

THE UNIVERSITY OF MICHIGAN  
REGENTS COMMUNICATION

Item for Information

**Subject:** Henry Russel Awards for 2018

I am pleased to inform you that the Henry Russel Awards Faculty Advisory Committee, chaired by Dean Carol A. Fierke, met recently and selected four faculty members to receive Henry Russel Awards for 2018. This award, which recognizes both exceptional scholarship and conspicuous ability as a teacher, is one of the highest honors the University bestows upon junior faculty members. The awards will be presented on the occasion of the Henry Russel Lecture, to be delivered in the Winter Term of 2018.

The faculty members selected to receive this award are:

**Justin C. Kasper**, Associate Professor of Climate and Space Sciences and Engineering, College of Engineering

**Becky Lorenz Peterson**, Assistant Professor of Electrical Engineering and Computer Science, College of Engineering

**Daniel Rabosky**, Assistant Professor of Ecology and Evolutionary Biology and Assistant Curator, Museum of Zoology, College of Literature, Science, and the Arts

**Paul Zimmerman**, Assistant Professor of Chemistry, College of Literature, Science, and the Arts

Respectfully submitted:



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Mark S. Schlissel  
President

June 2017

Attachment

## **Justin Kasper**

Justin Kasper received his A.B. in physics from the University of Chicago (1999) and his Ph.D. in physics from the Massachusetts Institute of Technology (2003). He was a postdoctoral researcher and research scientist at MIT's Kavli Institute for Astrophysics and Space Research, a visiting scholar at Boston University's Center for Space Physics, and a lecturer in the astronomy department of Harvard University before his appointment in 2013 as an associate professor in the Department of Climate and Space Sciences and Engineering at the University of Michigan. He is also an astrophysicist in the High Energy Astrophysics Division of the Smithsonian Astrophysical Observatory.

Impressively, at this early stage in his career, Professor Kasper has established a worldwide reputation as a leader in space science instrumentation. He is carrying out pioneering measurements of the solar atmosphere, the solar wind, and planetary systems, and is a leader in the development of innovative experimental instruments that will define research on space weather. His research is advancing our understanding of the processes that generate solar storms that eject high energy plasma and x-ray radiation which can pose serious risks to electronic infrastructure on Earth and the health of astronauts in space. As the lead scientist overseeing the orbiting instruments that are the only sentinels for advance detection of incoming storms, he maintains the planet's early warning system. He is also the principal investigator in the development of instrumentation for a solar probe to be launched in 2018. This innovative instrument, sturdy enough to withstand formidable radiation, heat, and plasma pressures, will provide the first direct measurements of the solar atmosphere in which storms form and accelerate away from the Sun. He is also a lead investigator for an instrument aboard a spacecraft that will travel to Jupiter's moon, Europa, and measure the thickness of Europa's ice shell and the depth and salinity of its sub-surface oceans. These first measurements will be a key milestone in the search for possible life beyond Earth. Professor Kasper has authored 130 widely-cited articles in refereed journals. The outstanding quality and impact of his research has been confirmed by his numerous awards, including the prestigious Presidential Early Career Award for Scientists and Engineers, the highest award presented by the U.S. government to early-stage scientists and engineers.

Professor Kasper is also an exceptional teacher. He has developed a highly popular course on engineering solutions to astrophysical problems, and transformed other courses to be hands-on laboratories where students build instruments for upcoming space missions. His impact on graduate students is extraordinary. He has already graduated two doctoral students and is advisor to five more, all of whom are closely involved in the fabrication and calibration of instruments that will advance our knowledge of space. As a teacher, Professor Kasper is developing a new generation of leaders who are ready to conceive, develop and lead entire space missions from proposal to launch.

Every dimension of Professor Kasper's stellar scientific and professional accomplishments shows great promise for the future. The distinction that he has brought to the University of Michigan and the Department of Climate and Space Sciences and Engineering makes him exceptionally qualified to receive the Henry Russel Award.

## **Becky (Rebecca Lorenz) Peterson**

Becky Peterson received her B.S.E.E. in electrical engineering from the University of Rochester (1996), her M.S.E.E. in electrical engineering from the University of Minnesota (2000), and her Ph.D. in electrical engineering from Princeton University (2006). She was an associate lecturer in engineering at Newnham College, University of Cambridge, where she was also a post-doctoral research associate at the Cavendish Laboratory in the Department of Physics. In 2009 she was appointed assistant research scientist in the University of Michigan's Department of Electrical Engineering and Computer Science, where in 2013 she was appointed assistant professor.

Professor Peterson is an engineer of exceptional creativity whose path-breaking research lies at the intersection of emerging materials and electronic devices. She is exploring difficult challenges about how new materials can be adapted to address critical needs in the development of a range of new technologies, from flexible electronics to power electronics. Her research is making fundamental contributions to the development of nanoparticle-based electronics and sensors, self-assembled nanofabrication techniques, transparent or "invisible" circuits, and electro-mechanical properties of thin films, all of which are critical components of next-generation electronic devices. She is developing processes for using liquid inks to deposit amorphous oxide semiconductors for the manufacture of high-performance electronic and optoelectronic devices, sensors, and circuits. Her research is opening the door for the development of a wide range of new technologies for producing a variety of applications, including novel thin-film devices, or what she calls "electronics on anything." Her research extends to the development of new materials for producing power semiconductor devices that include switches and rectifiers that can operate at very large voltages in extreme environments, including electric vehicles and space applications. In recognition of her path-breaking excellence as a leading research innovator, Professor Peterson has received a National Science Foundation's Faculty Early Career Development (CAREER) Award, a DARPA Young Faculty Award, and the DARPA Director's Fellowship which is annually awarded to fewer than four Young Faculty Award recipients.

Professor Peterson is a gifted and devoted teacher who constantly seeks new ways to engage, challenge, and excite her undergraduate students. She uses video podcasts to supplement lectures and to review complex topics, and has brought into the classroom software that engineers use to simulate test and measurement systems, creating a "virtual bench" for demonstrating circuit concepts. While still at an early stage of her career, she is chair or co-chair of six doctoral students, and has advised master's students and directed many undergraduate projects.

At any scale of academic endeavor, from conceiving and directing large research projects that develop innovative electronic methods and technologies, to working with, mentoring, and inspiring individual students, Professor Peterson is a brilliant researcher, an outstanding teacher, and an exemplary colleague. She has brought distinction to electrical engineering and computer science at the University of Michigan, and is extraordinarily qualified to receive the Henry Russel Award.

## **Daniel Lee Rabosky**

Daniel Rabosky received his B.S in biological sciences from Ohio University (1999), his M.S. in biology from The Pennsylvania State University (2003), and his Ph.D. in ecology and evolutionary biology from Cornell University (2009). He was a research fellow at the University of California, Berkeley, and in 2012 joined our Department of Ecology and Evolutionary Biology as an assistant professor, and as assistant curator of reptiles and amphibians at the Museum of Zoology.

Professor Rabosky is an internationally recognized innovator and intellectual leader in the field of macro-evolutionary biology, an area of biological science that seeks to understand the evolutionary trends of whole taxonomic groups over long periods of time. His research is directed at one of the most challenging questions in biology—what are the evolutionary drivers responsible for the unequal composition and distribution of the planet’s biodiversity? Why do some groups of organisms undergo dramatic evolutionary explosions and many others do not? He integrates theoretical and empirical approaches to evolutionary science and has established macro-evolutionary studies as an important and exciting new research area. He has developed a remarkable computer program that generates mathematical and computational models that combine theoretical insights from evolutionary biology (changes in genes and genomes over time) and ecology (changes in numbers and distribution of individuals over time). He uses his powerful computational tools to study evolutionary dynamics and detect, quantify, and test heterogeneity in evolutionary rates across broad sections of the tree of life. He uses this modeling to inform his fieldwork in Australia, where he studies increases in diversity among reptiles in ecological communities. His ground-breaking work appears in a stream of highly-cited articles published in leading general science and evolutionary biology journals. In recognition of the outstanding quality and significance of his research contributions, Professor Rabosky has received almost every major prize and award in evolutionary biology available to someone at his career stage, including the prestigious Theodosius Dobzhansky Prize from the Society for the Study of Evolution. He has also received a Packard Fellowship for Science and Engineering, which provides the most promising early-career scientists and engineers in the nation’s top universities “with flexible funding and the freedom to take risks and explore new frontiers in their fields of study.”

Professor Rabosky is a committed teacher who has developed a new course in quantitative methods and computer programming for ecology and evolution that is a major addition to the curriculum. He has completely re-worked a core course on vertebrate evolution and diversity that students have found inspirational. He is also a sought-after mentor by graduate students and post-doctoral research fellows, and is currently advisor to five doctoral students in his laboratory. At the Museum of Zoology, he curates the second largest collection of amphibians and reptiles in existence, and has been a leader in planning for a new biodiversity database platform for the Natural History Museum.

Professor Rabosky is a brilliantly accomplished and creative scientist who inspires others in the classroom, laboratory, and field site. Through his exceptional accomplishments in research and teaching, he has brought distinction to the University of Michigan and is extraordinarily qualified to receive the Henry Russel Award.

## Paul Zimmerman

Paul Zimmerman received his B.S in chemical engineering from the University of California, Berkeley (2005) and his Ph.D. in chemical engineering from Stanford University (2010). Following a postdoctoral research fellowship at the University of California, Berkeley, he joined the Department of Chemistry at the University of Michigan as an assistant professor (2012).

Professor Zimmerman is making many highly important and far-reaching contributions to chemistry by developing innovative computational methods that bridge chemical theory and laboratory experimentation. His computational models enable chemists to predict and understand the efficacy of intermediate mechanisms that occur along intricate paths of complex catalysis reactions. Until now, chemists have faced an arduous and time-consuming challenge in determining the mechanisms needed to achieve a desired reaction. Professor Zimmerman's research has produced computational tools that allow chemists to design, build, and test a range of new compounds for their ability to catalyze the creation of novel molecules and materials without the need to synthesize the catalysts. He collaborates with other chemists to discover new and highly effective reaction mechanisms. Working with experimentalists, he has identified complex and elusive causes for reaction failures and found solutions through modifying catalyst structures. His work has led to the design of new breakthrough catalysts and the discovery of unexpected pathways for reactions. His innovative computational methods have yielded major advances, and chemical industry scientists have eagerly adopted his tools for their research programs. Through his creative insights into the deep chemical physics of molecules, materials, and catalysts, Professor Zimmerman has also developed a repertoire of methods that has led to dramatic advances in the science of solar harvesting and storage materials, including the development of an innovative and unprecedented materials system for highly efficient direct solar-to-energy storage. He is also working to understand fundamental principles governing electrons, and his break-through electronic structure theories promise a revolution in the field of quantum chemistry that will permit simulations on real chemical systems with previously unobtainable accuracy. Professor Zimmerman has been recognized as a brilliant young computational chemist who is among the very top young scientists in his field. He has been awarded a Sloan Research Fellowship, a National Science Foundation's Faculty Early Career Development (CAREER) Award, and the American Chemical Society's Emerging Technologies in Computational Chemistry Award.

Professor Zimmerman is an equally creative and inspiring teacher, whose many contributions include a novel approach for teaching upper-level physical chemistry through the lens of sustainability, where students learn by taking on challenges in the development of green chemistry and renewable energy, and understanding the chemistry of climate change. While still at an early stage in his career, he mentors and advises fourteen graduate students in his research group and four postdoctoral research fellows.

Professor Zimmerman is a world leader in computational chemistry who has catalyzed real outcomes of major significance in the laboratory and industry. Few investigators ever reach his level of accomplishment at such an early stage in their career. He has brought high distinction to the University of Michigan and is truly qualified to receive the Henry Russel Award.