

Dear Reader,



The Network of Excellence (NoE) Patent-DfMM aims to establish a collaborative team to provide European industry with support in the field of "Design for Micro &

Nano Manufacture (DfMM)" to ensure that problems affecting the manufacturing and reliability of products based on micro & nano technologies (MNT) can be addressed before prototyping and production. For more information: <http://www.patent-dfmm.org/>

Welcome to the new edition of our bi-monthly E-Newsletter, which will keep you updated on project related activities, but also on other DfMM activities that run outside of the project.

We apologise in case you have been added to our database in error: if so, please reply by e-mail with "UNSUBSCRIBE" in the subject field.

We welcome your comments and contributions.

Happy reading!

Patric Salomon  
*NoE Patent-DfMM News Editor*

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**MINOS-EURONET Strategy Forum on the impact of converging technologies, 18 - 19 May 06**

### **List of Events**

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[www.patent-dfmm.org](http://www.patent-dfmm.org)

## **Abstract Deadlines for Conferences**

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**Call for Papers: COMS2006, Florida, 27-31 Aug 2006**

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## **News from the NoE Patent-DfMM**

### **PATENT-DfMM launches Flagship Projects**

During the PATENT-DfMM (internal) review in December 2005, priorities for the remaining period had been developed with the Industry Advisory Board (IAB). In 2006, focus will be on a selected number of flagship projects that further integrate research activities between partners, provide first solutions to key DfMM problems of industry and demonstrate the potential of PATENT-DfMM collaborative efforts and services to industry.

The following flagship projects have been launched in March/April:

#### ***HUMS - Health and Usage Monitoring MicroSystem***

This project focuses on the design, manufacture, package and test for reliability of a series of sensors aimed at monitoring the health and use of operation of larger systems. The initial focus is on aerospace systems through the participation of the SME BCF Designs who specialise in test engineering for aircraft systems. The project will over its life demonstrate how MNT based sensors capable of monitoring a range of “health” parameters can be integrated into key technology platforms or components, powered and networked into aircraft supervisory systems.

Contact: Marc Desmulliez ([m.desmulliez@hw.ac.uk](mailto:m.desmulliez@hw.ac.uk))

#### ***BioDrop - Droplet-Based Micro-Electronic Fluidic Operations for Production and Evaluation Platform BioMEMS***

The objective of this project is to develop a digital microfluidic platform (using so-called droplets) which is suitable for electrical analysis of biological material, as well as a production platform for peptides. Key to the realisation of this systems and subsequent related products is the realisation of an enhanced design flow that properly addresses reliability, testability and packaging within the design phase. Three European companies will participate, two of which are SMEs, who are involved in these two application areas in which the digital droplet platform can be used. A microelectrode Array (MEA) for analysing cell material is already available. Within BioDrop, the latter will be extended with a droplet transport/delivery system.

Contact: H.G. Kerkhoff ([h.g.kerkhoff@utwente.nl](mailto:h.g.kerkhoff@utwente.nl))

#### ***RELIABILITY - the reliability flagship project is structured into 3 clusters:***

##### ***RELMETH - Methodology for accelerated testing and reliability analysis of MEMS***

RELMETH intends to perform accelerated testing and reliability analysis on two types of MEMS, the final goal being to develop a methodology. Such analyses on a batch of MEMS are useful for: i) assessing the reliability level, ii) improving batch reliability by proposing appropriate corrective actions (in design, processes, monitors, etc.) and iii) building prediction methods able to foresee the reliability of future batches from the same device, even from the design phase (methods to be used in a Design for Reliability approach). During the first phase of RELMETH, the accelerated

testing & reliability analyses will begin for a MEMS accelerometer. In the second phase, a MEMS humidity sensor will be analysed.

Contact: Marius Bazu ([mbazu@imt.ro](mailto:mbazu@imt.ro)), Pascal Nouet ([nouet@lirmm.fr](mailto:nouet@lirmm.fr))

### ***VIBSHOCK - Holistic Reliability Engineering for MEMS harsh conditions***

This project will focus on package engineering including the modelling of package effects on MEMS device (e.g. development of a package model of the device under test, investigation of packaging materials like die attach etc. in use, ...), multi-domain failure mode modelling and definition of new test methodologies (i.e. investigation of failure modes of the package and of the MEMS device and their cross-link resulting in a better insight of the failure mechanism allowing for the definition of a new test methodology in harsh condition). It will also set up test equipments for reliability testing under harsh conditions and conduction of test (e.g. temperature cycling with temperature up to 350 °C, strong vibration, impacts, simulation of space conditions,...).

Contact: Khiem Trieu ([trieu@ims.fraunhofer.de](mailto:trieu@ims.fraunhofer.de)). Ingrid de Wolf ([dewolfi@imec.be](mailto:dewolfi@imec.be))

### ***Package reliability - Integrated Characterisation of Packaging Hermeticity Combining Test, Modelling, Reliability Characterisation and Packaging Integration of a Humidity Microsensor***

This project proposes to use a humidity microsensor as a device to demonstrate DfMM; i.e. the design, fabrication, test, characterisation, simulation and packaging of MEMS. The microsensor will electrically detect traces of humidity within a package and is intended for in-situ investigation of packaging hermeticity. Packaging hermeticity is a common and well-known reliability issue of packaging technologies. This microsensor is based on nanoporous silicon with a high specific surface. It is primarily intended for wafer-level packaging technologies but will also be able to be used for other packages used in this flagship project.

Contact: Orla Slattery ([orla.slattery@tyndall.ie](mailto:orla.slattery@tyndall.ie))

More information will be published on our website [www.patent-dfmm.org](http://www.patent-dfmm.org).

### **News Release on CORDIS Wire Website**

"Towards a Design for Micro & Nano Manufacture Approach - Summary of Mid term results from the FP6-IST Network of Excellence "Design for Micro & Nano Manufacture (PATENT-DfMM)" is available on Cordis:

<http://wire.cordis.lu/index.cfm?fuseaction=article.Detail&rcn=6545>

### **Patent-DfMM upcoming events**

#### ***Workshop on Design for Reliability and Manufacturability in MNT, 25 Apr 06, Stresa, Lago Maggiore, Italy***

Co-organised by PATENT-DfMM and the NEXUS Methodology Working Groups "Reliability & Test" and "Design Modelling Simulation". Main emphasis will be on reliability and test problems, where design methodologies can lead to significant improvements. Industry's design and reliability needs will be discussed and latest research results and new approaches will be proposed by the research community.

Morning session: Industry needs and current research in Reliability and Test for MNT

\* How do industrial microsystems manufacturers deal with reliability and test?

\* What is specific for reliability and test in high volume production?

\* What are the main challenges for research?

\* Presentation of current research initiatives and projects in reliability and test

Afternoon session: Building Reliability and Test into the MNT design flow

\* How are reliability and test issues currently built into an industrial design flow?

\* What do Design, Modelling and Simulation Tools offer to support reliability and test?

\* How can methodologies, tools and databases be combined?

\* Presentation of current research initiatives and projects to build reliability and test issues into tools

\* How can researchers help industry (especially SMEs) to optimise reliability and test?

An updated programme will be available soon on our website: [www.patent-dfmm.org](http://www.patent-dfmm.org).

Contact: Patric Salomon, E-mail: [patric.salomon@4m2c.com](mailto:patric.salomon@4m2c.com)

### **2nd Meeting: Technology Roadmapping for Packaging, 8 Jun 06, Berlin, Germany**

Following the success of our first workshop 16 Feb 2006 in Edinburgh, we are currently preparing the second Technology Roadmapping of Packaging workshop which is to take place at IZM in Berlin. As a result of the first workshop at Heriot-Watt University, a list of Packaging "High-Level Challenges and Related Issues" was produced. The second workshop will focus on the developments required to solve these issues on the model of the ITRS roadmap. As one day will be insufficient to deal with all issues of these High-Level Challenges, we plan to focus on a selection from the following Challenges:

1. Hermetic/vacuum packaging and low-cost alternatives (near hermetic, plastic packages...)
2. Low-cost Wafer Level Packaging
3. Improvements in CAD/Modelling
4. Stress management to keep induced torsions as low as possible
5. 3D stacking and monolithic integration
6. Hybrid Integration (System in a Package, passive integration, Chip on Board, Via technologies...)
7. Built-in monitoring, Smart packages
8. Improved interfacing of MEMS device (optical assembly, active and passive alignment, soldering techniques)
9. Improved reliability (signal management, noise, interferences, interconnection reliability...)
10. Future packages (flexible substrates, chip in polymer no package...)

The PATENT-DfMM roadmapping team appreciates to receive YOUR view on which areas to cover! Any additional comments and views are also welcome! Please send your replies directly to Fabien Holler at [F.Holler@hw.ac.uk](mailto:F.Holler@hw.ac.uk).

Attendees at the Berlin meeting will identify and discuss developments required to solve these issues focusing on the 4 most selected High-Level Challenges. Participation from industry is encouraged. Please visit our website for more details: [www.patent-dfmm.org](http://www.patent-dfmm.org) or contact Fabien Holler directly. On the PATENT website (under events, 16 Feb), you will also find an overview presentation from the last workshop.

Contact: Fabien Holler, Heriot-Watt University, Edinburgh, E-Mail: [F.Holler@hw.ac.uk](mailto:F.Holler@hw.ac.uk)

### **AMICOM/PATENT-DfMM/ACE RF-MEMS Workshop, 28 June 2006, Orvieto, Italy**

This RF-MEMS Workshop on Industry application focuses on Reliability and Packaging. It will be organized by the NoE AMICOM in collaboration with the Networks of Excellence PATENT (Design for Micro & Nano Manufacture) and ACE (Antenna Center of Excellence). The workshop will be held in conjunction with the International Conference on RF MEMS and RF Microsystems MEMSWAVE2006 in Orvieto, Italy. (see: [www.memswave2006.org](http://www.memswave2006.org)).

Tentative speakers at the workshop are from Alcatel, EADS, Fraunhofer Institute, Heriot-Watt University, IETR, IMEC, Imperial, IXL, Philips, SonyEricsson, WTC, 3DPlus and 4M2C.

Contact: Anders Rydberg, E-mail: [anders.rydberg@signal.uu.se](mailto:anders.rydberg@signal.uu.se)

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## **Event Announcements**

### **EuroSimE 2006 Conference, 23 – 25 Apr 06, Como, Italy**

The EuroSimE conference is especially dedicated to thermal, mechanical and multiphysics simulation and experiments in microelectronics and Microsystems. It aims to promote further development and application of simulation methodologies and tools for the electronics industry, improve communication and exchange information between methodology & tool-developers and industry users and strengthen co-operation between industry, universities, and research institutes. MEMS/MST specific topics have been scheduled for the first day in order not to overlap with the DfMM workshop (24 Apr) and DTIP (25-27 Apr). Participants who are attending EuroSimE on 23 Apr and the DfMM workshop on 24 Apr may be eligible for a reduced registration fee at EuroSimE -

please request more information from Patric Salomon ([patric.salomon@4m2c.com](mailto:patric.salomon@4m2c.com)).  
More information: [www.eurosime.org](http://www.eurosime.org)

### **DTIP 2006 - Symposium on Design, Test, Integration and Packaging of MEMS/ MOEMS, 26 - 28 Apr 06, Stresa, Lago Maggiore, Italy**

This Symposium will be a follow-up to the very successful issues held in 1999 and 2000 in Paris, in 2001, 2002 and 2003 in Mandelieu-La Napoule and 2004 and 2005 in Montreux, Switzerland. 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. About 90 submissions were received from 20 countries.

More information: <http://tima.imag.fr/conferences/Dtip/DTIP2006/>

### **iMEMS 2006 International MEMS Conference, 9-12 May 06, Biopolis, Singapore**

It aims to provide an opportunity for academicians, professionals & industrialists in various related fields from all over the world to come together and learn from each other. An additional goal of the conference is to provide a place for academicians, professionals, industrialists with cross-disciplinary interests related to MEMS to meet and interact with members inside and outside their own particular disciplines.

For topic areas please visit the conference website <http://nanomicro.org/imems06/>.

### **First MINOS-EURONET Strategy Forum "High technologies, innovation policy and regional development", 18 -19 May 06, Bucharest, Romania**

The first day is devoted to Research, innovation and competitiveness of Europe. Policies, programmes, initiatives are presented, in the context of the 7th Framework Programme and of the Competitiveness and Innovation Program of the EU. The experience of NMS and ACC in RTDI strategies and programmes, including technology transfer and innovation will be also presented (Romania, Poland, and Lithuania). Innovation ecosystems and infrastructures will be exemplified by some of the best examples to be found in Europe.

The second day of the Forum will be devoted to the potential of integrating/converging technologies (micro-nano-bio-info) for economic growth. The output of the foresight exercise performed in Romania will provide the basis for a "case study".

Further details and on-line registration will be available on [www.minos-euro.net](http://www.minos-euro.net).

### **List of Events**

23 - 26 April 2006

#### **EuroSimE 2006**

Como, Italy

[www.eurosime.org](http://www.eurosime.org)

25 April 2006

#### **PATENT Workshop "Design for Reliability and Manufacturability" at DTIP2006**

Stresa, Italy

[www.patent-dfmm.org](http://www.patent-dfmm.org)

25 - 27 April 2006

#### **AMAA 2006 - Advanced Microsystems for Automotive Applications**

Berlin, Germany

[www.amaa.de](http://www.amaa.de)

26 - 28 April 2006

**DTIP 2006 - SYMPOSIUM on Design, Test, Integration and Packaging of MEMS/MOEMS**

Stresa, Italy

<http://tima.imag.fr/conferences/dtip/>

9 - 12 May 2006

**iMEMS 2006**

Singapore

<http://temasek.nus.edu.sg/imems06>

25 - 26 May 2006

**First MINOS-EURONET Strategy Forum on the impact of converging technologies**

Bucharest, Romania

[www.minos-euro.net](http://www.minos-euro.net)

30 May - 1 June 2006

**SMT/HYBRID/PACKAGING 2006**

Nuernberg, Germany

[www.smt-exhibition.com](http://www.smt-exhibition.com)

8 June 2006

**Second Technology PACKAGING Roadmapping Workshop**

Berlin, Germany

[www.patent-dfmm.org](http://www.patent-dfmm.org)

28 June 2006

**RF MEMS Cluster Meeting**

Orvieto, Italy

[www.memswave2006.org](http://www.memswave2006.org)

**Abstract deadlines for conferences**

**Call for Papers: CANEUS 2006 Conference on Aerospace Applications, 27 Aug - 1 Sep 06, Toulouse, France**

**Abstract Submission Deadline: 12 Apr 2006**

CANEUS 2006 is an international conference devoted to Micro-Nano-technology (MNT) development for aerospace applications. The CANEUS 2006 conference continues to build on the theme developed during previous, successful CANEUS conferences. World-class experts representing cutting-edge MNT research, system development, government and private investment, and aerospace-end users, address the issues of rapidly and cost-effectively transitioning MNT concepts to next generation aerospace applications. CANEUS 2006 culminates in focused workshops aimed at producing viable business plans for the system development of selected MNT concepts.

*More information:* [www.caneus.org](http://www.caneus.org)

**Call for Papers: COMS2006, Florida, 27-31 Aug 2006**

**Abstract Submission Deadline: 21 Apr 2006**

The 11th International Conference on the Commercialization of Micro and Nano Systems (COMS 2006) will be held in St Petersburg, Florida, USA, 27-31 Aug 2006. COMS fosters the commercialization of micro and nanotechnologies and addresses commercialization issues unique to these emerging and disruptive technologies. COMS 2006 will bring together key personnel from all over the world and from every sector of the supply chain, including government representatives, top researchers in the field, educators, relevant publication sources, equipment suppliers, end users, and financial experts. The small tech community gathers at COMS conferences to learn

from others, share their own knowledge, discuss and argue points of view - all of which contribute to the advancement of this emerging field. COMS 2006 addresses the issues related to building successful MNT firms, regions and educational programs. An exhibition of equipment suppliers, service providers, product suppliers and consultants will be held in conjunction with COMS 2006.

More information: [www.mancef-coms2006.org](http://www.mancef-coms2006.org)

**Call for Papers: EUROSENSORS XX, 17 - 20 Sep 06, Göteborg, Sweden**

**Submission Deadline: 28 April 2006**

Since its establishment in 1987, the Eurosensors series of conferences is the only European forum to cover the entire field of Microsystem technology. The Eurosensors conference provides an excellent opportunity to bring together European scientists and engineers from academy, research institutes and companies to present and discuss the latest results in the general field of solid-state sensors, actuators, microsystems and nanosystems. The conference goals are to stimulate interaction and knowledge exchange between the delegates in a friendly atmosphere.

Subjects for papers and further details: [www.EUROSENSORS2006.com](http://www.EUROSENSORS2006.com)

**Call for Papers: CAS 2006 International Semiconductor Conference, 27 - 29 Sep 06, Sinaia, Romania**

**Abstract Deadline: 28 May 06**

This 29th edition is organized by IMT-Bucharest, under the aegis of the IEEE-Electron Devices Society. Highlights topics are: Nanoscience and nanoengineering; Microoptics and microphotonics; Micromachined devices and circuits for microwave and millimeter wave applications; Micro and nanotechnologies for transducers, interfaces and microsystems; Micro and nanotechnologies for biomedical and environmental applications; Novel materials and intelligent materials; Power devices and microelectronics (including CAD). CAS 2006 program will consist in contributed (structured in oral or poster sessions) and invited papers.

More information: [www.imt.ro/cas](http://www.imt.ro/cas)

**Eurosensors XX Conference**

17 - 20 September 2006

Göteborg, Sweden

**Abstract Deadline: 28 April 2006**

[www.eurosensors2006.com](http://www.eurosensors2006.com)

**THERMINIC 2006 - International Workshop on Thermal Investigations of ICs and Systems**

27 - 29 September 2006

Nice, Cote d' Azur, France

**Abstract Deadline: 28 April 2006**

<http://tima.imag.fr/conferences/therminic/>

**IMAPS Nordic 2006 Conference**

17 - 20 September 2006

Gothenburg, Sweden

**Abstract Deadline: 29 April 2006**

[www.imapsnordic.org](http://www.imapsnordic.org)

**EMRS - European Material Research Society Conference - 2006 Fall Meeting**

4 - 8 September 2006

Warsaw, Poland

**Abstract Deadline: 5 May 2006**

[www.e-mrs.org/meetings/fall2006](http://www.e-mrs.org/meetings/fall2006)

**CAS 2006 International Semiconductor Conference**

27 - 29 September 2006

Sinaia, Romania

**Abstract Deadline: 28 May 2006**

[www.imt.ro/cas](http://www.imt.ro/cas)

**MNE 2006 International Conference on Micro- and Nano Engineering**

17 - 20 September 2006

Barcelona, Spain

**Abstract Deadline: 9 June 2006**

[www.mne06.org](http://www.mne06.org)

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## Other DfMM-related News

### **Job Opportunity „Post-Doctoral Position in Plastic Electronics“ at Centre Microélectronique de Provence, Gardanne, France**

The candidate will deal with nano-structuring and self-organization of polymers and/or small molecules in thin films, in order to enhance performances of plastic electronics devices (OTFTs, ring oscillator, OLEDs, ...) in using inkjet printing technique as a main building block for the future “reel-to-reel” printed microelectronics. Integrated to a cooperative regional research program (including industrial partners), this position will have academic support in synthesis of active organic materials. The post-doc work will be mainly dedicated to the self-organization engineering, realization and testing of organic materials devices elaborated by inkjet printing. The applicant should have a PhD degree in materials science or microelectronics, with a proved expertise in organic electronics. Further expertise in physical and/or chemical deposition engineering of organic materials will be appreciated. Publications in scientific journals and experience in networking are considered as advantages.

*Contact: Dr. S. Sanaur, Centre Microélectronique de Provence, Department of Packaging and Flexible Substrates, E-mail: [sanaur@emse.fr](mailto:sanaur@emse.fr)*

### **Job opportunity "Senior MEMS Engineer" at ISLI, Livingston, UK**

The Institute is seeking to recruit a self-motivated MEMS engineer, who will work as part of a flagship collaborative national project between the Institute, a commercial foundry provider and highly respected universities. The role requires an ability to work closely with both the foundry supplier and the academic research organisations to develop, characterise and qualify a range of MEMS processes. Experience in a commercial MEMS arena will enable the candidate to deliver high quality, design oriented, input to this process. In the later stages of the programme, the role will evolve into a strongly customer focused role as the primary point of interface for design expertise to customers of the service.

The candidate will apply his/her MEMS experience to the field of silicon MEMS; integrating Si MEMS, micro-fluidics, photonics and electronics. The project will be highly multi-disciplinary with applications expected in biology, medicine, metrology, chemical synthesis and smart structures. As the project develops, the candidate will generate new ideas and build these into further collaborative projects in their own right.

The successful applicant will have a high level of technical qualification in silicon based MEMS technology and will be familiar with silicon MEMS and its applications, having experience of the design process, techniques and tools. An understanding of the fabrication process and a proven ability to work closely with both design and process functions is crucial. Experience of product focused commercial development will be an advantage.

*Contact: Carol Slater, ISLI, Livingston, UK, E-mail: [carol.slater@sl-i-institute.ac.uk](mailto:carol.slater@sl-i-institute.ac.uk)*

### **Report from the International Symposium on “Mechanical Reliability of Silicon MEMS – Recent Progress and Further Requirements”, Halle (Saale), Germany, 27-28 Feb 06**

60 experts participated in this workshop to discuss progress and requirements of silicon MEMS reliability at the Fraunhofer Institute for Mechanics of Materials IWM. The key message from an

industry panel discussion was that the providing proof of MEMS reliability is one of the key factors for a long-term market success. Furthermore, it was emphasized that recent research results from academic institutions on the factors affecting the reliability have to be transferred into industrial MEMS design methodologies. The need for standards was discussed as well. It was suggested to initiate a round robin aiming at the definition of standards for fatigue tests. It was also concluded that standardization of test interfaces and data evaluation are required for reliability testing, especially during production. The complete report is available from section "EVENTS" of the PATENT website: [www.patent-dfmm.org](http://www.patent-dfmm.org)

Contact: Jörg Bagdahn, FhG-IWM, Halle, Germany, E-mail: [Joerg.Bagdahn@iwmh.fraunhofer.de](mailto:Joerg.Bagdahn@iwmh.fraunhofer.de)

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Next issue: **planned 4 May 2006** (deadline for contributions: **1 May 06** )

Please feel free to send us any DfMM-related news that might be of interest for our readership.

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This e-mail newsletter contains public information, only. Please feel free to distribute it to anyone who might be interested in the topics.

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