

UPSTATE
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Outlook

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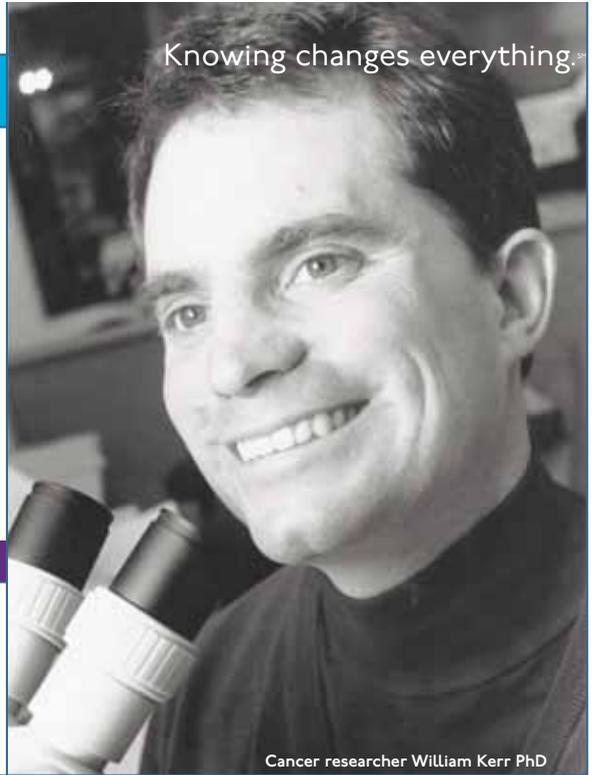
The Picture of Health

Keeping Central New York healthy includes keeping kids active, especially kids like Matthew, whose health issues make exercise a challenge. A pilot exercise program at Upstate's Institute for Human Performance — and a new master's degree in public health — underscore Upstate's faith in the power of public health initiatives. See page 8.

Matthew, left, with
"Coach" Luis
Columna



Vision researcher
Francesca Pignoni PhD



Cancer researcher William Kerr PhD



Diabetes researcher George Holz PhD

Brain Gain

Empire Scholars Enrich Upstate's Research Faculty

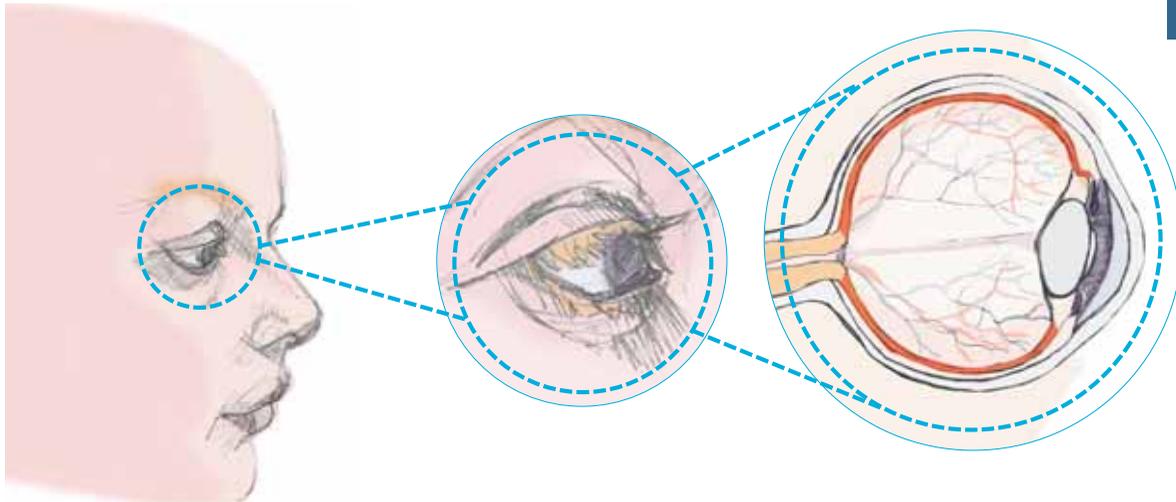
As a result of SUNY's Empire Innovation Program — aimed at attracting the country's most talented faculty researchers to SUNY — Upstate will soon have a trio of "Empire Scholars" in its research enterprise.

Diabetes researcher George Holz PhD, Upstate's first Empire Scholar, joined the faculty more than a year ago. Cancer researcher William Kerr PhD arrived this spring from the Moffitt Cancer Center in Florida. Expected this summer is Francesca Pignoni PhD from the Harvard University Medical Center.

Holz studies the beneficial effects of "incretin mimetics" in the treatment of type 2 diabetes. Mimetics are a class of blood glucose-lowering agents that mimic the action of a natural hormone (GLP-1) and stimulate the secretion of insulin from the pancreas. Unlike administered insulin, these mimetics are less likely to produce hypoglycemia, or abnormally low blood sugar.

According to Vice President for Research Steven Goodman PhD, Kerr is "a true joint hire" with appointments in the departments of Microbiology & Immunology and Pediatrics. He has more than \$3.8 million in NIH grant funding and was the Newman Scholar of the Leukemia and Lymphoma Society. Kerr studies the role of genes in the function of blood-forming (hematopoietic) stem cells and the role of a novel gene (LRBA) in cancer cells, in particular breast cancer and immune cells.

Pignoni, who will join the Center for Vision Research, holds NIH-funded grants totaling more than \$3 million. "Her research holds promise in better understanding the causes of retinal diseases such as macular degeneration and related conditions," says Robert Barlow PhD, professor and director of the Center for Vision Research in Upstate's Department of Ophthalmology.



Full Speed Ahead

Center for Vision Research Exemplifies Upstate's Team Approach

Already one of SUNY Upstate's success stories, the Center for Vision Research isn't about to stop now. "We never take our foot off the gas," says director Robert Barlow PhD, professor of ophthalmology. "We distinguish ourselves by the quality of the research."

The Center for Vision Research (CVR) has built a reputation as a leader in blinding diseases research. Since its founding in 1997, it has brought more than \$17.5 million to SUNY Upstate from public and private funding sources.

"People recognize that this place is growing in its research and that our stature is growing nationally and internationally," says Peter Calvert, a CVR researcher. "We're in a very healthy position to continue growing. Bob Barlow and Barry Knox are great scientists in their own right, and their interactions with people have put this place on the map. They built this Center, along with Ophthalmology Chair Dr. John Hoepner, who has been incredibly supportive."

The Center concentrates on diseases of the retina, the membrane at the back of the eye that senses light and sends impulses through the optic nerve to the brain. Researchers in the Center have different areas of expertise, and collaborate often on projects and publications. SUNY Upstate's vision researchers work as well with other vision scientists throughout the world.

"Seldom do you get a real diverse group of researchers like these, who have a common goal," says CVR member Michael Zuber. "Because of that, we all get along very well and understand each other. We're all trying to understand vision, retinal development and what goes wrong when vision is lost."



Robert Barlow PhD, professor of ophthalmology

Those efforts benefit from having Barlow, an internationally known figure in vision research, at the helm.

As a scientist, Barlow has broken new ground in such areas as the roles that blood sugar and biological clocks play in vision. He's made these discoveries by working with horseshoe crabs, Japanese quail, mice and even Air Force pilots.

As CVR's director, Barlow has been able to attract Nobel laureates and other prestigious guest lecturers to Upstate.

"Their visits have made a world of difference for young faculty," Zuber reports. "It's also a fantastic environment for students."

On the following pages, a look at the Center for Vision Research scientists and their work under Barlow.

Center for
Vision Research

Retina- Focused Researchers Find Common Ground

**Peter Calvert PhD,
Assistant Professor
of Ophthalmology**



When he began studying the visual system, Peter Calvert was astounded by the sensitivity and sophistication of the eye.

The retina contains millions of photoreceptors, either rods (nighttime vision) or cones (color recognition and light intensity sensors). Rod photoreceptors are remarkably sensitive. They can respond to a single photon, or light particle.

“Perhaps because of that sensitivity, rods are prone to problems that arise from mutations in genes that encode proteins responsible for sensing light,” Calvert explains.

By studying those proteins with a special microscope he helped develop, Calvert wants to determine how those genetic mutations ultimately lead to retinal degeneration and loss of sight.

“To alleviate suffering is incredibly important from the human side of this,” he says. “But we absolutely know we wouldn’t be able to understand disease if we didn’t understand how these things work in the first place.”

**Barry Knox PhD,
Professor of Biochemistry
& Molecular Biology**



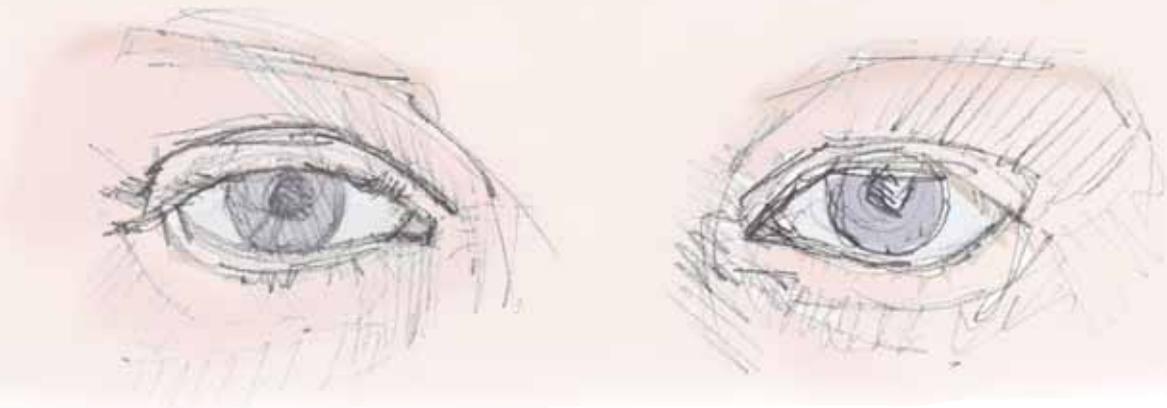
Barry Knox became interested in the retina as a post-doctoral fellow at MIT in the late 1980s when he read research papers on light-sensitive proteins.

“The thing that really got me interested,” Knox remembers, “was the basic question, ‘How do these cells absorb light and respond to it?’”

Knox has been probing that basic question ever since. Along the way, he has built an international reputation in part by pioneering the use of “transgenic” frogs (adapted frog embryos) to identify and study genetic mutations and how they relate to eye disease.

Knox, who came to SUNY Upstate in 1990, also is helping to develop the next generation of vision researchers by mentoring younger faculty members, post-doctoral fellows and graduate students.

“The things that really moved me as a young researcher, we’re doing now,” he said. “I can see that we’ll get to some of these answers.”



**Eduardo Solessio PhD,
Assistant Professor of Ophthalmology**

Eduardo Solessio’s original scientific interest was in prosthetic devices for the arm, and how they could be controlled. But his interest shifted to the eye when he studied neuroscience for his doctorate at Syracuse University.

Solessio’s research includes a study showing Vitamin A deprivation not only decreases light absorption in the eye but causes changes in the rods and cones resulting in metabolic stress on cells.

“To cope with the lack of pigmentation, the cell needs to consume a lot more energy to respond,” Solessio says.

His next study deals with diabetic retinopathy, a leading cause of blindness in American adults. It is caused by changes in the blood vessels of the retina brought about by diabetes. Solessio hopes to determine the connection between inflammatory factors and abnormal metabolism that may contribute to the disease.



“We’re very diverse in our approaches and interests, but what brings us together is the desire to solve these problems. The diversity is the key to our success.” – Michael Zuber

**Andrea Viczian PhD,
Assistant Professor
of Ophthalmology**

Andrea Viczian didn’t plan to be a research scientist studying the eye. “I started out as an artist, and one of the worst things I could possibly imagine was losing your vision,” she says.



But Viczian pursued her PhD in neuroscience at UCLA, and became intrigued by how the eye receives images and colors and sends signals to the brain. She is investigating how embryonic cells in the developing retina become either rod cells or cone cells, and how to replace those cells when they die.

“Our goal,” Viczian says of the CVR, “is to be nationally recognized as a top-tier eye research group.”

Viczian and Michael Zuber are part of the Retinal Stem Cell Consortium, an international collection of vision scientists that includes a MacArthur “Genius Award” Fellowship winner, Sally Temple, who heads the New York Neural Stem Cell Institute in Albany.

**Michael Zuber PhD,
Assistant Professor
of Ophthalmology**

Michael Zuber studies the coordinated action of seven genes that work together to generate retinal stem/progenitor cells and, ultimately, the eye.



Working with frog retinas, which are similar to human retinas in many respects, Zuber has induced a third eye to grow in a frog embryo.

Doing so provides a powerful tool for identifying the genes needed to produce retinal stem/progenitor cells. Zuber’s goal is to understand how the normal eye develops and to decipher what goes wrong in genetic disorders that result in abnormal eye formation.

“It’s like a puzzle,” Zuber said of retinal formation and function. “My place is to figure out how all the pieces work together.” ■

–James McKeever