Ninth International Conference on Miniaturized Systems for Chemistry and Life Sciences

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Preface

The Ninth International Conference on Miniaturized Systems for Chemistry and Life Sciences (Micro Total Analysis Systems, μTAS) combines leading research and applications in microfluidics, micro- and nano-technology, material science, chemistry biology, and medicine. From the initial meeting in Enschede, The Netherlands, in 1994 the conference has continued to grow and become a yearly conference, rotating between the Americas, Asia, and Europe. This year the number of submitted abstracts increased to 832 reflecting the continued interest in miniaturized systems for chemistry and life sciences. The μTAS Steering Committee had the challenging task of selecting 520 papers from the many high quality abstracts. The resulting technical program has expanded to 445 posters, but retains the format of 6 plenary sessions and two parallel tracks of 66 oral presentations in keeping with the broad, interdisciplinary character of μTAS conferences.

The proceeding's two volumes show maturation and broadening of the field with greater emphasis on integration of microfluidics, optics, and electronics into complete systems for diverse applications in chemistry, biology, and medicine. Traditional μTAS areas of separations and electrokinetic flows continue to be represented with many advances in new, nano- and micro-structure based approaches for DNA and protein preconcentration and separation. The proceedings also reflect further expansion of efforts in developing cell-based microsystems already prominent at the 2004 μTAS conference in Malmö, Sweden. Contributions describe growth of attached and suspended cells in microfluidic systems as well as the development of tissue cultures on chip. Cells are sorted and lysed, and subcellular analysis is performed in integrated microsystems. Fluid manipulation, such as pumping and mixing, remain core topics with focus on multiphase flows, specifically droplet based microfluidics and particle laden flows for manipulation and synthesis of colloidal nanoparticles. In addition to the many new devices and experimental demonstrations of microfluidic phenomena, the trend is increased three-dimensional imaging, quantitative analysis, and numerical simulations of microfluidic transport phenomena. The prominence of polymer-based microfabrication apparent in previous μTAS conferences continues with the PDMS/SU8 soft lithography platform augmented with polymer systems offering specific processing and application advantages. The increased emphasis on protein and cell based systems stimulates additional efforts in plasma and wet chemistry techniques for modifying microfluidic surfaces to reduce adsorption or achieve specific bonding characteristics. The expanding materials palette in microfabrication is accompanied by innovative efforts to realize nanostructures with unique μTAS applications in biomolecule separation and detection. The many scientific and engineering advances described in the proceedings give evidence to continued excitement and opportunities for miniaturized systems in chemistry and life science as the μTAS moves beyond its first decade of conferences.

I would like to thank all of those who have helped organize the 2005 conference especially the Steering Committee Technical Program Review Committee for reading and evaluating 832 abstracts and developing the final program. My co-editors Jongyoon Han, D. Jed Harrison, and Joel Voldman for help with the proceedings. And Katharine Cline and her staff at Preferred Meeting Management, Inc. for expertly handling the myriad of tasks associated with the organizing the μTAS conference which includes putting together this conference's proceedings. The Transducer Research Foundation (TRF) provided the

critical financial backing for the conference. Finally, I would like to thank the μTAS community for contributing their cutting-edge research to these volumes and making the conference a technical success.

Klavs F. Jensen
μTAS 2005 Chair
July 31, 2005

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1994 Enschede, The Netherlands
1996 Basel, Switzerland
1998 Banff, Alberta, Canada
2000 Enschede, The Netherlands
2001 Monterey, California, USA
2002 Nara, Japan,
2003 Squaw Valley, California, USA
2004 Malmö, Sweden

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