

IUPAC Launches Global Call to Action for Responsible Chemistry

In a world grappling with climate change, pollution, disinformation, and rapid technological shifts, the question is no longer can chemistry help—but how should it?

On 14 July 2025, at the opening of the IUPAC World Chemistry Congress, the International Union of Pure and Applied Chemistry (IUPAC) officially launched the *Guiding Principles of Responsible Chemistry*, a bold, forward-looking framework designed to transform how chemistry is practiced, taught, and perceived worldwide.

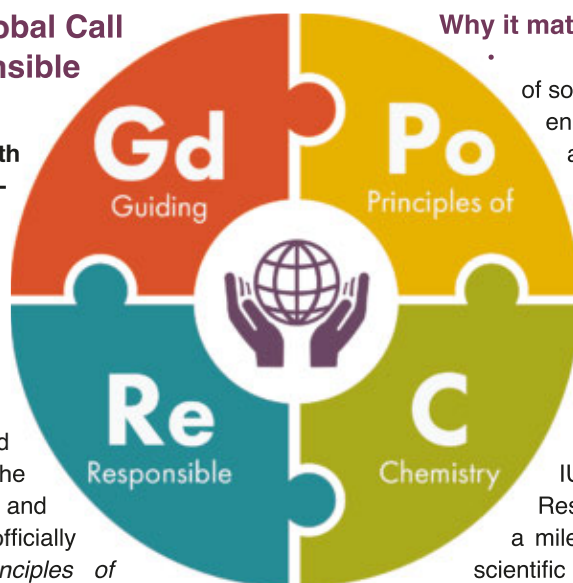
These Guiding Principles are more than a code of ethics: they are a call to action for scientists, educators, industry leaders, policymakers, and the next generation of chemists to align their work with humanity's most urgent needs. Linked to IUPAC's mission and core values and developed by a diverse global team over two years, the Principles define what it means to do chemistry responsibly in the 21st century, with transparency, equity, accountability, and sustainability at the core.

"Chemistry is not just about what we *can* make," says; Javier García-Martínez, IUPAC Past-President and member of this IUPAC Project, "It's about what we must do to ensure a livable, just, and sustainable future."

The Principles aim to spark a cultural shift across the entire chemistry enterprise—from university labs to multinational corporations. They are especially targeted toward students and young scientists, equipping them to lead with purpose and integrity in a rapidly changing world.

A unique collaboration with the King's Centre for Visualization in Science brought students directly into the process, ensuring the voices of future chemists helped shape the message. The student team contributed not only design elements—such as the website, icons, and taglines—but also crucial reflections that made the final product more engaging and relevant.

Accessible globally via <https://iupac.org/responsible-chemistry>, the Guiding Principles are a living resource designed to evolve and be used in classrooms, research labs, policy discussions, and public discourse alike.



Why it matters now

- Chemistry sits at the heart of solutions to climate resilience, energy transition, sustainable agriculture, and global health.
- The pace of innovation is outstripping public understanding and regulation.
- Society demands greater transparency and ethical conduct from science.

The launch of the IUPAC Guiding Principles for Responsible Chemistry marks a milestone moment for the global scientific community—and an invitation to all to help shape a more ethical, inclusive, and sustainable future through the power of chemistry.

<https://iupac.org/guiding-principles-of-responsible-chemistry/>

IUPAC Announces the 2025 Top Ten Emerging Technologies in Chemistry

IUPAC has now released the 2025 Top Ten Emerging Technologies in Chemistry. The goal of this initiative is to showcase the transformative value of chemistry and to inform the general public about the potential of the chemical sciences to foster the well-being of Society and the sustainability of our planet.

The 2025 finalists are (in alphabetical order):

- Additive Manufacturing
- Carbon Dots
- Direct Air Capture
- Electrochemical Carbon dioxide Capture
- Multimodal Foundation Models for Structure Elucidation
- Nanochain Biosensor
- Single-Atom Catalysis
- Synthetic Cells
- Thermogelling Polymers
- Xolography

The Jury*—an international panel of scientists with a varied and broad range of expertise—reviewed and discussed the diverse pool of nominations of emerging technologies that were submitted by researchers from

around the globe, ultimately selecting the final top ten that cover a broad range of fields from synthesis and polymer chemistry to health and machine learning. These technologies are defined as transformative innovations that lie in between a eureka-moment discovery and a fully-commercialized technology and that have outstanding potential to open new opportunities in chemistry, sustainability, and beyond. IUPAC's objective in putting these highly-innovative ideas under the spotlight, is to strongly encourage collaboration across all scientific disciplines in order to accelerate progress towards a more sustainable and equitable world.

In its seventh consecutive year of operation, the IUPAC Top Ten Emerging Technologies in Chemistry initiative continues to look into sustainability and circularity, connecting new and innovative ideas towards a greener future, while maintaining a strong interest in the development of methods for the improvement of human health. Overall, the selection of the 2025 Top Ten, carefully crafted by a panel of experts from a pool of global nominations, continues to carry the spirit established by the first Top Ten list released in 2019 and that is to highlight the potential of chemistry—and chemists—to provide solutions to the most urgent societal issues.

The 2025 Top Ten Emerging Technologies in Chemistry are further detailed in a feature article published in the October issue of *Chemistry International* (CI). Fernando Gomollón-Bel, the author of that feature, recognized that this edition showcases once more the versatility and variability of creativity in chemistry. As noted above, he concludes his review by saying that "IUPAC's objective in putting these highly-innovative ideas under the spotlight, is to strongly encourage collaboration across all scientific disciplines in order to accelerate progress towards a more sustainable and equitable world".

The first selection of the Top Ten Emerging Technologies in Chemistry was released in 2019 as a special activity honoring IUPAC's 100th anniversary. The results were published in the April 2019 issue of *Chemistry International*, 41(2), pp. 12-17, 2019 (<https://doi.org/10.1515/ci-2019-0203>) The results of subsequent editions and the related articles in *CI* can be accessed at: <https://iupac.org/what-we-do/top-ten/>.

*The following comprised the panel of judges for the 2025 Top Ten Emerging Technologies in Chemistry: Michael Droscher, (Chair, German Association for the Advancement of Science and Medicine), Bonnie Lawlor (secretary), Ehud Keinan, Javier García Martínez, Arasu Ganesan, Molly Shoichet, Juliane Sempionatto, Mamia El-Rhazi, Jorge Alegre Cebollada, Bernard West, Natalia Tarasova, Zhigang Shuai, Rai Kookana, and Kira Welter.

<https://iupac.org/what-we-do/top-ten/>

Actions Taken by IUPAC Council, Kuala Lumpur, Malaysia, July 2025

In July 2025, the 53rd IUPAC Council Meeting took place in Kuala Lumpur, Malaysia, alongside the General Assembly and the 50th World Chemistry Congress. The Council approved several motions and reports covering governance, scientific recommendations, and organizational matters. Highlights include:

- Governance & Membership: English confirmed as the official record language (2026–2029); new National Adhering Organizations admitted from Estonia, Guatemala, Peru, and Singapore.
- Scientific Standards: Adoption of updated recommendations on atomic weights (gadolinium, lutetium, zirconium).
- Elections & Committees: Appointment starting in January 2026 of new Vice President, Treasurer,

Officers and Boards members 2026-2027

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Christine Luscombe (Japan), Vice President

Ehud Keinan (Israel), Past President

Derek Craston (UK), Treasurer

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Uday Maitra (India, CCE Chemistry Education)

Alejandra Palermo (UK)

Floris Rutjes (Netherlands)

Fani Sakellariadou (Greece, Div VI Chemistry and the Environment)