THE UNIVERSITY OF MICHIGAN
REGENTS COMMUNICATION

Item for Information

Subject: Henry Russel Lecturer for 2023

The Henry Russel Awards Faculty Advisory Committee, chaired by Dean Michael J. Solomon, met recently and upon their recommendation I am pleased to confirm that Mark. E. Newman, the Anatol Rapoport Distinguished University Professor of Physics, Professor of Physics and Professor of Complex Systems, College of Literature, Science, and the Arts, will be the Henry Russel Lecturer for 2023. Professor Newman will deliver the Russel Lecture in the Winter Term of 2023.

The Henry Russel Lectureship is the highest honor that the University bestows upon a senior member of its faculty. A description of the contributions of this extraordinary faculty member is attached.

Respectfully submitted:

Mary Sue Coleman
President

June 2022
Attachment

Mark E. Newman

Mark E. Newman, the Anatol Rapoport Distinguished University Professor of Physics, professor of physics, and professor of complex systems, is a foundational figure in modern network science, a field he helped create in the late 1990s and that now is among the most active areas of complex systems and interdisciplinary physics research. Network science draws on graph theory from mathematics, statistical mechanics from physics, inferential modeling from statistics, data mining and information visualization from computer science, and social structure from sociology to study the network representations of physical, biological, and social phenomena leading to predictive models of these phenomena. Professor Newman was among the first to recognize the importance of network structure in determining the behavior of complex systems and to understand how theoretical methods of statistical physics could be adapted to network science. He has published nearly two hundred refereed papers in leading journals in physics and other fields of science. His early papers made fundamental contributions to topics including random graph models, network robustness, assortative mixing, community detection, and search algorithms and have secured classic status in the field. His recent research addresses two broad areas of network science. The first is the development of statistical inference methods based on generative network models that can detect subtle underlying structures buried in observed data. These methods allow the discernment of complex hierarchies in biological and social systems, the prediction of positions of missing links in network data, and the generation of artificial networks with features that match those found in nature. A second area of his research involves the investigation of the mathematical properties of matrices and the development of fast algorithms for investigating clusters of strongly connected nodes, or communities, in complex networks.

It is difficult to overstate the influence of Professor Newman's research. Indeed, he is one of the most highly-cited researchers anywhere in the world in all fields of science. His 2003 paper on the structure and function of complex networks was the single most highly-cited papers for a decade in all of mathematics. Among many honors, awards, and recognitions, he has been elected as a fellow of the American Physical Society and of the American Association for the Advancement of Science, and has received both a Guggenheim Fellowship and a Simons Fellowship in Theoretical Physics. He has won the Lagrange-CRT Foundation Prize, the preeminent international award in complexity science, for "his outstanding interdisciplinary work at the intersection of physics, computational, and social science that has opened the door to a deeper understanding of complex systems." The citation notes that "no one has understood and mathematically formalized as deeply as Mark Newman the importance of communities and modules in the structure of social, technological, and biological networks." In 2021 he received the Euler Award, the highest honor from the Network Science Society, for his outstanding field-defining research discoveries that have changed paradigms in network science, and was chosen as a Citation Laureate for the impact of his published work, an award that pertains to likely Nobel Prize winners.

Professor Newman has served as chair, co-chair, or committee member on over fifty doctoral committees. Doctoral students and postdoctoral fellows he has supervised have gone on to leading positions in industry and the academy. He is renowned for his skill in explaining complicated and abstract subjects with exceptional clarity. He has been described as a natural teacher who charts clear paths through complicated material while drawing examples from a vast array of natural and social phenomena. His book *Networks* (2nd ed., 2018) is the standard introduction to complexity science for a broad scientific

audience. He revamped one of the most unpopular core courses for physics majors (Statistical and Thermal Physics) to immediate student acclaim. He rebuilt the department's course on computational physics so that course enrollments now overflow the available space. As a result of this effort, he authored a widely-adopted textbook on the Python programming language for physics (*Computational Physics*). He also has developed two original graduate courses in complex systems that attract students from many graduate programs and fields across campus. His course on network theory is central to the University of Michigan's international leadership in this field. In addition to his other talents, Professor Newman is a gifted jazz pianist who rebuilt the Physics of Music course to incorporate a broader range of world music and other music technologies beyond the Western classical tradition. His breadth as a researcher and teacher is inspirational. His research on cartograms, a type of map that scales the sizes of regions in proportion to like populations, creates an effective and comprehensible visualization of geographic data. Building on his breakthrough technique for building cartograms, he co-authored a popular volume (*The Atlas of the Real World*) that won the 2009 Gold Award of the Geographical Association of primary and secondary school teachers, with the citation noting that it "should be in every geography classroom and in every school, college, and university library."

Professor Newman received his B.A. (1988) in physics at the University of Oxford where he also earned his Ph.D. (1991) in physics. He was appointed as a postdoctoral fellow at Cornell University in 1991, and in 1996 was appointed as a postdoctoral fellow at the Santa Fe Institute where in 1998 he was appointed research professor. He joined the University of Michigan in 2002 as assistant professor of physics, and was promoted to associate professor of physics in 2005. In 2008 he was promoted to professor of physics. In 2008 he was named the Paul Dirac Collegiate Professor of Physics and in 2015 he was named the Anatol Rapaport Distinguished University Professor of Physics.

As a world-renowned physicist and towering figure in the study of complex networks who has reshaped his field and trained a new generation of leading scientists, Professor Newman's many contributions have brought distinction to the University of Michigan and the College of Literature, Science, and the Arts, and he is an exceptionally worthy selection as the 2023 Henry Russel Lecturer.

Subject: Henry Russel Awards for 2023

The Henry Russel Awards Faculty Advisory Committee, chaired by Dean Michael J. Solomon, met recently and upon their recommendation I am pleased to confirm the selection of four faculty members to receive Henry Russel Awards for 2023. 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 2023.

The faculty members selected to receive this award are:

Andrej Lenert, Assistant Professor of Chemical Engineering, College of Engineering

Alexandra Rosati, Assistant Professor of Psychology and Assistant Professor of Anthropology (by courtesy), College of Literature, Science, and the Arts

Kira Thurman, Assistant Professor of Germanic Languages and Literatures and Assistant Professor of History, College of Literature, Science, and the Arts

Liuyan Zhao, Assistant Professor of Physics, College of Literature, Science, and the Arts

Respectfully submitted:

Mary Sue Coleman
President

Attachment

June 2022

Andrej Lenert

Andrej Lenert received his B.S.E. in mechanical engineering at the University of Iowa (2008), followed by his S.M. (2010) and Ph.D. (2014) in mechanical engineering at the Massachusetts Institute of Technology. He joined the University of Michigan as a postdoctoral research fellow in the Nanoscale Transport Lab at the University of Michigan, after which he was appointed in 2016 as assistant professor in the Department of Chemical Engineering.

Professor Lenert has received wide recognition for his path-breaking research that achieves significant efficiencies for producing on-demand electrical power and high-grade heat from solar energy. An innovative researcher, he has made major contributions for reaching net-zero energy by solving some of the most pressing problems associated with conversion and storage of renewable energy. In 2020, he and his multidisciplinary team at U-M made significant advances in developing a new thermal photovoltaic cell, a power-generating system that converts stored thermal energy back into electrical energy when needed. Their work increased conversion efficiency by 25-30% over existing technology, unlocking its use for grid-scale storage of renewables. They achieved this breakthrough by novel use of nanostructured materials to improve control over the electromagnetic spectrum of thermal radiation. This research, published as an article in the leading journal, *Nature*, has been hailed as a major advance for providing reliable and affordable electricity which is key to transforming the world's energy system to one with net-zero greenhouse gas emissions. Professor Lenert's research is also showing how transparent insulating glasses with engineered nanostructures can help meet the need for industrial process heat that is renewable, inexpensive, and available when needed.

In addition to his stellar research contributions, Professor Lenert is recognized as a gifted teacher in the classroom and an equally outstanding mentor in the laboratory. He redesigned one of the most challenging required courses for Chemical Engineering undergraduates, incorporating new learning techniques and tools, and galvanized student engagement. Undergraduate students seek him out as a skilled and encouraging research mentor. He has supervised over sixteen undergraduate researchers and provides active and inspiring guidance as they carry out substantial research responsibilities. His contributions to graduate education are equally notable. He has revamped the first-year orientation course to introduce the importance of diversity, equity, and inclusion and to incorporate elements for professional and career development. He has already supervised nine Ph.D. candidates and two postdoctoral fellows. In 2022, the College of Engineering recognized Professor Lenert's excellence as a researcher, teacher, and mentor with its prestigious 1938E Award, which honors one assistant professor annually. Professor Lenert has also earned the NSF CAREER Award (2022), the 3M Non-Tenured Faculty Award (2020), and a listing in Forbes 30 Under 30 (Science) (2016).

Professor Lenert's accomplishments as an exceptional researcher, teacher, and mentor bring distinction to the University of Michigan and the Department of Chemical Engineering, and make him exceptionally qualified to receive the Henry Russel Award.

Alexandra G. Rosati

Alexandra Rosati received her A.B. in psychology at Harvard University (2005) and her Ph.D. in evolutionary anthropology at Duke University (2012). Following a postdoctoral research fellowship in the Department of Psychology at Yale University, she was appointed assistant professor in the Department of Human Evolutionary Biology at Harvard. In 2017 she joined the University of Michigan as assistant professor in the Department of Psychology and the Department of Anthropology (by courtesy).

Professor Rosati is an extraordinarily creative researcher who investigates the evolution of complex cognitive skills such as decision-making and self-control among a wide range of primates, including apes, monkeys, and lemurs. She poses theoretical questions about the experiences and cognitive abilities necessary for the emergence of complex decision-making abilities. Her investigation of these questions has revealed similarities between humans and non-human primates in cognitive responses and yielded foundational empirical findings about the evolution of decision-making. In her field work with non-human primates she has investigated how complex dietary ecologies shape the evolution of abilities associated with intelligent behavior, such as memory, spatial cognition, and risk-taking. Professor Rosati is also developing new comparative understandings of patterns of cognitive development, change, and aging in nonhuman primates. In her ground-breaking research with free-ranging monkey and ape populations, she has done some of the first large-scale studies of animal cognition across the lifespan from infancy to old age, which has established new frameworks for understanding the evolution of cognitive change in all primates, including humans. Professor Rosati's research contributions have been recognized with an Alfred P. Sloan Research Fellowship in Neuroscience (2019), an NSF CAREER Award (2020), and the American Psychological Association's Award for Early Career Contributions to Psychology (2022). Her accomplishments have drawn considerable public attention and have been featured in a variety of international public media, including *The New York Times*, *The Guardian*, and the BBC.

Professor Rosati is equally an inspiring teacher and mentor. She has developed three successful new undergraduate courses on evolution that feature highly engaging hands-on learning activities and has co-developed a new evolution pathway for undergraduates in the Biopsychology, Cognition, and Neuroscience major. Remarkably, she has enabled undergraduates to participate in primatological research, with particular focus on creating hands-on experiences involving field work and data analysis for under-represented students. She is also a sought-after adviser and mentor of graduate students and postdoctoral research fellows. Finally, she has worked to disseminate primate research, knowledge, and training more broadly by creating a website called Primate Learning in Action which publicly hosts a variety of educational materials.

Professor Rosati's accomplishments as an exceptional researcher, teacher, and mentor bring distinction to the University of Michigan and the Department of Psychology and the Department of Anthropology, and make her exceptionally qualified to receive the Henry Russel Award.

Kira Thurman

Kira Thurman received her B.M. in music history and literature from Baldwin-Wallace College (2006) and earned her Ph.D. in history at the University of Rochester (2013). She was appointed assistant professor in history at the University of Akron (2013), and in 2015 joined the University of Michigan as assistant professor of Germanic languages and literatures and assistant professor of history. In the fall of 2022, she will also begin her appointment as associate professor of music.

Professor Thurman's scholarship stands at the intersection of German history, German cultural studies, Black studies, and musicology. Her recent book, *Singing Like Germans: Black Musicians in the Land of Bach, Beethoven, and Brahms* (2021), recovers the transnational and transcultural histories of the classically-trained black musicians from the United States, the Caribbean and Latin America who performed in Germany and Austria from the mid-nineteenth to the mid-twentieth century. Through the lens of music and musicianship, and by recovering the histories of Black performers, she examines the construction of German national culture through the classical tradition and how racial identities both contested and reinforced this construction. In numerous journal articles and book chapters, and in many invited lectures in North America and Europe, she is opening new perspectives on the history of the trans-Atlantic Black experience through her study of the creativity and resilience of Black classical musicians. Professor Thurman is reaching audiences far beyond the academy, giving interviews for NPR and PBS and writing for outlets such as *The New York Times*, *The New Yorker*, *The New York Review of Books*, and *Süddeutsche Zeitung*. In recognition of her outstanding and original scholarship, she has received a Berlin Prize from the American Academy in Berlin, a research fellowship from Vienna's Institute for Cultural Studies (IFK), and a research fellowship from the Institute for Advanced Study at Princeton.

Professor Thurman is an outstanding and deeply committed teacher. Her undergraduate courses in the Department of Germanic Literatures and Languages and the Department of History have earned the highest accolades from students, and she has been nominated four times for the Golden Apple teaching award. She is brimming with ideas about ways to bring new teaching materials into the classroom and is a contributor and advisor to the web-based Blackcentraleurope.com, an extraordinary teaching repository of historical materials and sources about the millennium-long Black experience in the German lands. She is a sought-after adviser of graduate students in several Ph.D. and D.M.A. programs, and has served on ten dissertation committees, including music performance, as well as on dissertation committees in Belgium, the United Kingdom, and Canada.

Professor Thurman's accomplishments as an exceptional scholar, teacher, and mentor bring distinction to the University of Michigan and the Department of Germanic Languages and Literatures, the Department of History, and the School of Music, Theatre and Dance, and make her exceptionally qualified to receive the Henry Russel Award.

Liuyan Zhao

Liuyan Zhao earned her B.S. in physics from the University of Science and Technology of China (2008), and her Ph.D. in physics from Columbia University. She was a postdoctoral research fellow at the California Institute of Technology before joining the University of Michigan in 2017 as assistant professor in the Department of Physics. In 2022 she was promoted to associate professor in the Department of Physics.

Professor Zhao is an innovative scientist who is engaged in the discovery of totally new electronic phases of matter. Her seminal research in condensed matter physics focuses on discovering and understanding novel electronic phases found in quantum materials. These materials have unusual and complex electronic properties and are of very high interest in research on the cutting-edge frontiers of physics, materials science, and engineering. A leading experimentalist in optical studies of phases and structures in quantum materials, she has developed new nonlinear and ultrafast optical spectroscopy and microscopy techniques to reveal and control the properties of novel electronic phases with respect to symmetry, time, spectral, and spatial resolutions, and to understand their complex relationships to other states in materials. Her fundamental discoveries have been widely hailed for their significance in advancing understandings of the unique properties of these materials that can be used in wholly new technologies. Professor Zhao publishes widely-cited papers in leading journals in her field. In recognition of her accomplishments and exceptional promise as an earlier-career scientist, she received the National Science Foundation's CAREER Award in 2018, and in 2021 she received the prestigious Sloan Research Fellowship. She has also received the Bryan R. Coles Prize, awarded by the International Conference on Strongly Correlated Electron Systems for her significant contributions to the experimental study and discovery of strongly correlated electron materials and phenomena.

Professor Zhao is a highly effective research leader. Since 2017 she has mentored four postdoctoral fellows and has chaired or served as a member of fifteen doctoral dissertation committees. She is an engaged and encouraging mentor who responds to the individual academic interests of each student she advises. She has earned accolades for her undergraduate teaching, including a lab course that introduces physics majors to the most important concepts of modern physics, and the advanced introduction course to quantum mechanics. Her students prize how she takes a genuine interest in their personal well-being. Of the seventeen undergraduates she has advised, five have gone on to graduate study in physics.

Professor Zhao's accomplishments as an exceptional scientist, research mentor, and teacher bring distinction to the University of Michigan and the Department of Physics, and make her exceptionally qualified to receive the Henry Russel Award.