

**Micro Total Analysis Systems 2004**  
**Volume 2**

**Proceedings of  $\mu$ TAS 2004**  
**8th International Conference on Miniaturized**  
**Systems for Chemistry and Life Sciences**

**Malmö, Sweden**  
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*edited by*

Thomas Laurell  
*Lund Institute of Technology, Sweden*

Johan Nilsson  
*Lund Institute of Technology, Sweden*

Klavs Jensen  
*Massachusetts Institute of Technology, USA*

D. Jed Harrison  
*University of Alberta, Canada*

Jörg P. Kutter  
*Technical University of Denmark, Denmark*

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## PREFACE

The 8th International Conference on Miniaturisation in Chemistry and Life Sciences, MicroTAS (Micro Total Analysis Systems) is celebrating its 10th anniversary year. The conference developed from a small gathering of researchers active in the field of MicroTAS in Enschede, The Netherlands, in 1994 with 160 participants. The success of this first meeting was followed by an equally appreciated  $\mu$ TAS workshop in Basel, Switzerland, in 1996 with a remarkable increase in the number of participants to 275. Optimism in the research field continued and the subsequent event was the truly unforgettable conference organised in Banff, Canada in 1998, with a record-breaking 420 conference delegates and about 130 papers submitted. At the following meeting in 2000, the conference returned to its birth place in Europe (at the University of Twente, Enschede, The Netherlands) again breaking new records for the MicroTAS conference with close to 500 attendees and about 140 scientific papers accepted (230 submissions). Due to the increasing interest that the MicroTAS/Lab-On-A-Chip field was generating, the subsequent meeting in 2001, in Monterey, CA, USA, forced the conference format into two parallel oral sessions in order to meet the pressure from the scientific community. In spite of the 9-11 terrorist attack and subsequent restrictions in international travelling, the conference attracted about 790 delegates and 276 accepted scientific contributions. The meeting was also characterised by an impressive commercial exhibition, demonstrating the transition of several of the earlier  $\mu$ TAS developments into the industrial sector. The subsequent conference (2002) in Japan is forever etched into our minds both with respect to the excellent organisation and scientific programme as well as the wonderful setting in ancient Nara. Although difficulties were developing in the industrial and financial sectors, following the IT-crash, the Nara meeting attracted 710 delegates with 316 accepted scientific contributions. The next  $\mu$ TAS conference was organised in another glorious location, Squaw Valley, CA, USA, in October 2003 and despite the setback in the global economy which clearly also affected academic budgets the conference attracted over 650 delegates with 325 accepted scientific presentations.

This year's conference confirms the continuing increase in interest in the  $\mu$ TAS-research field. More papers were submitted than ever before, 657, giving the Technical Programme Committee a difficult task in the abstract evaluation procedure. Again the scientific programme expanded, now to encompass a total of 422 accepted scientific contributions. We also see a continuing strong presence from the industrial area with some new players, indicating a recovery in the financial sector.

These two volumes contain the proceedings of the MicroTAS 2004 conference in Malmö, Sweden, September 26-30. Every paper presented will also be made available from the Royal Society of Chemistry, Lab on a Chip web-site at [www.rsc.org/loc](http://www.rsc.org/loc). The proceedings from the  $\mu$ TAS 2003 conference can also be accessed from this site.

The content of this year's MicroTAS conference clearly shows that the efforts in developing cell-based microsystems are increasing. Not only is work quite frequently focused on cell manipulation, and on-chip culturing but also on complete microsystems

for cell transport, culturing, analysis and monitoring including feed-back systems are now presented. The transition to polymer-based technologies continues and the now widely used SU-8/PDMS platform has opened up the  $\mu$ TAS-field to all those who do not necessarily have access to high performance clean-rooms, which vastly broadens the number of players that can now access and work in the field. A clear trend is also the increase in microfluidic two-phase systems, which seems to have come to a point where the two-phase fluid handling is well controlled and, *e.g.*, applications with compartmentalised chemistry in oil-immersed aqueous droplets in streaming microsystems are seen. The more mature areas of chip-based separation science are still very strong moving towards applications in genomics, proteomics and diagnostics. An exciting development is the continued progress in nanotechnology and the study of microfluidic transport, and molecular interaction and separation in nanoscale channels, this year displaying a representation equal to those in cell-based microsystems.

Looking back at  $\mu$ TAS conferences over the last ten years I can conclude that the field has matured and broadened from the original very strong focus on chip-based capillary electrophoresis systems to encompass a new science field of an extremely interdisciplinary nature with materials physicists and analytical chemists at one end and cell & molecular biologists and clinicians at the other. The field of microfluidics with all its aspects in combination with micro- and nanotechnology and life science research is accelerating, finding new areas where the miniaturised scale really makes a difference, and this is, of course, what research in this area is all about! We can confidently look forward to another ten years of exciting developments in this scientific field.

Finally, I would like to express my thanks to all of those who helped in organising this conference. The local organising committee for their broad network to industrial supporters and exhibitors and for all the work that is not seen but is yet so necessary. The Technical Programme Committee for the seemingly endless work reading and evaluating the 650 submitted abstracts in a medieval castle in southern Sweden. This is a task on which the whole foundation of the MicroTAS conference rests. Malmö Conference Agency is greatly acknowledged and I would especially like to thank, Lars Nilsson, Anna Martinsson and Niklas Swedenborg for their excellent and hard work in making all the necessary practical arrangements come to fruition. I would like to express my deepest gratitude to Johan Nilsson and Jörg Kutter, without whom, the administration would have been a total disaster, and for their expedient and fluent processing of all protocols and endless abstract and proceedings databases.

Last but not least, I thank all of you in the  $\mu$ TAS-science community for compiling and contributing your cutting-edge research for these two proceeding volumes. Without you there would be no meeting!

Thomas Laurell  
 $\mu$ TAS 2004 Chairman  
July 14, 2004

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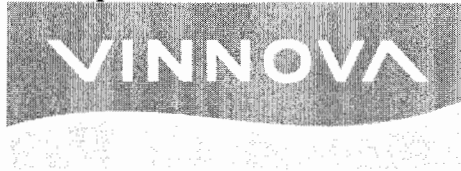
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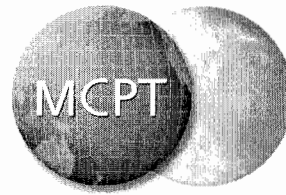
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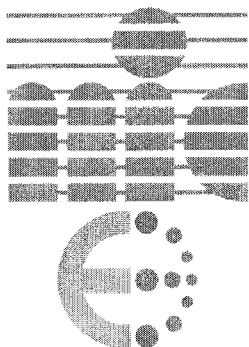
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