



#ucdaviseyecenter

Spring/Summer 2013

# enVISION

News from the UC Davis Eye Center



## EYE CENTER RESEARCH

TACKLING THE ISSUE OF TRAUMATIC BRAIN INJURY

WEBSITE





# ➤ FROM THE CHAIR'S DESK

Those of us who practice clinical ophthalmology are made aware day after day of the huge impact that vision impairment has on the lives of our patients. When I made the decision as a medical student to pursue ophthalmology as a career, there was at least a moment of hesitation about going into a field in which I would not be saving lives. How wrong I was in that moment of hesitation. I now feel as though my colleagues and I save lives every day—very occasionally literally and often more figuratively in terms of quality of life. As ophthalmologists, we have the opportunity to elevate the quality of our patients' lives, to give them independence and livelihood, and to grant hope for a better future.

Here at the Eye Center, our faculty, residents, fellows, and staff are engaged continually in this visual restoration of life. Whether it is dealing with infection on the surface of the eye or conditions affecting the visual centers of the brain, the Eye Center engages disorders of the visual system from cornea to cortex.

In this issue of enVision, we look at “sports ophthalmology” and the crucial role that vision plays in the lives and health of athletes at all levels. This is but one of the many areas of vision that play a role in the daily programmatic activities of the Eye Center. While eye disease in children and the elderly are a significant focus for us and, indeed, for all of ophthalmology, there has been less exploration of the visual needs of the young and healthy—and specifically of athletes. Yet vision can be crucial to athletic achievement, and the visual system may also be threatened by the hazards of athletics. And so, we are excited about the development of a Sports Vision Program here at the UC Davis Eye Center, yet another innovative activity in vision care at our institution.

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Mark Mannis, M.D., FACS  
Professor and Chair  
Department of Ophthalmology & Vision Science  
UC Davis Eye Center

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EYE CENTER

is published by the UC Davis Eye Center. For more information about ophthalmology services and vision research at UC Davis, visit our Web site at: [www.ucdmc.ucdavis.edu/eyecenter](http://www.ucdmc.ucdavis.edu/eyecenter) or call (916) 734-6435.

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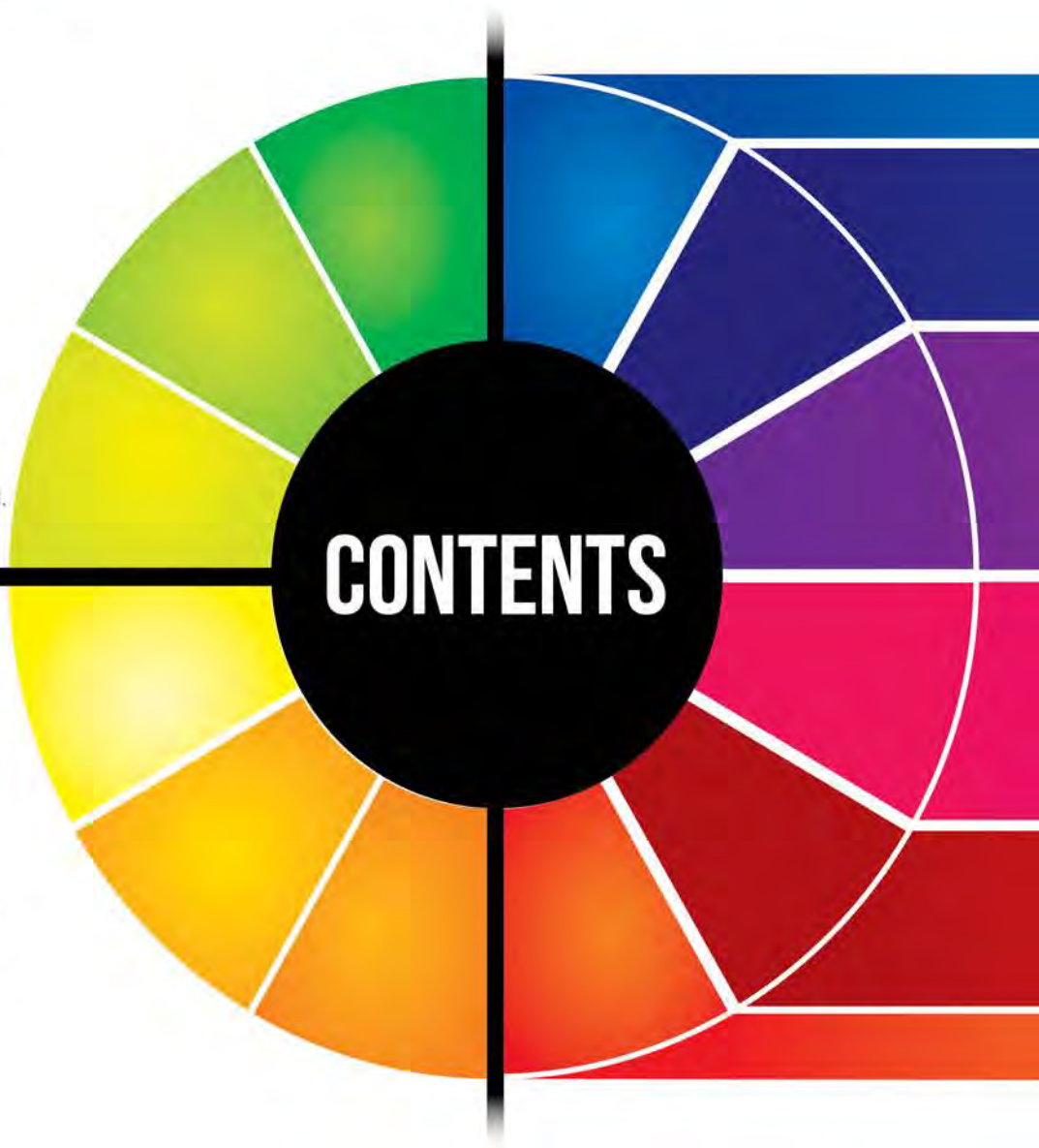


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2



## APPOINTMENTS ▼

### To Schedule Patient

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(916) 734-6992 (FAX)  
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Roseville  
2261 Douglas Blvd.  
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(916) 783-7109

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Cadillac Drive  
77 Cadillac Dr.  
Sacramento, CA 95825  
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**Tackling the Issue of  
Traumatic Brain  
Injury**



**06**

**Rise Grant Awarded**



**16**

**50,000 Patients and  
growing**



**18**

**AAO Chicago**



**20**

## **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.



▶ **TACKLING  
THE ISSUE OF  
TRAUMATIC  
BRAIN INJURY**

by Khizer Khaderi, MD, MPH

Why would a professional football player, who has reached the pinnacle of his career by winning a Super Bowl and is a future Hall of Famer, end his life with a self-inflicted wound to the chest at the age of forty-three years old?

### **THE ANSWER? TRAUMATIC BRAIN INJURY.**

The player mentioned above is Junior Seau, a retired linebacker, who had his brain donated to and studied by the National Institutes of Health. The study confirmed he suffered from chronic traumatic encephalopathy, a degenerative disease process typically diagnosed post-mortem, following a history of multiple concussions and/or other forms of traumatic brain injury.

### **"HOW WAS THAT HUMANLY POSSIBLE?"**

is a common phrase uttered by sportscasters, and describes the awe, excitement and entertainment aspects of watching sports. Today's athletes appear as invincible as the superheroes we grew up reading about in comic books. An NFL linebacker exerts up to 1000 lbs of force when hitting an opposing player. That is 200 lbs more force than the battering ram used by policemen to break open doors. Junior Seau had been involved in at least 545 tackles over a twenty-year career, which is equivalent to 545,000 lbs of force or being hit by a Boeing 747 aircraft.

What type of toll do all those hits take on the brain? Traumatic brain injury (TBI) is defined by the National Institutes of Health as a form of acquired brain injury, which occurs when a sudden trauma causes damage to the brain. TBI can result when the head suddenly and violently hits an object, or when an object pierces the skull and enters brain tissue. Symptoms of a TBI can be mild, moderate, or severe, depending on the extent of the damage to the brain.

TBI can affect the communication between the eye and brain. Affects on the eyes range from mild symptoms (blurred vision or tired eyes), to moderate/severe symptoms including dilation of one or both pupils. Damage in communication between the eye and brain results in missing parts of vision in one or both eyes (visual field abnormalities), and/or inability to keep images as one (double vision and nystagmus). All of these problems can make routine activities such as reading or driving very difficult or impossible to do.

With today's athletes being bigger, faster and stronger, there is a growing trend of traumatic brain injury, especially among those who participate in impact sports like football, hockey and boxing/mixed martial arts. Furthermore, TBI is not limited to professional athletes, as it is becoming more commonplace at the college, high school, and junior levels of play. With the increasing prevalence of these brain injuries, what is being done to diagnose the early symptoms of brain injury to avoid the fate of Junior Seau and other fallen sports heroes?

Currently, researches are using the advent of technologies, such as the iPad, to conduct tests of cognitive thinking. At the forefront is the IMPACT and King-Devick tests, both of which involve a series of tasks to test visual and verbal attention. Most recently, Reebok has teamed up with MC10 to develop a sensor-embedded cap that can be worn under

## ● ● ● REEBOK / MC10 SENSOR CAP ▶

a helmet, which measures the impact of a hit to the head. The cap is designed to let an athlete know when to seek medical treatment or rest before resuming play. Although these technologies show promise, they each have their pros and cons. None of them provide a complete solution of a reliable automated system for both diagnosing and monitoring athletes for TBI. Does such a system exist?

The answer is yes and it's at UC Davis Eye Center, at the Sports Vision Lab, under the directorship of Khizer Khaderi, MD, MPH.

Dr. Khaderi and colleagues have devised a system involving the measurement of eye movements, pupillary response, and brain waves. Having spent almost a decade in sports vision research and technology, Dr. Khaderi's interest in traumatic brain injury and its affect on the visual system came about through reading an ESPN article on the subject. "The article really brought to light the need of having an inexpensive and accurate method of measuring concussions, the earliest form of traumatic brain injury," says Dr. Khaderi. "After a review of all the major works on current TBI research, I noticed two trends – first, researchers focused on only one area to measure for diagnosis, such as only cognition, or only eye tracking. Secondly, there was no system for monitoring and triaging athletes affected by traumatic brain injury, which allows for assessment of whether they are ready to safely go back in the game."



"Our goal is to provide an inexpensive and accurate system to measure three common signs of brain injury and to triage the injury based on the results of the measurements. The technology is there to do so, our system is in place and we are excited for our upcoming pilot study. Football, hockey and other impact sports aren't going away, and we need to meet the demands of our athletes, because the same measures we use to diagnose and treat this area, can be used for a broader audience of people affected by traumatic brain injury."







## NS MINDBAND II



*"After a review of all the major works on current TBI research, I noticed two trends – first, researchers focused on only one area to measure for diagnosis, such as only cognition, or only eye tracking. Secondly, there was no system for monitoring and triaging athletes affected by traumatic brain injury, which allows for assessment of whether they are ready to safely go back in the game."*

The logo for 'enVISION GREEN' features the word 'enVISION' in a bold, green, sans-serif font. The letter 'O' in 'VISION' is replaced by a circular graphic containing a stylized sunburst or fan-like pattern. To the right of 'enVISION', the word 'GREEN' is written vertically in a smaller, green, sans-serif font. The background of the top half of the page is dark with large, faint, circular sunburst patterns.

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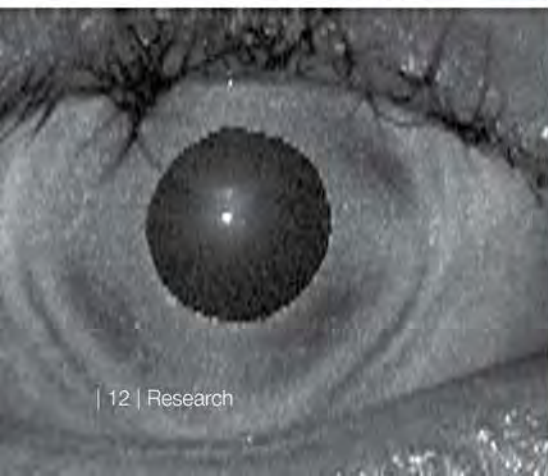
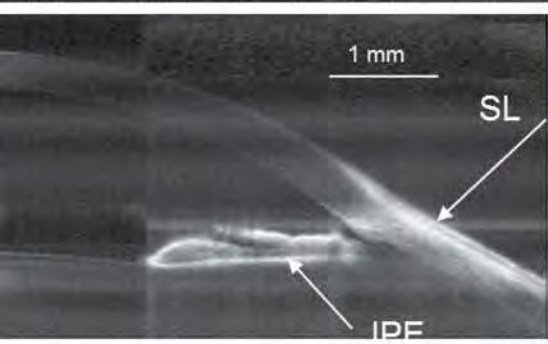
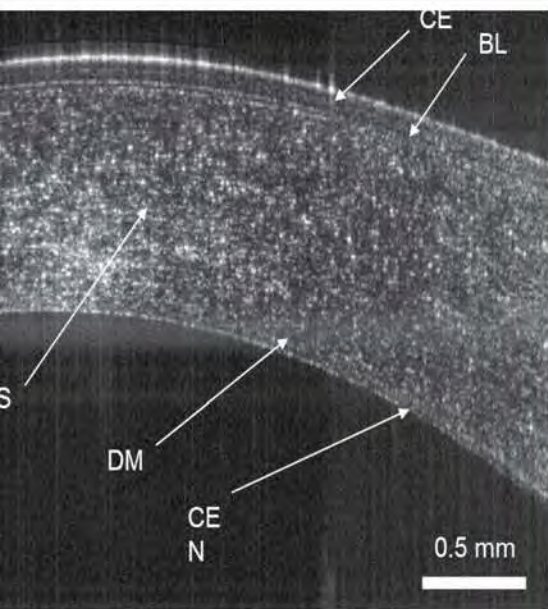
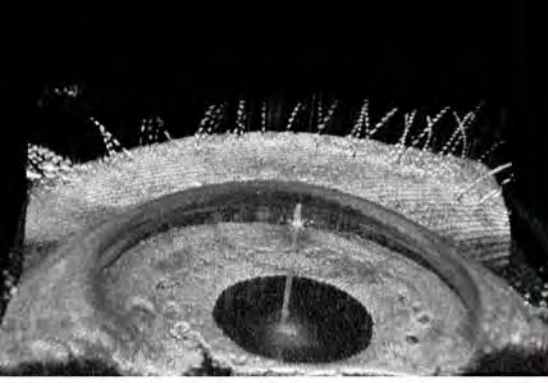
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## ADVANCED EYE IMAGING MOVES 'FORWARD' AT UC DAVIS

The VSRI (*Vision Science and Advanced Retinal Imaging Laboratory*) located in the UC Davis Eye Center has been supported by the National Eye Institute with a 10-year, \$10-million, research grant to develop imaging methods that will permit individual cells to be visualized in the living eye. Most of the work for this project has focused on the back of the eye to help patients with retinal diseases such as age-related macular degeneration.

Now, a new effort in the imaging laboratory is focused on the front of the eye, from the cornea to the lens. The engineering effort is led by Drs. Raju Poddar and Robert Zawadzki, in collaboration with Dr. Dennis Cortes, a cornea specialist. The new instrument uses the principle of optical coherence tomography in which a harmless beam of light is scanned across the eye and the faint reflections from each layer are captured much like echos are recorded with ultrasound. This principle is exploited in commercial instruments, but at much slower speeds. This is important because the eye is always moving somewhat (even when you try to hold it steady) and eye motion causes blur in the image just like a jiggling camera produces blurry pictures. The new instrument, called swept-source OCT, is about five times faster than standard commercial devices. In addition, the Eye Center's custom swept-source instrument has two different modes of image capture, one in which the entire depth of the front of the eye is imaged (not possible with current commercial instruments) and another that provides a zoomed-in view to produce very detailed images of a chosen area. Finally, the new swept-source device is fast enough to repeat scans across the whole eye in a few seconds so that multiple images may be obtained and combined for a three-dimensional view of the retina. This requires software developed by a Ph.D. student in the UC Davis Computer Science Department, Arlie Capps.

Images of the front portion of the eye in 3D are already revealing details of diseased corneas and implanted corneal prostheses that have not been imaged this clearly or completely with any other instrument.

# THE CENTER FOR VISUAL SCIENCES HOSTS THIRD ANNUAL VISION RESEARCH SYMPOSIUM

Each year, the Center for Visual Sciences hosts a one-day symposium dedicated to basic and translational science in vision at UC Davis. The Center for Visual Sciences, under the able leadership of Paul FitzGerald, PhD, is a virtual center comprised of 50 UC Davis faculty from 14 campus departments and the Eye Center. This year's symposium was held January 4, 2013 and featured speakers from the UC Davis Campus.

In recognition of great contributions of former Eye Center Chair, John Keltner, to the research programs in vision at UCD, the Eye Center and the Center for Visual Sciences established the annual John L. Keltner Lectureship in Vision Science. The first annual Keltner Lecturer was Ed Callaway, PhD, Professor and Audrey Geisel Chair in Biomedical Science at the Salk Institute, whose topic was "Of Mice and Monkeys: A Journey into the Visual System".

The collective power of the programs of vision science at UCD is attested to by the fact that we are ranked 8th in the nation in grant funding for vision science. The annual symposium is a palpable testament to the vitality of the vision science programs here at UC Davis. More information on the Center for Visual Sciences and the annual symposium can be found at [www.cvs.ucdavis.edu](http://www.cvs.ucdavis.edu).

*Top to bottom*

- 1 Dr. Mark Mannis presenting the John L. Keltner Lectureship award to Ed Callaway, PhD
- 2 Dr. and Mrs. John Keltner along with members of the UC Davis Community
- 3 Vision Science Community listen to the Keltner Lectureship



# ▼ DENNIS CORTES





The Eye Center has had a long tradition of bringing talent from other parts of the world to learn from and collaborate with our faculty. For the last year, Dr. Dennis Cortes from Santiago, Chile has become a member of the Cornea Service and Imaging Center teams here in the department. Dr. Cortes trained in Chile and practices there at the Pontificia Universidad Católica de Chile and Dr. Sótero del Río Hospital, where he trained as a resident. He has had a particular interest and talent in imaging techniques of the anterior segment of the eye and came to UC Davis bringing his considerable experience to our service. Employing high definition ocular coherence tomography techniques, combined with new generation confocal microscopy, Dr. Cortes has greatly enhanced our non-invasive diagnostic capabilities.

Dennis came to Davis with his wife, Claudia, and three children, Alonso (age 15), Carla (age 13) and Vicente (age 9). He has used his time here at UC Davis to expand his own capabilities as an imaging expert and to assist the anterior segment surgeons in both the clinic and the laboratory with diagnostic images. Dennis has collaborated with Drs. Chris Murphy, Jennifer Li, and Mark Mannis in studies of a new keratoprosthesis that is being developed and has also begun working in our optics laboratory with Dr. Jack Werner on the development of an optical imaging system that will provide even more detail of the eye's anterior segment.

Dr. Cortes has already published several papers during his time at Davis and is embarking upon the production of a book on anterior segment imaging. Later this year, he will return to Santiago to continue his practice and clinical research in Chile, bringing home his experiences at the Eye Center.

- ❶ *Dr. Cortes with his wife, Claudia*
- ❷ *Dr. Cortes' three children: Alonso, Carla, and Vicente*
- ❸ *Dr. Cortes obtaining high-resolution images of the anterior segment of the eye*



# RISE GRANT

Three Center for Visual Sciences faculty--Ed Pugh, John Werner, and Paul FitzGerald--were awarded a UC Davis RISE research grant for \$866,000 to develop an instrument that permits the identification of single cells in the retinas of living mice. This instrument would create, for the first time, the ability for researchers to follow the fate of individual cells over the lifetime of

the mouse. The device will enable a wide range of studies which previously could not be conducted in living animals. Many different types of processes can be studied. Some examples include: 1) following individual cells during progression of diseases such as glaucoma, as well as during experimental treatments designed to prevent or retard the progression of disease; 2)

charting the effectiveness of gene-therapy to correct inherited retinal diseases, or therapies designed to treat diseases such as macular degeneration; 3) determining whether injected stem cells implant at the right location, and then undergo maturation into functioning retinal cells. For more information, contact Paul FitzGerald at [pgfitzgerald@ucdavis.edu](mailto:pgfitzgerald@ucdavis.edu)



## ▼ Organization of Macular Friends

Meets 1st Thursday of each month  
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916-452-8271

## ▼ Covell Gardens Retirement Community

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(530) 753-1522  
Arturoolg@aol.com

## ▼ Davis Senior Center

Jennifer Frazier  
646 A Street  
Davis, CA 95616  
(530) 753-7694  
jenniferlynnfrazier@gmail.com

## ▼ El Dorado Center For the Visually Impaired

4600 Farnsworth Lane  
El Dorado, CA 95623  
(530) 626-6715

## ▼ Earle Baum Center

4539 Occidental Road  
Santa Rosa, CA 95401  
(707) 523-3222  
ebc@earlebaum.org

## ▼ Low Vision Support Group

1300 Jefferson Street, #114  
Napa, CA 94559  
(707) 696-5706

## ▼ New Outlook Support Group

3571 Sunview Road  
Paradise, CA 95969  
(530) 514-8793

## ▼ Eye Contact

For the residents of Sun City Lincoln Hills  
(916)645-5516  
Chelsea@starstream.net

## ▼ Insight Roseville

Maidu Senior Center  
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(916) 782-2406

## ▼ Sunrise Macular Degeneration Association

PO Box 491  
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## ▼ Center for Visually Impaired Adults Placer County

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Auburn, CA 95602  
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## ▼ Lincoln Glaucoma Support Group at Sun City Lincoln Hills

Bonnie Dale  
Orchard Creek Lodge  
Meets 2<sup>nd</sup> Wednesday of each  
month at 4:00 pm  
Lincoln, CA 95648  
(916) 543-2133



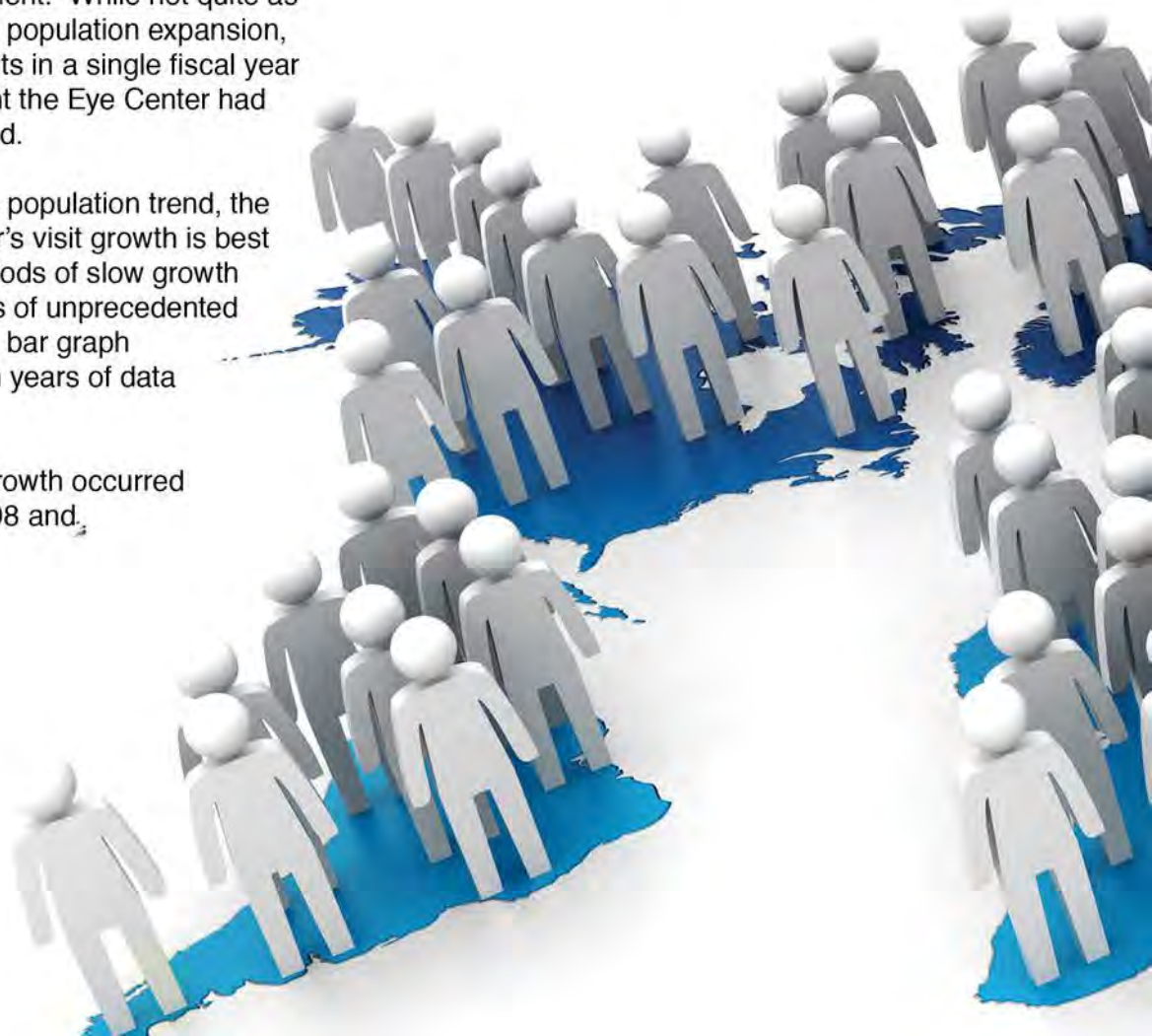
# 50,000 AND GROWING

On March 12, 2012, British researchers calculated the planet Earth welcomed a truly unique individual: the 7 billionth human. What is not quite as well-known (although equally important amongst this readership), is not long thereafter, on June 26, 2012, UC Davis Eye Center administrative researchers calculated a milestone of its own: its 50,000th patient. While not quite as momentous as world population expansion, achieving 50,000 visits in a single fiscal year is an accomplishment the Eye Center had never before achieved.

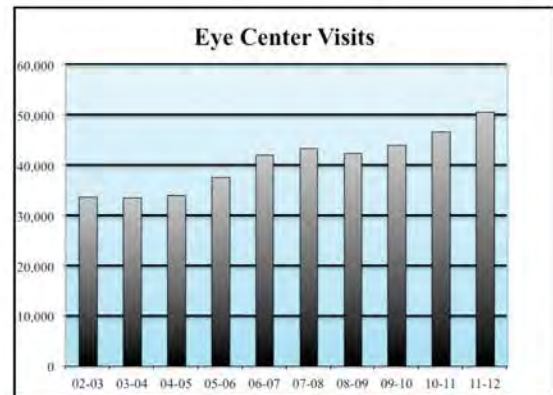
Much like the world's population trend, the UC Davis Eye Center's visit growth is best characterized by periods of slow growth accentuated by years of unprecedented expansion. A simple bar graph outlining the prior ten years of data illustrates this point.

Two rapid areas of growth occurred between 2004 to 2008 and

2009 to 2012. While economic expansion and contraction certainly played a factor, so too did the addition of new clinical space. In 2004, the Eye Center added 8,500 SF and 14 new exam rooms at our Cadillac Drive clinic. In 2009, growth was spurred by a combination of new faculty establishing



thriving practices and the addition of the electronic medical record prompting greater clinic efficiency. More recently, the Eye Center added almost 2,700 additional square feet of clinical space at Cadillac along with a second optical shop to serve the needs of our Cadillac Drive patients. And, finally, in December of 2012, the opening of the Student Health Clinic on the Davis campus will surely continue the Eye Center's upward momentum.



At a recent staff appreciation event, Dr. Mannis opened the program by congratulating the staff for achieving such a unique milestone. It is a validation of our employees' commitment to the overall departmental mission of high-quality clinical care, teaching, research, and service to the community. It is also a testament to the Eye Center's vast network of alumni and grateful patients who play no small part in furthering our ability to meet such an overwhelming demand for our services. We couldn't have done it without you!



# AAO

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# CHICAGO

Despite the cold and rain, we had a strong turn out for the 2012 AAO Alumni Reception in Chicago. The event was held at the Hotel Allegro on Sunday, November 11, 2012. The event was a great opportunity for Alumni to come together and visit with faculty, staff and current residents and fellows.

The event was attended by Alumni from the U.S. and South America. With wonderful wine from California and delicious food, all had a memorable evening.

## Page 20

- 1 *David Payne, M.D. and Mark Mannis, M.D.*
- 2 *Saadia Rashid, M.D., Karishma Chandra, Angel Hanson, and Amy Chiuu*

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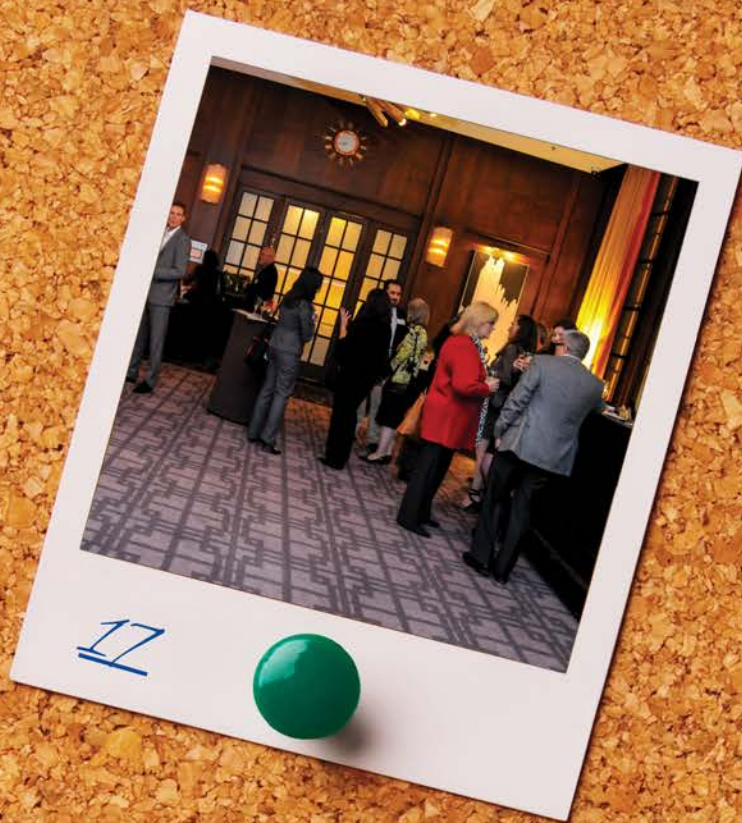
- 3 *Michele Lim, M.D. and Saadia Rashid, M.D.*
- 4 *Kim Wings M.D., Jennifer Rizzo M.D. and Linda Margulies, M.D.*
- 5 *James Brandt, M.D. and Angel Hanson*
- 6 *Alena Reznik, M.D. and Jacob Reznik, M.D.*













# CONTINUED

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- 7 Ellen Redenbo and Karishma Chandra
- 8 Nancy Keltner and John Keltner M.D.
- 9 Nandini Gandhi, M.D. and Mitul Vakharia, M.D.
- 10 Fabo Ramirez, M.D., Mark Mannis, M.D. and Linda Lopez

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- 11 Angel Hanson, Mark Greiner, M.D. and Jayme Forner
- 12 James Ruben, M.D. and Kim Wings, M.D.
- 13 Kathy Howard and Sam Ramos
- 14 Vahid Feiz, M.D., Lani Gurria-Quintana, M.D., Frank Garcia-Ferrer, M.D., and Enrique Graue, M.D.

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- 15 Yao Liu, M.D. and Allan Hunter, M.D.
- 16 Samuel Lee, M.D., Annie Baik, M.D. and Eric Chin, M.D.
- 17 Reception Lobby
- 18 Mark Mannis, M.D. and Erich Groos, M.D.

## Page 25

- 19 James Ruben, M.D., and Chris Johnson, Ph.D.
- 20 John Keltner, M.D. and Khizer Khaderi, M.D., M.P.H.

We hope to see you in New Orleans in November this year!





## WE WELCOME

OUR NEW DEVELOPMENT TEAM



### Senior DIRECTOR OF DEVELOPMENT FOR VISION AND NEUROSCIENCES

Nora Moore Jimenez joins the UC Davis Eye Center as the Senior Director of Development for Vision and Neurosciences.

At the UC Davis Health System, Nora supported the Center for Pain Medicine and Vascular Center and she was the inaugural Director of Development for the Office of Research at the Davis campus.

Nora joined UC Davis in 2001 as Director of the UC Davis CONNECT program which helped start-up companies hone their business plans and identify funding sources and she came to UC Davis with more than 20 years experience as an entrepreneurial executive with Valley Media of Woodland and Sony Music. She holds a Bachelor of Science degree in finance from the University of Central Florida.

Nora believes that the UC Davis Eye Center has the ability to realize their vision through philanthropy in a very meaningful way and she looks forward to being part of this dedicated and very capable team.



## DIRECTOR OF DEVELOPMENT FOR VISION AND NEUROSCIENCES

E. Antoinette McLean joins UC Davis Health System and the Eye Center as the Director of Development for Vision and Neurosciences.

A native of the Bay Area, Antoinette previously held a position as the Associate Director of Individual Giving for the Computer History Museum in Mountain View, California.

With over eight years of professional and volunteer fundraising experience, Antoinette looks forward to helping the talented faculty and dedicated staff of the Eye Center realize their dreams and the Department's potential.

### FOR MORE INFORMATION ABOUT BECOMING A DONOR PLEASE CONTACT

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*In Memoriam*

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William D. Gruzensky  
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## LEADERSHIP



**Mark J. Mannis, M.D., F.A.C.S.**  
Professor, Cornea, External Disease, Chair  
Research Interests: Corneal transplant technology, eye & skin diseases, and artificial corneas.



**Michele C. Lim, M.D.**  
Professor, Glaucoma  
Vice-Chair, Medical Director  
Research Interests: Glaucoma patient compliance focusing on medication adherence and drug delivery.

## GLAUCOMA



**James D. Brandt, M.D.**  
Professor, Glaucoma  
Director, Glaucoma Service  
Research Interests: Nanotechnology for innovation in glaucoma treatments.



**Annie K. Baik, M.D.**  
Assistant Clinical Professor, Glaucoma, Veterans Administration, Mather  
Research Interests: Emerging glaucoma surgical techniques, patient education.

## CORNEA, EXTERNAL DISEASE AND UVEITIS



**Ivan R. Schwab, M.D., F.A.C.S.**  
Professor Emeritus, Cornea, External Disease and Uveitis  
Director, Cornea, External Disease Service  
Research Interests: Limbal stem cell transplants and comparative anatomy.



**Francisco J. Garcia-Ferrer, M.D.**  
Associate Clinical Professor, Cornea, External Disease and Refractive Surgery, Veterans Administration, Mather  
Research Interests: New technology for refractive surgery.

# COMPREHENSIVE OPHTHALMOLOGY



**Jeffrey J. Caspar, M.D.**  
Clinical Professor,  
Comprehensive  
Ophthalmology and Refractive  
Surgery  
Director, Residency Program  
Research Interests: Cataract  
surgery after refractive surgery  
and new techniques for  
cataract extraction.



**Esther S. Kim, M.D.**  
Clinical Professor,  
Comprehensive  
Ophthalmology  
Director, Optometric  
Services  
Research Interests:  
Improvement of  
technology in cataract  
surgery.



**Michele C. Lim, M.D.**  
Professor, Glaucoma  
Vice-Chair, Medical Director  
Research Interests: Glaucoma  
patient compliance focusing  
on medication adherence and  
drug delivery.

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and professional.”**



**Jennifer Li, M.D.**  
Assistant Professor, Cornea,  
External Disease and  
Refractive Surgery  
Research Interests:  
Endothelial keratoplasty and  
keratoprosthesis surgery.



**Mark J. Mannis, M.D., F.A.C.S.**  
Professor, Cornea, External  
Disease,  
Chair  
Research Interests:  
Corneal transplant  
technology, eye & skin  
diseases, and artificial  
corneas.

## REFRACTIVE



**Jeffrey J. Caspar, M.D.**  
Clinical Professor,  
Comprehensive  
Ophthalmology and Refractive  
Surgery  
Director, Residency Program  
Research Interests: Cataract  
surgery after refractive surgery  
and new techniques for  
cataract extraction.



**Francisco J. Garcia-Ferrer,  
M.D.**  
Associate Clinical Professor,  
Cornea, External Disease and  
Refractive Surgery, Veterans  
Administration, Mather  
Research Interests: New  
technology for refractive  
surgery.

## PEDIATRICS AND ADULT STRABISMUS



**Mary A. O'Hara, M.D.,  
F.A.C.S., F.C.A.P.**  
Professor, Director, Pediatric  
Ophthalmology and  
Strabismus Service  
Research Interests:  
Development of new  
technology in pediatric  
strabismus.



**Nandini Gandhi, M.D.**  
Assistant Professor, Pediatric  
Ophthalmology and  
Strabismus  
Research Interests:  
International ophthalmology  
and curriculum development  
abroad.

## VITREO-RETINA



**Lawrence S. Morse, M.D.,  
Ph.D.**  
Professor, Vitreo-retinal  
Surgery and Uveitis  
Director, Retina Service  
Research Interests:  
Treatments for diabetic  
retinopathy, age-related  
macular degeneration and  
retinal degeneration.



**Linda J. Margulies, M.D.**  
Clinical Professor, Vitreo-  
retinal Disease, Veterans  
Administration, Martinez  
Research Interests: New  
treatments for age-related  
macular degeneration.

## OPHTHALMIC PLASTICS



**Jennifer Li, M.D.**  
Assistant Professor, Cornea,  
External Disease and  
Refractive Surgery  
Research Interests:  
Endothelial keratoplasty and  
keratoprosthesis surgery.



**Lily Koo Lin, M.D.**  
Assistant Professor,  
Oculoplastic Surgery  
Research Interests:  
Improvement of  
aging eyelids and the  
relationship between the  
orbital globe and trauma.

## NEURO-OPHTHALMOLOGY



**John L. Keltner, M.D.**  
Distinguished Professor,  
Chair Emeritus, Neuro-  
Ophthalmology Research  
Director  
Research Interests: The effects  
of multiple sclerosis (MS) and  
cancer on vision.



**Syed Khizer Khaderi, M.D.,  
M.P.H.**  
Assistant Professor,  
Neuro-Ophthalmology  
Research Interests:  
Genetic diseases of the  
optic nerve and visual  
psychophysics.



**Ala Moshiri, M.D., Ph.D.**  
Assistant Professor, Vitreo-  
retinal Surgery  
Research Interests: Genetic  
diseases of the retina.



**Susanna S. Park, M.D., Ph.D.**  
Professor, Vitreo-retinal  
Surgery  
Research Interests:  
Age-related macular  
degeneration Proton  
beam treatments, and  
stem cell therapies.

# OPTOMETRISTS



**Thomas B. Barnes,**  
O.D., M.S., F.A.A.O.  
UC Berkeley School of  
Optometry  
Senior Optometrist



**Melissa Barnett Erickson,**  
O.D., F.A.A.O.  
UC Berkeley School of  
Optometry  
Principal Optometrist



**Hai Tong, O.D.**  
University of Missouri,  
St. Louis School of  
Optometry  
Senior  
Optometrist



**Kaaryn  
Pederson-Vanbuskirk,**  
O.D., F.A.A.O.  
UC Berkeley School of  
Optometry  
Senior Optometrist



**Mark S. Goldman, Ph.D.**  
Associate Professor,  
Neuroscience  
Research Interests: Computer  
models of eye movement.



**Leonard Hjelmeland,**  
Ph.D.  
Professor, Molecular &  
Cellular Biology;  
Ophthalmology  
Research Interests:  
Senescence of retinal  
pigment epithelium.



**Brooke S. Chang, O.D.**  
UC Berkeley School of  
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Senior Optometrist



**Larisa Johnson-Tong,  
O.D., F.A.A.O.**  
UC Berkeley School of  
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Senior Optometrist

## VISION SCIENTISTS



**Marie E. Burns, Ph.D.**  
Professor, Retinal Physiology  
Research Interests: Photo  
transduction, photoreceptor  
adaptation, and protein  
movement.



**Paul FitzGerald, Ph.D.**  
Professor, Cell Biology  
and Human Anatomy  
Director, Center for  
Visual Sciences  
Research Interests: The  
role of intermediate  
filaments in the biology  
of the ocular lens.



**Andrew T. Ishida, Ph.D.**  
Professor, Neurobiology,  
Physiology, & Behavior  
Research Interests: Modulation  
of retinal ganglion cell  
excitability.



**Zeljka Smit-McBride, Ph.D.**  
Research Scientist  
Vitreoretinal Research  
Lab University of  
California, Davis  
Research Interests:  
Genomics and epigenetics  
of aging and age-related  
eye diseases, age-related  
macular degeneration and  
diabetic retinopathy.



**Christopher J. Murphy, D.V.M., Ph.D.**  
Professor, Comparative Ophthalmology  
Research Interests: Biophysical cueing and modulation of cell behaviors.



**Charles E. Thirkill, Ph.D.**  
Adjunct Professor Emeritus, Immunology & Biology.  
Research Interests: Ocular immunology, retinal and optic nerve imaging techniques.



**John S. Werner, Ph.D.**  
Distinguished Professor, Visual Psychophysics.  
Research Interests: Color and spatial vision, normal aging and age-related disease, retinal and optic nerve imaging.



**Robert J. Zawadzki, Ph.D.**  
Assistant Researcher, High Resolution Retinal Imaging.  
Research Interests: Retinal and optic nerve imaging techniques.



**Min Zhao, M.D., Ph.D.**  
Professor, Regenerative Cures.  
Research Interests: The role of endogenous electric fields to stimulate cell migration, corneal wound healing and regeneration.

## ACTUAL PATIENT QUOTE

**“Good staff – good people – good doctors.”**



# RESIDENTS AND FELLOWS



Michael C. Chen, M.D.  
Clinical Cornea Fellow



Allan A. Hunter, III, M.D.  
Clinical Retina Fellow



Yao Liu, M.D.  
Clinical Glaucoma Fellow



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



Eric Chin, M.D.  
Third Year Resident



Bobeck Modjtahedi, M.D.  
Third Year Resident



Alena Reznik, M.D.  
Third Year Resident



Jennifer Rizzo, M.D.  
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Harinderpal Chahal, M.D.  
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Roma Patel, M.D.  
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Judith Sabah, M.D., Ph.D.  
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Annamieka Leary, M.D.  
First Year Resident



Shabnam Taylor, M.D.  
First Year Resident



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



Peter Wu, M.D.  
First Year Resident

# OPTOMETRY @ STUDENT HEALTH SERVICES NOW OPEN



The UC Davis Eye Center is pleased to announce the opening of a new clinic in Davis. Located within the newly constructed Student Health Services Building, this clinic is dedicated to fulfilling the optometric eye care needs of registered UC Davis students. With a fully staffed clinic and an optical shop, we have truly developed a one-stop service that is equipped to accommodate eyeglass prescriptions, contact lenses, and basic eye ailments. This is an exciting new partnership between the Eye Center and the main campus and we are proud to serve this vibrant section of the UC Davis community!



**MELISSA BARNETT ERICKSON,  
O.D., F.A.A.O.**

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**May 17-19, 2013**

### **36<sup>th</sup> Annual UC Davis Eye Center Symposium**

Ophthalmology 2013: Are you at the top of your game?  
Napa Valley Marriott Hotel & Spa  
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**June 15, 2013**

### **UC Davis Eye Center Alumni Day**

UC Davis Education Building  
Sacramento, CA

## **Save the Date!**

**November 17, 2013**

**Alumni Reception**  
**American Academy of Ophthalmology**  
New Orleans, LA

**UC DAVIS**  
**EYE CENTER**