

ACS GCI Summer School on Green Chemistry and Sustainable Energy

2023 Annual Report

July 12-17, 2023, Golden, Colorado



“Training and inspiring students to become tomorrow's leaders
in Green and Sustainable Chemistry and Engineering.”

Information: www.acs.org/gcsummerschool

Foreword by David A. Laviska – Portfolio Manager for Education, ACS GCI

This report summarizes key details and statistics relevant to the prestigious Green Chemistry Summer School program sponsored and organized by the American Chemical Society Green Chemistry Institute (ACS GCI). As we look back on this year's highly successful program, we note that 2023 marked the 20th anniversary since the first Summer School was held in Uruguay back in 2003. Mary Kirchoff (retired since 2021) was the organizer and Director of that inaugural program, and it is a testament to her vision and hard work – and those of dozens of other professionals working both within and outside the ACS over the past two decades – that the Summer School remains one of the most impactful training experiences available to graduate students and postdoctoral scholars preparing for careers related to green and sustainable chemistry and engineering.

As shown in post-program survey data, students were highly satisfied with the 2023 program, and we are delighted to know that they are joining the broader green chemistry and engineering community as they complete their education and forge careers focused – we hope – on initiatives that will contribute to the vision of a more sustainable future for the planet. Representing eleven countries and a long list of states and provinces in the U.S. and Canada, the student cohort for 2023 was exceptionally diverse, talented, and motivated to work for change across the chemistry enterprise. A large majority of students rated the overall summer school experience at the highest level – “outstanding” – and their engagement with us both during and since the summer school underlines the profound, lasting impact of the program.

As Director of the 2023 program, I want to thank the faculty – 13 colleagues representing a broad spectrum of disciplines – who gave so generously of their time and expertise. It was exciting seeing them teach, encourage, and engage with the students while exhorting them to think at a higher level about the roles chemistry and engineering play in tackling global sustainability challenges. The inspiring leadership from our volunteer faculty is at the heart of the student experience and we thank them for the critical role they played in making the program such a huge success.

Looking forward, we have several exciting changes planned for future summer school programs – small and large modifications we hope will make the experiences more inclusive, impactful, and far-reaching. As more students apply each year, the admission process has become increasingly selective, yet we want to provide as many opportunities as possible. Stay tuned for more information about this and other changes for 2024 to be announced in the coming months. Now that we have passed the midpoint of the 15-year timeframe set forth by the United Nations with their Sustainable Development Goals initiative, the urgency for training our future scientists is greater than ever. We are working to ensure that the ACS GCI Summer School continues to earn its reputation as the most sought-after program of its kind.

Remarks from Adelina Voutchkova – Director of the ACS GCI and Office of Sustainability

In addition to being a critical way that we empower early career chemists to tackle tough sustainability challenges and introduce them to the green chemistry community, the ACS GCI Summer School aims to bridge the geopolitical divide between chemists across the Americas. Students and postdocs from across North, South, and Central America and the Caribbean have the opportunity to start building a community that leads to collaborations, friendships, and enriching, impactful careers. As an alumna of the Summer School myself, I deeply appreciate this initiative and its alignment with the core mission of the GCI: “To catalyze the implementation of innovative approaches to chemistry and engineering that enable sustainable development across the globe.”

As of this year, we are excited to announce a partnership with our colleagues in the ACS Education Division to bring additional ACS career resources to Summer School attendees. We also have a variety of other exciting changes in the planning stage as we work to evolve the Summer School program to best meet the needs of the next generation of chemists. We are grateful to everyone who has contributed to the success of the summer school over the past two decades and look forward to another 20+ years of welcoming students to this profoundly important initiative.

TABLE OF CONTENTS

Summary Overview.....	1
Organizers & Participants.....	3
Diversity & Survey Results.....	5
Agenda.....	7
Faculty.....	9
Poster Sessions.....	14
Future Plans.....	15
Acknowledgements.....	16
2024 Summer School.....	17

Summary Overview

The conclusion of this year's American Chemical Society Green Chemistry Institute (ACS GCI) Summer School on Green Chemistry and Sustainable Energy marked a significant milestone: twenty years since its founding in 2003. Over the last two decades, it has been a privilege for the ACS to offer this fully-funded once-in-a-lifetime opportunity to exceptional graduate students and postdoctoral chemists and engineers. This report provides a detailed look into the 2023 experience, including the agenda, faculty, topics covered, statistics, and future plans.

Open to students in North, South, and Central America and the Caribbean, nearly 1200 students have participated since 2003, representing more than 230 universities in 13 countries. The 2023 Summer School was held July 12-17 at the Colorado School of Mines in Golden, CO, and brought together 62 student participants from 11 countries. While the ACS Summer School has evolved over the years – including moving between various locations (Montevideo, Pittsburgh, Washington, D.C., Mexico City, and Montreal, among others) – the core program goals have remained the same: a commitment to fostering knowledge, collaboration, and leadership in green chemistry and engineering with a strong emphasis on diversity, equity, and inclusion.

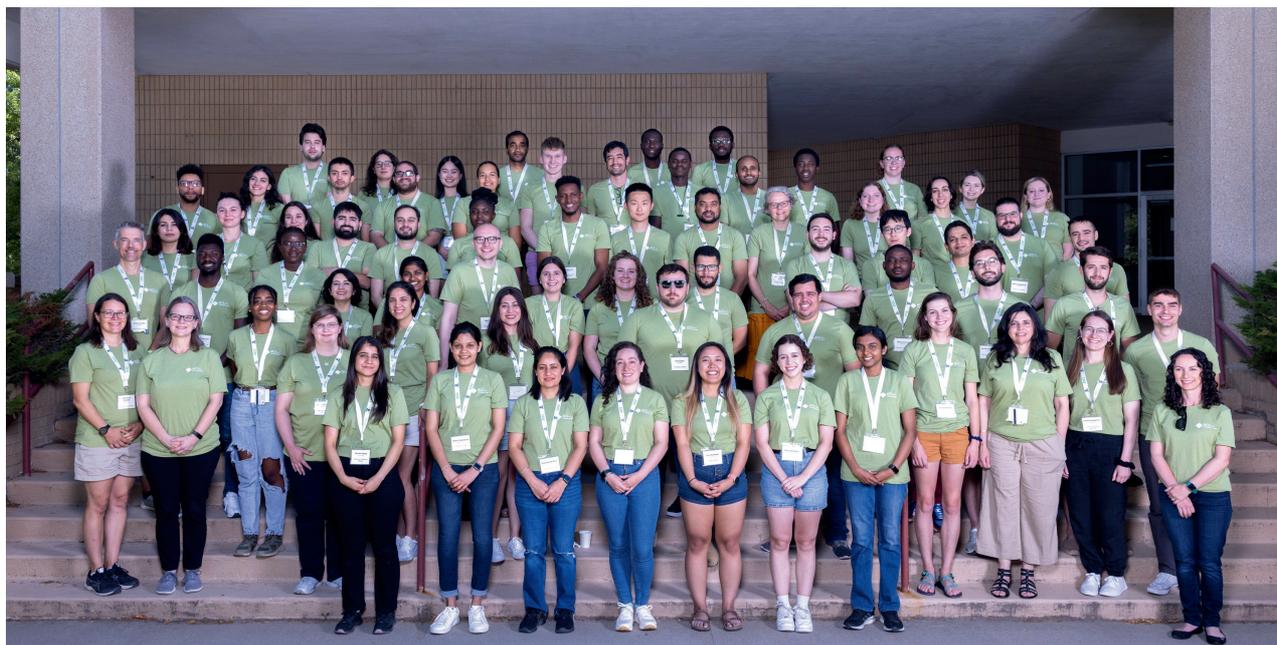
We are committed to ensuring that all participants leave the program with:

- Increased understanding of the central tenets of Green Chemistry and why it is critical to helping us build a more sustainable future;
- Examples of how Green Chemistry and Sustainability concepts can be integrated into the work of chemists, engineers, and innovators; and
- Confidence to start reimagining every aspect of research, development, teaching, and collaborations to leverage an inclusive, systems-level mindset while tackling global sustainability challenges.

To achieve this, the 2023 program featured 20 instructional modules (lectures, interactive sessions, and discussions), three 2-hour student poster sessions, and continuous networking opportunities. The curriculum was expansive, with 13 distinguished faculty from academia, non-profit organizations, and industry, offering topics such as toxicology, greener synthesis, energy storage, circularity, and many others. Student evaluations confirm that these objectives were exceeded, giving the learning content an average rating of 4.4 (with 4 being “exceeding the goal” and 5 being “far exceeding the goal”).



Summary Overview (Continued)



The 2023 ACS Summer School Cohort

Participants also gave the overall program high marks, with an average experience rating of 4.6 out of 5 (with 4 being “very good” and 5 being “outstanding”).

While the central focus of the program is on learning about new topics and skillsets, it’s also about creating a resilient network of scientists with shared values and interests. Each year, students have opportunities to build connections during social events and location-based excursions. In 2023, the opening evening featured a welcome barbeque, and on Saturday, participants enjoyed a field trip to Denver and had the option to attend a Major League Baseball game.

We invite you to explore the full report for a deeper understanding of the overall experience and the lasting benefits provided by the ACS Summer School on Green Chemistry and Sustainable Energy.

This week has fully changed the way I'm looking at the science I'm doing. It has made me take a step back and look at whole systems rather than individual parts, which is something I'll take with me for the rest of my career.

Participant evaluations underscored the program’s value.

2023

ACS GCI Summer School on Green Chemistry and Sustainable Energy

Organizers - ACS Green Chemistry Institute

David A. Laviska, Portfolio Manager, GC & Sustainability in Education

Chanelle Bragg, Executive Assistant to the ACS COO

Adelina Voutchkova, Director, ACS Office of Sustainability & GCI

Christiana Briddell, Communications Portfolio, GCI/Office of Sustainability

Isamir Martinez, Sr. Scientific Alliances & Business Engagement Manager

Sederra Ross, Program Specialist

Faculty

Kathryn Beers, National Institute of Standards and Technology, Washington, D.C.

Joan Brennecke, University of Texas, Austin, TX

Amy Cannon, Beyond Benign, Wilmington, MA

Philip Jessop, Queen's University, Kingston, Ontario, Canada

Jakub Kostal, George Washington University, Washington, D.C.

David A. Laviska, ACS Green Chemistry Institute, Washington, D.C.

Bruce Lipshutz, University of California, Santa Barbara, CA

Isamir Martinez, ACS Green Chemistry Institute, Washington, D.C.

Audrey Moores, McGill University, Montreal, Quebec, Canada

Amy Prieto, Colorado State University, Fort Collins, CO

Susannah Scott, University of California, Santa Barbara, CA

Adelina Voutchkova, ACS Green Chemistry Institute, Washington, D.C.

John Warner, Beyond Benign & The Technology Greenhouse, Wilmington, MA

Participants

Taofiq Abdulraheem, Mississippi State University

Himani Ahuja, University of California, Merced

Indunil Anjalie, University of Toledo

Emmanuel Aranisola, Lehigh University

Felipe Barría-Cáceres, Pontificia Universidad Católica de Chile

Alicia Battaglia, University of Toronto, Canada

Alejandro Burgos Suazo, University of Puerto Rico at Rio Piedras

Paulo Carvalho, Federal University of Juiz de Fora, Brazil

Sara Catingan, McGill University, Canada

Samir Castilla Acevedo, University of Kansas

Nilave Chakraborty, University of Utah

Yevedzo Chipangura, University of Minnesota

2023

ACS GCI Summer School on Green Chemistry and Sustainable Energy

Participants (Continued)

Nayana Christudas Beena, Indiana University
Bloomington

Micaela Ayelén Cuellar, Universidad Nacional de
Córdoba, Argentina

Keira Culley, University of Colorado Boulder

Brylon Denman, University of Minnesota

Federico Dezotti, Instituto de Química Rosario,
Argentina

Francisca Duran, Pontificia Universidad Católica de
Chile

Georgia Douglas, University of Victoria, Canada

Emmanuel Fagbohun, Toronto Metropolitan
University, Canada

Flora Fan, University of California, Los Angeles

Raven Gallenstein, Texas Woman's University

Juliana María García Chacon, Universidad Nacional
de Colombia

James Akor Godwin, Pennsylvania State University

Steffan Green, University of Kansas

Krystal Grieger, North Dakota State University

Eloi Grignon, University of Toronto, Canada

Mariano Guagliardo, Texas Tech University

Julia Huddy, Dartmouth College

Dulmini Jayawardhena, University of Cincinnati

Madeline Karod, Cornell University

Gaganpreet Kaur, University of Louisville

Nicholas Lang, University of Utah

Cássio Luis Lucato, Universidade de São Paulo, Brazil

Jignesh Shantaram Mahajan, University of Delaware

Marianne Meyersohn, University of Minnesota

James Mizvesky, Seton Hall University

Paulina Carmona Monroy, Materials Research
Institute at the National Autonomous University
of Mexico

Josefina Morrone, Centro de Investigaciones en
Bionanociencias Elizabeth Jares Erijman, Argentina

Marisa Moss, Rensselaer Polytechnic Institute

Falonne Moubogno Tchodimo, University of
Texas at San Antonio

Juan Carlos Muñoz-Senmache, University of
Puerto Rico at Mayagüez

Emmanuel Musa, Oregon State University

Guillermo Lozano Onrubia, University of Toronto,
Canada

Jimin Park, Georgia Institute of Technology

Faezeh Pazoki, McGill University, Canada

Durbis Castillo Pazos, McGill University, Canada

Oluwatosin Popoola, Clarkson University

Ricaldo Pryce, University of the West Indies, Jamaica

Humberto Quiñonez, Universidad Nacional de Villa
María, Argentina

Nathan Rackstraw, University of Minnesota

Azina Rahmani, University of Central Florida

Rachel Rapagnani, University of Minnesota, Twin Cities

Emma Rettner, Colorado State University

Camila Irabuena Rivero, Universidad de la República de
Uruguay

Elliot Rossomme, USDA - Agricultural Research Services

Rohesh Silva, University of Cincinnati

Jorge Alejandro Solis-Portillo, Universidad de San Carlos
de Guatemala

Kenneth Trejos-Cuadra, University of Costa Rica

Mikhailey Wheeler, Memorial University of
Newfoundland & Labrador, Canada

Galen Yang, McGill University, Canada

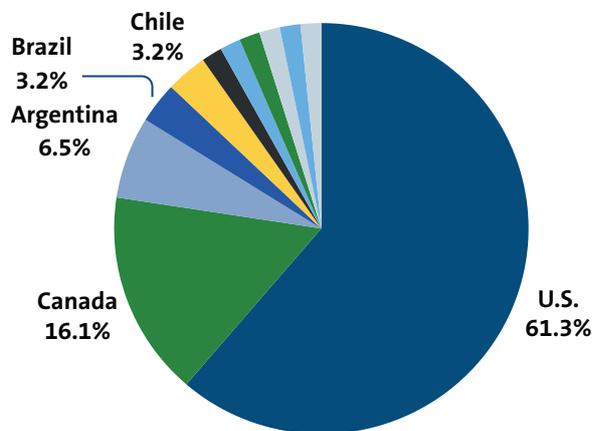
Sara Yazdi, Virginia Tech



Diversity

Out of 180 applicants, 62 were selected to participate. With a 34% acceptance rate, this makes our program not only prestigious but also competitive. Within the 11 countries that participants represented, 77% were from North America, 13% from South America, 8% from Central America, and 2% from the Caribbean. Gender representation was balanced, with 50% of students identifying as male, 48% as female, and 2% as non-binary/other. This is also true of faculty, eight of whom identify as female (61.5%) and five as male (38.5%).

Geographic Diversity:

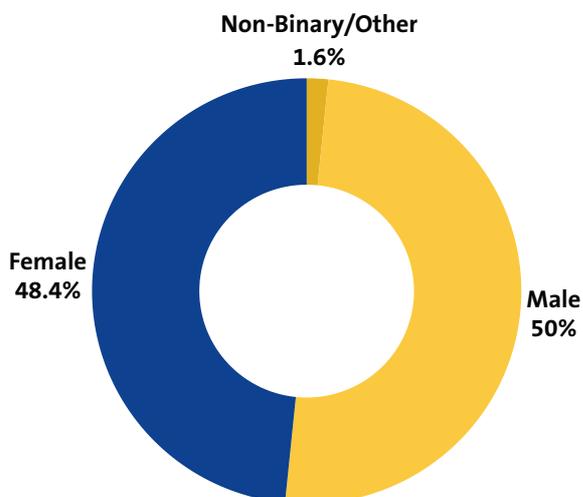


Breakdown: U.S. (38 (2 Puerto Rico)); Canada (10); Argentina (4); Brazil (2); Chile (2); Columbia (1); Costa Rica (1); Guatemala (1); Jamaica (1); Mexico (1); Uruguay (1)

“From day one I felt a part of the group, I felt I could contribute a lot with my knowledge and experience, and the team was very supportive.”

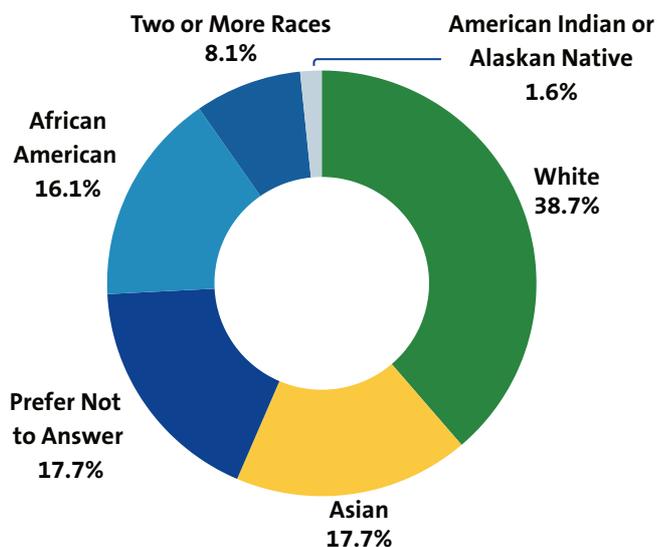
-Participant feedback

Gender Diversity:



Gender: Male (31); Female (30); Non-Binary/Other (1).

Racial Diversity:



Race: American Indian or Alaskan Native (1); Asian (11); Black or African American (10); Prefer not to answer (11); Two or more races (5); White (24)

Survey Results

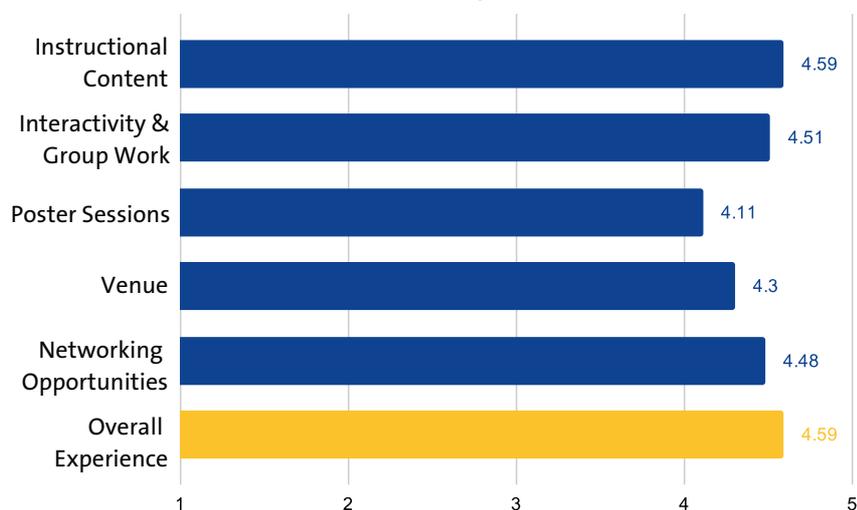
Overall, the Summer School received a 4.6 out of 5 (with five being “outstanding”) in student evaluations. Student surveys also showed that the program’s objectives were met. The learning outcomes evaluated were:

Goal 1: Did the program “increase your understanding of the central tenets of green chemistry”?

Goal 2: Did the program provide “examples of how green chemistry and sustainability concepts can be integrated into the work of chemists, engineers, and innovators”?

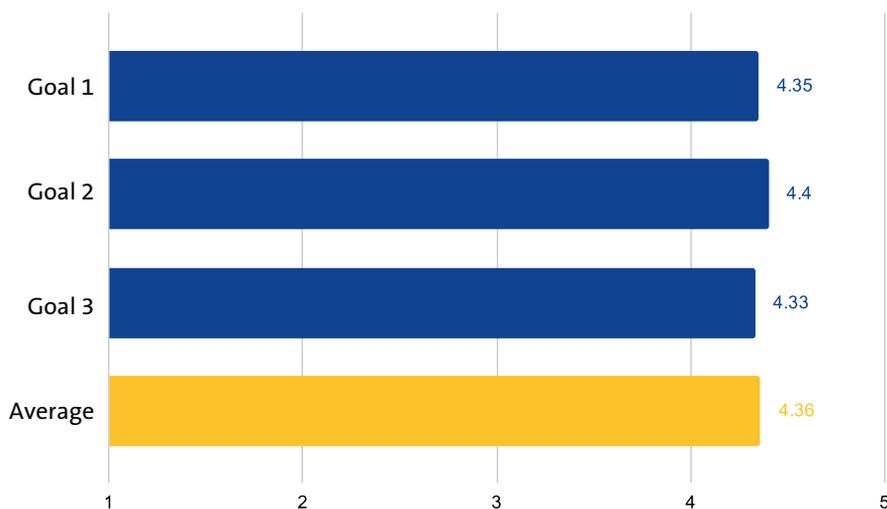
Goal 3: Did the program increase your “confidence to start reimagining research, development, teaching, and/or collaborations in order to leverage an inclusive, systems-level mindset and implement green chemistry and sustainability concepts”?

Student Evaluations Summary



On a scale of one to five, students gave the program an overall rating of 4.59 (4 = very good and 5 = outstanding).

Evaluation of Learning Objectives



With an average rating of 4.36 on a scale of one to five, the achievement of learning goals consistently “exceeded the goal” (4) and “far exceeded the goal” (5).

Agenda

DAY 1 - JULY 11

TIME	EVENT	INSTRUCTOR
10:00 AM - 5:00 PM	Check-In	
7:00 PM - 9:00 PM	Opening BBQ	

DAY 2 - JULY 12

TIME	EVENT	INSTRUCTOR
7:30 AM - 8:30 AM	BREAKFAST	
9:00 AM	Introduction: Green and Sustainable by Design	David A. Laviska, ACS GCI
10:30 AM	BREAK	
11:00 AM	Green Chemistry in Context: Education and Research	Adelina Voutchkova, ACS GCI
12:30 PM	LUNCH	
1:30 PM	Green Chemistry: Practical Application in the Research Lab	John Warner, Beyond Benign & The Technology Greenhouse
3:00 PM	BREAK	
3:30 PM	Choosing the Greenest Synthesis: Part 1	Philip Jessop, Queen's University
5:00 PM - 6:30 PM	DINNER	
7:30 PM	Poster Session 1	

DAY 3 - JULY 13

TIME	EVENT	INSTRUCTOR
7:30 AM - 8:30 AM	BREAKFAST	
9:00 AM	Changing Chemistry Education: Building Community and Empowering Educators and Leaders	Amy Cannon, Beyond Benign
10:30 AM	BREAK	
11:00 AM	Batteries	Amy Prieto, Colorado State University
12:30 PM	LUNCH	
1:30 PM	Photovoltaics	Amy Prieto, Colorado State University
3:00 PM	BREAK	
3:30 PM	Choosing the Greenest Synthesis Working Session	Philip Jessop, Queen's University
5:00 PM - 6:30 PM	DINNER	
7:30 PM	Homework for Attendees	

Agenda (Continued)

DAY 4 - JULY 14

TIME	EVENT	INSTRUCTOR
7:30 AM - 8:30 AM	BREAKFAST	
9:00 AM	Choosing the Greenest Synthesis: Student Reports	Philip Jessop, Queen's University
10:30 AM	BREAK	
11:00 AM	Energy Applications of Ionic Liquids	Joan Brennecke, University of Texas Austin
12:30 PM	LUNCH	
1:30 PM	Surfactant-Enabled Reactions in Water: It's the Future	Bruce Lipshutz, University of California Santa Barbara
3:00 PM	BREAK	
3:30 PM	Green Solvents	Philip Jessop, Queen's University
5:00 PM - 6:30 PM	DINNER	
7:30 PM	Poster Session 2	

DAY 5 - JULY 15

TIME	EVENT	INSTRUCTOR
	All Day Excursion	

DAY 6 - JULY 16

TIME	EVENT	INSTRUCTOR
7:30AM - 8:30 AM	BREAKFAST	
9:00 AM	Catalysis and Polymers	Susannah Scott, University of California Santa Barbara
10:30 AM	BREAK	
11:00 AM	Green Chemical Engineering	Susannah Scott, University of California Santa Barbara
12:30 PM	LUNCH	
1:30 PM	Mechanochemistry	Audrey Moores, McGill University
3:00 PM	BREAK	
3:30 PM	Plastics & Materials Circularity	Kate Beers, National Institute of Standards and Technology
5:00 PM - 6:30 PM	DINNER	
7:30 PM	Poster Session 3	

Agenda (Continued)

DAY 7 - JULY 17

TIME	EVENT	INSTRUCTOR
7:30 AM - 8:30 AM	BREAKFAST	
9:00 AM	Biomass and the Blue Economy	Audrey Moores, McGill University
10:30 AM	BREAK	
11:00 AM	Effective Tools and Metrics to Impact Decisions When Designing Chemical Processes	Isamir Martinez, ACS GCI
12:30 PM	LUNCH	
1:30 PM	Bridging Chemistry and Toxicology via Computational Modeling to Develop Safer Chemicals	Jakub Kostal, George Washington University
3:00 PM	BREAK	
3:30 PM	Summative Case Study and Interactive Exercise	Laviska, Voutchkova, Kostal, Martinez, Moores
5:00 PM - 6:00 PM	Wrap-up and Evaluations	
6:30 PM	CLOSING DINNER	

FACULTY

Thirteen esteemed faculty represented universities, industry, and non-profit organizations.



Kathryn Beers

National Institute of Standards and Technology

Topics Covered:

Plastics and Circularity

Bio:

Kate leads the Circular Economy program at NIST, where she is engaged across the Institute in activities related to plastics recycling, new materials design, and environmental impacts of plastic waste. Kate earned a B.S. in chemistry with high honors from The College of William and Mary and M.S. and Ph.D. degrees in polymer science and chemistry, respectively, from Carnegie Mellon University.

Faculty (Continued)



Joan Brennecke

University of Texas, Austin, TX

Topic Covered:

Ionic Liquids

Bio:

Joan F. Brennecke is currently Cockrell Family Chair in Engineering #16 in the McKetta Department of Chemical Engineering at the University of Texas at Austin. She began her academic career at the University of Notre Dame after completing her Ph.D. and M.S. (1989 and 1987) degrees at the University of Illinois at Urbana-Champaign and her B. S. at the University of Texas at Austin (1984). Her research interests are primarily in the development of less environmentally harmful solvents, including supercritical fluids and ionic liquids.



Amy Cannon

Beyond Benign

Topics Covered:

Online Resources and Community

Bio:

Amy received the world's first Ph.D. in Green Chemistry at the University of Massachusetts, Boston. With an undergraduate degree in chemistry from Saint Anselm College, Amy sought to use her knowledge to advance the field of sustainability. As co-founder of Beyond Benign, a non-profit solely dedicated to advancing green chemistry education, Amy is passionate about empowering educators to make transformative change in their teaching.



Philip Jessop

Queen's University, Kingston Ontario, Canada

Topics Covered:

"Choosing the Greenest Synthesis" Lecture and Working Session;
Greener Solvents

Bio:

Dr. Philip Jessop is a professor and Canada Research Chair of Green Chemistry at the Dept. of Chemistry, Queen's University in Kingston, Canada. He serves as Executive Research Director at Forward Water Technologies. After his Ph.D. (British Columbia, 1991) and a postdoctoral appointment (Toronto, 1992), he was a contract researcher in Japan working for R. Noyori (Nobel Prize 2001). As a professor, he studies green solvents & the chemistry of CO₂ and H₂.

Faculty (Continued)



Jakub Kostal

George Washington University, Washington, D.C.

Topic Covered:

“Toxicology: Designing Safer Chemicals”

Bio:

Jakub Kostal is a chemistry faculty at the George Washington University, where his group develops computational methods for the design of safer chemicals. Dr. Kostal is also a principal at ToxFix, a developer of in silico predictive tools, which have supported the pharmaceutical and personal care industries for over 10 years. He holds a Ph.D. in Theoretical and Biophysical Chemistry from Yale University and a B.A. from Middlebury College.



David A. Laviska

ACS Green Chemistry Institute, Washington, D.C.

Topic Covered:

“Intro and Overview: Green Chemistry and Sustainability by Design”

Bio:

Before joining the ACS GCI, Dr. Laviska was Assistant Professor at Seton Hall University where he co-directed the Academy for Green Chemistry, Stewardship, and Sustainability. His research focused on green(er) synthesis and catalysis. Prior to his second career in academia, David worked as an Environmental/ Analytical Specialist with the EPA and earned all of his degrees in chemistry: Ph.D. (Rutgers University), M.S. (University of Washington), and B.A. (Cornell University).



Bruce Lipshutz

University of California, Santa Barbara, CA

Topic Covered:

Surfactant-Enabled Reactions in Water

Bio:

Bruce Lipshutz is a Distinguished Professor of Chemistry at the University of California, Santa Barbara. Dr. Lipshutz received his Ph.D. at Yale in 1977, and his research group develops “designer” surfactants to eliminate the need for organic solvents in reactions. He has received several awards recognizing his work, including the EPA’s Presidential Green Chemistry Challenge Award and the ACS GCI Pharmaceutical Roundtable’s Peter Dunn Award.

Faculty (Continued)



Isamir Martinez

ACS Green Chemistry Institute, Washington, D.C.

Topic Covered:

Green Chemistry Tools and Metrics Designed by the ACS GCI Pharmaceutical Roundtable

Bio:

Dr. Isamir Martinez leads the ACS GCI Industrial Portfolio and engages stakeholders to implement green chemistry throughout the global chemical enterprise. Isamir holds a Ph.D. in Organic Chemistry from the University of Connecticut and a B.S. in Chemistry from the University of Puerto Rico. She brings extensive experience from the pharmaceutical industry and has also taught at Quinnipiac University and the University of Connecticut.



Audrey Moores

McGill University, Montreal, Quebec, Canada

Topics Covered:

Mechanochemistry, Nanochemistry, Biomass, Blue Economy, Teaching

Bio:

Audrey Moores is a Full Professor of Chemistry, co-lead of the Materials group of the McGill Sustainable Systems Initiative (MSSI), and associate director of the Facility for Electron Microscopy Research (FEMR) at McGill University. Her research group focuses on sustainable mechanochemical solutions for nanoparticles and biopolymer synthesis. Dr. Moores earned her Ph.D., M.Sc., and B.Sc. degrees in chemistry at the École Polytechnique in France.



Amy Prieto

Colorado State University, Fort Collins, CO

Topics Covered:

Batteries, Photovoltaics

Bio:

Dr. Prieto is a Professor in the Department of Chemistry at Colorado State University, and the Founder and CTO of Prieto Battery, Inc. Her active projects include research in Li-ion batteries, developing nanoparticles inks for photovoltaics, light metal nanoparticles for hydrogen storage, and novel nanowire structures. She earned her B.A. in Chemistry and Philosophy at Williams College, and her Ph.D. in Inorganic Chemistry from the University of California, Berkeley.

Faculty (Continued)



Susannah Scott

University of California, Santa Barbara, CA

Topics Covered:

Catalysis, Polymers, Chemical Engineering

Bio:

Susannah Scott is a Distinguished Professor in both Chemical Engineering and in Chemistry & Biochemistry at the University of California, Santa Barbara. She earned her Ph.D. in Inorganic Chemistry at Iowa State University and was awarded a NATO Postdoctoral Fellowship while at the Institut de Recherches sur la Catalyse in France. Her research interests include design of heterogeneous catalysts for the conversion of carbon-based feedstocks and catalysts to promote air and water quality.



Adelina Voutchkova

ACS Green Chemistry Institute, Washington, D.C.

Topic Covered:

Summer School Learning Goals

Bio:

Dr. Voutchkova joined ACS in June 2023 from a robust academic career at George Washington University as an Associate Professor in Chemistry, with a research focus on facilitating circular economies through catalysis and designer solvents. Prior, she served as a Research Associate at the Yale Center for Green Chemistry and Green Engineering and obtained her Ph.D. in organometallic chemistry from Yale University. She holds a B.A. in Chemistry from Middlebury College.



John Warner

Beyond Benign & The Technology Greenhouse

Topics Covered:

Inspiration and Innovation

Bio:

John Warner is one of the founders of the field of green chemistry. He received his B.S. in Chemistry from the University of Massachusetts Boston and his Ph.D. in Chemistry from Princeton University. In 2007, he founded the Warner Babcock Institute for Green Chemistry with Jim Babcock (a research organization developing green chemistry technologies), and Beyond Benign with Amy Cannon (a non-profit dedicated to sustainability and green chemistry education). John is constantly giving keynote talks and workshops on Green Chemistry, Innovation, Circular Economy, and Biomimicry.

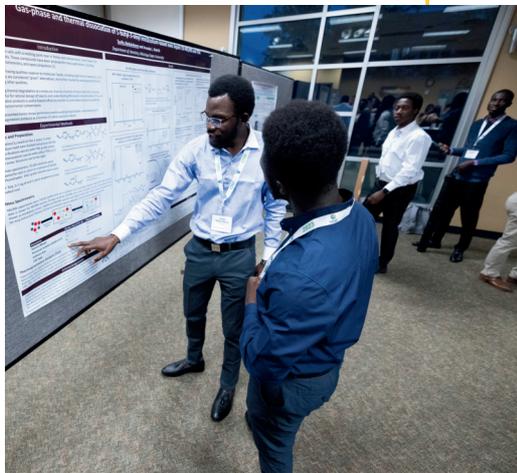
Poster Sessions



Three student poster sessions generated vibrant discussion & put a spotlight on the group's achievements

“ I do polymer synthesis, and I use tons of solvents every day. I got inspired to use greener solvents...and I got inspired to study the toxicity of the polymers I synthesize.”

At the end of the program, participants shared their takeaways.



Future Plans

Given the importance of the ACS GCI Summer School program in shaping future leaders in green and sustainable chemistry and engineering, we are committed to continual change and improvement over the coming years. There are three central variables for us to consider each year: location, faculty, and topics/content.



Location

As mentioned in the introduction, the Summer School program has changed locations multiple times over the last two decades. In addition to providing opportunities for new collaborations with local industries, moving the Summer School program to a new venue periodically enables the ACS GCI to connect with diverse faculty, student populations, and local communities. For 2024, we are tentatively planning to move the program to the University of Vermont in Burlington, VT.



Faculty

Our instructors volunteer their time to be at the Summer School and while many of them have participated in multiple programs, variability of travel and schedules means there are always new faculty among veterans. This diversity of instructors is valuable since it facilitates an evolving syllabus; our programmatic goals include offering trending/emerging topics whenever possible alongside standard curricular staples and skillsets. For 2024, we expect to include faculty from the University of Vermont as well as at least one instructor from Latin America.



Topics/Content

Given the short duration of the Summer School program (five days of instruction), the number of topics addressed is limited to the available class time blocks. Nevertheless, we collect data from student feedback on topics they would like to see included, and we will include those that fit the overall syllabus as well as faculty expertise. For 2024, content has not been determined, but will definitely include science communication and DEIR as it relates to careers in Green Chemistry and Engineering.

“The [ACS Summer School for Green Chemistry] is a true institution...it has helped shape and grow our community and establish green chemistry as a respected field. The way it shapes our students at this key moment in their careers is essential to ensure green chemistry is engrained in their thought processes whether they pick academia, private, or public sector as careers. I was lucky enough to attend as a participant in 2006, send many of my students there since, participate in the organization of the 2011 school, and finally participate as a lecturer in 2021 and 2022. This school is really integral in the way the ACS has helped promote green chemistry. The ACS should continue to support it and piggyback on it to develop new initiatives.”

-Audrey Moores, Professor of Sustainable Chemistry at McGill University

Acknowledgements

Sincere thanks to:

- Chanelle Bragg and LaTrease Garrison for supporting the planning and organization of the 2023 Summer School program. Chanelle's exceptional organizational skills, interest, enthusiasm, and motivation to ensure the highest possible level of success were indispensable before and throughout the program. We are grateful for her kindness, patience, and unwavering support of student success.
- The thirteen faculty who shared their expertise and time so generously with the students. They set a high standard for clarity, insight, and connecting with the students that will be hard to surpass in future programs.
- The Colorado School of Mines for hosting the program over the last several years.
- The Petroleum Research Fund (PRF) for twenty years of financial support. We are grateful for their vision and consistent acknowledgment of the impact and value of the ACS GCI Summer School.
- Brad Zangwill Photography



“The Summer School is currently the best scientific gathering I have ever attended, and it ticks all the boxes of making me a great researcher in the future.”

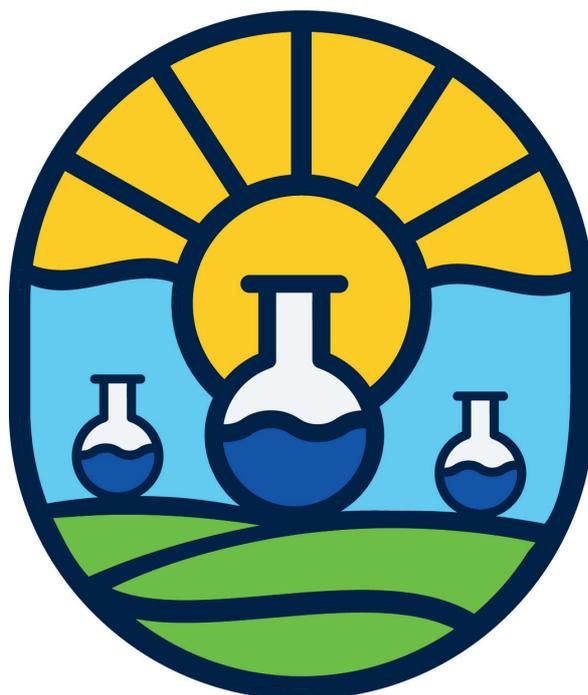
-Participant feedback



We Can't Wait to See You in 2024!

“Everything was great, and it was an amazing experience. I am leaving Golden wiser, happier, and with more awareness about how to make a better world...this experience changed my life.”

-Participant
feedback



Apply to join the Summer School

Application Deadline:

January 26, 2024

Dates and Location:

June 2024 in Burlington, Vermont

Learn More:

www.acs.org/gcsummerschool