TRAINING TODAY’S DOCTORS TO BE TOMORROW’S SURGEONS
Dr. Kingsley Okafor practicing surgical techniques in the Lanie Albrecht Microsurgical Training Laboratory.
From the Chair’s Desk

_It is the best of times...but not without challenges._

UC Davis Health System is in a time of tremendous growth and change. The changes in our national healthcare system have had a huge impact on the way we do business. This is made even more complex by the fact that in addition to providing top notch patient care to the population with the most challenging health issues in our region, we are a hospital dedicated to the training of new generations of talented physicians. Training young doctors and, at the same time, caring for the most ill in our community, is a complex and extremely costly enterprise.

Fortunately, we have exciting new leadership in our Dean and Vice Chancellor for Human Health Sciences, Dr. Julie Freischlag. Dr. Freischlag, joining our institution from Johns Hopkins where she chaired the Department of Surgery, brings renewed energy to the Health System and will help to set its course for the next decade.

Like the Health System, the Eye Center is also in a tremendous growth phase marked by the addition of new faculty, additional fellowship trainees, and cutting-edge services being made available to our patients such as the femtosecond laser for cataract surgery. Such additions speak to the vibrancy of our organization, even in these financially trying times.

The reality is that our healthcare system and the current reimbursements that we receive for the provision of care cannot cover the costs that are required to make us one of the finest eye centers in the country. To accomplish our tripartite goal of service, research and education, we rely on philanthropic support. A wonderful example of this is the new microsurgical training laboratory, featured later in this edition of enVISION. This unique training facility could not have been made possible without the largesse of the Lanie Albrecht Foundation. And so, change and growth require resources. A good portion of these resources flow from the goodwill of patients, friends and alumni trainees. We thank them for their investment in our program and for their trust in us.

Sincerely,

Mark J. Mannis, MD
Professor and Chair, UC Davis Eye Center
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OUR VISION

Our vision is to be the world’s transformational leader in collaborative vision research and in the development of cures for blinding eye disease from cornea to cortex.

OUR MISSION

We will realize our vision through pioneering collaborative vision research, providing state-of-the-art, world-class eye care, and training superbly prepared ophthalmologists and vision scientists.

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and

Charles Bradbrook, MD Recognized by the Eye Center for his dedication to continuing education.
Eye Center Opens
The Lanie Albrecht Foundation Microsurgical Training Laboratory

by Mark J. Mannis, M.D.

Ophthalmology is, perhaps, unique among medical specialties in its combination of broad medical care that is directed to diseases of all the organ systems. The eye is a microcosm of the entire body. As such, the ophthalmologist deals with endocrine diseases such as diabetes and thyroid disorders; skin diseases such as rosacea; infectious disease in its many manifestations in the eye; neurology with the eye as a direct extension of the brain and with vision occupying 40% of the brain’s anatomic function; oncology with tumors that affect the eye; and age-related and vascular diseases among many others.

At the same time, we are a surgical specialty, practicing very elegant surgery blessed with a high rate of functional success. Ophthalmic surgery ranges from exceedingly fine microsurgery inside the eye to restorative plastic surgery of the tissues around the eye. And the outcomes of ophthalmic surgery are, arguably, the best in medicine. Both patient and physician derive enormous satisfaction with the highly successful outcomes of cataract surgery, for example. Likewise, corneal transplantation, retinal detachment repair, straightening of the eyes in children and adults, and restorative oculoplastic surgery can be life altering for the patient, providing huge improvements in the quality of life.

Residents training at the UC Davis Eye Center have always left our institution with quality surgical training. Both in the lab and the operating room, our faculty of expert ophthalmic surgeons nurture our trainees into their surgical roles as skilled practitioners of surgical eye care.

This year we are further enhancing our capabilities for providing expert surgical training. Through the generosity of Mr. Ralph Albrecht and the Lanie Albrecht Foundation,
the Eye Center has opened a state-of-the-art microsurgical training facility in the Ambulatory Care Center. Fully equipped with high-quality surgical microscopes, microsurgical instruments for each resident, and video and recording capabilities, the lab will serve as the surgical training center for our residents for many years to come. The lab will also be used by residents in the veterinary ophthalmology training program, and will be available to other microsurgical specialties at the Medical Center, plus our community faculty as well.

In conjunction with the establishment of the Microsurgical Training Laboratory, the Eye Center is partnering with the Ophthalmology Department at the School of Veterinary Medicine to create a unique, web-based, graduated surgical training curriculum in ophthalmology. This course will require both the Eye Center residents as well as the Vet Med residents to achieve milestones in the development of their surgical skills over the three-year training period.

The training lab will be the site of future ophthalmic surgical courses here at the Eye Center but otherwise will be available to all residents 24 hours a day for individual practice and tutoring.

In providing the Eye Center with this facility, the Lanie Albrecht Foundation has provided generations of future eye patients with the gift of meticulously trained surgeons and the confidence that their eyes are in the hands of skilled practitioners trained to do the finest possible job of surgical vision restoration.

Left to right:
(Page 5) Dr. Nandini Gandhi Associate Program Director, practicing microsurgery, (Page 6) Dr. Mark Mannis, Department Chair and Mrs. Sharon Wong, Executive Director of the Foundation, officially open the new facility, (2) M. Glesen, M. Mannis, S. Wong and D. Christy. (Page 7) UC Davis residents in the lab with Program Director Jeffrey Caspar, MD
Surgical Training at the UC Davis Eye Center

by Jeffrey Caspar, M.D.

Surgery is both a science and an art. The performance of a surgical procedure, particularly an operation on the eye where the margin for error is extremely small and the stakes are very high, demands careful study, a lot of pre-surgical laboratory practice, and excellent mentorship in the operating room. Ophthalmic surgery is a varied science, ranging from cosmetic and reconstructive surgery of the lids and skin around the eye, to corneal transplantation, glaucoma surgery, various types of laser surgery, cataract surgery, and retina surgery. Each of these types of surgery demands a very specific skill set. Over the three years of residency, our trainees learn to assist the faculty surgeons and are gradually introduced to hands-on surgery in preparation for their careers as board-certified ophthalmologists.

In the very first week of training, our residents are brought to the laboratory and given a thorough orientation both to the instrumentation of ocular surgery as well as to the special accommodations made for the patient undergoing surgery. Our trainees must be fully familiar with the general medical status of patients going to the operating room, conditions which may have an impact on the outcome of the ophthalmic procedure. Next, over the course of the first year of training, our residents learn to assist the faculty in the operating room and are gradually introduced to performing various parts of the procedures moving from the simplest to the more difficult and complex. Certain procedures are not undertaken until Fellowship, which is a year (in some cases 2 years) of specialty training after residency. But the residents all get a firm grounding in the principles and practices of ophthalmic surgery.

During the final year of residency, the trainees follow their own patients and perform most of the cases themselves under the direct supervision of experienced faculty. In addition, our program has two affiliated Veterans Administration Hospitals where our residents are afforded the opportunity to participate in the surgical care of the patients there.

This year, we are pleased to open the Lanie Albrecht Foundation Microsurgical Training Laboratory. Through a generous gift from Ralph Albrecht and the Lanie Albrecht Foundation, the Eye Center will have a state-of-the-art microsurgical training laboratory complete with surgical microscopes, surgical instruments, and a unique video system that will allow instructors and students to demonstrate techniques to one another. We anticipate that this lab will be used not only by the Eye Center ophthalmology residents but, in addition, by the ophthalmology residents from the School of Veterinary Medicine, and trainees from other surgical specialties in which microsurgery is performed. This lab will be used for regular in-house training sessions, both group and individual, as well as for surgical training courses.

The graduates of the training program here at the Eye Center are well respected for their surgical expertise. Fine facilities, a large and varied patient population, and skilled mentorship make the surgical training at UC Davis second to none for individual practice and tutoring.

In providing the Eye Center with this facility, the Lanie Albrecht Foundation has bestowed upon generations of future eye patients the gift of meticulously trained surgeons and the confidence that their eyes are in the hands of skilled practitioners trained to do the finest possible job of surgical vision restoration.
In October of 2010, the UC Davis Eye Center's Residency Program was presented with a unique opportunity. During its annual resident surgery practice course, Dr. Matti Vazeen presented the residents with a talk on his involvement with the Ispahani Islamia Eye Institute and Hospital (IEH) located in Dhaka, the capital of Bangladesh. Established in 1960, the IEH is the largest eye hospital in Dhaka, an immense facility seeing nearly 425,000 patients each year.

Dr. Vazeen is an ophthalmologist and the director of the Center for Advanced Eye Care in Carson City, Nevada. He attended medical school at Northwestern University Medical School in Chicago and completed his residency in ophthalmology at LSU-Ochsner in New Orleans. But it was as an undergraduate alumnus of UC Davis that forged this connection with the Eye Center.

At the surgical course, Dr. Vazeen gave a fascinating and inspiring talk on the Islamia Eye Hospital and his connection with it. He discussed its assets as a wonderful teaching opportunity for the residents and, in conclusion, offered to fund the travel of two residents per year to the IEH.

In January of 2012, Dr. Vazeen and Dr. Caspar, Professor and Director of Residency Education, traveled to the IEH. There, they spent a week observing and teaching in the clinic and operating room and gave lectures each evening. Their stay culminated in a one-day symposium during which they lectured, answered questions and performed live surgery via video feed. The symposium was well attended by numerous ophthalmologists from Dhaka and the surrounding areas.

The budding relationship between UC Davis Eye Center and IEH expanded in April of 2012 when the UC Davis Eye Center sponsored Dr. Amiruz Zamin, head of the cornea department at IEH, to spend one month in the US working with Dr. Caspar. During his stay, Dr. Amir

UC Davis Eye Center Goes to Bangladesh

by Jeffrey Caspar, M.D.
observed in clinic and in the operating room, attended teaching rounds, and presented several interesting clinical and surgical cases.

Since this initial exchange, the relationship between these two eye centers has blossomed. In October of 2012, Dr. John Keltner, Distinguished Professor and Chair Emeritus of the UC Davis Department of Ophthalmology & Vision Science, traveled with his wife to IEH. Dr. Keltner has since been instrumental in recruiting equipment donations for the IEH and in establishing the Friends of Islamia Eye Hospital, Dhaka, a tax-exempt charity, to help support operations there.

Following Dr. Keltner’s visit, other physicians from the Eye Center have made regular visits to the IEH. In December of 2012, Dr. Nandini Gandhi, Assistant Professor of Pediatric Ophthalmology, spent a week lecturing and teaching surgery.

Then, in January of 2013, Dr. Eric Chin became our first senior resident to travel to IEH. Dr. Chin spent a month giving 11 lectures, learning new surgical techniques and helping to develop additional teaching and research programs. He was accompanied by Dr. Annie Baik, Assistant Professor of the UC Davis Glaucoma Service.

In December of 2013, Dr. Vivian Lien became our second senior resident to travel to Dhaka and our third resident is scheduled to travel in the spring of 2014.

Working in Bangladesh is an enlightening experience for our residents, one that is provided by few training programs in the country. The experience in Bangladesh exposes the residents to a wide range of eye diseases and surgical techniques not frequently seen in the United States. There they learn the challenges and rewards of providing much needed eye care in a developing nation and will be better prepared for future opportunities in international service. Their experiences also foster long-standing relationships and emphasize the need to give back to the profession of ophthalmology and to the underserved throughout the world.

Having begun with Dr. Vazeen’s desire to give back to a profession that has been so good to him, we expect the mutually beneficial relationship between IEH and UCD to continue to expand and grow over the coming years.

*Photos:*
*Dr. Jennifer Li, MD, UC Davis Cornea Specialist with patients at IEH, Vivien Lien, MD Senior Resident at UCD, examining a patient in Dhaka.*
For most new parents, putting a contact lens on their baby’s eye is unimaginable. For a few, this is just part of their daily routine, like feedings, bathing and changing diapers. Approximately 3 in 10,000 children are born with cataracts and require lens removal surgery, the most common reason an infant would be fit for contact lenses. Removing the cataracts results in an extreme prescription. This makes glasses very difficult, if not impossible to wear. Without accurate correction, these children will develop deep amblyopia or lazy eye, meaning the potential for good vision is very unlikely. With contact lens wear and careful observation, these children have a much greater chance for normal visual development.

One of the biggest challenges for pediatric contact lens wear is lens loss. On average, infants will lose 9 lenses in the first year. For the second time, the Children’s Miracle Network has partnered with the UC Davis Eye Center by generously providing a $10,000 grant over two
years to cover the cost of these custom contact lenses. The grant has proven invaluable by providing initial and spare lenses when contact lenses are inevitably lost and particularly beneficial when insurance coverage falls short.

While fitting contact lenses on infants is challenging, it is, nonetheless, very rewarding. We welcome the opportunity to fit infants and children with medically necessary contact lenses and are grateful for the grant from the Children’s Miracle Network for making it a little easier. The real heroes, however, are the dedicated parents who go above and beyond by inserting, removing and cleaning contact lenses every day. It is their determination, along with our clinical experience at the UC Davis Eye Center, that results in the best possible visual success for these children.
UC Davis Eye Center

Alumni
Volunteer Clinical Faculty Reception
UC Davis Medical School’s Paul Hom Asian Health Clinic is the oldest existing free Asian clinic in the United States. The clinic is open on Saturdays to provide free primary care services to the medically uninsured.

In 1971 a group of UC Davis medical students, along with Paul Hom, MD, decided to create a place where elderly Asians and immigrant families could get adequate healthcare in a setting where their language and economic barriers could be overcome.

For the past five years, UC Davis Eye Center has participated in the Paul Hom Asian Health Fair held annually in the Fall with the help of the Lion’s Club Mobile Eye Van to do screenings for diabetes, glaucoma, cataracts, macular degeneration and other eye diseases. It gives our ophthalmologists, fellows, residents and medical students an opportunity to gain experience in community medicine while giving back. The medical staff are supported by an impressive body of undergraduate students who are fluent in, and provide translation for, a variety of Asian languages including Chinese (Mandarin and Cantonese), Vietnamese, and even Mongolian.

The Eye Center will soon expand its services to include a regular eye clinic to be held quarterly at the Paul Hom Asian Clinic with the goal of providing sustained ophthalmic services to this important part of our community.

Dr. Michele Lim leads a team of UC Davis faculty, residents, fellows, medical students and undergraduates with visual examinations.
Ophthalmology residency is a whirlwind of emotions, experiences, sleepless nights on call, a very steep learning curve, and great triumphs. After medical school and a year of internship typically in internal medicine, ophthalmology residency is the first time we get to practice the field that we have chosen as our life long career. Most of what we learn in ophthalmology is new to us, since most of medical school is spent learning about the rest of the body with minimal coverage on the eyes.

The first weeks of residency are overwhelming but exciting. During the blur of the first few days, we quickly learn examination techniques, the many new diagnoses, as well as an array of new surgical skills. Surgical training begins the very first week. Until this year, we had to take turns practicing in a small converted bathroom equipped only with an old microscope and surgical tools. This was less than ideal, because there was barely room for a faculty member and a resident. With the January 2014 opening of the Eye Center’s new microsurgical training laboratory, resident teaching will be much more effective. Even more exciting, from my perspective, is the idea of senior residents assisting the junior residents. Learning a new skill alone can be frustrating, but in the new lab, there is space for multiple residents to work simultaneously making for a more enjoyable, interactive and instructive experience.

The hardest choice I made during residency was the decision to pursue a fellowship and which subspecialty field to choose. Ultimately, I chose to enter the field of glaucoma, because I found the most satisfaction from partnering with these patients, teaching them about their often slow and silent disease, and following them for many years. Also, I found the unanswered questions regarding the development and treatment of the disease to be intellectually stimulating and found myself attracted to the possibility of a career in an academic teaching institution.

The most gratifying of experiences I had at UC Davis centered on the support I received from the faculty once I established my goals and interests. The exploration of finding one’s passion within ophthalmology is personal, and my mentors gave me plenty of time and space to make up my mind. But once I decided, I received generous support along the way for my career and research goals.

As the end of my residency approaches, I am beginning to realize how much I will miss this department and the relationships I have created here. My advice to future residents is to stay strong and happy, find your passion within ophthalmology and take advantage of all that UC Davis offers. When you need that extra burst of motivation, think back to what inspired you to choose ophthalmology initially. For me, I only need to look closely at the patient in my exam chair. The patient’s gratitude always reminds me of why I chose this path.
The Low Vision Clinic of Society for the Blind is one of the longest-running community-based eye clinics in the Sacramento Region. The clinic was established in 1975 by a group of volunteers who saw a need to provide eye healthcare and training in low vision devices. Today, Society for the Blind’s Low Vision Clinic is one of the most comprehensive providers of low vision services in Northern California, caring for patients in 26 counties.

Five optometrists, all of whom have extensive training and experience in low vision eye care, provide exams and training on devices for patients. Too often, however, patients do not learn about the Low Vision Clinic until months or even years after they begin to experience vision loss. Penny Riley, manager of the clinic, said one of the most common statements heard in our Low Vision Clinic is “I wish I had known you were here much sooner.”

The recent partnership with the UC Davis Eye Center has increased awareness of this important community resource. Patients of the Low Vision Clinic receive an extensive exam which typically lasts up to two hours and includes testing with specialized diagnostic tools to determine visual acuity, contrast sensitivity, color vision and field of vision. The doctors assist the patients in the selection of low vision devices, and Society staff meet with the patient to discuss additional services available to them.

The onsite retail store at Society for the Blind keeps a wide variety of low vision devices on hand, from hand-held magnifiers, spectacle-mounted telescopes, to CCTVs and scanners. The Low Vision Clinic serves clients of the Department of Rehabilitation as well as patients with Medicare and private insurance.

“Our goal is to keep our patients active, on the job, and focused on their goals and dreams,” said Shari Roeseler, Executive Director of Society for the Blind. The three leading causes of blindness - glaucoma, age-related macular degeneration and cataracts - occur most frequently in people 55 and older. This segment of the population in the Sacramento region is growing rapidly. Seniors today are very active and vision loss can threaten the active lifestyles to which they are accustomed. “Vision loss need not deter them,” Roeseler added, “and our Low Vision Clinic is here to work with patients to ensure they have access to assistive devices and ongoing eye healthcare so they can live life to the fullest.”

To learn more about the Low Vision Clinic please call: 916-889-7506.
Without question, my training in ophthalmology at the UC Davis Eye Center planted the seeds which enabled me to grow the wonderful practice I enjoy today. When I hear about the experiences of doctors trained in programs elsewhere, it’s easy to be grateful for the gift I was given. Our UC Davis Eye Center is unique in fostering a tremendous personal connection between the residents, professors and clinical instructors. Relationships often go beyond the traditional teacher-student roles and extend to life-long social bonds. Thus is collegiality born!

A quarter-century later, it’s terrific to be able to give back and continue to broaden and strengthen my relationship with the faculty, staff, residents and fellows.

Professionally, I learn from attending the many conferences and meetings. The Eye Center seems to be tuned into the topics that appeal to all facets of practicing eye surgeons. There’s something for the academicians, the group practitioners, and those of us in completely solo practice. It’s a wonderful feeling to sit in a room with others in such different chosen paths and feel the kinship that we are all in the same specialty.

Financially, I realized that while I had always made donations to various charitable organizations and causes, it was time to “buckle down” and write the check to my own alma mater! The process was seamless and by working with the development staff, I was able to direct my contributions specifically for my three topics of interest: humanitarian efforts, teaching practice skills, and surgical training.

We established an Endowment for Excellence in Resident Education, and I’m excited to see these funds grow and provide support for residents now and into the future. I encourage others interested in resident education to support this endowment, which provides funding for travel to professional conferences and clinical mission trips. This provides an opportunity for our residents to hone their skills and to help those in need in developing countries. It is a joy to help a resident learn that “giving back” is what being a doctor is all about.

I have fun in the clinic, teaching the residents as a clinical professor. Giving hints to encourage active and focused listening, patient involvement and efficient movement during an exam and discussion is well received and appreciated by the residents.

Despite a busy professional life juggling my solo practice, participating in our regular cataract mission trips and taking time for social activities - helping this new generation of eye physicians develop better patient-centered skills is truly a meaningful pleasure for me. I strongly encourage others to become involved and connect with our UC Davis Eye Center “Family.” There’s no place like home!
It is 5,009 miles from Dublin, Ireland to Sacramento, California, but that didn’t stop Tania Hashmi from making the journey in search of sunshine and new adventures. Tania is an orthoptist and the newest member of the UC Davis Eye Center family.

Travel comes naturally to Tania. She was born in Sheffield, England and moved to Dublin, Ireland at age 2 years. She returned to Sheffield for University, receiving a degree in orthoptics with a postgraduate diploma in strabismus and vision science. A certificate from the University of Liverpool qualifies Tania to train orthoptists. After several years at home in Ireland, Tania looked westward for new challenges.

Orthoptics is an allied health profession that involves the diagnosis and management of binocular vision disorders. Orthoptists are important members of the eye care team and provide unique services for patients with eye muscle problems. In addition, they make significant contributions to eye research. The Eye Center at UC Davis has provided orthoptic services to the community since 2004 and welcomes Tania’s expertise in continuing these services. Tania’s professional goals include research and an expansion of her experience in the diagnosis and management of adult strabismus. In addition, Tania will be participating in the orthoptic externship that is being developed between St. Catherine University and the Eye Center at UC Davis.

Tania is very out-going and loves to socialize. She has found lots to do in Sacramento. She loves the sea and the mountains that are in close proximity to our city. The good food and diversity is much appreciated, as is the music scene. Tania is presently learning to play the banjo and has an interest in bluegrass music. She is still looking for a good rowing club to explore the many waterways of Sacramento. Tania Hashmi welcomes meeting new members of the UC Davis family and, in her beautiful Irish brogue, exclaims, “If you’re ever bored, find me!”
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Vitreoretinal Research Lab  
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Ocular immunology, retinal and optic nerve imaging techniques

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Research Interests:  
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Research Interests:
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of retinal degeneration

This image is taken from a mouse retina that has been removed, and spread flat on a microscope slide. A subpopulation of retinal ganglion cells is fluorescing green due to the presence Green Fluorescent Protein. The large roundish cell body shows “spray” dendrites, and also a single long axon. Input from rods and cones is conveyed to the ganglion cell via the dendrites. When this input reaches a certain threshold it gives rise to an electrical pulse (action potential) which travels along the axon to the optic nerve head, where it exits the eye on its way to the brain. It is the ganglion cells which die off with untreated glaucoma, starting at the periphery of the eye, and progressing centrally toward the optic nerve head.

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Amar P. Patel, M.D.
Clinical Retina Fellow

Sumeer Thinda, M.D.
Clinical Retina Fellow

Harinderpal Chahal, M.D.
Third Year Resident

Vivian Lien, M.D.
Third Year Resident

Roma Patel, M.D., M.B.A
Third Year Resident

Judith Sabah, M.D., Ph.D.
Third Year Resident

Annamieka Leary, M.D.
Second Year Resident

Shabnam Taylor, M.D.
Second Year Resident

Jeffrey Willis, M.D., Ph.D.
Second Year Resident

Peter Wu, M.D.
Second Year Resident

Nathaniel Gebhard, M.D.
First Year Resident

Kimberly Gokoffs, M.D., Ph.D.
First Year Resident

Natasha Kye, M.D.
First Year Resident

Kingsley Okafor, M.D.
First Year Resident
The Mini Medical School program on the UC Davis campus provides a dynamic public program to the community. As part of this lecture on Saturday, February 15, Dr. Mannis presented a talk entitled “The Aging Eye: Preserving your Vision for Life” to over 350 participants in the program. Reviewing the basics of cataract, glaucoma, and age related macular degeneration, Dr. Mannis also presented the newest technologies available for the treatment of these diseases.

Charles Bradbrook, MD recognized by the Eye Center for his dedication to continuing education

by Kimber Chavez

Dr. Bradbrook graduated from Northwestern University Feinberg School of Medicine in 1957. He chose to practice in Sacramento and has been here since September of 1961. He has practiced general ophthalmology with the Martel Eye Group since 1986.

Dr. Bradbrook has been a steadfast participant at nearly every educational event at UC Davis Eye Center in his 53 years of practice. This past February, he was honored with a Lifetime of Education Award at our Grand Rounds conference.

When asked if he is looking forward to retirement, he responded, “I enjoy my weekends, but I am not ready for a 7 day weekend yet.” We admire Dr. Bradbrook for his dedication to life-long learning.
The complexity of the intricate system of vision that brings us the visual world begins when light touches the front of the eye and is then focused by the cornea and the lens onto the “film” that records the images we see—our retina. There, light is converted into chemical and electrical energy that goes to the brain. This visual signal is carried through a delicate cable—the optic nerve— consisting of tens of millions of nerve fibers called “axons”. Our ability to see the world depends on the proper function of this coaxial cable transmitting light from the cornea at the front of the eye to the cortex in the back of the brain.

This remarkable visual system that opens the glories of the world to us can be disrupted by injury, disease, and the processes of aging. While there are many causes of interruption to the visual system and ensuing loss of vision, perhaps the most difficult problems are those that directly affect the optic nerve—the final common pathway of sight. These include inflammatory diseases, infections, neurologic disorders, vascular disease and, of course, glaucoma— one of the three most common causes of blindness in our country and the world over. Diseases of the optic nerve have remained a huge problem because, unlike other tissues in the body, nerve tissue heals with scarring that interrupts the normal transmission of the optic nerve. Until now, we have been unable to direct the regeneration and regrowth of damaged neurons in a way that allows the optic nerve to regain function.

Developing the ability to stimulate re-growth of the optic nerve is a challenge that UC Davis is extremely well-positioned to undertake. The UC Davis Eye Center and Center for Vision Science bring together an unmatched team including ophthalmologists, cell biologists, stem cell biologists, physiologists, engineers and bio-engineers who have the tools and knowledge to ensure success.

The next enVISION Magazine will focus on current optic nerve research and future expansion plans to become the leading center of optic nerve research in the world.
Together we bring research from the laboratory to the bedside, and we advance:

**STEM CELL RESEARCH:**
UC Davis Eye Center researchers initiated the first clinical trial in the U.S. using a person’s own stem cells to treat previously untreatable blinding retinal conditions such as age-related macular degeneration.

**DIAGNOSIS AND TREATMENT:**
We are developing high-resolution, non-invasive imaging tools to look inside a patient’s eye to understand - at the cellular level – early indicators of a range of eye diseases and the impact of patient centered treatment programs.

**UNDERSTANDING THE MYSTERY OF VISION:**
By studying responses to light we are understanding how the visual signal transmits from the photosensitive cells in the human eye to the brain.

**OPTIC NERVE RESEARCH:**
Our retinal stem cell biologists are studying how stem cells grow and become retinal ganglion cells and then, how to get them to reform connectivity that transmits the visual signal to the brain.

**ARTIFICIAL CORNEA:**
In collaboration with the School of Veterinary Medicine, we are using animal models to develop an artificial cornea.

**RETINAL DISEASES:**
Researchers are identifying biological markers related to retinal disease and are using these markers to develop therapeutic strategies that will slow the progression of blinding eye diseases.

**TRAUMATIC BRAIN INJURY AND SPORTS MEDICINE:**
We are developing vision training tools for athletes to enhance their performance and tools for rapid diagnosis of traumatic brain injury.

Please consider supporting our work today. Your gift will support cutting edge vision science research and benefit many individuals today and in years to come.