Inclusive Science Communication

Making Science 'Make Sense' for Everybody

The 30th Annual Cottrell Scholar Conference
July 17-19, 2024

COTTRELL SCHOLARS CONFERENCE

RESEARCH CORPORATION *for* SCIENCE ADVANCEMENT

COTTRELL SCHOLAR CONFERENCE

Objectives

To empower scholars to build community and participate in information exchange, participants will:

- Welcome the members of the 2024 Cottrell Scholar class and facilitate their interactions with other members of the community
- Engage in community building by celebrating Holland and STAR/IMPACT awardees
- Engage in authentic dialogue with the goal of identifying pressing issues affecting academic environments
- Discuss successful activities and approaches for making STEM more equitable
- Identify topics that may lead to successful Cottrell Scholars Collaborative projects
- Have the opportunity to form teams and become involved in STEM education projects with national impact

Diversity, Inclusion and No Harassment

Research Corporation for Science Advancement fosters an inclusive and respectful environment for listening in which the different identities, backgrounds, and perspectives of all participants are valued, and in which everyone is empowered to share ideas as fellow scientists.

RCSA does not tolerate any form of harassment, which could include verbal or physical conduct that has the purpose or effect of substantially interfering with anyone else's participation or performance at this conference, or of creating an intimidating, hostile, or offensive environment; any such harassment may result in dismissal from the conference.

Read RCSA's Code of Conduct

From the President

Cottrell Scholars play a vital role in bringing about changes that reflect our shared values of excellence in both research and education, of a more diverse and inclusive community of physical scientists, and of service and leadership locally, nationally, and globally.

I am especially thankful for the work of Cottrell Scholars through the Cottrell Scholar Program Committee and through Cottrell Scholars Collaborative projects to promote even more strongly our commitment to diversity, equity, and inclusion. This year has seen the successful launch of our RCSA Fellows Initiative, led by Cottrell Scholar 1995 Eileen Spain and based on a Cottrell Scholars Collaborative project designed to provide underrepresented postdoctoral fellows with experience interviewing for faculty positions. We are also welcoming to this conference and to the Cottrell Scholar community our second group of Holland Award recipients. The Holland Award, envisioned by Cottrell Scholars, was established to recognize our former Board Director Bob Holland and to bring into our community colleagues who have excelled in their research and in their DEI initiatives.

The development of a thriving community of very busy teacher-scholars requires the commitment of time and energy from all the Cottrell Scholars, especially in coming to Tucson for this annual conference. My thanks to all of you for carving out this time in your schedules and for your enthusiastic participation in the discussions that will take place over the next few days. My thanks, also, to Senior Program Director **Silvia Ronco**, who with Senior Program Directors **Richard Wiener** and **Andrew Feig** and Program Director **Eileen Spain**, builds and nurtures this wonderful community through her caring about each Cottrell Scholar and through her passion for this remarkable program.

I wish you all the best for an enjoyable and stimulating conference.

Daniel Linzer
President
Research Corporation for Science Advancement

From the Program Director

Welcome to the 30th Annual Cottrell Scholar Conference!

We are delighted to host you in Tucson! The 2024 conference, ***Inclusive Science Communication: Making Science "Make Sense" for Everybody***, is co-chaired by Cottrell Scholars 1999 **Karen Bjorkman** and 2016 **Scott Shaw**. The conference program was planned to foster thoughtful discussions on the synergetic relationship between science communication and nurturing inclusive environments. An exceptional keynote speaker, Cottrell Scholar 1997 **Adam Falk**, will set the stage for thought-provoking breakouts aimed at generating innovative ideas for implementation on your campuses and beyond.

As always, a central goal of the Cottrell Scholar Conference is to extend a warm welcome to the newest class of Cottrell Scholars. To our 2024 Cottrell Scholars, please know that you were selected for your impressive research and educational programs, as well as your strong potential to actively contribute to the Cottrell Scholar family. To our returning Scholars, we encourage you to introduce yourselves to the newcomers and embrace them as part of this remarkable multidisciplinary and multigenerational community of more than 500 teacher-scholars.

Community building is the heart and soul of the Cottrell Scholar Program! At this year's conference, we will celebrate the second class of Holland awardees, four outstanding senior scientists, mentors, and leaders who were selected to join the CS community due to the strength of their research programs and their contributions to diversity, equity, and inclusion. We will also showcase the exemplary work and leadership of our 2024 Cottrell STAR and IMPACT award recipients.

A great way to explore new educational ideas with potential national impact is to participate in a project with the Cottrell Scholars Collaborative (CSC), a diverse, cross-disciplinary network of Cottrell Scholars working together to improve science education at colleges and universities across the U.S. and Canada. Engaging with one or more of these projects can provide inspiration to improve your own work and excellent opportunities to interact with other Cottrell Scholars.

We hope this event is a refreshing, informative, and intellectually stimulating experience. We look forward to working with you!

Silvia Ronco
Senior Program Director
Research Corporation for Science Advancement

2024 Cottrell Scholar Conference Agenda

Inclusive Science Communication: Making Science "Make Sense" for Everybody
July 17 – 19, 2024

Wednesday, July 17

2:00 – 6:00 pm	**Registration**	Lobby Foyer
3:00 – 4:00 pm	**Opening Reception** Drinks and Light Hors d'Oeuvres	Arizona Deck
4:00 – 4:30 pm	**Welcome and Introductions** Dan Linzer, Silvia Ronco, Karen Bjorkman and Scott Shaw	Canyon II & IV
4:30 – 5:45 pm	**2024 Cottrell Scholar Presentations**	Canyon II & IV
6:00 – 7:00 pm	**Dinner**	Grand I & II
7:00 – 8:00 pm	**IMPACT Award Presentation** Rory Waterman **Cottrell Scholar Trophy Ceremony**	Grand I & II

COTTRELL SCHOLAR CONFERENCE

2024 Cottrell Scholar Conference Agenda

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Thursday, July 18

7 am	**Registration**	Arizona Foyer
7:00 – 8:00 am	**Breakfast**	Arizona Deck
8:00 – 9:15 am	**2024 Cottrell Scholar Presentations**	Canyon II & IV
9:15 – 9:30 am	**Morning Break**	Arizona Foyer
9:30 – 10:45 am	**Keynote Presentation** Adam Falk *"For Scientists, There's No Escaping Culture"*	Canyon II & IV
10:45 am – 12:00 pm	**Breakout Session I** *"Identify Your Purpose, Your Audiences and Your Message"*	Lantana, Verbena, Indigo and Aster
12:00 – 12:30 pm	**Report Out**	Canyon II & IV
12:30 – 1:30 pm	**Lunch**	Grand I & II
1:30 – 2:45 pm	**Breakout Session II** *"Equip Yourself with Tools"*	Lantana, Verbena, Indigo and Aster
2:45 – 3:00 pm	**Report Out**	Canyon II & IV
3:00 – 5:00 pm	**Informal Networking** Swimming, Azul Bar/Lounge	
5:30 – 7:00 pm	**Reception Honoring New Community Members** **Poster Session: 2024 CS, CS Collaborative Projects** Drinks and Light Hors d'Oeuvres	Arizona Foyer
7:00 – 9:00 pm	**Dinner** **Holland Award Presentations**	Grand I & II

2024 Cottrell Scholar Conference Agenda

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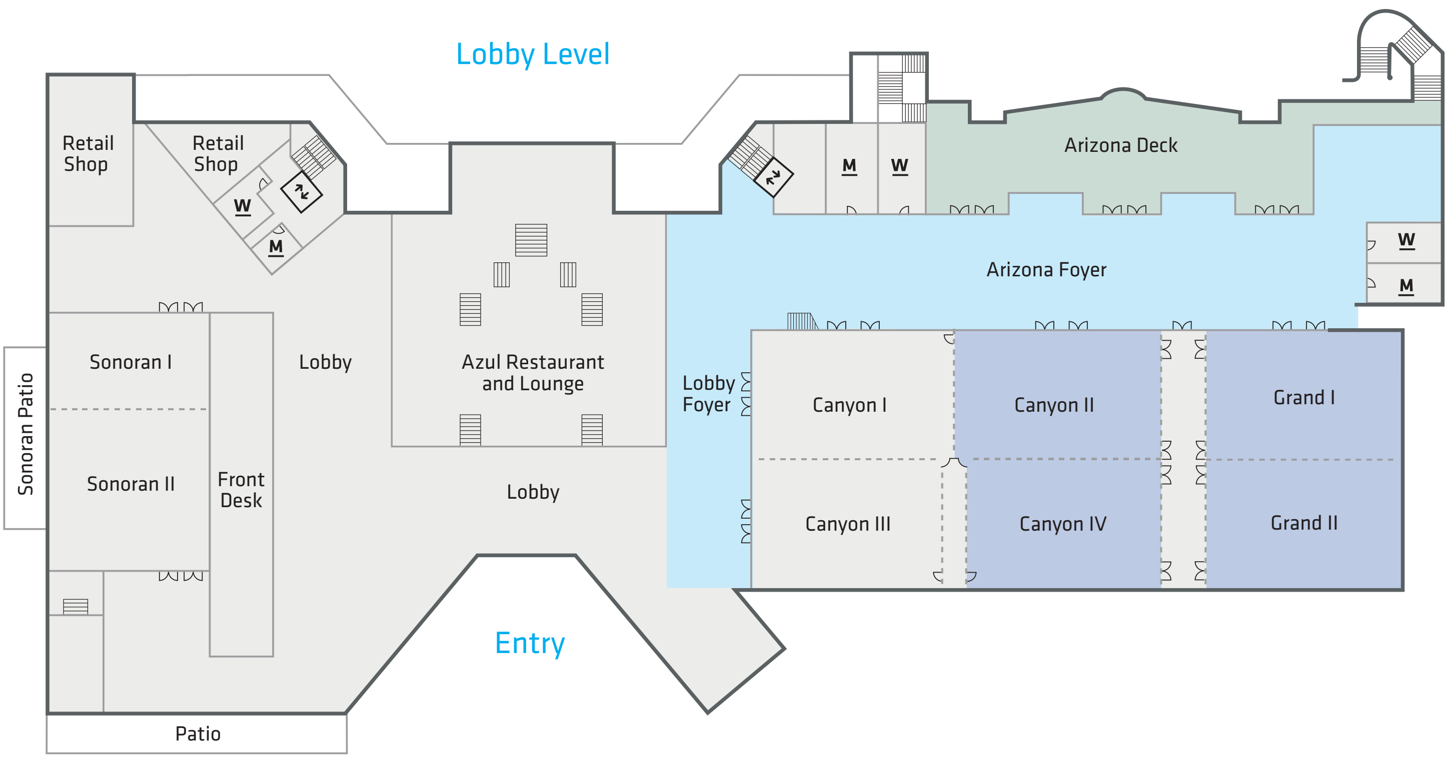
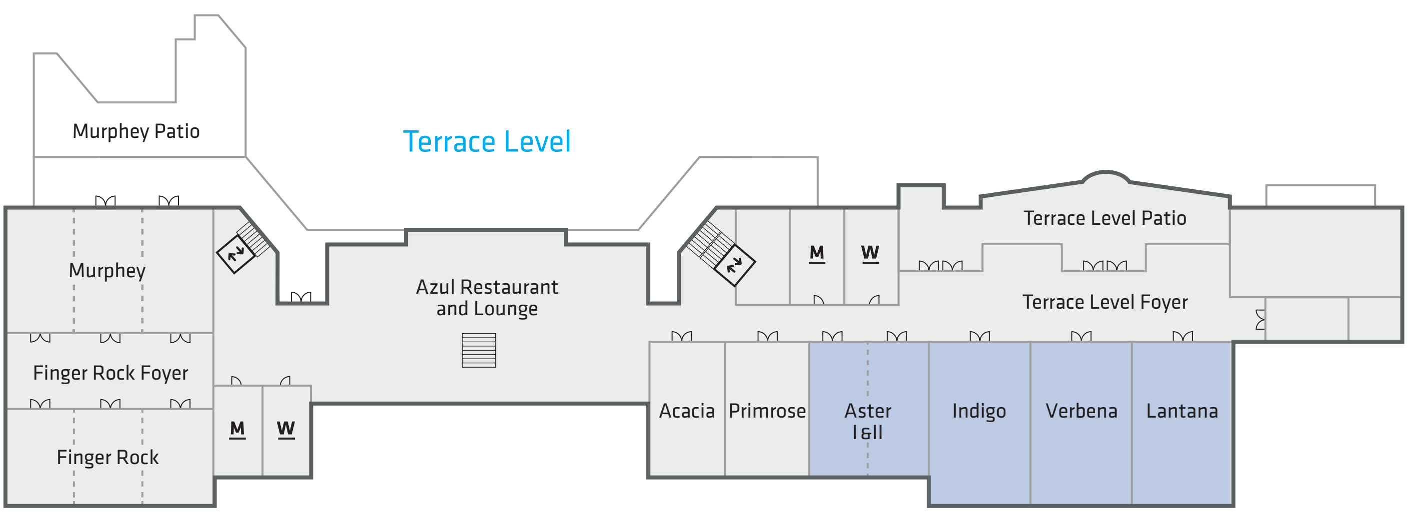
Friday, July 19

7:00 – 8:30 am	**Breakfast**	Arizona Deck
8:30 – 9:45 am	**IMPACT and STAR Award Presentations** Maura McLaughlin and Mark Moldwin	Canyon II & IV
9:45 – 10:15 am	**Morning Break**	Arizona Foyer
10:15 – 11:30 am	**Breakout Session III** *"Empowering Others with Science Communication"*	Lantana, Verbena, Indigo and Aster
11:30 am – 12:00 pm	**Report Out and Team Formation**	Canyon II & IV
12:00 – 1:30 pm	**Lunch**	Grand I & II
1:30 – 3:30 pm	**Breakout Session IV** Unstructured Time to Work on Educational Collaborations; Interest Group Meetings	Lantana, Verbena, Indigo and Aster
3:30 – 4:00 pm	**Conference Wrap-Up & Survey**	Canyon II & IV
4:00 – 6:00 pm	**Informal Networking** Swimming, Azul Bar/Lounge	
6:00 – 7:00 pm	**Reception** Drinks and Light Hors d'Oeuvres	Arizona Foyer
7:00 – 9:30 pm	**Family Dinner** All guests are invited to join!	Arizona Deck

Westin La Paloma Resort and Spa





Keynote Speaker

For Scientists, There's No Escaping Culture

Adam Falk
President
Alfred P. Sloan Foundation

Abstract: Most physical scientists explore aspects of the natural world that are largely independent of the lives of human beings. In fact, many of us may have been attracted to physics, chemistry, and astronomy for that reason. Yet actually doing our work of research and teaching is a very human endeavor, and questions of culture are important in everything we do. We'll talk about the role of culture when we look outward — bringing our work into the public sphere — and when we look inward — making our disciplines fully inclusive of everyone. And I'll argue that when it comes to culture, looking outward and looking inward are really looking in the same direction.

Bio: Adam F. Falk is President of the Alfred P. Sloan Foundation. Before joining the Foundation in 2018, Falk served as President of Williams College. He came to Williams in 2010 from the Johns Hopkins University, where he had served as the James B. Knapp Dean of the Krieger School of Arts and Sciences, following service as Dean of the Faculty. A theoretical high-energy physicist who joined the Johns Hopkins faculty in 1994, Falk is a Fellow of the American Physical Society and winner of the Johns Hopkins Alumni Association Excellence in Teaching Award. Early in his career, he won national young investigator awards from the National Science Foundation, the Department of Energy, and the Research Corporation for Science Advancement. In 1995, he was awarded a Sloan Research Fellowship in Physics. He has served on the Physics Advisory Committee of the Fermi National Accelerator Laboratory and on the Panel on Public Affairs of the American Physical Society. Falk holds a Ph.D. from Harvard University and a B.S. from the University of North Carolina, where he was a Morehead-Cain Scholar. He held post-doctoral appointments at the Stanford Linear Accelerator Center and the University of California, San Diego. Falk is an elected Member of the American Academy of Arts and Sciences and a Member of the Council on Foreign Relations. He has been awarded honorary degrees by Amherst College and Williams College, has received the University of North Carolina Distinguished Young Alumnus Award, and is an Honorary Fellow of Exeter College, Oxford University. He is a trustee of Mount Holyoke College, the North Carolina School of Science and Mathematics, and Scholars at Risk, and he has served on the boards of the Sterling and Francine Clark Art Institute, the Massachusetts Museum of Contemporary Art, and the Williamstown Theatre Festival.

2024 STAR Award

Mark Moldwin
Climate and Space Sciences and Engineering
University of Michigan

Cottrell Scholar 1997 Mark Moldwin is recognized for research that has revolutionized space-based magnetometry as well as his work in developing educational courses, materials, and textbooks in the emerging field of space weather, which focuses on understanding how energy, mass, and momentum from the Sun affect the Earth's space and ground technological systems and society. In the last few years, Moldwin has been selected for three NASA magnetometer satellite projects. A consistently top-rated teacher, he has advocated for inclusive, accessible and equitable STEM education and, more recently, for increased attention to student mental health. He has served on advisory committees for organizations such as the National Science Foundation, NASA, and the National Academies, and conducted workshops for students and early career scientists in China, Chile, Ethiopia, Norway, Malaysia, Zambia, and South Africa as part of the United Nations' International Space Weather Initiative. He was a member of the American Geophysical Union Ethics Task Force that in 2016 helped codify an Ethics Policy recognizing that harm done by harassment, bullying, and discrimination is just as damaging to the community as the traditional ethical violations of plagiarism, fabrication, and falsification. Moldwin is currently co-chairing the NAS Solar and Space Physics Decadal Survey State of the Profession Panel that is advocating for systemic change in diversity, equity, inclusion, and accessibility within space physics and the broader research community.

2024 IMPACT Award

Maura McLaughlin
Department of Physics and Astronomy
West Virginia University

Cottrell Scholar 2009 Maura McLaughlin is an international leader in astrophysics working to build pipelines for high-school students to STEM majors and careers. She founded and co-directs the North American Nanohertz Observatory for Gravitational Wave Astrophysics (NANOGrav), an international collaboration engaging some 50 senior investigators from across 30 institutions in the use of millisecond pulsars to serve as a timing array for the detection of low frequency gravitational waves. Their recent discovery of the first evidence for a stochastic background of low-frequency gravitational waves received significant attention from both the press and the broader astronomical community. McLaughlin collaborated with colleagues at the National Radio Astronomy Observatory to establish the Pulsar Search Collaboratory, a program to engage middle and high school students and their teachers in hands-on data analysis to identify new pulsars. Through the program, more than 2,000 students in 18 states have not just “played the part” of astronomers but have discovered seven pulsars. She served on the National Academy of Sciences Decadal Survey Panel charting the 10-year program of research priorities in Astronomy and currently chairs the Science Advisory Committee (SAC) for DSA-2000, an array of 2000 5-meter radio dishes planned to be built in the Nevada desert. She is co-Laureate of the 2023 Shaw Prize in Astronomy for the discovery of Fast Radio Bursts.

2024 IMPACT Award

Rory Waterman
Department of Chemistry
University of Vermont

Cottrell Scholar 2009 Rory Waterman is a leader in organometallic catalysis and main group chemistry whose efforts to implement systemic change in science and science education exemplify the Cottrell Scholar community's values of teaching and service. In 2011, he co-founded the RCSA Cottrell Scholars Collaborative New Faculty Workshop for new chemistry faculty, which is now administered by the American Chemical Society. The workshops have grown in scope and capacity, helping more than 700 faculty members understand more effective teaching, mentoring, and inclusive science. The workshop model is now being replicated by Fulbright-Cottrell Scholars in Germany. He has been a leader in the implementation and dissemination of Course-based Undergraduate Research Experiences (CUREs), organizing the first workshop for the physical sciences, which brought together education researchers, educators, campus and national leaders, and representatives from funding agencies to discuss effective practices in development, implementation, and assessment. This led to publication of Expanding the CURE Model: Course-based Undergraduate Research Experiences (co-edited by Waterman and published by RCSA) which is distributed free of cost and has formed the basis of subsequent workshops. He has ushered dozens of science teachers through the University of Vermont's Masters of Arts in Teaching program in a transition from a career in STEM to science teaching, and he is active on scientific journal editorial boards and in organizing scientific symposia at national meetings and regional conferences.

2024 Holland Awards

Marcel Agüeros

Astronomy, Columbia University

Associate Professor of Astronomy at Columbia University, Marcel Agüeros is an expert in stellar astrophysics whose group studies the rotation and magnetic activity of Sun-like stars to understand their evolution. In nearly 30 years of interacting with learners from the elementary to graduate levels, he has worked to create systemic changes that address the historic underrepresentation of women and minorities in science. As a graduate student at the University of Washington, he founded the Pre-Major in Astronomy Program (Pre-MAP) for underrepresented first-year undergraduates, now in its 19th year, and later launched and led a successful post-baccalaureate Bridge to the Ph.D. Program in STEM. In addition to spending four years as a trustee of the American Astronomical Society (AAS), he was a member of its Task Force on Diversity and Inclusion in Astronomy Graduate Education, which played a crucial role in challenging the culture of Ph.D. admissions practices. He serves on the advisory committee of TEAM-UP Together, an initiative to double the number of Black students earning physics and astronomy degrees nationally by 2030, and on the users committee of NASA's Transiting Exoplanet Survey Satellite (TESS) mission. In 2023, he was named a Fellow of the AAS for his innovative observational work and leadership in inclusion and equity.

Jorge López

Physics, University of Texas, El Paso

Jorge López is a Professor of Physics at the University of Texas at El Paso whose significant research contributions to the field of nuclear physics are matched by mentorship and advocacy that has helped launch scores of his students into successful careers in science and engineering, both in academia and in industry. Lopez started his career at UTEP as Assistant Professor, moved up the ladder and chaired the Department of Physics for eight years, helping undergraduates have several semesters of meaningful research experience. He was elected a Fellow of the American Physical Society for his contributions to the understanding of the liquid-gas nuclear phase transition, but he has worked in many other areas, often to accommodate the research interests or opportunities for undergraduates. In 1995, he helped create the National Society of Hispanic Physicists. A renowned teacher, he received the University of Texas Regents' Outstanding Teaching Award and was admitted to the UT Academy of Distinguished Teachers. He is a current member of the Nuclear Science Advisory Committee of the Department of Energy and the National Science Foundation, and a recipient of the Presidential Award for Excellence in Science, Mathematics, and Engineering Mentoring from the White House and the NSF. He was inducted into the Mexican Academy of Sciences in 2012.

Nadya Mason

Physics, University of Chicago

Dean of the Pritzker School of Molecular Engineering at the University of Chicago, Nadya Mason is recognized as a role model and proponent of the idea that students of every background should have the opportunity to discover STEM for themselves. She maintains a strong research program in experimental condensed matter physics focusing on advancing the understanding and control of quantum materials at the nanoscale. She is an ardent communicator, a proponent of outreach, and an active one-on-one mentor who has used her influence to encourage mentoring on a larger scale. As Chair of the American Physical Society's Committee on Minorities, she led the creation of the "National Mentoring Community," which aims to pair every underrepresented undergraduate student with a local mentor. As Director of the Illinois Materials Research Science and Engineering Center, she created a center-wide focus on mentoring, with required mentor-mentee contracts and mentor trainings at all levels. Mason is a member of the National Academy of Sciences, the American Academy of Arts and Sciences, and is an American Physical Society Fellow. She is also an in-demand keynote speaker and member of numerous national committees and advisory groups.

Leyte Winfield

Chemistry, Spelman College

Professor in the Department of Chemistry and Biochemistry and Division Chair for the Division of Natural Sciences and Mathematics at Spelman College, Leyte Winfield is honored for her love of experimentation and organic synthesis along with her unyielding commitment to ensuring that women of African descent can thrive in STEM pathways. Her research in drug design and synthesis produced a library of tricyclic molecules or benzimidazoles that have therapeutic potential against reproductive cancers disproportionately impacting African Americans, and her curricular innovations have improved performance among students from underrepresented groups, creating opportunities for undergraduates whose own research accomplishments have been nationally recognized. She launched a Cosmetic Science program that represents one of only two at the undergraduate level in the United States and the first of its kind at a Primarily Undergraduate Institution and a Historically Black College and University. She serves as an adviser for several National Science Foundation and the National Institutes of Health-funded initiatives, is a Fellow of the American Chemical Society, and was recently awarded the Henry C. McBay Outstanding Teacher Award from the National Organization of Black Chemists and Chemical Engineers.

Cottrell Scholars Collaborative Proposal Writing Guidelines

Successful proposals should have the potential to positively impact undergraduate and/or graduate science education in the classroom, at the departmental level or at the national level.

- Up to four $25,000 awards will be given to teams of Cottrell Scholars working collaboratively.
- Two-year awards are made to a team formed at this conference.
- Members of the team are Cottrell Scholars, Fulbright-Cottrell Scholars, or Holland awardees.
- Award could be for a new project that will expand the impact of existing funded collaborative projects. New collaborative projects are also welcome.
- CSC proposals consist of two pages plus an optional third page with references. Proposals must include a statement of the problem, a working plan, anticipated impact, how the outcomes will be broadly disseminated, and a brief budget justification.
- CSC proposals must be submitted through the RCSA online submission system (PRISM, https://prism.rescorp.org) by 11:59 PM Pacific on **August 5, 2024**.
- Awards will be announced within a month of submission. The tentative start date is October 1, 2024.

Conference Evaluation Survey

An online conference survey will be available on Friday, July 19, 2024. To access and complete the survey, please go to: https://www.surveymonkey.com/r/2024_CS_Conference

2024 Cottrell Scholars

Carlos Argüelles Delgado

Physics, Harvard University

Searching for New Physics with Galactic Neutrinos

IceCube has recently announced the discovery of high-energy neutrino emission from our Galaxy. These neutrinos have unique properties that provide access to previously unexplored territory. Neutrinos manifest quantum-mechanical properties in extremely long lever arms enabling the measurement of tiny effects that kinematic measurements cannot access. The research objective of this proposal is to perform the first search for new physics with galactic neutrinos, where we will focus on two scenarios motivated by quantum-gravity and neutrino mass schemes. To do this analysis, we will improve the reconstruction of galactic neutrinos and create a new map of the galactic neutrino emission using the latest gas maps of the Galaxy. The educational goal of this proposal is to improve class engagement, provide additional support to students, and enhance homework assignments using Artificial Intelligence (AI). We will improve class engagement by introducing a new methodology, were students submit questions during lectures that an AI summarizes to the lecturer as representative questions. Additionally, we will use AI tools to provide weekly suggestion to the student on which parts of the material to focus. Finally, we will improve homework by providing AI-generated recommendations in the deliberate-practice homework assignments.

Bernadette Broderick

Chemistry, University of Missouri

A New Tool to Probe Condensed-Phase Chemistry: Rotational Spectroscopy of Buffer-Gas Cooled Molecules Desorbed from an Ice Surface

Chemistry in ices is the primary way in which complex organic molecules (COMs) are formed in the interstellar medium (ISM). However, the understanding of the fundamental reactions involved in the formation of COMs in ice is limited despite the wide range of experimental and computational techniques that have been employed to probe them. We present here the application of a new technique developed within our group to study ice chemistry with the high-resolution, structure-specific, quantitative approach afforded by broadband rotational spectroscopy. The approach, termed CPICE, affords unambiguous detection of species desorbed from an energetically processed ice with isomer-and conformer-specificity and with meaningful relative abundances, for the first time. This promises new insights into the chemical evolution of the star-forming regions that spawn new solar systems, and at the same time can make detected molecules more reliable reporters on conditions in distant sources.

Lia Corrales

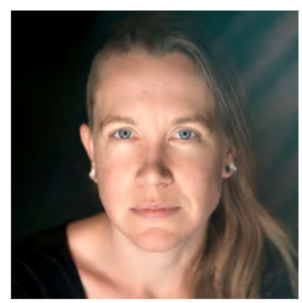
Astronomy, University of Michigan

Unveiling Cosmic Treasures: Exploring the Secrets of Astromineralogy with X-Ray Imaging Spectroscopy

Particulate matter in the Universe affects every field of astrophysics. X-ray spectroscopy provides the most direct method for measuring the composition of interstellar dust. I am a world-leading expert in X-ray dust scattering halos, which are virtual images of extended X-ray emission around a bright point source, arising from small angle diffraction by interstellar dust. As X-ray light propagates through the interstellar medium, it penetrates dust grains, leaving a spectroscopic footprint along the way. As a leader of the XRISM Science Team, I will study the silicate, oxygen, and iron content of interstellar dust and surmise their connections (or lack thereof) to suspected interstellar dust analogs collected in our own Solar System.

My work with dust scattering halos requires me to pioneer new data analysis techniques for high energy astrophysics as an entire field, with advanced computing strategies that I have developed through my PhD and beyond. As a contributor to multiple open source software packages and leader in the Astropy Project, I am well poised to develop and teach these practices to budding researchers in my field. I propose to adapt the educational materials I developed for WoCCode, a peer mentoring network for women of color, into an advanced undergraduate class. My course will teach the 3Rs of software design – readability, resilience, and reuse – to undergraduates in the natural sciences. By aligning my teaching responsibilities with my work in WoCCode, I will also be able to improve and expand the material for future WoCCode workshops.

Katherine de Kleer



Astronomy, California Institute of Technology

Planetesimal Interiors: Searching for Evidence of Core Material

Remnants of large planetesimals that were collisionally fragmented early in the Solar System's history remain today in the form of asteroids. The M-type asteroids have historically been thought to represent portions of the metallic cores of large, differentiated planetesimals, providing a window into early Solar System evolution. We have developed an approach that utilizes high spatial resolution emission and polarization data from the Atacama Large Millimeter Array (ALMA) to quantify the form and distribution of metals on asteroid surfaces. We demonstrated this approach on the largest M-type asteroid (16) Psyche, and now propose to extend it to a set of targets of nominally metal and silicate compositions. This will reveal the extent of possible core material present on the surfaces of evolved asteroids and will identify large-scale heterogeneities in surface metal content (or other surface properties) that might be expected if these objects are large fragments of differentiated bodies. In addition, I propose to reformulate a project-based course I first developed in 2020 for upper-level astronomy students; the new course, while still providing key practical experience for future astronomy researchers, will now be more accessible and relevant to students who do not have strong physics or coding backgrounds and will reach a more diverse group of Caltech undergraduates. The new course objectives are to (a) engage new students in studies or even careers in astronomy; and (b) empower students with knowledge and practical tools that can serve as a basis for astronomy as a life-long extracurricular pursuit.

Meagan Elinski
Chemistry, Hope College

Chemical-Mechanical Control over Nanoparticle-Hydrogel Sliding Interfaces

Research: Molecular control over surfaces in sliding motion has the potential to transform treatments for osteoarthritis. However, the implementation of nanoparticles as drug delivery vehicles results in complex chemical-mechanical interactions that are not well understood. Using hydrogels as a mimetic material, the proposed work seeks to systematically study the interplay of nanoparticle surface chemistries, molecular and physical structures, and applied mechanical forces in a soft sliding interface. Building foundational knowledge at the intersection of chemistry and mechanics, this work will enable complete synthetic control over hydrogel nanocomposites through "top-down" integration of nanoparticles into hydrogel surfaces and "bottom-up" in situ mechanochemical formation of surface bound hydrogel films. Uncovering new synthetic pathways for the molecular control of soft sliding interfaces can reshape osteoarthritis treatment and address broader challenges in healthcare.
Education: With persistently low representation of minority students and overall declining numbers of chemistry majors, strategies for change require a multidimensional approach. The proposed educational plan aims to foster an inclusive department culture, reduce equity gaps, and energize interest in chemistry. This will be addressed through three main areas: student-facing, structural, and community-facing. Student-facing work will build a scaffolded set of diversity, equity, inclusion, and respect (DEIR) discussions spanning the chemistry curriculum, fostering student well-being and sense of belonging. Structural changes will focus on reducing equity gaps through evidence-based practices in active learning and assessment. Community-facing plans include developing undergraduate students as leaders in science and inspiring middle school students. Collectively, this work will increase student confidence and perseverance in chemistry.

Jacob Gayles
Physics, University of South Florida

Strain Manipulation of Charge and Spin Dynamics in 2D Magnets

Modern society requires new methods of computing, due to the strain of information and energy on current devices and materials. 2D materials provide a new route for compact devices that utilize low-power with efficient manipulation. We make use of 2D van der Waal magnetic materials to understand charge and spin transport due to external stimuli. This proposal will utilize state-of the art first principle calculations, develop novel tight-binding Hamiltonians, and predict transport mechanisms in such 2D materials. The work will be carried out by a graduate student and two undergraduates under the supervision of the principal investigator. The concept academic pipeline has strained the job market and without increasing the representation of historically underrepresented groups in the STEM fields. One aspect that is not considered after the recruitment of underrepresented groups is the barriers that are faced with in physics programs and upon completion. I will develop a program centered on the colloquium that includes a course for undergraduates and transfer students. This program aims to remedy the barriers faced by underrepresented groups by connecting with students and completely engaging them in the research, education, and outreach aspects of the department. This will give students a sense of community, hope, and purpose in physics in order to ensure long term retention of underrepresented groups and non- underrepresented groups.

2024 Cottrell Scholars Continued

Leslie Hamachi
Chemistry, California Polytechnic State University, San Luis Obispo

Colloidal Stabilization of Covalent Organic Frameworks with Acid-Base Chemistry and STEM Educator Training

The research objective of this proposal is to understand the surface chemistry of covalent organic framework (COF) colloids. Although nanoscale COFs (nanoCOFs) are hypothesized to have better performance than their bulk counterparts in applications requiring diffusion, it remains difficult to synthesize them. Understanding the mechanisms responsible for colloidal stabilization is a crucial step towards their synthesis. In this proposal, the surface chemistry of imine-linked and boronate ester-linked COF colloids will be investigated by studying acid-base chemistry at the colloid surfaces as the mechanism of colloidal stabilization. We propose to study the effect of sterically hindered benzoic acid catalysts and stronger organic acids on colloidal stability and particle morphologies. Additionally, we propose using fluorescent Lewis adducts to provide spectroscopic evidence for the colloidal stabilization of boron-based COF colloids. If successful, these projects will transform the way that COF colloid surface chemistry is understood.

The educational plan addresses STEM educator training to meet the STEM teacher shortage and improving macromolecule education at Cal Poly. The “Learn by Doing Lab” provides undergraduate students with hands-on teaching experience to an audience of 3rd-8th grade students. The proposed educational plan will develop new macromolecule themed activities for the Learn by Doing Lab including “Condensation,” an educational card game. Additionally, a new “Foundations of Macromolecular Chemistry” course will be designed with an emphasis on polymer end of life considerations and sustainability. These educational materials will provide students with the tools to address pressing environmental concerns of polymer pollution and evaluate the design of new materials.

Farnaz Heidar-Zadeh
Chemistry, Queen's University

Combining Quantum Chemistry Concepts and Machine Learning for Drug Discovery

The proposed research develops physics-based machine learning (ML) methods and computer software to accelerate drug discovery. These methods are suitable for systematically screening billions of molecules to select promising candidates for further experimental scrutiny. Unlike existing approaches, the proposed ML methods are faithful to physical laws and chemical principles, so they are applicable to large molecules and diverse phenomena. The first key idea is to incorporate conceptual quantum chemistry quantities into the development of the ML model to achieve chemical transferability. The obtained ML models are guaranteed to be scalable, so they can be combined with molecular dynamic simulations to compute drug binding affinities. Alternatively, a novel approach is proposed to characterize a molecule's fingerprint by capturing its spectral features of relevant surface properties. The proposed surface spectra similarity of molecules immensely improves models that directly predict drug binding affinities.

The educational proposal develops a tiered structure for learning, using, applying, and innovating with mathematics in the chemistry curriculum. The linchpin of this structure is a new course, Mathematical Tools for Chemical Problems. This course will incorporate active-learning and mentorship components that are helpful for all students, but especially beneficial for students from nontraditional backgrounds. The course features several new technologies: using computer programming (Python and Jupyter Notebooks) to avoid “tedious” mathematical manipulations and allow relevant examples to be considered, using interactive online materials (Jupyter Book) to provide an active-learning resource for students, even after they complete the course, and using automated testing (GitHub Classroom) to provide immediate objective feedback.

2024 Cottrell Scholars Continued

Tova Holmes
Physics, University of Tennessee, Knoxville

Next Generation Beams: Exploring the Potential of Muon Acceleration

For decades of energy frontier exploration, we've utilized the two charged particles that are easiest to produce and manipulate, the proton and the electron. As we contemplate the future of high energy colliders, the use of these particles fundamentally limits our potential energy reach: the low electron mass due to synchrotron radiation and the proton due to its composite nature. Luckily, the Standard Model provides an alternative: the muon. In this proposal, I describe a muon collider program that will build the connective tissue between accelerator and experimental design, allowing for the optimization of a realistic collider design. This work is aimed at benchmarking detecter performance needs, with a focus on the tracking detector, while also laying the groundwork for a muon collider demonstrator.

In the educational portion of this proposal, I discuss the pressing need to give undergraduate students an explicit education in design and communication. These skills, while sometimes picked up by enterprising students in a research environment, are not taught as core elements of many undergraduate curriculums, including ours at University of Tennessee, Knoxville. As a consequence, students are not taught to value these skills, even though they are crucial elements needed for success in physics research. Meanwhile, interventions related to teaching these skills in a design thinking context have been shown to improve outcomes for students from minoritized groups. In this proposal, I lay out the details of a course centering these skills, with evidence-based practices that will enhance students' physics identity and improve retention.

Fang Liu
Chemistry, Emory University

Machine Learning Aided Quantum Chemistry Discovery in the Solution Phase

Machine learning (ML) and big data play increasingly important roles in chemical discovery. Although numerous critical chemical processes occur in the solution phase, ML-aided discovery mostly focuses on gas-phase chemistry, with much fewer applications in the solution phase. This gap is due to the scarcity of high-quality solution-phase datasets and suitable ML methods. Our objective is to overcome these challenges by developing ML models and implementing automated workflows for the design and discovery of functional molecules in solution phases. Although we currently focus on discovering photoredox catalysts, the framework can be extended to the discovery of other functional molecules in solution phases. Our efforts will facilitate the efficient prediction of solvation configurations, accurate prediction of solution-phase thermodynamic and photophysical properties, as well as the extraction of design rules to control excited-state electron transfer rates in photopolymerization.

This research proposal aligns with our educational plan, which aims to enhance the data science skills of undergraduate and graduate students in the Chemistry Department of Emory University. An exit survey in the department revealed that most graduating seniors felt insufficient exposure to data science and computational skills. Insufficient training in these areas has a detrimental impact on students' career development and the overall research performance of the department. To address this issue, I propose the integration of data science into the Chemistry Unbound undergraduate curriculum and the implementation of a research-oriented course that effectively trains students to apply coding and data science skills and techniques to practical chemistry applications.

Anne Medling
Astronomy, University of Toledo

Doing Our Homework: Direct Tests of Black Hole Accretion Rate Prescriptions

Sophisticated galaxy evolution simulations have dramatically advanced our understanding of the physical processes at play in galaxies. However, even the most complex simulations today need to guess what is going on at very small scales. By combining near-infrared adaptive optics-assisted integral field spectroscopy and long-baseline ALMA CO interferometry, this program will measure key properties at sub-10pc resolution around a broad range of active black holes. These measurements provide the inputs for standard sub-grid prescriptions relating to black hole accretion rates, allowing predictions of, for a given black hole, what the accretion rate would be if that prescription were the dominant one. These systems also have existing hard-X-ray observations and modeling to provide the actual accretion rate. Putting these two together will identify which black hole accretion rate prescriptions are reasonable in which regimes, and produce recommendations for galaxy evolution simulations.

This proposal includes a 3-part education plan designed to improve recruitment and retention of students in Physics & Astronomy at the University of Toledo. This program will support current students through mentorship and a new course aimed at bolstering foundational physics, math, and logic skills, and reach out to new students by partnering with two existing diversity-focused bridge programs. Both threads focus on increasing students' sense of social belonging; this sense of belonging has been shown to improve resilience and increase persistence when courses are challenging.

Maren Mossman
Physics, University of San Diego

Cloud-Based Investigations of Quantum Hydrodynamics in Ultracold Atomic Gases

Quantum turbulence provides a fertile area of study in which classical fluid dynamics and quantum mechanics intertwine, providing frameworks of interest to pure mathematics as well as practical interest to topics such as superconductivity and neutron star physics. In this proposed work, we will investigate the emergence and long-term behavior of inhomogeneous, or localized, quantum turbulence in a channel-geometry Bose-Einstein condensate, shedding light on fundamental aspects of superfluidity and turbulent flow. By subjecting a superfluid with supersonic flow velocities to collisions in a channel, we will observe spatiotemporal evolution of quantum vortices, their interactions, and the subsequent energy cascade. Exploiting the tunability of these table-top atomic physics platforms, we can additionally explore the role of external parameters on the generation and dynamics of localized quantum turbulence, such as dimensionality, initial flow velocity, and the number of initial mesoscopic BECs. The findings from this study have implications for understanding the intricate interplay between classical and quantum dynamics in superfluid systems, as well as for applications in areas such as solid-state quantum computing and superconductivity.

Utilizing a cloud-based platform for creating quantum matter remotely, this work will demonstrate the new-found accessibility to study quantum dynamics at a primarily undergraduate institution. The education plan described here introduces a new upper-level inquiry-based atomic physics course that uses both hands-on lab curriculum as well as remote instrumentation to bring students into the quantum technology space and prepare them for careers in quantum science and engineering, addressing an area of national need.

Johanna Nagy

Physics, Case Western Reserve University

Measuring Cosmic Birefringence in the Presence of Galactic Foregrounds and Improving Career Preparation through Advanced Physics Labs

Cosmic birefringence, the rotation of the polarization of light as it travels through the Universe, is a powerful probe of new fundamental physics. It would generate a unique signal in the polarization of the cosmic microwave background (CMB) radiation, which could be detected with current and future instruments. However, recent theoretical modeling and new observational evidence has revealed that the CMB signal is likely to be overshadowed by Galactic foregrounds. Here we present a research plan designed to address this problem by using new data to directly measure these foreground signals, performing a new cosmic birefringence search with a pipeline designed for robust foreground cleaning, and quantifying calibration requirements to enable more sensitive measurements with future instruments. My education plan focuses on improving career preparation for Physics majors at CWRU by transforming the advanced laboratory sequence. Physics Bachelor's degree recipients are ultimately employed in a wide variety of long-term careers, and a recent review of the CWRU Physics department by an external strategic advisory group identified undergraduate career preparation as a critical area for improvement. By focusing on the advanced labs and implementing the recommendations of several national reports, I aim to improve students' problem solving versatility, interdisciplinary work capacity, and interpersonal skills. The planned course transformations include improving the advanced lab experiments, emphasizing the development of data analysis and presentation skills, and creating a more equitable and inclusive experience.

Denise Okafor

Chemistry, Pennsylvania State University

Allostery and Architecture: Building and Validating Functional Models of Multidomain Receptors

Research Plan: Nuclear receptors are an important family of ligand-regulated transcription factors, including the well-known estrogen and androgen receptors, that control metabolism, development, inflammation and other physiological processes. These multi-domain proteins rely on allosteric communication between domains, permitting ligand binding on one domain to regulate DNA binding on another. With less than ten experimental structures of full-length receptors in existence, there is a fundamental gap in our understanding of how nuclear receptors physically interact to permit ligand-specific transcriptional outcomes, and a desperate need for new, creative approaches to investigate nuclear receptor structures. Our research utilizes a computational approach that circumvents experimental limitations in characterizing full-length receptor structures. We have validated this approach in a monomeric model of the farnesoid X receptor, demonstrating that the receptor attains unique configurations in the presence of functionally distinct ligands. This proposal focuses on characterizing domain architecture in dimeric and DNA bound models of the receptor, with the ultimate goal of elucidating mechanisms of interdomain allosteric communication. Education Plan: Incorporation of computational skills and knowledge into biochemistry education is crucial both for enhancing student learning and preparing students to be competitive for STEM careers. Our educational plan will create modules to incorporate molecular modeling and simulations into the curriculum of the two Biochemistry courses (one Introductory, one upper-level elective) at Penn State. We will also design and implement a CURE that provides authentic computational research experiences for undergraduate students, allowing them to conduct research, analyse their data and report their findings.

Rebecca Rapf
Chemistry, Trinity University

Interface-Induced Changes to Electronic Structure and Reactivity of Environmentally-Relevant Polycyclic Aromatic Species

This proposal describes a systematic plan to significantly impact both our understanding of reactivity in the natural environment and the success of students in throughout the chemistry curriculum at Trinity University and beyond. The research plan explores how interfaces mediate both the optical properties and the chemistry of a series of polycyclic aromatic species with implications for the degradation pathways of such pollutants in the natural environment. Using a series of surface-sensitive techniques, including ultraviolet reflectance-absorption spectroscopy (UVRAS), we will examine, in situ, how changes in molecular orientation, phase, and aggregation affect the spectroscopic properties (Aim 1) and the photochemical reactivity (Aim 2) of these species at the air-water interface and intercalated into organic films. The educational plan seeks to enhance and support the mathematical fluency and quantitative reasoning of students in chemistry To address these goals, we propose a modular approach to increasing math fluency and quantitative reasoning by incorporating "just-in-time" math review exercises in the first semester of general chemistry (Aim 1), as well as implementing a series of targeted exercises throughout organic chemistry that build mathematical intuition to support chemical understanding (Aim 2).

Paul Robustelli
Chemistry, Dartmouth College

Characterizing and Modulating Interactions of Disordered Proteins that Drive Biomolecular Condensate Formation and Cytotoxic Aggregation

Intrinsically disordered proteins (IDPs) represent ~40% of the human proteome, play crucial roles in a variety of biological pathways and biomolecular assemblies and have been implicated in many human diseases. IDPs do not fold into a well-defined three-dimensional structure under physiological conditions and instead populate a dynamic conformational ensemble of rapidly interconverting structures. As a result, IDPs are extremely difficult to experimentally characterize at an atomic level and are currently considered "undruggable" by conventional structure-based drug design methods. Here, we propose to develop an integrated computational and experimental platform to obtain accurate atomistic descriptions of the dynamic and multivalent interactions of IDPs that drive biomolecular condensate formation and cytotoxic aggregation. These methods will enable researchers to obtain a more detailed and predictive mechanistic understanding of the roles of IDPs these processes. We also propose to develop methods to integrate computer simulations and biophysical experiments to rationally design small molecule inhibitors that modulate processes of biomolecular condensate formation and protein misfolding, with the goal of discovering novel IDP therapeutics.

This proposal also describes pedagogical initiatives to develop interactive computational exercises and research projects that require no coding background to introduce students to fundamental computational skills by using computer code to solve problems in undergraduate and graduate chemistry curricula and a pedagogical initiative to develop interactive computational outreach activities to demonstrate the growing importance of computation in STEM fields to high school students.

Timothy Su

Chemistry, University of California, Riverside

Skeletal Editing of Silicon Nanostructures & Student-Created Social Media Videos to Close the Achievement Gap

The research proposal seeks to extend the concept of skeletal editing familiar from organic chemistry to the precise atomic doping of silicon clusters and nanocrystals. It builds on recent work from the PI showing that sila-diamondoid clusters can engage in skeletal isomerizations that swap a peripheral Ge atom with an internal Si atom in the cluster core.
Aim 1 seeks to expand the scope of skeletal editing reactions in sila-diamondoids, where heteroatoms of electronic interest are exchanged into the core. Their single-molecule conductance will be measured with a homebuilt scanning tunneling microscopy break-junction instrument. Aim 2 explores the use of skeletal editing reactions to enact post-synthetic core doping in silicon nanocrystals. If realized, the synthetic innovations in this proposal will allow the broader field to tune the electronic and optical properties of silicon nanostructures with an unprecedented level of control.
The educational proposal builds off recent work published by the PI on using student-created social media (i.e., TikTok) videos to improve learning outcomes in a large General Chemistry course. In preliminary work, this activity led to an increase of 10 percentage points in final exam scores for the participant versus the control group. These videos also served as highly effective vehicles for outreach, accumulating 2.9 million views since the inception of the program. The proposed work seeks to identify which specific elements of activity participation lead to improved exam performance, as well as which demographics of students benefit most from the activity.

Jessica Swanson

Chemistry, University of Utah

Probing the Role of Membranes in Bacterial Methane Oxidation with Multiscale Simulations

Methanotrophs are bacteria that consume methane and have potential use in methane capture and conversion technologies. Methane removal has recently been recognized as an essential target to limit near-term climate change. The use of methanotrophs is limited, however, by their slow growth in low methane concentrations and our inability to retain activity of the key enzymes outside of the host bacteria. In this work, we propose to use multiscale simulations to study the fundamental processes limiting methanotrophic growth and enzymatic activity. Specifically with the Cottrell Award, we will study the role of intracytoplasmic membranes in the adsorption and delivery of methane to the methane oxidation enzyme, particulate methane monooxygenase (pMMO). Since the native membrane environment has been clearly tied to pMMO activity, we will also study the influence of different membrane forces (packing, hexameric protein interactions, transmembrane voltage, and ion gradients) on the pMMO structure and dynamics. These studies will provide an essential baseline from which to study reductant association, electron transfer and proton uptake pathways, and the oxidation reaction itself. Collectively, the proposed work will contribute to our molecular-level understanding of methanotrophic methane oxidation and establish best practices for studying the involved processes in silico. Ultimately, the obtained insights will help guide the design of methanotroph strains with increased efficiency for use in methanotrophic bioreactors, and membrane scaffolds that retain pMMO activity for use in methane conversion biotechnologies.

Michael Welsh
Chemistry, Hamilton College

Characterization of Enzymes that Build and Degrade Spore Cortex Peptidoglycan

Combating the growing threat of antibiotic resistance necessitates identification and characterization of new cellular targets. One possible pathway for intervention is cell wall biosynthesis and degradation in bacterial spores. The peptidoglycan layer surrounding bacterial spores contains a unique modification, muramic-d-lactam, that is required for spore germination. Enzymes that build and degrade spore peptidoglycan are therefore possible antibiotic targets, but the functions of these proteins are poorly understood, largely due to lack of access to appropriate substrates that would enable their biochemical reconstitution outside the cell. Recent advances by our group have made it possible to prepare defined spore peptidoglycan substrates in vitro. The research described in this proposal seeks to use these methods to characterize two important proteins of unknown function that act on spore peptidoglycan.

The educational component of this proposal addresses problems in the biochemistry curriculum at Hamilton College. The current format of our introductory biochemistry course, Chem 270, has contributed to low engagement in biochemistry research within the Chemistry Department and has contributed to poor community among students in an interdisciplinary Biochemistry/Molecular Biology program. Chem 270 will be redesigned to incorporate case study-based, guided inquiry exercises that introduce research topics in biochemistry. Through these activities, students will learn fundamental biochemical concepts collaboratively through the lens of biochemical research. The result will be greater recruitment of students into biochemistry research groups, increased retention of underrepresented students, and a bolstered sense of community and belonging in our department.

Conference Participants

Mario Affatigato **CS 1996**
maffatig@coe.edu
Physics, Coe College
My research interests cover oxide glasses and amorphous materials, with an emphasis on their structure, properties, and applications. My largest educational interest is in the benefits of undergraduate research in physics and materials.

Marcel Agüeros **HOL 2024**
marcel@astro.columbia.edu
Astronomy, Columbia University
I focus on measuring the rotation and magnetic activity of Sun-like stars to understand how these quantities are connected and evolve. I am dedicated to creating systemic changes that address the historic underrepresentation of women and minorities in science.

Carlos Argüelles **CS 2024**
carguelles@g.harvard.edu
Physics, Harvard University
My research searches for new physical phenomena using high-energy astrophysical neutrinos. My education interest is related to how machine learning can be used to increase learning in undergraduate physics classes.

Darcy Barron **CS 2022**
dbarron2@unm.edu
Physics and Astronomy, University of New Mexico
I study our universe with measurements of the cosmic microwave background, from building instruments to understanding the data they produce. I'm interested in bringing elements of research and discovery into physics courses, to give a broader audience access to these experiences.

Penny Beuning **CS 2009**
P.Beuning@northeastern.edu
Chemistry and Chemical Biology, Northeastern University
DNA damage responses, DNA replication, and protein engineering, with applications in cancer, antibiotic resistance, and forensic science. Education interest in CUREs, undergraduate early research, classroom active learning, graduate student and faculty professional development.

Rachel Bezanson **CS 2021**
rachel.bezanson@pitt.edu
Physics and Astronomy, University of Pittsburgh
The formation and growth of massive galaxies across cosmic time. Graduate student and undergraduate mentoring, supporting undergraduate research experiences.

Karen Bjorkman **CS 1999**
karen.bjorkman@utoledo.edu
Physics and Astronomy, University of Toledo
I am interested in circumstellar disks around high-mass stars, and the timescales for their development, variability, and disappearance. I enjoy teaching introductory astronomy for non-majors as well as observational astrophysics courses for majors.

Steve Bradforth **CS 1999**
stephen.bradforth@usc.edu
Chemistry, University of Southern California
The application of ultrafast lasers to DNA damage, liquid ionization and characterizing light harvesting for solar energy. Currently directing a pilot project on reforming faculty teaching evaluation funded by the Association of American Universities.

Conference Participants Continued

Bernadette Broderick CS 2024
broderickbm@missouri.edu
Chemistry, University of Missouri
We are interested in the development of new tools to understand how complex organic molecules are synthesized in the interstellar medium. A peer-mentoring program in Chemistry targeted for low-income, underrepresented, and first-generation college students will be developed.

Carl Brozek CS 2022
cbrozek@uoregon.edu
Chemistry and Biochemistry, University of Oregon
The Brozek Lab studies redox processes of the "nanoscale gap" between small molecules and macroscopic materials. The Brozek Lab advances science education beyond classroom instruction to prepare students for their next career and educational gals.

Richard Brutchey CS 2010
brutchey@usc.edu
Chemistry, University of Southern California
We develop inorganic materials syntheses to address challenges related to catalysis, energy storage and conversion, and sustainability. Community College outreach.

Raychelle Burks HOL 2023
burks@american.edu
Chemistry, American University
My research is focused on the development of field portable colorimetric and luminescent sensing systems for forensic applications. My work focuses on pop culture as cognitive anchor and media computation for computing skillset building.

Matt Caplan CS 2023
mecapl1@ilstu.edu
Physics, Illinois State University
Computational physics / Strongly coupled plasmas in white dwarfs and neutron stars / Black hole accretion / Dark Matter. Arms control and nuclear weapons policy / Public education via YouTube with Kurzgesagt & PBS SpaceTime.

Lou Charkoudian CS 2018
lcharkou@haverford.edu
Chemistry, Haverford College
Our undergraduate research team studies natural product biosynthesis. Integrating original research and community engagement courses and studying the role of interpersonal factors in STEM education.

Laura Chomiuk CS 2017
chomiuk@pa.msu.edu
Physics and Astronomy, Michigan State University
Stellar explosions and their interaction/impact with their surroundings: novae and supernovae! Engaging a large number of diverse undergrads in authentic research.

Luis Colón HOL 2023
lacolon@buffalo.edu
Chemistry, State University of New York at Buffalo
Synthesis, characterization/application of silica-based adsorbent materials; chemical analysis/separations; advancing diversity in chemistry. Improvement of undergraduate laboratory; facilitation of undergraduate research opportunities for underrepresented populations.

Conference Participants Continued

Lia Corrales CS 2024
liac@umich.edu
Astronomy, University of Michigan
I do astromineralogy, probing the composition of interstellar dust and exoplanet clouds through near-ultraviolet (NUV) and X-ray absorption. I seek to develop inclusive, community-building open-source data science curriculums and integrate social justice into coding education.

Lindsay Currie
lcurrie@cur.org
Council on Undergraduate Research
Scaffolding research into the undergraduate curriculum. Focus on undergraduate research, especially as a career readiness tool and expanding access to the experience.

Scott Cushing CS 2022
scushing@caltech.edu
Chemistry and Chemical Engineering, California Institute of Technology
Ultrafast laser spectroscopy, instrumentation science, dynamics in materials ranging from batteries to solar cells. Outreach programs connecting community college and MSI students with research-intensive universities.

Alex Dainis
adainis@dreyfus.org
Chemistry, Camille and Henry Dreyfus Foundation
I am a science communicator with over a decade of experience creating educational, digital video content. Interested in research-backed science communication practices.

Ryan Davis CS 2022
rddavis@sandia.gov
Materials, Physical, and Chemical Science Center, Sandia National Laboratories
Analytical, physical and atmospheric chemistry. Particular research interests in chemistry and physics of confined environments. Effective mentoring of research students, asset-based pedagogies.

Katherine de Kleer CS 2024
dekleer@caltech.edu
Geological and Planetary Sciences & Division of Physics, Math and Astronomy, California Institute of Technology
The formation and thermochemical evolution of planets and moons, as constrained by multi-wavelength astronomical observations. Hands-on training in multi-wavelength astronomical observations and astronomy outreach; project-based, inquiry-led learning.

Charlie Doret CS 2017
scd2@williams.edu
Physics, Williams College
Atom-based-tests of physics beyond the Standard Model & quantum simulation with trapped ions. Making physics accessible to everyone; incorporating varied teaching techniques throughout the STEM curriculum; undergraduate research.

Conference Participants Continued

Meagan Elinski CS 2024
elinski@hope.edu
Chemistry, Hope College
Molecular and mechanochemical control over soft sliding interfaces. Combining student-facing, structural, and community-facing practices to reduce equity gaps and energize interest in chemistry.

Deven Estes FCS 2023
deven.estes@itc.uni-stuttgart.de
Institute of Technical Chemistry, University of Stuttgart
Surface organometallic chemistry, molecular structures and mechanisms of heterogeneous catalysis, molecular heterogeneous catalysis. crossing borders in catalysis education, introducing heterogeneous catalysis and industrial chemistry in chemistry curriculum

Adam Falk CS 1997
falk@sloan.org
Office of the President, Alfred P. Sloan Foundation
The Sloan Foundation supports science and economics, diversity and inclusion in STEM, and the public understanding of science. The Sloan Foundation's grant making in education is largely focused on promoting diversity and inclusion in graduate education in STEM.

Ben Feldman CS 2022
bef@stanford.edu
Physics, Stanford University
Developing new techniques to engineer and study emergent quantum electronic phases in reduced dimensional systems. Enhancing undergraduate research opportunities as well as developing active learning and inquiry-based coursework.

Daniela Fera CS 2021
dfera1@swarthmore.edu
Chemistry and Biochemistry, Swarthmore College
Determination and analysis of protein-protein complex structures and interactions important for antibody development. Teaching introductory and advanced biochemistry concepts in an inclusive environment with active learning approaches.

Megan Fieser CS 2023
fieser@usc.edu
Chemistry, University of Southern California
My research focuses on the design of catalyst methods to synthesize new, degradable polymers or to repurpose waste polymers. My educational interests are in the development of courses that build intuition for students to use broadly in their careers.

Jay Foley CS 2019
jfoley19@uncc.edu
Chemistry, University of North Carolina at Charlotte
Theory and modeling of light-matter interactions, strong light-matter coupling. Enhancing Science Courses by Integrating Python.

Nancy Forde CS 2007
nforde@sfu.ca
Physics, Simon Fraser University
Molecular-scale biophysics: developing single-molecule approaches to characterize mechanical properties and synthetic molecular motors. Personalizing student learning: physics for life science students and incorporating independent projects into coursework.

Conference Participants Continued

Carla Fröhlich CS 2014
cfrohli@ncsu.edu
Physics, North Carolina State University
Computational astrophysicist. Nucleosynthesis, supernovae, and kilonovae. Multi-messenger predictions. Machine learning. Mindset and belonging. Assessments and grading.

Jacob Gayles CS 2024
gayles@usf.edu
Physics, University of South Florida
Spintronics, topology, magnetism, condensed matter physics, computation A.I. Outreach, active learning, engagement. attainment, training, and retention of undergraduate and graduate researchers.

John Gilbertson CS 2009
gilberj4@wwu.edu
Chemistry, Western Washington University
We are working on small molecule activation, oxoanion deoxygenation, and coordination chemistry in general. I am interested in learning modern methods to improve student learning outcomes.

Jason Gillmore CS 2006
gillmore@hope.edu
Chemistry, Hope College
Organic mechanism, synthesis, photochemistry, electrochemistry, and computation, particularly applied to dyes, photochromes, and materials. Undergraduate research, PLTL, CUREs, organic and general chemistry, and mentoring junior/future faculty.

Daren Ginete
dginete@sciphil.org
Science Philanthropy Alliance

Graham Giovanetti CS 2023
gkg1@williams.edu
Physics, Williams College
I am an experimental particle and nuclear physicist, primarily focused on "rare-event" searches. I am interested in ways we can support students and improve our retention within the physics major, particularly in introductory courses.

Vera Gluscevic CS 2023
vera.gluscevic@usc.edu
Physics and Astronomy, University of Southern California
Cosmology and astrophysics; dark matter; galaxy formation; near-field cosmology; CMB; cosmic acceleration; cosmological tensions; neutrinos. Inclusivity and active learning in physics and astronomy; programming and inference courses for science majors; research for undergrads.

Boyd Goodson CS 2005
bgoodson@chem.siu.edu
School of Chemical & Biomolecular Sciences, Southern Illinois University Carbondale
physical chemistry; biomedical imaging; hyperpolarization-enhanced NMR & MRI; neutron-optics-based tests of fundamental symmetries. innovative methods in general chemistry; hands-on demonstrations / outreach; undergraduate research experiences.

Martin Gruebele CS 1995
mgruebel@illinois.edu
Chemistry, Physics, Biophysics and Quantitative Biology, College of Medicine, University of Illinois at Urbana-Champaign
Quantum scrambling; fish locomotion; in-cell biophysics; carbon dot synthesis and characterization. Community college-accessible labs; sonification; data science education.

Conference Participants Continued

Kathryn Haas CS 2016
kathryn.haas@duke.edu
Chemistry, Duke University
How do proteins interact with metal ions to control structure/function? Elucidating coordination chemistry using spectroscopy & theory. CUREs and CoREs in advanced chemistry courses. Open educational resources.

Ryan Hadt CS 2022
rghadt@caltech.edu
Chemistry and Chemical Engineering, California Institute of Technology
The Hadt lab utilizes physical inorganic approaches to understand the electronic structures of transition metal ions. I am interested in inorganic chemistry education, with an emphasis on group theory, ligand field theory, and physical methods.

Leslie Hamachi CS 2024
hamachi@calpoly.edu
Chemistry and Biochemistry, California Polytechnic State University, San Luis Obispo
Colloidal Covalent Organic Framework (COF) synthesis and surface chemistry. Active learning in polymer chemistry and general chemistry classrooms. Development of educational board games and card games.

Amanda Hargrove CS 2017
amanda.hargrove@utoronto.ca
Chemical & Physical Sciences, University of Toronto Mississauga
The Hargrove Lab explores RNA-biased small molecules and privileged RNA topologies for selective modulation of RNA conformation and function. In Hargrove's CURE, first year students ID patterns in RNA recognition via binding assays and principal component analysis.

Jen Heemstra CS 2015
heemstra@wustl.edu
Chemistry, Washington University in St. Louis
Biomolecules do amazing things! We engineer nucleic acids and proteins to address unmet needs in human health and the environment. Creating a healthier academic culture! We are interested in how to promote equity, resilience, and well-being for students in STEM.

Farnaz Heidar-Zadeh CS 2024
farnaz.heidarzadeh@queensu.ca
Chemistry, Queen's University
Developing mathematical tools and computer software to predict chemical phenomena using quantum chemistry and machine learning. Developing a tiered structure for learning and applying mathematics in the chemistry curriculum through computer programming.

Ute Hellmich FCS 2017
ute.hellmich@uni-jena.de
Institute of Organic Chemistry & Macromolecular Chemistry, Friederich-Schiller-Universität Jena
Structural dynamics, negected tropical diseases, lipid regulation, intrinsically disordered regions - in membrane proteins and beyond! Supporting the next generation of scientists into becoming critical thinkers and to foster passion for basic research.

Chris Hendon CS 2021
chendon@uoregon.edu
Chemistry and Biochemistry, University of Oregon
Computational materials chemistry for energy conversion. Inorganic and materials chemistry, as well as high-performance computing. Also coffee.

Conference Participants Continued

Rigoberto Hernandez CS 1999
r.hernandez@jhu.edu
Chemistry, Johns Hopkins University
Theoretical/Comp Chemistry @JHUChemistry, nonequilibrium dynamics: reactions, TST, nanoparticles, chemical chips, proteins @EveryWhereChem. Diversity & Inclusion @OxideChem, Academic Leadership Training Workshops, ACS Leadership Experience, ACS President-Elect Candidate.

Mike Hildreth CS 2003
mhildret@nd.edu
The Graduate School, University of Notre Dame
Experimental Particle Physics, large scale distributed computing, open data, data preservation, improving graduate and undergrad education. Improving graduate and undergraduate education, graduate and postdoc mentoring, student-focused graduate curricula, ethics in curriculum.

Tova Holmes CS 2024
tholmes@utk.edu
Physics & Astronomy, University of Tennessee, Knoxville
My work focuses on searches for new fundamental particles at the Large Hadron Collider, and on building towards a future Muon Collider. I'm especially interested in the incorporation of teaching techniques from the design disciplines into physics.

Brent Iverson
iversonb@austin.utexas.edu
RCSA Board of Directors
Warren J. and Viola Mae Raymer Professor, Chemistry, University of Texas at Austin

Sarah Keane CS 2022
sckeane@umich.edu
Chemistry, Biophysics, University of Michigan
We are interested in understanding how RNA structure and conformational dynamics contributes to the regulation of microRNA biogenesis. I'm interested in developing and incorporating authentic research experiences into biophysics/biochemistry courses.

Michael Larsen CS 2022
larsen32@wwu.edu
Chemistry, Western Washington University
Polymer chemistry, sustainable materials, degradable polymers. Active learning in large classes, peer mentoring, course structure as a tool for equitable instruction.

Adam Leibovich CS 2006
akl2@pitt.edu
Physics and Astronomy, University of Pittsburgh
Theoretical particle physics and gravitational wave physics. Large undergraduate intro courses.

Eli Levenson-Falk CS 2021
elevenso@usc.edu
Physics & Astronomy, University of Southern California
Experimental quantum information science using superconducting circuits, studies of foundational quantum physics, and precision measurement. Active learning and flipped classrooms in upper-level classes, novel assessments, research-based courses.

Conference Participants Continued

Huey-Wen Lin CS 2020
hwlin@pa.msu.edu
Physics and Astronomy, Michigan State University
Supercomputing to study partonic properties of nucleons for high-energy and nuclear physics; exploring AI and quantum computing as tools. Interactive flipped classroom, peer learning, use research data in the classroom.

Fang Liu CS 2024
fang.liu@emory.edu
Chemistry, Emory University
Develop machine learning models and automated simulation workflows to discover functional molecules in the solution phase. Enhance the data science skills of chemistry undergraduate and graduate students.

Jane Liu HOL 2023
Jane.Liu@pomona.edu
Chemistry, Pomona College
Microbiology, Vibrio cholerae, phages, microbial gene regulation, aptamers, riboswitches, molecular evolution, chemical education. CUREs, DEI, reading scientific literature, first-year chemistry, biochemistry.

Laura Lopez CS 2019
lopez.513@osu.edu
Astronomy, Ohio State University
Star and galaxy formation, the interstellar medium, galactic winds, supernovae. Professional development, inquiry-based activities, research opportunities, peer-to-peer mentorship, Bridge programs.

Jorge López HOL 2024
jorgelopez@utep.edu
Physics, University of Texas at El Paso
I study nuclear physics ranging from nuclear reactions all the way to the formation of nuclear pasta in the crust of of neutron stars. I have participated in studies of pre-K teaching, course for educators, and in the implementation of peer led teaching learning (PLTL).

Lauren Marbella CS 2022
lem2221@columbia.edu
Chemical Engineering, Columbia University
Our research group is interested in understanding and controlling chemical reactions at electrochemical interfaces. I am interested in improving knowledge and accessibility around NMR methods and incorporating these tools into undergraduate research.

Thomas Markland CS 2015
tmarkland@stanford.edu
Chemistry, Stanford University
Development of theoretical methods to model condensed phase systems, with a particular emphasis on the role of quantum mechanical effects. Teaching physical and computational chemistry courses with Python and Jupyter notebooks.

Jim Martin CS 1997
martinjd@ncsu.edu
Chemistry, North Carolina State University
Structure and properties of materials at the interface of molecular and solid-state chemistry. Condensed matter kinetics and thermodynamics. Discovery-based pedagogical practice based on integrated teaching and research.

Conference Participants Continued

Nadya Mason HOL 2024
nmason1@uchicago.edu
Pritzker School of Molecular Engineering, University of Chicago
Experimental studies of quantum materials, such as nano-scale wires, atomically thin membranes, and nanostructured superconductors. Increasing diversity and inclusivity. Hands-on learning for science and engineering.

Maura McLaughlin CS 2009
maura.mclaughlin@mail.wvu.edu
Physics and Astronomy, West Virginia University
I use radio telescopes to time pulsars in order to detect and characterize low-frequency gravitational waves from supermassive black holes. I involve high-school and two-year and four-year college students in pulsar science in an effort to build sustainable STEM pipelines.

Kristen McQuinn CS 2023
kristen.mcquinn@rutgers.edu
Physics and Astronomy, Rutgers University - New Brunswick
The formation / evolution of low-mass galaxies discovery and characterization of faint systems in the nearby universe near-field cosmology. Providing research experience to URMs in STEM.

Anne Medling CS 2024
anne.medling@utoledo.edu
Physics & Astronomy, University of Toledo
I'm interested in galaxy evolution, particularly black hole accretion and feedback, using observations at the highest spatial resolutions. I'm interested in building student resilience and STEM belonging through active learning and inclusive messaging/practices.

Emily Miller
emily.miller@aau.edu
Association of American Universities
Systemic organizational and cultural change at research universities to advance institution- and department-level educational innovations. Evidence-informed innovations in undergraduate STEM and doctoral education; academic work and faculty reward structures.

Mark Moldwin CS 1997
mmoldwin@umich.edu
Climate and Space Sciences and Engineering, University of Michigan
My research interests are space plasma physics, magnetic sensor development, space weather, and research professional development. My education interests include space weather courses for non-science majors and using smartphone sensors for physics experiments.

Maren E Mossman CS 2024
mmossman@sandiego.edu
Physics and Biophysics, University of San Diego
Experimental atomic physics with ultracold atoms with applications to quantum simulation and hydrodynamics. Building educational programming to allow undergraduate students to gain hands-on experience in quantum science and technologies.

Karl Mueller CS 1996
drktmueller@gmail.com
Physical and Computational Sciences, Pacific Northwest National Laboratory
I manage an R&D portfolio from Department of Energy sponsors in the Office of Science for a national laboratory. I also study batteries. I collaborate with our Chief Diversity Officer and her team to foster relationships with MSIs and provide our staff with resources for DEIA.

Conference Participants Continued

Jorge Muñoz CS 2022
jamunoz@utep.edu
Physics, University of Texas at El Paso
Phase stability of materials, particularly entropic contributions, studied using computational methods and machine learning. Development of technology tools and course structures that leverage computational thinking, social learning, and research experiences.

Cathy Murphy CS 1996
murphycj@illinois.edu
RCSA Board of Directors
Interim Director, Beckman Institute for Advanced Science and Technology, Larry R. Faulkner Endowed Chair, Chemistry, University of Illinois at Urbana-Champaign
Synthesis, characterization, biological and energy applications and environmental implications of colloidal gold nanocrystals. General, inorganic, materials chemistry.

Johanna Nagy CS 2024
nagy@case.edu
Physics, Case Western Reserve University
My research focuses on developing instrumentation and analysis tools for cosmology with the Cosmic Microwave Background. I am particularly interested in improving advanced Physics lab courses, especially with regard to career preparation and DEI.

Sharon Neufeldt CS 2020
sharon.neufeldt@montana.edu
Chemistry & Biochemistry, Montana State University
Organic and organometallic chemistry, especially understanding mechanisms of transition metal-catalyzed reactions. Visual tools for learning three-dimensional concepts.

Denise Okafor CS 2024
cdo5093@psu.edu
Biochemistry and Molecular Biology, Pennsylvania State University
My lab seeks to understand how ligands modulate transcription in nuclear receptors, a family of ligand-induced transcription factors. I am interested in introducing computational modeling and molecular dynamics simulations into the biochemistry curriculum.

Lisa Olshansky CS 2022
lolshans@illinois.edu
Chemistry, University of Illinois at Urbana-Champaign
My lab examines bioinorganic model systems that mimic conformational gating mechanisms operative in naturally occuring metalloproteins. I founded an initiative aimed at building community and fostering engagement among chemistry students from underrepresented groups at UIUC.

Amanda Patrick CS 2022
apatrick@chemistry.msstate.edu
Chemistry, Mississippi State University
Small molecule mass spectrometry, especially characterization of ionic liquids and their degradation products. Writing and communication in chemistry, first-year student engagement, and integrating mass spectrometry throughout the curriculum.

David Patrick CS 1997
dpatrick@wwu.edu
Graduate School, Western Washington University
Crystallization in thin films of molecular semiconductor materials for electronic and solar energy applications. As the Dean of the Graduate School, I'm interested in masters-level graduate education and student success across disciplines.

Conference Participants Continued

Alison (Ali) Elise Patteson CS 2023
aepattes@syr.edu
Physics, Syracuse University
I study biological physics and soft matter physics. I'm interest the cell cytoskeleton and collective motion of bacteria colonies. I am involved in high school student outreach, and I care about active learning and building an inclusive culture in my classroom/group.

William Pfalzgraff CS 2023
w.pfalzgraff@chatham.edu
Chemistry, Chatham University
My research is broadly in chemical dynamics in heterogeneous environments such as polarized interfaces. I am interested in how visualization, and simulation tools can improve student learning in physical chemistry and geoscience.

Davit Potoyan CS 2021
potoyan@iastate.edu
Chemistry, Iowa State University
We are a computational biophysics lab that studies allosteric proteins, biomolecular condensates, and chromatin organization. Integrating Python and ChatGPT into physical chemistry courses via interactive websites containing lectures, code, animations, and projects.

Chanda Prescod-Weinstein CS 2023
chanda.prescod-weinstein@unh.edu
Physics and Astronomy, University of New Hampshire
My technical research is focused on using astrophysical techniques to investigate the fundamental nature of dark matter. I am especially interested in best practices in graduate education and integrating social ethics into undergraduate education.

Rebecca Rapf CS 2024
rrapf@trinity.edu
Chemistry, Trinity University
My lab is interested in interfacial chemistry and photochemistry applied to atmospheric and astrobiology problems. I'm interested in supporting quantitative reasoning and problem solving of students throughout the undergraduate chemistry curriculum.

Paul Raston CS 2019
raston@hawaii.edu
Chemistry, University of Hawaii at Manoa
Microwave and Laser spectroscopy of unstable molecules that are relevant to combustion, the atmosphere, or interstellar space. Teaching physical chemistry to undergrads in lecture and lab, and developing virtual spectrometers.

Noel Richardson CS 2023
noel.richardson@erau.edu
Physics and Astronomy, Embry-Riddle Aeronautical University
I am interested in determining fundamental parameters and evolutionary pathways for massive binary stars, especially Wolf-Rayet stars. I am developing a CURE focused on observations of binary stars for students to develop skills needed for data analysis in astronomy.

Chad Risko CS 2018
chad.risko@uky.edu
Chemistry, University of Kentucky
Multiscale simulations of materials, with particular focus on materials for electronics and energy conversion and storage. Multidisciplinary approaches to engaging students in physical chemistry.

Conference Participants Continued

Tyler Robinson CS 2021
tdrobin@arizona.edu
Lunar and Planetary Laboratory, University of Arizona
My research focuses on understanding habitability indicators, atmospheres, and biosignatures for exoplanets and Solar System worlds. I am interested in effective techniques for use in large undergrad courses and professional development-focused methods for grad courses.

Paul Robustelli CS 2024
paul.j.robustelli@dartmouth.edu
Chemistry, Dartmouth College
Interests: Computational Biophysics, Molecular Simulations, Intrinsically Disordered Proteins, NMR spectroscopy, Drug Design. I'm interested in teaching modern computational skills in undergraduate and graduate courses.

Jenny Ross CS 2010
jlross@syr.edu
Physics, Syracuse University
Using soft matter and biophysics to answer the question "How does the cell organize its insides without a manager?" Active, hands-on, experiential. Turning the boring into fun!

Eduardo Rozo CS 2018
erozo@arizona.edu
Physics, University of Arizona
Cosmology. Effective teaching strategies.

Zac Schultz CS 2013
schultz.133@osu.edu
Chemistry, Ohio State University
My research involves the use of spectroscopy and microscopy to identify, quantify, and understand the behavior of molecules. My current educational interests are in promoting student engagement in both upper level and intro level courses.

Scott Shaw CS 2016
scott-k-shaw@uiowa.edu
Chemistry, University of Iowa
Measuring Molecules at Surfaces. Let there be rubrics.

Brad Smith CS 1994
smith.115@nd.edu
Chemistry & Biochemistry, University of Notre Dame
Supramolecular chemistry and molecular imaging, especially fluorescence guided surgery. Organic chemistry for sophomores and graduate students, I maintain a very active web-site of problems on organic structure elucidation.

David Strubbe CS 2020
dstrubbe@ucmerced.edu
Physics, University of California, Merced
Condensed matter theory, electronic structure methods, excited states, quantum defects, 2D materials, high energy density science. Computational physics, condensed matter, CUREs, pedagogical simulation tools. (https://nanohub.org/tools/ucb_compnano/)

Tim Su CS 2024
timothys@ucr.edu
Chemistry, University of California, Riverside
We use rational chemical synthesis to make new types of silicon molecules, then study their quantum transport in single-molecule junctions. Student-created social media videos to make abstract concepts more relatable & improve learning outcomes in Gen. Chem. courses.

Conference Participants Continued

Ruby Sullan CS 2021
ruby.sullan@utoronto.ca
Physical and Environmental Sciences, University of Toronto Scarborough
Developing bioinspired, multifunctional nanomaterials with a focus on understanding nanomaterial-bacteria interactions. Inspiring and engaging early undergraduates with state-of-the art research in nanotechnology and interfacial science.

Jessica Swanson CS 2024
j.swanson@utah.edu
Chemistry, University of Utah
Multiscale simulations to probe biomolecular processes such as electrochemical charge transport and bacterial methane oxidation. Developing "Chemistry for Climate Solutions" to expose incoming students to the rich fundamental science behind climate solutions0

Daniel Tabor CS 2023
daniel_tabor@tamu.edu
Chemistry, Texas A&M University
Our group works in the area of theoretical chemistry, focusing on materials design, spectroscopy, and machine learning in chemistry. We focus on integrating data science and ML methods into small modules for undergraduates in chemistry.

Guenther Thiele FCS 2020
guenther.thiele@fu-berlin.de
Chemistry, Biology and Pharmacy, Freie Universität Berlin
Sustainable energy and spintronic materials. Virtual and Augmented Reality in Teaching.

Claire Till CS 2020
claire.till@humboldt.edu
Chemistry, California State Polytechnic University, Humboldt
Scandium, iron, metal-ligand interactions, ocean chemistry, biogeochemical cycling. Hands on lab skills, critical thinking, scientific writing, specifications grading and self-grading.

Ryan Trainor CS 2022
ryan.trainor@fandm.edu
Physics & Astronomy, Franklin & Marshall College
I study galaxy formation and evolution using optical and infrared telescopes on the ground and in space. I teach a broad range of undergraduate physics and astronomy classes, including intersections with sociology, data science, and computation.

Sergei Urazhdin CS 2008
sergei.urazhdin@emory.edu
Physics, Emory University
Electron correlations in magnetism and superconductivity, and electronic and optical methods for their charcterization. Developement of new course content tailored to the evolving science and technology; hands-on empirial learning.

Rory Waterman CS 2009
rory.waterman@uvm.edu
Chemistry, University of Vermont
I sure like making molecules. Some of that is new catalysts, some is new molecules and materials, but much of it is abundance driven. Making trouble, getting people access, helping anyone be a scientist. Just the fun stuff.

Conference Participants Continued

Michael Welsh CS 2024
mwelsh@hamilton.edu
Chemistry, Hamilton College
I am interested in the biosynthesis of carbohydrate polymers that decorate the cell surface of bacteria and bacterial spores. I want to develop courses where students learn and apply fundamental biochemistry concepts by exploring research articles.

Jessica Werk CS 2020
jwerk@uw.edu
Astronomy, University of Washington
I study, though both Astronomical observations and theory, the vast networks of diffuse plasma that course through the intergalactic medium. I am deeply interested in meaningful research experiences for undergraduates that can be scaled up to match the demand.

Julian West CS 2023
jgwest@rice.edu
Chemistry, Rice University
Catalysis, radical chemistry, sustainable synthesis, photochemistry. Increasing the science communication ability of scientists.

Leyte Winfield HOL 2024
LWinfield@spelman.edu
Chemistry & Biochemistry, Spelman College
The synthesis and design of novel benzimidazoles for the treatment of cancers that disproportionately impact African Americans. The work characterizes minority students as agents of their success and Spelman's learning environment as one which nurtures such agency.

Leah Witus CS 2021
lwitus@macalester.edu
Chemistry, Macalester College
The role of secondary structure in catalytic peptide activity, enzyme protein conjugates for therapeutic protein applications. Accessible science communication with the general public via direct outreach efforts and the development of a course for undergrads.

Amanda Wolfe CS 2017
awolfe@unca.edu
Chemistry and Biochemistry, University of North Carolina at Asheville
The Wolfe lab works on the development of small molecule antibiotics that target bioenergetic complexes in Gram-negative pathogens. We are interested in incorporating high-impact research into undergraduate courses.

2024 Conference Planning Committee

Karen Bjorkman
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University of Toledo

Lou Charkoudian
Chemistry
Haverford College

Jennifer Heemstra
Chemistry
Washington University in St. Louis

Gina MacDonald
Chemistry and Biochemistry
James Madison University

Scott Shaw
Chemistry
University of Iowa

Tom Solomon
Physics
Bucknell University

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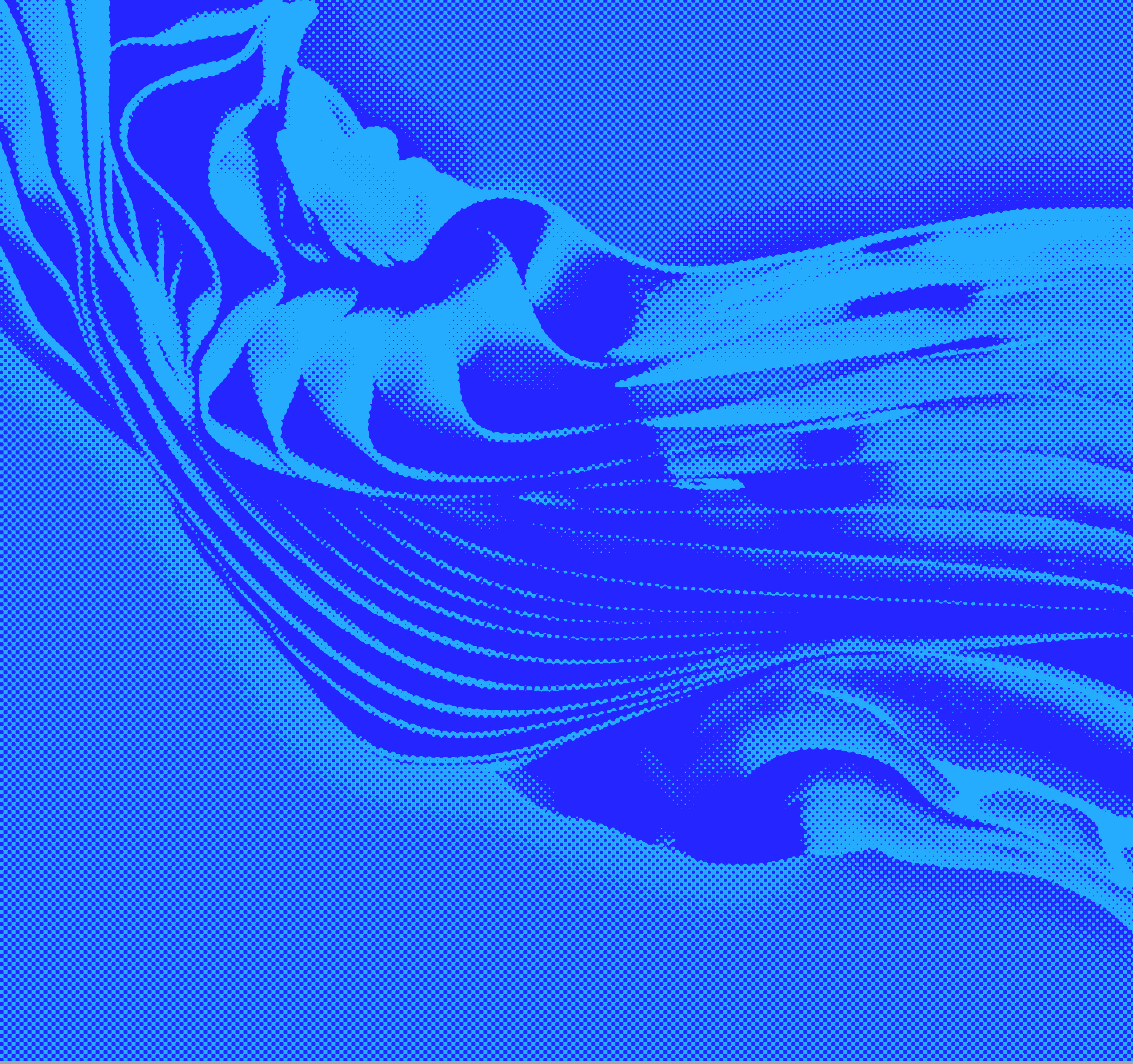

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