

Free MEMS Training STIMESI Training course program

MEMSCAP: MUMPs® (Multi-User MEMS) processes

Leiden University
Leiden, The Netherlands
December 8-11, 2009

Abstract

MEMSCAP provides access to three MEMS processes, described below, via the MUMPs® MPW service.

The PolyMUMPs™ process is based upon the deposition of the following layers onto a Si substrate: a nitride isolation layer, a polysilicon ground layer, two structural polysilicon layers, two sacrificial oxide release layers, and one metal layer for electrical connection and enhanced reflectivity.

SOIMUMPs™ utilizes a three mask, silicon-on-insulator (SOI) process based upon a starting wafer consisting of layer thicknesses 10 μm or 25μm, 1 μm, and 400 μm, for the silicon, oxide, and substrate, respectively. The silicon layer may be patterned and etched down to the oxide to form mechanical structures, resistors and electrical routing. In addition, the substrate can be back-etched to the oxide, enabling the construction of through-hole structures.

MetalMUMPs™ employs electroplated nickel as the primary structural and interconnect material. In addition to this, doped polysilicon layers may be used to form resistors or further mechanical structures. Electrical isolation is achieved through the deposition of silicon nitride and oxide is employed as a sacrificial layer. Trench layers may be etched into the substrate so as to achieve additional thermal and electrical isolation. Gold plating of the nickel sidewalls may be employed if low contact resistance is desired.

Topics

This training course will provide an overview to the three MUMPs® processes, highlighting their different strengths with reference to potential applications. An overview of the design kits will be presented, and design methodologies will be illustrated using hands-on tutorial exercises. A strong emphasis of the course will be on familiarizing the participants with the process design rules. In this way, tips and tricks for pushing the process will be discussed. Additionally, a general MEMS technical overview and business overview will be presented to provide students with a general knowledge base of information regarding MEMS past, present, and future applications.

Format

The first half of the course will provide attendees with an overview of each of the processes, as well as an introduction to the design kits and design rules, plus the general overviews. The second half of the course will consist of hands-on design exercises using MEMS Pro from SoftMEMS for design entry and ANSYS for finite element modeling.

The PolyMUMPs tutorial sessions will make use of both parameterized and non-parameterized cells from the CaMEL library. Example devices contained within this library include: linear comb drives, micro-tongs, and wobble motors. The Metal MUMPs session will employ tutorials based upon relay-like devices, whilst the SOIMUMPs hands-on class will concentrate on optical devices.

What is STIMESI ?

The goal of the STIMESI Stimulation Action is to stimulate European universities and research institutes to adopt MEMS and SiP technologies. The more experienced universities already active in MEMS design/technology will be assisted to increase their MEMS research activities and to design and fabricate more MEMS circuits and SiP components. Additionally other universities not currently active in this area will be given guidance to help them bootstrap their MEMS/SiP teaching and research activities.

Who should attend ?

All Europractice member universities and research institutes that want to begin or strengthen their teaching and/or research activities in MEMS/SiP technologies. Also companies having interest in using MEMS in future products are invited to attend.

Location

Leiden University is the oldest university in the Netherlands. It was founded in February 1575, as a gift from William of Orange to the citizens of Leiden who had withstood a long siege. It was the first university in the Netherlands where freedom of belief and religion was practiced, as reflected by the university's motto, Praesidium Libertatis, Bastion of Liberty. It was in this atmosphere that philosophers like Spinoza and Descartes were able to develop their ideas.

The city of Leiden is a typical university city. University buildings are scattered throughout the city and students that live and study in Leiden give the city its relaxed and vivid atmosphere.



Universiteit Leiden



The STIMESI Course will take place in:

Address:

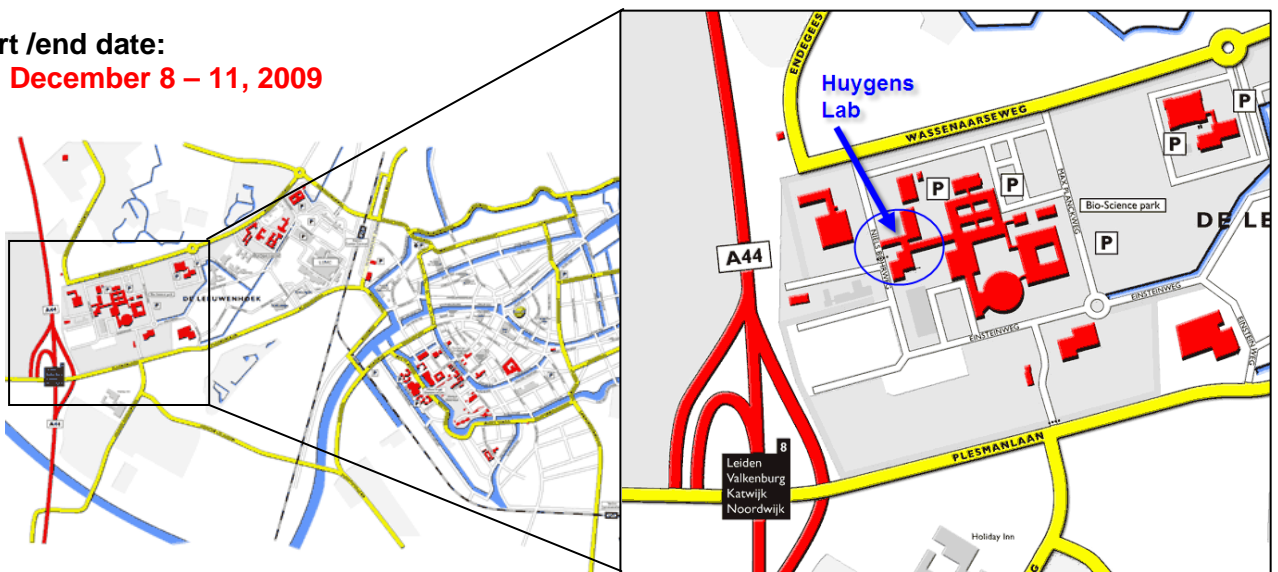
Leiden University, LION
Huygens Laboratory, room HL323
Niels Bohrweg 2
2333 CA Leiden
The Netherlands

Useful links:

- Website for general information: <http://www.physics.leidenuniv.nl>
- How to come to Leiden University: <http://www.physics.leidenuniv.nl/visitors.asp>
- Travel instructions to Huygens Lab: http://www.science.leidenuniv.nl/index.php/english/contact/huygens_laboratory
- Link to map: http://www.physics.leidenuniv.nl/institute/PlanLdnLION/PlanLdn-files/Leeuwenhoek_totaal.htm

Start /end date:

December 8 – 11, 2009



Accommodations :

Attendees are responsible for finding their own accommodations for the course. Below are some links to help you find a hotel:

- Leiden Tourist Information Office: www.vvvleiden.nl
- Hotels : <http://www.vvvleiden.nl/en/accommodations/lijs/1?title=hotels>
- Hotels : <http://www.hotelsvanleiden.nl/en/hotels>

Fees :

- Attendance is free for members of universities and research centers from all 27 EU countries and Norway, Iceland, Lichtenstein, Israel, Croatia, Switzerland and Turkey. The course is limited to 20 students. In case the course is over-subscribed, access is limited to one participant per institute and on first-come basis
- Companies : 300 € (excl. 19,6% VAT)
- Fee includes all lectures, course notes, lunches and refreshment breaks. Hotel accommodations and meals other than lunches are not included in the course fee.
- Cancellation by a participant between 2 and 14 days before the start of the course is subject to a 200 € administration fee. A 300 € fee will be charged for cancellation within 48 hours of the start of the course or for those who do not attend.

REGISTRATION

To register for this course, go to our online booking system and complete the electronic form.

The following link brings you there : <http://www.stimesi.rl.ac.uk>

Browse to the [STIMESI Course Booking System](#), select the "MEMSCAP MUMPs" course and use the "Book This Course" link:

Course: MUMPs Multi-User MEMS Processes
Descriptor: Training on the MEMSCAP MUMPs techno...
 The Multi-User MEMS Processes, or MUMPs, is a MEMS prototyping and a seamless transition into volume manufacturing. MEMSCAP offers three unique stand-alone, multi-mask MEMS processes in MUMPs: PolyMUMPs, SOIMUMPs, and MetalMUMPs
 PolyMUMPs is a three-layer polysilicon surface and bulk micromachining process, with 2 sacrificial layers and one metal layer. SOIMUMPs is based on a Silicon-On-Insulator(SOI) wafer. MetalMUMPs incorporates all three major MEMS processes: LIGA-like, thick metal electroplating, as well as bulk and surface micromachining.

Schedule for the MEMSCAP MUMPs course

Location information Leiden University The Netherlands From: 08-Dec-2009 To: 11-Dec-2009 Academic cost: 0 EURO **Book This Course**

NOTES:

Each course is limited to 20 participants to ensure a high quality of training. Please reserve your place early. This course is organized by the STIMESI program and runs approximately every 6 months and moves to different locations within Europe. The STIMESI program ends by the end of 2009. Therefore, this course will be the last in the row. (unless possible continuation of the project).

The STIMESI Course Booking System is managed and maintained by STFC Rutherford Appleton Laboratory. All enquires should be emailed to: stimesi@rl.ac.uk