CEIS links faculty with companies

Clerio changing eye care

Women engineers share experiences
As our President Richard Feldman explained in a recent Words from Wallis Hall message, “Whether it’s the next medical breakthrough, the next patent, or the next sustainable plan to help people in need, entrepreneurship is part of who we are, and it consistently informs our educational mission.”

This newsletter is one way we do that. And that’s why we have a new look on the cover.

The previous title, Full Spectrum, aptly described the breadth of what we offer to our students. But as we send our newsletter to a wider audience, I want readers to see at a glance, in bold letters, that this is a publication of the Hajim School of Engineering & Applied Sciences at the University of Rochester.

We’re also showing through a series of photographs how the University’s mission to “learn, discover, heal, and create” is manifested in the work done by our students and faculty.

The other change in this issue is a new section on technology transfer—an important but often underappreciated tool in translating the great ideas and inventions that come out of our faculty members’ labs into products and services that can benefit us all. In fact, an appreciation for tech transfer and entrepreneurship is essential to engineering. As we tackle the grand challenges facing society, at some point the solutions need to go further than a lab prototype or a journal publication.

In this issue, we show how the Center for Emerging and Innovative Sciences helps jumpstart this process, connecting faculty members and companies and supporting their collaborations on critical technological challenges. We highlight an exciting “Venture Ready” technology from Danielle Benoit of biomedical engineering. And we describe how a transformative idea from the lab of Wayne Knox is about to change eye care as we know it, thanks to a start-up company called Clerio Vision Inc.

This is an important part of what we do, not only at the Hajim School, but at the University as a whole.

As our President Richard Feldman explained in a recent Words from Wallis Hall message, “Whether it’s the next medical breakthrough, the next patent, or the next sustainable plan to help people in need, entrepreneurship is part of who we are, and it consistently informs our educational mission.”

So, watch for more updates on Hajim School technology transfer in upcoming issues, alongside articles about all the other exciting things our faculty, staff, students, and alumni are doing. “Full Spectrum” is no longer on the cover, but it’s still at the heart of all we do.
Lisa Norwood is clearly revved up as she checks to be sure some 400 graduating seniors are ready to file into Kodak Hall at Eastman Theatre for the Hajim School diploma ceremony. Students enthusiastically exchange high fives with her.

The assistant dean for undergraduate studies—herself an alumna of the engineering school—has been preparing for this moment for months. Organizing the school’s commencement activities each year is a major commitment for Norwood—but not the only one by any means.

With a staff of five, she is responsible for setting strategic priorities, monitoring student progress, enforcing academic standards, reviewing petitions and appeals, providing academic counseling, and acting as an advocate for student concerns and needs with the faculty and administration—all in support of about 1,800 undergraduate engineering students.

This includes serving as the faculty advisor for undecided engineering students; promoting academic opportunities such as study abroad, internships, and the new NAE Grand Challenges Scholars program to Hajim School students; and keeping abreast of faculty and departmental policies, then interpreting them for students.

She is also dedicated to increasing the number of women and students of color studying science, engineering, and technology. The STEM-Gems program she designed dramatically increased the retention of low-income, first-generation, and underrepresented racial minority students in the Hajim School and earned a Meliora Award in 2016. The program includes one-on-one mentoring with upperclass STEM-Gems students, study halls, academic support workshops, and support to attend national conferences and career days.

“Lisa is an outstanding member of the Hajim team. She is knowledgeable about every aspect of the different engineering degree programs, and she is dedicated to helping our students succeed,” says Hajim School Dean Wendi Heinzelman. “Her commitment to ensuring access to all students and to enabling different on-ramps into engineering, such as through the development of new clusters that are attractive to students from a variety of backgrounds, ensure that the Hajim School continues to move forward in positive ways.”

At one time, Norwood wanted to be a forest ranger and later became interested in coastal shore management while earning her BS in geomechanical engineering here. She later returned to the University, planning to earn a teaching degree while working as an academic advisor with the College Center for Advising Services.

“I had never stepped foot in an advising office as a student, but I loved working with students,” Norwood says. It was a turning point. Norwood switched to a master’s in higher education administration, completed her degree in 1995, and became assistant dean that year.

“It’s not what I planned originally,” Norwood says. “But I would like to think that Judith Walk, my counterpart when I was an undergraduate, would be proud of what I’ve become.”

“I am dedicated to increasing the number of women and students of color studying science, engineering, and technology,” Norwood says. “The STEM-Gems program I designed dramatically increased the retention of low-income, first-generation, and underrepresented racial minority students in the Hajim School and earned a Meliora Award in 2016. The program includes one-on-one mentoring with upperclass STEM-Gems students, study halls, academic support workshops, and support to attend national conferences and career days.”

Research associate Xiaofeng Qian; Joseph Eberly, the Andrew Carnegie Professor of Physics; and Nick Vamivakas, associate professor of quantum optics and quantum physics, resolved a “weirdness” of quantum mechanics—wave-particle duality—by establishing its intimate connection to entanglement in a paper published in Optica.
Jim McGrath is always thinking one step ahead when he’s doing a research project for SIMPore, a Henrietta-based company that uses silicon nanomembrane technology developed in the biomedical engineering professor's lab.

The Center for Emerging and Innovative Science (CEIS) helps McGrath keep one step ahead.

For example, SIMPore recently contracted with McGrath's lab to develop ways to filter tentative exosomes (small, cell-derived vesicles) from blood to provide earlier diagnosis of cancer. But McGrath says, "CEIS has allowed us to always extend the scope of a project a bit, allowing us to push ourselves down the development pathway much faster than we could otherwise."

"The original project did not involve the detection part, but ultimately, that’s something we will need," McGrath says. "CEIS has allowed us to always extend the scope of a project a bit, allowing us to push ourselves down the development pathway much faster than we could otherwise."

For nearly 30 years, CEIS has been linking faculty members at the University of Rochester, RIT, and other regional universities with local companies on projects to help spur economic development. More than 70 such projects during the last six years have involved Hajim School faculty members. During the last five fiscal years, CEIS estimates that projects it has supported have created 168 jobs, retained 161 others, and have had an overall economic impact of $306.9 million.

As one of 15 New York State Centers for Advanced Technology (supported by NYSSTAR, a Division of Empire State Development), CEIS can bolster the funding a company provides for a research project with additional state money. Typically, a company will provide $60,000, CEIS will provide $30,000, this, combined with a reduced deduction for University overhead, "is plenty to support a PhD student for a year and do something meaningful," says CEIS director Mark Blocko, a distinguished professor and chair of electrical and computer engineering.

"This is especially important for some of the junior faculty members, who don’t have federal funding yet," adds Paul Ballentine, CEIS executive director.

Key industry partners over the years have included Bausch & Lomb, Harris, Corning, Optics, and Thermo Fisher Scientific.

"Sometimes the company has a problem they want to solve, and we find a faculty member to pair them up with. Other times the faculty member invents something, and they’re interested in getting a company interested in capitalizing on that," Blocko says. "So, it can work both ways."

For example, with CEIS support, Carestream Inc., a leader in medical and dental imaging, has joined forces with several faculty members in the Rochester Center for Biomedical Ultrasound on developing new technologies to help the company expand its use of ultrasound imaging for medical diagnosis.

CEIS has also provided important support for University start-ups, most recently for LighTopTech and Clerio Vision (see story on page 8). Between the support from CEIS, access to talented University of Rochester graduates, and over $18 million in funding, Clerio is now moving into clinical trials across a number of important products.

A highly trained workforce, not just technology, is critical to economic development. So, Knox was especially pleased when one of his former PhD students, who helped develop the femtosecond laser technology with CEIS funding support and had since moved to Boston, recently asked Knox to write him a recommendation letter for a job offer in California.

Knox suggested another option. As a result, Lisen Xu ‘13 (PhD) is instead back in Rochester—now working for Clerio Vision. After B&L was acquired by Valeant, the project was taken over four years ago with the founding of Clerio Vision Inc. Mike Tottenman, Clerio’s founder and CEO, says continued CEIS support since then has been critical for:

1. obtaining venture capital financing. "Being able to demonstrate that there’s a strong University partner in CEIS to offset some of the research costs is very helpful," Totterman says.

2. providing access to the expertise and the specialized labs and equipment of the faculty members directly involved in developing the technology, including Knox, Krystel Huxlin, Jonathan Ellis (now at the University of Arizona), and Paul Funkenbusch. "This includes very specialized testing equipment that doesn’t exist anywhere else," Totterman notes. "Even if we had unlimited funding it would be very difficult to build them because they are so unique."

"So, when we went to raise our Series A, B, and C rounds from investors, we always profiled the relationship we have with CEIS, as something that is unique and differentiating and allows us to move forward faster and much more cost effectively."

CEIS funded a project enabling Kilean Lucas, a PhD student in the lab of Jim McGrath, to spend time working at SIMPore, a Henrietta-based company. Though Lucas plans a career in academia, he says the experience was beneficial. "I don’t think as an engineer you can ever be solely academic or solely in industry," he says. "You have to have some sort of collaboration, or cross talk between the two. And being able to work within industry and understand what they want, and what their goals are, helps academic researchers better design what they’re doing in the lab."
F
t our years ago, with successful University of Rochester start-ups VirtualScopics and iCardiac under his belt, Mikael Totterman figured it was time to take a break. Instead, Totterman dived into a third start-up—Clerio Vision—which is on the verge of changing eye care as we know it.

Thanks to a new technology that originated in the lab of optics professor Wayne Knox, Clerio is developing new ways to write vision corrections into contact lenses and intracocular lenses. The company has even found ways to write vision corrections directly into the human cornea. And unlike LASIK surgery, the procedure can not only correct the cornea nonsurgically, but be used on the same cornea potentially multiple times as a person ages. Without any of the flap-cutting part of the current LASIK operation that prevents many people from electing to have the procedure.

Called laser-induced refractive index change (LIRIC), the technology uses femtosecond laser pulses (a billionth of a second) to “change water concentration on a micron by micron basis, which changes optical properties,” says Totterman, Clerio’s founder and CEO. Contact lenses, intracocular lenses, and the human cornea all have specific levels of water concentration, so LIRIC can be applied to all three.

That covers a huge swath of the vision care market. And given that “98 percent of humans could benefit from vision correction at some point in their lives,” Totterman says, “this is one of those start-ups that has the potential to touch a very large part of the human population.”

Knox considers it nothing short of a “miracle” that Totterman and his team arrived on the scene at just the right time to pump new life into a project that was in danger of running out of funding. The project was initially conceived soon after Knox, a PhD student on the project, which soon encompassed modifying contact lenses as well.

A third application materialized when Krystal Hudnul, professor of ophthalmology, suggested the possibility of using the technology directly on the human cornea and joined the project as a collaborator. Jonathan Ellis (now at the University of Arizona) and Paul Frankenbusch of mechanical engineering later joined as well. And then, just as the technology was about to be commercialized, Valiant Pharmaceuticals acquired Bausch & Lomb in 2013 and abruptly cut support for research. This could have been a devastating setback, except for another “miracle,” Knox says. B&L, which co-owned the patents generated by the project, turned them over to the University.

That opened the door for Totterman and his team. Totterman describes his first reaction as being available, my first reaction was we’ve got to figure out a way to structure a business around this before it gets off track.”

“Mikael Totterman

“When I found out about the technology being available, my first reaction was we’ve got to figure out a way to structure a business around this before it gets off track.”

Mikael Totterman

“This is the most interesting project I’ve ever worked on. So, looking back four years ago, I’m happy I didn’t take any time off!”

Mikael Totterman

A combination of factors eased the way, for example:

• Scott Catlin, head of URF Ventures, the University’s tech transfer office, drew on his previous experience in the vision care industry to help recruit heads of software, engineering, and optical design.

• CEIS continued to sponsor collaborative, Clerio-and New York State-funded projects with the labs of Knox, Hudnul, and Ellis. This not only kept the research on track but provided opportunities for Clerio to hire former students from those labs who were already familiar with the technology and able to “hit the ground running.”

• An internal grant from the University’s Clinical and Translational Science Institute kept the project going until new funding could be arranged by Clerio.

• Additional funding to help with the technology transfer process has been secured from the National Science Foundation’s Small Business Technology Transfer (SBTT) program, now into the second phase.

“This is a paradigm of what we would love to have happen more regularly—a start-up company that continues to work with the University in a virtuous cycle,” says Catlin.

Clerio, with offices at NextCorps and labs on University Avenue, now has more than 60 people working on the project in various capacities, some as full-time employees, some as part-time consultants, and some under a Clerio-funded University of Rochester research contract. The company is backed by about $18 million in venture capital and NSF funding. It anticipates completing clinical studies on its contact lenses in time to bring them to market next year. It will begin clinical trials on its device for noninvasive cornea surgery later this year, and a device for correcting intracocular lenses next year.

“Between 2019 and 2024 we’ve got quite a few products looking to come on the market,” Totterman says. “And each one of those is in a multibillion-dollar market segment.”

“This is the most interesting project I’ve ever worked on. So, looking back four years ago, I’m happy I didn’t take any time off!”

Mikael Totterman

About Clerio: Since forming in 2013, Clerio has raised $15 million and is on the verge of launching a device for non-invasive cornea surgery, a first in the industry. It is leveraging an industry-changing technology, laser-induced refractive index change (LIRIC), to address the needs of a $18 billion market in which current corrective software, LASIK, and excimer laser technology are limited by their inability to correct vision at the corneal level.

Current Offers:

• Contact lenses with intracorneal corrections
• Intracorneal corrections directly into the human cornea

Clerio is looking for investors to help bring these technologies to market.

Contact: mikael.totterman@clerio.com
I really liked that sort of style, of always having new things. That's something I would definitely like to try in my own lab."

As a tenure-track assistant professor at Rochester, Giacomelli will explore the applications of advanced imaging technology to other areas of surgery and medicine in general with the goal of improving diagnosis and surgical management of cancer.

Giacomelli’s PhD advisor at Duke University, Adam Whasil Lee, is “very serious about incorporating undergraduates into his research,” says Giacomelli.

“I really liked that sort of style, of always having new people coming in, especially undergraduates trying out new things. That's something I would definitely like to try in my own lab.”

**Biomedical Engineering**

Biomedical Engineering

**Chemical Engineering**

Astrid Müller joins the department as a tenure-track assistant professor, after serving as a staff scientist at the California Institute of Technology’s Beckman Institute.

Müller’s research focuses on understanding which properties or combinations of properties govern a material’s performance, particularly as it relates to solar energy. At the Beckman Institute, she was working to develop efficient methods of oxidizing water molecules, which involves the creation of hydrogen ions and oxygen molecules. At Rochester, she plans to take the next step by developing selective carbon dioxide catalysts capable of generating sustainable, carbon-neutral liquid fuels.

Müller received her PhD from the Max-Planck Institute of Quantum Optics and Ludwig-Maximilians-Universität München in Germany. She has more than 40 articles to her credit in a wide variety of peer-reviewed journals, including Chemical Reviews, Energy & Environmental Science, and Materials Horizons. In 2017, she was presented the Exemplary Research Mentor Award by the Chemical Physics Laboratory at the Blood Institute University. She also attended one of 10 world leaders to be named Young Investigator in Penfield, says, "It's exciting to be coming back to the Rochester area.

At Rochester, she will continue to research, with a particular emphasis on how mechanical signals into biochemical responses, a process known as mechanotransduction. At Rochester, she plans to continue that research, with a particular emphasis on how mechanical signals into biochemical responses, a process known as mechanotransduction. At Rochester, she plans to continue that research, with a particular emphasis on how mechanical signals into biochemical responses, a process known as mechanotransduction.

Her PhD work at the University of Cambridge focused on designing augmented and tangible interfaces that support creativity and social interaction through interactive play for young children with autism spectrum condition. Most recently, as a postdoctoral fellow at Carnegie Mellon University, she led a project that explores the design of an intelligent peer and collaborative tabletop game that fosters curiosity, exploration, and self-efficacy for science education.

Zhen Bai, who joins the department as a tenure-track assistant professor, is passionate about designing innovative interfaces that augment our cognitive, emotional, and social experiences in a playful and accessible way.

Data Science

Ajoy Anand, an instructional track assistant professor, is also a deputy director of the Goergen Institute for Data Science.

Anand came to the University from Carestream Health in Rochester, where he worked as technical manager in medical ultrasound. Before that, he spent 10 years as a senior research scientist and senior medical research scientist at Philips HealthCare Research. In his administrative role at the Goergen Institute, Anand is responsible for managing data science funding programs and identifying opportunities for expanding curricular offerings.

Anand's research has involved medical ultrasound and biomedical signal processing. He is currently working to automate ultrasound technology to make it readily available for emergency medical technicians and others who are not fully trained in ultrasound. Along with being coinventor on more than 25 scientific papers, he has coauthored more than 35 journal articles and conference proceedings. His technical interests are in time-series analysis, physical model-based predictive analysis, and biomedical data analytics.

Anand earned his PhD and MS degrees in electrical engineering at the University of Washington and his MS in biomedical engineering from the University of Texas. In the 2018-19 academic year, he will teach the data science capstone and practicum courses.

Computer Science

Zhen Bai, who joins the department as a tenure-track assistant professor, is passionate about designing innovative interfaces that augment our cognitive, emotional, and social experiences in a playful and accessible way.

As a PhD student in electrical and computer engineering at the University of Rochester, Heilemann was required to be a teaching assistant for Data Science. He will teach engineering computation, mechanical systems, introduction to solid mechanics, structures, and introduction to solid modeling.

Laura Slane joins the faculty as an instructional track assistant professor, after serving as a year as a tenure-track assistant professor of biomedical engineering at Trine University (formerly Tri-State University) in Angola, Indiana.

She is in mechanical engineering (Bucknell University), but her MS and PhD degrees are in biomedical engineering (University of Wisconsin-Madison). This reflects her interest in how mechanical principles can be applied to better understand the function of muscles, tendons, and joints to reduce injury risk and improve rehabilitation.

She received an NIH postdoctoral fellowship at KU Leuven in Belgium to study how ultrasound elastography could be used to measure soft tissue mechanics after total knee replacement.

However, at Rochester, as at Trine, Slane will be primarily an instructor, not a researcher. “I’ve always been interested in teaching,” she says, “and the past year at Trine really cemented that.”

At Rochester, she will teach classes in computer-aided design, statistics, and dynamics. She also hopes to have an opportunity to mentor students doing research projects. Slane, who grew up in Penfield, says, “It’s exciting to be coming back” to the Rochester area.

**Biomedical Engineering**

FACULTY APPOINTMENTS

“The process involved in early detection at cancer that is removed from the body was mostly developed in the 1950s century and has advanced very little since then,” says Michael Giacomelli.

However, as a postdoctoral fellow and research scientist at MIT, Giacomelli developed photon imaging methods to assist in the surgical treatment of breast cancer. The research could improve the success rate of surgery by enabling surgeons to evaluate tissue as it is removed from the body.

As a tenure-track assistant professor at Rochester, Giacomelli will explore the applications of advanced imaging technology to other areas of surgery and medicine in general with the goal of improving diagnosis and surgical management of cancer.

Giacomelli’s PhD advisor at Duke University, Adam Whasil Lee, is “very serious about incorporating undergraduates into his research,” says Giacomelli.

“I really liked that sort of style, of always having new people coming in, especially undergraduates trying out new things. That's something I would definitely like to try in my own lab.”

Whasil Lee has degrees in electrical engineering, applied physics, and mechanical engineering and materials science.

Lee is currently exploring how choreocytosis, cartilage cells, convert mechanical signals into biochemical responses, a process known as mechanotransduction. At Rochester, she plans to continue that research, with a particular emphasis on how mechanical signals into biochemical responses, a process known as mechanotransduction.

Her PhD work at the University of Cambridge focused on designing augmented and tangible interfaces that support creativity and social interaction through interactive play for young children with autism spectrum condition. Most recently, as a postdoctoral fellow at Carnegie Mellon University, she led a project that explores the design of an intelligent peer and collaborative tabletop game that fosters curiosity, exploration, and self-efficacy for science education.

Zhen was drawn to Rochester by the “emerging synergy of AI/VR (augmented reality/virtual reality) research across disciplines and by the University’s strengths in neuroscience, artificial intelligence, and engineering. Theories and techniques offered in these fields,” she says, “allow me to innovate user-centered and data-driven design approaches for future technologies that transform the research landscape of Human-Computer Interaction (HCI).”

She hopes to “establish long-standing collaboration with the wide network of autism, education, and health care researchers at the University and also to expand her research into areas like lifelong learning, mental health, aging, and active citizenship.”

“I am also dedicated to developing compelling undergraduate and graduate courses that intersect with HCI, AI, VR, intelligent interface, and education technology.”

It was a “natural transition,” then, for him to become an instructional track assistant professor in the department starting fall this year.

He’ll supervise senior design teams and teach a portfolio class for the popular audio and music engineering program for undergraduates, plus supervise the work master’s students do for research credit.

“These design-based classes are really good for preparing students for jobs in industry,” Heilemann says. “Students work in teams because that’s what they’ll be doing in the workplace. So, I try to stress collaboration as much as possible.”

For his PhD thesis at Rochester, Heilemann worked under advisor Mark Brock, the chair of electrical and computer engineering, on using tiny force drivers to make the screens of computers, televisions, and mobile devices vibrate so that the screens themselves become speakers.

It will be a homecoming of sorts when Selçuk Köse joins the Department of Electrical and Computer Engineering in January as a tenure-associate professor of biomedical engineering and his wife are alumni.

Köse received his master’s (2008) and PhD (2012) degrees here in electrical engineering and Leman Kanıtkar Köse received her EdD from the Warner School (2012).

For the past six years Köse has been an assistant professor at the University of South Florida, where he worked on computer hardware security and chip design.

“While I plan to continue working on different research problems related to hardware security,” Köse says, “I will also focus on the security and privacy concerns in specific technologies—such as connected autonomous vehicles and Internet of Things (IoT) devices.”

Köse received a National Science Foundation CAREER award in 2014 and has received three University of South Florida outstanding research and faculty awards. He is an associate editor for the Journal of Circuits, Systems and Computers (JCSS) and Microelectronics Journal.

“As the University of Rochester is quite prestigious in the field of engineering, I will have more opportunities to collaborate while performing cutting-edge research,” Köse says.

**Chemical Engineering**

**Computer Science**

**Data Science**

**Electrical and Computer Engineering**

**Mechanical Engineering**

At Rochester, she will teach classes in computer-aided design, statistics, and dynamics. She also hopes to have an opportunity to mentor students doing research projects. Slane, who grew up in Penfield, says, “It’s exciting to be coming back” to the Rochester area.

**Biomedical Engineering**

**Chemical Engineering**

**Computer Science**

**Data Science**

**Electrical and Computer Engineering**

**Mechanical Engineering**

**Biomedical Engineering**

**Chemical Engineering**

**Computer Science**

**Data Science**

**Electrical and Computer Engineering**

**Mechanical Engineering**
Danielle Benoit, associate professor of biomedical engineering, received the 2018 University of Maine Francis Crowe Engineering Alumni Award.

Laurel Carney, the Marylou Ingram Professor of Biomedical Engineering, received the Edmund A. Hajim Outstanding Faculty Award.

Eby Friedman, distinguished professor of electrical and computer engineering, received the IEEE Circuits and Systems Mac Van Valkenburg Award.

Chunlei Guo, professor of optics, received the 2017 T. C. Graham Prize from the Association for Iron and Steel Technology.

Ehsan Hedayati, assistant professor of computer science and the Asaro Biggar Family Fellow in Data Science, received a National Science Foundation CAREER award.

Andrew White, assistant professor of chemical engineering, received a National Science Foundation CAREER award.

James Zavislan, assistant professor of optics and associate dean of education and new initiatives, was appointed as a Mercor Biggar Distinguished Teaching Professor for a three-year term.

Sue Zhang (left) and Matthew Boulanger work on their senior design project, a noninvasive, portable device to screen for Type II diabetes. The device will be used by Timothy Dye, a professor of obstetrics and gynecology, and his team on the island of Pohnpei, Micronesia, where diabetes is widespread.
Women engineers find inspiration in sharing experiences

Twenty-five alumni and current students joined Dean Wendi Heinzelman and Hajim alumna Rachel Berg and her husband, Andy, for the inaugural gathering of the Hajim Women Alumni Network this spring.

As a young girl, Jeanine Hayes ’92 (optics) never had a singular dream about what she wanted to do when she grew up.

“For me, I think there was never anything I thought I couldn’t do,” says the recipient of this year’s Hajim School Distinguished Alumnae Award. That assertion, she adds, “can do” attitude helps explain why Hayes, Nike’s first Chief IP Officer, and now the vice president and general manager of Nike Ease and sustainable product innovation at the company, has enjoyed repeated success along a “continual” career path in law, technology, intellectual property, entertainment, and consumer products. It also helped that she studied engineering and played varsity sports at the University of Rochester, she told students while on campus for a Hajim School Dean’s Advisory Committee meeting.

Optics taught her critical thinking, problem-solving skills, and perseverance, she says. “You get comfortable not having answers to everything and having to figure it out. Varsity sports—soccer and track and field—taught her discipline, time management, the importance of teamwork, not letting teammates down, and ‘how to lose and get back up and keep going.’

“You’re at a great university,” she said. “And as you go out in the real world, you will find that the discipline and ethics and skill sets you’re learning here are invaluable.”

Hayes began her career at a big Los Angeles law firm and then pivoted to Overture Services, a small tech start-up and pioneer of paid search, where she held positions in IP, business litigation, licensing, and eventually as General Counsel. After Overture was bought by Yahoo!, she stayed on with Yahoo!, serving as VP and deputy general counsel working on a wide range of global legal and business issues, including M&A and venture formation and license of Alibaba. She joined Nike as its VP, Chief IP Counsel in 2011.

“I’ve always worked hard at what I’m doing,” Hayes explains. “I’ve also been fortunate to be given some unique opportunities along the way. It’s important to remember that opportunities don’t always come when you’re ready so it’s good to keep your mind open to new things. It could be really interesting work or a unique opportunity along the way. It’s important to show up well, seek to learn something new from the experience, and build a network of professional colleagues along the way. People who create these kinds of building blocks throughout their careers often end up with more responsibility coming their way—even if that was never their intention when they started.

In trying to “build” work-life balance into daily schedules, it’s often better to take the long view. Often times the daily view “lasts for about 15 minutes” until your kid gets sick in the morning as you’re trying to get out the door. Focus instead on: “What are the big things you want in life? Don’t lose sight of them, be open and flexible.”

“Working at smaller or start-up companies can be extremely valuable because people often have to wear multiple hats and get handed a lot of opportunity early. That was my experience in the Internet/tech space, which ‘really taught me the value of access to a wide variety of roles and responsibilities,” Hayes said. That can pay off at big companies too. Employees willing to do a “stretch” in another department often develop new skill sets and find additional opportunities or avenues of promotion open to them.

For engineers, in particular, she urges, “Hone your communications skills, [and] your emotional intelligence skills. Sometimes you get engineers who can be too binary. You’ve got to be able to talk to people” and find collaborative solutions. You’ve learned problem-solving skill sets through your academic education; being able to effectively communicate will make you that much more successful in your career.

Mentorship: “I operate with the idea that everybody can be a mentor, and every situation a learning experience.” In all stages of her career she’s benefited from people providing me guidance—whether a coach, boss, colleague, family member, or friend. Mentorship doesn’t have to be formal and can come from anywhere when you’re willing to listen, learn, and ask.”

Career advice for students:

• Research the “ground rules” of career fields—even of specific companies—you might be interested in. What’s expected or important? “Researc[ing] can educate you with enough literacy to ask good questions and show well during interviews. ‘You’ve got the internet, so there are no excuses; you can find out a lot of [information that gives you a head start].’

• Find something you enjoy. It sounds cliché, but it’s true that doing something you love and working with great people really is some of the best career advice. You’d do well naturally when you’re doing something you’re passionate about.

• ‘Work hard and do your current job well.’ This is critical, in her view, as she sees many people looking for the next thing and expecting a path of immediate advancement without delivering in their current role. Even if you think what you’re doing is just a temporary step on your career path, it’s important to show up well, seek to learn something new from the experience, and build a network of professional colleagues along the way. People who create these kinds of building blocks throughout their careers often end up with more responsibility coming their way—even if that was never their intention when they started.

• In trying to “build” work-life balance into daily schedules, it’s often better to take the long view. Often times the daily view “lasts for about 15 minutes” until your kid gets sick in the morning as you’re trying to get out the door. Focus instead on: “What are the big things you want in life? Don’t lose sight of them, be open and flexible.”

• Working at smaller or start-up companies can be extremely valuable because people often have to wear multiple hats and get handed a lot of opportunity early. That was my experience in the Internet/tech space, which “really taught me the value of access to a wide variety of roles and responsibilities,” Hayes said. That can pay off at big companies too. Employees willing to do a “stretch” in another department often develop new skill sets and find additional opportunities or avenues of promotion open to them.

• For engineers, in particular, she urges, “Hone your communications skills, [and] your emotional intelligence skills. Sometimes you get engineers who can be too binary. You’ve got to be able to talk to people” and find collaborative solutions. You’ve learned problem-solving skill sets through your academic education; being able to effectively communicate will make you that much more successful in your career.

• Mentorship: “I operate with the idea that everybody can be a mentor, and every situation a learning experience.” In all stages of her career she’s benefited from people providing me guidance—whether a coach, boss, colleague, family member, or friend. Mentorship doesn’t have to be formal and can come from anywhere when you’re willing to listen, learn, and ask.”

Distinguished alumna
Jeanine Hayes

‘There was never anything I thought I couldn’t do’
CONGRATULATIONS TO OUR **NOBEL LAUREATES!**

**Gerard Mourou**, former scientist at the Laboratory for Laser Energetics and professor of optics, and **Donna Strickland '89**, former PhD student in optics, shared in this year’s Nobel Prize for Physics for their development at LLE of a table-top terawatt laser using chirped-pulse amplification. This breakthrough paved the way for creating very short and very intense laser pulses now used in a variety of applications, from LASIK eye surgery to the manufacturing of materials used in cell phones.