IntegramPlus and µBuilder joint training event
December 2007, IMT, Bucharest, Romania

In the period 3rd to 5th of December 2007, a course presenting two EC funded projects on microfluidics was offered at IMT-Bucharest (partner in INTEGRAM Plus). The two projects have set out to increase knowledge in microfluidcs and provide scientists and engineers with little or no knowledge in microfluidics and microsystem technology, an introduction and kick start. For details about the projects see µBuilder web page **http://www.sintef.no/content/page12____11691.aspx** and INTEGRAM Plus web page **http://www.integramplus.com.**

During the course the participants learned about potential applications, the technologies offered by the project partners and how to design in these technologies. By the end of the course, the people were able to make simple designs in the technologies presented and make use of the dedicated software that were used in two separate hands-on sessions offering introduction to design and simulation using state-of-the-art software.

21 participants (from research institutes, universities and industry) attended the joint course. The course format and content were appreciated as suitable for the audience, as resulted from the feed-back forms filled by the participants, which could lead to more such joint events.

Target Groups:

The course was primarily aimed at students, PhD students, postgraduates engineers and physicians from European universities and research institutes interested in developing MEMS design skills and accessing low-cost fabrication services, who participated free of charge. In addition, engineers and researchers from industry and other organisations were invited to participate.

Each of the projects introduced their specific technologies

MICROBUILDER:
Design your own microsystem

The MicroBuilder part of the event (3rd – 4th of December) was mainly focused on MultiMEMS technologies (Silicon/Glass Multi Project Wafer and Polymer manufacturing and mixed technologies).

Christopher Grinde (Vestfold University College, Norway) and **Danilo Demarchi** (Politecnico di Torino, Italy) presented the MicroBuilder project, the **ThinXXS, Tronics and MultiMems** technologies in the first day, and **CoventorWare-based** examples and exercises (hands-on) in the second day of the course.

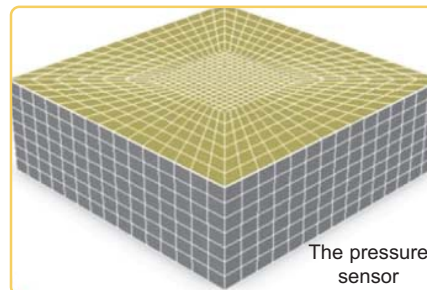### Day 1 (3rd December):
MicroBuilder project presentation; Thinxxs technology+add-on processes; Tronics technology; MultiMEMS technology;
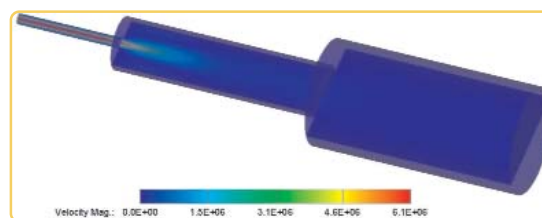### Day 2 (4th December)
Device examples; Coventor software; Hands-on with Coventor/MultiMEMS;

During the hands-on training, the example was based on a pressure sensor, designed using the MicroBuilder MultiMEMS technology. The sensor was first designed and simulated using the Coventor Designer and Analyzer modules, before the same sensor was designed and simulated using the Coventor Architect module. The course target was that, at the ebd of the training event, the participants to be able to design and simulate MultiMEMS structures using the different CoventorWare packages.

The pressure sensor

INTEGRAMplus: Design, Technology and Simulation of Microfluidic Structures: The INTEGRAMplus part (on the 5th of December) was focused on microfluidics technologies and applications. **Dr. Carmen Moldovan**, **Oana Nedelcu** and **Bogdan Firtat** (IMT-Bucharest) gave a presentation on the INTEGRAMplus project and its technologies and provided several examples and exercises using the microfluidics module of CoventorWare. Some basic microfluidic structures were designed and simulated, in order to provide the participants the initial knowledge in using the specific CAD tools.

The fluid velocity through a rounded, variable area, channel

This part of the course aimed at:
• Introducing the INTEGRAMplus project and services offer;
• Introducing MEMS and the key-concepts of microfluidics;
• Providing familiarity with CoventorWare tools for microfluidics (design, modeling and simulations)
• Explaining methods to help students design and analyse MEMS microfluidic devices;
• Reinforcing learning through practical case studies and worked examples based on simple devices, using hands-on training for microfluidics simulations;
• Supporting participants to develop heir own design ideas and practical implementations in INTEGRAMplus processes.

Image from course hall.

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