

Theme 8

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Micro- and Nanosystems in Medicine, Active Implants, Biosensors



Theme Chairs:

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ABSTRACT:

Micro- and nanosystem science has the potential to change life sciences and medical technologies by merging biological with micro technologies. The aim of this theme is to merge the two completely different scientific fields. Analytical and therapeutic micro- and nanosystems will be mandatory for system biologists and biomedical engineering in the long run, for gaining insight into morphology and the interactive processes of the living system.

New and personalized drugs can be developed leading to a revolution in life science supported by smart and sensitive micro-analytical tools, ultimately with single molecule sensitivity.

To date, micro-analytical devices have been used in clinical chemistry or in molecular biology as metabolic sensor arrays or gene chips. In addition, standard micro-biomedical products are primarily employed in intensive care and the surgical theater for monitoring purposes. The next generation of nanosystems will allow a deeper view into the function of cells, cell cultures, organs, and whole organisms.

The content of the theme goes beyond miniaturization to cover the use of innovative materials and biological substances in combination with micro-technological fabrication processes. These combined topics will yield completely new medical devices by intimately merging analytical and therapeutical methods in a process called "theranostics".

The scientific topics range from intelligent implant devices and drug delivery systems, to analytical micro-biosensors and arrays, complex DNA, protein and cell-based micro-systems. The emerging fields of bio-nano-technology will be highlighted. The target group of this theme includes engineers interested in the emerging field of micro-and nanoscience, medical doctors who are interested in the application of such devices, and biologists.

TRACKS:

Active Implants

Track Chairs:
Hans-Jürgen Wildau,
Biotronik,
Berlin, Germany

Hoc-Khiem Trieu,
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Duisburg, Germany

Drug Delivery

Track Chairs:
Marc J. Madou,
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Irvine, USA

Jens Ducree,
Dublin City University,
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Nanobiosensors

Track Chairs:
Rainer Fasching,
University
Stanford, USA

Christine Kranz,
University of Ulm,
Germany

Nanoparticles/ Nanotheranostics

Track Chairs:
Andreas Jordan,
Magforce Nanotech-
nologies Inc.,
Berlin, Germany

Michael Krüger,
University of Freiburg,
Germany

Lab-on-Chip/ Biochips

Track Chairs:
Andreas Manz,
University of Twente,
Netherlands

Albert van den Berg,
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On-Chip Cell Analysis

Track Chairs:
Bernhard Wolf,
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Alfred Stett,
University of Tübingen,
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