



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: 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!

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www.patent-dfmm.org

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News from the NoE Patent-DfMM

Open Call For Proposals for New Contractors (last-minute reminder - deadline: 7 Mar 2005):

Supporting Integration in the EC FP6 Network of Excellence "Design for Micro and Nano Manufacture (PATENT-DfMM)"

The Network of Excellence has identified a need for additional partners in the areas Design for Testability: Objective – increase the total number of researchers contributing to the area, Packaging of μ Fluidic based devices and systems, and μ Fluidics and Bio-MEMS Reliability Engineering. Further information is available at www.patent-dfmm.org or from the project co-ordinator Andrew Richardson.

Contact: Andrew Richardson, Lancaster University, E-Mail: a.richardson@lancaster.ac.uk

PATENT-DfMM at Hanover Fair, 11-15 April 2005

PATENT-DfMM will have a booth at this year's Hanover Fair. The booth will be shared with the EC-funded Europractice project and will be located within the IVAM pavilion at the "Microtechnology special area", Exhibition Hall 15, Booth D 36.

A presentation "European service offers for the design and manufacturing of MNT-based systems" by Patric Salomon is scheduled within the "Microtechnology special area" for 13 April, 15:40.

Contact: Patric Salomon, E-Mail: info@patent-dfmm.org

Workshop on Design for Micro & Nano Manufacture, Montreux, Switzerland, 30-31 May 2005 (in conjunction with DTIP)

This public workshop will present European research activities in the areas of MEMS Test and Packaging, discuss objectives, and aims at getting feedback on industry needs in the Design for Micro and Nano Manufacture. It also includes tutorials on Failure Analysis and Thermal Characterisation.

Monday 30 May

14:00 – 15:30 **Latest Advances in MEMS Testing**, Organised by P. Nouet, LIRMM, France
This session will address a selection of Design for Test (DfT) solutions recently proposed to reduce the cost of MEMS testing.

15:50 – 17:20 **Tutorial "Techniques for Failure Analysis of MEMS and MEMS Packages"**,
I. De Wolf, IMEC, Belgium
The focus of this tutorial is on failure analysis (FA) of MEMS and MEMS packaging. Techniques commonly used for FA of IC's and IC-packages that can also be used for MEMS, are discussed. But also new techniques specific to MEMS FA will be introduced and their application field, advantages and disadvantages will be discussed.

Tuesday 31 May

09:00 – 10:30 **Tutorial "Thermal Characterisation of MEMS Structures and Packages"**,
M. Rencz, BUTE/MicReD, Hungary
This tutorial gives an introduction to the thermal characterisation of MEMS elements and packages. It introduces the theory of the thermal transient characterisation method and presents how to use it for structure integrity checking and for model generation.

10:50 – 12:20 **European Research Programmes in MEMS Packaging / Package Engineering**
Organised by A. Brown, QinetiQ, UK
European research programmes in MEMS packaging will be presented. These include an overview on the "package engineering" projects within the PATENT-DfMM project.

14:00 – 17:20 **NEXUS MWG-DMS and NoE PATENT-DfMM Workshop "Design Modelling Simulation of MEMS"**, Organised by P. Salomon, 4M2C, Germany
This workshop is co-organised by the NEXUS Methodology Working Group "Design Modelling Simulation" (MWG-DMS), formerly USC-CAD, and the NoE PATENT-DfMM. Its objective is to share latest developments and ideas for "Design for Manufacture" methodologies and their potential implementation into algorithms and design tools. Presentations will be from design, modelling and simulation experts and commercial EDA providers.

Venue Hôtel Eden au Lac, Montreux, Switzerland

Registration fee €150 (including coffee breaks, lunch on 31 May and proceedings)
Please register for this 1.5 day Workshop on Design for Micro & Nano Manufacture through the DTIP registration form at <http://tima.imag.fr/conferences/dtip/DTIP2005/>.
Hotel information is also available from the DTIP website.

The detailed programme of the workshop will be updated at: www.patent-dfmm.org.

Contact: Patric Salomon, 4M2C PATRIC SALOMON GmbH, Berlin, Germany, E-mail: patric.salomon@4m2c.com
More information on DTIP: <http://tima.imag.fr/conferences/dtip/DTIP2005/>

DfMM Summer School organised by NoE PATENT-DfMM, Montpellier, France, 5-7 September 2005

Following the success of the 2004 DfMM Summer School in Livingston, Scotland, there are plans to run a similar event this year in Montpellier, France. This will be presented during 5-7 September 2005, and will include tutorials and technical presentations from the portfolio of training material which is currently being developed under the PATENT-DfMM Network of Excellence. Further details of the technical programme will be published on the www.patent-dfmm.org website over the coming weeks as details are confirmed. Meanwhile, please register your interest by sending an email message to: events@sl-i-institute.ac.uk with "DfMM Summer School" as the subject.

Contact: George Bell, ISLI, Scotland, E-mail: events@sl-i-institute.ac.uk
www.patent-dfmm.org

DfMM SME Support and Business Development Projects launched

Being an FP6 Network of Excellence, PATENT-DfMM has a very flexible approach to distribute budgets within the project. In an annual (internal) review, which is supported by the Industry Advisory Board (IAB), priorities for the next period will be set. Internal calls for project proposals are launched throughout the year.

The following internal projects have been launched recently:

PATENT-DfMM Business Development

Access Service for MNT based Sensors (Qinetiq, ULAN, 4M2C). This project will build a concept to extend the Europractice INTEGRAM service to DfMM and Packaging forming a core dissemination route for the PATENT-DfMM services portfolio.

PATENT-DfMM SME Support

Application of MEMS Test Strategies to MEMS for Detecting Faults in Aircraft Wiring (ULAN, BCF Designs, HWU).

Integration of DfT and test know-how into a new MEMS device to be designed and commercialised by an SME. Success will result in investment in the NoE PATENT-DfMM.

More information is available from www.patent-dfmm.org.

Contact: Andrew Richardson, Lancaster University, E-Mail: a.richardson@lancaster.ac.uk

Events/ Conferences, and Calls for Papers

COMS2005, Baden-2005 - CALL FOR PAPERS - deadline: 20 Mar 2005

The 10th International Conference on the Commercialization of Micro and Nanosystems (COMS 2005) will be jointly organized by Forschungszentrum Karlsruhe and the Micro and Nanotechnology Commercialization and Education Foundation (MANCEF). The Abstract Submission Deadline is 20 Mar 2005.

The Conference fosters the commercialization of micro and nanotechnologies and addresses commercialization issues unique to these emerging and disruptive technologies. COMS 2005 will bring together key people from across the world and from every sector of industry,

including leading practitioners in the field, equipment suppliers, end users, customers, Government representatives, education and financial experts. COMS2005 addresses recent advances in micro/nanotechnology and their impact on commercial markets.

For more information: www.mancef-coms2005.org

**4M 2005 Multi Material Micro Manufacture Conference
- CALL FOR PAPERS - deadline: 31 Mar 2005
Karlsruhe, Germany, 29 Jun - 1 Jul 2005**

To broaden the range of microsystems-based products and simultaneously to multiply their capabilities requires the integration of new materials and precision engineering technologies for their processing with IC-based, batch-fabrication processes. The present suite of microtechnologies will not be able alone to meet the manufacturing demands for high aspect-ratio structures, enhanced forced microactuation, improved environment resistance and high precision microcomponents. These are the biggest challenges to micro product development and at the same represent promising research and development areas for innovation and value creation. In this context, the main goal of the Conference is to provide a forum for experts from industry and academia to share the results of their in-depth investigations and engage in interdisciplinary discussions about micro-technologies for batch-processing of metals, polymers and ceramics, and the development of new production platforms for multi-material micro products.

The conference will take place at the Centre for Advanced Technological and Environmental Training of Forschungszentrum Karlsruhe (www.fzk.de), Germany. Papers are invited on all aspects of manufacturing of metal, polymer and ceramic microstructures and their application in microsystems-based products. Submission of Abstracts will be electronic only at: www.4m-net.org/4M_Conference
Deadline: 31 March 2005

Contact: Dr. Stefan Dimov (Co-Chair), Jeanette Whyte (Conf. Secretary)
Cardiff University, UK, E-mail: whytejc@cf.ac.uk, www.4m-net.org

**MEMUNITY seminar "The Challenges of Testing MEMS", Dortmund,
Germany, 10 March 2005**

Seminar topics include:

Why early MEMS testing is important
The challenges of MEMS testing
Typical requirements of a test lab

Contact: Fiona Kemp, SUSS Microtec, Germany, E-Mail: kemp@suss.de, www.memunity.com

**Training course on "Analogue Semiconductor Test Engineering", 6-8 April
2005, ISLI, Livingston, Scotland**

Presented by Prof Andrew Richardson, Director – Centre for Microsystems Engineering

The importance of this discipline to manufacturability of electronic system products cannot be stressed enough. Building intelligence and functionality normally requires more sophisticated coupling to human interfaces and communications infrastructure. This all requires embedded analogue functions. We are also experiencing higher levels of integration which now requires sensing and actuation functions which again relies on analogue interfacing. The trend here is towards mixed technologies – i.e. bio, optical, electronic and mechanical functions that tend to place high demands on the interface electronics in terms

of noise, signal magnitude, stability and linearity. Reliable and economic test and characterisation is hence crucial. This course reflects the multi-disciplinary nature of analogue test engineering.

The first day is dedicated to the "basics" of the discipline. Analogue characteristics of signals and networks from superposition and kirchoff's laws to sampling will be reviewed, requirements of the analogue test process discussed and the basic techniques presented. This day will be suitable for students, practicing engineers and managers who need to understand both current and future issues.

The second day will cover analogue measurement technology together with training into the key sources of measurement errors with their solutions. The day will cover both core analogue functions that include amplifiers, filters and oscillators together with mixed signal macros including data converters and clock synchronisation. This day will be suitable for students, system integrators and design, test and product engineers. Methods for testing MEMS and systems that include biochemical, electrochemical and optical functions will also be covered.

The third day will focus on self-test and design for testability with an emphasis on data converters, phase locked loop technology and mixed signal systems. Emerging techniques to access embedded analogue functions will be discussed and use of standardised test.

The fee is £795 + VAT with discounts for group bookings.

Details are available at <http://www.sli-institute.ac.uk/pdf/news/at02.pdf>

Contact: Suzanne O'Hare, ISLI, Livingston, Scotland, E-Mail: events@sli-institute.ac.uk

Course on "MEMS in RF and Microwave Electronics", 11-13 April, IMEC, Leuven, Belgium

This course aims at getting interested parties informed on:

- RF MEMS fabrication processes, devices, circuits, systems, packaging, reliability and CAD
- How to apply RF MEMS technology to create superior wireless systems
- How to evaluate competing RF MEMS devices and technologies in light of your capabilities, applications and budget.
- How to identify opportunities for RF MEMS insertion in wireless applications.

Co-organized by IMEC's Microelectronics Training Center (MTC) and Hector de los Santos from Nano MEMS Research, LCC

http://www.imec.be/mtc/buildframes.htm?URL=http://www.imec.be/tcmwebapp/internet/course.tcm?L=EN_GB&K=MTC&Course=AAAABMH

East/West Partnering workshop within the MINAEAST.NET initiative, TU Berlin/FhG-IZM, Berlin, Germany, 22 Apr 2005 still open for presenters

The aim of the network MINAEAST-NET (www.minaeast.net) is to prepare the participation of organisations from associated candidate countries (ACCs) for projects in FP6 in the area of Micro and Nano Technologies (MNT). The main objective is networking on micro and nanotechnologies, according to priority thematic areas 2 (IST) and 3 (NMP) from FP 6. The project is coordinated by IMT Bucharest.

The aim of this workshop is to help organisations from East European countries in participating in EC FP6 projects. In addition to presentations from existing projects (who might look for further partners), Eastern organisations will present their expertise for FP6 projects. In the afternoon, a lab tour through TUB/IZM facilities will be organised.

Existing projects or new projects that are still looking for suitable eastern partners, and Eastern organisations that are interested in joining such projects could still join the meeting and present.

Contacts: Karl-F. Becker, TU Berlin/FhG-IZM, Berlin, Germany, E-Mail: karl-friedrich.becker@izm.fraunhofer.de

Patric Salomon, 4M2C PATRIC SALOMON GmbH, Berlin, Germany, E-mail: patric.salomon@4m2c.com

DTIP - Design, Test, Integration and Packaging of MEMS and MOEMS to host PATENT-DfMM Workshop, Montreux, Switzerland, 1-3 June 2005

DTIP is the symposium on Design, Test, Integration and Packaging of MEMS and MOEMS. The goal of DTIP is to provide a forum for in-depth investigations and interdisciplinary discussions involving design, modelling, testing, micromachining, microfabrication, integration and packaging of structures, devices, and systems. Within the DTIP Programme on 1 June, there will also be a PANEL on "Design for Micro & Nano Manufacture - Industry Needs and Research Status" to present and discuss key results from this workshop.

Contact: Patric Salomon, 4M2C PATRIC SALOMON GmbH, Berlin, Germany, E-mail:

patric.salomon@4m2c.com

More information on DTIP: <http://tima.imag.fr/conferences/dtip/DTIP2005/>

Other DfMM-related News

PhD Job Opportunity at Lancaster University: Management & Coordination Support Officer

Lancaster University is seeking applications from highly motivated individuals to join the PATENT-DfMM project coordination team that currently consists of legal and contract specialists, financial support and overall project coordination. Duties would include:

- General project management including monitoring of deliverables and support to the project management board
- Business Development including investigation of risk and contractual issues associated with business models, building inventories of skills and expertise and portfolio development for the technical and training activities.
- Coordination of funding requests and support to the universities research support office in account management.

Contact: Andrew Richardson, Lancaster University, E-Mail: a.richardson@lancaster.ac.uk

Faculty Position at Université Catholique de Louvain (UCL), Louvain-la-Neuve, Belgium

The successful candidate will develop research in the area of MEMS/NEMS (micro/nano-electromechanical systems). A non exhaustive list of technological areas targeted by this research includes sensors, actuators, semiconductor devices, microwave devices, micro-mechanics, micro-fluids, bioelectronics and energy. He/she will teach or coordinate lectures on technology and design of micro/nano systems, in particular those including electronic devices and physico-chemical, electromechanical, optical or bioelectronic sensors/actuators.

Starting date: 1 Sep 2005

http://www.crct.ucl.ac.be/Poste_acad_vacants_2005_2006/fsa_931_us.html

3D-Mintegration: a project looking at the future of manufacturing

The British Funding Agency, EPSRC (Engineering & Physical Science Research Council) has awarded 5.5 MEuros to a Consortium of 6 British Universities (Cambridge, Cranfield, Loughborough, Nottingham, Heriot Watt, Greenwich) and 28 companies and the National Physics Laboratory (NPL) to develop the technologies and strategic approaches required for the design and manufacture of tightly-integrated 3D miniaturised products. The project is to be co-ordinated by the MicroSystems Engineering Centre (MISEC) Heriot Watt University whose director is Dr Marc Desmulliez.

This vision is a giant leap from the customary planar integration of semiconductors and the use of 2D printed circuit boards. It is also a momentous departure from the production of silicon-based "microsystems" whose processing has also evolved from the flat-land of semiconductors. Even though advances in semiconductors, interconnects and microsystems are currently fuelling extraordinary advances in products, they will only at best provide 2.5D structures and component-level parts, not fully-assembled and packaged products. Moreover, the design philosophies behind products made from these parts are also essentially two-dimensional, bound to planar processes, and reduced to the "cut & paste" combining of standardised parts using regularised processes rather than a true fusion of integration using manufacturing optimised specifically for a target product.

In addressing this project, radically new thinking will be generated in the end-to-end design, processing, assembly, packaging, integration and testing of complete 3D miniaturised/integrated "3D MIntegrated" products. A three-dimensional starting point is proposed for design, considering 3D integration from the outset and immersing designers in the "product world" that they are tasked with creating. Manufacturing based upon the flexible and novel use of existing processes, and innovation in assembly and packaging such that they ultimately fuse into true integration will also be researched. To validate these ideas, three manufacturing philosophies will be pursued: Lamination, Building-block and Folding. All three are promising routes to whole-product integration in 3D space. Additional details about the proposal can be obtained at the following website: <http://www.3DMintegration.com>.

Contact: Marc Desmulliez, Heriot Watt University, MISEC, Edinburgh, Scotland, E-Mail: m.desmulliez@hw.ac.uk, Web: www.hw.ac.uk

Next issue: **03 May 2005** (deadline for contributions: **01 May 2005**)

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

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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