

# Conference Call



## POLY-CHAR 2024 MADRID— “Polymers for our Future”

by Araceli Flores and Michael Hess

The 2024 Annual World Forum on Advanced Materials, **POLY-CHAR 2024 MADRID**, was held from the 27–31 May at the Central Campus of the Spanish National Research Council (CSIC), in Madrid. The conference was chaired by a member of the POLY-CHAR Scientific Committee, Araceli Flores, who, like many other members of the POLY-CHAR 2024 Organising Committee, is a member of the CSIC. There were also two other members of the Organising Committee belonging to POLYMAT-UPV and the University of Alcalá. The event was endorsed by IUPAC and also supported by the GEP Group (in Spanish: *Grupo Especializado de Polímeros, GEP*) of the Spanish Royal Society of Chemistry and Physics. POLY-CHAR 2024 enjoyed the following sponsorship: Groupe Nutriset (Diamond Sponsor); POLYKEY, Anton Paar, ThermoFisher, Renishaw (Gold Sponsors); Bruker, Polymer Char, ST Japan, JEOL, PhotoThermal, ScienTec Ibérica (Silver Sponsors).

POLY-CHAR 2024 MADRID, after POLY-CHAR 2023 in Auckland, is the second live conference after the pandemic that forced the switch to digital events. The event has received an enthusiastic response, with 210 registered delegates from 34 countries around the world. A total of 5 plenary speakers, 12 keynote speakers, 21 invited speakers, 77 oral presentations and 62 posters (including 18 poster flash presentations) contributed to the conference. Particularly noteworthy was the enthusiastic response from young scientists, who represented 40% of the participants.

POLY-CHAR is a non-profit, non-governmental organisation dedicated to creating a collegial environment for information exchange, organising student exchanges and collaborations, holding international

meetings and providing a platform for scientists from all over the world in the field of polymer science and technology. POLY-CHAR is driven by groundbreaking polymer research from synthesis all the way to application. One important aspect of POLY-CHAR is its multidisciplinary nature that traditionally includes chemists, physicists, biologists, and engineers.

Following the spirit of earlier POLY-CHAR conferences, the MADRID edition placed special emphasis on the promotion of young scientists. POLY-CHAR 2024 offered on Monday, 27 May, prior to the four days of conference sessions, the well-established one-day pre-conference workshop (a one-day tutorial) for graduate students and young researchers, taught by distinguished lecturers. The Short Course lecturers, plenary speakers, and keynote speakers were asked to be available for discussions to all participants—in particular the students—throughout the conference. We commemorated the indelible contribution of our cherished colleague Melissa Chan Chin Han by naming the Pre-Conference Short Course in her memory, in recognition of her commitment to the education of young scientists. Additionally, this particular edition had special poster flash dedicated sessions where brilliant researchers in the early stages of their careers had the opportunity to present their work orally. Finally, we collected donations from keynote speakers to provide scholarships for students. We are very grateful to the keynote speakers Holger Schonherr, Ophelia Tsui, Haritz Sardon, and Andrew Whittaker who have made generous donations for grants for young researchers from developing countries to cover their fees and accommodation costs:

- Ana Muñoz, Universidad de Antioquia Medellin, Colombia
- Jirawan Jindakaew, Thammasat University, Thailand
- Prakash Gautam, Tribhuvan University, Kathmandu, Nepal



Farewell drinks at the cloister. From left to right: Peter Mallon (Vice-President of the IUPAC Polymer Division), Araceli Flores (Chair of POLY-CHAR 2024), Javier García-Martínez (IUPAC Past President), Rameshwar Adhikari (Member of the IUPAC Polymer Division), Christine Luscombe (Past President of the IUPAC Polymer Division, 2020-2023)

- Achyut Nepal, Tribhuvan University, Kathmandu, Nepal
- Nadia Anter, Sultan Moulay Slimane University, Morocco
- Yonca Alkan Goksu, Istanbul Technical University, Turkey

POLY-CHAR 2024 MADRID had the underlying theme of “Polymers for our Future” with the aim of promoting interdisciplinary understanding between the classical branches of polymer science and areas of special current importance, such as sustainability, recyclability, energy, health, and security. These topics provided a transversal scaffold for the nine thematic sessions in the conference programme:

- Polymer synthesis, green chemistry, synthesis of sustainable polymers
- Biopolymers, polymers and nutrition, biomedical polymers
- Polymer physics, structure-properties relations
- Advances in theory and simulation
- Polymers for energy storage and smart materials
- Advances in characterization of polymers
- Rheology, processing, additive manufacturing
- Polymer degradation, mechanical, chemical recycling, circular strategies
- Multiphase materials, copolymers, blends, composites, nanocomposites

On Tuesday, 28 May, the Opening Ceremony took place in the hall of the historic CSIC Central Building, followed by two plenary sessions. Additional plenary sessions opened the day's presentations from Wednesday to Friday. We are very pleased with the line-up of plenary speakers, all eminent scientists in their fields, who presented the latest advances and ground-breaking research:

- Marc Hillmayer, “A Holistic Approach to Developing Next-Generation Sustainable Polymers”
- Katja Loos, “Unleashing the Potential of Enzymes for Green Furan-Based Polymer Synthesis”
- Christopher Li, “Tuning Polymer Crystallization Pathway for Functional Materials”
- M Jesús Vicent, “Polypeptide-based Nanomedicine Unveiling Tropism and Biological Barrier Crossing Capabilities”
- Christine Luscombe, “The Unexpected Polymerization Behavior in Semiconducting Polymer Synthesis”

Plenary lectures were followed by three parallel sessions distributed in different historic buildings of the CSIC. We are grateful to our keynote and invited speakers for sharing their science with us and making this conference a significant event. Two of the keynote lectures pay tribute to our late POLY-CHAR Scientific Committee members, R. P. Singh and D. Berek.

On Wednesday afternoon, 29 May, a Transition Ceremony was held, preceded by an overview of IUPAC and Polymer Division Activities by Michael Hess. During the transition ceremony, Jean Marc Saiter handed over to Holger Schönherr as the new President of POLY-CHAR.

Poster sessions were held during the one-hour morning coffee break on Wednesday and Thursday and took place in the CSIC Cloister, a wonderful setting for fruitful discussions. Finally, the awards and prizes were announced at the closing ceremony on Friday 31<sup>st</sup> afternoon. These are the winning researchers:

- **The Jean-Marie Lehn Award**, bestowed to a senior scientist to recognize their significant contribution in the field of materials science and engineering, was awarded to Christine Luscombe,

Okinawa institute, Okinawa Institute of Science and Technology, Japan.

- **The POLY-CHAR Awards for the best oral presentations by students and young scientists** were given to: Andres Cardil, Institute of Structure of Matter (IEM-CSIC), Madrid, Spain; Joshua Schumacher, University of Siegen, Germany; Jirawan Jindakaew, Thammasat University, Thailand.
- **The POLY-CHAR Awards for the best poster presentations by students and young scientists** were given to: Talika Neuendorf, Leibniz-Institut für Polymerforschung Dresden e. V, Dresden, Germany; Marius Schmidt, University of Bayreuth, Bayreuth, Germany; Florian C. Klein, Universität Hamburg, Germany.
- **The IUPAC Prizes for the best poster presentations** were awarded to: Jaime Lledó, University of Valladolid, Spain; Palash Das, Indian Institute of Technology Kharagpur, India; Scarlett Elizabeth López Álvarez, Universidad de Guadalajara, Mexico.

Finally, this POLY-CHAR edition has awarded two **special prizes from the GEP Group** to: Beatriz Merillas (**best oral presentation**) and Clara Amezáua (**best poster presentation**), both from the University of Valladolid, Spain.

The social agenda for POLY-CHAR 2024 was designed to facilitate communication and strengthen relationships. On Monday 27 May, young researchers who had registered for the Short Course had the opportunity to take part in an Escape Room activity to promote team building. On the other hand, a flamenco dance show was offered to the lecturers of the Short Course as a courtesy for their support. On Tuesday 28 May, a welcome reception with nibbles and drinks was offered at the end of the day sessions. The conference excursion was scheduled for the afternoon of Wednesday and we visited the UNESCO World Heritage City of Alcalá de Henares. Another important social event took place on Thursday with the Conference Gala Dinner at the historic Café Comercial. Finally, after the closing ceremony of the conference, a Spanish wine was offered in the cloister where we said goodbye to our colleagues and friends. While sampling this Spanish wine we had the opportunity to meet the IUPAC President, Javier García-Martínez, who stopped by the Cloister to greet the delegates.

The upcoming POLY-CHAR 2025 conference will take place in Mauritius, September 2025.

Araceli Flores served as Chair for POLY-CHAR 2024. She is a member of the Institute of Polymer Science and Technology of the Spanish National Research Council (CSIC) in Madrid.

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## Applications of Nanotechnology in Agriculture and Food Systems

by Melanie Kah and Rai Kookana

IUPAC is currently sponsoring several projects related to nanotechnology in the Chemistry and the Environment Division. The first project (# 2016-016-2-600) on the “Guidance for Industry and Regulators on Assessment of the Environmental Fate and Risks of Nano-enabled Pesticides” looks at the ecological risks associated with nano-enabled pesticides in agricultural systems (Walker *et al.*, 2018. Journal of Agricultural and Food Chemistry, 66, 6480; Kah *et al.*, 2018, Nature Nanotechnology, 13, 677 ). The second project (# 2017-035-2-600) is on “Human Health Risk Consideration of Nano-enabled Pesticides for Industry and Regulators.” This project extends the concepts developed for ecological risk assessment, to human health risk assessment (Kah *et al.*, 2021. Nature Nanotechnology, 16, 955-964). It also considers next-generation risk assessment approaches, which can apply to both humans and the environment and recognise their linkages. And this year, IUPAC has also provided support (#2023-027-1-FSC), to facilitate early-career researchers’ participation in the IUPAC-endorsed meeting Gordon Research Conference (GRC-2024) on Nanoscale Science and Engineering for Agriculture and Food Systems. The meeting took place 23-28 June 2024, at the University of Southern New Hampshire (USA).

Clearly, the three projects are closely related as they cover the applications of nanotechnology in Agriculture and Food Systems, in a broader sense (via GRC-2024) as well as in a narrower sense, by focussing on nano-enabled pesticides. The conference provided an opportunity to (i) discuss the current developments in nanotechnology for the potential benefit to the agriculture and food sector and (ii) to discuss implications on nano-pesticides for regulatory bodies, industry and research organisations.

At GRC-2024, the lectures given by high-profile speakers from different sectors catalysed lively and inspiring discussions on the potential applications of nanotechnology in food systems.

The grantees of IUPAC support to attend GRC-2024 were selected based on their academic merit and country of origin. They presented their research