

## **51<sup>st</sup> International Symposium on High Performance Liquid Phase Separations and Related Techniques (HPLC 2023)**

The 51<sup>st</sup> International Symposium on High Performance Liquid Phase Separations and Related Techniques was held from Sunday 18 to Thursday 22 June 2023 in Düsseldorf, Germany. This year, the symposium was chaired by Professor Michael Lämmerhofer from the University of Tübingen, and Professor Oliver J. Schmitz from the University of Duisburg-Essen.

The HPLC symposium is globally recognized as the premier conference dedicated to liquid phase separations and associated technologies. This edition featured a comprehensive program with over 1300 participants from around the world. It encompassed all facets of separation sciences in both liquid and supercritical fluid phases, with a special emphasis on integrating cutting-edge detection technologies such as mass spectrometry. The symposium's agenda spanned from fundamental principles and theories of chromatographic separations and detection methods to the latest advances in methodologies, technologies, column materials, and instruments. Moreover, it showcased applications in diverse fields and emphasized considerations of quality assurance.

Attendees had the opportunity to benefit from various activities, including short courses, workshops, tutorials, and enlightening plenary and keynote lectures delivered by esteemed scientists in the field. However, most presentations were selected from submitted abstracts, fostering active participation, and enabling participants to share and discuss their latest research findings with the audience. This edition also encouraged younger scientists to actively participate in the conference through the 'Separation Science SLAM', in which young scientists bringing their own research closer to the HPLC audience in an entertaining and understandable way in only 5 minutes; and the 'HPLC Tube', which awarded the best self-produced video on HPLC research. Similarly, among around 300 poster contributions, one of them was awarded with the Best Poster Award. Additionally, the HPLC 2023 also featured a large exhibition and vendor seminars, allowing attendees to explore the latest innovations and services from leading vendors in the industry.

The congress commenced on Sunday morning with a short course program led by renowned international industrial and academic experts. The courses covered various fields such as two-dimensional HPLC, supercritical fluid chromatography, miniaturized sample preparation, mass spectrometry, ion-mobility mass spectrometry, metabolomics and lipidomics, data processing, 3D-printing in separation science, chiral separation, and biopharmaceutical analysis. The opening ceremony took place on Sunday afternoon at the Düsseldorf Congress Center, where the chairs warmly welcomed the attendees. The ceremony included the presentation of awards and fellowships followed by the first plenary lectures entitled 'Molecular phenomics in systems, synthetic, and chemical biology' by Prof. John A. McLean, director of the Center for Innovative Technologies at Vanderbilt University (USA), and 'Molecular phenomics in personalized and public healthcare in a changing world: Lessons from understanding COVID-19' by Prof. Jeremy K. Nicholson, director of the Australian National Phenome Centre in Perth (Australia). The opening concluded with a welcome standing cocktail which was accompanied by a small but lively brass band.

The following days, four parallel sessions were run in different halls covering different topics: biochromatography, sample preparation, omics, industry, stationary phase, pharmaceutical analysis, multidimensional LC, fundamentals, forensic analysis, chiral separation, capillary electrophoresis, column technologies, instrumentation, untargeted analysis, data analysis, ion mobility spectrometry, food analysis, etc. Vendor seminars took place during lunch times while exhibitions and poster sessions were held during lunches and coffee breaks.

Monday was a full day of enlightening sessions, starting with two plenary lectures entitled 'Separations sciences coupled to mass spectrometry for multimodal analysis: challenges and opportunities'" by Gérard Hopfgartner, Prof. in the department of Analytical and Inorganic Chemistry at the University of Geneva, and 'Digital transformation of the analytical laboratory – big bang or evolution?' by Joachim Richert, Vice President of Analytical Science BASF in Ludwigshafen (Germany). Throughout the day, a series of keynote presentations and oral sessions by senior and young scientist took place in different halls. Poster session 1 held during three coffee break sessions provided attendees with networking opportunities and informal discussions on various topics. The day also included a discussion on sustainability and green laboratory practices, facilitated through a mobile application that allowed attendees to follow the agenda and interact with other participants.

The schedule was similar on Tuesday, beginning with a plenary session focused on the structural characterization of biopolymers, composed of two plenary lectures given by the distinguished scientists Valérie Gabelica, professor at the University of Namur (Belgium), who presented the talk entitled 'Ion mobility mass spectrometry to infer biopolymer folding and interactions' and Christian G. Huber, professor at the University of Salzburg (Austria), who delivered the speech entitled 'Structural analysis of highly complex protein therapeutics by HPLC-MS: lessons that we have learned from an analytical chemistry perspective'. After an additional poster session 1, poster session 2 was held for four sessions from Tuesday to Wednesday during coffee breaks, covering different topics such as environmental analysis, fundamentals, ion-mobility mass spectrometry, HPLC in chemical industry, new instrumentation and mass spectrometric, LC-MS, SFC-MS and CE-MS, materials and 3D-printing, or multidimensional separations, among others. A total of eleven disciplines (i.e., biochromatography, fundamentals, omics, chiral separations, multidimensional LC, column technologies, capillary electrophoresis and microfluidics, instrumentation, biopharmaceuticals, untargeted analysis, and data analysis) were discussed in scientific sessions made up of both keynote lectures and oral presentations. Tutorials on ion mobility-mass spectrometry and chromatographic methods for analysis of therapeutic oligonucleotides and mRNA were also performed. The 'HPLC Tube' competition, which took place in the evening, served the participants to exhibit their research results through 3-minute videos on the topic 'How is your chromatography making a difference in the world'. Moreover, a job speed dating was arranged to give scientists and companies the opportunity to introduce themselves and exchange contact information for future job offers.

The Wednesday program started with a plenary session on high-throughput analysis, carried out by Jennifer Van Eyk, professor of Medicine at Cedars-Sinai Medical Center in Los Angeles (USA) and Petra Dittrich, professor of Bioanalytics and Head of the Laboratory of Bioanalytical Chemistry at the Department of Chemistry and Applied Biosciences (D-CHAB) at ETH Zurich in Switzerland, presenting the talks entitled 'High Throughput Single Cell Proteomics of Organ-

derived Cell Populations by Nanoflow Dual Trap Single Column Liquid Chromatography' and 'High density droplet arrays for high throughput analysis', respectively. Following, scientific sessions regarding several topics (i.e., ion mobility spectrometry, food analysis, drug discovery pharmacokinetics, hyphenated technologies, new technologies, and bioanalysis) took place. A total of four tutorials were conducted by experts of different fields. The exclusive conference dinner was held at The Classic Remise in Düsseldorf, where attendees enjoyed the exhibition of classic and collector vehicles.

On Thursday morning, scientific sessions on multidimensional LC, bioseparation, bioanalysis, preparative LC and process analysis, and materials and 3D-printing, were delivered through keynote lectures and oral presentations. The participants nominated for the best poster award made flash oral presentations to apply for it. The last tutorial, which was about miniaturization of sampling and sample preparation devices, was presented by renowned Prof. Janusz Pawliszyn from University of Waterloo (Canada), who developed a solid-phase microextraction procedure. The closing plenary session 'Future of HPLC' was conducted by three plenary lectures 'Fundamental Studies of Enhanced-Fluidity Liquid Chromatography – Electrospray Ionization Mass Spectrometry of Complex Biological Systems', 'New Methods Contributing to Metabolomics Analyses of Single Cells' and 'A Journey Through the Chromatographic Universe Using Kinetic Plots' given by future chairs Susan Olesik from the Ohio State University (USA), Guowang Xu from the Dalian Institute of Chemical Physics (China) and Gert Desmet from the Vrije Universiteit Brussel (Belgium), respectively, took place at Auditorium of Congress Center Düsseldorf, followed by Csaba Horváth Young Scientist Award and Best Poster Awards ceremony, and the invitations to future HPLC congresses, two editions that will take place in 2024 in the cities of Denver (USA) and Dalian (China), as well as the 54<sup>th</sup> edition in 2025 in Bruges (Belgium). Finally, a farewell drink event was celebrated to spend one last pleasant moment before returning home.

The HPLC 2023 conference provided a valuable platform to discuss and explore the latest chromatographic advances, as well as sharing not only ideas, but also experiences between experts and beginners in the field of High Performance Liquid Phase Separations and Related Techniques fields.

**María del Mar Aparicio Muriana**

*Departamento de Química Analítica  
Facultad de Ciencias  
Universidad de Granada*

**Ruth Rodríguez Ramos**

*Química Analítica  
Facultad de Ciencias  
Universidad de La Laguna*