

Smart Systems Integration 2012

6th International Conference and
Exhibition on Integration Issues of
Miniaturized Systems – MEMS, NEMS,
ICs and Electronic Components

Zurich, Switzerland
21-22 March 2012

Editors:

T. Gessner

ISBN: 978-1-5108-8384-0

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2012) by Mesago Messe Frankfurt GmbH
All rights reserved.

Printed by Curran Associates, Inc. (2019)

For permission requests, please contact Mesago Messe Frankfurt GmbH
at the address below.

Mesago Messe Frankfurt GmbH
Rotebuehlstrasse 83-85
70178 Stuttgart Germany

Phone: 49 711 619 460
Fax: 49 711 619 4690

info@mesago.com

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com



Table of Contents

Smart Systems Integration – short review and further development of smart systems 1

Thomas Gessner, Fraunhofer ENAS, Germany

Thomas Koehler, VDI/VDE Innovation + Technik GmbH, Germany

Keynote-Sessions

From SoC to Smart Systems by heterogeneous Integration: an innovative approach to address new markets 10

Carmelo Papa, STMicroelectronics, EPoS, Italy

Smarter Safety – Using Technology to Protect Lives 11

Cleo Cabuz, Honeywell, USA

Smart Systems start with innovations in materials 19

Gian-Luca Bona, EMPA, Switzerland

A European approach to Research and Innovation on Enabling Technologies: the case of Smart Systems and Smart Systems Integration 20

Dirk Beernaert, European Commission, Belgium

Technical Challenges of Extremely Miniaturized Hearing Systems 22

Evert Dijkstra, Phonak Communications, Switzerland

Conference Sessions

Session I: System integration and packaging I

A new 2-axis light incident and intensity sensor realized as an integrated smart system 30

Andreas Nebeling, Wolfgang Schreiber-Prillwitz, ELMOS Semiconductor, Germany

Chemically resistant encapsulation for MEMS release 37

Serguei Stoukatch, Fabrice Axis, Jacques Destiné, University of Liege, Belgium

Ester Tooten, Laurent A. Francis, Université Catholique de Louvain, Belgium

Bruno Heusdens, TAIPRO Engineering, Belgium

Particle Detection Microoptical System Based on Hybrid Integration and Silicon Micromachining 45

I. Bernat, M. Moreno, L. Fonseca, University of Barcelona, Spain

High density sensor integration in mobile measurement products 53

Knut Siercks, J. Hinderling, L. Stauffer, Hexagon Technology Center, Switzerland

Session II: Design of components and systems

Assembling mechanical sensors into engineering structures 61

Jürgen Wilde, Thomas Fellner, Elena Zukowski, Michael Berndt, University of Freiburg – IMTEK, Germany

Bond Wire Antennas for Compact RF Microsystems 69

Ivan Ndip, Abdurrahman Öz, Christian Tschoban, Stefan Schmitz, Stephan Guttowski, Martin Schneider-Ramelow, Herbert Reichl, Klaus-Dieter Lang, Fraunhofer IZM, Germany

Piezoelectric vibration damping using autonomous switching shunt 77

Tomasso Delpero, Paolo Ermanni, ETH Zurich, Switzerland
Andrea Bergamini, EMPA, Switzerland

Design of smart sensing system for vapor trace detection of explosives 86

Drago Strle, Bogdan Štefane, University of Ljubljana, Slovenia
Igor Muševič, Institute Jozef Stefan, Slovenia

Session III: System integration and packaging II

Miniature atomic clocks 94

R. Jose James, J. Pierer, Ch. Bosshard, J. Haesler, T. Overstolz, D. Ruffieux, S. Lecomte, CSEM, Switzerland

Platinum TSVs for High-Temperature Processing and Operation of Microsystems 102

R. Gueye, T. Akiyama, D. Briand, N. F. de Rooij, Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland

3D integration – technology and test strategy 109

Stephan Dobritz, J. Grafe, C. Rudolph, M. Böttcher, M.J. Wolf, K. D. Lang, Fraunhofer IZM, Germany

Thinning Process Optimization for an Ultra-thin 3D Magnetic Field Sensor 117

Srecko Cvetkovic, Rahel Kruppe, Lutz Rissing, Leibniz University Hannover, Germany

Session IV: Emerging micro and nano devices and technologies

Hands-on-access facility for MEMS and semiconductor prototyping at Tohoku University 123

Kentaro Totsu, Masaaki Moriyama, Masayoshi Esashi, Tohoku University, Japan

Out of Plane Capacitive Transducer in Air Gap Insulation Microstructures Technology for High Precision Monolithic 3-Axis Sensors 130

Danny Reuter, Markus Nowack, Alexey Shaporin, Jan Rockstroh, Sven Haas, Andreas Bertz, Jan Mehner, Thomas Gessner, Chemnitz University of Technology, Germany

Integration of the magnetic-based metallic glass micro-mirror with the tunable frequency actuation system 138

Yao-Chuan Tsai, Jae-Wung Lee, Yu-Ching Lin, Masayoshi Esashi, Tohoku University, Japan
Thomas Gessner, Fraunhofer ENAS, Germany

The Development Path of Electrostatic Resonant to Electrostatic Quasistatic Driven Micro Scanning Mirrors 143

Jan Grahmann, Dennis Jung, David Kallweit, Thilo Sandner, Thomas Graßhoff, Harald Schenk, Fraunhofer IPMS, Germany

Session V: Test and reliability of components and systems

The use of COTS in harsher environment – conditions and assessment of the risk on reliability 152

Bruno Foucher, EADS France-Innovation Works, France

Advanced Reliability Testing of Smart Systems under Complex Loading 153

B. Michel, Fraunhofer ENAS, Germany

R. Puffal, Infineon, Germany

H. Shirangi, Bosch Mahle Turbosystems, Germany

W. Wondrak, Daimler, Germany

Aging analysis for MEMS devices using X-ray techniques 155

Alex Dommann, Tobias Bandi, Antonia Neels, CSEM, Switzerland

Reliability characterization of SiP in LGA / QFN packages in harsh environment with focus on design and assembly process 161

M. Brizoux, A. Grivon, E. Monier-Vinard, THALES Global Services, France

Session VI: New materials, nano structures and devices

Patterning of SU-8 Pillars with Submicron Widths by Electron Beam Lithography at 20 and 30 kV 169

Valentin Doering, Christofer Hierold, ETH Zurich, Switzerland

Fabrication of nc-Si Electron Emitter Array Integrated with Active-Matrix Driving LSI for Massively Parallel EB Lithography 177

N. Ikegami, N. Koshida, Tokyo University of Agriculture and Technology, Japan

T. Yoshida, M. Esashi, Tohoku University, Japan

A. Kojima, H. Ohyi, Crestec Corporation, Japan

Thermal and UV nanoimprint lithography for applications from the micro to the nano scale 185

Jan Besser, Mario Baum, Maik Wiemer, Thomas Gessner, Fraunhofer ENAS, Germany

Samuel Sanchez Ordonez, Leibniz Institute for Solid State and Materials Research Dresden (IFW), Germany

Christine Thanner, EV Group E. Thallner, Austria

Christian Vetter, Chemnitz University of Technology, Germany

Super-compliant metallic electrodes for Electroactive Polymer Actuators 192

Florian Habrard, Jörg Patscheider, Gabor Kovacs, EMPA, Switzerland

Session VII: Manufacturing technologies

3D-MID – Adding the 3rd Dimension in Smart Systems Integration 199

Albert Birkicht, HARTING, Switzerland

Integration of CMOS and MEMS processes as part of X-FAB's "More than Moore" Modularity 205

Uwe Schwarz, Konstanze Schmidt, X-FAB Semiconductor Foundries, Germany

Direct deposition of surface acoustic wave sensors by aerosol jet printing technique 211

Denis Vandormael, Olivier Rigo, Laurent Seronveaux, Daniel Monnoye, Eric Beeckman, Thierry Dormal, Sirris, Belgium

Marc Duquennoy, Mohammadi Ouaftouh, Julien Deboucq, Frédéric Jenot, Université de Valenciennes, France

Inkjet Printing of Functional Structures for Lab-on-Chip Systems 219

Oliver Pabst, Erik Beckert, Ramona Eberhardt, Andreas Tünnermann, Fraunhofer IOF, Germany

Laser Micromachining and micro hot embossing for highly integrated Lab-on-Chip Systems 226

Tom Enderlein, Jörg Nestler, Chemnitz University of Technology, Germany

Mario Baum, Thomas Otto, Jan Besser, Maik Wiemer, Thomas Gessner, Fraunhofer ENAS, Germany

Björn John, Jens Hänel, 3D Micromac, Germany

Session VIII: Power management of smart systems / energy efficiency, energy harvesting

On-chip micro fuel cells as power supply for smart microsystems 234

D. Zimmermann, I. Freund, Micronas, Germany

J. Becker, C. Müller, H. Reinecke, M. Kuhl, C. Moranz, Y. Manoli, University of Freiburg – IMTEK,

Germany

Development of Silicon integrated rechargeable lithium ion micro batteries 242

Krystan Marquardt, Thomas Stolle, Marc Ferch, Robert Hahn, Fraunhofer IZM, Germany

Mikael Thunman, University of Technology Berlin, Germany

Smart Energy Management and Energy Distribution in Decentralized Self-Powered Sensor Networks using Artificial Intelligence Concepts 249

Stefan Bosse, Frank Kirchner, University of Bremen, Germany

Monolithic integration of multiarrays of silicon nanowires into thermoelectric microgenerators 257

Diana Davila, Instituto de Microelectrónica de Barcelona (IMB-CNM), Spain

Realizing Parsimonious Systems through Inexact/Approximate Computing: A Survey and Future Directions 258

Avinash Lingamneni, ChristianENZ, Christian Pigué, CSEM, Switzerland

Krishna Palem, Rice University, USA

Session IX: Assembling and interconnect technologies

Si Interposer Technologies for three dimensional AMR Sensor Systems 266

S. Raukopf, C. Gebhardt, Sensitec, Germany

F. Roscher, M. Baum, R. Kinner, M. Wiemer, T. Gessner, Fraunhofer ENAS, Germany

A Packaging Technology for High Temperature Environments 274

K. Brinkfeldt, E. Adolfsson, P. Johander, T. Åklint, P. E. Tegehal, Swerea, Sweden

A novel wafer-level microwave circuit integration method using high-resistive Si as double side substrate with TSV for inter side interconnections 280

Le Luo, Jiajie Tang, Shanghai Institute of Microsystem and Information Technology, China

3D Integration for MEMS devices using photosensitive glass 288

Dirk Wuensch, Christian Hofmann, Chemnitz University of Technology, Germany

Jan Besser, Ina Schubert, Knut Gottfried, Maik Wiemer, Thomas Gessner, Fraunhofer ENAS, Germany

Session X: Smart systems for communication and medtech

An integrated microsystem for DNA extraction, amplification and purification from human blood 295

Ben Jones, Paolo Fiorini, Maki Hiraoka, Sara Peeters, Bivragh Majeed, Maaïke Op de Beeck, Chris Van Hoof, IMEC, Belgium
Ichiro Yamashita, Panasonic Corporation, Japan

Photonic sensing of food allergy: integration and miniaturization 303

J. Pierer, T. Stadelmann, Ch. Bosshard, T. Volden, S. F. Graf, H. F. Knapp, CSEM, Switzerland
J. Álvarez, D. Hill, University of Valencia, Spain
M. Cretich, L. Sola, M. Chiari, ICRM CNR, Italy
P. Bettotti, N. Kumar, L. Pavesi, University of Trento, Italy
F. Saharil, K. B. Gylfason, T. Haraldsson, W. van der Wijngaart, KTH Royal Institute of Technology, Sweden
G. Platt, V. Volkovoy, M. Swann, Farfield Group, UK
L. Rosenfeld, K. Beyer, Charité Universitätsmedizin Berlin, Germany
I. Metton, G. Skorski, Phylogene, France

Flow rate influence on the adsorption capabilities on a preconcentrator device for a NDIR ethylene gas sensor 312

Steffen Janssen, Adam Sklorz, Walter Lang, University of Bremen, Germany

Modular smart RFID system with integrated CO sensors and energy harvester 320

Carolin Peter, Ina Schumacher, Jürgen Wöllenstein, Fraunhofer IPM, Germany
Alexander Gavrikov, Micropelt, Germany
Jürgen Kalbitzer, Scemtec Transponder Technology, Germany
Lars Becker, Sven Kloos, J. Dittrich Electronic, Germany

Session XI: Smart systems for automotive applications, green cars and aeronautics

Tri-axial MEMS gyroscope for Automotive applications 328

Marco Ferraresi, Alberto Marinoni, STMicroelectronics, Italy

Novel Architecture for Battery Management Systems in Fully Electrical Cars 337

S. Rzepka, A. Otto, R. Dudek, B. Michel, Fraunhofer ENAS, Germany

Wireless sensor network for Structural Health Monitoring with Guided Ultrasonic Wave propagation 345

Christian Dürager, EMPA, Switzerland

Aeronautics structural health monitoring with a Smart integrated System the size of a credit card 351

Vincent Rouet, Bruno Foucher, EADS France-Innovation Works, France

Microtechnology for Monitoring Underground and Overhead Power Distribution Systems 359

Richard White, Igor Paprotny, Berkeley Sensor & Actuator Center, US
Qiliang (Richard) Xu, Giovanni Gonzales, Chris Sherman, Paul Wright, ME Dept.
Michael Seidel, Tomas Nora, CITRIS] U. of California, Berkeley, CA

Poster Session

Development of transfer Electrostatic Carriers (T-ESC®) for thin 300mm wafer handling using seal glass bonding technology 363

I. Balaj, R. Raschke, ProTec Carrier Systems, Germany
M. Baum, S. Uhlig, M. Wiemer, T. Gessner, Fraunhofer ENAS, Germany
J. Grafe, Fraunhofer IZM, Germany

Noise Canceling Chopper Stabilized Front-End for Electrochemical Biosensors 367

Viswanathan Balasubramanian, Christian Enz, EPFL, Switzerland
Pierre –Francois Ruedi, CSEM, Switzerland

Design of a Mechanical Gripper with an Integrated Smart Sensor Network for Multi-Axial Force Sensing and Perception of Environment 371

Stefan Bosse, Sebastian Hogreve, Kirsten Tracht, University of Bremen, Germany

Novel nano-scale energetic systems for low-temperature and stress-free joining of dissimilar materials 375

J. Bräuer, J. Besser, M. Wiemer, T. Gessner, Fraunhofer ENAS, Germany

Smart Microoptical In-Ear-Sensor For Life Sciences 379

Olaf Brodersen, Hans-Georg Ortlepp, Arndt Steinke, CiS Forschungsinstitut f. Mikrosensorik, Germany

Design and characterization of a microfluidic device for bioprocess control in microtiter plates 383

A. Buchenauer, U. Schnakenberg, W. Mokwa, RWTH Aachen University, Germany

Sensor Network Based on Fibre Optics and Smart Electronic Sensor Nodes for Intelligent Sensorial Materials 387

Christoph Budelmann, DFKI, Germany

Solder joining of a miniaturized laser on a multi-material smart platform 391

T. Burkhardt, E. Beckert, M. Hornaff, J. Thiele, D. Burkhardt, R. Eberhardt, A. Tünnermann, Fraunhofer IOF, Germany
M. Galan, M. Gilaberte, S. Ferrando, D. Montes, P. Ribes, Monocrom S. L., Spain

Foil Based Application Employing Customized Printed Batteries 395

Michael Espig, Sebastian Heinz, André Stark, Reinhard R. Baumann, Chemnitz University of Technology, Germany
Andreas Willert, Fraunhofer ENAS, Germany

Micro fuel cell powered platform for autonomous microfluidics applications 399

J. P. Esquivel, M. Salleras, F. J. del Campo, N. Sabaté, Instituto de Microelectrónica de Barcelona (IMB-CNM), Spain
M. Castellarnau, Massachusetts Institute of Technology, USA
J. Colomer-Farrarons, P. Miribel-Català, University of Barcelona, Spain

Design, modelling and simulation of an implantable microprobe for neural recording 403

Bogdan Firtat, Carmen Moldovan, National Institute for Research and Development in Microtechnologies (IMT), Romania
Paul Schiopu, "Politehnica" University, Romania

Novel Biologically Active Protein-Metal Hybrids: Biomedical applications 408

Amihy Freeman, Yossi Shacham-Diamand, Tel Aviv University, Israel

Competence Center for Power Electronics, Development of an advanced, modular frequency converter for traction control 412

D. Friedrich, R. Dudde, K. Kohlmann, Fraunhofer ISIT, Germany
S. Taube, N. Eggert, Jungheinrich, Germany
H. Solmecke, J. Zitzelsberger, Jenoptik, ESW, Germany
F. Osterwald, Danfoss Silicon Power, Germany
R. Isernhagen, Vishay Siliconix Itzehoe, Germany
F. W. Fuchs, Christian-Albrechts-University of Kiel, Germany
R. Eisele, C. Weber, University of Applied Sciences Kiel, Germany
M. Berger, University of Applied Sciences West Coast, Germany

Design and Manufacturing of Micro Synthetic Jet Actuators 417

Christian Gebauer, Karla Hiller, Robert Schulze, Chemnitz University of Technology, Germany
Martin Schueller, Thomas Otto, Thomas Gessner, Fraunhofer ENAS, Germany

Intelligent Sensor Hub Benefits for Sensor Networks 421

Stephane Gervais-Ducouret, Freescale, France
Michael Stanley, Freescale, USA

Towards miniature carbon-nanotube based X-ray sources 425

S. Giudice, R. Jose James, G. Spinola Durante, Ch. Bosshard, C. Muller, P. Niedermann, A. Dommann, Ch. Kottler, C. Urban, CSEM, Switzerland
H.-R. Elsener, R. Longtin, J. R. Sanchez-Valencia, P. Groening, EMPA, Switzerland

DHC ISEE – Digital Home Compliant Intelligence, Semantics and Energy Efficiency 432

Ignacio Gonzalez Alonso, University of Oviedo, Spain
José Miguel Rubio Varas, Domotica daVinci, Spain

MOLANAE: Modelling Language for Nanomaterials Engineering 437

Ignacio Gonzalez Alonso, University of Oviedo, Spain

A Low Power MEMS based 2.4 GHz Radio Front End with Channel Filtering at RF 441

Aravind Heragu, David Ruffieux, ChristianENZ, CSEM, EPFL, Switzerland

Electronic Device Integration on Foils Using Semiconductor Nanoparticles 445

Ulrich Hilleringmann, K. Wolff, F. Assion, University of Paderborn, Germany
F. F. Vidor, G. I. Wirth, Universidade Federal do Rio Grande do Sul, Brazil

On the Wafer-Level Assembly of Multi-Component MOEMS Devices 450

Chenping Jia, Jörg Frömel, Maik Wiemer, Thomas Gessner, Fraunhofer ENAS, Germany
Sylwester Bargiel, Nicolas Passilly, Christophe Gorecki, FEMTO-ST, France

Control and Analysis of Stiction on Cantilever Beams 454

Maya Kato, Ichiroh Katoh, Japan Aerospace Exploration Agency, Japan

Spatio-angular microscopy 457

Martin Kielhorn, Susan Cox, Rainer Heintzmann, King's College London, Germany
Erhard Ipp, In-Vision Digital Imaging Optics GmbH, Austria

3D lithography for x-ray compound refractive lenses 462

O. Kurapova, L. Petti, C. Hierold, ETH Zurich, Switzerland

Analysis of High-Speed PCB Connectors using Electromagnetic Field Simulations 466

Uwe Maaß, Fraunhofer IZM, Germany

Chip-based optical sensor to determine the arterial oxygen concentration 467

Martin Möbius, Chemnitz University of Technology, Germany
Alexander Weiss, Thomas Otto, Thomas Gessner, Fraunhofer ENAS, Germany

Multichannel bidirectional microprobe for neuronal cells recording and stimulation and the integrated platform for measurements 507

Carmen Moldovan, Rodica Iosub, Cecilia Codreanu, Bogdan Firtat, Daniel Necula,
Costin Brasoveanu, National Institute for Research and Development in Microtechnologies (IMT),
Romania
Ion Stan, Romelgen SRL, Romania

Towards integration of silica membrane based DNA extraction on chip 471

Andreas Morschhauser, Sascha Geidel, Thomas Otto, Thomas Gessner, Fraunhofer ENAS, Germany
Cornelia Stiehl, Jörg Nestler, Biflow Systems, Germany

Modeling, Measurement and Optimization of Bond Wires for High-Speed Signal Transmission 475

Ivan Ndip, Abdurrahman Öz, Christian Tschoban, Stefan Schmitz, Stephan Guttowski, Martin
Schneider-Ramelow, Herbert Reichl, Klaus-Dieter Lang, Fraunhofer IZM, Germany

Highly Sensitive Radiation Detectors for Medical Applications 479

Lars Nebrich, Ignaz Eisele, Fraunhofer EMFT, Germany
Florian Wiest, Ketek, Germany

Development of a new measurement module for in-situ detection of micro test pieces 483

Pan Chi Hsiang, National Chin-Yi University of Technology, Taiwan

Development of a portable gas sensing system based on nanodevices 487

Albert Romano-Rodriguez, Román Jiménez-Díaz, Juan Daniel Prades, Francisco Hernández-
Ramírez, Jordi Samà, Olga Casals, University of Barcelona, Spain

Broadband via Satellite deployment made fast & easy with smart systems 491

P. Ruiz, J. Sánchez, Integrasys, Spain

The integration of smart systems: from R&D to products 495

P. Ruiz, JM Martinez, Integrasys, Spain

Charging SiO₂ and cytop electret film by Negative Ion generator Air Purifier multiple ionizer for MEMS based energy harvesting systems 499

Awad Saad Abou El Kheir, University of Applied Sciences Furtwangen, Germany

Comparison of lumped and finite element modeling for thermoelectric devices 503

Petra Streit, Robert Schulze, Chemnitz University of Technology, Germany
Detlef Billep, Thomas Otto, Thomas Gessner, Fraunhofer ENAS, Germany

Smartness in Manufacturing: A symbiosis between Smart Systems as products and the Smart Processes used in their manufacture 512

David Topham, Arts & Science, Great Britain
Marc Desmulliez, Heriot-Watt University, Great Britain

Smart Systems for monitoring photovoltaic plants 516

Tolgan Ungan, Patrick Steindl, SmartExergy, Germany

Analyses of the main areas of the MEMS market in Russia 520

Denis Urmanov, Russian MEMS Association, Russia
Igor Markov, Vladimir Lisov, Dmitriy Dvornikov, Sovtest ATE, Russia

Autonomous sensor network for power line monitoring 524

Sven Voigt, Chemnitz University of Technology, Germany
Steffen Kurth, Thomas Geßner, Fraunhofer ENAS, Germany

Temperature controlled transparent micro chambers 528

Henning Völlm, Dara Feili, Helmut Seidel, Saarland University, Germany

FIB/SEM Analysis for Smart Systems Integration 532

Thomas Wächtler, Ellen Auerswald, Dietmar Vogel, Bernd Michel, Stefan E. Schulz, Thomas Gessner, Fraunhofer ENAS, Germany

Iris Höbelt, Markus Nowack, Chemnitz University of Technology, Germany

Astrid Gollhardt, Fraunhofer IZM, Germany

Power Management Circuits Design for Low Intensity Indoor Light Powered Wireless Sensor Nodes 534

Wensi Wang, Ningning Wang, Michael Hayes, Brendan O'Flynn, Cian O'Mathuna, Tyndall National Institute, Ireland

Development of a magnetic field sensor working under high temperature 539

Anja Wienecke, Lutz Rissing, Leibniz University Hannover, Germany

Advanced Interposer for Heterogeneous Device Integration 540

M. J. Wolf, M. Boettcher, J. Grafe, Fraunhofer IZM, Germany

Miniaturization of LED Dimming Ballast using Piezo-Transformer and Universal Control IC 544

Yuja Yang, Matthias Radecker, Fraunhofer IZM, Germany

Wolf-Joachim Fischer, Technical University Dresden, Germany

Wafer Level Fabrication of an Integrated Microdispenser with Electrical Impedance Detection for Single-cell Printing 548

Azmi Yusof, Kiril Kalkandjiev, Jonas Schöndube, Roland Zengerle, Peter Koltay, University of Freiburg – IMTEK, Germany

Infusion Micro-Pump Development Using MEMS Technology 552

L. Zanotti, M. Ferrera, A. Merassi, L. Oggioni, M. Perletti, A. Sciutti, STMicroelectronics, Italy

E. Chappel, C. Conan, S. Mefti, F. Cannehan, G.-L. Lettieri, S. Proennecke, Debiotech, Switzerland

Special Sessions by EPoSS

New approaches in Smart Systems research N/A

Policy perspectives for Smart Systems Integration N/A

Special Sessions USA

Special session USA I – US MEMS session by Karen Lightman N/A

Special session USA II by Roger Grace N/A