NaPa
Emerging Nanopatterning Methods

PANAMA Summer Schools

NAPA project organizes a series of Summer school in Toulouse each year in July called PANAMA. The concept of this training is a “hands-on” approach of nanotechnologies focused on Nanopatterning: **PANAMA** for “**PA**tterning at the **NA**noscale – **M**ethods and **A**pplications”. Indeed, the concept of summer schools dedicated to nanopatterning and applications has been selected as the main tool for training actively young scientists in the domains relevant to NAPA project. The format is a small school (24 students), combining one week of magisterial courses on Nanopatterning, Applications in Industry and Ethical and Societal Issues and one week of practical training on Emerging Nanopatterning Methods. The school is organized by **C. Vieu** (LAAS-CNRS).

Second Edition 3 -14 July 2006

Next edition will take place in Toulouse from 2-13 July 2007

The forth PANAMA school will also be organized in Toulouse during the two first weeks of July 2008.

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A- Selection of students – fees – background

The school is open to Masters students, PhD and post-doc. We accept a large range of scientific backgrounds ranging from biology to material science and chemistry.

For the edition of the event in 2006, NAPA board decided to restrict the advertising of the school to NAPA consortium. The idea was to allow partners to benefit from this school. Next edition could be opened also to the community of Nano2Life (NoE) and NAIMO (IP).

Students are asked to send a CV, a letter of motivation for this specific school and a letter of support. Based on these elements 24 students are selected.

The school for the NAPA students is completely free. The only cost at their charge is the travel expenses and the meals during the week-end. This policy of free inscription was greatly appreciated by some students who claimed that otherwise they would have never got the possibility to attend the school due to budget restrictions in their institutions.
For other participants a financial participation will be asked for meals and accommodation.

People giving the lectures or supervising the practical works are not remunerated. Living and Travel expenses of lecturers are covered by NAPA.

B- Menu of the school

- The first week was dedicated to magisterial lectures in order to improve theoretical backgrounds. You can find below the program of the lectures:

MEMS-based nanopatterning: **Juergen Brugger (EPFL)**
Stencil lithography: **Juergen Brugger (EPFL)**
Social and ethical implications of nanotechnology: **Helmut Schift (PSI)**
Panorama of nanopatterning methods: alternative lithography: **Helmut Schift (PSI)**
Self-assembled monolayers and their use in soft and probe lithography: **Bart Jan Ravoo (SMCT)**
Nanoimprint lithography: **Helmut Schift (PSI)**
Microcontact printing: **Heiko Wolf (IBM)**
3D Nanoimprinting, **Massimo Tormen (TASC)**
Nanoparticles and patterning techniques: **Lucia Curri (CNR / IPCF)**

NEMS design and fabrication, **Franscesc Perez-Murano (CNM)**
UHV Dynamic Stencil: **David Martrou (CEMES)**
Nanofluidics for DNA analysis: **Jonas Tegenfeldt (Lund University)**
Micro/nanofluidics for bioseparation: **Jonas Tegenfeldt (Lund University)**
Polymers for nanopatterning : **Marko Vogler (MRT)**
Fundamentals of molecular dynamics (MD) modelling and its applications in simulations of nanopatterning processes, **Damien Thompson (Tyndall)**
Nanodispensing, **Andre Meister (CSEM)**
Characterization of polymers and other materials: **Zygmunt Rymuza (WUT)**
NIL modeling and nanorheology of polymers: **David Mendels (NPL)**

- Then 5 practical works were organized during the second week of the school. These experimental works are representative of the main technologies investigated inside NAPA project:

1- **Introduction to soft-lithography and DNA Array fabrication**
2- **NanoImprint Lithography**
3- **Stencil Lithography**
4- **Soft Lithography at the nanoscale**
5- **Master fabrication by EBL**

Students are split in groups of 3, and a rotation over the 5 workshops is organized in order each student attends to all the workshops.

C- Brainstorming session

The major innovation of the 2nd edition of the PANAMA school was the implementation of brainstorming sessions. Three groups of students have been constituted regarding to a presentation of the different disciplines.
Each group brainstormed independently under the supervision of a scientist of LAAS-CNRS.

The basic rule of this exercise was to design collectively a scientific project taking care of the following aspects:

- Innovation
- Using one or two emerging Nanopatterning techniques (NIL, µCP, Stencil, others, mix and match …)
- Interdisciplinary
- For identified applications

The different groups were also asked to address the following items:

- Technological feasibility
- Degree of innovation
- Applicative fields
- Identification of possible risks
- Industrial transfer

After an individual preparation, the three projects were presented by each group at the end of the second week.

The three groups were put into a situation of a soft competition by indicating that a jury composed of the three LAAS supervisors will elect the best project on the basis of these oral presentations.

For the third edition in 2007, small adjustments are in progress but the menu of lectures and practical workshops will look very similar.

D- Social event

14th of July is a national celebration day commemorating the “prise de la Bastille” in 1789. We have organized a full day of excursion around the thematic of Catharism. An old medieval village and an abbey (Fontfroide abbey) were visited in the morning. After lunch taken in Minerve, which is classified among the most beautiful villages of France, we visited this impressive place, mixture of historical relics of the past and of natural beauty. Our trip continued with the visit of the Rieux-Minervois church, 12th century edifice, built on a heptagonal plan. After the banquet in Cavanac (5kms from Carcassonne) we enjoyed the wonderful firework of the well-known city of Carcassonne.