Dear alumni and friends of the Hajim School:

Steadily increasing enrollments . . . An impressive string of faculty and student awards . . . Exciting educational initiatives on several fronts.

As I look back at the accomplishments of the Hajim School during the last 12 months, I see an institution on the move!

So it is all the more enjoyable to share this State of the School report with you. It is an appropriate time to do so. We are in the midst of developing the University’s next five-year plan. As we take the pulse of the Hajim School, we are at the start of what should be an exciting chapter in the University’s history.

**Enrollment surge continues**

Let’s begin with some encouraging statistical benchmarks:

The Hajim School’s remarkable growth in enrollment continues. We began this school year with 1,105 undergraduates either as declared engineering majors or having indicated engineering as their first choice of majors in the college, an all-time high. Depending on how many we retain in the discipline of engineering, this would be an increase of as much as 52 percent since 2007–08. This far exceeds the overall 10 percent enrollment increase experienced at other peer engineering schools.

So I believe this is more than just a temporary “bubble” of students gravitating to engineering during hard times because of its better job prospects. Our University Admissions Office has worked hard to promote our school; we’ve gained tremendous visibility thanks to Ed Hajim’s generous gift, and I can’t help thinking that the word is getting out: We have a great program here where students can explore a full spectrum educational experience!

Our enrollments of graduate students have been increasing as well. We now have 216 MS students compared to 61 in 2004–05 and 335 PhD students, up from 285.

How much more growth can we accommodate? Ideally, we’d like to have an undergraduate enrollment of about 1,200 students, which would result in about 250 graduates a year. We’d like to see master’s and PhD enrollments at about 400 students each.
Other positive trends:

The latest rankings by the American Society for Engineering Education put us 19th among U.S. engineering schools in the percentage of bachelor’s degrees awarded to women.

The ASEE ranked us 26th in research expenditures, which is pretty remarkable for a school of our size, and second in highest ratio of research expenditures to doctoral degree recipients.

The percentage of our students studying abroad is expected to reach 18 percent this year, putting us well within reach of our goal of 25 percent by 2015. That compares with the 6 percent of engineering students nationally who study abroad. This kind of experience, I believe, is invaluable for engineering students who, as professionals, will quite likely work on projects of international scope at some point.

And despite those hefty enrollment increases, faculty hires in recent years have enabled us to maintain a healthy 10:1 ratio of students to faculty on average over the past four years. ASEE ranked us 16th in lowest ratio of bachelor’s degree recipients to faculty.

Faculty awards

But of course you cannot measure a school by numbers alone. You have to factor in individual achievement as well, and we have much to be proud of in that area. Let me recap some of the highlights since my last state of the school message.

Among our faculty:
Govind Agrawal, professor of optics and physics, received the 2012 IEEE Photonics Society Quantum Electronics Award “for sustained contributions to fiber-optic telecommunication technology through innovative research and authorship of numerous widely respected books in the field.”

Riccardo Betti, professor of mechanical engineering and physics, was one of nine recipients of the Lawrence Award from the U.S. Department of Energy for a series of theoretical discoveries in the physics of inertial confinement fusion.

Mark Bocko, our chair of electrical and computer engineering, was named one of three recipients of this year’s Goergen Awards for excellence in undergraduate teaching.

Joseph Eberly, the Andrew Carnegie Professor of Physics and professor of optics, received the Optical Society’s 2012 Distinguished Service Award for his contributions as founding editor of the journal Optics Express, his leadership while serving as president, and his commitment in serving the society.

Lane A. Hemaspanda, professor of computer science, received the University’s 2012 Edward Peck Curtis Award for Excellence in Undergraduate Teaching.
Richard E. Waugh, professor and chair of the Department of Biomedical Engineering, was elected a fellow of the American Association for the Advancement of Science (AAAS), the world’s largest general scientific society, for his distinguished contributions to the study of cell and membrane mechanics and for leadership in biomedical engineering.

David Williams, the William G. Allyn Professor of Medical Optics, professor of optics, professor of brain and cognitive sciences, professor of ophthalmology, professor of biomedical engineering, and director of the Center for Visual Science, received the international Antonio Champalimaud Vision Award, which cited his work on adaptive optics technologies as a “major breakthrough in the understanding and/or the preservation of vision.”

Xi-Cheng Zhang, who became director of the Institute of Optics at the start of this year, was named the 2012 recipient of the William F. Meggers Award by the Optical Society of America (OSA) for his exceptional contributions to coherent generation and detection of ultra-broadband THz waves for far-infrared spectroscopy.

Student achievement

Among our students and recent grads:

John Nicosia ’13, a biomedical engineering major, was awarded the Professors’ Choice Award for Undergraduate Research in Engineering and Applied Sciences at the University of Rochester Undergraduate Research Expo for his research on “Techniques to Quantify Cell Proliferation in Three-Dimensional Hydrogels.”

Catherine Marando ’12, Douglas Clift ’12, and Kelli Summers ’11, won prestigious Whitaker International Fellowships, which are awarded to promising biomedical engineering graduates so they can gain international experience in education or research.

BME undergraduate students John Nicosia and Laura Hobbs were awarded University of Rochester/Xerox Undergraduate Research Fellowships to work in Diane Dalecki’s lab on developing ultrasound technologies for cell and tissue engineering applications.

Michael Bux, a biomedical engineering student in Danielle Benoit’s lab, was awarded a University of Rochester/Xerox Undergraduate Fellowship.

BME graduate student Jason Inzana of the Awad Lab; Michael Baranello, a chemical engineering PhD student in the Benoit Lab; and Molly Boutin, an alumnus of the Benoit lab (undergraduate research assistant), received prestigious National Science Foundation Research Fellowships, which provide three years of graduate study support for students pursing doctoral degrees.

Xiaochen Guo, a PhD student in electrical and computer engineering, was selected as one of the recipients of the intensely competitive 2012–13 IBM PhD fellowship.
Cristina Canavesi, a PhD candidate at the Institute of Optics, working with advisor Jannick Rolland, was the 2012 recipient of the Bill Price and Warren Smith Award, the highest student SPIE award in optical design. (Cristina also won the Mark Ain Business Model Competition, along with three other students, for developing an optical device that improves the treatment of skin cancer and pre-cancerous tissue.)

Garrett West, an optics graduate and entering master’s student, spent the summer interning at NASA’s Goddard Space Flight Center, where he was awarded a 2012 NASA travel grant named for Nobel scholar John Mather. Kathleen Adelsberger, a PhD candidate working with associate professor James Zavislan at the institute, was awarded a National Physical Science Consortium fellowship to support her research in optical design for wavefront coded imaging systems.

Five graduate students at the Institute of Optics—Matthew Bergkoetter, Kyle Fuerschbach, Leva McIntire, Brent Plansinis, and Travis Petersen—received Frank Horton Fellowships from the Laboratory of Laser Energetics. Fuerschbach also won Best Student Paper Award with his presentation “Interferometric Null Configurations for Measuring f-polynomial Surfaces” at the Optical Fabrication and Testing meeting sponsored by the Optical Society of America (OSA).

Na Yang, PhD student in electrical and computer engineering, received an ISCA (International Speech Communication Association) travel grant to support her presentation of her paper entitled “Speech-based emotion classification using multiclass SVM with hybrid kernel and thresholding fusion” at the 2012 IEEE Workshop on Spoken Language Technology.

Youssef Farhat, a graduate student in biomedical engineering, took first place in the Orthopaedic Research Society’s “Video Outreach Competition” for his video “Who Cares about Orthopaedic Research?”

And let’s not forget the positive image conveyed when our Baja SAE and Solar Splash teams compete at national events, as they did this year. We now have two other teams working hard to compete on the national stage. They qualified for the finals of the Cornell Cup, a college-level embedded design competition. One team will be working on a “Braille e-book reader,” the other a “Disinfection Robot.” They’ll head to Walt Disney World for the finals in May.

Alumni support

We owe a great deal to those who preceded us at the Hajim School and especially those who also maintain close ties with their alma mater. Consider, for example, the recipient of this year’s Hajim School of Engineering Distinguished Alumnus Award. Pandeli (Lee) Durbetaki ’54 (MS), professor emeritus at Georgia Institute of Technology’s George W. Woodruff School of Mechanical Engineering, has been a guiding influence in his field—and a staunch supporter of the Hajim School. He has been a valued member of the Visiting Committee for 10 years and created the Durbetaki Fellowship in Mechanical Engineering in 1990 to provide funding for a graduate assistantship.
Alumni like Lee help us in many ways. They interact with our students and serve as role models. Those who serve on our Visiting Committee and Dean’s Advisory Committee provide sage advice to my staff and me and help spread the word about the great things happening at the Hajim School. They host college events and network with other alumni and friends of the University; this helps drum up much-needed financial support.

That support has been increasing in recent years. The percentage of Hajim alumni who make annual gifts to Rochester has increased from less than 10 percent to 15.3 percent in the last four years, and the amount of unrestricted giving by alumni has increased from $490,000 a year to $621,051. The number of George Eastman Circle members among our alumni has more than doubled to 155 since fiscal ’09.

We have made significant gains together in support of the Hajim School and the University, and we must continue to increase our efforts in this domain to effectively compete with our peer institutions. I remain deeply grateful to our active alumni for all their support—financial or otherwise.

**Hajim School initiatives**

I’ve also been pleased with the continuing progress we’ve made in initiating innovative approaches to education, research, and collaboration. This will put us in a good position to address some of the critical challenges facing the Hajim School in the next few years.

One of the most pressing of these challenges, I believe, is the need to expand our strategic partnerships with corporations. We’ve got a lot to offer in research capability. An increase in corporate funding to support that capability would help pick up the slack in federal research dollars. Expanded corporate ties would provide more internships and, ultimately, job placements for our students. And increased collaboration with corporations would help solidify the University’s role as a critical partner in driving our economy.

Some recent developments have the potential to foster just this kind of collaboration.

A $1.9 million federal grant to the Center for Emerging and Innovative Sciences, for example, will fund the **Rochester Regional Optics, Photonics, and Imaging Accelerator (RRPA)** program and have multiple payoffs not only for the University but also for the entire region. It will create high-quality, sustainable jobs; develop a skilled advanced manufacturing workforce; encourage development of small businesses; and accelerate technological innovation.

The recently launched **Center for Medical Technology and Innovation** will allow master’s students with an engineering background to spend at least two months in operating rooms, intensive care units, and other clinical settings, partnering with
clinicians, companies, and other institutions. They will then design medical devices that can address patient needs within the realities of a clinical setting. I can’t help but think that medical device manufacturers desperate for engineers with actual clinical experience will want to partner with us in this endeavor!

Acquisition of an advanced model X-ray photoelectron spectrometer, through a grant just awarded, will bolster our URnano facility and provide another incentive for businesses and research institutions to collaborate with us.

Much of this will directly benefit our most important clients of all, our students. Three University of Rochester courses will be modified so that students in engineering, physics, and materials science can have hands-on experience with the spectrometer, and students who graduate with a master’s degree through CMTI will have a leg up in the competition for jobs designing medical devices.

To further prepare our upperclassmen, we will be offering a two-credit course this spring on communication skills, geared specifically to helping students craft résumés, conduct interviews, and give presentations as part of their job searches after they graduate. Quite frankly, I would like to see this become mandatory for all our students. Texting and tweeting have not exactly enhanced the grammar and spelling skills of our students!

Other initiatives are well under way. We are awaiting final state approval to officially launch an exciting new audio and music engineering major. By my next state of the school report, students in this major will be using state-of-the-art labs and studios in the Ronald Rettner Hall for Media Arts and Innovation now taking shape between Morey Hall and Wilson Commons.

Professor Jannick Rolland’s Center for Freeform Optics moved closer to reality when it received a National Science Foundation planning grant. This collaboration involving Rochester, Penn State, UNC–Charlotte, and various industry and government entities and institutions has as its goal nothing less than a transformation of the optics industry by advancing research and education on the science, engineering, and applications of freeform optics through industrial partnerships.
Our commitment to the future of Big Data—the efficient analysis of vast quantities of information—was highlighted by the Rochester Big Data Forum 2012, spearheaded by Henry Kautz, chair of computer sciences. Leading researchers, corporate executives, and faculty from across the country attended. We've only just begun to “mine” this previously untapped resource. One of the big challenges of Big Data is to have not only the hardware, but also the people who can come up with creative models for analyzing and drawing conclusions from mountains of data. In any event, Big Data is certainly a big deal at our University.

Looking ahead

Though my duties have expanded this year with my appointment as interim senior vice president for research, I will continue as dean of the Hajim School to devote the necessary time and energy required to build on the school’s successes and address the challenges facing it.

For example, we need to make sure we can accommodate our growing enrollment without sacrificing educational quality or overburdening our faculty.

We now retain about two-thirds of our students from freshman to senior year; I think we can do a lot better than that.

Even as federal funding stagnates, we need to diversify the sources of the funding we do receive, and not rely so heavily—as we do now—on NIH and DOE. To serve as a catalyst for the innovation economy, we must find mechanisms for engaging deeply with the corporate world in research and development and further enrich the start-up community here in Rochester and beyond.

We also need to figure out how to take advantage of the burgeoning interest in online education, not as a substitute for the residential campus experience, but as a way to enhance it.

I relish these challenges; they make this an exciting time in higher education. The way we address these opportunities may very well shape the role of colleges and universities for decades to come.

Randy Essex ’75, a geomechanics graduate, visited the River Campus recently to talk about the often daunting challenges in his line of work: drilling tunnels worldwide through mountains and under cities in subsurface conditions that once would have been deemed impossible. He says, “It’s when our competitors say it can’t be done that we really get interested!”

That’s exactly how I feel about the challenges facing the Hajim School.

I’m proud to be part of a school that has accomplished so much. And I have no doubt that we’ve only begun to realize our potential.

Sincerely,

Robert L. Clark
Professor and Dean
Interim Senior Vice President for Research