesis entitled: *A Medical Robotic System for Laser Phonosurgery*. The resultant novel laser control device became the subject of Dr. Yu-Tung Wong's resident research. This work has recently been published in the *Laryngoscope* journal, entitled: *Novel Co(2) Laser Robotic Controller Outperforms Experienced Laser Operators In Tasks Of Accuracy And Performance Repeatability*. This project has established the superiority of the robotic controller in laser guidance accuracy and repeatability over expert human laser operators. Ongoing work is focused on further characterizing the advantages of computer filtering in

the learning and performance of microlaryngeal laser surgery.

Other current research studies are investigating the effectiveness and relative swallowing outcomes of specific surgical techniques for the treatment of Zenkers diverticulum as well as the medium and long-term clinical outcomes for goretex thyroplasty in mobile vocal folds.

In work with Bioptogen, a RTP start-up company, optical coherence tomography (OCT) is being utilized to acquire real-time 2D and 3D images to aid in tumor border detection and to assess subepithelial anatomic detail. Projects determining the role for quantitative laryngeal electromyography (LEMG) continue being conducted by Dr. Robert Buckmire and Dr. James Howard, who staffs the LEMG clinic, as a joint effort between the Department of Neurology and the Department of Otolaryngology.

Emily Buss, PhD is an auditory researcher involved in a wide range of projects investigating the perception of sound in human listeners. Many of these projects are clinically focused, including adults and children with sensorineural hearing loss; some of these listeners make use of hearing aids or cochlear implants. Other projects focus on normal-hearing adults and children, with the goal of developing normative models of auditory processing and development. Experimental methods used in these studies include traditional psychophysical paradigms based on behavioral responses, such as the detection or discrimination of simple sounds, as well as masked speech recognition. In many cases the resulting data can be incorporated into computer-based models that formally characterize different stages of auditory processing. These models address an important gap in the existing knowledge base and could be used to improve the delivery of acoustic signals and/or electric stimulation.

Dr. Buss is currently working on a large research initiative sponsored by the National Institutes of Health aimed at understanding effects of level fluctuation on

the encoding of spectral cues, such as the spectral cues underlying good speech perception. Level fluctuation can have a marked effect on auditory processing, degrading sensitivity in some conditions and improving it in others. The overarching goal of this work is to identify and characterize the auditory processes that limit detection and spectral discrimination of stimuli that vary in level for normal-hearing, hearing-impaired, and cochlear-implanted listeners. Parallel experiments in psychoacoustics and speech perception paradigms are expected to result in a greater understanding of basic auditory processes. Results of this work could have implications for the clinical evaluation of speech perception.

Another project examines the importance of highly redundant temporal cues in speech understanding, particularly when the signal is highly masked or degraded. This work is relevant to public health in that it provides a theoretical framework for understanding how hearing loss and limited language experience impact speech perception, particularly in complex background

maskers. To that end, psychoacoustic methods are being constructed for differentiating between the effects of hearing impairment and more central auditory processing limitations, and for evaluating listening effort under complex listening conditions. It is anticipated that the results of this work will advance our basic understanding of the role of auditory cue redundancy in speech perception and guide the development of clinical tools for better diagnosis and treatment of hearing impairment. Dr. Buss has considerable expertise and a long-standing interest in the normal development of hearing. Recently this interest has focused on establishing a model of the development of auditory processing based on internal noise. A primary goal of this work is to provide a uniform metric for comparing performance across a wide range of auditory tasks in school-aged children. Another goal is to identify the mechanisms responsible for reduced auditory sensitivity in these tasks. Collaboration with Dr. Lori Leibold, in the Division of Speech and Hearing, focuses on better understanding susceptibility to and release

from masking in infancy and childhood, as well as the consequences of sensorineural hearing loss on auditory development.

In addition to this laboratory work, Dr. Buss maintains an ongoing involvement in a number of clinically based cochlear implant and hearing aid investigations, for which she provides support in experimental design and analysis. One such project evaluates performance of hearing-impaired children fitted with frequency compression hearing aids. This project relies on collaboration with colleagues in UNC's Division of Speech and Hearing, the Department of Otolaryngology, and the CCCDP. Another project, carried out in conjunction with Dr. Craig Buchman and Dr. Ben Wei, examines the ability of patients with unilateral atresia to benefit from a bone conduction hearing aid. These clinically focused projects represent an important step in applying basic-science research to real-world problems.

Margaret Meg Dillon, AuD, is a clinical research audiologist on the adult cochlear implant team. Currently, UNC is participating in two multi-center FDA controlled clinical trials: Electric-Acoustic Stimulation (EAS) of the auditory system and utilization of the Vibrant Soundbridge (VSB) for conductive and mixed hearing loss. EAS utilizes a shorter, more flexible electrode array to preserve residual hearing during cochlear implantation in patients with substantial low-frequency hearing remnants. Electric stimulation presents the high frequency information while a hearing aid amplifies the acoustic, low-frequency portion in a unilateral configuration. In 2010 the inclusion criteria expanded to offer enrollment to patients with greater amounts of residual hearing. UNC continues to lead the US in enrollment in the EAS clinical trial, with Arm 1 completed (opened in 2007) and a limited number of slots available under the Arm 2 candidacy criteria. The progress of our patient population has been discussed in publications and at national and international conferences. Drs. Pillsbury, Buchman, and Adunka continue to receive referrals from centers across

the country. Additionally, our team is completing extended testing in this patient population to compare them to conventional cochlear implant recipients and further assess their speech perception abilities in more challenging listening conditions beyond the clinical trial protocol.

Recently, the FDA approved the second round of enrollment in the VSB clinical trial. The VSB converts the acoustic signal into controlled, amplified oscillations to deliver to the cochlea. Currently, the device is approved in the US for patients with moderate-to-severe sensorineural hearing loss. This study investigates the safety and efficacy of placement of the Floating Mass Transducer (FMT) of the Vibrating Ossicular Prosthesis (VORP) near the round window in patients with conductive and mixed hearing loss who are unsuccessful users of traditional amplification. We are continuing to assess the longitudinal outcomes of the four subjects in the first cohort (completed in 2009). The subjects in this second cohort have undergone implantation and will undergo objective and subjective assessment this year.

The adult cochlear implant team is also investigating the impact of electrode array length on ease of insertion during implantation and on postoperative measures. The speech perception, musical discrimination, and subjective report are assessed for patients receiving a medium (24 mm) versus a standard (31 mm) electrode array. Findings from this research may provide insight to the benefits of electrical stimulation of the apex, the rate at which cochlear implant recipients reach asymptotic performance, and the impact of resistance experienced during electrode insertion on postoperative outcomes.

Additional topics currently under investigation also include: temporal processing in cochlear implant recipients, stressed listening, and subjective benefits of cochlear implantation. Drs. Meg Dillon, Emily Buss, and Marcia Adunka collaborated to create a cochlear implant subjective questionnaire, a tool presently not available in the cochlear implant field. The questionnaire addresses issues specific to the cochlear implant experience, which is not included by instruments developed for users of traditional amplification. They are in the process of publishing the findings.

Amelia F. Drake, MD, FACS has the role as pediatric otolaryngologist and director of the UNC Craniofacial Center. These positions makes her ideally suited to serve as the PI of the proposed study of hearing and neurodevelopment of toddlers with craniofacial microsomia. The study follow many children with this condition, yet the degree of understanding of what to predict for their families and educators is limited. Prior work in describing the condition and better understanding the phenotypic variation in this condition

has permitted the study to question the unique issues relating to congenital absence of the ear unilaterally, or the abnormality of the unilateral mandible. Current collaboration on the CFM Planning Grant (RC1 DE 020270) has enabled the development of the Facial Asymmetry Collaborative for Interdisciplinary Assessment and Learning (FACIAL) network. Dr. Drake is excited about the opportunity to build on the FACIAL research infrastructure that they have created for this next phase of research in CFM.

Charles S. Ebert, Jr., MD, MPH returned to UNC as an Assistant Professor in the Division of Rhinology, Allergy and Endoscopic Skull Base Surgery after completing his Rhinology fellowship training at the Georgia Sinus and Nasal Institute. As the first former resident to complete the T32 NIH Training Program, he has remained active in his research pursuits, providing mentorship to current residents, including Drs. Kibwei McKinney, Jessica Smyth, Alex Farag, Baishakhi Choudhury, Deepak Dugar, and numerous medical students. His basic science interests have been directed at investigating the molecular basis of inflammatory diseases of the nose and paranasal sinuses. In this research, he seeks to specifically characterize the genetic expression profiles of patients with Allergic Fungal Rhinosinusitis through a comparative analysis of healthy and diseased specimens of sinonasal mucosa. Through a collaborative effort with the Department of Biostatistics in the UNC School of Public

Health, he has received a funding for this project through the North Carolina Translational and Clinical Sciences Institute funded through Clinical and Translational Science Awards. Other research interests include: cost effective analyses of endonasal, endoscopic surgical approaches to the skull base versus traditional open approaches, attempting to quantify the impact of Functional Endoscopic Sinus Surgery via patient-rated quality of life (QOL) measures and through objective correlates with Computational Fluid Dynamics (CFD) models, examine the use of specific strains of probiotics in the prevention and treatment of allergy-induced Eustachian tube dysfunction in the rat model, and the treatment of otitis media with effusion using CpG oligodeoxynucleotides in an allergic rat model. Dr. Ebert is also the co-director for the new Rhinology and Endoscopic Skull Base surgery fellowship and is the Associate Residency Program Director.

Hannah Eskridge, MSP, CCC-SLP, LSLS Cert AVT is the current CASTLE Director. She has been working with children who are deaf or hard of hearing and their families for over 10 years. She directs the Professional Training Program as well as coordinates staff and various other programs

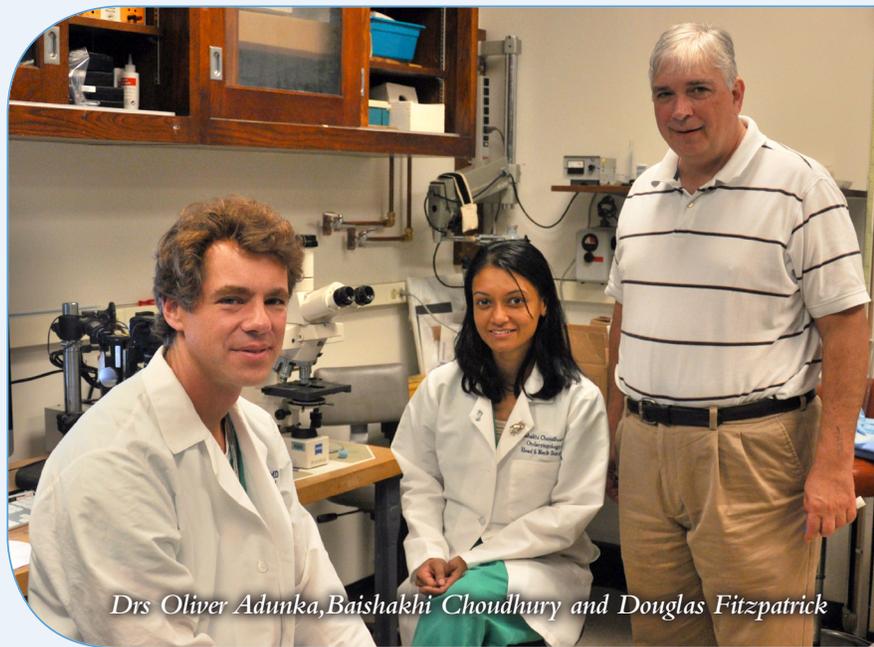
at CASTLE. Hannah also conducts Auditory Verbal parent sessions. Hannah earned her Master's Degree from the University of South Carolina in the Auditory-Verbal track. She currently serves on the AG Bell Academy Certification Committee.

Douglas C. Fitzpatrick, PhD

and his colleagues study the physiology and anatomy of hearing using animal models. Projects this past year include continuing progress in studies on preserving residual hearing during cochlear implantation, as well as studies on midbrain implantation, binaural hearing, and transformations of auditory information processing at different brain levels. As always, medical students and residents have contributed greatly to progress over the past year.

The study on preserving residual hearing during cochlear implantation is being done in collaboration with Drs. Adunka and Buchman. In their surgical practices, a growing number of patients with severe hearing loss are being treated with cochlear implants. These patients retain some residual acoustic hearing, and preserving this residual hearing through the implantation can improve speech understanding in noise compared to electrical stimulation alone. However, residual hearing is often compromised during the surgery. Our hypothesis is that the retention of acoustic hearing will be improved if the surgeon has real-time physiological information on the state of hearing preservation during the implantation process. Current generations of cochlear implants are capable of providing such physiological information, but knowledge of physiological changes as a result of electrode interaction with cochlear structures is limited. Consequently, we are conducting experiments using gerbils that are intended to correlate changes in intracochlear potentials in response to acoustic stimuli as an electrode impacts cochlear structures. Over the past

year we: 1) developed and published a gerbil model of noise-induced hearing loss that simulates the hearing condition of patients that will undergo a hearing-preservation cochlear implant surgery, 2) submitted studies using this model and normal-hearing gerbils about the complex effects that occur as a flexible, clinical-type of electrode is inserted into scala tympani, and 3) submitted a study showing that lock-in amplifier technology can provide improved sensitivity over standard electrophysiological methods for recording cochlear potentials 4) began our first recordings of cochlear potentials in implant patients.



Drs. Oliver Adunka, Baishakhi Choudhury, and Douglas Fitzpatrick

Studies on midbrain implants are motivated by the need to provide auditory sensation to people who lack a functional auditory nerve. These patients cannot be helped by traditional cochlear implants. We have successfully implanted multichannel electrodes in the IC of rabbits,

and have measured neural and behavioral thresholds to stimulation of the implant. Further work on this project requires major changes to hardware and software to provide electrical stimulation of complex stimuli including speech sounds, which we are investigating. To investigate this, we are developing the ability to present and manipulate information-bearing elements of complex sounds that simulate speech in our rabbit model. To this end, we have tested the sensitivity of rabbits to formant frequencies in vowels and voice onset time in plosive consonant-vowel combinations.

Improvements in aids for the hearing-impaired depend on a solid knowledge of the operation of the normal auditory system. To study information processing at different brain levels, we are continuing research on processing between the inferior colliculus and the auditory cortex. In collaboration with Dr. Nell Cant from Duke, experiments to study the anatomy and physiology of the auditory thalamus are being performed in gerbils. The thalamus lies between the inferior colliculus in the midbrain and the auditory cortex. In the inferior colliculus, the central nucleus is the beginning of the core (or lemniscal) auditory pathway. It contains a single tonotopic representation. In contrast, the auditory cortex

contains multiple functional areas each with a separate tonotopic organization. The transformation from a single to multiple tonotopic areas is typically thought to be due to divergence of pathways from the auditory thalamus to auditory cortex. However, Dr. Cant's work in gerbils and our previous work in bats suggests that the transformation actually occurs in the output pathways of the IC to the auditory thalamus. Our hypothesis is therefore that multiple tonotopic representation will first occur in the auditory thalamus. Our experiments to test this are being done through a combination of electrophysiology and anatomical tract-tracing.

We made considerable progress this past year, in large part because of the efforts of Baishakhi Choudhury, a resident on the research track supported by the NIHT T32 grant held by the department, and two medical students, Christine DeMason and Faisal Ahmad. The team was able to produce results that contributed to four submitted manuscripts from my lab, as well as publishing results from several studies in collaboration with other faculty.

As always, Stephen Pulver has provided superb technical assistance throughout the year.

John H. Grose, PhD is the Principal Investigator on an NIH-funded project that examines complex sound processing in normal and impaired auditory systems. The current focus of this project is on understanding the decline in temporal processing with age. He has recently demonstrated that sensitivity to inter-aural time differences (ITDs), as a measure of temporal fine-structure coding, begins to decline as early as middle age (published in *Ear and Hearing*). This focus has proceeded to examine sensitivity to binaural beats as a metric of fine-structure coding. Current work suggests that this binaural measure may be more sensitive than monaural measures. However, the salience of the beat appears to be relatively low. As a complementary arm to the psychoacoustic experiments, the assessment of the

electrophysiological representation of the binaural beat has recently be completed (ePub ahead of print in *Ear and Hearing*). This study showed that the steady state response in the EEG associated with the binaural beat is more likely to be present in younger than in older listeners, independent of hearing loss, but that – when present – the characteristics of the response are similar in the two populations.

In addition to his major research emphasis, Dr. Grose continues to contribute to the evoked potential testing of infants and toddlers, as well as patients with cochlear implants. His current focus in this area is on electrophysiological responses in children with auditory neuropathy spectrum disorder.

Joseph W. Hall, PhD is presently the principal investigator on two R01 NIH research grants, both funded by the National Institute of Deafness and other Communication Disorders. One of these projects is Development and Plasticity in Normal and Impaired Hearing. The main experiment in this project is investigating the effect of sensorineural hearing loss

normal-hearing children. The specific focus is on the ability to use very brief temporal cues and to separate these cues from other temporally proximal acoustical information. The results of this study should aid the understanding of the ability to understand speech in difficult listening situations. The lead investigator on this project is Shuman He.



*Back Row: Madhu Dev, John Grose, PhD, Tara Steplowski.
Front Row: Emily Buss, PhD, Joseph W. Hall III, PhD, and Sara Mamo, AuD*

on the development of hearing in children. The aim is to examine the ability of these children to obtain benefit for speech perception in noise for noise that has spectral dips, temporal dips, or both spectral and temporal dips. The ability to benefit from such spectro-temporal dips probably accounts for the relatively good ability of listeners with normal hearing to understand speech in noisy environments. It is important to assess the effect of hearing loss on these abilities, particularly in children, where experience with speech/language cues is relatively limited. The project is also investigating normal development of the ability to integrate fragments of speech in noisy backgrounds where the signal-to-noise ratio is low.

A second experiment in this NIH grant is investigating the development of auditory temporal processing in

the masking noise play a crucial role.

Dr. Hall's second NIH-funded grant is Spectro-temporal Processing in Normal and Impaired Ears. A basic science study in this project is examining the sensitivity of listeners to across-frequency coherence of temporal envelope. A novel feature of the study is that it used noise bandwidths that are considerably wider than the width of the normal auditory filter. Therefore, in order to perform well on the task, the listener would have to be able to reconstruct the stimulus temporal envelope by combining the outputs of multiple peripheral auditory filters. A related possibility is that listeners perform many narrowband analyses of the information and then combine the cues extracted from the analysis.

A third study in this NIH grant is a basic science project investigating the frequency selective nature of binaural hearing. It has long been known that the frequency region responsible for binaural masking is wider than that associated with monaural (single-ear) masking. This project examines the basis for this finding and is specifically testing the hypothesis that the dynamics of the temporal envelope of

A second study in this project is examining whether sensorineural hearing loss can sometimes facilitate the encoding of some temporal auditory cues. A classic notion is that hearing-impaired listeners may be able to benefit from improved temporal envelope detail at the outputs of relatively wide auditory filters. However, most studies on temporal processing have shown either similar performance between normal and impaired ears, or slightly poorer performance by hearing-impaired listeners. One important reason that could account for the general failure to find better temporal processing in impaired listeners with poor frequency selectivity than in normal-hearing listeners with good frequency selectivity is that normal-hearing listeners appear to be very adept at combining information across multiple, relatively narrow auditory filters. Thus any advantage that reduced frequency selectivity might provide to a hearing-impaired listener in simple temporal processing paradigms may be matched by the advantage available to a normal-hearing listener due to the combination of information across multiple, peripheral auditory filters.

The hypothesis we are investigating is that hearing-impaired listeners will show temporal processing that is better than normal under conditions where it is more advantageous to base performance on the output of a single, broad auditory filter than to combine information across multiple, narrow auditory filters. The information obtained should result in a better understanding of the factors that govern the perception of complex sounds in hearing-impaired patients.

A third study in this project is investigating the phenomenon of comodulation masking release where the detection of a tone in a fluctuating masker is improved when additional noise with the same fluctuation pattern is added at other frequencies. This phenomenon is referred to as comodulation masking release (CMR). While CMR can be large for the detection of a signal, it is quite a bit smaller for supra-threshold tasks, such as intensity discrimination. The current study is investigating this phenomenon for the task of frequency discrimination.

D. Neil Hayes, MD, MPH of the Division of Hematology and Oncology, Department of Medicine, was given a joint appointment with the Department of Otolaryngology/Head and Neck Surgery in 2009. He has been collaborating with our head and neck oncologists on projects for many years.

Mission Statement

The Hayes Lab endeavors to bring together a collection of researchers with intersecting interests in multidisciplinary clinical cancer care, clinical trials, translational cancer research, and model systems of cancer with a focus on aerodigestive tumors.

Clinical Practice and Clinical Trials

In the clinic we provide multidisciplinary care across a spectrum of aerodigestive tumors. Our primary

focus is on lung tumors and epithelial tumors of the head and neck (mouth, throat, larynx, sinuses, and salivary glands). All patient care is delivered by a full services tertiary and quaternary care facility with rich compliment of oncology care. In this context, we have endeavored to develop a palate of clinical trials serving the spectrum of disease we treat, including focused trials appropriate to every patient stage and function. The breadth and depth of our practice leads us to an expertise in rare tumors of the head, neck, and lung as well, and the treatment of rare tumors is clearly part of our expertise.

Translational cancer research and model systems

Progress in two key areas of science has provided the foundation for the work in our group. First, the advent of personal computers along with associated progress in the field of statistical computing greatly

accelerated the development of data-rich models of human disease behavior. Second, collaborative efforts across the biomedical science have made available the building blocks of normal (i. e. The Human Genome Project) and adherent genomes (i. e. The Cancer Genome Atlas). To leverage the power of computers to assess alterations in the genome associated with cancer a host of molecular technologies has become commercially available in recent years. The primary targets of these assays have been nucleic acids (DNA and RNA), although a limited number of protein assays are also included. The technologies allow labs such as ours to make broad and inclusive measurements in samples of alterations in gene expression (RNA), gene dosage (DNA amplification and deletions), gene structure (normal population variants, mutations, alternate splices, fusion genes, epigenetic modifications), protein abundance and other events such as presence of a pathogen. Primary technologies in use in our lab include array based approaches (gene expression arrays, methylation profiling, SNP chips, CGH, miRNA arrays), sequencing (targeted and deep sequencing/NextGen), and immunohistochemistry (including tissue microarrays).

Our lab is intimately connected with the practice of clinical medicine, and as such, our interest is not simply the detection of alterations such as those described above. All alterations are placed in their clinical context, including the frequency of the event and any relevant association with cancer outcome. To accomplish these goals, our lab works equally hard to capture both clinical and molecular data for any samples we evaluate. The hypothesis of our research

is that tumor-specific predictors based on high throughput nucleic acid and protein assays will offer significant advances.

Early work by Dr. Hayes, performed in collaboration with his mentor Dr. Matthew Meyerson, included a meta-analysis of approximately 500 human lung adenocarcinoma expression arrays generated by the National Cancer Institute's Director's Challenge Program. We successfully reconciled discordant previous reports by demonstrating three reproducible molecular tumor subtypes of lung adenocarcinoma that are otherwise indistinguishable by routine clinical evaluation. The subtypes have statistically significant survival differences, independent of disease stage and are comprised of tumors with differing underlying rates of mutations in key lung cancer genes including KRAS and EGFR. Similar reports for squamous cell carcinoma of the lung are forthcoming, as are reports of clinically applicable diagnostic tests. More recently, in collaboration with Kwok Wong and Ned Sharpless we have documented the frequent mutation of the gene STK11/LKB1 in human lung cancers, including squamous cell carcinoma. Numerous follow up reports of the clinical importance of these findings are forthcoming.

Statistical Collaborations

Data analysis of the type we routinely perform requires a strong set of statistical collaborators since standard methods are frequently lacking. In this way, we have been fortunate to build ties with numerous local and national statisticians, computer scientists, biostatisticians, and epidemiologists.

Shuman He, PhD is conducting several research projects focusing on objective measures in cochlear implant (CI) recipients. The long-term goal of these projects is to develop objective tools that can be used in clinical settings to select appropriate candidates, to assess the impact, and to assist with the programming process of cochlear implantation in patients who are

unable to reliably participate in behavioral tasks. In one program of research, Dr. He, together with Dr. Buchman and Dr. Grose, are assessing the utility of objective measures to select early – and optimal – intervention for individual patients with auditory neuropathy spectrum disorder (ANSO). In one project, we are investigating the association between

acoustically/electrically evoked cortical event-related potentials and speech perception performance in ANSD children who use hearing aids or cochlear implants. The goal is to identify cortical event-related potential measures that can address urgent, time-sensitive questions in individual cases of ANSD such as: ‘Should this child continue with a hearing aid trial or should immediate transition to cochlear implantation be considered?’ or, ‘Is this cochlear-implanted child likely to succeed with routine implant-centered therapy, or will a better outcome be achieved with the inclusion of some other type of supplemental training?’. In the second project, we are evaluating characteristics of the electrically evoked cortical event-related potential in patients with cochlea nerve deficiency (CND). Results of this project can potentially affect clinical decision-making process regarding whether cochlear implantation is an appropriate intervention strategy for CND patients. In the third project, we are comparing electrocochleography (ECoChG) recordings obtained simultaneously at the round window and tympanic membrane in patients with ANSD undergoing cochlear implant surgery. Recent studies suggest that measuring ECoChG might further

refine site of lesion identification and thereby be useful in predicting outcomes in ANSD children. However, these studies used trans-tympanic methods to record from the cochlear promontory or round window and were, therefore, necessarily invasive. In contrast, extra-tympanic ECoChG, with electrodes placed proximal to, or in contact with, the TM is less invasive and might lend itself to a more generalizable testing paradigm if responses remain sufficient. Results of this project can potentially be used as part of clinical decisions tools in terms of whether a subgroup of ANSD patients should have cochlear implantation surgeries.

Dr. He is also investigating the feasibility of using the binaural interaction component (BIC) of the electrically evoked cortical event-related potential to 1) assist in programming bilateral CIs; 2) evaluate the benefits of bilateral cochlear implantation; and 3) assess effects of bilateral cochlear implantation on binaural hearing. Results of this project could potentially improve the way candidates for bilateral implantation is selected in the future. It is likely that findings of this project will particularly impact the way we work with the youngest cochlear implant recipients.

Julia S. Kimbell, PhD is a Research Associate Professor. She is an applied mathematician, currently conducting research on applications of computational fluid dynamics (CFD) to studies of nasal airflow, gas uptake, and particle deposition. This research focuses mainly on medicine and therapeutics in which CFD models are used to predict surgical effects on nasal function as well as more effective ways of delivering topical nasal medications. Dr. Kimbell also uses CFD models of the nasal passages of laboratory animals to test hypotheses about the role of dose in respiratory tract responses to inhaled materials, and to support risk assessments in which animal

responses are extrapolated to humans on the basis of dose predictions in the respiratory tract.

In her research, Dr. Kimbell uses CT or MRI scans



Dr. Kimbell (center) among contributors for the Ribbon of Recognition (one of Top Ten Abstracts) Risk Assessment Specialty Section Annual Meeting of the Society of Toxicology March, 2011

or cross-sectional images of tissue specimens to build three-dimensional, anatomically-accurate CFD models of the nasal passages of laboratory mice, rats, primates, and humans. Dr. Kimbell and her collaborators have recently completed studies using these models on the deposition of nano- and micrometer-sized particles in the rat nasal passages, the effects of surface smoothing on particle deposition in the human nasal passages, and the development of combined nose-and-lung models of respiratory tract dose in rats and humans. They also recently used their human CFD models to study objective ways to measure and predict improvements in patients' symptoms when septoplasty and turbinate reduction are used to treat nasal airway obstruction, and how surgery may affect the distribution of sprayed medication in the nasal passages of patients being treated for nasal airway obstruction or chronic rhinosinusitis.

Dr. Kimbell is currently funded to conduct research using nasal CFD models to (1) study possible associations of patient-reported symptoms with specific

variables computed from three-dimensional CFD models of the patients' nasal passages based on CT scans taken both before and after surgery (NIH/NIBIB), (2) study the effects of surgery on the distribution of nasal sprays inside the nasal cavity (NIH/NIBIB), and (3) gain a quantitative understanding of intervention effects on children being treated for airway collapse (NIH/NHLBI). She is collaborating with Dr. Carlton Zdanski on CFD modeling of pediatric airways, and Dr. Brent Senior, Dr. Adam Zanation, Dr. Charles Ebert, and Dr. Kibwei McKinney on CFD modeling of sinus surgery effects on nasal airflow and topical drug delivery. Dr. Kimbell also works with her postdoctoral fellow, Dennis Frank, PhD, on the simulation of nasal spray distribution in normal and diseased nasal passages. The department's newly created Otolaryngology/Head and Neck Surgery Computing and Clinical Research Lab, run by Drs. Kimbell and Zanation, provides a resource for conducting this research as well as increasing departmental access to high-performance computer workstations and software to create 3D reconstructions from imaging data.

Paul B. Manis, PhD and his colleagues are studying cellular mechanisms of information processing in the central auditory system. The research has two principal goals. The first goal is to understand the normal cellular mechanisms and the organization and function of neural networks that are responsible for the remarkable sensory abilities of the auditory system. The second goal is to understand how these mechanisms are affected by hearing loss, and how they may contribute to tinnitus. This work is currently supported by 3 NIH R01 grants to Dr. Manis.

In the first project, Drs. Manis and Mancilla, along with Heather O'Donohue, are studying the physiology of the dorsal cochlear nucleus. The dorsal cochlear nucleus (DCN) is a site for rapid and early processing of spectrally complex acoustic stimuli, and is the first point in the auditory system where auditory and non-auditory information converges. Changes in the DCN

following hearing loss has been associated with central tinnitus, which is a perception of a phantom sound. We have built on our existing data on electrical excitability and synaptic function to create a biologically accurate circuit model of the DCN, and are collecting more experimental data to constrain specific aspects of the model. We will use this model to test predictions about how changes in synaptic function associated with hearing loss can affect the output of the nucleus. We have found that this model predicts that synchronized firing of the output cells depends on the details of interactions between the cartwheel cells. This synchrony could be a dysfunctional activity pattern that leads to tinnitus. We are also testing whether noise-induced central tinnitus is associated with decreases in inhibitory synaptic strength, or with increased intrinsic electrical excitability. Ms. Heather O'Donohue has found that the spontaneous activity of DCN cells, as measured by an optical method of calcium imaging, is greatly disrupted in noise-exposed mice. This suggests that noise exposure

alters the circuitry and intrinsic properties of cells in the DCN. Tinnitus is a phenomenon that affects nearly 20% of people in the U.S., and which is debilitating to nearly 2 million citizens. There is a significant unmet need for effective treatments. Our experiments will directly evaluate specific synaptic systems and receptors that can be targeted for pharmacological intervention for treatment and cure of this persistent problem. This project is funded by NIH through 2011.

In a second research project, Dr. Manis, along with Dr. Ruili Xie and Mr. Luke Campagnola (Neurobiology graduate student), are investigating the integrative mechanisms of anterior ventral cochlear nucleus (AVCN) bushy and stellate neurons in normal animals, and in animals experiencing acute and chronic hearing loss. These cells are part of a major set of pathways that are important in both speech perception and for sound localization. Recent studies have shown that inhibition plays a much more important role in sculpting the responses of ventral cochlear nucleus (VCN) neurons to the temporal and spectral composition of sound than previously appreciated. Our studies

have revealed that the time course of inhibition, even from a single source, is different in the two principal cell types, the bushy and stellate cells. We have created two detailed computational models based on these physiological studies that have helped to reveal the functional significance of the different time courses of inhibition. The first is that the slow inhibition onto bushy cells improves their ability to precisely respond to auditory nerve inputs. The second is that the fast inhibition onto the stellate cells seems essential for them to detect modulated signals in noise; slow inhibition does not work to improve this detection. We are also evaluating how the function of these inhibitory circuits,

as well as excitatory circuits, is affected by hearing loss. This project is funded through 2014. Dr. Xie also has just completed a 2-year grant from the Deafness Research Foundation to study the development and function of inhibitory circuits in the VCN of mice that exhibit an early-onset, high frequency hearing loss.

This year was also a banner year for the lab as we finally obtained a major research grant from NIH to study the auditory cortex. While auditory information processed by the brainstem and midbrain auditory nuclei is ultimately analyzed in the auditory cortex, which consists of a core or primary region and several highly interconnected surrounding areas defined by their tonotopic organization and acoustic responsiveness. Recent studies have shown that the primary auditory

cortex is highly plastic, and that the properties of the cells can be modified by relevant interactions between the organism and its environment, and also in response to hearing loss. Furthermore, it has become evident that sensory cortex not only processes sensory information, but also plays an active role in the recall of prior sensory experience. This grant focuses first on examining the organization of local cortical circuits in normal animals and in animals with hearing loss using laser guided photostimulation of neural circuits using caged glutamate, the main excitatory neurotransmitter in the brain. The organization of circuits is being studied by Ms. Megan Kratz, a Neurobiology graduate student. Dr.



*Back Row: Drs Jaime Mancilla and Paul Manis, Luke Campagnola and Dr. Ruili Xie.
Front Row: Megan Kratz and Heather O'Donohue*

Deepti Rao, a recent graduate of the Department of Cell and Molecular Physiology, has been investigating spike timing dependent plasticity, which is thought to be a learning rule that maximizes mutual information between inputs and outputs of simple neural networks, and is thought to be associated with learning and memory in the cortex. Mr. Russell Coletti (an MS1) and Dr. Joe Roche, a former resident on the research track, also investigated the mechanisms and spike-timing plasticity in auditory cortex at different synapses. The final aim of this grant is to examine how the functional neural circuits of the cortex are rewired following noise-induced hearing loss. We expect that the local circuits change both their spatial arrangement and synaptic strength to compensate for the loss of input. The changes in these circuits will affect how people with hearing loss

process auditory information, and circuit remodeling at this level is likely to contribute to tinnitus.

Lastly, a collaborative project between the lab (Manis, Mancilla, Zhang) with Drs. Patricia Maness (Department of Biochemistry and Biophysics) and Eva Anton (Department of Cell and Molecular Physiology) is examining inhibitory circuits and their role in network activity in the auditory and prefrontal cortex in two mouse models of schizophrenia. The current project, with postdoctoral associate Dr. Xuying Zhang, uses an optogenetic approach to examine the spatial and functional organization of inhibitory networks using laser-guided photostimulation of a specific set of cells expressing channelrhodopsins. This work is supported through the UNC Conte Center (Dr. John Gilmore, PI).

Andrew F. Olshan, PhD and Mark C. Weissler, MD were funded in July of 2001 by the National Cancer Institute to conduct a study (The CHANCE study) in 46 counties in North Carolina to comprehensively evaluate the role of genetic susceptibility factors in the etiology of squamous cell carcinoma of the head and neck. The population-based case-control study, funded by the National Cancer Institute, included 1,300 cases and 1,300 controls and constituted the largest population-based study of head and neck cancer ever conducted in the United States. Polymorphisms of genes representing metabolism (activation and detoxification) of carcinogens and nutrients, mediators of oxidative stress, DNA repair, and other pathways are being investigated using a 1,536 single nucleotide polymorphism (SNP) array. The size and population-based design should allow the investigators to more confidently confirm or reject associations raised in previous studies. In addition, with the collection of treatment and survival data the study can also examine genetic and other predictors of survival. The study collected tumor blocks for future studies of downstream somatic alterations of tumor suppressor genes and oncogenes. The stored tumor sections are now being used to detect HPV in a subcohort of CHANCE

patients. The study is part of an international project to conduct a genome-wide association study to evaluate over 500,000 genetic markers in relation to head and neck cancer risk. A paper reporting the top GWAS hits has recently been published in PLoS Genetics. A CHANCE manuscript describing the association between polymorphisms of alcohol-metabolizing genes and the risk of SCCHN has been accepted for publication in Cancer Epidemiology, Biomarkers & Prevention.

Drs. Olshan and Weissler have also conducted research to evaluate survivorship factors, including quality of life, among cases in the CHANCE study. This work has been extended through funding by the Lance Armstrong Foundation and has collected data on quality of life among African-American head and neck cancer survivors. The project is examining the influence of social, clinical, access to care, and behavioral factors on quality of life, especially among African-Americans for which there is little available quality of life information. Patient information was collected one year after diagnosis and three years after diagnosis. Information on quality of life has been obtained from over 500 head and neck cancer survivors. An initial manuscript on one-year QOL has been prepared.

Carol G. Shores, MD, PhD has been working over the last several years to develop cancer research infrastructure at Kamuzu Central Hospital in Lilongwe, Malawi in collaboration with Mina Hosseinpour MD (Associate Professor Infectious Disease, UNC Project). An online database of cancer cases presenting to all departments in the hospital was established in September 2010 in collaboration with the UNC Lineberger Comprehensive Cancer Center Bioinformatics Group, and recorded over 1800 cases from January 2011 to August 2011. A KCH and the UNC Project collaborative pathology lab opened in July 2011, enabling them to establish pathologic diagnosis in patients presenting to KCH. Infrastructure is in place for other tissue procurement projects, including a -80 freezer.

Moses MD and Albert Mwanfongo MD.

2. An epidemiology study of co-morbid infections (HIV, Hep B, schistosomiasis and active malaria) and patient demographics with presentation of cancer at KCH. This project has enrolled 350 patients and finished enrollment in September 2011 and the data is currently being evaluated.
3. Evaluation of risk factors and co-morbid infections and genetic risk factors of esophageal cancer in Malawi. This is the most common cancer presenting to the Surgery Department and the second most common cancer in both men and woman. We have collected >90 tumors and will begin lab analysis later this

Ongoing specific cancer projects include:

1. Epidemiology of all patients presenting to KCH with cancer. Epidemiology of all patients tracked in the KCH Cancer Database from January 2010 through July 2011 is currently being evaluated. The most common cancers in woman are (in order) cervical, esophageal and Kaposi sarcoma, and the most common cancers in men are Kaposi sarcoma, esophageal and prostate. This data will be presented at the African Organization for Research and Training in Cancer in Cairo Egypt in December 2011. Lindsey Wolf, MS4 from UCSF (Doris Duke Fellowship) and Michael Owino MPH (UNC Project) have contributed to this project in the past year, along with our full time data clerks, Chrissie Chilima and Ande Salima and UNC Project clinicians Agnes



Dr. Carol Shores operates with resident surgeons in Malawi

year. We have completed a retrospective review of flexible esophogogastrosopies at KCH, which demonstrated that 27% of these patients had esophageal cancer. Lindsey Wolf MS3 and Rahim Ibrahim (KCH PGY2) had a significant contribution to this project, and Yohannie Mlombe MD will continue the project in the coming year.

4. Burkitt lymphoma (BL) is the most common pediatric cancer in sub-Saharan Africa and is associated with Epstein-Barr Virus (EBV). In a proof of principle study, we demonstrated increased EBV viral particles in tumor biopsies after the first dose of cyclophosphamide, suggesting that the virus had converted to a lytic infection. During the lytic cycle, EBV expresses

proteins that make it susceptible to antiviral therapy. We have completed a phase I clinical trial of valacyclovir and cyclophosphamide in children with BL at Kamuzu Central Hospital. I have applied for NCI R01 funding for a phase 2 trial. Dan Olson MD (pediatrician UNC Project) and Oren Mechanic MS1 UNC contributed to this project.

Holly FB Teagle, AuD is the primary investigator for an NIH-funded study called Childhood Development after Cochlear Implantation (CDaCI) and works closely with Jennifer Woodard, AuD and Hannah Eskridge, MSP, to collect data for this long term multi-center study. Cochlear implantation provides deaf children with access to sound, which is the first step in overcoming significant delays in receptive and expressive language development and the resultant cognitive and academic deficits. Psycho-social aspects of child development, including parent-child interactions and social development are also strongly influenced by significant hearing loss. The effects of deafness and the subsequent acquisition of sound through cochlear implantation on the whole child has been the focus of this multi-center study in which has been renewed for a second five year term. Drs. Pillsbury, Buchman, and Zdanski are the surgeons for the project.

Other collaborative research projects underway at the CCCDP include ongoing study of the benefits of cochlear implantation in special populations of children, such as those with Auditory Neuropathy Spectrum Disorder and children with Cochlear Malformations. We also continue to collect clinical

outcome results for children who have undergone cochlear implant revision surgery, children who are using bimodal technology: a hearing aid in one ear and a cochlear implant in the other, and children who have bilateral cochlear implants. CCCDP staff audiologists will be presenting papers at an International Cochlear Implant meeting this summer on these topics. New cochlear implant technology becomes available on a regular basis from the 3 manufacturers. Because of our large and diverse patient population and our depth of experience, the CCCDP is often asked to participate in clinical trials with all three cochlear implant manufacturers to evaluate new cochlear implant system features, evaluation materials, or participate in post-market approval studies.



Holly FB Teagle, AuD with Melcheemoco Johnson at a 2011 CCCDP fundraising event

Xiaoying Yin, MD is working on several research projects.

1. **Genetic study of head and neck squamous cell carcinoma (HNSCC).** Working with Neil Hayes, MD (Division of Medical Oncology) and Carol G. Shores, MD, PhD, we received a University cancer research fund for 2009–2011 for genetic study of head and neck cancer. Through the past 6 years, we have collected about 150 of HNSCCA tumors samples from patients at UNC. Using this tissue bank, we have performed gene expression analysis for 138 patients with squamous cell carcinoma head and neck. 4 molecular subtypes was found, although no significance has been found between subtype and patient's survival, some unique biological information has been found among different subtypes. We also performed SNP analysis for 110 patients' with squamous cell carcinoma of head and neck to identify causative genomic aberrations (amplification and deletions and LOH). Genome-wide mean copy number analysis showed copy number gains in several chromosomes, such as chr11q13 (contain CNND1), chr3q26 (PIK3CA) and chr7p11 (EGFR) and copy number lose in several chromosome, such as chr9p21 (CDK2A) and chr3p21 (CTNNB1). Integrated study of copy number and gene expression for oncogenes in some chromosome shown that copy number and gene expression values are highly correlated for those genes associated with HNSCC. Further bioinformatics analysis is going on for these study.

MicroRNA alterations in human head and neck squamous cell carcinoma. We got a clinical translational research award from UNC Lineberger Cancer center in 2009 for analysis microRNA alterations in human head and neck squamous cell carcinoma. The aim of this study is to investigate the expression patterns of miRNA in human HNSCC and determine the diagnostic and predicting utility of specific miRNA alteration in the assessment of HNSCC patients. Using Affymetrix's microRNA array platform, we have done mircoRNA array for 115

HNSCC samples and validate some most expressed micro RNAs by real time RT-PCR both on fresh tissue and FFPE tissue. The array results are generally in agreement with RT-PCR results.

Comparison among all tumor samples by complete linkage and uncentered Pearson correlation generated a hierarchical clustering of the samples on the basis of similarity in the expression of any pairs of samples. This initial unsupervised clustering divided the samples into 3 discrete groups. The most highly expressed microRNAs in our study of head and neck squamous cell carcinoma cancer samples including: mir-31, mir-200, mir-203, mir-205, mir-206 and mir-210. Some of these microRNAs have been reported altered expression in some cancer.

More analysis is going on to find micro RNAs that can be used for predict patients' prognosis.

miRNA profile study. Time course study of miRNA profile changes during normal human bronchial epithelial (hBE) differentiation. Pilot study of miRNA profile changes of human bronchial epithelial when exposed to: pseudomonas, Retinoic acid, Azithromycin, IL-3, and injury (scratch).

Clinical Sequencing. Under the leadership of Dr. Shelton Earp, as well as Drs Neil Hayes and Norman Sharpless, Lineberger Comprehensive Cancer Center established a clinical oncology research program and aimed to develop a tumor molecular analyses program and its use to support treatment decisions.

The initial work I am involved with included testing protocol on normal control tissues from frozen tissue, FFPE and lung cancer tissue with known mutations.

Carlton J. Zdanski, MD describes his role as researcher in a variety of settings:

in Young Children.” The co-principal investigators and the multitude of collaborators are hard at work...details to follow.

Through the concerted efforts of many individuals

within the Department of Otolaryngology/Head and Neck Surgery, The Department of Pediatrics, and multiple individuals within the University of North Carolinas Hospitals system, we continue to build the North Carolina Children’s Airway Center initially formed with the assistance of a generous grant from The Duke Endowment. The Airway Center specializes in the

coordinated delivery of cutting edge, multi-disciplinary, specialized care for children with airway disorders. The Center will also seek to educate patients and their families as well as clinicians regarding airway disorders and to perform research. The Center’s multi-disciplinary clinics began formally seeing patients in September of 2007. Multiple areas of research are currently being explored and protocols for efficient and safe evaluation and management of more common airway problems are being developed and fine tuned.

This past year, Dr. Zdanski along with Dr. Stephanie Davis (Pediatric Pulmonology) and Dr. Richard Superfine (Physics and Astronomy) were awarded a National Institutes of Health R01 grant totaling \$3.6 million dollars for their submission “Predictive Modeling for Treatment of Upper Airway Obstruction



The Department co-sponsored the Carolina’s Pediatric Airway Course with the Department of Otolaryngology at the University of North Carolina. Dr. Zdanski and former UNC OHNS resident and Pediatric otolaryngologist Dr. David White co-directed the two day course. This year the course will be hosted at the Medical University of South Carolina and participants will include faculty and residents from Duke University, Wake Forest/Bowman Gray School of Medicine, Emory, and the Medical College of Georgia. The course continues to grow in content and scale.

Research into the mechanisms of otitis media, continue in the laboratory with Drs. Fitzpatrick, Ebert, Choudury, and Prazma examining Eustachian tube dysfunction.

Finally, Dr. Zdanski traveled to Malawi this year to engage in the training of surgical residents at Kamuzu Central Hospital in Lilongwe. This two week endeavor involved teaching residents and clinical officers there pediatric airway endoscopy. Accompanying Dr. Z on this trip was another former UNC resident and now plastic surgeon Dr. Krishna Patel. Together, many cleft lips and palates were repaired and the Malawian residents were trained in aspects of cleft care and surgery. Additional surgeries were performed for airway stenosis. Overall, it was a very valuable experience and we look forward to providing a continuing educational and surgical presence there.

Clinical research has primarily revolved around our excellent Pediatric Cochlear Implant Program at UNC. This is one of the most active pediatric cochlear implant programs in the country. Our Internal Review Board approved protocol for the study to determine the optimal protocol for the auditory rehabilitation of children with Auditory Neuropathy/Dys-synchrony continues and data collection continues. Interest has been intense on an international level and across disciplines. We plan to continue to collect, present, and publish our data on as it matures.

Adam M. Zanation, MD

Since his return to UNC, Adam M. Zanation, MD, has wasted no time in initiating cutting-edge research in the area of Skull Base Surgery and Oncology and Clinical Quality of Life and Functional Outcomes Research. His passion for research began in residency and continues to grow as he embarks his career in a new surgical specialty in Otolaryngology. Dr. Zanation has involved residents, Drs. Mihir Patel, Rupali Shah, Josh Surowitz, Kibwei McKinney, Michael Stadler, Alex Farag, Brian Thorp, and Grace Kim, in studies investigating novel techniques in this area. The lab has also mentored seven UNC medical students on projects related to Dr. Zanation's practice. Projects involved everything from the basic science of thyroid and skull base tumor molecular biology to radioanatomic studies in pediatric skull base surgery to clinical outcomes projects in head and neck oncology and endoscopic skull base surgery. Dr. Zanation has 47 pubmed indexed publications and since arriving back to UNC as an attending three years ago, his lab has published 32 pubmed indexed citations. The research team has presented over 20 abstracts this past year and published 14 papers in the last year. The lab has won multiple awards including the Harrell Resident Research Award from the Triological Society,

the North American Skull Base Society Research Award, the Triological Society Head and Neck Best Poster Award and many others. In May of 2010, Dr.



Zanation was awarded a Triological Society Career Development Grant to support a clinical trial entitled Phase II Quality of Life and Neurocognitive Outcomes Trial in Skull Base Tumor Surgery. Also, Dr. Charles Ebert and Dr. Zanation, were awarded a CTSA grant on the Genomics of Allergic Fungal Sinusitis. Dr. Zanation promises to be an outstanding physician-scientist with research contributions at the forefront of Skull Base Surgery, Rhinology and Head and Neck Oncology.



Dr. Paula Harmon



Drs. Harold Pillsbury and Scott Shadfar

The UNC Minimally Invasive Otolaryngology/Head and Neck Surgery Center

Minimally invasive surgery is a hot topic in all of medicine and in the media. It has become an almost ubiquitous term that is getting harder and harder to define. What is minimally invasive surgery and how does one safely advance and study these new surgical techniques? Dr. Zanation believes minimally invasive surgery means any novel techniques that result in less functional and quality of life deficits without compromising the long-term efficacy of the surgery. For endoscopic skull base surgery, the primary benefit is no brain retraction and no need for a formal craniotomy. These advantages have the potential to limit brain trauma and improve neurocognitive and neurofunctional outcomes. And if improved cosmetic or no incision surgery is possible, then it is a secondary benefit. So how does a surgical team study these new techniques?

Surgical science is rooted in a foundation of step-wise thought. First, the approach or technology must be conceived, and then pre-clinical testing illustrates the feasibility of new approach prior to patient application. The next step takes the surgery to highly selected patients with the short-term goal of studying technical limitations and peri-operative safety. Lastly, longer-term primary outcomes such as tumor control must be studied. All these are within the bounds of routine clinical care; however, studying cost, quality of life and specific functional outcomes take additional effort and

planning outside the realm of clinical care.

This pathway of prospective, hypothesis-driven and controlled evaluation of cost, quality of life and functional outcomes is one of the keystones for the Zanation-Ebert Lab. Dr. Charles Ebert is fellowship trained and has a special interest in complex and minimally invasive surgery for sinonasal inflammatory disorders. He and Dr. Zanation have joined in a collaborative lab group to develop and study the outcomes of novel surgical techniques and technologies. This collaboration has been immensely successful resulting in a significant volume of research ideas and data including three newly active prospective clinical surgical trials in only nine months. This success and model lead Dr. Zanation along with Dr. Robert Buckmire to conceive of the University of North Carolina Minimally Invasive Otolaryngology/Head and Neck Surgery Center.

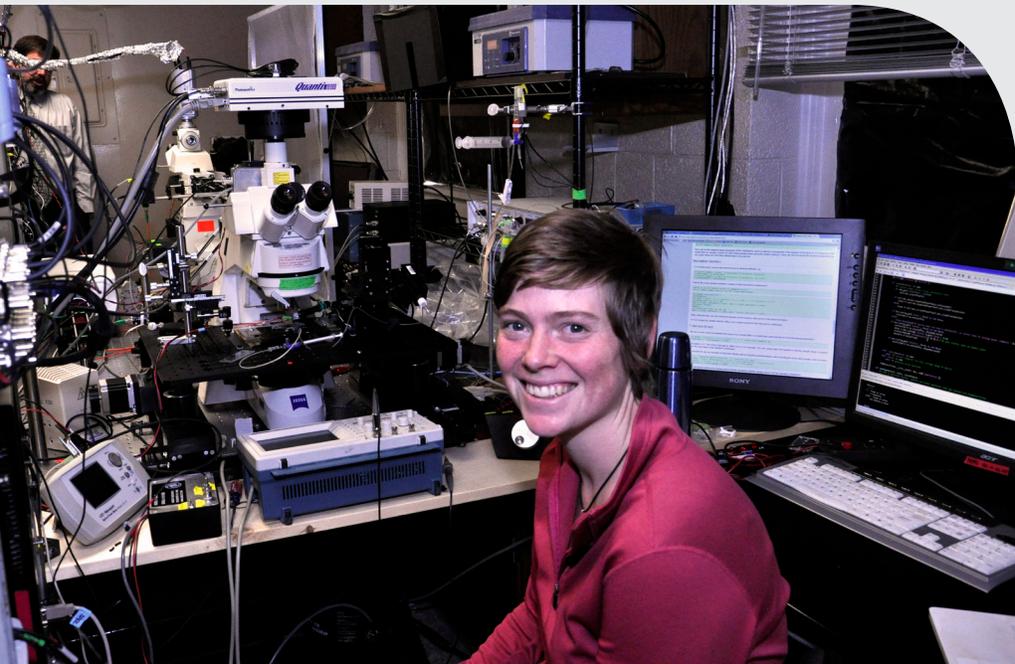
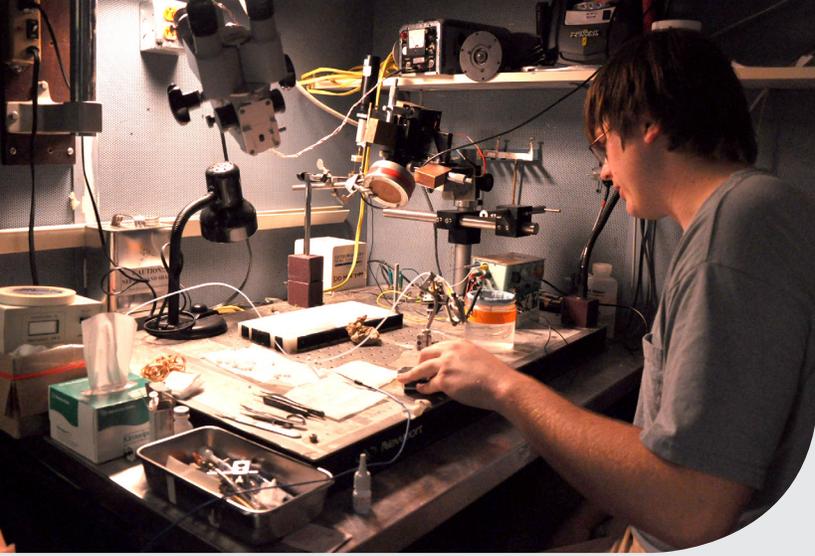
The UNC Minimally Invasive Otolaryngology/Head and Neck Surgery Center has been set-up as the first such center in the United States. The mission statement of the center is *Advancing functional and quality of life outcomes in Otolaryngology/Head and Neck Surgery through technology, research and minimally invasive surgical techniques*. It is an umbrella for all types of advancements in surgical techniques and morbidity across *all* subspecialties of Otolaryngology (from Head and Neck Surgery to Laryngology to Rhinology, etc.). The goal of the Center is to advance surgical care while prospectively studying surgical outcomes. This

Center is open to all fields of Otolaryngology/Head and Neck Surgery at UNC, and we hope through cross-pollination of ideas from different specialties we can even further advance minimally invasive techniques and technology, such as robotic assisted surgery, across multidisciplinary fields. The long-term goal of the Center is to obtain research funding to support these areas of development and research while advancing surgical techniques within Otolaryngology.

For more information on the UNC Minimally Invasive Otolaryngology/Head and Neck Surgery Center, see our website coming soon at unc-net.org or call 919-966-3343 for Dr. Zanation.

Currently active prospective clinical trials within the UNC Minimally Invasive Otolaryngology/Head and Neck Surgery Center are listed below. We hope to open such outcomes trials within each division of the Department of Otolaryngology/Head and Neck Surgery. Multiple other technical, anatomic and retrospective studies are also underway.

- [Prospective Morbidity, Quality of Life and Neurocognitive Outcomes after Skull Base Surgery](#)
- [Prospective Evaluation of the Clinical Impact and Outcomes of a Multidisciplinary Head and Neck Tumor Board \(Presented at the 2010 AHNS\)](#)
- [Analysis and Comparison of Outcomes, Gene Expression Profiles and Eosinophilic Pathways in Allergic Fungal Rhinosinusitis](#)
- [Prospective Clinical Trial of Fluid Dynamic Analysis after Functional Endoscopic Sinus Surgery \(Presented at 2010 ARS\)](#)
- [Virtual Surgery Clinical Trial involving Sinonasal Airflow with Different Size and Orientation of Maxillary Antrostomy](#)
- [Randomized Controlled Trial of Surfactant Irrigation after Sinus Surgery \(study completed, presented at the 2011 ARS\)](#)



Grant



arts **GRANTS, HONORS & AWARDS** *wards*

Description	Principal Investigator	Sponsor	Duration	Amount
Auditory Cortex: Synaptic organization and plasticity	Paul Manis, PhD (35% effort)	NIDCD	03/01/2011 - 02/28/2016	\$365,147 Year 1, Total Direct Costs
Physiology of the Dorsal Cochlear Nucleus Molecular Layer	Paul Manis, PhD (45% effort)	NIDCD	12/2006 - 11/2011	\$1,250,000 Total Direct Costs
Cellular Mechanisms of Auditory Information Processing	Paul Manis, PhD (45% effort)	NIDCD	04/01/2009 - 03/31/2014	\$1,250,000 Total Direct Costs
Research Training in Otolaryngology	Paul Manis, PhD	NIDCD	07/01/2003 - 06/30/2013	\$154,122
Mapping the Connectivity of Cochlea Nucleus Bushy Cells	Paul Manis, PhD	NIDCD	09/01/2010 - 08/31/2012	\$31,744
Prospective Studies of the Pathogenesis of Schizophrenia	PI: Dr. John Gilmore (Psychiatry) Co-Investigator: Paul Manis, PhD (7.5% effort)	NIMH	08/01/2008 - 07/31/2012	\$2,195,152
AHRQ Systematic Review of OME	Austin Rose, MD	RTI/UNC	2011 - 2012	\$40,000
Bilateral Cochlear Implant Benefit	Craig A. Buchman, MD, FACS	Advanced Bionics Corp.	03/19/2008 - 12/18/2011	\$23,490
Cortical Auditory Evoked Potentials in Bilateral Cochlear implant users and in Listeners with Bimodal Hearing	PI: Shuman He, Phd Co-Investigator: Craig A. Buchman, MD, FACS	MedEL Corporation	07/01/2011 - 06/30/2013	\$218,910
Cochlear Implant Design Testing	Craig A. Buchman, MD, FACS	Cochlear Corporation	04/01/2011 - 07/31/2012	\$96,200
Acoustic Cues in Auditory Pattern Analysis	PI: Emily Buss, Phd Co-Investigator: Craig A. Buchman, MD, FACS	NIH/NIDCD	04/01/2011 - 03/31/2016	\$1,480,000
Cortical Potentials and Speech Perception in Children with Auditory Neuropathy	Craig A. Buchman, MD, FACS	NIH/NIDCD	07/05/2011 - 06/30/2013	\$407,000

Auditory Neuropathy Spectrum Disorder in Children	Craig A. Buchman, MD, FACS	Deafness Research Foundation	07/1/2010 - 06/31/2011	\$25,000
A Patient-Matched Analysis Of Global Gene Expression Profiling In Allergic Fungal Sinusitis	Co-PI: Charles S. Ebert, Jr., MD, MPH	NC TraCS Institute	12/01/2010 - 12/01/2011	\$50,000
Examine The Use Of Specific Strains Of Probiotics In The Prevention And Treatment Of Allergy-Induced Et Dysfunction	Charles S. Ebert, Jr., MD, MPH	American Academy of Otolaryngic Allergy	04/01/2011 - 03/31/2012	\$6,000
The Treatment Of Otitis Media With Effusion Using Cpg Oligodeoxynucleotides In An Allergic Rat Model	Charles S. Ebert, Jr., MD, MPH	Centralized Otolaryngology Research Efforts	07/01/2011 - 07/02/2012	\$10,000
Vibrant Sound Bridge Clinical Trial	Craig A. Buchman, MD, FACS	MedEL Corporation	06/01/2011 - 11/30/2012	\$78,939
Spectral Profile Cues And Synthetic Listening	Emily Buss, PhD	NIH/NIDCD	04/01/2005 - 03/31/2016	\$170,000 Present year
Development And Plasticity In Normal And Impaired Ears	Co-PI: Emily Buss, PhD	NIH/NIDCD	09/01/1986 - 08/31/2012	\$206,903 Present year
Spectro-Temporal Analysis In Normal And Impaired Ears	Co-PI: Emily Buss, PhD	NIH/NIDCD	09/01/1986 - 08/31/2012	\$210,375 Present year
Complex Sound Analysis In Normal And Impaired Ears	Co-PI: Emily Buss, PhD	NIH/NIDCD	12/01/1992 - 08/31/2013	\$211,782 Present year
Susceptibility To And Release From Masking In Infancy And Childhood	Co-PI: Emily Buss, PhD	NIH/NIDCD	03/01/2011 - 02/28/2016	\$250,000 Present year
Venous or Arterial Ligation and Intraoperative Dissemination (VALID) of Cancer Cells: A Randomized Clinical Trial for Patients with Resectable Non-Small Cell Lung Cancer	D. Neil Hayes, MD, MPH	National Institute for Environmental Health Sciences	2004 - 2011	\$12,000
Prospective, Longitudinal, MultiCenter, Descriptive Registry of Patients Receiving Therapy Other Than Surgical Resection	D. Neil Hayes, MD, MPH	Imclone Systems	07/06/2006-07/05/2012	\$106,300
Understanding and Achieving Professionalism in a Surgical Practice	PI: Scott Hultman, MD. Participant: Amelia F. Drake, MD	AOA 2010 Professionalism Project	07/07/2010 - 06/30/2011	\$16,000

Multi-Center Randomized Phase II Study of Erlotinib, Cisplatin and Radiotherapy versus Cisplatin and Radiotherapy in Patients with Stage III and IV Squamous Cell Carcinoma of the Head and Neck	D. Neil Hayes, MD, MPH (2.50% effort)	Genentech	07/16/2006 – 07/15/2010	\$42,625
A Randomized Phase 3 Study of Pemetrexed in Combination with Cisplatin Versus Cisplatin Monotherapy in Patients with Recurrent or Metastatic Head and Neck Cancer	D. Neil Hayes, MD, MPH (2% effort)	Eli Lilly	03/2007 – 2011	\$93,082
Randomized Phase II Study of Bevacizumab/Tarceva and Tarceva/Sulindac in Squamous cell Carcinoma of the Head and Neck	D. Neil Hayes, MD, MPH (2.50% effort)	Dana-Farber Partners	07/06/2007 – 07/05/2010	\$40,000
A Randomized, Open label Phase II Study of BIBW 2992 vs Cetuximab (Erbix) in Patients with Metastatic or Recurrent Head and Neck Squamous Cell Carcinoma	D. Neil Hayes, MD, MPH (5% effort)	Boehringer Ingelheim Pharmaceuticals	11/06/2008– 11/05/2011	\$89,614
A Genomic Analysis & Visualization Pipeline Based on an Enterprise Data Warehouse	D. Neil Hayes, MD, MPH (20% effort)	NIH	09/01/2009 – 08/31/2014	\$15,000,000
Integrated Analysis of Chromatin Structure and Gene Expression Patterns in Human Tumors	D. Neil Hayes, MD, MPH (5% effort)	National Cancer Institute	09/29/2009 – 07/31/2014	\$3,699,542
Micro RNA Regulation of Human Airway Epithelial Phenotype	Co-PI: D. Neil Hayes, MD, MPH (20% effort)	NIH (ARRA)	09/30/2009– 08/31/2010	\$500,000
Flexible Statistical Machine Learning Techniques For Cancer-Related Data	Co-PI: D. Neil Hayes, MD, MPH (5% effort)	NIH	04/01/2010 – 03/31/2015	\$285,568
The Inferior Colliculus as a Site for Electrical Stimulation	Douglas C. Fitzpatrick, PhD	NIH/NIDCD	12/01/2008 – 11/30/2010	Direct costs \$275,000/year
Various Studies to Advance the Science and Understanding of Hearing Loss and Intervention	PI: Oliver F. Adunka, MD Co-PI: Douglas C. Fitzpatrick, PhD, and Craig A. Buchman, MD, FACS	Med-El Corporation	12/01/2008 – 12/01/2013	\$300,000

Complex Sound Analysis in Normal and Impaired Listeners	John H. Grose, PhD	NIH/NIDCD	12/01/1992 – 08/31/2013	\$212,500 Present year
Temporal Masking and Speech Recognition in the Aging Auditory System: US-Brazil	John H. Grose, PhD	NIDCD	07/01/2011 – 06/30/2013	\$58,335
Development And Plasticity In Normal And Impaired Hearing	Joseph W. Hall, PhD	NIH/NIDCD	09/01/1986 – 08/31/2012	Direct costs \$200,996/year Indirect costs \$92,458
The Effect Of Cochlear Hearing Loss On Across-Frequency Spectro-Temporal Analysis	Joseph W. Hall, PhD	NIH/NIDCD	09/01/1986 – 07/31/2014	Present year direct costs \$203,643 Indirect costs \$97,749
Spectro-Temporal Analysis in Normal and Impaired Ears	Joseph W. Hall, PhD	NIDCD	09/01/1986 – 07/31/2014	\$301,392
The Treatment of Otitis Media with Effusion Using CpG Oligodeoxynucleotides	Baishakhi Choundry, MD	AAOHNS	07/01/2011 – 06/30/2012	\$10,000
Cortical Auditory Evoked Potentials in Bilateral Cochlear Implant Users	Shuman He, PhD	NIH/NIDCD	2012-2015 [Pending]	Direct costs 300,000 Indirect costs \$144,000
Cortical Potentials and Speech Perception in Children with Auditory Neuropathy	Co-PI: Shuman He, PhD	NIH-NIDCD	2011-2013	Direct costs \$274,982. Indirect costs \$132,000
Cortical Auditory Evoked Potentials in Bilateral Cochlear Implant Users and Listeners with Bimodal Hearing	Shuman He, PhD	MED-EL Hearing Solutions	2011-2013	Direct costs \$140,384 Indirect costs \$31,495
Rapid Case Ascertainment Core	Co-PI: Andrew F. Olshan, PhD	Cancer Center Core Support	1999 – 2015	\$18,239,570
Training Grant in Cancer Epidemiology	Andrew F. Olshan, PhD	NIH	2001 – 2011	\$1,647,736

Developmental Susceptibility Research Core	Co-PI: Andrew F. Olshan, PhD	National Institute of Environmental Health Science	2001-2010	\$1,481,721
Quality of Life Among African-American Head and Neck Cancer Survivors	Andrew F. Olshan, PhD	Lance Armstrong Foundation	2007 - 2012	\$225,000
North Carolina Center for Birth Defects Research and Prevention	Andrew F. Olshan, PhD	CDC	2002- 2013	\$900,000 annually
Genetic Susceptibility Factors in the Etiology of Neuroblastoma	Andrew F. Olshan, PhD	NCI	2008 - 2013	\$2,891,925
Training Program in Reproductive, Perinatal, and Pediatric Epidemiology	Co-PI: Andrew F. Olshan, PhD	NICHHD	2008 - 2013	\$1,430,220
Moderators of Functional Outcomes in Children with Mild to Severe Hearing Loss	UNC Co-PI: Patricia Roush, AuD (15% effort)	NIH/NIDCD	08/01/2008 - 07/31/2013	Direct costs \$1,031,736 Totalling \$1,506,334
Tissue Engineering of Cartilage Using Human Umbilical Cord Mesenchymal Stem Cells and Nanofiber-Based Chondrogenesis	Co-Investigators: John P. Dahl, MD, PhD, MBA, William W. Shockley, MD and John A. van Alast, MD	AAOHNS Foundation CORE Grant (Resident Research Award, Dr.Dahl)	2010 - 2011	\$10,000
Comorbid Infections and Cancer in Malawi	Carol G. Shores, MD, PhD	NC TraCS Institute	05/01/2010 - 05/01/2011	\$50,000
Cancer database and tissue procurement in Malawi	Carol G. Shores, MD, PhD	Lineberger Comprehensive Cancer Center	04/01/2010 - 04/01/2011	\$12,000
Doris Duke Foundation Fellowship for Lindsey Wolf MS4, UCSF	Carol G. Shores, MD, PhD [Mentor for Lindsey Wolf]	Doris Duke Fellowship	07/01/2010 - 07/01/2011	
Comorbid infections and cancer in Malawi	Carol G. Shores, MD, PhD [Fogarty International Research Fellowship for Elizabeth Bigger, MD]	NIH Fogarty International Center	07/01/2009 - 07/01/2010	\$75,000

Phase 1 Trial OfValacyclovir And Cyclophosphamide Therapy In Burkitt Lymphoma	Carol G. Shores, MD, PhD [Fogarty International Research Fellowship for Dan Olson, MD]	NIH Fogarty International Center	07/01/2010 - 07/01/2011	\$75,000
Analysis Of Risk Factors For Esophageal Cancer In Malawi	Carol G. Shores, MD, PhD [Fogarty International Research Fellowship for Yohannie Mlombe]	NIH Fogarty International Center	07/01/2011 - 07/01/2012	\$75,000
A Patient-Matched Analysis Of Global Gene Expression Profiling In Allergic Fungal Sinusitis	Co-PIs: Adam M. Zanation, MD and Charles S. Ebert, MD, MPH	NC TraCS	12/01/2010 - 11/30/2011	\$50,000
Prospective Clinical Trial of Outcomes in Skull Base Tumor Surgery	Adam M. Zanation, MD	Triologic Society Career Development Award	08/01/2010 - 07/31/2011	\$40,000
Validation of an Endoscopic Scoring System for Perioperative Morbidity in Skull Base Surgery	Adam M. Zanation, MD	ARS D-Scope Grant	08/01/2010 - 07/31/2012	\$20,000 [Equipment only]
Predictive Modeling for Treatment of Upper Airway Obstruction in Young Children	Carlton J. Zdanski, MD, FACS, FAAP	NIH	2010 - 2014	\$3,600,000
Dose Assessment of Selected Components of Fragrance Materials in the Respiratory Tracts of Humans and Rats	Co-Investigator: Julia S. Kimbell, PhD (1.52% effort)	Research Institute for Fragrance Materials	06/01/2009 - 06/30/2011	Direct costs \$13,340/year
Mechanism of Species Dependent Environmental Lung Injury	Co-Investigator: Julia S. Kimbell, PhD (2.18% effort)	University of Alabama at Birmingham	04/01/2006 - 03/31/2011	Direct costs \$29,609/year
Computer Modeling of Surgical Outcomes for Nasal Airway Obstruction - ARRA	Co-Investigator: Julia S. Kimbell, PhD (7.2% effort)	Medical College of Wisconsin	04/01/2009 - 03/31/2013	Direct costs \$87,000/year
Predictive Modeling for Treatment of Upper Airway Obstruction in Young Children	Co-Investigator: Julia S. Kimbell, PhD (2.4% effort)	NIH/NHLBI	09/17/2010 - 08/31/2014	Direct costs \$649,137
Modeling the Pediatric Upper Airway Using A-OCT and DNS CFD	Co-Investigator: Julia S. Kimbell, PhD (2.4% effort)	NIH/NHLBI	09/17/2010 - 08/31/2014	Direct costs \$31,952
Childhood Development after Cochlear Implantation-Phase II	Holly F.B. Teagle, AuD	Johns Hopkins University	07/01/2009 - 06/30/2012	\$96,154

DISTINGUISHED PROFESSORSHIPS

The W. Paul Biggers Distinguished Professorship

The W. Paul Biggers Distinguished Professorship was established in 2000 to honor Dr. Biggers, who had been an integral part of the University of North Carolina since becoming a medical student in 1959.

Paul Biggers was born in 1937 in Charlotte, North Carolina, earned a B.S. at Davidson College and his M.D. at the University of North Carolina at Chapel Hill. He completed his internship and residency also at UNC. In 1968 Dr. Biggers joined the faculty in Otolaryngology/Head and Neck Surgery at UNC.

Dr. Biggers offered an example of compassion, scholarly devotion, commitment to patient care, and teaching that is beyond compare. The numerous teaching awards bestowed upon him by the School of Medicine evidenced his contribution to medical teaching of students and residents.

Beyond these contributions, Dr. Biggers had a lifetime interest in speech and language and served on the Board of Examiners for Speech and Language Pathologists and Audiology. Through tireless efforts, he ensured that



*W. Paul Biggers Professor:
William W. Shockley, MD
(2005-present)*

the state legislature establish and continue a program designed to aid children with speech and hearing disorders. This program has already benefitted thousands of children within the State of North Carolina. For these efforts, he was presented the Service to Mankind Award and was honored with the H. Fleming Fuller

Award as the outstanding clinician at the UNC Hospitals.

Established in 1992, the Carolina Children's Communicative Disorders Program (CCCDP) was made possible by Dr. Biggers' insight, perseverance, and generosity of spirit. This program is funded by the State of North Carolina and aids children with speech and hearing disorders. To honor him, the name was changed to the W. Paul Biggers, MD, Carolina Children's Communicative Disorders Program. Outside of the Division of Otolaryngology/Head and Neck Surgery, Dr. Biggers was very active within the University. He helped coach the football team and served on the Executive Committee of the Board of Directors for the Educational Foundation. These accomplishments only begin to describe the service that Dr. Biggers provided to the State, the University, and to Otolaryngology/Head and Neck Surgery at UNC.

In recognition of Dr. Biggers' many contributions, the W. Paul Biggers Distinguished Professorship was established before he died in April of 2000 at the age of 62. Dr. Biggers asked that this Professorship be awarded to a physician who shares his passion for innovative teaching. On July 1, 2005, William W. Shockley, MD, was named the W. Paul Biggers Distinguished Professor of Otolaryngology/Head and Neck Surgery, to continue the tradition of excellence in patient care, compassion, teaching, and service that Dr. Biggers exemplified.

The Thomas J. Dark Distinguished Professorship

The Thomas J. Dark Professorship in Otolaryngology was established in the University's School of Medicine in 1976 by Thomas Jefferson Dark of Siler City and Ft. Lauderdale, Florida.

The son of a Chatham County farmer, Dark was born in 1894. A member of the class of 1925, Dark studied in the University's School of Commerce — now the Kenan-Flagler Business School — and caught the attention and

admiration of then-Dean Dudley DeWitt Carroll and John Sprunt Hill of Durham, who built and gave The Carolina Inn to the University. Dark handled John Hill's business correspondence relating to the construction of the inn and, upon its completion, was kept on for another year as social manager.

After receiving a Certificate of Commerce from the University in 1925, he returned to Siler City, where he organized the community's first fire department and became its chief. He worked briefly for a chair company in High Point and an automobile company in Greensboro. Then Carroll recommended him for a sales job with Collins & Aikman Corp. of Roxboro and New York.

In 1940, he invested in a small manufacturing company, the Buchmann Spark-Wheel Corp. When he became president, the company had 18 employees with varying levels of expertise in manufacturing small precision metal parts for cigarette lighters, toys, mining lamps and hardware. During World War II, under Dark's leadership, this small, obscure firm expanded, filling U.S. Army, Navy and Army Air Corps contracts for precision parts used in ordnance, radar and communications equipment for fighter and bomber planes. At this time, Dark purchased 3,000 acres of land near Athens, Georgia, and converted a rundown cotton plantation into a highly prized farm for raising Black Angus beef cattle. He continued both of these activities until his retirement in 1958.

Soon after his retirement, he bought a home in Ft. Lauderdale. He grew roses and raised bees in between recreational sailing trips. Because of family in North Carolina, he divided his time between Ft. Lauderdale and Siler City, with visits to his alma mater in Chapel Hill. An avid sports fan, he rarely missed a home football game in the last two decades of his life. He died in Siler City in 1987 at age 93.

In addition to establishing the Dark Professorship, he provided other gifts to the University, including a scholarship fund in the School of Medicine, a challenge gift to his classmates and a gift to establish an office for

the Order of the Bell Tower in the new George Watts Hill Alumni Center. He also inspired his friend, Eunice Bernhard, to endow a professorship in the School of Medicine.

In recognition of his continuing loyalty and generosity, the School of Medicine presented him with its Distinguished Service Award in 1982.



Thomas J. Dark Professor: Harold C. Pillsbury, III, MD (1991-present)

The Joseph Palmer Riddle Distinguished Professorship

The Joseph Palmer Riddle Distinguished Professorship in Otolaryngology was established in the University's School of Medicine in 1977 by a gift from Joseph Riddle.

Riddle was born in 1921 in Fayetteville. As the eldest son of a railroad conductor, he went to work at an early age at his family's gas station and country store. The long hours and minimal living conditions motivated the young Riddle to look to other opportunities for his future. He began working at the shipyard in Wilmington, where he met his future wife, March Floyd of Fairmont, N.C.

Riddle went on to serve for a time in the U.S. Navy. Afterwards, the newlyweds returned to Robeson County and Riddle began as a mail carrier. In 1952, Riddle, with the help of his father-in-law, began building homes in Cumberland County to respond to the military growth in the area. His construction and development company, the March Development Corp., concentrated its building efforts on the boundaries of Fort Bragg. The company is credited with contributing to the growth explosion of Fayetteville's west side beginning in the 1960s. In addition, Riddle purchased and developed the 600-acres



*Joseph Palmer Riddle Professor:
Mark C. Weissler, MD
(2000-present)*

Cross Creek Mall area to transform his hometown into a major retail shopping center.

Riddle contributed substantially to projects that benefited education, medicine and quality of life in Fayetteville and at the University. Although not an alumnus, he

was a member of the School of Medicine's Co-

Founders Club and a vigorous and untiring force on the Medical Foundation Board of Directors. He also served on the Board of Directors of the Educational Foundation, which supports the University's athletic programs. He was one of a growing number of individuals whose gifts have gone to support both the academic and athletic programs of the University.

In addition to establishing the professorship, Riddle contributed funds to the Division of Cardiology in the Department of Medicine and the Division of Otolaryngology in the Department of Surgery. He provided needed funding for research associates and specialized scientific equipment for the Division of Cardiology. His support of the Otolaryngology Department led to advances in the study of otolaryngologic allergy and the establishment of an otolaryngology and microsurgery laboratory that bears his name.

Riddle's continued interest and support of medical programs at the University resulted in a substantial gift to the UNC-CH Lineberger Comprehensive Cancer Research Center. In recognition of his interest and support, he was presented the Distinguished Service Award by the School of Medicine in 1980.

Riddle and his wife, March, had three children: Sharlene

(B.A. '84), Joseph III (B.S. '77) and Carolyn. Riddle died in 1995 at the age of 73.

The Newton D. Fischer Distinguished Professorship

The Newton D. Fischer Distinguished Professorship was established in 1993 to honor Fischer, a longtime medical school professor who established the Division of Otolaryngology/Head and Neck Surgery in 1952. It was created by the members of the Newton D. Fischer Society, who funded it, envisioning an ongoing contribution to academic otolaryngology.

Fischer was born in San Antonio in 1921. He earned three degrees from the University of Texas: a B.S. in 1942, a B.A. in 1943, and an M.D. in 1945. Fischer completed his residency at Johns Hopkins University, where he was an instructor for one year before coming to Chapel Hill in 1952. Fischer was the first Chief of Otolaryngology, a post he held for more than 30 years. He was among the first doctors to receive an otolaryngology training grant from the National Institutes of Health. In 1977, Fischer was named the Thomas J. Dark Distinguished Professor of Surgery, the chair he held until 1991.

Fischer is credited with helping the Division of Otolaryngology/Head and Neck Surgery achieve national prominence, widely recognized as one of the top 10 in training programs for residents in otolaryngology. Among the many residents Fischer trained is Harold C. Pillsbury III, who said of Fischer, "The loving care of a man of this depth is the sort of support an individual needs to really accomplish his best work."

Fischer's numerous awards include "The Professor" Award in 1977 and The Central Carolina Bank Excellence in Teaching Award in 1988. In 1984, he and his wife, Janet, a Sarah Graham Kenan Professor in the School of Medicine, won the Thomas Jefferson Award, which is given annually to the UNC-CH faculty member who best exemplifies the ideals and objectives of Jefferson through personal influence, teaching, writing and scholarship. Janet J. Fischer died after a courageous fight



*Newton D. Fischer Professor:
Amelia F. Drake, MD
(1998-present)*

with breast cancer on February 24, 2007. At her memorial service, she was described by her grandson as “a remarkable woman who lived an extraordinary life.”

Newton and Janet Fischer have five children: twins Jeannette (M.D. '81) and Amelia (M.D. '81), and Duncan, Anne (B.A. '83) and Helen (B.A. '81, M.A. '86),

and eight grandchildren: Sarah, Jake, and Eva Stein; Luke, Kent, and Duncan Fischer; and Connor and Cliff Drake.

The Thomas J. Dark Distinguished Professorship and Distinguished Research Professorship in Otolaryngology/Head and Neck Surgery

The Thomas J. Dark Professorships were established in 1976 and 2011 by Thomas Jefferson Dark of Siler City, North Carolina and Ft. Lauderdale, Florida.

The son of a Chatham County farmer, Dark was born in 1894. A member of the class of 1925, Dark studied in the University's School of Commerce — now the Kenan-Flagler Business School — and caught the attention and admiration of then-Dean Dudley DeWitt Carroll and John Sprunt Hill of Durham, who built and gave The Carolina Inn to the University. Dark handled John Hill's business correspondence relating to the construction of the inn and, upon its completion, was kept on for another year as social manager.

After receiving a Certificate of Commerce from the University in 1925, he returned to Siler City, where he organized the community's first fire department

and became its chief. He worked briefly for a chair company in High Point and an automobile company in Greensboro. Then Carroll recommended him for a sales job with Collins & Aikman Corp. of Roxboro and New York.

In 1940, he invested in a small manufacturing company, the Buchmann Spark-Wheel Corp. When he became president, the company had 18 employees with varying levels of expertise in manufacturing small precision metal parts for cigarette lighters, toys, mining lamps and hardware. During World War II, under Dark's leadership, this small, obscure firm expanded, filling U.S. Army, Navy and Army Air Corps contracts for precision parts used in ordnance, radar and communications equipment for fighter and bomber planes. At this time, Dark purchased 3,000 acres of land near Athens, Georgia, and converted a rundown cotton plantation into a highly prized farm for raising Black Angus beef cattle. He continued both of these activities until his retirement in 1958.

Soon after his retirement, he bought a home in Ft. Lauderdale. He grew roses and raised bees in between recreational sailing trips. Because of family in North Carolina, he divided his time between Ft. Lauderdale and Siler City, with visits to his alma mater in Chapel Hill. An avid sports fan, he rarely missed a home football game in the last two decades of his life. He died in Siler City in 1987 at age 93.

In addition to establishing the Dark Professorships, he provided other gifts to the University, including a scholarship fund in the School of Medicine, a challenge gift to his classmates and a gift to establish an office for the Order of the Bell Tower in the new George Watts Hill Alumni Center. He also inspired his friend, Eunice Bernhard, to endow a professorship in the School of Medicine.

In recognition of his continuing loyalty and generosity, the School of Medicine presented him with its Distinguished Service Award in 1982.

Newton D. Fischer, MD held the first Thomas J. Dark

Professorship from 1977 – 1991. Harold C. Pillsbury, III, MD currently holds this professorship.

The inaugural Thomas J. Dark Research Professorship was awarded to Paul B. Manis, Ph.D. in 2011. Dr. Manis is currently studying how cells in the brain process



*Thomas J. Dark Research Professor:
Paul B. Manis, PhD (2011-present)*

sound information, by studying the electrical activity of single cells, the chemical communication between cells and the organization of the neural cell assemblies. His research has been continuously funded by NIH grants for nearly 25 years. Additionally, he successfully submitted and has maintained our Department's NIH research training

grant. This grant supports medical student and resident education, and is one of only about a dozen in the US. He also serves on the NIDCD Advisory Council and as the Editor-in-Chief of the Journal of the Association for Research in Otolaryngology.

The James S. and June M. Ficklen Distinguished Professorship in Otolaryngology/Head and Neck Surgery

This professorship was established in 2008 by the late James Ficklen and June Ficklen of Greenville, NC in honor of Dr. Harold C. Pillsbury, III.

James Skinner Ficklen, Jr., a Greenville, NC, native, attended Woodberry Forest School in Virginia, graduating in 1942. The following fall he entered The University of North Carolina at Chapel Hill where he joined Sigma Alpha Epsilon and enrolled in Naval ROTC. After two years of study, he enlisted in the Naval Training

School in Cambridge, Massachusetts followed by service as a Lieutenant on the USS Cleveland. Ficklen, a Communications Officer, witnessed the Japanese surrender to General MacArthur on board the USS Missouri. After the war, he completed his undergraduate studies and returned to Greenville where he joined E. B. Ficklen Tobacco Company in Greenville, NC as treasurer. Mr. Ficklen was known for his interest in the community and was active throughout his life in Greenville's civic and financial affairs. He served on various boards of directors including Home Federal Savings and Loan and Wachovia Bank. He worked with a number of charitable organizations including the Red Cross, United Way, Salvation Army and The Children's Home in Greensboro.

June Montague Ficklen is the spouse of the late James Skinner Ficklen, Jr. Ms. Ficklen is a founding member of Women for Women, a special interest fund of the Greater Greenville Community Foundation. Ms. Ficklen provided the seed money to start this fund in 2005. Ms. Ficklen is a member and past Board of Advisors for the North Carolina Outward Bound School and the East Carolina University Board of Visitors.

This professorship was awarded to its first recipient, Joseph W. Hall, III, Ph.D. in 2011. Dr. Hall's excellent research has resulted in over 25 years of continuous funding by the NIH and the receipt of the Claude Pepper Award of Excellence from the NIH Deafness Institute. He has served as Associate Editor of the Journal of the Acoustical Society of America and currently serves as a member of the FDA Division of Ophthalmic and Ear, Nose and Throat Devices Panel.



*James S. and June M. Ficklen Professor:
Joseph W. Hall, III, PhD (2011-present)*

The Nathaniel T. and Sheila E. Harris Distinguished Professorship in Otolaryngology/Head and Neck Surgery

This professorship was established in 2006 by Nat and Sheila Harris of Burlington, North Carolina in honor of their good friend and physician, Dr. Harold C. Pillsbury, III.

Nathaniel Thomas “Nat” Harris, Jr. was born and raised in Burlington, North Carolina. He is President and Senior Partner of Harris, Crouch, Long, Scott & Miller in Whitsett, NC. Mr. Harris attended The University of North Carolina at Chapel Hill and later joined Massachusetts Mutual as a national sales leader. In 1967, Mr. Harris founded Harris & Associates which later became Harris, Crouch, Long, Scott & Miller in 1981. Harris, Crouch, Long, Scott & Miller provides its clients with innovative and creative insurance solutions that help to assist businesses and maintain family wealth.

Mr. Harris’ previous service at Carolina includes the Educational Foundation (serving as President in 1988 and 1989), an Endowment Trustee for the Rams Club, Regional Volunteer for the Bicentennial Campaign and the National Development Council. Additionally, Mr. Harris served with distinction on the Medical Foundation of North Carolina Board, the Lineberger Comprehensive Cancer Center Board of Visitors and is a past member of the UNC Board of Visitors. Mr. Harris enjoys bird hunting with friends throughout the US, Central America, South America, Africa and Europe. He is also an avid saltwater fly fisherman and has fished in Australia, Mexico, Guatemala, Costa Rica, Panama and Venezuela.

Sheila Eileen Westbrook Harris was also born and raised in Burlington, North Carolina. She has dedicated her life to serving her family. She enjoys spending time with her daughters, Kim (B.A. ’89) and Lawson (B.A. ’93), and her 4 grandchildren. She also enjoys time at their home on the coast of North Carolina. She has served on the Lineberger Comprehensive Cancer

Center Board of Visitors and actively supports UNC’s Arts and Sciences Foundation Professorship Program.

This professorship was awarded in 2011 to its first recipient, Brent A. Senior, MD, FACS, FARS.

Dr. Senior has been at UNC for the last 11 years. He is Chief of the Division of Rhinology, Allergy, and Endoscopic Skull Base Surgery and Vice Chair for Academic Affairs for the Department. He has a strong national and international reputation in the fields of Rhinology and Endoscopic Sinus Surgery, having served as President of the American Rhinologic Society and on the Board of Directors of the International Rhinologic Society. He has an unwavering commitment to education, having received numerous teaching accolades while also serving as the current chair of the Rhinology and Allergy Education Committee for the American Academy of Otolaryngology/Head and Neck Surgery. He also serves as Associate Editor for the International Forum of Allergy and Rhinology and on the Editorial Boards of numerous national and international otolaryngologic journals. His commitment to humanitarian efforts is well known through his work around the world and, specifically, for the last 15 years, in Vietnam where he has received the Peoples Medal for his work there as well as the Medal of Honor from City of Ho Chi Minh City. He received the Humanitarian of the Year Award from the American Academy of Otolaryngology.



Nathaniel T. and Sheila E. Harris Professor: Brent A. Senior MD (2011-present)

NEWTON D. FISCHER SOCIETY MEETING

For decades the Department of Otolaryngology/Head and Neck Surgery has trained medical students and residents. The first chairman of the UNC Division of Otolaryngology/Head and Neck Surgery was Newton D. Fischer. Dr. Fischer's enduring emphasis on medical students' and residents' education, as well as research, continues to shape the philosophy of the Department to this day. Clinical practice within this field involves the medical and surgical diagnosis and management of very common to very rare diseases such as treatment of the neck in squamous cell carcinoma, chronic rhinosinusitis, and auditory neuropathy. Novel research and emerging technologies are changing how these disease processes are managed, including endoscopic approaches and external approaches. This annual meeting provides new information and surgical techniques for the practicing Otolaryngologist/ Head and Neck Surgeon.

This year, the meeting was held on June 5, 2011 at the Paul J. Rizzo Conference Center in Chapel Hill. Drs. Austin Rose and Charles Ebert served as Course Directors. Myles Pensak, MD, from the University of Cincinnati, was the Keynote Speaker. At the end of the program, a banquet was held in honor of the graduating Chief Residents.

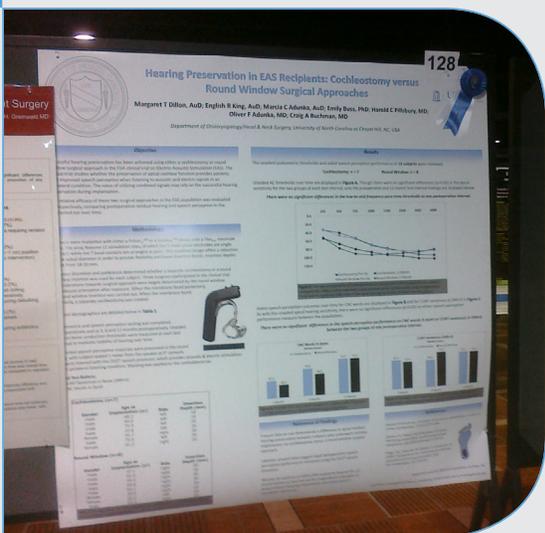


Oral presentations included

- *Principles of Unilateral Cleft Lip Repair Made Easy*
Joshua C. Demke, MD
- *Minimally Invasive Approaches for Juvenile Nasopharyngeal Angiofibroma*
Alisha N. West, MD, Adam M. Zanation, MD, and Austin S. Rose, MD
- *A Historical Perspective on the Otolaryngologist's Role in Cleft Care*
Amelia F. Drake, MD
- *Pediatric ENT Update 2011: Congenital Nasal Anomalies*
Austin S. Rose, MD
- *Full-Thickness Skin Grafting for Nasal Reconstruction*
Brian D. Thorp, MD and William W. Shockley, MD
- *Microtia: The UNC Experience*
Jessica K. Smyth, MD, William W. Shockley, MD and Carlton J. Zdanski, MD
- *Cartilage Tissue Engineering on Nanofiber Scaffolds: Implications for Microtia Reconstruction*
John P. Dahl, MD, PhD, MBA
- *Keynote Speaker Lecture: The Enigmatic Smile – Mona Lisa Revisited*
Myles L. Pensak, MD, FACS
- *Otology Panel Discussion*
Rose J. Eapen, MD, Harold C. Pillsbury III, MD, Craig A. Buchman, MD and Oliver F. Adunka, MD
- *Effects of Intracochlear Electrode Placement on Cochlear Function in an Animal Model*
Baishakhi Choudhury, MD and Oliver F. Adunka, MD
- *Nasal Airflow and Air-Conditioning after Functional Endoscopic Sinus Surgery: A Fluid Dynamics Model*
Kibwei A. McKinney, MD, Julia S. Kimbell, PhD, Carlos S. Ebert, Jr., MD, MPH, Brent A. Senior, MD, and Adam M. Zanation, MD

HONORS, AWARDS, AND ACHIEVEMENTS

Margaret T. Dillon, AuD received a Blue Ribbon for her poster presentation: Hearing Preservation in EAS Recipients: Cochleostomy versus Round Window Surgical Approaches at the 13th Symposium on Cochlear Implants in Children, Chicago, IL July 14-16, 2011.



Robert Buckmire, PhD was elected to Academy of Educators of the UNC School of Medicine in 2011.

Dr. Jake Dahl received the Centralized Otolaryngology Research Efforts (CORE) Resident Research Award, American Academy of Otolaryngology: Head and Neck Surgery Foundation, was the 2010 Intern of the Year, Division of Plastic and Reconstructive Surgery, UNC School of Medicine, received the 2010 Wolf and Daisy Losken Craniofacial Research Award, Division of Plastic and Reconstructive Surgery, UNC

School of Medicine

As of February 21, 2011, Dr. Manis is the Editor-in-Chief of the Journal of the Association for Research in Otolaryngology. This journal, published by the Association for Research in Otolaryngology, currently has the highest Impact Factor of all specialty journals related to Otolaryngology. JARO is a peer-reviewed journal that publishes research findings from disciplines related to otolaryngology and communications sciences, including hearing and balance.

More information on the Journal: <http://www.springerlink.com/content/1525-3961/>

Dr. Esa Bloedon received the 2010 Teaching Attending Award, from the Wake Area Health Education Center.

As of June, 2011, Dr. Manis is a member of the National Institute on Deafness and Other Communication Disorders (NIDCD) Advisory Council. The Council is a federally mandated committee, composed of scientists and lay persons. Each type of of the National Institutes of Health maintains a national advisory council which has two general functions: (1) to advise the Institute on policy and procedures affecting the extramural research programs and (2) to provide a second level of

review for all grant and cooperative agreement applications considered by the Institute for funding. His term is 2011-2015 (4 years).

Dr. Manis was awarded a new R01 (research project) grant from NIDCD, starting in March, 2011, entitled Auditory Cortex: Synaptic Organization and Plasticity. This grant runs for 5 years and has total direct costs (as awarded) of \$2,026,438, and total costs (including indirects) of \$2,026,438. A description of the work on this grant is in the lab writeup.

Dr. Emily Buss became a Fellow of the Acoustical Society of America in 2010.

Dr. Julia Kimbell received a Ribbon of Recognition (one of Top Ten Abstracts), in the Risk Assessment Specialty Section, Annual Meeting of the Society of Toxicology, March, 2011.

Dr. Harold C. Pillsbury was the Guest of Honor, Combined Sections Meeting, American Laryngological, Rhinological, and Otological Society (The Triological Society), Chicago, IL, April 29, 2011. Dr. Pillsbury was also the Guest of Honor, Southern Section Meeting, American Laryngological, Rhinological, and Otological Society (The Triological Society), Scottsdale, AZ, January 27, 2011.

Dr. Douglas Fitzpatrick received the 2010 Medical Student Research Mentor Award from the Academy of Educators.

Mark C. Weissler, MD was elected to the following associations:

- Southern Section Triological Society Vice Presidential Citation, Scottsdale AZ, January, 2011
- Best Doctors in America, 2011
- America's Top Doctors, published by Castle Connolly Medical Ltd. for 2011: for five consecutive years.
- America's Top Doctors recognition for Cancer, published by Castle Connolly Medical Ltd. , 2007, 2008, 2009, 2010, 2011
- America's Top Doctors recognition for Otolaryngology, published by Castle Connolly Medical, Ltd. for 2011: for ten years in a row.
- Triological Society – Southern Section Presidential Citation in recognition of outstanding contributions to Otolaryngology/Head and Neck Surgery. Marco Island, FL, January 9, 2004.
- Top Doctors recognition for Otolaryngology, Business North Carolina, 2002-2011

Dr. Brent Senior became the Nathaniel and Sheila Harris Distinguished Professor, June 2011. Dr. Senior was also included in the Best Doctors, 2011-2012, USA and North Carolina, and Castle Connolly's America's Top Doctors, 2011.

Dr. William Shockley received Top Doctor Recognition for Otolaryngology, Business North Carolina for 2011: a tenth year in a row.

Craig A. Buchman, MD, FACS is a recipient of a \$400,000 grant from the NIH, from the study *Cochlear Implantation in Children with Labyrinthine Anomalies and Cochlear Nerve Deficiency*: Implications for Auditory Brainstem Implantation. This study observed outcomes among children with inner ear malformations and cochlear nerve deficiency with a cochlear implant. The study was a collaborative effort by UNC ENT, and features Holly F. B. Teagle, AuD; Patricia A. Roush, AuD; Lisa R. Park, AuD; Debora Hatch, AuD; Jennifer Woodard, AuD; Carlton Zdanski, MD; and Oliver F. Adunka, MD as contributing authors. The American Laryngological, Rhinological and Otological Society feature the study in The Laryngoscope publication.

Grace G. Kim, MD received the two-year NIH Loan Repayment award for Clinical Research.

The 10th edition of Castle Connolly Medical, Inc. recognized Drs Harold Pillsbury, Mark Weissler, Brent Senior, and William Shockley as "America's Top Doctors" in the specialty of Otolaryngology, and Dr. Amelia Drake in Pediatric Otolaryngology. Dr. Weissler is also listed in the 5th edition of Castle Connolly's "America's Top Doctors for Cancer." UNC ENT's nominated by their peers in an extensive survey process of thousands of American doctors.

Adam Campbell, MD received the Deborah C. Leary award for the paper *Correlation of Early Auditory Potentials and Intracochlear Electrode Insertion Properties: An Animal Model featuring Near Real-Time Monitoring*. Adam worked with Drs. Adunka and Fitzpatrick under a yearlong research grant from the Department as a medical student.

Adam M. Zanation, MD received the 2011 Triological Society Southern Section 1st Place Research Award in Head and Neck Surgery Section, January 2011, Scottsdale, AZ.



Adam M. Zanation, MD received the 2011 Triological Society Combined Section 2nd place The John E. Bordley Resident Research Award, January 2011, Scottsdale, AZ.

UNC Health Care's real doctors, real people video featuring Deepak R. Dugar, MD won four bronze Telly Awards. Thanks to everyone who voted for the video!

Baishakhi Choudhury, MD received an AAO-HNSF Resident Research Grant for her grant proposal entitled The Treatment of Otitis Media with Effusion using CpG Oligodeoxynucleotides.

Julia Kimbell, PhD collaborated with Dr. John Rhee at the Medical College of Wisconsin on virtual nasal surgery research, *Toward Personalized Nasal Surgery Using Computational Fluid Dynamics*. The paper featured another UNC collaborator, Guilherme J. M. Garcia, PhD.

Mark C. Weissler, MD was accepted into the American Surgical Association in June 2011.

The 115th Annual AAO-HNS Meeting & OTO EXPO was September 11-14, 2011 in San Francisco, California. The Department was widely represented, featuring presentations by Drs Grace Kim, Jake P. Dahl, and Dennis O. Frank, PhD. Adam M. Zanation, MD and Brent A. Senior, MD taught two courses and Craig Buchman, MD was featured as

moderator and presenter for three miniseminars.

On May 11, 2011, Craig A. Buchman, MD attended a Medicare Evidence Development & Coverage Advisory Committee (MEDCAC) meeting to provide data on the effectiveness of cochlear implants (CI) in patients, and to urge the Centers for Medicare and Medicaid Services (CMS) to expand its coverage for the device. Although MEDCAC, which makes recommendations to CMS about its coverage for devices, concluded there was not enough evidence to expand Medicare coverage for CIs, it plans to continue engaging specialty societies and CI manufacturers so it can obtain more robust data on health outcomes. ONLINE EXTRAS: See more at entnet.org/Practice/MEDCAC/CochlearImplants.cfm.

Craig A. Buchman, MD was named a founding board member of the American Cochlear Implant Alliance (ACIA). The ACIA is a newly founded organization dedicated to creating access to cochlear implantation for all that can potentially benefit.

UNC was well represented at the 13th Symposium on Cochlear Implants in Children held in Chicago from July 14-16. The UNC team gave more than 10 oral and poster presentations at the conference on many topics relating to cochlear implantation and other implantable auditory prostheses. The

team continues to lead the field through their commitment to the highest quality patient care, research, and teaching.

In an effort to bring professional groups closer together, Drs. Buchman and Adunka, along with an international group of other cochlear implant experts, are currently in the process of setting-up a global, multi-professional society for cochlear implants and related technology. This organization should help bridge the gap between various professionals such as audiologists, speech and language pathologists, researchers, teachers, and otolaryngologists. We are developing a multidisciplinary, non-profit organization with the goals of advancing education, patient care, and research in cochlear implantation and other related auditory prostheses. With these goals in mind, the society will provide a platform that allows professionals from various fields to communicate through common information portals that include meetings, scientific journals and web-based media.

Dr. Trevor Hackman is opening a sialendoscopy practice for patients with chronic and acute submandibular and parotid glands problems. Sialendoscopy is a new alternative endoscopic procedure to treat salivary gland stones and treat chronic salivary gland infections in a minimally invasive manner. Traditional treatments include marsupilizing

the Wharton's duct in the floor of mouth or excising the gland. Sialendoscopy provides patients an outpatient minimally invasive alternative to traditional surgery for patients suffering from salivary infections.

Two of our residents have published papers to the October 2010 issue of *The Laryngoscope*. Dr. John Dahl co-authored "Recombinant human tissue factor pathway inhibitor prevents thrombosis in a venous tuck model," with Drs. Ezzat, Luginbuhl, Gordin, Krein, and Heffelfinger. Dr. Deepak Dugar, a first-year resident, published "Pediatric acute sinusitis: predictors of increased resource utilization," with Drs. Lander, Mahalingam-Dhingra, and R.K. Shah.

Dr. Scott Shadfar gave an oral presentation on his research at the 2010 American Head and Neck Society Research Workshop on Biology, Prevention & Treatment of Head & Neck Cancer, October 28-30, 2010, in Arlington, Virginia. The paper, "Cancer Cachexia: NF- κ B inhibition protects against tumor induced cardiac atrophy in vivo using the novel compound Resveratrol," was co-authored by Drs. Marion Couch, Kibwei McKinney, Xiaoying Yin, Lisa Weinstein, Denis Guttridge, and Monte Willis.

Craig Buchman, MD, and Pat Roush, AuD, were invited presenters

at the fifth triennial "Sound Foundations" conference. Attendees from the US and over 30 other countries gathered in Chicago in November for a three-day international pediatric audiology conference on assessment and management of children with hearing loss. Dr. Buchman delivered a presentation entitled "Candidacy Considerations for Implantable Hearing Technologies: An Otolologist's Perspective." Dr. Roush presented on "Auditory Neuropathy and Challenges in Diagnostic Audiology."



Audiologist Sarah Martinho, Au.D. (center), was chosen "Clinical Preceptor of the Year" by UNC's AuD Class of 2011. Graduates Nicole Duncan (left) and Ellen Pearce (right), who participated in the nomination process, praised Dr. Martinho for her excellence in pediatric audiology and her outstanding attributes as a clinical educator.

Deepak Dugar, MD won the Best Plastic Surgery Intern of the Year award. The Plastic Surgery

intern award has been a long time tradition at UNC. Its chosen from the 12 interns a year who rotate on the Plastic Surgery service each year. The award is based on surgical skills, patient care and overall service management. In prior years, Drs. Jake Dahl, Kibwei McKinney and Mihir Patel were recipients of the award. This year Dr. Dugar received it during Surgery Grand Rounds by Dr. van Aalst. Hope its an award we can continue to keep in our department!

Rose Eapen, MD was inducted into Alpha Omega Alpha at the University of North Carolina, Chapel Hill Chapter, March 2011. Dr. Eapen also recieved the UNC Shockley Silver Owl Award for Excellence in Teaching in June 2010. She was recognized as 1 of 20 residents annually for outstanding teaching

Amelia F. Drake, MD received the Vice Presidential Citation, Southern Section of the Triologic Society, January 2012.

Present



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PRESENTATIONS

Adunka OF. *Electrical acoustical stimulation of CI-hearing aid: What we know today.* 10th European Symposium on Paediatric Cochlear Implantation, Athens, Greece, May 12-15, 2011.

Adunka OF. *Potential benefits of deep electrode insertion.* 10th European Symposium on Paediatric Cochlear Implantation, Athens, Greece, May 12-15, 2011.

Adunka OF. *Surgery for peripheral facial nerve paralysis.* 8th Annual Middle East Update in Otolaryngology. Dubai, UAE, May 8-10, 2011.

Adunka OF. *Cochlear implantation in unusual cases.* 8th Annual Middle East Update in Otolaryngology. Dubai, UAE, May 8-10, 2011.

Adunka OF, Buchman CA, King ER, Adunka MC, Dillon MT. *Round window stimulation for conductive or mixed hearing loss using Vibrant MED-EL in Adults.* 8th Annual Middle East Update in Otolaryngology. Dubai, UAE, May 8-10, 2011.

Adunka OF. *Recent advances in hearing preservation cochlear implantation.* 8th Annual Middle East Update in Otolaryngology. Dubai, UAE, May 8-10, 2011.

Adunka OF. *Protecting the function of the inner ear: Non-traumatic scala tympani access.* 8th Annual Middle East Update in Otolaryngology. Dubai, UAE, May 8-10, 2011.

Adunka OF, Buchman CA, Fitzpatrick DC. *A model for electric acoustic stimulation.* Hearing Preservation Workshop IX, Miami Beach, October 22-23, 2010.

Adunka OF. *Surgical techniques to facilitate hearing preservation.* International Hearing Implant Summit, Beijing, China, August 19-21, 2010.

Buchman CA. *Auditory neuropathy spectrum disorder in children.* DeWeese lecture, Department of Otolaryngology-HNS, OHSU, Portland OR, Oct 28, 2011.

Buchman CA. *Hearing loss in children: An otologist perspective.* UNC Pediatric Audiology Symposium, Chapel Hill, NC Oct 28, 2011.



Lalwani A, Buchman CA, El-Kashlan H, Haynes D, Lustig L, Megerian C. *Avoiding and Managing Complications in Otologic Surgery.* American Academy of Otolaryngology-Head and Neck Surgery, San Francisco, CA Sept 13, 2011.

White D, Buchman CA, Choo D, Diego P. *Advances in the Management of Cholesteatoma in Children.* American Academy of Otolaryngology-Head and Neck Surgery, San Francisco, CA Sept 13, 2011.

Buchman CA (Chair), Roush PA, Greinwald J, Papsin B, Niparko J. *Failed newborn infant hearing screening: What's next?* American Academy of Otolaryngology-Head and Neck Surgery, San Francisco, CA Sept 11, 2011.

Buchman CA and Young N (Chairs), Gantz B, Niparko J, Pillsbury HC, Roland P. *Controversies in Cochlear Implantation*. American Neurotology Meeting, San Francisco, CA Sept 10, 2011.

Buchman CA. *American Cochlear Implant Alliance (ACIA)*. 27th Annual Meeting of the William House Cochlear Implant Study Group, San Francisco, CA Sept 10, 2011.

Buchman CA. *Expanding Indications in Cochlear Implantation*. 27th Annual Meeting of the William House Cochlear Implant Study Group, San Francisco, CA Sept 11, 2011.

Aylsworth AS, Kaiser-Rogers K, Powell CM, Jewett T, Buchman C. *Two novel, potentially recessive phenotypes: 1) Kyphomelic dysplasia with cleft lip and palate, and 2) primordial dwarfism with inner ear malformations*. 32nd Annual David W. Smith Workshop on Malformations and Morphogenesis, UCLA Lake Arrowhead Conference Center, September 9-14, 2011.

He S, Grose J, Buchman CA. *Effects of Interaural Electrode Channel Offset on the Binaural Interaction Component of the Electrically Evoked Cortical Auditory Potential*. Conference on Implantable Auditory Prostheses (CIAP), Asilomar Conference Center, Pacific Grove, CA, July 24-29, 2011.

Buchman CA. *Cochlear implants as a Standard of Care*. Cochlear Corporation Satellite Symposium. 13th Symposium on Cochlear Implants in Children Chicago, IL, July 14, 2011.

Buchman CA. *Generating meaningful data in Cochlear Implantation*. Cochlear Corporation Satellite Symposium. 13th Symposium on Cochlear Implants in Children Chicago, IL, July 15, 2011.

Buchman CA, He S, Kimbell JS, Teagle HFB, Strader H, Roush PA, Adunka OF. *Cochlear implantation in children with cochlear nerve deficiency*. Presented for 13th Symposium on Cochlear

Implants in Children, Chicago, IL July 15, 2011.

Hatch DR, Teagle HFB, Park L, Woodard J, Buchman CA. *The Impact of Cochlear Implant Revision Surgery on Speech Perception Performance in Children*. Presented for 13th Symposium on Cochlear Implants in Children, Chicago, IL July 14-16, 2011.

Ahmad F, DeMason C, Teagle HFB, Woodard J, Hatch D, Dimaria L, Eskridge H, Henderson L, Adunka OF, Buchman CA. *Cochlear implantation in children with post-linguistic hearing loss*. Presented at 13th Symposium on Cochlear Implants in Children, Chicago, IL July 14-16, 2011.

Strader H, He S, Grose J, Buchman CA. *Electrocochleography in patients with Auditory Neuropathy Spectrum Disorder: Comparison of round window and tympanic membrane recordings*. Presented at 13th Symposium on Cochlear Implants in Children, Chicago, IL July 14-16, 2011.

Teagle HFB, Finley CC, DiMaria L, Hatch D, Woodard J, Strader H, Buchman CA. *A different approach to programming Advanced Bionics 90k recipients: Return to traditional methods and concepts*. Presented for 13th Symposium on Cochlear Implants in Children, Chicago, IL July 15, 2011.

Dahl, J. *Necrotizing Soft Tissue Infections of the Head and Neck*. Grand Rounds, Department of Otolaryngology: Head and Neck Surgery, University of North Carolina at Chapel Hill, June 2011.

DiMaria L, Teagle HFB, Finley CC, DiMaria L, Hatch D, Woodard J, Strader H, Buchman CA. *Soft failure, revision, and subsequent lack of neural response in a pediatric bilateral recipient*. Presented for 13th Symposium on Cochlear Implants in Children, Chicago, IL July 14-16, 2011.

Dillon MT, King ER, Adunka MC, Pillsbury HC, Buchman CA, Adunka OF. *Initial Outcomes of Arm 2 Candidacy in EAS*. Presented for 13th Symposium on Cochlear Implants in

Children, Chicago, IL July 14-16, 2011.

Buchman CA. *The Fully-Integrated Hearing Program at UNC*. Cochlear Corporation Board of Director Meeting, Department of Otolaryngology-Head & Neck Surgery, University of North Carolina at Chapel Hill, Chapel Hill, NC, Jun 6-7, 2011.

Eapen R (moderator), Adunka OF, Buchman CA, Pensak M, Pillsbury HC, Wei B. *Otology Neurotology Panel*. Newton D. Fisher Society, Department of Otolaryngology-Head & Neck Surgery, University of North Carolina at Chapel Hill, Chapel Hill, NC, Jun 4, 2011.

Buchman CA. *Unilateral and Bilateral Cochlear Implantation in Adults*. Center for Medicare and Medicaid Services (CMS) Medicare Evidence Development & Coverage Advisory Committee (MedCAC). Baltimore, MD May 11, 2011.

Buchman CA, Teagle HFB, Roush PA, DiMaria L, Hatch D, Woodard J, Zdanski C, Adunka OF. *Cochlear Implantation In Children with Labyrinthine Anomalies and Cochlear Nerve Deficiency: Implications for Auditory Brainstem Implantation*. Presented at Annual Meeting of the Triological Society, Chicago, IL April 29, 2011.

Buchman CA (moderator), Gerard J, Herzog J, Wazen J, Wooley A. *Panel Discussion: Issues in Cochlear Implantation*. Ultimate Colorado Mid-Winter Meeting and the Colorado Otology—Audiology Conference, Vail CO, Feb 16, 2011.

Gabbard S (Moderator), Sharma A, Hood L, Buchman C, Kocsis K, Burns S. *Panel Discussion: Controversies in Auditory Neuropathy*. Ultimate Colorado Mid-Winter Meeting and the Colorado Otology—Audiology Conference, Vail CO, Feb 15, 2011.

Buchman CA, Adunka MS, Adunka OF, Pillsbury HC. *Round window stimulation for conductive and mixed hearing loss*. Ultimate Colorado Mid-Winter Meeting and the Colorado Otology—

Audiology Conference, Vail CO, Feb 14, 2011.

Buchman CA. *Physician service leader*. Department of Ophthalmology, University of North Carolina at Chapel Hill, Chapel, NC Jan 19, 2011.

Arjmand E, Bertinato M, Buchman CA, Davenport S, Innis H, Loundon N, Meinzen-Derr J, Ruder C, Scott M, Wiley S, Wingo C. *Sensorineural hearing loss in children with multiple disabilities*. SENTAC Pre-conference Symposium, Cincinnati, OH, Dec 2, 2010.

Buchman CA. *Hearing loss in children*. Carolina Children's Communicative Disorders Program and NC AG Bell Annual Fall Conference, Asheboro, NC, Nov 19, 2010.

Buchman CA. *Tympanoplasty, Mastoidectomy, Ossicular Chain Reconstruction*. Anspach senior resident and fellows skull base dissection course. West Palm Beach Florida, Nov 15, 2010.

Buchman CA. *Candidacy consideration in modern implantable devices: An otologists perspective*. A Sound Foundations Through Early Amplification, International Pediatric Audiology Conference, Chicago, IL, Nov 8, 2010.

Adunka O, Buchman CA, Fitzpatrick D. *Physiologic recording in an animal model of EAS*. Hearing preservation workshop. Miami, FL, Oct 22, 2010.

Buchman CA (Chair), Adunka OA, Skarzynski P, Helbig S, Jiang D, Majdani O, Bozorg-Garyeli A, Usami I. *Hearing Preservation During and Following Cochlear Implantation*. Hearing preservation workshop. Miami, FL, Oct 22, 2010.

Buchman CA, Pillsbury HC, Adunka MC, Dillon MT, King ER, Adunka OF. *EAS in adults using the FlexEAS Array*. Hearing preservation workshop. Miami, FL, Oct 22, 2010.

Buchman CA. *Hearing preservation cochleostomy*. Hearing preservation workshop. Miami, FL, Oct 21, 2010.

Buchman CA, Adunka O, Adunka M, Pillsbury HC. *Vibrant MedEL for conductive and mixed hearing loss*. Presented at the Otosclerosis Study Group, Boston MA, Sept 25, 2010.

Buchman CA. *Complications of MRI in children with cochlear implants*. Presented at the William House Cochlear Implant Study Group, Boston, MA Sept 25, 2010.



Buchman CA. *Update on Cochlear Implants*. Slattery W, Dornhoffer J, Fayad J, Megerian C Co-Presenters. Implantable Hearing Devices Miniseminar, Presented at the AAO-HNS, Boston, MA, Sept 29, 2010.

He S, Grose J, Buchman CA. *Electrically-evoked cortical potentials and speech perception in children with auditory neuropathy*. Presented at the Objective Measures in Auditory Implants-6th International Symposium, Saint Louis, MO, Sept 22-25, 2010.

Woodard J, Teagle H, DiMaria L, Hatch D, Adunka O, Zdanski C, Buchman C. *Comparison of electric charge levels, speech perception and age at implant of bilateral pediatric CI users*. Presented at CI2010, Stockholm, Sweden, July 2, 2010.

Buchman CA, Adunka MC, King ER, Adunka OF. *Round Window Stimulation for Conductive or Mixed Hearing Loss using Vibrant® MED-EL in Adults*. Presented at CI2010, Stockholm, Sweden, July 2, 2010.

Di Maria L, Teagle HFB, Buss E, Leibold L, Roush P, Buchman CA. *Frequency Compression Hearing Aids for CI Children with Residual Hearing in the Non-Implanted Ear*. Presented at CI2010, Stockholm, Sweden, July 3, 2010.

Hatch DR, Teagle HFB, Di Maria L, Woodard J, Zdanski C, Adunka O, Buchman CA. *The Impact of Revision Cochlear Implant Surgery on Speech Perception Scores in Children*. Presented at CI2010, Stockholm, Sweden, July 3, 2010.

Buchman CA, Campbell A, Adunka OF. *Enlarged vestibular aqueduct syndrome in children: Influence of MRI characteristics on outcomes*. Presented at CI2010, Stockholm, Sweden, July 3, 2010.

Teagle HF, DiMaria L, Hatch D, Woodard J, Adunka O, Zdanski C, Buchman C. *Patient characteristics, MAP parameters & Speech perception outcomes for CI children with cochlear malformations*. Presented at CI2010, Stockholm, Sweden, July 3, 2010.

Dillon MT, Adunka MC, King ER, Buss E, Adunka OF, Pillsbury HC, Buchman CA. *Objective and Subjective Benefits of EAS: Results of a Single Center*. Presented at CI2010, Stockholm, Sweden, July 2, 2010.

Fitzpatrick D, Campbell A, Suberman T, Buchman C, Adunka O. *Electrophysiological measurements to preserve residual hearing during cochlear implantation: Results in animals*. Presented at CI2010, Stockholm, Sweden, July 2, 2010.

Pillsbury HC, Adunka OF, Adunka MC, Dillon MT, King ER, Buchman CA. *Eas In Adults Using The Flexeas Array*. Presented at CI2010, Stockholm, Sweden, July 2, 2010.

Buchman C, Vischer M, Young N, Roland P. *Round Table: Borderline Children*. Presented at CI2010, Stockholm, Sweden, July 2, 2010.

Papsin B, Buchman C, Wie OB, Flexer C. *Round Table: Early Operation, Pro And Cons*. Presented at CI2010, Stockholm, Sweden, July 1, 2010.

Haynes D, O'Malley M, Buchman CA, Labadie R, Wanna G, Waller M, Pillsbury HC. *Is Better Performing Predicted By Ear Preoperative Measures: Results From A Multiinstitutional Bilateral Trial*. Presented at CI2010, Stockholm, Sweden, July 1, 2010.

Buckmire R, Hube L. *Taking Care of Your Voice*. Pastoral Care Department, UNC Hospitals, May 13, 2011

Buckmire R, Hube L, Markus, E. *Finding My Voice: An Artist's Recovery from Laryngeal Apergillosis*. North Carolina Speech Hearing & Language Association State Convention. Greensboro, NC, April 7, 2011

Buckmire R. *Endoscopic Management of Glottic Airway Dysfunction Carolinas Pediatric Airway Course, Chapel Hill, NC, October 21, 2010*

Buckmire R. *Transnasal Esopagoscopy (State of the Art)*. Voice 2010: The Fourth World Voice Congress, Seoul, Korea September 7, 2010

Buckmire R. *Medical Diagnosis and Management*. Demystifying the Treatment of Voice Disorders, Chapel Hill, NC August 27, 2010

Wong Y, Buckmire R. *Robotic Alternative to the CO₂ laser Micromanipulator is Both Advantageous and Preferred by Young Otolaryngologists*. North Carolina/ South Carolina Otolaryngology and Head & Neck Surgery 2010 Assembly, Asheville, NC, July 16, 2010

Buckmire R. *Advanced (Adult) Laryngotracheal*

Reconstruction. North Carolina/ South Carolina Otolaryngology and Head & Neck Surgery 2010 Assembly, Asheville, NC, July 18, 2010

Dillon MT, King ER, Adunka MC, Buss E, Pillsbury HC, Adunka OF, and Buchman CA. *Additional Assessment Of Eas Subject Utilizing The Duet Speech Processor*. The 13Th Symposium On Cochlear Implants In Children. Chicago, IL, July 2011.

Buss E, Leibold LJ, Grose JH, and Hall JW. *Effects Of Stimulus Variability In Auditory Development*. The 161st Meeting of the Acoustical Society of America, Seattle, WA, May 2011.

Grose JH, Buss E, and Hall JW. *Binaural Beat Rate Discrimination*. The 161st Meeting of the Acoustical Society of America, Seattle, WA, May 2011.

Hillock-Dunn A, Leibold LJ, and Buss E. *Remote Frequency Masking Of A 4000 Hz Signal By A 500-1000 Hz Noise Band*. The 161st Meeting of the Acoustical Society of America, Seattle, WA, May 2011.

Bonino AY, Leibold LJ, and Buss E. *Effect Of Signal-Temporal Uncertainty During Childhood: Detection Of A Tonal Signal In A Random-Frequency, Two-Tone Masker*. The 161st Meeting of the Acoustical Society of America, Seattle, WA, May 2011.

Leibold LJ, Hillock-Dunn A, and Buss E. *Children's Identification Of Consonants In Speech-Shaped Noise Or A Two-Talker Masker*. American Auditory Society, Scottsdale, AZ, May 2011.

Ozmeral E, Buss E, and Hall JW. *The Role of Upward Spread of Masking in the Ability to Benefit from Asynchronous Glimpsing of Masked Speech*. The 34 th Midwinter Research Meeting of the Association for Research in Otolaryngology, Baltimore, MD, Feb 2011.

Dillon MT, Buss E, and Adunka MC. *Unc Cochlear Implant Subjective Questionnaires*. The 11th International

Conference on Cochlear Implants and Other Auditory Implantable Technologies, Stockholm, Sweden, July 2010.

Drake AF. *The Multidisciplinary Approach to Pediatric Airways*. Distinguished Lambertson Lecture, Ann Arbor, MI, Sep 16, 2011

Drake AF, Zdanski CJ Davis S, Vaughn B. *The Multidisciplinary Approach to Challenging Pediatric Airways*. South Carolina & North Carolina Otolaryngology Assembly, Charleston, SC, July 2011.

Dillon MT, and Buchman CA. *What Going into the Apex Provides, 13th Symposium on Cochlear Implants in Children, MED-EL Satellite Symposium, Chicago, IL, July 2011*. [Invited Speaker]

Dillon MT. *Clinical Implications and Outcomes of Active Round Window Stimulation for Conductive or Mixed Hearing Loss*. Hearing Loss Association of America Convention 2011, Washington, DC, June 2011.



Dillon MT and Adunka MC. *Bimodal Listening: Fitting Strategies and Benefits*. North Carolina Speech Hearing and Language Association Fall Conference, Greensboro, NC, September 2010. [Invited Speaker]

Dillon MT, King ER, Adunka MC, Pillsbury HC,

Buchman CA, and Adunka OF (2010). *Objective and Subjective Benefits of EAS – Results of a Single Center*. The 11th International Conference on Cochlear Implants and Other Auditory Implantable Technologies, Stockholm, Sweden, July 2010.

Dillon MT (2010). *Candidacy for Implantable Technologies at UNC*. Newton Fisher Meeting, Chapel Hill, NC, June 2010.

Dillon MT, King ER, Adunka MC, Buss E, Pillsbury HC, Adunka OF, and Buchman CA. *Investigation of the Electric-Acoustic Stimulation (EAS) Cochlear Implant Alone Listening Condition and Speech Perception in Noise*. Conference on Implantable Auditory Prostheses, Asilomar, CA, July 2011.

Dillon MT, King ER, Adunka MC, Buss E, Pillsbury HC, Adunka OF, and Buchman CA. *Hearing Preservation in EAS Recipients: Cochleostomy versus Round Window Surgical Approaches*. 13th Symposium on Cochlear Implants in Children, Chicago, IL, July 2011. [poster presentation award]

Dillon MT, King ER, Adunka MC, Buss E, Pillsbury HC, Adunka OF, and Buchman CA. *Analysis of the CI Alone Listening Condition and Speech Performance in Noise by EAS Subjects*. 13th Symposium on Cochlear Implants in Children, Chicago, IL, July 2011.

Dillon MT, King ER, Adunka MC, Buss E, Pillsbury HC, Buchman CA and Adunka OF. *Objective and Subjective Benefits of Electric-Acoustic Stimulation: 12-Month Data*. 13th Symposium on Cochlear Implants in Children, Chicago, IL, July 2011.

Ebert CS, Little RM, Deal AM, Zanation AM, McKinney KA, Senior BA. *Occupational Hazards of Endoscopic Endonasal Surgery*. American Rhinologic Society 2011 Annual Meeting, San Francisco, CA. September 2011. Oral Presentation.

Farag AA, Deal AM, McKinney KA, Thorp BD, Senior BA, Ebert CS Jr, Zanation AM. *Single-*

blind randomized controlled trial of surfactant versus hypertonic saline irrigation following endoscopic endonasal surgery in the early post-operative period. American Rhinologic Society 2011 Annual Meeting, San Francisco, CA. September 2011. Oral Presentation.

Turley R, Cohen SM, Becker A, Ebert CS Jr. *Role of Rhinitis in Laryngitis: Another Dimension of the Unified Airway.* Combined Otolaryngology Section Meeting. Chicago, IL May, 2011.

McKinney K, Frank D, Ebert CS Jr, Zanation AM, Kimbell J. *Nasal Airflow and Air-conditioning After Functional Endoscopic Sinus Surgery: A Fluid Dynamics Model.* Combined Otolaryngology Section Meeting. Chicago, IL May, 2011.

Ebert CS, Oosmanally N, Paul JE, Zanation AM, Ewend MG, Senior BA. *Comparative Analysis of Cost of Endoscopic Endonasal Minimally Invasive and Sublabial-transseptal Approaches to the Pituitary.* American Rhinologic Society 2010 Annual Meeting, Boston, MA. September 2010. Oral Presentation.

Suberman TA, Zanation AM, Ewend MG, Senior BA, Ebert CS. *Sinonasal Quality-of-life before and after Minimally Invasive Pituitary Surgery.* American Rhinologic Society 2010 Annual Meeting, Boston, MA. September 2010. Oral Presentation.

Wheless SA, McKinney KA, Senior BA, Ewend MG, Germanwala AV, Ebert CS Jr, Zanation AM. *Beyond the Pituitary: Prospective Clinical Trial of Nasal Healing, Sinonasal Quality of Life and Olfaction in Expanded.* American Rhinologic Society 2010 Annual Meeting, Boston, MA. September 2010. Oral Presentation.

McKinney KA, Ebert CS, Senior BA, Wheless SA, Zanation AM. *Feasibility of paired utilization of robotic surgery with image guidance for endonasal surgery.* American Rhinologic Society Annual Meeting, Sept 25, 2010, Boston, MA. Poster Presentation.

Campbell AP, Suberman TA, Mlot S, Ebert CS, Fitzpatrick D, Prazma J, Zdanski CJ. *Role of LPS on Allergic Eustachian Tube Dysfunction.* 2010 American Academy of Otolaryngology 2010 Annual Meeting. Boston, MA; September 2010. Poster Presentation.

Eskridge, H, Henderson, L. *The ABC's of it All: Vowels.* Raleigh, NC. April 2011

Eskridge, H, Vernelson, S, Ragin, R. *When Change is Needed.* Chapel Hill, NC, March 2011.

Hackman, TG. *Education Evolves.* University of Pittsburgh Department of Otolaryngology Graduation/Research Day Invited Lecture: UPMC Pittsburgh, PA. June 2011

Hackman, TG. *Office-based ultrasonography (hands-on course).* The Sinus Form 2011. Waldorf Astoria, New York. July 2011

Hackman, TG. *Transoral Laser Microsurgery course.* Washington University St Louis – instructor and presenter – May 2011

Hackman, TG. *Salivary Gland Lecture.* UNC Brain & Behavior course for Second Year Medical Students UNC. February 2011

He S, Buss E, and Hall JW. *The shape of monaural temporal window in school-aged children and adults.* 33rd Midwinter Meeting of The Association for Research in Otolaryngology, Anaheim, CA, 2011

He S, Grose, JH, and Buchman, CA. *The relationship between auditory discrimination and auditory event-related potentials.* 33rd Midwinter Meeting of The Association for Research in Otolaryngology, Anaheim, CA, 2011

Kimbell JS. *Computer Modeling of Surgery and Drug Delivery in the Nasal Passages.* Department of Chemical and Biomolecular Engineering, Clarkson University, Potsdam, NY, April 12, 2011

- Kimbell JS. *Computational Fluid Dynamics Modeling in the Nasal Passages for Drug Delivery and Surgical Effects*. Biomedical Engineering Department, University of North Carolina and North Carolina State University, Raleigh, NC, Oct. 22, 2010.
- Kimbell JS. *Nasal Airway Computer Modeling and Tissue Engineering*. Miniseminar presentation, Academy of Otolaryngology/Head and Neck Surgery Foundation Annual Meeting, Boston, Sept. 27, 2010.
- Kimbell JS. *Computer Modeling of Surgery and Drug Delivery in the Nasal Passages*. Duke Airways Biology Forum, Duke University, Durham, NC, Sept. 17, 2010.
- King, ER. *Objective & Subjective Benefits of the VSB as a Treatment for Recipients with Conductive or Mixed Hearing Loss*. 13th Symposium on Cochlear Implant in Children, Chicago, IL, July 2011.
- King, ER. *Because Life is Worth Living*. Cochlear Hearing Health Fair, Charlotte, NC, May 2011.
- Manis PB. *Synaptic Dynamics and Local Circuits in the Cochlear Nucleus and Auditory Cortex*. Northeastern Ohio University College of Medicine, Rootstown, OH, Sept. 30, 2010.
- Manis PB. *Synaptic Dynamics and Local Circuits in the Cochlear Nucleus and Auditory Cortex*. West Virginia University, Morgantown, WV, October 27, 2010.
- Manis PB. *Synaptic Dynamics and Local Circuits in the Cochlear Nucleus and Auditory Cortex*. George Washington University, Washington, DC, Nov. 12, 2010.
- Manis PB. *Mapping Local Circuitry in the Ventral Cochlear Nucleus with Photostimulation*. (Campagnola, L., and Manis, P.) Association for Research in Otolaryngology, Baltimore MD, February 2011.
- Manis PB. *Target-specific roles of glycinergic inhibition in the principal cells of the cochlear nucleus*. (Xie, R. and Manis, P.) Association for Research in Otolaryngology, Baltimore MD, February 2011.
- Manis PB. *Synaptic Dynamics and Local Circuits in the Cochlear Nucleus and Auditory Cortex*. Duke (UNC-Duke Synapse Club), May 10, 2011.
- Pillsbury HC. *Accountable Care Organizations and How They Impact OHNS*. South Carolina and North Carolina Otolaryngology Head and Neck Surgery Assembly, Charleston, SC, July 9, 2011.
- Pillsbury HC. *Manpower Update in Otolaryngology*. Carolina Medical Center – NorthEast, Concord, NC, May 13, 2011.
- Pillsbury HC. *Use of Midlevel Providers in Medical Practice*. Pinehurst Medical Symposium, Pinehurst, NC, March 5, 2011.
- Pillsbury HC. *Workforce Issues in Otolaryngology/Head and Neck Surgery*. Northeastern Ohio Otolaryngology and Head and Neck Surgery Society, Cleveland, OH, February 9, 2011.
- Pillsbury HC. *Evolution of Auditory Implants*. Northeastern Ohio Otolaryngology and Head and Neck Surgery Society, Cleveland, OH, February 9, 2011.
- Pillsbury HC. *The Evolution of Auditory Implants*. Kansas City Society of Ophthalmology and Otolaryngology, Kansas City, MO, January 7, 2011.
- Pillsbury HC, Sherman D, Healy G, Kennedy D, and Nielsen D. *When Politics Interfaces with Medical Medicine: Effective Advocacy American Academy of Otolaryngology Annual Meeting, Boston, MA, September 27, 2010*.
- Pillsbury HC. *Hearing Preservation of the US EAS Trial – Results of a Single Center Collegium Oto-Rhino-Laryngologicum Amicitiae Sacrum*. Budapest, Hungary, August 24, 2010.

Pillsbury HC. *Midlevel Providers in the OHNS Workforce*. NC/SC OHNS 2010 Assembly, Asheville, NC, July 17, 2010.

Pillsbury HC., *EAS in Adults Using the FlexEAS Electrode Array*. The 11th International Conference on Cochlear Implants and Other Auditory Implantable Technologies, Stockholm, Sweden, July 2, 2010.

Rose AS. *AHEC Grand Rounds*. Department of Pediatrics – New Hanover Regional Medical Center, Wilmington, NC, June 7, 2011.

Ebert CS and Rose AS. *Surgical and Post-operative Care for Pediatric Allergic Fungal Sinusitis*. South East AHEC Grand Rounds, Department of Pediatrics – New Hanover Regional Medical Center, Wilmington, NC, June 7, 2011.



Rose AS. *Pediatric ENT Update 2011: Congenital Nasal Anomalies*. Slide presentation at the Annual Newton D. Fischer Society Meeting, Chapel Hill, NC, June 4, 2011.

West AN, Zanation AM, Rose AS. *Minimally-Invasive Approaches for Juvenile Nasopharyngeal Angiofibroma*. Slide presentation at the Annual Newton D. Fischer Society Meeting, Chapel Hill, NC, June 4, 2011.

Rose AS. *Pediatric Sinusitis*. North Carolina

Society of Otorhinolaryngology / Head and Neck Nurses. Chapel Hill, NC, December 18, 2010.

Rose AS. *The Pediatric Airway*. Grand Rounds, Department of Pediatrics – New Hanover Regional Medical Center, Wilmington, NC, November 2, 2010

Teagle HFB, Roush, P. *Auditory Neuropathy Spectrum Disorder*. Invited presentation, A.G. Bell Listening and Spoken Language Symposium, July 21-23, 2011.

Roush, PA. *Challenging Case of High Frequency Hearing Loss*. Invited presentation, Pediatric Grand Rounds, American Academy of Audiology Annual Conference, Chicago, April 6-9, 2011

Roush, PA. *Audiologic Management in Children: A Continuum of Care*. Invited presentation, Michigan EHDI Conference, East Lansing, Michigan, February 25, 2011

Roush, PA. *Behavioral Audiologic Assessment of Infants and Young Children*. Invited presentation, American Speech, Language and Hearing Association Audiology 2010: Early Hearing Detection and Intervention, online course, October 13-25, 2010.

Roush, PA. *Auditory Neuropathy Spectrum Disorder*. Invited presentation, Institut Raymond-Dewar, Montreal, Quebec, October 21, 2010

Senior BA. *Moderator – Predictive, Diagnostic and Prognostic Biomarkers of Vasculitis*. 15th National Vasculitis and ANCA Workshop, Chapel Hill, NC May 17, 2011

Senior BA. *Vasculitis: The Otolaryngologists Perspective*. Vasculitis Foundation, Chapel Hill, NC May 14, 2011

Senior BA. *Vasculitis 101: ENT Manifestations*. Vasculitis Foundation, Chapel Hill, NC May 14, 2011

Senior BA. *OSA: The Otolaryngologists Perspective*. North Carolina Associate of Sleep Technologists (NCAST),

Raleigh, NC, 11/13/10.

Senior BA. *Endoscopic Resection of Sinonasal Tumors/Image-Guided Surgery*. 2011 Southern States Rhinology Program, Kiawah Island, SC, April 1, 2011

Senior BA. *Surgical Anatomy*. 2011 Southern States Rhinology Program, Kiawah Island, SC, March 31, 2011

Senior BA. *Chronic Sinusitis/Managing the Difficult Patient Panel Discussion*. 2011 Southern States Rhinology Program, Kiawah Island, SC, March 31, 2011

Senior BA. *Chronic Sinusitis? Where Does It Come From?* 2011 Southern States Rhinology Course Program, Kiawah Island, SC, March 31, 2011

Senior BA. *Evidence for Extent of Surgery in Sinusitis*. International Rhinology Innovative Symposium (IRIS), Adelaide, Australia, July 16, 2011

Senior BA. *Bone Infection and Its Relationship to Intracellular Staph*. International Rhinology Innovative Symposium (IRIS), Adelaide, Australia, July 15, 2011

Senior BA. *Frontal Sinus Management*. AAOA Educational Forum/Core Basic Course, Allergy & Rhinology Maintenance of Certification Review Course, Dallas, TX, January 23, 2011

Senior BA. *Headache and Facial Pain*. AAOA Educational Forum/Core Basic Course, Allergy & Rhinology Maintenance of Certification Review Course, Dallas, TX, January 23, 2011

Senior BA. *Diagnosis and Classification of Rhinosinusitis*. AAOA Educational Forum/Core Basic Course, Allergy & Rhinology Maintenance of Certification Review Course, Dallas, TX, January 22, 2011



Senior BA. *CSF Rhinorrhea: Diagnosis and Management*. 1st Annual Comprehensive Skull Base Program, UT Southwestern Medical Center at Dallas, Dallas, TX, December 3, 2010

Senior BA. *Endoscopic Management of Pituitary Tumors*. – 1st Annual Comprehensive Skull Base Program – Keynote Address, UT Southwestern Medical Center at Dallas, Dallas, TX December 2, 2010

Senior BA. *Lab Instruction, Advanced Techniques in Endoscopic Management of Sinonasal Disorders*. St. Petersburg, FL, November 6, 2010

Senior BA. *CSF Leak and Pituitary Surgery, Advanced Techniques in Endoscopic Management of Sinonasal Disorders*. St. Petersburg, FL, November 5, 2010

Senior BA. *Primary Frontal Sinus Surgery: Considerations for FESS or Balloon? Advanced Techniques in Endoscopic Management of Sinonasal Disorders*. St. Petersburg, FL, November 5, 2010

Senior BA. *Challenging Frontal Sinus Cases, Advanced Techniques in Endoscopic Management of Sinonasal Disorders*. St. Petersburg, FL, November 5, 2010

Senior BA. *Gastroesophageal Reflux and OSA, Advanced Techniques in Endoscopic Management of Sinonasal Disorders*. St. Petersburg, FL, November 4, 2010.

- Chandra R, Lanza D, Senior BA, Zinreich S. *Panel – My Worst Complication, Advanced Techniques in Endoscopic Management of Sinonasal Disorders*. St. Petersburg, FL, November 4, 2010
- Senior BA. *Avoidance of Complications in Sinus Surgery*. Carolinas Medical Center NorthEast, Concord, NC October 26, 2010.
- Senior BA. *Non-FDA Approved Treatment of Sinusitis*. ARS/AAOA Joint Symposium, Boston, MA, September 25, 2010
- Suberman T, Zanation A, Senior BA, Ebert, C. *Sinonasal Quality-of-life before and after Endoscopic, Endonasal Minimally Invasive Pituitary Surgery*. ARS 56th Annual Meeting, Boston, MA, September 25, 2010
- Ebert C, Oosmanally N, Zanation A, Senior B. *Comparative Analysis of Cost of Minimally Invasive Pituitary surgery and Sublabial-transseptal Approaches to the Pituitary*. ARS 56th Annual Meeting, Boston, MA, September 25, 2010
- Senior BA. *Moderator - Panel: Point of Service Imaging in Otolaryngology*. AAO/HNS Annual Meeting, Boston, MA, September 28, 2010
- Senior BA. *Minimally Invasive Pituitary Surgery*. AAO/HNS Annual Meeting, Boston, MA, September 28, 2010
- Senior BA. *Surgical Anatomy of the Paranasal Sinuses*. AAO/HNS Annual Meeting, Boston, MA, September 26, 2010
- Shockley WW. *Nasal Reconstruction Using Full Thickness Skin Grafts (Mini-Seminar on Cutaneous Reconstruction)*. American Academy of Otolaryngology – Head and Neck Surgery Foundation Annual Meeting. San Francisco, CA, September 13, 2011.
- Dahl JP, Montserrat C, Pappa AK, Madan G, Shockley WW, van Aalst JA. *Cartilage Tissue Engineering: Implications for Microtia Reconstruction*. American Academy of Otolaryngology – Head and Neck Surgery Foundation Annual Meeting. San Francisco, CA, September 11, 2011.
- Shockley WW and Jewett BS. *Reconstruction of Small to Moderate Nasal Defects (Course)*. American Academy of Facial Plastic and Reconstructive Surgery Annual Meeting. San Francisco, CA, September 9, 2011.
- Smyth JA, Shockley WW, Zdanski CJ, van Aalst. *Microtia: The UNC Experience*. Newton D. Fischer Society. Chapel Hill, NC, June 4, 2011.
- Thorp, BD, Deal AM, Shockley WW. *Full Thickness Skin Grafts for Nasal Reconstruction*. Newton D. Fischer Society. Chapel Hill, NC June 4, 2011.
- Dahl JP, Montserrat C, Pappa AK, Madan G, van Aalst JA, Shockley WW. *Human Umbilical Cord Mesenchymal Stem Cell Derived Cartilage on a Nanofiber Scaffold: Implications for Craniofacial Surgery*. South Carolina-North Carolina Otolaryngology/Head and Neck Surgery Assembly. Charleston, SC, July 8, 2011.
- Dahl JP, Montserrat C, Pappa AK, Shockley WW, Zdanski CJ, van Aalst JA. *Cartilage Tissue Engineering on Nanofiber Scaffolds: Implication for Microtia Reconstruction*. Newton D. Fischer Society. Chapel Hill, NC, June 4, 2011.
- Dahl JP, Montserrat C, Pappa AK, Shockley WW, van Aalst JA. *Tissue Engineered Cartilage for Microtia Reconstruction*. American Cleft Palate Craniofacial Association. San Juan, PR, April 7, 2011.
- Shockley WW. *Nasal Obstruction and the Nasal Dorsum: Tension Nose and Saddle Nose Deformity*. (Panel on Functional Rhinoplasty) Triological Society, Combined Section Meeting. Scottsdale, AZ, January 28, 2011.
- Shockley WW. *The Nasal Valve and Functional Rhinoplasty*. (Moderator) Triological Society, Combined

Section Meeting. Scottsdale, AZ, January 28, 2011.

Shockley WW. *Management of Eyelid Injuries*. Visiting Professor, Wake Forest University. Winston-Salem, NC, December 8, 2010.

Shockley WW. *Facial Cutaneous Hemangiomas and AV Malformations: What Do We Know?* Visiting Professor, Wake Forest University. Winston-Salem, NC, December 7, 2010.

Shockley WW. *Mini-Seminar: Management of*

McKinney KA, Deal A, Wheless SA, Little RM, Auvergne L, Zanation AM. *How Does Coordinated Multidisciplinary Care Impact Head and Neck Tumor Treatment Planning: A Prospective Evaluation of a Multidisciplinary Tumor Conference*. American Head and Neck Society Meeting, April 28, 2011, Chicago, IL.

McKinney KA, Frank D, Zanation AM, Ebert CE, Senior BS, Kimbell JS. *Nasal Airflow and Air-Conditioning After Functional Endoscopic Sinus Surgery: A Fluid Dynamics Model*. American Rhinologic Society, April 28, 2011, Chicago, IL.

Smyth JK, Deal AM, Huang B, Weissler M, Zanation AM, Shores CG. *Comparison of Outcomes for Head and Neck Squamous Cell Carcinomas in Patients with N3 Neck Disease Treated Primarily with Chemoradiation Versus Surgical Resection*. Triological Society Combined Sections Meeting, January 29, 2011, Scottsdale, AZ.

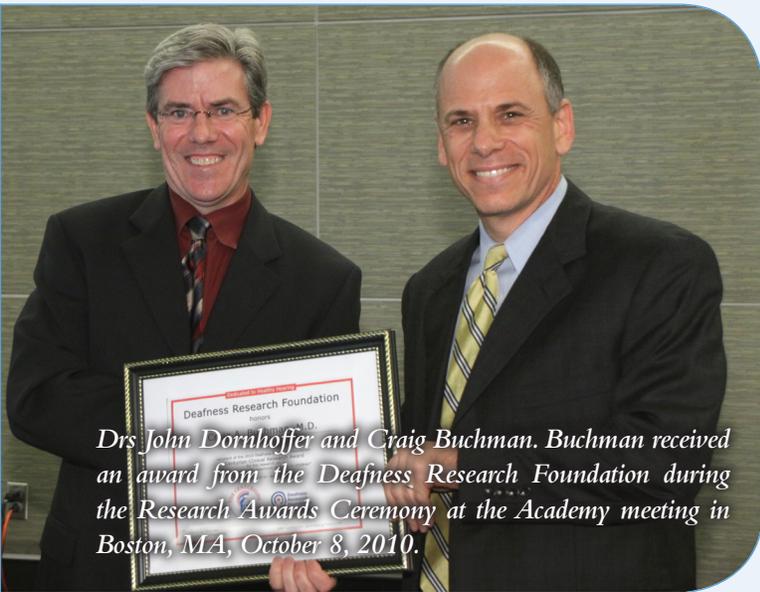
Shah RN, Zanation AM. *The First Report of Basilar Invagination and Brainstem Compression as a Complication of Head and Neck Radiation: Options for Treatment and Techniques for Endonasal Clivectomy and Odontectomy*. Triological Society Combined Sections Meeting, January 29, 2011, Scottsdale, AZ.

McKinney, KA, Zanation, AM. *Facial Nerve and Mimetic Muscle Composite Mobilization as an Adjunct to Open Skull Base Surgery*. Triological Society Combined Section Meeting, January 29, 2011, Scottsdale, AZ.

Zanation AM (Invited Panelist). *How I Do It: Endoscopic Resection of JNAs*. Triological Society Combined Section Meeting, January 28, 2011, Scottsdale, AZ.

Zanation AM (Invited Faculty). *Surgery and Clinical Research*. 9th Annual Clinical Investigator Student Trainee Forum, NIH Campus, Bethesda, MD, Nov. 18-19, 2010.

Zanation AM. *Advances in Cranial Base Surgery*. 4th Annual Otolaryngology Updates in NYC, Columbia



Drs John Dornhoffer and Craig Buchman. Buchman received an award from the Deafness Research Foundation during the Research Awards Ceremony at the Academy meeting in Boston, MA, October 8, 2010.

Orbital Injuries. (Moderator). American Academy of Otolaryngology – Head and Neck Surgery. Boston, MA., September 28, 2010.

Shockley WW. *A Practical Approach to the Management of Facial Scars*. Visiting Professor Lecture, University of Missouri. Columbia, MO, August 4, 2010.

Shockley WW. *Eyelid Injuries: Management Principles*. Visiting Professor Lecture, University of Missouri. Columbia, MO, August 3, 2010.

Shockley WW. *Reconstruction of Nasal Defects: Principles and Techniques*. Visiting Professor Lecture, University of Missouri. Columbia, MO, August 3, 2010.

University, NYC, Oct. 28-29, 2010.

Zanation AM (Invited Faculty). *Advances in Thyroid Surgery*. NC OR Nursing Group, Oct. 16, 2010, Chapel Hill, NC.

Zanation AM (Invited Faculty). *Endonasal Endoscopic Pituitary Surgery: How to get started*, Oct. 1, 2010, Wilmington, NC.

Wheless SA, McKinney KA, Ebert CS, Zanation AM. *Beyond the sella: prospective clinical trial of nasal healing, sinonasal quality of life, and olfaction in expanded endonasal skull base surgery*. Podium Presentation, American Rhinologic Society Annual Meeting, Sept 25, 2010, Boston, MA.

Zanation AM and Germanwala AV. *The Medial Optico-Carotid Recess (MOCR) as a Keyhole for Endoscopic Endonasal Approaches to Paraclinoid Cerebral Aneurysms*. Podium Presentation, American Rhinologic Society Annual Meeting, Sept 25, 2010, Boston, MA

Zanation AM and Snyderman C. *CME Course – Endoscopic Skull Base Anatomy*. 2010 AAOHNS Annual Meeting, San Diego, CA. September 25, 2010.

Zanation AM. *UNC ENT Grand Rounds – Updates in Coding*. Chapel Hill, NC August 18, 2010.

Germanwala AV and Zanation AM. *Endoscopic endonasal techniques for intracranial rostral anterior skull base lesions: our initial 20 month experience*. 9th International Meeting: Updates in Neuro-Oncology/Brain Tumor Symposium. Cortona, Italy. July 3, 2010.

Rosenthal LS, Hatch D, Adunka O, Buchman CA, Zdanski CJ. *Speech Perception After Cochlear Implantation in Children with Congenital CMV*. 13th Symposium on Cochlear Implants in Children, Chicago, IL, July 14 – July 16, 2011.

Zdanski CJ. *Panel Discussion: The Multidisciplinary*

Team Approach to Challenging Pediatric Airway Problems. SC/NC Otolaryngology HNS Surgery Assembly, Charleston, SC, July 7 – July 10, 2011

Zdanski CJ, Abode K. *Barriers To Hospital Discharge For Young Children With New Tracheostomies*. 2011 ATS International Conference, Poster Presentation, Denver, CO, May 18, 2011.

Zdanski CJ. *Craniofacial/VPI Moderator: A Retrospective Analysis of the Functional Outcomes of 78 Monobloc Mid-Facial Advancements by Distraction on the Upper Airway*. COSM-ASPO 2011, Chicago, IL, May, 1, 2011.

Stadler ME, Zanation AM, Zdanski CJ. *Transoral Robotic Surgery on a Pediatric Lymphatic Malformation*. ASPO 2011, 2nd Combined Poster Reception, Chicago, IL, April 29, 2011.

Abode KA, Reilly C, Drake AF, Retsch-Bogart GZ, Zdanski CJ. *Effect of a Multidisciplinary Children's Airway Center on Length of Stay for Young Children with Newly Placed Tracheostomies*. ASPO 2011, 2nd Combined Poster Reception, Chicago, IL, April 29, 2011.

Zdanski CJ. *Alumni Day 2011 Otolaryngology Clinical and Coding Updates: Cutting Edge and Practical Applications*. Pediatric Otolaryngology (Panel) Pittsburgh, PA, April 1-2, 2011.

Zdanski CJ. *The Carolinas' Pediatric Airway Course*. Chapel Hill, NC Oct. 21-22, 2010.

Zdanski CJ. *Evaluation and Management of Head and Neck Lesions*. North Carolina Dermatology Association Meeting, Asheville, NC, August 6-8, 2010.

PUBLICATIONS

Journals, Articles & Refereed Papers

Ahmad FI, DeMason CE, Teagle HFB, Henderson L, Adunka OF, Buchman CA. *Cochlear Implantation in Children with Post-Lingual Hearing Loss*. Laryngoscope (submitted).

He S, Grose J, Buchman CA. *Auditory Discrimination: The Relationship Between Psychophysical and Electrophysiological Measures*. Ear Hear (in press).

Di Maria L, Teagle HFB, Buss E, Leibold LJ, Roush PA, Buchman CA. *Influence of Frequency Compression Hearing Aids for CI Children with Acoustically Amplified Residual Hearing in the Non-Implanted Ear*. Ear Hear (in press).

Choudhury B, Adunka OF, Demason CE, Ahmad FI, Buchman CA, Fitzpatrick DC. *Detection of*

Intracochlear Damage With Cochlear Implantation in a Gerbil Model of Hearing Loss. Otol Neurotol. 2011 Oct;32(8):1370-1378.

Suberman TA, Campbell AP, Adunka OF, Buchman CA, Roche JP, Fitzpatrick DC. *A gerbil model of sloping sensorineural hearing loss*. Otol Neurotol. 2011 Jun;32(4):544-52.

Stadler ME, Huang BY, Campbell A, Buchman CA, Adunka OF. *Endolymphatic sac abscess in the setting of enlarged vestibular aqueduct syndrome*. Otol Neurotol. 2011 Apr;32(3):e18-9.

Campbell AP, Adunka OF, Zhou B, Qaqish BF, Buchman CA. *Large vestibular aqueduct syndrome: anatomic and Functional Parameters*. Laryngoscope. 2011 Feb;121(2):352-357.

Campbell AP, Suberman TA, Buchman CA, Fitzpatrick DC, Adunka OF. *Correlation of early auditory potentials and intracochlear electrode insertion properties: an animal model featuring near real-*

time monitoring. Otol Neurotol. 2010 Dec;31(9):1391-8.

Huang BY, Roche JP, Buchman CA, Castillo M. *Brain stem and inner ear abnormalities in children with auditory neuropathy spectrum disorder and cochlear nerve deficiency*. AJNR Am J Neuroradiol. 2010 Nov;31(10):1972-9.

Kimani JW, Buchman CA, Booker JK, Huang BY, Castillo M, Powell CM, Weck KE. *Sensorineural hearing loss in a pediatric population: association of congenital cytomegalovirus infection with intracranial abnormalities*. Arch Otolaryngol Head Neck. 2010 Oct;136(10):999-1004.

Adunka OF, Mlot S, Suberman TA, Campbell AP, Surowitz J, Buchman CA, Fitzpatrick DC. *Intracochlear recordings of electrophysiological parameters indicating cochlear damage*. Otol Neurotol. 2010 Oct;31(8):1233-41.

Adunka OF, Pillsbury HC, Adunka MC, Buchman CA. *Is electric acoustic stimulation better than conventional cochlear implantation for speech perception in quiet?* Otol Neurotol. 2010 Sep;31(7):1049-54.

Campbell AP, Suberman TA, Buchman CA, Fitzpatrick DC, Adunka OF. *Flexible cochlear microendoscopy in the*



- gerbil. *Laryngoscope*. 2010 Aug;120(8):1619-24.
- Roche JP, Huang BY, Castillo M, Bassim MK, Adunka OF, Buchman CA. *Imaging characteristics of children with auditory neuropathy spectrum disorder*. *Otol Neurotol*. 2010 Jul;31(5):780-8.
- Wong YT, Finley CC, Giallo JF 2nd, Buckmire RA. *Novel Co(2) Laser Robotic Controller Outperforms Experienced Laser Operators In Tasks Of Accuracy And Performance Repeatability*. *Laryngoscope*. 2011 Aug;121(8):1738-42
- Shaheen NJ, Crockett SD, Bright SD, Madanick RD, Buckmire R, Couch M, Dellon ES, Galanko JA, Sharpless G, Morgan DR, Spacek MB, Heidt-Davis P, Henke D. *Randomised Clinical Trial: High-Dose Acid Suppression for Chronic Cough- A Double-Blind, Placebo-Controlled Study*. *Aliment Pharmacol Ther*. 2011 Jan;33(2):225-34.
- Buckmire RA, Bryson P, Patel M. *Type I Gore-Tex Laryngoplasty for Glottic Incompetence in Mobile Vocal Folds*. *J Voice*. 2011 May;25(3):288-92.
- Hall JW, Buss E, and Grose JH. *Exploring The Additivity Of Binaural And Monaural Masking Release*. *Journal of the Acoustical Society of America*, 129, 2080-2087. (2011)
- Hall JW, Buss E, and Grose JH. *Masked Detection And Discrimination Of Tone Sequences Under Conditions Of Monaural And Binaural Masking Release*. *Journal of the Acoustical Society of America*, 129, 482-1489. (2011)
- Buss E, and Hall JW. *Effects Of Non-Simultaneous Masking On The Binaural Masking Level Difference*. *Journal of the Acoustical Society of America*, 129, 907-919. (2011)
- Ozmeral E, Buss E, and Hall JW. *Asynchronous Glimpsing Of Speech: The Roles Of Upward Spread Of Masking And Task Set-Size*. *Journal of the Acoustical Society of America*, under review. (2011)
- Buss E, Grose JH, and Hall JW. *Frequency Discrimination Under Conditions Of Comodulation Masking Release*. *Journal of the Acoustical Society of America*, under review. (2011)
- Drake AF. *Otolaryngologic Challenges in Cleft/Craniofacial Care*. 2011
- AlHadidi, A, Cevidanes, L, Drake, AF, and Pimenta, Luiz. *3D Image Analysis Techniques in Diagnosis and Follow-Up of Crainiofacial Microsomia*. NIDCR. 2011.
- Hackman T, Rickert CG, Getz AE, Uppaluri R. *Endoscopic surgical management of vidian nerve schwannoma*. *Laryngoscope*. 2011 Feb;121(2): 241-4.
- Hall JW, Buss E, and Grose JH. *Monaural envelope correlation perception and stimulus bandwidth*. *Journal of the Acoustical Society of America*, under review. (2011)
- Park LR, Teagle HFB, Buss E, Roush PA, and Buchman CA. *Effects Of Frequency Compression Hearing Aids For Unilaterally Implanted Children With Acoustically Amplified Residual Hearing In The Non-Implanted Ear*. *Ear and Hearing*, under review. (2011)
- Hall JW, Buss E, and Grose JH and Roush PA. *Effects of age and hearing loss on the ability to benefit from temporal and spectral modulation*. under review. (2011)
- Buss E, He S, Grose, JH, and Hall JW. *The monaural temporal window in school-aged children and adults*. In preparation.
- Hayes DN (one of approximately 100 listed and unordered contributors). *Integrated genomic analyses of ovarian carcinoma*. *Cancer Genome Atlas Research Network*. *Nature*. 2011 Jun
- He S, Brown CJ, and Abbas PJ. *Preliminary results of the relation between binaural interaction component of electrically evoked auditory brainstem responses and interaural pitch comparison in bilateral cochlear implant recipients*. *Ear and Hearing*, 2011, Jul 1. [Epub ahead of print].
- He S, Brown CJ and Abbas PJ. *Effects of Electrode Pairing and Stimulation Level on The Electrically*



Evoked Binaural Interaction Component of The Auditory Brain Stem Response. Ear and Hearing.

He S, Grose JH, and Buchman, CA. *The Relation Between Auditory Discrimination And Auditory Event-Related Potentials.* Ear and Hearing, (Under review after revision). (2011)

Buss E, He S, Grose JH, and Hall JW. *The Shape Of Monaural Temporal Window In School-Aged Children And Adults.* Journal of the Acoustic Society of America. (Submitted). (2011)

He S, Grose JH, and Buchman CA. *Electrically Evoked Cortical Responses In Children With Auditory Neuropathy Spectrum Disorder: preliminary results.* (In Preparation). (2011)

He S, Grose JH, and Buchman CA. *Objective Measures Of Gap Detection In Children With Auditory Neuropathy Spectrum Disorder.* (In Preparation). (2011)

Fried D, Khandani A, Shores C,

Of Pretreatment Positron Emission Tomography On Clinical Outcomes Of Patients With Head And Neck Cancer Treated With Definitive Chemoradiotherapy. Head Neck. 2011 Aug 18.

Richards KL, Zhang B, Sun M, Dong W, Churchill J, Bachinski LL, Wilson CD, Baggerly KA, Yin G, Hayes DN, Wistuba II, Krahe R. *Methylation Of The Candidate Biomarker Tcf21 Is Very Frequent Across A Spectrum Of Early-Stage Nonsmall Cell Lung Cancers.* Cancer. 2011 Feb 1;117(3):606-17.

Yin X, Hayes DN, Shores CG. *Antitumor Activity Of Enzastaurin As Radiation Sensitizer In Head And Neck Squamous Cell Carcinoma.* Head Neck. 2010 Oct 21. P

Wilkerson MD, Yin X, Hoadley KA, Liu Y, Hayward MC, Cabanski CR, Muldrew K, Miller CR, Randell SH, Socinski MA, Parsons AM, Funkhouser WK, Lee CB, Roberts PJ, Thorne L, Bernard PS, Perou CM, Hayes DN. *Lung Squamous Cell Carcinoma Mrna Expression*

Weissler M, Hayes N, Hackman T, Rosenman J, Chera BS. *Matched Cohort Analysis Of The Effect*

Subtypes Are Reproducible, Clinically Important, And Correspond To Normal Cell Types. Clin Cancer Res. 2010 Oct 1;16(19):4864-75.

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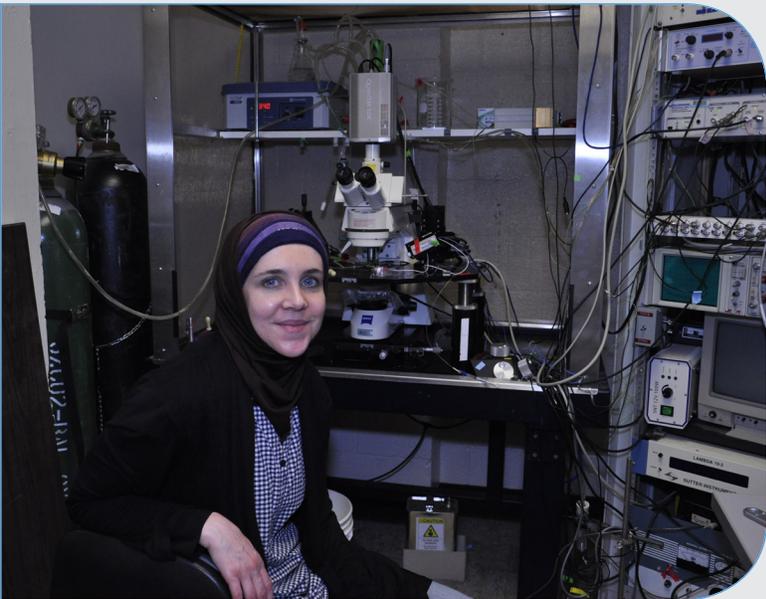
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CCCDP / CASTLE

5501 Fortunes Ridge Drive
Suite A
Durham, NC 27713



ENT at WakeMed

Andrews Center, Second Floor
3024 New Bern Avenue
Raleigh, NC 27610



WHAT ELSE DO WE DO?



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1. UNC mascot, Rameses, gets some sugar from Kathy Harris and Meg Dillon, AuD at the Cochlear Picnic, May 21, 2011
2. ENT Softball league, the Supreme Turbinators. Total win/loss record for the season was 3-6.
3. Sara Mamo, AuD and husband Jared welcomed their baby boy, Brooks Walsh Butlin on September 19, 2011
4. Dr. Pillsbury steers his sailboat on Lake Pinehurst
5. Dr. Jake and Noelle Dahl welcomed a baby girl, Mary Rose on August 12, 2011 to the ENT family
6. ENT participated in BikeFest 2011 in Hillsborough, NC August 18, 2011
7. Drs. Kim, Pillsbury and Choudhury celebrate after a softball win at Margaret's Cantina
8. Dr. Paula Harmon married Dale Goodman on October 9, 2010 in Macon, Georgia. Pictured with the happy couple are Drs. Blanks, Shah and Cannon.



9. Dr. Julia Kimbell with family at Niagara Falls, (husband Rory was photographer) July, 2010
10. Dr. Carlton Zdanski and Robert Humphreys play a mean set of brass with Nomads Band at the CCCDP/Castle Silent Auction, August 28, 2011
11. Drs. Rose and Ebert pictured with the AHEC aircraft
12. Drs. Alexander Farag and Brent Senior perform an Operation
13. Residents and faculty attending the Southern Section meeting hiked Camelback Mountain, March, 2011.
14. Dr. Carlton Zdanski was embraced, and played with the UNC Project. defeating the US Embassy 4-3.
15. Drs. Zanation, Thorp, McKinney and Ebert Zip Lining, 300 ft in a tree nest



In REMEMBERANCE *ance*



Samylia Alston, CNA, Paula J. Harmon, MD, Shelvy Riley, CNA and Anna Bradshaw

The UNC Department of Otolaryngology lost a dear colleague and friend on July 1, 2011. Before her brave fight with terminal illness, Shelvy Riley functioned as the work-up nurse for many years. She shepherded many PGY-1 residents through the preop grid required prior to undergoing scheduled surgeries. She did so with poise and elegance and humor.

A wife and mother, she was extremely proud of her twin sons and of her young grandchildren. Pictured with some of her many friends, Shelvy was beloved by her many patients and colleagues. One of her many strengths was coordinating the holiday clinic events. These included the usual: Thanksgiving, the Fourth of July, etc, but also baby showers for residents or birthdays. Her joy, sense of humor and patience will be remembered.

- AMELIA F. DRAKE, MD, FACS

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WAYS TO GIVE

If you or someone you love has fought serious ear, nose, or throat diseases, you know how important hope can be. UNC wants to give you and your loved ones that hope, and you can help. Your gift, whether or not it is in memory or honor of someone, can help the Department continue its national excellence in patient care, OHNS disease research, and patient education. We're seeing breakthroughs in a wide range of ear, nose, and throat diseases. We've also taken the lead in innovative and compassionate patient care. And we're training the best future OHNS physicians so that they can help your children and grandchildren.

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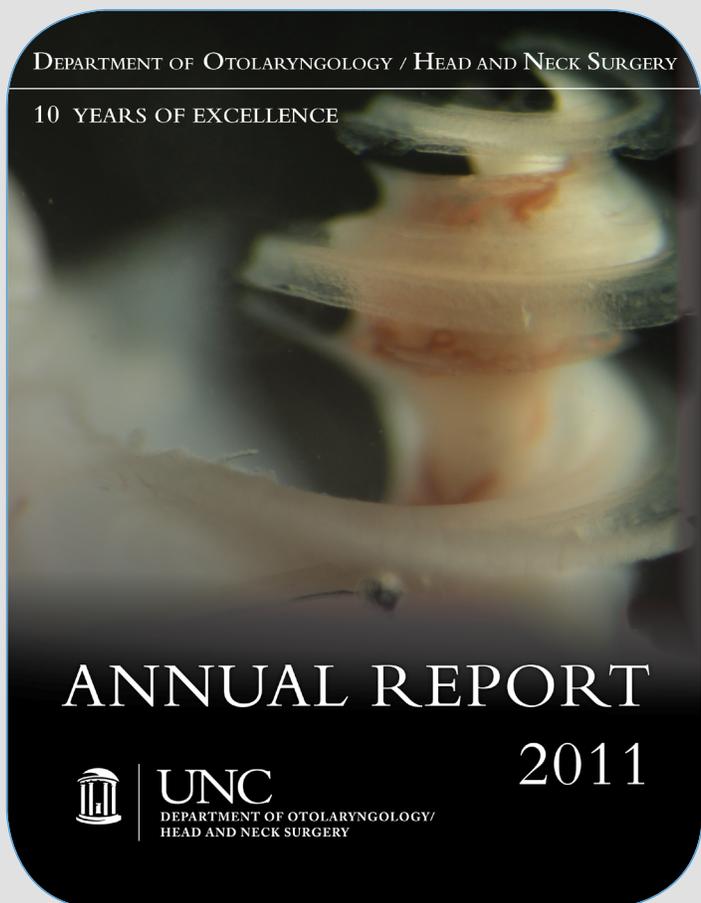
Leslie Nelson, our Director of Development, would be happy to talk to you!

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ABOUT THE COVER

An electrode used for a simulated cochlear implantation was fixed in place in this whole mount preparation of a gerbil cochlea. The depicted experiment is part of a project to develop an intracochlear recording system that can be used during a cochlear implantation to optimize placement of the electrode array. At the conclusion of the electrophysiologic portion of the experiment, the electrode was fixated using dental cement. The specimen was subsequently fixed, harvested, and decalcified. The lateral wall of the cochlea was carefully removed while preserving the integrity of the cochlear structures and the position of the electrode. The experiment was performed by Baishakhi Choudhury, MD, resident in our T32 program. The skillful preparation was performed by Steve Pulver. The image was captured using a Wild M50 dissecting microscope (Leica Inc., Wetzlar, Germany).

This experiment is part of a larger project headed by Drs. Douglas C. Fitzpatrick, Ph.D. and Oliver F. Adunka, M.D. to provide intraoperative electrophysiologic feedback during cochlear implantation. Ultimately, this information obtained in a real-time fashion should provide vital information about cochlear health, possible damage, and position of the electrode relative to sensory cells within the cochlea.







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Residents who graduated from our program in 2011: Michael E. Stadler, MD; Deidra A. Blanks, MD; Paula J. Harmon, MD; and Mitchell R. Gore, MD