COMS 2002

PROCEEDINGS

The 7th International Conference on the Commercialization of Micro and Nano Systems

September 8-12, 2002

Marriott Eagle Crest Conference Resort
Ypsilanti, Michigan USA

SPONSORED BY

Micro and Nanotechnology Commercialization Education Foundation
The 7th International Conference on the Commercialization of Micro and Nano Systems

PROGRAM SCHEDULE
(as of 08/26/02)

Sunday, September 8

1:00 pm - 6:00 pm  Registration
6:00 pm - 7:30 pm  Welcome Reception

Monday, September 9

7:00 am - 8:00 am  Registration
7:00 am - 7:50 am  Small Times Media Continental Breakfast
                  Moderator - Steve Crosby, Editor
                  Roundtable Topic - Surviving the Economy: Small Tech Businesses Tell Their Stories - A Small Tech Talks™
8:00 am - 8:10 am  Welcome and Introduction
                  Joseph Giachino, University of Michigan, USA
                  Steven Walsh, MANCEF, USA
8:10 am - 8:40 am  Michigan Welcome
                  John Engler, Governor of Michigan, USA
8:40 am - 10:00 am  Overview of MEMS and Nanotechnology
                  Small Tech Success: What Do We Need to Get There? 49
                  R. Snyder - Ardesta, USA
                  Integrated Sensors, MEMS, and Microsystems: A Perspective on their Development and Commercialization 51
                  K.D. Wise - University of Michigan, USA
                  Success Factors for MEMS Products and Technologies 59
                  K. Petersen - Cepheid, USA
                  Next-Generation Integrated Systems 61
                  A. Romig - Sandia National Laboratories, USA
10:00 am - 10:30 am  Refreshment Break/Exhibit Inspection
10:30 am - 11:15 am  Rules for Revolution 63
                  G. Kawasaki
                  Garage Technology Ventures, USA
11:15 am - 11:35 am  Technical Barriers to Nanomanufacturing and the Need for a Nanomanufacturing Toolbox 67
                  A.A. Busnaina¹, and J. Chen²
                  ¹Northeastern University, USA and ²University of Massachusetts at Lowell, USA

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11:35 pm - 12:30 pm  Roadmap Overview  
Moderator  
Steven Walsh, MANCEF, USA

RM-1  J. Elders, MANCEF, USA

RM-2  The NEXUS Microsystems Roadmap  
H. Zinner¹, A. El Fatatry² and G. Menozzi³  
¹EADS, FRANCE, ²BAE Systems, FRANCE, and ³MEMSCAP, FRANCE

RM-3  An Updated Roadmap for Medical MEMS  
J.M. Wilkinson, Technology for Industry, Ltd., UNITED KINGDOM

12:30 pm – 1:30 pm  Roundtable Networking Luncheon  
Sponsored by UK Northwest Development Agency

1:30 pm – 3:00 pm  Concurrent Sessions  
(Each session will be followed by a panel Q&A discussion after the break)

Session A.  Marketing Session  
Session & Panel Moderator  
Jonathan Linton, Rensselaer Polytechnic Institute

MA-1  Commercialization Issues of MEMS/MST/Micromachines: An Updated Industry Report Card on the Barriers to Commercialization  
R. Grace  
Roger Grace Associates, USA

MA-2  Assessing Market Potential of New MEMS: What Matters is Market Understanding  
P. Boulon¹ and P. Millier²  
¹Yole Développement, FRANCE and ²EM Lyon, FRANCE

MA-3  Marketing and Research Alliances: The Strategic Development and Use of Roadmaps  
C.T. Mooney and R.A. Schultz  
Emerson and Cuming Inc., USA

MA-4  The Business of MEMS: A Market Perspective  
M. Bourne  
In-Stat/MDR, USA

MA-5  Commercialization of Microtechnology  
B. Brox  
The Imego Institute, SWEDEN

Session B.  Nanotechnology Session  
Session & Panel Moderator  
Ahmed A. Busnaina, Northeastern University, USA

MB-1  NanoAppls - Commercialization of Nanotechnology Biosensors  
R.P. Case¹, R.B. Atilano², and S. Walsh³  
¹New Mexico’s Science & Technology Corporation, USA, ²NanoAppls, USA and ³University of New Mexico, USA
MB-2 State of the Art Automated Nanoimprinting of Polymers and its Challenges
C. Schaefer¹, S. Farrens², T. Glinsner¹, P. Lindner¹, N. Roos³, H.-C. Scheer³, and B. Wieder²
¹EV Group, AUSTRIA, ²EV Group Inc., USA, and ³University of Wuppertal, GERMANY

MB-3 Poly-Carbon Nano- and Micro- Technologies for Wireless Integrated Micro-Systems
D.M. Aslam¹, K. Najafi², K. Wise², and T. Zellers²
¹Michigan State University, USA and ²University of Michigan, USA

MB-4 Low Energy Surface Coatings for MEMS
X. Zhu
MicroSurfaces, Inc., USA and University of Minnesota, USA

MB-5 MINATEC - The New Center of Competence for Micro and Nano Technologies in Grenoble
C. Axlerad and J.C. Guibert
CEA-LETI, FRANCE

MB-6 Microsystems in Space
J. Koehler and L. Stenmark
Uppsala University, SWEDEN

Session C. Standards Session
Session & Panel Moderator
Bruce L. Gehman, Semiconductor Equipment and Materials International (SEMI³), USA

MC-1 Technical Standards for the MEMS Industry
B.L. Gehman
Semiconductor Equipment and Materials International (SEMI³), USA

MC-2 The Importance of Metrology and Standardization for Micro-Systems Technology
R.K. Leach
National Physical Laboratory, UNITED KINGDOM

MC-3 On the Complexity of Microsystems
J.C. Boudreaux
NIST/Advanced Technology Program, USA

MC-4 The European Activities on MEMS/MST Standardization - A Brief Overview
U. Behringer
UBC Microelectronics, GERMANY

MC-5 The Role of Simulation in MEMS Metrology
S.F. Bart
MST Partners, USA

MC-6 Standard Roadmap Panel
Session D.  
Telecommunication Session  
Session & Panel Moderator  
Sean Neylon, Colibrys SA, SWITZERLAND

MD-1  
From Prototype to Product: MEMS Microphones for Niche and High Volume Applications  
M. Frischholz\(^1\), J. Koblitz\(^1\), P. Rombach\(^2\), U. Klein\(^2\), and M. Müllborn\(^2\)  
\(^1\)microFAB Bremen GmbH, GERMANY and \(^2\)SonionMEMS, DENMARK

MD-2  
"It's Not the MEMS!" Moving MEMS-Based Communications Solutions Up the Supply Chain  
T. Breunig and M.A. Maher  
MEMSCAP, USA

MD-3  
RF MEMS - The Next MEMS Killer Application  
J. Bouchaud and H. Wicht  
WTC - Wicht Technologie Consulting, GERMANY

MD-4  
MEMS in Telecom - Is There a Dial Tone?  
J. Walker  
JayWalker Technical Consulting, USA

MD-5  
3D Optical Switch Technology at Corning IntelliSense  
J. Bernstein, J. Brazzle, M. Dokmeci, T. Kudrle, C. Mastrangelo, W. Taylor, and N. Yazdi  
Corning IntelliSense Corporation, USA

MD-6  
RF MEMS Switch Platforms Expedite MEMS Integration and Commercialization  
J.L. Hilbert and A.S. Morris  
Coventor, Inc., USA

Session E.  
HARM Session  
Session & Panel Moderator  
Jill M. Hruby, Sandia National Laboratories, USA

ME-1  
The Future of LIGA Technology  
J.M. Hruby  
Sandia National Laboratories - Livermore, USA

ME-2  
Application Opportunities for LIGA  
C. Khan Malek\(^1\) and V. Saile\(^2\)\(^\text{3}\)  
\(^1\)Université Paris, FRANCE, \(^2\)Universität Karlsruhe and Forschungszentrum Karlsruhe GMBH, GERMANY, and \(^3\)ANKA, Angströmquelle Karlsruhe GmbH, GERMANY

ME-3  
Cost Effective Fabrication of High Precision Microstructures using a Direct LIGA Approach  
J. Goettert\(^1\), G. Ahrens\(^2\), M. Bednarzik\(^3\), R. Degen\(^4\), Y. Desta\(^1\), G. Gruetnzer\(^2\), L. Jian\(^3\), B. Loechel\(^3\), R. Ruhmann\(^2\) and J. Yoonyoung\(^1\)  
\(^1\)Louisiana State University, USA, \(^2\)MicroResist Technology Gmbh, GERMANY, \(^3\)BESSY Gmbh, GERMANY, and \(^4\)Micromotion GmbH, GERMANY

ME-4  
Access to the LIGA Process at the Center for Advanced Microstructures and Devices (CAMD)  
Y.M. Desta\(^1\), W.L. Benard\(^2\), J. Goettert\(^1\), M. Pederson\(^2\) and M. Huff\(^2\)  
\(^1\)Louisiana State University, USA and \(^2\)MEMS Exchange, USA

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ME-5  Axsun's Commercial LIGA Foundry - A First Year Up-Date  
D. Boehme, W. Bonivert, and J. Krafcik  
Axsun Technologies Inc., USA

ME-6  HARM - Activities in Research and Commercialization at Forschungszentrum Karlsruhe  
P. Bley  
Forschungszentrum Karlsruhe (FZK), GERMANY

3:00 pm – 3:30 pm  Refreshment Break/Exhibit Inspection
3:30 pm – 4:00 pm  Sessions A, B, C, D, & E Panel Discussions
4:00 pm – 4:30 pm  Report Out by Session
4:30 pm – 4:45 pm  Announcements
4:45 pm – 6:00 pm  Wine & Cheese Reception
6:00 pm – 10:00 pm  Ford Museum Dinner  
Sponsored by Michigan Economic Development Corporation and Ardesta

Tuesday, September 10

7:30 am – 8:30 am  Micro and Nano R&D Media Breakfast  
Moderator - Tim Studt, Editor  
Roundtable Topic - Defining the Issues in MEMS Integration

8:30 am – 9:00 am  Keynote Speaker  
From Academia to Commercial Venture: A Case Study on Polychromix  
S. D. Senturia  
Massachusetts Institute of Technology, USA and Polychromix, Inc., USA

9:00 am – 10:30 am  Concurrent Sessions  
(Each session will be followed by a panel Q&A discussion after the break)

Session F.  Microsystems in the Asia/Pacific Rim Market Session  
Session & Panel Moderator  
Bob Sweatt, Sandia National Laboratories, USA

TF-1  Recent MEMS Market Trends in Japan  
M. Waga  
Global Emerging Technology Institute, JAPAN

TF-2  Asian Optical Technologies  
R. Haak  
Robert Haak & Associates, USA

TF-3  Bringing MEMS Commercialization to China  
S. L. Feng, Y. L. Wang, and W. Y. Wang  
Chinese Academy of Sciences, CHINA
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TF-4 Opportunities for Commercialization of Russian Technologies Subsidized by the U.S. Government
G.H. Dahlinbacka
Lawrence Berkeley National Laboratory, USA

TF-5 Bootstrapping MNT Commercialization in Australia - The Roles Played by Government/Industry/Academia
E. Harvey¹,², C. Davenport³, and J. Niall³
¹Swinburne University of Technology, AUSTRALIA, ²Co Operative Research Centre for Micro Technology, AUSTRALIA, and ³Government of Victoria, AUSTRALIA

Session G. Foundries Study Session
Session & Panel Moderator
Peter Podesser, EV Group, AUSTRIA

TG-1 Market Analysis for Microsystems 2000-2005 - A Report from the NEXUS Task Force
R. Wechsung¹ and A.E. Fatatry
¹STEAG microParts GmbH, GERMANY and ²BAE Systems, ENGLAND

TG-2 World MEMS Fab: An Overview of the MEMS Industry Worldwide
E. Mounier and J.-C. Eloy
Yole Développement, FRANCE

TG-3 Infrastructure for MEMS/MST: The Foundry Concept
J. Elders¹ and H. van Heeren²
¹C2V, THE NETHERLANDS and ²OnStream MST, THE NETHERLANDS

TG-4 MEMS and the Silicon Paradigm
J.D. Evans
MEMGen Corporation, USA

TG-5 About the Need for Customer Specific Packaging Solutions and How to Solve it through a Foundry Concept
H. Bohlmann, R. Götzlen and A. Reinhardt
microTEC GmbH, GERMANY

TG-6 Microtechnology Centre at Chalmers
O. Engström
Chalmers University of Technology, SWEDEN

Session H. Transportation Session
Session & Panel Moderator
Joseph Giachino, University of Michigan, USA

TH-1 Application Opportunities for MEMS/MST in the Automotive Market: The Great Migration from Electromechanical and Discrete Solutions
R. Grace
Roger Grace Associates, USA
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<td>A. Tee¹, D. Chir¹, K. Sooriakumar¹, B. Patmon¹, S. Naidu¹, K.-W. Kok¹, F. Wee-Hin¹, and B.Y. Majlis²</td>
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<td>¹Mem Tech Sdn. Bhd. (MemTech), SINGAPORE and ²Univ Kebangsaan, MALAYSIA</td>
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<td>MEMS Opportunities in John Deere Sensor Applications</td>
<td>D. Lickness</td>
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<td>Commercialization of MEMS Automotive Accelerometers</td>
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<td>National Security Applications of MEMS Technologies and the Promise of a Microsystems Unit Cell</td>
<td>M.W. Scott¹ and S. Walsh²</td>
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<td>¹Sandia Nat Labs, USA and ²Univ of New Mexico, USA</td>
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<td>C.J. Call</td>
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<td>MesoSystems, USA</td>
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<td>Mega Potential of Micro and Nano Solutions for Bio and Chemical Detection System</td>
<td>F. Hartley¹ and S. Varma²</td>
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<td>D. Fries</td>
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<td>Using Nanoscale Surface Cues to Steer Biological Systems</td>
<td>D.S. Sutherland¹, J. Brink¹, H. Agheli¹, U. Lidberg¹, G.E. Marshall², and A.-S. Andersson¹</td>
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<td>¹Chalmers Univ of Technology, SWEDEN and Univ Glasgow, UK</td>
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Session J. Clusters/Regional Session
Session & Panel Moderator
Roger Grace, Roger Grace Associates, USA

TJ-1 The Development of a UK Microsystems Packaging Centre
D. Tolfree
Technopreneur Ltd., UNITED KINGDOM

TJ-2 The NEXUS Product/Technology Roadmap 2002
H. Zinner¹, A. El Fatatry² and G. Menozzi³
¹EADS, FRANCE, ²BAE Systems, FRANCE, and ³MEMSCAP, FRANCE

TJ-3 Promotion of Scientific and Technological Development and Industrialization by German MST-Associations
P. Bley¹², P. Fritz¹², and R. Theobald²
¹Forschungszentrum Karlsruhe (FZK), GERMANY and ²GMM (Gesellschaft für Mikroelektronik, Mikro-u. Feinwerktechnik), GERMANY

TJ-4 MST/MEMS in Germany - Public Support and Future Perspectives
G. Fernholz and H. Kergel
VDI/VDE-Technologiezentrum Informationstechnik, GmbH, GERMANY

TJ-5 SUMINEnt, The European IVAM SME B2B Accelerator
M. Pierselhuis
IVAM, GERMANY

TJ-6 MEMS Cluster Development in Finland - Centered on Technological Excellence
A. Vehannen¹, M. Montonen¹, A. Haapalina¹, J. Meriano² and M. Tilli¹
¹Okmetric OYJ, FINLAND and ²Silicon Sense Inc., USA

10:30 am – 11:00 am Refreshment Break/Exhibit Inspection
11:00 am – 11:30 am Sessions F, G, H, I, & J, Panel Discussions
11:30 am – 12:00 pm Report Out
12:00 pm - 12:15 pm Announcements
12:15 pm - 1:15 pm Roundtable Networking Luncheon
Sponsored by Standard MEMS
12:30 pm – 6:30 pm MANCEF Golf Tournament - Eagle Crest Golf Course
1:30 pm – 4:30 pm Center for Wireless Integrated Microsystems Tour
WIMS/University of Michigan
7:00 pm - 11:00 pm Motown Evening
Sponsored by Silicon Sense, Inc.
Wednesday, September 11

7:30 am – 8:25 am  Sensors Magazine Media Breakfast
Moderator - Barbara Goode, Editor
Roundtable Topic - New Directions in Sensing: Where Will MEMS Take Sensors Next

8:25 am - 8:30 am  September 11th - Moment of Silence and Reflection

8:30 am - 9:00 am  Keynote Speaker
MOEMS Startup Success Factors - Two Years Later
J. Bryzek
Transparent Networks, Inc., USA

9:00 am – 10:30 am  Concurrent Sessions
(Each session will be followed by a panel Q&A discussion after the break)

Session K.  Infrastructure/Equipment Session
Session & Panel Moderator
Christian Schaefer, EV Group, AUSTRIA

WK-1  MEMS Adaptable Package (MAP)
M.H. Castro-Cedeno
Concurrent Technologies Corporation, USA

WK-2  New MEMS Manufacturing Technologies
P. Lindner1, B. Wieder2, C. Schaefer1, S. Farrens2, and V. Dragoi1
1EV Group, AUSTRIA and 2EV Group, USA

WK-3  Reduction Lithography as Enabling Technology for MEMS Manufacturing
P. ten Berge, C.Q. Gui, F.C.G. Bijnen, R. Pellens, and J. Dishmon
ASML Special Applications, THE NETHERLANDS

WK-4  Is Bigger Necessarily Best - Issues that Influence the Economic Advantages of Wafer Diameter for Silicon MEMS Manufacturing
S. Neylon
Colibrys SA, SWITZERLAND

WK-5  Future Trends for Aligned Bonding in MEMS Production
C. Ossmann1, G. Lecarpentier2, J. Dumas3, J. Kuehnholz1, and J. Hoeppner1
1SUSS MicroTec, GERMANY, 2SUSS MicroTec, FRANCE, and 3SUSS MicroTec, USA

WK-6  Economical and Technological Lithography Challenges of High Volume MST/MEMS Manufacturing
P. Consentino
Ultratech Stepper, Inc., USA

Session L.  Cluster/Regional II Session
Session & Panel Moderator
Michael Finney, Michigan Economic Development Corporation, USA

WL-1  Technology Clusters and Their Role in the Development of the Microsystems Industry
R. Grace1 and M. Ramsinghani2
1Roger Grace Associates, USA and 2Michigan Economic Development Corporation, USA

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<td>K. Eijkel(^1) and W.H. van den Berg(^2)</td>
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<td>(^1)University of Twente, THE NETHERLANDS (^2)Innofonds Twente Venture Capital B.V., THE NETHERLANDS</td>
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<td>Applied MEMS, Inc. - A Potential Catalyst for Regional MEMS Business Development in Houston</td>
<td>H. Goldberg and D. Chang</td>
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<td>Canadian Research, Technology, and Product Interests in Micromachining</td>
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**Session M.**

**Packaging Session**

Session & Panel Moderator

Michael Mignardi, Texas Instruments, USA

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<td>D. Feicht, T. Tessier, and E. Jan Vardaman</td>
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<td>MEMS Packaging - Definitions, Applications and Trends</td>
<td>H. Wicht(^1), J. Boucaud(^1), C. Bahle(^1), and E. Jung(^2)</td>
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<td>J. Branebjerg, M. Brunbjerg, and J. Bay</td>
<td>DELTA Danish Electronics, Light &amp; Acoustics, DENMARK</td>
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<td>Microtec Associates, USA</td>
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Session N. Entrepreneurship Session
Session & Panel Moderator
Mahendra Ramsinghani, Michigan Economic Development Corporation, USA

WN-1 Profitability as a Financing Option for MEMS Companies
B. Alton
Micralyne Inc., CANADA

WN-2 Commercialization of MEMS Technologies: What Seems to Work?
B.A. Kirchhoff¹, S. Newbert², and S. Walsh³
¹New Jersey Institute of Technology, USA, ²Rutgers University, USA, and ³University of New Mexico, USA

WN-3 MEMS Startups: Small Business Development Strategies
D. Hyman
XCom Wireless, Inc., USA

WN-4 A Framework for Technology Commercialization
N. Kane
Illinois Partners, LLC, USA

WN-5 How to Build a MEMS Business
N.E. Ortyl
StandardMEMS, Inc., USA

WN-6 Crawl before Running: A Serial Entrepreneurs Road Map to Spinning, Off a Core Technology
T. Griego
SurFect Technology Inc., USA and GET Systems, Inc., USA

Session O. Education/Academia Session - Panel
Panel Moderator
Andres C. Salazar, University of New Mexico, USA

Presenters
L. McAfee, University of Michigan, USA
J.E. Wood, University of New Mexico, USA
R. Stinnett, Sandia National Laboratories, USA
T. Dallas, Texas Tech University, USA
F. Lopez, Albuquerque Vocational Institute, USA

Additional Panelists
T. Studt, R&D Micro Nano Magazine, USA
B.G. Goode, Sensors Magazine, USA
S. Crosby, Small Times, USA
S. Buchler, Semiconductor Magazine, USA

10:30 am – 11:00 am Refreshment Break/Exhibit Inspection
11:00 am – 11:30 am Sessions K, L, M, & N Panel Discussions
11:30 am – 12:00 pm Report Out
The 7th International Conference on the Commercialization of Micro and Nano Systems

12:00 pm – 1:00 pm Roundtable Networking Luncheon
Sponsored by DALSA Semiconductur

1:00 pm – 2:30 pm Concurrent Sessions
(Each session will be followed by a panel Q&A discussion after the break)

Session P. Aerospace Session
Session & Panel Moderator
Jay Jakubczak, Sandia National Laboratories, USA

WP-1 Full Circle Commercialization of a Quartz Rate Sensor: Aerospace to Automotive to Aerospace
A.M. Madni, L.E. Costlow, and J. LaBoskey
BEI Technologies, Inc., USA

WP-2 On the Commercial Value of Micro-Systems in the Space Development and Applications
H. Kim
Korea Aerospace Research Institute (KARI), KOREA

WP-3 Global Patent Strategies: It's a Small World After All
R.M. Siminski
Harness, Dickey & Pierce, P.L.C., USA

WP-4 NEMS for Space and Terrestrial Applications
F.T. Hartley and C. England
Jet Propulsion Laboratory, USA

WP-5 Commercialization of Inertial Navigation Systems
Imego AB, SWEDEN

Session Q. BioMedical Session
Session & Panel Moderator
Tony Beugelsdijk, Los Alamos National Laboratories, USA

WQ-1 Immunosensing using Fabricated Protein Microarrays
S.W. Howell, D. Inerowicz, L. Guirl, F. Regnier, and R. Reifenberger
Purdue University, USA

WQ-2 Micro Filters made with Semiconductor Technologies: A Revolution in Particle-Fluid Separation
H. van Heeren¹, E. van Kuijk¹, and C. van Rijn²
¹OnStream MST B.V., THE NETHERLANDS
and ²Aquamartijn Micro Filtration B.V., THE NETHERLANDS

WQ-3 Sensor Micro-Arrays Offer Complete Testing Solutions
S.J. Pace and R. Brown
Sensicore Inc., USA

WQ-4 A New Model for Commercializing Nanotechnology
M. Magnusson¹, L. Samuelson², and L. Montelius²
¹Pronano AB, SWEDEN and ²Lund University, SWEDEN

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The 7th International Conference on the Commercialization of Micro and Nano Systems

WQ-5 Strategies for the Development of Biosensors - Few Examples
A. Krozer
The Imega Institute, SWEDEN

WQ-6 Replication Technologies - Their Impact on Microsystem Manufacturing
M. Read
Amic AB, SWEDEN

Session R. Consumer Session
Session & Panel Moderator
Uwe Kleinkes. IVAM, GERMANY

WR-1 Integrated Infrared Gas Sensor using MEMS Photonic Bandgap Structure
B.R. Kinkade, J.T. Daly, and E.A. Johnson
Ion Optics, Inc., USA

WR-2 Integrated Microsensors for Home Appliances - Issues and Opportunities
H.O. Marcy
Whirlpool Corporation, USA

WR-3 MEMS for Appliance Markets
G. Tschulena
sgt Sensor Consulting, GERMANY

Session S. Industrial Session
Session & Panel Moderator
Dave Tolfree, Technopreneur Ltd, UNITED KINGDOM

WS-1 MUSiC®: An Enabling Microfabrication Process for MEMS
J.M. Melzak, A. Leppart, S. Rajgopal, and K. Moses
FiberLead, Inc., USA

W.C. Merrill and R. Earles
Glennan Microsystems Initiative Inc., USA

WS-3 Commercial Impacts of Microreaction Technology - An Emerging Technology Wins Even Conservative Industrial Sectors
U. Fuil and S. Kiesewalter
IMM - Institut für Mikrotechnik Mainz GmbH, GERMANY

WS-4 Challenges to Technology Deployment from an End User's Perspective
I. Chan, C.-P. Hsiao, D. Shipley, and A. de Beer
ChevronTexaco Energy Research & Technology, USA

WS-5 Microrobotics as a Commercialization Tools
H. Stephanou, D. Popa, and B. Wales
Rensselaer Polytechnic Institute, USA

WS-6 The Commercialization of Micromachined Flow Sensors
D. Sparks, N. Najafi, Y. Zhang, S. Massoud-Ansari, M. Straayer, J. Cripe, R. Schneider, and R. Smith
Integrated Sensing Systems (ISSYS), Inc., USA

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Session T.  Foundries Session
Session & Panel Moderator
Todd Christenson, Sandia National Laboratories, USA

WT-1  Challenges and Opportunities for MEMS Foundries: Staying Focused in a Highly Diversified MEMS Market
J. Koblitz and M. Frischholz
microFAB Bremen GmbH, GERMANY

WT-2  Challenges of MEMS Commercialization Through Foundries
S. Massoud-Ansari and N. Najafi
Integrated Sensing Systems (ISSYS), Inc., USA

WT-3  The Make-Buy Decision for MEMS Manufacturing, Internal versus External Foundry: Which Is Better
A.K. Swiecki
Corning IntelliSense Corporation, USA

WT-4  Commercialization of MEMS Through MUMPs®
D. Koester and B. Hardy
Cronos, A JDS Uniphase Company, USA

WT-5  Making MEMS Work: The Customer-Foundry Relationship
J.S. Foster and M.G. Heaton
Innovative Micro Technology, USA

WT-6  Customer Specific MEMS Development and Foundry Service from Tronic's Microsystems
S. Renard
Tronic's Microsystems, FRANCE

2:30 pm – 3:15 pm  Refreshment Break/Exhibit Inspection
3:15 pm – 4:15 pm  Sessions P, Q, R, S, & T Panel Discussions
4:15 pm – 4:45 pm  Report Out
7:00 pm – 10:00 pm  Classical Banquet
Sponsored by Small Times Media
Thursday, September 12

7:30 am – 8:30 am    Semiconductor Magazine Media Breakfast
          Moderator - Steve Buehler, Editor
          Roundtable Topic - How Can Semiconductor Manufacturers Leverage Their Knowledge and Techniques to Move MEMS and Microelectronic Manufacturing Into the Industry's Global Production Model

Capital Formation Workshop
          Session & Panel Moderator
          Weijie Yun, Everest Microsystems, Inc., USA
          Sul Kassicieh, University of New Mexico,
          and Mahendra Ramsinghani, Michigan Economic Development Corporation, USA

8:30 am – 8:50 am    Keynote
          Paul Atherton
          NanoVentures Ltd., UNITED KINGDOM

8:50 am - 9:50 am    Capital Formation Session

          Presenters
          M.D. Naik, ASGL Inc., USA
          E. Oldekop, Deutsche Ventures, GERMANY
          M. Dierks, Intel Capital, USA
          S. Johns, Ardesta, USA

9:50 am - 10:00 am    Refreshment Break

10:00 am – 11:00 am    Panel Discussion

          Panelists
          T. Kendall, JP Morgan Partners, USA
          E. Oldekop, Deutsche Ventures, GERMANY
          M. Dierks, Intel Capital, USA
          M.D. Naik, ASGL Inc., USA
          S. Johns, Ardesta, USA
          J. Bryzek, Transparent Networks, Inc., USA
          N. Najafi, Integrated Sensing Systems (ISSYS), Inc., USA

11:00 am – 1:30 pm    Business Plan Presentations

1:30 pm - 2:30 pm    Roundtable Networking Luncheon
          Sponsored by MANCEF

2:30 pm    Conference Adjourns