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## A VISION FOR THE BLIND

BY LAUREN WALLY

**B**lindness is a significant cause of human morbidity and has been shown to result in social isolation, increased risk of falling and resultant hip fractures, depression, family stress, and ultimately, a greater tendency toward disability or premature death (Ellwein, 1996). Accordingly, restoring visual function for the blind has tremendous consequences.

The past decade has brought technological advances that catapulted the idea of an ocular prosthetic from the realm of science fiction to the brink of reality. Over the last ten years, innovations in computer circuitry have allowed for significant progress in the development of ocular prosthetic devices. In varying ways these devices attempt to make the most of a patient's intact sensory pathways that mediate vision, but usually only fall into three categories: retinal implantation, sensory substitution or cortical stimulation (Winter, 2007). These machine-human interfaces promise to eventually restore some type of visual function in otherwise blind or near-blind individuals. However, the visual images which result in current iterations do not resemble "normal" vision. For example, images have a limited field of vision, no color or depth perception, and are heavily pixilated and crude. While such limited visual precepts do allow the blind to perform simple tasks like sorting objects or grating discrimination, more complex visual functionality is needed to make these devices useful in a real world setting comprised of intricate scenes.

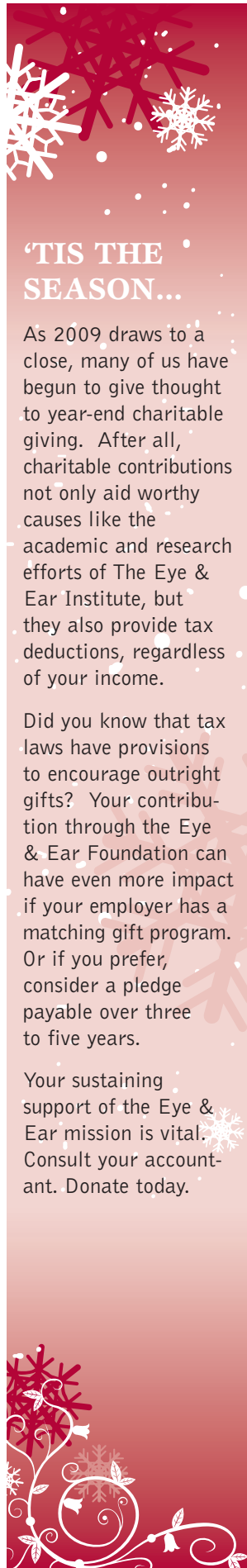
Along with the need for more sophisticated results, another hurdle in moving these devices from research labs to clinical practices is the lack of a framework to support their adoption by clinicians. The criteria for assessing functional outcomes are lacking—most of the devices are not yet FDA-approved; the strategies for rehabilitation training are not developed; and medical classification codes reimbursement costs have not yet been determined.



*Dr. Amy Nau and a patient test revolutionary vision substitution technology BrainPort.*

However, UPMC Eye Center is steadily addressing those barriers with the help of physician-scientists like Dr. Amy Nau, Director of Contact Lens and Low Vision Service. Dr. Nau is currently doing great work with The BrainPort™ Vision Device, a sensory substitution device produced by Wicab, Inc. that is intended to help users "see through the tongue." BrainPort improves orientation and mobility for patients who are blind or have very low vision by providing information about location, position, size, and shape of objects to the brain through electro tactile stimulation of the tongue. Imagine a pair of sunglasses with a camera that is attached to a Blackberry-sized transmitter that connects to a "lollipop" device. The lollipop is placed on the tongue and has sensors that emit the sensation of champagne bubbles. These sensors then carry signals from the camera to the brain. In the near future, Dr. Nau will begin studying another sensory substitution device that helps patients "see through sound." This device, called the vOICE™, uses the intact sense of hearing to create "soundscapes" that can be used to interpret an envi-

*Continued on page 8*



## 'TIS THE SEASON...

As 2009 draws to a close, many of us have begun to give thought to year-end charitable giving. After all, charitable contributions not only aid worthy causes like the academic and research efforts of The Eye & Ear Institute, but they also provide tax deductions, regardless of your income.

Did you know that tax laws have provisions to encourage outright gifts? Your contribution through the Eye & Ear Foundation can have even more impact if your employer has a matching gift program. Or if you prefer, consider a pledge payable over three to five years.

Your sustaining support of the Eye & Ear mission is vital. Consult your accountant. Donate today.



# THE FUTURE OF HEAD AND NECK CANCER

BY JENNIFER R. GRANDIS, MD

**A**t the Eye & Ear Institute, the members of the head and neck program in the Department of Otolaryngology work closely together to care for head and neck cancer patients. Physicians and scientists meet several times a week to discuss ongoing research projects and plan future investigations. The goal of these studies is to improve the quality of life for the patient with head and neck cancer and to develop new and improved ways to prevent, diagnose and treat this cancer. Frequent interactions between physicians and scientists ensure that questions being addressed in laboratories will ultimately result in answers for patients suffering from head and neck cancer. Under the mentorship of Vice Chair for Research Dr. Jennifer Grandis, there are a number of physician-scientists who are currently leading clinical trials with great promise.

Dr. Uma Duvvuri is the newest member of this expert team and he is leading a study to understand the effects of two new cancer drugs which target proteins thought to be important in the development of head and neck cancer. The first, erlotinib (Tarceva™) blocks the epidermal growth factor receptor and the other, dasatinib (Sprycel™) inhibits Src family kinases. Both medications have helped control the growth of cancers in the laboratory setting so Dr. Duvvuri's team is working to see if combining these agents that target individual growth pathways is more effective for head and neck cancer patients than each treatment alone.

Dr. Seungwon Kim's lab is studying an antibody, cetuximab (Erbix™), which targets the epidermal growth factor receptor. Cetuximab is approved for use in patients with head and neck cancer but has only been helpful for some. Accordingly, Dr. Kim is investigating the potential benefits of adding the antibody bevacizumab

(Avastin™), which targets the vascular endothelial growth factor. Routinely used to treat other cancers, Avastin blocks the formation of new blood vessels and could prove valuable by blocking cancer-related proteins in tumors.

In addition to studies designed to control cancer growth, the Chief of the Division of Head and Neck Surgery, Dr. Robert Ferris, is working on a head and neck cancer vaccine. His lab is studying how the immune system may identify patients most likely to benefit from treatment medications such as cetuximab, and how this in turn may be used to create a vaccine which may prevent head and neck cancer.

Finally, Dr. Grandis' lab is coordinating a new model of testing agents for cancer treatment. Unfortunately, it often takes a long time for new drugs to become available for cancer patients. The Grandis lab's new approach will enable the Eye & Ear Institute team of physician-scientists to provide these promising new agents to patients much sooner.

One promising study to come from these relationships suggests that doctors may be able to use a blood test to determine an individual's risk of developing cancer and to predict which treatment is most likely to be effective. Not only do these collaborative efforts nurture the research of promising physician-scientists, but they ultimately have the potential to develop improved and more effective strategies with fewer side effects for the treatment and one day, prevention of head and neck cancer.

*For more about the head and neck cancer program, contact 412-647-2100. To make a gift to support these research efforts, call 412-383-8756, or give online today at [www.eyeandear.org](http://www.eyeandear.org).*

# ON THE MOVE

BY LAUREN WALLY & LORI ANN YOUNG

**Q ■ What happens when you combine medical students with an interest in ophthalmology and a man with a “vision” of his own and the knowledge to implement it?**

*A: The Guerilla Eye Service, a mobile clinic staffed by volunteers providing free, comprehensive eye care to those in need since 2006.*

The Guerilla Eye Service (GES) began when those students approached the Director of the Ophthalmology Residency and Medical Education Programs, Evan (Jake) Waxman, MD, PhD and asked to start a local chapter of one of the national vision screening organizations. Jake believes screening events have their place and raise community awareness of eye disease. They can identify patients at risk of losing vision. So why GES? Because Jake felt they could do more. “In my experience,” he says, “many patients who attend these screening are outside the targeted risk group. In many cases, patients who have established ophthalmic care come to the screenings for an inappropriate ‘second opinion.’ Additionally, I was concerned that patients walk away from the screening overly reassured that they have had a ‘real eye exam.’ Most importantly, many people who are identified as ‘at risk’ receive no follow-up and may forget to or be unable to seek care.”

Under Dr. Waxman, the GES takes a different approach to eye care. “We focus on recognizing barriers to ophthalmic care and overcoming them,” he says. “Barriers can be financial, transportation and mobility related, geographic, or related to attitudes and awareness.”

With grants from local foundations, portable equipment was purchased that would provide complete eye exams. The first location to benefit from the model was Verland, a facility for individuals suffering from mental disabilities. These patients need stability and a sense of familiarity. Taking them away from their familiar environment and bringing them to a busy office is not always in their best interest. Additional sites have since been added—Birmingham Free Health Clinic, Squirrel Hill Health Center, Ninth Street Free Clinic in McKeesport and Catholic Charities Free Health Care Center all provide care to the underserved population of Pittsburgh and surrounding counties. Additionally, the GES makes twice yearly visits to Cornerstone Care in Greensboro and Waynesburg, PA.

Staffed by residents, medical students, and UPMC Eye Center staff, the Guerilla Eye Service brings treatment directly to those in need. Dr. Waxman states that “with our current equipment, crew, and methods we have identified and treated numerous patients who would have lost vision otherwise.” And there are those in Pittsburgh who are extremely thankful.

*To support the GES, contact 412-383-8756. Or give online at [www.eyeandear.org](http://www.eyeandear.org).*

*The Guerilla Eye Service provides quality eye care for many at-risk individuals around Pittsburgh.*

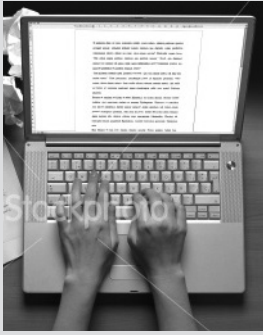


## HUBERTA S. AND JOHN V. SICILIANO FAMILY FUND FOR CANCER RESEARCH

The Department of Otolaryngology at The Eye & Ear Institute held its annual Siciliano Lecture on Monday, October 26th, with David Eisele, MD, Professor and Chairman of Otolaryngology at the University of California-San Francisco delivering his lecture, “Parapharyngeal Space Neoplasms: New Perspectives”.

The Siciliano Lecture series is made possible by the Siciliano Fund for Cancer Research, established in honor of John Vincent Siciliano, a resident of Steubenville, OH who succumbed to cancer in 2003. The fund is also used to help young physician scientists begin to establish themselves in laboratory research. These important efforts will one day help to change outcomes in the management of head and neck cancers.

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## TELL US YOUR STORY

Generosity can come in many forms — philanthropic support of the programs of The Eye & Ear Institute, participation in medical research, or sharing experiences of care at UPMC Eye Center or University Ear, Nose & Throat Specialists. How has Eye & Ear made a difference in your life? We'd love to learn more about your patient story.

Help us educate those who may not understand the seriousness of diseases and disorders of the eye, ear, nose and throat. Encourage those struggling with similar medical conditions. Inspire those who would like to support research, education or care programs with a charitable gift.

Share your story today at our secure Website, [www.eyear.org](http://www.eyear.org).

The Eye & Ear Foundation gratefully recognizes the support of individuals, businesses and foundations committed to bringing new science and new solutions to people with diseases and disorders of the eye, ear, nose, throat head and neck. Thank you for your partnership in this mission through philanthropy.

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## THE *Year* IN REVIEW

The 2008-2009 fiscal year was one of change and growth. Here are just a few highlights:

- The Department of Ophthalmology at The Eye & Ear Institute received high praise from national experts
- Eight Eye & Ear physicians were honored by *Pittsburgh Magazine* as top doctors for expert care and innovative research
- The Louis J. Fox Center for Vision Restoration was established — gifts from supporters nationwide, matched 1:1 by UPMC, continue to grow this exciting program
- The Eye & Ear Foundation introduced its newsletter, *Sight + Sound*
- The Foundation launched its updated Website, [www.eyear.org](http://www.eyear.org), aimed at informing visitors and making it easier than ever to support the Foundation

# UNDER YOUR NOSE

BY B.J. FERGUSON, MD

**T**he longer I live and the more I see of disease, the more I appreciate the value of quality of life over quantity. It is often simple pleasures—the things right under our noses—which make life enjoyable. Allergies and sinusitis are seldom life-threatening; however, they are common, often co-existing disorders which sap energy, impair sleep, preclude clear-headed thinking, and prevent the enjoyment of simple things like a picnic outside on a rare sunny summer day in Pittsburgh.



I lead the team of physicians and researchers at the Division of Sino-nasal Disorders and Allergy of The Eye & Ear Institute, and we are dedicated to providing the most comprehensive care and management of allergies and rhinosinusitis. With our main office at UPMC Mercy, as well as satellite offices at St. Margaret, Shadyside, Wexford and Indiana, we are on the forefront of allergy research. Sublingual drops and tablets, traditional allergy shots, education in avoidance and targeted medical therapy are all part of our program to care for patients

who suffer from sinus disorders and allergies.

In our experience, clinical care and research go hand-in-hand. Sometimes a very important observation has been right under our noses; it's just been hidden or we are still learning how to look for it. For example, two years ago, a patient had an infected cheek (maxillary) sinusitis which persisted for three years despite five surgeries and oral and IV antibiotics. A sinus CT scan finally revealed an overlooked periapical abscess of her tooth and once the infected tooth was pulled, the patient had complete resolution. Our team went on to discover that up to 20% of dental abscesses may be missed by routine dental screening and only become apparent upon trained evaluation of a sinus CT scan. In fact, up to 75% of severe maxillary sinus infections are associated with dental infection and surgery doesn't cure the sinuses unless the infected tooth is also addressed.

Research like this is our legacy to the future. Why do previously healthy, middle-aged adults lose their sense of smell, contract asthma, or develop nasal polyps (which hang down into the nose from the sinus outflow tracts like small grapes)? Many of these patients have intriguing immune deficiencies and are frequently infected with a particular bacteria that causes inflammation. There are so many unanswered questions and as yet, so few targeted and successful therapies in this group of patients.

One area of our focus is rhinosinusitis, a heterogeneous disorder associated with a variety of things, from nasal polyps to infectious bacteria and fungi, and we are at the forefront of categorizing chronic rhinosinusitis based on these associations and types of inflammatory cells present. From this we can draw generalizations about categories of rhinosinusitis, which can assist us in targeting medical therapy. Our division was among the first to demonstrate bacterial biofilms in chronic sinusitis through electron micrographic imaging performed with the assistance of the University of Pittsburgh's Center for Biologic Imaging. Bacterial biofilms are particularly stubborn infections in which symptoms may improve while the patient is on antibiotics, but the infection itself is not really eradicated so it returns when antibiotics are withdrawn. Surgery that is successful in many of our other patients is frequently ineffectual in patients with biofilms. Topical culture-directed antibiotics and prolonged antibiotics following surgery appear to be helping in some of these patients, but further study and new tools are needed.

To date, there is no single medication that has an FDA indication for chronic rhinosinusitis but our Division of Sino-nasal Disorders and Allergy continues to investigate underlying causes of disease and to improve care as we work toward a cure. We hope that with continued directed research, the time will come when the most stubborn diseases have solutions as simple as correcting an infected tooth and our patients can be restored to a better quality of life.

*Support this research with a contribution today. Call 412-383-8756 or visit [www.eyeandear.org](http://www.eyeandear.org).*

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**Up to 75% of severe maxillary sinus infections are associated with dental infection...**

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*Albert Muse, Dr. Gregory Wolf, Gordon Nelson and Dr. Jonas Johnson at the 2009 Muse Prize Dinner*



## SHARE THE GIFT OF HEARING

Don't throw out your old or unwanted hearing aids! Recycling your used hearing aids is a great way to make a tax deductible gift through the Eye & Ear Foundation that will directly impact the quality of life for an adult or child suffering hearing loss or impairment. Any make or model, regardless of age, can be donated to the Hearing Aid Recycling Program. Your gift really can make a difference.

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## A TRIBUTE TO EXCELLENCE

BY JACQUELIN WALKER

**O**n September 17, 2009, supporters of the Eye & Ear Foundation and clinical and research leaders of the Department of Otolaryngology at The Eye & Ear Institute gathered together for the annual Albert C. Muse Prize celebration. This year's honor went to a visionary researcher, professor and leader-Gregory T. Wolf, MD.

Dr. Wolf is renowned for many accomplishments, including his organization of the first International Workshop in the Biology and Treatment of Head and Neck Cancer (which would eventually form the First International Conference on Head and Neck Cancer), serving as the first director of the head and neck oncology program at the University of Michigan, and later serving as Chairman of its Department of Otolaryngology.

Dr. Wolf has left a tremendous mark on the head and neck cancer field through groundbreaking research as well, especially as lead investigator in clinical trials for the National Veteran's Affairs Cooperative Study for organ preservation. Here he demonstrated that by administering traditional chemotherapy along with radiation therapy to advanced laryngeal cancer patients, treatment could prove just as effective as surgery but preserve patients' organs in the process. These findings were subsequently established as standard of care worldwide, improving patients' quality of care as well as quality of life during treatment. Dr. Wolf has committed a career spanning more than 25 years to bringing medical oncologists,

radiation oncologists, radiologists, pathologists and scientists together in research that will enhance the future of head and neck cancer patient care.

The Eye & Ear Foundation created the Albert C. Muse Prize to honor such vision, dedication and achievement in ophthalmology and otolaryngology. Since its inception in 2001, the Muse Prize has been awarded to distinguished physicians and scientists worldwide for their excellence in study and clinical care: Wolfgang Steiner, MD; Judah Folkman, MD; James F. Battey Jr., MD, PhD; Daniel M. Albert, MD; and Philip J. Rosenfeld, MD, PhD. And while the award honors medical excellence, it also honors its namesake, Albert C. Muse, former chair of the Foundation and current vice-chair.

For more than thirty years, Mr. Muse has served and philanthropically supported the research and care goals of the Eye & Ear Hospital, Institute and Foundation.

Currently, Dr. Wolf serves the University of Michigan as Chair Emeritus of the Department of Otolaryngology, as well as Professor and Director of Specialized Program of Research Excellence (S.P.O.R.E.) Head and Neck Cancer at the University.

*To inquire about giving to the Albert C. Muse Prize or joining us for the 2010 Muse Prize in Ophthalmology, contact 412-383-8756 or [info@eyeandear.org](mailto:info@eyeandear.org). Or visit [eyeandear.org](http://eyeandear.org).*

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The official registration and financial information  
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### *Vision continued from page 1*

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ronment. She is also collaborating with the  
Robotics Institute at Carnegie Mellon  
University in an effort to integrate existing  
machine vision technology into artificial vision  
devices. In this way, images captured from a  
video camera can be preprocessed by a comput-  
er to assist in interpretation of an environment.

While focusing on establishing some of the out-  
come measures and rehabilitation training that  
will be key in bringing substitution vision  
devices like the BrainPort and the vOICE into  
clinical settings, Dr. Nau is also examining the  
effects of brain plasticity in patients who use  
artificial vision devices. She hopes to one day  
answer such questions as whether one can still  
use artificial vision devices after being blind for



*Amy Nau, OD*

many years. In her own  
words, “artificial vision devices  
hold the promise to restore  
some independence to those  
with total vision loss.”  
Current funding by the DCED  
and the Louis J. Fox Center for  
Vision Restoration, which is a  
joint program of UPMC, the  
University of Pittsburgh and  
the UPMC Eye Center, makes Dr. Nau’s vision  
possible.

*For more information on these vision restoration  
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Nau’s efforts with a gift, contact us at 412-383-  
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