Exhibition/Demonstrations

The Symposium will feature an exhibition along the 3 days of the Conferences.
At the time of printing this programme a few exhibitors have already booked a stand:

BAL-TEC AG provides state of the art preparation equipment for the electron microscopy as well as for the MEMS industry. The CPD 400 series critical point dryers are designed to process MEMS wafers in order to prevent sticktion and other undesirable side-effects.
http://www.bal-tec.com/

Alcatel Micro Machining Systems (MMS) is a business unit within Alcatel Vacuum Technology headquartered in Annecy, France. Alcatel MMS specializes in the designing, manufacturing, marketing and servicing of deep plasma etching systems for the fabrication of Micro Electro Mechanical Systems (MEMS) and Micro Optical Electro Mechanical Systems (MOEMS).
http://www.alcatelvacuum.com

EV Group provides wafer processing equipment for MEMS and microfluidics, advanced packaging, compound semiconductor/MOEMS, SOI, power devices, and nanotechnology applications: mask/bond aligners, wafer bonders, wafer/mask cleaning systems, temporary bonders and debonders, resist processing systems (spin/spray coaters, developers), hot embossing and nanoimprinting systems, defect and particle inspection systems. **http://www.EVGroup.com**

The company provides measurement and simulation tools and services for the thermal and electro-thermal investigation and design of microelectronic systems, e.g. ICs, packages, MEMS, PWBs and MCMs.
http://www.micred.com

CMP is one of the most experienced brokers in ICs and MEMS. MEMS processes available for prototyping and small volume production include CMOS, BiCMOS and GaAs bulk micromachining based on austriamicrosystems and OMMIC processes and “MUMPS” from MEMSCAP (PolyMUMPS, SOIMUMPS, and MetalMUMPS). CMP provides design kits, CAD tools and packaging services. **http://cmp.imag.fr**

High accuracy direct write laser lithography equipment for wafer and mask making. System includes automatic precision alignment for direct writing and metrology capabilities. Direct writing and mask making up to 70" with sub micron structure size and resolution.
http://www.himt.de

MEMSCAP is a leading provider of MEMS-based products. MEMSCAP proven and innovative solutions for the design, development and manufacturing, cover products and production capabilities for the medical, aeronautics and military industries, the communications market, as well as design automation tools and foundry services. **http://www.memscap.com**

Design Stim Printed in France. Photos DR

Design, Test, Integration and Packaging of MEMS/MOEMS

Montreux - Switzerland

12-14 May 2004

SYMPOSIUM ON

DTIP 2004

Chair: B. COURTOIS, *TIMA Labs, Grenoble, France*

Co-Chair: K. MARKUS, *Zeus Strategies, LLC, Durham, USA*

Conferences

CAD, Design and Test

Chair: J. KORVINK,

Univ. of Freiburg, Germany

Co-chair: J.M. KARAM,

MEMSCAP, Bernin, France

Microfabrication, Integration and Packaging

Chair: A. IONESCU,

EPFL, Lausanne, Switzerland

Co-chair: M. ESASHI,

Tohoku Univ., Japan

Including

Workshop on Impact of Packaging on MEMS Devices

organized by E. JUNG,

IZM, Berlin, Germany

Co-locating with

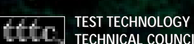
Workshop on MEMS and Nanotechnology Integration

organized by Aviation and Missile Research Development Engineering Center, European Research Office, US Army

> 10-11 May 2004

Sponsored by

CNRS-INPG-UJF



IEEE Circuits and Systems Society

Hotel reservation form

Room Type	Arrival	Departure	Nr of nights

Please use BLOCK CAPITALS

Last or Family Name:

First Name:

Organisation:

Address:

Country: Email:

Tel: Fax:

* Preferential rates at The **Hôtel Eden au Lac** for all booking **before 31st March 2004**

Sfr.220 /night in a single - the Swiss buffet breakfast included -

Sfr.280 /night in a double room - the Swiss buffet breakfast/pers. included -

Visitor tax Sfr.3.80/person/night not included.

Conditions: The **Hôtel Eden au Lac** requires an advance payment equal to one night payable by **31st March 2004** to guarantee the reservation. This deposit is non refundable. Cut off date for "DTIP 2004" block booking is the 31st March 2004. From this date onwards, guest rooms and the room negotiated rate will be offered subject to availability.
Prices quoted include VAT government taxes at the present rate. Should these rates alter the **Hôtel Eden au Lac** reserves the right to adjust its prices.

Reservation will not be accepted without credit card information.
I hereby authorize the Sofitel Royal Casino to charge the amount of one night to the following credit card:

Credit card type:

CREDIT CARD N° I___I___I___I___I I___I___I___I___I I___I___I___I___I I___I___I___I___I

Expiry Date: I___I___I I___I___I

Name of Cardholder: **Amount in Sfr :**

Date / Signature for authorisation to charge your credit card above mentioned:

The form is to be returned, no later than 31st March 2004, to:

HOTEL EDEN AU LAC
Reservation Service
CH-1820 MONTREUX, SWITZERLAND
Fax: +41 21 966 0 900

Note: In case of special requirements, please call The **Hôtel Eden au Lac**:
+ 41 21 966 0 800.

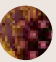
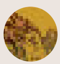
Aim of the Symposium

This Symposium will be a follow-up to the very successful issues held in 1999 and 2000 in Paris and in 2001, 2002 and 2003 in Mandelieu-La Napoule. This series of Symposia is a unique single-meeting event expressly planned to bring together participants interested in manufacturing microstructures and participants interested in design tools to facilitate the conception of these microstructures. Again, a special emphasis will be put on the very crucial needs of MEMS/MOEMS in terms of packaging solutions. The goal of the Symposium is to provide a forum for in-depth investigations and interdisciplinary discussions involving design, modeling, testing, micromachining, microfabrication, integration and packaging of structures, devices, and systems.
The Symposium is sponsored by the IEEE Computer Society Test Technology Technical Council, TIMA Labs, in cooperation with, the IEEE Circuits and Systems Society in collaboration with the French Chapter.
We look forward to welcoming you to Montreux.

B. COURTOIS, *TIMA Labs*

K. MARKUS, *Zeus Strategies*

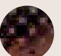
Venue

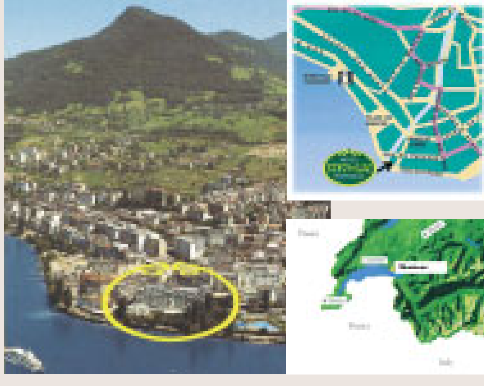



The Symposium will be held at the Hôtel Eden au Lac in Montreux, Switzerland www.edenmontreux.ch. On the shores of Lake Geneva, the Hôtel Eden au Lac overlooks the lake and the majestic Alps to the south.
The delightful situation at the edge of Lake Geneva and the gentle climate, have made Montreux and Vevey the Swiss Riviera. Lively towns with famous festivals, quayside floral displays, terraces, Casino and Edwardian-style hotels.

Hôtel Eden au Lac
11, rue du Théâtre
CH - 1820 Montreux, Switzerland
Tel.: +41 21 966 0 800,
fax: +41 21 966 0 900,
www.edenmontreux.ch

Access





Montreux
(http://www.swiss-riviera.com/otm/)
is less than an hour away from Geneva airport.
The distance from Geneva international airport is 90km.

- time & cost by taxi:
approx. 45 minutes & approx. SFr300
- time & cost by train:
approx. 70 minutes & approx. - second class SFr 31, first class SFr 52

Int'l Workshop on MEMS AND NANOTECHNOLOGY INTEGRATION (MNI): APPLICATIONS - 10-11 MAY 2004 -

MOTIVATION Applications for MEMS devices continue to expand as the fabrication technology advances. But device requirements for system integration require a careful look at the technology issues that limit performance and lifetime or that restrict the architectural designs possible. These designs include compatibility of materials, mechanical interactions, electrical interconnection, vibration effects, thermal management, and vacuum or packing constraints. In additions, many of the device applications lend themselves to geometrical scaling extending to the NANO level, thus further challenging traditional approaches for stimulation or pick-off of signals and information. The use of optical techniques together with MEMS devices adds to the concerns of material choices and design requirements. Further advancements in the integration of MEMS and NANO devices for applications in inertial or environmental sensors, actuators, controllers, micro-fluidics, RF components, and energy conversion will depend upon resolving the associated technical barriers.

OBJECTIVES The workshop will focus on the identification of these technical barriers or issues, and then explore the possible approaches for solution.
The program is arranged to provide adequate time for technical discussion stimulated by invited presentations directed toward a better understanding of the technical applications and issues of MEMS and NANO device integration.
A broad range of technical expertise is expected to be represented by the workshop participants with opportunities for future technical collaborations. The results of the workshop will be collected and reported as part of a panel discussion during the Symposium on DTIP of MEMS/MOEMS (Thursday 13 May 2004).

TOPICS The topics of special interest are:
- alternate materials
- electronic integration with MEMS devices
- environmental effects
- extension of MEMS to nano scale

The detailed programme will be available in due time on the DTP web site.

ORGANIZING AND SCIENTIFIC COMMITTEE:

P. Ashley, AMRDEC, *Redstone Arsenal, USA*
B. Courtois, *TIMA Lab., Grenoble, France*
L. Murdock, *AMRDEC- European Research Office, London, UK*
P. Ruffin, *AMRDEC, Redstone Arsenal, USA*
M. Marchetti, *U. of Roma "La Sapienza", Italy*
P. Stevens, *QinetiQ, UK*
M. Regi, *U. of Roma "La Sapienza", Italy*
M. Lyon, *AMRDEC, Redstone Arsenal, USA*

FORMAT

The Workshop is expected to take place over 2 days.

VENUE

The venue of the Workshop will be the same of the DTIP:
Hotel Eden au Lac – 11, rue du Théâtre
CH - 1820 Montreux, Switzerland
Tel.: +41 21 966 0 800, fax: +41 21 966 0 900,
www.edenmontreux.ch
Please use the enclosed hotel reservation form to secure your hotel.

ATTENDANCE Attendance to the Workshop will be open, but the total number of participants will be limited to 50. It is necessary to register using the form that will be available in due time on the DTIP web site. Authors should in addition notify their registration to the organizing committee by email: B. Courtois (DTIP@imag.fr) L. Murdock (lmurdock@usaitca.army.mil) and P. Ashley (Paul.Ashley@us.army.mil)
The registration fees cover admission to all sessions of the MNI Workshop, but do not include the participation to the Symposium DTIP.

PROCEEDINGS A Workshop record will be constituted by the abstracts of the papers assembled by 31 March, and Proceedings will be made available at the Workshop.

Special issues of the Journal of Microsystem Technologies and of the Journal of Analog Integrated Circuits and Signal Processing

Two Special Issues or Special Sections of leading Journals will follow up the Symposium: Journal of Microsystem Technologies and Analog Integrated Circuits and Signal Processing.

➔ The Special Issue of the Journal of Microsystem Technologies will focus on microfabrication, integration and packaging of MEMS and MOEMS.

Papers should not normally exceed 6000 word equivalents (20 double-spaced typed pages including figures and tables). For more details, please follow the Journal of Microsystem Technologies submission guidelines as available from the **http://link.springer.de/link/service/journals/00542/instr.htm.**

➔ The Special Issue of ALOG the Journal of Analog Integrated Circuits and Signal Processing will focus on design and test aspects of MEMS and MOEMS.

Papers should include an informative title and an abstract of 100 to 250 words at the head of the manuscript. The abstract should be a carefully worded description of the problem addressed, the key ideas introduced, and the results. Abstracts will be printed with the article. Detailed specifications for the submissions may be found in any issue of the Journal. **http://www.wkap.nl/prod/j/0925-1030**

The deadline to submit to either of the Special Issues is 1st June 2004. Authors should indicate the Journal they submit to. They will be notified about their papers by 31 July 2004.

Submission will be electronically only, through the Web page (click on "Submit a Paper for Special Issues"). Fill in the questionnaire and attach your PDF file where appropriate. Don't submit multiple files for a single paper. Once your submission has been checked (viewing and printing quality), you will receive an acknowledgement by e-mail. You should first prepare a file in PDF format. Please note that uncompressed unencapsulated postscript is the single alternative format and should be used only when absolutely necessary. Use the contact author's last name as file name; add numerals in the case of multiple submissions (e.g., lo1, lo2).

In case you experience any problems with the submission procedure, please contact the General Chair.

Invited talks

↘ Super-fine inkjet printing -toward the minimal manufactuaring system-

➔ K. Murata, *National Institute of Advanced Industrial Science and Technology Nanotechnology Research Institute, Ibaraki, Japan*

A super-fine inkjet system which allows arrangements of dots with a minimum size of less than one micron has been developed. We will show the possibility toward the minimal manufacturing system.

↘ SOI gas sensing microsystems,

➔ F. Udrea, *Cambridge U., UK*

The development of solid state gas sensors and their gradual transition to smart CMOS technology will be reviewed, followed by a detailed discussion of advantages/disadvantages of using SOI
micromachning technology compared to standard bulk technology. New concepts in SOI microsystems such as use of CMOS compatible layers for micro-hotplates will also be described. The presentation will end with a discussion on the use of smart gas sensors in high volume wireless applications.

↘ RF MEMSoC,

➔ G. K. Fedder, *Carnegie Mellon U., Pittsburgh, USA*

The demand for low-power embedded wireless capability is driving a trend to make more sophisticated and better performing RF systems on chip. Advances in CMOS and BiCMOS micromachining has led to recent work on MEMS-enabled RF circuits that exploit on-chip passives with superior quality factor and tuning capabilities.

↘ Quartz challenged by silicon micromechanics,

➔ T. Mattila, *VTT Information Technology, Espoo, Finland*

Despite the ongoing digitalization, an analog frequency reference is required in every wireless transceiver for the foreseeable future. The conventional solution relies on quartz crystals that appear bulky in the otherwise highly integrated architectures. The presentation will describe the recent advances in the silicon microresonator technology - in particular, how the short- and long-term frequency stability can be realized in the miniature size.

NEXUS MWG-DMS and NoE PATENT-DfMM Workshop on DESIGN FOR MICRO & NANO MANUFACTURE

> 11 May 2004, 13:00 - 18:00

This workshop is co-organised by the NEXUS Methodology Working Group "Design Modelling Simulation" (MWG-DMS), formerly USC-CAD, and the new EC-funded Network of Excellence "Design for Micro & Nano Manufacture" (PATENT-DfMM). PATENT-DfMM **(www.patent-dfmm.org)** aims to establish a collaborative team to provide European industry with support in the field of "design for micro nano manufacture" to ensure that problems affecting the manufacture and reliability of products based on micro nano technologies (MNT) can be addressed before prototype and pre-production. The aim of this workshop is to present PATENT-DfMM and discuss the realistic needs of organisations expected to be the major beneficiaries. These include:

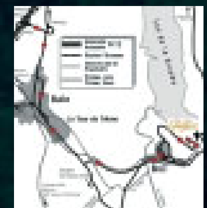
- Design and Engineering Companies or business units within companies (Design Houses) through the use of Patent-DfMM methodology in their design work,
- Design Tool (EDA) providers through the implementation of Patent-DfMM methodology into their tools,
- Small and medium-sized companies (SMEs) through the use of Patent-DfMM methodology and services.

Participation in the workshop is free of charge, but advance registration is advised.
CONTACT: P. Salomon, *4M2C PATRIC SALOMON GmbH,*
Tel.: +49 30 2435 7870,
E-mail: patric.salomon@4m2c.com

Social Event programme

> Thursday 13 May 2004

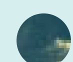
17.30	Bus departure to Broc
18.15-19.00	Discovery of the Swiss chocolate world
19.00	Bus departure to Gruyères
19.30	Typical diner at "Le Chalet" Restaurant in Gruyères
22.00	Bus departure to the Hotel Eden au Lac



Approximately 45 min. of visit welcomes you in the fascinating universe of the chocolate. Discover a multitude of enthralling information on the cocoa and the chocolate, for any knowledge (or almost) on this world of softness and pleasure!
Discover the first-ever chocolate factory at Broc, home of the market leading Swiss chocolate brand, Cailler. Founded in 1819, Cailler is the worlds'first chocolate manufacturing company.
Today, you will find the factory still located in the same picture postcard setting, amidst green pastures and a dramatic backdrop of Swiss mountains, an amazing view; Your can even watch the cows that provide milk for the famous chocolates graze freely all around the factory. Indeed, it is the fresh milk and the continued use of original recipes developed by François-Louis Cailler which give Cailler chocolates that outstanding taste and creamy smoothness.

- Diner at "Le Chalet" Restaurant in Gruyères: a delightful meeting place in a historical town, with a loft full of hidden treasures.

Hotel information

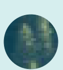


The Hôtel Eden au Lac will provide lodging for the Conference attendees (but there is no obligation to stay at the Hôtel Eden au Lac). Lodging at the Hôtel Eden au Lac has to be booked using the hotel accommodation form. To search for hotels by price category, use: **http://www.montreux.ch/hotels/**

Insurance

While the Symposium organisation makes every effort in order to ensure the safety and well being of all the Symposium participants and associates, the Symposium cannot take responsibility for any accident or damage that may occur during the Symposium.

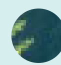
Proceedings



Proceedings of this symposium will be available at the meeting as part of the registration fee. If you cannot attend, you may still order Proceedings at the price of 50€ (order form available on the conference web site, the sending of the Proceedings package will be done after the Symposium, and if the payment is received).

DTIP is happy to acknowledge the services of SuviSoft Oy Ltd for the technical management of the Symposium.

Posters



All posters will be introduced by one slide in 5 minutes each. They will be presented in 2 sessions in parallel on Wednesday 12 May from 18.00 to 18.40 for CAD, Design and Test posters and from 18.00 to 19.20 for Microfabrication, Integration and Packaging posters.

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esashi@cc.mech.tohoku.ac.jp

Chair: J. KORVINK, *U. of Freiburg, Germany*
Co-chair: J.M. KARAM, *MEMSCAP, Bernin, France*

Programme Committee:

I. Balk, *the Ramzay Technologies Inc, Brighton, USA*
A. Kaiser, *IEMN, Lille, France*
A. Wild, *Motorola, München, Germany*
B. Vigna, *STMicroelectronics, Cornadero, Italy*
B. Charlot, *TIMA Labs., Grenoble, France*
B. Romanowicz, *Nano Science and Technology Institute, Cambridge, USA*
S. Blanton, *Carnegie Mellon U., Pittsburgh, USA*
C. Cane, *U. of Barcelona, Spain*
Y.C. Liang, *National U. of Singapore*
P. Wu, *National Chiao Tung U., Hsinchu City, Taiwan*
F. Maloberti, *Texas A&M U., College Station, USA*
M. Ismail, *Ohio State U., Columbus, USA*
D. Keating, *Corning Intellisense, Wilmington, USA*
R. Laur, *U. Bremen, Germany*
M.A. Maher, *MemsCap Inc., San Jose, USA*
F. Pressecq, *CNES, Toulouse, France*
M. Rencz, *BUTE, Budapest, Hungary*
R. Rudd, *Lawrence Livermore National Lab., Livermore, USA*
J. Samitier, *U. of Barcelona, Spain*
M. Santiago, *U. Barcelona, Spain*
O. Sigmund, *TU of Denmark, Lyngby, Denmark*
T. Bourouina, *ESIEE, Noisy le Grand, France*
T. Mukherjee, *Carnegie Mellon U., Pittsburgh, USA*
T. Veijola, *Helsinki U. of Technology, Finland*
G. Wachutka, *TU München, Germany*
Z. Cui, *RAL, Didcot, UK*

This Conference will bring together researchers, engineers and practitioners involved in the development of CAD tools and design methodologies for MEMS and MOEMS. The participants will also have the opportunity to interact with the other Conference by the means of plenary talks.

The topics for this Conference include:

- Technology CAD in general
- Modeling and simulation of fabrication processes
- Devices and components (sensors, actuators, ...)
- MEMS/MOEMS libraries and IP
- Signal processing
- Integrated CAD tools
- Numerical simulation
- Yield estimation
- Failure mechanisms
- Fault modeling
- Fault simulation and test pattern generation
- Mechanical simulation
- Thermal evaluation
- Interoperability of CAD/CAE tools
- Multiphysics simulation
- Structured design methodologies
- Languages for interchange data among designs and tools
- Model order reduction

Microfabrication, Integration and Packaging Conference

Chair: A. IONESCU, *EPFL, Lausanne, Switzerland*
Co-chair: M. ESASHI, *Tohoku U., Japan*

Programme Committee:

V. Bright, *U. of Colorado, Boulder, USA*
H. Fujita, *U. of Tokyo, Japan*
R. Maeda, *MITI, Tsukuba, Japan*
P. Viktorovitch, *LEOM, Ecully, France*
D. Allen, *Cranfield U., Bedford, UK*
F. Tay, *National U. of Singapore*
D. Tolfree, *DRAL, Warrington, UK*
A. Tay, *National U. of Singapore*
G.S. Kuo, *National Chengchi U., Taipei, Taiwan*
A.Q. Liu, *Nayang Technological U., Singapore*
M. de Labachelerie, *LPMO, Besançon, France*
C. Khan Malek, *LPMO, Besançon, France*
J. Jakubczak, *Sandia Nat. Labs, Albuquerque, USA*
D. Seeger, *IBM, Watson Research Center, Yorktown Heights, USA*
V. Kempe, *Sensor Dynamics AG, Graz Lebring Austria*
M. Heckele, *Institut für Mikrostrukturtechnik, Forschungszentrum Karlsruhe, Germany*
J. Dual, *ETH Zurich, Switzerland*
J. Walker, *Freehold, USA*
H. Yang, *National Chung Hsing U., Taichung, Taiwan*
N. Meyendorf, *U. of Dayton, USA*
B. Weiss, *U. of Vienna, Austria*
S. Basrour, *TIMA Labs., Grenoble, France*
K. Sato, *Nagoya U., Japan*
B. Michel, *IZM, Berlin, Germany*
E. Jung, *IZM, Berlin, Germany*
D. Collard, *IEMN, Villeneuve d'Ascq, France*
K. Bergman, *Columbia U., New York, USA*
P. French, *TU Delft, The Netherlands*
P. Nicole, *Thales Group, France*
H. Hartnagel, *TU Darmstadt, Germany*
H. Wicht, *Wicht Technologie Consulting, München, Germany*

This Conference will bring together researchers, engineers and practitioners involved in the development of integration technologies and packaging for MEMS and MOEMS. The participants will also have the opportunity to interact with the other Conference by the means of plenary talks.

The topics for this Conference include:

- Integrated processes (micromachining, micromolding, ...)
- Process integration between MEMS and electronics
- Microlithography issues unique to MEMS/MOEMS
- Manufacturing
- Materials
- Assembly technologies
- Packaging for harsh environments
- MOEMS packaging
- RF and microwave packaging
- Test structures
- Devices and components (sensors, actuators, ...)
- Dimensional measurements
- Physical measurements
- Failure analysis
- Reliability
- Characterization
- Process monitoring
- Non destructive evaluation

TECHNICAL PROGRAMME

Wednesday 12 May

7.30-8.30 Registration cont'd

8.30-8.40 Opening

8.40-9.20 Invited talk 1: RF MEMSoC, G. K. Fedder, *Carnegie Mellon U., Pittsburgh, USA*

➔ Chair: K. Markus, *Zeus Strategies, LLC, Durham, USA*

9.20-11.00 Workshop on IMPACT OF PACKAGING ON MEMS DEVICES

➔ Organizer: E. Jung, *IZM, Berlin, Germany*

➔ IMPACT OF PACKAGING ON MEMS DEVICES, E. Jung, IZM, *Berlin, Germany*

➔ MODELING AND SIMULATION FOR SRESS-FREE MOUNTING OF MEMS, J. Wilde, *IMTEK, Freiburg, Germany*

➔ PACKAGING OF A ULTRASENSITIVE SILICON MICROPHONE, A. Dehe, *Infineon Technologies, Munich, Germany*

➔ DISPOSABLE INSULIN PUMP - A MEDICAL CASE STUDY, N. Schneeberger, *Debiotech, Lausanne, Switzerland*

A discussion time will next allow interaction with the audience.

11.00-11.20 Break

11.20-12.00 Invited talk 2: QUARTZ CHALLENGED BY SILICON MICROMECHANICS, T. Mattila, *VTT Information Technology, Espoo, Finland*

➔ Chair: M. Esashi, Tohoku U., Japan

12.00-13.00 Vendors session

➔ Chair: B. Courtois, *TIMA Labs. Grenoble, France*

Those exhibitors who have booked a stand at the time of printing the programme will introduce their products in a 8 minutes presentation.

HEIDELBERG INSTRUMENTS – BAL-TEC – ALCATEL VACUUM TECHNOLOGY – EVG – MICRED – CMP – MEMSCAP.

13.00-15.00 Lunch

15.00-16.20

Session 1: INTEGRATED CAD TOOLS

➔ Chair: B. Romanowicz, *Nano Science and Tech. Inst., Cambridge, USA*

15.00 AUTOMATED MASK CREATION FROM A 3D MODEL WITHIN A CAD ENVIRONMENT
R. Schiek, R. Schmidt,
Sandia National Lab., Albuquerque, USA

15.20 AN ENHANCED T-CAD APPROACH IN MEMS DESIGN WITH INTEGRATED SPECIFICATION MANAGEMENT AND BUILDING BLOCKS
U. Triltsch, S. Büttgenbach,
IMT, Braunschweig, Germany

15.40 DYNAMIC IDENTIFICATION OF MEMS BY EIGENSENSITIVITY
A. Gugliotta, A. Somà, *Politecnico di Torino, Italy*
C.J.V.D. Poel Filho, R. Pavanello,
State U. of Campinas, Brazil

16.00 AN AUTOMATIC TOOL FOR HIGH-LEVEL ALGORITHMIC COMPLEXITY EVALUATION AND OPTIMIZATION FOR SYSTEM DESIGN
M. Ravasi, Ch. Clerc, M. Mattavelli, D. Mlynek,
Swiss Federal Inst. of Tech. of Lausanne, Switzerland

15.00-16.40

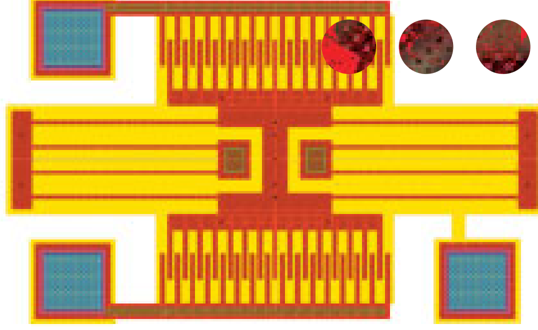
Session 2: DICING, ASSEMBLY AND PACKAGING

➔ Chair: V. Kempe, *Sensor Dynamics AG, Graz Lebring Austria*

15.00 SOLUTIONS FOR DICING RELEASED CMOS-MEMS MULTI-PROJECT WAFER
S. H. Tseng, F. Y. Xiao, Y. Z. Juang, C. F. Chiu,
National Chip Implementation Center, Hsinchu, Taiwan

15.20 MECHANICAL AND ELECTRICAL BONDING BETWEEN SILICON WAFER AND GLASS WAFER WITH ETCHED CHANNELS CONTAINING METAL TRACKS
S. Brida, O. Stojanovic, *Auxitrol Aerospace Group, Bourges France*

15.40 A ROBOTIC SYSTEM FOR ASSEMBLY AND PACKAGING OF MICRO-OPTOELECTRONIC COMPONENTS
A. Codourey, A.-C. Pliska, B. Sprenger,
M. Thurner, M. Honegger, Ch. Bosshard,
A. Steinecker, *CSEM, Lausanne, Switzerland*



16.20-16.40 Break

16.40-18.00

Session 3: BEHAVIOURAL MODELLING

➔ Chair: G. Wachutka, *TU München, Germany*

16.40 DEVELOPMENT OF BEHAVIOURAL MODELS FOR MEMS STRUCTURES
M. Lishchynska, N. Cordero, O. Slattery, *NMRC, Cork, Ireland*

17.00 EXPERIMENTAL MEASUREMENTS AND BEHAVIORAL MODELING OF AN ELECTROSTATICALLY ACTUATED BI-AXIAL MICROMIRROR
F. Parrain, S. Megherbi, G. Raynaud, H. Mathias, J.-P. Gilles, A. Bosseboeuf, *IEF, Orsay, France*

17.20 A BEHAVIOURAL MODEL OF RESONANT CANTILEVERS FOR CHEMICAL SENSING
D. Paci, *Information Engineering Department, Pisa, Italy*
K.-U. Kirstein, C. Vançura, J. Lichtenberg, H. Baltes, *ETH-Zurich, Switzerland*

17.40 BEHAVIOURAL MODELLING OF MICRO-BATTERIES FOR SELF POWERED MICRO SYSTEMS
Y. Ammar, S. Basrour, *TIMA Labs., Grenoble, France*

18.00-18.40

POSTERS INTRODUCTION SESSION

CAD, Design and Test posters are introduced by one slide in 5 minutes each.

➔ Chair: M. Rencz, BUTE, *Budapest, Hungary*

➔ ELECTROSTATIC BEHAVIOR OF MEMS CAPACITIVE PRESSURE SENSORS WITH NON-PLANAR DIAPHRAGMS UNDER ELECTRICAL LOADING
N. Soin, B. Yeop-Majlis, *National U. of Malaysia, Kuala Lumpur, Malaysia*

➔ OPTIMIZED FLEXURAL HINGES FOR COMPLIANT MICROMECHANISMS
M. Munteanu, F. De Bona, *U. degli Studi di Udine, Italia*

16.00 PACKAGING AND TESTING OF FIBER OPTICAL MEMS
Z. Wang, *Singapore Inst. of Manufacturing Tech., Singapore*
W. Cao, Z. Lu, *National U. of Singapore, Singapore*

16.20 GLASS FRIT BONDING - AN UNIVERSAL TECHNOLOGY FOR WAFER LEVEL ENCAPSULATION AND PACKAGING
R. Knechtel, *X-FAB Semiconductor Foundries, Erfurt, Germany*

16.40-17.00 Break

17.00-18.00

Session 4: THERMO-MECHANICAL STRESS EVALUATION OF MEMS PACKAGES

➔ Chair: A. Tay, *National U. of Singapore*

17.00 THERMO-MECHANICAL ANALYSIS OF ADVANCED ELECTRONIC PACKAGES
J.-P. Sommer, B. Michel, *IZM Berlin, Germany*
O. Wittler, D. Manessis, *TU Berlin, Germany*

17.20 THE INFLUENCE OF PACKAGE-INDUCED STRESSES ON MOULDED HALL SENSORS
J. Wilde, S. Fischer, *IMTEK-AVT, U. Freiburg, Germany*
R. Janke, H. Beyer, *MICRONAS, Freiburg, Germany*

17.40 STRENGTH AND MATERIAL PROPERTIES OF GLASS FRIT BONDED MICRO PACKAGES
K. Glien, J. Graf, H. Höfer, *Robert Bosch, Stuttgart, Germany*
J. Bagdahn, M. Ebert, *Fraunhofer Inst. for Mechanics of Materials, Halle, Germany*

18.00-19.20

POSTERS INTRODUCTION SESSION

Microfabrication, Integration and Packaging posters are introduced by one slide in 5 minutes each.

➔ Chair: P. Nicole, *Thales Group, France*

➔ AN IN-SITU TEST STRUCTURE FOR SIMULTANEOUSLY DETERMINING MULTI-MATERIAL PROPERTIES OF A FILM
C-H. Pan, *National Chin-Yi Inst. of Tech., Taichung, Taiwan*

➔ DEVELOPMENT OF TEST STRUCTURES OF THE THERMAL RADIATION DETECTORS ON BASE OF THE HIGHER MANGANESE SILICIDE FILMS
D. Kabilov, T. Kamilov, A. Uzakov, B. Kamilov,

➔ SOI-CMOS COMPATIBLE LOW-POWER GAS SENSOR USING SPUTTERED AND DROP-COATED METAL-OXIDE ACTIVE LAYERS
P. Ivanov, J. Laconte, J-P. Raskin, D. Flandre, *U. Catholic of Louvain, Belgium*
M. Stankova, E. Sotter, E. Llobet, X. Vilanova, X. Correig, *U. Rovira i Virgili, Spain*

➔ IMPROVEMENT OF NON-LINEAR SENSITIVITY OF A CAPACITIVE TYPE ACCELEROMETER USING COMPENSATION BEAMS
A. Santoso Tamsir, B. Yeop Majlis, *U. Kebangsaan Malaysia, Kuala Lumpur, Malaysia*

➔ MECHANICAL SENSITIVITY ENHANCEMENT OF AN AREA-CHANGED CAPACITIVE ACCELEROMETER BY OPTIMIZATION OF THE DEVICE GEOMETRY
B. Yeop Majlis, B. Bais, *U. Kebangsaan Malaysia, Kuala Lumpur, Malaysia*

➔ A 3D-CAM SYSTEM FOR AUTOMATING NC PART PROGRAMMING FOR EXCIMER LASER MICROMACHINING
E. Mutapcic, P. Iovenitti, J.P. Hayes, *Industrial Research Institute Swinburne, Melbourne, Australia*

➔ LOW-LOSS OHMIC RF-MEMS SWITCHES WITH INTERDIGITATED ELECTRODE TOPOLOGY
R. Gaddi, M. Bellei, A. Gnudi, *ARCES – U. of Bologna, Italy*
B. Margesin, F. Giacomozzi, *ITC-IRST, Trento, Italy*

➔ LARGE-SCALE CIRCUIT SIMULATION BY USING COMPOSITION OF WAVEFORM RELAXATION AND ITERATED TIMING ANALYSIS ALGORITHMS
C-J. Chen, T-N. Yang, W-P. Tai, *Chinese Culture U., Taipei, Taiwan*
S-C. Yi, *National Changhua U. of Education, Taiwan*
H-H. Hsu, *Tamkang U., Taipei, Taiwan*
W. Liu, *Tung-Nan Inst. of Tech., Taipei, Taiwan*
H. Husnutdinova, I. Samiev, R. Saidahmedov, *Tashkent State Aviation, Uzbekistan*
M. Tursunov, *Physical Inst. of Tech. of the Uzbek Academy of Sciences, Tashkent, Uzbekistan*
M. Takeda, *Nagaoka U. of Tech., Japan*

➔ DEVELOPMENT OF A LOW-COST HYBRID POLYMERIC MULTI-LAYERED PNEUMATIC MICROVALVE
G. Thuillier, C. Khan Malek, *LPMO / CNRS, Besançon, France*

➔ TEMPERATURE STUDY OF ALTI / TIW ON POLYSILICON CONTACT RESISTANCE FOR HIGH TEMPERATURE MEMS APPLICATIONS
A. Andrei, C. Malhaire, D. Barbier, *LPM - INSA Lyon, France*
S. Brida, J-M. Dujardin, O. Legras, *Auxitrol SA, Bourges, France*

➔ CHARACTERIZATION OF PACKAGING PROCESS FOR MOEMS TUNABLE FILTER
Y-S. Eom, J-H. Lee, B-S. Choi, H-G. Yun, J-T. Moon, M-L. Lee, C-A. Choi, C-H. Jun, *ETRI, Daejeon, South Korea*

➔ THE NUMERICAL SIMULATION AND EXPERIMENT FOR THE PIN-TO-PLATE MICROJOINING BY ND:YAG LASER
C-K. Chung, Y-C. Lin, *National Cheng Kung U., Tainan, Taiwan*

➔ HIGH VOLTAGE GaAS DIODE STACKS: THE CHOICE OF EPISTRUCTURES FOR ASSEMBLING
T. Rang, *Tallinn TU, Estonia*
V. Vojtovich, N. Kuznetsova, *Clifton ltd, Tallinn, Estonia*

➔ A NOVEL SELF-TESTABLE METHOD FOR LARGE-SCALE PRESSURE SENSORS
X. Liu, M. Huo, X. Wang, W. Chen, W. Wang, H. Zhang, Y Sun, Y. Yan, *MEMS Center, Harbin Inst. of Tech., China*

➔ A NOVEL TECHNOLOGY FOR FABRICATING MICRONEEDLE WITH SU-8
Z. Zhao, *IECAS, Beijing, China*

➔ FORMATIONA AND ITS CHARACTERIZATION OF PHOTOVOLTAIC LEAD LANTHANUM ZIRCONATE TITANATE IN A NEW LAYERED FILM STRUCTURE DESIGN
M. Ichiki, H. Furue, T. Kobayashi, Y. Morikawa, K. Nonaka, R. Maeda, *MITI, Tsukuba Japan*
T. Nakada, *Tokyo Denki U., Japan*
C. Endo, *Takashima Sangyo Co., Japan*

➔ FABRICATED TUNABLE INDUCTOR BY MICROFABRICATION TECHNOLOGY
C-H. Chien, C-H. Wang, *Tatung U., Taiwan*

➔ CONTROL OF A MOVING SYSTEM AT SUB-NANOMETRIC SCALE FOR MICROFABRICATION
L. Chassagne, D. Haddad, S. Topu, Y. Alayli, *LIRIS, Versailles France*
P. Juncar, *BNM-INM/CNAM, Paris, France*

➔ LOW TEMPERATURE WAFER BONDING FOR MEMS PACKAGING
V. Dragoi, P. Lindner, *EV Group, Schaerding, Austria*
S. Farrens, *EV Group Inc, Phoenix, USA*

➔ MICRO ASSEMBLY OF CONTACTS TO OPTICAL BACKPLANES
A. Menschig, *MiLaSys technologies, Stuttgart, Germany*

➔ AN INTENSITY TESTING MODEL AND EXAMINATION OF GOLD-SILICON WAFER BONDING
X. Wang, *Beihang U., China*
D. Zhang, *Peking U., China*

➔ TUNABEL FABRY - PEROT SURFACE MICROMACHINED INTEFEROMETER -
R. Muller, D. Cristea, C. Catalin Tibeica, M. Kusko, *IMT Bucharest, Romania*
P. Pons, P. Arguel, *CNRS-LAAS Toulouse, France*
D. Syvridis, *U. of Athens, Greece*

18.40-20.00 Posters viewing / exhibition

19.30 Cocktail

Thursday 13 May

8.00-8.40 Invited talk 3: SOI GAS SENSING MICROSYSTEMS, F. Udrea, *Cambridge U., UK*

➔ Chair: A. Ionescu, *EPFL, Lausanne, Switzerland*

8.40-10.10 Panel on THE MEMS AND NANOTECHNOLOGY INTEGRATION WORKSHOP

➔ Chair: L. Murdock, *US Army International Technology Center-Atlantic, AMRDEC-European Research Office (ERO), London, UK*

➔ Presenters: P. Ashley, *Aviation and Missile Research, Development & Engineering Center (AMRDEC), Army, Redstone Arsenal, USA*
D. King, *QinetiQ, UK*
M. Lyon / R. Hatcher, *Aviation and Missile Research, Development Engineering Center (AMRDEC), Army, Redstone Arsenal, USA*
M. Marchetti / M. Regi, *U. of Roma " La Sapienza", Italy*

The session chairs of the Workshop held 10-11 May will briefly report on the sessions. A discussion time will next allow interaction with the audience.

10.10-10.30 Break

10.30-11.10 Invited talk 4: SUPER-FINE INKJET PRINTING - TOWARD THE MINIMAL MANUFACTUARING SYSTEM-
K. Murata, *National Institute of Advanced Industrial Science and Technology Nanotechnology Research Institute, Ibaraki, Japan*

➔ Chair: J. Korvink, *U. of Freiburg, Germany*

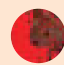
11.10-12.40 Panel on NETWORKS OF EXCELLENCE

➔ Chair: J.M. Karam, *MEMSCAP, Bernin, France*

➔ Presenters: S. Dimov, 4M NoE coordinator, *Cardiff U., UK*
A. Hierlemann, GOSPEL NoE representative, *ETH Zurich, Switzerland*
A. Richardson, PATENT NoE coordinator, *Lancaster U., UK*
R. Plana, AMICOM NoE coordinator, *Toulouse, France*

4 Networks of Excellence supported by EU in the framework of the 6th PCRD will be briefly introduced. A discussion time will next allow interaction with the audience.

Thursday 13 May



The Network 4M brings together 30 organisations across Europe with expertise in microtechnologies that underpin the use of non-silicon materials and/or 3D microstructures in the next generation of microsystems-based products. The topic of GOSPEL is artificial olfaction, i.e., to understand the biological sense of smell, to provide an objective, quantitative assessment of odours, and to monitor technically relevant gases. Artificial olfaction will be realized by developing/using multifunctional, intelligent microsensor systems. The PATENT-DfMM "Design for Micro & Nano Manufacture" Network is involving 24 partners across Europe that aims to establish a collaborative team to provide European industry with support in test, reliability and packaging engineering for MNT based products. AMICOM "Advanced Microsystem for RF and MillimeterWave Communications" network of excellence is involving 28 partners across Europe focusing on the development of the microsystem concept for wireless communications by associating MEMS devices with integrated circuits.

12.40-14.40 Lunch

14.40-16.40

Session 5: RF MEMS MODELLING

Chair: A. Wild, *Motorola, München, Germany*

14.40 V-SHAPED MICROMECHANICAL TUNABLE CAPACITOR FOR RF APPLICATIONS
A. Cruau, G. Lissorgues, *ESIEE, Noisy-le-Grand, France*
P. Nicole, *Thales Airborne Systems, Elancourt, France*
D. Placko, *ENS Cachan, France*
A. Ionescu, *EPFL, Lausanne, Switzerland*

15.00 DESIGN, MODELING AND MEASUREMENTS OF TUNABLE MEMS INDUCTORS
C.-M. Tassetti, G. Lissorgues, *ESIEE, Noisy-le-Grand, France*
M. Bensetti, *LGEP, Gif-sur-Yvette, France*
J.-P. Gilles, *IEF, Orsay, France,*
P. Nicole, *Thales Airborne Systems, Elancourt, France*

15.20 PHYSICAL MICROELECTROMECHANICAL RESONATOR MODEL
G. Casinovi, *Georgia Inst. of Tech., Atlanta, USA*

15.40 SIMULATION PERFORMANCE OF A MICROWAVE MICRO-ELECTROMECHANICAL SYSTEM SHUNT SWITCH USING CHATOYANT
M. Bails, J. Martinez, S. Levitan, I. Avdeev, M. Lovell, D. Chiarulli, *U. of Pittsburgh, USA*

16.00 ELECTROMECHANICAL MODELLING OF LOW-VOLTAGE RF MEMS SWITCHES
C. O'Mahony, R. Duane, A. Mathewson, *NMRC, Cork, Ireland*
M. Hill, *Cork Inst. of Tech., Ireland*

16.20 A HIGH-PASS LOW-PASS MEMS PHASE SHIFTER
J. Zhu, J. Lin, Y. Yu, N-. Yang, *Nanjing Electronic Devices Inst., China*
B. Zhou, *Southeast U., Nanjing, China*

14.40-16.40

Session 6: DEVICES AND COMPONENTS

Chair: R. Maeda, *MITI, Tsukuba, Japan*

14.40 MEMS-BASED-PHOTONIC BANDGAP USING NON-UNIFORM PERIOD STRUCTURE
M. Faeyz Karim, Y. A. Bin, L. Y. Hui, L. A. Qun, *Nanyang TU, Singapore*

15.00 MEMS BASED PHOTONIC BANDGAP (PBG) BAND-STOP-FILTER
X. Zhang, A. Liu, *School of EEE, NTU, Singapore*

15.20 STABLE SOI MICROMACHINED ELECTROSTATIC AC VOLTAGE REFERENCE
A. Kärkkäinen, P. Pekko, N. Pesonen, M. Suhonen, A. Oja, J. Kyynäräinen, H. Seppä, *VTT Microsensing, Espoo, Finland*

15.40 INTEGRATED ELECTROMAGNETIC MICROACTUATOR WITH A LARGE DRIVING FORCE
H. Yang, *Inst. Of Precision Eng., Taichung, Taiwan*
C.-T. Pan, *National Sun Yat-Sen U., Kaohsiung, Taiwan*
S.-C. Shen, *Industrial Tech. Research Inst., Hsinchu,Taiwan*

16.00 A LOW COST POLYMER BASED PIEZO-ACTUATED MICROPUMP FOR DRUG DELIVERY SYSTEM
L. Hong, *Inst. of Materials Research and Engineering, Singapore*
A. O. Tay, *National U. of Singapore, Singapore*
G.C. Lim, Y.M. Wan, *Singapore Inst. of Manufacturing Tech., Singapore*

16.20 LARGE AREA MEMS MANUFACTURE
M. Miles, *Iridigm Display Corporation, San Francisco, USA*

16.40-17.30 Posters viewing / exhibition

17.30-22.00 Bus departure Social event

9.00-10.20

Session 7: DESIGN AND MODELLING

➔ Chair: C. Cane, *U. of Barcelona, Spain*

09.00 A MEMS TUNABLE OPTICAL FILTER BASED ON VERTICAL DBR ARCHITECTURE
B. Saadany, *ESIEE, Noisy-le-Grand, France/ MEMSCAP, Cairo, Egypt*
F. Marty, T. Bourouina, *ESIEE, Noisy-le-Grand, France*
Y. Mita, *VDEC, The U. of Tokyo, Japan*
D. Khalil, *Ain Shams U., Cairo, Egypt*

09.20 A FULL IDENTIFICATION SYSTEM FOR A TACTILE FINGERPRINT SENSOR
N. Galy, B. Charlot, B. Courtois, *TIMA Labs., France*
F. Parrain, *IEF, Orsay, France*

09.40 DESIGN OPTIMISATION OF INTEGRATED PLANAR MINIATURE MAGNETIC MOTORS
B. Delinchant, *GE44 – LARGE Lab., Saint Nazaire, France*
B. du Peloux, N. Achotte, F. Wurtz, O. Cugat, J. Delamare, *LEG/ENSIEG, Grenoble, France*

10.00 A NEW TEMPERATURE COMPENSATION SCHEME FOR A SILICON NITRIDE BEAM RESONANT PRESSURE SENSOR
D. Chen, D. Cui, S. Xia, *Inst. of Electronics, CAS, Beijing, China*
Z. Cui, *Rutherford Appleton Lab., Didcot, UK*

10.20-10.40 Break

9.00-10.40

Session 8: INTEGRATED PROCESSES

➔ Chair: D. Seeger, *IBM, Watson Research Center, Yorktown Heights, USA*

09.00 IMPROVED CMOS MEMS PROCESS AND CMOS COMPATIBILITY TEST
F. Y. Xiao, S. H. Tseng, Y. Z. Juang, C. F. Chiu, *National Chip Implementation Center, Hsinchu, Taiwan*

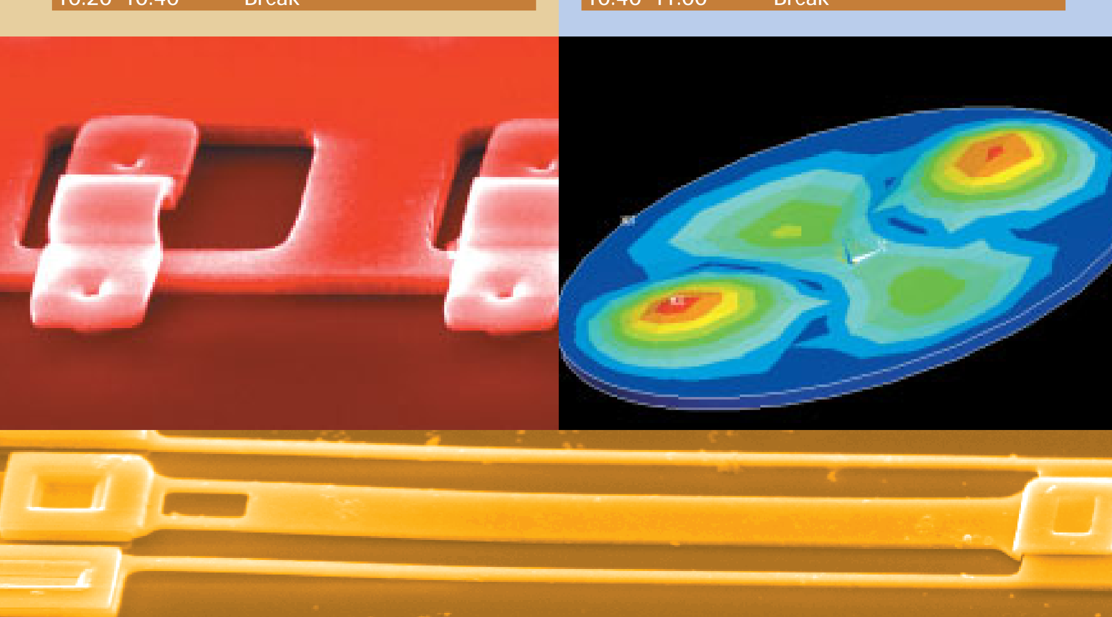
09.20 FLASH RELEASE – AN ALTERNATIVE FOR RELEASING COMPLEX MEMS DEVICES
S. Deladi, G.J.M. Krijnen, M.C. Elwenspoek, *MESA+ Research Inst./ U. of Twente, The Netherlands*

09.40 FEATURE LENGTH-SCALE MODELING OF LPCVD AND PECVD MEMS FABRICATION PROCESSES
L. Musson, S. Plimpton, R. Schmidt, Sandia *National Lab., Albuquerque, USA*

10.00 BIO-MEMS FABRICATED ARTIFICIAL CAPILLARIES FOR TISSUE ENGINEERING
G.-J. Wang, C.-L. Chen, S.-H. Hsu, Y.-L. Chiang, *National Chung-Hsing U., Taichung, Taiwan*

10.20 BULK-MICROMACHINED ELECTROSTATIC MICROACTUATORS FOR HARD DISK DRIVES
B. Chen, J. Miao, H. Zhu, *NTU, Nanyang, Singapore*

10.40-11.00 Break



Friday 14 May

10.40-12.00
Session 9: COMPACT MODELLING AND MIXED SIMULATION

Chair: T. Mukherjee, *Carnegie Mellon U., Pittsburgh, USA*

10.40 COMPACT MODELS FOR SQUEEZED-FILM DAMPERS WITH INERTIAL EFFECTS
T. Veijola, *Helsinki U. of Tech., Espoo, Finland*

11.00 A METHODOLOGY TO EXTRACT DYNAMIC COMPACT THERMAL MODELS UNDER TIME-VARYING BOUNDARY CONDITIONS: APPLICATION TO A THERMOPILE BASED IR SENSOR
M. Salleras, J. Samitier, S. Marco, *U. of Barcelona, Spain*
J. Palacín, *U. of Lleida, Spain*

11.:20 IMPROVED PHYSICALLY-BASED MIXED-LEVEL DAMPING MODEL
R. Sattler, G. Wachutka, *Inst. for Physics of Electrotechnology, Munich, Germany*

11.40 SYSTEM LEVEL MODELING OF THE RELEVANT PHYSICAL EFFECTS OF INERTIAL SENSORS USING ORDER REDUCTION METHODS
S. Reitz, J. Bastian, P. Schneider, P. Schwarz, *Fraunhofer Inst. for Integrated Circuits, Dresden, Germany*
C. Döring, R. Neul, Robert Bosch, *Gerlingen-Schillerhöhe, Germany*

11.00-12.00
Session 10: RELIABILITY AND CHARACTERIZATION

Chair: F. Pressecq, *CNES, Toulouse, France*

11.00 FRACTURE STRENGTH AND THE FATIGUE OF POLYCRYSTALLINE SILICON UNDER STATIC AND LONG TERM HIGH FREQUENCY CYCLIC LOAD
R. Boroch, W. Bernhard, K. Kehr, J. Hauer, R. Mueller-Fiedler, Robert Bosch, *Gerlingen-Schillerhöhe, Germany*

11.20 MODELING OF HUMIDITY INDUCED FAILURES : APPLICATION TO POLYSILICON STRUCTURES
P. Schmitt, *CNES/LAAS, Toulouse, France*
X. Lafontan, *NovaMEMS, Saverdun, France*
Francis Pressecq, *CNES, Toulouse, France*
C. Oudea, *EADS-LV, Les Mureaux, France*
D. Esteve, J.-Y. Fourniol, *LAAS, Toulouse, France*

11.40 TRANSIENT THERMAL CHARACTERISATION OF HOT PLATES
G. Bognár, V. Székely, *BUTE, Budapest, Hungary*
P. Fürjes, *Research Inst. for Tech. Physics and Materials Science, Budapest, Hungary*
M. Rencz, *MicRed, Budapest, Hungary*

12.00-13.30 Lunch

13.30-14.50
Session 11: DESIGN METHODS AND OPTIMIZATION

Chair: R. Laur, *U. Bremen, Germany*

13.30 A NOVEL SILICON BASED EXTENDED-CAVITY-LASER. APPLICATIONS IN SPECTROSCOPY.
C. Chappaz, V. Petrini, *CEA/LETI, Grenoble, France*
M. de Labachelerie, *LPMO/CNRS, Besançon, France*

13.50 OPTIMIZATION OF AN ELECTROMAGNETIC ACTUATOR FOR OPTICAL SWITCH APPLICATIONS
J. S. Han, J. Korvink, *U. of Freiburg, Germany*
J. S. Ko, *Pusan National U., Korea*

14.10 NUCLEAR MAGNETIC RESONANCE SENSOR HDL MODELING AND EXPERIMENTAL VERIFICATION"
S. Megherbi, G. Raynaud, J.-F. Pône, *IEF, Orsay, France*
J.-Ch. Gineffri, L. Darasse, *U. Paris-Sud, Orsay, France*

13.30-14.50
Session 12: EMBOSSING & MODELLING

Chair: H. Yang, *National Chung Hsing U., Taichung, Taiwan*

13.30 LARGE-SCALE HOT EMBOSSING
M. Worgull, M. Heckele, W. Schomburg, *Forschungszentrum Karlsruhe, Germany*

13.50 HIGH ASPECT RATIO MICRO/NANO-EMBOSSING OF POLYMER MATERIALS WITH NICKEL MOLD FABRICATED BY ELECTRON BEAM LITHOGRAPHY AND DRIE
Y. Murakoshi, M. Takahashi, R. Maeda, *AIST, Tsukuba, Japan*
Y. Nishioka, *Nihon U., Japan*

14.10 MICRO/NANO HOT EMBOSSING PYREX GLASS WITH GLASSY CARBON MOLD FABRICATED BY FOCUSED-ION-BEAM ETCHING
M. Takahashi, Y. Murakoshi, R. Maeda, *AIST, Tsukuba, Japan*

14.30 CHARACTERIZATION OF INDIVIDUAL BIO-CELLS WITH THERMALLY ACTUATED PROBE ARRAYS
Y. Cho, D. Collard, B. Kim, *U. of Tokyo, Japan*
M. Lagouge, F. Conseil, B. Legrand, L. Buchaillot, *IEMN/CNRS, Villeneuve d'Ascq, France*

K. Sugimoto, *Shinshu U., Japan*

14.30 A STUDY OF INTEGRATION OF LIGA AND MEDM TECHNOLGY ON THE MICRO INJECTION MOLDING OF INK JET PRINTERS' NOZZLE PLATES
S.-C. Tseng, Y.-C. Chen, *National Yunlin U. of Sci. & Tech., Touliu City, Taiwan*
B.Y. Shew, *Sychrotron Radiation Research Center, Taiwan*

14.50-15.10 Break

15.10-16.10

Session 13: DESIGN METHODS

Chair: T. Veijola, *Helsinki U. of Technology, Finland*

15.10 "ELECTRONIC MOSQUITO": DESIGNING A SEMI-INVASIVE MICROSYSTEM FOR BLOOD SAMPLING, ANALYSIS AND DRUG DELIVERY APPLICATIONS
G. Gattiker, K. Kaler, M. Mintchev, *U. of Calgary, Canada*

15.30 COMPARISON OF HIGH Q MICRORESONATORS OPERATING ON A THIN PLATE MODE : THE LAMÉ-MODE
J. R. Coudevylle, M. De Labachelerie, *LPMO / CNRS, Besançon, France*
S. Basrour, *TIMA Labs., Grenoble, France*

15.50 DESIGN OF A MICRO-ACTUATOR FOR 2D PRECISION POSITIONING
M. Hu, S.-F. Ling, H. Du, *NTU, Nanyang, Singapore*

15.10- 16:30

Session 14: MICROFABRICATION

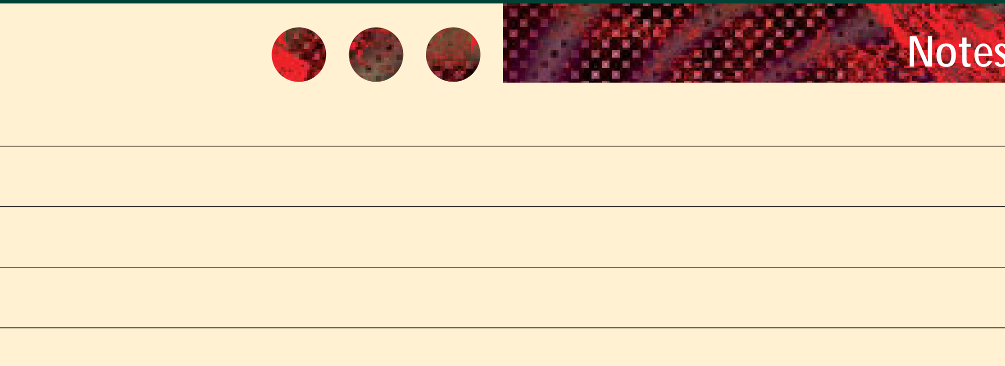
Chair: A.Q. Liu, *Nayang Technological U., Singapore*

15.10 FABRICATION OF GRADATION MICROLENS ARRAY WITH INCREASING SAG HEIGHTS USING UV PROXIMITY PRINTING METHOD
H. Yang, *National Chung Hsing U., Taichung, Taiwan*
C.-K. Chao, T.-H. Lin, C.-P. Lin, *National Taiwan U. of Science and Tech., Taipei, Taiwan*

15.30 INKJET PRINTING OF SELF-ASSEMBLED MONOLAYERS
K. Karasaki, J. Kim, B. Kim, *CIRMM/IIS, U. of Tokyo, Japan*

15.50 FABRICATION OF AN ACCURATELY VERTICAL SIDEWALL FOR OPTICAL SWITCH APPLICATIONS USING DEEP RIE AND PHOTORESIST SPRAY COATING
T. Ikehara, R. Maeda, *AIST, Tsukuba, Japan*

16.10 TESTING OF A LIGA-MICROSPECTROMETER FOR MONITORING THE DISSOLUTION OF COPPER AND STAINLESS STEEL IN AQUEOUS FERRIC CHLORIDE SOLUTIONS
D. M. Allen, H. Almond, B. Maynard, *Cranfield U., UK*



Notes

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Registration will be electronically only.
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Please tick appropriate : ☐ IEEE ☐ Author : Paper N°_________ Session N°_________ ☐ Committee Member	520 Euros	570 Euros	
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DTIP 2004 - The symposium at a glance

Wednesday 12 May

- 7.30-8.30 Registration cont'd
- 8.30-8.40 Opening
- 8.40-9.20 Invited talk 1:
  RF MEMSoC,
  G. K. Fedder, Carnegie Mellon U., Pittsburgh, USA
- 9.20-11.00 Workshop on Impact of Packaging on MEMS Devices
- 11.00-11.20 Break
- 11.20-12.00 Invited talk 2:
  QUARTZ CHALLENGED BY SILICON MICROMECHANICS,
  T. Mattila, VTT Information Technology, Espoo, Finland
- 12.00-13.00 Vendors session
- 13.00-15.00 Lunch

15.00-16.20	15.00-16.40
Session 1: INTEGRATED CAD TOOLS	Session 2: DICING, ASSEMBLY AND PACKAGING
16.20-16.40 Break	16.40-17.00 Break
16.40-18.00	17.00-18.00
Session 3: BEHAVIOURAL MODELING	Session 4: THERMO-MECHANICAL STRESS EVALUATION OF MEMS PACKAGES
18.00-18.40	18.00-19.20
Posters introduction session	Posters introduction session

- 18.40-20.00 Posters viewing / exhibition
- 19.30 Cocktail

Thursday 13 May

- 8.00-8.40 Invited talk 3:
  SOI GAS SENSING MICROSYSTEMS,
  F. Udrea, Cambridge U., UK
- 8.40-10.10 Panel on the MEMS and Nanotechnology Integration Workshop
- 10.10-10.30 Break
- 10.30-11.10 Invited talk 4:
  SUPER-FINE INKJET PRINTING-TOWARD THE MINIMAL MANUFACTUARING SYSTEM-
  K. Murata, National Institute of Advanced Industrial Science and Technology Nanotechnology Research Institute, Ibaraki, Japan
- 11.10-12.40 Panel on Networks of Excellence
- 12.40-14.40 Lunch

14.40-16.40	14.40-16.40
Session 5: RF MEMS MODELLING	Session 6: DEVICES AND COMPONENTS

- 16.40-17.30 Posters viewing / exhibition
- 17.30-22.00 Bus departure / Social event

Friday 14 May

9.00-10.20	9.00-10.40
Session 7: DESIGN AND MODELLING	Session 8: INTEGRATED PROCESSES
10.20-10.40 Break	10.40-11.00 Break
10.40-12.00	11.00-12.00
Session 9: COMPACT MODELLING AND MIXED SIMULATION	Session 10: RELIABILITY AND CHARACTERI-ZATION
12.00-13.30 Lunch	
13.30-14.50	13.30-14.50
Session 11: DESIGN METHODS AND OPTIMIZATION	Session 12: EMBOSSING & MODELLING
14.50-15.10 Break	
15.10-16.10	15.10-16.30
Session 13: DESIGN METHODS	Session 14: MICRO-FABRICATION