

## MANCEF Quarterly Newsletter

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### MESSAGE FROM THE PRESIDENT, ROGER GRACE

The second quarter of 2003 has been exciting and challenging for MANCEF. I am gratified by the support the MANCEF board has provided in making our strategic initiatives and conference participation major successes. Thank you all.

Our participation at conferences has enabled Board members to build awareness of MANCEF to the MST/Nano community worldwide. Conferences that MANCEF sponsored and/or exhibited at in 2003 include:

[Nano Ventures 2003](#) -  
Richardson, TX, USA

[Policy and Infrastructure for the  
Exploitation of Micro-Nanotechnology](#)  
- Cheshire, UK

Semicon Europe, Munich,  
FRG

[High Aspect Ratio Micro-Structure  
Technology Workshop](#) - Monterrey,  
CA, USA

Hannover Fair, Hannover,  
FRG

[Transducers '03](#) - Boston, MA, USA

[Annual Iberoamerican  
Research and Development  
Summit](#) - Albuquerque, NM,  
USA

[New England International  
Nanomanufacturing Workshop](#) -  
Boston, MA, USA

Q-3, 2003 will provide more opportunities for us to spread the word about MANCEF and our mission. At [Semicon West in San Francisco](#), MANCEF will be a major sponsor of and exhibitor at the one-day MEMS conference program, co-chaired by myself and Joe Brown (Suss Microtech), another MANCEF board member.

MANCEF'S participation at [ICMENS2003](#) in Banff, Alberta on July 20

**Secretary**

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- 23 and at the 3rd [CWMEMS](#) on August 20 in Ottawa follow on our North-South marketing efforts initiated at AIRDS in Albuquerque, New Mexico. Canada is a vital target for our recruitment efforts, and we look forward to growing the Latin American membership as those countries join the global Micro-Nano industrial/academic base.

A special thank you to David Tolfree, MANCEF VP of Europe, and our Dutch partners, Kees Eijkel, Henne van Heeren, and Job Elders, in making this the best COMS ever. Christine Neuy, Chair of the COMS technical committee, has done a superb job in creating an exciting and informative technical program (See the detailed .pdf file at [mancef-coms2003.org/program](http://mancef-coms2003.org/program).)

I am delighted to announce that MANCEF is embarking on a new Grants & Scholarship program. We'd like your ideas and support on the Grants & Scholarships committee. Please contact Steve Walsh at [walsh@unm.edu](mailto:walsh@unm.edu) for more information.

I look forward to meeting you in San Francisco, Banff, Ottawa, or Amsterdam soon. Have a pleasant and restorative summer in the meantime.

R. Grace

## Promoted Events

- [SEMICON West](#) - San Francisco, CA, USA, July 14-18
- [ICMENS](#) - Banff, Canada, July 20-23
- [CWMEMS](#) - Ottawa, Canada, August 22

## COMS2003 Update

Henne van Heeren

Preparations for the 8th annual Commercialization of Micro and Nano Systems conference are in full swing. As with previous conferences, this one promises to give a complete in-depth overview of the status of the micro and nanotechnologies' commercialization. COMS2003 Speakers cover the full range of micro- and nanosystems, representing industrial suppliers, users, academia and governmental organisations. The COMS Program allows attendees to choose across numerous industry and commercialization topics including:

- Aerospace / Automotive
- Assembly
- Bio-medical / Pharma
- Commercialisation of Nano
- Consumer Applications
- Design & Manufacturing
- Entrepreneurship
- Equipment
- Foundries

- HARMST
- Markets and Opportunities
- Packaging
- Public Private Partnerships
- Regional Policies / Infrastructure
- Roadmaps
- Standards
- Strategies
- Telecom
- Wireless / RF MEMS

In addition, an exhibition will show the latest developments in equipment and services. The program offers ample opportunity to meet your peers and exchange views about the industry. For more information on attending this conference or participating in the exhibition, see [www.mancef-coms2003.org](http://www.mancef-coms2003.org) or send an email to: [info@mancef-coms2003.org](mailto:info@mancef-coms2003.org)

[COMS 2003 Information](#)

When: September 8-11, 2003 Where: Amsterdam, The Netherlands

Registration	Before Aug. 1	After Aug. 1
Conference attendee	€ 990	€ 1100
Student fee*	€ 350	€ 450
Accompanying person	€ 350	€ 350

\* Students should be accompanied by a mentor/ professor.

## COMS2004 Update

### James Wylde

While excitement builds for [COMS2003](#), MANCEF's Conference and Workshop Committee has been working behind the scenes to ensure a successful COMS2004. Two Canadian cities, Montréal and Edmonton, have submitted proposals. Both cities are well positioned to offer attendees and exhibitors a stimulating technical program, interesting exhibits, and great side trips.

Neil Gordon of the NanoBusiness Alliance and Nick Tasker of DALSA are spearheading the Montréal, Quebec team, working to bring COMS to the heart of French Canada. Montréal, situated on the St Lawrence River and in the shadow of Mont Royal, enjoys a vibrant small tech community; centers of excellence such as the Canadian Space Agency, DALSA Semiconductor; and leading Canadian universities, specifically Concordia, École Polytechnique, and McGill.

Chris Lumb of Micralyne, Myron Borys of Economic Development Edmonton, and Leigh Hill of NanoMEMS are taking the lead in Edmonton. Edmonton is the center of a fast-growing small tech cluster in the Canadian West and is situated close to the foothills of the Rocky Mountains. Small tech enterprise in Edmonton is led by companies such as Micralyne and BigBangWidth, and is also the newly selected center for the Canadian National Research Council's National Institute of NanoTechnology (NINT). Edmonton is home to one of the largest engineering departments in Canada at the University of Alberta.

## Conference Summaries

### From Albuquerque, NM, USA - Scott Bryant

The Annual Iberoamerican Research and Development Summit was held in Albuquerque, New Mexico in the last week of May and focused on advanced manufacturing in Micro and Nano technology. This conference was simulcasted to the attendees in both English and Spanish and was the world's first Latin American conference on the science and commercial potential of Micro and Nano technologies. The state of their respective regional

efforts were provided by: Dr. Dario Francisco Guimaraes de Azevedo, Centro de Excelência em Tecnologia Eletrônica Avancada (CEITEC), Brazil; Dr. Francelino Lamy de Miranda Grandó, Secretaria de Política Tecnologia Empresarial, SEPTE, Brazil; Ing. Jaime Parada Avila, Director General, Consejo Nacional de Ciencia y Tecnología; Dr. Gonzalo Córdoba, National Secretary, National Department of Science, Technology and Innovation, Panama; and Pedro León, Director, National center for High Technology (CENAT), Costa Rica; David Ríos Jara, CIMAV, Mexico; Guillermo Fernández de la Garza, Exec. Director, US - Mexico Science Foundation. The United States was represented by Ambassador James Sweeney; Benjamin H. Wu, Deputy Under Secretary for Technology; the U.S. Department of Commerce; and by US Senator for New Mexico, Jeff Bingeman. Senator Bingeman and Undersecretary Wu presented keynote speeches on the strategic and commercial importance of Microsystems for the United States and their IberoAmerican national partners.

Keynote addresses by two exceptional commercialization speakers provided invaluable insight and inspiration for those in attendance. Dr. Arturo Ayon of Sony Corporation discussed the commercialization pathway to production of 10 million micro-speaker units, while simultaneously announcing the bittersweet closure of their Sony San Antonio facilities and the resultant transfer of production of micro-speakers to Sony Japan. BEI Inc. founding president, Dr. Asad Madni and Dr. Weiji Yun discussed a value added pricing approach to developing a company based on Micro and Nano technology. The duo used BEI's successful, full circle journey - leaving the aircraft industry to supply sensors to the automobile industry and ultimately returning to supply sensors back into aircraft industry - as a case study of the importance of pricing and execution to Micro-Nano firms.

The conference highlighted Albuquerque's status as an emerging world leader in Micro-Nano commercialization facilities, as well as New Mexico's natural affinity as a gateway for exchange between Ibero-, Latin- and North American Micro-Nano efforts. Next year's AIRDS 2004 will cover topics related to Micro-Nano interface in the areas of biomedicine, medical equipment, and genomic research.

## Conference Summaries

From Cheshire, UK - David Tolfree

A high-level, international conference on Policy and Infrastructure for the Exploitation of Micro and Nanotechnology was held at Cranage Hall in Cheshire, England on 6 June 2003. The conference was sponsored by the Northwest Development Agency (NWDA) and MANCEF. It was chaired by Lord Wade of Chorlton and organized and presented by David Tolfree, MANCEF Vice President for Europe. Featured expert speakers from the USA and Europe attended. Mr. John Burrows, the Director of Business and Innovation of the Northwest Development Agency gave the welcome address. David Hughes, the Director General of Innovation at the Department of Trade and Industry outlined the U.K. Government's likely response to the need for further action to support the commercialization of nanotechnology and exploitation of the existing investments in this area.

A mixed audience of over 70 people attended the conference, including leaders from regional development agencies, businesses, industry, and

## INTERNATIONAL MEMS/MST/TOP DOWN NANO ROADMAP

The efforts of the chapter leaders and the contributors over the past four years have been enormous. With the assistance of over 400 contributors from four continents (Asia, Australia, Europe, & North America), the 15 chapters were completed. Through their efforts, we were able to present the completed roadmap at the COMS 2002 conference in September 2002. Special thanks to the nearly seventy chapter leaders who worked so hard to make this possible. [Purchase the Micro-Nano Roadmap now](#). MANCEF members receive a \$200 discount.



research organizations. They were presented with policy, infrastructure, commercialization challenges and opportunities. Quality presentations coupled with active networking in an excellent country environment made the meeting a milestone event. We've received very positive feedback from delegates and speakers. This conference, the first of its kind in the UK, emphasized that full commercialization requires an infrastructure providing a seamless path from research and development to product manufacture and market exploitation. The urgent need of how to address the skills shortage issue was a foremost concern of many delegates. This and many other questions concerning infrastructure and commercialization were exchanged with the speakers.

#### How to Order Internet:

<http://www.mancef.org/roadmap.htm>

Phone: +1-619-232-9499

The global market for microproducts is growing at an immense rate, and is currently estimated at £40 billion. The NWDA supported this event and its aims because it recognizes that the economic and social consequences for a market of this size are unprecedented and cannot be ignored. An infrastructure for micro and nanotechnology will significantly contribute to regional economic development. A more detailed report is being prepared for publication in MST News and Micro Nano journals. In addition, a separate report intended for circulation to the United Kingdom's Science Minister Lord Sainsbury and members of the select committee for Science & Technology in the House of Lords, as well as industry leaders, is also underway.

## Conference Summaries

### From Boston, MA, USA - Roger Grace

MANCEF was one of five sponsors of the I.E.E.E. Electron Devices Society Transducers'03 conference held June 8-12. Over 1000 microtechnologists represented North/South America Europe, Asia, Africa, and Australia. The meeting also drew a major academic contingent. MANCEF's sponsored and exhibited at this conference because it tied in with our strategic plan to support international conferences where student involvement was encouraged. It also provided us with an opportunity to meet new people, inform them of MANCEF's mission and to promote our Roadmaps and COMS 2003.

Ben Hocker (formerly of Honeywell) was the session chair, Roger Howe (UC Berkeley) the technical chair, Roger Grace (MANCEF) the development chair, and Steve Senturia (Polychromix) was the local events chair. 206 technical papers were presented at forty- four technical sessions in four simultaneous venues. While virtually all of the papers were technical, Steve Senturia and Gabriel Rabiz (Univ. of Michigan) presented exceptional "commercialization themed" papers under the title, "Perspective on MEMS Past and Future: The Tortuous Pathway from Bright Ideas to Real products", and "RF MEMS /Switches: Status of the Technology", respectively.

In addition to the technical sessions, pre-conference short courses were available and a well-subscribed poster session made the week an information-intensive experience for attendees. A technical exhibit with 48 exhibitors representing equipment manufactures, publishers, and other infrastructure supplies, complemented the technical program.

MANCEF also exhibited at Transducer '03. As a volunteer-based non-profit organization, MANCEF asks members to support the foundation with some sweat equity. Roger Grace of MANCEF, Joe Brown of Suss Microtec, and Nick Tasker of Dalsa were kind enough to volunteer to provide booth support. Thank you, Joe and Nick!

The conference was not all work. Boston weather cooperated and provided enjoyable late Spring temperatures

and conditions. The social program included a Sunday night reception at the Boston Copeley Marriott, Monday night reception and dinner at the Boston Museum of Fine Art ( with a preview of the Thomas Gainsborough exhibition) , a Tuesday evening at the famous Boston Pops at the historic Symphony Hall and a Wednesday evening dinner at the Marriott again.

Transducers' 05 will be held in Korea and Transducers '07 in France.

## Conference Summaries

### From Monterey, CA, USA - Steven Walsh

The bi-annual High Aspect Ratio Micro-Structure Technology (HARMST) conference was chaired by Dr. Jill Hruby, Director Sandia National Laboratory, and Dr. Jost Göttert, Director CAMD, on June 15-17 in Monterey, California. This conference was supported by Sandia National Laboratories, CAMD, Digital Matrix and MANCEF [www.mancef.org](http://www.mancef.org). The conference hosted a range of excellent technical papers on the problems and the progress in HARM Lithography, replication, electroforming, design and applications, testing, metrology and standards. Dr. Peter Bley of FZK, the founder and past chair of the conference and a MANCEF Board member, was provided with a special award honoring his contributions to the field.

## Commercial Challenges Faced by HARM Technologies

Photo resist technologies continue to improve and many companies, specifically Microresist Technology GmbH, are working with Shipley and Microchem to overcome these challenges in this arena. Yield and Quality control of LIGA structures continue to be a problem. Kevin Kelly of International Mezzo Technologies, Inc. stated the importance of robust molding solutions for LIGA to capture untapped market potential. Based on experience, he believes Injection molding can sometimes be better than Embossing during replication. Volker Saile of Forschungszentrum Karlsruhe said that the infrastructure for LIGA based MicroOptic and Biomedical applications, although greatly improved, needs to be sustained. Further, Saile felt that product design and marketing lag behind other infrastructure areas.

It was cautioned that LIGA foundries should ensure customers are not disappointed when they use LIGA for the first time. The chances of these early customers returning after a bad experience would be nil. There were many requests for LIGA technology in the Hannover Fair, 2003 especially in the Medical arena. However, there are very few commercial products based solely on HARM-based LIGA, such as the microspectrometer used in the bilirubin analyzer and zero backlash gears. Hence the steps suggested to popularize LIGA were :

## Nine Proposed Activities to Overcome Commercial Challenges to HARM - LIGA

1. Spend more on R&D to improve Yield.
2. Do not wait for customers to give specifications. A proactive approach is required and cost can be passed on to the consumer for high quality products.
3. The most elegant solution is not always the best solution to solve customer problems. Highly qualified scientists should think like engineers.
4. Aggressive marketing in engineering magazines, rather than scientific journals.
5. Stress the features and benefits of the technology, rather than the technology itself.
6. MEMS Designers accustomed to Bulk and Surface Micromachining have to be trained and educated to think in terms of HARM.

7. Concentrate on niche applications.
8. A better Cost Model specific to LIGA has to be worked out.
9. Better co-ordination and collaboration needed among LIGA foundries to ensure that the customer can get the most out of LIGA in terms of device features and accuracy.

## Conference Summaries

From Boston, MA, USA - Roger Grace

The 1st New England International Nanomanufacturing Workshop was held at Northeastern University in Boston, Massachusetts on June 17/18. Professor Ahmed Busnaina, Northeastern University, developed and chaired the workshop, which was co-hosted by Northeastern University, the University of New Hampshire, and the University of Massachusetts at Lowell. MANCEF and the Massachusetts Technology Collaborative were sponsors. The workshop theme was "Breaking the Barriers to Nanomanufacturing to Enable the Commercialization of Nanotechnology".

The workshop provided the opportunity for 17 international speakers to share some of their current research activities in the area of Nanotechnology, including "Report on the January 2003 NSF Nanomanufacturing Workshop" by Professor Busnaina; "Overview of Nanomanufacturing Programs of NSF", by Haris Doumanidis, NSF Nanotechnology Manufacturing Program Manager; "High-Rate, High-Volume Nanomanufacturing of Polymers" by Professor Joey Mead of the University of Massachusetts Lowell; "Production of Patterned Electro spray Fiber Structures" by Phil Gibson of the US Army Natick (Massachusetts) Laboratory; "Nano Mechatronics" by Chang-Soo Han of the Korean Institute of Machinery and Materials; "Manufacturable Surface Modification of Micro/nano Electro Mechanical System" by Jin-Goo Park of Hanyang University (Korea). In addition, three panel sessions were conducted covering significant areas of nanotechnology commercialization. Over 70 attendees including many students from the three co-sponsoring universities were present for the event, which included a small exhibit and a student poster paper session.

MANCEF president, Roger Grace, was the lead introductory speaker for the Tuesday June 17 schedule with a presentation entitled "An Updated Industry Report Card on the Commercialization of Microsystems: Lessons to be Learned from a Big Brother". The presentation compared and contrasted barriers that have faced the MEMS/MST industry in the past and then related them to the Nano industry.

Tuesday panels included one devoted to nanomanufacturing tools where MANCEF Board advisors Tom Cellucci (Zyvex) and Bob Sulouff (Analog Devices) were panelists. Roger Grace was a panelist on the Investment in Nanotechnology session. The Wednesday panel addressed the topic "Reliability in Nanomanufacturing". This was a most successful event with plans to create a "second" conference in the June 2004 time-frame in the New England area. For more information, please contact Professor Busnaina at [busnaina@coe.neu.edu](mailto:busnaina@coe.neu.edu).

### MANCEF Members Only Special Benefit Conference Presentations Online

MANCEF members may access the New England International Nanomanufacturing Workshop presentations online.

Members will be mailed a web address, user name, and password separately from the newsletter. Be looking for it in your e-mail shortly.

This is a benefit of your paid membership; please do not transfer the proceedings to non-MANCEF members.