

2012 SIGHT+ SOUND

SPRING EDITION



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Above:
Dr. Anthony Kuo

Revolutionary Technology Earns Joel S. Schuman, MD, FACS Prestigious Carnegie Science Award

by Zack Butovich



Optical Coherence Tomography (OCT) is an innovative new technology that can create a three-dimensional map of tissues of the eye using light in a completely non-invasive, non-contact manner. The resolution of OCT is so great it provides details of the eye at microscopic levels. Using OCT, eye doctors can provide a diagnosis much sooner than they could without it. OCT can also help in identifying progression of a host of eye diseases and conditions including glaucoma, macular degeneration, various forms of retinopathy, and optic nerve damage, among others.

Dr. Joel S. Schuman, Chairman of the Department of Ophthalmology and Director of the UPMC Eye Center, participated in the invention of OCT nearly 22 years ago. He has continued to improve OCT technology, including innovating new uses for OCT as well as new ways of analyzing the information produced from it. For his work and groundbreaking achievements in OCT technology, Dr. Schuman recently received the prestigious Life Sciences Award from the Carnegie Sciences Award program. Though he acknowledges the recognition from his peers with humility, Dr. Schuman says, "the most satisfying thing is that something made in a lab is being used to help patients—which is why we do the work."

OCT was first developed in a lab at MIT in the 1980s. As one of the inventors, Dr. Schuman remembers the sort of team work that was necessary for the success of the technology. Clinical ophthalmologists, scientists and engineers all came together in a combined effort to help create this extremely important and useful technology. When Dr. Schuman eventually came to the Department of Ophthalmology at Pitt, he brought the philosophy of the importance of collaboration with him. Working to defeat the iconic "lone scientist image," Dr. Schuman emphasized teamwork in his department. The combination of different perspectives on research issues allows for a more efficient and effective look at problems. "With such a broad swath of expertise and trainees," Dr. Schuman says, "things are constantly stimulating. You can really live on the cutting edge of new approaches to disease detection." And by combining the minds of great researchers in a multitude of areas, he helped grow the department from around 20 full-time faculty in 2003 to 50 full-time faculty today, plus many more staff and students (undergraduate, medical, graduate and post-doctoral students) as well as residents and fellows.

Dr. Schuman is recognized as a world leader in glaucoma research and treatment. He first became interested in glaucoma as a resident at the Medical College of Virginia, when he saw that, as a field, glaucoma was incredibly underserved relative to the number of people that suffered from it. The problem is that glaucoma is a clinical diagnosis, and at the time was diagnosed only by very subjective means. This fact made it very difficult to treat glaucoma, but made Dr. Schuman

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California Family's Extensive Search Leads Them to Pittsburgh

by Zack Butovich



Conor McKiernan

Conor McKiernan is a normal 11 year old boy who loves to play baseball (he is a pitcher) and watch the Yankees. He gets As and Bs in school, and is popular in his class. In fact, there is nothing about him that suggests that only six months ago he underwent surgery to remove a large tumor that had been growing inside his nasal cavity. Despite living in California, Conor and his family found their way to Dr. Snyderman and the Eye and Ear Institute.

For years Conor complained of allergies, but began really suffering from nasal blockage within the last two years. After going back and forth between many allergists and pediatricians, as well as new diets and changes in his normal routines, Conor's symptoms still did not improve. Soon after, Conor mentioned offhandedly to his mother, Jill Schwartz, that he had lost hearing in his right ear over the previous few months.

They went back to the allergist, then the pediatrician, and ultimately to an otolaryngologist. Finally, they found the source of the problem was a strange "growth" in Conor's nasal cavity. The doctor ordered a CT scan which further implied that the growth looked like a tumor, although doctors were not able to specifically identify it yet.

Later that week, Conor received an MRI confirming the size and location of a massive tumor growing in his nasal cavity and intracranial region. Conor's parents subsequently went into a frenzy calling every contact, association, and connection they could think of. They sent out scans to over thirty hospitals all around the country and called dozens of physicians, surgeons, and ENT specialists, desperately seeking help. Finally, a diagnosis came back—Conor had a JNA, or juvenile nasopharyngeal angiofibroma, a specific type of tumor that arises in the back of the nose and exclusively affects young males. JNA is often characterized by a very rich blood supply that makes surgical removal extremely difficult and dangerous. Conor's tumor had

already grown large enough to have eroded the bone separating his sinuses from his brain, and extended intracranially, actually pushing up against his brain.

Dr. Carl Snyderman, of the Department of Otolaryngology, was the first physician to give Jill and Kieran McKiernan (Conor's father) a call back. He confidently told them that he had dealt with a number of cases like Conor's and had extensive operating experience with this type of tumor.

Soon after, Jill and Kieran took a conference call which included about a dozen or so physicians and surgeons. There were doctors from Boston, Los Angeles, New York, St. John's, Israel — literally all over the country and world participating in the call. Divergent opinions were presented to the family, ranging from recommendations of open brain surgery to radiation therapy. Dr. Snyderman presented the Endoscopic Endonasal Approach, as a minimally invasive and far more effective operation than the other suggestions. Though others dismissed this as "too cavalier," and that Conor's tumor was too large to be operable with that procedure, Dr. Snyderman held his ground, stating, "I have done this before."

It was soon after that Conor's parents knew they were putting their faith in Dr. Snyderman and the experience of the UPMC team at the Center for Skull Base Surgery. "He was just so consistent and confident," Kieran recalls of Dr. Snyderman, "He never swayed, never shaken, just a great gentleman."

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Dr. Waxman to Receive Carnegie Science Center Award

Work with Guerilla Eye Service Impacts Underserved Communities

by Zack Butovich

"I can't emphasize enough that the Guerrilla Eye Service project has been a group effort and that a lot of credit should go to the medical students and residents who helped create the project and who come out on missions with me."

On February 2, 2012, Dr. Evan 'Jake' Waxman was awarded the Catalyst for Professional and Community Education Award as one of 18 Carnegie Science Center Awards. This is the first year for this prestigious award and represents recognition for the tremendous amount of philanthropy and work Dr. Waxman has shown with his Guerilla Eye Service mobile eye clinic.



Dr. Evan Waxman, with student volunteer, administering free eye exam at South Side's Birmingham Clinic.

The GES serves the community with three missions a month, where they visit local free health care centers for underserved communities and provide free eye screenings to patients. Recently, the GES has employed the use of retinal cameras in a number of clinics, which will help provide retinal scans for patients even when the GES cannot be present.

Over the next year, the GES plans to begin serving additional clinics in the area as well as establishing new partnerships with local health centers. An increase in educational efforts is also underway. Dr. Waxman will use case histories and pictures from various missions to educate primary care physicians about the importance of eye health, as well as those still working through their medical educations. Dr. Waxman ultimately hopes to use the experience gained over the last six years to encourage and assist similar efforts in other cities in the U.S.

"I feel truly honored to be recognized by the Carnegie Science Center as a community

educator. I can't emphasize enough that the Guerrilla Eye Service project has been a group effort and that a lot of credit should go to the medical students and residents who helped create the project and who come out on missions with me," Dr. Waxman had to say. "The GES service activities help to remind all of us who participate why we became doctors in the first place—to help people." **S+S**



Dr. Waxman conducting an eye exam.

Announcing Our 2012 Muse Prize Recipient



Congratulations to our 2012 Albert C. Muse Prize winner for Ophthalmology Excellence, Jeremy Nathans, MD,

PhD. Dr. Nathans is a Professor in the Departments of Molecular Biology and Genetics, Neuroscience, and Ophthalmology at the Johns Hopkins University School of Medicine, as well as an Investigator of the Howard Hughes Medical Institute. The Eye & Ear Foundation is proud to award Dr. Nathans the Muse Prize in recognition of his fundamental discoveries in both basic and clinical science.

The Muse Prize, established in 2001, to honor Albert C. Muse and his work with the Eye & Ear Foundation, is awarded annually to a physician or scientist who has demonstrated excellence in their field and has stood out through their extraordinary contributions in either Ophthalmology or Otolaryngology. Alternating each year between these two medical fields, our goal is to associate the University of Pittsburgh's world-class Departments of Ophthalmology and Otolaryngology with leading clinicians and scientists from around the world.

Dr. Nathans will present the 2012 Muse Prize Lecture at noon on October 24 in University of Pittsburgh's Scaife Hall. The lecture is open to the public. That evening, at an "invitation only" dinner honoring Dr. Nathans, the Muse Prize will be awarded by Albert C. Muse, Lawton Snyder, of the Eye & Ear Foundation, and Dr. Joel Schuman, Eye & Ear Foundation Professor and Chair at the University of Pittsburgh's Department of Ophthalmology.

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You CAN Make a Difference!



Should you wish to donate to the particular research projects you have read about in this issue or to any of EEF Funds, you can do so at www.eyeandear.org.

You can also call 412-383-8749 or use the envelope provided.

New Advancements in Tinnitus Research Have Great Potential

by Zack Butovich

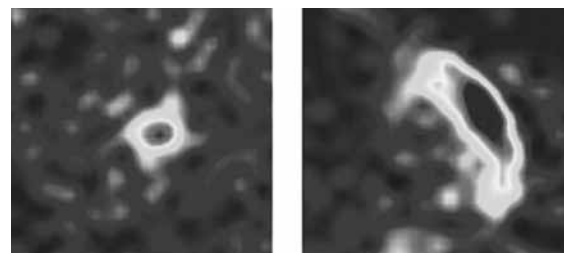
Tinnitus is an auditory disorder which affects approximately 10 percent of the general population, although it occurs more frequently in older populations. Tinnitus is often characterized as a constant, unending ringing in the ears, although sometimes the common high frequency ringing sound can more closely resemble a painfully debilitating crashing noise. Tinnitus is generally found in noise exposed individuals, from musicians to soldiers, and there is no cure. For a long time, the belief was that tinnitus was an actual physical sound occurring in the inner ear, which lead researchers the wrong way in searching for a solution. The source of tinnitus is, in fact, found in the brain, and is not a noise, but a neural malfunction. Dr. Thanos Tzounopoulos, of the Auditory Research Group, part of our Department of Otolaryngology, was one of the first scientists to explore the cellular mechanisms underlying the tinnitus "noise." His revolutionary discoveries in this field redefined the way tinnitus research was conducted and how future treatment could be conceived.

The Auditory Research group is led by Dr. Karl Kandler, and is comprised of Dr. Tzounopoulos and Dr. Maria Rubio. Focused on auditory systems and brain plasticity formation, the group has produced detailed insight into the underlying mechanisms of normal and pathological auditory processing, which has helped lead to the discovery of many basic principles that govern hearing as well as the fundamental design of approaches to therapy of auditory malfunctions. The Group uses collaborative and cross-disciplinary approaches in their research, ensuring through behavioral, anatomical, electrophysiological, and imaging techniques, that every problem has been evaluated thoroughly, helping to define the best possible solutions to even the most complex problems, such as tinnitus.

The hearing center of the brain has a quality known as plasticity, meaning it adapts to new information similar to other parts of the brain that are responsible for complex learning like language or memory. This indicates that the perception of sound could be more a learned process in the auditory brain stem,

which Dr. Tzounopoulos later proved. Tinnitus occurs when brain cells misfire, and tries to replace silence with activity (which creates the "noise"), due to some sort of hearing damage, which could either be congenital or developed over time. Dr. Tzounopoulos' work established that it is the decrease in activity of specific brain neurotransmitters that leads to overactive malfunctioning auditory circuits.

This discovery has led to international recognition. Dr. Tzounopoulos and his research



An example of Tinnitus seen on a cellular level. The image on the left is that of a normal brain cell, the image on the right is an example of brain cells affected by Tinnitus.

have been referenced by the Wall Street Journal and NPR, among others, but he still isn't satisfied. His most current research has led to another incredible discovery: the potential targets that may be critically involved in the generation and/or maintenance of tinnitus. These targets could include various neurotransmitter receptors, proteins, and membrane channels – and are relatively promising in the implications they have made in experimental models. Dr. Tzounopoulos, along with Dr. Kandler, have suggested the use of various medications that could help with the reduction or treatment of the tinnitus "sound" through this critical advancement in research, indicating something no other research has yet been able to achieve—a potential cure for tinnitus.

The Eye & Ear Foundation, which has helped support this research, the Department of Otolaryngology, and the University of Pittsburgh is very excited about the progress Dr. Tzounopoulos and the Auditory Research Group has made and continues to make—and we anxiously await the next great step in tinnitus research. **S&S**

New Ways to Track Eye Disease, Educate Students, Developed in the Ophthalmic Research Lab

by Zack Butovich

Gadi Wollstein, MD, is the Director of the Ophthalmic Imaging Research Lab, sometimes referred to as the Glaucoma Imaging Group, due to its heavy expertise in glaucoma research. The Lab focuses on using cutting edge technology and imaging devices, such as optical coherence tomography (OCT), in order to diagnose, monitor, and research diseases and disorders of the eye. The Lab conducts a wide range of research in an effort to better understand what is happening in the eye when it is affected by various conditions. The advanced imaging technologies allows quantification of ocular structures, essentially providing a more in depth analysis of disease permeation as well as an ability to detect eye structure to within a few microns (1/1000 of a millimeter).

In addition to using machines producing this extreme level of detailed data, the Lab employs a wide array of prototype devices with which the Ophthalmic Imaging Research Lab is involved in the development of, and researches towards their uses in a clinical application. Dr. Wollstein believes that one of the main goals of their research is to directly influence and improve patient care. "The goal," Dr. Wollstein says, "is to always improve our ability to detect a disease such as glaucoma and its changes over time, which is normally very difficult to detect, but extremely important and beneficial to the patient."

Dr. Wollstein came to the University of Pittsburgh in 2003 from Boston, accompanying Dr. Joel Schuman's move to the Chair of Ophthalmology. Having worked for more than 15 years in ophthalmic research, and with clinical experience prior to that, Dr. Wollstein uses his expertise to guide the Lab's work as well as the research efforts of undergraduate and graduate students, medical students, residents, post-doctoral students, fellows, and visiting scholars from all over the country and world that are trained in the lab. Each ophthalmology resident must complete a scholarly research project from top to bottom, concept to proposal to experiment or clinical study, as part of their



Dr. Gadi Wollstein, Dr. Joel Shuman, and the Ophthalmic Imaging Research Lab staff.

Dr. Wollstein is most interested in the clinical application of studies...This sort of near-translational attitude forces [him] to constantly ask himself how to quantify particular data or results and turn them into improved clinical patient management.

education requirements. Dr. Wollstein meets with each one of them regularly to ensure their process is streamlined, efficient, and of publishable quality. Often, Dr. Wollstein remarks, the research that comes out is of a very impressive quality. "Some of it is really cutting-edge stuff," he says, "some of it has real clinical implications." The required research projects are designed to give each resident strong experience that should ultimately make them a better clinician, even if they don't continue into research.

Dr. Wollstein is most interested in the clinical application of studies. In other words, he is most dedicated to taking information and data gained from research,

whether it be basic science, experimentation, or clinical trials, and figuring out how it could apply to and benefit patients. This sort of near-translational attitude forces Dr. Wollstein to constantly ask himself how to quantify particular data or results and turn them into improved clinical patient management. He closely supervises projects, constantly approaching their implications from a patient-centric view, focusing on applicability and feasibility. This sort of dedication, combined with his years of both research and clinical work, have given Dr. Wollstein a strong basis with which to evaluate the quality of work that passes through his research lab.

Many research studies that come through the Lab's dedicated work and from resident research projects have gone on to produce real clinically significant results. Dr. Wollstein is proud of the quality of work from the physician-scientists that come through his laboratory. "The ultimate goal," he says, "is to improve disease detection and monitor changes," as they occur in our patients. **S+S**

The Zini Family Establishes New Research Fund

by Zack Butovich

Aldo Zini is the CEO of Aethon, a growing company in the health-care robotics industry; he is also the newest board member of the Eye & Ear Foundation. We are proud to have Mr. Zini on our Board, and we are excited that he and his family have created the **Ivo Zini Innovation Technology Fund**.

However, this is not the first connection Mr. Zini's family has had with the Eye and Ear Institute. Aldo's father, Ivo Zini, worked in collaboration with the Eye and Ear Hospital (as it was called when Ivo started his work) and Montefiore Hospital in helping develop and create prosthetics for patients who have had extensive surgery for tumors of the head and neck. Ivo Zini was a talented sculptor and artist, and after meeting and developing a relationship with Dr. Eugene Myers, who was Chair of Otolaryngology at the Eye and Ear Hospital, Ivo began working part-time as a consultant, eventually becoming a full-time employee in prosthetic design for nearly 25 years. It was innovation that inspired Ivo Zini to discover, through art and illusion, new ways for patients to live with their anatomical defects. It was that same innovation that led Ivo Zini to develop new techniques in cosmetic prosthesis, including new ways to attach the prosthesis to the facial tissue so it would stay securely in place.

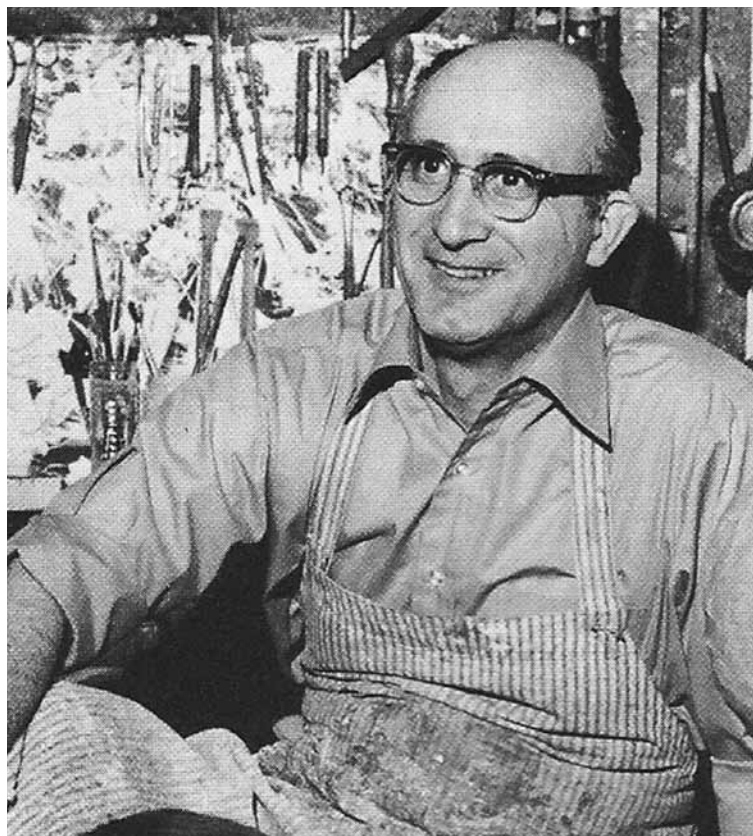
At the time, prosthetic design was a very unique specialty, and Ivo's skill and artistic background brought a new perspective to this discipline. Through the course of his career at Eye and Ear, Ivo worked with many physicians and helped countless patients. Aldo recalls, "My father was a very modest guy, he never talked much about what he did." Yet, after his retirement and passing, Aldo and his family remember many people, patients and doctors, who contacted his family to express how sorely missed Ivo was. "My father really loved working at Eye and Ear Hospital," Aldo said, and evidently, people loved working with him as well.

At the end of 2011, to honor his father's legacy and work with the Maxillofacial Prosthodontics and Rehabilitation at the Eye and

Ear Institute, Aldo and his family provided substantial support to the Eye & Ear Foundation to establish a new fund called the Ivo Zini Innovative Technology Fund. The Fund is designed to support advancements in areas such as robotic technology and surgery, as well as innovative technologies for clinical use in our Department of Otolaryngology. Supported research would include projects such as medical robotics, including the use of the DaVinci robot (the only FDA approved surgical robot in the country) to treat head and neck cancer patients, along with new technologies to prevent head and neck cancer, and new advancements made in collaboration with Carnegie Mellon University School of Engineering. Aldo sees robotics as the future, and wants the fund to help continue the great work already being done at the Eye and Ear Institute. "It's something [my father] would have liked," Aldo says of the fund.

Before joining the Board of the Eye & Ear Foundation, Aldo met with Dr. Eugene Myers, who wanted to discuss ways to honor Ivo's work, having developed a very close relationship with him over the years. And as Aldo became more familiar with the current work of the Eye and Ear Institute, he developed a strong interest in seeing it expand. By the time he was invited to join the Board, Aldo was already dedicated to the academic and research efforts of the Institute, and "didn't have to give it a lot of thought." Aldo added, "I'm very proud of my father's work and grateful for the memories [my family] has of his time at Eye and Ear. To be able to contribute in a small way to the work my father was a part of...makes it more meaningful."

We are happy to welcome Aldo Zini to our Board, and look forward to honoring Ivo Zini's legacy with this brand new Ivo Zini Innovation Technology Fund. **S+S**

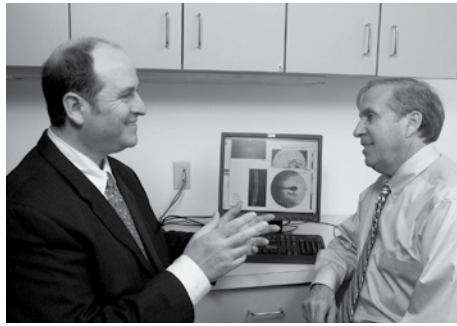


Ivo Zini and examples of his prosthetic design work

Revolutionary Technology

(continued from cover page)

determined to improve how glaucoma was recognized and cared for. Today, OCT provides a precise and accurate numerical measurement that doctors can use to diagnose and track glaucoma. As Chair of the Department of Ophthalmology, Dr. Schuman is dedicated to providing the highest quality of care for the tens of thousands of patients each year.



Dr. Joel Schuman with Dr. Chris Ryan

Through the highest levels of support from philanthropic individuals and NIH funding in the Department's recent history, new, creative, and innovative treatments for glaucoma, macular degeneration, and other major eye conditions that still remain without cures are being developed.

There are new stem cell therapies that are working in research studies; OCT is being used to detect corneal stem cells in living eyes; viral vectors are being created for gene therapies and gene transfections; in June a leading retina scientist is joining the team to being a new Retina Regeneration lab; small molecules are being used to help regenerate tissue function; sensory substitution research is designing new technology to "replace" lost sight with other senses; there are countless other areas of research and study conducted by our promising next generation of physician-scientists of students and residents.

Dr. Schuman is extremely proud of the work being done in the Department of Ophthalmology and UPMC Eye Center. Research conducted spans the gamut of basic science to translational research to clinical approaches, but as Dr. Schuman says, "We try to always keep the problems of the patient in mind. How is this invention, discovery or technique improve the sight and quality of life for our patients today and in the future?"

Dr. Schuman will be receiving the Life Sciences Award on May 11 at the Carnegie Science Center. **S+S**

Charitable Gift Cards Make Great Gifts

Your gift in a loved one's name can help fund research at the Eye and Ear Institute to improve the lives of people with disorders and diseases of the eye, ear, nose, throat, head, and neck. Visit **eyeandear.org**

today for Charitable Gift Card giving details.



California Family Travels for Skull Base Surgery

(continued from page 2)

Dr. Snyderman reassured Jill and Kieran by explaining the procedure to them. He was positive the whole tumor could be removed using the endoscopic techniques through the nose and mouth.

The Center for Skull Base Surgery at UPMC is the world leader in skull base surgery—a minimally invasive technique that allows surgeons to access the region of the head below the brain. Dr. Snyderman and Dr. Paul Gardner, from the Department of Neurosurgery, are co-directors of the Center, and the leading surgical team in the endoscopic endonasal approach.

On September 23, 2011, Conor underwent his first surgery with Drs. Snyderman and Gardner, and on the 30th, his second. It was on the 30th that the doctors came out of the operating room, looked at Jill and Kieran, and said, "We got it all." It was an indescribable joy for the parents.



Dr. Paul Gardner, Conor, and Dr. Carl Snyderman

Jill and Kieran have both been actively helping out our Eye & Ear Foundation since their return to California with Conor. Our Cranial Base Surgery Program is in need of a new educational center for surgical training in cranial base surgery with an

emphasis on endoscopic techniques. This educational center would utilize a variety of teaching formats and methods to provide the most effective learning for young surgeons, develop new and more effective teaching methods, provide a forum for discussion, evaluation, and implementation of new surgical technologies, and create an international database for multi-institutional collaboration. They are determined to help us raise support for the new center. "Some people are so matter of fact about charities," Jill says, "but it's so different [with] this." She is dedicated to helping us find support so others can feel the joy and elation she felt when Drs. Snyderman and Gardner told her, "we got it all." "Not a minute goes by that I don't think about it," Jill said.

Conor has another MRI follow up in three months, but has otherwise been without the symptoms that first brought him to the doctor's, and is doing fantastic since his recovery in October. On Halloween he went trick or treating as a "mad surgeon." "This is something very special that you have in Pittsburgh," Jill said recently over the phone, "There's no such thing as a Hollywood ending, but this is." **S+S**



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Letter from the Executive Director



Lawton Snyder

There are many different forms of planned giving, from simple bequests, to more complicated trust agreements, all of which are designed to best meet your goals and individual situation. Should you wish to discuss or learn more about Planned Giving, please call 412-383-8756.

Dear Friends,

The primary mission of the Eye & Ear Foundation (EEF) is to support the departments of Ophthalmology and Otolaryngology with funding for research. EEF support helps our research scientists supplement the cost of research that is not covered by the National Institutes of Health (NIH). The availability of NIH dollars has declined for the past ten years which has made these already competitive grants even more competitive. We can proudly state that, within the University of Pittsburgh's departments of Ophthalmology and Otolaryngology, NIH support for research has increased over the past ten years. This is primarily the result of outstanding leadership and hard work, however, your support and the support from the EEF has played a significant role in this success. In fiscal year 2011, the Eye & Ear Foundation provided \$ 1.9 million in support to our two departments. This support has initiated new research in some areas or helped to bring bench research to the bedside in others. Ultimately, the goal for the EEF and the scientists who we support is to find treatments and cures for the many people we all know who suffer from diseases and disorders of the eye, ear, nose, and throat. Thank you for your support!

Lawton Snyder
Executive Director
The Eye & Ear Foundation of Pittsburgh