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Dear Friends of UIC Bioengineering,

In our Spring 2019 Newsletter, I’m proud to share with you the latest accomplishments of our outstanding faculty, staff, and students. As always, thank you for supporting our continued pursuit of excellence. Gifts targeted to the department help us achieve our strategic goals and could include opportunities to endow a named professorship, scholarship, laboratory, or special facility or program.

See our “Make a Gift” link at bioe.uic.edu. In addition to financial support, I know that the network of UIC BioE alumni and friends will continue to help our students find internship and employment opportunities.

I am always happy to meet our alumni and friends and welcome your visit. And, please join our Facebook group; see the link to the left.

Sincerely,

Thomas J. Royston, PhD
UIC Bioengineering Department’s work with BiAffect app garners nationwide press coverage

“BiAffect analyzes data streams generated by a user’s interaction with their smartphone to create insights about their mood and cognition”
—Professor Alex Leow

A research team led by Alex Leow of the Richard and Loan Hill Department of Bioengineering and the Department of Psychiatry at UIC created the BiAffect app, which has the potential to turn smartphones into a tool to unobtrusively monitor users’ mental health.

The app and the research around it have drawn a significant amount of press coverage for the valuable signals it may provide to ensure that people are in a positive state of mental health and connect them with services if they are not—a factor that is especially important for people with depression, bipolar disorder, and other conditions.

“BiAffect analyzes data streams generated by a user’s interaction with their smartphone to create insights about their mood and cognition,” Leow said. “From these data, patterns associated with particular moods or cognitive states are identified which can be used to inform the care of people with mental health disorders and promote improved outcomes.”

The BiAffect app and several other similar apps are still currently being developed and are probably several years away from being widely available and effective. Along with making sure the apps are correctly capturing a user’s mood, researchers must make sure they are ensuring that users’ data and privacy remain secure.

“Critically ensuring data security and participant privacy is the biggest challenge thus far,” Leow told Rolling Stone.
Researchers at the University of Illinois at Chicago and Queensland University of Technology, Australia have developed a device that can isolate individual cancer cells from patient blood samples, which may one day enable rapid, cheap liquid biopsies to help detect cancer and develop targeted treatment plans. The findings are reported in the journal *Microsystems & Nanoengineering*.

“This new microfluidics chip lets us separate cancer cells from whole blood or minimally diluted blood,” said Ian Papautsky, Richard and Loan Hill Professor of Bioengineering in the Cancer Center at UIC, and corresponding author on the paper. “While devices for detecting cancer cells circulating in the blood are becoming available, most are relatively expensive and are out of reach of many research labs or hospitals. Our device is cheap and doesn’t require much specimen preparation or dilution, making it fast and easy to use.”

The ability to successfully isolate cancer cells is a crucial step in enabling liquid biopsy, where cancer could be detected through a simple blood draw. This would eliminate the discomfort and cost of tissue biopsies, which use needles or surgical procedures as part of cancer diagnosis. Liquid biopsy could also be useful in tracking the efficacy of chemotherapy over the course of time and for detecting cancer in organs difficult to access through traditional biopsy techniques, including the brain and lungs.

However, isolating circulating tumor cells from the blood is no easy task, as they are present in extremely small quantities. For many cancers, circulating cells are present at levels close to one per 1 billion blood cells. “A 7.5-milliliter tube of blood, which is a typical volume for a blood draw, might have 10 cancer cells and 35-40 billion blood cells,” said Papautsky. “So we are really looking for a needle in a haystack.”

Microfluidic technologies present an alternative to traditional methods of cell detection in fluids. These devices either use markers to capture targeted cells as they float by or they take advantage of the physical properties of targeted cells — mainly size — to separate them from other cells present in fluids.

The device capitalizes on the phenomena of inertial migration and shear-induced diffusion to separate cancer cells from blood as it passes through "microchannels" formed in plastic. “We are still investigating the physics behind these phenomena and their interplay in the device, but it separates cells based on tiny differences in size, which dictate the cell’s attraction to various locations within a column of liquid as it moves.”

Papautsky and his colleagues “spiked” 5-milliliter samples of healthy blood with 10 small-cell lung cancer cells and then ran the blood through their device. They were able to recover 93 percent of the cancer cells using the microfluidic device. Previously developed microfluidics devices designed to separate circulating tumor cells from blood had recovery rates between 50 percent and 80 percent.

When Papautsky and his team ran eight samples of blood taken from patients diagnosed with non-small-cell lung cancer, they were able to separate cancer cells from six of the samples using the microfluidic device.

Jian Zhou and Amanda Bogseth from the University of Illinois at Chicago and Arutha Kulasinghe, Ken O’Byrne, and Chamindie Punyadeera from Queensland University of Technology, Australia, are co-authors on the paper.

This research was supported in part by Cancer Australia Grant APP1145657.

Diagram shows how the microfluidics device separates cancer cells from blood. The green circles represent cancer cells.
Xincheng Yao, Richard and Loan Hill professor of Bioengineering and Ophthalmology and Visual Sciences at the University of Illinois at Chicago, was recently honored as a 2019 Fellow of the International Society for Optics and Photonics (SPIE).

The society promotes members as new fellows within SPIE each year to honor those who have made significant scientific and technical contributions in the fields of imaging, optics, and photonics. The group works with scientists, educators, and members of industry to advance light-based research and technologies.

SPIE noted Yao received his fellowship for his achievements in optical imaging of retinal function, optical coherence tomography, and super-resolution microscopy.

“I was deeply honored to be recognized by the society because it helps people know about work ongoing at UIC,” Yao said. “SPIE is an optical society. They organize scientific conferences regularly, actively promoting scientific research, industry engineering and education opportunities in optics.”

Yao said his lab is working on developing optics-based imaging technology with a specific focus on eye applications, including retinal disease detection and treatment evaluation.

“The eye can be an open window for us to diagnose brain diseases”

–Professor Xincheng Yao

“We try to detect the early stages of disease because it gives us a better chance for treatment,” Yao said. “If a retinal disease is discovered too late, it can be a big problem and lead to visual losses and even total blindness.”

Yao noted his lab is working on several projects related to imaging of the eye, including ultra-wide field fundus photography, functional optical coherence tomography (OCT), super-resolution ophthalmoscopy, and retinal image analysis and classification.

He noted the human eye is unique because it is transparent, which opens up optical imaging possibilities for retinal examination at high resolution.

On March 25, 2019, Dr. Yao was inducted into Medical and Biological Engineering Elite in Washington D.C.

“From the neuroscience point of view, our retinas belong to the brain,” Yao said. “It’s part of the central nervous system. The eye can be an open window for us to diagnose brain diseases also.”

Yao was also recently inducted as a Fellow into the American Institute for Medical and Biological Engineering (AIMBE). He was selected for his contributions to retinal biophysics, functional OCT, OCT angiography, super-resolution microscopy, and ultra-widefield fundus photography.

This year’s class of Fellows were celebrated during the AIMBE annual meeting at the National Academy of Sciences in Washington, D.C., on March 25.

Yao said he was deeply honored to be elected as AIMBE Fellow and to be recognized by the biological and medical engineering communities.
Bioengineering Visiting Scholar in Klatt Lab Facilitates Scan of Dinosaur Sue Bones

Normally a bone CT scan over at UIC’s Outpatient Care Center would not cause a stir among Chicago residents and local media. But most patients who undergo a scan are not 67 million years old like the Field Museum’s SUE the Tyrannosaurus rex.

The bones, which included a humerus, fibula, and fused spinal vertebrae, were transported to campus by UIC bioengineering fellow Rolf Reiter. Reiter is a visiting scholar in the Klatt Lab at the university.

Reiter and his colleagues at Berlin’s Museum of Natural History and Charité – Universitätsmedizin Berlin are hoping improved CT technology will help them discover the causes of several deformations in SUE’s bones that have puzzled researchers for decades. In addition to solving the mystery, the researchers hope the scans will be beneficial for humans by providing information into pathologies from millions of years ago and insights into new diagnostic techniques.

The results of the scans are expected to be released in the upcoming months.

“We are doing the same type of scan on the bones that we’d do when we are looking for signs of cancer or other diseases in a patient. The scanner is clinical and we use it every day to image patients.”

–Rolf Reiter, visiting scholar

Professor Dieter Klatt, PI of The Motion-Encoding MRI Lab

Read more about Klatt Lab:

Motion-Encoding MRI Lab
“I’m a fourth-year radiology resident from the Charité - Universitätsmedizin Berlin, Germany and now a visiting scholar for two years at UIC bioengineering at the imaging lab of Professor Dieter Klatt.”

—Rolf Reiter, visiting scholar

The story of the bone scans has been covered by various news outlets. Full stories linked below:

- WBEZ News
- NBC 5 News
- ABC 7 News
- Chicago Sun Times
- CBS 2 News
- WBBM News Radio

Photo Credit: Fan Wang from Health Sciences and Research Communications, Office of Public & Government Affairs, UIC
The University of Illinois at Chicago’s Bioengineering Department and the University of Illinois at Chicago student chapter of the Biomedical Engineering Society (BMES) hosted the second annual UIC Bioengineering Research Symposium on April 15.

This year’s symposium featured a keynote presentation from Richard and Loan Hill Professor of Bioengineering and Orthopaedics Eben Alsberg, 36 posters from graduate and undergraduate students, and eight oral presentations by graduate students and postdoctoral associates.

The topics covered at the symposium touched on the extensive breadth of the bioengineering field and included work on non-alcoholic fatty liver disease, liver tissue engineering, hydrogels to delivery drug therapies, droplet technology to study antibiotic resistance, super-resolution imaging of retinas, linear predictive coding to help correct oral-motor speech disorder, an upper limb support system for laparoscopic procedures, and many others.

The event allows students to gain invaluable experience in presenting their research to a broader audience in a professional but controlled environment, according to Associate Professor Salman Khetani.

“It is a great skill to be able to describe your research to a non-specialist,” Khetani said. “Because we are always so engulfed in what we do, we sometimes forget the best way to communicate it to other people.”

He added the event is also a great résumé builder for the participants for the student organizers.

Khetani stressed how valuable it was for BMES to organize the event, judge the poster and oral presentations, and provide the awards for the winners.

“This is an event by the students, for the students, and of the students,” he said. “The department provides the baseline infrastructure, but this is a student-run activity … I do not want this to be just another national conference, because there are plenty of those.”

BMES gave out awards to students for both oral and poster presentations. The oral awards went to Grace Brown and Trinh Lam, who received second and first place, respectively. The undergraduate poster awards included a second-place finish for Demi Ibrahim and a first-place finish for Haley Patel, while the graduate poster awards were given from third to first to Stephen Lenzini, Regeant Panday, and David Kukla.

Kukla, who is working with in-vitro models of non-alcoholic fatty liver disease to find dietary triggers of the condition that some researchers believe impacts affects one in three Americans, said he was really excited to win the top graduate poster award. He added that the symposium was also a great opportunity to practice presenting his work to a larger audience outside of his lab.

“It definitely prepares you for these short presentations where you showcase your research,” Kukla said. “We are in a lab all the time, so you are not really talking and presenting on things, so I understand how for some people this can be kind of scary. But by having these symposiums, it allows you to really work on those skills.”

The symposium allows undergraduate and graduate students a chance to learn about all the other research going on within the department and the university. Khetani said the event could also help inspire undergraduates to seek out more information on or pursue graduate opportunities at the department’s labs or in the research and development fields in industry. Kukla agreed and added the event is a great place to find other students and researchers to work with.

“In grad school, you are in your lab every day all day, so you don’t really get to see what else is going on,” Kukla said. “So, it’s a great opportunity to see what other labs are doing and what potential collaborations are available.”

Fresh off the successful sequel to last year’s inaugural event, Khetani is already thinking about ways to expand and improve the symposium in the future. He said the organizers received 52 abstract submissions for this year’s event, which he would love to increase to 100 submissions in the next few years. The organizers would also like to move to a larger space starting next year, as this year’s 100 attendees were a little cramped in the current space.

In addition to those small changes, Khetani would eventually like to invite other bioengineering students and departments from other Chicago-area universities. He said this would allow everyone involved a chance to see what other opportunities are available within the city.

“My ultimate plan would be a Chicago Bioengineering Day where we showcase Chicago as the hub of bioengineering research outside of Boston and San Francisco,” Khetani said.
BMES and UIC Highlight Expansive Bioengineering Research Projects at Second Annual Research Symposium

Professor Khetani with keynote speaker, Eben Alsberg

Professor Khetani with BMES students

Professor Khetani with keynote speaker, Eben Alsberg

Professor Khetani with BMES students
AIMBE Inducts Four UIC Bioengineering Professors to Renowned College of Fellows

The American Institute for Medical and Biological Engineering (AIMBE) inducted four University of Illinois at Chicago professors to its illustrious College of Fellows.

Four faculty members from the Richard and Loan Hill Department of Bioengineering were a part of this year’s class, including Irena Levitan, professor of medicine, pharmacology and bioengineering; Hayat Onyuksel, professor of pharmaceutics and bioengineering; Brenda Russell, professor emerita of physiology and biophysics, bioengineering, and medicine; and Xincheng Yao, Richard and Loan Hill professor of bioengineering and of ophthalmology and visual sciences.

Being elected into the AIMBE College of Fellows is a high honor for engineers working in the medical and biological fields. In fact, the institute noted that its inductees are made up of the top 2 percent of medical and biological engineers.

Levitan was recognized for her outstanding contributions to the understanding of lipid-ion channel interactions, cellular biomechanics, and vascular dysfunction under dyslipidemia. Levitan and her research group provided the field the first comprehensive structural insights into cholesterol regulation of K+ channels.

Onyuksel was selected for her important contributions to the development of safe and effective nanomedicines for targeted treatments of breast cancer and inflammatory diseases. Onyuksel’s lab delivers drug molecules by encapsulating them in an innovative nano-carrier system that allows for the drugs to be delivered directly to diseased tissues without causing side effects to healthy tissue.

Russell, a pioneer in the bioengineering field for almost five decades, was recognized for her investigation of the importance of forces and the microenvironment to cells. Her research has changed how scientists think about skeletal and cardiac muscle adaptation and helped introduce the possibility of multidimensional ways muscle can respond to mechanical demands.

Yao was selected for his contributions to retinal biophysics, functional optical coherence tomography (OCT), OCT angiography, super-resolution microscopy, and ultra-widefield fundus photography.

Bioengineering Professor Jim Patton and Richard and Loan Hill Professor Ian Papautsky were inducted as fellows in AIMBE last year.

This year’s Fellows were celebrated during the AIMBE annual meeting at the National Academy of Sciences in Washington, D.C., on March 25.
Title: “Center for Advanced Design and Manufacturing of Integrated Microfluidics (CADMIM)"

PI: Bioengineering Hill Professor and Cancer Center faculty member Ian Papautsky
Co-PI: Abe Lee (UC Irvine)
Funding Source: Phase 2 NSF Industry/University Cooperative Research Center
Award Period: 5 years
Amount: $1,250,000 overall ($500,000 UIC’s share)

Description: The Center for Advanced Design and Manufacturing of Integrated Microfluidics (CADMIM) is a National Science Foundation (NSF) Industry/University Cooperative Research Center (I/UCRC). CADMIM’s vision is to advance cutting-edge research and education of integrated microfluidics, the science manipulating fluids at the sub-millimeter scale. The Center acts as a bridge between academia and industry, by working closely with industrial members and developing applied research projects that can address bottlenecks in their business spaces and workflows. The CADMIM mission is to create tools, methods, and technologies for integrated microfluidics enabling cost-effective, quick, and easy diagnosis of the environment, agriculture, and human health. With this Phase 2 award, CADMIM will continue its mission, engaging more industry partners, working with them to advance microfluidics technology and develop solutions to their needs.

Title: “Functional tomography of neurovascular coupling interactions in healthy and diseased retinas”

PI: Xincheng Yao, Hill Professor in Bioengineering and in Ophthalmology and Visual Sciences
Funding Source: NIH R01 Grant
Award Period: 4 Years with a start date of April 1, 2019.
Amount: $1,391,708

Description: This project is to investigate spatiotemporal interactions between neural activities and hemodynamic changes in the retina, and to explore quantitative mapping of retinal neurovascular coupling defects caused by neurodegenerative diseases. Retinal neurodegenerative diseases, such as age-related macular degeneration (AMD), retinitis pigmentosa (RP), diabetic retinopathy (DR) and glaucoma, can produce severe vision losses if medical interventions cannot be provided promptly. As one part of the central nervous system (CNS), the retina is also targeted by other neurodegenerative diseases, such as Parkinson’s and Alzheimer’s diseases, which are the major cause of dementia. Early detection of these neurodegenerative diseases is essential for better study and development of preventive strategies. Functional imaging of neurovascular coupling defects promises early detection of neurodegeneration. Direct access to the brain for high-resolution examination of neurovascular coupling defects is difficult. The retina opens a window for high-resolution study of neurovascular coupling defects. This project is to explore spatiotemporal mapping of three-dimensional (3D) interactions between neural activities and hemodynamic changes.

Title: Translational Oncology Program Proposal

Awarded to: Bioengineering Hill Professor and Cancer Center faculty member Ian Papautsky, along with Alicia Hubert, MD, Assistant Professor of Surgery
Funding Source: UI Cancer Center Pilot Grant
Award Period: 1 year
Amount: $125,000

Description: Lung cancer (LC) is the leading cancer killer in both men and women in the United States, causing 160,000 deaths annually and accounting for more than 25 percent of all cancer deaths. The standard of care for early-stage LC screening is low dose computed tomography (LDCT) scans; however, LDCT has a false positive rate of 96 percent and can only detect metastasis more than or equal to one centimeter. Consequently, a primary tumor biopsy is necessary to make a diagnosis with a sensitivity of 73 percent to 85 percent of cases, which leads to wasted resources: hospital services, time, money, and undue patient suffering due to invasive testing. The latter contributes to health disparities in the black and Hispanic communities. Despite these efforts, two-thirds of patients are diagnosed with late stage cancer with a profoundly low five-year survival rate of 18.2 percent. Moreover, the conventional tumor biopsies only represent the molecular profile of the primary tumor, and report on late tumorigenic events harbored by distant metastases.

We hypothesize that circulating tumor cells (CTCs)/circulating tumor microemboli (CTMs), cell free DNA (cfDNA), and circulating tumor DNA (ctDNA) offer a real-time lung cancer genetic/epigenetic census that can be used clinically for lung cancer screening, cancer diagnosis and classification, prognosis, and to track chemotherapeutic response. Our goal is to develop an inexpensive, simple to operate liquid biopsy (LB) platform for clinical diagnosis, prognostication, and treatment monitoring, as well as a basic science research platform. The Papautsky lab has developed a microfluidic device (MFD) for the label-free isolation of CTCs/CTMs from whole blood. The Hubert lab has developed LB methodology for blood and urine sampling, and has identified and characterized several biomarkers for LC.

Title: “Diagnosing Glaucome in the Peripheral Retina”

PI: John Hetling, Associate Professor in Bioengineering
Co-PI’s: Thasarat Vajaranant and Jason McNaney, both from Ophthalmology and Visual Sciences
Funding Source: National Glaucoma Research Grant awarded by the BrightFocus Foundation
Award Period: 2 years, with a start date of July 1, 2019.
Amount: $150,000

Description: The ultimate objective of this work is to provide a direct, objective, repeatable and highly sensitive measure of glaucomatous damage to RGCs in the peripheral retina that can be routinely employed in a clinical setting (in complement to existing central retina testing). To this end, the PIs have developed a novel pattern ERG system, comprised of a three-dimensional pattern stimulus source optimized for probing the function of RGCs in the peripheral retina. The response to this peripheral pattern stimulus is referred to as the peripheral pattern electroretinogram, or ppERG. The present proposal seeks to obtain validation for this approach in earliest-stage primary open-angle glaucoma, and to optimize the testing protocols to exploit the sectoral changes in RGC function that characterize this disease.
The Institute of Biomaterials, Tribocorrosion, and Nanomedicine (IBTN) was founded in 2012 by four UIC faculty. This year, the eighth IBTN Research Symposium was held at UIC’s College of Dentistry on April 15, with a theme of “Advances in Diagnostics and Sensor Technology in Healthcare.”

The meeting included the plenary talk given by Asimina Kiourti of Ohio State University and 10 invited lectures focusing on “Advances in Diagnostics and Sensor Technology in Healthcare”. The opening session was chaired by Richard and Loan Hill Department of Bioengineering Professor Christos Takoudis, and the welcome message was given by Associate Professor Tolou Shokuhfar, the executive chair of the conference. Opening remarks were made by Stephen Campbell of UIC’s College of Dentistry; William Sanders, director of DPI with UIC; Markus Wimmer of the department of orthopedics at Rush University Medical Center; and Peter Olubambi of IBTN South Africa. There were also 25 excellent research posters from students, postdocs, and faculty members.

The focus of the symposium was to bring together a multidisciplinary group of clinicians, material scientists, mechanical engineers, chemical engineers, and bioengineers. The goal of the symposium was to invite experts from the aforementioned fields and discuss the advancement of biomedical implants, biomaterials, bio-nanotechnology, electrochemistry, and more. Such meetings are helpful to provide future direction and strengthen the collaboration between the U.S. and international branches of IBTN specializing in next-generation implants and nanomedicine research. This year the local committee chair was Divya Bijukumar of the bioengineering department and UIC School of Medicine, Rockford.

Approximately 100 participants took part in this year’s symposium, including invited professors, speakers from the United States, poster participants, local committee members, students, and guests. Two exhibition booths were arranged for the participants, including the MTS Systems, and a novel hip implant testing system by an undergraduate student team from the bioengineering department led by Elizabeth Brott.

Ten invited speakers gave lectures on various topics including “Air micro-fluidics: Micro-Electro-Mechanical Sensors for Detection of Pollutants and Aerosols” by Igor Paprotny from the department of electrical and computer engineering; “Securing Health-monitoring Devices: A Hardware Security & Trust Perspective” by Ahish Shylendra from the department of electronics and computer engineering; “Development of ultra-low volume, multi-biofluid, cortisol sensing platform” by Sayali Upasham from the Biomedical Micro-devices and Nanotechnology Lab, UTD Dallas; “Metallurgy in Total Joint Arthroplasty” by Robin Pourzal from the department of orthopedic surgery at Rush Medical College; “Collagen Deficiency Associated with Pelvic Organ Prolapse: Nanodiagnostics and Cell Therapeutic Strategy” by Rong Wang from the Center for sensor and engineering with IIT; “Soft, Epidermal Microfluidic Systems for Non-Invasive Monitoring of Sweat Chemistry and Dynamics” by Amay Bandodkar from Northwestern University; “Advancements in Mechanical testing of Biomaterials” by Matthew Struve from MTS Systems; and “Tribocorrosion Evaluation of Spark Plasma Sintered Nano-Ti-Ta-Zr” by Peter Olubambi from Tshwane University of Technology in South Africa. Shokuhfar also delivered an interesting lecture on nanosur-face modifications to enhance the biological and mechanical properties of implants. Finally, there was an open forum discussion led by Xu-June Li on the presented topics and future direction of the research.

The symposium named 14 poster award winners from the 24 PhD, graduate, and undergraduate presenters. Two participants, PhD student Prabaha Sridhar from the University of Toledo, and graduate student Rajani Nagaraj from the University of Illinois College of Medicine at Rockford, were recognized for best posters. Their work focused on “Antibacterial Tri-Magnesium Phosphate Hydrate Coatings on Polyetheretherketone (PEEK) Based Implants with Effective Treatment of Surgical Site Infections” and “Anti-angiogenic peptide conjugated peg-b-pp5-micellar delivery system to prevent αβ3 integrin-mediated angiogenesis” respectively.

The successful symposium would not have been possible without valuable sponsorship from TMJ concepts, Gamry Instruments, Loadstar, UIC Dental School, Department of Bioengineering, Colgate, UIC International Services, Rush University Medical Center, College of Medicine at Rockford, and Springer Publications. There was support from IBTN Alumni Abhijith Segu, Shradha Rao, and Poojitha Vellore. All IBTN-US members put effort into the success of this conference. The organizers also thanked local committee members, including Chair Divya Biju, Rajini Nagaraj, Oba Akinfosile, Ohri Shivam, Sneha Kamat, Jose A. Villanueva, Christine Lee, Kristen Sipek, Sarita Sahu, and Kai-yanu Chang. Other acknowledgements for the event include Dental School Business/Administrative Associate Anna Panova, Senior Manager of Information Systems Michael Martin, and UIC-Rockford Department of Medical Science Business Manager Nancy Olson.
UIC students in the Biomedical Implants course (BioE/ME 562) participated in the Biomedical Implant Students Assembly on December 3, 2018.

The symposium was organized by Dr. Mathew Mathew, the course instructor and tribocorrosion expert with appointments at UIC and Rush University Medical Center. Mathew is also a co-director of Institute of Biomaterials, Tribocorrosion and Nano-medicine. The student volunteers—Lioudmila Sorokina, who was also chair of the event, and Christine Lee worked hard to make the event a great success.

The highlight of the symposium was a special lecture by Dr. Louis Mercuri, a renowned temporomandibular joint disorders expert, a clinical consultant for TMJ Concepts, and a visiting professor in the Department of Orthopedic Surgery at Rush. Mercuri provided a clinical perspective on the future of biomedical implants.

More than 32 students presented on topics related to biomedical implants and their developments. Two best contributions were selected for Dr. Mercuri’s Honorable Mention Implant Award 2018. Award judges included Mercuri, Dr. Divya Bijukumar, Kirsten Sipek, Sarita Sahu, Diana Gutierrez, Kay-Yuan Chung, Siva Mamid, Rajini Nagraj, Tina Trinh, Vineeth Gattu, and Leela Buddaraju. First place winner Jaqueline Rojas Robles delivered a talk on FDA regulations of 3D-printed biomedical implants, while second-place winner Christine Lee discussed dental implants.
STUDENT AWARDS

Minhaj Alam
Provost’s Graduate Research Award and CCTS PECTS Fellowship
Bioengineering PhD student Minhaj Alam in Professor Yao’s lab has received a provost’s graduate research award for his work toward a comprehensive computer aided diagnosis (CAD) system that can be used for regular screening of patients with retinal diseases. The award will help Minhaj to conduct a pilot study on automated classification of diabetic retinopathy using OCTA imaging and machine-learning algorithms. Minhaj also received a Pre-doctoral Education for Clinical and Translational Scientists fellowship through the Center for Clinical and Translational Science and the College of Medicine of UIC for academic year 2018-2019.

David Le
Knights Templar Eye Foundation ARVO Travel Grant
PhD student David Le received the Knights Templar Eye Foundation Travel Grant from the Association for Research in Vision and Ophthalmology, which helped him to attend the annual ARVO conference in Vancouver, Canada, from April 28 to May 2. While at the conference, Le presented his research on branchpoint analysis in optical coherence tomography angiography (OCTA) for diabetic retinopathy (DR) patients. Le’s research is specifically focused on quantitative analysis of the blood vessel geometry for different stages in DR: mild, moderate, and severe. By analyzing the blood vessel geometry, he believes he can detect and classify DR stages and help with treatment and prevention of progression.

Yiming Lu
CCTS PECTS Fellowship
Biomedical Optics and Functional Imaging Laboratory PhD student Yiming Lu was awarded a Pre-doctoral Education for Clinical and Translational Scientists fellowship through the Center for Clinical and Translational Science and the College of Medicine of UIC. Students selected for the PECTS program become part of a clinical and translational science community through completion of a core curriculum, joint events, seminars, and workshops outside of their degree programs. Lu is focused on various optical imaging techniques to investigate the physical and physiological activities of the retina and find a biomarker for the early diagnosis of retinal diseases.

Ghasem Yazdanpanah
ARVO Travel Grant
The Association for Research in Vision and Ophthalmology selected University of Illinois at Chicago MD/MPH student Ghasem Yazdanpanah to receive the Qais Farjo, MD Memorial Travel Grant to provide partial travel support to attend and present at the ARVO 2019 annual meeting held in Vancouver, Canada. Yazdanpanah presented his research about fabricated hydrogel made up of processed natural tissues with corneal wound healing effects. Yazdanpanah and his colleagues also created hydrogel from human amniotic membrane and found both hydrogels had similar corneal wound-healing effects. The fabricated natural hydrogels have potential in corneal tissue engineering. Yazdanpanah is a student of Tolou Shokuhfar in the Richard and Loan Hill Department of Bioengineering and Mark Rosenblatt and Ali Djalilian, both from the Department of Ophthalmology and Visual Science. Yazdanpanah said his goal is to become a clinical scientist focused on ophthalmology.

Alan Perez-Rathke
Best Poster Award
Molecular and Systems Computational Bioengineering Laboratory PhD student Alan Perez-Rathke was awarded Best Poster at the Multiscale Modeling of Chromatin: Bridging Experiment with Theory thematic meeting, held in Les Houches, France, March 31 to April 5, 2019. This meeting brought together biologists, chemists, physicists, and mathematicians to discuss and launch collaborations to advance the field of chromatin modeling and applications through new conceptual approaches and perspectives. The meeting emphasized the unique multiscale features and properties of chromatin, from DNA to nuclear organization and interactions, and encouraged/enhanced the development of multiscale models and experimental strategies needed to address all relevant components of the chromatin folding problem. Such multiscale approaches, combining experimental data and modeling/informatics, are necessary to extract and identify structure/function relationships on various scales, from individual base pairs to whole genomes, and to pursue important applications in epigenetics and medicine.

Samira Mali
BPS Travel Award
PhD student Samira Mali received a Biophysical Society Conference travel award to attend the annual BPS gathering in Baltimore. Under the supervision of Professor Jie Liang, Mali has been researching computational modeling of chromatin folding using deep sampling. For this year’s conference, Mali worked on the effect of chromatin stiffness and nuclear confinement on chromosome interactions and lamina associated domains.
Senior bioengineering students use technical skills to help child with cerebral palsy stay hydrated

A group of five senior Richard and Loan Hill Bioengineering students have combined their skills and ingenuity together to design an assistive device that will help a child with cerebral palsy with spastic quadriplegia stay hydrated. The team noted that people with motor deficiencies frequently have trouble staying hydrated and must rely on caregivers for help with drinking.

Samantha Lagestee, Dylan Tremmel, Omar Maldonado, John Jarka, and Aseel Al Kishtaini have been hard at work since August 2018 creating their wheelchair-compatible electronic fluid delivery system, which utilizes a reservoir and water pump, along with a straw attached to a servo motor that can be moved into a drinking position and out of the way by the user.

The students have been working with the family and a feeding therapist at the nonprofit Easterseals to design the device and to ensure it is functional for the child. The team assembled the reservoir and straw system using a commercial hydration pack, food-grade tubing, and a water pump. They also 3D printed a custom straw support structure at UIC’s MakerSpace and designed a circuit to power the motor and water pump with a rechargeable battery system.

“We chose this project because we saw an opportunity to use our unique skill set to help a child,” Lagestee said. “Oftentimes, senior design projects are developed for faculty, industry, or medical professional sponsors, with little to no input from potential end users. When we saw that there was a particular family we were working with, we knew that we could make a difference for them and have a chance to see our product in action.”

UIC Bioengineering graduate student places at Three Minute Thesis competition

Richard and Loan Hill Department of Bioengineering graduate student Trinh Lam recently took third place at the University of Illinois at Chicago’s third annual Three Minute Thesis competition.

The 3MT competition, which was developed by The University of Queensland in Australia, helps students effectively explain their research in three minutes. The short explanations also help the students discuss their work in a way non-specialists can understand. The competition was open to students enrolled in either a master’s or PhD program with an original research project.

Lam, who is a PhD student in Professor David Eddington’s lab, took third place in this year’s competition with her presentation titled “Femtoliter Droplet Confinement of Streptococcus pneumoniae: Bacterial Genetic Transformation in Droplet.”

Freshman Engineering Success Program

This summer, Chicago-area students are invited to UIC for a week of hands-on activities and challenges that will introduce them to the vast potential of engineering. Engineering is not a subject that grade-school students encounter every day, so UIC Engineering Experience Camp provides an inspiring look at the ways in which engineers can change the world. Full details and schedule online: