

Implementation of Microreactor Technology in Biotechnology – IMTB Conference: A new platform for an interdisciplinary science and technology

This special issue of the Chemical and Biochemical Engineering Quarterly journal is one of the outcomes of the 2nd International Conference Implementation of Microreactor Technology in Biotechnology – IMTB 2013, which provides a forum for people from academia and industry to share, discuss, and implement new findings from the cross-section of microfluidics, life sciences, analytics and bioprocess engineering.

This event was a sequel of the 1st International Conference Implementation of Microreactor Technology in Biotechnology – IMTB 2010, which was held in Ljubljana, Slovenia, in September 2010. The idea to organize a bilateral thematic meeting supported by the cooperative programme of two neighbouring countries, namely Slovenia and Croatia, emerged from the interest of two literally “micro” groups from the Faculty of Chemistry and Chemical Technology of the Ljubljana University and the Faculty of Chemical Engineering and Technology of the Zagreb University to share their enthusiasm in microreactor technology with a focus on biotechnological applications and to promote it within the community. In the end, it became so much bigger. By the strong support of the hosting faculty, Slovene sponsors and donators, an enthusiastic organizing team and a network of researchers who were willing to contribute to this event, it evolved into an open-access conference, where invited experts in chemical, electrical and mechanical engineering, biotechnology and chemistry, mostly from Slovenia and Croatia, but also from Great Britain, Portugal, Austria, Denmark, Italy, Germany and France presented their work to an audience of almost 100 students, scientists and professionals from the industry. Numerous positive feedbacks of participants were a strong motivation for organizers to prepare the next conference with even higher expectations.

So, the 2nd International Conference Implementation of Microreactor Technology in Biotechnology – IMTB 2013, which took place in Cavtat, Croatia, on May 5–8, 2013, was organized under the auspices of the Section on Applied Biocatalysis of the European Federation of Biotechnology and the European Federation of Chemical Engineering. There was an open call for presentations and members of the international Scientific Committee with broad expertise in the field made a selection of the best ones for oral presentations. Experts from USA, Europe and Asia presented more than 60 oral and poster contributions to over 80 participants from 19 countries,

who derived from both the scientific community and the leading industry in the field such as Sigma-Aldrich, Sandoz GmbH, Gedeon Richter Ltd., iX factory GmbH etc.

Invited plenary and keynote lectures at the IMTB 2013 Conference were given by the pioneers and leading experts in the field of microfluidics development and implementation. An opening discourse about the promises of microtechnology was given by Prof. Goran N. Jovanović from Oregon State University and the Microproducts Breakthrough Institute, who is the most meritorious person for the research activities in the region of IMTB Conference domicile. Among plenary speakers, Prof. John M. Woodley from the Technical University of Denmark discussed the opportunities of microreactor technology for biocatalytic process development, Prof. Andreas Manz from KIST Europe revealed the evolution and outlooks of implementation of microfluidic chips in analysis, while Prof. Volker Hessel from the Eindhoven University of Technology exposed the importance of flow processes for sustainable production and their relevance for bio-based industry.

Four consecutive sections of the conference were opened by eminent keynote speakers presenting cutting-edge results on specific topics. Prof. Bernd Nidetzky from the Graz University of Technology gave an insight into the field of enzymatic microreactors; the session on cells within microstructured devices was opened by the lecture on the development of microbioreactors for stem cell cultivation, given by Dr. Nicolas Szita from the University College of London; in the section on analysis Prof. Takehito Kitamori from the University of Tokyo introduced micro and extended-nano fluidics applications in chemistry and novel functional devices enabling determination of attomolar analyte concentrations, while the section on process intensification and integration was opened by the presentation of Prof. Krist Gernaey from the Technical University of Denmark, who exposed the importance of process modelling for efficient development of industrial processes using microreactor-based technology.

Among the most important achievements of the IMTB 2013 conference was the participation of many young researchers sharing their enthusiasm for microfluidics and microreactor technology, who had the opportunity to present and discuss their work. The best poster award went to Birgit Ungerböck from the Graz University of Technology for her joined research with the Austri-

an Institute of Technology on microfluidic oxygen imaging. The interdisciplinary feature of the IMTB conference enabled participants to gain and implement complementary skills in order to accomplish their goals. A bright, vivid and loose atmosphere during all four days of the conference resembled a pleasant family meeting, as described by some of the participants.

Outcomes of the IMTB 2013 Conference were collected on CDs with extended abstracts, while selected authors were invited to contribute to the IMTB 2013 Conference special issue of the journal Green Processing and Synthesis, published in December 2013. Furthermore, this special issue of the Chemical and Biochemical Engineering Quarterly journal is another peer reviewed selection of outstanding contributions from this event, reflecting the interdisciplinary feature of this arena and its potential for scientific and technological solutions. As stated in a feature article on biotechnical micro-flow processing written by one of the pioneers in the field of microreactor technology, Prof. Hessel, an opening of the technology to impacts of other disciplines is needed for the successful goal – implementation in biotechnology, as stated in the title of the IMTB Conference. Therefore, only joint efforts of scientists contributing to this special issue from mechanical/biochemical engineering aiming at developing low-cost microfluidic biochemical devices and reactors, chemical engineers capable of developing mathematical model-based process description and explanation of basic phenomena within microfluidic systems, as well as using process systems engineering meth-

ods and tools for faster process development, along with experts from life sciences explaining e.g. interactions of cell populations within these miniaturized devices, and chemists implementing biocatalytic synthetic routes, will lead to the successful realization of the potential of this emerging technology in industry.

Let us express our deepest gratitude to all the authors of papers and contributions at the IMTB 2013 Conference, members of the Organizing and Scientific Committee, as well as technical supporters, sponsors, donators and financial support of the EC project BIO-INTENSE (Grant Agreement No. 312148), but most of all to Mrs. Anita Šalić for her skilful assistance which substantially contributed to this outcome.

We kindly invite you to join us in reaching this exciting goal and we look forward to welcoming you to the 3rd International Conference IMTB 2015, which will be held in Opatija, Croatia, on May 10–13, 2015.

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(<http://imtb2013.fkkt.uni-lj.si/>):*

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