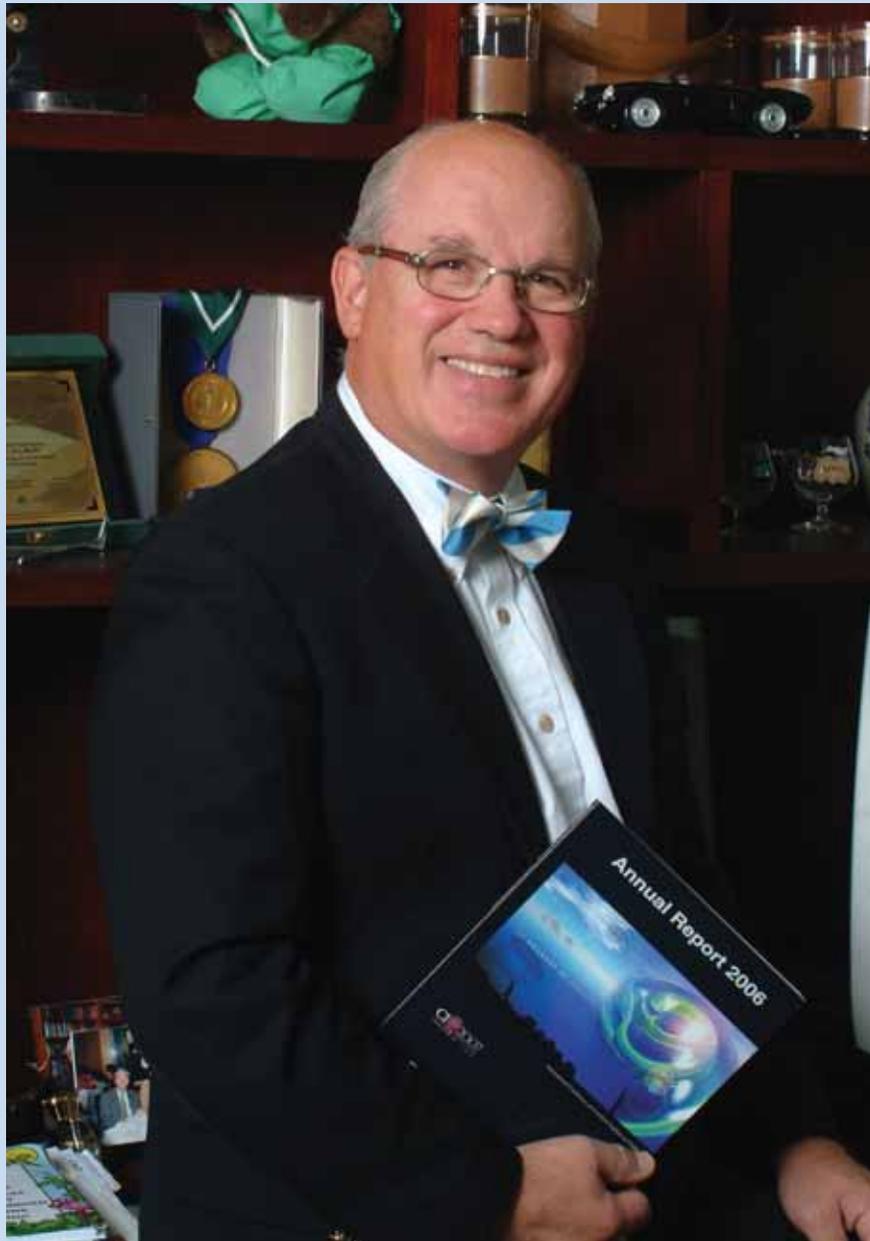
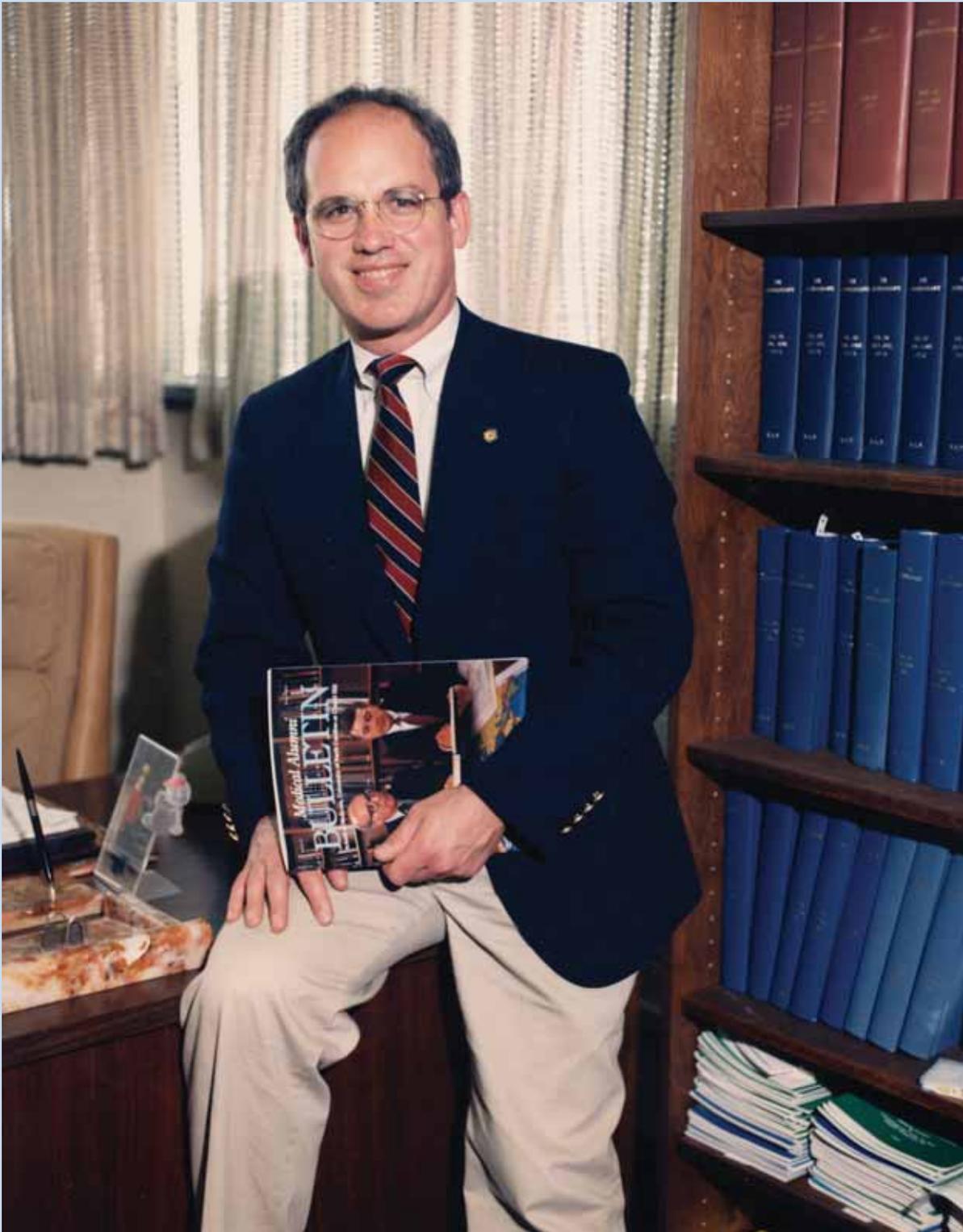


ANNUAL REPORT 2007



25 Years of Excellence in Leadership



“I have always believed in leading by example. I have never asked anyone in the Department to do something I wouldn’t be willing to do myself.”

- Harold C. Pillsbury, MD

The above photo from 1983 and the current photo on the front cover were both taken by photographer Paul Braly.

THE DEPARTMENT OF OTOLARYNGOLOGY
HEAD AND NECK SURGERY

2007

ANNUAL REPORT



THE UNIVERSITY OF NORTH CAROLINA SCHOOL OF MEDICINE
CHAPEL HILL, NORTH CAROLINA

25 Years of Excellence in Leadership: A Tribute to Dr. Pillsbury

Harold C. Pillsbury, III, MD, FACS, known by most as Rick, Dr. P, or Boss, will be entering his 25th year as head of Otolaryngology/Head and Neck Surgery at the University of North Carolina at Chapel Hill. He earned his MD at George Washington University, completed Otolaryngology residency training at UNC under Dr. Newton D. Fischer, followed by fellowship training in Zurich, Switzerland, and joined the faculty at Yale University School of Medicine in 1977. When Dr. Fischer decided to step down from his role as Division Chief in 1982, Dr. Pillsbury was invited back to UNC to assume this leadership. His goal was to continue what Dr. Fischer had started - to advance the research and clinical areas of Otolaryngology at UNC and to build a first-rate residency program. The Division strengthened, and in 2001 became the Department of Otolaryngology/Head and Neck Surgery. It is fair to say that our Department is what it is today because of the constant devotion and incredible determination of Dr. Pillsbury, and because of the encouragement and support he gives everyone around him. In order to best illustrate this, the following thoughts were gathered from a few of the countless people whose lives and careers have been influenced by him.

I have known Dr. P since I was in high school and he was a resident in the UNC Otolaryngology program that my father established and lead. For many years, he has guided my career, as well as that of many others, in a positive direction, and I recognize him for what he is, a strong force in the medical school. Constancy, singular leadership, unbridled energy: are there better words to describe that force of nature we all know as Dr. P? He has cajoled, directed, inspired and, yes, driven me absolutely bonkers. I would not have had it any other way. - *Amelia F. Drake, MD, Newton D. Fischer Distinguished Professor*

Throughout his career Dr. Pillsbury has been a leader at the local, regional and national level and has been president of almost every major organization in our specialty. He has been a strong proponent of patient care and a major innovator in the UNC Healthcare System. To top it off, he has promoted the growth an ENT program that has developed into one of the best in the country. - *William W. Shockley, MD, Vice Chair and W. Paul Biggers Distinguished Professor*

Without question, I owe my entire career to Dr. Pillsbury. Thirteen years ago I made the decision to be an otolaryngologist, and that was made entirely possible by Dr. P's willingness to find a research position for me as a medical student. After my research year, the only place I wanted to train was UNC. If not for Dr. P's willingness to take a chance on me, that would have never been possible. Following my residency, it was ultimately Dr. P who made possible my current position as an attending in the UNC program and the Director of WakeMed ENT. Thank you, Boss, for all you have done for me. - *Michael O. Ferguson, MD, Assistant Professor*

Besides being a tremendous leader and resident advocate, the sincerity and genuine care Dr. Pillsbury possesses for his patients is his most impressive attribute. He always goes the extra mile to make sure his patients are cared for regardless of the problem. I am truly grateful for Dr. Pillsbury allowing me and two of my fellow LSU residents to become a part of the UNC program after Hurricane Katrina struck New Orleans. However, after getting to know him the past couple of years, I am not surprised that he stepped up to the plate to help out those in difficult times. - *Jeffrey B. LaCour, MD (Resident, LSU 2003-2005, UNC 2005-2008)*

I think one of the greatest strengths of our Department is mutual loyalty. Our trust in Dr. Pillsbury's leadership is reciprocated by his dedication to us, his faculty. This dedication is evident in his support and encouragement of our career development, particularly for junior faculty. Since I arrived here as a post-doctoral fellow, Dr. Pillsbury has been an active proponent of my work and helped me to achieve the benchmarks necessary for advancement. By nurturing the potential within the Department, Dr. Pillsbury builds for a stronger future. - *Emily Buss, PhD, Associate Professor*

Rick Pillsbury is a veritable force of nature. His energy, creativity, and passionate commitment to patients are a model for us all. I am deeply grateful for what he does daily for UNC. - *William L. Roper, MD, MPH, Dean, UNC School of Medicine*

I first met Dr. Pillsbury when I started working as the ONLY nurse in the Franklin Square Surgery Clinic in 1984. I was a young, somewhat timid nurse with no ENT experience. From the very beginning, Dr. Pillsbury made me feel like a valued member of the ENT team and used every possible opportunity to teach me the basics of ENT and encourage me in my nursing role. He gave me confidence in my own abilities and I have truly enjoyed my many years working under his leadership. Over the years, I have seen him encourage and bring out the best in all the residents, medical students and staff that he teaches. - *Elaine Hinkle, RN, BSN, Otolaryngology Clinic Nurse Educator*

While running a highly-regarded ENT department, Dr. Pillsbury's utmost concern remains education. He truly makes the quality of the residency training program a top priority, both on a local and national level. - *Scott A. Scharer, MD, Jacksonville, FL (Resident, 1999-2004)*

When I first met Dr. Pillsbury as a resident applicant I was immediately struck by his enthusiasm for his residents and his program. His passion for resident education is one of the main reasons I chose this residency. Dr. Pillsbury, first and foremost, is an advocate for the residents in his program. He is committed to making this the best training opportunity in Otolaryngology/Head and Neck Surgery. - *Gregory J. Basura, MD, PhD (Resident, 2005-2010)*

Twenty-five years ago, Dr. Pillsbury provided medical students and residents with research training that competed with the finest in the university. Since then, he has built research programs that rival the best in the nation. - *Joseph W. Hall, PhD, Professor and Chief, Division of Auditory Research*

Upon first meeting Dr. Pillsbury, I knew that UNC-CH was THE place to train as an otolaryngologist. After 5 years of excellent training, I left full of Pillsburyisms and clinical skills that exceeded my expectations. Perhaps more than any other individual, Dr. Pillsbury has shaped not only the way I practice medicine but also the way I approach life's challenges as I "hope for the best and prepare for the worst." - *Robert F. Labadie, MD, PhD, Vanderbilt University, Nashville, TN (Resident, 1996-2001)*

The last twenty-five years have seen a myriad of changes in medicine, the University of North Carolina, UNC Hospitals, and even the UNC Department of Otolaryngology/Head and Neck Surgery. Buildings, people, and policies have come and gone, but one thing that has remained constant: the leadership of Rick Pillsbury building one of the premier programs in ENT in the country today. There are few individuals that have contributed so much, worked so hard, and cheered so loud as Rick. - *Brent A. Senior, MD, Associate Professor and Chief, Division of Rhinology, Allergy, and Sinus Surgery*

I love working with Dr. Pillsbury. He is direct, open, honest, and you never have to guess where he stands on issues. His loyalty and dedication to the University and to UNC Hospitals is unparalleled. - Gary L. Park, MD, President and CEO, UNC Hospitals

I have worked closely with Dr. Pillsbury for almost eight years as the VP of Surgical Services. He has been unfailingly supportive and loyal to me and to UNCH. He is an excellent surgeon utilizing not only the proper surgical technique but also setting the proper collegial atmosphere in the operating room. Dr. Pillsbury is internationally renowned for his work with cochlear implants and for advancing the otolaryngology profession. What he cares most about, however, are the people he works with and the patients he cares for. Dr. Pillsbury understands all the complex systems that interact to produce a successful operation and he focuses on the people for that outcome. I am proud to work with Dr. Pillsbury. - Susan S. Phillips, RN, MHA, CNOR, Vice President of Surgical Services

I know that Dr. Pillsbury has left an indelible mark on me. Perhaps more than any other single attribute, the Boss has grit. What I mean by this is that once he has a cause and he knows that the cause is best, he will continue to pursue it until through his sheer will and determination the goal is achieved. Of course, Dr. Pillsbury has many other attributes that make him stand out in a crowd, but for trainees he was always there to offer a helping hand and his full support. I am deeply grateful to have trained at UNC and with Dr. Pillsbury. - Wendell G. Yarbrough, MD, Vanderbilt University, Nashville, TN (Resident, 1989-1994; Fellowship, 1994-1996; UNC Faculty, 1996-2004)

Rick was chief resident when I was a junior resident in Otolaryngology. His surpassing energy and keen intellect combine to define an extraordinary leader. He is forthright on issues and welcomes new ideas, a “can do” individual who makes things happen. - Charles B. Beasley, MD, Kinston, NC (Resident, 1974-1979)

Rick’s visionary leadership, coupled with his resilient enthusiasm and can-do attitude, has been an inspiration to me throughout my career, as I am sure it has been for many otolaryngologists. - Jesús E. Medina, MD, Chair, Dept. of Otorhinolaryngology, University of Oklahoma, Oklahoma City, OK

Dr. Pillsbury is an enviable leader, and through his superlative leadership he has created a department unmatched in its dedication to resident and medical student education. The program has grown to reflect his simultaneous hard-charging determination and sense of humor that make learning fun and remain the envy of departments across the country. - J. Madison Clark, MD, Burlington, NC (Resident 1995-2000)

I suspect that most people would find it hard to fully describe the impact that Dr. Pillsbury has had on their lives and careers. As a former resident, I was impacted by Dr. P at a very influential point in my career. What impresses me most is his formidable skill as a leader. He has surrounded himself with extraordinarily talented people and empowers them to perform to the best of their ability. This establishes an environment where great things can, and do, happen. I feel humbled to have been a part of this “greatness,” if just for a little while. - Robert D. Cullen, MD, Kansas City, MO (Resident 2000-2005)

Thank you, Dr. P!

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INTRODUCTION

A Message from the Chair

Harold C. Pillsbury, MD

June 30, 2007



In reviewing the progress we have made in our Department this year, it is clear that our success is the effort of many people in different arenas to ensure the continued vitality of our mission. Over this past year we have maintained our reputational score in *US News and World Report* at #18. Our faculty, including Drs. Couch, Shores and Grose, have received prestigious teaching awards. In addition, our pediatric faculty, spearheaded by Dr. Zdanski, was instrumental in securing a grant from the Duke Endowment enabling us to institute a state-of-the-art Airway Center serving high-risk children with significant airway disease.

The CCCDP has begun a monumental new program with a satellite facility in the eastern part of the state in Wilmington, NC. This facility has enabled families of hearing impaired children to receive state-of-the-art care within their own community without having to drive to Chapel Hill or Durham.

Our residents continue to do a superb job at every level to cement our reputation as one of the top training programs in the country. Students and residents supported by our NIH T-32 grant have made substantive contributions in both clinical and basic research. Many of our residents have received research awards.

Drs. Buchman and Adunka have begun studying a new electric-acoustic cochlear implant system, which should expand the criteria for cochlear implantation to include patients with greater degrees of residual hearing. In the past, these patients were excluded from cochlear implantation despite receiving limited benefit from traditional forms of hearing aids. Initial results suggest that this patient population is achieving significant improvement in speech understanding.

Our institution was honored to be given the opportunity to host CI 2007, the 11th International Cochlear Implant Symposium in Children. The meeting drew over 1200 attendees from 37 countries and was a huge success by all measures. The proceeds from this meeting have been designated to start a new professorship in our department.

Our research and clinical activities are not only statewide and regional, but they are truly international. Drs. Shores and Harmon have participated in a study in Malawi directed at improving care in patients with Burkitt Lymphoma and other ENT disorders. Dr. Senior and his team of residents and physicians from other institutions continue to deliver health care and medical education to the people of Viet Nam.

When I look through this annual report, I see not only people who are willing to talk the talk, but also those who are willing to walk the walk. It is that capacity to deliver on promises that makes us so special.

This coming year promises to be equally rewarding for all our faculty, residents, and staff. I look forward to sharing our experiences with you as the year progresses through our *Heads Up* quarterly publications.

THE UNC SCHOOL OF MEDICINE

A Message from Dean Roper

Dear Colleagues,

To be the Nation's leading public school of medicine is not just a lofty statement. It is a very real promise to our students and the people of North Carolina.

I would like to applaud our students for an extraordinary showing on the national USMLE Step 1 board exam this year. We had a 98 percent pass rate, while the national pass rate for first-time takers was 93 percent. Our pass rate has increased five percentage points from just four years ago. Our mean total score was 224 (SD 19), and the national mean total score was 217 (SD 23). Another notable statistic: our student pass rate increased from 96 percent last year to 98 percent this year.

We are extremely proud of both the laudable teaching effort that our professors make in our clinics and lecture halls, as well as the hard work our students put in to their academic study and clinical skills each and every day.

As teachers and clinicians, our faculty and staff are clearly preparing our students for a lifetime of achievement. I want to thank them for their knowledge and for providing our students with the tools they need to succeed and become excellent doctors.

I commend you for exemplifying our Vision and Values – making them a real promise and commitment to our students, our patients and our state.

Sincerely,

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



The Mission of the UNC School of Medicine

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.

Fall 2005

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.

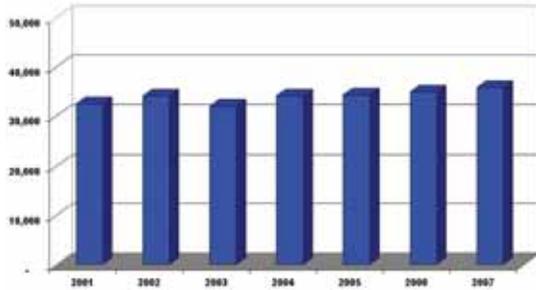


Allen F. Marshall, MD, and Brent A. Senior, MD

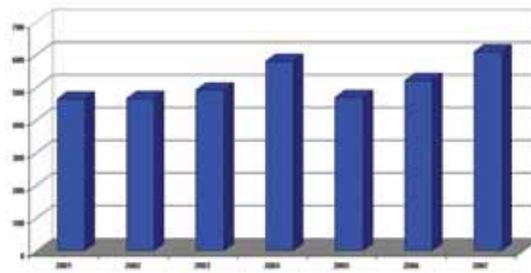
10 reasons why the Department of Otolaryngology/Head and Neck Surgery at the University of North Carolina is the best place for first-rate patient care, unsurpassed resident training, and pioneering research:

1. Our reputational score, according to the 2007 Best Hospitals issue of *US News and World Report*, places us among the top 18 of all hospitals in the United States for care of the ears, nose, and throat.
2. We continue to be innovators in the fields of head and neck cancer research and auditory research, ranking 12th of all departments of otolaryngology in the nation for funding received by the National Institutes of Health. We received a total of over \$2.2 million in awards from the NIH and other sources during the fiscal year 2007.
3. UNC has one of the top five Otolaryngology/Head and Neck Surgery residency programs in the country.
4. Four of our attending physicians were named "America's Top Doctors" by Castle Connolly, Ltd.
5. Five of our doctors were named "Best Doctors" in Otolaryngology in the state by *Business North Carolina* magazine. Only 18 North Carolina otolaryngologists are on this list.
6. UNC has a 200-bed free-standing women's and children's hospital with three outstanding Pediatric Otolaryngologists. The Chief of the Division of Pediatric Otolaryngology is also the Director of the Craniofacial Center of the UNC School of Dentistry.
7. 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 by BrainLAB, AG, of Munich, Germany.
8. UNC has one of the top five cochlear implantation programs in the country. The CCCDP is the only such program in the country that provides funding assistance to low-income families.
9. The UNC ENT Allergy Clinic received one of the highest ratings for overall patient satisfaction according to the latest Press Ganey Patient Satisfaction survey results.
10. The UNC Voice Center is the only such center in North Carolina to boast both a fellowship-trained laryngologist and a singing voice specialist.

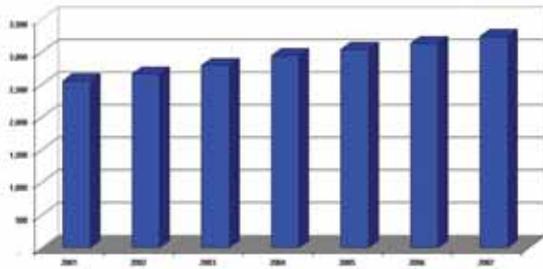
Outpatient Visits



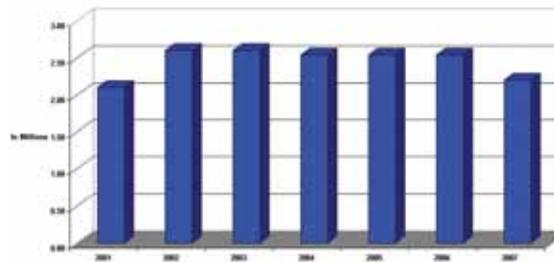
Inpatient Admissions



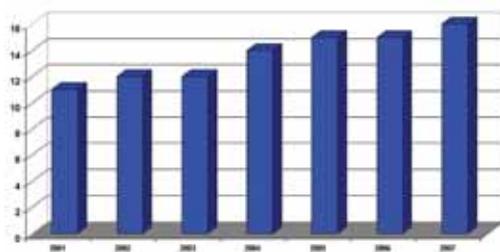
OR Cases



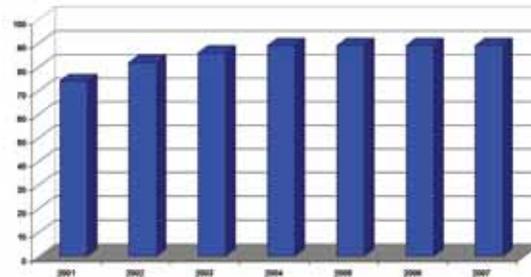
Grant Funding



UNC Physicians & Associates Members



Number of Staff Positions



Six Specialties at UNC Hospitals Ranked Among Nation's Best by U.S. News & World Report

CHAPEL HILL – Six medical specialties offered at the University of North Carolina Hospitals rank among the top 50 programs of their kind nationwide, reports the July 23/ July 30 issue of U.S. News & World Report magazine.

According to U.S. News, only 173 hospitals nationwide out of 5,462 that were evaluated scored highly enough to be ranked in one or more specialties.

To be eligible for ranking in 12 of the 16 specialties ranked by U.S. News, hospitals had to meet any of three standards: membership in the Council of Teaching Hospitals, affiliation with a medical school, or availability of at least six out of 13 advanced services such as image-guided radiation therapy and robotic surgery. This year, more than three quarters of all hospitals failed to meet this requirement.

The UNC Hospitals programs, and their top-50 rankings, are:

- Cancer, 40
- **Ear, Nose & Throat, 38***
- Gynecology, 24
- Kidney Disease, 28
- Respiratory Disorders, 25
- Urology, 43

* The UNC Department of Otolaryngology/Head and Neck Surgery had a reputational ranking of 18.

Administration

Harold C. Pillsbury, MD, FACS (Department Chair)

William W. Shockley, MD, FACS (Department Vice Chair)

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)

William W. Shockley, MD, FACS

Scott D. Meredith, MD, FACS (WakeMed ENT)

Carol G. Shores, MD, PhD, FACS

Marion E. Couch, MD, PhD, FACS

Xiaoying Yin, MD

Andrew F. Olshan, PhD

Brian Kanapkey, MA

Sean Gallagher, RN

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

Craig A. Buchman, MD, FACS (Division Chief, Center Director)

Harold C. Pillsbury, MD, FACS

Oliver F. Adunka, MD

The Division of Pediatric Otolaryngology

Amelia F. Drake, MD, FACS (Chief)

Carlton J. Zdanski, MD, FACS

Austin S. Rose, MD

The Division of Rhinology, Allergy, and Sinus Surgery

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

Brett E. Dorfman, MD (WakeMed ENT)

Michael O. Ferguson, MD (WakeMed ENT)

**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 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

Paul B. Manis, PhD

John H. Grose, PhD

Emily Buss, PhD

Charles C. Finley, PhD

Douglas C. Fitzpatrick, PhD

W. Paul Biggers Carolina Children's Communicative Disorders Program

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

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

Carlton J. Zdanski, MD, FACS

Oliver F. Adunka, MD

Carolyn J. Brown, MS, CCC-SLP/A (Program Director)

Holly Teagle, AuD (Clinical Director)

The Adult Cochlear Implant Program

Marcia Clark, AuD (Director)

Sleep and Snoring Surgery

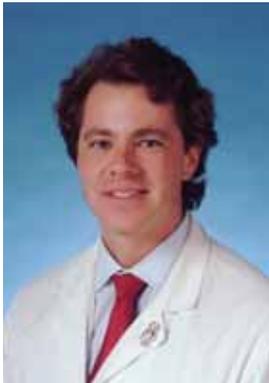
Brent A. Senior, MD, FACS, FARS

Marion E. Couch, MD, PhD, FACS

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
BA, MD: George Washington University
Residency: University of North Carolina at Chapel Hill
Special Interests: Otolaryngology, neurotology, skull base surgery, head
and neck tumors, cochlear implantation



Oliver F. Adunka, MD, Assistant Professor
MD: Medical University of Vienna, Austria
Residency: J. W. Goethe University, Frankfurt, Germany
Fellowship: UNC Department of Otolaryngology/Head and Neck
Surgery
Special Interests: otology, neurotology, lateral skull base surgery,
acoustic tumors, cochlear implants, hearing preservation



Carolyn J. Brown, MS, CCC-SLP/A, Assistant Professor
Program Director, W. Paul Biggers, MD, Carolina Children's
Communicative Disorders Program
BS, MS: Indiana State University
Master's Equivalent in Audiology: University of Illinois
Special Interests: Cochlear implantation in profoundly deaf
children, development of spoken language in children who are
deaf and hard of hearing



Craig A. Buchman, MD, FACS, Professor
Chief, Division of Otolaryngology/Neurotology and Skull Base Surgery
Medical Administrative Director, CCCDP
BS: University of Georgia
MD: University of Florida
Research Fellowship (Otolaryngology): University of Pittsburgh
School of Medicine, Children's Hospital of Pittsburgh
Residency (Otolaryngology): University of Pittsburgh School of
Medicine
Fellowship (Otolaryngology/Neurotology and Skull Base Surgery):
House Ear Institute and Clinic, Los Angeles
Special Interests: Otolaryngology/neurotology and skull base surgery,
cochlear implantation



Robert A. Buckmire, MD, Associate Professor
Chief, Division of Voice and Swallowing Disorders
Director, UNC Voice Center
BA: Boston University
MD: University of Virginia School of Medicine
Residency (Otolaryngology): University of North Carolina at
Chapel Hill
Fellowship (Laryngology): Vanderbilt University Voice Center
Special Interests: Voice and swallowing disorders, diagnostic
laryngeal EMG, laryngeal framework surgery, microsurgical
treatment of laryngeal pathology



Emily Buss, PhD, Associate Professor
BA: Swarthmore College
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: 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 surgery, surgical airway management, microvascular free tissue transfer reconstruction



Brett E. Dorfman, MD, Assistant Professor
Otolaryngology/Head and Neck Surgery, Wake Medical Center
BA: Cornell University
MD: Emory University School of Medicine
Internship, Residency: Duke University Medical School
Special Interests: Rhinology, allergy, sinus surgery



Amelia F. Drake, MD, FACS, Professor
Newton D. Fischer Distinguished Professor of Otolaryngology/
Head and Neck Surgery
Chief, Division of Pediatric Otolaryngology
Director, UNC Craniofacial Center
BA: Cornell University
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



Michael O. Ferguson, MD, Assistant Professor
Otolaryngology/Head and Neck Surgery, Wake Medical Center
BA: 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: 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
BS, BA: University of Maryland
PhD: University of North Carolina at Chapel Hill
Special Interest: Neuronal bases of sound localization performance



John H. Grose, PhD, Professor
BA: University of Keele, United Kingdom
MSc: University of Southampton, United Kingdom
PhD (Audiology): Northwestern University
Special Interest: Psychoacoustics



Joseph W. Hall, PhD, Professor
Chief, Division of Auditory Research
BS: College of William and Mary
MS: University of North Carolina at Chapel Hill
PhD (Experimental Psychology): University of North Carolina at Greensboro
Special Interests: Clinical psychoacoustics, cochlear implantation



Paul B. Manis, PhD, Professor
Chief, Division of Research Training and Education
BS: California Institute of Technology
PhD: University of Florida
Fellowship (Neurobiology): Vanderbilt University School of Medicine
Special Interests: Cellular basis of auditory information processing; central nervous system plasticity



Scott D. Meredith, MD, FACS, Associate Professor
Otolaryngology/Head and Neck Surgery – Wake Medical Center
BS, MD: University of Virginia
Residency: University of Virginia
Fellowship (Head & Neck Surgical Oncology): University of Virginia
Special Interest: Head and neck oncology



Andrew F. Olshan, PhD, Professor
Chair, Department of Epidemiology, UNC School of Public Health
BA: Arizona State University
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, Assistant Professor
BA: Duke University
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
BA (Communication Disorders): University of Massachusetts - Amherst
MA (Audiology): University of Iowa
AuD: University of Florida
Special Interests: Pediatric Audiology



Brent A. Senior, MD, FACS, Associate Professor
Chief, Division of Rhinology, Allergy, and Sinus Surgery
BS: Wheaton College
MD: University of Michigan
Residency: Boston University and Tufts University
Fellowship (Rhinology and Sinus Surgery): University of Pennsylvania Medical Center
Special Interests: Sinus surgery, rhinology, allergy, sleep disorders, snoring



William W. Shockley, MD, FACS, Professor, Vice Chair
W. Paul Biggers Distinguished Professor of Otolaryngology/
Head and Neck Surgery
Chief, Division of Facial Plastic and Reconstructive Surgery
BA, MD: Indiana University
Residency: University of Cincinnati
Fellowship (Head and Neck Surgical Oncology): Methodist Hospital, Indianapolis, Indiana
Special Interests: Facial plastic and reconstructive surgery, head and neck tumor surgery



Carol G. Shores, MD, PhD, FACS, Associate Professor
BS: University of Florida
PhD (Biochemistry): University of North Carolina at Chapel Hill
MD: University of North Carolina at Chapel Hill
Residency: University of North Carolina at Chapel Hill
Special Interests: Detection of micrometastasis, study of gene expression in radiation and chemotherapy resistance, and development of novel therapies for head and neck cancer



Holly Fryauf-Bertschy Teagle, AuD, Assistant Professor
Clinical Director, W. Paul Biggers, MD, Carolina Children's Communicative Disorders Program
BA (Speech Pathology and Audiology): University of Arkansas
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
BA, MD: Boston University Six-Year Medical Program
Residency: Harvard University
Fellowship (Head and Neck Oncologic Surgery): University of Cincinnati
Special Interest: Head and neck tumor surgery



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: University of Pittsburgh (Molecular Biology)
Special Interests: Cancer cachexia, tumor vaccines in head and neck cancer



Carlton J. Zdanski, MD, Associate Professor
BS: North Carolina State University
MD: University of North Carolina at Chapel Hill
Residency (Otolaryngology): University of North Carolina at Chapel Hill
Fellowship (Pediatric Otolaryngology): Children's Hospital of Pittsburgh
Special Interests: Pediatric otolaryngology, research in the mechanisms of hearing and hearing loss



Drs. Robert Buckmire and Austin Rose in clinic.



Dr. Ferguson with his young patient Hailey (who had PE tubes), her mother, and her grandmother, Teresa Swanson, RN.

WakeMed Faculty Physicians ENT-Head and Neck and Facial Plastics Surgery

Four physicians who hold faculty appointments in the UNC Department of Otolaryngology/ Head and Neck Surgery practice in Raleigh at WakeMed. They are Scott D. Meredith, MD; Brett E. Dorfman, MD; Michael O. Ferguson, MD; and Raymond D. Cook, MD.

WakeMed Faculty Physicians ENT-Head and Neck Surgery is the only Otolaryngology/Head and Neck Surgery group serving an 800-bed hospital and level one trauma center to offer 24 hours a day, 7 days a week coverage for ENT and facial trauma. In addition to the four attendings on staff, the UNC residents also spend 4-6 months per year at WakeMed during their second, third and fourth years of residency. The WakeMed rotation serves as the residents' true introduction to the clinical experience, and approximately 25% of their surgical volume comes from their time at WakeMed.

Dr. Meredith is the senior partner in the group, having joined the practice in 1993. He is fellowship trained in head and neck oncology and is most interested in the care of the cancer patient, thyroid disease, pediatric ENT, and sinus disease. In the fall of 2005, Dr. Ferguson took over as the Director of the group and his clinical interests focus on pediatric otolaryngology, sinus diseases, endocrine surgery and head and neck cancer. Dr. Dorfman's areas of expertise include pediatric and adult ENT problems, including ear disease, nasal and sinus surgery, and voice disorders. Dr. Cook specializes in facial plastic and reconstructive surgery, including facial rejuvenation and reconstruction of local scars and skin cancer.



Wake OR: Michael Stadler, MD; Noah Parker (MSIV); and Allen Marshall, MD (attending surgeon Mike Ferguson, MD, took the picture)

This otolaryngology practice has been caring for the community since 1992 and in 2003 opened a new North Raleigh office, in the fastest growing area in the Triangle. The new outer loop (I-540) provides easy access from Cary, Research Triangle Park, Durham, and Northern Wake County. WakeMed North is a new state-of-the-art ambulatory surgery center with full radiology and laboratory services on site. WakeMed Faculty Physicians ENT Head & Neck Surgery is closely affiliated with WakeMed, Wake County's premier health care system for both adult and pediatric care. Along with the most advanced technology and equipment available, they provide care in a comfortable office setting to create an ideal medical experience.

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

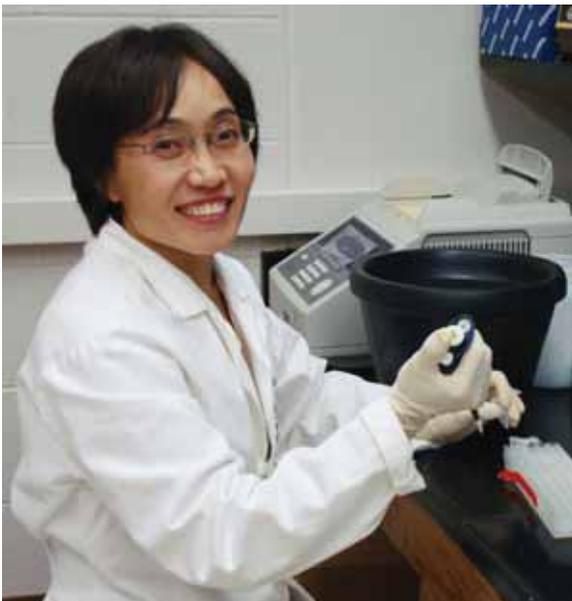


Residents Michael Stadler, MD, and Trinita Cannon, MD, during their WakeMed rotation.

NEW APPOINTMENTS



Oliver F. Adunka, MD, joined the faculty on July 1, 2007, as Assistant Professor. Dr. Adunka earned his MD in 1999 from the Medical University of Vienna, Austria, and received his license to practice medicine in both Austria and Germany. He completed residency training in Otolaryngology in 2004 and earned a post-doctoral degree in 2005, both at the J.W. Goethe University in Frankfurt, Germany. In 2005, Dr. Adunka was invited to train under Drs. Craig Buchman and Harold Pillsbury for a two-year fellowship in Otology/Neurotology. Dr. Adunka's practice is dedicated to the diagnosis and treatment of ear and hearing disorders. His current research interests include acoustic tumors, cochlear implants, and hearing preservation.



Xiaoying Yin, MD, joined the faculty as Assistant Professor on July 1, 2007. She earned her MD from Xi'an Medical University in Xi'an, China, followed by residency in clinical surgical pathology also in Xi'an. She completed a two-year fellowship in the Department of Pathology at the University of Pittsburgh, and worked for several years in the Division of Hematology/Oncology at the Children's Hospital of Pittsburgh, conducting various research projects. After five years as a Senior Research Associate at the UNC Lineberger Comprehensive Cancer Center, Dr. Yin joins us to continue her work in the field of cancer research. Her most recent research is on cancer cachexia and tumor vaccines in head and neck cancer, which will help to determine the pathophysiology of cancer cachexia and to improve head and neck cancer prevention and recurrence.

THE STAFF

Employees as of July 1, 007

Carolyn Hamby, Clinical Academic
Departmental Administrator
Holly Findt Gall, Director of Development

Nursing Staff (UNC Healthcare)

Lynn Alston
Diane Burden
Sandra Cocke
Claire Culberson
Libby Drake
Barbara Esterly
Elaine Hinkle
Lynda Lucas
Judy Miles
Cynthia Nabut
Patricia Perry
Shelvy Riley
Soon Young Rondinelli
B.J. Squires
Jori Thomas
Eloise Williams

Administrative Academic Affairs

Jonna Apple
Laura Bermel
Kathy Bogie
Ellen Douth
Cheryl Goodrich
Kathy Harris
Elizabeth Perry
Dawn Wilson
Donna Woodard

Research Affairs

Madhu Dev
Heather O'Donohue
Steve Pulver
Lisa Whittle

UNC P&A (UNC Healthcare)

Kelen Beacham
Karen Kenion
Patricia Longest

Patient Business Associates

Anita Champion
Vicky Dowdy
Leann Glover
Earlene Howze
Angel Jeffries
Lesonia Mason
Sonia Mason
Elaine Ray
Brenda Vernon
Sandra Yates

Surgery Schedulers

Anna Bradshaw
Jennifer Fennell

CCCDP

Lisa DiMaria
Deb Hatch
Robert Humphreys
David Perry
Jennifer Woodard

CASTLE

Hannah Eskridge
Maegan Evans
Sandra Hancock
Francisca Hernandez-Collins
Tom Page
Lori Parker
Cynthia Poole
Erin Thompson
Sherri Vernelson



Annita Champion, Vickie Dowdy, Sonya Mason (Patient Business Associates), and Elaine Ray (Clinic Supervisor)



Jennifer Fennell, Surgery Coordinator



Claire Culberson and Jori Thomas, Pediatric Otolaryngology Nurses



Pat Perry, Nursing Assistant, and Sandy Yates, Patient Business Associate, at Carolina Pointe



Eloise Williams, Nursing Assistant



Lynn Alston (Medical Support Assistant) - who keeps everyone smiling!



Cynthia Nabut (Nurse to Drs. Shores and Weissler), and Diane Burden (Nursing Assistant)



Libby Drake (Allergy Nurse), and Lynda Lucas (Nurse to Dr. Pillsbury)



Cheryl Goodrich (Human Resources Manager), Laura Bermel (Accounting Manager), Ellen Douth (Residency Program Coordinator), Elizabeth Perry (Publications Manager), and Kathy Bogie (Administrative Assistant to Drs. Senior and Buckmire)

THE RESIDENTS



Drs. Paul Bryson and Derek Leight in clinic.



John W. Alldredge, MD (2007)

BS (biology): University of Alabama, 1998
MD: Louisiana State University College of Medicine, 2002



Marc K. Bassim, MD (2007)

BS (biology): American University of Beirut, 1997
MD: American University of Beirut Medical Center, 2001



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



Paul C. Bryson, MD (2009)

BS (biology): Denison University, 2000
MD: University of Pittsburgh School of Medicine, 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



Joshua C. Demke, MD (2008)

BS: Brigham Young University, 1998
MD: Texas Tech School of Medicine, 2003
Residency, General Surgery: University of Kentucky, 2003-04



Rose J. Eapen, MD (Research Track, 2012)

BS (neural science): New York University, 2001
MD: Duke University Medical School, 2005



Charles S. Ebert, MD, MPH (Research Track, 2009)

BA (Spanish, political science): UNC-Chapel Hill, 1992
Universidad de Sevilla, Seville, Spain, 1990-91
MPH (epidemiology): UNC School of Public Health, 2002
MD: UNC School of Medicine, 2002



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



Karen A. Kölln, MD (2008)

BA (biology & Hispanic studies): Northwestern University, 1998
MD: University of Iowa, 2003



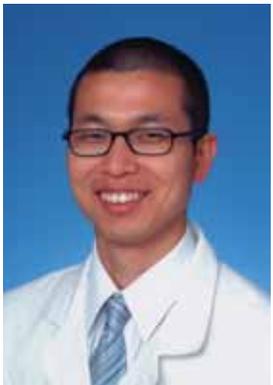
Jeffrey B. LaCour, MD (2008)

BS (biology): UNC-Chapel Hill, 1998
MD: Louisiana State University, 2003



Keith M. Ladner, MD (2010)

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



Steve C. Lee, MD, PhD (2008)

BS (zoology): Andrews University, 1994
PhD (biochemistry): Loma Linda Graduate School, 2001
MD: Loma Linda University School of Medicine, 2003



W. Derek Leight, MD (2009)

BS (cognitive science): University of California at San Diego, 1999
MD: UNC School of Medicine, 2004



Allen F. Marshall, MD (2009)

BS (biology): Davidson College, 1997
MD: UNC School of Medicine, 2004



Krishna G. Patel, MD, PhD (2007)

BA: Columbia University, 1994
PhD (molecular medicine): Medical College of Georgia, 2000
MD: Medical College of Georgia, 2002



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



Rupali N. Shah, MD (2012)

BS/BA (microbiology, political science): University of Georgia, 2003
MD: Emory University School of Medicine, 2007



Michael E. Stadler, MD (2011)

BS (biology): University of Wisconsin at Madison
MD: University of Wisconsin Medical School, 2006



Joshua B. Surowitz, MD (2012)

BS (biomedical engineering): University of Miami, 2000
MD: University of North Carolina School of Medicine, 2007
Research Fellow: UNC Dept. of Otolaryngology/Head and Neck
Surgery (NIH funded), 2006-07



Alisha N. West, MD (2010)

BS (neuroscience, psychology): University of California, San Diego,
2001
MD: University of California, San Diego, 2005



Maheer N. Younes, MD (2012)

BS (biology): American University of Beirut, 1997
MD: American University of Beirut, 2001



Adam M. Zanation, MD (2007)

BS (biology): UNC-Chapel Hill, 1997
MD: UNC School of Medicine, 2002



Dr. Mitch Gore checks on a patient between cases.

EDUCATIONAL PROGRAMS



Karen Kölln, MD, performing sinus surgery. Dr. Senior was the attending surgeon.

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

Medical Students

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.

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.

Residency Program

Dr. Amelia F. Drake serves as the Director of the Residency Program. Her 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



Drs. Keith Ladner and Maher Younes with Residency Program Coordinator Ellen Doutt. Ellen is one of the first contacts at UNC for applicants to our program. She processes applications, coordinates the interview process, and streamlines their course through their residency training.



Dr. Mihir Patel talks to a patient about preparations for her upcoming surgery.

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.

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.

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



Residents starting their training in June of 2007: Joseph P. Roche, MD; Maher N. Younes, MD; Rupali N. Shah, MD; and Joshua B. Surowitz, MD.

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, the Department of Anatomy and Cell Biology, and Glaxo-Wellcome, Inc. Research Institute. 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.



The 2006 Annual Meeting of the American Academy of Otolaryngology-Head and Neck Surgery took place in Toronto, Canada. After a day of scientific sessions, meeting attendees enjoyed a night out at the Toronto Blue Jays Stadium to watch the New York Yankees win the game. Front row: Krishna Patel, Allen Marshall, Kathleen Balliu, Austin Rose. Back row: Luke Richey, Paul Bryson, Carlos Ebert, Deidra Blanks, Rose Eapen, Adam Zanation, Raymond Cook, Mike Ferguson, Derek Leight, and Josh Surowitz.

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 2-year research training positions during residency. The grant also guarantees the Department's continued support and promotion of medical student research experiences at UNC. The training grant further extends the burgeoning research support within the department, by providing stipends for medical students (2 for the summers and 2 for a whole year, each year of the grant) and one resident for two years for research training each year. This past year, we supported two medical students (Jonathan George, from Duke, working with Dr. Marion Couch, and Jason Roberts from ECU) for very successful and productive one-year research experiences. Jonathan was involved in projects studying allogeneic whole-cell GM-CSF-secreting tumor vaccination and chemotherapeutic immunomodulation in a murine HNSCC model; the effect of altered Toll-like receptor (TLR) 4 signaling on the development of cancer cachexia in a murine model; development of a novel immunocompetent murine model of head & neck cancer cachexia; and identification of a metabolomic profile of cachexia in a mouse model. Jason Roberts worked with Dr. Doug Fitzpatrick on the neurophysiology of binaural interactions in the rabbit. We also supported two summer students. Our current 1-year trainee is Scott Asher, from the University of Alabama, Birmingham. Mr. Asher is working with Dr. Marion Couch on NF- κ B inhibition and cancer cachexia in a mouse model.

Last year's short term trainees included Alex Farag and Scott Daniels. Alex, from the Medical University of Ohio, worked with Dr. Carol Shores on genetic profiling and immunohistochemistry of follicular thyroid lesions, a translational project utilizing immunocytochemical staining of previously collected

tissue samples. Scott Daniels (UNC School of Medicine) was in the laboratory of Drs. Paul Manis and Greg Basura, studying the cellular neurophysiology of serotonergic neurotransmission in brain slices of auditory cortex. Current summer medical student trainees (both from UNC) include Adam Campbell, who is studying cochlear implant speech perception outcomes under Drs. Oliver Adunka and Craig Buchmann, and Logan Foltz, who is studying plasticity of the responses of inferior colliculus neurons as a function of behavioral state with Dr. Fitzpatrick.

The 2-year research program for selected residents is also continuing to grow, with one resident having just completed the program, and two that are currently in the program. Completing the program this past June, Dr. Deidra Blanks worked with Dr. Fitzpatrick looking at neural responses to interaural time differences using amplitude modulated tones with binaurally mismatched carrier frequencies in the inferior colliculus of unanesthetized rabbits. She also completed two allergy projects with Dr. Prazma, studying the effects of immuno-modulatory oligonucleotides in a model of allergy induced Eustachian tube dysfunction in rats. Dr. Blanks has also studied the ability of normal hearing listeners to detect interaural envelope timing differences for carriers that are separated widely in frequency, working with Drs. Emily Buss and Joe Hall. This project demonstrated that normal hearing listeners were able to use carrier frequency mismatches of several octaves. Entering the second year of her research experience is Dr. Rose Eapen. Rose is working in the laboratory of Drs. Emily Buss, John Grose and Joe Hall, where she is studying the effects of otitis media with effusion on speech perception and frequency weighting in children. She is also involved in a project studying temporal coding in patients with Ménière's Disease. This study examines the hypothesis that part of the speech perception difficulty experienced by patients having Ménière's disease is due to poor coding of the temporal fine structure of speech, and that this is modulated with the ingestion of glycerol. Finally, Dr. Mihir Patel is beginning his 2-year research program, where he is studying the patterns of protein expression in thyroid carcinomas using immunochemistry and proteomic approaches, under the guidance of Dr. Carol Shores.

Based on our successes, we also submitted the first competing renewal of the supporting training grant to NIH this past spring. 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 2-year research resident), an AHNS/AAO Young Investigator Award (Dr. Patel, a 2-year research resident), Lineberger Comprehensive Cancer Center (3 grants, Dr. Cannon, a 2-year research resident), the American Academy of Otolaryngic Allergy (Drs. Ebert and Eapen in separate grants), and a ROADS scholarship from AAOA (Dr. Blanks). Additional success in the program is evident in the number of applicants 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 4 years, this grant has provided research support for 5 residents for 2-year research projects, 6 medical students for a 1-year research experience, and 7 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.

Carolina Course in Sinus Surgery and Facial Plastic Surgery

by Paul C. Bryson, MD

The Eighth Annual Carolina Course in Sinus Surgery and Facial Plastic Surgery recently took place April 13-14, 2007 in Savannah, Georgia. Due to renovation of UNC's Berryhill Hall, Dr. Senior and Dr. Shockley changed locations with the assistance of Dr. Frederick Kuhn of the Georgia Sinus Institute. The course was fantastic as usual and this year's facilities were quite exceptional.



Dr. Paul Bryson refines his deep plane face-lifting technique.

The course commenced on Friday, April 13th, as all participants met at Savannah's University Medical Center at 7:00 a.m. for a brief registration and a breakfast of hot coffee and fresh pastries. It was a pleasure to see some familiar faces, as well as meet residents from other programs, and faculty from other institutions.

At 7:30, Dr. Senior warmly welcomed all in attendance, after which he and Dr. Shockley discussed the schedule for the next two days. This year's sinus surgery/rhinology instructors included Dr. Brian Mathews (Wake Forest University), Dr. Frederick Kuhn (Georgia Nasal and Sinus Institute), and Dr. Chris Melroy (formerly of UNC and currently Dr. Kuhn's fellow).

The morning began with lectures on the medical management of sinus disease, sinus anatomy, basic endoscopic surgical techniques, and complication avoidance. This was followed by more advanced topics including frontal sinus surgery, sphenoid sinus surgery, CSF leak repair, as well as open approaches to the paranasal sinuses.

Cadaveric dissection and individual instruction from faculty members followed a quick lunch. Each station consisted of a fresh cadaver specimen and state-of-the-art equipment, complete with various angled endoscopes, monitors, entire instrument sets, and micro-debriders. Some stations were even equipped with image guidance systems. Company reps strolled through the various rooms to answer questions and troubleshoot problems. The entire afternoon was spent in the lab as the PGY-3's performed basic FESS, and PGY-5's honed their skills for life after residency.



Sinus Surgery instructors: Drs. Frederick Kuhn, Brent Senior, Brian Mathews, and Chris Melroy

Individualized instruction from the faculty and the opportunity to have one's own dissection specimen were invaluable. A special component to this year's course was the presence of the Xoran portable CT scanner. Participants were asked to grade their dissection performance. We then had the opportunity to see a CT scan of our dissection, thus providing instant feedback for our efforts.

The day concluded with a pleasant dinner at The Crab Shack on Tybee Island complete with camaraderie, conversation, food and libations. After a laid back seafood dinner, the group returned to Savannah and hit the riverfront to sample some of the local night life.



Facial Plastic Surgery instructors: Drs. Achih Chen, Raymond Cook, William Shockley, Lynn Damitz, and Neil Goldman

Saturday commenced the facial plastic surgery component of the course. Dr. Shockley introduced our instructors, which included Dr. Shockley, Dr. Lynn Damitz (UNC Plastic Surgery), Dr. Raymond Cook (UNC, WakeMed ENT), Dr. Neil Goldman (Wake Forest University), Dr. Achih Chen (Medical College of Georgia), and Dr. Adam Zanation (UNC).

As before, the morning was filled with excellent lectures on several salient topics including management of frontal sinus fractures, fundamentals of rhinoplasty, upper and lower lid blepharoplasty, endoscopic brow lift, surgical rejuvenation of the midface, highlights of the deep plane facelift, adjunctive cosmetic procedures, and scar revision techniques. All lectures were outstanding.



Faculty and residents gather for dissection demonstration before starting work on their cadavers.



Dr. Senior first assists for Dr. Kuhn during the sinus dissection lab.

After lunch, we again headed to the lab to apply what we had learned in the classroom. Under the tutelage of our instructors, we refined our techniques in rhinoplasty, blepharoplasty, face and brow lifting. Our instructors once again moved from station to station, individualizing their teaching, and maximizing our learning. After a great afternoon of mastering the beautification of our fellow man, we all went our separate ways feeling very satisfied and excited about what we had just experienced and learned.

The Eighth Annual Carolina Course was a resounding success with fantastic facilities. Both attendees and faculty alike were pleased with the content of the course as well as with the Savannah location. Kathy Harris did a wonderful job. I was impressed with the quality of lectures, the topics covered, and the hands-on approach to learning. Being able to participate in solo cadaveric dissections under the supervision of fellowship-trained surgeons in their respective fields is an invaluable experience. As a PGY-3 resident, I was able to cover a significant breadth and depth of surgical anatomy and technique that will serve me well as I become a senior resident in the coming months.

On behalf of the UNC residents, I wish to extend our deepest gratitude to Drs. Senior and Dr. Shockley and all instructors who volunteered their time to further our education. Special thanks go out to Kathy Harris for her organizational skills (and patience!), and for taking these photos. Thanks also go out to our corporate sponsors and supporters including BrainLAB, Stryker/Leibinger, Xoran, Sanofi Aventis, Medtronic, Karl Storz Endoscopy, and GyruS ENT.



Participants had dinner at The Crab Shack on Tybee Island on Friday night.

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 seven exceptional speakers:

Carolyn J. Brown, PhD

Professor

Department of Speech Pathology and Audiology

University of Iowa

Iowa City, Iowa

Electrically Evoked Cortical Potentials

Electrically Evoked Auditory Potentials: The Iowa Perspective

July 25-26, 2006

Fan-Gang Zeng, PhD

Professor

Departments of Anatomy and Neurobiology, Biomedical Engineering, Cognitive Sciences, and

Otolaryngology

University of California

Irvine, California

Cochlear Implants: Past, Present, and Future

August 3-4, 2006

Laurel H. Carney, MD

Professor

Departments of Biomedical & Chemical Engineering, and Electrical Engineering & Computer Science

Institute for Sensory Research, Syracuse University

Syracuse, New York

Neural Mechanisms for Detecting Tones in Noise

A Novel Strategy for Addressing Hearing Loss Based on Neural Coding of Amplitude-Modulated Sounds

September 21-22, 2006

James H. Krouse, MD, PhD

Professor and Vice Chair

Director of Rhinology/Allergy

Department of Otolaryngology/Head and Neck Surgery

Wayne State University

Detroit, Michigan

Modified Quantitative Testing (MQT): A New Approach to Skin Testing for Inhalent Allergy

Sensitivity and Specificity of Skin Testing: Validating Test Results with End-Organ Challenge

November 14-14, 2006

Anthony P. Tufaro, DDS, MD

Assistant Professor

Surgical Oncology & Endocrine Surgery, Head & Neck Surgery

Johns Hopkins University

Baltimore, Maryland

Soft Tissue Reconstruction for Oncologic Defects of the Head and Neck

Melanoma: An Update in Management

December 19-20, 2006

Robert M. Naclerio, MD

Professor of Surgery

Section Chief, Otolaryngology-Head and Neck Surgery

University of Chicago

Chicago, Illinois

State of the Science - Pathophysiology of Allergic Rhinitis: Impact on Target Organs

Cysteinyl Leukotrienes: Important Mediators in the Pathogenesis of Allergic Rhinitis

April 24-25, 2007

Charles N. Ford, MD

Professor and Chair,

Division of Otolaryngology, Department of Surgery

Professor, Department of Anesthesiology

University of Wisconsin

Madison, Wisconsin

Pulsed Dye Laser in the Spectrum of Laryngeal Laser Surgery

Assessment and Management of the Scarred Vocal Fold

March 20-21, 2007

DISTINGUISHED PROFESSORSHIPS

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

The W. Paul Biggers Distinguished Professorship

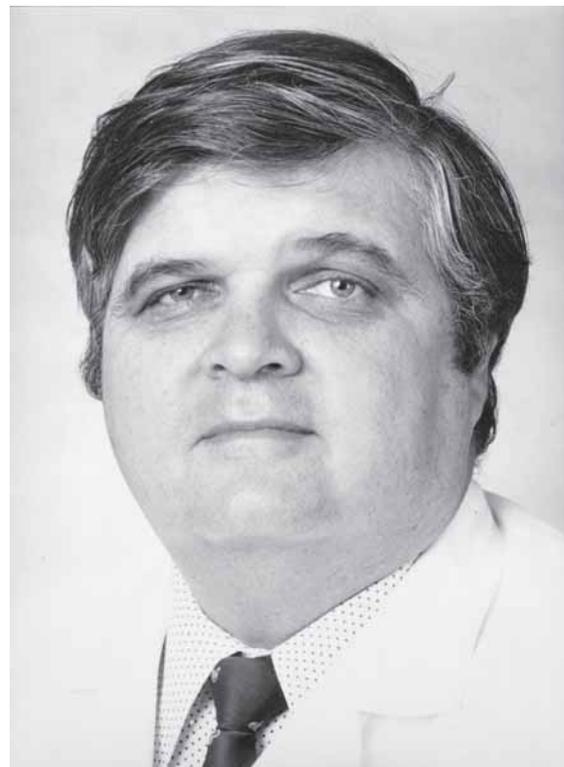
The W. Paul Biggers Distinguished Professorship was established in 2000 to honor Dr. Biggers, who had been an integral part of the University of North Carolina since becoming a medical student in 1959.

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.

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



W. Paul Biggers, MD

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 Professors:

2005 – present William W. Shockley, MD

The Thomas J. Dark Distinguished Professorship

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

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

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

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



Thomas J. Dark

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:

1977 – 1991	Newton D. Fischer, MD
1991 – present	Harold C. Pillsbury, III, MD

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:

1977-2000	W. Paul Biggers, MD
2000-present	Mark C. Weissler, MD

The Newton D. Fischer Distinguished Professorship

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

Fischer was born in San Antonio in 1921. He earned three degrees from the University of Texas: a B.S. in 1942, a B.A. in 1943, and an M.D. in 1945. Fischer completed his residency at Johns Hopkins University, where he was an instructor for one year before coming to Chapel Hill in 1952. Fischer was

the first Chief of Otolaryngology, a post he held for more than 30 years. He was among the first doctors to receive an otolaryngology training grant from the National Institutes of Health. In 1977, Fischer was named the Thomas J. Dark Distinguished Professor of Surgery, the chair he held until 1991.

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

Fischer’s numerous awards include “The Professor” Award in 1977 and The Central Carolina Bank Excellence in Teaching Award in 1988. In 1984, he and his wife, Janet, a Sarah Graham Kenan Professor in the School of Medicine, won the Thomas Jefferson Award, which is given annually to the UNC-CH faculty member who best exemplifies the ideals and objectives of Jefferson through personal influence, teaching, writing and scholarship. Janet J. Fischer died after a courageous fight 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 Professors:
1998-present Amelia F. Drake, MD



Drs. Newton and Janet Fischer

HONORING FISCHER AND RESIDENTS



L to R: Drs. Chapman McQueen (Alamance ENT, Burlington, NC), Newton Fischer (Professor Emeritus, UNC), and John Emmett (Memphis, TN)

The annual meeting of the Newton D. Fisher Society was held on June 16, 2007, at the Sheraton Chapel Hill Hotel. According to course director Dr. Austin Rose and meeting coordinator Ellen Douth, it was a tremendous success. In addition to a number of presentations by our own faculty and residents, the Department welcomed speakers from throughout the state and across the country including Dr. Merritt Seshul and Dr. Will Harrill from Hickory, NC and Dr. Greg Staffel from The Shea Clinic in Memphis, TN. Dr. Staffel's demonstration of his electronic medical records system was a true multimedia extravaganza, leaving many in the audience, including Dr. Fischer, truly amazed. The program was concluded with a wonderful and inspiring presentation

entitled "Pediatric ENT Lessons Learned in the Third World & the United States" by keynote speaker Dr. James Sidman of the University of Minnesota. This year also saw the addition of a number of poster presentations.

That same evening, the Fischer Society attendees were invited to a reception and dinner, which was also given in honor of the chief residents who have completed their training in Otolaryngology-Head and Neck Surgery. This year all of our chief residents have been offered prestigious fellowships. John W. Alldredge, MD, will be doing a Rhinology fellowship at the Sinus and Nasal Institute of Florida in St. Petersburg. Adam M. Zanation, MD, will be at the University of Pittsburgh Medical Center doing a Skull Base/Head and Neck Surgical Oncology fellowship. Marc K. Bassim, MD, is headed out to California for a fellowship in Otolaryngology/Neurotology at the House Ear Institute in Los Angeles. Krishna G. Patel, MD, PhD, is also going to California for a fellowship in Facial Plastic and Reconstructive Surgery at the University of California-Davis. Dr. Pillsbury presented them with certificates signed by each faculty member, and Dr. Drake inducted them into the Newton D. Fisher Society.



Dr. Greg Staffel (Guest Speaker, The Shea Clinic, Memphis, TN) and Dr. James Sidman (Keynote Speaker, University of Minnesota, Minneapolis, MN)



Drs. Robert Buckmire, Adam Zanation, Carlton Zdanski, and Austin Rose

Oral Presentations:

Auditory Brainstem Implantation in Non-NF2 Patients

Craig Buchman, MD - UNC OHNS

Combining Electric and Acoustic Hearing

Oliver Adunka, MD - UNC OHNS

Intradermal Positivity after Negative Prick Testing: Molds and Epidermals

Merritt J. Seshul, MD - Carolina ENT/HNSC, Hickory, NC

Update in Transsphenoidal Pituitary Surgery

Karen Kölln, MD, and Brent Senior, MD - UNC OHNS

Advances in Minimally Invasive and Endoscopic Neck Surgery

Adam Zanation, MD - UNC OHNS

Transnasal Esophagoscopy in an Office Setting: A Review of Three Years' Data

Will Harrill, MD - Carolina ENT/HNSC - Hickory, NC

Laryngology Update 2007

Robert Buckmire, MD - UNC OHNS

A Phase I/II Clinical Trial of the Effect of Celecoxib on Patients with Cancer Cachexia
Trinitia Cannon, MD - UNC OHNS

Do It Yourself EMR
Greg Staffel, MD - The Shea Clinic, Memphis, TN

Accuracy of Plain Films in the Evaluation of Batteries as Ingested Foreign Bodies
Steve Lee, MD, PhD - UNC OHNS

Applications of Immune Modulatory Oligonucleotides in Otolaryngic Allergy
Charles Ebert, MD, MPH - UNC OHNS

Pediatric ENT Lessons Learned in the Third World & the U.S.
James Sidman, MD - Keynote Speaker
Pediatric ENT Associates - University of Minnesota, Minneapolis, MN

Poster Presentations:

Management of Laryngotracheal and Esophageal Disruptions Following "Clothesline" Injury
Farhad Ardeshirpour, MSIV; Rose J. Eapen, MD; Christopher T. Melroy, MD; Mark C. Weissler, MD

The Use of Ultrasound in Defining Nasal Fractures
Farhad Ardeshirpour, MSIV; Keith Ladner, MD; Paul Bryson, MD; Carol G. Shores, MD, PhD;
William Shockley, MD

Temporal Processing in Binaural Neurons
Jason Roberts, MSIII; Douglas Fitzpatrick, PhD; Emily Buss, PhD

Clinical Outcome Study of Well-Differentiated Thyroid Cancer Invading the Airway
Jason Roberts, MSIII; Allen Marshall, MD; Adam Zanation, MD; Mark Weissler, MD

Neural Responses to Amplitude Modulation using Binaurally Mismatched Carrier Frequencies
Deidra Blanks, MD; Douglas Fitzpatrick, PhD; Jason Roberts, MSIII; Emily Buss, PhD

IMOS in the Prevention of Nasal Allergen-Induced Eustachian Tube Dysfunction
Charles Ebert, MD, MPH; Mihir Patel, MD; Austin Rose, MD; Jiri Prazma, MD

XRCC1 Polymorphisms, Dietary Folate Intake, and Squamous Cell Carcinoma of the Head and Neck
Jonathan George, MD; Andrew Olshan, PhD; Mia M. Gaudet, PhD; Mark Weissler, MD

NEW DEVELOPMENTS

The North Carolina Children's Airway Center

The North Carolina Children's Airway Center has been awarded a grant from The Duke Endowment from 2007 to 2009 for the creation of a center to care for children with aerodigestive problems. The Center will be a unique public private endeavor, brought into existence by funding from the Department of Otolaryngology/Head and Neck Surgery, the Department of Pediatrics Division of Pulmonology, and The Duke Endowment. It will involve multidisciplinary evaluation and treatment of children with complex airway and swallowing 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 is currently in its organizational stage. Formal multidisciplinary clinics are expected to be opened in late summer or early fall of 2007. The Center's core organizational structure includes Surgical Director Carlton J. Zdanski, MD; Medical Director George Retsch-Bogart, MD; Associate Medical Director Marianna Henry, MD; Respiratory Therapist Mark Hall, RT; Tracheostomy Nurse Cynthia Reilly, RN; Speech Pathologists Jennifer Rayburn, SLP, and Leah Thompson, SLP; Administrative Coordinator Leslie A. Stewart, MA; and Program Coordinator Kathy Abode, RN.



In June of 2007, Prentis Moore (held by his parents Wayland and Chandra Moore), had surgery to close his stoma. Prentis is one of many children who are benefitting from the multidisciplinary teamwork of the Airway Center.

The North Carolina Children's Airway Center will take a multidisciplinary approach to each patient and the full range of pediatric medical and surgical services, including anesthesia, ICU care, feeding and swallowing, nutrition, tracheostomy care, social work, respiratory therapy, speech and communication, will be available to patients of the Airway Center. The physicians 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 Marjorie Thomas, RN, or call the Consultation Center at 800-862-6264, and request Dr. Zdanski.



Teacher of the Deaf, Francisca Hernandez-Casillas, MA, works with children in the Durham CASTLE preschool classroom.



Maegan Evans, PhD, CCC-SLP, (right) works with Grace Wilson and her mom at the Durham CASTLE.

CASTLE Expands to Wilmington

CASTLE (Center for Acquisition of Spoken language Through Listening Enrichment) is taking another leap forward. It is the next step in Carolyn Brown's vision of a comprehensive statewide program supporting children with cochlear implants. Grants provided by The Duke Endowment and the Cape Fear Memorial Foundation have permitted CASTLE to begin building on the successful prototype in Durham, which was first initiated five years ago. A first expansion site will begin operations in Wilmington in the coming weeks, and a second is planned for the western part of the State in the fall of 2008.

Staff for the new Wilmington site have been hired and are currently on hand at the Durham Center. The new preschool classroom teacher, Francisca Hernandez-Casillas, comes to us from California. She holds a master's degree from California State University-Fresno in Communicative Sciences and Disorders, with an emphasis in Deaf Education. She attended the North Carolina Summer Institute at CASTLE in 2005. Francisca has taught children with hearing loss from birth to 12th grade. She has been on staff at the Durham site since September.

Speech/Language Pathologist Maegan Evans, PhD, has joined CASTLE to provide individualized therapy and to serve as trainer/mentor for school professionals in the counties surrounding Wilmington. She has received master's and doctoral degrees in Communicative Sciences and Disorders from the University of South Carolina-Columbia. Portions of Maegan's dissertation, "Acoustic Analysis of Adult Cochlear Implant Users' Voice and Speech", were published in the Journal of Voice, September 2006, and she presented the results of the study at the 2006 National A. G. Bell Association Conference in Pittsburgh. She was the recipient of an A. G. Bell Fellowship Grant between August 2005 and August 2006.

CASTLE is teaching children who are deaf to listen and to talk. With the development of advanced technologies, supported by the appropriate school and family-based interventions, most children who are deaf or hard-of-hearing have the potential to develop spoken language. This can allow them

direct access to mainstreamed education and the potential to become fully productive and enfranchised citizens. After receiving access to these technologies and appropriate interventions, many North Carolina children are now entering kindergarten with self-confidence and age-appropriate language.

This extraordinary development also presents us with a unique opportunity to reduce both the immediate costs of deaf education and the need for long-term support for people who are deaf or hard of hearing with public resources.

The rapidly increasing number of cochlear implants has posed a significant challenge, especially to educators and policymakers. Most professionals working with deaf children have been trained to teach using sign language and are not prepared to meet the new demands involved in developing spoken language in children with the new technology.

The expansion of CASTLE will bring services and training closer to families and schools. Two new regionally-focused centers will provide direct services to children and their families, including auditory-based speech-language therapy and evaluations, and it will serve to focus and coordinate professional support for children in the counties for which it is responsible. In addition, the new centers will serve as bases for professional training and mentoring, made available both to surrounding public school districts and to the early interventionist educators who work with the 0-3 age group. They will house a preschool program in which school professionals and therapists can gain hands-on experience. Each preschool will ultimately have two classrooms serving ages 2-3 and 4-5.

Clinical otologic and audiology services, as well as cochlear implant evaluations, will continue to be provided only at UNC facilities in Durham and Chapel Hill.

North Carolina is in a unique position to host such a model because it is the only state, so far as we know, which provides a financial assistance program for families with children who have hearing loss and who are unable to afford the new technologies. Consequently, the minorities represented in our patient population generally reflect the true demographics of the State.

Specific objectives for CASTLE include increasing the number of school professionals trained to provide auditory-based intervention, increasing access to auditory-based intervention services for children in rural areas of North Carolina, and increasing the number of children with hearing loss who have access to an auditory-based preschool experience. The more isolated rural school districts present the greatest challenge to the delivery of training and services from the current centralized location. Given the growing number of these children served by North Carolina Public Schools, we find ourselves confronted with the necessity to build a locally accessible statewide program through which school professionals can obtain the training and assistance they require.

The New MED-EL Electric-Acoustic System: UNC Leads the Way

On April 4, 2007, Dr. Craig Buchman performed the first implantation of the MED-EL electric-acoustic system in North America. For this clinical trial, UNC has joined the ranks of 13 other centers across the US and Canada. The anticipated enrollment for this FDA regulated clinical trial has been set at 55 subjects. UNC has lead the enrollment process with 5 subjects to date with two of them who having already undergone surgery.

Subjects eligible for participation must be between the ages of 18 and 70 and have stable mild sloping to profound bilateral sensorineural hearing loss. Additionally, patients should have an extensive history of traditional amplification and hearing aid use. Patients most appropriate for this trial are most often those demonstrating a discrepancy between severely decreased speech understanding as compared to their relatively good pure-tone audiogram.

This new hearing system combines electric stimulation from a cochlear implant and acoustic stimulation via a conventional hearing aid. Both systems act synergistically in that the hearing aid amplifies the residual low frequency hearing, while the cochlear implant provides high frequency information. This stimulation pattern has been termed electric acoustic stimulation and has revealed robust outcomes for listening in noise as well as for music appreciation – conditions traditional cochlear implants have been less effective.

To provide adequate acoustic stimulation for effective EAS, preservation of residual hearing during the surgical implantation process is fundamental. Since certain factors determining the hearing preservation outcome remain speculative, maintenance of residual hearing during and after surgery provides the biggest challenge. Upcoming research at UNC will focus on some of these topics to determine audiological and surgical factors responsible for hearing loss.

The Principal Investigator is Dr. Oliver Adunka. Co-Investigators are Drs. Harold Pillsbury and Craig Buchman.



Chief Resident Adam Zanation, MD, and Craig Buchman, MD, prepare the patient for the first implantation of the MED-EL Electric-Acoustic System (EAS) in North America.

UNC Hospitals Performs First Non-Tumor Auditory Brainstem Implant in U.S.

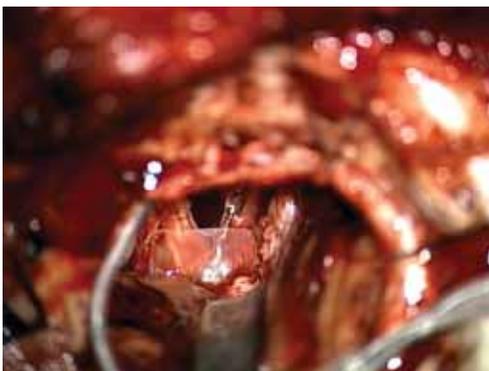
CHAPEL HILL – Surgeons at UNC Hospitals recently performed the first auditory brainstem implant procedure in the United States in a patient that did not have inner ear tumors associated with a condition called neurofibromatosis type II (NF2).

Performed July 13 by Drs. Craig Buchman and Matthew Ewend, this surgery was the first in a new clinical trial to test the safety and effectiveness of the procedure in patients who have damaged auditory or hearing nerves but do not have NF2 tumors. Only two sites in the country currently are authorized to perform the procedure in this group of patients: UNC Hospitals and the House Ear Institute in Los Angeles.

The surgeons placed the electrodes from the auditory brainstem implant (ABI) through an opening in the back of the skull, in to an area of the brainstem that senses hearing. Collaborating with a team of audiologists, the electrodes were then stimulated and recordings from the brain were made. “Preliminary responses from the brain were very encouraging” Buchman said. “A number of the stimulated electrodes generated neural responses that suggested that appropriate auditory stimulation was occurring. These were the kind of responses we were looking for and confirmed good placement of the device.” The patient who received the ABI is doing well and recovering at home. It will likely be a month or so before the device is activated and several months before the patient and his medical caregivers know whether or not the procedure resulted in improved hearing.

The ABI was developed by the House Ear Institute in 1979 as a means of restoring hearing to NF2 patients who become deaf after surgery to remove tumors from their auditory nerves. The device was approved by the U.S. Food and Drug Administration in 2000 for use in this group of NF2 patients. It is not currently approved for use in patients without tumors, so the new clinical trial is aimed at obtaining FDA approval for use in non-tumor patients.

The ABI device works by bypassing the cochlea and the auditory nerves to transmit sound directly to the brainstem. The ABI is placed directly on the nerve center at the base of the brain. After the surgery, patients work with audiologists to test and adjust their wearable sound processors as they learn to understand and interpret new sounds. Most ABI recipients benefit through increased sound awareness, but must also use lip reading cues to understand speech.



Electrode array of the auditory brainstem implant has been placed into the lateral recess.



CT image with the auditory brainstem implant in place.

CLINICAL SERVICES



Head and Neck Surgeons, Drs. Marion Couch, Carol Shores, Mark Weissler, and William Shockley

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.

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; Harold C. Pillsbury, MD; and Carol G. Shores, MD, PhD, serve as the Program's Head & Neck oncologic surgeons. This conference is also Webcast to Wilmington, NC where Head & Neck physicians participate directly and discuss their patients. Patients from Wake Med are also presented at this conference.

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

Sean Gallagher, with a Masters in counseling psychology from Boston College and a BSN from UNC, Chapel Hill, is now the nurse coordinator for the H&N program. He has risen to the occasion and is doing a stellar job in this complex position.



Dr. Shores gets a hug from one of her many favorite patients, in clinic with his wife.

One of our main focuses this last year has been on our research laboratory at the Lineberger Cancer Center. We have hired Xiaoying Yin, MD, MS as an assistant professor in the department. Xiaoying has worked at Lineberger since 2002 as a senior research associate. She received her MD degree from Xian Medical University, Xian, China in 1983 and then completed a residency in pathology in China. She worked at the University of Pittsburgh as a post-doctoral fellow in the department of pathology and then as a research assistant professor at the Children's Hospital of Pittsburgh until 2002. She received her Masters in molecular biology from the University of Pittsburgh in 1993.

We continue to be blessed with our many years of collaboration with Dr. Andy Olshan who was named Chair of the Department of Epidemiology at the UNC School of Public Health.- In addition, Dr. Olshan won a prestigious grant this year from the Lance Armstrong Foundation to study oral cancer. The grant funds research on the experiences of head and neck cancer survivors, so that health professionals can effectively manage the impact of treatments on a patient's social, family and work roles.

We offer state of the art and complete treatment and reconstructive options for all H&N neoplasms. Through our weekly teleconference which includes physicians from Wake Med in Raleigh and Wilmington, we are reaching out to supply needed services and expertise to physicians and patients throughout North Carolina.



Mark Weissler, MD, and Cindy Nabut, RN.

Current Clinical Trials in Head and Neck Oncology:

The Utility of Immunohistochemical Markers to Reliably Diagnose and Differentiate Follicular Thyroid Carcinoma from Adenoma.

Viral Response to Chemotherapy in Endemic Burkitt Lymphoma

Molecular Analysis of Head and Neck Cancers

Prospective, Longitudinal, Multi-Center, Descriptive Registry of Patients Receiving Therapy other than Surgical Resection Alone for Newly Diagnosed Head and Neck Carcinoma

Phase I Randomized, Double-blind, Placebo-controlled Trial of the Effect of Temporary Dietary Antioxidant Depletion on Tumor Growth and Cachexia in Head and Neck Cancer Patients Receiving Chemoradiation Therapy

Human Papilloma Virus Transmission in Head and Neck Squamous Cell Carcinoma

Infrared Imaging of Reconstructive Flaps

Metabolomic Analysis of Cachexia in Head and Neck Cancer Patients

Efficacy of Celebrex on Cancer Cachexia Syndrome

Infrared Imaging of Reconstructive Tissue Flaps.

An Open Label Dose Escalation Phase I Study of MLN8054, a Novel Aurora A Kinase Inhibitor in Patients with Advanced Solid Tumors

A Two-Arm Phase I Dose Escalation Trial of Vinflunine with Erlotinib or Pemetrexed in Refractory Solid Tumors

Phase 2 Study of Erlotinib, Cisplatin and Radiotherapy versus Cisplatin and Radiotherapy in Patients with Stage III and IV SCCHN.

Phase 3 Randomized Study of Pemetrexed in Combination with Cisplatin versus Cisplatin Monotherapy in Patients with Recurrent or Metastatic Head and Neck Cancer.



Jeffrey LaCour, MD, and William Shockley, MD

Facial Plastic and Reconstructive Surgery

Facial Plastic and Reconstructive Surgery plays an important role in the clinical care of patients and in the education of residents. Dr. Shockley, Chief of the Division of Facial Plastic and Reconstructive Surgery says “Traditionally we have focused on patients requiring reconstructive procedures. More recently we have seen a number of patients seeking cosmetic procedures. In the US and abroad there has been tremendous growth in these procedures, especially office procedures performed without incisions, scars or side effects. As a result the popularity of Botox and soft tissue fillers has soared”. Dr. Shockley at UNC and Dr. Raymond Cook at Wake Med see a broad range of patients in consultation. Many of the reconstructive procedures are focused on the treatment and reconstruction of skin cancer, facial paralysis, facial and nasal deformities, and the medical and surgical management of scars.

With the nationwide emphasis on health and appearance there has been a shift from the more traditional cosmetic surgical procedures to office procedures which have minimal to no side effects and no associated down time. This allows the patients to come in for a “quick fix” and be on their way. Improving access has been a major goal of the Facial Plastic Surgery Service. Dr. Shockley is now seeing patients at Carolina Pointe and Dr. Cook sees patients at Wake Med North. This has provided a more optimal environment in which to see these patients.

Many patients are referred for surgical reconstruction. At UNC, Dr. Shockley sees a wide variety of patients with defects and deformities. “I still love reconstructive surgery. Each patient presents a particular challenge and hopefully we can come up with a unique solution. Of course our goal is to restore the patient’s function and appearance to as close to normal as possible.” Dr. Shockley’s special interests include rhinoplasty, reconstruction of facial cutaneous defects, skin cancer, surgery for facial paralysis, and scar revision.

Elaine Hinkle, RN has been Dr. Shockley’s nurse for 12 years. “Elaine has played a major role in the success of the Facial Plastic Surgery Clinic. She continues to play a critical role in our entire clinical enterprise. She is adored by the patients and is one of the most respected and dedicated nurses at UNC Hospitals” says Shockley.



Elaine Hinkle, RN

Dr. Raymond Cook a fellowship trained Facial Plastic Surgeon at Wake Medical Center also sees a variety of patients. His interests include both surgical and non-surgical forms of facial rejuvenation and reconstructive surgery secondary to trauma and cancer. Dr. Cook’s goal is to enhance or restore the intrinsic beauty, which is present in each individual, rather than create a result that appears “surgical.”

Dr. Cook sees his cosmetic patients in the WakeMed North office in North Raleigh. The office has recently acquired the Portrait Plasma for skin regeneration. The Portrait Plasma is the next generation of medical laser technology. Dr. Cook has had great success using the Portrait Plasma to treat multiple patients for wrinkles, fine lines, texture and imperfections in skin tone and discoloration.

From an educational standpoint there has been an expansion in the facial plastic surgery curriculum. Facial Plastic Surgery Conference meets twice a month and has been a big hit with the residents. In addition to reviewing chapters from a facial plastic surgery text, there are lectures from the UNC faculty, guest lecturers and journal clubs. Residents see patients in The UNC Facial Plastic Surgery Clinics with a broad range of disorders including: facial skin lesions, skin cancer, congenital or acquired facial and nasal deformities, microtia, facial paralysis and vascular lesions. Recently there has been a surge in patients requiring functional rhinoplasty, nasal valve problems, and esthetic rhinoplasty. Consultations are also available for those seeking facial cosmetic procedures.

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 and 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.



Dr. Robert Buckmire reviews photos with a patient after scoping him.

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.



Ellen Markus, MA, CCC-SLP, DMA; and Linda F. Hube, MS, CCC-SLP.

Speech Pathology:

The Head and Neck Cancer Voice Restoration and Swallowing Clinic

The Voice Restoration and Swallowing Clinic consist 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 voice restoration and swallowing are covered by speech pathologists Brian Kanapkey, Linda Hube, and Leslie Johnson.

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 (TEP), 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



Dr. Buckmire and Speech Pathologist Brian Kanapkey review a patient's 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 evaluated and treated by the speech pathologist.

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

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 and persistent granulating tracheoesophageal fistula is maintained by Brian Kanapkey using silicone for creation of extended tracheoesophageal flanges to stop around the prosthesis leakage. This process reduces pulmonary aspiration and risk of aspiration pneumonia from around the prosthesis leaks.

Brian Kanapkey also heads up the UNC ENT Swallowing Clinic in conjunction with Dr. Robert Buckmire. The clinic provides a multidisciplinary approach to swallowing disorders related to problems of the mouth, throat and upper esophagus. The clinic works closely with physicians in gastroenterology and radiology to provide identification and treatment for oral and pharyngeal disorders as well as swallowing problems related to gastrointestinal issues. Objective instrumentation is used to aid the physician and speech pathologist in correct identification of swallowing disorders and treatment is undertaken with the latest technology available. Currently, the clinic is held one day a week.



Drs. Karen Kölln and Brent Senior performing sinus surgery.

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.

Libby Drake, RN, and Judy Miles, 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 smiling faces to our allergy patients, 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.

Division Chief Brent A. Senior, MD, along with Harold C. Pillsbury, MD, Brett E. Dorfman, MD, and Michael O. Ferguson, MD, perform minimally invasive surgery including Functional Endoscopic Sinus Surgery (FESS), a minimally invasive technique used to restore sinus ventilation and normal function in the setting of chronic infection. More recently, advances in these minimally invasive techniques now allow UNC surgeons to perform minimally invasive surgery for some tumors of the



Judy Miles, RN, gives an allergy shot at the Carolina Pointe clinic.

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 by BrainLAB, AG, of Munich, Germany.

A major activity of the Division is co-sponsorship of the Eighth Annual Carolina Course in Sinus Surgery and Facial Plastic Surgery. This year, as a result of renovations in the anatomy labs at UNC, the course took place in Savannah, Georgia at the laboratory facilities of the division's adjunct professor, Dr. Fred Kuhn. Attracting 30 residents from around the country, the course provided an opportunity to participate in laboratory dissections while hearing renowned rhinologists over the course of this two-day meeting.

Research is another 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. In addition, Dr. Senior was honored to provide a plenary session address in Kuala Lumpur, Malaysia at the meeting of the International Society of Infection and Allergy of the Nose. 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. Indeed, research being spearheaded by PGY-3 resident Alisha West involving the role of Eotaxin in sinusitis led to her receipt of the prestigious Sam Sanders Award in Basic Science from the American Academy of Otolaryngic Allergy.

Nasal Somnoplasty

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. Nasal Somnoplasty is a procedure that can be performed in the office with only topical anesthesia avoids a trip to the Operating Room and has an extremely low incidence of side effects, which primarily include 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. Nasal somnoplasty 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.

Palatal Somnoplasty

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, palatal Somnoplasty is our procedure of choice. It is an 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.

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. Options for treatment provided by members of the Department of Otolaryngology/Head and Neck Surgery include 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

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.

Minimally Invasive Pituitary Surgery

Since March 2000, Brent Senior, MD, along with Matthew Ewend, MD of the Department of Surgery, Division of Neurosurgery, have been performing Minimally Invasive Pituitary Surgery (MIPS) to treat pituitary adenomas. In contrast to traditional open approaches, no incisions are involved, dramatically reducing the overall morbidity of the procedure. The sphenoid is accessed directly through the nose using sinus endoscopes and is widely opened. The scope is set 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 more complete given the ability of the angled endoscopes to see behind and under otherwise obstructing structures. 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 journals.

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, who share the effort of caring for the child with problems relating to the ears, nose, sinuses, upper aerodigestive tract, or neck. They see patients in the first “pod” of the ENT Clinic in the Neurosciences Hospital, as well as at Carolina Pointe. Dr. Zdanski participates in the Carolina Children’s Communicative Disorders Program (CCCDP) and performs cochlear implants as well as other ear procedures in children. Dr. Drake serves as the Director of the UNC Craniofacial Center. In addition to providing the ENT consults to the child with a cleft, the Pediatric Otolaryngologists perform palatoplasties and surgeries for velopharyngeal insufficiency.

The North Carolina Children’s Airway Center has been awarded a grant from The Duke Endowment from 2007 to 2009 for the creation of a center to care for children with aerodigestive problems. For more information on this endeavor, please see page 57.



Pediatric Otolaryngology Team: Claire Culberson, RN; Austin S. Rose, MD; Amelia F. Drake, MD; Carlton J. Zdanski, MD; and Marjorie Thomas, RN



Danielle is one of Dr. Zdanski's biggest fans.

Current Clinical Trials in Pediatric Otolaryngology:

C0536: Safety and Efficacy of Topical Moxidex Otic Solution Compared to Moxifloxacin Solution in the Treatment of Acute Otitis Media with Otorrhea through a Tympanostomy Tube (AOMT)

Assistive Device Benefits in Children Diagnosed with Auditory Neuropathy

High Resolution Ultrasound in the Evaluation of Pediatric Airway Pathology

UNC Hospitals Hearing and Voice Center at Carolina Pointe

Over the past year, the Department of Audiology and Speech has provided North Carolinians with world-class Audiology, and Speech Pathology services at the UNC Hospitals Hearing and Voice Center at Carolina Pointe. This community-based Audiology and Speech Pathology clinic works 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.

Voice and speech therapy services 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 30 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, vocal ergonomics, videolaryngostroboscopy, and voice recording and analysis including acoustic and aerodynamic measurements.

Gregory Smith continues to oversee the delivery of Audiology services at the UNC Hospitals Hearing and Voice Center. Smith joined the Department of Audiology and Speech Pathology in September 2005 after working as a staff Audiologist at Mayo Clinic in Rochester, Minnesota. He received his B.A. in Speech and Hearing Science in 1999 and his M.A. in Audiology in 2001 from The University of Iowa. “The first year of operations at our new clinic has been very successful,” says Smith. “Our patients have been extremely happy with our comprehensive hearing and speech services, convenient location, and free, front-door parking.”



Audiologist Gregory Smith running a hearing test.

The UNC Hospitals Hearing and Voice Center has evolved into a state-of-the-art facility that provides a wide range of hearing assessment 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.

In addition to conducting comprehensive hearing evaluations, Smith has cultivated a thriving hearing aid dispensing program. “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 is 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 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.

Solutions for patients with normal hearing are also available. The SoundPort by Starkey Laboratories is the world’s first custom-fit headset for Bluetooth® enabled cellular phones. It is a small, lightweight system that connects directly to a custom earpiece for clear, hands-free and wireless telephone communication. A variety of custom earmolds can also be obtained through UNC Hospitals Hearing and Voice Center. For example, they offer products such as custom iPod® earbuds designed to direct music comfortably into the user’s ear while providing a much better fit than standard earphones. Additionally, they are able to fit custom earmolds for hearing protection, as well as specialty earmolds for musicians and audiophiles, pilots, motorcyclists, race car drivers, swimmers, anesthesiologists, and for medical professionals who use stethoscopes.

Over the past decade, the field of Audiology has expanded to meet the growing needs of a technology-driven society. “Because the hearing aid industry has made some giant leaps forward in recent years with digital signal processing, we are now able to offer a wide range of custom solutions for individuals with normal hearing, as well as individuals with mild through profound hearing loss,” says Smith. “This is an exciting time to be an audiologist, and a great time to be a patient at the UNC Hospitals Hearing and Voice Center.”

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.



Dr. Buchman gets a high five from a young 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 “DeafTalk”, a video interpreting system. Diagnostic exams available include behavioral, evoked response, and vestibular testing. Patient education, on a wide variety of hearing related conditions, has been developed for patients and families. 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. Otolology 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 over 60 cochlear implants were performed in the pediatric population. The majority of these interventions were carried out in children under 18 months of age. In fact, 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.

The Ear and Hearing Center also evaluated more than 100 new adult patients with hearing loss for possible cochlear implantation last year, implanting nearly 80 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



Ear and Hearing Center Nurse, B.J. Squires, RN, talks to a cochlear implant patient before he is seen by Dr. Buchman at the Carolina Pointe clinic.



Dr. Pillsbury examines a patient's ears.

considering cochlear implantation. Drs. Adunka, Buchman, Clark, 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.



Audiologists Corinne Macpherson, AuD; Marcia Clark, AuD (Director of Adult Cochlear Implant Program); Sarah Martinho, AuD; and Jill Ritch, AuD

Another area of interest is bilateral cochlear implantation. Drs.

Buchman and Pillsbury have been actively involved in bilateral implantation in selected patients more than 5 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.

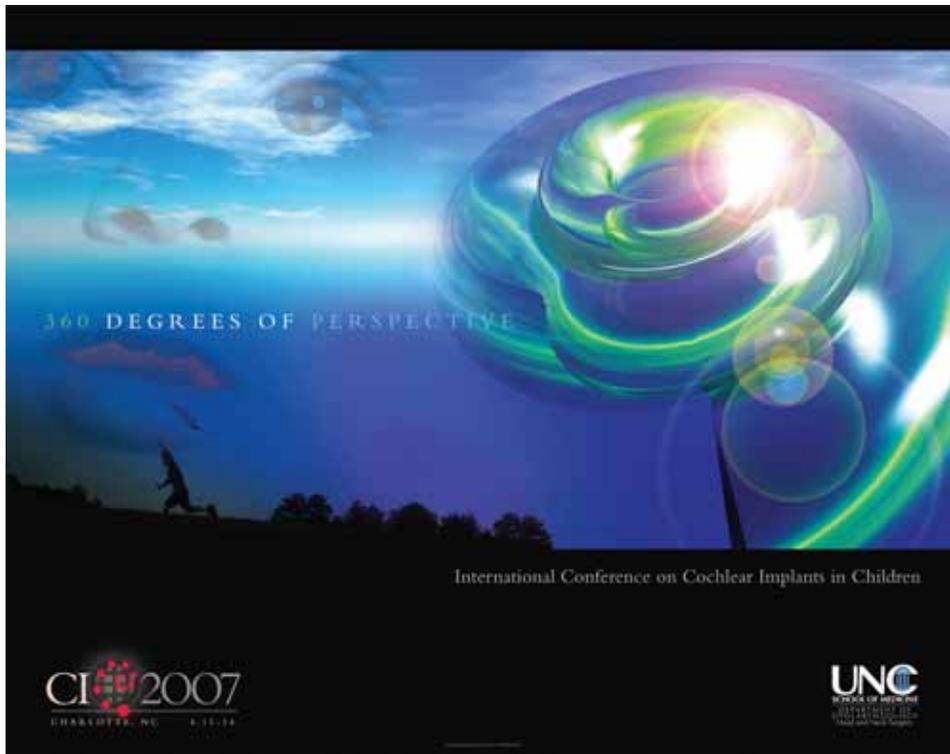
While cochlear implants are useful for most patients with severe to profound sensorineural hearing loss, occasionally patients may not benefit from implantation because of disorders related to the cochlear nerve or cochlea. In such cases, direct brainstem stimulation may provide improvements in communication 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 recently performed a brainstem implant in a patient that suffered from cochlear ossification following meningitis. Only time will tell if this surgery will be

useful for this patient and others afflicted with cochlear or neural disorders not amenable to conventional cochlear implantation.



Drs. Adunka and Buchman

Future studies will continue to focus on testing the safety and efficacy of a variety of new devices.



CI2007 Meeting Summary

by Rose P. Eapen, MD, and Emily Buss, PhD

The 11th International Conference on Cochlear Implants in Children (CI2007) took place April 11-14 in Charlotte. This year, UNC-Chapel Hill was the host organization, and our department took the lead role in planning and directing the conference, with organizational and administrative support provided by the American College of Surgeons. The conference was a resounding success, thanks in no small part to the department's great efforts. The goals of the meeting were to bring together participants from a range of disciplines including surgery, audiology, basic science, engineering, education and industry. Dr. Harold Pillsbury and Dr. Craig Buchman, course directors, provided the leadership and vision to meld these broad interests into a cohesive program. This strategic work was carried out with the help and support of the otolaryngology organizing committee, including Drs. Carlton Zdanski (UNC), Debra Tucci (Duke), John McElveen (Carolina Ear and Hearing), Trevor Goldberg (Charlotte Ear, Nose, and Throat) and Brad Brechtelsbauer (East Carolina University). Attendance at CI2007 surpassed expectation, and was truly international in flavor, with over one thousand registrants from all over the world participating. Having an international meeting so close to home provided a unique opportunity for students and residents here at UNC. Representatives from our residency program included Drs. Marc Bassim, Carlos Ebert, Allen Marshall, Deidra Blanks and Rose Eapen.

The first day of the meeting focused on Cochlear Implantation of the Very Young. The guest of honor for this session was Dr. Simon Parisier (New York University), who talked about the challenges faced

by cochlear implant technology. Dr. Pat Roush's talk entitled "Early Assessment and Hearing Aid Fitting in Infants" considered some of the problems involved with assessing the hearing status of very young children. She emphasized the need for appropriate behavioral and objective testing, coupled with optimized amplification, prior to cochlear implant surgery – issues that are pertinent to the question of how early an infant should be implanted. That afternoon, Dr. Pillsbury presented data on cochlear implantation in patients with significant residual hearing preoperatively; results of this study showed considerable improvement in performance 3 years following implantation. Dr. Oliver Adunka presented cochlear microphonic data collected at various stages during a cochlear implant surgery in a child with auditory neuropathy. This provided novel insights into when cochlear function, as reflected in hair cell response, becomes compromised by the surgical invasion itself. Dr. Charlie Finley also presented a poster on the topic of how CT, behavioral and electrophysiological data might guide mapping to maximize usable hearing in cochlear implant patients.

The focus topic for the second day of the meeting was Auditory Nerve Assessment and Disorders. Dr. Margo Skinner (Washington University) contributed in absentia a very interesting overview of the challenges of cochlear implant fitting in young children, a presentation which was given by her colleague Dr. Jill Firszt (Washington University). Dr. Craig Buchman presented data demonstrating the need for MRI evaluation in addition to CT evaluation for children being referred for cochlear



Entertaining the crowd at CI2007: Drs. Pillsbury, Zdanski, Marshall, Ebert, and Bassim.

implantation to rule out cochlear nerve deficiency. CCCDP audiologist Jennifer Weinstock reported data showing that intracochlear evoked compound action potentials can be measured in pediatric cochlear implant patients who, preoperatively, had the audiological profile of auditory neuropathy, and that these potentials may be predictive of later speech performance. Dr. Carlton Zdanski discussed the medical and audiological profiles of children with auditory neuropathy, and presented cumulative data on outcomes of cochlear implantation in these children. Dr. Charlie Finley also presented his findings that functional hearing may be impaired by overly deep electrode insertion or insertion of the electrode into scala vestibuli. Dr. Doug Fitzpatrick presented some exciting behavioral and physiological data in rabbits using the experimental IC device. Medical student Jason Roberts (East Carolina University) presented electrophysiological and behavioral data on binaural processing of binaurally offset acoustic stimuli, and Dr. Deidra Blanks presented work on normal-hearing simulation of binaural cues available to bilaterally implanted listeners.

Overall this conference was a huge success and a great learning experience. It is inspirational to see how far the field of cochlear implantation has progressed over the past 20 years, and it is exciting to be part of such a vibrant community of clinicians and scientists.



A week after cochlear implantation on his left ear, Parker and his mother, Holly Shoun, return to the ENT clinic at Carolina Pointe for a postop checkup by Dr. Pillsbury. Parker has two cochlear implants. His right ear was implanted in 2004. He is a student in the CASTLE program. Ms. Shoun attended the CI2007 meeting.



Dr. Pat Roush uses a variety of play techniques to test a child's hearing.

Pediatric Audiology

The UNC Pediatric Audiology Team, under the Direction of Patricia A. Roush, AuD, continues to see an expanding caseload of infants and young children with hearing loss. Since the North Carolina legislature mandated newborn hearing screening in 1999, the UNC program has seen an ever-increasing number of babies referred from newborn hearing screening programs throughout the state. As in other hospitals throughout the state, babies born at UNC receive a hearing screening prior to hospital discharge. At UNC, nurse coordinator Chris Stancil ensures that all infants in the well baby nursery receive a hearing screening prior to hospital discharge. Audiologist Patti Reitz screens infants admitted to the Newborn Intensive Care Unit (NICU).

Many of the children who were identified with hearing loss as infants during the early years of the statewide screening program are now entering kindergarten with speech and language skills on par with their hearing peers, due to the benefits of early identification and intervention. It is now common for many infants to be fitted with hearing aids at less than four months of age as compared to past years when children were often two to three years of age before their hearing loss was identified.

In addition to following several hundred children with typical “sensory” hearing loss, the pediatric audiology team in conjunction with the UNC pediatric cochlear implant team is also following over one hundred children who have been diagnosed with auditory neuropathy/auditory dyssynchrony (AN/AD). While AN/AD is not a new disorder, newer test techniques in recent years have allowed

us to more accurately diagnose it. AN/AD presents new challenges in management for pediatric audiologists and the UNC pediatric team in conjunction with UNC otolaryngologists have developed an evidence based protocol for evaluation and management so that all infants diagnosed with this disorder will have the most effective treatment possible.

The UNC pediatric program was highlighted at several state, national and international meetings this past year. In October 2006, Dr. Pat Roush gave an invited presentation entitled *Hearing Care for Infants: A Continuum of Services* at the 3rd Biannual UNC Pediatric Audiology Symposium. This meeting attended by audiologists throughout the state is sponsored by the UNC Division of Speech and Hearing Sciences in conjunction with UNC Pediatric Audiology. In March 2007, pediatric audiologists Pat Roush, Jill Ritch, Sarah Martinho and Corinne Macpherson gave presentations on management of infants with hearing loss at the N.C. Speech, Language and Hearing Association's annual meeting in Raleigh.

In April, the UNC Dept. of Otolaryngology hosted the 11th International Conference on Cochlear Implants in Children in Charlotte. The meeting was truly international with over 1000 participants from 25 countries in attendance. Dr. Roush gave a featured presentation at the conference entitled *Early Assessment and Hearing Aid Fitting in Infants: Eliminating the Sources of Error*. She also traveled to Switzerland in June where she delivered a presentation entitled *Diagnosis and Management of Auditory Neuropathy/Auditory Dyssynchrony in Infants and Children*.



Director of the Adult Cochlear Implant Program, Dr. Marcia Clark, shares and interprets the audiological results and outcomes with a patient. The discussion centered around his candidacy as a future cochlear implant recipient.

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/early 1980s and has managed to grow and thrive throughout the years, providing quality medical care to close to 1000 cochlear implant recipients young and old. The number of patients implanted annually continues to rise as a result of expanding candidacy criteria for implantation as well as new developments in cutting-edge cochlear implant technology from the three implant manufacturers worldwide; MED-EL Corporation, Advanced Bionics Corporation (Boston Scientific), and Cochlear Corporation. The UNC Adult Cochlear Implant Program incorporates a knowledgeable and sophisticated team of scientists and healthcare professionals, including, Harold C. Pillsbury, MD; Craig A. Buchman, MD; Oliver F. Adunka, MD; Marcia Clark, Au.D; and a valuable team of researchers, including Joseph Hall, PhD; John Grose, PhD; Emily Buss, PhD; Charles Finley, PhD; and OHNS residents.

The cochlear implant is an electronic device which bypasses the outer and middle ear, providing direct stimulation to the surviving auditory nerve fibers in the ear. The procedure involves the implantation of a receiver stimulator behind the ear in combination with an external speech processor to drive the internal component. Traditionally, this technology has only applied to patients who

suffered from bilateral severe to profound sensorineural hearing loss and who no longer received measurable benefit from standard acoustical amplification. This criterion for candidacy has changed dramatically in the past few years and we are now able to offer this remarkable technology to patients with more residual hearing. The UNC Adult Cochlear Implant program prides itself on being innovative and forward thinking in the field of medicine as we are active participants in clinical research and FDA clinical trials.

In January 2007, we embarked on a new FDA regulated trial sponsored by MED-EL Corporation and entitled Electroacoustic Stimulation. This new trial incorporates a hybrid device technology; a partially inserted cochlear implant device 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. To date, we have implanted four patients using the EAS approach and the outcomes have been successful. Improvements in hearing in noise as well as improved music appreciation have been the reported benefits of this technology over even traditional cochlear implants. Progress of the trial we be ongoing as we attempt to enroll more qualified participants and to monitor the success and outcomes of these patience over the upcoming year. 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.



Michelle Van Gorden is a fourth year AuD student training under Dr. Marcia Clark.

Further, we remain steadfast in our goal to promote and share research findings at national and international conferences on hearing. In April 2007, the UNC Department of Otolaryngology Head and Neck Surgery hosted the 11th International Conference on Cochlear Implants in Children in Charlotte, NC. With over 1000 attendants from national and international locations, the conference focused on critical topics in children with hearing loss, more specifically bilateral cochlear implantation, bimodal hearing, auditory neuropathy, and early intervention protocols for children. The meeting posed as a unique opportunity for the exchange of knowledge between implant centers worldwide.



Group hug at the CCCDP! Clockwise: Speech Language Pathologist Erin Thompson, Mylah, Ivan, Mercy Ann, SiSi, and Isabella.

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

Increasing numbers of children are coming to UNC Pediatric Cochlear Implant Team each year. They include both new patients and children who have been implanted by other programs. The team is now managing more than 500 children with cochlear implants from 77 North Carolina counties and two neighboring states. The success of cochlear implants is presenting challenges to clinicians, educators, and policy makers. Children with cochlear implants who were born without hearing cannot make significantly effective progress beyond surgery without four or more years of intensive therapy and specialized educational services. This process requires a team approach and must fully engage the child’s family. Each team member, including school professionals and the child’s parents, must participate effectively in a coordinated “auditory-based approach” to the development of spoken language. This is complicated by the fact that most teachers of the deaf and other professionals in the field have been trained to work with sign language and have found themselves unprepared to develop auditory skills and spoken language in these children.

The commitment to follow implant patients as they develop, to support a team approach, and to assure that the technology is doing its job are all critical aspects of The W. Paul Biggers, MD Carolina

Children's Communicative Disorders Program (CCCDP) mandate. Program Director Carolyn J. Brown joined ENT to develop the CCCDP shortly after it was funded. She came to UNC from California, where she had served with Dr. William House on the world's first pediatric cochlear implant team. Carolyn has also responded to the challenges posed by the needs of pediatric implant patients by creating the Center for Acquisition of Spoken language Through Listening Enrichment (CASTLE) to provide both direct services to families and the training and mentoring required by professionals. CASTLE was founded five years ago to develop a prototype program providing auditory-based professional training and mentoring, family training and support, speech therapy, and a model preschool program for children with severe to profound hearing loss.

CASTLE is teaching children who are deaf to listen and to talk. Through advanced technologies and cutting edge school and family-based interventions, these children are gaining direct access to mainstreamed education and the potential to become fully productive and enfranchised citizens. Rapidly growing public acceptance of cochlear implants has posed a significant challenge, especially to school professionals and policymakers. An essential part of the mission of CASTLE is to provide a practical model to clinicians and policy-makers for giving access to audition and the potential for spoken language to children who are born deaf. It also 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.

Having demonstrated its ability to deliver effective services to both families and professionals, the program is currently being expanded to include sites in eastern and western parts of the State. This will facilitate access to training and services in every North Carolina county and school system, and will make CASTLE a unique regional model that will be more effective than a centralized program, and that can be replicated anywhere.

The Expansion Project has been initiated by Carolyn Brown with grants from The Duke Endowment, The Cape Fear Memorial Foundation, and The Cannon Foundation. Additional funding is being sought to continue the expansion of CASTLE to enhance program components for families, school professionals, and early intervention educators across the North Carolina.

The North Carolina General Assembly has provided for the core budget of the CCCDP with a recurring grant now totaling \$503,000/year. The main CASTLE, located in Durham, is currently funded by the Oberkotter Foundation and the State of North Carolina. State funding for CASTLE, beyond the core budget for the CCCDP, has been provided since 2004, increasing to \$400,000 in the State budget recently approved for 2007-08. This brings the total investment by the State in CASTLE to \$1.4 million. The new Wilmington site has been initiated with grants from The Duke Endowment, The Cape Fear Memorial Foundation, and The Cannon Foundation. Since 2001 Carolyn has raised \$2.8 million from private sources.

The Wilmington program is operating in temporary quarters until construction is completed on the building in which facilities will be leased. When this site gains a firm footing and sufficient addition-



Speech Language Pathologist Tom Page, in a speech therapy session with Kris.

al funds are secured, it is anticipated that a second expansion site can be opened in Hickory as early as the fall of 2008.

Maegan Evans, PhD., CCC-SLP came to CASTLE in late 2006 to help open the new Wilmington site. Maegan received her master's and doctoral degrees in Communication Sciences and Disorders from the University of South Carolina-Columbia. She worked as a Speech-Language Pathologist at USC from August 2002 to December 2006. At CASTLE, Maegan provides speech and language therapy to preschoolers, speech and language diagnostics to children of all ages, Parent Participation Sessions to children of all ages, and will provide training opportunities for hearing-related professionals in the southeastern region of North Carolina.

Francisca Hernández Casillas, MA, Teacher of the Deaf and Hard of Hearing joined CASTLE in July 2006 and subsequently became the first lead preschool teacher to serve at the new site in Wilmington. Francisca graduated from California State University, Fresno, with a Master of Arts degree in Deaf Education in May of 2002. She served in California as an itinerant teacher of the deaf working with children from birth through 12th grade, and she attended Summer Institute at CASTLE in 2005.

Responding to the Challenge

Dr. Harold Pillsbury serves as Executive Director to the CCCDP. Dr. Craig Buchman is Medical Administrative Director, and, along with Dr. Carlton Zdanski, performs most implant surgeries for

the pediatric program. Dr. Buchman is also director of the Ear & Hearing Center. 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, and attending professional meetings in the United States and Europe.

Holly F. B. Teagle, AuD, was appointed Clinical Director of the Pediatric Cochlear Implant Program at the CCCDP in early 2006, taking over this aspect of the program from Program Director Carolyn J. Brown, who has turned much of her attention to the expansion of CASTLE and the general administration of the CCCDP. Holly has also served, among other roles, as the UNC Site Coordinator and Principal Investigator for a recently renewed NIH (NIDCD)-funded study entitled Childhood Development after Cochlear Implantation (CDaCI).

The Pediatric Cochlear Implant Team performed 59 implant surgeries on children between July 1, 2006 and June 30, 2007, and, as already mentioned, is managing more than 500 children with cochlear implants. Of the 59 surgeries performed during the year fourteen were revision surgeries, replacing devices that had malfunctioned, and twelve were bilateral surgeries in which the children received a second implant. The team includes three surgeons, five audiologists, two speech-language pathologists, and two social research assistants. At the time the program was founded by Dr. Biggers fourteen years ago, there were just 14 children to follow. With the addition of CASTLE the staff has been expanded to include three additional speech-language pathologists, one full-time and one part-time certified auditory-verbal therapist, and four teachers of the deaf.

Today the CCCDP continues to tackle the range of challenges confronting the families of children with cochlear implants. With children committed to an auditory-based track throughout North Carolina, families are confronted with schools and other institutions that are unable to respond effectively. At present there are only fifteen certified auditory-verbal therapists (Cert. AVT) available in North Carolina. While there is a Cert. AVT living on the outer banks, not one is otherwise available east of Raleigh. The CCCDP and the North Carolina Department of Public Instruction (DPI) are racing to catch up. Some teachers of the deaf have now been introduced to the auditory-based approach. The effort has come a long way, but a great deal more remains to be accomplished. The expansion of CASTLE to new locations in the east and west is greatly needed. And, the CCCDP is continuing to develop training standards for professionals involved in the state's early intervention program and those working with preschool and grade school children.

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. Utilizing its own preschool classrooms, CASTLE provides hands-on training in auditory-based therapy and teaching techniques for speech pathologists and teachers of the deaf, a practicum site for graduate students in the UNC system, a Family Learning Center, and a therapy program for children with hearing loss. An intensive training program for school professionals and early interventionists in Wake County was funded by the John Rex Endowment 4 years ago as a prototype for what is expected to follow across North Carolina.



Seated: Beth Whitfield, Carolyn Brown, Holly Teagle, Sherri Vernelson. Middle row (staggered): Tom Page, Lisa DiMaria, Erin Thompson, Pat Roush, Hannah Eskridge, Lori Parker, Jennifer Woodard, Robert Humphreys, Sindy Poole, Craig Buchman. Back row: Carlton Zdanski, Oliver Adunka, Allison Cleland, Deb Hatch, Sandra Onisk-Hancock, David Perry.

Early Intervention as Critical Priority

Early identification and intervention are key factors in making the most of auditory and speech potential for children who are deaf or hard of hearing. Early childhood is the critical period for language development. The first six months of life may be the most significant. Research confirms that the language skills of children are ultimately enhanced when intervention is initiated prior to six months of age. At CASTLE, parents receive counseling, education, and guidance in one-on-one sessions emphasizing the acquisition of spoken language skills through structured listening. Parents and children meet regularly with therapists to learn strategies and techniques that promote listening and speaking. With the help of the Family Learning Center and a resource library, parents and caregivers learn to integrate language development into play and other daily activities.

Training internships are available at CASTLE for professionals in North Carolina working with children who are deaf or hard of hearing and their families. Professionals receive intensive, hands-on training in the use of an auditory-based approach. Additionally, professionals are provided opportunities to learn about the medical, surgical, and audiological management of hearing loss, including new technologies. Numerous school districts across the state have begun to take advantage of this resource, sending staff for one-week internships.

The CCCDP has also facilitated the professional development by providing periodic seminars and two-day conferences. An Institute for Auditory-Verbal Therapy offered for graduate credit, known affectionately as "The Summer Institute," is being repeated annually. The Summer Institute provides instruction with hands-on clinical experience. Although North Carolina professionals are our priority, this program has received national recognition and has been attended by professionals from a

number of states, as well as Canada and Mexico. In this way, a growing number of professionals across North Carolina have been exposed to the basic principles of an auditory-based approach.

The annual CCCDP Fall Conference, co-sponsored by the North Carolina A.G. Bell Association, featured Judith Simser this past year, an internationally acclaimed authority on the education of children with hearing loss. Parents and professionals attended from across North Carolina, including representatives from about 30 public school districts. Proceeds from the Conference are donated to help pay for an annual weekend camp for deaf children and their families each year.

Foundations for Research

The UNC Pediatric Cochlear Implant Team has monitored audiometric and speech-language measures for each patient in the program since 1993. Testing begins prior to surgery and continues every six months to a year. Some of these children are now entering college. Managed by David Perry, the assembled data is growing rapidly and is currently in the process of expansion to accommodate bilateral implantation.

The CCCDP is one of six implant centers in the United States participating in a NIH (NIDCD)-funded longitudinal study entitled Childhood Development after Cochlear Implantation (CDaCI). The purpose of this multi-center study is to evaluate the impact of cochlear implantation on the “whole



Audiologist Jennifer Woodard tries out the new programs for mapping of Jenna’s bilateral implants to ensure optimal hearing.

child,” with particular emphasis on longitudinal measures of cognitive, social, and behavioral development. Specific measures of language development, speech perception ability, and speech production are also being tracked. It is anticipated that data from this study will contribute to our understanding of the factors predicting implant-associated language use, communication competence, and perceived value of early implantation in light of associated costs.

Thirty children and their parents were enrolled as participants at the beginning of the study at UNC. Several families have moved away and had to drop out, but 27 remain. A total of 188 children with cochlear implants and 97 control subjects were enrolled for the entire project. The other participating centers include Johns Hopkins University (the Coordinating Center), House Ear Institute in California, the University of Miami, the University of Michigan, and the University of Texas Callier Hearing Research Center. This study has now been underway for five years and has recently been extended for another five years. Carolyn Brown has served as the UNC Principal Investigator with Holly Teagle, AuD, as the UNC site coordinator. However, Dr. Teagle will assume the role of UNC Principal Investigator going forward. Hannah Eskridge will remain the primary speech-language pathologist on the project.

The Financial Assistance Program

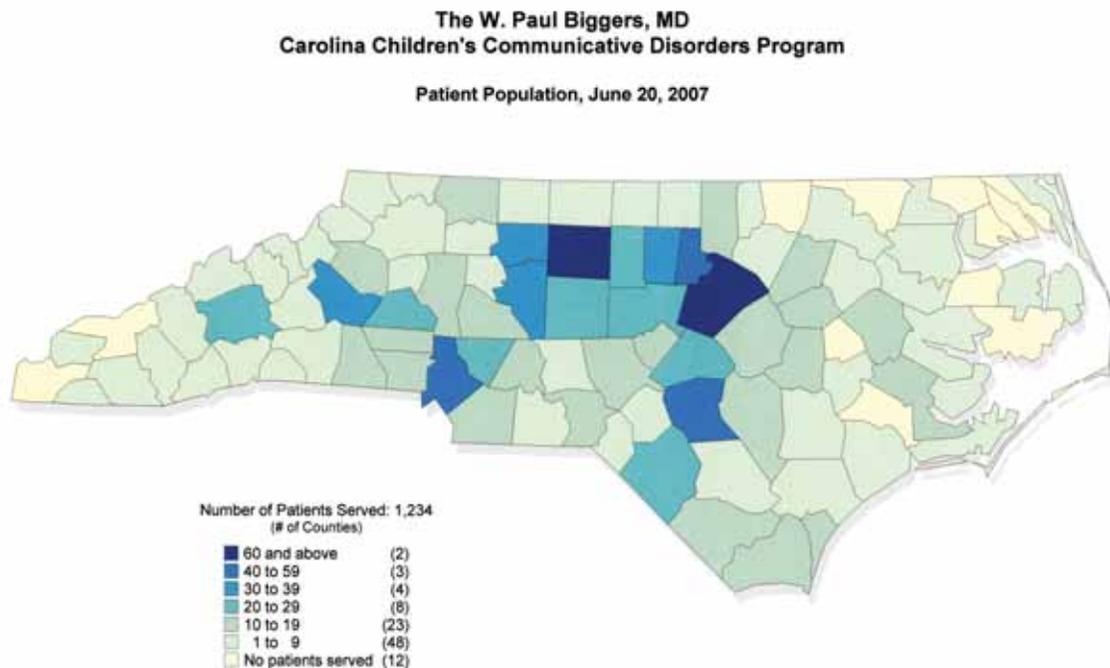
The CCCDP was first proposed to the North Carolina legislature by W. Paul Biggers, MD, in the spring of 1992, to include a financial assistance program. It was funded later that year and continues to respond to rapidly growing demands from across North Carolina. The grant serves children from birth to age 21, funding such technologies as frequency transposition hearing aids, digital programmable hearing aids, cochlear implants, 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 certain implant accessories such as batteries, cords, and external equipment. 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 1241 children. From July 2006 to June 2007, 62 new children were enrolled. A total of 443 children were enrolled at some point during this period. Of 340 currently enrolled children, 183 have cochlear implants.

Primary elements in supporting a hearing-impaired child’s educational success are school visits and IEP (individual educational planning) sessions. CCCDP staff travel thousands of miles each year for school visits in support of children enrolled in the grant. School visits include observation of the child in the classroom, followed by a meeting at the end of the school day during which the CCCDP professional meets with parents and professionals, often including the child’s regular teacher, teacher of the hearing-impaired, speech therapist, and advocacy representative, to discuss the

child's needs and offer recommendations. CCCDP staff participate in IEP sessions with a variety of school professionals to review progress and discuss new goals for the child's education.

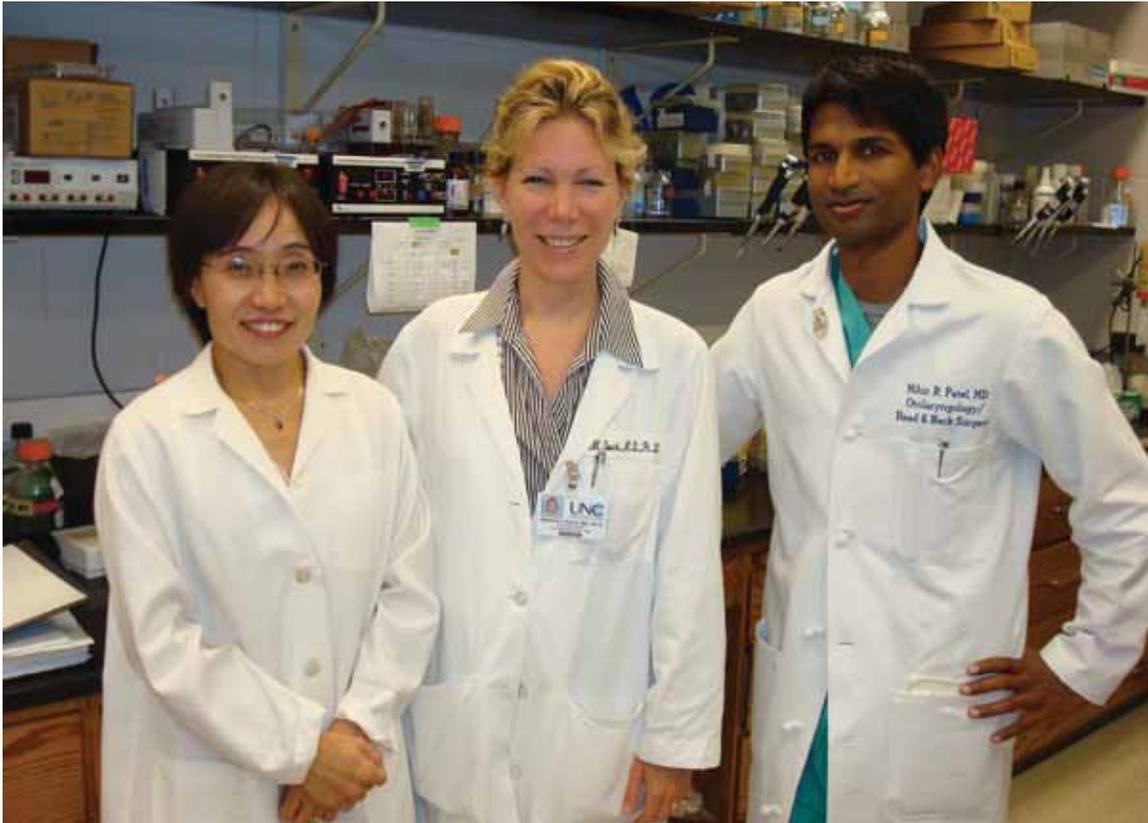
A strong focus on building the capacity of school professionals has helped to make the University of North Carolina at Chapel Hill one of the leading centers for the development of spoken language in children with hearing loss. The program has created a comprehensive approach to the developmental challenges faced by children who gain access to sound much later than normal. CASTLE is making it possible for communities to support children with implants and, in particular, for public school systems to bring them up to grade level as quickly and effectively as possible. After receiving access to advanced technologies, many North Carolina children who are profoundly and pre-lingually deaf are now entering kindergarten with self-confidence and age-appropriate language.



Source: CCCDP, 2007.
Produced By: North Carolina Rural Health Research Program, Cecil G. Sheps
Center for Health Services Research, University of North Carolina at Chapel Hill.

RESEARCH

Head and Neck Cancer Research



Xiaoying Yin, MD; Marion E. Couch, MD, PhD; and Mihir R. Patel, MD

Marion E. Couch, MD, PhD, and her colleagues are working on the mechanism of cancer cachexia syndrome, a wasting syndrome which afflicts so many of our cancer patients. The contribution of both the host and the tumor to cancer cachexia is being actively investigated. Albert Baldwin, PhD, Associate Director of the Lineberger Comprehensive Cancer Center and HJ Kim, MD, in the Department of General Surgery at UNC are collaborating to determine whether various signaling pathways are involved in cachexia. Ashley Wysong (MS3), a Howard Hughes fellow at the University of North Carolina, will investigate whether novel inhibitors of the transcription factor, NFkB, are effective in reducing the symptoms associated with cachexia. Scott Asher (MS3), a recipient of an Otolaryngology T32 training award, will investigate ways to utilize metabolomics to detect this syndrome, and to monitor the response to anti-cachexia therapy. For this project, we are collaborating with Thomas O'Connell, PhD, the Director of the Metabolomics Laboratory at UNC. The laboratory published work describing a head and neck animal model for cancer cachexia and work implicating the innate



The Lineberger Cancer Center

immune system (Toll-like receptors) in the severity of the wasting syndrome. Ongoing clinical trials will confirm our published pilot study in patients with head and neck and gastrointestinal cancer treated with the cyclo-oxygenase inhibitor drug, Celebrex. Patients treated with moderate doses of the anti-inflammatory drug were able to reverse the wasting and had increased quality of life scores.

Meredith Burgents, PhD joins the laboratory during her post-doctoral fellowship with Dr. Couch and Dr. Jon Serody and she will be pursuing research using a genetically-engineered allogeneic tumor cell vaccine for patients with head and neck cancer. A majority of patients with head and neck cancer present with advanced disease. New therapies are needed and cancer vaccines are emerging as a promising form of adjuvant therapy. Dr. Couch received a University of North Carolina Translational Research Award for her project entitled, "Allogeneic, genetically-engineered tumor vaccine." This will allow her time and resources to develop a Phase I clinical trial with correlative studies for a novel tumor vaccine for head and neck cancer patients. Her mentors are Dr. Jon Serody and Dr. Claire Dees in the Department of Internal Medicine. Both mentors have extensive experience in clinical trials involving vaccines.

Dr. Michael Stadler (PGY2) will join the lab to evaluate how Toll-like Receptor 4 (TLR-4) function affects the anti-tumor response of an allogeneic, GM-CSF secreting, HER-2/neu expressing, whole cell tumor vaccine (3T3/GM-neu) on mice challenged with a squamous cell carcinoma cell line. He received a Resident Research Award from the American Academy of Otolaryngology – Head & Neck Surgery to perform these studies. Dr. Mitchell Gore (PGY2) will examine the effects of TLR-9 agonists on the severity of cancer cachexia. He will investigate whether the addition of TLR-9 agonists to mice with cancer cachexia will result in increased NF κ B activation, production of proinflammatory cytokines, more severe clinical signs of cachexia, and increased levels of a marker of muscle atrophy. He will then use TLR-9 antagonists in the same model to determine if the effects of the cachexia are blunted with this treatment.

Our laboratory group continues to investigate the effect of temporary depletion of antioxidants in the diet during chemoradiation therapy in patients with oropharyngeal cancer. This carefully designed Phase I clinical trial will assess the safety of this novel diet. Patients are being actively enrolled. Secondary objectives include measurements of cancer cachexia such as weight loss, body composition, serum cytokine levels, and quality of life and activity surveys. The rate of programmed cell death or apoptosis and the rate of cell division will be determined in the tumors of patients on the clinical trial. Dr. Derek Leight (PGY4) and Joshua Surowitz (PGY1) are working on an Institutional Review Board approved study that uses infrared imaging to determine if subtle temperature changes in a reconstructive flap may predict flap compromise. This is a multidisciplinary project which will determine whether this is a sensitive method of monitoring flaps in head and neck cancer patients. It will also potentially challenge the dogma that tissue flaps with compromised blood flow have decreased temperature.



Carol G. Shores, MD, PhD, is involved in several research projects. Mihir Patel, MD, PGY2, and Paul Bryson, MD, PGY3, are working to distinguish follicular thyroid carcinomas from adenomas using fine needle aspirations (FNA). This distinction is currently only made after thyroid lobectomy. By examining published expression arrays, we have developed a list of genes whose expression distinguishes follicular thyroid carcinomas from adenomas. We have developed tissue microarrays (TMA) containing hundreds of thyroid specimens with a wide variety of pathologies with funding from the American Head and Neck Society and the UNC Medical Alumni Endowment Fund. Using commercially available antibodies, the TMAs are stained for the proteins encoded by these genes, and multivariate analysis

will be used to determine a staining pattern specific for follicular carcinoma versus adenomas. We will then use this staining protocol on FNAs from patients with thyroid nodules to determine if it can be used clinically.

Human papilloma virus is causative in cervical squamous cell carcinoma (SCCA), and is found in 50% of oropharyngeal SCCA. Although it is implied that HPV can transmit oropharyngeal SCCA, this has not been proven. UNC Head and Neck Surgery Division has identified two non-smoking couples with oropharyngeal SCCA. All four patients had low risk factors for developing head and neck cancer. Working with Elizabeth Andrews, DSS (Oral and Maxillofacial Pathology Graduate Student) and Jennifer Webster-Cyriaque, DDS, PhD (School of Dentistry), clinical specimens from these patients have been collected and shown to all contain HPV. The subtype is being determined, and if they match between couples, it will be strong evidence that HPV transmitted the cancer between partners.

Working with Xiaoying Yin, MD, and Neil Hayes, MD (Division of Medical Oncology), we have collected hundreds of HNSCCA tumors from our patients at UNC. Using this tissue bank, we are

generating microarray expression data to compare gene expression in tumors that do and do not respond to combined chemoradiation. In addition, Dr. Hayes and Steve Lee, MD, PGY4, have compared our expression profile with two other HNSCC data sets. This demonstrated two distinct sets of patients defined by their gene expression, with different overall outcomes.

Xiaoying Yin, MD, has been collaborating with Conforma Corporation in examining a novel class of chemotherapy agents, Hsp90 inhibitors. Hsp90 stabilizes cellular proteins, and inhibition can lead to the degradation of several tumor related proteins, thereby interrupting several pathways simultaneously. One inhibitor has been shown to radiosensitize HNSCC in a xenograft model, with minimal side effects and disruption of the expected proteins.

Epstein Barr Virus (EBV) is associated with several different cancers, including Burkett's Lymphoma. This tumor is rare in North America, but is a common childhood cancer in subsaharan Africa. In tissue culture and animal models, EBV shifts from a drug resistant latent infection to a drug sensitive lytic infection when exposed to chemotherapy. If this is true in human EBV associated cancers, the addition of antiviral therapies with the first round of chemotherapy may increase cure rates. Dr. Shores is the principle investigator of a clinical trial in Malawi Africa to examine changes in EBV virus status in children with Burkett's Lymphoma. Dr. Paula Harmon, PGY2, has received an American Academy of Otolaryngology/Head and Neck Surgery Foundation Resident Research Award to open this trial. Drs. Shores and Harmon will travel to Malawi in August 2007 to start collecting tissue from Burkett's patients.

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 will include 1,300 cases and 1,300 controls and will constitute 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. The size and population-based design should allow the investigators to more confidently confirm or reject associations raised in previous studies. The study will also collect tumor blocks will for future studies of "downstream" somatic alterations of tumor suppressor genes and oncogenes. The basic data collection phase was completed in June 2006 and initial analyses are underway. 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 lead 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. New analyses are underway on gene methylation in the stored tumor samples.

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.



Dr. Andy Olshan

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. The CHANCE study, which is ongoing, is funded by the National Cancer Institute.

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.

Ear and Hearing Research



Graduate Student Deepti Rao and Postdoctoral Research Associate Jaime Mancilla, PhD, performing electrophysiological experiments in the dorsal cochlear nucleus, which is thought to play a role in the production of tinnitus.

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 two grants to members of the laboratory, Dr. Greg Basura and Dr. Yong Wang.

In the first project, Dr. Manis and his colleagues, Dr. Jaime Mancilla, Dr. Sarah Street and Dr. Beom Cho Jun, are studying the physiology of the dorsal cochlear nucleus molecular layer. 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. Increased spontaneous activity in the DCN after hearing loss has also been associated with central *tinnitus* (perception of a phantom sound) after noise-induced hearing loss. 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 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.

In a second research project, Dr. Manis, along with Dr. Yong Wang, Dr. Ruili Xie, and a Neurobiology graduate student, Mr. Luke Campagnola, is investigating the integrative mechanisms of anterior ventral cochlear nucleus (AVCN) bushy neurons in normal animals, and in animals experiencing chronic hearing loss. These cells are part of a major set of pathways that are important in both speech perception and for sound localization. There are 3 sets of experiments. In the first aim, we are testing explicit hypotheses about the subthreshold integrative mechanisms of AVCN bushy neurons using *in vitro* methods and dynamic clamp to apply realistic patterns of synaptic conductance changes that represent the activity expected with acoustic stimulation. We are examining ideas about how the specialized potassium conductances found in auditory neurons contribute to integration of synaptic inputs using a new method called “dynamic clamp”. In the second aim, we are testing the hypothesis that the two primary sources of inhibition to bushy cells utilize synapses with different release properties and temporal dynamics. We are also testing whether inhibition is necessary to improve temporal fidelity of timing information, and whether inhibition helps to provide a sparse code to more central synapses. We are documenting the organization of the functional circuitry within the AVCN through paired recordings between inhibitory interneurons and principal neurons. In the



The Manis Lab Team: Lower: Ruili Xie, PhD; Beom Cho Jun, MD, PhD; Sarah Street, PhD; Eveleen Randall. Standing: Yong Wang, PhD; Heather O'Donohue; Deepti Rao; Paul Manis, PhD; Jaime Mancilla, PhD; Luke Campagnola.

third aim, we are examining the effects of hearing loss on synaptic transmission at both excitatory and inhibitory synaptic inputs in a mouse model. We are testing the hypothesis that hearing loss causes the postsynaptic receptors to return to an immature state, e.g., similar to the receptor expression pattern seen during early development. With Ms. Eveleen Randall (who will be an MS1 at UNC in the fall) and Ms. Heather O'Donohue, we are also investigating the more speculative hypothesis that there are compensatory changes in nicotinic cholinergic receptor function in the AVCN, since there is evidence that innervation of the cochlear nucleus by cholinergic afferents may be increased after profound hearing loss that includes loss of spiral ganglion cells. This work is also dovetailing with the UNC Proteomics Core and Dr. Xian Chen, to look at other proteins that may change in the cochlear nucleus and inferior colliculus with hearing loss. These experiments will help us understand how information is processed in the central auditory system under normal hearing conditions, and will shed light on functional and cellular changes in central processing that occur in hearing loss and deafness. Understanding these dynamic changes is an essential step toward developing compensatory or corrective strategies to restore hearing and optimize auditory communication in the face of hair cell and ganglion cell loss.

In a related set of experiments, Dr. Manis' lab is examining the effects of age-related hearing loss on central processing in mice. The DBA strain of mice exhibits a highly reproducible early-onset high frequency hearing loss of peripheral origin. Dr. Yong Wang, a postdoctoral fellow in the laboratory, has found that cells in the high frequency regions of the cochlear nuclei of these mice undergo

changes in their synaptic communication with the auditory nerve. We are excited about these results, and the experiments may have implications for understanding how best to treat patients with significant hearing loss. Dr. Wang has recently received an R03 grant from NIH to study the effects of noise-induced hearing loss on these synapses, as well as on the integrative mechanisms of cochlear nucleus bushy neurons.

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 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 Deafness Research Foundation (to Dr. Greg Basura, a resident in the laboratory), to study 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. Lastly, a project 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.



Gregory J. Basura, MD, PhD, wrote an article for our quarterly newsletter about his research project with Dr. Manis and his group. The following is an update:

Since the winter 2007 *Heads Up* report on our research in the auditory cortex, some exciting things have continued to develop in the lab of Dr. Paul Manis. At the time of that report we were continuing our work that was awarded a grant from the Deafness Research Foundation (DRF) to explore the role of serotonin and plasticity within the auditory cortex in response to early-onset sensorineural hearing loss. There has been considerable productivity with the project that has demonstrated changes in the way auditory cortex neurons respond to serotonin neurotransmission after cochlear ablation as a model of sensorineural hearing loss. This productivity captivated

the interest of the DRF to the point that they renewed our grant for another year of funded research to continue through the summer of 2008.

Hearing impairments during development can produce significant changes in speech maturation, sound discrimination, and cognitive function. Clinically, this may lead to a permanent loss of auditory

perceptual skills and impairment of language acquisition. To date, hearing loss research has predominantly focused on cochlear and cochlear nuclei functioning in animal models of deafness, while alterations in the primary auditory cortex (A1) remain largely unexplored. Understanding potential elements of plasticity in the central nervous system following sensorineural hearing loss (SNHL) is important as it may suggest novel clinical interventions leading to restorative hearing.

In the laboratory of Dr. Paul Manis we are investigating elements of plasticity within the A1 in response to early onset SNHL. Using a rodent model of bilateral cochlear ablation in pre-hearing animals, I am using electrophysiologic techniques to evaluate how A1 pyramidal neurons behave following an early loss of sensorineural inputs. More specifically, I am addressing serotonin (5-HT), a known early modulator of normal cortical function and development, and specific 5-HT receptors and how they may be contributing to elements of plasticity following SNHL.

We were fortunate enough to be awarded a Deafness Research Foundation Grant for the first year (2006-2007) studies entitled: *Synaptic Organization and Plasticity in the Auditory Cortex Following Cochlear Ablation: Role of Serotonin Neurotransmission*. Specifically, these studies were designed to characterize the influence of serotonergic neurotransmission, via 5-HT₂ receptors, on auditory neuronal excitability following bilateral SNHL.

Since our last application to the DRF, we have made considerable progress in understanding the influence of 5-HT and 5-HT₂ receptors on pyramidal cell excitability within the normal developing A1 and following cochlear ablation as a model of early onset SNHL. We have demonstrated that 5-HT largely suppresses layer II/III cell excitability in the sham-operated A1; an effect exacerbated by 5-HT₂ receptor blockade suggesting that 5-HT₂ receptors normally positively regulate A1 neurons. Interestingly, following cochlear ablation, A1 cell excitability is not appreciably suppressed by 5-HT, an effect that is not altered by 5-HT₂ receptor antagonism, suggesting that 5-HT₂ receptor coupling to A1 layer II/II neurons is disrupted following cochlear ablation. Because 5-HT application to whole cell recordings stimulates multiple receptor subtypes, our present second year application for continued funding from the DRF seeks to utilize selective 5-HT_{2A} receptor agonist and antagonist compounds to better elucidate changes in 5-HT_{2A} receptor coupling to pyramidal cells following cochlear ablation. Moreover, we have utilized radio-ligand binding and high performance liquid chromatography assays to characterize 5-HT_{2A} receptor protein expression and 5-HT and metabolite levels, respectively in A1 during normal development. These studies have characterized the normal developing A1 for trends within the 5-HT system that will be re-evaluated for elements of plasticity following cochlear ablation.

The clinical importance of this research lies in the identification of mechanisms contributing to plasticity and compensatory functioning in the central nervous system following sensorineural hearing loss. The evaluation of A1 neuronal functioning in an animal model of deafness and the progressive identification of neurotransmitter receptor systems that may modulate their activity after hearing loss, may lead to the development of pharmacologic tools to facilitate restorative hearing. Such findings could suggest simple neuropharmacological approaches to prevent permanent changes in auditory cortex transmission so that when hearing is restored, normal A1 function is achieved.



Psychoacoustic Research Team: Seated: Emily Buss, PhD; Joseph Hall, PhD, Madhu Dev, Lisa Whittle. Standing: John Grose, PhD; and Rose Eapen, MD.

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 initiative here explores the consequences of otitis media with effusion (OME) on the development of hearing. The studies conducted in this project have indicated that several auditory processes show delayed development in many children with OME history, particularly processes that underlie the ability to hear desired sounds in complex auditory backgrounds. It is not uncommon for deficits in auditory processing to linger well after the audiogram has returned to normal. These results may have implications for the ability of children with OME history to hear in both social and educational settings. A current emphasis is the study of the development of frequency weighting for speech in children who have a history of otitis media. This project has also contributed to the understanding of auditory development in normally hearing children. Recent findings indicate that children with a history of OME tend to weight speech information that is in a frequency region near 2000 Hz than frequencies that are lower or higher. It is possible that this is related to the fact that the hearing loss associated with OME is often less severe at 2000 Hz than at lower and higher frequencies. This raises the possibility that neural processes underlying the encoding of speech develop abnormally in children with OME, but in such a way that minimizes the associated disability.

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. This project is also initiating new

studies of auditory abilities that are important for normal hearing of complex sounds. One of the studies is investigating the auditory processes that underlie the ability to hear the pitch of a complex sound. The results of this study may help identify the particular kinds of sensorineural processes that underlie the perception of pitch. A second study is 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 a new 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 ears. Most everyday listening environments consist of a multitude of sounds, many of which are fluctuating in level over time. The way in which the brain sifts apart this acoustic complex into its constituent sound sources is referred to as auditory perceptual organization. The root interest of Dr. Grose's project is to understand the role that temporal processing plays in perceptual organization and how impaired auditory systems compromise this ability. One focus of this research has been on the discrimination of silent intervals in complex sounds where the spectral characteristics of the sounds either side of the silent interval differ. Intervals such as these occur quite often in running speech and are semantically informative. In a paper published this year, Dr. Grose demonstrated that when the sound after the gap is more spectrally complex than the sound before the gap, discrimination of the gap itself becomes quite poor. Auditory brainstem responses (ABRs) elicited by the same sounds demonstrated that the silent interval itself was well marked, and therefore what appeared to be disrupted was the ability to attend to the interval. Another paper under review shows that listeners with cochlear implants exhibit a similar effect. A related line of work in Dr. Grose's lab looks at whether detection of silent intervals can be facilitated if reference sounds are also present that may assist the brain in identifying when the gaps occur. A paper in press shows that under some conditions, there can be benefit from reference bands, much like the benefit to tone detection seen in the phenomenon of comodulation masking release (CMR) discovered by his colleague, Dr. Joseph Hall. Despite the similarities, the gap detection benefit does not appear to be entirely the same as CMR.

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, children with chronic otitis media, and 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 objective measures, such as surface-recorded evoked potentials and acoustic reflex. 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 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. One area of interest currently under development concerns

the use of short-term spectral cues in processing dynamic stimuli.



Rose Eapen, MD, is a resident in the research track, working on projects with Emily Buss, PhD.

In addition to this laboratory work, Dr. Buss maintains an ongoing involvement in a number of cochlear implant investigations, for which she provides support in experimental design and analysis. 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.

Charles C. Finley, PhD, is a biomedical engineer and neurobiologist who studies 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. During the summer of 2007 rising fourth-year Tulane medical student, Shawn Gailushas, made significant progress in the digitization of a normal reference cochlea (see figure) in which the effects on neural recruitment of various electrode placements will be modeled. 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 in the *Annals of Otolaryngology* this year and has resulted in new emphasis by surgeons and manufacturers to improve electrode insertion techniques. In June, 2007 Dr. Finley was awarded a Faculty Fellowship from UNC's Renaissance Computing Institute (RENCI) to accelerate his modeling work by implementing a version of his cochlear model on RENCi's high performance computer clusters. The RENCi fellowship will enable construction of a full head model in which the temporal bone and cochlea will be described in significantly greater detail than any previous models and will eliminate the need to make many simplifying assumptions that Finley believes have significantly biased previous studies.

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. Ms. Punita Christopher has been pursuing this work as part of her Ph.D. research in Biomedical Engineering with Dr. Finley as her advisor. Ms. Christopher completed her PhD in August, 2007. 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.

Oliver F. Adunka, MD, is primarily involved in clinical research projects of Dr. Buchman's team. His research focuses on cochlear implant related topics. Dr. Adunka is especially interested in the evaluation of the combined electric-acoustic stimulation (EAS) of the auditory system, a new method, which combines acoustic hearing and cochlear implant on the same or on opposite ears. He is the UNC principal investigator for the US EAS Multicenter Clinical Trial, which started in April 2007. He will be heavily involved in the newly established Temporal Bone Laboratory on the 7th floor of the Neurosciences Hospital. This laboratory will focus on histologic tissue preparations using a special sawing, grinding, polishing technique where decalcification of bone is not necessary. This technique also allows for sectioning of hard material like titanium prostheses or cochlear implant electrodes.

Also, Dr. Adunka will start his appointment as a Clinical Assistant Professor in July 2007 and will continue to work in Dr. Buchman's group on clinical topics as well as in the Temporal Bone Laboratory. Again, research topics will focus on measures to improve hearing preservation and subsequent bimodal EAS. Further topics include clinical research on the topic of absent cochlear nerves and pediatric auditory brainstem implantation. This project is lead by Dr. Buchman and will be started here at UNC to provide auditory habilitation for children with bilateral absent cochlear nerves or special types of severe inner ear malformations.

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, CMV and connexin-related hearing loss. In the field of cochlear implantation, Dr. Buchman and colleagues have been studying 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.

In the areas of basic research, Drs. Buchman, Adunka and Pillsbury have launched a new area of investigation at UNC, evaluating intracochlear trauma from cochlear implant surgery in the human temporal bone model. This is an extension of Dr. Adunka's previous work prior to coming to UNC and promises to help surgeons and scientists develop surgical techniques and electrode arrays for future use. Dr. Buchman also is involved in a project attempting to record auditory-evoked electrophysiological responses using an intracochlear device in an attempt to better characterize hair cell and neural populations.



Stuart Owens (student working in Dr. Fitzpatrick's lab), Steve Pulver, Dr. Jiri Prazma, and Dr. Doug Fitzpatrick.

Douglas C. Fitzpatrick, PhD, and his colleagues study the neuronal basis of binaural hearing. The two ears encode the frequency and timing of sounds, and dedicated neural pathways then compare the information from the two sides to improve the signal to noise ratio and to extract specific information such as the location of the sound source. The difference in the time of arrival of sounds at each ear is a major binaural cue for localizing sounds on the azimuth. Human listeners can discriminate interaural time differences (ITDs) as small as 10-20 microseconds, or about 1/100 the width of a typical action potential. As might be expected,

the neural basis for discriminating ITDs has received considerable attention. Our approach has been to combine neurophysiological and behavioral techniques to measure the thresholds for ITD discrimination achieved by neurons for comparison with human behavioral thresholds and with behavioral thresholds measured in the species from which the neurons are recorded. In addition, until recently, the mechanisms for achieving sensitivity to ITDs seemed clear, but this consensus is no longer present. Neural recordings at multiple levels of the auditory pathway can help to resolve questions of mechanism. Finally, we are applying our basic understanding of binaural processing and the auditory system to test devices that may be used to provide hearing to the deaf. Currently, this remarkable achievement is possible with cochlear implants placed in only one ear. However, unilateral implants cannot provide the benefits of binaural hearing, so it is not surprising that even high-performing recipients of cochlear implants often do poorly in noisy environments and do not localize sounds well. We are therefore assessing the ability of cochlear implants to activate the binaural system. In addition, some subjects are not candidates for cochlear implants because their condition has not left a patent auditory nerve, and in general the complex geometry of the inner ear and variable survival of the nerve make the benefit of a cochlear implant variable and hard to predict. An auditory prosthesis located centrally can help alleviate these difficulties. Consequently, we are using our animal model to test the feasibility of an implant in the auditory midbrain.

This past year we made further progress in understanding the mechanisms for ITD sensitivity through the manipulation of the intensity of signals. We found that the dominant model of ITD sensitivity, called the Jeffress model, does not account for the responses of neurons as the intensity at the ears is varied.

A new project begun this past year is to examine the degree to which high frequency signals in the two ears must be matched in frequency in order to extract the ITD conveyed by low frequency modulations of the stimulus envelope. The rationale for this project is that current speech processing

strategies extract the envelope of sounds in different frequency channels and modulate the amplitude of stimulation accordingly. Because the position of the electrode contacts within the tonotopic array of the cochlea on each side may not be identical, it would be advantageous if the contacts stimulated did not have to be matched in tonotopic position for ITD encoding to occur. Our preliminary results based on recordings from neurons in the inferior colliculus indicate that the ability to encode the ITD is maximal if the frequencies at the ears are matched but encoding can occur even for large frequency mismatches (> 1 octave). Dr. Deidra Blanks is in charge of this project, which is being done in collaboration with the psychoacousticians (Drs. Joe Hall, John Grose and Emily Buss). This work has resulted in a manuscript that has been accepted for publication in the Journal of the Association for Research in Otolaryngology.

Another project is to measure the ability of neurons in the inferior colliculus to follow temporal fluctuations of the ITD, such as would be associated with a moving sound source. Currently, the literature suggests a mismatch between behavioral and neural results, with behavioral measurements suggesting the binaural system is slow, or “sluggish”, while the neurons show no such sluggishness. However, our hypothesis is that the mismatch is due to the different methods used: psychoacousticians have typically measured the threshold change in the ITD required for detecting movements of different speeds, while physiologists have measured the maximal rate at which a large change in the ITD can be detected by changes in neuronal firing patterns. Consequently, we have designed a physiological experiment that parallels the methods used in behavioral experiments. Our results show that some neurons in the inferior colliculus respond in a manner that is compatible with binaural sluggishness, but other neurons do not. We are extending this project to the study of cortical neurons to see if most or all of the neurons show responses that are compatible with binaural sluggishness. This work is also being done in collaboration with the psychoacousticians (Drs. Joe Hall, John Grose and Emily Buss).

We have continued a project supported by the Advanced Bionics Corporation to investigate the ability of an implant in the midbrain rather than cochlea to provide the percept of hearing. In the past year we successfully implanted multichannel electrodes in the IC of rabbits, and have measured neural and behavioral thresholds to stimulation of the implant. This work is being done in collaboration with Dr. Charles Finley.

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

Jiri Prazma, MD, PhD, and his colleagues have also 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, Deidra A. Blanks, MD, and Rose J. Eapen, MD, both residents in the research track, have investigated a new and influential mediator of allergic inflammation, immunomodulatory oligodeoxynucleotides (IMOs). Studies have shown that these types of oligodeoxynucleotides were efficacious in the treatment of allergic-like airway inflammation and airway hyperresponsiveness by preventing naive T-lymphocyte differentiation. In addition, IMOs demonstrated a potent effect on early and late phase allergic airway responses by reducing eosinophils, IL-10, IL-4, IL-5, and IL-6. However, there has been no research investigating the ability of these drugs to inhibit allergy induced OME. Deidra continues to investigate the differences in the ability of transtympanic versus nasopharyngeal IMO to treat the allergic response to an allergy challenge, in ovalbumin sensitized Brown Norway rats. She also studied how long a single dose of IMO is able to protect allergic rats when challenged in week intervals from allergy.

Both IMO treatment groups at the first evaluation required approximately 50% less pressure to open ($P < 0.001$) and close ($P < 0.001$) the Eustachian tube compared to the OVA allergic groups. There was no statistically significant difference in any parameter between the transtympanic and nasopharyngeal treatment routes. Single dose of IMO was able to protect allergic rats for 2-3 weeks from allergic response to albumin challenge.

Conclusion: IMO given via transtympanic or nasopharyngeal application can treat allergy-induced ETD in rats. IMO may offer substantial promise in the future management of OME. Treatment with IMOs prevented OVA-induced allergic Eustachian tube inflammation in the rat and in the future may provide a useful agent in the management of allergy-induced OME in children.

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

In the laboratory with Drs. Jiri Prazma and Allen Marshall, we have examined the problem of subglottic stenosis of the airway in the pediatric population. Specifically, we have examined the role of locally delivered anti-inflammatory medications in the prevention of subglottic stenosis and the effect of stent size on airway patency in airway reconstruction. This work has involved the efforts of undergraduate students, medical students, and residents. Our studies to date have led to unexpected findings which were presented internationally at the annual meeting of the American Academy of Otolaryngology/Head and Neck Surgery in Toronto and will soon be submitted for publication.

In exciting research into the mechanisms of otitis media, I am working 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. This work will be presented at the American Academy of Otolaryngology in Washington, D.C. this fall and work in this subject will continue.

Additional clinical research in the area of the Pediatric Airway has been in collaboration with Dr. Amelia Drake and Dr. Austin Rose. We investigated the use of ultrasonography in the evaluation of pediatric airway pathology. This application of ultrasonography is not only new but has the additional appeal of being non-invasive and does not require sedation. The results of our preliminary studies were presented at the European Society of Paediatric Otolaryngology in Paris, France and publications regarding ultrasonographic features of Respiratory Papillomatosis and other airway lesions are pending.

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 closer to home in Charlotte, North Carolina. Our group was also privileged to write about our philosophy for rehabilitation for the American Speech-Language-Hearing Association Division 9 publication. Interest has been intense on an international level and across disciplines. We plan to continue to present and publish our data as it matures. Our collaboration with the Department of Pathology examining the role of cytomegalovirus (CMV) induced sensorineural hearing loss was presented at the Association of Molecular Pathology Annual Meeting and Exhibits in Orlando, Florida, in November 2006.

Finally, 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 Hospital 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 will specialize 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 plan to begin formally seeing patients in the fall of 2007.

Auditory Neuropathy Study

The study regarding children diagnosed with Auditory Neuropathy/Auditory Dys-synchrony (AN) continues and involves various committed members of the Pediatric Otolaryngology faculty and staff. Dr. Carlton Zdanski is the principal investigator on the project with the CCCDP, the UNC Cochlear Implant Team, and the UNC pediatric audiologists. The primary question of the study relates to how children with hearing loss who have been diagnosed with AN benefit from their hearing aids and/or cochlear implants. Information on the children's medical history, particularly peri-natal events, radiographic, audiologic, and demographic information are also being collected to learn more about factors common among or possibly contributing to this diagnosis.

The natural history of Auditory Neuropathy is not well known. It is diagnosed by one of several possible indicators. These include cochlear hair cell activity as documented by the presence of a cochlear microphonic in Auditory Brainstem Response (ABR) tests and/or by the presence of otoacoustic emissions (OAE) in an ear that has an absent or abnormal ABR. There is general disagreement between objective and subjective behavioral auditory tests. Behavioral hearing test results can fluctuate idiosyncratically and auditory thresholds may be inconsistent with word understanding. Appropriate rehabilitation can be especially challenging in the pediatric population.

It is suspected that AN is much more widespread than has been documented. It has come to the forefront of the field of Audiology particularly since the increase in newborn hearing screenings around the country. There is general disagreement and confusion regarding the diagnosis, prognosis, and appropriate management of children diagnosed with AN. Children who are not diagnosed correctly may not be properly managed, which subsequently creates social and educational issues.

The data from our group of children were presented at the 11th International Conference on Cochlear Implants in Children in Charlotte, North Carolina which was also hosted by the Department of Otolaryngology/Head and Neck Surgery and our group was solicited to write an article for the American Speech-Language-Hearing Association. Work continues on this exciting topic and we are learning more as our children with AN grow up.

Holly Teagle, AuD, is the primary investigator and coordinator 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. Psychosocial 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 recently been renewed for a second five year term. Drs. Pillsbury, Buchman, and Zdanski are the surgeons and Hannah Eskridge provides speech and language assessments on the project.

Sinus and Allergy Research

Alisha N. West, MD, reports on a project she is working on with Brent Senior, MD.



Drs. Brent Senior and Alisha West

Dr. Senior and I have been awarded the ROAD scholarship from the AAOA for a second year to conduct rhinology research. The project is titled “Role of Eotaxin in Chronic Rhinosinusitis”. Keith Ladner has carried on the project this past six months quite successfully, and gained stride with the *in vivo* model and application of the previous work performed. Our project will be presented at this year’s Academy meeting at both the ARS and AAOA meetings.

The importance of this project is to identify a potential new cure for CRS. Chronic Rhinosinusitis is one of the leading causes of annual visits to the Otolaryngologist. In fact, 66 million adults in the US reported sinus problems

last year. Additionally, nearly \$5.8 billion dollars is spent annually on treatment for CRS that typically gives little to no relief of symptoms, and symptoms usually recur within three months of therapy. Therefore, new targets must be identified, and although a cure is not imminent, great strides have been made to decrease the symptoms of inflammation.

In summary, we have harvested endosinus tissue from patients suffering from Chronic Rhinosinusitis (CRS) and normal controls during endoscopic sinus surgery. We then immediately proteased the tissue to break it down into its cellular components, and grew these endosinus cells on an air-liquid interface. This allowed the cells to become ciliated and differentiated (with an apical and basolateral side). Once the cells were differentiated with cilia we were able to challenge the cells with various bacteria *in vitro* and see how they reacted.

First, we compared the baseline supernatant to that collected after the bacterial challenge. We tested both aliquots for the presence of Eotaxin. Additionally, we contrasted the amount of Eotaxin found in CRS patients when compared to controls before and after stimulation with bacteria. Eotaxin is a chemokine that attracts Eosinophils and is secreted by epithelial cells in response to inflammation. We found that not only did the CRS tissues have higher levels of Eotaxin at baseline, but they also had a significant increase in this chemokine following bacterial stimulation. This finding was statistically significant.

Over the past six months, we have developed an *in vivo* model also looking at the presence of Eotaxin in the milieu of the paranasal sinuses in CRS patients and controls. We achieved this by performing endosinus lavage on patients undergoing endoscopic sinus surgery for CRS (test subjects) and MIPS (controls). The lavage sample was then run through a cytospin to fraction out the eosinophils. These

were then counted in the standard fashion. Additionally the supernant was sent for quantification of Eotaxin and a panel of other cytokines using the Luminex technology. These additional cytokines that are related to CRS could also be considered for potential targets for therapy.

Our project aims to identify a new target for a cure for this prevalent disease, or at the very least decrease the symptoms associated with the inflammation including: congestion, headache, runny nose, foul smell, and dry mucosa. Due to Eotaxin's chemoattractant effect on Eosinophils, by blocking Eosinophil demargination into endosinus epithelial cells, inflammation will in turn be eliminated or minimized.

In conclusion, I would like to thank Dr. Senior for bringing this fantastic opportunity to my attention and helping me so much with it. He is a wonderful mentor and a pleasure to work with. I would also like to thank Dr. Pillsbury for providing us with designated research time, and encouraging all of us to pursue basic science research. I am proud of the work that we have accomplished.

Voice and Swallowing Research

Robert A. Buckmire, MD, has several ongoing clinical and research projects involving voice and swallowing.

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.

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), The Voice Center is participating in developmental work regarding tumor border detection and microlaryngeal laser guidance techniques. Initial work with border detection was undertaken including the use of "active contours". Active contours are computer-generated curves that move in order to determine the perimeter of an object located within an image. A current PhD thesis project is focused on the design and creation of improved laser guidance hardware and software for microlaryngeal surgery.

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.

Many additional clinic projects involving laryngeal surgical techniques, swallowing disorders and technique analysis in surgical treatment of post-treatment, head and neck cancer dysphagia are underway. Several collaborative research efforts with the Division of Gastroenterology are also being pursued.

OUTREACH

Malawi 2007



Dr. Harmon comforts a child with massive ascites after the Malawian pediatrician performed a procedure.

During the summer of 2007, Drs. Carol Shores and Paula Harmon spent three weeks in Lilongwe, Malawi, a country in the eastern Africa. The purpose of the trip was to implement the Burkitt Lymphoma and Epstein-Barr virus (EBV) study. Also during the three week mission, Shores and Harmon performed operations related to many facets of Otolaryngology from mandibulectomies to sinus surgery to laryngoscopy. During this trip, the surgical relationships that were formed during Dr. Shores' previous trip were rekindled.

EBV is an oncogenic herpesvirus associated with a number of human malignancies. The diseases include nasopharyngeal carcinoma, T-cell lymphoma, Hodgkin's Disease, gastric carcinoma and Burkitt Lymphoma.

Approximately 50% of all cancers in children in the equatorial parts of Africa are of the endemic Burkitt's. This type of lymphoma is more likely to affect children than adults. It is also strongly connected to an infection by the Epstein Barr virus as over 95% of the patients developing the cancer has a previous virus infection. Endemic Burkitt's often involves the maxilla or mandible.

In cancers associated with EBV the virus is found in the latent form, which is non-responsive to anti-viral medication. In previous animal studies it has been shown that the EBV latent tumors change from the latent form to the lytic form after receiving chemotherapy. Lytic proteins produced by these tumors convert anti-viral medications such as ganciclovir to its active form, causing a combination synergistic cytotoxic effect on tumor cells. This phenomenon has not been tested in human tissue.

Dr. Harmon was awarded two grants, one by the American Academy of Otolaryngology - Head and Neck Surgery (CORE grant), and the other from UNC Medical School Alumni Endowment Fund to research *The Viral Response to Chemotherapy in Endemic Burkitt Lymphoma*.

Through the collaboration between UNC Project and Lilongwe Kamuzu Central Hospital, Dr. Harmon and her advisor, Dr. Shores, set up the proof of concept portion of the study, which if proven effective, will lead to a clinical trial involving patients with Burkitt Lymphoma and possible other EBV associated tumors. Our objectives are to determine whether cyclophosphamide-containing chemotherapy regimen increases lytic EBV gene expression, inducing expression of virally encoded kinases that convert ganciclovir into its active cytotoxic form. We hypothesized that human EBV-positive Burkitt Lymphoma will respond to cyclophosphamide by increasing viral gene expression within four days of treatment. If this is found to be true, this will lead to a clinical trial with human subjects with Burkitt Lymphoma and possible other EBV-positive malignancies.

During the first week of the mission, Dr. Harmon handled all of the logistics of the project. This included training the laboratory staff, Lilongwe pediatrician, and nurses how to collect FNA samples, consent forms, IRB rules and organization of data to be sent to UNC Chapel Hill for further analysis.

After the arrival of Dr. Shores during the second week, the two UNC surgeons began their clinical mission with the general surgeons of Kamuzu Central Hospital. Dr. Muyco, a Filipino physician who has practiced in Malawi for more than 28 years and is the acting chief of surgery, advised Drs.



Dr. Muyco, Chief of Surgery at Kamuzu Central Hospital, with Drs. Harmon and Shores



Dr. Shores scopes a child while in Surgery Clinic.

Shores and Harmon that he has been admitting patients to the hospital for the last 2 months in anticipation of our arrival. Although the overall experience was very rewarding, the first clinic day was overwhelming due to the fact that many of the patients had disease processes that would be cured with ease in the United States but since they were located in Malawi, many of the resources that needed to be available were nonexistent. Also, many of these patients were told that the American physicians were coming and that we would be able to resect their tumors. During the surgery clinic days for each patient that we saw and felt that they were surgical candidates, just as many patients or more were deemed incurable.

Examples of some of the disease processes: hemangiomas, head and neck squamous cell carcinoma, ameloblastomas, benign parotid tumors, sinus mucocele, laryngeal papillomas, nasal polyposis, keloids, airway foreign bodies.

Needless to say, many patients were scheduled that first week and early the following week. Having two weeks to provide surgical service to the patients allowed the physicians to teach the clinical officers and surgical team post operative care for otolaryngology patients. Many major surgeries and procedures were performed and included but not limited to: mandibulectomy, maxillectomy, frontal sinus mucocele removal, parotidectomy, keloid removal and laryngoscopy. At UNC, there is state-of-the-art surgical equipment, including drills and drill bits. In Malawi, these things were unavailable; For example the mandibulectomies were performed with gigli saws and osteotomes.

There is a great need for medical equipment in Malawi. Many of the instruments are nonfunctional, ETT are recycled, and there are only 2 automatic ventilators that are to be used between their 4 operating rooms.

Drs. Shores and Harmon are finding ways to donate equipment that in America is either discarded or stored away as surplus. The equipment and supplies will be shipped to Malawi to decrease some of the healthcare burden that is afflicting the country.

Words from Dr. Harmon:

This is an experience that leaves a bittersweet taste in my heart. Each day after leaving the operating room or evening rounds, there was a feeling of helplessness. I asked myself several questions, such as: How can I help all of these/my people? What can I do to sustain the help that we have begun? At the same time, the experience was so overwhelming that when I left the hospital everyday, I felt a sense of fulfillment. To realize my calling and to be able to start fulfilling this charge at this point in my career was a true blessing. Dr. Shores stated that she could move to Malawi, work there for an entire lifetime and the country would still be in a health deprived state. If we viewed Malawi as a bucket, I commend Dr. Shores for dropping something in the bucket...over time with the help of Dr. Shores, UNC, and myself...together we can fill that bucket.



Dr. Harmon eases the anxiety of a patient prior to surgery.

Project Uplift

The Department of Otolaryngology/Head and Neck Surgery has participated in Project Uplift for the past three years. This program is sponsored by UNC Diversity & Multicultural Affairs and the Office of Undergraduate Admissions. To promote a diverse student body, gifted students from minority and underrepresented populations spend two days on the UNC campus learning about UNC student life and academic opportunities. These students have demonstrated leadership within their high schools and are deemed to have strong academic potential.

To encourage these students to come to the University of North Carolina and to consider a career in medicine, our residents and Dr. Marion Couch have hosted three sessions each year. The students are shown around the hospital and actually go into the operating rooms, where the technology used is highlighted. Our surgeons meet the students and welcome them to hospital. Our residents, such as Dr. Trinitia Cannon, Dr. Deidra Blanks, and Dr. Paula Harmon, describe their unique journeys that lead them to a surgical residency program. Doris Duke Research Fellow Jon George described what it was like to be a medical student and encouraged them to identify mentors to guide them in their careers. The importance of mentorship and following each person's own dream is emphasized. The students were encouraged to ask many questions and the interactive sessions were always well-attended.

Carolina ENT Outreach: Vietnam 2007



“No Delicious, No Pay!” That’s the motto outside a favorite noodle restaurant in Ho Chi Minh City, Vietnam. At about a buck for a giant bowl of piping hot, spicy noodles, it’s a great value and so far, no refunds have been requested!

While Dr. Senior has not been so liberal as to offer money back guarantees for people participating in his yearly mission to Vietnam, so far, like this favorite noodle place, no one has asked!

Partnering again with Resource Exchange International of Colorado Springs, this 10th trip to Vietnam promises to be the most unique yet. On a previous trip two years ago, Dr. Senior was asked by the Vietnamese to assist and participate in the Association of Southeast Asian Nations (ASEAN) ORL Congress occurring in August 2007. This major meeting of Southeast Asian otolaryngologists will be hosted by the physicians in Vietnam for the first time, so the pressure is on! As a result of this major meeting, Dr. Senior’s team this year will number over 20 attending otolaryngologists from around the world. In addition, several otolaryngology residents in training will also participate from around the country, including UNC PGY-5 resident, Steve Lee. Following a week of meeting participation in Ho Chi Minh City, the team will proceed to Hanoi for a week of working in the hospitals there including doing surgery, seeing patients in clinic, and providing lectures.

If you would like to participate in this work, either financially or as a participant, please feel free to contact Dr. Senior at Brent_Senior@med.unc.edu. We are confident that you won’t be asking for your money back!



Dr. Senior with two of our visiting physicians, Dr. Cong (left, from Thailand), and Dr. Lee (from South Korea).

International Visiting Physicians

Over this last year, the Otolaryngology/Head and Neck Surgery department has continued to influence and advance the field internationally by hosting a large number of visiting physicians from overseas. Traveling from Vietnam, this year the department was pleased to welcome Drs. Dinh and Canh from Hanoi for extended fellowships. Dr. Dinh is the Chief of Otolaryngology/Head and Neck Surgery at the Bach Mai Hospital, the largest general hospital in Vietnam. Dr. Canh hails from the ENT Hospital of Hanoi, where he functions as Chief of Reconstructive Surgery, under former UNC Otolaryngology fellow, Dr. Ho Quang. Both physicians stayed about six weeks updating themselves with the latest techniques in Rhinology (under Dr. Senior) and Facial Plastic and Reconstructive Surgery (under Dr. Shockley). Later in the year, the department welcomed Dr. Lee from South Korea, Dr. Abraham from India, and Dr. Cong from Thailand. Dr. Lee and Dr. Cong hail from private hospitals in their countries, while Dr. Abraham visited us from the Christian Medical College of Vallore, the largest hospital in India where she is developing an outreach program in otolaryngology, reaching out to the poor of south India. It has been a pleasure to have them all with us!

GRANTS

North Carolina Children's Airway Center
Principal Investigator: Carlton J. Zdanski, MD
Duke Endowment, \$360,267.00
07/01/2007 - 06/30/2009

Quality of Life Among African-American Head and Neck Cancer Survivors
Principal Investigator: Andrew F. Olshan, PhD
Co-Investigator: Jianwen Cai, PhD
Collaborators: Mark C. Weissler, MD; William Funkhouser, MD, PhD
Lance Armstrong Foundation, \$246,760
2007 - 2010

RENCI Fellowship
Principal Investigator: Charles C. Finley, PhD
Renaissance Computing Institute (RENCI) of UNC-Chapel Hill, \$50,000.
06/2007 - 05/2008

Center for Acquisition of Spoken language Through Listening Enrichment (CASTLE),
Wilmington expansion site.
Program Director: Carolyn J. Brown, MS, CCC-A/SLP
Cape Fear Memorial Foundation, \$225,000
2007 - 2009

Center for Acquisition of Spoken language Through Listening Enrichment (CASTLE),
Statewide Expansion Project.
Program Director: Carolyn J. Brown, MS, CCC-A/SLP
The Duke Endowment, \$300,000
2006 - 2008

Wake Children's Hearing Intervention Program
Program Director: Carolyn J. Brown, MS, CCC-A/SLP
The John Rex Endowment, \$103,171
2003 - 2008

Children's Hearing Intervention Program: Center for Acquisition of Spoken language
Through Listening Enrichment (CASTLE).
Program Director: Carolyn J. Brown, MS, CCC-A/SLP
The Oberkotter Foundation, \$1,512,000
2001 - 2009

The Inferior Colliculus as a Site of Electrical Stimulation
Principal Investigator: Douglas C. Fitzpatrick, PhD
Advanced Bionics Corporation, \$307,000
05/01/2005 - 06/30/2007

Physio-Anatomical Factors in Cochlear Implant Outcomes

Principal Investigator: Charles C. Finley, PhD

R21 grant from NIH/NIDCD, \$125,000/year

07/2004 – 06/2006

Complex Sound Analysis in Normal and Impaired Ears

Principal Investigator: John H. Grose, PhD

Co-Investigator: Charles C. Finley, PhD

Co-Investigator: Emily Buss, PhD

R01 grant from NIH/NIDCD, \$204,750 (current year)

03/2003 - 02/2008

Spectral Profile Cues and Synthetic Listening

Principal Investigator: Emily Buss, PhD

RO1 grant from NIH/NIDCD, \$182,500/year

12/15/2005 – 11/30/2010

Development and Plasticity in Normal and Impaired Ears

Principal-Investigator: Joseph W. Hall, PhD

Co-Investigators: Emily Buss, PhD; John H. Grose, PhD; Harold C. Pillsbury, MD

R01 grant from NIH/NIDCD, \$227,500/year

09/01/1985 – 08/31/2007

Spectro-Temporal Analysis in Normal and Impaired Ears

Principal Investigator: Joseph W. Hall, PhD

Co-Investigators: Emily Buss, PhD; John H. Grose, PhD; Harold C. Pillsbury, MD

R01 grant from NIH/NIDCD, \$227,500/year

09/01/1986 – 07/31/2009

Research Training in Otolaryngology

Program Director and Principal Investigator: Paul B. Manis, PhD

T32 grant from NIH/NIDCD, \$596,863

07/01/2003 – 06/30/2008

Physiology of the Dorsal Cochlear Nucleus Molecular Layer

Principal Investigator: Paul B. Manis, PhD

Personnel: Yong Wang, PhD; Jaime Mancilla, PhD; Sarah Street, BS (PhD student)

R01 grant from NIH/NIDCD, \$900,000

04/2001 – 03/2007

Cellular Mechanisms of Auditory Information Processing

Principal Investigator: Paul B. Manis, PhD

Personnel: Yong Wang, PhD; Eveleen Randall (UNC senior biology major)

R01 grant from NIH/NIDCD, \$637,500

09/01/2001 – 03/31/2011

Effect of Noise Induced Hearing Loss on AVCN Principal Neurons

Principal Investigator: Yong Wang, PhD

R03 grant from NIH/NIDCD, \$150,000

04/01/2006 – 03/31/2009

Synaptic Organization and Plasticity in the Auditory Cortex Following Cochlear Ablation: Role of Serotonin Neurotransmission

Principal Investigator: Gregory J. Basura, MD, PhD

Mentor: Paul B. Manis, PhD

Deafness Research Foundation, \$40,000

07/01/2006 – 06/30/2008

Childhood Development after Cochlear Implantation (CDaCI Study)

Coordinating Center: Johns Hopkins University

UNC Principal Investigator: Carolyn J. Brown, MS, CCC-SLP/A

UNC Co-Investigators: Craig A. Buchman, MD; Harold C. Pillsbury, MD; Holly Teagle, AuD (study coordinator)

NIH/NIDCD R01 DC004797, \$595,000

05/01/2002 - 04/30/2007

Childhood Development after Cochlear Implantation (CDaCI Study)

Coordinating Center: Johns Hopkins University

UNC Principal Investigator: Holly Teagle, AuD

UNC Co-Investigators: Carolyn J. Brown, MS, CCC-SLP/A; Craig A. Buchman, MD; Harold C. Pillsbury, MD; Carlton J. Zdanski, MD; Jennifer Woodard, MA; and Hannah Eskridge, MSP

NIH/NIDCD R01 DC004797, \$523,541

08/01/2007 – 07/30/2012

Allogeneic Genetically-Engineered Tumor Vaccine

Principal Investigator: Marion E. Couch, MD, PhD

University of North Carolina Program in Translational Science, \$266,000

07/2006 – 06/2008

Chronic Cough and Reflux Disease: A Randomized, Double-Blinded, Placebo Controlled Trial of High Dose Proton Pump Inhibition.

Principal Investigator: Nicholas J. Shaheen, MD, MPH

Co-Investigator: Marion E. Couch, MD, PhD

Astra-Zeneca Pilot Grant, \$195,000

01/2005 – 12/2007

Visualization of the Airway During Percutaneous Tracheostomies Using Ultrasound

Principal Investigator: Marion E. Couch, MD, PhD

Co-Investigator: Paul C. Bryson, MD

Cook Critical Care Pilot Grant, \$3,500

06/2006 – 07/2008

Microarray Analysis of Head and Neck Squamous Cell Carcinoma as a Predictor of Treatment.

Principal Investigator: Carol G. Shores, MD, PhD

Scholar Development and Faculty Transition Award, \$125,000/year

09/01/2002 - 09/01/2006

HONORS, AWARDS, AND ACHIEVEMENTS



Chief Residents 2007: Drs. Alldredge, Zanation, Bassim, and Patel

This year all of our chief residents were offered prestigious fellowships. **John W. Alldredge, MD**, will be doing a Rhinology fellowship at the Sinus and Nasal Institute of Florida in St. Petersburg. **Adam M. Zanation, MD**, will be at the University of Pittsburgh Medical Center doing a Skull Base/Head and Neck Surgical Oncology fellowship. **Marc K. Bassim, MD**, is headed out to California for a fellowship in Otolaryngology/Neurotology at the House Ear Institute in Los Angeles. **Krishna G. Patel, MD, PhD**, is also going to California for a fellowship in Facial Plastic and Reconstructive Surgery at the University of California-Davis.

The July 2007 issue of *Business North Carolina* magazine published a list of the state's best doctors. This information comes from Best Doctors, Inc., a Boston-based company that rates physicians by asking approximately 35,000 practicing physicians nationwide to whom they would go for medical care if they or their families needed a specialist. Best Doctors verifies licenses and board certifications, and then asks the doctors who are nominated detailed questions about their practices, experience, and research. Those with the highest average (only 5% of all doctors in North Carolina) made the list, which is divided into 36 fields. In the field of Otolaryngology, 5 of the 18 doctors on the list are faculty in the UNC Department of Otolaryngology/Head and Neck Surgery. They are **Drs. Pillsbury, Shockley, Drake, Weissler, and Senior**.

Carol G. Shores, MD, PhD, was promoted to Associate Professor with Tenure. After earning her PhD at UNC in Biochemistry, completing a 3-year postdoctoral research fellowship at Glaxo-Wellcome, and medical school and residency training in Otolaryngology/Head and Neck Surgery at UNC, Dr. Shores joined our faculty in 2000. She is a head and neck oncology clinical and surgical specialist, and devotes much of her time in her lab at the Lineberger Comprehensive Cancer Center. The main projects in her lab are to determine gene expression patterns that may predict response to therapy in head and neck cancer patients using microarray analysis.

Marion E. Couch, MD, PhD, was promoted to Associate Professor with Tenure. Dr. Couch started her career in Otolaryngology/Head and Neck Surgery at Johns Hopkins, completing residency and joining the faculty there in 1996. She came to UNC in 2003. Dr. Couch is highly skilled in microvascular reconstruction of the head and neck, as well as ablative techniques of head and neck oncology. Her research interests include tumor vaccines, molecular biology of head and neck cancer, and gene therapy.

Emily Buss, PhD, was promoted to Associate Professor with Tenure. She started her career at UNC as a post-doctoral fellow in 1997, and then was invited to join the faculty in 2001 as Assistant Research Professor. Dr. Buss is an auditory science researcher involved in a range of projects investigating the perception of sound in human listeners. In addition to basic psychoacoustics, her previous work has focused on the development of hearing in children, understanding speech in noise, and computer modeling of complex sound processing in normal-hearing adults. Dr. Buss is also involved in several clinical cochlear implant investigations, providing support in experimental design and analysis.

Mark C. Weissler, MD, was elected as Regent of the American College of Surgeons (ACS) at the group's annual meeting in Chicago. Dr. Weissler has been an ACS fellow since 1990. He has served as a governor to the ACS from the American Laryngological Association, on various ACS committees, including the Advisory Council for Otolaryngology-Head & Neck Surgery and the Pre- and Post-operative Care Committee, and is a past president of the North Carolina Chapter of the ACS. The ACS, with more than 64,000 fellows—including more than 3,700 fellows in other countries and over 5,000 associate fellows, is the largest organization of surgeons in the world. It was founded in 1913 to improve the quality of care for the surgical patient by setting high standards for surgical education and practice. The 19-member Board of Regents governs the ACS. Weissler will serve an initial three-year term as regent.

Charles (“Carlos”) Ebert, MD, MPH, was awarded first prize, the President's Award, at the 2006 American Academy of Otolaryngology/Head and Neck Surgery annual meeting in Toronto, for his poster presentation, “Immunomodulatory Oligonucleotides in the Prevention of Nasal Allergen-Induced Eustachian Tube Dysfunction.” Co-authors were **Drs. Mihir Patel, Austin Rose, and Jiri Prazma**.

Paul C. Bryson, MD, was asked to serve on the Voice, Speech, and Swallowing Committee of the American Academy of Otolaryngology-Head and Neck Surgery. He is the only resident on the committee.

John H. Grose, PhD, was chosen as one of four recipients of the 2007 Distinguished Teaching Award for Post-Baccalaureate Instruction. His students in the AuD program nominated him for this prestigious university award. Dr. Grose is Course Director of three required courses for the Doctor of Audiology (AuD) program, gives lectures to OHNS residents, mentors residents and AuD students in the lab, provides preceptorships to medical students, as well as supervises graduate students in Audiology and Biomedical Engineering undertaking a thesis project in the area of Audiology/ Psychoacoustics.



Dr. John Grose with the AuD students graduating in 2008. Seated: Adam Mehlenbacher, Dr. Grose, Sara Mamo, Hailly Humphrey. Standing: Kara Conrad, Shana Jacobs.

Adam M. Zanation, MD, won the James Harrill Resident Research Award from the Triologic Society for his study: “A controlled outcomes study of radiation resistance in spindle cell variant squamous cell carcinoma of the head and neck.” He presented this work at the 2007 Southern Section Meeting in February, at Marco Island, Florida. His co-authors include **Marion E. Couch, MD, PhD**; **William W. Shockley, MD**; **Carol G. Shores, MD, PhD**; and **Victor Lai, BS**.

Luke Richey, BA a fourth-year medical student, has recently completed his year of ENT research in the lab of **Carol G. Shores, MD, PhD**, as a Doris Duke Fellow. His research resulted in the publication of a paper in the January 2007 issue of *Otolaryngology-Head and Neck Surgery*, titled “The effectiveness of salvage surgery after the failure of primary concomitant chemoradiation in head and neck cancer.” **Mark C. Weissler, MD**, had identified the need for the study based on his clinical experience with primary chemoradiation failures and making the difficult decision of whether to attempt surgical salvage. We now have a cohort of over 200 head and neck cancer patients who received chemoradiation intended for cure. This is generating new ideas for future studies in which we could use the same cohort. Along with Richey, Shores, and Weissler, co-authors include **Jonathan George, BA** (also a Doris Duke Fellow); **Steve C. Lee, MD, PhD**; **David K. Sutton, BS**.

BME Core Faculty member, **Charles Finley, PhD**, will be one of four faculty members at the University of North Carolina at Chapel Hill named Faculty Fellows of the Renaissance Computing Institute (RENCI) and will spend the next year working closely with RENCI staff on innovative research projects that use advanced technologies. As a Faculty Fellow, Dr. Finley will collaborate with RENCI staff and have access to RENCI high-performance computing, storage, visualization and data management/analysis resources, and to sensor and hardware prototyping capabilities. Each fellow is eligible for up to \$50,000 to support travel, salaries, equipment and other research needs. Dr. Finley's research team will use high-performance computing and advanced visualization tools to improve the design and application of cochlear implants, devices that have helped to restore functional speech understanding in patients with severe hearing losses. Dr. Finley will develop patient-specific computational models to determine the final positioning of electrode contacts in the implant that take advantage of the patients' functioning neurons. These models also will provide insight into the stimulation mechanism that occurs in the cochlea, which could impact the design and fitting of implant devices.

Sherri Vernelson, Teacher of the Deaf and Hard of Hearing for the CASTLE program in the Department of Otolaryngology/Head and Neck Surgery was awarded a full scholarship to pursue a master's degree in special education with an emphasis in deaf education. The John Tracy Clinic Teacher Education Program in partnership with the University of San Diego School of Leadership and Education Sciences created a two-year, web-based, distance learning program that allows teachers working in auditory-oral centers of excellence, such as CASTLE, to specialize in auditory-oral and auditory-verbal education. Sherri first began teaching deaf and hard of hearing children to develop spoken language in 1993 and joined the CASTLE staff in 2005. Sherri has been a wonderful addition to our staff with her high work ethic, upbeat personality, and dedication to the children and their families. She will graduate with her master's degree in May 2008.



Sherri Vernelson

Carolyn J. Brown, MS, CCC-SLP/A, was the recipient of the 2006 Daniel Ling award. Daniel Ling was an internationally known professional in the field of deaf education, due to his unprecedented work in the development of spoken language in deaf children. He presented and consulted all over the world for most of his career. He also authored many papers and books on this subject. This award in his honor is given by the North Carolina A.G. Bell organization to one professional each year to recognize his or her work in the field. Ms. Brown says that it was quite an honor to have been chosen for this award, since Dr. Ling had been such a big influence on her career. She has been the Program Director of the CCCDP since 1993 and is Clinical Assistant Professor in the Department of Otolaryngology/Head and Neck Surgery.

North Carolina Governor Mike Easley has reappointed **Carolyn Brown** as a member of the North Carolina Council for Deaf and Hard of Hearing.

In March of 2007, **Carol G. Shores, MD, PhD**, and **Marion E. Couch, MD, PhD**, were recognized for excellence in teaching by being selected as members of the UNC School of Medicine's Academy of Educators. Established in January 2007, the Academy of Educators promotes and supports excellence in teaching and the work and career paths of excellent teachers. As Department Chair, Dr. Pillsbury nominated Shores and Couch. Fellows of the Academy of Educators are faculty who dedicate a significant portion of their career to medical student education with recognized expertise and leadership roles in teaching, curriculum development and education scholarship.



Drs. Shores, Couch, and Pillsbury

Adam M. Zanation, MD, received a 2007 House Officer Award. These awards are given every 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. The award was presented at the Biannual Meeting of the Medical Staff on May 30th. Dr. Pillsbury said, "It is gratifying to have this opportunity to express our respect and appreciation for Adam and his contribution to the high quality of care we provide at our medical center."

Austin S. Rose, MD, was invited to serve on the Task Force on New Materials for the American Board of Otolaryngology. His 3-year term began in 2006. Dr. Rose was also invited to serve as Judge of the 2007 Houston Otolaryngology Society's Resident Paper Competition.

Three residents have been awarded Research in Otolaryngology & Allergy Development (ROAD) scholarships for \$5,000 each: **Deidra A. Blanks, MD** ("Long-Term Treatment of IMOs for Eustachian Tube Dysfunction in Rats"); **Alisha N. West, MD** ("Role of Eotaxin in Chronic Rhinosinusitis"); and **Rose J. Eapen, MD** ("Treatment of Nasopharyngeal Allergy to Improve Endotoxin Induced Middle Ear Effusions").

Mihir R. Patel, MD, a second year resident on the research track, received a Young Investigator Award from the American Head & Neck Society and the American Academy of Otolaryngology-Head and Neck Surgery. The project is titled "Immunohistochemical Microarray Gene Expression Differences of Thyroid Neoplasms." Drs. Shores, Couch, Zanation, and Bryson were also on the research team. Dr. Patel will receive \$10,000 in funding per year for two years. He has just completed his internship in General Surgery and is now starting his two years of research.

Michael E. Stadler, MD, was awarded a CORE Resident Research Grant by the American Academy of Otolaryngology-Head and Neck Surgery. He will receive \$10,000 to fund his project, "Effects of TLRs 4 & 9 on an Allogenic Whole Cell GM-CSF-Secreting Tumor Vaccine."

Paula J. Harmon, MD, was recognized as the "Best Intern" of 2007 with the Esklund Pediatric Surgery Award, presented by the UNC Division of Pediatric Surgery, as well as the Honorary Emergency Room Resident of 2007, presented by the Department of Emergency Medicine. Dr. Harmon was also awarded two grants: a Resident Research Grant of \$11,000 by the American Academy of Otolaryngology/Head and Neck Surgery for her project titled "Viral Response to Chemotherapy in Endemic Burkitt Lymphoma," and a UNC School of Medicine Alumni Association Endowment Grant of \$5,000.

Jeffrey B. LaCour, MD, was inducted into Alpha Omega Alpha, the only national medical honor society in the world, whose purpose is to "recognize and perpetuate excellence in the medical profession." Each year, members of the UNC AOA chapter vote on two residents at UNC to join AOA, and our Dr. LaCour was one. Amelia F. Drake, MD, is the student advisor of the UNC AOA chapter.

Steve C. Lee, MD, PhD, and **Joshua C. Demke, MD**, have each been awarded \$1000 humanitarian resident travel grants from the American Academy of Otolaryngology-Head and Neck Surgery Humanitarian Efforts Committee to be used to offset expenses for travel this fall. Dr. Lee will be joining Drs. Brent Senior and Austin Rose on a medical mission trip to Vietnam. Dr. Demke will be going to the West Bank with Dr. Jon Van Aalst (of the Department of Surgery, Division of Plastic and Reconstructive Surgery) to assist with cleft palate surgery. This trip is also supported by the Palestine Children's Relief Fund.



Brian Kanapkey, MA, and Patricia Roush, AuD, were named Clinical Preceptors of the Year by their students.

Students graduating in May honored two of their clinical preceptors at a graduation ceremony on May 13th for the School of Medicine's Division of Speech and Hearing Sciences in the Department of Allied Health Sciences. This year both honorees are from UNC Hospitals.

The Speech-Language Pathology Class of 2007 selected **Brian Kanapkey, MA**, a speech pathologist at UNC Hospitals, as Speech-Language Pathology Preceptor of the Year. Considering that twenty-two students in the Class of 2007 worked with a total of nearly one hundred highly qualified clinical supervisors, the award is truly an honor. One of his students, Erin Daly, said, "As a clinical supervisor, Brian creates a challenging learning environment while maintaining a comfortable and open supervisor-student relationship. He is constantly teaching and sharing his wealth of knowledge in order to maximize his student's learning in each situation of every day. Brian is able to provide his students with a balance of supervision and independence, which gives them the knowledge and confidence in order to become skilled clinicians."

For Audiology Preceptor of the Year, the Au.D. class of 2007 selected **Patricia Roush, AuD**, Director of Pediatric Audiology at UNC Hospitals. The Division's Externship Coordinator for Audiology, Dr. Debra Weisleder, noted that the award honors the preceptor who, over four years, stood out as exemplary in clinical mentoring. Students in the AuD class of 2007 were supervised by over seventy preceptors at twenty-six different clinical sites, with each student accumulating over 2,000 clinical clock hours. In presenting the award, AuD graduate Philip Griffin remarked, "Students value her characteristics of honesty, caring, passion for teaching, and humanistic outlook. Our experiences with her enriched us as students and provided us a definition of what it is to be a great audiologist. Every student loves working with Dr. Pat Roush, and we are thankful for all the mentoring and valuable time and experiences she gave each of us."

PUBLICATIONS

Refereed Articles in Journals:

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PRESENTATIONS

Adunka OF, Roush P, Macpherson C, Buchman CA. *Value of computed tomography in the evaluation of children with deficient cochlear nerves.* Annual Meeting of the American Neurotology Society, San Diego, CA, April 28, 2007.

Adunka OF. *Combining Electric and Acoustic Hearing.* Newton D. Fischer Society Annual Meeting, Chapel Hill, NC, June 16, 2007.

Adunka OF, Buss E, Grose J, Roush P, Macpherson C, Buchman CA. *Monitoring Cochlear Function During Cochlear Implantation.* Hearing Preservation workshop Research Triangle, Durham NC, Oct 12, 2006.

Ardeshirpour F, Eapen RP, Melroy CT, Weissler MC. *Management of tracheal esophageal clothesline injuries.* Poster presentation, American Broncho-Esophagological Association, Combined Otolaryngology Spring Meetings, San Diego, CA, April 2007.

Ardeshirpour F, Eapen RP, Melroy CT, Weissler MC. *Management of Laryngotracheal and Esophageal Disruptions Following "Clothesline" Injury.* Poster presentation, Newton D. Fischer Society Meeting, Chapel Hill, NC, June 16, 2007.

Ardeshirpour F, Ladner K, Bryson P, Shores CG, Shockley WW. *The Use of Ultrasound in Defining Nasal Fractures.* Poster presentation, Newton D. Fischer Society Meeting, Chapel Hill, NC, June 16, 2007.

Blanks DA, Fitzpatrick DC, Roberts J, Buss E. *Neural Responses to Amplitude Modulation using Binaurally Mismatched Carrier Frequencies.* Poster presentation, Newton D. Fischer Society Meeting, Chapel Hill, NC, June 16, 2007.

Bryson PC, Buckmire, RA. *Laryngoscopic Findings in Unilateral Vocal Fold Paresis.* Poster presented at the American Academy of Otolaryngology Meeting, Toronto, Canada, September 2006.

Bryson PC, Buckmire RA. *Evolving Nature of Pediatric Airway Lesions Over Time.* Poster presented at the ABEA Meeting, San Diego, California, May 2007.

Buchman, CA. *Auditory Brainstem Implantation in Non-NF2 Patients.* Newton D. Fischer Society Annual Meeting, Chapel Hill, NC, June 16, 2007.

Buchman CA. *Scala tympani cochleostomy.* Visiting professor, Department of Otolaryngology, Johns Hopkins School of Medicine, Baltimore, MD, June 4, 2007.

Buchman CA. *Cochlear Nerve deficiency in Children*. Visiting professor, Department of Otolaryngology, Johns Hopkins School of Medicine, Baltimore, MD, June 4, 2007.

Buchman CA, Adunka OA. *Scala tympani cochleostomy*. Meeting of the Medical Advisory Board (MAC) of Advanced Bionics Corp, San Diego, CA April 30, 2007.

Buchman CA. *Hearing loss and rehabilitation*. MAHEC lecture Teleconference, School of Public Health, University of North Carolina at Chapel Hill, NC. April 17, 2007.

Buchman CA. *Cochlear implantation in children with auditory neuropathy*. Alumni Meeting of the Department of Otolaryngology, University of Pittsburgh School of Medicine, Pittsburgh, PA Mar 16, 2007.

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Buchman CA. *Failed Newborn Infant Screening-What's Next??* Annual Meeting of the Minnesota Academy of Otolaryngology-Head and Neck Surgery. Minneapolis, MN January 20, 2007.

Buchman CA. *Dizziness*. Campus Health Services James A. Taylor Building, The University of North Carolina, November 10, 2006.

Buchman CA. *Cochlear Implantation in Children*. North Carolina Chapter of Otolaryngology-Head and Neck Surgery Nurses. UNC Hospital, Chapel Hill, NC, November 4, 2006.

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Buckmire RA, Markus E. *Taking Care of Your Voice*. University of Chapel Hill Theatre Department. October, 2006.

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Cannon TY. *A Phase I/II Clinical Trial of the Effect of Celecoxib on Patients with Cancer Cachexia*. Newton D. Fischer Society Annual Meeting, Chapel Hill, NC, June 16, 2007.

Couch ME. *How to use curriculum to chart the progress of learners*. Conference on Evaluation of Resident Competency in Core Skills, Johns Hopkins Hospital School of Medicine, September 8 – 9, 2006, Baltimore, MD.

Couch ME. *Parathyroidectomy*. North Carolina/South Carolina Otolaryngology and Head & Neck Surgery Assembly, Asheville, NC, July 21, 2006.

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Dubin M, Liu C, Lin S, Senior BA. *Maximal Medical Therapy for Chronic Rhinosinusitis*, Annual Meeting of the American Rhinologic Society, Toronto, ON, Canada, September 16, 2006.

Ebert CS, Patel MR, Rose AS, Prazma J. *Immunomodulatory Oligonucleotides in the Prevention of Nasal Allergen-Induced Eustachian Tube Dysfunction*. Poster presentation at the American Academy of Otolaryngology-Head and Neck Surgery Annual Meeting / Research Forum, Toronto, Canada, September 2006. (**President's Award)

Ebert CS. *Applications of Immune Modulatory Oligonucleotides in Otolaryngic Allergy*. Newton D. Fischer Society Annual Meeting, Chapel Hill, NC, June 16, 2007.

Ebert CS, Patel MR, Rose AS, Prazma J. *IMOS in the Prevention of Nasal Allergen-Induced Eustachian Tube Dysfunction*. Poster Presentation, Newton D. Fischer Society Meeting, Chapel Hill, NC, June 16, 2007.

George J, Olshan A, Gaudet M, Weissler M. *XRCC1 Polymorphisms, Dietary Folate Intake, and Squamous Cell Carcinoma of the Head and Neck*. Poster Presentation, Newton D. Fischer Society Meeting, Chapel Hill, NC, June 16, 2007.

Grose JH, Hall JW, Buss E. *Gap Detection in Modulated Noise: Across-Frequency Facilitation and Interference*. The 153rd Meeting of the Acoustical Society of America, Salt Lake City, UT, June 2007.

Hall JW, Buss E, Grose JH. *Effect of Hearing Loss on the Ability to Process Synchronous and Asynchronous Cues for Speech Identification*. The 153rd Meeting of the Acoustical Society of America, Salt Lake City, UT, June 2007.

Kölln KA, Senior BA. *Update in Transsphenoidal Pituitary Surgery*. Newton D. Fischer Society Annual Meeting, Chapel Hill, NC, June 16, 2007.

Kim DL, Senior BA. *Image Guided Surgery at the University of North Carolina*, 32nd Congress of the Korean Rhinologic Society, Seoul, Korea, November 5, 2006.

Kuruville R, Ewend MG, Senior BA, Givree SJ. *Visual Function after MIPS*. North American Neuro-Ophthalmology Society Annual Meeting, Snowbird, Utah, February 10-15, 2007

Lee SC, Ebert CS, Fordham LA, Rose AS. *Plain Films in the Identification of Esophageal Foreign Bodies*. Poster Presentation, Newton D. Fischer Society Annual Meeting, Chapel Hill, NC, June 16, 2007.

Lee SC, Ebert CS, Fordham LA, Rose AS. *Accuracy of Plain Films in the Evaluation of Batteries as Ingested Foreign Bodies*. Poster presentation at the American Society of Pediatric Otolaryngology (ASPO) Annual Meeting, San Diego, CA, April 2007.

Lee SC. *Accuracy of Plain Films in the Evaluation of Batteries as Ingested Foreign Bodies*. Newton D. Fischer Society Annual Meeting, Chapel Hill, NC, June 16, 2007.

Pillsbury HC. *Current Management of Otitis Externa*, The Summit Club of Birmingham, Birmingham, AL, June 26, 2007.

Pillsbury HC. Panelist. *Vestibular Diagnosis Alternative Otologic Therapy*. Otolaryngology Update for the Practicing Otolaryngologist. Annual Spring Conference. Michigan Ear Institute Traverse City, Michigan, June 10, 2007.

Pillsbury HC. Guest Faculty. *Workforce in Otolaryngology*. Otology Update for the Practicing Otolaryngologist. Annual Spring Conference. Michigan Ear Institute Traverse City, Michigan, June 10, 2007.

Pillsbury, HC. Guest Faculty. *Advances in Cochlear Implant Surgery*. Otology Update for the Practicing Otolaryngologist. Annual Spring Conference. Michigan Ear Institute Traverse City, Michigan, June 9, 2007.

Pillsbury, HC. Panelist. *Aspects of Hearing Loss, Medical and Surgical*. Otology Update for the Practicing Otolaryngologist. Annual Spring Conference. Michigan Ear Institute Traverse City, Michigan, June 9, 2007.

Pillsbury HC. *Review of Topical Aminoglycosides and Incidence of Ototoxicity*, Nashville Academy of Otolaryngology, Nashville, TN, May 21, 2007.

Pillsbury HC. *Stemming the Flow of Allergic Rhinitis*, Halifax Regional Medical Center, Roanoke Rapids, NC, April 3, 2007.

Pillsbury HC. *Treatment of Lower Respiratory Infections (LRTIs)*, Advanced Health Media, Kinston, NC, March 14, 2007.

Pillsbury HC. *Treatment of Lower Respiratory Infections (LRTIs)*, Advanced Health Media, Cary, NC, March 13, 2007.

Pillsbury HC. *Workforce Issues and Pay-for-Performance*, North Carolina Society of Otolaryngology and Head & Neck Surgery, Greensboro, NC February 10, 2007.

Pillsbury HC. *Patient Selection for Cochlear Implant in Elderly Patients with Hearing Defecit*, Morehead Memorial Hospital, Eden, NC, February 7, 2007.

Pillsbury HC. *Rhinitis (Allergic, Vasomotor)*, North Carolina Academy of Family Physicians Winter Weekend, Asheville, NC, November 30, 2006.

Pillsbury HC, Shambaugh/Girgis Visiting Professor. *Workforce Issues in Otolaryngology: Where Will We Be Ten Years From Now?* Chicago Laryngological and Otological Society meeting, Chicago, IL, November 6, 2006.

Pillsbury HC, Gantz B, Grandis J, panelists. Wolf G, moderator. *Lessons Learned from the T-32 Grants*. The Society of University Otolaryngologists-Head and Neck Surgeons and The Association of Academic Departments of Otolaryngology, 2006 Annual Meeting, Chicago, IL, October 13-15, 2006.

Pillsbury HC. Moderator. *Cochlear Implants: Concepts, Results, and Future Perspectives*, International Congress of Rhinology – Otolaryngology & Skull Base Surgery, Athens, Greece, September 2, 2006.

Pillsbury HC. Panelist. *Chronic Otitis Media: Consensus and Controversies*, International Congress of Rhinology – Otolaryngology & Skull Base Surgery, Athens, Greece, September 1, 2006.

Pillsbury HC. *Cochlear Implants in the Elderly & Patterns of Failure in Cochlear Implants*, National Medical Association 2006 Annual Meeting & Scientific Assembly, Dallas, TX, August 8, 2006.

Pillsbury HC. *Otitis Media: Its Effects on Hearing in Children*, National Medical Association 2006 Annual Meeting & Scientific Assembly, Dallas, TX, August 8, 2006.

Pillsbury HC. *A Rationale for Therapy of Skull Base Lesions*, National Medical Association 2006 Annual Meeting & Scientific Assembly, Dallas, TX, August 8, 2006.

Roberts J, Fitzpatrick DC, Buss E. *Temporal Processing in Binaural Neurons*. Poster Presentation, Newton D. Fischer Society Meeting, Chapel Hill, NC, June 16, 2007.

Roberts J, Marshall AF, Zanation AM, Weissler MC. *Clinical Outcome Study of Well-Differentiated Thyroid Cancer Invading the Airway*. Poster Presentation, Newton D. Fischer Society Meeting, Chapel Hill, NC, June 16, 2007.

Roberts JM, Zanation AM, Marshall AF, Weissler MC. *Clinical Outcome Study of Well-Differentiated Thyroid Cancer Invading the Airway*. Poster presentation, American Head and Neck Society, Combined Otolaryngology Spring Meetings, San Diego, CA, April 2007.

Rose AS. Foreign Bodies of the Airway. Grand Rounds, Departments of Family Medicine & Internal Medicine. Maria Parham Medical Center, Henderson, NC, May 29, 2007.

Roush P. *Management of Auditory Neuropathy/Auditory Dyssynchrony in Infants and Children*. Invited presentation, Phonak Pediatric Advisory Board, Zurich, Switzerland, July 1, 2007.

Roush P. *Hearing Loss in Infants and Children: A Team Approach*. Invited presentation to Raleigh HITCH-UP parent support group, May 1, 2007.

Roush P, Roush J, Wilson K, Alberg J, Everett R. *Hearing Care for Infants*. Invited presentation. North Carolina Speech, Hearing and Language Association Annual Convention, March 31, 2007.

Roush P. *Hearing Loss in Infants and Children: A Team Approach*. Invited presentation to Charlotte HITCH-UP parent support group, February 6, 2007.

Roush P. *Hearing Care for Infants: A Continuum of Services*. Invited presentation, 3rd Biannual UNC Pediatric Audiology Symposium, October 5, 2006.

Scanga L, Powell C, Zdanski C, Buchman C, Roush P, Booker J, Gulley ML. *Congenital Human CMV Infection Identified by PCR of Dried Blood Spots from Newborns Subsequently Diagnosed with Hearing Loss*. Annual Meeting of the Association of Molecular Pathology, Fall 2006.

Senior BA. *Endoscopic Resection of Anterior Skull Base Tumors*. Tufts University, Boston, MA, June 13, 2007

Senior BA. *Complications of Sinus Surgery and their Avoidance*. Tufts University, Boston, MA, June 13, 2007

Senior BA. *IGS: Why and When?* Tufts University, Boston, MA, June 13, 2007

Senior BA. *Surgical Anatomy of the Sinuses*. Iowa Sinus Course, Iowa City, Iowa, June 8, 2007

Senior BA. *Frontal Sinus Surgery*. Iowa Sinus Course, Iowa City, Iowa, June 8, 2007

Senior BA. *Endoscopic Resection of Anterior Skull Base Tumors*. Iowa Sinus Course, Iowa City, Iowa, June 9, 2007

Senior BA. *Endoscopic Repair of CSF Leaks*. Iowa Sinus Course, Iowa City, Iowa, June 9, 2007

Senior BA. *Frontal Sinus Surgery*. 4th International Congress of Otorhinolaryngology/Head and Neck Surgery, Amman, Jordan, May 17, 2007

Senior BA. *Pituitary Surgery*. 4th International Congress of Otorhinolaryngology/Head and Neck Surgery, Amman, Jordan, May 17, 2007

Senior BA. *Frontal Sinus Surgery*. 4th International Congress of Otorhinolaryngology/Head and Neck Surgery, Amman, Jordan, May 17, 2007

Senior BA. *Traditional FESS, How Much Surgery is Appropriate (Panel)?* Annual Meeting of the Triological Society, San Diego, CA, April 28, 2007.

Senior BA. Moderator, *Imaging in Rhinology*, Meeting of the American Rhinologic Society. San Diego, CA, April 27, 2007

Senior BA. *CRS Definitions and Etiologies*. Carolina Course in Sinus Surgery. Savannah, GA. April 13, 2007

Senior BA. *CRS Definitions and Etiologies*. Southern States Course in FESS, Emory University, Atlanta, GA, March 15, 2007.

Senior BA. *IGS: Why and When*. Southern States Course in FESS, Emory University, Atlanta, GA, March 15, 2007.

Senior BA. *Endoscopic Resection of Tumors of the Sinuses and Skull Base*. Southern States Course in FESS, Emory University, Atlanta, GA, March 15, 2007.

Senior BA. *State of the Art Image Guided Surgery*. 26th ISIAN, Kuala Lumpur, Malaysia, February 1, 2007

Senior BA. *Minimally Invasive Pituitary Surgery*. 26th ISIAN, Kuala Lumpur, Malaysia, February 2, 2007

Senior BA. *Intracellular Staph in Rhinosinusitis*. 26th ISIAN, Kuala Lumpur, Malaysia, February 2, 2007

Senior BA. *Surgical Anatomy of the Sinuses*. Precongress Course in Functional Endoscopic Sinus and Skull Base Surgery, Hospital Universiti Kebangsaan Malaysia, Kuala Lumpur, Malaysia, January 29, 2007.

Senior BA. *Bone Infection in Rhinosinusitis*. Precongress Course in Functional Endoscopic Sinus and Skull Base Surgery, Hospital Universiti Kebangsaan Malaysia, Kuala Lumpur, Malaysia, January 30, 2007.

Senior BA. *Hydroscopy*. Precongress Course in Functional Endoscopic Sinus and Skull Base Surgery, Hospital Universiti Kebangsaan Malaysia, Kuala Lumpur, Malaysia, January 30, 2007.

Senior BA. *Applied Anatomy-Difficult Areas in Sinus Surgery, Powered Instrumentation in FESS*, Copenhagen University Hospital, Copenhagen, Denmark, December 14, 2006.

Senior BA. *My Worst Case, Powered Instrumentation in FESS*, Copenhagen University Hospital, Copenhagen, Denmark, December 14, 2006.

Senior BA. *FESS and Powered Instrumentation with or without Navigation, Powered Instrumentation in FESS*, Copenhagen University Hospital, Copenhagen, Denmark, December 14, 2006.

Senior BA. *Demonstration Dissection of the Sella and Parasellar Region, Powered Instrumentation in FESS*, Copenhagen University Hospital, Copenhagen, Denmark, December 14, 2006.

Senior BA. *Acute Management of Complications*, Annual Meeting of the West Virginia Otolaryngology Society, Greenbrier, WV, November 3, 2006.

Senior BA. *Avoidance of Complications in Sinus Surgery*, Annual Meeting of the West Virginia Otolaryngology Society, Greenbrier, WV, November 4, 2006

Senior BA. *Frontal Sinus Surgery*, Annual Meeting of the West Virginia Otolaryngology Society, Greenbrier, WV, November 4, 2006

Senior BA. *Minimally Invasive Pituitary Surgery*, Annual Meeting of the West Virginia Otolaryngology Society, Greenbrier, WV, November 5, 2006

Senior BA. *Medical Management of Sinusitis*, Southern States Rhinology Course, Medical College of Georgia, Augusta, GA, October 19, 2006.

Senior BA. *Endoscopic Resection of Tumors*, Southern States Rhinology Course, Medical College of Georgia, Augusta, GA, October 19, 2006.

Senior BA. *Minimally Invasive Pituitary Surgery*, Southern States Rhinology Course, Medical College of Georgia, Augusta, GA, October 19, 2006.

Senior BA. *Surgical Anatomy of the Sinuses*, Annual Meeting of the American Academy of Otolaryngology/Head and Neck Surgery, Toronto, ON, Canada, September 17, 2006

Senior BA. *Image Guided Surgery, Trends and Future Technologies*, Annual Meeting of the American Academy of Otolaryngology/Head and Neck Surgery, Toronto, ON, Canada, September 18, 2006

Senior BA, Ewend MG. *Minimally Invasive Pituitary Surgery*, Annual Meeting of the American Academy of Otolaryngology/Head and Neck Surgery, Toronto, ON, Canada, September 19, 2006

Senior BA, *MIPS: The Otolaryngologists Perspective*, Multidisciplinary Pituitary Tumor Board, University of North Carolina, Chapel Hill, NC, July 5, 2006

Sennaroglu L, Colletti V, Streitberger C, Baumgartner W, Pillsbury H, Van de Heyning P, Hagen R, Vischer M, Kiratzidis T, Bebear J-P, Adunka O, Pau H-W, Olgun L, Raine C. Surgical Round Table. *New Developments in Hearing Technology*. 6th Wullstein Symposium 2006. Sponsored by Med-El Corporation. University of Würzburg, Germany. December 7-10, 2006.

Shockley WW. *Influence of Lifestyle on Aging*. Alumni Guest Speaker. Queen City ENT Symposium, Department of Otolaryngology-Head and Neck Surgery, University of Cincinnati College of Medicine, Cincinnati, OH, June 9, 2007.

Shockley WW. *Reconstruction of Facial Cutaneous Defects*. Guest Speaker for NC Chapter of the Society of Otolaryngology/Head and Neck Nurses. Chapel Hill, NC, March 3, 2007.

Shockley WW. *The Larynx: Applied Clinical Anatomy*. MSI Grand Rounds, UNC Dept. of Cell and Developmental Biology, December 3, 2006.

Shockley WW. *Sinus and Nasal Tumors. Updates in Ophthalmic Oncology*. UNC Department of Ophthalmology. Chapel Hill, NC, October 1, 2006.

Shockley WW. *Reconstruction of Nasal Alar Defects: 10 Practical Tips*. North Carolina/South Carolina Annual Meeting, North Carolina Society of Otolaryngology-Head and Neck Surgery, Asheville, NC, July 20-23, 2006.

West A, Senior BA. *Eotaxin in Chronic Rhinosinusitis*, Annual Meeting of the American Academy of Otolaryngic Allergy, Toronto, ON, Canada, September 16, 2006

Zanation AM. *Advances in Minimally Invasive and Endoscopic Neck Surgery*. Newton D. Fischer Society Annual Meeting, Chapel Hill, NC, June 16, 2007.

CI2007:

The following presentations were made at the 11th International Conference on Cochlear Implants in Children, hosted by the UNC Department of Otolaryngology/Head and Neck Surgery, in Charlotte, NC, April 11-14, 2007. Course Directors were Harold C. Pillsbury, MD, and Craig A. Buchman, MD.

Adunka O, Roush P, Buss E, Grose J, Macpherson C, Buchman C. *Monitoring of Cochlear Function During Cochlear Implantation*.

Blanks D, Fitzpatrick D, Hall J, Buss E. *A Normal-Hearing Stimulation of Bilateral Cochlear Implant Stimulation*.

Blanks D, Fitzpatrick D, Buss E, Hall J. *Neural Responses to Amplitude Modulation and Intensity Effects Using Binaurally Mismatched Carrier Frequencies*.

Brown C, Eskridge H, Teagle H, Buchman C, Pillsbury H. *Pediatric Cochlear Implantation: The Importance of a Team Approach and Collaboration with Public Schools*.

Buchman CA, Cullen RD, Pillsbury HC, Teagle H, Brown CJ, Luxford WM, Eisenburg L. *The Clinic Perspective – Internal Device Reliability*.

Buchman C. *Cochlear Nerve Deficiency in Children*.

Eskridge H, Brown C, Henderson L, Teagle H, Buchman C, Pillsbury H, CDaCI Investigative Team. *Comparison of Speech Production Development between Children with Cochlear Implants and Normal Hearing Peers.*

Finley CC, Holden L, Holden T, Whiting B, Skinner M. *Simple Fitting Modifications Based on Measures of Peripheral Variability in Individual Subjects.*

Finley CC. *In Vivo Testing of Cochlear Implant Devices – Implant Reliability Forum.*

Fitzpatrick D, Finley C, Ingraham M, Roberts J, Adunka O, Pillsbury H. *Physiological Responses to Electrical Stimulation of the Inferior Colliculus in Unanesthetized Rabbits.*

Fitzpatrick D, Finley C, Ingraham M, Roberts J, Pillsbury H. *Behavioral Responses to Electrical Stimulation of the Inferior Colliculus in Rabbits.*

Francis H, Buchman C, Visaya J, Wang N, Zwolan T, Fink N, Niparko J, CDaCI Investigative Team. *Surgical Factors in Pediatric Cochlear Implantation and Early Auditory Outcomes.*

Pillsbury H, Cullen R, Buss E, Clark M, Buchman C. *Cochlear Implantation in Patients with Significant Residual Hearing.*

Roush P. *Early Assessment and Hearing Aid Fitting in Infants: Eliminating Sources of Error.*

Skinner M, Holden T, Whiting B, Voie A, Saxson E, Neely G, Hullar T, Finley C. *The Role of Electrode Placement as a Contributor to Variability and Outcomes.*

Weinstock J, Teagle H, Buchman C, Zdanski C. *Intracochlear ECAP Testing in Children with Auditory Neuropathy.*

Zdanski C, Teagle H, Roush P, Cleland A, Buchman C, Brown C. *Medical/Audiological Profiles and CI Outcomes for Children with Auditory Neuropathy.*

Harold C. Pillsbury, III: The Early Years

Baltimore, Maryland







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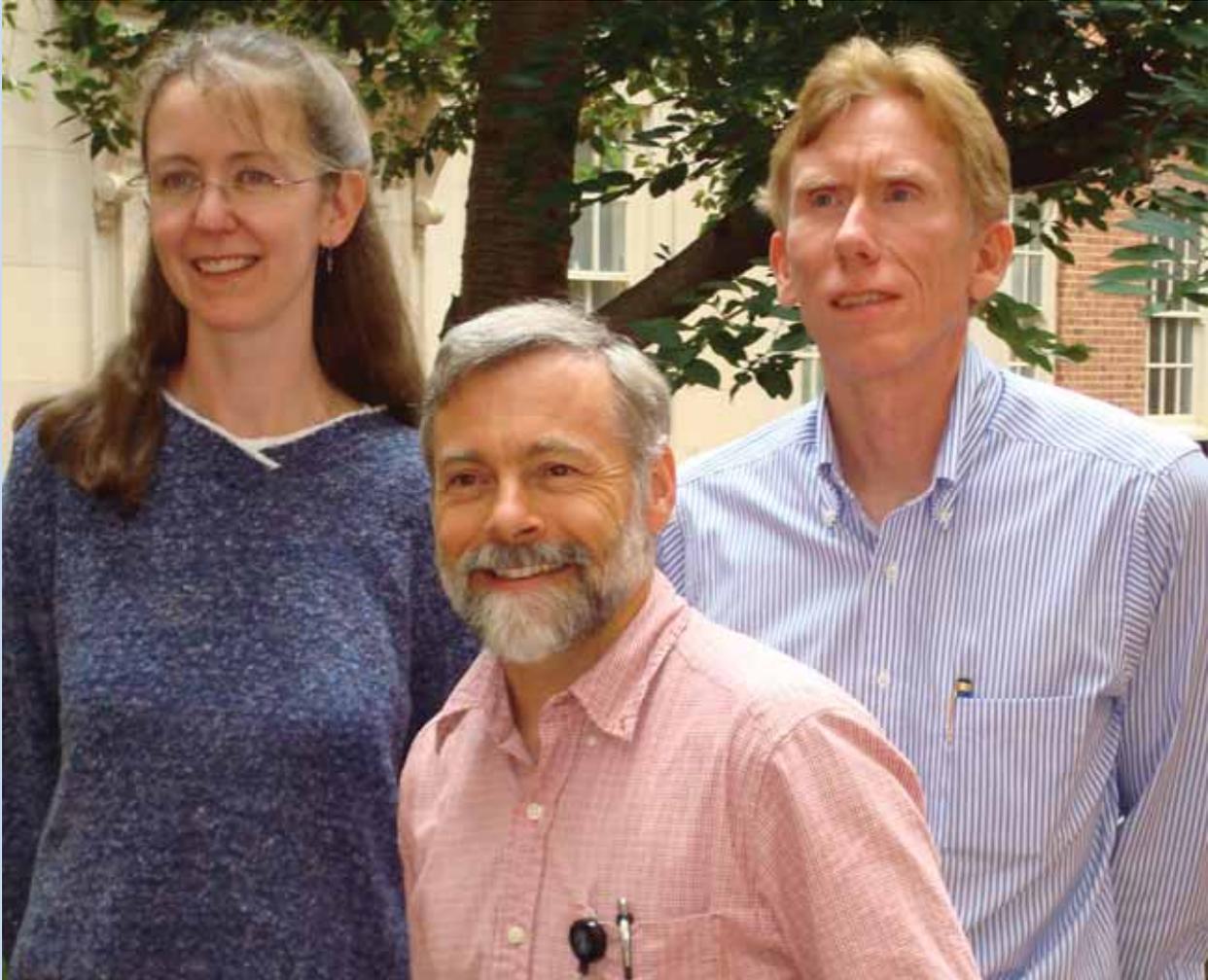
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_____ Ficklen/Pillsbury Research Fund

Thank you!



Psychoacoustic Research Scientists: Emily Buss, PhD; John H. Grose, PhD; and Joseph W. Hall, PhD

A quarter century ago...

At about the same time that Dr. Pillsbury took over as Chief of ENT, Joe Hall – then a promising young post-doctoral investigator at the Institute of Hearing Research in England – was puzzling over a peculiar set of data he had collected. The data appeared to show that background noise well removed in frequency from the target sound actually made the target sound easier to hear. This peculiar result was completely at odds with accepted auditory theory at that time. Nevertheless, Dr. Hall pursued the serendipitous result, and his findings were published in a seminal paper in 1984. The new phenomenon, now called Comodulation Masking Release (CMR), opened up an important new chapter in auditory research, and one that Joe and his colleagues in the Hearing Research Lab, Emily Buss and John Grose, are still writing today.



Residents who graduated from our program in 2007: John W. Alldredge, MD; Adam M. Zanation, MD; Marc K. Bassim, MD; and Krishna G. Patel, MD, PhD.

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