

ERI ANNOUNCEMENTS & COMING EVENTS

Welcoming New Members

During Fall Semester 2010 the Eye Research Institute welcomed the following ERI members, fostering new connections across the UW-Madison campus and beyond:

Members: Carol Hirschmugl, PhD (Physics; UW-Milwaukee)
Yijun Huang, PhD (Ophthalmology and Visual Sciences)
Dolores Severtson, PhD (School of Nursing)
Lalita Subramaniam, PhD (Ophthalmology and Visual Sciences)
Matthew Weed, PhD (Interim Associate Director, Wisconsin Institute for Discovery)

Associate Members: Suzanne Peyer, PhD (Medical Microbiology and Immunology)
H. Adam Steinberg, DBA (ArtforScience, community)

ERI Seminar Noon to 1:00pm, January 11

Dana Vaughan, PhD (Biology & Microbiology, UW-Oshkosh) uses the 13-lined ground squirrel to explore retinal remodeling; **Margaret McFall-Ngai, PhD** (Medical Microbiology & Immunology) studies a squid/bacterium symbiosis to discern how tissues evolved to interact with light. They will share insights as they speak about

Two unique animal model systems: contributions to vision knowledge.

Bock Labs Penthouse, 9th floor

RSVP for pizza lunch by 3:00pm Monday, January 10: gmstirr@wisc.edu

ERI Seminar Noon to 1:00pm, February 8

Gordana Raca, MD, PhD, FACMG (Pathology & Laboratory Medicine) and **D.J. Sidjanin, PhD** (Cell Biology, Neurobiology & Anatomy; Medical College of Wisconsin) will share their

Genetic approaches: understanding congenital eye anomalies and cataract.

Wisconsin Institutes of Medical Research (WIMR) Room 7001A

RSVP for pizza lunch by 3:00pm on Monday, February 7: gmstirr@wisc.edu

Advancing Poster Presentation Skills, an ERI lecture on February 18, 3:00pm

H. Adam Steinberg, former Artist & Scientist at the Department of Biochemistry, will share his 20 years of experience with effective ways to present scientific data in a poster. Attend this valuable seminar to learn the importance of clear, succinct communication, effective layout, and how to get noticed! This opportunity is for graduate students and post-docs in ERI member lab groups, as well as for ERI member faculty and staff.

Presenting Scientific Data: Posters

Friday, February 18, 3:00pm to 4:00pm

Biochemistry Addition Room 175

(First-come, first-served; room seats 50)

Building Graduate Student Opportunity: *The David G. Walsh Research Fellowship*

In recognition of ERI Advisory Board leadership and of vision research advocacy by UW Regent David G. Walsh, JD, ERI Director Dr. Daniel Albert recently announced that the ERI is establishing the *David G. Walsh Research Fellowship* for graduate research related to retina. Intended to help nurture the next generation of vision scientists, the Walsh Fellowship will initially provide funds for a graduate student to attend a research conference to present work and to advance educational and professional development opportunities. Over time, intent is to grow the Fellowship to provide a full stipend to support a selected Walsh Fellow as he/she progresses throughout their research program. In Spring Semester of 2011, one graduate student will be selected to receive a \$1,000 travel award to attend and present work at a professional conference/symposium. Application information will be available in late January.

FACULTY, STAFF & AFFILIATE ACCOMPLISHMENTS

Prestigious Packard Fellowship Award May Advance Vision Restoration

Li Zhang (Computer Sciences) has been chosen by the Packard Foundation as a 2010 recipient of the prestigious Packard Fellowship in Science and Engineering, providing an unrestricted research grant of \$875,000 over five years. Created by David Packard, co-founder of the Hewlett-Packard Company, the Packard Fellowship Program was designed to seek out and reward the pursuit of creative engineering and scientific research with minimal constraints on funding use to carry out the research. Dr. Zhang, one of just 17 recipients nationally, will dedicate funds to developing techniques to sense and interpret visual, audio and EMG data in order to restore 3D vision for blind people by developing new computational imaging and vision techniques that work with artificial retinas.

Shakhashiri Elected to Lead the American Chemical Society

Bassam Shakhashiri (Chemistry), a noted teaching and science education policy advocate, has been voted president-elect of the American Chemical Society (ACS), the largest scientific organization in the world, and will begin a three-year term of service on the ACS board this January. Founder of the Wisconsin Initiative for Science Literacy, which fosters programs exploring the interfaces between science and the arts, humanities, ethics, the economy, and health, Dr. Shakhashiri hopes to serve ACS by promoting initiatives supporting research, science education, and science communication—energizing scientists to share the joy, importance and consequences of their discoveries.

RESEARCH NEWS

Mirror Image: Monkeys See and Recognize “Self”

A study conducted by **Luis Populin** (Anatomy) and published in the online public Library of Science journal PLoS ONE recounts the first demonstration that any monkey has a degree of self-awareness. Typically, monkeys do not know what to make of a mirror: they generally ignore it or interpret their reflection as being another monkey, failing to recognize the reflection as their own image. Along with humans, some chimpanzees and orangutans have been shown to recognize a temporary mark placed on their faces, demonstrating self-awareness; but monkeys have consistently failed this mark test, instead exhibiting social responses to mirror images as if they were other monkeys. Detailed in the article “Rhesus monkeys (*Macaca mulatta*) do recognize themselves in the mirror: implications for the evolution of self-recognition,” results show that under specific conditions rhesus monkeys showed consistent self-directed behaviors in front of a mirror which did not take place absent the mirror. In stark contrast with past reports, the rhesus monkeys in this study—prepared for electrophysiological recordings with a head implant—seemed to overcome gaze aversion or lack of interest in order to look at and examine themselves near the implant in front of the mirror. Dr. Populin hypothesizes that the head implant, a clearly prominent mark, was the catalyst in their looking behavior, demonstrating that rhesus monkeys do have some sense of “self” and supporting the idea of an evolutionary continuity of mental functions in the primate lineage. [Rajala AZ, Reininger KR, Lancaster KM, Populin LC. PLoS ONE. 2010 Sep 29;5(9). pii: e12865.]

Modulating Bim Protein May Protect Retinal Vasculature in Newborns

Advancing our understanding of the process of retinal blood vessel growth in newborns, **Christine Sorenson** (Pediatrics) describes how lack of bim, a protein that induces cell death, impacts development of the retinal vasculature. Her article in *Developmental Biology*, entitled “Bim is responsible for the inherent sensitivity of the developing retinal vasculature to hyperoxia,” recounts work in a mouse model demonstrating that in the absence of bim, the retina does not undergo loss of blood vessels when exposed to high oxygen and did not undergo abnormal neovascularization upon return to room air. Instead, retinal vessel formation proceeded normally. The retinal vasculature exhibits an inherent sensitivity to fluctuations in oxygen levels, predisposing the developing retina to retinopathy of prematurity (ROP) and loss of vision in premature infants. Current treatments are focused on prevention of neovascularization and do not address the underlying cause. But Dr. Sorenson notes that these studies establish a framework for future identification of modalities for modulation of bim expression and/or activity, toward alleviating blindness in premature infants exposed to high oxygen levels. [Wang S, Park S, Fei P, Sorenson CM. Dev Biol 2010 Nov 1. Epub ahead of print.]

Healthy Lifestyle Factors Reduce Risk for Age-Related Macular Degeneration

A team of investigators across the country, led by ERI members **Julie Mares** and **Barbara Blodi** (Ophthalmology and Visual Sciences), studied women who participated in the Women’s Health Initiative Observational Study and noted that having a combination of three healthy behaviors (healthy diet, physical activity, and not smoking) reduced risk for early age-related macular degeneration (AMD) by as much as three-fold when compared with those who had unhealthy lifestyles, lowering risk for advanced AMD in a person’s lifetime as well as the social and economic costs associated with treating it. Dr. Mares has just received funding from the National Eye Institute to further examine whether the likelihood of having AMD among people with healthy diets and lifestyles is stronger among women who have high-risk genetic traits. As co-principal Investigator with Dr. Sudya Iyengar of Case Western Reserve, Dr. Mares will also team with Dr. Blodi to investigate genetic predictors of high levels of plant pigments in the retina (thought to protect against AMD) and genetic predictors of high vitamin D status (related to lower risk for AMD in a previous study). They hope to learn how to enable those who have a family history of macular degeneration to lower their risk of getting the condition in

later life. [Mares JA, Volland RP, Sondel SA, Millen AE, Larowe T, Moeller SM, Klein ML, Blodi BA, Chappell RJ, Tinker L, Ritenbaugh C, Gehrs KM, Sarto GE, Johnson E, Snodderly DM, Wallace RB. Healthy lifestyles related to subsequent prevalence of age-related macular degeneration. Arch Ophthalmol. 2010 Dec 13. Epub ahead of print.]

Resveratrol Findings Promising for Future, Non-toxic Chemotherapeutics

In the December issue of *Clinical Cancer Research*, **Arthur Polans** (Ophthalmology and Visual Sciences) describes a natural, non-toxic plant product, resveratrol, and its use for the treatment of ocular tumors and other types of cancer. Clinical trials sponsored by the National Cancer Institute recently demonstrated a significant anti-cancer effect in colorectal cancer patients supplemented with resveratrol. Dr. Polans has worked on determining the compound's mechanism of action, with particular attention to increasing its bioavailability and thereby transforming resveratrol from a chemopreventive agent to a bona fide therapeutic. The Polans lab has determined that resveratrol enters tumor cells and activates both a rapid calcium signal that may be tied to changes in transcription and protein synthesis, as well as an effect on the mitochondria, the energy-producing organelles of the cell, culminating in tumor cell death. Resveratrol has a differential effect between cancer and normal cells, and the Polans lab has shown that normal cells do not respond to resveratrol by generating calcium signals. Similar findings have been made using other non-toxic natural products such as green tea (EGCG) and quercetin, and calcium signaling may form the basis for improved targeted therapy in cancer patients. Dr. Polans hopes that by understanding the mechanism by which resveratrol specifically activates tumor cell death, a new generation of non-toxic chemotherapeutics can be developed and used either as an alternative to some current but toxic chemotherapeutic compounds or during various maintenance protocols to reduce chemoresistance or the recurrence of tumors. [Subramanian L, Youssef S, Bhattacharya S, Kenealey J, Polans AS, van Ginkel PR. Resveratrol: challenges in translation to the clinic—a critical discussion. Clin Cancer Res. 2010 Dec 15;16(24):5942-8. Epub 2010 Nov 2.]

We invite your feedback on this newsletter for the ERI membership.
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About ERI InSights

The UW Eye Research Institute will distribute *InSights* every other month. Its purpose is to build ERI community, advancing member connections and collaborations by sharing research and educational activities as well as member accomplishments and honors (including those of their lab associates and students). We welcome news of research advances, scholarly publications, grant awards, educational and professional honors, available lab positions, or shared equipment/services. If you have an item you wish to submit for possible inclusion, please send it to Gail Stirr at gmstirr@wisc.edu