

**The University of North Carolina at Chapel Hill
Department of Otolaryngology/Head and Neck Surgery**

**2009
Annual Report**



Over the past several years, medical mission trips have become an increasingly popular way for both residents and faculty in the Department to give back to those in less fortunate situations around the world. Countries with which members of the Department have developed relationships, including medical mission trips and the forwarding of badly needed medical supplies, include Vietnam, Malawi, the West Bank, Nicaragua and Cuba.

It's very gratifying to do what we can to help our medical colleagues overseas - not only in the care of their patients, but also in sharing with them what we have learned in our practices here at UNC.

Austin S. Rose, MD (West Bank)



The enormous need for well-trained health professionals in Africa will only be met by training Africans. I am honored to teach the dedicated medical students, interns, surgery residents and clinical officers in Malawi, who work in such adverse conditions.

Carol G. Shores, MD, PhD (Malawi)

It's about returning a little bit of the immense wealth and blessing that I have received by being raised in a wonderful country, trained in outstanding programs, and working in a fantastic university doing what I love to do.

Brent A. Senior, MD (Vietnam)



The Department of Otolaryngology Head and Neck Surgery

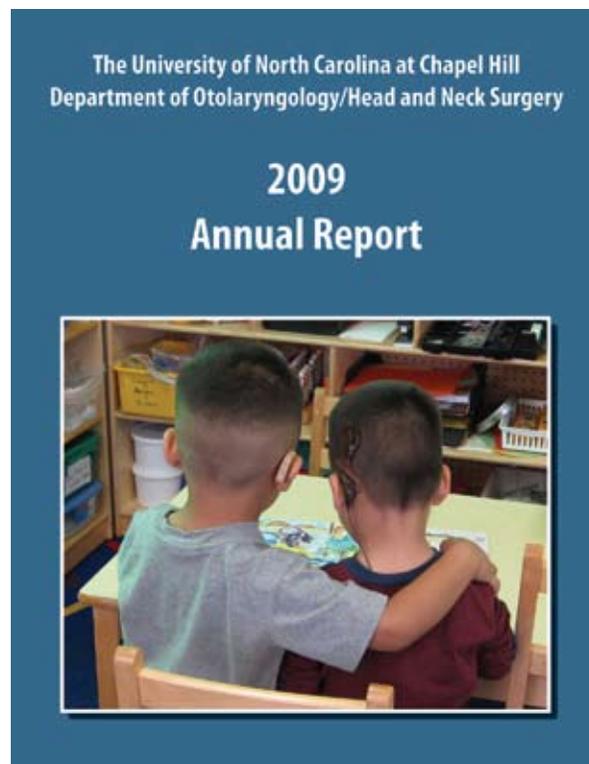


2009 ANNUAL REPORT

**The University of North Carolina School of Medicine
Chapel Hill, North Carolina**

About the Cover

The cover of our 2009 annual report features a photograph taken by Velma Grose, a Teaching Assistant at the Center for the Acquisition of Spoken language Through Listening Enrichment (CASTLE). On the left, Kevin Luevano encourages his friend Jesús Lule-Becerra as they work with pictures on a magnet board in their preschool classroom. Kevin and Jesús were both four-year-old students at CASTLE at the time of the photo. Kevin has severe hearing loss in his right ear and wears a hearing aid. He also has profound loss in his left ear, but is not able to wear a hearing aid on that side. Jesús had initially passed his newborn hearing screening, but failed a re-screening at one year and two months, and soon after was fitted with hearing aids. He then received a cochlear implant on the left at the age of one year and eleven months. Both boys graduated from CASTLE in June of 2009 at age 5 and started kindergarten in Durham County in August. The children at CASTLE follow typical learning patterns to develop speech, language, and listening skills to prepare them for kindergarten. Read more about CASTLE starting on page 86.



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Writing contributed by members of the Department
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Preparation and design by Elizabeth Perry

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The new North Carolina Cancer Hospital opened its doors in September 2009.

A Message from the Chair



In considering the mission of our department, I feel that it is important to emphasize something beyond the basic accomplishments in teaching, research, and the management of our patients. The element that we emphasize at UNC is caring about these missions. As you can see by reviewing this publication, there is a great deal of personal investment in every area we encounter. It is our goal to lift the spirits of those we touch in every area where we are involved.

There are so many events in our world these days that inspire fear, sadness, and anxiety, that there have to be sacred areas where a commitment is made to lift the spirits of all those we touch. There are many times when patients are anxious and scared, researchers do not always get their grants funded, and students are overwhelmed with the amount of work they must complete in order to move forward in their education. In each of these areas, there is an opportunity for each of us to insert ourselves in

a positive way to improve the lot of those we touch. Each of our faculty and staff, including the physicians, nurses, administrative support personnel, and researchers at all levels, have this as one of their top priorities. As I review this publication, it is clear to me that that particular quality shines through in every area.

I am most proud of the members of our department for the care that they have extended to others in everything they do. It is because of this quality that I never dread coming to work! I am always uplifted by those individuals with whom I interact on our medical campus. The outreach that we have been able to accomplish around the world is truly remarkable and has established our reputation in all corners of the globe.

I hope you enjoy reading this annual report as much as I have enjoyed working with Elizabeth Perry to prepare it. I would like to thank Elizabeth for having done such a superb job in capturing the essence of our department!

A handwritten signature in black ink that reads "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, Department of Otolaryngology/Head and Neck Surgery

August 27, 2009

The UNC School of Medicine

A Message from the Dean



At UNC, our values are clear – leading, teaching, caring. We live them every day through our dedication to educating our students, providing quality patient care and advancing research. Our reputation, based on values and success, is what continues to attract the best and the brightest to Chapel Hill.

Throughout the last year, we exemplified our values through our commitment to quality care, scoring above national averages in patient satisfaction. We continued to serve more of our state's residents and worked to expand access to patients and students throughout the state. Our researchers made significant progress across medical disciplines, through investments like the University Cancer Research Fund and the creation of the North Carolina Translational and Clinical Sciences Institute.

We also are proud of the exceptional efforts of our professors to share with our medical students a rich educational experience, which integrates outstanding clinical care and leading academic research; and we commend our students for their hard work and dedication to academic study and clinical skills. In 2009, our student pass rate on the USMLE Step 1 was 98 percent – 5 percent higher than the national average and a 2 percent increase from our scores in 2008.

I am privileged to be a part of an institution that teaches the next generation of health professionals, leads the way with path-breaking research and provides exceptional care for our communities.

A handwritten signature in black ink that reads "William L. Roper". The signature is written in a cursive, flowing style.

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

July 2009

Our Vision:

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

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.

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 underserved 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.

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.

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.

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



The Department

Mission Statement

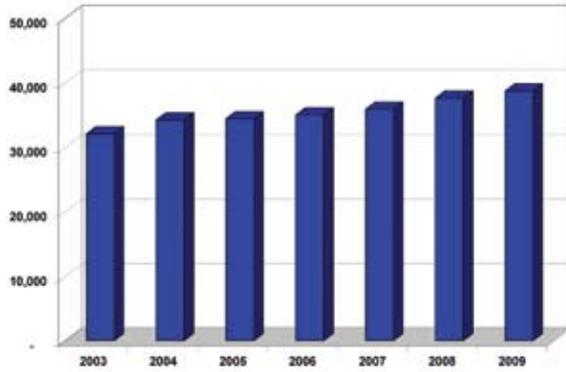
The Mission of the Department of Otolaryngology/Head and Neck Surgery is to improve health care by enhancing the field of Otolaryngology/Head and Neck Surgery and by advancing its clinical applications. To fulfill this Mission, our objectives are the following:

1. To provide excellent otolaryngologic/head and neck surgical patient care that can serve as a national model.
2. To provide outstanding undergraduate and postgraduate education that disseminates otolaryngology/head and neck surgery knowledge and facilitates more contributions to the knowledge base.
3. To carry out basic science, clinical, and health services research that advance the field of otolaryngology/head and neck surgery.

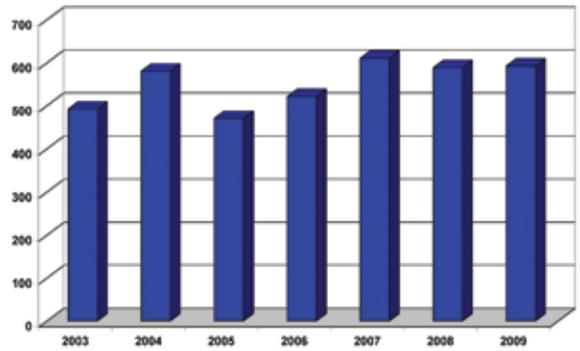


Drs. Craig Buchman and Derek Leight

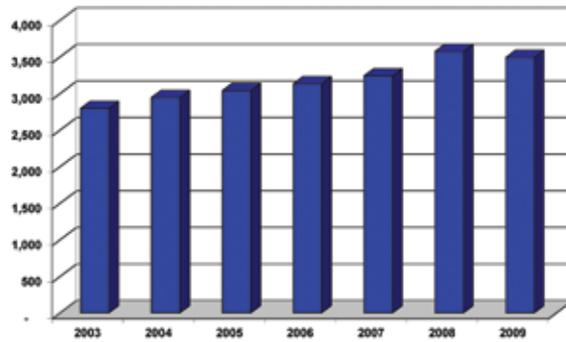
Outpatient Visits



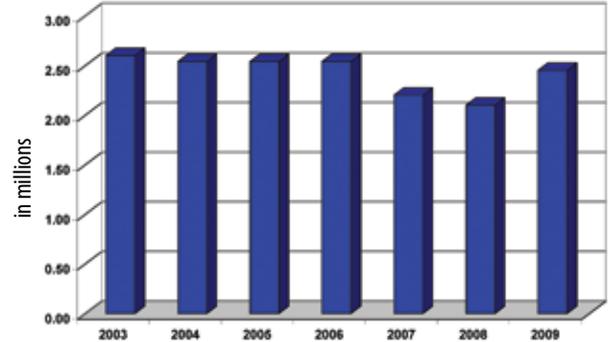
Inpatient Admissions



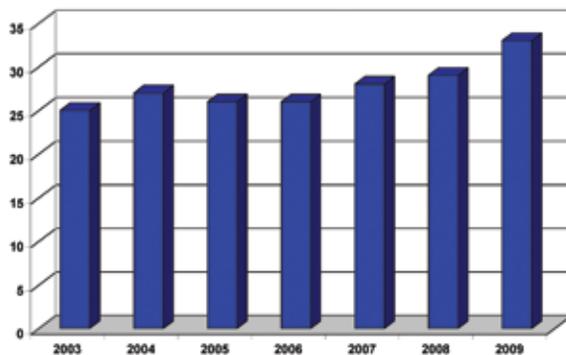
OR Cases



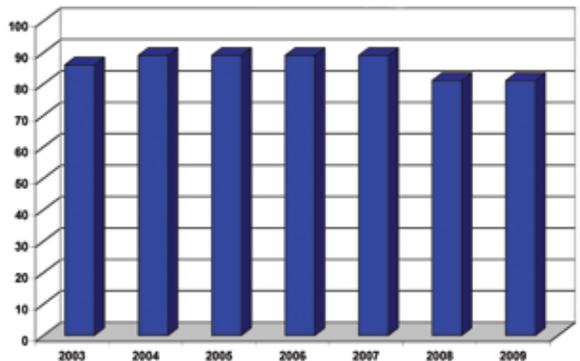
Grant Funding



Faculty Members



Staff Members



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)

The Division of Facial Plastic and Reconstructive Surgery

William W. Shockley, MD, FACS (Chief)
Raymond D. Cook, MD (WakeMed ENT)

The Division of Head and Neck Oncology

Head and Neck Cancer Research

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

The Division of Otology/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

The UNC Skull Base Center

Craig A. Buchman, MD, FACS (Director)
Harold C. Pillsbury, MD, FACS
William W. Shockley, MD, FACS
Brent A Senior, MD, FACS, FARS
Marion E. Couch, MD, PhD, FACS
Oliver F. Adunka, MD
Adam M. Zanation, MD

The 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

The Division of Pediatric Otolaryngology

Amelia F. Drake, MD, FACS (Chief)

Carlton J. Zdanski, MD, FACS

Austin S. Rose, MD

Laura Rosenthal, MD

The Division of Rhinology, Allergy, and Sinus Surgery

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

Adam M. Zanation, MD

Charles S. Ebert, Jr., MD, MPH

Brett E. Dorfman, MD (WakeMed ENT)

Michael O. Ferguson, MD (WakeMed ENT)

Esa A. Bloedon, MD (WakeMed ENT)

Allen F. Marshall, MD (WakeMed ENT)

Julia S. Kimbell, PhD

The Division of Auditory Research

Joseph W. Hall, PhD (Chief)

Jiri Prazma, MD, PhD

Paul B. Manis, PhD

John H. Grose, PhD

Emily Buss, PhD

Charles C. Finley, PhD

Douglas C. Fitzpatrick, PhD

Patricia A. Roush, AuD

The Division of Research Training and Education

Paul B. Manis, PhD (Chief)

Joseph W. Hall, PhD

Jiri Prazma, MD, PhD

John H. Grose, PhD

Emily Buss, PhD

Charles C. Finley, PhD

Douglas C. Fitzpatrick, PhD

Marion E. Couch, MD, PhD

Xiaoying Yin, MD

Julia S. Kimbell, PhD

D. Neil Hayes, MD, MPH

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 Teagle, AuD, CCC-A (Clinical Program Director)

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

The Adult Cochlear Implant Program

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

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

Sleep and Snoring Surgery

Brent A. Senior, MD, FACS, FARS

Marion E. Couch, MD, PhD, FACS

New Faculty Appointments

Charles S. Ebert, Jr., MD, MPH, began his appointment in July as Assistant Professor within the Division of Rhinology, Allergy, and Sinus Surgery. He earned both his Doctorate of Medicine and Masters of Public Health in Epidemiology in 2002 from the University of North Carolina School of Medicine and School of Public Health. Dr. Ebert completed a residency in Otolaryngology/Head and Neck Surgery at UNC in 2009. This included two years of dedicated research sponsored by the NIH, followed by fellowship training from the Georgia Nasal and Sinus Institute in Savannah, Georgia. His practice is dedicated to both the medical and surgical management of chronic sinusitis, allergic fungal sinusitis, primary and revision sinus surgery, sinonasal tumors, computer guided surgery, allergic disease, and other nasal disorders.



Hannah R. Eskridge, MSP, CCC-SLP, LSLS Cert. AVT, joined the faculty in June as Clinical Instructor. Ms. Eskridge earned her Masters in Speech Pathology from the University of South Carolina. She is a Certified Auditory Verbal Therapist. She has been a part of the CCCDP family since 2001 as a Speech/Language Pathologist, and in 2006 she became the Program Director of the Center for the Acquisition of Spoken language Through Listening Enrichment (CASTLE). Ms. Eskridge is especially interested in listening and spoken language development in children who are deaf or hard of hearing, with specific focus on training teachers of the deaf and speech-language pathologists.



Trevor G. Hackman, MD, our new Head and Neck Oncologist, began his appointment as Assistant Professor in August. He earned his MD and completed residency training in Otolaryngology at the University of Pittsburgh. He then went on to complete a one-year fellowship at Washington University, where he trained in Transoral Laser Microsurgery, Facial Plastics & Microvascular Reconstruction, and Head & Neck Oncologic and Skull Base Surgery under Bruce Haughey, MD. In addition to those areas, Dr. Hackman is interested in endocrine surgery, parotid surgery, head and neck reconstruction, minimally invasive head and neck surgery, as well as sinus surgery.



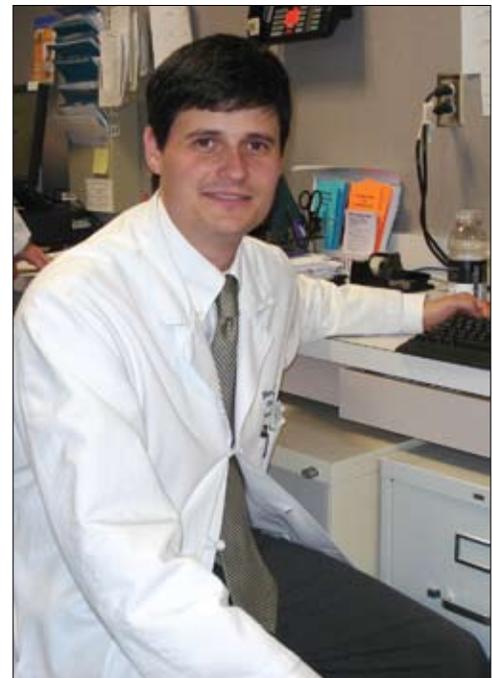
D. Neil Hayes, MD, MPH, of the Department of Medicine, Division of Hematology/Oncology, was awarded a joint appointment with the Department of Otolaryngology/Head and Neck Surgery as Assistant Professor on June 1st. Dr. Hayes has collaborated with our head and neck oncologists for many years on research projects and patient care. 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.



Julia S. Kimbell, PhD, began her appointment as Associate Professor on June 1st. She earned her PhD in differential geometry from Duke University, followed by a post-doctoral fellowship at The Hamner Institutes for Health Sciences (formerly the Chemical Industry Institute of Toxicology). Before joining our Department, she had been working as a Senior Investigator at CIIT at The Hamner, located in Research Triangle Park, North Carolina. An applied mathematician, Dr. Kimbell specializes in biomathematical modeling. Biomathematics is the application of mathematics to biology and medicine, and Dr. Kimbell's 3D models of the nose and nasal passages are considered state of the art in nasal modeling. Her research involves 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.



Allen F. Marshall, MD, is the newest addition to WakeMed Faculty Physicians ENT-Head and Neck and Facial Plastic Surgery, beginning his appointment as Assistant Professor in July. He earned his MD at the University of North Carolina School of Medicine and completed residency training in Otolaryngology/Head and Neck Surgery at UNC this year. Dr. Marshall's clinical interests are broad including all areas of Adult and Pediatric general Otolaryngology, but he particularly enjoys rhinology, sinus surgery, thyroid and salivary gland surgery, and common ear disease.



The Faculty



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
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, Assistant Professor
Otolaryngology/Head and Neck Surgery, Wake Medical Center
MD: Thomas Jefferson Medical College, Philadelphia, PA
Residency: Thomas Jefferson University Hospital
Special Interests: Rhinology, endoscopic sinus surgery, thyroid and parathyroid disease, rhinology, pediatric otolaryngology



Craig A. Buchman, MD, FACS, 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 and Skull Base Surgery): House Ear Institute and Clinic, Los Angeles
Special Interests: Otolaryngology, neurotology, lateral skull base surgery, acoustic tumors, cochlear implants, hearing preservation



Robert A. Buckmire, MD, Associate Professor
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: Psychoacoustics



Raymond D. Cook, MD, Assistant Professor
Otolaryngology/Head and Neck Surgery, Wake Medical Center
MD: University of North Carolina School of Medicine
Residency: Duke University Medical Center
Fellowship (Facial Plastic and Reconstructive Surgery): Tampa, Florida
Special Interests: General otolaryngology, sinus surgery, thyroid surgery, pediatric otolaryngology, facial rejuvenation, reconstruction of local scars and skin cancers



Marion E. Couch, MD, PhD, FACS, Associate Professor
MD: Rush Medical College
PhD: Rush University
Residency: Johns Hopkins University School of Medicine
Special Interests: Head and neck surgical oncology, thyroid and parathyroid surgery, surgical airway management, microvascular free tissue transfer reconstruction, cancer cachexia



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
Chief, Division of Pediatric Otolaryngology
Director, UNC Otolaryngology/Head and Neck Surgery Residency Program
Director, UNC Craniofacial Center
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
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



Hannah R. Eskridge, MSP, CCC-SLP, LSL 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: Listening and spoken language development in children who are deaf or hard of hearing, with specific focus on training teachers of the deaf and speech-language pathologists



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, UNC 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: Rhinology, allergy, sinus surgery, pediatric otolaryngology, and head and neck oncology

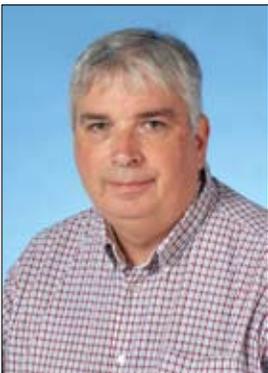


Charles C. Finley, PhD, Associate Professor

BSEE: Georgia Institute of Technology

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

Special Interests: Speech processor, electrode systems and mathematical models in cochlear implants, variability in cochlear implant outcomes, patient assessments for advanced fitting and device validation; biomedical engineering



Doug D. 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
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.



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
Fellowship (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



Jiri Prazma, MD, PhD, Professor
MD: Charles University, Prague, Czechoslovakia
PhD (Physiology): Czechoslovak Academy of Sciences
Residency: Charles University, Prague, Czechoslovakia
Special Interest: Inflammation of the middle ear, nose, and larynx



Austin S. Rose, MD, Associate Professor
Director, Pediatric Otolaryngology Fellowship Program
MD: University of North Carolina School of Medicine
Residency: University of North Carolina School of Medicine
Fellowship (Pediatric Otolaryngology): Johns Hopkins University School of Medicine
Special Interests: Pediatric otolaryngology, reconstructive airway surgery, chronic ear disease



Patricia A. Roush, AuD, Assistant Professor
Director of Pediatric Audiology
MA (Audiology): University of Iowa
AuD: University of Florida
Special Interests: Pediatric Audiology



Brent A. Senior, MD, FACS, Professor
Chief, Division of Rhinology, Allergy, and Sinus 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, Wake Medical Center
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 Fryauf-Bertschy Teagle, AuD, Assistant Professor
Clinical Director, W. Paul Biggers, MD, Carolina Children's Communicative Disorders Program
MA (Audiology): University of Iowa
AuD: University of Florida
Special Interests: Cochlear implant outcomes in children, focusing on device efficacy and clinical management issues



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, laser utilization in head and neck surgery, voice disorders, laryngeal/tracheal stenosis, skull base cancer, cerebrospinal fluid leaks



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
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 tumor surgery, endoscopic minimally invasive head and neck tumor surgery, sinonasal tumors/cancer, CSF rhinorrhea, robotic head and neck surgery, parotid tumors, head and neck sarcomas, rhinology, allergic fungal sinusitis, frontal sinus diseases, primary and revision sinus surgery



Carlton J. Zdanski, MD, Associate Professor
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

WakeMed Faculty Physicians



The WakeMed ENT Team: Drs. Allen Marshall, Brett Dorfman, Carol Shores, Michael Ferguson, Raymond Cook, and Esa Bloedon.

Over 15 years ago, Dr. Pillsbury made a critical decision for the future of UNC's Otolaryngology residency program by creating a clinical position at what was then known as Wake Medical Center in Raleigh. The original position was as a solo practitioner, under the umbrella of the Wake Area Health Education Coalition, staffed by one resident and primarily intended for the expansion of the residency's trauma experience.

Since that time, the WakeMed division has gone through many permutations and has seen several physicians make their mark on the program only to move on to other pastures. Stability and retention of the attending staff proved difficult over the first decade of the practice, despite the stable leadership of Dr. Pillsbury and Dr. Scott Meredith. Then over the course of three years, starting in 2001, the practice made three key hires in Brett Dorfman, Michael Ferguson, and Raymond Cook, and WakeMed ENT/Head and Neck Surgery hasn't looked back since.

Now in 2009, the practice has blossomed in numbers and success. By July of this year, the WakeMed group will have grown to six attendings, with the addition of three more incredible hires over the past two years. Although trauma remains a focus for the WakeMed group, the umbrella of services that it provides to the UNC residents and the patients of WakeMed continues to expand. In 2003, the WakeMed North practice was opened, in an attempt to capture a larger market share of the Raleigh patient population as well as to expand the educational opportunities of the UNC residents. Dr. Cook has seen a rapid expansion of his facial plastics practice at WakeMed North, providing experiences in operative cosmetics that UNC residents had previously limited exposure to. On the heels of this

success, the practice has recently opened a full-service MedSpa to complement the facial plastics opportunities. As a result of the success of this satellite office, WakeMed ENT recently made the decision to open a third office in Knightdale, and this will be up and running by late summer, adding another dimension to the practice, and allowing increased opportunities for resident education.

All this growth and change doesn't happen by accident, and it doesn't happen if the practice isn't made up of an incredible group of otolaryngologists and educators. Drs. Dorfman, Ferguson, and Cook are the senior members of this group and have waived the flags of both UNC and WakeMed for many years. But it is the new arrivals that have truly put WakeMed's division in a different echelon, and the WakeMed ENT group looks forward to a lifelong contribution from all of them.

The first newbie to arrive on the scene was Dr. Esa Bloedon, who graduated from UNC's undergraduate program in 1994. After college, Dr. Bloedon spent the next few years of his life soaking in the experiences of travel, finally settling in to medical school at Thomas Jefferson Medical College and graduating *magna cum laude* in 2003. He stayed at Jefferson for residency and was heavily recruited to stay on staff there after the completion of his residency. But the call to return to North Carolina was too great for Esa and his wife LeAnne, a North Carolina native herself, and they returned with their two boys, Rhys and Pierce, in the summer of 2008. They have since added a third, daughter Avery, but despite the whirlwind of family life, Dr. Bloedon has still somehow found the time to quickly grow his practice, focusing on continuing the trend of this group of physicians by maintaining a practice that can best be described as a high-level generalist, meaning he'll essentially do it all.

The next freshman to arrive on campus was not quite so new to the scene, as only the fewest of readers of this publication aren't aware of the near decade of contributions to the UNC program by Dr. Carol Shores. Despite serving as one of UNC's all-time most beloved attendings at UNC since the year 2000, the loss of WakeMed's only dedicated head and neck surgical oncologists almost two years ago put the rest of the practice in a small bind, as many head and neck cancer patients have long depended on the services provided by our hospital. So through a series of truly fortunate events, Dr. Shores made a game-saving decision to leave her comfy Chapel Hill clinical confines to join the WakeMed group in Raleigh. But although the location is different, the care and compassion Dr. Shores shows for this population of patients and the dedication she has for residents remains unfaltering.

The final piece of the puzzle arrived this summer as the combination of the prior two arrivals: fresh out of residency but certainly a familiar face and easily one of the most enjoyed and valued graduates of UNC's residency program in a very long time. Since his arrival to Chapel Hill from Davidson College in 1997, Dr. Allen Marshall has been groomed for his position within the UNC ENT family. His incredible work ethic and hard-to-resist personality has always been a perfect match for the UNC program, and his potential value to the program as an attending was identified early on by the WakeMed program. Fortunately, Allen's ties to the area include his mother and brother, who is an anesthesiologist at WakeMed, so recruiting him to join the WakeMed practice was a slightly easy sell. Allen joins forces with Dr. Bloedon, making their mark as the new kids on the block in our Knightdale practice, and he brings with him the exact skill set that all UNC graduates leave with, a complete tool kit of clinical competency, that make him an instant success at WakeMed. Of course it must be noted that Allen's clinical success is dwarfed by his personal successes, outkicking his coverage by marrying his sweetheart since their first week of college, Clair. Joining them in the move to Raleigh are their sons Hutch and Nelson.

WakeMed is proud of its contributions to the UNC residency program and looks forward to the next era of clinical medicine and resident education.

The Staff

Carolyn Hamby, Clinical Academic Departmental Administrator
Holli Gall, Director of Development

Administrative Academic Affairs

Jonna Apple
Kathy Bogie
Ellen Doult
Cheryl Goodrich
Kathy Harris
Dawn Wilson
Donna Woodard
Laura Yurco, MBA

Nursing Staff (UNC Healthcare)

Samylia Alston, CNA
Paula Boisvert, RN
Diane Burden, CNA
Katie Chandler, RN
Claire Culberson, RN
Sherry Egodo, CNA
Barbara Esterly, RN
Elaine Hinkle, RN, BSN
Lynda Lucas, RN
Karl Mann, RN
Judy Miles, RN
Cynthia Nabut, RN
Patricia Perry, CNA
Shelvy Riley, CNA
Soon Young Rondinelli, RN
B.J. Squires, RN
Regina Stoffel, RN

Patient Business Associates

Anna Bradshaw (Supervisor)
Issbel Armstrong
Wendy Boyd
Crystal Curasi
Katherine Eng
Earlene Howze
Angel Jeffries
Nicole Sharpe
Brenda Vernon
Sandra Yates

Research Affairs

Madhu Dev
Meg Dillon, AuD
Shana Jacobs, AuD
Sara Mamo, AuD
Heather O'Donohue
Steve Pulver
Tara Steplowski

CCCDP

Lisa DiMaria, AuD, CCC-A
Deb Hatch, AuD, CCC-A
Robert Humphreys
David Perry
Jennifer Woodard, AuD, CCC-A

CASTLE (Durham Location)

Sandra Hancock, MS, CCC-SLP, LSLs Cert. AVT
Lillian Henderson, MSP, CCC-SLP, LSLs Cert. AVT
Lori Parker
Cynthia Poole
Erin Thompson, MS, CCC-SLP, LSLs Cert. AVT

CASTLE (Wilmington Location)

Meagan Evans, PhD, CCC-SLP, LSLs Cert. AVEd
Francisca Hernandez-Casillas, MA
Marcelo Nascimento

UNC P&A (UNC Healthcare)

Surgery Schedulers:

Anna Bradshaw (Supervisor)
Kelen Beacham
Patricia Longest
Juliette Olivares

Medical Coders:

Clara Frye
Karen Kenion



Dr. P with some of our fantastic nursing staff: Left to right: Samylia Alston, CNA; Claire Culberson, RN; Lynda Lucas, RN; Harold Pillsbury, MD; Shelvy Riley, CNA; Diane Burden, CNA; and Sherry Egodo, CNA (kneeling)



Surgery Schedulers: Patricia Longest, Kelen Beacham, and Juliette Olivares



Patient Business Associates: Brenda Vernon, Katherine Eng, and Crystal Curasi



Administrative Academic Affairs Staff: Ellen Doult (Residency Program Coordinator and Administrative Assistant to Drs. Drake and Ebert), Kathy Bogie (Administrative Assistant to Drs. Senior and Buckmire), Kathy Harris (Executive Assistant to Dr. Pillsbury), Laura Yurco (Accounting Manager), Dawn Wilson (Administrative Assistant to Drs. Zdanski, Rose, and Zanation), Cheryl Goodrich (Human Resources Manager), and Jonna Apple (Administrative Assistant to Drs. Shockley, Couch, and Hackman). Not pictured: Donna Woodard (Administrative Assistant to Drs. Weissler, Buchman, and Adunka)



Allergy Nurse, Judy Miles, RN



Barbara Esterly, RN (nurse to Dr. Senior), and Lynda Lucas, RN (nurse to Dr. Pillsbury)



Shelvy Riley, CNA



B.J. Squires, RN (nurse to Drs. Buchman and Adunka, and Paula Boisvert, RN (nurse to Drs. Ebert and Hackman)



Donna Woodard (Admin. Asst. to Drs. Buchman, Weissler, and Adunka), and Dawn Wilson (Admin. Asst. to Drs. Zdanski, Rose, and Zanation)



Allergy Nurse, Gina Stoffel, RN



Diane Burden, CNA, and Claire Culberson, RN (nurse to Drs. Zdanski and Rose)



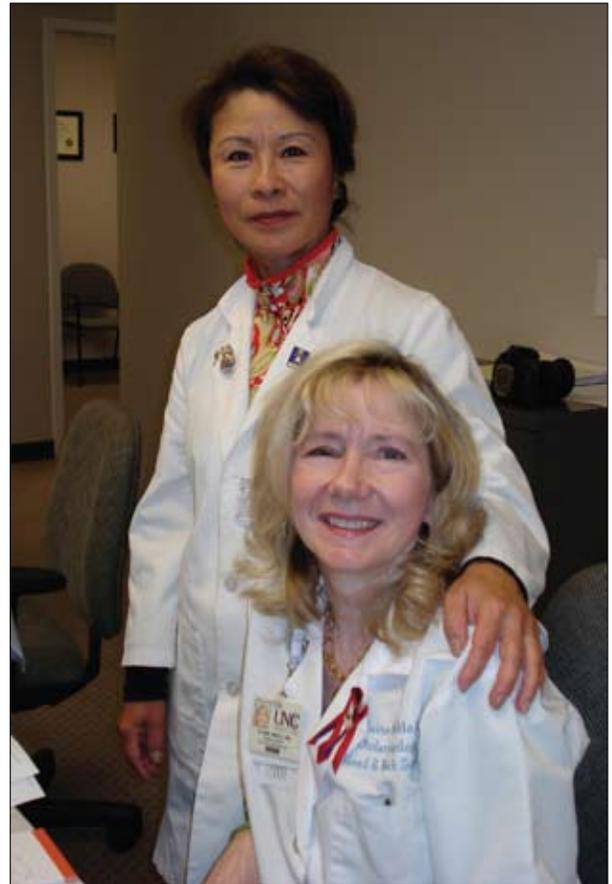
Patient Business Associates: Lesonia Mason and Nicole Sharpe



Patient Business Associates: Angel Jeffries and Wendy Boyd



Anna Bradshaw (Supervisor of Patient Business Associates and Surgery Schedulers), and Patient Business Associate Sandra Yates



Soon Young Rondinelli (nurse to Dr. Zanation), and Elaine Hinkle, RN, BSN (nurse to Dr. Shockley and Nurse Educator)



Pat Perry, CNA

The Residents

The Chiefs: Post-Graduation Plans and Reflections on the Program



Drs. Ebert and Marshall

Charles (“Carlos”) S. Ebert, MD, MPH, was the first resident to complete the 7-year research track. He joined the faculty in July as an Assistant Professor, specializing in Rhinology and Sinus Surgery. “The time I’ve spent as an Otolaryngology resident at the University of North Carolina will always be a very special part of my life. The distinguished faculty has aided my development in countless ways as a surgeon, researcher, and especially as an individual. I have been blessed with the opportunity to receive training from such a renowned, supportive, and dedicated group of faculty. The depth and breadth of our training is without equal and I feel prepared to embrace the opportunities and challenges that the future may bring. THANK YOU all for the countless hours devoted to our instruction, the preparation of talks to further our education, and the cultivation of our overall development!”

Allen F. Marshall, MD, is staying with the Department as an Assistant Professor at WakeMed Faculty Physicians ENT-Head and Neck and Facial Plastic Surgery in Raleigh. He will practice all areas of Otolaryngology. “I feel tremendously grateful to the exceptional faculty that I have worked with over the last five years. I have had the privilege to benefit not only from their clinical and surgical expertise but their remarkable teaching skills as well. Such exposure has greatly influenced my own career decision to incorporate resident teaching as a major component of my practice. As faculty with the Wake Med division, I look forward to giving back to future residents for years to come.”



Dr. Bryson

Paul C. Bryson, MD, embarked on a fellowship in Laryngeal Surgery and Voice Rehabilitation at the Massachusetts General Hospital, Harvard Medical School, under the direction of Dr. Steven Zeitels. “I am indebted to my professors for their patience, devotion to resident education, and commitment to providing excellent patient care. I have also learned a lot from my co-residents and will miss the camaraderie and collegiality that so embodies UNC Otolaryngology.”



Dr. Leight

W. Derek Leight, MD, headed out to Omaha, Nebraska, for a fellowship in Rhinology at the Department of Otolaryngology-Head and Neck Surgery at the University of Nebraska under Dr. Donald Leopold. “I have been truly blessed to have been a part of such a special place. Our department is top notch in reputation, but world class in character. Each faculty member has a rare, special blend of intellect, compassion, ability, and dedication. The caliber of our education is surpassed only by the quality of our mentorship and our personal relationships among faculty and residents. Thank you to all the faculty, for your time, your instruction, and your example of steadfast dedication to your patients and to the practice of medicine. I will always cherish being a part of the UNC Otolaryngology family.”



Gregory J. Basura, MD, PhD (2010)

BS/BA (Zoology, Psychology): Albertson College of Idaho, 1994

PhD (Anatomy, Cell Biology): Wayne State University, 1999

MD: University of Washington, 2005



Deidra A. Blanks, MD (Research Track, 2011)

BS (Biology): East Carolina University, 2000

MD: Brody School of Medicine (ECU), 2004



Trinitia Y. Cannon, MD (Research Track, 2010)

RN: St. Joseph's Hospital School of Nursing, 1995

BS (Biology): Lemoyne College, 1999

MD: University of Rochester School of Medicine, 2003



Baishakhi Choudhury, MD (Research Track, 2016)

BS (Psychobiology/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, Philadelphia, PA, 2009



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 Toledo College of Medicine, 2009



Mitchell R. Gore, MD, PhD (2011)

BS (Chemistry): UNC-Chapel Hill, 1999

PhD (Chemistry): UNC-Chapel Hill, 2004

MD: UNC School of Medicine, 2006



Paula J. Harmon, MD (2011)

BS (Biology): Spelman College, 2000
MD: Morehouse School of Medicine, 2006



Keith M. Ladner, MD (2010)

BS (Economics): University of Washington, 2001
MD: University of Colorado School of Medicine, 2005



Kibwei A. McKinney, MD (Research Track, 2015)

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: UNC School of Medicine, 2006



Joseph P. Roche, MD (Research Track, 2014)

BA (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



Jessica K. Smyth, MD (2013)

BS (Chemistry): United States Military Academy, 2000
MD: Uniformed Services University of the Health Sciences, 2004
Residency (General Surgery): San Antonio Uniformed Services Health Education Consortium, 2005
Physician: Aerospace Medicine, Kuwait and Pope AFB, 2005-08



Michael E. Stadler, MD (2011)

BS (Biology): University of Wisconsin at Madison, 2001

MD: University of Wisconsin Medical School, 2006



Joshua B. Surowitz, MD (2012)

BS (Biomedical Engineering): University of Miami, 2000

MD: UNC School of Medicine, 2007

Research Fellow: UNC Dept. of OHNS (NIH Funded): 2006-07



Brian D. Thorp, MD (2014)

BS (Biology): James Madison University, 2005

MD: Eastern Virginia Medical School, 2009

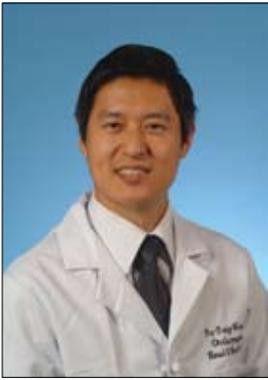


Alisha N. West, MD (2010)

BS (Neuroscience, Psychology): University of California-San Diego, 1999

MS (Neuroscience): University of California-San Diego, 2001

MD: University of California-San Diego, 2005



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



Maher N. Younes, MD (2012)

BS (Biology): American University of Beirut, 1997
MD: American University of Beirut, 2001
Postdoctoral Research Fellowship (Head and Neck Cancer): MD Anderson Cancer Center, University of Texas, 2002-2007



A busy day at Carolina Pointe: Dr. Jimmy Wallace (resident from the Dept. of Family Medicine, on rotation in ENT), Drs. Shockley, Leight, Zanation, and Blanks, and nurse Elaine Hinkle.

Educational Programs

The Department of Otolaryngology/Head & Neck Surgery offers numerous educational programs to residents and medical students.

Medical Students

In October 2008, Dr. Adam Zanation was named Director of Medical Student Affairs within the Department of Otolaryngology/Head and Neck Surgery. This includes being third year surgery rotation coordinator and fourth year “Acting Internship” rotation 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 Course* 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.



Third-year medical student Robert Eil, left, attends clinic with Drs. Ladner and Pillsbury.



Lisette Saca, an undergraduate student who is interested in medicine, follows Dr. Senior in clinic to observe and learn about the field.



Drs. Keith Ladner and fourth-year medical student Stephan Mlot on their way to join Dr. Weissler in the OR.



Research Education: Angela Yarnell Bonino (3rd year PhD student, Speech & Hearing Sciences), Dr. Emily Buss, and Stefan Mlot (4th year medical student) discuss data from a recent experiment. Dr. Buss frequently works with medical students and residents who opt to do research in the psychoacoustics laboratory.

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 ten acting interns 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. Amelia F. Drake serves as the Director of the Residency Program, and Dr. Michael Ferguson is the Associate Program Director. Their 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.

A curriculum of lectures is followed that spans the academic year. In addition, the residents coordinate a dissection lab over the summer of commonly-performed procedures. Finally, most residents participate in outside educational meetings. The third year residents attend the North Carolina/South Carolina Otolaryngology meeting, the fourth year residents attend a temporal bone course, and fifth year residents attend the annual meeting of the American Academy of Otolaryngology-Head & Neck Surgery.

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. 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.



Dr. Amelia Drake (Director of the Residency Program), with Drs. Alisha West and Austin Rose in the Children's Hospital OR.



Dr. Greg Basura at the OR front desk.



Dr. Mike Stadler prepares to see a patient in clinic.

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 and operative cases.

Resident Education

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.

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. Each Wednesday morning residents present a case-based conference. The emphasis is on differential diagnosis, work-up, and management decisions. An in-depth discussion of the disease or disorder follows.

Invited guest lecturers from medical schools across the United States and abroad present a wide range of topics of both clinical and research interest. Visiting professors also participate in conferences during their visits.



Drs. Mitch Gore and Maher Younes



Dr. Scott Shadfar

One new educational opportunity has been the participation of a medico-legal course organized at Duke in which senior residents are invited to participate.

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, resulting in numerous awards and publications.

The Department of Otolaryngology/Head and Neck Surgery has a number of laboratories engaged in 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 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 reflux, airway problems, allergies, and sinonasal disorders.

NIH Training Grant

In 2001, the Department was awarded a 5-year grant totaling \$580,000, 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 two-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 summers 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 one-year training position. Mr. Stefan Mlot worked with Drs. Emily Buss, John Grose, and Joe Hall on a project investigating speech perception in patients with Ménière's disease. He also worked with Dr. Fitzpatrick and Adunka on measurements of cochlear function while advancing an electrode similar to a cochlear implant, to determine the consequences of implants on residual hearing, and to try to identify an early electrophysiological marker of mechanical cochlear damage associated with implant insertion. He has also worked on the effects of endotoxins on the development of nasal allergy with Dr. Prazma. Mr. Alexander Rich is working with Dr. Paul Manis on the effects of hearing loss on excitatory synaptic transmission from the auditory nerve to the stellate cells of the ventral cochlear nucleus. His project has revealed some very interesting effects of temporary hearing loss (temporary threshold shift) following loud sounds, as well as of longer-term hearing loss (permanent threshold shift) that is produced by exposure to loud sounds. We also had two summer medical student trainees. Ms. Eveleen Randall studied the short-term effects of hearing loss on synaptic transmission in the dorsal cochlear nucleus in rats with Dr. Manis. Ms. Katherine Sebastian studied plasticity of the responses of inferior colliculus neurons as a function of behavioral state with Dr. Fitzpatrick. Our current one-year trainee is Mr. Thomas Suberman, who is working with Dr. Fitzpatrick and Adunka, continuing on the cochlear implant project described above.

The crown jewel of the training grant is the two-year research program for selected residents. Last year, Dr. Joe Roche joined us. He is continuing his two-year research program, where he is studying spike-timing dependent plasticity in auditory cortex with Dr. Paul Manis. Dr. Roche received the Herbert Silverstein Otology/Neurotology Research Award, a two-year fellowship, which is jointly sponsored by the AAO-HNS Foundation and the American



Dr. Joe Roche with Dr. Paul Manis. Dr. Manis is the Program Director and Principal Investigator on the NIH Training Grant.



Dr. Rose Eapen



Dr. Deidra Blanks

Neurotology Society. This fellowship helps to support his research on synaptic plasticity and critical periods for sensory learning in auditory cortex. Dr. Roche has also been involved in an auditory neuropathy retrospective with Dr. Craig Buchman, in which they have tabulated findings from >100 children from MRI and CT and compared this with patient historical data and risk factors. This was presented at the Combined Otolaryngology Society Meeting in May, 2009. He has also been working with Dr. Brent Senior, investigating the prevalence of specific IgE levels in a pediatric population using a new assay method that has a lower limit of detection.

Dr. Mihir Patel has just completed his second year as a resident on the research track, working principally with Dr. Marion Couch. He has been worked on two projects, both involving tissue microarrays. The first was an immunohistochemical and molecular analysis of follicular thyroid lesions with the goal of designing a protocol to preoperatively identify benign versus malignant lesions. The second was the CHANCE TMA study, an analysis of squamous cell carcinomas in 150 patients. The primary goal is to preoperatively determine how to further classify head and neck SCCa lesions to guide treatment options and modality. The study analysis of tissue from 150 HNSCC patients, and is targeting various DNA repair genes. Our incoming research resident is Dr. Kibwei McKinney.

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. The residents in particular have also been quite successful in obtaining additional research funding for their projects, including from the Deafness Research Foundation (Dr. Ebert, a two-year research resident), an AHNS/AAO Young Investigator Award (Dr. Patel, a two-year research resident), Lineberger Comprehensive Cancer Center (3 grants, Dr. Cannon, a two-year research resident), the American Academy of Otolaryngic Allergy (Drs. Ebert and Eapen in separate grants), a ROADS scholarship from AAOA (Dr. Blanks), and the Herbert Silverstein Otology/Neurotology Research Award (Dr. Roche). 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 7 years, this grant has provided research support for 8 residents for two-year research projects, 10 medical students for a one-year research experience, and 10 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.

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

Ann Gillenwater, MD

Professor, Department of Head and Neck Surgery
University of Texas MD Anderson Cancer Center
Houston, Texas
Optical Technologies for Diagnosis and Detection of Oral Neoplasia
Surgical Management of Oral Cancer
October 28-29, 2008

D. Bradley Welling, MD, PhD

Chair and Professor, Department of Otolaryngology/Head and Neck Surgery
The Ohio State University College of Medicine
Columbus, Ohio
Molecular Biology and Treatment of Vestibular Schwannomas
Menière's Update 2008
November 11-12, 2008

Trevor G. Hackman, MD

Fellow, Department of Otolaryngology/Head and Neck Surgery
Washington University in St. Louis
St. Louis, Missouri
The Role of Surgery in the Chemoradiation Era: Transoral Laser Microsurgery
November 19, 2008

Robert Ferris, MD, PhD

Associate Professor, Department of Immunology
University of Pittsburgh
Pittsburgh, Pennsylvania
Head and Neck Cancer Immunotherapy: Trials and Tribulations
Endoscopic Head and Neck Surgery: Gimmick or the Future?
December 9-10, 2008

James Fortson, MD

ENT Associates of Atlanta
Atlanta, Georgia
Head & Neck Manifestations of Child Maltreatment
December 18, 2008

Ricardo L. Carrau, MD

Professor, Department of Otolaryngology/Head and Neck Surgery
Director, UPMC Swallowing Disorders Center
University of Pittsburgh Medical Center
Pittsburgh, Pennsylvania
Evaluation and Management of Swallowing Disorders
Complications of Endoscopic Skull Base Surgery: Prevention and Management
February 10-11, 2009

J. Dale Browne, MD

Chair and Professor, Department of Otolaryngology/Head and Neck Surgery
Wake Forest University
Winston-Salem, North Carolina

*The Greater Sphenoid Wing: Surgical Anatomy and Applications in Otolaryngology
A Paradigm of Techniques for Repair of Spontaneous CSF Leaks*

February 24-25, 2009

Andrew P. Lane, MD

Associate Professor, Department of Otolaryngology-Head and Neck Surgery
Director, Johns Hopkins Sinus Center
John Hopkins Medical Center
Baltimore, Maryland

*Chronic Rhinosinusitis - Associated Olfactory Loss
Infection and Chronic Rhinosinusitis: The Chicken or the Egg?*

March 17-18, 2009

Edward Farris, MD

Farris Facial Plastic & Cosmetic Surgery Center
Tampa Bay, Florida

*Browlifting
Personal Philosophies in Rhinoplasty*

March 31 – April 1, 2009

Valerie Lund, MD

Professor
Institute of Laryngology and Otology
Royal National Throat, Nose and Ear Hospital
London, United Kingdom

*Surgical Management of Malignant Sinonasal Tumors: From Craniofacial to Endoscopic Resection
Evidenced Based Management of Chronic Rhinosinusitis*

April 14-15, 2009

Wendell G. Yarbrough, MD

Associate Professor of Otolaryngology and Cancer Biology
Department of Otolaryngology
Vanderbilt University Medical Center
Nashville, Tennessee

Tumor Suppressor Qualities of Novel NF-kB Regulator, LZAP and Modeling of HNSCC

April 23, 2009

Cherie-Ann O. Nathan, MD

Professor and Vice-Chair
Department of Otolaryngology-Head and Neck Surgery
Director, Head and Neck Surgical Oncology
Louisiana State University Health Sciences Center
Shreveport, Louisiana

*Targeted Therapy in Head and Neck Cancer: Why target the mTOR pathway?
Robotic Assisted Endoscopic Approach for Pituitary Tumors*

May 12-13, 2009

Outreach



In Hanoi, Dr. Senior examines a patient as Vietnamese ENT residents observe.

Vietnam: The Work and the Need Continue

2009 marked the 12th year that Dr. Brent Senior, Vice Chair of Academic Affairs and Chief of Rhinology, Allergy, and Sinus Surgery traveled to Vietnam with a team of otolaryngologists to work in the major teaching facilities in Ho Chi Min City in the south and Hanoi in the north. Over that time while working in conjunction with REI Vietnam of Colorado Springs, dozens of private and academic otolaryngologists from the US, Singapore, and Korea have participated as well as audiologists, nurses, and nearly a dozen otolaryngology residents from UNC and elsewhere. Millions of dollars in surgical equipment have been donated and dozens of Vietnamese otolaryngologists have been sponsored to come to the United States for mini fellowships, many of whom have gone on to become chairs of their respective departments.

In 2007, this work culminated in Dr. Senior being awarded the “Medal for People’s Health” from the Minister of Health for Vietnam.

Over that dozen years, tremendous progress has been seen. The technical expertise of rhinologic, otologic, and head and neck surgeries, particularly at the major teaching centers, has improved. Lectures and Grand Rounds, uncommon prior to the ENT Outreach trips, are now a routine part of the resident’s training. Individuals trained with the assistance of UNC ENT faculty and residents now perform complex skull base and rhinologic procedures

with good expertise and solid equipment. Vietnamese ENT residents who previously never saw these procedures are now finishing their training with surgical experience in these areas. And probably most gratifying is that these teachers who have learned from the experience given to them by these outreach teams are now going out regularly to provincial hospitals to teach rural otolaryngologists and perform surgery in their hospitals, providing a reach for UNC ENT Outreach that otherwise would never be seen.

But the work and the need continue! New hospitals are being visited every year with new sets of educational and equipment needs. The team visited the Gia Dinh Hospital in Ho Chi Minh City for the first time since early in the decade. This resulted in two long, hard days of operating and clinic, but many happy patients and physicians. And in 2009, UNC Otolaryngology/Head and Neck Surgery welcomed three otolaryngologists from Vietnam: Dr. Vu Trung Luong from the Bach Mai Hospital in Hanoi, Vietnam, Dr. Pham Kien Huu, from the Medical University Hospital in Ho Chi Minh City, and Dr. Hung from E Hospital in Hanoi.

The team plans to return again in the spring of 2010, this time with the added dimension and participation of UNC neurosurgeons and oncologists. Interested physicians, nurses, or audiologists who may like to participate should feel free to contact Dr. Senior at BSenior@med.unc.edu for more information. In addition, anyone interested in contributing to the UNC ENT Outreach efforts should feel free to contact Holli Gall at Holli_Gall@med.unc.edu, Director of Development for the Department of Otolaryngology/Head and Neck Surgery.



Vietnamese ENT residents gather around as Dr. Senior performs sinus surgery while teaching the latest techniques in Vietnam.

International Visiting Physicians

While we have always welcomed fellow otolaryngologists from throughout North Carolina to visit our clinics and ORs, over the last several years UNC Otolaryngology/Head and Neck Surgery has become a coveted destination for international physicians to visit as well. Observational fellowships varying from just a few days to up to two years allow for an opportunity to observe, participate in research, and learn from cutting edge technology and state of the art surgery by leaders in the field. Accompanied by a heavy dose of Tar Heel hospitality, these surgeons are returning home with increased knowledge and expertise to be able to serve their own local populations.

Physicians participating over the last year include three physicians from Vietnam, Dr. Vu Trung Luong from the Bach Mai Hospital in Hanoi, Vietnam, Dr. Pham Kien Huu, from the Medical University Hospital in Ho Chi Minh City, and Dr. Hung from E Hospital in Hanoi. In addition, UNC Otolaryngology hosted Dr. Jae-Hoon Lee from Wonkwang University School of Medicine, South Korea, Dr. Sang Hyun Lee from the Good ENT Clinic in South Korea, and Dr. Ajit Man Singh from Batra Hospital & Max-Healthcare, New Delhi, India.

While each of these physicians has come with a different interest within the field of Otolaryngology/Head and Neck Surgery, all have left feeling that their skills have been improved and their patients will receive better care.

“It has been a wonderful experience for me to be able to learn from such renowned experts,” says Sang Hyun Lee. “I am looking forward to incorporating some of the ideas and techniques that I have learned into my own practice in Korea,” he says.

Dr. Brent Senior, Vice Chairman and Chief of Rhinology, Allergy, and Sinus Surgery replies, “As the leading otolaryngology department in North Carolina and one of the top facilities in the United States, it is critical that we reach out to our international colleagues, particularly our colleagues in the developing world. Our world is becoming a very small one and our ENT world is especially so.”

He adds, “While many of our faculty have been reaching out to different countries, now the world is literally coming to our doorstep. It is wonderful that our department, in this way, is able to touch surgeons and patients around the globe.”



Physicians visiting from South Korea: Sanghyun Lee, MD (July 2007 - July 2009) and Jaehoon Lee, MD (July 2008 - July 2009), heading to the Operating Room to observe Dr. Senior.



Dr. Anas A. Eid (right), a young physician native to the West Bank, assists Dr. Austin Rose with a surgical procedure in Tulkarm. Photo by Maria van Aalst.

Return to the West Bank

by Dr. Austin Rose

Tulkarm is a medium sized city of about 60,000 people in the West Bank part of the Palestinian Territories. It has a fairly rich history dating back to the Ottoman Empire, though the land on which it sits is thought to have been inhabited for almost five thousand years. Though charming in many respects, the town also bears witness to many years of political instability and uncertainty and is home to a large refugee camp dating back to 1950.

The town has one main public hospital, the Dr. Thabet Thabet Hospital where our team was based, with about 100 beds and a small privately-funded hospital with only 35 beds. Health care services are coordinated by the Palestinian National Authority's Ministry of Health, though there remain significant shortages of infrastructure, supplies and medical personnel, especially in subspecialty fields.

Over the past several years Dr. John van Aalst, one of our colleagues in the Division of Plastic and Reconstructive Surgery here at UNC, has focused in particular on improving the care of cleft lip and palate patients in the region. He has helped to organize the Palestinian Cleft Society and has led several medical mission trips to the West Bank. In part, his family ties may have led him there as well, as his mother was born in Tulkarm.

This past June I was fortunate to be able to return to the West Bank for the second time as a member of Dr. van Aalst's surgical team. In addition to Dr. van Aalst and myself, the team this year included Dr. Libby Wilson from UCLA, who had come to work primarily in Jericho, and Dr. Sayf Yacoub-Saed from Bethlehem. Though from the West Bank

himself, Dr. Yacoub-Saed completed his general surgery training in Greece and is currently a plastic surgery fellow at the Soroka Medical Center in Beer Sheva, Israel.

For Americans, the journey to Tulkarm begins with a flight to Tel Aviv and about a one hour drive to the IDF check point between Israel and the West Bank. We spent our first day in Ramallah, about 6 miles north of Jerusalem, attending a meeting of the Palestinian Cleft Society where I gave a talk entitled "Operating Safely on Children with Clefts – Airway Issues". The next day, we headed north to Tulkarm for our screening day, where over 100 children were seen by each of the team's physicians. Issues included cleft lip and palate, trauma, aural microtia and atresia, hearing loss, speech delay and both acute and chronic ear disease. After an exhausting day, a rough outline of the week's surgical schedule was determined.

To be sure, one of the primary goals is to help train local physicians, and a number of young surgeons from the area were there to both observe and participate directly in all of the surgical cases. For the first year, a number of ENT cases were able to be performed as well, including sinus surgery - performed endoscopically for the first time ever in Tulkarm! Again, the focus was on teaching.

One of the main challenges for those providing daily care in the region is the lack of modern medical equipment. Last year, I helped to set up an ENT microscope that had been generously donated so that ear tubes could be more easily placed. I later learned that the microscope had allowed improved treatment in cases of acute mastoiditis and chronic ear disease, though physicians were still struggling without the use of any form of otologic drill, relying primarily on osteotomes. Luckily this year, thanks to another generous donation, we were able to transport and set up an electric drill for the hospitals ENT surgeons. There is no question that these two additions have significantly improved the level and quality of ENT care in Tulkarm.

The week brought many challenges, but the hard work was met with equal gratitude and generosity from both the patients' families, as well as from our wonderful medical colleagues in Tulkarm. I look forward to working with them again in the future as they strive to improve the level of care in this fascinating part of the world in which they live.



A generous donation allowed Dr. Austin Rose to bring an otologic drill on this year's trip. After training of local ENT physicians and staff in its set up and use, the drill was left at the Dr. Thabet Thabet Hospital in Tulkarm to help improve their care for otology patients. Prior to this, osteotomes were the primary instrument used in mastoid cases. With Dr. Rose is Mohammed, the head of surgical services and new fan of UNC. Photo by Maria van Aalst.



Dr. John van Aalst (seated) of the UNC Department of Surgery's Division of Plastic & Reconstructive Surgery, and Dr. Sayf Yacoub-Saed of Bethlehem (right) see patients on screening day prior to surgery. Dr. van Aalst's mission to the West Bank is supported and organized by the Palestine Children's Relief Fund.



Patients waiting to be seen in the clinic at Kamuzu Central Hospital in Lilongwe, Malawi.

Cancer Research and Resident Training in Malawi

by Dr. Jessica Smyth

In June 2009, Dr. Carol Shores and I traveled to Kamuzu Central Hospital (KCH) in Lilongwe, Malawi. Lilongwe, located in central Malawi, is the nation's capital and has a population of approximately 850,000. Many European and South African expatriates live in Lilongwe and many NGOs—including the UNC Project—international aid organizations, and international corporations operate out of the city. Consequently, the city has many accommodations that are familiar to the western traveler including a variety of coffee shops, cafes, bars, clubs, and restaurants. However, most of Lilongwe's Malawian citizens live on just a few dollars a day and many are unemployed. The population of Lilongwe has grown as villagers, including young children orphaned from HIV, from the surrounding rural areas have relocated to the capital in search of jobs and improved quality of life.

Kamuzu Central Hospital is a 1,000-bed, public, tertiary care hospital operated by the Ministry of Health that serves a population of nearly four million people. Dr. Muyco, a Filipino surgeon who has been practicing in Malawi for 30 years, is the chief of the surgery department. The department is a conglomeration of surgeons from around the globe, including Norway, Tanzania, and China, who have a heart for the welfare of Malawi. Currently, there are no Malawian surgeons. Additionally, there are no otolaryngologists. Clinical officers are the vast majority of providers in the hospital and throughout the country. Following high school, clinical officers complete 2 years of formal education and eighteen months of on-the-job training. In many surrounding cities, they are the only available medical staff in the clinics. There is one clinical officer at KCH who specializes in otolaryngology.

Dr. Shores has traveled to KCH many times and the purpose of our current trip was less clinical than some of her prior trips. During this trip, my goal was to lay the groundwork for research investigating ameloblastomas. Ameloblastomas are benign, locally aggressive odontogenic tumors. Studies demonstrate a distinct geographic



Dr. Jessica Smyth at Lake Malawi



Drs. Jessie Mlotha, Carol Shores, Silas Bere, and Jessica Smyth

variation in the incidence of this tumor with a 10-fold increase in incidence in Sub Saharan Africa compared to the United States. The majority of patients are less than 20 years of age. Currently, no etiology has been identified. The marked geographic variation, however, suggests a local agent or exposure such as viral infection may be causative. Other cancers with variation in geographic distribution are associated with viral infection, i.e. Epstein-Barr virus with Burkitt's lymphoma and nasopharyngeal carcinoma. It is well established that viruses induce and deregulate cell growth. The objective of our investigation is to definitely determine if a specific virus or viral family is associated with ameloblastomas in Malawi. A large portion of the head and neck pathology that presents to KCH is seen in the dental clinic; consequently, the oral surgeons – Dr. Jessie Mlotha and Dr. Silas Bere – will assist us and biopsy masses consistent with ameloblastomas.

In addition to this project, Dr. Shores is also working diligently to establish a cancer registry at KCH. More than one third of worldwide cancer deaths are due to preventable causes such as viral infection, poor nutrition, and tobacco use. In developing nations, chronic infections such as HIV, hepatitis viruses, human papilloma virus, human herpes virus-8, and schistosomiasis increase the burden of neoplastic disease. The registry can be used to quantify the burden of disease, request resources for treatment and prevention, and be used to set up clinical trials to guide future therapies.

There is a strong desire to have a Malawian surgeon at KCH which was the impetus for establishing a surgical residency program in Malawi. The first group of surgical residents arrived while we were in Malawi. A third goal of our trip was to assess the surgical residency training program and determine how UNC trained faculty could contribute to the training of these young surgeons.

I had the opportunity to interview the new residents. Gift Mulima is a 28-year-old male from the Zomba District. He became a physician to save lives and to contribute to quality health service delivery. He is pursuing surgery because there is a high disease burden that requires surgical intervention and few available trained surgeons. He strongly believes it would make a tremendous difference if Malawian surgeons would stay and work in the country. He is considering subspecialization in otolaryngology or plastic surgery and intends to be actively involved in the training of future Malawian surgeons. Rahim Ibrahim is also 28-years-old. He is from the Dedza District and believes being a physician is a noble cause. He expressed that Malawi has a very low physician to patient ratio (1:80,000) and subsequently has a great need for physicians, and even more so, for surgeons. Consequently, he is pursuing surgical training to help provide better health care and to assist in saving the lives of Malawians. Tiyamike Eletima Chilunjika is a 26-year-old woman and hails from the Dowa District. She was encouraged by her parents to pursue

medicine. After taking courses in medicine, she realized she enjoyed serving patients with various conditions, especially surgical conditions. She intends to become a Pediatric Surgeon and would likely be the first female surgeon in Malawi. The expectation is that one of these residents will soon be the first Malawian surgeon on staff at KCH and will eventually lead the department.

We were continually impressed by the number of patients and the burden of disease treated by this group of surgeons and staff. While seeing patients on the ward, we spoke with the nursing staff. On one particular morning, the nurse on the surgical ward was responsible for 38 patients. On another day, the theater (operating room) ground to a standstill because there was a water outage and instruments could not be sterilized. Ventilators are limited. CT and MRI imaging are nonexistent. It is amazing the care that is provided to the patients given the limited resources available at the hospital. We were able to provide some medical equipment and supplies that we brought with us, which were greatly appreciated. We hope that in the future we can provide more.

Each resident is paid \$500 per month for a total cost of \$30,000 to train a surgical resident through a 5-year program. Our goal is to be able to fund one resident per year. Additionally, my goal is to provide each of the three residents with a laptop computer.

The experience was extremely rewarding. Although this is a country with great needs, it is also a country of energetic, young physicians willing to work toward improvement. Dr. Shores has seen significant improvements in the few years that she has been traveling to Malawi, and it is our desire that we do all we can to ensure this progress continues. If you are interested in making a donation that will support the surgical residents training in Malawi, please contact Holli Gall, North Carolina Medical Foundation Major Gifts Officer, at holli_gall@med.unc.edu.

The Carolina Covenant Mentoring Program

UNC was one of the first universities to establish a program that is now used throughout the country. In the Carolina Covenant, UNC covers all financial needs for admitted students whose family's incomes are at 200 percent of the federal poverty level or less. The students are given no special consideration for admission and are granted a Carolina Covenant scholarship only after they meet the admission criteria. But these are remarkable students as evidenced by the fact that a majority of the scholars are the first in their families to go to college. Each year, Dr. Marion Couch participates in a special program to be a faculty advisor to some of the undergraduate Covenant scholars.

To offer the students in the Carolina Covenant the opportunity to have mentors in the School of Medicine, the School of Public Health, and the Lineberger Comprehensive Cancer Center, Dr. Marion Couch and her colleagues have begun an additional mentoring program. The goal of the program is to give the undergraduate students the background information they need to make sound, successful career choices and to mentor them to achieve their goals.

Once a month, the students and physicians meet for Carolina Covenant Medicine and Science Mentoring program on campus. The program starts with some advice on how to prepare for a career in medicine and research. Topics include how to apply to medical school, what a career in medicine entails, and how to balance family and career. Questions are encouraged and after the meetings, the students are given the opportunity to shadow the physicians in their offices. Dinner is served to encourage professional networking. Dr. Bruce Cairns, Dr. Sam Jones, Dr. Matthew Ewend, Dr. Lisa Carey, and Dr. Peadar Noone are among many physicians who participate in this program.

Free Oral, Head & Neck Cancer Screening

The Multidisciplinary Head & Neck Oncology program participated in the Annual Oral, Head & Neck Cancer Awareness Week (April 26th – May 2nd, 2009). A free Oral, Head & Neck Cancer Screening was offered to the community on April 29th. Dr. Mark Weissler and many of the Otolaryngology/Head and Neck Surgery residents provided screenings to 36 people. Members of the multidisciplinary team set up tables in the lobby of UNC Hospital and provided information about Head & Neck Cancer, smoking cessation, and nutrition to the community.

“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,” he adds. “The new UNC Nicotine Dependence Program is a great asset to assist people in quitting smoking.”



Participating in the free screening: Drs. Scott Shadfar, Mihir Patel, Joe Roche, Mark Weissler, Allen Marshall, and Maher Younes



Nurse Navigator Sean Gallagher, RN, provided information about head and neck cancer in the hospital lobby on the day of the free screening.



After the patient completes a questionnaire about overall health, nutrition, and lifestyle choices, the exam includes discussion and a careful check of the head and neck.

Clinical Programs



Dr. Amelia Drake meets with a patient and his parents in the holding area of the Children's Hospital before surgery.

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 share the effort of caring for infants and children with problems relating to the ears, nose and throat. They see patients in the UNC ENT Clinic in the North Carolina Neurosciences Hospital, as well as at the UNC ENT at Carolina Pointe office. In addition, over 2000 operative cases are performed each year in pediatric otolaryngology at the Children's Hospital OR and the outpatient Ambulatory Care Center OR.

Many children presenting to UNC have complicated medical problems and multi-system diseases that require the careful coordination of physicians and specialists in a number of 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, led 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 Dental School, has helped to coordinate



Dr. Carlton Zdanski with a patient who has bilateral hearing aids.

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, for many years.

In addition to their clinical work, the faculty of the Division of Pediatric Otolaryngology dedicate significant time to both teaching and research responsibilities. Dr. Drake serves as the Department's Residency Program Director and both Drs. Rose and Zdanski continue to serve on the American Board of Otolaryngology's Task Force for New Materials. In addition, Dr. Rose is the current Course 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, on several occasions – including those in conjunction with medical mission trips to the West Bank/Israel 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.



A patient and her mom, after a visit with Dr. Austin Rose.

Pediatric Otolaryngology Fellowship



Dr. Laura Rosenthal

Over the past few years, the demand for pediatric ENT services within our Department has grown exponentially. While meeting this demand has been challenging, it has also created significant learning opportunities, both in terms of clinical experience and surgical cases. To address this need, the Department now offers a one-year Pediatric Otolaryngology Fellowship.

Our first fellow, Dr. Laura Rosenthal, began in July of 2009. She earned her MD from the University of Illinois, followed by residency training in Otolaryngology/Head and 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. Given her undergraduate background in bioengineering and bioethics, Dr. Rosenthal is also interested in the relationship between physicians and industry and the unique ethical issues faced when taking care of children.

“As our Division grows, I think there is a clear opportunity for excellent training at the fellow level” say Dr. Austin Rose, Director of the Pediatric Otolaryngology Fellowship Program. As home to a free-standing Children’s Hospital, Pediatric Airway Center, Craniofacial Center and Pediatric Cochlear Implant Program, UNC offers many ways for pediatric otolaryngologists entering the field to get involved and expand upon their residency training.

In addition to clinical responsibilities, there will also be 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. As the only pediatric ENT fellowship in the state, the program should help to bolster the Division’s position as the premier group for pediatric otolaryngology training in North Carolina.



Dr. Rosenthal getting to know a patient before examining her ears.

The North Carolina Children's Airway Center

The North Carolina Children's Airway Center helped The North Carolina Children's Hospital achieve a ranking of 11th in the nation among the top 30 children's hospitals caring for children with respiratory disorders by *US News & World Report* in their 2009 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. It is a unique public/private endeavor, brought into existence by funding from the Department of Otolaryngology/



Medical Director of the NC Children's Airway Center, Dr. Carlton Zdanski, with Dr. Trinitia Cannon

Head and Neck Surgery, the Department of Pediatrics' Division of Pulmonology, and The Duke Endowment to provide multidisciplinary evaluation and treatment of children with complex airway disorders. 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 will seek to instruct families, medical students, clinicians and healthcare providers, and to perform research into pediatric airway disorders. The North Carolina Children's Airway Center officially opened its doors in September 10, 2007. Since then, more than 500 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 been established, multiple presentations at national meetings given, and numerous presentations at the state and local level.

The Center's core organizational structure includes Surgical Director Carlton J. Zdanski, MD; Medical Director George Retsch-Bogart, MD; Respiratory Therapist Mark Hall, RT; Tracheostomy Nurse Cynthia Reilly, PNP; OHNS pediatric nurse Claire Culberson; Speech Pathologists Jennifer Rayburn, SLP, and Leah Thompson, SLP; Administrative Coordinator Leslie A. Stewart, MA; Social Worker Cathy Tutka, LCSW; and Program Coordinator Kathy Abode, RN.

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 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 Claire Culberson, RN, or call the Consultation Center at 800-862-6264, and request Dr. Zdanski.

Facial Plastic and Reconstructive Surgery

The Division of Facial Plastic and Reconstructive Surgery continues to grow, taking care of patients with both cosmetic and reconstructive needs.

At UNC Hospitals, Dr. Shockley has started a Rhinoplasty Clinic. This clinic is devoted to the needs of patients with traumatic nasal deformities, congenital anomalies, patients with nasal valve problems, as well as patients with nasal obstruction and cosmetic concerns.

Dr. Raymond Cook has developed a state-of-the-art center at WakeMed in Raleigh, focusing on rejuvenation of the aging face. In January of 2009,

Dr. Cook and WakeMed Facial Plastic Surgery opened Premier Med Spa of Raleigh. Dr. Cook opened the Med Spa because he saw an increasing need to incorporate the development of effective non-surgical medical technologies into his aesthetic practice. Angie Ciosek, the Med Spa's licensed aesthetician, is a native of Poland. She received degrees from the School of Cosmetology in Gdansk and the Michigan College of Beauty. Angie is passionate about skin care and has extensive expertise in all areas of skin care. The state-of-the-art facility located in North Raleigh provides the most comprehensive services available including laser hair removal, IPL photofacials, chemical peels, therapeutic facials, microdermabrasion, Rhytec skin rejuvenation, and laser vein therapy. The Med Spa also offers Botox injections, filler injections, and laser skin resurfacing.

Dr. Shockley and Dr. Cook were invited faculty members at the recent Advances in Rhinoplasty Course in Seattle. Dr. Cook discussed the management of soft tissue injuries of the nose, facial and nasal aesthetics, and served as one of the course directors of the Rhinoplasty Dissection Course. Dr. Shockley's talks were focused on functional septorhinoplasty, the use of osteotomies and rhinoplasty, and techniques related to reconstruction in patients with large nasal defects. "Like many of my colleagues in facial plastic surgery, I really enjoy nasal reconstructive procedures and rhinoplasty surgery," said Dr. Shockley. "There is a great sense of satisfaction when you can restore the ability to breathe through the nose as well as improve someone's appearance."

The Facial Plastic service continues to manage patients with other reconstructive problems including surgery for facial paralysis, traumatic facial deformities, and traumatic scar deformities, as well as hemangiomas and vascular malformations. We continue to see lots of patients with skin cancer, some of whom have been immunosuppressed. Many of these patients require complex reconstruction of facial defects involving the face, eyelids, ears or nose.



Drs. Shockley and Stadler performing a revision septorhinoplasty for traumatic nasoseptal deformity

Dr. Shockley and Dr. Zdanski have also placed a significant emphasis on microtia repair. Several successful surgeries have been performed. The team approach seems to be working well as the patient gets the benefit of two surgeons with special expertise and two surgeons with a perspective on the aesthetics of reconstruction. At the present time, we are typically doing a four-stage procedure using costal cartilage grafts. In special circumstances, such as traumatic loss of the ear, we have used osseointegrated implants for use with a prosthetic ear. Of course our prosthetic ears are created by one of our most artistic colleagues, Dr. Glenn Minsley in the Department of Prosthodontics at the UNC Dental School.

Both Dr. Shockley and Dr. Cook see patients with cosmetic concerns. Not surprisingly, many patients are looking for less invasive procedures in order to avoid down time from work. Therefore Botox, fillers for wrinkles, superficial laser procedures, microdermabrasion, and other minor office procedures have become quite popular.

From an educational viewpoint, there is a focused facial plastic surgery curriculum. We have Facial Plastic Surgery Conference twice a month. We also have a review course in facial plastic surgery in the spring. This is typically done in conjunction with Dr. Neal Goldman at Wake Forest University School of Medicine. This course is open to Otolaryngology residents in North Carolina as well as residents in Plastic Surgery and fellows in Ophthalmic Plastic and Reconstructive surgery. Facial Plastic Surgery Conference entails lectures from the UNC attending faculty, guest speakers and journal clubs. We are extremely indebted to Dr. Madison Clark who is one of our clinical faculty. He has been a great asset and a committed teacher.



Dr. Shockley and his nurse of 14 years, Elaine Hinkle, RN

As almost everyone knows, Elaine Hinkle is one of our most revered and respected nurses. Dr. Shockley has been lucky enough to have her as his nurse for the past 14 years. Elaine has played a major role in the success of the Facial Plastic Surgery Clinic. “Luckily I have a lot of happy patients, but I understand that much of that has to do with the personality and accessibility of my nurse,” Dr. Shockley says. “Elaine always has a smile and always has the patient’s best interest at heart. She is adored by the patients and is one of the most respected and dedicated nurses that I have ever worked with.”

Dr. Cook at Wake Med North and Dr. Shockley at UNC Hospitals are happy to see patient referrals related to facial skin lesions, skin cancers, congenital and acquired facial and nasal deformities, facial paralysis, microtia and vascular

lesions. In addition, we are happy to see patients with any cosmetic concerns or concerns related to the aging process. A significant portion of our practice is devoted to functional and cosmetic rhinoplasty as well as other disorders causing nasal obstruction, such as nasal valve dysfunction.



Dr. Brent Senior performing sinus surgery using computer image guidance.

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 Sinus Surgery provides a complete range of services for management of sinus and allergy conditions. These services include the latest in medicine, immunotherapy, and surgery.

Judy Miles, RN, and Gina Stoffel, RN, provide full allergy service to over 300 patients a month. With the use of the multi-test 11 screen, the allergy nurses have been able to test younger children. The opening of the Carolina Pointe satellite clinic has brought unparalleled convenience, offering free parking at the front door. The allergy nurses and ENT physicians are an integral part of educating new residents about the importance of allergy treatment in the ENT practice.

The Division is managed by Brent A. Senior, MD, with other members including Adam Zanation, MD, Harold C. Pillsbury, MD, Brett E. Dorfman, MD (WakeMed), and Michael O. Ferguson, MD (WakeMed). Carlos Ebert, MD is the newest member of the team, having trained in Otolaryngology at the University of North Carolina followed by a fellowship in Rhinology at the Georgia Nasal and Sinus Institute. 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 minimally invasive surgery for many tumors of the nose and sinuses and, in some cases, those of the orbit and even of the brain. Recent technological acquisitions, including the latest in powered instrumentation and computer image guidance, 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 result of the Division of Rhinology, Allergy, and Sinus Surgery's leadership in the realm of nasal and sinus 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.



The newest addition to the Division, Dr. Carlos Ebert, with his nurse, Paula Boisvert, RN

A major activity of the Division is co-sponsorship of educational programs in rhinology and sinus surgery. The Division co-sponsors the Southern States Rhinology Course held each spring on Kiawah Island, South Carolina. Jointly sponsored by the Medical University of South Carolina, the Medical College of Georgia, 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 April 8-10, 2010; more information on this annual course can be found at www.southernstatesrhinology.org.



Dr. Adam Zanation

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 otolaryngologic meetings including the Annual Meeting of the AAO/HNS and the Annual Meeting of the American Rhinologic Society. Topics of division research have included aspects of minimally invasive pituitary surgery, image guidance, and basic science studies in the innate immunity of the paranasal sinus epithelium, leading to several papers submitted and published in peer-reviewed journals. Collaborative work with the Department of Psychiatry and the Division of Pulmonary Medicine is ongoing and yielding new insights into the nature of sinus disease and olfaction.



Dr. Senior and his nurse, Barbara Esterly, RN, with Aneil K. Mishra, PhD (a patient from Duke!)



Allergy Nurse Judy Miles, RN, gives a patient his shot.

Office Based Treatments for Nasal Obstruction

Nasal obstruction has long been successfully treated with septoplasty and/or submucosal resection of the inferior turbinates. Both procedures require a visit to the Operating Room, usually with general anesthesia, and frequently with septal splints and packing. Complications of these procedures include nasal septal perforation, bleeding, infection, and following over-resection of the inferior turbinates, dry nose with persistent crusting. Radiofrequency submucosal resection of the turbinates (Nasal Somnoplasty) is a minimally invasive procedure that can be performed in the office with only topical anesthesia that avoids a trip to the Operating Room and has an extremely low incidence of side effects (bleeding). It is indicated for patients whose nasal obstruction does not relate to deflections of the nasal septum and whose turbinate enlargement is not due to bony hypertrophy. The procedure is well tolerated by patients, with no postoperative pain, and one to two treatment sessions will cure approximately 80-90% of appropriately-selected patients' nasal obstruction. Radiofrequency submucosal resection of the turbinates is an ideal procedure for patients who do not wish to have a procedure performed in the Operating Room, and whose nasal obstruction is not related to septal deflection.

Office Based Treatments for Snoring

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 (Palatal Somnoplasty) is our procedure of choice. Now available in the United States for about 10 years, It is a time tested office-based procedure, where a needle electrode is inserted into the palate, delivering radiofrequency energy to heat surrounding tissue. We have altered the technique to increase the amount of energy and the number of lesions given to the palate, thereby decreasing the number of treatment sessions needed to improve snoring. 70% of patients will be cured after two treatment sessions using our technique. The side effects of this procedure are minimal; however, palatal ulceration, fistula, and uvular slough have been reported. 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. Obstructive sleep apnea has been associated with decreased life span, mandating diagnosis and treatment. Working with sleep medicine specialists in the Departments of Neurology and the Division of Pulmonary Medicine, as well as surgical colleagues in the Department of Oral and Maxillofacial Surgery and Dentistry, members of the Department of Otolaryngology/Head and Neck Surgery provide unique personalized treatment plans for patients with sleep apnea including some of the following:

Septoplasty

Septoplasty consists of removing pieces of deviated bone and cartilage from the nasal septum. Avoiding the need for packing of the nose or placement of splints makes this outpatient operation a remarkably painless procedure. For patients with enlargement of the turbinates alone and a straight septum, turbinate reduction may be all that is required.

Tongue Base Somnoplasty

(Radiofrequency Volumetric Tissue Reduction of the Tongue)

Patients with obstructive sleep apnea frequently have obstruction at the tongue base. Many procedures are available to improve this obstruction, including genioglossus advancement, hyoid suspension, mandibulomaxillary advancement, and more recently, tongue base Somnoplasty.

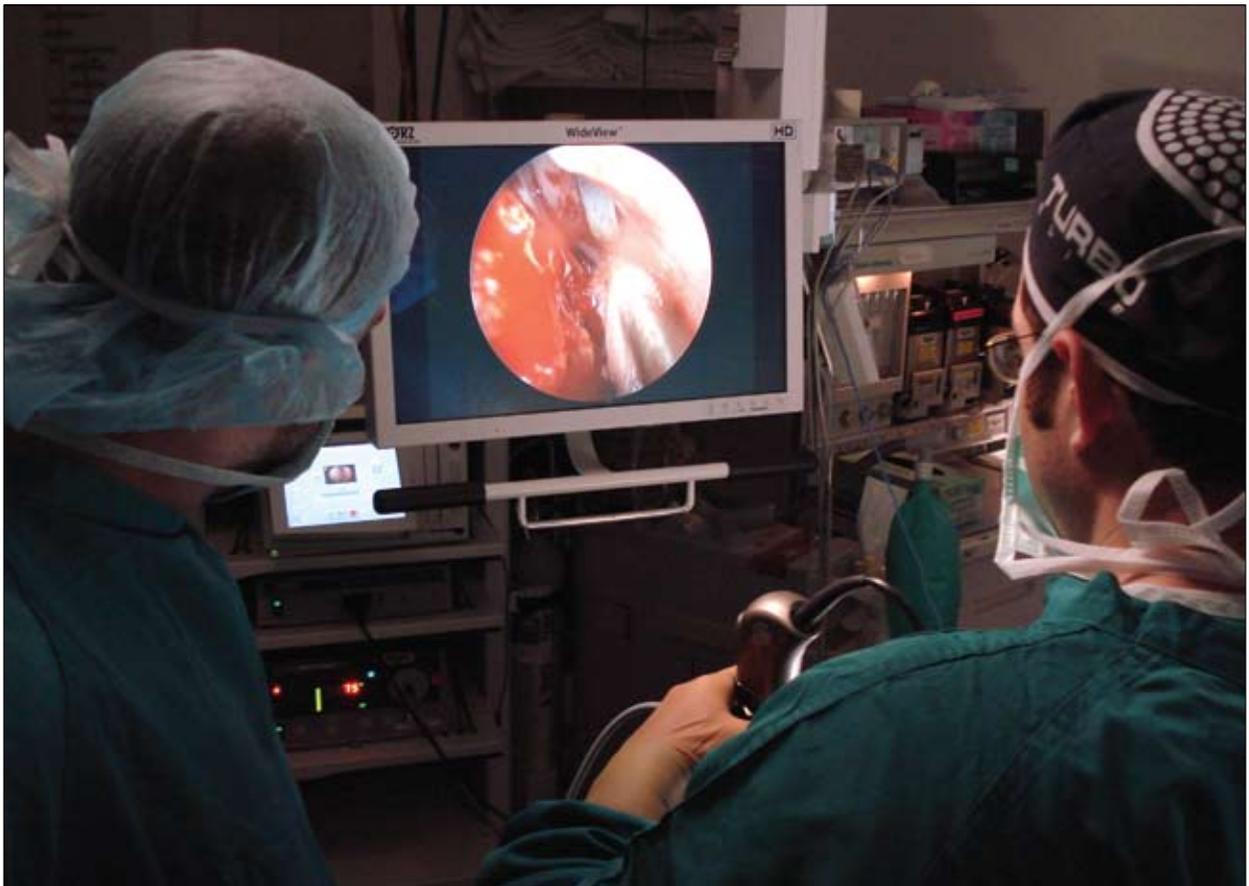
The tongue base Somnoplasty uses radiofrequency energy to heat tissue surrounding a small needle which is inserted into the tongue base. The heated tissue is resorbed by the body, leaving a scarring, reducing the size of the tongue base. This procedure has proven safe with a small incidence of tongue base abscesses being the primary complication. While proven effective by a few studies, tongue base Somnoplasty is a relatively new technique, and the ultimate utility of this modality is still unknown.

Uvulopalatopharyngoplasty

Uvulopalatopharyngoplasty (UPPP) involves removing the uvula and portions of the palate and is frequently combined with tonsillectomy. Significant improvement in obstructive sleep apnea (OSA) 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 moved slightly, thereby pulling the tongue slightly 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.



No incisions required. Drs. Adam Zanation and Paul Bryson remove a large vascular nasal mass endoscopically through the nose.

Pioneering Minimally Invasive Skull Base Tumor Treatments: Minimally Invasive Pituitary Surgery (MIPS) 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 350 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 50 expanded endoscopic tumor surgeries. In a very special case, Drs. Zanation and Germanwala performed the first endoscopic endonasal clipping of a ruptured aneurysm in the world. This case illustrates the potential of the minimally invasive endoscopic approach and shows that UNC is expanding the limits in this new field.



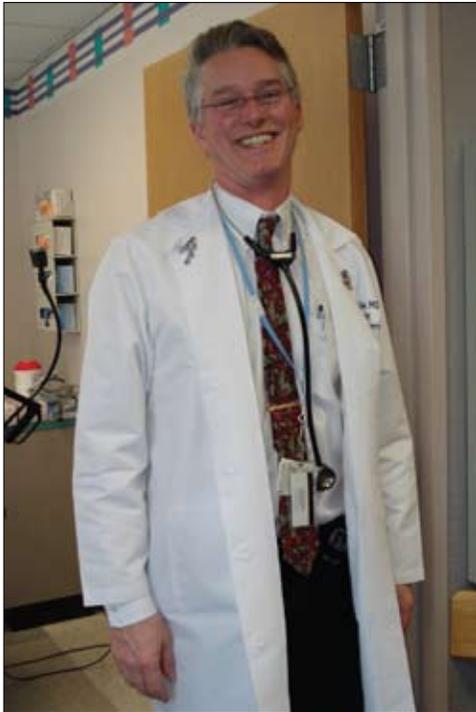
Drs. Adam Zanation, Austin Rose, and Paul Bryson with the patient in the holding area before endoscopic skull base surgery to remove a tumor through the patient's nose. Not pictured: Dr. Anand Germanwala (UNC Neurosurgery)

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. In March 2009, a 12-year-old boy presented to Dr. Austin Rose, UNC Pediatric Otolaryngology, for severe recurrent epistaxis with an advanced JNA. The tumor extended from the right infratemporal fossa, filling the right sphenopalatine fossa and extending up to the sphenoid skull base. Due to skull base involvement and the tumor's large size, the best option for the patient is with multidisciplinary care. Dr. Rose presented the patient to Dr. Adam Zanation, UNC Head and Neck Surgery and Skull Base Surgery. The two surgeons presented all treatment options to the patient and the family, and decided on proceeding with an expanded endoscopic approach to the tumor and the skull base. This is a novel approach for a giant JNA such as this one. With no incisions on the face or head, the tumor was removed en-bloc through the nose on June 3, 2009. The patient was discharged home from the hospital on postoperative day 2.

This case illustrates the growing overlap of subspecialty skull base care and research that is being provided within the Department. 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. 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.

The UNC Multidisciplinary Head & Neck Oncology Program

The Multidisciplinary Head & Neck Oncology Program offers a full range of leading-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 and microvascular free flap reconstruction.



Dr. Mark Weissler



Dr. Marion Couch and her nurse, Karl Mann, RN

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; Marion E. Couch, MD, PhD; Adam M. Zanation, MD, and Trevor G. Hackman, MD, serve as the Program's Head & Neck oncologic surgeons at UNC, while Dr. Carol G. Shores MD, PhD serves as the oncologic surgeon and Wake Med. This conference is also Webcast to Wilmington, NC where Head & Neck physicians participate directly and discuss their patients. Patients from Wake Med in Raleigh are presented at this conference by Dr. Shores. Our weekly tumor board now routinely discusses over 30 patients per week actively undergoing multidisciplinary cancer therapy at UNC. In 2008, 730 new patients came through the Multidisciplinary Head & Neck Cancer Program at UNC Hospitals. Our clinical practice continues to grow on a yearly basis.



Dr. Carol Shores and Speech Pathologist Brian Kanapkey

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.



Drs. William Shockley, Derek Leight, Deidra Blanks, and Adam Zanation

Sean Gallagher, RN, MS, and Susan Hayden, RN serve as our nurse coordinators for head and neck cancer patients. Cynthia Smith serves as the Head and Neck Oncology Program Coordinator. 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 is our intake coordinator. She arranges for initial consultations at UNC from referring physicians. She helps us gather all the outside medical information on these often complex patients.



Dr. Trevor Hackman on his first day seeing patients in the clinic, August 12, 2009.

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 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, 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 this year 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 Yul Brenner 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 nurse coordinators put on an exhibit and information center in the hospital lobby.

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 clinical trials are listed below.

- OSI 3602s – Phase 2 study of erlotinib, cisplatin and radiotherapy versus cisplatin and radiotherapy in patients with Stage III and IV SCCHN. First line trial.
- OSI 3597s – Phase 2 Randomized Study of Bevacizumab/tarceva and Tarceva/sulindac in SCCHN. Second line trial for patients who have failed to respond to or relapsed from at least one prior chemo or chemo/radiotherapy.
- H3E-MC-JMHR – Phase 3 randomized study of pemetrexed in combination with cisplatin versus cisplatin/placebo in patients with recurrent or metastatic SCCHN. For recurrent disease or newly diagnosed distant mets. Must be 6 months out from last treatment.
- BI 1200.28 – Randomized open-label Phase II study of BIBW 2992 versus cetuximab (Erbix) in patients with metastatic or recurrent SCCHN after failure of platinum-containing therapy with a cross-over period for progressing patients. Must be at least 3 months out from recent treatment.

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. Byron will be working on establishing new and much more comprehensive protocols for continued evaluation and treatment improvement for head and neck cancer patients.

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.



Speech Pathologist Brian Kanapkey applying a heat and moisture exchange system to the patient's tracheostoma. Photo by Linda Kastleman.

The latest in technology for swallowing therapy, such as surface electromyography for biofeedback and VitalStim electrical stimulation is used here at UNC. The 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.

Yet another role filled by the head and neck clinic speech pathologist is in the area of patient and family teaching before and following tracheostomy tube placement. Speech pathology is as part of the team seeing this population for the purpose of creating a much more comfortable patient facing surgical 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.

In the Words of a Patient: Amanda Futrell



My story begins in the summer of 2002. I was 25 years old when I discovered a small lump on the side of my right jaw. It soon became painful and grew bigger. I went to my regular dentist, who sent me to an oral surgeon. He took a biopsy and assured me that the last thing it would be was cancer. After confirming the results with an out-of-state lab, the results came back. I went to my post-op appointment alone, leaving my mom, aunt, and grandma in the car. I was taken into a room and the nurse disappeared, coming back with my mom. The doctor came in and told me that he was very sorry, but that the results showed that I had malignant osteosarcoma, and I needed to see another specialist in town. They had made me an appointment already. To say I was in shock was an understatement. I didn't believe something like this could happen to me. I never smoked. I went to the other appointment, and the doctor recommended that I go see a friend of his in Chapel Hill. So I went to see Dr. Mark Weissler, an ENT oncology specialist. My only option was surgery, and soon.

I spent my time having x-rays, CT scans, and MRIs to confirm and stage the cancer. Then I made the long trip up to see Dr. Weissler, hoping and praying for a good surgeon and promising results. We met with Dr. Weissler, and I immediately liked him. He was calm, assuring, and skillful in his field. He talked to us about the type of cancer and how rare mine was. Osteosarcoma is usually found in children and in the long bones. Mine was in my jaw. He told us that the only treatment was surgery to take the jawbone out and replace it with a piece of my left fibula, with blood vessels, nerve, and tissue transplant. Then began the long ordeal of meeting all the doctors that might become involved in my case. There was a possibility of chemo or radiation, but it wasn't needed.

September 3, 2002, was the day of my surgery. It took around eight hours for the surgery. I was told there were quite a few doctors who worked on me. Dr. Damon Anagnos was my Plastic and Reconstructive Surgeon. He performed the microvascular surgery necessary to transfer my fibula to my new jaw. I woke up with an NG tube, tracheostomy, and tubes and lines to monitor the bone graft. I spent two days in the ICU and 7 days on another floor. I had to learn to breathe, eat, and talk again. I had to overcome the pain and fear, and learn to eat and breathe at the same time. My mom or my aunt was always with me, since I wasn't able to talk and tell the nurses my needs. I started eating soft foods with the help of the Speech Pathologist, Brian Kanapkey. Soon I was able to breathe alone and come home without the trach.

Being home was scary, and I prayed a lot. I was on a soft pureed diet for over a year. After the area had healed for three months, they started the reconstruction for teeth on December 12, 2002. The grafted bone was split in half by Dr. Blakey and a distracter was applied. Twice a day my mom and I had to turn it so the bones would separate and new bone would be fill in, making it strong enough to implant a fixed bridge with teeth. After getting it to the new height, we let it heal and strengthen.

During this time, I kept going to see Dr. Weissler. He was always reassuring me that the area looked good and I was progressing well. I am blessed to have him as my doctor. I felt like I was struggling to grasp the idea that my leg bone was in my mouth, along with a skin graft from my thigh, and all the scars still make me self-conscious. The UNC Dental School started the process of making me a fixed/removable bridge with teeth, and after many months, I had teeth again, thanks to Dr. Glen Minsley of Dental Prosthetics. I still see Dr. Weissler yearly for checkups. It has been seven years, and I'm looking forward to a lifetime of being cancer free.



Dr. Robert Buckmire examining the oral cavity

The UNC Voice Center

The UNC Voice Center is comprised of a multidisciplinary team providing specialized diagnostic and therapeutic services to dysphonic patients with all descriptions of voice disorders and laryngeal pathologies. The Clinic is staffed by members of the Department of Otolaryngology/Head and Neck Surgery as well as Speech Pathology with a specialty in voice disorders, as well as a singing voice specialist. 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.

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, diagnostic laryngeal electromyography, microlaryngeal surgery, 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, who is the Coordinator of the UNC Voice Center, is a speech language pathologist and singing voice specialist. Dr. Markus has a Master's Degree in Speech Pathology and a Doctorate in Vocal Music Performance and specializes in the care of the professional singer. 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. Ms. Hube also has a special interest in the behavioral approach to the treatment of Spasmodic Dysphonia and has lectured on the topic at both regional and international symposia.

Drs. Buckmire and Weissler, Dr. Markus, and Ms. Hube continue an active practice in the treatment of a wide variety of laryngeal and voice problems, including laryngeal dystonia, vocal cord paralysis and paresis, cysts, polyps, nodules, and other pathologies of the larynx in both casual and professional voice users.



Drs. Greg Basura and Robert Buckmire performing endoscopic laryngeal surgery with a shaver device for laryngeal papilloma.



Speech Pathologist Linda Hube and Dr. Buckmire review data from a patient's voice lab evaluation during a multidisciplinary Voice Clinic.

The UNC Hospitals Hearing and Voice Center at Carolina Pointe

The UNC Hospitals Hearing and Voice Center at Carolina Pointe celebrated its third anniversary in April this year. This community-based Audiology and Speech Pathology clinic works in close collaboration with the UNC Ear, Nose and Throat physician group and is conveniently located at 5915 Farrington Road adjacent to the intersection of Highway 54 and Interstate 40.

Diagnostic voice evaluations are performed at Carolina Pointe and are provided by an interdisciplinary team of highly-experienced physicians and speech pathologists. Dr. Ellen Markus is the Voice Center Coordinator. She is a speech pathologist, singing voice specialist, and holds a doctorate in vocal music performance. 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. Dr. Markus shares clinic time at Carolina Pointe with Linda Hube who is also a speech pathologist and has a background in theater and singing. She works with patients with both voice and swallowing disorders and has a special interest in the Spasmodic Dysphonia population. Available voice and speech services include behavioral assessment, videolaryngostroboscopy, acoustic and aerodynamic measurements, assessment of vocal ergonomics, and spirometric evaluation.

In addition to the voice program, the audiology team at the UNC Hospitals Hearing and Voice Center provides a wide range of audiology services. They offer hearing evaluations for pediatric through adult patient populations as well as impedance testing including tympanometry and acoustic reflexes. They are able to assess otoacoustic emissions in patients of all ages, which provides objective information about outer hair cell function in the inner ear.

The audiology program at the UNC Hospitals Hearing and Voice Center has experienced consistent growth over the past three years. Gregory Smith continues to oversee the delivery of audiology services at the UNC Hospitals Hearing

and Voice Center. Over a year ago, Drs. Jill Ritch and English King joined the audiology team at Carolina Pointe. Dr. Ritch is a pediatric audiologist with over 12 years of experience at UNC Hospitals and Dr. King completed her audiology externship at UNC Hospitals and is a 2007 graduate of the doctoral program in audiology at James Madison University. Dr. King is an adult cochlear implant specialist and has an interest in amplification for the adult patient population. “Over the past three years, we have noticed consistent increases in patient visits and procedures performed at Carolina Pointe,” says Smith. “Certainly, the addition of Drs. Ritch and King to the audiology team at Carolina Pointe has been vital to our success and continued growth.” added Smith.

The contributions of Drs. Ritch and King has allowed for further expansion of the audiology services available at Carolina Pointe. Dr. Ritch offers hearing aid selection, fitting and follow-up appointments for children of all ages, and Dr. King provides cochlear implant services for adults including candidacy evaluations, device programming, and routine check-up appointments.

The adult hearing aid dispensing program has also experienced steady growth over the past year. “Our goal is to provide every patient with the education they need when deciding to purchase new hearing instruments,” says Smith. Focusing on patient education and the latest digital technology has contributed to the growing number of satisfied and successful hearing aid users. “Our hearing aid return rate continues to remain extremely low at around 1%,” says Smith. “The bottom line is that we want our patients to be satisfied with the product they choose,” adds Smith. Patients are allowed 30 days to evaluate their hearing aids and they may return their hearing aids for any reason during the evaluation. All hearing aids purchased at the Hearing and Voice Center come with a minimum one-year warranty, which also includes loss and damage coverage. Recognizing that cost may be a concern for some patients, UNC Hospitals offers payment plans that can be arranged prior to the hearing aid purchase. Additionally, patients

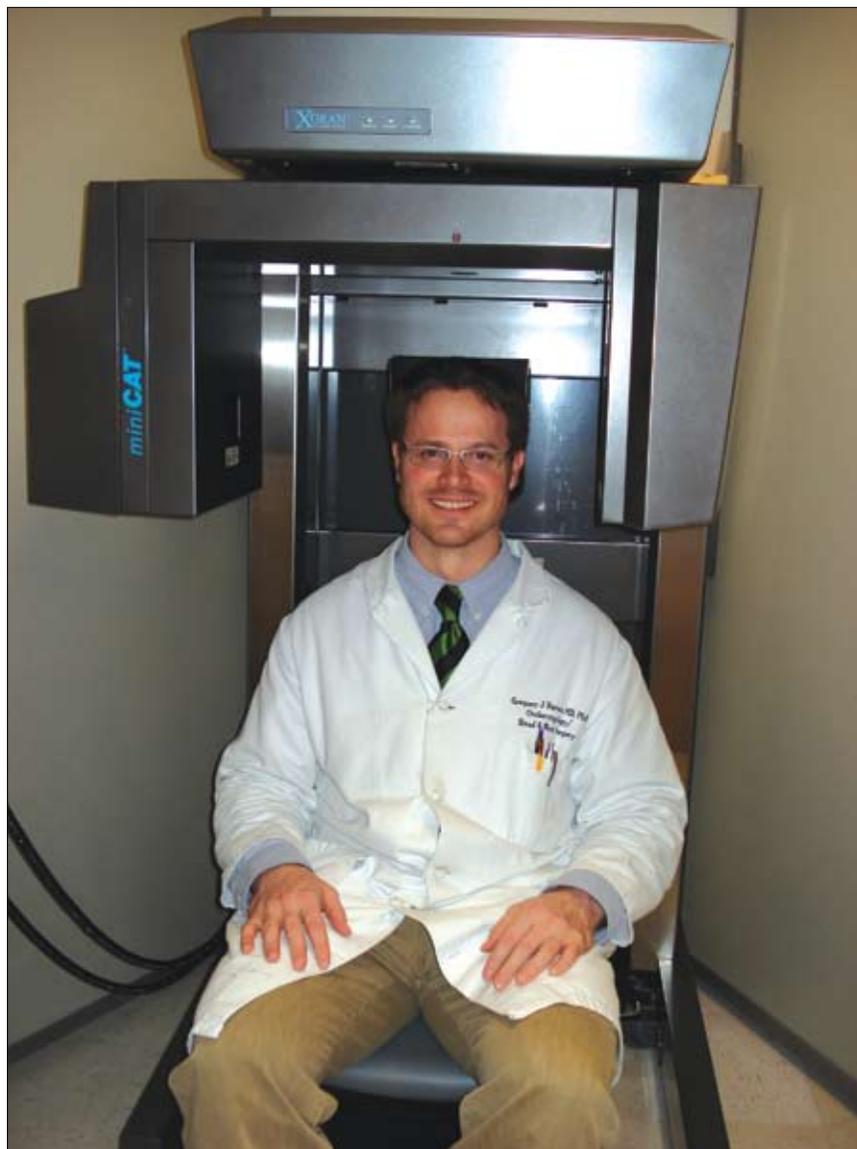


Audiologists Gregory Smith and Jill Ritch, AuD

are encouraged to bring in hearing aids that are either broken or not functioning properly for repair or adjustment, regardless of where they were originally purchased.

To further improve patient access to the audiology and speech pathology programs offered at UNC Hospitals, the Hearing and Voice Center is going to expand into available clinic space at Carolina Pointe adjacent to the clinic's current location. Completion for the expansion is slated for the fall of 2009. We are anticipating the addition of one sound booth for audiometric testing, and two voice therapy suites. This expansion will provide a much needed opportunity for the adult and pediatric hearing aid programs to grow and will allow the UNC Voice Center to shift their clinic operations to a more convenient and accessible location.

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.



New at Carolina Pointe: Dr. Greg Basura sits in the new CT scanner. The Xoran MiniCAT allows immediate access to temporal bone and sinus CT scans for patients.



Dr. Pillsbury discusses treatment options with a patient.

The Ear and Hearing Center

The UNC Ear and Hearing Center, directed by Dr. Craig Buchman, is a regional center that provides specialized diagnostic and surgical care to adult and pediatric patients with diseases of the ear, skull base, head, and neck. The Center represents a comprehensive multidisciplinary approach to service delivery and patient care. Multiple professionals trained in varying aspects of hearing disorders staff the Center. Specialists of the Center are from the Division of Neurotology & Skull Base Surgery, the Division of Pediatric Otolaryngology, and the Carolina Children's Communication Disorders Program (CCCDP)/CASTLE, and the UNC Hospitals Division of Audiology & Speech Pathology). These specialists include pediatric and adult audiologists and otolaryngologists, auditory/verbal therapists, speech pathologists, and a designated Ear & Hearing Center nurse.

The Ear and Hearing Center serves as a resource, not only for UNC Hospitals, but also for patients, physicians, nurses, audiologists, and other healthcare professionals throughout the State of North Carolina. Staff services range from consultation, diagnosis, disease treatment, and medical/surgical interventions, to rehabilitation and follow-up.

Extensive audiology services, in conjunction with Otolaryngology/Head & Neck physicians, are an integral part of the Ear & Hearing Center. Newborn to geriatric hearing screening; hearing aid assessment, fitting, and dispensing; and cochlear implantation evaluation are offered. American Sign Language interpreter service is also readily available through "Deaf Talk", 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. Center staff also 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 and national conferences promoting the goals of the Center and academic interests of the University, and, 4) ongoing hearing-related research. Otolaryngology physicians, Ear and Hearing Center nurses, audiologists, speech pathologists and other staff are also committed to student teaching, and the development and provision of continuing professional education, both on the UNC Hospital campus and the state.

In the last year, the Ear and 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 100 cochlear implants were performed in the pediatric population. 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 and Hearing Center continue to collaborate closely with professionals from around the state to provide additional services for these children.



Dr. Oliver Adunka with a pediatric ear patient

The Ear and Hearing Center also evaluated more than 100 new adult patients with hearing loss for possible cochlear implantation last year, implanting nearly 100 new patients. Recent advances in surgical techniques and device technology has allowed surgeons at UNC to implant patients with more residual hearing than ever before. Patients with hearing loss no longer need to be deaf before considering cochlear implantation. Drs. Adunka, Buchman, Clark-Adunka, and Pillsbury 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. 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 6 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 100 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.

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 has been used for patients with tumors of the brainstem in the past but has never been applied to non-tumor patients in the United States. In an effort to provide this specialized technology to patients in need, Dr. Buchman and Dr. Matthew Ewend from the UNC Division of Neurosurgery performed a brainstem implant in a patient that suffered from cochlear ossification following meningitis. This patient has now been using his device for more than 2 years with significant demonstrated benefits. For this patient, the brainstem implant has provided dramatic improvements in sound awareness and enhanced lipreading abilities, thereby improving quality of life substantially.

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. Three patients have been implanted thus far at UNC. These patients have noticed significant gains in their hearing. One individual that previously had no ear canal since birth is now able to hear with this ear. While this technology remains experimental, the potential future applications remain very exciting.

The Ear and Hearing Center professionals have also been very active in local, regional, national and international programs to educate others in hearing-related disorders. Some of the areas of expertise that our group has lectured on in the past year include newborn infant hearing screening programs, pediatric hearing loss, amplification, cochlear implantation, electrophysiological assessment of hearing in children, auditory neuropathy spectrum disorder (ANSD), and vestibular disorders.

The UNC Skull Base Center

The multidisciplinary skull base team at UNC is now 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.

In 2009, the Skull Base Center was very active in a variety of areas. In the anterior skull base, together with their neurosurgery colleagues, Drs. Senior and Zanation extended their already robust experience with endoscopic



Drs. Craig Buchman and Alisha West. Dr. Buchman is the Director of both the UNC Ear and Hearing Center and the UNC Skull Base Center.

pituitary and parasellar surgery. These cases are now routinely being done with 2-3 days in the hospital and rare need for intranasal packing. Moreover, these surgeons are now routinely extending endoscopic tumor resections in the anterior base of skull to the clivus and petrous apex without the need for external incisions. This approach is significantly reducing patient morbidity without compromising tumor removal. Quite notably, Drs. Zanation and Germanwala also successfully accomplished the first, purely endoscopic, transnasal clipping of 2 anterior circulation aneurysms. Importantly, in this particular

case, the endoscopic surgical exposure allowed for better visualization than conventional open approaches, again without the need for external incisions or a formal craniotomy. This novel approach further extends the surgical armamentarium of the endoscopic skull base surgeons at UNC and might redefine the way selected lesions should be managed in the future.

In the posterior and lateral skull base, together with their neurosurgery colleagues, Drs. Buchman and Adunka performed a variety of skull base tumor surgeries in 2009. Notably, hearing preservation has become commonplace among many patients undergoing acoustic tumor surgery, owing to refinements in surgical techniques and experience. We also continue to have excellent results in the broad areas of functional neural preservation and even restoration in some cases. We also continue to combine a variety of surgical exposures and reconstruction techniques in this area to manage complex lesions.

At UNC, growing number of patients are electing treatment with the Cyberknife Radiosurgery Unit for a variety of lesions related to the base of skull. Some examples of these lesions include: vestibular schwannoma (acoustic neuroma), meningioma, pituitary adenoma, trigeminal neuralgia, to name a few. Moreover, patients with malignant disease have also been treated in selected cases as well. This technology has certainly increased our ability to treat patients that otherwise might have been considered untreatable in the past.

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 bases 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 new UNC Skull Base Center. Others from the Department of Otolaryngology-Head and Neck Surgery who are directly involved include Drs. Oliver Adunka, Marion Couch, Harold Pillsbury, Brent Senior, William Shockley, and Adam Zanation, as well as nurses Barbara Esterly, RN, B.J. Squires, RN, Soonyoung Rondinelli, RN and Sean Gallagher, RN.

Other UNC Disciplines Involved:

Neurosurgery: Drs. Matthew Ewend and Anand Germanwala

Radiation Oncology: Dr. David Morris

Endocrinology: Dr. Julie Sharpless

Ophthalmology: Drs. Syndee Givre and Jonathan Dutton

Neuroradiology: Drs. Mauricio Castillo, Valerie Jewells, Keith Smith, Sten Solander, and Benjamin Huang

Neurology: Dr. Jerry Greenwood

Medical Oncology: Dr. Neil Hayes

Nursing: Sharon Cush, RN, and Pasha Lemnah, RN

Rehabilitation: Diane Meyer, PT



Marcia Clark Adunka, AuD, Director of the UNC Adult Cochlear Implant Program, meets with a patient, Stephanie Sjoblad, AuD, an audiologist who has a cochlear implant. Read Stephanie's story on page 83.

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 and most prestigious cochlear implant center in North Carolina and is well recognized across the country. The program has been in existence since the late 1970s and has managed to grow and thrive throughout the years. Presently, the adult cochlear implant program supports over 600 cochlear implant recipients from across North Carolina and beyond. The number of patients able to benefit from cochlear implants increases annually as a result of expanding candidacy criteria, new developments in cutting-edge cochlear implant technology, and increased referrals from knowledgeable practitioners in the fields of otolaryngology and audiology. The UNC Adult Cochlear Implant Program remains unique in its incorporation of a sophisticated team of scientists and healthcare professionals, including, Harold C. Pillsbury, MD; Craig A. Buchman, MD; Oliver F. Adunka, MD; Marcia Clark Adunka, AuD; English King, AuD; and a valuable team of researchers, including Joseph Hall, PhD; John Grose, PhD; Emily Buss, PhD; and Charles Finley, PhD.

The UNC family has once again expanded to include a new clinical researcher dedicated to the development and growth of the adult cochlear implant studies at UNC, and we are pleased to welcome Meg Dillon, AuD. Dr. Dillon is a recent graduate of the doctoral program in audiology at the University of North Carolina at Chapel Hill. She

completed her fourth year externship at UNC Hospitals, where she honed her skills in hearing aids and cochlear implants. In May of this year, Meg Dillon attained a clinical doctorate in audiology with a focus on adult patient care. She is a native of Fayetteville, North Carolina.

A cochlear implant is an electronic device which bypasses the outer and middle ear, providing direct stimulation to the surviving auditory nerve fibers within the cochlea. The procedure involves the surgical implantation of a receiver stimulator behind the ear in combination with an external speech processor to communicate with the internal component. Historically, cochlear implants have only applied to patients who suffered from bilateral severe to profound sensorineural hearing loss and who no longer received measurable benefit from acoustic hearing aids. Candidacy criteria continue to change with the advent of new cochlear implant devices as well as new surgical approaches. There are three cochlear implant manufacturers worldwide, who specialize in the development and application of cochlear implant systems. These companies include, Cochlear Corporation, Advanced Bionics, and MED-EL Corporation. UNC Hospitals is proud to offer patients access to the medical technologies from all three cochlear implant manufacturers.

In January 2007, UNC embarked on a new clinical trial sponsored by MED-EL Corporation and entitled Electroacoustic Stimulation. This study aimed to incorporate 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 combination of acoustic amplification via a hearing aid for the low frequency hearing of a patient in combination with high frequency stimulation via a cochlear implant has proven to be a promising method of treatment for patients with varied degrees of hearing loss, most notably those with ski-sloped configurations.

At present, we have implanted 13 patients using the EAS approach and the recorded outcomes have been robust for all study patients. Our findings served to reinforce previous European data demonstrating improved hearing in noise performance as well as improved music appreciation among these hybrid cochlear implant recipients. Our commitment to this trial will be ongoing as we continue to seek and enroll more qualified participants and to monitor the progress of our current recipients. 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 the 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. We would love to share our new findings and opportunities with you.

Bilateral cochlear implantation continues to represent another avenue of growth at UNC Healthcare as well as other cochlear implant centers nationwide. The trend toward dual implantation, whether in a simultaneous approach or via sequential procedures, is the result of published data, outlying the benefits of bilateral hearing. These well-documented benefits, include localization of a sound stimulus (important for safety in one's surroundings) and improved hearing in background noise as well as quiet environments. As of January of 2006, most private insurance companies are demonstrating support to insured patients who are in need of bilateral cochlear implants to improve their hearing abilities. More and more patients are taking this approach to their hearing. It appears the trend is here to stay!

In the Words of a Patient: Stephanie Sjoblad, AuD

Nothing prepared me for the moment my cochlear implant was activated on May 18, 2009. Not the fact that I am an audiologist. Not the fact that I had for years heard how “squeaky and cartoon-like” voices sound when one’s cochlear implant is first activated. Not the fact that my own brother had told me precisely what to expect. When Dr. Marcia Adunka, the Director of UNC Hospital’s Adult Cochlear Implant (CI) program, activated my MEDL-EL cochlear implant, my first breath sounded like gale force winds. My voice sounded different from anything I knew. And then, someone spoke, and without seeing the person, I heard. Within moments, Dr. Adunka randomly said the days of the week, which I correctly repeated without lip-reading. This foreign and unexpected sound was awful and beautiful at the same time. Quickly, I became overjoyed as I was understanding speech without visual cues for the first time in years.



I was born with moderate sensorineural hearing loss in the 1960s. I was the middle child of three children born with hearing loss to parents with normal hearing. I began wearing a hearing aid in the first grade, and throughout my tenure in the public school system, I was treated like every other child, only I had preferential seating. Over the years, my hearing declined, so I eventually started to wear two hearing aids. By college, I needed note-takers to fully understand the lectures. At that time I met my future husband. When he called me for the first time to ask me on a date, it was an awkward conversation because I could not hear him well, despite using hearing aids and phone amplifiers. He later told me he thought I was not interested in him because I was so ‘business-like’ during the phone conversation. Nothing was further from the truth, but phone calls were becoming increasingly difficult for me, as I began to rely on lip-reading more for communication. Fast forward many years, and by the time I was pregnant with our first child, the physician had to call my husband to confirm my pregnancy, as I could no longer hear on the phone.

I knew it was time for the CI, but another four years passed before I actually had the surgery. I began to think more seriously about the surgery in 2007, after the birth of my second child. I wondered when would be the best time to learn to hear again while raising two young children and working full time at UNC as an audiologist and professor in the UNC Division of Speech and Hearing Sciences. In November of 2008, I scheduled my initial consult with Dr. Craig Buchman at UNC Hospitals to complete all the preliminary testing and determine my eligibility for a CI. Audiologically, I knew I had enough hearing loss to qualify. Dr. Buchman reported my CT scan was normal and he was very encouraged that I would do well with an implant. His rationale was my hearing loss was genetically the same as my brother’s hearing loss, and my brother was already a successful CI user, having been implanted at UMASS in 2001.

My surgery was April 29th, 2009, and three weeks later I was activated. I made a phone call the day of the activation to my parents who were in town visiting. I heard my mother say, “Okay. . . I understand.” My auditory memory has come flooding back. Unlike my brother who needed guidance indentifying new sounds around him, I heard these sounds (the car blinker, the air conditioner, birds, etc.) and could often correctly identify the sound source. My performance at one month post activation was more typical of performance CI recipients experience six months after activation. My brother was slightly envious of how quickly I was hearing with the CI. I reminded him it did not matter how quickly one hears with a CI, as the end result is what matters the most. I was actually envious that he has had better hearing now for eight years, and I’m just now getting started.

My sons’ voices are so much easier to understand now than with my hearing aids. My patients can talk to me now while I’m recording their case histories or programming their hearing aids, and I can hear them. My conversations with students and colleagues are less strenuous. I can hear my husband on the phone clearly for the first time ever. Getting a cochlear implant has been a marvelous journey, and every day is better than the previous day. I’m very grateful to Dr. Buchman and Dr. Adunka, as well as MED-EL Corporation, for improving the quality of my life tenfold.

Pediatric Audiology

The UNC Pediatric Audiology Team, 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 Paula Johnson, AuD, Corinne Macpherson, AuD, Sarah Martinho, AuD and Jill Ritch, AuD. Since 2009, infants born at UNCH and at birthing hospitals throughout the state receive a hearing screening prior to hospital discharge. At UNC, screening coordinator Chris Stancil oversees hearing screening performed by nursing staff in the well baby nursery while audiologist Patricia Reitz, MS, 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 the team is 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 by the age of 2-3 months. For infants with uncomplicated birth histories the 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 benefit from auditory stimulation within weeks of birth.



Pediatric Audiologists: Sarah Martinho, AuD; Patricia Roush, AuD (Director); Paula Johnson, AuD; Jill Ritch, AuD; and Corinne Macpherson, AuD.

Members of the team are also engaged in a number of 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 five-year 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 a five-year, \$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. Shana Jacobs, AuD, an audiologist, and Thomas Page, MS, a speech pathologist, have joined the staff to work on this project. Across the three sites, 450 children with mild to severe hearing loss and 150 children with normal hearing will be enrolled.

In addition to following over 600 children with “typical” sensorineural hearing loss, the UNC pediatric audiology team, working in collaboration with the UNC pediatric cochlear implant team, is following over 160 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. Craig Buchman co-authored a chapter on the topic of ANSD with Dr. Roush and Dr. Holly Teagle, in a text entitled “Clinical Management of Children with Cochlear Implants,” edited by Dr. Laurie Eisenburg of the House Ear Institute and published in 2009 by Plural.

Other endeavors aimed at improving the clinical management of children with ANSD have involved international efforts to develop guidelines for diagnosis and intervention. In June, 2008, Dr. Roush was invited to present on the use of hearing aids in children with ANSD as part of a three-day Guidelines Development Conference on Auditory Neuropathy held in conjunction with the international Newborn Hearing Screening Conference in Cernobbio, Italy, June 19-21st. Guidelines developed at the conference were published and distributed across the U.S. and other nations. Dr. Roush was also an invited speaker at meetings on ANSD management at The Denver Children’s Hospital in October, 2008, UCLA Medical Center in Los Angeles in January, 2009, UNC Chapel Hill in February, 2009, and at the National Early Hearing and Detection Meeting (EHDI) in Dallas in March, 2009. In addition, Dr. Roush gave invited presentations on ANSD at conferences held in Brighton, England in November, 2008, at the Georgia Academy of Audiology in February, and in Toronto in April. In March, Dr Roush gave two invited presentations at the Rhode Island Hearing Assessment Project’s annual conference in Warwick, R.I.; one entitled “Developing an Audiological Roadmap for Children Birth to Three,” and the other entitled “The Challenges of Mild Bilateral and Unilateral Hearing Loss in Early Life”.

In October, 2008, Dr. Corinne Macpherson and Dr. Patricia Roush gave an invited presentation entitled “Family Friendly Audiology in a Medical Center” at the third annual “Investing in Family Support” conference in Raleigh. Several families whose children receive hearing care at UNC participated in a panel discussion during the presentation. The conference was sponsored by the National Center for Hearing Assessment and Management (NCHAM) at Utah State University.

As we look ahead to the new academic year, the UNC team will continue our patient service and research activities described above. In addition, we will continue a research project recently initiated on new hearing aid technology called frequency compression, a new hearing aid processing strategy that allows access to higher frequency sounds that are not available using conventional hearing aids. These high frequency sounds are important for speech understanding. This project is being undertaken in collaboration with Drs. Lori Leibold in the Division of Speech and Hearing Sciences in the Department of Allied Health Sciences and Dr. Emily Buss in the UNC Department of Otolaryngology.

The W. Paul Biggers, MD Carolina Children's Communicative Disorders Program (CCCDP) and the UNC Pediatric Cochlear Implant Team

The CCCDP and the Pediatric Cochlear Implant Team have had another successful year and have seen a record number of children with cochlear implants. With the retirement of Carolyn Brown in August of 2008, Holly F. B. Teagle, AuD, CCC-A, became Program Director for the CCCDP. Although Carolyn has retired, she remains on the faculty and continues to serve as a consultant and advisor for CASTLE, assisting in particular with efforts to secure funding for CASTLE as a public/private partnership. Holly Teagle joined the ENT faculty in 2003 and became Clinical Director of the Pediatric Cochlear Implant Team in 2005. She teaches courses on cochlear implants for the Division of Speech and Hearing and the AG Bell First Years Program. In addition, she manages the Program's research database and a grant from the National Institutes of Health (NIH), "Childhood Development after Cochlear Implantation," a multi-center study coordinated from Johns Hopkins University. Holly earned her Master's Degree from the University of Iowa, where she went on to participate in cochlear implant research and provided patient care for many years. She received her clinical doctorate from the University of Florida.



Holly Teagle, AuD, CCC-A (Program Director of the CCCDP and Clinical Director of the Pediatric Cochlear Implant Program), and Hannah Eskridge, MSP, CCC-SLP, LSLS Cert. AVT (Director of CASTLE)

The number of pediatric cochlear implant surgeries has grown dramatically in the past three years, making UNC one of the largest pediatric implant centers in the county. 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 of the child. When a child is referred as a potential candidate for cochlear implantation, the Pediatric Cochlear Implant 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, so the collaborative approach must be maintained at a high level. The UNC-CCCDP 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.

Dr. Harold Pillsbury serves as Executive Director of the CCCDP. Dr. Craig Buchman is Medical Administrative Director, and, along with Drs. Carlton Zdanski and Oliver Adunka, performs most implant surgeries for the pediatric program. The surgeons are involved with all aspects of the CCCDP, participating in clinical staff meetings, supporting the audiologists and speech-language pathologists who follow the children as they develop their listening and communication skills, and attending professional meetings in the United States and Europe.



Jennifer Woodard, AuD, CCC-A, doing a tympanogram

The Pediatric Cochlear Implant Team surgeons performed more implant surgeries this year than ever before. Of the 97 surgeries performed between July 1, 2008 and June 30, 2009, 13 were revision surgeries, replacing devices that had malfunctioned, and 25 were bilateral surgeries in which the children received a second implant. The CCCDP audiologists, Holly Teagle, AuD, Jennifer Woodard, AuD, Lisa DiMaria, AuD, and Debora Hatch, AuD, provide audiological management for the children, ensuring their implant devices are carefully programmed and well-maintained to obtain the maximal benefit.

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 W. Paul Biggers, MD Carolina Children's Communicative Disorders Program (CCCDP) mandate. It was for this reason that the Center for Acquisition of Spoken Language Through Listening Enrichment (CASTLE) was created in 2001. To honor Carolyn Brown on the occasion of her retirement, for all her hard work and dedication in developing the program, CASTLE was renamed the Carolyn Brown Center for Acquisition of Spoken Language Through Listening Enrichment.

CASTLE is now directed by Hannah Eskridge, MSP, CCC-SLP LSLs Cert AVT, who has been serving on the staff since 2001 and recently joined the ENT faculty. She is supported by a staff of experienced teachers and speech-language pathologists: Erin Thompson, MA, CCC-SLP, Sandra Hancock, MS, CCC-SLP, Lillian Henderson, MSP, CCC-SLP, LSLs Cert AVT, Sindy Poole, BS, Maegan Evans, Ph.D, CCC-SLP, Francisca Casillas Hernandez, MA, and teaching assistant Velma Grose. Meagan and Francisca are based at the Wilmington site.

CASTLE is teaching children who are deaf or hard of hearing to listen and talk. CASTLE's mission is two-fold: to provide direct intervention services and to provide training to public school and early intervention professionals throughout the State of North Carolina and beyond. Through advanced technologies and cutting edge intervention, these children are gaining direct access to mainstreamed education and the potential to become fully productive and enfranchised citizens. With infant newborn hearing screening and advancements in technology, more parents are choosing a spoken language approach for their children who are deaf or hard of hearing. However, the majority of university programs continue to graduate teachers of the deaf trained in a sign language approach. This poses a significant challenge, especially to school districts and policy-makers, to



Khyler Hagens



CASTLE kids with Erin Thompson (Speech-Language Pathologist, center) and Sindy Poole (Teacher of the Deaf, right)

provide appropriate intervention. Therefore, CASTLE makes a practical model available to clinicians and policy-makers for giving access to audition and the potential for spoken language to children who are born deaf or hard of hearing. This presents an extraordinary opportunity to reduce costs, both the immediate costs of deaf education and the long-term costs of supporting people who are deaf or hard of hearing with public resources. The programs at CASTLE are thought to be among very few in the United States designed to respond to the broad requirements of a successful pediatric cochlear implant program.

CASTLE has a satellite center in Wilmington. This helps to facilitate ease of access to both direct services and training from more North Carolina counties and school systems, making CASTLE a unique regional model that is more effective than a centralized program. An additional site is planned for the western part of the state as funding becomes available.

The North Carolina General Assembly has provided for the core budget of the CCCDP with a recurring grant currently totaling \$503,000/year. 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, and the State of North Carolina. State funding for CASTLE has been provided since 2004. The new budget for 2009-10, yet to be approved as this goes to print, includes \$575,000 for the coming year.

Today the CCCDP continues to tackle the range of challenges facing the families of children with cochlear implants. With families of children who are deaf and hard of hearing committed to Listening and Spoken Language throughout

North Carolina, there remains a need for schools and other institutions that lack the experience or resources to respond effectively. CCCDP/CASTLE are responding by providing a myriad of training opportunities. Many teachers of the deaf and speech-language pathologists from across the United States have now been introduced to auditory, “Listening and Spoken Language,” approaches through a variety of training opportunities at CASTLE. The effort has come a long way, but a great deal more remains to be accomplished.

CASTLE Expands Training and Therapy Services

CASTLE is dedicated to providing quality 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.



Sherri Vernelson (Teacher of the Deaf) gets a big hug from Myla Harris.

At CASTLE, parents receive counseling, education, and guidance in one-on-one sessions emphasizing the acquisition of spoken language skills through listening. Parents and children meet regularly with therapists to learn strategies and techniques that promote listening and talking. With the help of the family learning center and the resource library at the Durham site, parents and caregivers learn to integrate language development into play and other daily activities.

The several facets of the program at CASTLE, include the following:

- Speech/language diagnostic evaluations determine need and eligibility for a variety of available programs, including cochlear implant candidacy and follow-up. One hundred seventy-three children received such evaluations during the year just ended.
- Individual therapy is provided for hearing-impaired infants and toddlers, as well as older children, including both auditory-verbal therapy and preschool speech/language therapy, to facilitate language and speech development at home. A total of 3174 such therapy sessions were provided this year. Financial accommodation is made for families with limited resources. No family is turned away due to financial limitations.
- 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 in both Wilmington and Durham. Twenty-seven children were enrolled in these programs during the year, utilizing three classrooms in Durham and one in Wilmington.
- A 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.

- 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 Listening and Spoken Language approach for teachers and therapists working in the field. The program is focusing particular effort on intensive training for school professionals in rural areas where training opportunities are limited. Attention was concentrated this year on the Whiteville City Schools and in Chatham, Hoke, Moore, New Hanover, and Orange Counties. This training includes monthly visits throughout the school year, for one on one coaching/mentoring. Professionals may also participate in week-long internships at a CASTLE site.
- Listening and Spoken Language modules are co-sponsored throughout the state. These workshops are provided free of charge to North Carolina professionals. This school year CCCDP/CASTLE co-sponsored 15 modules.

In addition to these aspects of the program, other projects of CASTLE have expanded or been developed in the course of the past year:

- 1) The CCCDP and CASTLE are proud to be part of a NC Consortium working to provide free training to NC professionals. 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.
- 2) The 12th annual Carolina Summer Institute was a resounding success. Due to fundraising efforts, CASTLE was able to provide more than \$10,000 in scholarship aid, and the Institute again had full enrollment. This was especially significant this year, as other training programs throughout the country have experienced declines in enrollment due to funding limitations. Participants came this year from North Carolina, Georgia, Florida, Oklahoma, Virginia, South Carolina, Pennsylvania, and Ohio.
- 3) “Insight,” a parent education group, continues to respond to the need for more information than time allows during the weekly parent participation sessions already provided. It was felt that parents could be educated about many issues and necessary skills in a more comprehensive manner. The monthly Insight group sessions have covered skills such as troubleshooting your child’s cochlear implant, language stimulation techniques, and singing with your child. Attendance is expected for parents of children in the Preschool Program and is also open to all other CCCDP/CASTLE families. Every effort is made to support the ability of parents to attend with flexible scheduling and availability of childcare. For the final Insight session of the school year in May, a parent volunteer with a degree in counseling sought information that families were interested in for the upcoming school year. She plans to lead the group this year and address needs the families may face from grief to behavior management.
- 4) “Parents Educating Parents” (PEP) is an offering for families who are starting the preschool or therapy process for the first time. The program involves two meetings with a “Parent Educator” assigned by CASTLE staff. The first meeting takes place on site at CASTLE and a second is in the home. Following these meetings, the parent can choose whether to continue a relationship with the parent-educator. This is designed to give parents access to someone who has “already been there” and can provide a level of support that professionals are often unable to provide. This year’s addition to the PEP program included the first parent-only lunch, establishment of a parent email group, and a PEP organized support for staff during Teacher Appreciation Week.



CASTLE kids with Velma Grose (Teaching Assistant, left), Alison Ruff (student teacher from UNC Greensboro, center), and Sherri Vernelson (Teacher of the Deaf, right)

5) The annual CCCDP Fall Conference, co-sponsored by the North Carolina A.G. Bell Association, featured Chris Barton this year, a music therapist with expertise in working with children with hearing loss. Parents and professionals attended from across North Carolina to learn how to develop listening and spoken language skills through music.

Foundations for Research

The diverse characteristics of the large clinical population of cochlear implant candidates seen by the Pediatric Cochlear Implant Program are 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 sixth year. This promises to be a landmark study that will impact the direction of future cochlear implant patient management. Thirty children and their parents are 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.



Jonathan Mosher holding his processor and head piece

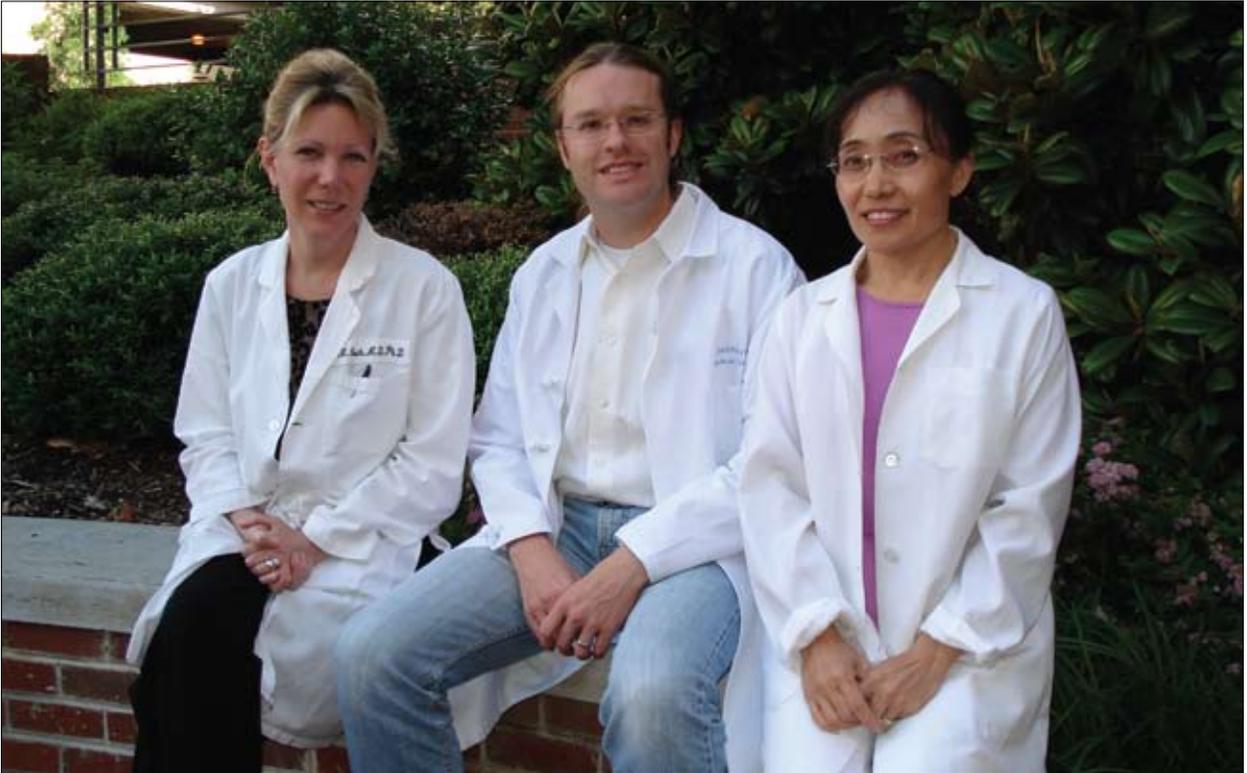
The Financial Assistance Program

The CCCDP was first proposed to the North Carolina General Assembly by W. Paul Biggers, MD, in the spring of 1992, to include a financial assistance program. It was funded later that year and continues to respond to 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 cannot afford to pay. Medicaid currently funds most expenses related to cochlear implants, so the CCCDP grant only provides funding for equipment not covered by Medicaid. There are children enrolled in the grant who had their cochlear implant surgeries before being accepted. The CCCDP accepts these children in order to help the 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.

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 enrolled 1381 children from 91 North Carolina counties. From June 1, 2008 to May 31, 2009, 68 children were enrolled for the first time. A total of 455 children were enrolled at some point during this period. Of 368 currently enrolled children, 205 have cochlear implants.

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.

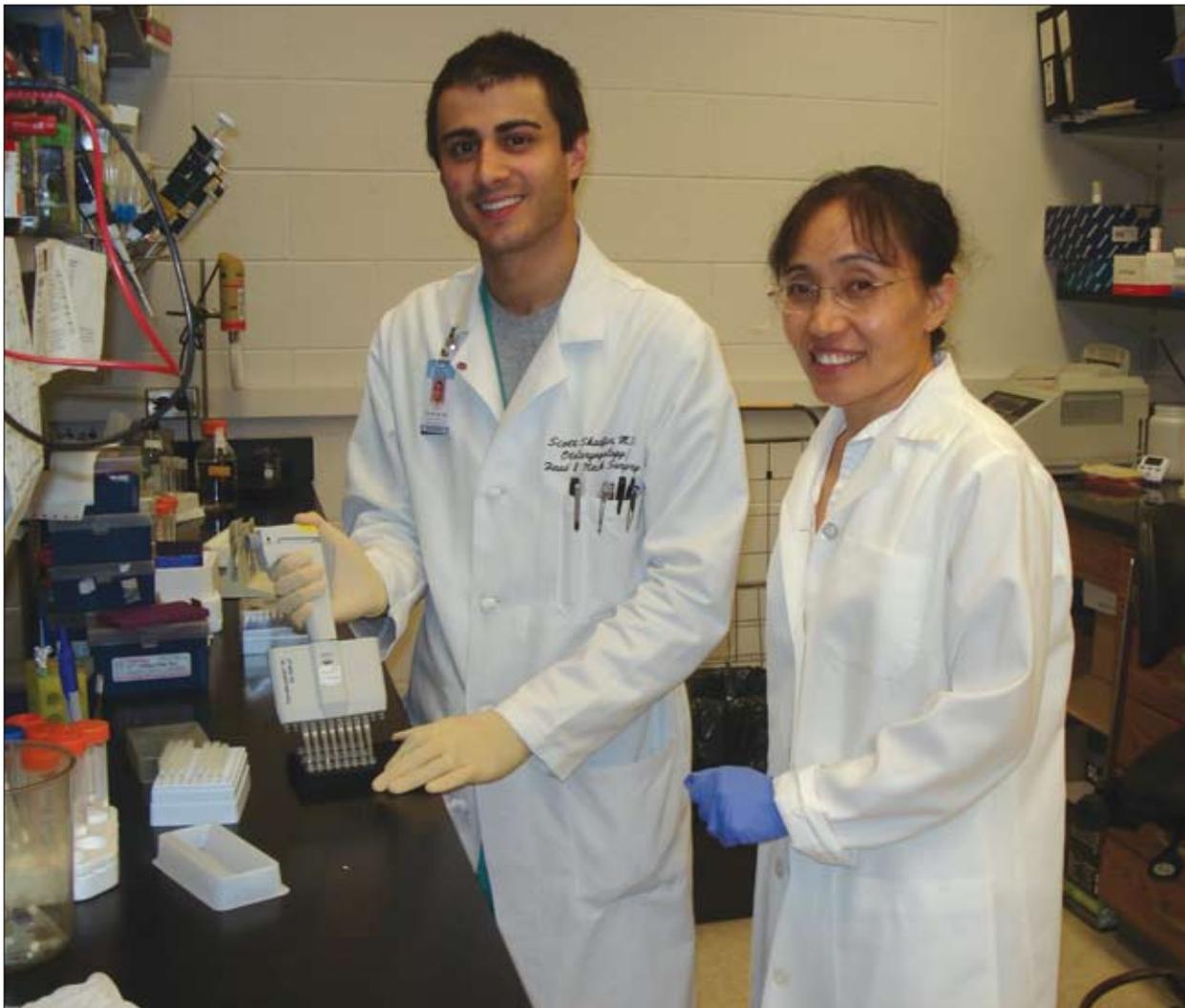
Research



Head and Neck Cancer Researchers: Marion Couch, MD, PhD; D. Neil Hayes, MD, MPH; and Xiaoying Yin, MD

Marion Everett Couch, MD, PhD, and her colleagues continue to work on the mechanisms of cancer cachexia syndrome, a profound wasting syndrome, which affects many patients with advanced stage head and neck cancer. Previous studies had defined the clinical profile of head and neck cancer patients suffering from this metabolic derangement. It is not merely starvation and its etiology is multifactorial. Work previously done by her group in a clinical trial used anti-inflammatory agents such as cyclo-oxygenase II inhibitors to reverse its effects. To further elucidate the role of inflammation in this syndrome, selective NF- κ B inhibitors were used to reduce the inflammatory cascade that contributes to cancer cachexia. In a well-established animal model of cancer cachexia, two selective NF κ B inhibitors were used after the induction of cancer cachexia to reverse the muscle wasting seen. They had no toxic side effects in this short-term trial, and they prolonged survival in the animals. In collaboration with Albert Baldwin, PhD, Associate Director of the Lineberger Comprehensive Cancer Center, Ashley Wysong was able to work with Monte Willis, MD, PhD, Assistant Professor in Pathology & Laboratory Medicine, to determine the cardiac effects of cachexia in this animal model. The use of selective and short term use of these NF κ B inhibitors were able to reverse these effects without causing cardiac hypertrophy. These findings may contribute to better understanding of why patients do not tolerate therapy, either medical or surgical, when they are suffering from cancer cachexia. Their studies demonstrated for the first time that the function and structure of the heart were profoundly affected in a detrimental way in animals with cancer cachexia.

Dr. Scott Shadafar (PGY2) is extending these studies by looking at the effect of the muscle enhancing agent, Resveratrol, which is also a NF κ B inhibitor, on cancer cachexia. He will use our well-established murine model to investigate the short term use on Resveratrol on muscle mass, body weight, NF κ B inhibition, and cardiac function.



Drs. Scott Shadfar and Xiaoying Yin

In collaboration with Dr. Thomas O'Connell, the Director of Metabolomics at UNC, an effort to better define cancer cachexia, the metabolic profile was determined in an animal model using Metabolomics. This is a platform that allows for the survey of 1,500 different metabolites using NMR spectroscopy. Cancer cachexia was found to be distinctly different from starvation and low glucose levels, high low density lipoprotein and very low density lipoprotein levels are seen in the serum. Based on the metabolic profiles, we had evidence that cachexia could be reversed with resection of the tumor. Tumor burden alone did not account for the metabolic perturbations either. These studies will help us determine the exact metabolic derangements that exist in this condition. This will aide in future research studies as we may better define those patients who truly have cancer cachexia. In addition, these findings can be used to create a panel of metabolic markers to better define this condition in animals and in patients with cancer cachexia. There is a clinical trial to collect serum from patients with and without cancer cachexia, and this work will be extended to other patient populations.

Mitchell Gore, MD, PhD (PGY4) was able to modulate the effects of cancer cachexia and tumor growth in an animal model by using toll-like receptor (TLR) 9 agonist and antagonists. He also looked at various pathways involved in muscle wasting during cancer cachexia, especially PI3-AKT pathway.

Xiaoying Yin, MD, is working on several research projects:

1. Evaluate the anti-tumor effect of enzastaurin, a PKC- β inhibitors on HNSCC. Protein kinase C (PKC) is a family of serine/threonine kinases known to play critical roles in the signal transduction pathways involved in growth factor response, cell proliferation, differentiation, and apoptosis. Therefore, the PKCs are potential targets for cancer therapies. Enzastaurin is a specific protein kinase C beta (PKC- β) inhibitor that has been reported effective for inhibiting tumor growth in many other tumor types. In addition to specifically inhibiting tumor-derived VEGF-induced angiogenesis, it has been reported that enzastaurin can directly inhibit proliferation, and induce apoptosis which will inhibit tumor growth *in vitro* and *in vivo*. Our research project is aimed to (1) evaluate the effect of enzastaurin on HNSCC as an antitumor agent alone and as a radiosensitizer with radiation both *in vitro* with HNSCC cell lines and *in vivo* using a novel mice model that mimics the delivery of concurrent chemoradiation in HNSCC patients, (2) help unravel the mechanism of the effect of enzastaurin and cisplatin by analyzing enzastaurin/cisplatin-induced protein level changes in signal transduction pathways and gene expression changes that are due to enzastaurin/cisplatin and radiation treatment, and (3) refine this murine model of chemoradiation responsiveness for use with other novel agents.

2. 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 competitive grant 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 will (1) independently validate *a priori* two previously identified head and neck squamous cell carcinoma molecular subtypes (basal and epidermal-mesenchymal transformed) and develop an assay for clinical detection tumor molecular subtypes, (2) distinguish HNSCC subtypes and identify causative genomic aberrations (amplification and deletions) as measured by high resolution DNA copy number assays, and (3) evaluate clinical courses of HNSCC subtypes using a large population based cohort of HNSCC derived from The North Carolina Head and Neck Cancer Epidemiologic Study (CHANCE).

3. Evaluate the anti-tumor effect of Hsp90 inhibitors on HNSCC. Collaborating with Biogen Idec Corporation, we have studied a novel class of chemotherapy agents, Hsp90 inhibitors, BIIB021. Hsp90 stabilizes cellular proteins, and inhibition can lead to the degradation of several tumor related proteins, thereby interrupting several pathways simultaneously. The Hsp90 inhibitor BIIB021 has been shown to radiosensitize HNSCC in a xenograft model, with minimal side effects and disruption of the expected proteins. A paper about this research is underway.

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. 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.

Carol G. Shores, MD, PhD, is developing several lines of cancer research in the southeastern African country of Malawi. She works closely with the UNC Project, located at Kamuzu Central Hospital (KCH) in the capital, Lilongwe. The UNC Project (<http://www.med.unc.edu/wrkunits/2depts/medicine/id/malawi/>) was established by the UNC Division of Infectious Diseases in 1990 to conduct HIV clinical trials. The program is now expanding to include surgical research in cancer and trauma care.

Burkitt's lymphoma is a common pediatric head and neck tumor in sub-Saharan Africa and is associated with Epstein Barr virus. The virus is in a latent form in the cancer, when it is resistant to treatment with antiviral therapy. Dr. Shores and Paula Harmon, MD, (UNC PGY3) in collaboration with Margaret Gully, MD, (UNC Pathology) collected tumor samples from 30 children with Burkitt's lymphoma before and after treatment. The results indicate that the virus switch to a lytic infection, and should therefore be sensitive to antiviral medications, very early after the first round of chemotherapy. This suggests that pre-treating children with antiviral therapy prior to the first round of chemotherapy may increase the number of tumor cells killed. A clinical trial is planned to answer this question, pending funding.



In Lilongwe, Malawi: Dr. Carol Shores, Dr. Clifford Wokocha (KCH pediatrician who is a co-author on the Burkitt's Lymphoma study), his nurse Mary Mwansambo, and Dr. Paula Harmon.

Ameloblastomas are odontogenic tumors that occur primarily in teenagers and young adults. The incidence of ameloblastomas in Africans is 10 fold higher than Caucasian Americans and 5 fold higher than African Americans. This suggests an environmental factor, possibly a viral infection. To determine this, Jessica Smyth, MD, (UNC PGY1) in collaboration with Dirk Dittmer, PhD, (UNC Department of Microbiology & Immunology) wrote a protocol to collect 25 samples of ameloblastomas from patients at KCH and analyze them for the presence of virus known to be associated with human tumors. Drs. Smyth and Shores traveled to Malawi in June 2009 to initiate the study.

Understanding the incidence of cancer is key to designing cost effective prevention and treatment plans. There is currently no tumor registry in Malawi, and the WHO depends on local registries for accurate assessments of cancer incidence. Dr. Elizabeth Bigger (PGY3, Vanderbilt University) will begin a year long Fogarty Fellowship in July to set up a cancer database and registry in Lilongwe. Dr. Shores and Mina Hosseinipour MD (UNC Associate Professor Infectious Disease who is full time in Malawi) are her advisors. Dr. Bigger's project will also examine the relationship of HIV status with cancer presentation and outcomes.

Cancer is primarily a surgical disease in Malawi, as there is no radiation oncology facility and chemotherapy is too expensive for most patients. Trauma and congenital anomalies are also surgical diseases, and treatment of these

depends on consistent presence of well trained surgeons. Toward this goal, Dr. Shores has worked with the surgeons in Lilongwe and UNC surgeons Anthony Charles, MD, (Trauma Surgery) and Clara Lee, MD, (Plastic Surgery) to establish a surgery resident training program at KCH. Four new residents will begin in this College of Surgeons of East, Central & Southern Africa approved program in July 2009. Dr. Shores is committed to traveling to Malawi at least once a year to teach in this program, and Dr. Charles and she are applying for funding to teach surgical research to the new residents.



In the operating room in Malawi, Dr. Shores helps clinical officers to remove a foreign body (a bean) from a child's airway.

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 included 1,300 cases and 1,300 controls and constituted the largest 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, and DNA repair will be 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. The study also collected tumor blocks for future studies of “downstream” somatic alterations of tumor suppressor genes and oncogenes. Manuscripts have been developed examining tobacco and alcohol, dietary patterns, and oral health. Once the genetic data is available in July 2009 Dr. Olshan and colleagues will examine the effects of specific genotypes and gene-exposure interactions. Drs. Olshan and Weissler have also conducted a pilot study to evaluate survivorship factors, including quality of life, among cases in the CHANCE study. Cases were interviewed again eight months after diagnosis about smoking habits, access to health care, and quality of life issues. This work has led to the award of a grant from the Lance Armstrong Foundation to continue to collect data on quality of life among African-American head and neck cancer survivors.

Dr. Olshan also continues to collaborate with Dr. Weissler on analyses of gene-environment interaction and head and neck cancer using samples from a previously conducted case-control study conducted at UNC Hospitals.

Lance Armstrong Foundation Grant

Treatment for head and neck cancer is particularly aggressive, affecting speech, swallowing, breathing and communication. A grant from the Lance Armstrong Foundation to the University of North Carolina at Chapel Hill will fund research on the experiences of head and neck cancer survivors, so that health professionals can effectively manage the impact of treatment on a patient's social, family and work roles.

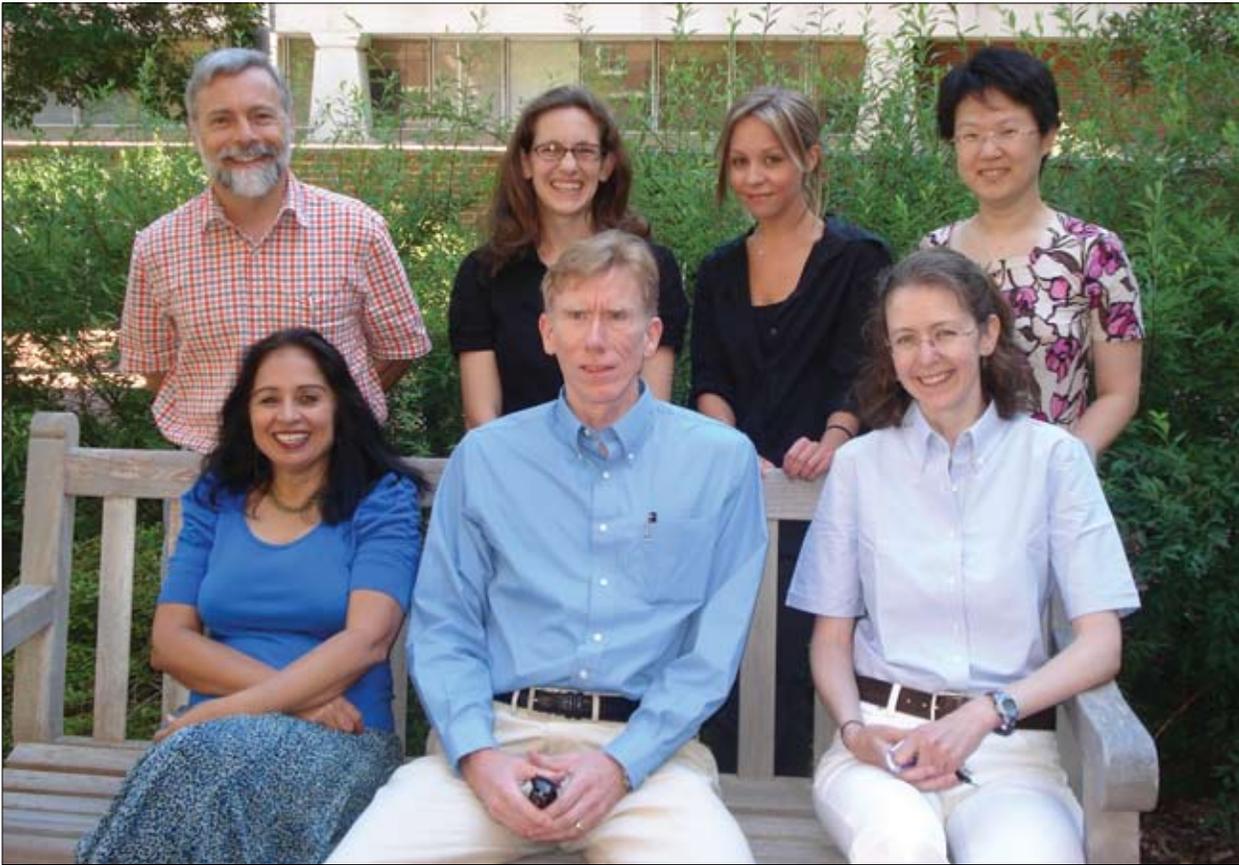
The three-year, \$246,760 grant was awarded to Dr. Andy Olshan, Professor and Chair of Epidemiology in the UNC School of Public Health and Principal Investigator of the study. Olshan is also a research professor in the School of Medicine's Department of Otolaryngology/Head and Neck Surgery and program leader for cancer epidemiology in the UNC Lineberger Comprehensive Cancer Center.

Because quality of life outcomes are especially critical for head and neck cancer (oral, pharyngeal, laryngeal) patients and their caregivers, more research is needed on the experiences of survivors, especially among black patients, Olshan said. The study will examine the influence of social, clinical, access to care, and behavioral factors on quality of life. Blacks have a higher incidence and worse survival than other groups.

"Given the paucity of data and studies on quality of life among African-American head and neck cancer survivors we expect this study to yield valuable new data," Olshan said. Olshan and his colleagues will analyze data collected for the Carolina Head and Neck Cancer Study (CHANCE), the largest epidemiologic study of squamous cell carcinoma of the head and neck in the United States and the first to include a significant number of black patients. Patient information will be collected one year after diagnosis and three years after diagnosis. Data collection for the quality of life study will be complete in six months. The CHANCE study was funded by the National Cancer Institute. To date information on quality of life has been obtained from over 500 head and neck cancer survivors. Data collection will end in December 2009 and will be followed by an analysis of predictors of quality of life and examination of patterns by age, gender, race, and other factors.

Pilot funds for the quality of life work were obtained from the Excellence Fund of the School of Medicine. CHANCE collaborators include Drs. Mark Weissler, JP Riddle Distinguished Professor of Otolaryngology/Head and Neck Surgery; William Funkhouser, Professor of Pathology; and Jianwen Cai, Professor and Associate Chair of Biostatistics in the UNC School of Public Health. The Lance Armstrong Foundation, founded in 1997 by cancer survivor and champion cyclist Lance Armstrong, is a nonprofit organization located in Austin, Texas.

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. 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, Mihir Patel, Rupali Shah, Josh Surowitz, Kibwei McKinney, and Yu-Tung Wong in studies investigating novel techniques in this area. The lab has also mentored three 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. The research team has presented over 20 abstracts this past year, published 8 papers, has another 4 papers accepted and 6 additional manuscripts submitted. Dr. Patel won the 2009 Harrell Resident Research Award for his work on skull base reconstruction and Dr. Zanation was awarded the North American Skull Base Society Research Award in Vancouver, CA on October 2008 for his work on endoscopic resections of sinonasal cancers. Dr. Zanation promises to be an outstanding physician-scientist with research contributions at the forefront of Skull Base Surgery and Head and Neck Oncology.



The Psychoacoustics Research Team: Seated: Madhu Dev (Social Research Specialist); Joseph Hall, PhD (Professor and Chief of the Division of Auditory Research); Emily Buss, PhD (Associate Professor). Standing: John Grose, PhD (Professor); Sara Mamo, AuD (Audiologist); Tara Steplowski (Research Assistant); and Shuman He, MD, PhD (Post-Doctoral Research Associate).

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 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.

A second experiment in this NIH grant is investigating the development of auditory temporal processing in 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 our postdoctoral fellow, Shuman He.

A third study in this NIH grant is investigating the ability of children to integrate speech information that arises from distinctly different frequency regions. This kind of ability is crucial for successful performance in children with cochlear implants. Results from this study are suggesting that children are as good as adults in integrating

information across frequency, but that children require more frequency detail than adults to achieve a criterion level of speech recognition performance. This project is being carried out by fourth year medical student, Stefan Mlot.

Dr. Hall's second NIH-funded grant is Spectro-temporal Processing in Normal and Impaired Ears. One series of studies in this project is investigating the ability of patients with sensorineural hearing loss to integrate information in one spectral region at a given time with information in other spectral regions at a later time. This ability is probably quite useful in understanding speech when listening conditions are very poor, and a limitation in this capacity could account for part of the difficulty experienced by hearing-impaired patients in background noise. The project is also investigating central auditory processes that enable the perception of signals in fluctuating background noises. Many natural background sounds possess such fluctuations, and it appears as though auditory processes have developed that take advantage of the favorable listening intervals that occur in the fluctuation minima. These studies should lead to a better understanding of the factors that enable us to hear in background noise.

Dr. Hall is also a co-investigator on an NIH grant that is investigating changes in brain anatomy and function that may accompany sensori-neural hearing loss in humans. This project uses both standard psychoacoustical methods and functional magnetic resonance imaging (fMRI) techniques. The approach is currently focusing on patients who have very steeply sloping hearing losses in one ear. Preliminary data suggest that it is possible the central auditory system reorganizes in such a way that greater weight is placed on the output of the better ear in such patients, even for frequencies at which hearing is normal in both ears. The results of this study will have implications for the ways in which brain function and structure change in response to peripheral hearing loss.

John H. Grose, PhD, is the Principal Investigator on an NIH-funded project that examines complex sound processing in normal and impaired auditory systems. This project was competitively renewed in September, 2008, with a focus on the role of temporal processing in perceptual organization. In particular, a major emphasis is on understanding the decline in temporal processing with age. Current work, presented at the 2009 Midwinter meeting of the Association for Research in Otolaryngology, indicates that deficits in envelope processing are present in older listeners but only for high modulation rates, not low rates. This, in turn, has invited investigation into the reduced benefits that older listeners exhibit for speech perception in low modulation rate noise. A second set of experiments has focused on fine structure coding as measured by inter-aural time difference thresholds. As expected, older listeners perform more poorly than younger listeners, but of greater interest is that this deficit is evident even in the pre-senescent (middle-aged) auditory system. This work was presented at the Spring 2009 meeting of the Acoustical Society of America. A major effort at the moment is to expand this work to include electrophysiological measures of temporal processing.

In addition to his major research emphasis, Dr. Grose is active clinically in the evoked potential testing of infants and toddlers, as well as patients with cochlear implants.

Emily Buss, PhD, is an auditory science researcher involved in a range of projects investigating the perception of sound in human listeners. Many of these projects focus on special populations, including hearing-impaired adults and children, children with chronic otitis media (OME) and adult cochlear implant users. 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 detection or discrimination, as well as evoked potentials and speech perception in a

wide range of backgrounds. In many cases the resulting data can be incorporated into a computer-based model that formally characterizes different stages of auditory processing.

Dr. Buss is currently working on research initiatives aimed at understanding the effect of OME on the utilization of speech cues in different configurations masking noise, central neural plasticity in response to peripheral hearing loss, the importance of temporal cues in speech understanding, and the role of amplitude modulation across frequency in parsing a sound scene. Work is currently under way on verifying a model of the development of auditory processing based on internal noise; the goal of this work is to provide a uniform metric for comparing performance across a wide range of auditory tasks in school-aged children.

In addition to this laboratory work, Dr. Buss maintains an ongoing involvement in a number of 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. She is also involved in a multidisciplinary study with UNC's Department of Psychology using fMRI to characterize the cortical representation of sound in patients with normal hearing and with hearing loss.

Douglas C. Fitzpatrick, PhD, and his colleagues study the physiology and anatomy of hearing using animal models. Projects this past year include the start of a study on preserving residual hearing during cochlear implantation, as well as continuing studies on midbrain implantation, binaural hearing, and transformations of auditory information processing at different brain levels.

The new 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 the best outcomes occur if this residual hearing can be preserved. In particular, retaining residual hearing improves speech understanding in noise compared to electrical stimulation alone. However, residual hearing is often compromised during the implantation 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, our experiments are aimed to correlate changes in intracochlear potentials in response to acoustic stimuli as an electrode impacts cochlear structures. Funding for this project has been provided by the Med-El company.

The 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. This work is being done in collaboration with Dr. Charles Finley, and is supported by an R21 from NIH that began this year.

Studies on binaural hearing are continuing with a particular emphasis on the ability of the binaural auditory system at different brain levels to process temporal variations in cues to sound source location. These experiments



The roots and balance of hearing. This is the vestibulocochlear system of *Meriones unguiculatus*, the Mongolian gerbil. Gerbils are being used as a model system for electroacoustic hearing in a study by Drs. Adunka, Fitzpatrick and Buchman. Dissection and photo by Stephen Pulver.

are motivated by mismatch between behavioral and neural results, with behavioral measurements suggesting the binaural system is slow, or “sluggish”, while the neurons show no such sluggishness. Techniques include behavioral measurements and neural recordings in rabbits. To date, we have not observed differences in the ability of neurons at any brain level to follow temporal modulations of binaural compared to monaural cues. Consequently, our current hypothesis is that binaural sluggishness is not due to an inherent limitation in processing binaural signals, but rather an enhancement in processing AM in humans compared to rabbits. This enhancement is likely to be the result of the need to encode AM for extracting information in complex signals such as speech.

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, we have begun experiments to study the anatomy and physiology of the auditory thalamus 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.

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

Charles C. Finley, PhD, is a biomedical engineer and neurobiologist, who investigates the design and application of cochlear implant systems. His work includes clinically-based issues such as speech processor design and fitting, as well as *in situ* device evaluation. He also pursues basic research in understanding the anatomical and physiological basis for variable speech reception outcomes across patients.

This latter area of work involves the integration of high-resolution CT imaging, measurement of intracochlear evoked potentials and computer modeling to make predictions about the neural responsiveness and neural survival patterns in various regions of an individual patient's implanted cochlea. This multidisciplinary work is being pursued in patients with the Clarion and Nucleus implant systems in collaboration with investigators at Washington University in St. Louis. In this study patients are being assessed pre- and post-operatively using high-resolution CT techniques to determine cochlear anatomy and electrode placement. Peripheral intracochlear physiological responses are also being measured to characterize the status of the cochlea. As part of this project, techniques are also being developed to derive an anatomically-based, finite-element, cochlear model for each individual patient using the CT anatomical information. This computational model will interface with a neural response model and will be used to help interpret intracochlear evoked response data to provide insight into neural survival patterns. Finley's work in this area was recently recognized by the UNC-CH/NCSU/Duke Renaissance Computing Institute (RENCI) with the competitive award of a RENCI Faculty Fellowship for the academic year 2007-2008. During the year Finley worked with four colleagues at RENCI to implement and expand his model system which includes a full head, a detailed temporal bone and a high-resolution cochlea with implanted electrode array. The model system is implemented on various high performance computer clusters at RENCI. This latter study is motivated by the CT observations to date which show that surgical variation in electrode placement across patients regarding depth of insertion and scalar positioning each significantly influence speech reception performance. This observation was reported by Finley and colleagues in *Otology and Neurotology* in 2008 and has resulted in new emphasis by surgeons and manufacturers to improve electrode insertion techniques. Indicative of the broad interest by the implant community in this work, Finley and colleagues' paper was recently designated as *best all-round* article in cochlear implants in 2008 by the *Hearing Journal*. Finley was also recently honored by the British Cochlear Implant Group as the keynote speaker at its annual conference at Cambridge University in June, 2009 and awarded lifetime membership in the organization.

Development of generic methods of monitoring and evaluating the functional performance of implanted cochlear implant systems in patients continues in Dr. Finley's lab. In recent years this work spawned a series of basic science studies investigating the patterns of electrical artifact potentials appearing on the scalp of cochlear implant patients. Careful measurement, analysis and modeling of these electrical potential patterns has provided new insights into the pathways along which stimulation current flows during normal operation of cochlear implant systems. Of particular significance is the observation that the current flow pathways for apical and basal stimulation sites are significantly different contrary to conventional wisdom. This observation has served as a key piece of information to link disparate findings from CT imaging, intracochlear electrophysiological measures and psychophysical perceptions to hypothesize the existence of a stimulation mechanism that leads to ectopic stimulation of the auditory nerve in the internal meatus during intracochlear stimulation. This effect is thought to be a significant factor limiting the speech reception abilities of lower performing implant subjects. Several new stimulation strategies have been developed to alleviate this phenomenon and are presently being tested in patients.

Finley's studies of electrical artifact patterns also have significant clinical utility in monitoring cochlear implant device function *in situ*. The FDA has recently approached Finley to apply his techniques in a multicenter, multidevice study of the impact of device failures on speech recognition outcomes in children. Finley is also applying similar

techniques to study electrical stimulation mechanisms in blind patients implanted with a retinal prosthesis in collaboration with a device manufacturer. An additional area of activity for the next year will be a new NIH-funded project in collaboration with Dr. Fitzpatrick to explore basic science questions related to encoding of speech information using direct electrical stimulation applied to the inferior colliculus.



The Manis Lab: Ruili Xie, PhD (Post-doctoral Research Associate); Megan Kratz (graduate student, Neurobiology); Jaime Mancilla, PhD (Post-doctoral Research Associate); Paul Manis, PhD (Professor and Chief of the Division of Research Training and Education); Luke Campagnola (graduate student, Neurobiology); Deepti Rao (graduate student, Cell and Molecular Physiology); Joseph Roche, MD (resident currently in second year of NIH-sponsored research training); and Heather O'Donohue (Research Technician II). Not pictured are Gontran Aljure (Lab Technician) and Alex Rich (4th year medical student).

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 2 NIH R01 grants to Dr. Manis, and grants to Drs. Greg Basura and Joseph Roche.

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. Increased activity of DCN neurons can be caused by increased electrical excitability or decreased inhibition, and thus these are potential mechanisms for tinnitus. While the responses of DCN principal neurons (called pyramidal cells) to sound are strongly molded by inhibition, little is known about the functional operation of the major inhibitory networks. The goals of this project are to investigate inhibitory circuits in the DCN, and to elucidate their roles in normal sensory processing as well as in auditory dysfunction. In the first aim, we are studying the organization and synaptic dynamics of the two major inhibitory circuits in



Ruili Xie, PhD

the DCN, using paired whole-cell recording. We are examining whether the synaptic influence of the most populous inhibitory interneurons, the cartwheel cells, depends on the target cell type, and whether cartwheel cells can fire in a synchronized manner as predicted from their physiology and connections. We are studying the spatial organization of cartwheel cell axons to determine whether and how this system, which receives non-tonotopic inputs, might operate in a tonotopic fashion. These experiments include morphological reconstruction of cell pairs to determine the spatial organization of local connections. In the second aim, we are investigating short (seconds) and long-term (hours) synaptic plasticity at inhibitory synapses in the DCN. We will test whether cartwheel cells utilize glycine and GABA as co-transmitters onto the pyramidal cells and other cartwheel cells, and whether there is activity-dependent short-term modulation of inhibitory

synapses. We are also testing whether the inhibitory synapses from cartwheel to pyramidal cells, and the synapses between cartwheel cells, can undergo similar activity-dependent plastic changes. In the third aim, we are using our data on electrical excitability and synaptic function to create a biologically accurate circuit model of the DCN. 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. In the fourth aim, we are testing (using a rat model system) whether noise-induced central tinnitus is associated with decreases in inhibitory synaptic strength, or with increased intrinsic electrical excitability. These experiments will test whether changes in intracellular chloride regulation, consequent to changes in activity after hearing loss, will alter the behavior of inhibitory networks and the strength of inhibition, thus leading to abnormal activity and the perception of a phantom sound. 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, Mr. Luke Campagnola (Neurobiology graduate student) and Mr. Alexander Rich (MS4 at UNC), 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. Central processing of the auditory environment begins with the generation of diverse, parallel, streams of information processing at the level of the first auditory center of the brain, the cochlear nucleus. These streams are created by populations of neurons with distinct patterns of synaptic inputs and projections. Recent studies have shown that inhibition plays a much more important role in sculpting the responses of ventral cochlear nucleus (VCN) neurons to sound than previously appreciated. Inhibition can serve to enhance both the spectral and temporal processing of sound attributes that are important for sound identification and localization as well as speech processing. 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. The first aim of this proposal is to clarify the functional synaptic organization of two local inhibitory synaptic circuits in the VCN. The second aim is to test the hypothesis that the synaptic currents on different cell types are mediated by different glycine receptor subunits. We are also investigating the presynaptic mechanisms that regulate the time course of release during sustained activity. A third aim is to incorporate this information into a detailed computational model, which will be used to explore the importance of different aspects of inhibition in temporal and spectral processing in the VCN. The fourth aim is to determine how the function of these inhibitory circuits, as well as their excitatory counterparts, is affected by hearing loss. All of these experiments will be performed in brain slices of adult mice. Overall, our studies will identify critical mechanisms in early auditory information processing, and determine how those mechanisms contribute to the analysis of complex sounds. We will then determine how these mechanisms are affected by hearing loss, which will provide insights for alternative stimulation strategies for the hard-of-hearing and for cochlear implant users. This project received renewed funding from NIH this year, and will continue through 2013.

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. 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 has led to a new line of research in the laboratory that has now received additional funding from the NIH to Dr. Greg Basura, a resident in the laboratory, and AAO-HNS/ANS to Dr. Joseph Roche. Dr. Basura is studying the consequences of hearing loss on cellular processing in auditory cortex, and to study the potential role of serotonergic receptors in modulating hearing-loss induced plasticity. Ms. Deepti Rao, a graduate student from Cell and Molecular Physiology, is also working on this project. The lab is also interested in investigating synaptic changes that are associated with learning and memory in the auditory cortex. Ms. Rao, Ms. Megan Kratz (a graduate student in the Curriculum in Neurobiology) and Dr. Joe Roche are also investigating the mechanisms and functional significance of spike timing dependent plasticity, which is thought to be a learning rule that maximizes mutual information between inputs and outputs of simple neural networks. Dr. Joe Roche along with Dr. Manis will also be studying the development of spike timing dependent plasticity and how it is affected by sensorineural hearing loss.

Lastly, a collaborative project with Dr. Patricia Maness (Department of Biochemistry and Biophysics) is examining inhibitory circuits and their role in regulating gamma rhythms in the auditory cortex in a mouse model of schizophrenia is supported through the UNC Conte Center (Dr. John Gilmore, PI).



Medical student Alex Rich



Dr. Shuman He

Shuman He, MD, PhD, Post-doctoral Research Associate, began working in our labs in November 2008. She completed her MD and residency training in ENT at the Medical School of Shandong University in Jinan, China. She then came to the US to pursue her doctorate at the University of Iowa, where her dissertation focused on evoked potential testing in cochlear-implanted patients. Here at UNC, she has been working on two main projects. In one project, she works with Dr. Joe Hall on a study examining temporal processing in children. The goal of this project is to examine the development of the ability to use fine temporal, acoustic features to discriminate among – and recognize – sounds. In the other project, she works with Dr. Craig Buchman on a study dealing with evoked potentials in children with auditory neuropathy. One facet of this project is to determine whether the Acoustic Change Complex (a class of cortical evoked potentials) can provide a measure of perceptual discrimination in these children.

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 160 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. We 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.

Dr. Buchman continues to collaborate with Drs. Adunka and Fitzpatrick in the area of electrophysiological markers of hearing loss and intracochlear trauma. Using a combination of human temporal bone studies and animal model experimentation, these projects seek to further define the cause(s) of surgically induced hearing loss and importantly, identify functional markers of impending irreversible trauma. Early results are very promising and application of these findings will have broad reaching effects on the field of inner ear surgery.

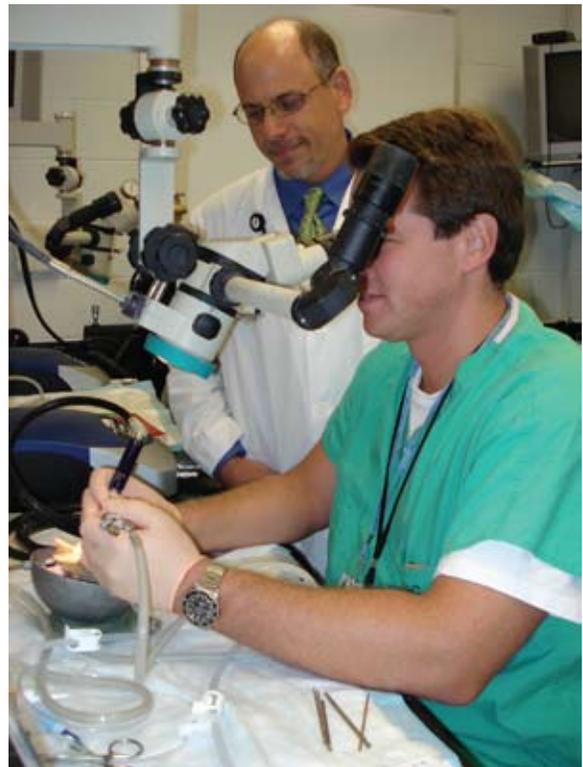
Together with the Office of Technology Development at UNC, Dr. Buchman and Dr. Adunka have applied for a US and International Patent to provide intracochlear measurements of acoustically evoked auditory potentials. This new technology should provide improved means to monitor hearing during hearing preservation 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.

Oliver F. Adunka, MD, is primarily involved in clinical research projects in the area of electric stimulation of the auditory system and inner ear hearing preservation. Dr. Adunka is the PI of the electric-acoustic stimulation (EAS) clinical trial; a multi-center North American trial in which UNC performed the first surgeries.

In collaboration with Drs. Fitzpatrick and Buchman, Dr. Adunka has embarked on a series of animal experiments using Mongolian gerbils focusing on the acute effects of intracochlear trauma and electrode insertion on early auditory potentials. Those potentials include cochlear microphonics from hair cells and compound action potentials from the spiral ganglion. First experiments revealed a peculiar configuration of electrophysiologic markers so that imminent intracochlear trauma can be predicted when still reversible. Also, these electrophysiologic markers have been correlated with morphological data from both histological evaluations as well as from microendoscopic imaging during the experiment. Future research in this area will focus on the effects of hearing loss on these early potentials and their significance for long-term hearing preservation. Also, in a close collaboration with an implant manufacturer, these data will be used to implement this technology into future cochlear implants.

Dr. Adunka is also heading the new 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. Last year's efforts have focused on the evaluation of cochleostomies furnished using new laser technology. Preliminary data demonstrate a sometimes positive effect of touch-less surgical methods such as the laser for a cochleostomy approach. Future research will focus on various alternative approaches to electrostimulation and hearing preserving techniques.

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 in the world. 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.



Drs. Craig Buchman and Oliver Adunka in the Temporal Bone Lab

During his research efforts, Dr. Adunka has mentored medical students including Adam Campbell, MS III, who will join our research team between his 3rd and 4th year of medical school to help with animal experiments centered around hearing preservation mentioned above. Also, Thomas Suberman, MS III, will join Dr. Fitzpatrick's lab for one year and will also focus on our series of animal experiments focusing on electrophysiologic characteristics of early intracochlear trauma.

Over the past 2 years, Dr. Adunka has developed a multi-client pediatric hearing loss database. Data that has been collected from the CCCDP and the pediatric hearing aid group have been merged and the database in its current form contains information on about 2,400 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.

Jiri Prazma, MD, PhD, and his colleagues have continued in their study of allergy-induced Eustachian tube dysfunction. The role of allergy in the development of Eustachian tube dysfunction (ETD) and otitis media with effusion (OME) has been investigated in the laboratory for many years. While the etiology of OME most likely involves many factors, allergic inflammation in and around the nasopharyngeal portion of the Eustachian tube (ET) or within the middle ear leads to the breakdown of the protective functions of the ET, thereby resulting in increased risk for the development of otitis media. For this reason, it is theorized that by modulating the pathways that lead to the allergic response, we can limit the inflammation caused by the allergic response resulting in ETD.

We have developed a model of ETD where rats are sensitized to ova-albumin (OVA) and subsequently challenged with this allergen either transtympanically or through the nasopharynx. This challenge causes an allergic-like response leading to inflammation within the middle or around the nasopharyngeal portion of the ET. This inflammation consequently leads to worsening of the ET's ventilatory function manifested as increased passive opening and closing pressures as well as worsening of active clearance of negative pressure. It also impairs the mucociliary clearance of the ET.

Supported by the Resident Research Grant of the American Academy of Otolaryngic Allergy, Joshua Surowitz, MD (PGY2), Stefan Mlot (MS4), and Carlton J. Zdanski, MD, have investigated new oligodeoxynucleotides with CpG motifs (CpG ODN), which are known mediators of allergic inflammation. This study has demonstrated that TLRA 9 and 7 antagonist increases patency of the Eustachian tube and slows mucociliary transport in the Eustachian tube. This study demonstrates that antagonists were efficacious in the treatment of allergic-like airway inflammation and airway hyperresponsiveness by preventing naive T-lymphocyte differentiation. Antagonist of these receptors may have opposing effects when applied into the middle ear.

Conclusion: CpG ODN given via transtympanic or nasopharyngeal application can treat allergy-induced ETD in rats and may offer substantial promise in the future management of otitis media and otitis media with effusions.

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

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 Carolina's Hospitals system, we have been awarded a generous grant from The Duke Endowment for the formation of the North Carolina Children's Airway Center. 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.

In the laboratory with Drs. Jiri Prazma and Allen Marshall, we continue to examine the problem of subglottic stenosis of the airway in the pediatric population and to examine etiologies and diagnostic tools for Meniere's Disease. Research into the mechanisms of otitis media, continue in the laboratory with Drs. Ebert, Blanks, Eapen, and Prazma examining the role of immunomodulatory oligonucleotides in the prevention and treatment of OVA-induced Eustachian tube dysfunction.

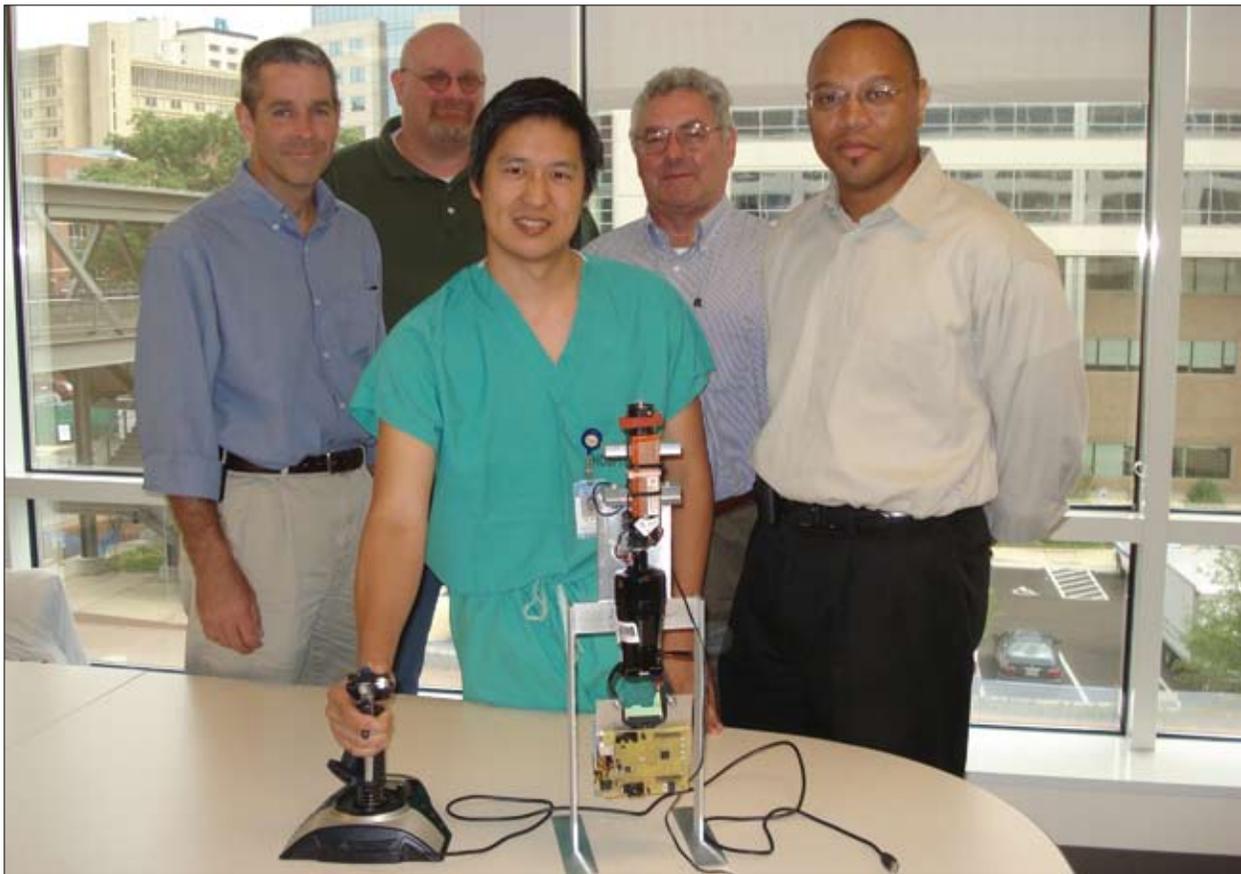
Research is being conducted into imaging in GJB related sensorineural hearing loss with Michael Stadler, MD. These data will be presented at the upcoming AAO-HNSF Meeting in San Diego, California this Fall.

Additional clinical research in the area of the Pediatric Airway has been in collaboration with Dr. Amelia Drake. We investigated the social impact of tracheotomies on school aged children.

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. These data were again presented at international meetings, this time in Seattle, Washington. Our group was also privileged to write about our philosophy and share some of our data for a chapter in an upcoming book. 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.

Holly Teagle, AuD, is the primary investigator for an NIH-funded study called Childhood Development after Cochlear Implantation (CDaCI). 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, Hannah Eskridge provides speech and language assessments and Jennifer Woodard coordinates the patient visits and data collection.

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. 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.



Part of the multidisciplinary project team designing a new bio-robotic device for control of the operative micro-laryngoscopic CO2 laser. From left to right: Denis Cormier, PhD (Industrial Engineering, NCSU); Kent Mieswinkel, MA (Biomedical Engineering, UNC/NCSU); Yu-Tung Wong, MD; Eddie Grant, PhD (Biomedical Engineering, UNC/NCSU); and Robert A. Buckmire, MD. Dr. Wong will be participating by validating “proof of concept” in our project designed to improve the safety, efficiency, and accuracy of the micro-laryngeal surgical laser, using this new bio-robotic device.

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 Phonomicrosurgery.” The resultant novel laser control device is currently in testing in the lab. Further work on the device engineering and software programming serves as a current resident research project in collaboration with the robotics lab at NC State. In collaborative research efforts with the Division of Gastroenterology, prospective, placebo-controlled studies regarding chronic cough, GERD and laryngoscopic signs of laryngo-pharyngeal research are in the final stages of data acquisition and data analysis. Both computer recognition algorithms and novel in vivo imaging techniques are being adapted for the purpose of developing “image guidance” in laryngeal surgery. 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) are being conducted as a joint effort between the Department of Neurology and the Department of Otolaryngology. Dr. Robert Buckmire and Dr. James Howard, who staff the LEMG clinic, are conducting an evaluation of quantitative versus qualitative interpretations of the LEMGs in a blinded fashion. In the last year, residents have presented divisional research posters and oral presentations at both national and international meetings.

Julia S. Kimbell, PhD, joined the faculty in June 2009 as a Research Associate Professor. She is currently conducting research on applications of computational fluid dynamics (CFD) to studies of nasal uptake and deposition. This research has three main areas of focus: (1) dose-response studies that test hypotheses about the role of dose in respiratory tract responses to inhaled materials, (2) risk assessment studies in which animal responses are extrapolated to humans on the basis of dose predictions in similar tissue types, and (3) research in medicine and therapeutics in which we seek to establish the use of computational fluid dynamics in planning nasal surgery and delivering inhaled therapeutic drugs more effectively.

In this research, cross-sectional images of tissue specimens and human anatomy are used to build three-dimensional, anatomically-accurate CFD models of the nasal passages of laboratory mice, rats, primates, and humans. Human subjects in our database range in age from 5 to 64 years old and include several ethnic types and both males and females. She and her collaborators have recently completed studies using these models on the deposition of nano-sized particles in the rat olfactory area and how regional dose predictions of inhaled particles and reactive, water-soluble gases compare among the upper respiratory tracts of several children and adults. They also recently used their human CFD models to predict and optimize nasal deposition patterns of both sprayed and nebulized medications, and to improve our understanding of the potential effects of surgery on nasal function for partial turbinectomy, atrophic rhinitis, and septal deviation.

She is currently funded to conduct research using their 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) calibrate interspecies nasal and lung dosimetry models to predict respiratory tract dose of inhaled raw fragrance chemicals in rats and humans (Research Institute for Fragrance Materials), (3) test hypotheses about the mechanisms of age-related ozone toxicity in the respiratory tract lining and epithelium and to extend this research to other animal species (NIH/NIEHS), (4) extend our previous rat nanoparticle deposition in olfactory-lined nasal areas to humans (NIOSH), and (5) help develop three-dimensional biologically-based models of the respiratory tracts of animals and humans determine structural and functional properties, cellular organization, and metabolic capacity (NIH/NHLBI). She and her collaborator, Principal Investigator John Rhee, MD (Medical College of Wisconsin), have just been approved for additional funding from NIH to add a postdoctoral fellow and a drug delivery component to our NIBIB-funded surgery project as well.



Three-dimensional, computational fluid dynamics models of the rat and human nasal passages (red). Developed by Dr. Kimbell, these models are being used to help improve human health risk assessment, deliver pharmaceutical drugs more effectively, and study the effects of potential surgical interventions.

Grants

Electroacoustic Stimulation

Principal Investigator: Oliver Adunka
Co-Investigators: Craig Buchman, Marcia Clark Adunka, Harold Pillsbury
Med EL Corporation
03/27/07 – 03/27/10
\$5,500

Monitoring Residual Hearing During Cochlear Implantation

Principal Investigator: Oliver Adunka
Co-Investigator: Doug Fitzpatrick
Med-EL Corporation
12/01/08 – 11/30/09
\$154,651

Bilateral Cochlear Implantation in Children

Principal Investigator: Craig Buchman
Co-Investigators: Holly Teagle, Oliver Adunka, Carlton Zdanski, John Niparko, Jill Cinnici, Nancy Fink
Advanced Bionics Corporation
University of North Carolina at Chapel Hill (subsidiary)
03/19/08 – 03/18/11
\$66,871

Auditory Brainstem Implantation in Non-NF2 Patients

Principal Investigator: Craig Buchman
Co-Investigators: Marcia Clark Adunka, Holly Teagle, John Grose, Matt Ewend, Derald Brackmann, Jose Fayad, Marc Schwartz, Steve Otto
Cochlear Corporation
University of North Carolina at Chapel Hill (subsidiary)
03/27/07-03/27/10

Vibrant Med EL Clinical Trial

Principal Investigator: Craig Buchman
Co-Investigators: Marcia Clark Adunka, Oliver Adunka, Harold Pillsbury
Sponsor: Med EL Corporation
09/21/07 – 09/21/10
\$56,000

Spectral Profile Cues and Synthetic Listening

Principal Investigator: Emily Buss
NIH/NIDCD
12/15/05 – 11/30/10
\$119,797 (current year)

The Inferior Colliculus as a Site of Electrical Stimulation

Principal Investigator: Doug Fitzpatrick
Co-Investigator: Charles Finley
NIH-NIDCD
12/08 – 11/11
\$275,000 (total direct costs)

Complex Sound Analysis in Normal and Impaired Ears

Principal Investigator: John Grose
Co-Investigators: Emily Buss, Charles Finley
NIH/NIDCD
12/01/92 – 08/31/13
\$212,500 (current year)

Development and Plasticity in Normal and Impaired Ears

Principal Investigator: Joseph Hall
Co-Investigator: Emily Buss
NIH/NIDCD
09/01/86 – 08/31/12
\$212,500 (current year)

Spectro-Temporal Analysis in Normal and Impaired Ears

Principal Investigator: Joseph Hall
Co-Investigator: Emily Buss
NIH/NIDCD
09/01/86 – 07/31/09
\$215,711 (current year)

Computer Modeling of Surgical Outcomes for Nasal Airway Obstruction

Principal Investigator: Julia Kimbell
Medical College of Wisconsin Subcontract/NIH
06/01/09-4/30/13
\$299,516 (total direct costs)

Mechanisms of Species-Dependent Environmental Lung Injury

Principal Investigator: Julia Kimbell
University of Alabama at Birmingham Subcontract/NIEHS
06/01/09-3/31/11
\$43,494 (total direct costs)

Development of Specific Modifications to Multi-Path Particle Deposition Model and Software Interface: Human Nasal Region

Principal Investigator: Julia Kimbell
The Hamner Institute Subcontract/NIOSH
06/01/09-12/31/09
\$4,972 (total direct costs)

3D Imaging and Computer Modeling of the Respiratory Tract

Principal Investigator: Julia Kimbell
The Hamner Institute Subcontract/PNNL
06/01/09-8/31/09
\$4,515 (total direct costs)

Dose Assessment of Selected Components of Fragrance Materials in the Respiratory Tracts of Humans and Rats

Principal Investigator: Julia Kimbell
The Hamner Institute Subcontract/RIFM
06/01/09-6/30/11
\$40,000 (total direct costs)

Research Training in Otolaryngology

Principal Investigator: Paul Manis

NIDCD

07/01/03 – 06/30/10

\$1,009,288 (total direct costs)

Physiology of the Dorsal Cochlear Nucleus Molecular Layer

Principal Investigator: Paul Manis

NIDCD

12/06 – 06/11

\$1,250,000 (total direct costs)

Cellular Mechanisms of Auditory Information Processing

Principal Investigator: Paul Manis

NIDCD

04/01/09 – 03/31/14

\$1,250,000 (total direct costs)

Prospective Studies of the Pathogenesis of Schizophrenia

Principal Investigators: John Gilmore, Aysenil Belger, Anthony-Sam Lamantia, Eva Anton, and Martin Styner

Co-Investigators: Paul Manis, Honor Wolfe, and James Reznick

08/01/08-7/31/10

\$1,423,311 (total direct costs)

Quality of Life Among African-American Head and Neck Cancer Survivors

Principal Investigator: Andrew Olshan

Co-Investigators: Jianwen Cai

Collaborators: Mark Weissler, William Funkhouser

Lance Armstrong Foundation

2007-2010

\$225,000

Moderators of Functional Outcomes in Children with Mild to Severe Hearing Loss

Principal Investigators: Bruce Tomblin (Univ. of Iowa), Mary Pat Moeller (Boys Town National Research Hospital)

UNC Co-Principal Investigators: Patricia Roush, Melody Harrison

University of Iowa Subcontract/NIH-NIDCD

08/01/08 – 07/31/13

\$1,506,334 (total amount)

Role of Adenosine in Chronic Rhinosinusitis

Principal Investigator: Xioyang Hua

Co-Investigator: Brent Senior

American Academy of Otolaryngology CORE

04/01/08 – 03/31/09

\$10,000

Molecular and Immunohistochemical Differentiation of Thyroid Follicular Lesions

Principal Investigator: Carol Shores

Co-Investigators: Adam Zanation, Mihir Patel

AHNS/AAO-HNSF Young Investigator Award

07/01/07 – 06/30/09

\$20,000 (current year)

Childhood Development after Cochlear Implantation (CDaCI Study)

Coordinating Center: Johns Hopkins University

UNC Principal Investigator: Holly Teagle

UNC Co-Investigators: Carolyn Brown, Craig Buchman, Harold Pillsbury, Carlton Zdanski, Jennifer Woodard, Hannah Eskridge

NIH/NIDCD

08/01/07 – 07/30/12

\$523,541

Children's Hearing Intervention Program; Center for Acquisition of Spoken language Through Listening Enrichment (CASTLE)

Principal Investigator: Holly Teagle

The Oberkötter Foundation

2001-2009

\$1,512,000

Center for Acquisition of Spoken language Through Listening Enrichment (CASTLE), Wilmington expansion site

Principal Investigator: Holly Teagle

Cape Fear Memorial Foundation

2007-2009

\$225,000

Center for Acquisition of Spoken language Through Listening Enrichment (CASTLE), Statewide Expansion Project

Principal Investigator: Holly Teagle

The Duke Endowment

2006-2008

\$300,000

Wake Children's Hearing Intervention Program

Principal Investigator: Holly Teagle

The John Rex Endowment

2003-2008

\$103,171

North Carolina Children's Airway Center

Principal Investigator: Carlton Zdanski

Duke Endowment

7/1/07-6/30/2010

\$360,000 (total direct costs)

Distinguished Professorships

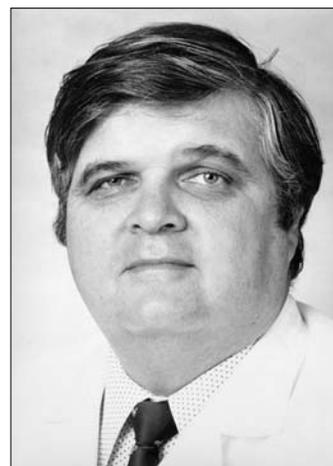
The distinguished professorships held by faculty in the Department of Otolaryngology/Head and Neck Surgery:

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 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.



W. Paul Biggers, MD

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 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.

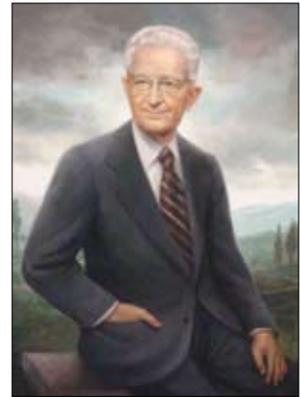
In recognition of Dr. Biggers' many contributions, the W. Paul Biggers Distinguished Professorship was established before he died in April of 2000 at the age of 62. Dr. Biggers asked that this Professorship be awarded to a physician who shares his passion for innovative teaching. On July 1, 2005, William 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.

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

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.



Thomas J. Dark

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 Professors:

Newton D. Fischer, MD (1977-1991)

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 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.

Joseph Palmer Riddle Professors:

W. Paul Biggers, MD (1977-2000)

Mark C. Weissler, MD (2000-present)

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.



Drs. Newton and Janet Fischer

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 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.

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

The Harold C. Pillsbury Distinguished Professorship was established in 2007 to be awarded to a faculty member in the Department of Otolaryngology/Head and Neck Surgery.

The June and James Ficklen Distinguished Professorship was established in 2008 to be awarded to a faculty member in the Department of Otolaryngology/Head and Neck Surgery.

In 2006, a Distinguished Professorship was established by an anonymous donor.

For more information, please contact Holli Gall, Director of Development, local: (919) 843-5734, toll-free: 1-800-962-2543, or holli_gall@med.unc.edu.

The Newton D. Fischer Society Meeting

In keeping with the Department's strong commitment to education, the annual meeting of the Newton D. Fischer Society was held on June 6, 2009, at the Paul J. Rizzo Conference Center in Chapel Hill. Dr. Austin Rose was the Course Director again this year. The oral presentations are listed:

Endoscopic approaches for cerebral artery aneurysms
W. Derek Leight, MD, and Adam M. Zanation, MD

Single Institution Outcomes with the MED-EL EAS System from a North American Study Site
Oliver F. Adunka, MD

Laryngology Update 2009
Robert A. Buckmire, MD

ENT Clinical Care and Research in Malawi
Carol G. Shores, MD, PhD

Chronic Rhinosinusitis: A New Classification Scheme and its Role in Treatment
Charles S. Ebert, Jr., MD, MPH

Equipment Choices in Pediatric Otolaryngology
Austin S. Rose, MD

Evolution of the Treatment of the Neck in Squamous Cell Carcinoma of the Head and Neck
Jesús E. Medina, MD (Keynote Speaker)

Imaging and Auditory Neuropathy: An Initial Investigation
Joseph P. Roche, MD

Oculoplastics in Otolaryngology: External Approaches to the Orbital Vault
P. Chase Lay, MD

Pearls from the Dark Side
J. Madison Clark, MD

Percutaneous Cochlear Implantation: Results of Clinical Validation Experiments
Robert F. Labadie, MD, PhD



Drs. Deidra Blanks and Robert Buckmire



Drs. Allen Marshall, Austin Rose, and Adam Zanation



Drs. Oliver Adunka and Mitch Gore

Honors, Awards, and Achievements

The 8th edition of Castle Connolly Medical, Inc., recognized **Drs. Harold Pillsbury, Mark Weissler, Brent Senior, and Marion Couch** as “America’s Top Doctors” in the specialty of Otolaryngology, and **Dr. Amelia Drake** in the specialty of Pediatric Otolaryngology. Drs. Couch and Weissler are also listed in the 4th edition of Castle Connolly’s “America’s Top Doctors for Cancer”. They were nominated by their peers in an extensive survey process of thousands of American doctors. They were screened by the Castle Connolly physician-led research team, and then were selected as among the very best in their specialties and in their community for inclusion in the published list of “America’s Top Doctors.”

UNC Healthcare named the **ENT Allergy Clinic at Carolina Pointe** as a “Top Five” clinic in January 2009. In February, both the **ENT Clinic** and **Speech & Audiology** were designated as “Top Five” clinics. The “Top Five” clinics are selected each month based on the results of patient satisfaction surveys.

The North Carolina Children’s Airway Center was ranked 11th in the nation among the top 30 children’s hospitals caring for children with respiratory disorders by *US News & World Report* in their 2009 issue of America’s Best Children’s Hospitals. **Dr. Carlton Zdanski** is the Surgical Director of this multidisciplinary center. **Drs. Amelia Drake and Austin Rose** are among the many who share in the care of pediatric patients with airway disorders at UNC.

Harold C. Pillsbury, MD, received a Presidential Citation Award at the 112th Annual Meeting of the Triological Society in Phoenix, Arizona, on May 28, 2009. Given annually by the Triological Society, the award recognizes outstanding contributions to Otolaryngology-Head and Neck Surgery.

Harold C. Pillsbury, MD, and **Brent A. Senior, MD**, were invited by the Department of Otolaryngology-Head and Neck Surgery of the University of Athens as guest speakers at the Third International Congress of Rhinology-Otology and Skull Base Surgery - Current Concepts. The meeting took place May 7-10, 2009, in Athens, Greece. Dr. Pillsbury gave a talk and moderated a round table panel discussion on the topic of “Cochlear Implant Surgery and Management of Complications.” Dr. Senior presented “Minimally Invasive Pituitary Surgery,” “Decision Making in Frontal Sinus Surgery,” and “Great Debate: Is Balloon Frontal Dilation the Best Solution Ever?”

Brent A. Senior, MD, FACS, was appointed Vice Chair for Academic Affairs. He was also promoted to Professor of Otolaryngology/Head and Neck Surgery with a joint appointment in the Department of Surgery as Professor of Neurosurgery. Dr. Senior was the invited keynote faculty and lecturer at the 15th Annual Conference of the Egyptian ORL Society at Cairo University, February 25-27, 2009.

Craig A. Buchman, MD, FACS, was appointed Vice Chair for Clinical Affairs. He also was given a joint appointment in the Department of Surgery as Professor of Neurosurgery. He was selected as a Fellow in the Academy of Educators of the UNC School of Medicine. He was honored as the Chandler Lecturer by the Department of Otolaryngology of the University of Miami School of Medicine in June 2009. Dr. Buchman also received a Presidential Citation by Thomas J. Balkany, MD, President of the Triological Society, at the Southern Section Meeting in Florida in January 2009. He was invited to give a talk at the 7th Meeting on Binaural Hearing Implants, which took place in Bordeaux, France, April 16-19, 2009. Dr. Buchman was also recently appointed Chairman of the Early Hearing Detection

Intervention Advisory Board of the Department of Public Health of the State of North Carolina, as well as the Chairman-Elect of the William House Cochlear Implant Study Group.

John H. Grose, PhD, was invited to give a talk in Japan at the Auditory Research Meeting organized by the Psychological and Physiological Acoustics Technical Committee of the Acoustical Society of Japan. The conference was held on the campus of Doshisha University in the historic city of Kyoto, May 29-30. The conference was wide-ranging in content and included talks on bat sonar navigation, auditory-based orientation aids for the blind, electrophysiology, speech acoustics, and psychoacoustical studies of hearing loss, among others. Dr. Grose's talk was entitled "Processing of temporal envelopes and fine structure as a function of age." Following the conference, Dr. Grose was able to tour the impressive laboratory facilities of Prof. Hiroshi Riquimaroux, the primary organizer of the meeting, and meet with his students.



Professor Hiroshi Riquimaroux with Dr. John Grose in Japan

Michael O. Ferguson, MD, was promoted to Associate Professor and was named the Associate Director of the UNC Otolaryngology/Head and Neck Surgery Residency Program. He was also recently appointed as an at-large member of WakeMed's Medical Executive Committee.

Carol G. Shores, MD, PhD, received a UNC Center for AIDS Research/Lineberger Comprehensive Cancer Center Grant for \$30,000 to set up a clinical cancer database at Kamuzu Central Hospital in Lilongwe, Malawi. In addition, she and her colleagues will set up tissue procurement and studies to examine how co-morbid infections affect the presentation, treatment and outcomes of Malawian cancer patients. Dr. Elizabeth Bigger, an Internal Medicine resident at Vanderbilt University, has received an NIH Fogarty International Clinical Research Fellowship to work on this project, and Dr. Shores will serve as her US advisor.

Austin S. Rose, MD, was promoted to Associate Professor, with a joint appointment with the Department of Pediatrics.

Austin S. Rose, MD, and **Carlton J. Zdanski, MD**, have recently been elected members of the American Society of Pediatric Otolaryngology. Selection for membership is based on three years of experience in Pediatric Otolaryngology, letters of support, and submission of an operative case log, which is extensively reviewed. ASPO's mission is to foster excellence in the care of children with otorhinolaryngologic disorders and thereby enhance the distinction of pediatric otorhinolaryngology as a profession.

Charles C. Finley, PhD, was invited by conference organizers to be a platform presenter at the 2009 Conference on Implantable Auditory Prostheses in July at Lake Tahoe, California. He was also invited to be the keynote speaker at the 2009 Conference of the British Cochlear Implant Group in Cambridge, England in June. Dr. Finley was awarded Life Membership in the British Cochlear Implant Group of Cambridge University.

An article co-authored by **Charles C. Finley, PhD**, was named “Best All-Around” article on cochlear implants in the 2008 Best of Audiology Literature issue published by *The Hearing Journal*. The article was published in Otolology & Neurotology by Charles Finley, Timothy Holden, Laura Holden, Bruce Whiting, Richard Chole, Gail Neely, Timothy Hullar, and Margaret Skinner. It provided a multidisciplinary, authoritative, and objective explanation of the large individual variability in CI performance. Starting with high-resolution X-ray images of individual inner ears, the authors measured electrode locations and related them not only to surgical techniques but also to speech performance. “I believe this paper will be a landmark in CI research,” states Fan-Gang Zeng, PhD, an established authority on cochlear implants.

Mark C. Weissler, MD, was elected to the Central Judiciary Committee of the American College of Surgeons, as well as to the Editorial Board of Otolaryngology-Head and Neck Surgery.

Adam M. Zanation, MD, was named Director of Medical Student Affairs within the Department of Otolaryngology/Head and Neck Surgery. This includes being third year surgery rotation coordinator and fourth year “Acting Internship” rotation coordinator. Dr. Zanation also won the 2008 North American Skull Base Society Research Award for a project and presentation in Vancouver, Canada, entitled “Outcomes in Patients Treated with Endoscopic Resection of Sinonasal Cancers.”

Charles S. Ebert, Jr., MD, MPH, was the recipient of a 2009 Robert C. Cefalo House Officer Award, given each year to five senior residents in the UNC School of Medicine who demonstrate effective communication with and empathy for patients and their families, exemplary professionalism, and the highest standards of patient care.

Mihir R. Patel, MD, won the Lloyd Storrs Resident Research Award given by the Triological Society at the Southern Section Meeting in January 2009. The title of the project was “A Novel Endoscopic Reconstruction for Anterior Skull Base Defects: The Endoscopic Pericranial Flap Usage in the First Three Patients.” Co-authors were **Drs. Rupali Shah and Adam Zanation**, as well as three from Pittsburgh, Pennsylvania: Drs. Carl Snyderman, Ricardo Carrau, and Amin Kassam.

Maher N. Younes, MD, received a \$5,000 grant from the North Carolina Medical Foundation for head and neck research. The title of the project is “Targeting Cervical Neck Node Metastases in a Mouse Model for Oral Cancer.” The aim of the project is to establish a real time *in vivo* model, whereby after injecting cancer cells in the tongue of mice, it grows and emits a signal that can be picked up by a machine. As the tumor starts metastasizing, its growth in the neck nodes can be detected. Afterwards, molecular targeted therapies will be used like antibodies to see if these tumors can be stopped from going to the neck nodes, or to see if those new therapies can cure already established lymph node metastases.

Presentations

Adunka OF, Pillsbury HC, Adunka MC, Buchman CA. *Electroacoustic Stimulation in Adults*. Hearing Preservation Workshop VII, Kansas City, MO. October 17-18, 2008.

Adunka OF, Pillsbury HC, Adunka MC, Buchman CA. *Is EAS Better than Conventional CI for Speech Perception in Quiet?* 142nd annual meeting of the American Otologic Society, Phoenix, AZ. May 29-30, 2009.

Adunka OF. *Migraine-Related Vertigo*. 2008 NC/SC Otolaryngology and Head & Neck Surgery Assembly, Pinehurst, NC. July 2008.

Adunka OF, Zdanski CJ, Zanation AM, Buckmire RA, Rose AS. *Problem Based Learning (PBL)*. UNC Neuroscience Block Curriculum Special Senses, ENT Section, Chapel Hill, NC. January 16, 2009.

Adunka O, Pillsbury HC, Adunka MC, Buchman CA. *Single Institution Outcomes with the MedEL EAS System from a North American Study Site*. 12th Symposium on Cochlear Implants in Children, Seattle, WA. June 18-20, 2009.

Adunka O. *Single Institution Outcomes with the MedEL EAS System from a North American Study Site*. Annual Meeting of the Newton D. Fischer Society, Chapel Hill, NC. June 6, 2009.

Andrews K, Eskridge H, Morris D. *Establishing Parents as Partners*. AVI Standardized Curriculum, Greenville, NC. April 1-2, 2009.

Arnoldner C, Settevendemie C, Helbig S, Baumann U, Adunka O, Gstöttner W. *Erste klinische Ergebnisse einer neuen atraumatischen Elektrode für die restgehörerhaltende Cochlea-Implant Chirurgie*. 52nd Austrian ENT Conference, Graz, Austria. September 10-14, 2008.

Bonino AY, Leibold LJ, Buss E. *Further Studies on the Benefit of a Carrier Phrase for Word Recognition in a Two-Talker Masker: Contributions of Coarticulation and Auditory Stream Segregation*. The 157th Meeting of the Acoustical Society of America, Portland, OR. May 2009.

Buchman CA. *Canal wall down mastoidectomy*. Anspach Temporal Bone Course. Palm Beach Gardens, FL. July 26, 2009.

Buchman CA. *Cochlear Implantation*. Anspach Temporal Bone Course. Palm Beach Gardens, FL. July 26, 2009.

Buchman CA. *Hearing Loss in Children: A Medical Perspective*. Department of Pediatrics, Rex Hospital, Raleigh, NC. June 24, 2009.

Buchman CA, Teagle HFB, Roush PA, Hatch D, Woodard J, Buss E, Zdanski C. *Cochlear Implantation in Children with Auditory Neuropathy Spectrum Disorder*. 12th Symposium on Cochlear Implants in Children, Seattle, WA. June 19, 2009.

Buchman CA. *Is Cochlear Implantation Below Age 1 Really Necessary?* Burning issues in pediatric cochlear implantation synergy session. 12th Symposium on Cochlear implants in Children, Seattle, WA. June 18, 2009.

Buchman CA, Wolfe J, Choo D, Runge-Samuels C. *Auditory Neuropathy Spectrum Disorder Synergy Session*. 12th Symposium on Cochlear implants in Children, Seattle, WA. June 18, 2009.

Buchman CA. *Auditory Neuropathy Spectrum Disorder in Children*. Chandler Society Meeting, Department of Otolaryngology, University of Miami School of Medicine, Miami, FL. June 13, 2009.

Buchman CA. *MedEL EAS Clinical Trial: Preliminary Results*. Investigators Meeting, Kansas City, MO. October 16, 2008.

Buchman CA. *Cochlear implantation in children*. Division of Speech and Hearing Sciences. University of North Carolina at Chapel Hill, Chapel Hill, NC. September 25, 2008.

Buchman CA, Adunka OF. *Scala Tympani Cochleostomy*. Presented at the William House Cochlear Implant Study Club, Chicago, IL. September 20, 2008.

Buchman CA. *Temporal Bone Dissection Course*, Invited Instructor. Anspach Corporation, Palm Beach Gardens, FL. July 25-26, 2009.

Buchman CA. *Cochlear Implantation in Children*. Division of Speech and Hearing sciences. University of North Carolina at Chapel Hill, Chapel Hill, NC. September 25, 2008.

Buckmire R. *What's New in Laryngology 2009*. Annual Meeting of the Newton Fischer Society, Chapel Hill, NC. June 6, 2009.

Buckmire R, Markus E. *Taking Care of Your Voice*. Fearington Village Choir, Pittsboro, NC. February 16, 2009.

Buckmire R, Markus E. *Taking Care of Your Voice*. AL Stanbach Middle School, Chapel Hill, NC. January 9, 2009.

Buckmire R, Markus E. *Taking Care of Your Voice*. The American Choral Directors Association Fall Conference, Greensboro, NC. October 10, 2008

Buss E, Hall JW, Grose JH (invited presentation). *The Importance of Temporal Fine Structure Coding for Speech Perception in Listeners with Sensorineural Hearing Impairment as Compared to Normal Hearing Listeners*. The 155th Meeting of the Acoustical Society of America, Paris, France. June 2008.

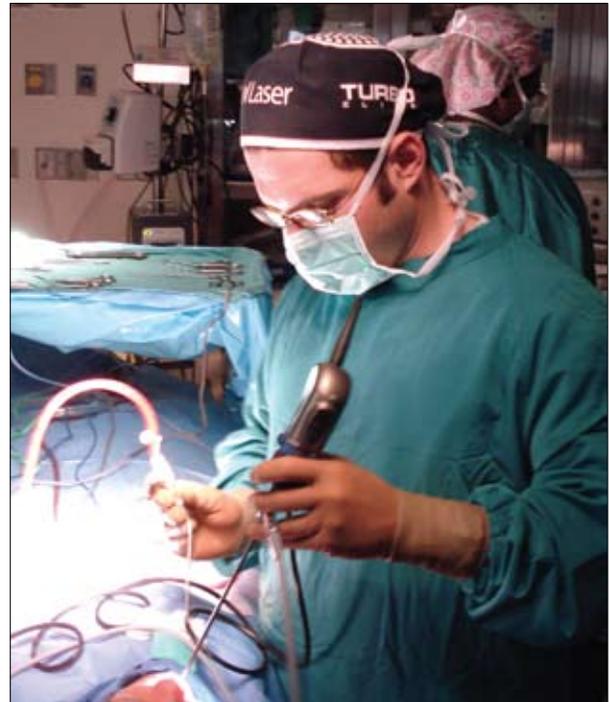
Bryson P, Patel M, Buckmire R. *Type I Gore-Tex Thyroplasty for Glottic Incompetence in Patients with Mobile Vocal Folds*. 2008 University of California at San Francisco Voice Conference, San Francisco, CA. October 18, 2008.

Campbell A, Adunka O, Huang B, Hawkins A, Buchman CA. *CT and MRI Characteristics in Children with Enlarged Vestibular Aqueduct Syndrome*. 12th Symposium on Cochlear Implants in Children, Seattle, WA. June 18-20, 2009.

Couch ME (invited panelist). *Career Development*. Society of University Otolaryngologists, Washington DC. November 5, 2009.

Couch ME (invited speaker). *Cancer Cachexia in Head and Neck Cancer Patients*. Johns Hopkins Hospital Department of Otolaryngology – Head & Neck Surgery, Biennial Alumni Meeting, Baltimore, MD. June 5, 2009.

Couch ME (visiting professor). *Innovations in Head & Neck Cancer*. Department of Surgery, New Hanover Regional Medical Center, Wilmington, NC. February 27, 2009.



Dr. Paul Bryson

Couch ME (invited panelist). *Forum of The Woman's Affairs Committee of Student Government*, University of North Carolina, Chapel Hill, NC. February 16, 2009.

Couch ME (invited speaker). *Free Flap Reconstruction of Mandible*. Craniofacial Trauma: The Aesthetics of Reconstruction, Chapel Hill, NC. January 17, 2009.

Couch ME (invited speaker). *Education of the Medical Student: The Role of Faculty during the Subinternship*. The Society of University Otolaryngologists – Head and Neck Surgeons, Chicago, IL. October 25, 2008.

Couch ME (invited speaker). *Systemic Therapy for Head and Neck Cancer: Putting the Surgeon's Role in Context*. Symposium, Chicago, IL. September 23, 2008.

Couch ME. *The Role of Surgery in the Management of Advanced Laryngeal Cancer: More than Just Salvage*. Mini-Symposium, Annual Meeting of the American Academy of Otolaryngology-Head and Neck Surgery, Chicago, IL. September 2008.

Couch ME (moderator). *Basic Science*. 7th International Conference on Head and Neck Cancer, San Francisco, CA. July 21, 2008.

Couch ME. *Lunch with the Professors: Practice Guidelines Cost Control*. 7th International Conference on Head and Neck Cancer, San Francisco, CA. July 21, 2008.

Couch ME. *Metabolic Differentiation of Cancer Cachexia in a Murine Model*. 7th International Conference on Head and Neck Cancer, San Francisco, CA. July 21, 2008.

Couch ME. *The Toll-like Receptor 9 Agonist ODN1826 Inhibits Cachexia and Tumor Growth in C26 Tumor-Bearing Mice*. 7th International Conference on Head and Neck Cancer, San Francisco, CA. July 21, 2008.

Couch ME. (invited speaker). *Current Treatments for Oral Cancer and the Oral Cancer Vaccine*. Carolina Institute for Oral Pathology, UNC, Chapel Hill, NC. July 16, 2008.

Couch ME. (invited speaker). *Management of the N0 Neck in Well Differentiated Thyroid Cancer*. Joint Anglo-American Meeting, Dublin, Ireland. July 7, 2008.



Dr. Amelia Drake

Drake AF, Rose AS, Zdanski CJ. *Coordination of Pediatric Airway Issues via the NC Children's Airway Center*. South Carolina & North Carolina Otolaryngology/Head & Neck Surgery Meeting, Myrtle Beach, SC. July 30 – August 2, 2009.

Drake AF. *FFNS: Incidence of Otitis Media*. Poster presentation at the American Society of Pediatric Otolaryngology, Seattle, WA. May 22-25, 2009.

Ebert CS, Suberman TA, Younes M, Leight WD, Senior, BA. *Sinonasal Quality of Life Before and After Minimally Invasive Pituitary Surgery*. Poster Presentation, Rhinoworld 2009, Philadelphia, PA. April 2009.

Ebert CS. *Chronic Rhinosinusitis: A New Classification Scheme and its Role in Treatment*. Annual Meeting of the Newton D. Fischer Society, Chapel Hill, NC. June 6, 2009.

- Eskridge H, Henderson L, Vernelson S. *Speech Babble and Critical Elements: Therapy How To*. Greensboro, NC. April 30, 2009.
- Eskridge H, Wilson K. *Development of Auditory Function/ AV Techniques*. AVI Standardized Curriculum, Concord, NC. January 2008.
- Finley CC. *The Contributions of Margaret Skinner in Understanding the Basis of Variability in Cochlear Implant Outcomes*. Invited oral presentation at the 2009 Conference on Implantable Auditory Prostheses, Granbilakken Conference Center, Lake Tahoe, CA. July 12-17, 2009.
- Finley CC. *Update on Ongoing Research on CT Imaging and Outcomes*. European Investigator's Conference, hosted by Advanced Bionics Corporation at Cambridge University, Cambridge, England. June 24, 2009.
- Finley CC. *The Difficult Cochlear Implant Patient*. Keynote address at the British Cochlear Implant Group Annual Conference at Cambridge University, Cambridge, England. June 22-23, 2009.
- Grose JH, Mamo SK, Buss E, Hall JW. *Temporal Processing as a Function of Age: Interaural Time Difference Discrimination*. The 157th Meeting of the Acoustical Society of America, Portland, OR. May 2009.
- Grose JH, Mamo SK, Hall JW III. *Age Effects in Temporal Envelope Processing: Speech Unmasking and Auditory Steady State Responses*. The 32nd Midwinter Research Meeting of the Association for Research in Otolaryngology, Baltimore, MD. February 2009.
- Hall JW, Buss E, Grose JH. *Monaural Envelope Correlation Perception and Broadband Temporal Analysis*. The 157th Meeting of the Acoustical Society of America, Portland, OR. May 2009.
- Hall JW, Buss E, Grose JH. *Across-Frequency Integration of Speech Information in Listeners with Sensorineural Hearing Loss*. Invited Presentation, The 155th Meeting of the Acoustical Society of America, Paris, France. June 2008.
- Hayes DN. *Updates in Chemotherapy for Head and Neck Cancer*. Friday Noon Conference, Brody School of Medicine, East Carolina University, Greenville, NC. September 12, 2008.
- Hayes DN. *Updates in Chemotherapy for Head and Neck Cancer*. Fellows Didactic Series, University of North Carolina, Chapel Hill, NC. September 9, 2008.
- Hayes DN. *Head and Neck Cancer: Updates in Therapy*. South Carolina Medical Society Annual Meeting. Charleston, SC. August 9, 2008.
- Hayes DN. *The Potential for a Molecular Diagnostics Based on Lung Cancer Gene Expression Profiling from Clinically Derived Paraffin Samples*. Genomic Health, Redwood City, CA. July 28, 2008.
- Hayes DN. *The Classification of Glioblastoma by Gene Expression Profiling*. Steering Committee Meeting at Memorial Sloan Kettering Comprehensive Cancer Center. The Cancer Genome Atlas, New York, NY. July 23, 2008.
- Hua X, Kirby Z, Senior B, Tilley S, Button B, Bennett W. *Methodologies for Assessing Mucociliary Clearance in Mice*. International Society for Aerosols in Medicine – Workshop on Mucociliary/Cough Clearance (Poster Presentation) Durham, NC. October 21-22, 2008.
- Huang BY, Castillo M, Buchman CA. *Intracranial findings in children with sensorineural hearing loss: Prevalence and spectrum of brain abnormalities*. Annual Meeting of the American Society of Neuroradiology, Vancouver Convention & Exhibit Center, British Columbia, Canada. May 16-21, 2009.
- Kimbell JS. *Mathematical Modeling in Nasal Drug Delivery and Surgery*. Special Session: Recent Advances in Mathematical Modeling in Medicine, Annual Joint Mathematics Meetings, Washington, DC. January 5, 2009.

Leight WD, Zanation AM. *Endoscopic Approaches for Cerebral Artery Aneurysms*. Annual Meeting of the Newton D. Fischer Society, Chapel Hill, NC. June 6, 2009.

Marshall AF. *First Branchial Cleft Anomalies*. Grand Rounds Presentation, UNC Department of Otolaryngology/Head and Neck Surgery, Chapel Hill, NC. November, 2008.

Mlot S, Adunka OF, Buchman CA, Fitzpatrick DC. *An Animal Model for Electroacoustic Stimulation: Using the Gerbil to Predict Imminent Cochlear Damage Associated with Electrode Advancement*. 12th Symposium on Cochlear Implants in Children, Seattle, WA. June 20, 2009.

Olshan AF. *Integrating Biomarkers Into Population Research*. School of Social and Family Dynamics, Center for Population Dynamics, Arizona State University, Tempe, AZ. April 7, 2009.

Patel MR, Shockley WW. *Oral and Plunging Ranulas: Myths and Misconceptions*. 2008 North Carolina-South Carolina Otolaryngology-Head and Neck Surgery Assembly. Pinehurst, NC. July 18, 2008.

Patel MR, Deal AM, Shockley WW. *Oral and Plunging Ranulas: What is the Most Effective Treatment?* Triological Society Combined Middle and Southern Sections Meeting, Bonita Springs, FL. January 9, 2009.

Pillsbury HC. *What's New in Cochlear Implantation*. Georgia Society of Otolaryngology Summer Meeting, Kiawah Island, SC. July 25, 2009.

Pillsbury HC. *Complications in Cochlear Implantation*. Georgia Society of Otolaryngology Summer Meeting, Kiawah Island, SC. July 24, 2009.

Pillsbury HC. *Workforce Issues in Otolaryngology*. Georgia Society of Otolaryngology Summer Meeting, Kiawah Island, SC. July 24, 2009.

Pillsbury HC. *Future of the ENT Surgeon*. British Academic Conference in Otolaryngology and ENTExpo, Liverpool, England. July 10, 2009.

Pillsbury HC. *The American Experience*. British Academic Conference in Otolaryngology and ENT Expo, Liverpool, England. July 9, 2009.

Pillsbury HC. *Cochlear Implant Surgery and Management of Complications*. 3rd International Congress of Rhinology – Otology & Skull Base Surgery Current Concepts, Athens, Greece. May 8, 2009.

Pillsbury HC. *Advances in Cochlear Implants*. Medical College of Georgia, Augusta, GA. March 23, 2009.

Pillsbury HC. *Physician Workforce Issues*. American Academy of Otolaryngology – Head and Neck Surgery Board of Governors Spring Meeting, Alexandria, VA. March 21, 2009.

Pillsbury HC. *Hearing Implants in Sensorineural Hearing Loss*. Collegium Oto-Rhino-Laryngologicum Amicitiae Sacrum, Berlin, Germany. August 26, 2008.

Pillsbury HC. *Allergic Rhinitis vs. Vasomotor Rhinitis - What's New?* North Carolina Academy of Physician Assistants, Myrtle Beach, SC. August 21, 2008.

Pillsbury HC. *Ethical Issues in Otolaryngology/Head and Neck Surgery*. Moderator. The Triological Society 112th Annual Meeting, Phoenix, AZ. May 30, 2009.



Drs. Surowitz and Pillsbury

Pillsbury HC. *Cochlear Implant Surgery and Management of Complications*. Moderator. 3rd International Congress of Rhinology – Otolaryngology & Skull Base Surgery Current Concepts, Athens, Greece. May 8, 2009.

Roche JP, Huang BY, Castillo M, Bassim MK, Adunka OF, Buchman CA. *Imaging Characteristics of Children with Auditory Neuropathy*. 44th annual meeting of the American Neurotology Society, Phoenix, AZ. May 29-30, 2009.

Roche J, Huang B, Buchman CA. Radiological assessment of children with auditory neuropathy. Annual Meeting of the American Neurotology Society, Phoenix, AZ. May 29, 2009.

Roche JP. *Imaging and Auditory Neuropathy: An Initial Investigation*. Annual Meeting of the Newton D. Fischer Society, Chapel Hill, NC. June 6, 2009.

Rose AS. *Salivary Glands*. Neurosciences block, University of North Carolina School of Medicine, Chapel Hill, NC. January 16, 2009.

Rose, AS. *Operating Safely on Children with Clefts – airway considerations*. Slide presentation at the 4th Meeting of the Palestinian Cleft Society, Ramallah, West Bank. June 2009.

Rose AS. *Tonsillectomy - A Comparison of Current Techniques*. Annual Meeting of the Newton D. Fischer Society, Chapel Hill, NC. June 6, 2009.

Roush P. *Auditory Neuropathy Spectrum Disorder (ANSD), Diagnosis and Management*. WE Listen International conference, Toronto, Ontario, Canada. April 24, 2009.

Roush P. *The Challenges of Mild Bilateral and Unilateral Hearing Loss*. 15th Annual RIHAP Seminar, Warwick, RI. March 23, 2009.

Roush P. *Developing an Audiological Roadmap for Children Birth to Five*. 15th Annual RIHAP Seminar, Warwick, RI. March 23, 2009.

Roush P. *Hearing Aid Fitting: New Technologies Improve Audibility*. National EHDI Conference, Dallas, TX, March 9, 2009.

Roush P. *Auditory Neuropathy Spectrum Disorder (ANSD), Diagnosis and Management*. National EHDI Conference, Dallas, TX, March 8, 2009.

Roush P. *Auditory Neuropathy Spectrum Disorder (ANSD), Diagnosis and Management*. Georgia Academy of Audiology Conference, Atlanta, GA. February 6, 2009.

Roush P. *Audiological Screening, Diagnosis and Management*. Identification and Management of Infants and Young Children with Auditory Neuropathy Spectrum Disorder, University of California, Los Angeles, CA. January 30, 2009.

Roush P. *Auditory Neuropathy Spectrum Disorder: No Simple Solutions*. Improving Outcomes for Children with Hearing Loss: Challenges and Solutions. 3rd Phonak European Conference on Pediatric Amplification Solutions, Brighton, England. November 24, 2008.

Roush P. *Amplification and Cochlear Implants for Infants and Children with Auditory Neuropathy Spectrum Disorder*. Identification and Management of Infants and Young Children with Auditory Neuropathy Spectrum Disorder, Denver CO. October 24, 2008.

Roush P, Dreith S. *Audiological Screening, Diagnosis and Management*. Identification and Management of Infants and Young Children with Auditory Neuropathy Spectrum Disorder, Denver CO. October 24, 2008.

Roush P, Macpherson C. *Family Friendly Audiology in a Medical Setting*. Investing in Family Support. 3rd Annual Conference (NCHAM), Raleigh, NC. October 21, 2008.

Senior BA. *Skull Base Surgery*. Medical Student I Lecture, University of North Carolina, Chapel Hill, NC. December 9, 2008.

Senior BA. *Sinus Anatomy I*. Residents, University of North Carolina, Chapel Hill, NC. November 20, 2008.

Senior BA. *Management of Frontal Sinus Fractures*. Grand Rounds, University of North Carolina Plastic Surgery, Chapel Hill, NC. September 26, 2008.

Senior BA. *Frontal Sinus-State of the Art (Southern States Rhinology Course) – Tumors*. RhinologyWorld 2009, Philadelphia, PA. April 16, 2009.

Senior BA. *Avoidance of Complications in Sinus Surgery*. The Nose, Inside & Out, UVA, Charlottesville, VA. October 23, 2008.

Senior BA. *Transsphenoidal Hypophysectomy*. The Nose, Inside & Out, UVA, Charlottesville, VA. October 23, 2008.

Senior BA. *Endoscopic Surgery for Tumors*. The Nose, Inside & Out, UVA, Charlottesville, VA. October 23, 2008.

Senior BA. *Sinus Prosection*. The Nose, Inside & Out, UVA, Charlottesville, VA. October 23, 2008.

Senior BA. *Sinus Anatomy*. American Academy Oto/HNS, Chicago, IL. September 22, 2008.

Senior BA. *Minimally Invasive Pituitary Surgery*. American Academy Oto/HNS, Chicago, IL. September 21, 2008.

Senior BA. Expert Discussion – Discussion with the Audience, 3rd International Congress of Rhinology, Otology & Skull Base Surgery Current Concepts, Athens, Greece. May 9, 2009.

Senior BA (moderator). *The Difficult Rhinologic Patient Panel (Cases Discussion)*. 3rd International Congress of Rhinology, Otology & Skull Base Surgery Current Concepts, Athens, Greece. May 8, 2009.

Senior BA. *Endoscopic Pituitary Surgery*. 3rd International Congress of Rhinology, Otology & Skull Base Surgery Current Concepts, Athens, Greece. May 8, 2009.

Senior BA. *Decision Making in Frontal Sinus Disease*. 3rd International Congress of Rhinology, Otology & Skull Base Surgery Current Concepts, Athens, Greece. May 8, 2009.

Senior BA. *Tumors of the Sinuses: All You Need to Know*. 15th Annual Conference on the Diseases of the Nose & Paranasal Sinuses, The Egyptian ORL Society, Cairo, Egypt. February 27, 2009.

Senior BA. *Image Guided Surgery of the Sinuses: Where We Are and Where We Are Going*. 15th Annual Conference on the Diseases of the Nose & Paranasal Sinuses, The Egyptian ORL Society, Cairo, Egypt. February 26, 2009.

Senior BA. *Management of CSF Leaks and Encephaloceles*. 15th Annual Conference on the Diseases of the Nose & Paranasal Sinuses, The Egyptian ORL Society, Cairo, Egypt. February 26, 2009.

Senior BA. *The State of the Art in the Management of CSF Leak*. Panel, 15th Annual Conference on the Diseases of the Nose & Paranasal Sinuses, The Egyptian ORL Society, Cairo, Egypt. February 26, 2009.

Senior BA. *Acute Management of Complications of Sinus Surgery*, 15th Annual Conference on the Diseases of the Nose & Paranasal Sinuses, The Egyptian ORL Society, Cairo, Egypt. February 26, 2009.

Senior BA. *Minimally Invasive Pituitary Surgery*. 15th Annual Conference on the Diseases of the Nose & Paranasal Sinuses, The Egyptian ORL Society, Cairo, Egypt. February 25, 2009.

Senior BA. *Decision Making in Sinonasal Surgery*. Panel, 15th Annual Conference on the Diseases of the Nose & Paranasal Sinuses, the Egyptian ORL Society, Cairo, Egypt. February 25, 2009.

Senior BA. *Anatomy and Surgery of the Frontal Sinus*. 15th Annual Conference on the Diseases of the Nose & Paranasal Sinuses, The Egyptian ORL Society, Cairo, Egypt. February 25, 2009.

Senior BA. *Where Does Sinusitis Come From*. 15th Annual Conference on the Diseases of the Nose & Paranasal Sinuses, The Egyptian ORL Society, Cairo, Egypt. February 25, 2009.

Senior BA. Panel: *Frontal Sinusotomy: Balloon to Obliteration*. Eastern Section Triological Society, Boston, MA. January 24, 2009.

Senior BA. *Basic FESS: Surgical Anatomy of the Sinuses*. First Middle Eastern Rhinology Congress, Tehran, Iran. November 5, 2008.

Senior BA. *Surgery and Anatomy of the Frontal Sinus*. First Middle Eastern Rhinology Congress, Tehran, Iran. November 5, 2008.

Senior BA. *Complications of Sinus Surgery*. First Middle Eastern Rhinology Congress, Tehran, Iran. November 5, 2008.

Senior BA. *Management of Acute Complications of Sinus Surgery*. First Middle Eastern Rhinology Congress, Tehran, Iran. November 5, 2008.

Senior BA. *Where Does Sinusitis Come From (a review of current ideas)*. First Middle Eastern Rhinology Congress, Tehran, Iran. November 5, 2008.

Senior BA. *Medical Management of Sinusitis*. First Middle Eastern Rhinology Congress, Tehran, Iran. November 5, 2008.

Senior BA. *Round Table on Endoscopic Skull Base Surgery*, First Middle Eastern Rhinology Congress, Tehran, Iran. November 5, 2008.

Senior BA. *Revision Sinus Surgery*. First Middle Eastern Rhinology Congress, Tehran, Iran. November 5, 2008.

Senior BA. *Advanced FESS: Image Guided Sinus Surgery with Recent Advances*. First Middle Eastern Rhinology Congress, Tehran, Iran. November 7, 2008.

Senior BA. *Endoscopic Skull Base Surgery/Tumor Surgery*. First Middle Eastern Rhinology Congress, Tehran, Iran. November 7, 2008.

Senior BA. *Minimally Invasive Pituitary Surgery*. First Middle Eastern Rhinology Congress, Tehran, Iran. November 7, 2008.

Senior BA. *Sinus Prosection*. Western States Rhinology Course, Sonoma, CA. October 17, 2008.

Senior BA. *Complications of Sinus Surgery: Avoidance & Treatment*. Western States Rhinology Course, Sonoma, CA. October 17, 2008.



Drs. Senior and Eapen

Senior BA. *Endoscopic Pituitary Surgery*. Western States Rhinology Course, Sonoma, CA. October 17, 2008.

Senior BA. *Pathogenesis of Rhinosinusitis: What Do We Know?* Western States Rhinology Course, Sonoma, CA. October 16, 2008.

Senior BA. *Revision Sinus Surgery: Identifying Causes of Failure*. Western States Rhinology Course, Sonoma, CA. October 16, 2008.

Senior BA. *Image Guided Surgery*. 3rd Riyadh Military Hospital FESS Course, Riyadh, Saudi Arabia. October 13, 2008.

Senior BA. *Endoscopic Resection of Sinonasal Tumors*. 3rd Riyadh Military Hospital FESS Course, Riyadh, Saudi Arabia. October 13, 2008.

Senior BA. *Transsphenoidal Surgery*. 3rd Riyadh Military Hospital FESS Course, Riyadh, Saudi Arabia. October 13, 2008.

Senior BA. *Surgical Anatomy of the Sinuses*. 3rd Riyadh Military Hospital FESS Course, Riyadh, Saudi Arabia. October 12, 2008.

Senior BA. *Chronic Sinusitis, Where Does it Come From?* 3rd Riyadh Military Hospital FESS Course, Riyadh, Saudi Arabia. October 12, 2008.

Senior BA. *Assessment of FESS Outcome & Post Operative Care*. 3rd Riyadh Military Hospital FESS Course, Riyadh, Saudi Arabia. October 12, 2008.

Senior BA. *Frontal Sinus Surgery*. 3rd Riyadh Military Hospital FESS Course, Riyadh, Saudi Arabia. October 12, 2008.

Shaw RN, Patel MR, Funkhouser WK, Shockley WW. *Polymorphous Low-Grade Adenocarcinoma: Patterns of Recurrence*. (Poster Presentation) American Head and Neck Society 2009 Annual Meeting, Phoenix, AZ. May 30, 2009.

Shockley WW. *External Cover for Large Nasal Defects*. Panel on Total Nasal Reconstruction. Advances in Rhinoplasty, Seattle WA. June 14, 2009.

Shockley WW. *Acute Management of Isolated Nasal Fractures*. Advances in Rhinoplasty, Seattle, WA. June 13, 2009.

Shockley WW. *Osteotomies: An Evidence – Based Review*. Panel on Functional Septorhinoplasty, Advances in Rhinoplasty, Seattle, WA. June 11, 2009.

Shockley WW. *Reconstruction Facial Cutaneous Defects: Cases for Discussion*. Visiting Professor, Medical College of Georgia, Augusta, GA. April 15, 2009.

Shockley WW. *Facial Cutaneous Hemangiomas and AV Malformations: Diagnosis and Management*. Visiting Professor, Medical College of Georgia, Augusta, GA. April 14, 2009.

Shockley, WW. *Reconstruction of Nasal Defects*. Carolina Course in Facial Plastic Surgery. Wake Forest University School of Medicine, Winston-Salem, NC. February 21, 2009.

Shockley WW. *My Approach to Functional Rhinoplasty*. Portland Rhinoplasty Course. Oregon Health and Science University, Portland, OR. July 26, 2008.

Shockley WW. *Osteotomies: Refinements and Pitfalls*. Portland Rhinoplasty Course, Oregon Health and Science University, Portland, OR. July 25, 2008.

Shockley WW. *Dorsal Augmentation: Materials and Techniques*. Portland Rhinoplasty Course, Oregon Health and Science University, Portland, OR. July 25, 2008.

Shockley WW. *Practical Tips in the Management of Facial Scars*. North Carolina-South Carolina Otolaryngology-Head and Neck Surgery Assembly. Pinehurst, NC. July 18, 2008.

Shockley WW, Clark JM, Ladner KM. *Facial Plastics and Reconstructive Surgery Panel*. Annual Meeting of the Newton D. Fischer Society, Chapel Hill, NC. June 6, 2009.

Shores CG. *ENT Clinical Care and Research in Malawi*. Annual Meeting of the Newton D. Fischer Society, Chapel Hill, NC. June 6, 2009.

Teagle, HFB. *Current Trends and Technology in Cochlear Implantation*. NC Spring Camp, Camp Cheerio, NC. May 17, 2009.

Weissler MC. *Oral Cancer: Risks, Diagnosis and Treatment*. Presentation to Wake AHEC at NC State University. February 10, 2009.

Weissler MC. *Oral Cancer: Symptoms, Diagnosis and Management*. Community presentation at UNC Wellness Center. October 29, 2008.

Weissler MC. *Oral Cancer: Risks, Diagnosis and Treatment*. Wake AHEC lecture, North Carolina State University, Student Health Center, Raleigh, NC. February 10, 2009.

Zdanski CJ, Campbell A, Adunka O, Huang B, Hawkins A, Buchman CA. *CT and MRI Imaging Characteristics in Children with Enlarged Vestibular Aqueduct Syndrome*. 12th Symposium on Cochlear Implants in Children, Seattle, WA. June 18-19, 2009.

Zdanski CJ, Buchman CA. *Cochlear Implantation in Children with Auditory Neuropathy Spectrum Disorder*. 12th Symposium on Cochlear Implants in Children, Seattle, WA. June 19, 2009.

Zdanski CJ. *Assessment and Rehabilitation of Children with Auditory Neuropathy Spectrum Disorder*. 12th Symposium on Cochlear Implants in Children, Seattle, WA. June 19, 2009.

Zdanski CJ (moderator). Session #5, American Society of Pediatric Otolaryngology, Twenty Fourth Annual Meeting, Seattle, WA. May 23, 2009.

Zdanski CJ. *Head and Neck Masses: Evaluation and Treatment*. Rex Pediatric Grand Rounds. Rex Healthcare, Raleigh, NC. January 28, 2009.

Zdanski CJ. *ENT Emergencies*. UNC Neuroscience Block Curriculum Special Senses, ENT Section, Chapel Hill, NC. January 16, 2009.

Zdanski CJ. *Pediatric Airway Trauma and Management*. William and Ida Friday Center, Chapel Hill, NC. December 9, 2008.

Zdanski CJ. *Hearing Loss, Hearing Aids, and Cochlear Implants*. CCCDP and NC AG Bell 15th Annual Hear'n'Now Conference, Durham, NC. November 7, 2008.

Zuckerman J, Rogers A, Wise S, Senior BA, Del Gaudio J. *The Utility of Cadaver Dissection in ESS Training Courses*. ARS Meeting, Chicago, IL. September 20, 2008.

Publications

Journal Articles:

Adunka OF, Buss E, Clark MS, Pillsbury HC, and Buchman CA. Effect of preoperative residual hearing on speech perception following cochlear implantation. *Laryngoscope* 2008;118(11):2044-2049.

Adunka OF, Buchman CA. Contemporary medical protocols for children with cochlear implants. Perspectives on Hearing and Hearing Disorders in Childhood. *ASHA Division 9* 2009 Mar;19(1):22-31

Barker DH, Quittner AL, Fink NE, Eisenberg LS, Tobey EA, Niparko JK, CDaCI Investigative Team. Predicting behavior problems in deaf and hearing children: The influences of language, attention, and parent-child communication. *Dev Psychopathol* 2009;21(2):373-92.

Basta PV, Bensen JT, Tse CK, Perou CM, Sullivan PF, Olshan AF. Genetic variation in Transaldolase1 and risk of squamous cell carcinoma of the head and neck. *Cancer Detect Prev* 2008;32:200-208.

Basura GJ, Abbas A, O'Donohue H, Lauder JM, Roth BL, Walker PD, Manis PB. Ontogeny of serotonin and serotonin2a receptors in rat auditory cortex. *Hear Res* 2008;44(1-2):45-50.

Belinson S, Smith JS, Myers E, Olshan A, Belinson J, Pretorius R, Qiao YL, Hartmann K. Descriptive evidence that risk profiles for cervical intraepithelial neoplasia 1,2, and 3 are unique. *Cancer Epidemiol Biomarkers Prev* 2008;17:2350-5.

Blanks DA, Buss E, Grose JH, Fitzpatrick DC, Hall JW III. Interaural time discrimination of envelopes carried on high-frequency tones as a function of level and interaural carrier mismatch. *Ear Hear* 2008;29(5):674-683.

Blanks DA, Ebert CS. Immune modulatory oligonucleotides in the prevention and treatment of allergen-induced Eustachian tube dysfunction in the animal model. *Curr Allergy Asthma Rep* 2008 Nov;8(6):508-12.

Bloom DC, Starr JR, Cunningham M, Davis T, de Serres LM, Drake AF, Haddad J, Hartnick C, MacArthur C, Milczuk HA, Muntz HR, Perkins JA, Senders C, Smith ME, Tollefson T, Willging JP, Zdanski CJ, Sie K. Multicenter Interrater and Intrarater Reliability in the Endoscopic Evaluation of Velopharyngeal Insufficiency. *Arch of Otolaryngol Head Neck Surg*, 2008;134(7):757-763.

Bryson P, Leight W, Zdanski C, Drake AF, Rose AS. High-resolution ultrasound in the evaluation of pediatric recurrent respiratory papillomatosis. *Arch Otolaryngol Head Neck Surg* 2009 Mar;135(3):250-3.

Buckmire R. Surgical Management of SLLP Injection during Injection Laryngoplasty: Case series and Review of the literature. *Archives of Otolaryngology-Head and Neck Surgery* 2009 Feb;135(2):205-8.

Burton M, Couch ME, Rosenfeld R. Extracts from The Cochran Library: Homeopathic medicines for adverse effects of cancer treatments. *Otolaryngol Head Neck Surg* 2009;141(2):162-5.

Buss E, Whittle LN, Grose JH, Hall JW III. Masking release for words in amplitude modulated noise as a function of modulation rate and task. *J Acoust Soc Am* 2009 Jul;126(1):269-80.

Buss E, Grose JH. Spectral integration under conditions of comodulation masking release. *J Acoust Soc Am* 2009;125:1612-1621.

Buss E, Hall JW III, Grose JH Psychometric functions for pure tone intensity discrimination: Slopes differ in school-aged children and adults," *J Acoust Soc Am* 2009;125(2):1050-1058.

- Buss E, Hall JW III. Factors contributing to comodulation masking release with dichotic maskers. *J Acoust Soc Am* 2008;124(4):1905-1908.
- Buss E. The effect of masker level uncertainty on intensity discrimination. *J Acoust Soc Am* 2008;123(1), 254-264.
- Buss E. Across-channel interference in intensity discrimination: The role of practice and listening strategy. *J Acoust Soc Am* 2008;123(1):265-272.
- Bryson PC, Leight WD, Zdanski CJ, Drake AF, Rose AS. High-resolution ultrasound in the evaluation of pediatric recurrent respiratory papillomatosis. *Arch Otolaryngol Head Neck Surg* 2009 Mar;135(3):250-3.
- Damrauer J, Stadler M, Acharyya S, Baldwin A, Couch M, Guttridge D. Chemotherapy-induced muscle wasting: Association with NF-kB and cancer cachexia. *Basic Applied Myology* 2008;18(5):139-148.
- Daniels JL, Pan IJ, Olshan AF, Breslow NE, Bunin GR, Ross JA. Obstetric history and birth characteristics and Wilms Tumor: A report from the Children's Oncology Group. *Cancer Causes Control* 2008;19:1103-10.
- Demke J, Bassim M, Patel MR, Dean S, Rahbar R, van Aalst JA, Drake A. Parental Perceptions and Morbidity: Tracheostomy and Pierre Robin Sequence. *Int J Pediatr Otorhinolaryngol* 2008 Oct;72(10):15 09-16.
- Devine S, West S, Andrews E, Tennis P, Eaton S, Thorp J, Olshan A. Validation of neural tube defects in the full featured — general practice research database. *Pharmacoepidemiol Drug Saf* 2008;17:434-44.
- Eapen RJ, Buchman CA. Bilateral cochlear implantation: Current concepts. *Curr Opin Otolaryngol Head Neck Surg* 2009 Jul 13. [Epub ahead of print]
- Eapen RJ, Buss E, Adunka MC, Pillsbury HC, Buchman CA. Hearing-in-noise benefits following bilateral simultaneous cochlear implantation continue to improve four years after implantation. *Otol Neurotol* 2009;30(2):153-159.
- Eapen RJ, Buss E, Grose JH, Drake AF, Dev MB, Hall JW III. The development of frequency weighting for speech in children with a history of otitis media with effusion. *Ear Hear* 2008;29(5):718-724.
- Ebert CS, Senior BA. A review of minimally invasive pituitary surgery: the evolution from maximally to minimally invasive surgery. *Otorhinolaryngol* 2009;59:97-105.
- Ebert CS, Zdanski CJ, Ardeshirpour F, Patel MR, Hart CF, Drake AF. Recurrent infantile myofibromatosis: A report of conservative management and discussion of treatment strategies. *Ear Nose Throat J* 2008 Dec;(12):E4.
- Ebert CS, Zanation AM, Buchman CA. Another cause for conductive hearing loss with present acoustic reflexes. *Laryngoscope* 2008 Nov;118(11):2059-61.
- Finley C, Holden T, Holden L, Whiting B, Chole R, Neely JG, Hullar T, Skinner M. Role of Electrode Placement as a Contributor to Variability in Cochlear Implant Outcomes. *Otol Neurotol* 2008;27:920-928.
- Fitzpatrick DC, Roberts JM, Kuwada S, Kim DO, Filipovic B. Processing Temporal Modulations in Binaural and Monaural Auditory Stimuli by Neurons in the Inferior Colliculus and Auditory Cortex. *J Assoc Res Otolaryngol* 2009 Jun [Epub ahead of print]
- Garcia GJM, Schroeter JD, Segal RA, Stanek J, Foureman GL, Kimbell JS. Dosimetry of nasal uptake of soluble and reactive gases: A first study of inter-human variability. *Inhal. Toxicol* 2009;21:607-618.
- Garcia GJM, Tewksbury EW, Wong BA, Kimbell JS. Inter-individual variability in nasal filtration as a function of nasal cavity geometry. *J Aerosol Med. and Pulm. Drug Delivery* 2009;22:139-155.

Gilboa S, Strickland M, Olshan A, Werler M, Correa A. Use of antihistamine medications during early pregnancy and isolated major malformations. *Birth Defects Research, Part A. Birth Defects Res A Clin Mol Teratol* 2009;85:137-50.

Ginsberg GL, Asgharian B, Kimbell JS, Ultman JS, Jarabek AM. Modeling approaches for estimating the dosimetry of inhaled toxicants in children. *J. Toxicol. Environ. Health* 2009;Part A,71:166-195. [Risk Assessment Award Winner, Annual Society of Toxicology meeting, 2009]

Grose JH. Gap detection and ear of presentation: Examination of disparate findings. *Ear Hear* 2008;29:975-978.

Grose JH, Buss E, Hall JW III. Within- and across-channel factors in the multi-band comodulation masking release paradigm. *J Acoust Soc Am* 2009;125(1):282-293.

Grose JH, Buss E, Hall JW III. Gap detection in modulated noise: Across-frequency facilitation and interference. *J Acoust Soc Am* 2008;123(2):998-1007.

Hackman T, Chicoine MR, Uppaluri R. Novel application of the palatal island flap for endoscopic skull base reconstruction. *Laryngoscope* 2009 Jun;119(8):1463-6.

Hackman T, Snyderman CH, Carrau RL, Kassam AB. Juvenile Nasopharyngeal Angiofibroma: The expanded endonasal approach. *Am J Rhinol* 2009 Jan/Feb;23(1):95-99.

Hall JW III, Buss E, Grose JH. Spectral integration of speech bands in normal-hearing and hearing-impaired listeners. *J Acoust Soc Am* 2008;124(2):1105-1115.

Hall JW, Buss E, Grose JH. Comodulation detection differences in children and adults. *J Acoust Soc Am* 2008;123(4):2213-2219.

Hall JW, Buss E, Grose JH. The effect of hearing impairment on the identification of speech that is modulated synchronously or asynchronously across frequency. *J Acoust Soc Am* 2008;123(2):955-962.

Hasan R, Olshan AF, Herring AH, Savitz DA, Siega-Riz AM, Hartmann KE. Self-reported vitamin supplementation in early pregnancy and risk of miscarriage. *Am J Epidemiol* 2009;169:1312-8.

Hayes DN, McLeod HL. EGFR regulation by microRNA in lung cancer: A rose by any other name... is an increasingly complicated rose. *Ann Oncol* 2008;19(6):1036-7.

Kalinski P, Ferris RL, López-Albaitero A, Mailliard R, Hackman T, Filho P, Andrade A, Wang X, Gooding W, Ferrone S. Maturation Pathways of Dendritic Cells Determine TAP1 and TAP2 Levels and Cross-presenting Function. *J Immunother* 2009 Jun;32(5):465-473.

Lee SC, Ebert CS, Fordham LA, Rose AS. Plain films in the evaluation of batteries as esophageal foreign bodies. *Int J Pediatr Otorhinlaryngol* 2008;72:1487-1491.

Linabery A, Blair CK, Gamis AS, Olshan AF, Heerema NA, Ross JA. Congenital abnormalities and acute leukemia among children with Down syndrome: A Children's Oncology Group study. *Cancer Epidemiol Biomarkers Prev* 2008;17:2572-7.

López-Albaitero A, Mailliard R, Hackman T, Filho PA, Wang X, Gooding W, Ferrone S, Kalinski P, Ferris RL. Maturation pathways of dendritic cells determine TAP1 and TAP2 levels and cross-presenting function. *J Immunother* 2009 Jun;32(5):465-73.

MacLehose RF, Olshan AF, Herring AH, Honein MA, Shaw GM, Romitti PA. Bayesian methods for misclassification correction: An example from birth defects epidemiology. *Epidemiology* 2009;20:27-35.

Makowski L, Hayes DN. Role of LKB1 in lung cancer development. *Br J Cancer* 2008;99(5):683-8.

- Mancilla JG, Manis PB. Two distinct types of inhibition mediated by cartwheel cells in the dorsal cochlear nucleus. *J Neurophysiol* 2009 May 27 [Epub ahead of print].
- Marshall AF, Pearson JM, Falk SE, Skaggs JD, Crocker WD, Saldaña E, Fitzpatrick DC. Auditory response properties of neurons in the tectal longitudinal column (TLC). *Hear Res* 2008 Oct; 244(1-2):35-44.
- O'Connell T, Ardeshirpour F, Asher S, Winnike J, Yin X, George J, Guttridge D, He W, Wysong A, Willis M, Couch M. Metabolomic analysis of cancer cachexia reveals distinct lipid and glucose alterations. *Metabolomics*, 2008;4(3):216-225.
- O'Reilly RC, He Z, Bloedon EA, Papsin B, Lundy L, Bolling L, Soundar S, Cook S, Reilly J, Schmidt R, Deutsch E, Barth P, Mehta D. The Role of Extraesophageal Reflux in Otitis Media in Infants and Children. *Laryngoscope* 2008 Jul;118(7 Part 2 Suppl 116):1-9.
- Oliver C, Hackman T, Carrau RL, Snyderman CH, Kassam AB, Prevedello DM, Gardner P. Palatal flap modifications allow pedicled reconstruction of the skull base. *Laryngoscope* 2008 Dec;118(12):2102-6.
- Patel M, Zdanski C, Abode K, Reilly C, Malinzak E, Stein J, Harris W, Drake A. Experience of the School-Aged Child with Tracheostomy. *Int J Pediatr Otorhinolaryngol* 2009 May;73:975-80.
- Roberts J, Shores C, Rose AS. Surgical treatment is warranted in aggressive central giant cell granuloma: a report of 2 cases. *Ear Nose Throat J* 2009 Mar;88(3):E8-E13.
- Rose AS, Ebert CS, Prazma J, Pillsbury HC. Noise exposure levels in stock car auto racing. *ENT Journal* 2008;87(12):689-692.
- Senior BA, Ebert CS, Kölln K, Bassim MK, Younes M, Sigounas D, Ewend MG. Triologic Society's Candidate's Thesis: Minimally Invasive Pituitary Surgery. *Laryngoscope* 2008 Oct;118(10):1842-55.
- Shah U, Sharpless NE, Hayes DN. LKB1 and lung cancer: More than the usual suspects. *Cancer Res* 2008;68(10):3562-5.
- Siega-Riz AM, Herring AH, Olshan AF, Smith J, Moore C and the National Birth Defects Prevention Study. The Joint Effects of Maternal Pregravid Body Mass Index and Age on the Risk of Gastroschisis. *Paediatr Perinat Epidemiol* 2009;23:51-7.
- Slickers JB, Olshan AF, Siega-Riz, AM, Honein MA, Aylsworth AS. Maternal body mass index and lifestyle exposures affect the risk of bilateral renal agenesis or hypoplasia: Findings from the National Birth Defects Prevention Study. *Am J Epidemiol* 2008;168:1259-67.
- Spiro GA, Chirila FV, von Gersdorff H, Manis PB. Heterogeneous Ca²⁺ influx along the adult calyx of Held: A structural and computational study. *Neuroscience* 2008;154:171-185.
- Stadler ME, Patel MR, Couch ME, Hayes DN. Molecular biology of head and neck cancer: Risks and pathways. *Hematol Oncol Clin North Am* 2008;22(6):1099-124.
- Wang Y, Manis PB. Short-term synaptic depression and recovery at the mammalian endbulb of Held synapse in mice. *J Neurophysiol* 2008;100(3):1255-1264.
- Whiting BR, Holden TA, Brunsdon BS, Finley CC, Skinner MW. Use of Computed Tomography Scans for Cochlear Implants. *J Digit Imaging* 2008;21(3):323-8.
- Wong-Gibbons DL, Romitti PA, Sun L, Moore CA, Reefhuis J, Bell EM, Olshan AF. Maternal periconceptional exposure to cigarette smoking and alcohol and esophageal atresia +/- tracheo-esophageal fistula. *Birth Defects Res A Clin Mol Teratol* 2008;82:776-84.

Book Chapters:

Buchman CA, Roush PA, Teagle HFB, Zdanski CJ. Clinical Management of Children with Auditory Neuropathy. In: Eisenburg LS (ed.) *Clinical Management of Children with Cochlear Implants*. San Diego: Plural Publishing, 2009, 633-45.

Buchman CA, Adunka OF. Translabyrinthine vestibular nerve section. In: Brackmann D, Shelton C, Arriaga M (eds.) *Surgery of the Ear*. Third edition. Philadelphia: Elsevier, 2009.

Eapen RA, Shockley WW. Chapter 11: Common Oral Lessons. In: Runge MS, Greganti MA (eds.). *Netters's Internal Medicine*, 2nd edition. Philadelphia: Saunders Elsevier, 2009: 61-66.

Kölln K, Senior BA. Complications of Transsphenoidal Hypophysectomy. In: Eisele DW, Smith RV (eds). *HNS*, 2nd Edition. Philadelphia: Mosby Elsevier, 2009, 581-594.

Kölln K, Senior BA. Diagnosis and Management of Acute Rhinosinusitis. In: Thaler ER, Kennedy DW (eds). *Rhinosinusitis: A Guide for Diagnosis and Management*. New York: Springer Science & Business Media, 2008, 29-40.

Kölln K, Senior BA. Revision Endoscopic Transsphenoidal Hypophysectomy. In: Kountakis S, Jacobs JB, Gosepath J (eds). *Revision Sinus Surgery*. Heidelberg, Germany: Springer-Verlag, 2008, 245-250.

Leight WD, Senior BA. Anesthetic Choices, Techniques, and Injections. In: Kountakis S, Jacobs JB, Gosepath J (eds). *Revision Sinus Surgery*. Heidelberg, Germany: Springer-Verlag, 2008, 71-78.

Manis PB. Biophysical Specializations of Neurons that Encode Timing. In : Allan I. Bausbaum, Akimichi Kaneko, Gordon M. Shepherd and Gerald Westheimer (eds.) *The Senses: A Comprehensive Reference*, Vol. 3, Audition, Peter Dallos and Donata Oertel. San Diego: Academic Press, 2008. P. 565-586.

Marshall AF, Shockley WW. Chapter 84: Cancer of the Oral Cavity and Oropharynx. In: Runge MS, Greganti MA (eds.). *Netters's Internal Medicine*, 2nd edition. Philadelphia: Saunders Elsevier, 2009: 600-605.

Reuland D, Senior BA. Rhinosinusitis. In: Runge MS and Greganti MA (eds.) *Netter's Internal Medicine*, 2nd Edition. Philadelphia: Saunders Elsevier, 2009, 52-55.

Roush, PA and Seewald, RC. Acoustic Amplification for Infants and Children: Selection, Fitting and Management. In L. Eisenburg (ed). *Clinical Management of Children with Cochlear Implants*. San Diego: Plural Publishing, 2008, 35-57.

Shockley, WW. Chapter 45: Reconstruction or Facial Mohs Defects. In: DeSouza C, Stucker FJ, Nathan CA (eds.). *Head and Neck Surgery*. St Louis: Jaypee Brothers Medical Publisher, 2009.

Shores CG. Disorders of the Neck and Upper Airway. In: Tintinalli JE, Kelen GD and Stapczynski JS (eds.) *Emergency Medicine: A Comprehensive Study Guide*, 7th Edition, New York: McGraw-Hill, 2009.

Shores CG, Hackeling TA and Triana RT. Complications of Airway Devices. In: Tintinalli JE, Kelen GD and Stapczynski JS (eds.) *Emergency Medicine: A Comprehensive Study Guide*, 7th Edition, New York: McGraw-Hill, 2009.

Weissler MC. Chapter 31: Open Approaches after Failure of Primary Sinus Surgery. In: Kountakis, Jacobs and Gosepath (eds.) *Revision Sinus Surgery*. Berlin: Springer, 2008, 275-279.

Internet:

Drake AF, Lee S. Pathology - Rhabdomyosarcoma. In: Meyers AD (ed.) *eMedicine Journal* (www.emedicine.com). Updated April 14, 2009.

What Else Do We Do?



Carol Shores went fishing and caught a wahoo. Husband Russ (right) couldn't compete. They were on vacation at St. John in the U.S. Virgin Islands.



Craig Buchman took his family to the beach. He and his wife, Liz, and their sons, Brett holding Ross, were on the Emerald Isle pier in North Carolina.



In November of 2005, Paul Manis went sailing with his daughter Lilli, in a Carolina Sailing Club regatta at Jordan Lake on their 1970 model Tanzer 16.



Trevor Hackman went to Disney World this summer with his wife Kimberley and their kids, Kiersten and Lance, before he began working with us in August.



The Senior family went to Hyco Lake, North Carolina, but who is who? Back row: Brent, Rebecca, wife Dana, and Benjamin. Front row: Anna and Grace.



Mike Stadler and his niece Lilia took a nap after he read her a bedtime story about treatment of the NO neck.



Proud dad Mark Weissler went to Charlottesville for the graduation of his daughter Kate from UVA.



Kibwei McKinney, Yu-Tung Wong, and Joe Roche played basketball at the new Southern Community Park in Chapel Hill. Kibwei can dunk!



Adam Zanation and his wife Jennifer took their son Brody to see the Cape Hatteras lighthouse, located on Hatteras Island in the Outer Banks of North Carolina.



Carlos Ebert and his son Mason had lunch together at the Museum of Life & Science in Durham.



At the NC/SC annual meeting, residents got together for fun with former UNC resident Krishna Patel at the Wild Dunes Resort in Charleston. Left to right: Trinitia Cannon, Krishna Patel, Josh Surowitz, and Rupali Shah.

Giving to the Department



Drs. Alisha West and Austin Rose take their pediatric patient to recovery after surgery.

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.

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would be happy to talk to you!

Holli_Gall@med.unc.edu
Local: (919) 843-5734
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Thank you!

Dr. Shockley and Elaine: A Great Team for 14 Years



Working with Dr. Shockley has been one of the highlights of my nursing career. He genuinely cares about his patients and is one of the best surgeons in the country. I can't say enough nice things about Dr. Shockley. I am constantly amazed by the results of his reconstructive surgeries. His patients love him. He is also an excellent teacher as evidenced by his teaching awards. He and I have a great working relationship.

Elaine Hinkle, RN, BSN

Elaine is adored by the patients and is one of the most respected and dedicated nurses that I have ever worked with. She has played a major role in the success of the Facial Plastic Surgery Clinic. Luckily I have a lot of happy patients, but I understand that much of that has to do with the personality and accessibility of my nurse. Elaine always has a smile and always has the patient's best interest at heart.

William W. Shockley, MD, FACS



Residents who graduated from our program in 2009: Charles S. Ebert, Jr., MD, MPH; Paul C. Bryson, MD; W. Derek Leight, MD; and Allen F. Marshall, MD

**Department of Otolaryngology/Head and Neck Surgery
University of North Carolina School of Medicine
Campus Box 7070
Chapel Hill, North Carolina 27599-7070**

www.med.unc.edu/ent