Navigating New Directions in Ethics

Constitutionally Speaking
Under the Microscope
Planes and Powertrains
Letter from the President

At the start of this school year, Mies Campus students were able to see the future literally taking shape before their eyes as they observed the progress being made on the Ed Kaplan Family Institute for Innovation and Tech Entrepreneurs. With a large number of rain-free days this past summer, the construction crew made great progress. The skeleton of the building could be seen by mid-August, when many of the girders were in place. Faculty member and Kaplan Institute Design Architect John Ronan received a 2017 R+D Award from ARCHITECT, the journal of the American Institute of Architects, for his unique use of ethylene tetrafluoroethylene on the outside of the building. You can view a livestream of the construction site at http://bit.ly/2vtbVvQ.

In August we announced Anijo Punnen Mathew as the Kaplan Institute’s inaugural academic director. A highly regarded associate professor at the Institute of Design, Anijo is also founder and chief experience officer of Vamonde, named by Built in Chicago as one of six Chicago startups shaping the future of virtual reality.

In other faculty news, we welcomed 29 new members to the university this fall. Two faculty, including J. D. Trout, the John & Mae Calamos Endowed Chair in Philosophy, will be joining Illinois Tech in January 2018. You can view all of their names and associated colleges on page 8 of this issue of IIT Magazine. Read their bios at magazine.iit.edu/fall-2017/new-faculty.

In other news, we also have 22 new members to the university this fall. Two faculty, including J. D. Trout, the John & Mae Calamos Endowed Chair in Philosophy, will be joining Illinois Tech in January 2018. You can view all of their names and associated colleges on page 8 of this issue of IIT Magazine. Read their bios at magazine.iit.edu/fall-2017/new-faculty.

Our people are indeed Illinois Tech’s greatest asset. Our newest students are joining a strong university community that takes great pride in guiding and supporting them on their way to becoming tomorrow’s leaders. I look forward to following our students’ accomplishments in the academic year ahead.

Sincerely,

Alan W. Cramb
"RECEIVING THIS SCHOLARSHIP HAS TRULY IMPACTED MY LIFE," SAYS JORGE ACOSTA (CE ’17), who obtained his Illinois Tech degree this past spring thanks to a Goldstein Engineering Scholarship and is now employed as a software engineer at John Deere. "Without it, my life could have taken a different path." Acosta grew up in Cicero, Illinois, where his mother, a janitor, struggled to raise four children after his father died. ¶ His story is not so unusual at Illinois Tech, which is among the 91 most generous universities in the nation, according to Money magazine. Virtually all full-time undergraduates at Illinois Tech receive scholarships of some kind, but only 5 percent of this money comes from private donations. ¶ That is something the university is hoping to change with the launch of its most ambitious scholarship initiative ever, an effort to raise tens of millions of philanthropic dollars for students like Acosta in the coming years.

For decades the university has self-funded the majority of its scholarships, hoping that students would reap the rewards. It was a good bet. In 2015 the United States Department of Education released its College Scorecard and revealed that alumni of Illinois Tech are among the highest earners in Illinois and the nation. ¶ Further analysis of the College Scorecard by The Equality of Opportunity Project and The New York Times showed that students born to families in the bottom 20 percent of income are more likely to rise to the top at Illinois Tech than they are at any other college or university in Illinois.¶ But ensuring that students from the bottom 20 percent receive the financial aid they need sometimes comes at a great cost to the university. That is why Judson Althoff (ME ’95) recently made one of the first gifts to Illinois Tech’s new scholarship initiative.

"I chose Illinois Tech because when I looked at the landscape of engineering schools that were out there, not only was Illinois Tech one of the best, but, frankly, it was one within my grasp," explains Althoff. "I didn't have a lot of means to go to college." ¶ Althoff received a scholarship and now he is paying that gift forward. It is an act of generosity Acosta hopes to imitate. "I look at my scholarship as a loan that I expect to pay back with interest to the school … in the form of donations toward scholarships."
Mutually Beneficial Mission: MEDLIFE 2017

For 12 Illinois Tech students, a plastic soft drink bottle, child’s toothbrush, and ibuprofen tablets rose far above the level of common, everyday items during the group’s week in Managua, Nicaragua, this past summer.

Along with faculty advisor Kathryn Spink, director of Pre-Health Professions Programs, the group participated in a weeklong medical mission with the international humanitarian organization Medicine, Education, and Development for Low-Income Families Everywhere, or MEDLIFE. On their first day in Central America, the members of the Illinois Tech team joined a “reality tour,” where they observed Managua residents picking through a landfill for coveted plastic bottles for resale. The students also assisted in children’s tooth-brushing clinics and worked in the MEDLIFE pharmacy, among other activities. For some students, this was their first MEDLIFE experience; for others, a repeat mission trip. Watch an IIT Magazine Video Exclusive, featuring Nour Issa (BIOL 3rd year), Ilma Lodhi (BME 4th year), Evelyn Thomas (BCHM ’17), and Spink at magazine.iit.edu. —Marcia Faye

More Online


“The brigade is a sign of IIT’s dedication to educating conscientious, critical-thinking individuals.” —Ilma Lodhi (BME 4th year)

“All I could think of was the hardships the hosts and students of the group endured. As a citizen of the United States, it was an eye opener for me.” —Mohannad Safadi (BIOL ’17)

“Going on the MEDLIFE brigade brought light to the ways the medical device industry can innovate devices to make patient diagnosis more affordable and convenient.” —Nirja Shah (BME ’17)


“Ibuprofen, for example, can be found in the United States at almost every corner store. From Walgreens to gas stations, this white, plastic bottle sits innocuously on the shelves for around $3. Little do we think and realize that this bottle is a superhero in many third-world countries.” —Diana Wu (CHE 3rd year)
“People knew these foreclosures were unfair, but they were unable to articulate they were more than unfair—they were unconstitutional.”

Chicago-Kent College of Law Professor Bernadette Atuahene, in the Detroit Metro Times, about the city’s foreclosure crisis this past summer

“They’re replacing [baseload, reliable] low-carbon energy with low-carbon energy that requires backup 65 percent to 85 percent of the time. Everywhere that nuclear is closed, it gets replaced by natural gas. That means France will probably get dirtier.”

Professor of Physics Jeff Terry in Forbes, about French President Emmanuel Macron’s intention to phase out the country’s nuclear power plants and replace them with wind and solar energy stations

“Is there a hazard or potential risk of cancer in humans who are exposed to RF [radio frequency] fields? I believe the answer is yes. But the more important question is, what is your exposure?”

IT Technology Institute President and Director David McCormick, on the controversial topic of cell towers near schools, on NPR Ed

“This ability to grab onto an object nearly anywhere, instead of needing a specific grapple point that may not even be there, is really advantageous. It means you don’t need a precision approach.”

Sohail Murad, chair of the Department of Chemical and Biological Engineering, on CBS 2 Chicago, about how a gecko-inspired gripper he developed could potentially clean up space junk

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“In His Own Words

Architect and historian Michelangelo Sabatino considers the rhizome, a plant system utilizing both vertical and horizontal roots, as a perfect visual metaphor exemplifying specificity and interconnectivity as two separate but equally important concepts that make for a holistic educational environment. On the Illinois Tech faculty since 2004 as professor and director of the architecture Ph.D. program, Sabatino considers his vision for the college now as interim dean of the College of Architecture.

I seek to rethink the relationship between our college, IIT, Chicago, and the rest of the world. We are more powerful if we identify opportunities where we can collectively be more impactful as a college of architecture by way of strategic collaborations with the Institute of Design or Armour College [of Engineering], for example. While the very nature of education is specialized, the learning process does not stop at colleges. I am a big proponent of the built environment. When you say ‘architecture’ instead of ‘built environment,’ you’re putting all of the agency on the architect, whereas we all know that architects are hugely important in many aspects leading up to the design, you need great collaborators in engineers, landscape architects, urban planners (just to name a few), in order to make anything really work. So I would stress the built environment over architecture with a capital A. That’s a bit of a provocation, I under- stand. But when you think about it, roads and infrastructure are equally as important as the buildings. We have various degree programs in the College of Architecture, but we also have the M.L.A. [landscape architecture and urbanism] program. When we talk about the legacy of the College of Architecture, I think we tend to give almost too much importance to [Ludwig] Mies (van der Rohe). He was certainly an innovator of huge impact, but he was also a man who collaborated. Three greats have influenced us at the school—Mies, Ludwig Hilberseimer, and Alfred Caldwell. Lafayette Park—a residential neighborhood realized in Detroit during the late 1950s and 1960s—is the result of a collaboration between them. My ambition is to think carefully about what it means to be a global architect today. To be a global architect you actually have to experiment with a local context that you learn from to apply your skills to other contexts. Take, for example, when Mies came to this city. Gary, Indiana, was a huge producer of steel. It was not only that Mies loved steel as an aesthetic, but the proximity to Gary also made the choice affordable. If one thinks of a building only in terms of aesthetics, you really don’t understand the context. Mies learned from America, and America learned from him. Being in Chicago was hugely important for him—he used what he learned in Europe, took it forward, and increased his oeuvre. As told to Marcia Faye

Michelangelo Sabatino: http://michelangelo-sabatino.com

MORE ONLINE
New faculty joining Illinois Tech in 2017–18 include researchers and scholars in Armour College of Engineering, Chicago-Kent College of Law, the College of Architecture, the College of Science, the Institute of Design, Lewis College of Human Sciences, the School of Applied Technology, and Stuart School of Business. Read their bios at magazine.iit.edu/fall-2017/new-faculty.

Mohammad Asadi
Assistant Professor
Armour College of Engineering

Rahman Azari
Assistant Professor
College of Architecture

Somdev Banerjee
Lecturer
College of Science

Maria Debije Counts
Assistant Professor
College of Architecture

Steve DuBois
Assistant Professor
Lewis College of Human Sciences

Yousel M. Elmehdwi
Senior Lecturer
College of Science

Michael Gentithes
Visiting Assistant Professor
Chicago-Kent College of Law

Bruce C. Gockerman
Industry Assistant Professor
Stuart School of Business

Baisravan HomChaudhuri
Assistant Professor
Armour College of Engineering

Yuan Hong
Assistant Professor
College of Science

Cody Jacobs
Visiting Assistant Professor
Chicago-Kent College of Law

Mark Jones
Visiting Industry Professor
Institute of Design

Andrew “Andy” Kumiega
Assistant Professor
Stuart School of Business

Trevor Lee
Visiting Assistant Professor
College of Architecture

Katie Leight
Lecturer
College of Science

Chun Liu
Chair and Professor
College of Science

Mohamed El Marzouki
Assistant Professor
Lewis College of Human Sciences

Tracey McGee
Senior Lecturer
School of Applied Technology

Kiah Wah Ong
Lecturer
College of Science

Zach Pino
Studio Instructor
Institute of Design

Rajikumar P. V. (January 2018)
Senior Lecturer
College of Science

Jennifer M. Robbins
Director of Experiential Learning and Lecturer
Chicago-Kent College of Law

Jason Romano
Senior Lecturer
School of Applied Technology

Amandeep Sandhu
Assistance Professor
School of Applied Technology

Ruth Schmidt
Director of Strategic Initiatives and Visiting Industry Professor
Institute of Design

Despina Stasi (AMAT, CS ‘03)
Senior Lecturer
College of Science

J. D. Trout (January 2018)
Endowed Chair in Philosophy
Lewis College of Human Sciences

Alla Vronskaya
Assistant Professor
Armour College of Engineering

Mohammad Asadi
Assistant Professor
Armour College of Engineering

Rahman Azari
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College of Science

C H I C A G O  I S  A  S P O R T S  M E C C A ,  B U T  I T S  f ervent fan base isn’t exclusive to pro teams. The Illinois Tech Scarlet Hawks men’s and women’s sports programs have their faithful Scarlet Fever student cheering section, and through the new Coach for a Day (CFAD) engagement program are adding faculty and staff members to the fan squad. "Our goal has been to connect athletics and academics," says Athletics Director Joe Hakes, who developed the idea with Christopher White, vice provost for research and academic affairs. "The coaches, in recruiting student-athletes, have to know something about the academic curriculum. We’re hopeful that faculty and staff will gain insight about what coaches and athletes do on a game night; how good our athletes are, and why they participate in sports." Hakes says that honorary coaches meet with the coach of the sport they are interested in to discuss their Coach for a Day game plan, including when practice is held, proper game protocol, and even appropriate coaching attire. White, who has been an honorary coach in four different sports including baseball, had a unique thrill when he was given a uniform to wear in the Guaranteed Rate Field dugout during this year’s South Side College Classic between Illinois Tech and the University of Chicago. ¶ Lewis College of Human Sciences Dean Christine Himes attended a 6 a.m. practice at Knecht Sports Center with the women’s basketball team in addition to observ ing a pregame practice and pregame talk. She also sat on the courtside bench during the game. ¶ “I’ve always admired student-athletes. I’m amazed at their ability to juggle classes, practices, homework, and games,” says Himes, noting that she so felt a part of the team that she attended another game a few weeks later. ¶ “Being a Coach for a Day helped me better understand the time and effort students put into their sport. I did not participate in high school or college athletics, so I was surprised by how much information the coach gave the athletes and how many things there are to remember during the game. Being on the bench gave me a whole new perspective on students and student life.” – Marcia Faye

Bringing Team Spirit Full Circle
Optimizing fuel performance and minimizing emissions has been the ambition of every engineer who designed a combustion engine since George Brayton developed his “ready motor” in 1872. Illinois Tech Assistant Professor of Mechanical, Materials, and Aerospace Engineering Carrie Hall is currently at the cutting edge of that search for new ways to make diesel engines cleaner and more efficient using dual-fuel technology.

Hall, the recipient of a $500,000 Faculty Early Career Development (CAREER) Award from the National Science Foundation, is applying innovations from studies of single-cylinder engines that use dual-fuel technology to multi-cylinder engines like those found in commercial trucks. Dual-fuel models like the Volvo V90 Bi-Fuel use a blend of two fuels, such as natural gas and gasoline. Each fuel is optimally efficient under different conditions, and using both allows for a more efficient engine overall. The goal is to develop automotive engines that can use an ideal blend of fuels that run more cleanly and provide the most efficient power output for the load demands on the engine. “In passenger cars it’s simpler to just go to electric or hybrid vehicles,” says Hall. “But for larger Class A trucks, we can’t have an electric option. They’re going to have to burn diesel fuel or something like it for the foreseeable future. These technologies could make them potentially more efficient.” Hall’s current research is focused on understanding the fundamental dynamics of how a multi-cylinder dual-fuel engine operates under various conditions. The next stage, she says, is understanding how to control such a complex, nonlinear system. “That becomes a very challenging mathematical problem, so lessons that we learn certainly have applications that we can take into other things,” she says. “We’re dealing with something that’s producing power from two sources, which is the same kind of thing that you’re doing on a hybrid vehicle, so a lot of other applications will have similar kinds of constraints and issues.” Hall became interested in engine technology because she wanted to tackle what she considers to be one of today’s biggest problems: how to efficiently produce energy with minimal environmental ramifications. She was drawn to automotive engineering because of the challenges involved in producing energy in a moving object. “You can produce energy in a stationary thing that’s just sitting there,” she says, “or you can produce it in something that’s moving around, and something that’s moving around is a lot more fun.”

Engineering Early Ed

Unlike a standard research grant, the CAREER proposal has an educational aspect. Carrie Hall is using it to approach the challenge of sparking younger students’ interest in STEM subjects. Beginning with first- and second-graders, Hall is working with a curriculum developer and a grammar school in Waukegan, Illinois, to integrate engineering activities as early as possible. They’ve used tuning forks and cup-and-string phones made of different materials to introduce first-graders to the engineering process. “A lot of times if we try to get girls into mechanical engineering programs, the norm is that you go to a high school,” says Hall. At that point, they’ve often already decided on other subjects. Hall says that by also focusing on the societal impacts of engineering, educators can make the field more attractive to young women in particular. “A lot of times girls and women like to be doing something that helps people or that’s going to make a difference,” she says. “What I was interested in was this energy problem. I was intrigued by that, and it led me to mechanical engineering. I think that for a lot of girls it can be that way. But I also think there’s a role in coming into the classroom a lot earlier and getting people a lot more acquainted with what the engineering process actually looks like.”

More Online


Two Fuels Are Better Than One

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And much of what we do now is invisible,” he explains, sharing an
example.

“For the average person, the concept of a smart phone is
accessible than the idea of a computer,” he adds, pointing to his
smart phone. “And even though the software is incredibly
complex, we don’t think twice about using it. But the
people who laid out the design. If you have so much invisible
software, it’s even harder to understand how something works.”

“Equally invisible to the average person and perhaps less
accessible than the concept of a smart phone’s capabilities is
genetic editing via CRISPR technology. A method that cuts and
replaces DNA at precise locations in a cell. In August a study was
published in the journal Nature by a team of researchers from the
United States, China, and South Korea who corrected the mutated
gene behind the disease hypertrophic cardiomyopathy in human
embryos. This scientific breakthrough raised numerous ethical
concerns on the already controversial subject of human genetic
engineering. The ethical implications of such emerging technolo-
gies comprise an area in which the Center for the Study of Ethics in
the Professions (CSEP) at Illinois Tech and faculty associates
are working to establish ethical guidelines.

Biostatistic Elisabeth Hildt heads the center, which has been
a touchstone for many in the ethics community at-large since
its establishment in 1976. Former head of the Research Group on
Neuroethics/Neurophilosophy at Johannes Gutenberg University
Mainz (Germany), Hildt says that CSEP’s Ethics Code Collection,
which Librarian and Information Researcher Kelly Laas compiled
from some 1,500 organizations, is an especially valuable resource
for today’s ethical challenges. It is the largest database of
individual codes of ethics and guidelines in the world.

“Ethics codes and guidelines offer a huge opportunity to shape
technology development, not just to recommend individual or
company behavior. They can help to provide direction on whether
or not new technologies should be developed. It makes use of
Crash Course videos and similar technologies, where modifications can be made to
the genetic endowment of an organism,” says Hildt. “What does it
mean to have something implanted in your brain? Is there a way
to manipulate people through it? What do people think about
having different types of technology in their bodies? Do we really
want this?”

Shortly after her arrival on campus in 2014, Hildt and postdoc-
toral student Geoff Holtzman began a two-year project funded
by the Swiss Cogito Foundation that examined the ways that
neuroscience and ethics intersect. Last year they organized the
symposium “Does Neuroscience Have Normative Implications?”
drawing experts from around the country. And earlier this year,
the Human Sciences after the Decade of the Brain, a book that
Hildt co-edited, was published.

“Engineering, genetic or otherwise, has been a mainstay of the
Ethics Center, in particular since 1987, when the late Vivian Weil
came on board as director. An Illinois Tech philosophy faculty
member for more than 40 years, Weil, along with Davis and Robert
Ladekovsky, emeritus faculty associate, initiated ACT, Illinois Tech’s
program that many colleges and universities around the country
have copied. Ethics Across the Curriculum.

“Building the center is what we focused on issues that the university was very much interested in, like
engineering ethics,” Davis, CSEP senior fellow, explains. “The reason we did Ethics Across the Curriculum was that a couple of mechanical engineering faculty wanted to integrate ethics into
their classes. We had nothing that was suitable for them so we spent a year developing materials they could use.”

Initially taught to Illinois Tech faculty, the National Science Foundation (NSF)-funded curriculum was soon offered to faculty from other institutions who spent two weeks during the summer on Mies Campus learning how to integrate ethics into
their technical courses. Davis says that a major goal of the program was to "build a Culture of Responsible Research and Practice in STEM" project aims to develop guidelines for identifying ethical problems and navigating the decision-making process within a STEM department or lab. Select doctoral students in biology, physics, biomedical engineering, and electrical engineering are conducting interviews with undergradu-
ates, peers, and staff to determine areas of ethical concern and to develop laborato-
y-specific ethical guidelines.

“Ethical issues are about how faculty should interact with students and mentor them and how researchers can make
decisions about understanding their data and presenting their data in a way that is responsible, that can best inform people, and that doesn’t direct people in the wrong way,” says Brey. “How confident do we need to be? No one person can
know everything.”

Illinois Tech students also have two extracurricular opportunities to explore ethics topics. The ethics club, QED: The
Ethical Debaters, meets weekly over lunch and once a month hosts a panel of professional ethicists on campus. It is only one facet of a
center that she made her first stop when
considering the ethics of computer science. “To me, this is an exciting
field, and I was excited to see so many students interested in
learning about it,” she says.

Brey says the hope is that by leading
discussions and sharing ways to apply professional ethics to their daily work, the students develop
a sense of responsibility to the vast
circle of stakeholders that are
affected by their work.

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More about Ethics Across the Curricu-


rowing up in Tabriz, Azerbaijan, Alireza Khaligh (Ph.D. EE ’06) sometimes accompanied his father to his job at the local electric power plant. The sight of the generators, smokestacks, and spinning turbines along with conversations he had with his father made such a profound impact on Khaligh that he turned to constructing circuits and electronic components as an adolescent hobby. With an aptitude for mathematics and physics, Khaligh had scored an academic trifecta by the time he received his doctorate: He ranked first in both his bachelor’s and master’s power engineering programs at Sharif University of Technology and first in the Ph.D. qualifying examination in the Department of Electrical and Computer Engineering at Illinois Tech.

“As a Ph.D. student, he was able to co-author eight journal papers with six of them as the lead author,” says Ali Emadi, professor and Canada Excellence Research Chair in Hybrid Powertrain at McMaster University, who served as Khaligh’s advisor during his former tenure at Illinois Tech. “Dr. Khaligh is truly innovative, exceptionally hardworking, and a highly productive world-class researcher and educator.”

In a telephone conversation from the University of Maryland, College Park (UMD), where he serves as an associate professor of electrical and computer engineering and director of the Maryland Power Electronics Laboratory, Khaligh says his achievements are the result of a simple formula. “I work hard and always have faith in God,” he says, adding that a little good luck doesn’t hurt. “Electrical engineering was the perfect subject for me. Some people oscillate around an axis, going back and forth between subjects. I knew what my passion was and wanted to get from this point to that point, so I worked hard.”

Recipient of a 2017 Illinois Tech Outstanding Young Alumnus Award, Khaligh has brought in more than $5 million in research funding for his power electronics converter projects as well as for projects on electric vehicles, energy harvesting, and undergraduate education programs since coming to UMD in 2011.

“The concepts that everybody is trying for in energy conversion are efficiency improvement, smaller size, and greater reliability,” says Khaligh, whose team is preparing to deliver prototypes of an auxiliary power-supply device to The Boeing Company; the culmination of a multi-year project. “In an aircraft there are individual air-conditioning units, as well as TVs and screens used as infotainment that are all powered by auxiliary power supplies that are supplied by generators. We designed the power supply to convert the three-phase voltage from the generator to a low direct-current (DC) voltage to provide power to the auxiliary load on the plane. Traditionally this was done on a much bigger, heavier, and inefficient scale. The UMD team is also building a prototype of a new converter for electric cars that combines the chargers for the main 400-volt battery and the auxiliary 12-volt battery that powers the headlights, radio, fan, and other components, much like in a plane.

Khaligh is also continuing two projects that he began at Illinois Tech while he was an assistant professor from 2007 to 2011: researching energy-harvesting systems and overseeing the National Science Foundation (NSF)-funded Research Experience for Undergraduates program that focuses on hybrid-electric vehicle technologies. Khaligh is an expert in the Energy, Power, Control, and Networks Program at the Electrical, Communications, and Cyber Systems (ECCS) Division at NSF, organizing panels and making funding decisions for grant proposals from universities across the country. Khaligh is contemplating his own team’s future projects, thinking back to the power plant that played such a central role during his childhood.

“Transportation electrification is one of the inevitable ways of independence from oil. There are over 250 million registered passenger vehicles in the United States. More than 40 percent of greenhouse gas and 70 percent of emissions come from transportation, and for a long time transportation has been 99 percent dependent on only one source of fuel, which is petroleum,” he says. “Electrification of transportation will create new opportunities from reducing CO2 emissions and reducing greenhouse gases, to new jobs for the next generation of engineers and scientists. We believe that our work will contribute to improving the quality of all human life.”

MORE ONLINE
Maryland Power Electronics Laboratory: khaligh.ece.umd.edu

IN PERPETUAL MOTION

By Marcia Faye
A group winds its way down the white brick stairwell of Building 212 on the campus of Argonne National Laboratory (ANL), near west suburban Lemont, Illinois. The voice of one member, Nestor Zaluzec (PHYS ’73)—senior scientist, inventor, and educator—booms out over the sound of equipment as he leads the way next door to the significantly quieter confines of the Sub-Ångstrom Microscopy Microanalysis Laboratory, or SÅMMLab. As Zaluzec unlocks the facility, which sits on a 100-ton concrete base, he can barely contain his excitement. Within SÅMMLab, part of the ANL Center for Nanoscale Materials, is the $8 million Argonne Chromatic Aberration-Corrected Transmission Electron Microscope FEI Titan, or ACAT. But the building’s design is meant to convey even more to come. It is being readied for the arrival of the ng-AEM—“the world’s highest-resolution, highest-sensitivity analytical electron microscope”—slated for delivery in 2018.

SÅMMLab was specifically built to house the next generation of subatomic resolution instrument, and concepts from it have been adopted in other laboratories around the world,” says Zaluzec. A member of ANL’s Photon Sciences Division, he is a principal figure in the design and implementation of the ng-AEM as well as related scientific instruments and resources at ANL. He notes that SÅMMLab, which he describes as a “building inside a building inside a building,” was an ANL design/build team effort, and its performance has surpassed the team’s design goals. Upon entering one of the microscope rooms, Zaluzec points out waffle-padded walls that resemble a car’s radiator, designed to cool yet minimize the perturbing effects of air flow. “Each room also has its own vibration-isolation control zone; the microscopes are vibration-isolated from the walls, which are vibration-isolated from the floors, which are vibration-isolated from each area,” he explains. “The rebar used in construction of the floor is made of fiberglass because normal steel material is potentially electromagnetic and can create ground loops and fields. Surrounding the edges of the concrete are two additional vibration-isolation materials—neoprene and foam. Stray external electromagnetic fields in SÅMMLab were low enough that monitors were even able to detect the streetlights turning on and off during commissioning, while the acoustic noise/vibration isolation is under 30 decibels.”

ACAT allows researchers to study materials at a resolution of less than 1 Ångstrom; observing and studying atoms in materials is a routine task in this research instrument. For perspective, imagine that there are about 254 million Ångstroms in one inch and that one million Ångstroms make up the thickness of a sheet of paper. ACAT was the result of a 2004 United States Department of Energy (DOE) project involving a team of national microscopy experts and industry partners FEI and CEOS, and was tailored to examine nanomaterials such as metals, ceramics, catalysts, semiconductors, and superconductors, all at atomic resolution. Zaluzec and other members of the DOE team worked together to design and build the world’s first chromatic and spherical aberration-corrected instrument. The Cs/Cc aberration corrector, the device that enabled ACAT to currently be the world’s highest-resolution microscope, is a series of specially designed electromagnetic and electrostatic lenses, and adjusts for optical limitations typically present in all electron microscopes. ACAT, which is part of ANL’s suite of DOE national user facilities, is accessible to all members of the scientific research and education community.

Another first for Zaluzec’s research group and implemented in the new generation of electron microscopes is the ability to simultaneously examine and chemically analyze by X-ray spectroscopy nanoscale specimens undergoing dynamic processes in liquids and gases. This was previously impossible in electron microscopes.

“We’re developing new technologies and methodologies to study nanomaterials in their native states and/or environments.”

—Nestor Zaluzec (PHYS ’73)
microscopes because they utilize a vacuum chamber to eliminate air molecules from interfering with the electron beam. The next generation of soft matter such as polymers, biological systems, and electronic devices will have a subangstrom probe as well as the highest-efficiency detectors in the world, says Zaluzec.

"We're developing new technologies and methodologies to study nanomaterials in their native states and environments..." says Zaluzec, "to study and ultimately understand how they evolve, grow, and change over time." Nestor Zaluzec was hired to wash test tubes until management realized that he had programmed a new calculating machine during his free time. At the Sherwin-Williams Research Center, where he later obtained a part-time job, he continued to work there and in the Computation Institute, established by Argonne and the University of Chicago. At Argonne, Zaluzec has been recognized with numerous national and international awards, the most recent being the Microscopy Society of America (MSA) 2017 Distinguished Scientist Award for Physical Sciences.

"I do what I do because not only is it important to solve vexing problems in today's complex and technologically demanding society, but it's also fun. I get a little bit of a physical high in the sense that I've answered a question and solved a problem. I feel really good about it! And then, it's like, okay—what are we going to do tomorrow?" says Zaluzec, a youthful joy in his voice. "We need to pass this excitement on to the next generation of scientists."
For Carolyn Shapiro, Chicago-Kent College of Law associate professor, the words “we the people”—the same words that begin the United States Constitution—seem to define her life. Even before she entered law school, Shapiro knew that she wanted to assist people in ways that were impactful and lasting. She first thought about a career in social services. After college she worked for Jewish Vocational Services and for the University of Chicago Law School, which is where she discovered her passion for constitutional law: “I’m interested in the commitments we make to each other as citizens of the same country, as members of the same polity,” she says. “I’m interested in how we navigate our differences.”

After graduation she clerked for Supreme Court of the United States Associate Justice Stephen G. Breyer and also former Chief Judge Richard A. Posner of the U.S. Court of Appeals for the Seventh Circuit, who retired in 2017. She says that her year clerking for Breyer, who was then relatively new to the Supreme Court, gave her much more than the knowledge of the law and exceptional dedication to seeing that Illinois law was upheld for all residents." she says.

Carolyn also blogs on ISCOTUS.org and contributes to the Huffington Post as well as the American Constitution Society Blog. Shapiro is now a recognized scholar and Supreme Court expert whose opinions and comments are featured in both local and national media outlets, from WTTW’s Chicago Tonight and Chicago Tonight to the Washington Post. Shapiro also arranged for Supreme Court Justice Elena Kagan, whom Shapiro describes as being an inspiration and “the best teacher I’ve ever had” — to speak at Chicago-Kent. Kavanaugh’s visit caps Shapiro’s return to the university after a two-and-a-half year hiatus (2014-16) as Illinois solicitor general, a position that allowed her to maximize her public service efforts. She reviewed the civil appeals and criminal appeals briefs filed in the Illinois Supreme Court, the U.S. Court of Appeals (Chicago), and the U.S. Supreme Court by the more than 40 attorneys representing the state. Shapiro also filed briefs and argued on behalf of the state in the U.S. Supreme Court, the Illinois Supreme Court, and both state and federal courts of appeals. In 2017 Shapiro was also honored by the Chicago Lawyer Chapter of the American Constitution Society for Law and Policy with an Ahmad M. Ali Award for advancing the progressive mission of the organization. In addition to her extensive depth of knowledge of the law and exceptional experience with the U.S. Supreme Court and the Seventh Circuit Court of Appeals, Carolyn brought a strong passion for public service to our office,” says Illinois Attorney General Lisa Madigan. “I was confident the people of Illinois would greatly benefit from her expertise and dedication to seeing that Illinois law was upheld for all residents.”
You could say Bob Hoel (BA ’70) became a whole new person at Illinois Tech. As an introverted first-year chemistry student, he discovered that he loved people while working with the Student Government Association, and he was eventually elected student body president. That experience led him to a successful 34-year career in sales and management. Having retired early, Bob can now be found volunteering in the community and advocating for different causes.

One of his causes is Illinois Tech, so he has included the university in his will, becoming a member of the Gunsaulus Society. The Gunsaulus Society honors those who have arranged for estate gifts to the university with special events and recognition.

Benefits of a Real Estate Gift in Your Will or Trust:
• Help ensure Illinois Tech’s future.
• Leave a legacy of giving back.
• Give without affecting your current cash flow or standard of living.
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• Direct your estate gift to a particular purpose.*

If you have named Illinois Tech as a beneficiary in your estate plan through your will, trust, IRA, or retirement plan, please let us know so that we may acknowledge your generosity and include you in the Gunsaulus Society.

Visit iit.edu/giftplanning to learn how you can benefit from these giving methods and more. Contact Dean Regenovich, Office of Gift Planning, at dregenovich@iit.edu or 312.567.5018.

*Please check with us to make sure the gift can be used as intended.
President Alan Crabb (left) and Illinois Tech Trustee Chris Gladen (center right), and J. B. Pritzker (right) present Howard Tullman of 1871 with the first Tech X Award. Photo: JM Photo Chicago

Members of the 50th Reunion committee took on the role of President Alan Crabb addresses attendees at the Reunion Luncheon, which honored the 50th, 25th, 35th, and 40th reunion classes and members of the Golden Society, individuals who graduated more than 50 years ago. Photo: Bonnie Robinson

Participants in the 10th Reunion reminisced around the Class of 2007 bench, their student gift to Mies Campus when they graduated. Photo: Bonnie Robinson

Kwame Mensah (LAW ’11), Gaithersburg, Md., was promoted to senior patent attorney for AstraZeneca, where he manages all issues related to the company’s immunology portfolio. Previously he served as in-house counsel for AstraZeneca, and as patent agent and associate at McDonald Boehnen, Harrell & Berghoff.

Charles Ventura (M.A.S. MAP ’14), Chicago, is chief executive officer of Homokos Mediul, Inc.

Anne Cooper (LAW ’15), Chicago, is an associate at Fragomen, Del Rey, Bernsen & Loewy, where she assists large companies and their employees with a variety of U.S. immigration matters. Previously she served as a law clerk at Fragomen’s New York and Chicago offices.

John Krymnicki (LAW ’15), Orlando Park, Ill., recently relocated to Orlando, Fla., and joined the commercial real estate company C2S Partners as a retail investment sales director.

Moriem Sakrouhi (ARCH ’16), Chicago, a junior architect at BBP Group, won second place overall and first place as the Community People’s Choice Award (Architecture) for her app MAPALL in the Ford/Mobilus New York Challenge.

Emma Ghariani (BA ’17), Chicago, is a construction project manager with Blinderman Construction after completing a two-year internship with the company.

Timothy Henry (ME ’17), Chicago, was commissioned as a second lieutenant in the U.S. Army. Assigned to the U.S. Army Corps of Engineers, he is part of the Strike Brigade of the 18th Airborne Division. Henry was designated a Distinguished Military Graduate for ranking in the top 20th percentile of the national order of merit list. He married Gillian O’Byrne in June.

Niharika Karla (M.A.S. DSC ’17), Chicago, is working for AspenTech in Boston, aiming to create a world with zero breakdowns, zero casualties, and zero environmental hazards through the use of machine learning.

Leana Omer (AE ’17), West Hills, Calif., appeared in the Los Angeles Daily News (May 14) article “For This LA Mother and Daughter, Work Is Rocket Science and Every Day Is Mother’s Day.” about how Omer and her mother, Diane, are both scientists employed at Aerostat Rocketdyne.

Spencer Peterson (ME ’17), Wheaton, Ill., was commissioned as a second lieutenant in the U.S. Army in May. Assigned to the Transportation Corps, he is part of the 18th Support Brigade. Peterson married Rachel Steves in May.

Stephen Yonke (AE ’17), Wheaton, Ill., was commissioned as a second lieutenant in the U.S. Army and is a cyber officer. Yonke has been designated a Distinguished Military Graduate for ranking in the top 20th percentile of the national order-of-merit list.

Students celebrated their Spirit Day 2017 Illinois Tech pride alongside alumni at the Homecoming Carnival.

Save the date for the 2018 Alumni Awards luncheon on Friday, April 20 in Hermann Hall. Please be on Mies Campus to help us celebrate our innovative and exceptional alumni.

DuPage Area STEM Expo Alumni Program
Saturday, February 24, 2018
Illinois Tech Rice Campus
Families are invited to the second annual Dupage Area STEM Expo event, hosted by the School of Applied Technology. Your school-aged children will have a blast at this hands-on exploration of science, technology, engineering, and mathematics!

SAVE THE DATE!
ALUMNI AWARDS 2018
Save the date for the 2018 Alumni Awards luncheon on Friday, April 20 in Hermann Hall. Please be on Mies Campus to help us celebrate our innovative and exceptional alumni.

CONNECT TODAY
Are you connected to the Alumni Association? When you update your mailing address, phone number, and email, you ensure that you receive up-to-date information from your alma mater, including alumni invitations, networking opportunities, and university news. Visit alumni.iit.edu/information-update to update your contact information today.

Visit alumni.iit.edu/sign-up to join today.
Creating His Own Luck

Judson Althoff’s late mother, a high school calculus teacher and celebrated debate coach in his small hometown of Wooster, Ohio, inspired him to embrace mathematics and sharpen his persuasive skills. Althoff (ME ’95) says, more importantly, she presented him with a gift that charted his success in the many directions his life has taken him.

“[My work ethic] is probably the single biggest thing she left behind for me; this notion that the harder you work, the luckier you get,” he explains. Althoff shared highlights from his childhood, his time at Illinois Tech, and his rise to Microsoft executive vice president for worldwide commercial business at a talk for students, faculty, and staff on Mies Campus when he visited the university to accept the Alumni Association’s 2017 Professional Achievement Award. He told the group that after graduation he received a surprising surplus of computer science job offers and, with a growing family to consider, accepted a position with a Canadian startup that outfitted mainframe systems with Internet capabilities. Althoff said he began to embrace all things high tech, teaching himself programming and delving into the intricacies of every computer the company serviced. After a few years, he felt he was ready to join a company “that could move the needle” and persuaded a recruiter to get him an interview for a position answering sales calls at Oracle in Chicago. “I said this is what life is handing me right now and I’m going to make the very best of it. I jumped in and answered the phones at Oracle in a little cube with three other guys,” he shared with his audience. “I worked my way up to become one of the youngest senior vice presidents the company has ever had. Four years ago Kevin Turner [former Microsoft chief operating officer] recruited me to run Microsoft North America.” In 2016 Microsoft Chief Executive Officer Satya Nadella named Althoff to his current role leading Microsoft’s Worldwide Commercial Business. Althoff predicts that digital transformation—which he defines as “a new wave of business innovation that’s fueled by cloud technologies like artificial intelligence, augmented reality, and data science”—will be the hot topic in technology for at least the next decade. Althoff shared stories of customers, such as Land O’ Lakes and Ecolab, that are partnering with Microsoft on their digital transformation journey. Althoff told the students in the audience that while the university will academically prepare them for this next advancement in technology, they would be wise to remember the deeper lessons that comprise their education. “They’re come a day when you’re not the best programmer anymore and your differential equations aren’t quite what they used to be,” says Althoff. “But those fundamentals—how you problem solve, how you work together, how you collaborate for a greater end—that will stick with you. That’s what IIT taught me.” —Marcia Faye
Tech alumni to meet, network, and share their experiences. “We want to help them build upon the efforts they made while they were studying in Chicago and keep on developing their networks and careers.”

Though the organization is not even a year old, the members of the Europe Alumni Association assumed the huge undertaking of hosting the second Europe Alumni Gathering, held in Paris from June 30 through July 2, 2017.

The event’s theme focused on global challenges—energy, health and wellness, security and water—chosen because they mirror Illinois Tech’s Engineering Themes program, which explores areas that alumni, faculty, and partner schools can impact to enhance the entire global population.

“Global challenges involve everyone, regardless of where they come from or the field they studied or work in,” says Leroy. “It was a unifying theme that allowed for rich debates between engineers, architects, and lawyers from different countries—few other themes would have been that universal and allowed us to cross the lines so easily.” [Visit alumni.iit.edu/paris-2017 to view conference materials and photos from the event.]

The last Global Alumni Gathering was held in 2014 in Chicago, and the next will be in 2019 at a location yet to be determined. In the meantime, connect with the Alumni Association through social media at alumni.iit.edu/connect or join the online community at alumni.iit.edu/login to find information about local chapter involvement and alumni gatherings in your area.

Illinois Tech Goes Global

The mark of an Illinois Institute of Technology education stretches throughout the world, and alumni around the globe demonstrate its influence every day. Last fall, alumni in Europe joined together to form the Europe Alumni Association.

The Europe Alumni Association’s main objective is to connect international alumni and renew in them the sense of belonging they felt when they were students in Chicago. “That amazing experience in Chicago connected us for life, but European alumni tended to lose sight of one another when they went back to their home countries,” says Charlotte Leroy (LL‘11), Europe Alumni Association president. To remedy this, Leroy helped to establish the association with the intent to encourage European Illinois alumni to meet, network, and share their experiences. “We want to help them build upon the efforts they made while they were studying in Chicago and keep on developing their networks and careers.”

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This year marks the 80th anniversary of the Chicago Bauhaus. In 2019 the original Bauhaus will observe its centennial. Martin Thaler, Institute of Design studio professor, offered the course Bauhaus Futures this past spring in anticipation of the 100th anniversary. His students selected three Bauhaus classics—the Dell Wine Jug, the Wagenfeld Lamp, and the Cesca Chair—and reconsidered their underlying design principles then applied the social and cultural context for today. They began the workshop by examining the actual artifacts, which included a visit to the archival collections of the Art Institute of Chicago.

With its simple but sturdy tubular steel frame, the Cesca Chair, designed by Bauhaus master Marcel Breuer in the 1920s, used the new manufacturing technology of bending tubular steel. Working from Breuer’s maxim, “Let our dwelling have no particular style,” Thaler’s students Andrew Bates (DSGN 2nd year) and Isabel Dec (DSGN 2nd year) created the Basis Chair guided by their user research: People live in less space, move often, and combine home and work lives. Their result is a versatile piece of furniture that can function as either a chair or a table surface, ready to take users into the next 100 years.

MORE ONLINE
“The Many Lives of a Very Common Chair”: http://nyti.ms/1vXJApV

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Illinois Tech is #1 in Illinois for highest average salaries of non-M.B.A. master’s graduates—(PayScale 2017)
Illinois Tech’s third annual Giving Day on November 7 promises to be the best one yet— with your help, of course!

Here’s how you can get involved:

✔️ Make a gift to support your college, scholarships, general university funds, or your favorite Scarlet Hawk sport.

✔️ Volunteer to be an online ambassador and share with your friends to help our cause— visit hawksgive.iit.edu for more information.

✔️ Follow Illinois Institute of Technology Alumni Association on social media for updates and videos throughout the day.

hawksgive.iit.edu
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Make a gift online at hawksgive.iit.edu on November 7 to be part of the action. Contact us at annualgiving@iit.edu for more information about how you can help make Giving Day 2017 a success.