In medicine, the eureka moment rarely happens. Sometimes medical advances gain momentum from a simple gesture like an introductory email or a serendipitous meeting. Just ask Ron Alterovitz, PhD, assistant professor of computer science and head of the Computational Robotics Research Group in the Department of Computer Science at UNC. Since arriving in Chapel Hill in 2009, Alterovitz’s group has been investigating new algorithms that can enable robotic tentacles to achieve depth and precision inside the human body. One of his devices – steerable needles he co-created as a graduate student at UC-Berkeley – is being developed to treat liver and prostate cancers.

Now Alterovitz is focused on a new surgical device – a snake-like, robotic set of concentric nested tubes made of nickel titanium. The device can be deployed from the tip of a bronchoscope, allowing physicians to reach farther than ever into the lungs to diagnose abnormal growths called nodules. It can also be deployed via the nose to surgically access tumors in the brain or nearby structures in the head. The robotic device has the potential to move through the body so precisely that it can avoid anatomical obstacles and reach its target within a millimeter.

These interdisciplinary, NIH-funded projects have been of interest to School of Medicine faculty members Richard Feins, MD, professor of surgery in the division of cardiothoracic surgery, and Brent Senior, MD, Nathaniel and Sheila Harris Distinguished Professor of Otolaryngology.

After receiving an email from Alterovitz upon his arrival at UNC, Dr. Feins, an early user of the superDimension lung navigation system, was immediately interested in hearing what Alterovitz had to say. “As surgeons, most of what we do in terms of treatment involves getting where we need to go, so when Ron came to me with the concept of a steerable catheter that could get anywhere he preprogrammed it to go, it was exciting,” says Dr. Feins.

Dr. Senior’s work with Alterovitz didn’t involve an email; it began at church. Dr. Senior was mentoring a student of Alterovitz’s at church when the two got to talking about their work at UNC. It soon became clear to Dr. Senior that he should meet Professor Alterovitz.
An exceptional surgeon who will add greatly to our efforts in the treatment and study of Head and Neck Cancer.

- Mark C. Weissler, MD, FACS
  JP Riddle Distinguished Professor of Otolaryngology
  Professor and Chief, UNC Head & Neck Oncology

The Division of Head and Neck Oncology is pleased to announce the addition of Samip N. Patel, MD as its newest Assistant Professor.

Dr. Patel completed his undergraduate studies at Purdue University, and attended medical school at Northeast Ohio Medical University where he graduated in 2007. While in medical school, Dr. Patel received the Ruth L. Kirschstein National Research Award, an NIH Trainee Fellowship, at the University of Michigan Medical School.

Dr. Patel did a residency in Otolaryngology at the University of South Florida College of Medicine, and graduated in 2012. He then completed a Fellowship in Advanced Head & Neck Oncology and Microvascular Reconstruction at the University of Toronto.

**Distinctions**
- Board Certified Otolaryngologist specializing in Head and Neck Oncology and Reconstruction
- Recipient of the NIH Trainee Fellowship – Ruth L. Kirschstein National Research Award

**SAMIP N. PATEL, MD**
Assistant Professor of Division of Head and Neck Oncology

This particular issue of Heads Up is devoted to the interaction of robotics and Head & Neck Surgery. Brent Senior has been significantly involved in these efforts as well as Adam Zanation, Trevor Hackman, and Carlton Zdanski. The opportunity to interact with our colleagues at NC State has offered us significant windows to translational research between biomedical engineering and surgery for our patients. I feel that this interaction is only beginning to blossom and that in the future most of the procedures we perform will be devoted to an interface between technology and patient care. Many of the conditions and diseases we treat will be monitored by implant prostheses and managed by drug eluding implants. While some individuals rail against the application of technology to Medicine, otolaryngologists have always embraced this interaction. Our faculty continues to promote such procedures to better serve our patients.

This is also an ideal opportunity to welcome Samip Patel to our faculty. He comes to us from Toronto where he just completed a Microvascular Head and Neck fellowship. He has hit the ground running and we look for fabulous advances from Samip, both in the arena of education and clinical expertise.

**Chair’s Corner**

**In Memoriam**

Heads Up is a quarterly newsletter published by OHNS Director of Communications, Nicolette DeGroot, and members of UNC-OHNS.
"I was excited to hear what he was doing because it really is exactly what we need to be thinking about for the future of what we do in skull-base surgery," says Dr. Senior.

**Branching Out**

"Think about the airway as a tree," says Dr. Feins. "The limbs get smaller and smaller as you fan out. You'd like to climb out to grab an apple off one of the branches, but you can only go so far before you have to stop because the limbs are too small and will break. That's sort of what we're talking about with reaching peripheral lung lesions."

Diagnosing peripheral-zone lung cancer is difficult. The nodules can be reached with a CT scan and biopsied, but doing so runs the risk of collapsing the lung. Furthermore, even when the lesion is reached, the amount of tissue that can be gathered may be limited, and therefore the sample is potentially inaccurate.

Snake-like robotic needles, attached to and deployed by the bronchoscope, may provide more accurate diagnoses. As curvilinear devices that can be programmed, the needles can snake their way through the parenchyma of the lung to access nodules in the peripheral zone, striking their target with precision.

"If the nodule identified in the CT scan is on the peripheral zone, and the bronchial tubes are so small that you can't use existing devices like the superDimension, then that's where these robots can work," says Alterovitz.

Early-stage diagnosis through biopsies of peripheral nodules has the potential to save lives. And in the immediate term, that's the focus of Alterovitz and Dr. Feins. The long-term goal, however, is to actually treat the tumors. Dr. Feins uses the analogy of the early days of cardiology.

"Cardiology was primarily a diagnostic specialty," says Dr. Feins. "They did angiograms and saw what was wrong with the patient, and then they'd have to send the patient to the surgeon. Eventually they found therapeutic options. They could dilate the arteries or put stents in the arteries. Those therapies changed the whole dynamic. I think it's possible that if we can get the technology to precisely where we need it to go, not only can we make a diagnosis, but we can add therapeutics like localized radiation, localized chemotherapy, or even localized freezing or radio-frequency ablation."

**High-Priced Real Estate**

The pituitary gland sits squarely in the middle of the skull. Flanking it on either side are the carotid arteries, which control blood flow to the brain. The cranial nerves surrounding the pituitary control vision, movement of the eyeballs, sensation to the face and jaw, and other functions critical to everyday life.

"I tell my residents that we're dealing in high-priced real estate," says Dr. Senior. "You have to be very exact. Critical nerves are a millimeter or two from the target area we're trying to reach."

According to cadaver studies, tumors in this region are common. Although rarely cause for concern, some abnormalities require operations. A century ago, surgeries in the pituitary were highly invasive, requiring the face to be filed open. The procedures resulted in high mortality and complication rates. Today, after a series of advances, endoscopic procedures, which include dissection inside the nasal cavity, are relatively safe. UNC Hospitals performs roughly 100 such procedures per year.

Although utilizing the surgeon's fine finger motion has proved effective thus far, there's room for further improvement, according to Dr. Senior. Robotic technology coming from the Computational Research Group is poised to allow surgeons performing this procedure to reduce dissections and increase precision within the target area.

"The beauty of Ron's work is that we may be able to go through natural openings and do minimal expansion of them, and then pinpoint directly into where the tumor is located by using a roadmap system," says Dr. Senior. "Because the robot has such fine ability to position and move instruments, theoretically it would be safer as well."

The device can be outfitted with a variety of applications at its tip, including a camera, gripper, suctioner, and irrigator. Up to four devices with different tips could be deployed simultaneously during a procedure, with the idea that the devices could be used together by the surgeon as part of a treatment of the tumor.

Dr. Senior is optimistic about the possible advances. "Our goal with these surgeries is 0 percent mortality, 0 percent morbidity," he says. "We don't want any complications. Of course, we'll never reach that, but I think that the robot will help to move us in the right direction.

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**Robots in Research continued on page 4**
Learning New Languages

As the collaborators continue to trade technical expertise to advance their work, Alterovitz and his lab scour medical journals for the relevant research that will aid them in the medical applications of their robots.

“Building up your vocabulary takes time, but it’s required to get up to speed,” he says.

Alterovitz talks at length with the physicians to learn about the specific procedures. Despite the challenges of learning another discipline, the give-and-take provides all parties with a better understanding of each other’s work.

“I’m in awe of what Ron does,” says Dr. Feins. “For Ron, the world of computer science is very easy. But the medicine part of what we’re doing – a lobectomy, for example – can be difficult for him to understand. I’m exactly the opposite.”

Dr. Feins and Alterovitz maintain an open dialogue. They sometimes speak for hours, hashing out the complications and challenges of their project. For them to be successful, it’s essential, Dr. Feins says, for Alterovitz to feel comfortable asking questions.

“I don’t want him to have any fear about asking, ‘What do you mean by this?’” says Dr. Feins. “I might have to tell him you can’t put a hose that big down the airway because the patient won’t be able to breathe. And he may have to tell me that we can’t make a right-angle turn. It’s a good back and forth.”

Alterovitz enjoys the process.

“That’s the fun part about this line of work — learning about these procedures, how the physicians do them, what’s important to them as they do them, and how we can translate what they want to do into technology,” says Alterovitz.

Alterovitz isn’t a complete newcomer to medicine. After finishing his PhD at Berkeley, he received an NIH award that gave him the opportunity to work in a medical research group at UCSF Medical Center, where he was embedded with medical physicists and radiation oncologists. Dr. Senior has watched Alterovitz learn medical concepts and admires his commitment to building his medical knowledge base.

“I have to say, I was honestly impressed that he has taken it as far as he has already,” Dr. Senior says. “He has a lot more insight into the anatomy and our procedures than I would expect a computer scientist to have. He’s really done quite well in terms of getting a good, established knowledge base.”

At the start of their collaboration, Dr. Senior invited Alterovitz’s students into the cadaver lab to perform dissections. He showed them the current endoscopic instrumentation so that they could get a sense of the distances, the tightness of the space, and the current complexities of the surgeries they do.

“I think that was a very valuable thing for them,” continues Dr. Senior. “Their knowledge of the anatomy is sort of like a black box with some obstacles in it. So we were able to give them a view of the anatomy in a very true and biologic and physiologic way.”

Alterovitz acknowledges that building his medical knowledge is a work in progress.

“I’ve been learning as I go,” he says. “I almost wish I had a little more formal training. But it’s been helpful that I have great collaborators.”

Culture of Collaboration

Prior to arriving at UNC, Alterovitz’s collaborative work with a UC-San Francisco Medical Center team and Johns Hopkins University mechanical engineers led to the development of steerable needles for improving the precision of prostate brachytherapy. When needles are inserted — and located accurately — in the prostate gland, radioactive seeds are deployed. The seeds distribute high doses of radiation to the tumor and only low doses to the surrounding healthy issues — so low that side effects are minimal.

Although UCSF Medical Center was located just across San Francisco Bay, Alterovitz recalls the challenges presented by the distance between Berkeley, where he lived and worked, and his collaborators.
near Haight-Ashbury. He had to take both a train and a bus any time he traveled to meetings with them, and it was difficult to set up gatherings spontaneously.

Such logistical impediments, Alterovitz admits, can slow research down. He has found the opposite situation at UNC, which he considers the perfect location for his work.

“A big reason this research can go forward is that here the School of Medicine and the College of Arts & Sciences are located on the same campus,” says Alterovitz. “It’s a simple thing, but it’s a huge benefit for this line of research because I can simply walk to the hospital to meet with my clinical collaborators, and we can even meet somewhat spontaneously.”

Dr. Feins feels fortunate to have such a close connection to other areas of the university.

“Proximity is critical,” says Dr. Feins. “Traditionally, in highly creative places, you have a critical mass of people that are in proximity to each other. Look back at the enclaves of painters in France, for example.”

Being geographically close has allowed Dr. Senior’s lab meetings with Alterovitz and his students to occur often.

“We’re literally right down the road from each other — and my lab is halfway between us,” says Dr. Senior. “So we’ve been able to meet very easily. It’s been absolutely great.”

Proximity alone doesn’t foster a collaborative atmosphere — silos often stand side-by-side and never meet. Rather, a shared spirit of creativity found across the campus helps to break down those silos and bring different sets of expertise together.

“UNC has a tremendous culture of collaboration,” says Dr. Feins. “We’re able to collaborate very easily and readily, and without a lot of the things that other centers worry about, such as what’s patentable. It’s vitally important to have that proximity and culture and even, some would say, architecture — places where you can get together and talk — to foster that. That’s what allows for a creative environment, which is the reason we’re all here.”

Dr. Senior echoes those sentiments.

“I’ve worked at a lot of places,” says Dr. Senior, “and the collaborative spirit that I get from the people here is fantastic. Ron is an expert in robotics and the computer science required to make these advances possible. I’m an expert at the disease and getting us into the area where the tumors are located. My neurosurgeon colleague upstairs is the expert at the actual tumor. It’s all of us bringing our expertise together that makes advances in medicine possible.”
Triangle Business Journal unveiled the 55 finalists for its 2014 Health Care Heroes Awards in February. On March 20th Drs. Craig Buchman and Matthew Ewend were awarded this year’s Health Care Hero Innovator/Research Award. They were among finalists chosen from a copious batch of doctors, nurses, volunteers and administrators. They were honored at an awards dinner at the Marriott City Center in Raleigh, North Carolina. Dr. Buchman shares his accolades: “This award was the result of an enormous, ongoing team effort including CCCDP, CASTLE, Pediatric Audiology, Auditory Research and Neurosurgery. I feel honored to work with all of these Heroes and the award is really a credit to them. Way to go team!”

Chief resident Brian Thorp, MD received the Robert C. Cefalo House Officer Award in December 2013. Recipients of this award have demonstrated a sincere empathy for patients and their families, an effectiveness in listening to and communicating with our patients; proven advocacy for and demonstration of the highest standards of patient care and maintained exemplary professional and interpersonal interactions with colleagues, staff, patients, and visitors. It is an annual award to recognize a member of the Hospital house staff for exemplary service to patients and families, professional performance, and compassionate patient care. Award presented by the selection committee after consideration of nomination by the UNC attending physicians and UNC Health Care employees.

The Third Annual CCCDP/CASTLE Breakfast Fundraiser was held the morning of March 19, 2014. CCCDP & CASTLE are programs in the UNC Ear & Hearing Center in the Department of Otolaryngology. Their mission is to Teach children who are deaf or hard of hearing to listen and talk by maximizing their full potential, Coach professionals to teach children with hearing loss, and Empower parents to become the primary advocates for their child. The breakfast, held at the UNC Rizzo Center, was a success raising over $27,000, and sharing the story of the amazing work of these programs.

### 2014 Visiting Professors Schedule

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<tr>
<th>Date</th>
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<th>Institution</th>
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<tr>
<td>March 11-12</td>
<td>Ted Teknos, MD</td>
<td>The Ohio State University</td>
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<td>March 25-26</td>
<td>Brian Wong, MD</td>
<td>University of California</td>
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<td>April 1-2</td>
<td>David Eisele, MD</td>
<td>Johns Hopkins</td>
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<td>April 8-9</td>
<td>Peter Adamson, MD</td>
<td>Adamson Cosmetic Facial Surgery</td>
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<td>April 22-23</td>
<td>Brian Wiatrak, MD</td>
<td>University of Alabama</td>
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<td>April 28-30</td>
<td>Bruce Gantz, MD &amp;</td>
<td>University of Iowa</td>
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<td>May 6-7</td>
<td>Ralph Metson, MD</td>
<td>Massachusetts Eye and Ear</td>
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<td>June 3-4</td>
<td>Sean McMenomym, MD</td>
<td>New York</td>
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The 48th annual American Academy of Facial Plastic and Reconstructive Surgery Fall meeting was held October 19-21, 2013. The meeting was co-chaired by William W. Shockley, MD, FACS. “The meeting was a tremendous success,” Shockley says. “We received nothing but positive feedback about the multiple venues we were able to offer. Whether you were interested in practice management, fillers, lasers, or neurotoxins, we had multiple speakers covering a wide range of topics. We are thrilled with the excitement that was generated from the meeting and are already looking forward to next year in Orlando.” Dr. Shockley also chaired a panel “Nasal Reconstruction--Small to Medium Defects, No Forehead Flaps Allowed,” and gave a talk. Dr. Andrea Jarchow gave a talk on Transitions Following Training. UNC-OHNS alumni Dr. Madison Clark was on a panel “Experience, Science and Nasal Valve Surgery--What the Literature Does Not Tell Us,” and held a course Nasal Valve Repair: A Structurally Integrated Approach.

Other alumni who also gave talks or were on panels: Dr. Brian Downs (WFU), Dr. Krishna Patel (MUSC), Dr. Brian Jewett (UMiami), and Dr. Rick Davis (Miramar FL).

**Dr. Craig Buchman** was a visiting professor and temporal bone course guest instructor during the January Temporal Bone Course at the Louisiana State University Health Sciences Center
New Orleans. LSU Director of Otology-Neurotology, Moisés A. Arriaga, MD, MBA, FACS was quoted: “Dr. Buchman was a marvelous guest instructor with unique insights into cochlear implants and chronic ear surgery strategies.”

Other presentations by Dr. Buchman:
- Invited Presenter at Ultimate Colorado Midwinter Meeting, University of Colorado, Feb 2-5, 2014
- Visiting Professor at University of Cincinnati Dept of Otolaryngology-Head and Neck Surgery March 18-19, and Mount Sinai School of Medicine, Dept of Otolaryngology New York Eye & Ear Hospital, NY March 6, 2014.

Dr. Trevor Hackman taught as a guest faculty member at the Louisiana State University Sialendoscopy course February 1-2, 2014. The course is designed for surgeons, and healthcare professionals engaged in the comprehensive management of patients with salivary gland disease and those requiring advanced endoscopic procedures.

Sarah Obarowski, a doctorate of audiology student working as a research assistant with Dr. Meg Dillon was selected for the NCSHLA Student Achievement Award.

Medical student Eric Formeister won the Scott Neil Schwirck Fellowship, award presented by Dr. Harold Pillsbury at the medical student research day banquet. The grant he submitted was accepted for studying round-window electrocochleography as it relates to speech perception outcomes in pediatric cochlear implant recipients.

The fellowship recognizes students who demonstrate the qualities that Scott possessed: curiosity, intellectual vigor, enthusiasm for science and research and, above all, a desire to help others. A prize of $2,500 is awarded to support the research efforts of a medical student. A medical school faculty committee selects the recipient of the fellowship. The committee is composed of four to five members of the medical school faculty representing the basic science and clinical areas. The fellowship will be presented at the Student Research Day Banquet.

Joe McClellan, William Merwin, and Eric Formeister are medical students working with Dr. Fitzpatrick and Dr. Adunka aiming for residencies in ENT. They study round window electrocochleography in both human cochlear implant recipients and in a gerbil model. Three poster presentations at ARO demonstrated data from electrocochleography in gerbil subjects. Chris Giardina is an MD/PhD student who will be pursuing his PhD with Dr. Fitzpatrick. Joe McClellan and Eric Formeister were selected for $500 travel awards from ARO.

Drs. Oliver Adunka, Douglas Fitzpatrick and Chris Giardina’s submission to the NC TraCS Center for Innovation’s 2014 Innovation Pilot Award “Intraoperative Recording Device to Minimize Trauma During Cochlear Implant Surgery” was chosen for funding in the amount of $50,000.

Dr. Brent Senior was the guest of honor at the 10th Annual Jakarta International FESS Course, and gave the “Role Model Lecture” on Leadership in Rhinology. The meeting had over 800 attendees from throughout Southeast Asia, primarily Indonesia. Dr. Senior is the Adjunct Professor of Otolaryngology at the Faculty of Medicine of the University of Indonesia.

Dr. Adam Zanation took his ATV for a spin during the February 12 snowstorm. He is pictured here in front of the Old Well. (Photo by Dr. Austin Rose)
FACULTY

The Department of Otolaryngology/Head and Neck Surgery
Harold C. Pillsbury, MD, FACS, Chair, Thomas J. Dark Distinguished Professor
Craig A. Buchman, MD, FACS, Vice Chair for Clinical Affairs, Harold C. Pillsbury Distinguished Professor
Brent A. Senior, MD, FACS, Vice Chair for Academic Affairs, Sheila and Nathaniel T. & Sheila W. Harris Distinguished Professor
Carolyn Hamby, Associate Chair for Administration

The Division of Head and Neck Oncology, Cancer Research
Mark C. Weisssler, MD, FACS, Professor and Chief, Joseph P. Riddle Distinguished Professor
Trevor G. Hackman, MD, Assistant Professor
Andrew F. Olshans, PhD, Professor
Brian R. Pace, ACNP-BC, Nurse Practitioner
Samip N. Patel, MD, Assistant Professor
William W. Shockley, MD, FACS, Professor and Chief, W. Paul Biggers Distinguished Professor
Adam M. Zanation, MD, Assistant Professor

The Division of Pediatric Otolaryngology
Carlton J. Zdanski, MD, FACS, FAAP, Associate Professor and Chief
Amelia F. Drake, MD, FACS, Newton D. Fischer Distinguished Professor

The Division of Facial Plastic and Reconstructive Surgery
William W. Shockley, MD, FACS, Professor and Chief, W. Paul Biggers Distinguished Professor
Andrea Jarchow-Garcia, MD, Assistant Professor, Facial Plastic Surgeon

The Division of Rhinology, Allergy, and Endoscopic Skull Base Surgery
Brent A. Senior, MD, FACS, Professor and Chief
Peter G. Chikes, MD, FACS, Assistant Professor
Charles S. Ebert, Jr., MD, MPH, Assistant Professor
Austin S. Rose, MD, Associate Professor
Adam M. Zanation, MD, Assistant Professor

The Division of Otolaryngology/Neurotology and Skull Base Surgery
Craig A. Buchman, MD, FACS, Professor and Chief
Harold C. Pillsbury, MD, FACS, Professor
Oliver F. Adunka, MD, Associate Professor

Sleep and Snoring Surgery
Brent A. Senior, MD, FACS, Professor

General Otolaryngology/Head and Neck Surgery
Peter G. Chikes, MD, FACS, Assistant Professor

The Division of Voice and Swallowing Disorders/UNC Voice Center
Robert A. Buckmire, MD, March Floyd Riddle Distinguished Professor and Chief
Mark C. Weisssler, MD, FACS, Professor, Joseph P. Riddle Distinguished Professor
Rupali N. Shah, MD, Assistant Professor
Brian Kanapkey, CCC-SLP, Speech Pathologist
Ellen S. Markus, MA, CCC-SLP, DMA, Coordinator
Elizabeth C. Ramsey, MS, CCC-SLP, Speech-Language Pathologist

The Division of Auditory Research
Joseph W. Hall, PhD, Professor and Chief, James S. and June M. Ficklen Distinguished Professor of Otolaryngology/Head and Neck Surgery
Paul B. Manis, PhD, Professor, Thomas J. Dark Distinguished Research Professor of Otolaryngology/Head and Neck Surgery
John H. Grose, PhD, Professor
Emily Buss, PhD, Associate Professor
Douglas C. Fitzpatrick, PhD, Assistant Professor
Shuman He, PhD, Research Assistant Professor
Margaret T. Dillon, AuD, Research Assistant Professor
Patricia A. Roush, AuD, Associate Professor, Director, Pediatric Audiology

Computational and Clinical Research
Julia S. Kimbell, PhD, Associate Professor

The Division of Research Training and Education
Paul B. Manis, PhD, Professor and Chief

The Adult Cochlear Implant Program
Marcia Clark Adunka, AuD, CCC-A, Director
English R. King, AuD, CCC-A, Audiologist
Margaret T. Dillon, AuD, CCC-A, Audiologist
Ellen Pearce, AuD, CCC-A, Audiologist

W. Paul Biggers Carolina Children’s Communicative Disorders Program
Craig A. Buchman, MD, FACS, Professor, Administrative Director
Harold C. Pillsbury, MD, FACS, Professor, Executive Director
Carlton J. Zdanski, MD, FACS, Associate Professor
Oliver F. Adunka, MD, Associate Professor
Holly F. B. Teagle, AuD, Associate Professor, Program Director
Hannah R. Eskridge, MSP, Assistant Professor, Director of CASTLE

WakeMed Faculty Physicians
Michael O. Ferguson, MD, Associate Professor and Chief
Brett E. Dorfman, MD, Assistant Professor
Esa A. Bloedon, MD, Assistant Professor
Allen F. Marshall, MD, Assistant Professor
James T. O’Neil, MD, Assistant Professor

RESIDENTS

Christopher Welch, MD, PhD
Lewis Overton, MD
Rounak Rawal, MD
Nathan H. Calloway, MD
Lauren W. Fedore, MD
Adam J. Kimple, MD, PhD
John P. Dahl, MD, PhD, MBA
Alexander Farag, MD
Brian D. Thorp, MD
Joseph P. Roche, MD
Deepak R. Dugar, MD
Anna Hang, MD
Keimun A. Slaughter, MD
Kibwei A. McKinney, MD
Adam P. Campbell, MD
Anand R. Dugar, MD
Cristina N. Klatt-Cromwell, MD
Baishakhi Choudhury, MD
Grace G. Kim, MD
Gitanjali Madan, MD