



**Crossing Borders, Cultivating Futures:
Monarchs, Milkweeds, and Journeys of Transformation in Science Education¹**

Friday February 28, 2025; 8:15am – 4:30pm
University of Illinois Chicago (UIC) | Isadore & Sadie Dorin Forum
725 W. Roosevelt Rd., Chicago, IL 60607

Conference Program

Meet and Greet | Breakfast

8:15 – 9:00 am

Room C / Main Hall

Welcome and Opening Remarks

Cultural Immersion in Monarchs and Milkweeds Advancing Science Education (CIM²AS)

Mary Ashley, University of Illinois Chicago

Stephanie Batres Spezza, University of Illinois Chicago

Jorge Mena Robles, University of Illinois Chicago

Maria Varelas, University of Illinois Chicago

9:00 – 10:10 am

Room C / Main Hall

Transition to Plenary Session

10:10-10:15 am

Morning Plenary Session

Saving the Monarchs

Jaime Rojo, Photographer and National Geographic Explorer

10:15 – 11:05 am

Room C / Main Hall

Transition to Parallel Sessions

11:05 – 11:15 am

¹ This conference is based upon work supported by the National Science Foundation under Grant No. IUSE-1928673. Any opinions, findings, and conclusions or recommendations expressed during the conference are those of the presenters and do not necessarily reflect the views of the National Science Foundation.

Morning Parallel Sessions

11:15 am – 12:30 pm

Bridging Science and Culture: Integrating Community Knowledge and Cultural Wealth in STEM Education

Brezhnev Batres, Benito Juarez Community Academy
Marcela Bernal-Munera, Malcolm X College
Ginevra Clark, University of Illinois Chicago

Room D

Empowering Students via Curricular Adaptation to Learn About Monarchs and Milkweeds

Pam Geddes, Northeastern Illinois University
Daniel Fernandez, Addison Trail High School
Alex Shingleton, University of Illinois Chicago

Room E

Evolution and Life Cycles of Teaching and Learning in Upper-Level College Science Courses

Aixa Alfonso, University of Illinois Chicago
Teresa Orenic, University of Illinois Chicago

Room F

Justice-Centered Science: Cultivating Science Knowledge and Sociopolitical Consciousness to Change the World

Diana Bonilla, Northern Illinois University
Paul Gulezian, Oakton College
Emily Minor, University of Illinois Chicago

Room G

Wings of Change: Integrating Monarch Butterfly Migration into Science Across Educational Levels

Alicia Anzaldo, Wilbur Wright College
Mary Ashley, University of Illinois Chicago
Jorge Santana, Theodore Roosevelt High School

Room H

Networking | Lunch

12:30 – 1:20 pm

Room C / Main Hall

Transition to Parallel Sessions

1:20 – 1:30 pm

Afternoon Parallel Sessions

1:30-2:45 pm

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Jorge Santana, Theodore Roosevelt High School

Room H

Break and Transition to Afternoon Plenary Session

2:45 – 3:00

Afternoon Plenary Session

Establishing Monarch Butterfly Overwintering Sites for Future Climates: Sacred Fir (Abies Religiosa) Upper Altitudinal Limit Expansion by Protected Assisted Migration

Cuauhtémoc Sáenz-Romero, Universidad Michoacana de San Nicolás de Hidalgo, Mexico *and*
Laboratorio Nacional CONAHCyT de Biología del Cambio Climático, Mexico

3:00 – 3:50 pm
Room C / Main Hall

Closing Conversation

Crossing Borders and Cultivating Futures
Mary Ashley, University of Illinois Chicago
Diana Bonilla, Northern Illinois University
Maria Varelas, University of Illinois Chicago

3:50 – 4:30 pm
Room C / Main Hall

SESSION ABSTRACTS

(in order of appearance in the conference program)

OPENING REMARKS

Cultural Immersion in Monarchs and Milkweeds Advancing Science Education (CIM²AS)

Mary Ashley, University of Illinois Chicago
Stephanie Batres Spezza, University of Illinois Chicago
Jorge Mena Robles, University of Illinois Chicago
Maria Varelas, University of Illinois Chicago

In this session, Mary Ashley will introduce the CIM²AS project and present an overview of the science of monarchs and milkweeds, which can be incorporated to differing degrees in various science classes from high school to early and advanced college science courses. Jorge Mena Robles will present on the cultural connections that the UIC Latino Cultural Center personnel including the Director Rosa Cabrera and the Civic Engagement Educator Lauren De Jesus facilitated for the undergraduate summer interns and the collaborating faculty. Lastly, Stephanie Batres Spezza and Maria Varelas will share understandings developed from two studies on the undergraduate summer interns' work. The first study focused on how Latina interns negotiated their multiple identities while participating in the research internship and the forms of cultural wealth that were implicated in these identity negotiations along with the ways in which the various elements of the research internship impacted the interns' identity negotiations. The second study focused on the role of testimonios in science research internships.

MORNING PLENARY SESSION

Saving the Monarchs

Jaime Rojo, Photographer and National Geographic Explorer

Few insects have captured our imagination like the Monarch Butterflies. Their migration is one of the most iconic wildlife spectacles in North America. However, their population has declined by 90% in the last four decades due to the loss of breeding habitat caused by industrial agriculture, deforestation in the wintering grounds, and, recently, extreme weather events fueled by climate change. From farmers to indigenous communities, from scientists to volunteer citizens, hundreds of people across North America are working to reverse this alarming trend and create a new future for Monarchs. In these polarizing times, the struggle of these beloved butterflies can be used to revisit our relationship with the natural world, provide hope, and unite three countries under the same goal: to save the Monarchs.

PARALLEL SESSIONS
(in alphabetical order by session title)

Bridging Science and Culture: Integrating Community Knowledge and Cultural Wealth in STEM Education

Brezhnev Batres, Benito Juarez Community Academy
Marcela Bernal-Munera, Malcolm X College
Genevra Clark, University of Illinois Chicago

In this session, we will discuss innovative teaching strategies at Hispanic-serving institutions (HSIs) that integrate students' cultural and community knowledges in STEM education, fostering inclusivity and cultural competence. Students in a high school biology class explore themes around the Monarch butterfly and its relations to milkweeds, culminating in co-created assignments where they use science practices to preserve cultural practices. Community college students in a biology course interview family members about their plant knowledge to learn about traditional uses of plants and bring cultural insights into science. In an organic chemistry course at a research-intensive university that combines indigenous knowledge frameworks like the Honorable Harvest with Green Chemistry Principles, students explore concepts through latex and cardenolide synthesis, connecting science with cultural traditions. Participants will be invited to reimagine STEM education to validate cultural knowledges, create inclusive learning environments, and empower students to bring their identities into STEM practice.

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Empowering Students via Curricular Adaptation to Learn About Monarchs and Milkweeds

Pam Geddes, Northeastern Illinois University
Daniel Fernandez, Addison Trail High School
Alex Shingleton, University of Illinois Chicago

Adapting and composing curriculum intentionally and specifically for students who have been historically and contemporarily marginalized in STEM have been shown to support their learning of science and nurture their identities, including their science identities. In this session, we will provide three examples of our individual journeys as educators in changing existing science curricula at each of our Hispanic-serving institutions. From a public high school setting with multilingual students and classes taught in Spanish to two public urban universities, one of which is research-intensive, we will share possibilities for creating opportunities with marginalized students to see themselves in the science curriculum that is studied in our classrooms. A unifying element in our curricular evolution is prioritizing connections to students' lived experiences, their cultures, and their various knowledge assets. Participants will have opportunities to consider and discuss how to apply such possibilities to their own curricula.

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Evolution and Life Cycles of Teaching and Learning in Upper-Level College Science Courses

Aixa Alfonso, University of Illinois Chicago
Teresa Orenic, University of Illinois Chicago

How do we meld traditional science content and practices with cultural and justice-oriented themes and support science identity development? In this session, participants will learn from and discuss the journeys of transformation that two UIC professors have undertaken by developing and teaching modules based on the science of monarchs and milkweeds in their courses—Cell Biology and Developmental Biology. As they share ways in which their teaching has evolved similarly and differently, they will focus on three main themes: (a) life cycles are central to organismal development, and intersections of life cycles impact life trajectories—a concept that is embodied in reciprocal interactions between humans and monarch butterflies that have led to conservation efforts and the cultural significance of monarchs as symbols of growth, transformation, biodiversity, among others; (b) Indigenous knowledge has saliency in scientific discoveries, exemplified by our understanding of monarch biology and cultural importance; and (c) meaningful teaching involves engaging students as whole people, with multiple identities and unique assets, in an ever-evolving learning process.

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Justice-Centered Science: Cultivating Science Knowledge and Sociopolitical Consciousness to Change the World

Diana Bonilla, Northern Illinois University
Paul Gulezian, Oakton College
Emily Minor, University of Illinois Chicago

The monarch butterfly and milkweeds system can serve as a catalyst for science educators to develop pedagogical approaches that center various dimensions of justice (environmental, social, economic, educational) in their science classes. In this session, the presenters will discuss the value of a justice-centered pedagogy along with its possible forms and functions. They will connect such pedagogy to the need for teaching science with political clarity that is necessary for the development of a key tenet of the culturally relevant pedagogy (CRP), sociopolitical consciousness. By helping students understand and critique inequities, and consider their own multiple identities (racial, ethnic, cultural, gender, science, academic, class, etc.) in the work of science, students both develop science knowledge and use it to interrogate injustices working toward better futures for themselves, their communities, and the world. Participants will learn strategies for integrating justice concepts into existing curriculum frameworks at various levels, from high school to introductory and advanced college courses.

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Wings of Change: Integrating Monarch Butterfly Migration into Science Across Educational Levels

Alicia Anzaldo, Wilbur Wright College
Mary Ashley, University of Illinois Chicago
Jorge Santana, Theodore Roosevelt High School

The focus of this session will be the exploration of the monarch butterflies’ migration through integrating science and culture across a range of educational levels—high school, community college, and university. Biology educators will present insights on the science of the migratory journey of monarch butterflies, cultural associations, and the relevance of both to the biology curriculum. Presenters will discuss recent scientific advances related to monarch migration and how they can be infused into various biology courses, including upper-level courses. Participants will also have opportunities to learn how hands-on experiences and culturally relevant assignments have enhanced student learning and engagement in college biology and high school science courses attended by diverse students, including emergent bilinguals/multilinguals. The interconnectedness of multiple aspects of the monarch butterfly migration and its significance for a science class will be discussed.



AFTERNOON PLENARY SESSION

Establishing Monarch Butterfly Overwintering Sites for Future Climates: Sacred Fir (*Abies Religiosa*) Upper Altitudinal Limit Expansion by Protected Assisted Migration

Cuauhtémoc Sáenz-Romero, Universidad Michoacana de San Nicolás de Hidalgo, Mexico *and* Laboratorio Nacional CONAHCyT de Biología del Cambio Climático, Mexico

Climate change projections suggest that by the end of the century, inside the Monarch Butterfly Biosphere Reserve (MBBR), it will be a disappearance of the suitable climatic habitat of the Sacred fir (*Abies religiosa*, oyamel), the Mexican conifer that is the exclusive overwintering site of the migratory populations of the Monarch butterfly (*Danaus plexippus*). We planted provenances of *A. religiosa* at elevations beyond their upper elevational limit (3550 m) of their current natural distribution, on Nevado de Toluca, a volcano with higher elevations than that of the MBBR, using existing shrubs as nurse plants to protect the seedlings from extreme temperatures. After three growing seasons, seedling height increment and survival indicate that the establishment of *A. religiosa* at 3600 and 3800 m is feasible. Planted stands could eventually serve as overwintering sites for the Monarch butterfly under projected future climates, compensating a 2.3 °C increase in mean annual temperature projected for 2060.

CLOSING CONVERSATION

Crossing Borders and Cultivating Futures

Mary Ashley, University of Illinois Chicago
Diana Bonilla, Northern Illinois University
Maria Varelas, University of Illinois Chicago

In this closing conversation, Diana Bonilla will share a poetic compilation of ideas presented at the various conference sessions that encapsulate main understandings CIM²AS collaborators have developed over the last four years. Then all three presenters will engage the attendees in interactive activities to reflect on possibilities for transformative science education that facilitates various types of border crossing and enables desirable and meaningful futures for students and communities.

BIOGRAPHICAL SKETCHES

(in alphabetical order by presenters' last names)

Aixa Alfonso, PhD, a native Puerto Rican, joined the University of Illinois Chicago (UIC) in 1996. She is a cell and developmental biologist in the Department of Biological Sciences and the Faculty Lead of Latin@s Gaining Access to Networks for Advancement in Science (L@s GANAS) since its inception in 2016. L@s GANAS promotes the engagement, persistence, and success of Latinx students in STEM fields. Alfonso is a co-PI of project CIM²AS, a recipient of a Ford Foundation Postdoctoral Fellowship, and her research has been funded by the National Institute of Health and the National Science Foundation (NSF). She has served as Program Officer in the Division of Integrative Organismal Systems of the NSF Directorate for Biological Studies and as a Visiting Associate Dean of Diversity in UIC's Graduate College. She is committed to providing access to and supporting the success of students interested in science and has mentored 13 graduate students and 76 undergraduates in their research projects, 30% of whom identify as Latin@.

Alicia J. Anzaldo is a Biology Professor with over 30 years of experience and a multi-award-winning educator at Wilbur Wright College, one of the City Colleges of Chicago. She has traveled the world studying various ecosystems, including following in the footsteps of Charles Darwin at the Galápagos Islands and canoeing the Sepik River in Papua New Guinea. Her commitment to research led her to participate in an international expedition to Antarctica, where her contributions earned her the Antarctica Service Medal from the National Science Foundation. As a result of her recent involvement with CIM²AS, in February of 2023, she traveled to Michoacán, Mexico to visit Monarch butterflies in their overwintering grounds. In the classroom, she encourages a profound respect for all life and promotes taking individual responsibility for the health of our planet. Her interests include the evolution and adaptation of life and the extinction of wildlife due to human activities.

Mary V. Ashley, Ph.D., is a Professor Emerita in the Department of Biological Sciences at UIC. She taught ecology and evolution to thousands of UIC undergraduates and mentored dozens of graduate students over more than 30 years at UIC. She is the Principal Investigator of the CIM²AS NSF grant and has worked to promote diversity and inclusion in STEM throughout her career. Ashley's research lab pioneered the use of molecular markers to study mating systems in plants and animals, including the first reports of long-distance pollination in plants. She and her students have conducted important studies in the field of conservation genetics, including genetic assessments of many threatened species. Her awards include UIC's Graduate Mentoring Award, a University Scholar Award, and UIC Woman of the Year Award.

Brezhnev Batres is a High School Science Teacher at Benito Juarez Community Academy in Chicago, where he has taught for over 13 years. Concurrently, he is pursuing a PhD in science education at the University of Illinois Chicago and has presented his research at NSTA and NARST. His research focuses on connecting students' lived experiences and identities to science learning, fostering deeper engagement and understanding. As a Latino educator, he is passionate about helping students see themselves reflected in science while supporting fellow educators in creating transformative learning experiences. His work emphasizes integrating arts-based approaches to bridge science, identity, and culture, enabling students and teachers to construct

meaningful connections with science. With a commitment to equity and inclusion, Batres aims to empower students to thrive as they navigate and contribute to the world of science.

Stephanie Batres Spezza is a Latina doctoral student in the Mathematics and Science Education PhD program in the Department of Curriculum and Instruction at the University of Illinois Chicago. Her research focuses on how middle school students of historically marginalized backgrounds construct and perform their identities and understandings of social justice-centered science as they engage in expansive forms of science learning. She was a middle school science teacher in the Chicago Public School district for 10 years, teaching in a school that primarily served Latin* and Black students. Currently, she serves as the program manager at SparkShop, a STEM education nonprofit, where she spearheads the development and implementation of a professional development initiative concentrating on engineering education. Additionally, she contributes as a research assistant to Project CIM²AS where she has been co-leading studies on how undergraduate Latin* students in summer research apprenticeships, supported by the project, make sense of their cultural wealth in their identity negotiations vis-à-vis science, and how their testimonios speak to ethnoracial storylines.

Marcela Bernal-Munera, PhD, is a faculty member and co-chair of the Department of Life Sciences at Malcolm X College in Chicago, where she has taught for over 14 years. She brings social justice issues related to science in her curriculum to position biology as a field of study available to all using this as a tool to challenge injustices and promote equity and empowerment. Additionally, she designs and leads faculty development possibilities for educators who seek to incorporate social justice issues and culturally sustaining pedagogy in STEM and healthcare curricula to support academic excellence, critical awareness, and community transformation.

Diana Bonilla is an Assistant Professor in the Department of Curriculum and Instruction at Northern Illinois University focusing on science education, bilingual education, and teacher education. She holds a PhD in science education from the University of Illinois Chicago, and her dissertation research examined curriculum for bilingual youth while braiding critical pedagogies of science, language and cultural responsiveness. As a Latina and high school science teacher for 8 years, Dr. Bonilla supports educators in creating transformative and culturally sustaining curricula for students to be seen, be heard, and thrive, as she works to bridge science, culture, and language in science teaching and learning.

Ginevra Clark is a Clinical Associate Professor in the Department of Chemistry at the University of Illinois Chicago, where she has taught for over 11 years. Her work focuses on the incorporation of social and environmental justice into the chemistry curriculum. She has redeveloped the curriculum for a pre-nursing class to incorporate health equity and has incorporated environmental justice and systems thinking into analytical chemistry.

Daniel Fernandez is a High School Science Teacher and a student in the Mathematics and Science Education PhD program in the Department of Curriculum and Instruction at the University of Illinois Chicago. His passion and current research focus is transforming science education for emergent bilinguals. He has taught high school science for 10 years, and presently teaches at Addison Trail High School where he has developed several bilingual (Spanish-taught) science curricula for Biology, Chemistry, Physics, Geoscience, and Newcomer Science. These

efforts foreground and build on emergent bilinguals' languages, cultures, and knowledge assets (e.g., community and indigenous knowledges) to nurture their capacities to create meaning in science and use it for their and their communities' wellbeing and growth.

Pam Geddes is a Professor in the Department of Biology and in the Environmental Science Program at Northeastern Illinois University (NEIU), a Hispanic-Serving Institution where she has been teaching for the last 16 years. In 2022, she was awarded the Audrey Reynolds Distinguished Teaching Award at NEIU. She is also an alumna of the Linton-Poodry SACNAS Leadership Institute (Society for the Advancement of Chicanos/Hispanics and Native Americans in Science). At NEIU, she has been the Co-Director of the Living Learning Communities program since Fall 2023. She strongly believes in the importance of intentional mentoring, and the affirming and transformative power of culturally sustaining experiences can have mostly for underrepresented students. To that end, she has been in strong partnerships with multiple institutions and in several federally funded projects from the NSF, USDA, and the Dept. of Education with the intent of increasing the participation, retention, and success of underrepresented students in STEM.

Paul Gulezian, Ph.D., is a Distinguished Professor of Biology at Oakton College in Des Plaines, Illinois. He is the lead instructor for environmental biology at Oakton and the co-founder of Oakton's Environmental Studies Concentration. Dr. Gulezian has developed Oakton's environmental science and ecology courses to integrate the natural area remnants on Oakton's Des Plaines campus into many outdoor labs that teach conservation biology and ecology topics through experiential learning. He is also the author of *A Field Guide to the Biodiversity of the Chicago Region*, recently published in the fourth edition, which includes ecological and natural history information on 670 species of the Chicago region in all the major taxonomic groups including plants, animals, and fungi.

Jorge Mena Robles serves as the Associate Director at the Latino Cultural Center at the University of Illinois Chicago. Through this work, he leads an oral history research internship for undergraduate students titled the *Lead.Create.Change* internship. During graduate school, his research focused on undocumented and queer youth activism and how the process of 'coming out' can lead to individual and collective identity formation. Currently, he is working with faculty on an archival project, titled *Undocumented Knowledges*, dedicated to preserving and making publicly available important documents of the undocumented youth movement, a juridical rights-based movement within the larger immigrant rights movement in the United States.

Emily Minor is an ecologist, Professor, and Director of Graduate Studies in the Department of Biological Sciences at the University of Illinois Chicago. Her research and teaching are highly interdisciplinary. Much of her research focuses on urban ecosystems and human-environment interactions. Dr. Minor teaches undergraduate classes such as *Human Ecological Systems* and *Landscape Ecology*, and she teaches a graduate class on *Agent-Based Modeling for Biological, Environmental, and Social Systems*.

Teresa Vales Orenic is a Latina Associate Professor of Biological Sciences at the University of Illinois Chicago whose research focuses on understanding the genetic and molecular mechanisms

underlying pattern formation in animal development and evolution. Dr. Orenic is Chair of the Biological Sciences Diversity Committee whose goal is to promote inclusive and supportive environments for undergraduate and graduate students in classrooms and research laboratories. She teaches molecular biology at the graduate level and developmental biology at both the graduate and undergraduate levels and mentors graduate and undergraduate students in research. In her teaching and mentoring, she strives to facilitate the development of students' thinking and problem solving by engaging them in scientific practices and critical reflection.

Jaime Rojo is a photographer and National Geographic Explorer with a background in conservation, who focuses on environmental stories about wilderness and wildlife and uses his images as tools to protect nature. He has spent 20 years documenting Monarch butterflies, and his story, "Saving the Monarchs"—a visual exploration of their migration, the threats they face, and the efforts to protect them—was featured on the cover of National Geographic in January 2024. Jaime also serves as a communications advisor to environmental organizations, corporate clients, educational institutions, and government agencies worldwide. He is a TED speaker, a Senior Fellow of the International League of Conservation Photographers, a trustee of the WILD Foundation, and has received honors from prestigious competitions such as World Press Photo, Wildlife Photographer of the Year, and Pictures of the Year International.

Cuauhtémoc Sáenz-Romero has been a full time professor-researcher, at the Instituto de Investigaciones sobre los Recursos Naturales, Universidad Michoacana de San Nicolás de Hidalgo, Morelia, Michoacán, México since 1999. He has published 118 papers at indexed international journals, and has directed or co-directed the theses of 8 PhD, 20 Masters, and 23 Bachelors students. His main recent research interest is the management of forest genetic resources (genecology, population genetics, conservation and reforestation) considering climatic change. His research focuses on the estimation of genetic differentiation among conifer populations (along altitudinal gradients) for quantitative/adaptive traits, and generation of guidelines to decide seed and seedling movements for reforestation programs considering climatic change. His research has been conducted at the forest of Mexican Native Indians (First Nations) at Nuevo San Juan Parangaricutiro, Michoacán State, Ixtlán de Juárez, Oaxaca, and Calimaya, State of México. Recently he has focused on searching for alternatives for reforestation (using assisted migration of *Abies religiosa* (Sacred Fir) provenances and shrubs as nurse plants) at the Monarch Butterfly Biosphere Reserve in the center of México.

Jorge I. Santana, B.S.B, M.A.T., is a Secondary Education Teacher at Roosevelt High School in Chicago Public Schools (CPS). He has taught biology and chemistry to thousands of Chicago Public School (CPS) students and mentored dozens of student teachers for 22 years in CPS. He served as Science Department Chairperson for 9 years, and on the Local School Council for two years as a teacher representative. He is a doctoral student in the Mathematics and Science Education PhD program at the University of Illinois Chicago, and his research focuses on justice-centered science curriculum and inquiry-based instruction in high school science classes and the impact on science knowledge and identity construction of emergent bilingual / multilingual students. His awards include the Presidential Award Scholarship and Roosevelt Teacher of the Year.

Alexander Shingleton, Ph.D., is a Professor of Biological Sciences at the University of Illinois Chicago specializing in evolutionary biology and developmental genetics. His research focuses on the genetic and environmental factors that regulate growth and size variation in organisms, and how these factors interact to shape adaptive traits. He has published extensively on topics such as developmental plasticity, body size regulation, and the genetic architecture of phenotypic traits. As an educator, Dr. Shingleton is committed to expanding opportunities for students to engage in science in meaningful and responsive ways. He teaches courses in genetics, developmental biology, and evolutionary theory, fostering critical thinking and hands-on learning through a combination of lectures, lab-based activities, and research mentorship. Dr. Shingleton's teaching philosophy emphasizes the integration of foundational knowledge with cutting-edge research as a tool for preparing students for relevant careers in the life sciences.

Maria Varelas is Professor of Science Education and Chair of the Department of Curriculum and Instruction at the University of Illinois Chicago and was the Director of the UIC Center for the Advancement of Teaching-Learning Communities. She is a Fellow of the American Association for the Advancement of Science. Her research focuses on exploring possibilities and challenges related to student learning when educators consider and practice science education centering equity and justice. With multi-year and multi-collaborator NSF grants totaling over \$12M, her research has emerged and unfolded in collaborations with teachers, seeking to create together transformative and generative learning spaces and places, centered on minoritized students' assets, agency, creativity, and voice, which challenge the power of restrictive structures and scaffold students' creation of knowledge consequential for their futures and the future of their communities. Varelas has published two books along with many journal articles and book chapters, has held leadership positions in science education, and has received several university awards for her teaching in undergraduate and graduate programs, and for her research.