June 2016

Message from Dean Breneman

Summer has officially arrived in Troy! Now that Commencement is over, summer programs and courses are in progress, and the low hum of intensive research activity can be felt across the campus. The weather has definitely turned warmer, our spirits are refreshed, and our lawns require more frequent mowing. In my office, it’s also the season for both “working hard and playing hard” – by day, we roll up our sleeves, bring new faculty onboard, make strategic plans, and look after the myriad of little things we need to do in order to get ready for fall. By night, and on some fortunate weekends, we can be found around campfires, boating on Lake George, or firing up BBQ grills with family and friends – (performing the wonderful Maillard Reaction – look it up…) and generally making the most of the season.

Fond memories of the School of Science Commencement Brunch are still fresh in our minds – especially the pride we took in celebrating the accomplishments of the Class of 2016, and honoring the dedication of the families and significant others whose support made it all possible. What a great group!

A few of the student activities taking place in the School of Science so far this summer include our latest Physics Research Experience for Undergraduates (REU) program (Professor Peter Persans and Professor Lakshmi), the brand new Data INCITE Lab (Professor Kristin Bennett) – part of our new undergraduate “Data Dexterity” initiative, and an NSF-supported Graduate Student Math Modeling Camp organized by Department of Mathematical Sciences Head Professor Don Schwendeman. Way to go, Science!

Our Science faculty have also been keeping busy in other areas too – for example, Computer Science Professor (and IDEA Director/Tetherless World Constellation leader) Jim Hendler just won a Best Paper of the Year award by the Japanese Society for Artificial Intelligence – great work, Jim! In other Science faculty news, Physics professor Shawn-Yu Lin has been selected to receive the prestigious Nanotechnology Pioneer Award for his work in creating the world’s darkest material – Wow!
We’re also celebrating a nice early career success story – Assistant Professor and Kolleck Career Development Chair of Biology Kevin Rose just received a $300k two-year NSF grant titled “Assessing the effects of cross-scale interactions mediating sub-continental lake thermal trends and carbon cycling.” Sounds like a fun project, doesn’t it? This is big news, since Kevin just joined us last August and is definitely off to a great start. Nice work, Kevin!

Great things are happening in the Rensselaer School of Science!

Come to Rensselaer and Change the World!

*Curt Breneman, Dean of Science*
Rensselaer Polytechnic Institute Graduates Urged To Harness Advances In Technology To Improve Society at 210th Commencement

Executive Director of the United Nations World Food Programme Ertharin Cousin—leader of the world’s largest humanitarian organization—urged graduates to think first of others and be the first generation that embraces technology for all the right reasons at the 210th Commencement at Rensselaer Polytechnic Institute (RPI) Saturday.

“The only morality that technology has is what we give it—and that is where RPI and you, its graduates, come into play,” said Cousin. “Whether you have majored in engineering, the humanities, or management, the challenge I pose for all of you today is the same: How can we use the rapid advances we see in technology to improve our society, to make it more just and provide a real opportunity for peace and prosperity for everyone across the world?”

Cousin continued, “that means bringing the benefits of the information economy into service for the poorest, not just for profit. Achieving this goal will require people like you, the RPI Class of 2016, not just going off to gain riches... do that if you like but also make your ideas, talents, and skills available to organizations like mine or others helping solve problems. Overcome the challenges and address the issues for the public good.”

Cousin addressed 1,703 graduates, their families, and friends at the 210th Rensselaer Commencement today, held at the East Campus Athletic Village. During the ceremony, Rensselaer awarded a total of 1,877 degrees. They include: 140 doctoral degrees, 489 master’s degrees, and 1,248 bachelor’s degrees. Some graduates have earned more than one degree.

Rensselaer President Shirley Ann Jackson Encourages Graduates To Find Unity in Diversity

See more
Creator of Darkest Material on Earth Honored by IEEE – Rensselaer researcher Shawn-Yu Lin to receive Nanotechnology Council Pioneer Award

Nanophotonics expert and physics professor Shawn-Yu Lin has been selected to receive the 2016 Institute of Electrical and Electronics Engineers (IEEE) Nanotechnology Council Pioneer Award in Nanotechnology “for pioneering contribution to the development of 3-D optical photonic-crystals and the discovery of the darkest nano-material on Earth.”

Lin, professor of physics at Rensselaer, will receive the award at the annual IEEE Conference on Nanotechnology Aug. 22-25 in Sendai City, Miyagi, Japan.

The darkest material was discovered by Lin and his team in 2008. The material, a thin coating comprised of low-density arrays of loosely vertically aligned carbon nanotubes, absorbs more than 99.9 percent of light and could one day be used to boost the effectiveness and efficiency of solar energy conversion, infrared sensors, and other devices. The research has been recognized by the Guinness Book of World Records.

The total reflectance of conventional black paint, for example, is between 5 and 10 percent (or absorptance of between 95 and 90 percent). The darkest man-made material, prior to the discovery by Lin’s group, boasted a total reflectance of 0.16 percent to 0.18 percent (or absorptance of 99.84 to 99.82 percent).

Lin’s team created a coating of low-density, vertically aligned carbon nanotube arrays that are engineered to have an extremely low index of refraction and the appropriate surface randomness, further reducing its reflectivity. The end result was a material with a total reflectance of 0.03 percent (or absorptance of 99.97 percent)—more than three times darker than the previous record, which used a film deposition of nickel-phosphorous alloy. Lin’s darkest material has a higher absorptance than that recently reported value of 99.965 percent by Surrey Nanosystem. The original darkest material from Rensselaer is still the darkest man-made nano-material on Earth.

See more
Rensselaer President Shirley Ann Jackson Co-Chairs Annual Meeting of the New Champions

RPI faculty participate in World Economic Forum discussions of the role of science in overcoming global challenges

Rensselaer president Dr. Shirley Ann Jackson recently co-chaired the World Economic Forum Annual Meeting of the New Champions in Tianjin, China, June 26-28, 2016. In her role as co-chair, Jackson participated in a debate on the role of corporate-led research in advancing scientific progress, a televised session in which she discussed the key elements of an innovation ecosystem that translates research results into technological innovations and business opportunities. Jackson also moderated a discussion among Rensselaer faculty of the role of big data in disrupting transmissible diseases.

“The Annual Meeting of the New Champions provides a unique opportunity to evaluate the convergence of the digital, physical, and biological worlds,” Jackson said. “This dialogue gives us the opportunity to assess this crossroads in conjunction with the great, global, human challenges we face today and work together with influential leaders from top organizations around the world toward a future that addresses these challenges—from a changing climate to the mitigation of disease.”

Joining Jackson for a discussion of the ways the university is looking beyond the boundaries of academic disciplines and leveraging new computational and biological tools to address transmissible disease were Rensselaer faculty members Jonathan Dordick, vice president for research and Howard P. Isermann Professor of Chemical and Biological Engineering, and Heng Ji, Edward P. Hamilton Development Chair Associate Professor in the Department of Computer Science.
Faculty News and Notes

- Jim Hendler, director of the Rensselaer Institute for Data Exploration and Applications (IDEA) and professor of computer science won the Best Paper of 2015 award by the Japanese Society for Artificial Intelligence. The title of the paper was “Tensor factorization that utilizes the semantics behind objects.”

- Kevin Rose, assistant professor and Kolleck Career Development Chair, received a two-year grant from the MacroSystems Biology and Early NEON Science Program (NSF/BIO/EF) titled “Assessing the effects of cross-scale interactions mediating sub-continental lake thermal trends and carbon cycling.”

FACULTY RECOGNITION – Institute Awards

AWARDS

Shengbai Zhang, Gail and Jeffrey L. Kodosky ’70 Constellation Professor of Physics, Information Technology, and Entrepreneurship has been awarded the William H. Wiley 1866 Distinguished Faculty Award which honors those who have won the respect of the students and their colleagues through demonstrated excellence in teaching, research, and scholarship – and through service to Rensselaer as evidenced by their contributions to local, regional, and national professional organizations and community involvement.

FACULTY RETIREMENT

Charles Boylen, Professor of Biological Sciences
Paul Stoler, Professor of Physics, Applied Physics, and Astronomy
Mark Wentland, Professor of Chemistry and Chemical Biology

FACULTY and STAFF RECOGNITION – SCIENCE AWARDS

Outstanding Early Research Award
The Early Research Award recognizes a faculty or staff member for accomplishments in research during the past three years. The winner demonstrates excellence in research innovation and accomplishments; has produced research results viewed as significant by others in the field; and excels in at least one of
the following: interdisciplinary collaboration, involving students in research, or involving members of underrepresented groups in research.

Chelsung Bae

**Outstanding Teaching Award**

The Outstanding Teaching Award recognizes a faculty or staff member for excellence in classroom instruction and other educational activities during the past three-year period. The winner demonstrates excellence in classroom instruction; is regarded highly by students for teaching accomplishments; and excels in at least one of the following: student mentoring, integrating research into the teaching program, course and curricular innovation, and service in introductory or required courses with large enrollments.

Eric Rutledge

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**Staff News**

**Outstanding Staff Award**

The Outstanding Staff Award recognizes a staff member for dedication, accomplishments, and contributions to the School of Science. The winner demonstrates excellent performance well beyond what the position requires; makes contributions that allow the department or unit to function effectively and efficiently; and exhibits special qualities such as: innovation, initiative, confidence, enthusiasm, the ability to meet challenges, and a cooperative attitude.

Karen Hardik
Student News and Notes

Data INCITE Lab

This summer 16 undergraduate mathematics majors are doing applied data analytics research for six weeks in Rensselaer’s new Data INCITE Laboratory supported by the NSF grant “EXTREEMS-QED: Data Analytics Throughout Undergraduate Mathematics.” Teams of students are contributing to open data-driven research problems including detecting and diagnosing failures during computer chip fabrication, understanding the circadian rhythms, and determining microbial communities in the RPI plant wall.

2016 Research Experience for Undergraduates (REU) in Physics

The Department of Physics, Applied Physics, and Astronomy is hosting ten visiting undergraduate students in an NSF-funded “Research Experience for Undergraduates” (REU) program this summer. The REU program at Rensselaer is focused on providing research opportunities for students in underrepresented groups and/or from colleges without doctoral research programs. Project areas include particle astrophysics, geophysics, geochemistry, nano- and low-dimensional materials, solar energy conversion, and computational physics.

Graduate Student Math Modeling Camp

Rensselaer’s Graduate Student Mathematical Modeling (GSMM) Camp is a four-day workshop whose aim is graduate student education and career development directed toward modern scientific problem-solving. The GSMM Camp is designed to promote a broad range of problem-solving skills, including mathematical modeling and analysis, scientific computation, and critical assessment of solutions. Problems are brought to the Camp by invited faculty and industry mentors. These problems are highly interdisciplinary in nature, inspired by real problems that arise in industrial applications. The work on the problems is done by graduate student teams, each with the guidance of an invited mentor, so that scientific communication is an important and integral component of the work. In this way, the GSMM Camp exposes graduate students to real-world problems of current scientific interest, and provides a valuable educational and career-enhancing experience outside the traditional academic setting.

The GSMM Camp operates hand in hand with the annual Mathematical Problems in Industry Workshop, this year to be held at Duke University. The Camp runs during the week prior to the Workshop and the
students and mentors attending the Camp are encouraged to attend the Workshop as well. Thus, the GSMM Camp provides an additional problem-solving experience for graduate students as a warm-up prior to the Workshop.

**Camp Organizer and Invited Mentors**

The GSMM Camp is organized by Donald Schwendeman, professor and head of the Department of Mathematical Sciences at Rensselaer. The camp took place from June 7 to 10, had 28 participants, and five of the students were Rensselaer graduate students.

The invited mentors for GSMMC 2016 were:

- Daniel Anderson, George Mason University
- C. Sean Bohun, University of Ontario Institute of Technology
- Mansoor Haider, North Carolina State University
- Katherine Newhall, University of North Carolina

Brief descriptions of the problems are posted on the GSMMC [Program](#) webpage. Camp attendees are pictured below.
Commencement Awards in Science

Undergraduate Student Awards

G. Howard Carragan Award (1961)
An annual award based on the income from funds contributed by friends and former students of Professor Carragan, the prize is awarded to a senior in the Department of Physics, Applied Physics, and Astronomy for outstanding scholarship.
Andrew Horning

Glenn Martin Mueller ’64 Prize (2000)
An annual prize established to honor Glenn Martin Mueller, Rensselaer Trustee and Graduate, Class of 1964. A leading venture capitalist in Silicon Valley, Glenn was a champion entrepreneur, funding many successful startup companies. This prize is given to a computer science major who is deemed to be the most entrepreneurial.
Jazmine Olinger
Sebastian Sarbora

J. Lawrence and Gertrude Katz (2001)
The J. Lawrence and Gertrude Katz award in Physics was established in 2001. This award is presented to the student selected as the outstanding graduating senior receiving a Bachelor of Science in Physics.
Maia Marchetti

John and Mary Cloke Prize (1964)
Awarded to a graduating senior in the Department of Chemistry and Chemical Biology who is continuing in a graduate school of chemistry, medicine, or biological science, and who has made a distinguished record, especially in the department.
Steven Tignor

Joseph L. Rosenholtz Prize (1963)
An annual award based on the income from funds contributed by friends and former students of Professor Rosenholtz, the prize is awarded to a senior in the Department of Earth and Environmental Sciences for outstanding work in earth sciences. Joseph Rosenholtz was Professor of Geology from 1924 into the 1960s and this award is given in his honor.
William Skorski
Brendan Anzures
Max Hirsch Prize (1972)
Established by Professor Edith H. Luchins in memory of her father, this prize is awarded to a senior in the Department of Mathematical Sciences who has demonstrated outstanding ability in academic work and gives promise of outstanding success in a career in mathematical sciences.

Theerawat Bhudisaksang
Hannah De Los Santos
Thomas Merkh
Benjamin Walker

Merck Index Award
Awarded to a senior in the Department of Chemistry and Chemical Biology with the highest grade point average.

Suttipong Suttapitugsakul

Nadia Trinkala Service Award (2012)
Established by Diane and Michael Trinkala in memory of their daughter, this award is given to a Physics or Applied Physics student who has made significant contributions to the community and quality of life at Rensselaer and in the city of Troy.

Victoria Butler

Paul A. McGloin Prize (1989)
An annual prize established in honor of Professor Paul McGloin, scholar and teacher in the Computer Science and Mathematical Sciences Departments from 1955 to 1989. The prize is given to an outstanding senior in computer science.

Raymond Jacobson

Rensselaer Class of 1902 Research Prize (1927)
The Class of 1902 Research Prize, established by the Class of 1902. It is awarded at Commencement to the senior in the School of Science or Engineering who has completed two semesters of undergraduate research and who presents the best research results culminating in a written report, submitted paper, or thesis.

Thomas Merkh, Mathematical Sciences/Physics, Applied Physics, and Astronomy

Robert G. LaFleur Award (1995)
An award established by the friends of Professor Robert G. LaFleur for students in the Department of Earth and Environmental Sciences demonstrating an excellent record in, commitment to, and promise in the field of environmental geosciences.

Kelsey Sudol
William Mehner

Robert Resnick Award
Awarded to an undergraduate student majoring in Physics or Applied Physics for academic achievement.

Thomas Merkh
Roland Walker Prize (1989)
Established by friends and former students to honor Roland Walker, Professor Emeritus of Biology. The prize is awarded to a senior in the Department of Biological Sciences for outstanding scholarship.

*Kenneth Campbell*
*Gabriella Rollo*
*Christopher Hartline*
*Mohsin Jawed*

Stanley I. Landgraf Prize ’46 (1998)
An annual prize established to honor Stanley Landgraf, Rensselaer trustee, acting president, and friend of the Computer Science Department. The prize is given to a computer science major who excels in leadership skills and academic achievement.

*Thomas Manzini*

W. A. Tarr Award
The Society of Sigma Gamma Epsilon, National Earth Sciences Honor Society, presents the W. A. Tarr Award annually to each society chapter. Scholarship, leadership, and contribution to the school provide the primary basis for the award. RPI’s Delta Theta Chapter 2016 recipient in the Department of Earth and Environmental Sciences is:

*Casimir Wills*

William Pitt Mason Prize (1939)
This prize goes to the senior in the Chemistry and Chemical Biology Department who has demonstrated outstanding academic work and gives promise of outstanding success in his or her professional chemistry career. Research is a major criterion for this award.

*Suttipong Suttapitugsakul*

Science Ambassadors
The Science Ambassadors (SAs) is a group comprised of select undergraduate students who work as teams to develop engaging and interactive science-related presentations geared toward K-12 students. As our new SAs prepare to inspire the next generation of scientists by sharing their own enthusiasm for the field, we want to say thank you to our three seniors who helped make our program a success.

*Angelo Angelidis, Mathematical Sciences*
*Victoria Butler, Physics*
*Thomas Manzini, Computer Science*

4.0 Awards
*Suttipong Suttapitugsakul, Chemistry and Chemical Biology*
*Andrew Jay Zeng, Biological Sciences, (Accelerated Physicians-Scientist Program)*
**Graduate Student Awards**

**Bill and Nancy Siegmann Applied Mathematical Modeling Prize (2014)**
An award established by John G. Watson ’71 in honor of his Ph.D. advisor, Professor Bill Siegmann, and his wife, Nancy. This prize is awarded to an undergraduate and/or graduate student whose work best exemplifies elegance in any or all of the three pillars of Applied Mathematics, namely, problem formulation, problem solution, and solution interpretation.

*Michael Caiola*
*James Gambino*
*Michael Schwarz*

**Henry Ehrlich Prize in Microbiology and Environmental Sciences (2012)**
The Henry Ehrlich Prize in Microbiology and Environmental Sciences is awarded for excellence in scholarship to either a graduating senior or graduate student (M.S., Ph.D.) in the Department of Biological Sciences who plans to pursue a career in microbiology and/or environmental sciences.

*Teri Hreha*

**Hillard B. Huntington Award (1976)**
Friends and former students of the late Hillard B. Huntington, professor emeritus of physics, established the prize. It is awarded at Commencement to an outstanding graduate student in the Department of Physics, Applied Physics, and Astronomy.

*Panagiotis Karampourniotis*

**Jack Hollingsworth Prize (1999)**
An annual prize to honor Jack Hollingsworth, Professor of Mathematics. This prize is awarded to a computer science student who made a major contribution to the educational program at Rensselaer.

*Kiana McNellis*

**Joaquin B. Diaz Prize (1978)**
Established by friends, family, and colleagues in memory of Dr. Joaquin B. Diaz, the Albert Einstein Professor of Science at Rensselaer in the Department of Mathematical Sciences. This award is presented to a graduate student in the Department of Mathematical Sciences who shows ability and enthusiasm for research in mathematics.

*William Pickering*
*Mark Woods*

**Dr. Johanna Maas Chemistry Teaching Assistant Award (2000)**
This award is presented to one or more graduate students for outstanding service in the teaching program of the Chemistry and Chemical Biology Department. Established by Sonja Krause, Class of 1954, and others in memory of Dr. Johanna Zelie Maas, chemist, physician, Holocaust survivor, and humanitarian.

*Fan Yang*
Paul S. Ho (2010)
Established in 2010 by Dr. Paul S. Ho, this prize is awarded to an outstanding graduate student enrolled in the Department of Physics, Applied Physics, and Astronomy.

Brian Frey

Ralph Ernest Huston Prize (1973)
Established by Antoinette K. Huston and sons Peter, Kenneth, Richard, and T. Michael, in memory of Dr. Ralph Huston, Professor of Mathematics from 1934–1969. This prize is to be awarded to the first or second year graduate student in the Department of Mathematical Sciences who has demonstrated unusual promise and ability as a teacher.

William Lotts

Robert McNaughton Prize (1989)
An annual prize established in honor of Professor Robert McNaughton, scholar and teacher in the Computer Science and Mathematical Sciences Departments from 1967 to 1989. The prize is given to an outstanding graduate student in computer science.

Evan Patton

Walter H. Bauer Doctoral Prize in Chemistry (1981)
This prize goes to a doctoral candidate who has an exceptional graduate record in the Department of Chemistry and Chemical Biology, has carried out meritorious doctoral thesis research, and shows outstanding promise in the field of chemistry.

Angela Mohanty

Walter Eppenstein ‘52 Graduate Teaching Assistant Award (1991)
Established by friends and colleagues of Walter Eppenstein, Professor Emeritus of Physics, to honor his many contributions to education at Rensselaer. It is awarded to one or two graduate students for outstanding contribution to our teaching program in the Department of Physics, Applied Physics, and Astronomy.

Anthony Yoshimura

Pictures of the Commencement Bunch can be viewed here:
http://s963.photobucket.com/user/kesslj3/library/SoS%20Commencement%20Brunch%202016

Catch more School of Science updates on social media!