

NEWSLETTER – September 2010

New set of courses of interest for Nano-Tera researchers

In the context of an ED (Education & Dissemination) activity, Nano-Tera is supporting the Swiss Foundation for Research in Microtechnology (FSRM) for the organization of a series of 1- or 2-day courses on various domains of interest to Nano-Tera researchers.


The Nano-Tera researchers will benefit from an almost free participation, as follows:

- CHF 100 for 1-day courses (instead of CHF 580)
- CHF 150 for 2-day courses (instead of CHF 1100)

These drastically reduced rates will cover meals and course documentation.

In addition, for interested participants, the Doctoral School in microsystems and microelectronics of the EPFL offers the possibility to obtain **1 ECTS credit point** for the successful participation in at least 2 course days (with a written exam at the end of one 2-day course or two 1-day courses).

The registration deadline is 2 weeks before each course. To benefit from the Nano-Tera discount, please mention “Discount Nano-Tera researcher” in the comments section of the registration form. Note that the number of places for discounted participations is limited to 10 Nano-Tera researchers, on a first come, first served basis.

The six courses held this fall 2010 are listed below: for more details on the contents of each course and for registration, simply follow the links provided at the end of each course description. For more information on these courses, do not hesitate to contact directly Annette Locher of the FSRM at locher@fsm.ch. 

Nano-Engineering

1 day October 28, 2010 – Zürich Technopark

- Tutors: Jürgen Brugger, EPFL
Harry Heinzlmann, CSEM

The course presents key instrumentation, technologies, manufacturing, and applications. It includes the technical background necessary to understand the new developments in nanotechnologies, in particular new phenomena when scaling down from micro to nanometer dimension. This course provides an overview of methods and tools for accessing the nanometer lengthscale. It covers the principles of scanning probe techniques ranging from surface physics to biology, from highly specialized experiments to routine materials testing, demonstrating the usefulness of these methods also for industrial work. The course furthermore describes state-of-the-art micro- and nanoengineering methods to create nanostructures that are needed for future applications in various applications (nanolithography, nanoelectronics, nano-optics, data storage and bio-analytical nanosystems). The content is adapted to the rapid changes in science, technology and society.

- Target audience

Technical managers, R&D engineers and scientists active in advanced nanometer scale surface technologies, or interested in “Micro and Nanotechnologies” in general.

- More information: [contents details and registration](#)

How X-rays can support the development of MEMS

2 days November 10-11, 2010 – Neuchâtel CSEM

- Tutors: Alex Dommann, CSEM
Antonia Neels, CSEM

Advanced High Resolution X-ray Diffraction methods are applied in strain, defect and deformation analysis on silicon single crystal (SiSC) based MEMS. Stresses and defects are introduced in the devices during the fabrication process (DRIE, annealing, bonding) and influence the crystalline perfection and therefore have a direct impact on the mechanical properties of MEMS. Stresses in the SiSC depend on the bonding process parameters such as voltage and temperature and also on the structuring procedure and the device release. The out-of-plane diffraction techniques applied reveal information about the device stress state. The understanding of the device structure will result in an improved device design and fabrication.

- Target audience

Engineers and researchers from industry and university.

- More information: [contents details and registration](#)

New Trends in Nano-Electronics

1 day November 18, 2010 – Zürich Technopark

- Tutors: Adrian Ionescu, EPFL
Thomas Skotnicki, STMicroelectronics

The course aims to give the attendants a general knowledge about state-of-the-art emerging nanoelectronics including technology, logic and memory device architectures and benchmarking for circuit and system applications. Particularly the new trends in Beyond CMOS and More-Than-Moore domains are detailed with concrete examples and discussions.

➤ Target audience

The course intends to address a wide range of R&D staff, PhD candidates and/or engineers from institutes or universities, marketing and business development managers of companies active or interested in emerging nano-electronics.

- More information: [contents details and registration](#)

Carbon Nanotubes: Unique Nano-materials with a Broad Field of Applications

1 day November 25, 2010 – Dübendorf EMPA

- Tutor: Pierangelo Gröning, EMPA

Carbon nanotubes are tiny, hollow tubes made of pure carbon just a few nanometers in diameter and up to few hundreds microns in length. They exhibit unique electrical properties, efficient heat conductivity and excellent mechanical strength. Due to their outstanding physical properties carbon nanotubes are one of nanotech's most promising molecular building blocks. Carbon nanotubes are already used in composites to make them stronger and lighter, e.g. for tennis rackets or bicycle frames. Carbon nanotube based cold electron sources for flat panel displays, X-ray sources or microwave amplifiers are close to be ready for the market.

The first part of lecture is an introduction on the physical properties of carbon nanotubes as well as their synthesis and production techniques. The second part is focused on applications. On the basis of numerous examples the great technological potential of carbon nanotubes is pointed out.

➤ Target audience

The course addresses a scientific and technological audience coming from industry as well as from academia.

- More information: [contents details and registration](#)

Micro-Optics

2 days December 14-15, 2010 – Lausanne EPFL

- Tutors: Hans Peter Herzig, EPFL
Markus Rossi, Heptagon AG

Micro-optical elements are ideal components for building compact optoelectronic systems. Typical elements are refractive and diffractive microlenses, Dammann gratings, optimized phase elements, and polarizers. Modern microfabrication technology enables the manufacturing of almost any structure shape including asymmetric aspherics, which provides all degrees of freedom for design. Besides the theoretical background and overview of current technology, system concepts will be discussed. In addition, selected applications will be presented including diffusers for illumination, collimation of high-power laser diode arrays, hybrid (refractive / diffractive) achromats, array generators, optical MEMS, photonic crystal waveguides. The participants will be introduced in different types of diffractive and refractive micro-optical elements. They will learn about their potential and they will get an idea of the suitable design tools.

➤ Target audience

R&D physicists, engineers, optical system designers involved in the development of new components and systems.

- More information: [contents details and registration](#)

Body Area Networks

2 days December 16-17, 2010 – Neuchâtel FSRM

- Tutors: Jean-Dominique Decotignie, CSEM
John Farserotu, CSEM

The course will present an overview of Body Area Networks: context, requirements, current solutions and remaining issues.

➤ Target audience

Engineers in electronics or communications that want to get a condensed update on the subject. Engineers or scientists that want to deploy BANs. Technical Product Managers who want to know more on the different solutions.

- More information: [contents details and registration](#)