

Status of the Field of Discipline-Based Education Research: A Workshop

Presenter Biographies

Reflecting on the 2012 DBER Report



KARL SMITH is Emeritus Professor of Civil, Environmental, and Geo- Engineering, Morse-Alumni Distinguished University Teaching Professor, and Faculty Member, Technological Leadership Institute at the University of Minnesota. He is also Emeritus Cooperative Learning Professor of Engineering Education, School of Engineering Education, at Purdue University. He is a Fellow of the American Association for the Advancement of Science, as well as a Fellow, Lifetime Achievement Award recipient, and Hall of Fame inductee of the American Society for Engineering Education. His research and development interests include building research and innovation capabilities in engineering education; faculty and graduate student professional development; and the role of cooperation in learning and design. Karl has over 40 years of experience working with faculty to redesign their courses and programs to improve student learning. He adapted the cooperative learning model to engineering education and has helped many faculty and graduate students with implementation. He has also advised and mentored many aspiring engineering education researchers. Karl wrote or co-wrote eight books including *How to model it: Problem solving for the computer age*, *Cooperative learning: Increasing college faculty instructional productivity*, *New paradigms for college teaching*, *Strategies for energizing large classes: From small groups to learning communities*, *Active learning: Cooperation in the college classroom*, and *Teamwork and project management*. His bachelor's and master's degrees are from Michigan Technological University, and his Ph.D. is from the University of Minnesota.

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MICHELLE SMITH is the Senior Associate Dean for Undergraduate Education in the College of Arts & Sciences (A&S), and an A&S Distinguished Professor in the Department of Ecology and Evolutionary Biology at Cornell University. Michelle started doing education research as a postdoc with the University of Colorado Science Education Initiative. Her research group focuses on questions such as:

- 1) What concepts are difficult to learn in undergraduate biology courses, and how can instructors identify them and help students?
- 2) What aspects of active learning make it an effective instructional tool?
- 3) How can peer-reviewed Open Educational Resources (OERs) promote innovative pedagogy and be used as artifacts to measure educational change?

These research questions are answered using classroom-based assessments, interviews, observation protocols, and surveys analyzed through quantitative and qualitative methods. Michelle designed several professional development experiences for educators. For example, she directed a program where middle and high school teachers observed and provided feedback on active learning instructional practices to college instructors. She also developed writing workshops to help instructors publish their undergraduate biology lessons as OERs. In her role as the Senior Associate Dean for Undergraduate Education, Michelle oversees several undergraduate initiatives. The initiatives include the Nexus Scholars Program to support paid summer research opportunities for 100 undergraduate students across the college and an advising seminar for all A&S first-year students. Michelle has a Ph.D. in biology from the University of Washington.

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NANEH APKARIAN is Assistant Professor of Mathematics Education in the Department of Mathematics and Statistics at SDSU. She previously worked as a postdoctoral research associate at Western Michigan University and Assistant Professor in Arizona State University's School of Mathematics & Statistics. Naneh's broad research focus is departmental change aimed at improving students' experiences with introductory STEM courses. Existing and ongoing research in RUME and DBER (and K-12 mathematics and science education fields) points to many pedagogical strategies, curricular approaches, and program structures which can support student success and broaden participation beyond the current system. However, shifts at the individual, departmental, and institutional level toward implementing these practices and structures have proven challenging at scale. Her work engages a systemic cultural approach to understand the relationships between individual, department and institutional factors that support and constrain interest, willingness and capacity for instructional change. In her spare time, she continues to play competitive water polo, travel and build community. Naneh grew up and completed her education in Southern California, culminating with a Ph.D. in Mathematics and Science Education from the joint doctoral program between UC San Diego and SDSU.

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STACEY LOWERY BRETZ is a first-generation college graduate, she is passionate about student success and committed to championing the journeys of diverse and inclusive higher education communities. Stacey is enthusiastic about creating highly collaborative environments, and particularly enjoys the challenges of optimizing resource allocation at the intersection of academic affairs, enrollment management, and university finance. She currently serves as Dean of the Getty College of Arts & Sciences at Ohio Northern University where she leads and serves 124 full-time faculty and staff across a broad portfolio of programs including the fine arts, performing arts, humanities, social sciences, teacher education, nursing & health professions, mathematics & natural sciences, manufacturing technology, and construction management. Stacey previously served at Miami University as the Inaugural Executive Fellow in the Office of the President and as Director of Special Projects in the Office of the Vice President for Enrollment Management and Student Success. She led multiple initiatives critical to university transformation, including academic program prioritization, fiscal priorities, and designing a capacity building program to develop advancement partners. Stacey was privileged to be mentored as an ACE Fellow in the Office of the Chancellor at the University of Illinois Urbana Champaign where she participated in the RCM budget development process across a highly decentralized university. Her research focuses on developing measures of students' learning by investigating thinking in the chemistry laboratory and with multiple representations of molecules and compounds. Stacey currently co-authors three chemistry textbooks published by W.W. Norton. She been selected as a Fellow of the American Chemical Society and as a Fellow of the American Association for the Advancement of Science. Stacey earned her B.A. and M.S. in chemistry from Cornell University and Pennsylvania State University, respectively. Stacey

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earned her Ph.D. in chemistry education research from Cornell University after which she completed a post-doctoral research fellowship at the University of California, Berkeley.



NOAH FINKELSTEIN is a Distinguished Professor of the University of Colorado system and Professor and Vice-chair of Physics at the University of Colorado Boulder. He conducts research in physics education, specifically studying the conditions that support students' identities, engagement and outcomes in physics – developing models of context. In parallel, he conducts research on organizational change – how educational transformations get taken up, spread, and sustained. He is a PI in the Physics Education Research (PER) group and founding co-director of CU's Center for STEM Learning. He co-directs the U.S. national Network of STEM Education Centers, and coalitions advancing undergraduate education transformation. He is involved in higher education policy, sits on the National Academies' Board of Science Education, is a Trustee of the Higher Learning Commission, and is a Fellow of both the American Physical Society and the American Association for the Advancement of Science.

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CYNTHIA (CINDY) FINELLI (Moderator) is the David C. Munson, Jr. Professor of Engineering, Professor of Electrical Engineering & Computer Science, and Professor of Education at the University of Michigan. She is the Chair of the planning committee.

Presentation and Panel Discussion on the Role of Theory in DBER



STANLEY LO is a Teaching Professor (with tenure) of Cell and Developmental Biology, Co-Director of the Joint Doctoral Program in Mathematics and Science Education, affiliate faculty in the Research Ethics Program, and Changemaker Fellow in anti-racist pedagogy at University of California San Diego. Collaborative projects in his research group examine how higher education faculty conceptions of diversity inform their instructional and mentoring practices, explore how undergraduate student identities intersect with their experiences and learning, and develop and evaluate programs to support transfer student success in STEM. Dr. Lo earned his Ph.D. in Biochemistry from Harvard University and worked as a Senior Research Associate in Learning Sciences at Searle Center for Advancing Learning and Teaching at Northwestern University. Dr. Lo was a National Academies Education Fellow and Mentor in Life Sciences in 2011-2016 and founding Communications Officer for the Research Interest Group in Contemporary Methods for Science Education Research at National Association for Research in Science Teaching in 2014-2020. He served as President of Society for Advancement of Biology

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Education Research in 2021-2022 and Chair of the Gordon Research Conference on Undergraduate Biology Education Research with the theme of “A New Vision for Change: Re-imagining Biology Education Through Social Justice” in 2022-2023. Dr. Lo is currently on the editorial boards of CBE-Life Sciences Education, CourseSource, and Journal of Research in Science Teaching. Together with 20+ graduate and postdoctoral scholars over the past decade, Dr. Lo has been working toward the goal of advancing inclusive excellence in STEM higher education.



JULIA SVOBODA is an Associate Professor and Chair of the Department of Education at Tufts University, with a secondary appointment in the Department of Biology. Her research explores how biology is learned and taught across diverse grade levels and educational settings, with particular focus on model-based reasoning as a biological practice that fosters deep understanding and critical thinking in college students. Dr. Svoboda's scholarship bridges biology education and the learning sciences, examining the biological reasoning, epistemological development, and design-based research that supports sensemaking and inquiry. She serves as an editor for the Discipline-Based Science Education section of *Science Education* and sits on the editorial board of *CBE - Life Sciences Education*.

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MELANIE COOPER is the Lappan-Phillips Professor of Science Education and Professor of Chemistry at Michigan State University. She earned her B.S. M.S. and Ph.D. in chemistry from the University of Manchester, England. Her research includes the development and assessment of STEM curricula based on theories of learning and evidence about how people learn, the impact on student learning, and how students perceive these transformed curricula. She has worked to cross disciplinary boundaries to develop coherent approaches to STEM teaching and learning by leading a team of DBER researchers to develop a coherent approach to gateway STEM courses in higher education. She is an elected Member of the National Academy of Education, a Fellow of the Royal Society of Chemistry, the American Chemical Society, and the American Association for the Advancement of Science. She was a member of the leadership team for the development of the Next Generation Science Standards (NGSS) and has served on the National Academy of Sciences Board on Science Education (BOSE) and as an author on several consensus reports for the National Academy of Sciences. She has received a number awards for excellence in teaching and for her contributions to research.



TERRELL MORTON is an Associate Professor of Identity and Justice in STEM Education at the University of Illinois Chicago. He is an alumnus of North Carolina A&T State University (B.S. Chemistry), University of Miami (MS Neuroscience), and UNC Chapel Hill (Ph.D. Education - Learning Sciences and Psychological Studies). Dr. Morton identifies as a Scholar-Activist! His work strives to transform the positioning and understanding of Blackness in mainstream education, specifically STEM, seeking justice and joy for Black students. Through every endeavor, he strives to “walk it like he talks it.”

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GLENN DOLPHIN received a Bachelor's from Binghamton University and a Master's degree from The Johns Hopkins University in geology. He worked in the groundwater industry, doing municipal water supply and groundwater remediation. Previously, he was a 9th-grade Earth Science teacher. During this time, Glenn became interested in using the history and philosophy of science (HPS) to teach geoscience concepts. He also became interested in student learning. Eventually, Glenn went back to school to earn a Ph.D. in Science Education at Syracuse University. His research focused on how metaphors influenced how a geology instructor taught. After graduating, Glenn accepted the Tamaratt Teaching Professorship at the University of Calgary. He began researching teaching and learning, focusing on the use of HPS to teach geology concepts and the nature of science. Glenn published an introductory textbook using this strategy and has published a book showcasing the development of the course and its efficacy for teaching geoscience concepts, and about the nature of science. He has also researched students' and scientists' thinking about science, based on their metaphor usage. Glenn recently completed research to understand how the Canadian public thinks about earthquakes and how to educate them best concerning the recent rollout of Canada's earthquake early warning system.

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MELONIE SEXTON (Moderator) is an educator, researcher, and a lifelong academic. She currently works at Valencia College as a tenured professor of psychological sciences. She is a member of the planning committee.

Leveraging Connections across Disciplines



ERIN DOLAN is a Josiah Meigs Distinguished Teaching Professor in the Department of Biochemistry & Molecular Biology and Georgia Athletic Association Professor of Innovative Science Education at the University of Georgia. As a neuroscience graduate student, she volunteered extensively in K-12 schools, which prompted her to pursue a career in biology education research. She teaches introductory biology and her research group, the SPREE Lab (Social Psychology of Research Experiences and Education), works to delineate the features of undergraduate and graduate research that influence students' career decisions, including the influence of research mentorship. She served on the U.S. National Academies consensus committee on mentoring in STEMM. She co-authored a guidebook on designing and teaching course-based undergraduate research experiences. She also served for ten years as Editor-in-Chief of the biology education research journal, CBE – Life Sciences Education.

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RENÉE COLE is a Professor of Chemistry and Department Executive Officer at the University of Iowa. Dr. Cole earned a B.A. in chemistry from Hendrix College, and M.S. and Ph.D. degrees in physical chemistry from the University of Oklahoma before completing a post-doctoral fellowship in chemistry education at the University of Wisconsin. Renée's research focuses on issues related to how students learn chemistry and how that can guide the design of instructional materials and teaching strategies as well on efforts related to faculty development and the connection between chemistry education research and the practice of teaching. She has been involved as a PI in multiple interdisciplinary research projects, including the ELIPSS Project (www.elipss.com), which is developing resources for STEM instructors to assess durable skills in the classroom as well as for a campus initiative to increase evidence-based instructional practices across campus. She was one of the PIs for the Increase the Impact Project (www.increasetheimpact.com), which developed resources for PIs to improve the propagation of their innovations. She has been a co-editor for two books focusing on chemistry education research. She was named a Fellow of the American Chemical Society (2015) and an AAAS Fellow (2021). She has been honored by receiving the James Flack Norris Award for Outstanding Achievement in the Teaching of Chemistry (2023), the Iowa Women of Innovation Award for Academic Innovation & Leadership (2014), and the Missouri Governor's Award for Excellence in Education (2009).

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DANIEL REINHOLZ (Moderator) is a Professor of Mathematics and Statistics at San Diego State University. They are a member of the planning committee.

Reflections on Interdisciplinary DBER work in light of the break out conversations



CHRIS RASMUSSEN is Professor of mathematics education and Associate Chair in the Department of Mathematics and Statistics at San Diego State University. He is a founding Editor of the *International Journal of Research in Undergraduate Mathematics Education*. His research investigates inquiry-oriented approaches to the learning and teaching of undergraduate mathematics, focusing on how mathematical ideas are developed through student exploration and teacher-student discourse. This work also includes a focus on redesigning upper division mathematics content courses so that they are more relevant for future secondary school teachers. A third component of his research program seeks to better understand departmental practices and programs to improve student success in the introductory mathematics courses required of all STEM majors and the process of departmental and institutional change to improve these courses. From 2017-2022 he served as a committee member of the National Academies of Science Roundtable on Systemic Change in Undergraduate STEM Education and from 2017-2020 he served as a representative of the Conference Board of

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Mathematical Sciences for the National Academy of Science's US National Commission on Mathematical Instruction. He currently serves on the National Academy of Science's Mathematical Sciences Education Board.



KADIAN CALLAHAN is Associate Dean for Student Success and Community Engagement and Professor of Mathematics Education in the College of Science and Mathematics (CSM) at Kennesaw State University (KSU). She collaborates with student leaders, faculty, staff, and administrators to ensure that CSM structures, policies, and practices align with the goal of creating a welcoming learning environment that fosters student success. Dr. Callahan also works with faculty and administrators across higher educational institutions to advance continuous improvement in undergraduate Science, Technology, Engineering, and Mathematics (STEM) education. Her research examines strategies for improving teaching and learning in science and mathematics courses and programs and analyzing STEM institutional change efforts to transform teaching, learning, and the student experience. She has led mathematics departmental change efforts and serves as a change partner for institutions seeking to improve introductory mathematics. At the national level, Dr. Callahan is co-leader for the Accelerating Systemic Change Network (ASCN), mentors emerging leaders for the Association of American Colleges & Universities (AAC&U) Project Kaleidoscope's STEM Leadership Institute, and serves on the Project EMBER leadership team for Transforming Post-Secondary Education in Mathematics (TPSE). She earned a Bachelor of Science degree in Mathematical Sciences/Minor in Computer Information Systems from Florida A&M University - Tallahassee. Her Master's degree is in Secondary Mathematics Education from Indiana University - Bloomington, and her Ph.D. is in Mathematics Education: Higher Education, Curriculum

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and Instruction from the University of Maryland -
College Park.



KAREN HIGH is a professor of Engineering and Science Education (ESED) at Clemson University. Prior to joining Clemson, she pursued technical and educational research as a chemical engineering professor at Oklahoma State University. She has been active in educational research and initiatives throughout her career. Her work integrates engineering, science, and education through Discipline-Based Education Research (DBER), focusing on how people learn, teach, and succeed across STEM disciplines. Her scholarship explores creativity, communication, critical thinking, mentoring, and faculty and graduate student development—areas that connect learning environments with professional formation in STEM. She is also engaged in building faculty and institutional capacity for conducting and sustaining DBER. Her current projects, supported by the National Science Foundation and other partners, examine holistic mentoring, faculty development, and student success. She regularly designs and facilitates national workshops for the American Society for Engineering Education, the Professional and Organizational Development (POD) Network, and the Kern Entrepreneurial Engineering Network (KEEN). These sessions focus on inclusive mentoring, graduate education, and strategies to broaden participation in STEM. Her work includes advancing a national research agenda for STEM faculty development and leading initiatives that link entrepreneurial mindset with engineering education research. She also collaborates nationwide to strengthen the national DBER community. High has held several leadership roles at Clemson, including Inaugural KEEN Campus Leader, Inaugural Director of the Center for Transformational Mentorship, Director of STEM Faculty Development Initiatives, and Associate Dean for Undergraduate Education, and is active in program and

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university accreditation and evaluation, particularly for ABET.



CHARLES HENDERSON (Moderator) is a Professor of Physics and Director of Interdisciplinary STEM Education at North Carolina State University. He is a member of the planning committee.

DBER Impact on Postsecondary Learning Experiences



JEREMI LONDON is the Associate Provost for Academic Opportunity and an Associate Professor of Mechanical Engineering at Vanderbilt University. She has mentored two dozen researchers since the beginning of a faculty career that spans three universities. Her commitment to bridging the gap between research and practice in engineering education is the focus of her scholarship. Her scholarly interests have been supported by over \$11.7M and resulted in over 100 peer-reviewed articles, best paper awards, and keynote addresses. Dr. London received a National Science Foundation CAREER Award and is a nominee of the 2025 Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring, the highest mentoring award in the nation. Some of her other awards include the 2021 Virginia Tech Presidential Principles of Community Award, the 2021 Dean's Award for Excellence for Outstanding New Assistant Professors, and the 2017 Poly Faculty Teaching Excellence Award. Her work also extends

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beyond the ivory towers of the academy: Dr. London was a member of Season 1's curriculum team for the PBS' Weather Hunters, a newly animated science cartoon for kids ages 5-8 from Al Roker entertainment, the production company led by Emmy-winning TODAY weatherman and host, Al Roker. It aired in September 2025. Dr. London earned three engineering degrees from Purdue (B.S. and M.S. in Industrial Engineering and Ph.D. in Engineering Education) and an MBA from University of Maryland Global Campus.



MICHAEL DENNIN has been Professor of Physics and Astronomy at UCI since 1997, and the Vice Provost for Teaching and Learning and Dean, Division of Undergraduate Education since 2015. His research focuses on the dynamics of foams, modeling of ice mélange in fjords, and institutional issues in education. He has won numerous awards for research and teaching, including being elected a Fellow of the American Physical Society, and is passionate about public outreach in the area of science. He has appeared on numerous television programs – including Science of Superman, Spider-man Tech, Batman Tech, Star Wars Tech, and Ancient Aliens. You can find Prof. Dennin on his YouTube Channel (<http://https://www.youtube.com/michaeldennin>) with interviews focused on higher education and his series Physics of X. In addition, Prof. Dennin serves as an expert on the podcast Fascinating Gadgets, Gizmos, and Gear-Based Technologies where he explains how to make fictional technology a reality (<http://fgggbt.com>). Recently, he published a science outreach book on the intersection between science and faith: *Divine Science: Finding Reason at the Heart of Faith*

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DAVE KUNG has worked in the intersection of mathematics and equity at numerous levels over the last three decades. He currently serves as the Executive Director of Transforming Post-Secondary Education in Mathematics (TPSE-Math). Prior to that, he served as the Director of Policy at the Charles A. Dana Center at The University of Texas at Austin. In this role, Kung led the Launch Years Initiative, working with state teams to modernize math options for students across the high school / higher ed transition – and ensure equitable access and success. Kung directed MAA Project NExT (New Experiences in Teaching), the math community’s premiere professional development program for early-career professors, from 2014 to 2023. He also works closely with K-12 and higher ed organizations, especially concentrating on equity issues in mathematics. Two Great Courses lecture series, on math/music and mind-bending paradoxes, have engaged audiences around the world. He has authored a variety of articles and books on topics in harmonic analysis and mathematics education. Kung was awarded the Deborah and Franklin Tepper Haimo Award, the MAA’s highest award in college math teaching, for his work at St. Mary’s College of Maryland, a public honors college outside Washington, D.C. He resides there, coaching local high school teachers, as well as playing violin and running—never simultaneously, but sometimes alongside his partner and daughter.

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ANDREA (DEA) FOLLMER is Professor of Psychology, Director of the Center for Teaching Excellence, and Gault Teaching Scholar at the University of Kansas. Her research focuses on memory and cognitive development, and on strategies for systemic improvement of higher education, informed by cognitive and developmental science. Her work has examined interventions for enhancing student learning and development, using assessment data to improve teaching and learning, representing and evaluating teaching, and scaling these activities to produce widespread change. Recent projects include TEval, an NSF-funded collaboration to transform the evaluation of teaching in higher education (their findings are detailed in *Transforming College Teaching Evaluation: A Framework for Instructional Excellence*, Harvard Education Press, 2025), and KU's Transforming STEM Initiative, a collaboration with 14 institutions to foster anti-deficit pedagogy across the introductory science curriculum. From 2016 to 2025, she served as Associate Director and then Director of the Bay View Alliance, a consortium of US and Canadian research universities collaborating on educational improvement initiatives. She currently sits on the National Academies' Roundtable for Systemic Change in Undergraduate STEM Education. Dr. Follmer Greenhoot completed her bachelor's degree in psychology at Dartmouth College, her doctorate in developmental psychology at the University of North Carolina at Chapel Hill, and a postdoctoral fellowship at the University of Arizona before joining the faculty at the University of Kansas in 1999.

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RAECHEL SOICHER (Moderator) is an Associate Director for Research and Evaluation in the Teaching + Learning Lab at Massachusetts Institute of Technology. She is a member of the planning committee.

Communicating the Value of DBER



ADRIENNE MINERICK is a Distinguished Professor of Chemical Engineering at Michigan Technological University. She earned her B.S. from Michigan Tech and her M.S. and Ph.D. from the University of Notre Dame. Adrienne completed her Presidential terms with the American Society for Engineering (ASEE) in June 2023. She is a fellow of the American Association for the Advancement of Science (AAAS), ASEE, American Institute of Chemical Engineers (AIChE), and was recently elected to the American Institute for Medical and Biological Engineering (AIMBE) College of Fellows. Adrienne has established three formal faculty mentoring programs, co-initiated ASEE Safe Zone workshops, co-led the Year of Action on Diversity, and served as President during the Year of Impact on Racial Equity. She earned the AES Electrophoresis Society's Lifetime Achievement Award in 2022 and was a prior Michigan Professor of the Year Nominee, demonstrating her passion for leveraging research to advance student growth and societal progress. She directs the Micro Medical Device Engineering Research Laboratory (□M.D. – ERL) at Michigan Tech and was Chief Technology Officer of a start-up company,

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Microdevice Engineering, Inc. (MDE). She has managed, as PI or co-PI, ~\$14.9 million, yielding 104 research graduates*, a patent, and >110 publications [*12 PhDs (64% women, 18% UR)].



HOWARD GOBSTEIN is Sr. Vice President for Academic Affairs of the Association of Public and Land-grant Universities (APLU). He leads the Office of Academic Affairs which supports the Council of Academic Affairs (provosts), Committee on Faculty Affairs (vice provosts for faculty affairs), the Council of Student Affairs (senior student affairs officers) and the Commission on Information, Measurement and Analysis (institutional data and analysis). His team leads studies to improve overall undergraduate education, STEM education, workforce development and the digital transformation of universities. Prior APLU positions include APLU Executive VP and head of STEM Education and Research Policy. Over 20 years at APLU he convened STEM education projects involving dozens of APLU institutions and supported by NSF and other foundations. Recent leadership included directing the NSF Eddie Bernice Johnson INCLUDES Aspire Alliance to enhance the diversity and inclusion of STEM faculty. He has spent his entire prior career engaged in university/science/government issues while serving at Michigan State University, the University of Michigan, the Association of American Universities (AAU), White House Office of Science and Technology Policy and the U.S. Government Accountability Office (GAO). Gobstein is a fellow of AAAS and a distinguished alum of the School of Interdisciplinary Engineering of Purdue University. He earned an MA in Science, Technology and Public Policy from George Washington University and a BS in Interdisciplinary Engineering from Purdue. Gobstein served on the NASEM Roundtable for Systemic Change in Undergraduate STEM Education. He also chaired a

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NASEM workshop on Increasing Student Success in Developmental Mathematics.



FRED BONNER II is Professor and Endowed Chair in Educational Leadership and Counseling and Founding Executive Director of the Minority Achievement, Creativity and High-Ability (MACH-III) Center at Prairie View A&M University. He is formerly the Samuel DeWitt Proctor Endowed Chair in Education in the Graduate School of Education at Rutgers University and an esteemed expert in the field of diversity in education. Prior to joining Rutgers, he was Professor of Higher Education Administration and Dean of Faculties at Texas A&M University-College Station. He earned a B.A. in Chemistry from the University of North Texas, an M.S. Ed. in Curriculum and Instruction from Baylor University, and an Ed.D. in Higher Education Administration & College Teaching from the University of Arkansas. Throughout his career, his work has consistently been centered on microcultural populations developing attitudes, motivations, and strategies to survive in macrocultural settings. This social justice philosophy has led him to publish numerous articles, books and book chapters related to: academically gifted African American male college students in varying postsecondary contexts (Historically Black Colleges and Universities, Predominantly White Institutions, and Community Colleges); teaching in the multicultural college classroom; diversity issues in student affairs; diverse millennial students in college; success factors influencing the retention of students of color in higher education and in the Science, Technology, Engineering and Mathematics (STEM) fields in particular; and faculty of color in predominantly White institutions (PWIs).

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LEILANI ARTHURS (Moderator) is an associate professor in the Department of Geological Sciences, an affiliate faculty member in the School of Education, and a member of the Discipline-Based Education Research Group at the University of Colorado at Boulder. She is a member of the planning committee.

Future Directions for DBER



ESTRELLA JOHNSON is an Associate Professor of Mathematics and the founding director of the College of Science's Center for Advancing Undergraduate Science Education at Virginia Tech. Her research agenda is composed of a multi-faceted approach to investigating one large and critical question: How can we support high-quality, ambitious teaching in university mathematics and science classes? This includes research into characterizing and analyzing classroom instructional practices; identifying individual, departmental, and institutional factors that shape pedagogical decisions through large-scale surveys and qualitative studies; and developing and evaluating instructional supports that foster meaningful instructional change. Grounded in both quantitative and qualitative methodologies, this work has revealed nuanced insights into classroom instruction, the uptake of research-based instructional strategies, and the systemic conditions that enable or constrain pedagogical innovation. This research informs the foundation and mission of the Center for Advancing Undergraduate Science Education, which seeks to engage science faculty as professional educators. This

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includes providing support for designing and implementing instructional innovations and offering research mentoring for conducting scholarship and research on the teaching and learning of undergraduate science and mathematics.



ERIC RIGGS is dean of the College of Natural Resources and Sciences and professor of geology at California State Polytechnic University, Humboldt. He previously served as associate dean for diversity and graduate affairs in the College of Geosciences and was professor of geoscience education in the Department of Geology & Geophysics at Texas A&M University. Riggs has also served in faculty and administrative roles at Purdue University and San Diego State University. Riggs' scholarship is focused on many related aspects of teaching, learning and cognition in the geosciences through the lens of embodied cognition, culture and diversity. He is past-president of the American Geosciences Institute (AGI) and the National Association of Geoscience Teachers (NAGT). He is a Fellow of the Geological Society of America (GSA) and is a professional member of GSA, NAGT, and the American Geophysical Union (AGU). Riggs has contributed to four prior workshops and reports with the National Academies of Sciences, Engineering and Medicine, related to the future of the Earth science workforce. He served on the executive committee of AGI from 2015 to 2017, where he participated in activities advocating for increased development of the Earth science workforce. Riggs received a Ph.D. in geological sciences from the University of California, Riverside.

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ALAN CHEVILLE studied optoelectronics and ultrafast optics at Rice University, followed by fourteen years as a faculty member at Oklahoma State University working on terahertz frequencies and engineering education. While at Oklahoma State he developed courses in photonics and engineering design. After serving for two and a half years as a program director in engineering education at the National Science Foundation, he took a position in electrical & computer engineering at Bucknell University. He is currently interested in engineering design education, engineering education policy, and the philosophy of engineering education



VIJI SATHY is Interim Associate Provost for Faculty Development and Success, Senior Associate Director and Interim Director of the Center for Faculty Excellence. With over 30 years at UNC as a student, faculty member, and academic leader, she brings deep expertise in faculty development focused on evidenced-based teaching approaches, academic leadership, and mentorship. A nationally recognized educator and facilitator, Dr. Sathy designs and leads programs that strengthen teaching and mentoring practices in higher education, advancing excellence and innovation across the academy. She has collaborated with organizations such as the Howard Hughes Medical Institute, American Association for the Advancement of Science (AAAS), the Association of American Universities (AAU), and the National Academies (NASEM) to drive systemic change in STEM education. Her leadership development work includes serving as Faculty Director of the Tyson Academic Leadership Program at UNC's Institute for the Arts & Humanities, where she coaches faculty leaders through the challenges of leading transformational change in academic institutions. Dr. Sathy's scholarship on pedagogy and student success has been featured in *Science* and *The Chronicle of Higher Education*. She has received numerous campus

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teaching awards, as well as top national honors, including the American Psychological Association's 2024 Charles L. Brewer Distinguished Teaching Award. She earned her B.S. and Ph.D. in psychometrics from UNC. Born in India and raised in a small North Carolina town, Dr. Sathy is a first-generation college graduate and a proud product of the state's public education system—and a lifelong Tar Heel.



CHARLES HENDERSON (Moderator) is a Professor of Physics and Director of Interdisciplinary STEM Education at North Carolina State University. He is a member of the planning committee.

Moderators from Break Out Sessions (1, 2, and 3)



PAULA LEMONS (reporting on break out 1) is Professor of Biochemistry and Molecular Biology and Senior Associate Dean in the Franklin College of Arts and Sciences at the University of Georgia. She is a member of the planning committee.

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KATELYN COOPER (Moderator, break out 2) is an Associate Professor in the School of Life Sciences at Arizona State University, where she leads the Cooper Biology Education Research Lab and directs the Mental Health Division of the Research for Inclusive STEM Education (RISE) Center. Trained as a discipline-based education researcher, she applies theories of clinical psychology and employs both quantitative and qualitative methodologies to study biology undergraduate, graduate, and medical education. Each summer, she serves as a Visiting Scholar at Northwestern University's Feinberg School of Medicine in the Lab for Scalable Mental Health, where she collaborates to integrate psychological science into educational contexts. The Cooper Lab investigates the mental health of science undergraduate, graduate, and faculty populations, examining how it intersects with cognitive and affective learning and how it affects faculty engagement in academic science. The lab's most recent efforts focus on developing and evaluating interventions designed to foster science student well-being, performance, and persistence. In 2025, the lab launched Fail-Safe Science, a video-repository and accompanying podcast, that promotes graduate student mental health and reframes failure in science. Dr. Cooper's research has been highlighted in *Science* and *Nature* as well as news outlets such as the *New York Times*, *CNN*, and *BBC News*. In 2022, Katelyn received the NSF CAREER award to investigate the relationship between research experiences and depression in STEM trainees, and was named to *NBC's PRIDE 30: The new generation* for her leadership in advancing inclusive biology education.

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MARGARET (MAGGIE) WEBB (Moderator, break out 2) is a Postdoctoral Research Fellow with Cornell University's Center for InterDisciplinary Education Research (CIDER). Dr. Margaret (Maggie) Webb holds a bachelor's degree in mechanical engineering from Rice University. She earned her Ph.D. in engineering education and a M.S. in civil engineering from Virginia Tech. Before her doctoral studies, she worked as a subsea engineer at ExxonMobil and taught algebra and geometry in Houston, TX. Her dissertation research focused on how academic structures and cultures can act as systems to influence STEM graduate students' interdisciplinary scholar identity development and career motivation over time. Originally from New Orleans, Webb's research interests overall stem from her experiences with hurricanes and resilient infrastructure. Her work centers on understanding how interdisciplinary academic ecosystems develop as well as how they prepare engineers and scientists to collaborate across disciplines and address complex societal challenges in their work. Her research currently explores the interactions between structures, systems, and culture on the development of Discipline-Based Education Research postdoctoral associates as scholars and change agents.



CHANDRA TURPEN (Moderator, break out 2) is a Research Assistant Professor at the University of Maryland, College Park with the Physics Education Research Group. She completed her PhD in Physics at the University of Colorado at Boulder specializing in Physics Education Research. Chandra's work involves designing and researching contexts for learning within higher education. In her research, Chandra draws from the perspectives of anthropology, cultural psychology, and the learning sciences. Through in-situ studies of classroom and institutional practice, Chandra focuses on the role of culture in science learning and educational change. Chandra pursues projects that

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have high potential for leveraging sustainable change in undergraduate STEM programs and makes these struggles for change a direct focus of her research efforts.



RYAN STOWE (Moderator, break out 3) earned his Ph.D. from Scripps Research under the guidance of Prof. William Roush. While enrolled in graduate school, Ryan was appointed a Christine Mirzayan Science and Technology Policy Fellow with the Board on Science Education at the National Academy of Sciences. Post-Ph.D., Ryan spent 3 years as a postdoctoral fellow mentored by Prof. Melanie Cooper. His postdoctoral work focused on supporting student engagement in expert-like epistemic practices. Ryan and his research group work to understand what would be required for chemistry classes to prepare students for their post-school daily lives. This agenda is multi-faceted and requires attending to how people and communities use chemistry in daily life, considering how (or whether) knowing and learning in-class resembles knowing and learning in-life, and de-settling taken-for-granted assumptions about what chemistry learning could and should look like.



JON-MARC RODRIGUEZ (Moderator, break out 3) is an Assistant Professor in the Department of Chemistry & Biochemistry at the University of Wisconsin–Milwaukee. He earned a B.S. in Pharmacological Chemistry and an M.S. in Chemistry from UC San Diego, and a Ph.D. in Chemistry from Purdue University. His research in chemistry education explores how students make sense of equations, interpret and construct graphs, and engage with mathematical reasoning in chemistry. His recent work examines the intersection of ethics with learning and research practices. He is also committed to supporting the growth of the chemistry education research community, especially individuals at the periphery, such

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as emerging researchers, instructors, and undergraduates interested in participating in science.



AMY DUNBAR-WALLIS (Moderator, break out 3) is an educator and researcher whose work bridges science education, civic engagement, and community-based research. She earned her Ph.D. in Ecology and Evolutionary Biology from the University of Colorado Boulder (advisor Dr. Lisa Corwin), where her research focused on the impacts of course-based undergraduate research experiences (CUREs) on student learning and instructor development, with a special emphasis on science civic engagement through the Tucson Bee Collaborative and The Boulder Apple Tree Project. Amy is also the community engagement coordinator for the Boulder Apple Tree Project, a long-term citizen science and preservation initiative that combines public participation, ecological research, and place-based education. She is currently a postdoctoral researcher at the University of Nebraska (advisor Dr. Jenny Dauer), exploring how experiential learning in large science courses (Scientific Decision Making in a Complex World) fosters science civic engagement. Amy is excited to support undergraduate STEM learning and research in a rapidly changing world. With more than two decades of experience across academic, nonprofit, and informal science learning settings, she is deeply committed to inclusive mentoring, interdisciplinary collaboration, and the preservation of cultural and ecological heritage.

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JOEL ALEJANDRO (ALEX) MEJIA (Moderator, break out 3) is a Professor in the Department of Biomedical Engineering at the University of Cincinnati. Before entering academia, he worked as a project engineer for the Department of Defense, Rio Tinto, and FLSmidth Minerals. Dr. Mejia's scholarship examines how cultural and social factors influence identity, movement, and participation within engineering. His research focuses on the physical and cultural divides across borders, languages, and knowledge systems to better understand the experiences and perspectives of individuals in engineering environments. He is especially interested in approaches that expand how engineering is understood and practiced within different cultural and educational settings, including bilingual engineering education and the role of critical thinking in engineering practice. Dr. Mejia received the Presidential Early Career Award for Scientists and Engineers (PECASE) in 2025 – the highest honor granted by the U.S. government to outstanding scientists and engineers.



LORI BANKS (Moderator, reporting on break out 3) is an Assistant Professor of Biology at Prairie View A&M University. She is a member of the planning committee.

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CYNTHIA J. FINELLI (Planning Committee Chair) is the David C. Munson, Jr. Professor of Engineering, Professor of Electrical Engineering & Computer Science, and Professor of Education at the University of Michigan. She was the founding Director of Engineering Education Research, serving in that role for ten years. Professor Finelli's research focuses on increasing faculty adoption of evidence-based instructional practices, promoting students' sense of social responsibility through engineering coursework, and identifying ways to better support students with neurodiversities, such as Attention-Deficit/Hyperactivity Disorder (ADHD). Professor Finelli is a Fellow of both the Institute of Electrical and Electronics Engineers (IEEE) and the American Society for Engineering Education (ASEE). Her extensive service includes roles as Deputy Editor for the *Journal of Engineering Education*, Associate Editor for the *European Journal of Engineering Education* and *IEEE Transactions on Education*, Chair of the Engineering Education Chairs and Heads Association, Co-chair of the ASEE Committee on Scholarly Publications, Chair of the Educational Research and Methods Division of ASEE, member of the governing board of the Research in Engineering Education Network, and member of the Steering Committee for the IEEE/ASEE Frontiers in Education Conference. She founded the Center for Research on Learning and Teaching in Engineering at the University of Michigan in 2003 and served as its Director for 12 years. Dr. Finelli earned her B.S.E., M.S.E., and Ph.D. degrees in Electrical Engineering from the University of Michigan

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LEILANI ARTHURS is an associate professor in the Department of Geological Sciences, an affiliate faculty member in the School of Education, and a member of the Discipline-Based Education Research Group at the University of Colorado at Boulder. She earned a Ph.D. in Civil Engineering and Geological Sciences from the University of Notre Dame, a B.S. in Geology from the University of Hawai'i at Hilo, and an A.B. in Peace and Conflict Studies from the University of California at Berkeley. She has work experience with the United States Geological Survey, earned certificates in pedagogy from the Kaneb Center for Teaching and Learning, and was a postdoctoral fellow for the Science Education Initiative. Her research involves studying challenges novices to geoscience encounter during instruction, developing and evaluating formative and summative assessments that facilitate student learning and promote science literacy, and exploring conditions that inhibit and promote the implementation of active learning strategies in post-secondary STEM education. Her work has been funded by the National Science Foundation and the National Aeronautics and Space Administration.



LORI BANKS is an Assistant Professor of Biology at Prairie View A&M University. She has a B.S. in Biology from Prairie View A&M University and a Ph.D. in Molecular Virology and Microbiology from Baylor College of Medicine. Dr. Banks' research focuses on protein structure-function studies related to drug discovery from a range of microbial targets. She designs and implements curricular models that incorporate graduate-level scientific research and medicine into undergraduate learning and works to increase the representation of historically excluded groups in STEM curriculum resources. Her curriculum design efforts have been supported by the Arthur Vining Davis Foundation's Project Pericles and the Molecular Sciences Software Institute's Accelerating Curricular

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Transformation in the Computational Molecular Sciences. Outside of her research and coursework, she is active in the Society for the Advancement of Chicanos and Native Americans in Science (SACNAS) and the American Society for Microbiology (ASM), and she does scientific outreach work with Zeta Youth Affiliates and Allies in Hope of Houston.



CHARLES HENDERSON is a Professor of Physics and Director of Interdisciplinary STEM Education at North Carolina State University. Prior to joining NC State in 2025, he was a Distinguished Professor at Western Michigan University (WMU), with a joint appointment between the Physics Department and the WMU Mallinson Institute for Science Education. He served as Director of the Mallinson Institute and co-Founder and co-Director of the WMU Center for Research on Instructional Change in Postsecondary Education (CRICPE). His research program focuses on understanding and promoting change in higher education, with an emphasis on improving undergraduate STEM instruction. Dr. Henderson's work has been supported by over \$11M in external grants and has resulted in many publications (see <https://sites.google.com/view/chenderson>). He is a Fulbright Scholar and a Fellow of the American Physical Society, Chief Editor of the journal *Physical Review Physics Education Research* for twelve years, and has served on three National Academy of Sciences Committees.

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WALTER C. LEE is a Professor in the Department of Engineering Education at Virginia Tech and the Executive Director of the Center for Engineering Excellence and Discovery (CEED). He also serves as an Associate Editor of the Journal of Engineering Education (JEE). Lee is broadly interested in broadening participation and student support, particularly as it relates to students from underrepresented or marginalized groups in engineering. His research earned him a National Science Foundation CAREER Award focused on examining the strengths and deficiencies within university support structures and processes from the perspective of marginalized students, as well as a Presidential Early Career Award for Scientists and Engineers (PECASE). Lee received his Ph.D. in Engineering Education from Virginia Tech, his M.S. in Industrial and Systems Engineering from Virginia Tech, and his B.S. in Industrial Engineering from Clemson University.



PAULA LEMONS is Professor of Biochemistry and Molecular Biology and Senior Associate Dean in the Franklin College of Arts and Sciences at the University of Georgia. She conducts discipline-based education research and leads a vibrant group of graduate students and undergraduate researchers. Her research group investigates undergraduate students' knowledge development in biochemistry and how pedagogy can maximize conceptual understanding and problem solving. She promotes the applications of discipline-based education research, such as the ways that research informs policies on undergraduate graduate education, through her service with the Scientists Engaged in Education Research (SEER) Center at UGA and her national involvement in organizations like the American Society for Biochemistry and Molecular Biology Education and Professional Development committee. As Senior Associate Dean for Franklin, Dr.

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Lemons leads the Office of Academic Innovation, where she guides and facilitates the college's work on academic programs, building career leaders, and creating student community. Dr. Lemons earned her Ph.D. in Biochemistry in 1999 from the University of Kentucky and pursued postdoctoral work in biology teaching and learning at Duke University from 1999-2001. She joined the faculty of the University of Georgia in 2009.



DANIEL L. REINHOLZ is a Professor of Mathematics and Statistics at San Diego State University. Dr. Reinholz engages in transformative research to understand and improve postsecondary STEM classroom learning environments. This work has been organized around the development of the EQUIP tool, which generates actionable data that can be incorporated into robust professional learning opportunities through faculty learning communities that support instructors to transform their teaching. Beyond the classroom, Dr. Reinholz serves as a Working Group Leader in the Accelerating Systemic Change Network, which aims to catalyze sustainable and scalable changes to STEM higher education. This work involves developing new models grounded in organizational change, and helping STEM departments build their own capacity for change. Dr. Reinholz has published 76 refereed journal articles, and is the author of the recent book, *Equitable and Engaging Mathematics Teaching: A Guide to Disrupting Hierarchies in the Classroom*. Dr. Reinholz's second solo-authored book, *Equity Learning Communities*, will be published by Harvard Education Press, available Fall 2025.

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DIANE RHODES is an Associate Professor of Computer Science in the Computer Technology Department at Red Rocks Community College, where she serves as the Bachelor of Applied Science Program Lead for Cybersecurity and Secure Software Development. As State Discipline Chair, she guides diverse academic and professional communities toward shared goals. Dr. Rhodes holds an Ed.D. from Ferris State University and an M.S. in Computer Science from Colorado Technical University. She is also a Community College Presidents Initiative (CCPI) STEM Fellow. Her work focuses on aligning computing curricula with industry demands and promoting inclusive educational frameworks.



MELONIE SEXTON is an educator, researcher, and a lifelong academic. She currently works at Valencia College as a tenured professor of psychological sciences. Melonie's teaching philosophy is that students learn best when they engage in high-impact practices and opportunities that prepare them for their future careers. Her classes are known for integrating elements of research, service-learning, interdisciplinary collaboration, and community engagement. Having served as the college's Undergraduate Research Coordinator for 6.5 years, Dr. Sexton has played a major role in expanding this work at two-year colleges and developing transfer pathways for students who plan to continue at a four-year university and beyond. In addition to developing curriculum for undergraduate students, Dr. Sexton also works closely with Valencia's faculty development department to create and facilitate courses that train other educators in these experiential practices. Dr. Sexton has won several awards for her work including being recognized as a National Science Foundation Graduate Fellow, receiving the Rising Leader Award from the Society of Experiential Education association, and in 2023, earning the Best Scholarship and Research Award in her tenure cohort.

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Dr. Sexton earned her Ph.D. in Psychology from Vanderbilt University and earned a B.S. in Psychology and a B.A. in Political Science from the University of Central Florida.



RAECHEL SOICHER is an Associate Director for Research and Evaluation in the Teaching + Learning Lab at Massachusetts Institute of Technology. Leveraging her cognitive neuroscience and applied psychology background, Dr. Soicher examines teaching and learning practices grounded in cognitive and motivational theory. Additionally, she conducts research through an Implementation Science lens – determining the contextual factors that support or impair the use of evidence-based pedagogical practices. Additionally, she conducts research through an Implementation Science lens – determining the contextual factors that support or impair the use of evidence-based pedagogical practices. Her research has been published in *Cognitive Research: Principles and Implications*, *Applied Cognitive Psychology*, and the *Journal of Computer Assisted Learning*, among others. She has provided expertise on implementation science for the National Academies of Science, Engineering, and Medicine regarding sexual harassment prevention programming in higher education and health professions education. She earned her Ph.D. in 2020 in Psychology from Oregon State University.

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MARCY TOWNS is the Bodner-Honig Professor of Chemistry and Associate Dean of Leadership Excellence for the College of Science at Purdue University. Her research has focused undergraduate chemistry laboratory including the development and implementation of digital badging to assess hands-on skills, argumentation practices, and student understanding of mathematics in chemistry in thermodynamics and kinetics. She is a Fellow of the American Association for the Advancement of Science, the American Chemical Society, and the Royal Society of Chemistry. She was recognized in 2021 as an IUPAC Distinguished Woman in Chemistry or Chemical Engineering. In 2019 she received the Nyholm Prize in Education from the Royal Society of Chemistry, and she received the 2017 ACS Award for Achievement in Research for the Teaching and Learning of Chemistry. Dr. Towns earned her Ph.D. and M.S. in chemistry from Purdue University and her B.A. in Chemistry and Mathematics from Linfield University.