

## **ERI UPDATES/ANNOUNCEMENTS**

### **Vision Roundtables Ongoing**

Organized and moderated by the ERI Research Committee, four focused, ERI-member roundtable discussions have been scheduled during Spring Semester. Sixteen members have gathered around the themes “Vision and Motor Control (natural & artificial)” and “Diseases of the Eye (cancers, genetic, vascular)” to share their respective research interests, to talk of current and hoped-for collaborative opportunities, and to suggest resource possibilities, space, and equipment connections to link their work. Roundtables focused on “Developmental Biology of the Eye” and “Ocular Cell Biology” will be held in the next two months, with anticipated involvement by another sixteen ERI members. These chances for members from varied disciplines to meet have been quite positive, and the committee intends to organize additional roundtable discussions in the next semester.

### **Vision-Related Course List Compiled**

The ERI Education Committee has compiled a list of UW-Madison courses with vision-related content. Courses included are from visual science and visual arts disciplines, and incorporate a wide-ranging scope of vision focus. It is hoped that this list will serve as a useful tool for faculty advisors and for students interested in exploring vision-related electives or concentrations. While most courses hold limited vision-specific content (i.e., only one or two class sessions), some do afford in-depth concentration. The list can be accessed on the ERI website: <http://vision.wisc.edu/courses.html>

### **ERI Committee Service**

The Research Committee, Education Committee, and Outreach Committee are each seeking additional members. If you are interested in serving with one of these groups, please contact Gail Stirr for information: [gmstirr@wisc.edu](mailto:gmstirr@wisc.edu)

## **COMING EVENTS**

### **ERI Seminar Noon to 1:00pm, April 13**

**Aki Ikeda, DVM, PhD** (Medical Genetics) and **Gillian McLellan, PhD, DACVO** (Surgical Sciences, VetMed; Ophthalmology & Visual Sciences) will discuss their respective research work with “Animal models of eye diseases: mouse/retinoschisis, feline/glaucoma” at Clinical Science Center G5/134.

RSVP for pizza lunch by Monday, April 12: [gmstirr@wisc.edu](mailto:gmstirr@wisc.edu)

\*Full Spring Semester Seminar Schedule: <http://vision.wisc.edu/seminars.html>

### **ERI Seminar Noon to 1:00pm, May 11**

**Michael Gleicher, PhD** (Computer Sciences) and **Matthew Rarey, PhD Candidate** (Art History, Center for Visual Cultures) will bring varied perspectives alive discussing “Perception and visualization: computer pictures and neuro-aesthetics.” Gleicher will talk about understanding perception to make better pictures, and Rarey will tell of meta-neuro-aesthetics and the ‘revenge’ of neuroanatomy pioneer Ramon y Cajal. Come to Room 1360 Genetics/Biotechnology Building on Henry Mall.

RSVP for pizza lunch by Monday, May 10: [gmstirr@wisc.edu](mailto:gmstirr@wisc.edu)

### **Register to Attend the ERI Outreach Event at Henry Vilas Zoo!**

On Sunday, May 23, 2010 (9:00am to 11:00am), join Zoo staff and ERI members **Dick Dubielzig, DVM** and **Ellison Bentley, DVM** for a program called ***Vision at the Zoo: A Bird's Eye View***. Adults and accompanied children are invited to meet an owl, penguin and macaw and learn about their eyes. Advance registration is required. Additional detail is available at the ERI website: <http://vision.wisc.edu/events.html> or by calling Gail Stirr at 265-4023.

### **2010 Midwest Eye Research Symposium**

Organized to provide a forum primarily for graduate students and postdocs to present vision related research, this daylong symposium at the University of Iowa will take place on Friday, June 25, 2010. Meeting registration and abstract submission are due by May 28, 2010. Encourage your students to register to present short talks and posters or simply to attend. Help bring the UW Eye Research Institute to the attention of the Midwest!

<http://webeye.ophth.uiowa.edu/eig//MERS.html>

## **FACULTY, STAFF & AFFILIATE ACCOMPLISHMENTS**

### **Sloan Research Fellowship Earmarks Excellence**

**Li Zhang** (Computer Sciences) is among 118 young American and Canadian faculty members selected to be Alfred P. Sloan Research Fellows in 2010-11. Intended to advance the work of exceptional researchers early in their academic careers, these two-year fellowships recognize distinguished performance and a unique potential to make substantial contributions to their field, providing \$50,000 of financial support to further research aims and inquiry. Zhang is a specialist in construction and analysis of computer vision, graphics and animation. He has studied how to stabilize images taken from several viewpoints, developing a novel multi-view 'denoising' algorithm that enhances image clarity through grouping multiple image inputs in a way that simplifies the complexity of image structures.

### **Forward under 40 Award Recognizes Artist/Scientist**

**Ahna Skop** (Medical Genetics) has been selected as a 2010 *Forward under 40* honoree by the Wisconsin Alumni Association (WAA). This annual award recognizes UW graduates under the age of 40, who are making an impact on the world by living the Wisconsin Idea. Skop has been very active in recruiting minority students to science and connecting them to laboratory opportunities. While her research has expanded our understanding of cell division and cell polarity, she is also well known for her art. Her efforts to unite art and science find expression through the striking images she captures through microscopes. You may have seen some of her work in the exhibit "Tiny: Art From Microscopes at UW-Madison," which has graced the Dane County Regional Airport since last April and demonstrates that scientifically meaningful images can double as extraordinarily intriguing artwork. Skop and other award recipients are featured in a March WAA publication entitled *Forward under 40*.

### **Graduate Student Selected as a UW-Madison Outstanding Woman of Color**

**Idella Yamben**, a Cellular & Molecular Biology Program (CMB) trainee and research assistant under **Anne Griep** (Anatomy), has been chosen as one of six women of color students, faculty and staff to be recognized in 2009-10. The UW-Madison Outstanding Women of Color Awards were created in 2007 to honor contributions and service to the community. Yamben was nominated for her work in forming the CMB Diversity Committee in 2005 and has since introduced Creating Excellence in Leadership in Science (CELS), a novel mentoring program for undergraduate minority students in the biological sciences at UW.

## **RESEARCH NEWS**

### **BrainPort Device Sparks Interest & Study**

ERI member **Aimee Arnoldussen**, a research neuroscientist at Wicab, Inc. (a biomedical company based in Middleton, Wisconsin), was invited to San Antonio, Texas to present Wicab's BrainPort vision device research at Ophthalmology Grand Rounds held jointly by the University of Texas, Wilford Hall USAF Medical Center, and Brooke Army Medical Center. Arnoldussen provided a demonstration of the technology and shared data of BrainPort vision device performance. This remarkable mechanism uses the tongue to stimulate the visual cortex, providing tactile information that the brain in turn recognizes as visual information. A current study at the University of Pittsburgh Medical Center is testing the BrainPort device with a cohort of blinded veterans, and military interest is high in this tool to give visually impaired and blinded individuals a functional mode of visual information. Arnoldussen and the BrainPort device were featured in the Summer 2008 issue of the ERI *Point of View* newsletter, "On the Tip of Your Tongue."

### **Nanostructure Cues Influence Cell Behaviors**

According to **Paul Nealey** (Chemical & Biological Engineering) and **Chris Murphy** (Surgical & Radiological Sciences, VetMed, UC-Davis), understanding the effects of nanostructured surfaces on corneal cell behavior is essential to the design of improved synthetic corneal implants. The physical environment on which corneal epithelial cells reside is comprised of very small (nanometer sized) fibrous structures. Understanding how the physical environment influences cell behaviors will allow scientists to incorporate the most significant physical cues into the design of corneal prostheses. Nealey and Murphy recently fabricated features that replicate the sizes found in the native environment of the corneal epithelium and show that human corneal epithelial cells respond to features that are approximately 1000 times smaller than the size of a typical cell. The discovery is reported in "The ability of corneal epithelial cells to recognize high aspect ratio nanostructures," *Biomaterials*, Feb 10 2010 [Epub ahead of print].

### **Grant Supports Safety Training for the Blind & Visually Impaired**

In his position as Director of Vision Rehabilitation for the Wisconsin Council of the Blind and Visually Impaired, **Marshall Flax** is implementing a new project funded by the Wisconsin Department of Transportation. Flax will run the first Wisconsin workshop to provide training to orientation and mobility (O&M) specialists in teaching blind and visually impaired persons to cross streets at traffic roundabouts. The advent of roundabouts in Wisconsin has presented new challenges to blind pedestrians and to O&M instructors, as the sound patterns of vehicle stops and starts no longer exist to guide crossing decisions. O&M specialists from around the state will train on site at a Milwaukee roundabout in April, and will then share new navigation strategies with blind and visually impaired pedestrians in their own communities. Flax will also be collaborating with the DOT to develop a public education campaign promoting driver awareness and pedestrian safety.

## Neuron Noise Informs Decisions

Research by **Michele Basso** (Physiology) may impact the way neuroscientists consider how the brain encodes information about making decisions and choices regarding where to direct the eyes. Studying non-human primate eye movements as a means to understand cognitive processes, Basso employed three statistical models to gain insight into how the brain pools neuronal activity and determines action. Her finding, that eye movement choice from populations of neurons may be best understood and predicted within a probability-based framework, is remarkable in that it suggests that the brain pools together all the activity of the brain cells—incorporating all the variable, or “noisy,” electrical signals of the individual neurons to make the most accurate choice. In her article “A probabilistic strategy for understanding action selection,” published in the February 2010 issue of the *Journal of Neuroscience*, Basso provides evidence that noise might help the brain to compose a richer contextual picture and to make better decisions. This work may explain why human brains do much better than computers when tasks involve uncertainty and information of unknown reliability, as our brains incorporate the noise that computers do not include. This may also explain why patients with Parkinson’s disease benefit from deep brain stimulation therapy, which introduces electrical impulses that may include just the right amount of noise for the brain to re-compute a desired action.

## Integrin Signaling in Glaucoma

Alterations in the deposition of the extracellular matrix proteins (important for the maintenance of tissue architecture and for supporting a variety of cellular processes) have long been associated with glaucoma. In a paper soon to appear in *Experimental Cell Research*, co-authors **Donna Peters** (Pathology & Laboratory Medicine), **Nader Sheibani** and **Paul Kaufman** (Ophthalmology & Visual Sciences) show that a particular signaling pathway ( $\alpha4\beta1$  integrin) that controls the contractile properties of the trabecular meshwork tissue in the eye and regulates intraocular pressure is influenced by the composition of the extracellular matrix. Changes in the composition of the extracellular matrix switch the signaling partner used by  $\alpha4\beta1$  integrins, thereby altering the contractile properties that regulate intraocular pressure. This study shows that an imbalance in the extracellular matrix could contribute to glaucoma, and that identifying the receptors activated by these matrix changes could offer new therapeutics for glaucoma.

Titled “Heparin II domain of fibronectin mediates contractility through an  $\alpha4\beta1$  co-signaling pathway,” the article is also co-authored by MK Schwinn, JM Gonzalez, and BT Gabelt. 2010 Mar 16. [Epub ahead of print].

## New Textbook Correlates Basic Science & Clinical Management

Edited by **Leonard Levin** and **Daniel Albert** (Ophthalmology & Visual Sciences) and just released by Elsevier, the textbook *Ocular Disease: Mechanisms and Management* was designed to serve as a companion volume to the classic *Adler’s Physiology of the Eye* (10th edition edited by **Paul Kaufman**). Levin and Albert recruited as contributors the most experienced authorities available in each of the major areas of ophthalmic disease including retina, cornea, cataract, glaucoma, uveitis, and neuro-ophthalmology. The text fosters practical understanding of the science behind eye disease and its relation to disease treatment and management.

## NEW PUBLICATIONS/CURRENT LITERATURE

These are among recent publications by ERI members. Please send us your citations for inclusion in future newsletters.

McIntosh BE, Hogenesch JB, **Bradfield CA**. Mammalian Per-Arnt-Sim proteins in environmental adaptation. *Annu Rev Physiol*. 2010 Mar 17;72:625-45.

Ambrosius WT, **Danis RP**, Goff DC Jr, Greven CM, Gerstein HC, Cohen RM, Riddle MC, Miller ME, Buse JB, Bonds DE, Peterson KA, Rosenberg YD, Perdue LH, Esser BA, Seaquist LA, Felicetta JV, Chew EY; ACCORD Study Group. Lack of association between thiazolidinediones and macular edema in type 2 diabetes: the ACCORD eye substudy. *Arch Ophthalmol*. 2010 Mar;128(3):312-8.

White NH, Sun W, Cleary PA, Tamborlane WV, **Danis RP**, Hainsworth DP, Davis MD. Effect of prior intensive therapy in type 1 diabetes mellitus on 10-year progression of retinopathy in the DCCT/EDIC: comparison of adults and adolescents. *Diabetes*. 2010 Feb 11. [Epub ahead of print]

Domalpally A, **Danis RP**, Myers D, Kruse CN. Quantitative analysis of the Stratus optical coherence tomography fast macular thickness map reports. *Indian J. Ophthalmol*. 2010 Mar-Apr; 58(2): 131-6.

Schober CS, Labelle P, **Dubielzig RR**. Feline conjunctival melanoma: histopathological characteristics and clinical outcomes. *Vet Ophthalmol*. 2010 Jan;13(1):43-6.

Nikodemova M, Lee J, Fabry Z, **Duncan ID**. Minocycline attenuates experimental autoimmune encephalomyelitis in rats by reducing T cell infiltration into the spinal cord. *J Neuroimmunol*. 2010 Feb;219(1-2):33-7. Epub 2010 Jan 25.

Lu B, Wang S, Francis PJ, Li T, **Gamm DM**, Capowski EE, Lund RD. Cell transplantation to arrest early changes in an *ush2a* animal model. *Invest Ophthalmol Vis Sci*. 2010 Apr;51(4):2269-76. Epub 2009 Dec 3.

**Guo LW**, Hajjipour AR, **Ruoho AE**. Complementary interactions of the rod PDE6 inhibitory subunit with the catalytic subunits and transducin. *J Biol Chem*. 2010 Mar 19. [Epub ahead of print]

Verdoni AM, **Ikeda S**, **Ikeda A**. Serum response factor is essential for the proper development of skin epithelium. *Mamm Genome*. 2010 Feb;21(1-2):64-76. Epub 2010 Jan 3.

Scott CJ, Seidler EA, **Levin LA**. Cell-autonomous generation of mitochondrial superoxide is a signal for cell death in differentiated neuronal precursor cells. *Brain Res*. 2010 Jan 8;1306:142-8. Epub 2009 Oct 9.

Thompson AF, **Levin LA**. Neuronal differentiation by analogs of staurosporine. *Neurochem Int*. 2010 Mar;56(4):554-560. Epub 2010 Jan 4.

**Mason AH**, Bruyn JL, Lazarus JA. Bimanual coordination in children: manipulation of object size. *Exp Brain Res*. 2010 Apr;201(4):797-807. Epub 2009 Dec 2.

**McFall-Ngai MJ**, Nyholm SV, Castillo MG. The role of the immune system in the initiation and persistence of the *Euprymna scolopes*—*Vibrio fischeri* symbiosis. *Semin Immunol*. 2010 Feb;22(1):48-53. Epub 2009 Dec 24.

Wier AM, Nyholm SV, Mandel MJ, Massengo-Tiassé RP, Schaefer AL, Koroleva I, Splinter-Bondurant S, Brown B, Manzella L, Snir E, Almabrazi H, Scheetz TE, Bonaldo Mde F, Casavant TL, Soares MB, Cronan JE, Reed JL, Ruby EG, **McFall-Ngai MJ**. Transcriptional patterns in both host and bacterium underlie a daily rhythm of anatomical and metabolic change in a beneficial symbiosis. *Proc Natl Acad Sci USA*. 2010 Feb 2;107(5):2259-64. Epub 2010 Jan 19.

Agarwal A, Weis TL, Schurr MJ, Faith NG, Czuprynski CJ, McAnulty JF, **Murphy CJ**, Abbott NL. Surfaces modified with nanometer-thick silver-impregnated polymeric films that kill bacteria but support growth of mammalian cells. *Biomaterials*. 2010 Feb;31(4):680-90. Epub 2009 Oct 28.

Ji S, Liu CC, Liu G, **Nealey PF**. Molecular transfer printing using block copolymers. *ACS Nano*. 2010 Feb 23;4(2):599-609.

Detcheverry FA, Pike DQ, **Nealey PF**, Müller M, de Pablo JJ. Simulations of theoretically informed coarse grain models of polymeric systems. *Faraday Diss*. 2010;144:111-25; discussion 203-22, 467-81.

**Nickells RW**. Variations in the rheostat model of apoptosis: What studies of retinal ganglion cell death tell us about the functions of the Bcl2 family proteins. *Exp Eye Res*. 2010 Mar 15. [Epub ahead of print]

Lee ES, Gabelt BT, Faralli JA, **Peters DM**, **Brandt CR**, **Kaufman PL**, Bhattacharya SK. COCH transgene expression in cultured human trabecular meshwork cells and its effect on outflow facility in monkey organ cultured anterior segments. *Invest Ophthalmol Vis Sci*. 2010 Apr;51(4):2060-6. Epub 2009 Nov 20.

Acheson DJ, **Postle BR**, Macdonald MC. The interaction of concreteness and phonological similarity in verbal working memory. *J Exp Psychol Learn Mem Cogn*. 2010 Jan;36(1):17-36.

Feredoes E, **Postle BR**. Prefrontal control of familiarity and recollection in working memory. *J Cogn Neurosci*. 2010 Feb;22(20):323-30.

Johnson JS, Hamidi M, **Postle BR**. Using EEG to explore how rTMS produces its effect on behavior. *Brain Topogr*. 2010 Jan;22(4):281-93. Epub 2009 Nov 14.

Mavlyutov TA, Epstein ML, Anderson KA, Ziskind-Conhaim L, **Ruoho AE**. The sigma-1 receptor is enriched in postsynaptic sites of C-terminals in mouse motoneurons. An anatomical and behavioral study. *Neuroscience*. 2010 Feb 16 [Epub ahead of print]

Tang Y, Scheef EA, Gurel Z, Sorenson CM, Jefcoate CR, **Sheibani N**. CYP1B1 and endothelial nitric oxide synthase combine to sustain proangiogenic functions of endothelial cells under hyperoxic stress. *Am J Physiol Cell Physiol*. 2010 Mar;298(3):C665-78. Epub 2009 Dec 23.

Lipinski J, **Simmering VR**, Johnson JS, Spencer JP. The role of experience in location estimation: Target distributions shift location memory biases. *Cognition*. 2010 Apr;115(1):147-53. Epub 2010 Feb 8.

Tollin DJ, McClaine EM, **Yin TC**. Short-latency, goal-directed movements of the pinnae to sounds that produce auditory spatial illusions. *J Neurophysiol*. 2010 Jan;103(1):446-57. Epub 2009 Nov 4.

**We invite your feedback on this newsletter for the ERI membership.  
Please respond with comments at: [InSights Feedback](#)**

### 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](mailto:gmstirr@wisc.edu)

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