



**RICHARD AND LOAN HILL  
DEPARTMENT OF  
BIOENGINEERING**

**CHICAGO'S**  
*bridging engineering & medicine through*  
**PUBLIC RESEARCH**  
*academic & research affiliations in a world class city*  
**UNIVERSITY**

# Newsletter

**Fall 2017**

## 13 **Top Story**

| *New Degree*

| *Bachelor of Science in Bioinformatics*

## 6 **Investiture**

| *Ian Papautsky*

| *Xincheng Yao*





Back Row (L to R): Ian Papautsky, Robert Barish (Vice Chancellor for Health Affairs), Pete Nelson (Dean, College of Engineering), Dimitri Azar (Dean, College of Medicine), Tom Royston (Head of Bioengineering)  
Front Row (L to R): Loan Hill, Richard Hill, Xincheng Yao



Photo upper (L to R): Hua Gao, Ian Papautsky, Prithviraj Mukherjee, Jian Zhou  
Photo below: Vice Chancellor Robert Barish officially awards professorship to Xincheng Yao.

## Hill Professorships Now Total Six

On September 18, 2017, the College of Engineering and College of Medicine jointly celebrated the investitures of professors Ian Papautsky, PhD, and Xincheng Yao, PhD, as the new Richard and Loan Hill Professors. Papautsky and Yao are now two of six professors endowed by Richard (BS '74) and Loan Hill.

Having both joined the College in recent years, Papautsky and Yao bring expertise to their respective research areas in the Richard and Loan Hill Department of Bioengineering. Papautsky's lab develops microfluidic systems and point-of-care sensors. These devices, aimed at improving public health and safety, have applications in sorting complex cell mixtures for biopsies or blood analyses and measuring exposure levels in humans to heavy metals like lead and manganese. Papautsky also serves as the co-director of the NSF industry/university cooperative called the Center for Advanced Design and Manufacturing of Integrated Microfluidics.

Yao, with a joint appointment in the Richard and Loan Hill Department of Bioengineering and the Department of Ophthalmology and Visual Sciences, develops optical technology for advanced imaging—including super-resolution ophthalmoscopy—of the retina, neural tissues, and endocrine cells in order to reveal distortions at early stages of eye disease. He serves as the instrument core director at the UIC Lions of Illinois Eye Research Institute, which houses his laboratory: the Biomedical Optics and Functional Imaging Laboratory.

Endowed professorships like these ones, the Hills believe, reinforce strong, leading-edge, multidisciplinary research at UIC and strengthen UIC's role as a major player in Chicago's biotechnology sector. "The key to success for Chicago and its universities," says Rick Hill, "will be creating an environment that stimulates investment in breakthrough medical technologies,

which will lead to rapid economic growth." To this end, the Hills have given nearly \$9 million to UIC, which includes a \$6.5 million pledge—the largest gift in the College's history—to the Richard and Loan Hill Department of Bioengineering, named in 2013.

Rick Hill graduated from UIC with a bachelor's degree in bioengineering. He has held engineering and management positions at Hughes Aircraft, Motorola, General Electric, and Tektronix. In 1993, he became CEO of Novellus Systems, a small semiconductor capital equipment company in Silicon Valley, which he led to become one of the top ten semiconductor equipment manufacturers in the world.

"UIC is a winner, and it's in a winning position," says Hill. "It's located in a world-class city that's both a leading academic medical destination and has a biotechnology business base that's poised to expand."

## Ian Papautsky, PhD



Ian Papautsky delivers acceptance speech.



Ian Papautsky received a BS in Biomedical Engineering from Boston University in 1995 and his PhD in Bioengineering in 1999 from the University of Utah. He then joined the faculty of the University of Cincinnati as an assistant professor in 2000. There, Ian's research began to focus on developing microfluidic systems and point-of-care sensors for improving public health and safety.

In 2008, his lab pioneered inertial microfluidics, an approach that uses hydrodynamic forces to manipulate focusing and positioning of cells or particles within flow without external forces, and can be used for label-free cell separation and sorting.

In 2013, Ian published a paper on the "Fundamentals of Inertial Focusing in Microchannels" which has already received more than 160 citations. He has successfully demonstrated a complete separation and isolation of rare cells, such as human prostate epithelial tumor (HPET) cells, the DU-145 (derived from brain metastasis) cells, and LNCaP cells, derived from left supraclavicular lymph nodes.

In January 2015 and then again in May 2016 his work was selected for a back cover of the prestigious *Lab on a Chip* journal (IF ~ 6.5).

Ian's research has attracted significant support from diverse funding sources including NIH, NSF, and industry. He has multiple issued and pending patents. A young startup in Singapore by one of his former students, Clearbridge Biomedics, has licensed his inertial microfluidics technology for commercializing label-free isolation of circulating tumor cells.

Ian joined UIC Bioengineering, also with membership in the UIC Cancer Center, on August 16, 2016. He is also Co-Director of the National Science Foundation (NSF) Center for Advanced Design and Manufacturing of Integrated Microfluidics (CADMIM).

In recognition of his research, Dr. Papautsky has received numerous awards and honors, including the Ohio Bioscience 30 in Their 30s award in 2007 and the Excellence and Service Award from the International Society for Optical Engineering in 2005 and 2007. He is also a Fellow of the Royal Chemical Society.

At the time of his investiture, Ian had authored more than 80 peer-reviewed archival journal publications that have been cited more than 5,000 times, with an h-index of 34, according to Google Scholar.

## Xincheng Yao, PhD

Xincheng Yao received his PhD in Optics from the Institute of Physics, Chinese Academy of Sciences in 2001. This was followed by his postdoctoral research at Los Alamos National Laboratory from 2001 to 2004. He held a Los Alamos National Laboratory Technical Staff appointment from 2004 to 2006, and served at CFD Research Corporation as a Senior Research Scientist from 2006 to 2007. He joined the University of Alabama at Birmingham as an Assistant Professor in 2007, and was promoted to tenured Associate Professor in 2012.

Xincheng Yao joined UIC Bioengineering as a professor, with an



Back row (L to R): Taehoon Kim, Taeyoon Son, Minhaj Nur Alam, Asif Anik, Yiming Lu, Chang-geng Liu, Benquan Wang  
Front row (L to R): Devrim Toslak, Vittoria Maneo, Xincheng Yao, Beatrice Pazzucconi

adjunct appointment in the UIC Department of Ophthalmology and Visual Sciences, on November 1, 2014. He also became director of Biomedical Optics and Functional Imaging Laboratory and the director of Instrument Shop Core in the UIC Lions of Illinois Eye Research Institute. The close ties between the Bioengineering department and Ophthalmology were key in recruiting Xincheng to UIC. At the time Dr. Yao joined UIC he was already PI on two major NIH R01 grants and the NSF CAREER Award.

Dr. Yao has been developing optical instruments to achieve functional examination of living neural tissues. While still at Los Alamos, he was the first person to report functional optical coherence tomography (OCT) of stimulus-evoked intrinsic optical signal (IOS) changes correlated with retinal neural dynamics.

Dr. Yao is widely recognized as a pioneer in intrinsic optical signal (IOS) imaging of living systems. He reported the first OCT recording of IOS changes in stimulated retina; and his group demonstrated first IOS imaging of pancreatic beta-cells.

Functional IOS imaging of the retina has tremendous potential to enhance clinical research and eventually the clinical management of eye diseases; functional IOS imaging of pancreatic beta-cells could significantly improve the prevention and treatment of diabetes. Different from many peers in the field of biophotonics technology developments, Dr. Yao does not stop at the surface of beautiful pictures or curves; he looks deeper into the mechanisms that underpin the fast optical signals. His invention of superresolution microscopy through virtually structured detection is considered highly innovative. The 'virtually structured detection' method holds excellent potential for enabling superresolution examination of retinal structures, and was instrumental in receiving his second NIH-NEI R01 grant.

Dr. Yao is highly visible in the professional community. At the time of his investiture he had over 60 archival journal publications and more than a dozen awarded patents, had been serving on 4 editorial boards of prestigious journals, and is actively involved in NIH and other funding source proposal reviews, and international conference organization.