



*20 Years of Driving Sustainability Globally through
Green Chemistry*

ACS Green Chemistry Institute Pharmaceutical Roundtable



2025 YEAR IN REVIEW



ACS Green Chemistry Institute
Pharmaceutical Roundtable

VISION

Recognizing the connection between human health and environmental health, we are working toward a future where life-changing medicines are produced in harmony with the planet.

MISSION

The ACS GCI Pharmaceutical Roundtable's mission is to catalyze green chemistry & engineering in the global pharmaceutical industry.

2025 MEMBERS



ASSOCIATE MEMBERS



AFFILIATE MEMBERS



LEADERSHIP



Isamir Martinez, Ph.D.,
Assistant Director,
ACS Green Chemistry
Institute®/ Office of
Sustainability



Paul Richardson, Ph.D.,
2025 Co-chair
Director, Analytical and
Synthesis Technologies,
Pfizer



Michael Kopach, Ph.D.,
2025 Co-chair
Associate Vice President,
Lilly

CELEBRATING 20 YEARS, FORGING THE FUTURE

2025 marked the 20th anniversary of the ACS GCI Pharmaceutical Roundtable (GCIPR), a truly meaningful milestone for this partnership between global companies and the ACS Green Chemistry Institute® (ACS GCI). Over these 20 years, the collaboration has shown that a competitive industry can come together in a shared commitment to drive sustainability in pharma and beyond.

In honor of the 20th anniversary, we had a series of special events to fulfill our mission of educating future leaders, investing in tools for innovation, and advancing research through our grants program. We collaborated with over 4,000 stakeholders by holding workshops in multiple countries, organizing a summit on the U.N. Sustainable Development Goal Good Health and Well-Being, and reaching audiences in China, India, and beyond through webinars and conferences, and by the many symposia organized.

While 2025 was a chance to celebrate and reflect, we also have been busy preparing a “Roadmap for Sustainable Medicines,” which will guide our priorities over the next 20 years and signal to the research community strategic focus areas and collaboration opportunities.

2025 HIGHLIGHTS



15

symposia, workshops, and
webinars presented globally

4,912

total stakeholders engaged in 2025

45

countries reached

\$480,000

distributed in research grants

5

journal publications

5

conferences sponsored

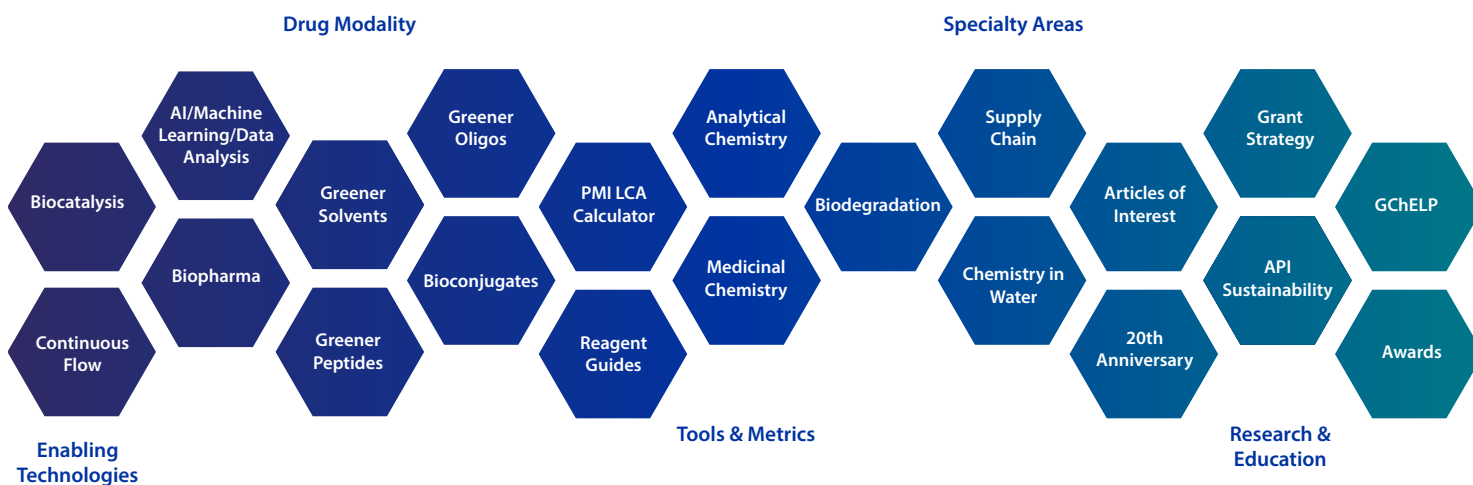
“Being part of the roundtable provides access to cutting-edge green chemistry tools and reinforces the importance of collaboration on sustainable practices to meet our goals.”

– Frank Roschangar, Boehringer Ingelheim



2025 FOCUS TEAMS

In 2025, there were 21 active focus teams co-led by Roundtable members with area expertise. All Roundtable members are encouraged to join focus teams to engage in the activities and outputs of the Roundtable.



GCIPR MEETINGS: NURTURING COLLABORATIONS, ADVANCING OUR MISSION

The ACS GCI, in collaboration with host companies, organizes three in-person meetings with the Roundtable each year. In 2025, the spring meeting was hosted by AstraZeneca in Macclesfield. The summer meeting was in Pittsburgh, PA during the GC&E conference. The fall meeting was hosted by Sanofi and Takeda in Cambridge, MA. Meetings

averaged 33 in-person attendees and 42 virtual attendees from around the globe (US, Europe, India and China). These interactions nurtured collaborations facilitating the advancement of the Roundtable's mission globally.

Spring Meeting, Hosted by AstraZeneca in Macclesfield, UK

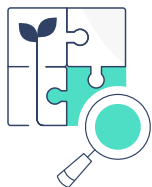


Summer Meeting, Hosted by ACS GCI at the GC&E Conference in Pittsburgh, PA



Fall Meeting, Hosted by Sanofi and Takeda in Cambridge, MA





ADVANCING THE RESEARCH AGENDA

Each year the ACS GCIPR selects grant topics to further key research priorities. In 2025, proposals were sought to advance greener catalysis, biocatalysis, technologies for manufacturing processes, and greener peptides, as well as for the Ignition Grant Program. From 266 proposals received, eight were funded for a total of \$480,000.

KEY RESEARCH AREAS, \$80K



BIOCATALYSIS

Alison Narayan

University of Michigan
Stereoselective biocatalytic C–C bond formation for 1,2-amino alcohol synthesis



PEPTIDES

Qilei Zhu

The University of Utah
Phosphine Catalyzed Electrochemical Amide Coupling Enabled by Structure Activity Relationships (SARs) Guided Optimization



PROCESS CHEMISTRY

Leah Spangler

Virginia Commonwealth University
Development of a Low-Cost, Continuous Bioreactor and Process for the Production of Peptide Therapeutics



CATALYSIS

Rachel Baker

Queen's University
Thinking inside the box: designing sustainable electrochemical cells for alcohol oxidation

IGNITION, \$40K



Soumitra Athavale

UCLA
Asymmetric, Biocatalytic Reduction of Unactivated Olefins



Philipp Gemmel

Trinity College (Connecticut)
Enzyme-mediated protecting group chemistry: Site-selective deprotection of benzylic ethers



Melissa Ramirez

University of Minnesota Twin Cities
Enantioselective Quaternary Carbon Center Synthesis via Cu-Catalyzed Dicarbofunctionalization of N-Tosylhydrazones



Kyle Lambert

Old Dominion University
Advancing Operationally Simple and Green Methods for Cobalt-Mediated Carbonyl Additions and Cross-Couplings

“The combination of funding along with mentorship from the GCI representatives is unlike other “starter” grants because dialogue taught us about new problems and connected us to potential future collaborators.” — Dan Weix, former grant recipient

AWARDS



2025 PETER J. DUNN AWARD – Large Molecules Category

Merck

From Bottleneck to Breakthrough: Developing a Sustainable and Scalable Manufacturing Process for a Complex ADC Drug-Linker



2025 PETER J. DUNN AWARD – Small Molecules Category

Corteva

A Sustainably-Designed Manufacturing Process to Adavelt™ Active from Renewable Feedstocks.”



2025 CMO AWARD

Olon S.p.A.

Recombinant DNA technology and chimeric protein expression for sustainable production of therapeutic peptides by microbial fermentation.



2025 (Inaugural) DISCOVERY CHEMISTRY AWARD

Pfizer

Walk-Up Automated Reaction Profiling (WARP) System: A Tool for Reaction Monitoring Designed for Discovery Chemists



2025 DATA SCIENCE AND MODELING FOR GREEN CHEMISTRY AWARD

Merck and Sunthetics

Algorithmic Process Optimization (APO) for Pharmaceutical Development



TOOLS AND METRICS FOR INNOVATION

Invested in further development of two key tools:



Analytical Method Greenness Score (AMGS)
Tool expansion to include Gas Chromatography.



Process Mass Intensity - Life Cycle Assessment (PMI-LCA) Tool

Development of online and downloadable application-based tool.

GCIPR TOOLBOX

METRIC-BASED TOOLS

SELECTION TOOLS

SPECIALTY TOOLS

Green Chemistry
Innovation
Scorecard
Calculator

Process Mass
Intensity Life Cycle
Assessment

Reagent
Guides

Process Mass
Intensity
Calculator

Solvent
Selection Tool

Analytical
Method Greenness
Score (AMGS)
Calculator

Convergent
Process Mass
Intensity
Calculator

Process Mass
Intensity
Prediction
Calculator

Biocatalysis
Guide

Biopharma PMI
Calculator

Solvent
Selection Guide

MedChem
Tips and Tricks

Acid-Base
Selection

"The AMGS [Analytical Method Greenness Score] has driven a move towards sustainable methods, a change recognized not only by separation scientists but also by instrument vendors, smaller contractors, and academics. This is reflected in the diverse range of published papers citing the original AMGS paper, which has reached over 207 citations as of December 2025." – Michael B. Hicks, Merck & Co., Inc.



20th Anniversary Poster Reception at GC&E

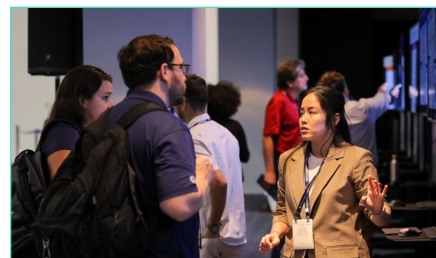


EDUCATING STUDENTS & INFLUENCING LEADERS



Green Chemistry & Engineering Conference
Pittsburgh, PA

The ACS GCIPR was a key part of the 29th Annual Green Chemistry & Engineering Conference (GC&E) held in June 2025 in Pittsburgh PA. The Roundtable was a Gold Sponsor, provided travel awards to students and academics, held an industry poster session and networking event, and organized 8 symposia and interactive panels.



Good Health and Well-Being: Advancing Good Health through Innovative Chemistry
Washington, D.C.

A summit dedicated to advancing U.N. Sustainable Development Goal 3: Good Health and Well-Being through sustainable chemical innovation. The event brought together leaders from industry, academia, and government to explore how green chemistry is transforming the development and production of medicines. The session included a panel discussion, celebratory poster session, and networking reception.



Driving Sustainability in Pharma and Allied Industries Workshop,
Macclesfield, UK and Cambridge, MA

The Roundtable presented two full day workshops in 2025; one hosted at AstraZeneca in Macclesfield, UK and a second at Takeda's campus in Cambridge, MA. These events brought together chemists, university students, and industry leaders to explore cutting-edge industrial green chemistry innovations. Participants gained a better understanding of how to apply green chemistry in practice through learning about Roundtable case studies, tools, and resources, and had an opportunity to engage members during the workshops' poster sessions.

Industrial Green Chemistry World Conference
Mumbai, India and virtual

IGCW highlights success stories to help drive greener manufacturing in chemical industry in India and beyond. Roundtable members presented case studies, greener peptide synthesis approaches, and best practices in medicinal chemistry, demonstrating the practical impact and global relevance of GCIPR resources. By aligning with IGCW, we aim to accelerate sustainable transformation across the chemical and pharmaceutical sectors, strengthening industry-wide adoption of green chemistry solutions globally.

Webinar: Driving Sustainability through Innovations in the Supply Chain - Supply Chain Team with CCS and ACS-i
China and virtual

This global webinar focused on greener industrial synthesis technologies advancing safety and sustainability in pharma and allied industries. Experts shared breakthroughs in continuous flow processes, green hydrogenation, and tools to reduce carbon footprints. Together with ACS-i and the Chinese Chemical Society (CCS), we celebrated the final event of the Roundtable's 20th anniversary year and shared how we plan to drive the next 20 years of sustainable chemistry.

PUBLICATIONS

The Evolving Landscape of Industrial Biocatalysis in Perspective from the ACS Green Chemistry Institute Pharmaceutical Roundtable. ACS Catal. 2025, 15, 12, 10780–10794

Environmental Sustainability Strategy of Active Pharmaceutical Ingredient Manufacturing: A Perspective from the American Chemical Society Green Chemistry Institute Pharmaceutical Roundtable. ACS Sustainable Chem. Eng. 2025, 13, 27, 10268–10284

GChELP: A Vital Resource for Teaching Practical Green Chemistry in Industry and Academia. ACS Sustainable Chem. Eng. 2025, 13, 27, 10259–10267

Solvent Sustainability in Drug Discovery: Where Are We Now, and How Can We Improve? J. Med. Chem. 2025, 68, 24, 25625–25664

Green Chemistry Articles of Interest to the Pharmaceutical Industry. Org. Process Res. Dev. 2025, 29, 6, 1361–1372.

ACS GCI Pharmaceutical Roundtable: 20 years of green chemistry leadership, Chemistry Today, January/February 2025, 43, 1.

c&en
CHEMICAL & ENGINEERING NEWS

ACS GCI Pharmaceutical Roundtable
reflects on 20 years of growth,
collaboration, and sustainable
breakthroughs



GCIPR Roadmap Group



GCIPR Workshop at ACS Fall 2025



Students at the GCIPR Workshop in Macclessfield, UK



EVENTS APPENDIX

SESSIONS ORGANIZED AT GC&E

- Advancing Sustainable Processes in Pharma and Allied Industries Utilizing Green Chemistry Innovation
- 20 Years of Sustainable Continuous Flow Chemistry: Lessons Learned
- ACS GCIPR Strategic Planning and Roadmap Development for Sustainable Technology and Operations
- Greener Reaction Systems for Pharmaceutical Manufacturing
- Sustainability in Organic Chemistry: Special Student/Postdoc Session
- Greening the Pharma Supply Chain: Innovations for Early Intermediate/Raw Material Processes
- Peptides, Peptoids, and Proteins: Greener Biomolecule Production and Analysis
- Data Science Applications in Base Metal Catalysis

ACS CONFERENCES

- ACS Spring 2025, San Diego: Sustainability in Organic Chemistry: 20 Years of the ACS GCIPR Grants Program; Unlocking a New Era: How AI is Transforming Drug Discovery and Development; Practical Green Chemistry Tools and Techniques for Research and Development Scientists
- ACS Fall 2025, Washington, D.C.: Workshop: Practical Green Chemistry Tools for Pharmaceutical Scientists; Good Health and Well-Being: Advancing Good Health through Innovative Chemistry
- 2025 Green & Sustainable Chemistry Summer School, Burlington, VT: Roundtable member and Takeda POC Dan Bailey presented the GCIPR toolkit and process metrics to a cohort of 74 graduate students from North, South, and Central America and the Caribbean

ACS WEBINARS

- Green Chemistry Using Smarter Metrics: A Life Cycle Approach
- Fewer Steps, Greater Strides: Celebrating Breakthroughs in Sustainable Manufacturing (Peter Dunn Award Webinar)
- Metrics & Mandates: Driving Chemistry Toward a Greener Future (GCIPR and ACS Government Affairs)

OTHER INTERNATIONAL ENGAGEMENTS

- Industrial Green Chemistry World 2025, Mumbai, India
- Emerald Isle Conference on Sustainable Chemistry and Engineering, Belfast, Northern Ireland
- Driving Sustainability through Innovations in the Supply Chain - Supply Chain Team with CCS and ACS-i
- CPhI Milan - Sustainable Future Track Symposia
- Global Conversation on Sustainability (GCS) (IUPAC event)

OTHER US-BASED ENGAGEMENTS

- International Symposium on Preparative and Process Chromatography (PREP), Philadelphia, Pennsylvania
- International Meeting of World Pharmacopoeias (IMWP)
- SACNAS. Columbus, OH: Charting Your Path: Career Pathways and Opportunities in Green Chemistry and Sustainability
- UConn GCI - ACS Green Chemistry Institute: Chemistry Implementations to Enable Sustainability, Mansfield, CT
- 29th American Peptide Symposium, San Diego, CA
- Pacific Chem 2025, Honolulu, Hawaii

Full-Day Public Workshops: Driving Sustainability in the Pharma and Allied Industries

- Workshop and poster reception at AstraZeneca, Macclesfield, UK
- Workshop and poster reception at Takeda, Cambridge, MA

**CONTACT US TO COLLABORATE WITH
THE ACS GCI PHARMACEUTICAL ROUNDTABLE**

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WEBSITE: [ACSGCIPR.ORG](https://www.acsgciper.org)