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Heads Up

A newsletter for alumni, colleagues, and friends of the Department

UNC Otolaryngologists Lead in Rhinology and Allergy

It's rare that you have a leader of a major national medical association on your faculty, but it is even rarer to have two! In September, 2010, Brent Senior, MD, Professor and Vice Chair of Otolaryngology/Head and Neck Surgery, and Chief of the Division of Rhinology, Allergy, and Sinus Surgery, took over as President of the American Rhinologic Society, a society of over 1200 otolaryngologists around the world dedicated to surgical and medical management of conditions impacting the nose and paranasal sinuses. In addition, Harold Pillsbury, MD, Thomas J. Dark Professor of Otolaryngology and Chair of the Department, became the President-Elect of the American Academy of Otolaryngic Allergy, a group of 2000 otolaryngologists dedicated to the management of nasal allergy.

“Being selected to head up these prestigious societies is an honor to us personally, but also a statement about the care that is being given to our patients at the University of North Carolina,” says Dr. Senior. “Being recognized by our peers in this way is very humbling and a great honor, but it all comes down to patient care and that time we spend in the clinic building a relationship with our patients. That is where care is delivered, and that is what we are most proud of.”

Endeavoring to provide the best rhinology and allergy care requires the latest investments in technology including in-office CT scanning and video endoscopy as well as the latest technology in the operating rooms including computerized image guidance, balloon technology, and most recently, robotics.

But central to our excellent team is our collection of exceptional people: Other critical members of our division include Dr. Adam Zanation, with a special interest in management of benign and malignant tumors



Harold C. Pillsbury, MD, President-Elect of the AAOA; Brent A. Senior, MD, President of the ARS

of the sinuses and skull base, and Dr. Charles Ebert, specializing in allergy and endoscopic management of inflammatory disease of the sinuses. Behind them stand a dedicated staff of residents eager to assist and learn.

Of equal importance is our outstanding support staff in the division. Barbara Esterly, RN, Soon Young Rondinelli, RN, and, recently joining the staff, Katie Chandler, RN, provide exceptional nursing care. Managing our allergy practice and the nearly 500 patients receiving immunotherapy through our clinic is Regina Stoffel, RN, at our Neurosciences Clinic and Nancy Gates, RN, at our Carolina Pointe Clinic. And, of course, behind the scenes are the myriads who make the clinic experience a pleasant and efficient one for all our patients. [Job 79033 • proof 2](#)

While providing this outstanding clinical care will always be our central focus, supplementing it in equally significant ways are our focus on education and research. Drs. Pillsbury, Zanation, Ebert, and Senior lecture at instructional courses and meetings locally, regionally and internationally on a regular basis on the most recent advances in the field. At the same time, a strong focus on cutting edge research in the division results in numerous publications and presentations at scientific meetings every year.

In this addition of *Heads Up*, we hope you enjoy the highlights of our work in the Division of Rhinology, Allergy, and Sinus Surgery in the areas of patient care, education, and research.

Chair's Corner

It is not often that I find myself on the cover our *Heads Up* publication, but that is the case this time because of the leadership roles that Brent and I hold in the ARS and AAOA. Beyond that, the real value of this issue of our newsletter is the wonderful work that our team is doing using the robot for head and neck tumor extirpation. This is especially impressive in the pediatric arena. In addition to the use of the robot, we have a tremendous impact on education in the Southeast by virtue of our Pediatric Airway Course coordinated by Dr. Carlton Zdanski of UNC and Dr. David White of MUSC. Parenthetically, Dave was a resident here at UNC before moving to Charleston, SC. I would also note Dr. Julie Kimbell, a fabulous applied mathematician, has done tremendous work in analyzing the sinuses and airway since joining us at UNC. She has created models that allow us to much better understand the dynamic mechanisms involved in airway obstruction and the mechanism of breathing. I have the highest regard for Julie as well as Dr. Kibwei McKinney, a T-32 grant recipient, who is now in his second year of research. Their contributions to the scientific literature are substantive and promise to significantly increase our understanding of the complex mechanisms involved in the dynamics of the airway. I hope you enjoy this issue of *Heads Up*.



Harold C. Pillsbury, MD
Department Chair



The Division of Rhinology, Allergy, and Sinus Surgery. L-R: Harold C. Pillsbury, MD; Brent A. Senior, MD (Chief); Soon Young Rondinelli, RN; Barbara Esterly, RN; Julia S. Kimbell, PhD; Charles S. Ebert, MD, MPH; and Adam M. Zanation, MD. Not pictured: Kathryn Chandler, RN; Regina Stoffel, RN; and Nancy Gates, RN. Photo by Paul Braly, Tarheel Images LLC.

The Best in America are at UNC!

US News & World Report "Best Hospitals" 2010-2011
UNC ranks #21 in the nation for "Ear, Nose and Throat"



Best Doctors in America, 2011-2012
(Best Doctors, Inc.)

Oliver F. Adunka, MD	Brent A. Senior, MD
Craig A. Buchman, MD	William W. Shockley, MD
Amelia F. Drake, MD	Mark C. Weissler, MD
Harold C. Pillsbury, MD	Carlton J. Zdanski, MD



America's Top Doctors, 9th Edition, 2010
(Castle Connolly Medical Ltd.)

Amelia F. Drake, MD	William W. Shockley, MD
Harold C. Pillsbury, MD	Mark C. Weissler, MD
Brent A. Senior, MD	



America's Top Doctors for Cancer, 6th edition, 2010
(Castle Connolly Medical Ltd.)

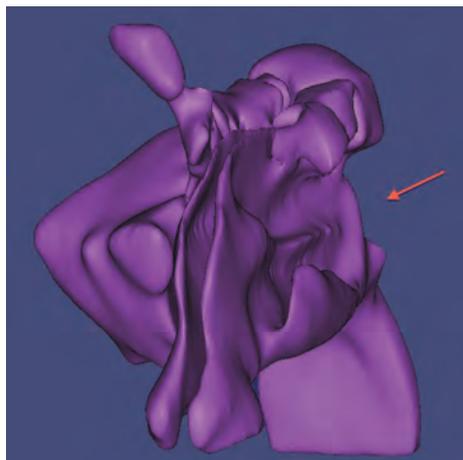
Mark C. Weissler, MD

CFD Analysis of Chronic Rhinosinusitis:

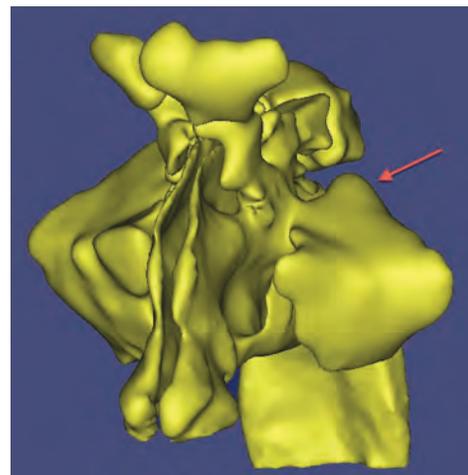
Characterization of Post-Surgical Changes in Nasal Airflow in Functional Endoscopic Sinus Surgery Through a Computational Fluid Dynamics Model

Under the direction of research faculty member Julia Kimbell, PhD, and clinical faculty members, Adam M. Zanation, MD, Charles S. Ebert, Jr., MD, MPH, and Brent A. Senior, MD, research resident Kibwei McKinney, MD, and post-doctoral fellow Dennis Frank, PhD, have undertaken a project to objectively characterize inspiratory airflow and topical drug delivery in patients undergoing Functional Endoscopic Sinus Surgery (FESS) for the treatment of Chronic Rhinosinusitis (CRS). Topical medications are routinely used in the treatment armamentarium of patients with CRS. When conservative approaches alone fail, FESS is employed with the goals of improving drainage from the affected sinuses, removing diseased tissues, enhancing ventilation, and permitting more effective deposition of adjuvant topical medications in the post-operative period. The goal of the present study is to use a computational fluid dynamics model to objectively quantify the ability of FESS to achieve its stated goals in the treatment of CRS of the ostiomeatal complex (OMC).

Patients were identified as having CRS of the OMC based upon the clinical criteria outlined by the 2002 Sinus and Allergy Health Partnership Task Force. For inclusion, patients had to have failed treatment with conservative measures and therefore required FESS as the best available treatment option. Pre- and post-operative computed tomography (CT) scans were obtained and each patient was asked to complete the Rhinosinusitis Outcome Measure-31 survey to assess the subjective grading of their disease process. The CT scans are being imported into Mimics™ software and a 3-dimensional model of the nasal and sinus airspaces was constructed. These reconstructions are smoothed and imported into the computer-aided design software package ICEM-CFD™, used to create unstructured tetrahedral meshes for simulations of inspiratory airflow, heat and water vapor transport, and nasal sprays. Correlations between subcategories of the RSOM-31 and the values obtained for airflow, heat and water flux, and particle deposition are being made using the Pearson's correlation coefficient.

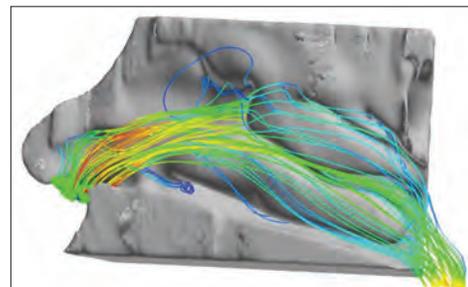


Pre-operative 3-dimensional model of the nasal airway of a patient with CRS, reconstructed from a maxillofacial Xoran™ scan with thresholding at -251 HU. The L maxillary sinus is poorly aerated secondary to mucosal edema, ostial obstruction, and purulence. It therefore could not be visualized at this threshold value.



Post-operative 3-dimensional model of the same patient with CRS following FESS. The L maxillary sinus antrum is widely patent, allowing for drainage and aeration of the sinus cavity.

Flow simulations are being performed bilaterally in patients with unilateral disease, looking specifically at sections in the coronal plane at the level of the maxillary antrum (7cm from the external nasal valve). In one patient, the cross-sectional area of this plane was larger on the diseased side ($8.32 \times 10^{-5} \text{m}^2$) than the contralateral side ($1.79 \times 10^{-4} \text{m}^2$) secondary to mucosal edema and inflammation. Pre-operative analysis revealed significant differences in nasal airflow between the diseased ($1.67 \times 10^{-3} \text{kg/s}$) and non-diseased sides ($6.33 \times 10^{-3} \text{kg/s}$). Water flux was present throughout the middle meatus on the non-diseased side, with very little present in the diseased nasal cavity.



Example simulation showing inspiratory airflow streams from the nostrils to the nasopharynx. Velocity decreases as the streams traverse the turbinates and is maximal in the nasal valve area and nasopharynx.

These results suggest that there are quantifiable physiologic differences between nasal airways affected by CRS and those with healthy mucosa. Post-operatively, scans will be obtained between 6 weeks and 3 months following surgery, depending on the extent of healing that has occurred. At this time point, additional CT scans will be obtained and models constructed to assess changes in the metrics previously discussed. Information gained from this study has potential use in patient selection for functional endoscopic sinus surgery.



Research Associate Professor Julia S. Kimbell, PhD, with T-32 Resident, Kibwei A. McKinney, MD, and Post-Doctoral Research Fellow, Dennis Frank, PhD.

Management of Complicated Allergic Fungal Sinusitis

A 24-year-old female was transferred to UNC with acute left vision loss and right cranial nerve 6 palsy. An MRI and CT (see figure) revealed an erosive process centered in the sphenoid sinus with posterior and anterior skull base erosion. Left circumferential involvement of optic canal was noted. Ophthalmology confirmed 20/400 vision on the left. Given the appearance on scope exam and radiology, allergic fungal sinusitis (AFS) was at the top of the differential. The diagnoses of neoplasm, invasive infections, and pseudotumor were also considered. After 24 hours of high dose steroids and antibiotics, no change in vision was noted and the decision was made to take the patient to the OR for FESS with optic nerve and orbital decompression.

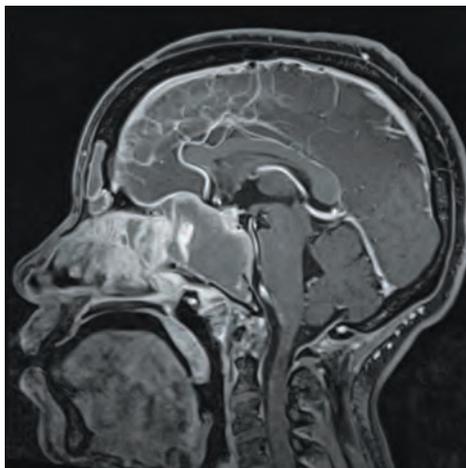
During the case, Dr. Adam Zanation removed significant polyps and fungal debris. All sinuses were opened including a “nasalization drill out” of the sphenoid sinus with a partial septectomy. Then careful suction dissection was carried back to the pulsatile pre-pontine dura, up to the anterior skull base and around the left optic nerve. Fungal debris was removed from the optico-carotid recess up to the anterior clinoid on the lateral side of the optic nerve. No CSF leak was noted. The patient did well, her vision returned to 20/25 before she left the hospital, and her cranial nerve 6 palsy slowly resolved. Allergy testing revealed significant fungal allergy and allergy to common environmental antigens. Her long-term treatments include immunotherapy and sinus rinses with steroids. She is 12 months

from her original presentation with normal vision and controlled sinus disease.

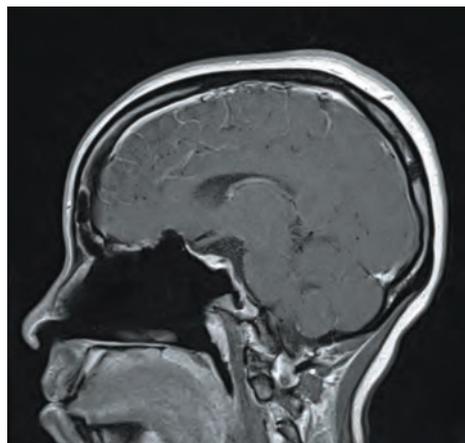
Approximately 5% of patients affected by chronic rhinosinusitis actually carry a diagnosis of AFS. 90% of patients demonstrate IgE to one or more fungal antigens. AFS is more common in the Southeast and Southwest than other parts of the US. The presentation of disease is variable from simple rhinitis symptoms to orbital/intracranial complications. Treatment is usually multi-pronged with surgery, allergy and medical treatments used together; even so, this disease remains at times recalcitrant and often requires additional surgery in the future.

At the UNC Department of Otolaryngology, we take a comprehensive approach to complex sinus diseases. We have in-office abilities for CT scanning, allergy testing and allergy treatment, and offer the complete array of technologies for sinus surgery. This case illustrates that the combination of appropriate sinus surgery, allergy treatment and sinonasal medical therapy can be successfully used together to control a complex sinus problem.

While AFS has been studied since the 1980s, little is known about the genomics of this disease. In August of 2010, Drs. Adam Zanation, Charles Ebert, and Kibwei McKinney were awarded a North Carolina Translational and Clinical Sciences Institute (NC TraCS) grant to study the genomics of sinus samples from AFS patients. The hope is that this research will identify targets for future therapy for this disease.



Pre-op: Heterogeneous polyps and fungal sinusitis with sphenoid and skull base erosion with intracranial extension.



Post-op: Open sphenoid, ethmoid and frontal sinuses with AFS removed from the intracranial anterior cranial fossa.

Allergy Nurses Provide a Shot in the Arm



Our Allergy Nurses: Nancy Gates, RN, and Gina Stoffel, RN

The nurses that call the shots in the ENT Allergy Clinic at UNC are Nancy Gates, RN, at Carolina Pointe, and Gina Stoffel, RN, at the Neurosciences Hospital. They work diligently to maintain and continue this practice that has made the Clinic a great success and has impacted the lives of so many people. They are referred allergy patients from all over North Carolina and beyond. The ENT Allergy Clinic provides patients with skin testing, desensitization shots, Rast Testing for inhalants and foods through Commonwealth Labs, and they are now using the UNC Core Lab for Immunocap testing.

“Immunocap is a very sensitive type of testing,” says Gina. “We have our own ENT panels set up for inhalants and foods, and results are readily available in a week. We are seeing several patients with the diagnosis of Allergic Fungal Sinusitis.” The clinic has implemented a specific panel of molds or environmental fungi identified in this disease process, that with immunotherapy, recurrence can be reduced.

“Working in the ENT Allergy Clinic is a really unique experience as we provide care and get to know such a diverse group of patients that we see on a very regular basis,” Nancy adds. “We are so proud to be working closely with the Rhinology team, the attendings and residents that make up the clinic and collaborate with us to provide the best quality of care our patients deserve.”

Pediatric Airway Course Rocks the House... Again!



Duke Resident Chad Whited, MD, a participant in the Carolinas' Pediatric Airway Course

The 2nd annual Carolinas' Pediatric Airway Course was hosted by the University of North Carolina this year, October 21-22, 2010. This is a continuing collaborative effort with the Medical University of South Carolina, co-directed by Drs. Carlton Zdanski (Chief, Pediatric OHNS at UNC) and David White

(Director, Pediatric OHNS at MUSC). Otolaryngology faculty and residents from Duke University and Wake Forest University joined them for the two-day interactive course.

Course faculty members included Drs. Robert Buckmire (UNC), Amelia Drake (UNC), Dan Kirse (WFU), Jeremy Meier (MUSC), Eileen Raynor (DUMC), Austin Rose (UNC), and Alisha West (UNC). The course was sponsored by The North Carolina Children's Airway Center and generous contributions from Acclarent, Covidien, LifeCell, Karl Storz, Medtronic, and OmniGuide.

Participants were provided a hands-on experience with open and endoscopic airway techniques. They were exposed to a variety of surgical techniques for the management of pediatric airway problems and developed and improved their skills of airway management and bronchoscopic

techniques, including managing emergent scenarios in the simulation laboratory.

A special shout out to Dawn Wilson (UNC) who went the extra mile to make sure everything ran smoothly and that all of our visitors were well cared for. Next year the course will return to MUSC in Charleston, South Carolina.



UNC Pediatric Otolaryngology Fellow Alisha West, MD, teaches the nuances of flexible bronchoscopy to third-year resident Jessica Smyth, MD, at the 2nd Annual Carolinas' Pediatric Airway Course.

UNC Presentations at ARS Boston 2010

The 56th Annual Meeting of the American Rhinologic Society took place on September 25, 2010, in Boston, Massachusetts. Dr. Brent Senior was sworn in as President for 2010-2011. Listed below are the presentations by members of our Department:

Adam Zanation, MD; Anand Germanwala, MD. *The Medial Optico-Carotid Recess (MOCR) as a Keyhole for Endoscopic Endonasal Approaches to Paraclinoid Cerebral Aneurysms.*

Adam Zanation, MD; Stephen Wheless, BS; Kibwei McKinney, MD; Brent Senior, MD. *Beyond the Pituitary: Prospective Clinical Trial of Nasal Healing, Sinonasal Quality of Life and Olfaction in Expanded Endonasal Skull Base Surgery.*

Charles Ebert, MD, MPH; Nadine Oosmanally, MSPH; Adam Zanation, MD; Brent Senior, MD. *Comparative Analysis of Cost of Minimally Invasive Pituitary Surgery and Sublabial-transsptal Approaches to the Pituitary.*

Thomas Suberman, BA; Adam Zanation, MD; Brent Senior, MD; Charles Ebert, MD, MPH. *Sinonasal Quality-of-Life before and after Endoscopic, Endonasal Minimally Invasive Pituitary Surgery.*

Kibwei McKinney, MD; Stephen Wheless, BS; Adam Zanation, MD. *Feasibility of Paired Utilization of Robotic Surgery with Image Guidance for Endonasal Surgery.*



Left to right: Stephen Wheless, BS; Thomas Suberman, BA; Charles Ebert, MD, MPH; Nadine Oosmally, MSPH; Adam Zanation, MD; Brent Senior, MD; and Kibwei McKinney, MD

UNC Otolaryngologists Utilize Robot for Pediatric Tumor Removal

This past August, Drs. Michael Stadler, Adam Zanation, and Carlton Zdanski successfully performed robotic-assisted resection of a large lymphangioma of the base of tongue, lateral pharyngeal wall, and supraglottis in a 15-year-old patient. To their knowledge, there are no reported cases in the literature to date of transoral robotic surgery (TORS) being successfully utilized for tumor resection in the pediatric patient population. The patient tolerated her procedure well and without complication, was discharged home on post-operative day two, and was tolerating a soft diet at that time. She was seen in follow-up at one month and continued to do quite well, with no postoperative sequelae related to the surgical resection of her tumor. The successful procedure was even part of features in the *Raleigh News & Observer* and on regional TV news!



The pre-operative sagittal CT cut highlighting the location of the tumor.



Drs. Adam Zanation, Carlton Zdanski, and Michael Stadler, with the robot they used to resect the tumor.

While surgical robotics had its beginnings and initial development with both NASA and the US Department of Defense, it has been commercial systems that have shown the most pronounced innovation and feasible application in the surgical world. While robot-assisted surgery has been used in abdominal, urologic, gynecologic and cardiac surgery for some time, only recently has TORS been integrated into the field of Otolaryngology/Head and Neck Surgery. The term “TORS” simply

relates to the transoral application of robotic devices to previously-described and clinically accepted procedures. However, based on the superior optics and articulating instrumentation, TORS may extend the variety and spectrum of diseases that are considered amendable to minimally invasive surgical treatment. Ongoing studies will undoubtedly help further delineate the specific indications and applications of this technology to our field.

Gore To Be First Rhinology Fellow, 2011-2012

We are honored and thrilled that Chief Resident Mitchell R. Gore, MD, PhD, will continue his training with us at the fellowship level starting in July 2011.

This past spring I was fortunate to be accepted as the first Rhinology/ Anterior Skull Base Fellow. It's an understatement to say that this is one of the greatest honors of my life and my dream fellowship. Being the first fellow is exciting and we could not ask for better teachers than Dr.

Senior, Dr. Zanation, and Dr. Ebert. Our Rhinology faculty are among my heroes in Otolaryngology, and it is incredible to be able to train under them for my fellowship. After residency I plan to have an academic career in rhinology and anterior skull base surgery. My specific interests are molecular and immunologic factors involved in chronic sinusitis and the tumor biology and genetic alterations in rare tumors such as esthesioneuroblastoma and sinonasal melanoma.



Mitchell R. Gore, MD, PhD

Announcements

(Just a few of the many exciting things happening in our Department)

Dr. Trevor Hackman is opening a sialendoscopy practice for patients with chronic and acute submandibular and parotid glands problems. Sialendoscopy is a new alternative endoscopic procedure to treat salivary glands stones and treat chronic salivary gland infections in a minimally invasive manner. Traditional treatments include marsupializing the Wharton's duct in the floor of mouth or excising the gland. Sialendoscopy provides patients an outpatient minimally invasive alternative to traditional surgery for patients suffering from salivary infections.

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

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

Craig Buchman, MD, and Pat Roush, AuD, were invited presenters at the fifth triennial "Sound Foundations" conference. Attendees from the US and over 30 other countries gathered in Chicago in November for a

three-day international pediatric audiology conference on assessment and management of children with hearing loss. Dr. Buchman delivered a presentation entitled "Candidacy Considerations for Implantable Hearing Technologies: An Otolologist's Perspective." Dr. Roush presented on "Auditory Neuropathy and Challenges in Diagnostic Audiology."

Chief Resident Dr. Paula Harmon married Mr. Dale Goodman on October 9, 2010, in her home town of Macon, Georgia. Due to the rigorous resident schedule, the wedding was planned in a record 5½ weeks. Of the 180 guests in attendance, UNC was represented by Dr. Amelia Drake, Dr. Deidra Blanks, Dr. Rupali Shah, Dr. Trinitia Cannon, Anna Bradshaw and Katie

Chandler. According to Dr. Harmon, the couple will honeymoon in December on an island "far, far away." As she will start her Pediatric Otolaryngology Fellowship at the University of Alabama in July, they will reside in Birmingham.



Dr. Paula Harmon and Mr. Dale Goodman

Watch for us in Scottsdale!

The Department will be very well represented at the upcoming Combined Sections Meeting in Scottsdale, Arizona, taking place January 27-29, 2011. Dr. William Shockley is the Vice President of the Southern Section, and Dr. Amelia Drake is on the Program Committee. Dr. Shockley will present Dr. Mark Weissler a Citation Award, and Dr. Harold Pillsbury will be the Guest of Honor.

Dr. Shockley will also moderate a panel on Nasal Valve Surgery, and Dr. Brent Senior will moderate a panel on Allergy and its Manifestations. Dr. Mihir Patel will be presenting his paper, "STT3A, C1orf24, TFF3: Putative Markers for Characterization of Follicular Thyroid Neoplasms from Fine Needle Aspirates," which won 2nd Prize in Resident Research in the Southern Section. Dr. Pillsbury will present "Manpower Issues in Otolaryngology/Head and Neck Surgery," and Dr. Adam Zanation is doing a "How I Do It" talk on Endoscopic Skull Base Tumor Surgery. Dr. Grace Kim will have a poster presentation on "Extensive Multifocal Rosai-Dorfman Disease Involving the Central Nervous System and Paranasal Sinuses," co-authored by Drs. Friedel, Jyung, Eloy, and Liu. Dr. Jessica Smyth will present "Outcomes of Head and Neck Squamous Cell Carcinoma Patients with N3 Neck Disease Treated Primarily with Chemoradiation vs. Surgical Resection," co-authored by Drs. Deal, Huang, Weissler, Zanation, and Shores. Drs. Rupali Shah and Adam Zanation co-authored a poster on "The First Report of Basilar Invagination and Brainstem Compression as a Complication of Head and Neck Radiation: Options for Treatment and Techniques for Endonasal Clivectomy and Odontectomy."

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The Department of Otolaryngology/Head and Neck Surgery is proud of its skilled faculty and staff who are committed to providing patients with the highest quality health care. Get to know us!

The Department of Otolaryngology/Head and Neck Surgery

Harold C. Pillsbury, MD, FACS, Chair, Thomas J. Dark Distinguished Professor of Otolaryngology/Head and Neck Surgery
Craig A. Buchman, MD, FACS, Vice Chair for Clinical Affairs
Brent A. Senior, MD, FACS, Vice Chair for Academic Affairs
Carolyn Hamby, Clinical Academic Departmental Administrator

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William W. Shockley, MD, FACS, Professor
Carol G. Shores, MD, PhD, Associate Professor
Xiaoying Yin, MD, Assistant Professor
Adam M. Zanation, MD, Assistant Professor
Trevor G. Hackman, MD, Assistant Professor
Andrew F. Olshan, PhD, Professor
D. Neil Hayes, MD, MPH, Assistant Professor
Brian K. Kanapke, Speech Pathologist

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Amelia F. Drake, MD, FACS, Newton D. Fischer Distinguished Professor of Otolaryngology/Head and Neck Surgery
Austin S. Rose, MD, Associate Professor
Alisha N. West, MD, Pediatric Otolaryngology Fellow

The Division of Facial Plastic and Reconstructive Surgery

William W. Shockley, MD, FACS, Professor and Chief, W. Paul Biggers Distinguished Professor of Otolaryngology/Head and Neck Surgery

The Division of Rhinology, Allergy, Sinus Surgery

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Adam M. Zanation, MD, Assistant Professor
Charles S. Ebert, Jr., MD, MPH, Assistant Professor
Julia S. Kimbell, PhD, Associate Professor

The Division of Otology/Neurotology and Skull Base Surgery

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Harold C. Pillsbury, MD, FACS, Professor
Oliver F. Adunka, MD, Assistant Professor

The Division of Voice and Swallowing Disorders/UNC Voice Center

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Mark C. Weissler, MD, FACS, Professor
Ellen S. Markus, MA, CCC-SLP, DMA, Coordinator
Linda F. Hube, MS, CCC-SLP, Speech Pathologist

Sleep and Snoring Surgery

Brent A. Senior, MD, FACS, Professor

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Emily Buss, PhD, Associate Professor
Charles C. Finley, PhD, Associate Professor
Douglas C. Fitzpatrick, PhD, Assistant Professor
Patricia A. Roush, AuD, Associate Professor, Director, Pediatric Audiology

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Margaret T. Dillon, AuD, CCC-A, Audiologist

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Hannah R. Eskridge, MSP, CCC-SLP, LSLC Cert. AVT, Clinical Instructor, Director of CASTLE

WakeMed Faculty Physicians

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Brett E. Dorfman, MD, Assistant Professor
Esa A. Bloedon, MD, Assistant Professor
Allen F. Marshall, MD, Assistant Professor

Residents:

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Paula J. Harmon, MD
Michael E. Stadler, MD
Deidra A. Blanks, MD

Rupali N. Shah, MD
Joshua B. Surowitz, MD
Maher N. Younes, MD
Rose J. Eapen, MD

Jessica K. Smyth, MD
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