

PROGRAM

THE COMMERCIALIZATION OF MICROSYSTEMS

September 11-16, 1994
Banff Conference Center

Banff, Alberta, Canada

The Engineering Foundation is sponsoring a conference on the COMMERCIALIZATION OF MICROSYSTEMS which will be held at the Banff Conference Center in Banff, Alberta, Canada from September 11-16, 1994. At the time of publication the conference is being co-sponsored by the Dynamic Systems and Controls Division of the ASME.

Overview

The conference will address the management and technology transfer programs in the United States and abroad. Past experience in the electronics arena shows that cutting-edge research alone is insufficient for the successful commercialization of the research results. It is necessary to have a clear understanding of the markets and the appropriate enabling technology(ies) that permits systems integration. Successful commercial integration requires involvement at the design, process, manufacturing, applications, and marketing levels because each one of these levels had its unique requirements. Thus, it is imperative to create a support infrastructure for MEMS that oversees communication and information exchange among these levels to prevent detrimental bottlenecks to commercialization.

SUNDAY, September 11, 1994

- | | |
|---------------|--|
| 15:00 - 21:00 | Registration - Across from Main Reception Desk
in Donald Cameron Hall |
| 18:00 - 19:30 | Welcome Dinner - Main Dining Room in Donald Cameron Hall |
| 19:30 - 21:30 | Welcome Reception - Solarium in Donald Cameron Hall |

NOTE: The main conference sessions will be held in Room 300 (Donald Cameron Hall). The rooms for breakout sessions will be announced.

All social hours (cash bars) will be held in the Solarium.

MONDAY, September 12, 1994

THEME: THE CHALLENGE OF COMMERCIALIZING RESEARCH

7:00 - 8:30	Breakfast Buffet
8:30 - 12:30	SESSION I Chair: R. Warrington
8:30	Welcome and Introductions
9:00	General Technology Overview Speaker:
9:40	Theme Talk: A Historical Perspective of MEMS Speaker: Joe Mallon, Stanford University
10:30	Coffee Break
10:45	Startup Companies in Silicon Microtechnology ► Lucas Novasensor Speaker: Janusz Bryzek, Lucas Novasensor ► Redwood Sensors Speaker: Mark Zdeblick, Redwood Sensors
12:30	Lunch Buffet
13:30 - 18:00	Group Discussions/Free Time
17:00 - 18:00	Social Hour (cash bar)
18:00 - 19:15	Dinner
19:30 - 20:30	SESSION II P. Bley Tutorials ► Bulk Micromachining Speaker: Hal Jerman, IC Sensors ► Surface Micromachining Speaker: Hirojuki Fujita, University of Tokyo
20:30	Break

MONDAY, September 12, 1994 (continued)

20:45 - 22:00

Tutorials

► Deep Lithography (UV and X-ray)

Speaker: Henry Guckel, University of Wisconsin - Madison

► Other Processes

Speaker: Craig Friedrich, Louisiana Tech University

22:00 - 23:00

Cash Bar

TUESDAY, September 13, 1994

THEME: RESEARCH COMMERCIALIZATION: PAST AND PRESENT

7:00 - 8:30	Breakfast Buffet
8:30 - 12:30	SESSION III Chair: M. Zdeblick
8:45	Theme Talk: The Challenge of Commercializing Research Speaker: Bob Sulouff, Analog Devices
9:30	Corporate Experience ➤ Texas Instruments' HDTV Microsensor Display Speaker: Jack Younse, Texas Instruments ➤ Applied Biosystems Speaker: Michael Albin ➤ Ford Corporation Speaker: Ed Sickafus, Ford Corporation
10:30	Coffee Break
10:45	Foreign Experience ➤ Micromachine Center Speaker: Hirojuki Fujita, University of Tokyo ➤ Institute of Microtechnology Mainz Speaker: Wolfgang Ehrfeld, iMM ➤ KfK Projekt Mikrosystemtechnik Speaker: Peter Bley, KfK
12:30	Lunch Buffet
13:30 - 18:00	Group Discussions/Free Time
17:00 - 18:00	Social Hour (cash bar)
18:00 - 19:15	Dinner
19:30 - 21:30	SESSION IV Chair: H. Fujita Marketing Microtechnology ➤ Silicon based Microsystems Speaker: Robert Mehalso, Microtec Associates
20:30	Coffee Break ➤ Other Technologies Speaker: Ursula Ehrfeld, iMM
21:45 - 22:45	Cash Bar

WEDNESDAY, September 14, 1994

THEME: LEVERAGING TECHNOLOGY

7:00 - 8:30 Breakfast Buffet

8:30 - 12:30 SESSION V
Chair: W. Ehrfeld

8:45 Panel Presentation: What works? What doesn't?
Speakers:
Perry Skeath, Integrated Technologies for Medicine
Mark Madou, Microfabrication Applications
Joe Mallon, Stanford University

9:30 Enabling Technologies: Equipment, Materials, and Design Tools
Speaker: Stephen Senturia, MIT

10:15 Coffee Break

10:30 Infrastructure Models
U.S. Infrastructure
➤ ARPA Multiproject Runs
Speaker: Karen Markus, MCNC
➤ TRP Regional Alliance for High Aspect Ratio MEMS
Speaker: Rod McCormick, NC State University
➤ BMFT Microsystems Project
Speaker: Hanns Fahlbusch, BMFT
➤ Initiatives in Microtechnology in the UK
Speaker: David Tolfree, Daresbury

12:30 Lunch

13:30 - 18:00 Group Discussions/Free Time

17:00 - 18:00 Social Hour (cash bar)

18:00 - 19:15 Dinner

19:30 - 21:30 SESSION VI
Chair: J. Jara-Almonte

Open Sessions and displays
Speaker: Fariborz Maseeh, Intellisense Corporation
Speaker: Juan Lam, Hughes Corporation
Speaker: Bart Van der Schoot, University of Neuchatel
Speaker: Robert Wegeng, Battelle

(Open bar and coffee)

THURSDAY, September 15, 1994

THEME: LEVERAGING TECHNOLOGY

7:00 - 8:30	Breakfast Buffet
8:30 - 12:30	SESSION VII Chair: K. Markus
8:45	Theme Talk: Paradigm Shifts and MEMS Applications Speaker: George Hazelrigg, National Science Foundation
9:30	Why haven't microsystems taken over the world? Part II Mark Madou, Microfabrication Applications
10:15	Coffee Break
10:30	Moderated Open Forum, Robert Mehalso, Microtec Associates Break into small groups by sector/interest for consensus draft of industrial research needs and/or key commercialization impediments
12:30	Lunch Buffet
14:30	Continuation of Group meetings or Free Time
17:00 - 18:00	Social Hour
18:00 - 19:15	Dinner
19:45 - 22:15	Group Meetings (continued)
20:45	Coffee Break

FRIDAY, September 16, 1994

THEME: SUMMARY

7:00 - 8:30	Breakfast Buffet
8:30 - 10:30	SESSION VIII Chair: R. Mehalso
8:45	of Findings
9:45	Coffee Break
10:00	Discussion and Closing Summary Robert Warrington and Jim Jara-Almonte
	Boxed Lunches

Engineering Foundation Conferences

COMMERCIALIZATION OF MICROSYSTEMS

Banff Conference Center
Banff, Alberta, Canada
September 11 to September 16, 1994

PARTICIPANTS LIST

- ✓ Albin, Michael - Senior Scientist
Applied Biosystems - PE
850 Lincoln Centre Drive
Foster City, CA 94404
Telephone: 415-638-5753/F-572-2743
- Allen, Tina L. - Office Coordinator
Louisiana Tech University
Inst. for Micromanufacturing
P.O. Box 10348
Ruston, LA 71272
Telephone: 318-257-2777/F-3999
- Ameel, Tim - Assistant Professor
Louisiana Technical University
P.O. Box 10348
Ruston, LA 71272
Telephone: 318-257-4714/F-3999
- ✓ Antonucci, Thomas - Accelerometer Engineering Mgr.
TRW TED
6040 N. Irwindale Avenue
Irwindale, CA 91702
Telephone: 818-812-7419/F-334-6139
- ✓ Benoit, Joseph N. - Associate Professor
Louisiana State University
Physiology Department
1501 Kings Highway
Shreveport, LA 71130
Telephone: 318-675-6036/F-6974
- ✓ Bley, Peter - Executive Program Manager
Kernforschungszentrum
PMT/PL
Postfach 3640
D-76021 Karlsruhe GERMANY
Telephone: 49-7247-82-2777/F-5579

PARTICIPANTS LIST Page # 2

/Bryzek, Janusz - Executive Vice President

Lucas Novasensor
1055 Mission Court
Fremont, CA 94539
Telephone: 510-490-9100/F-770-0645

/Cardarelli, Donato

M.S. Sapuppo & Associates
Dynamics Research Corporation
93 Border Street
West Newton, MA 02165
Telephone: 617-965-1346/F-244-7726

/Christensen, C. Paul - President

Potomac Photonics Inc.
4445 Nicole Drive
Lanham, MD 20706
Telephone: 301-459-3031/F-3034

/Christensen, Sarah - Marketing Manager

Potomac Photonics Inc.
4445 Nicole Drive
Lanham, MD 20706
Telephone: 301-459-3031/F-3034

/Clymer, Richard M. - Marketing & Project Consultant

TVJ Electroforming
2929 North Campbell Avenue
Chicago, IL 60618
Telephone: 312-478-2022/F-0008

/Cordella, Robert H. - Engineering Manager

U.S. Gov't. Office of R & D
P.O. Box 9723
Arlington, VA 22219-1723
Telephone: 703-351-2066/F-527-9492

/Dahlbacka, Glen - Industrial Program Dev. Mgr.

Lawrence Berkeley Laboratory
Technology Transfer Dept.
1 Cyclotron Road, B 90-1070
Berkeley, CA 94720
Telephone: 510-486-5358/F-6457

/Dauwalter, Charles R.

M.S. Sapuppo & Associates
Dynamics Research Corporation
93 Border Street
West Newton, MA 02165
Telephone: 617-965-1346/F-244-7726

/Drost, M. Kevin

Battelle
Pacific Northwest Laboratories
Richland, WA 99350
Telephone: 509-375-2017/F-3614

PARTICIPANTS LIST Page # 3

/ Edmans, Daniel M. - Staff Engineer & Scientist
Interscience Inc.
105 Jordan Road
Troy, NY 12180
Telephone: 518-283-7500/F-7502

/ Ehrfeld, Ursula
IMM Institute of Microtechnik
Carl-Zeiss-Strasse 18-20
D-55129 Mainz-Hechtsheim GERMANY
Telephone: 49-6131-990-110/F-200

/ Ehrfeld, Wolfgang - Professor
IMM Institut für Microtechnik
Carl-Zeiss-Strasse 18-20
D-55129 Mainz-Hechtsheim GERMANY
Telephone: 49-6131-990-100/F-200

/ Eijkel, Kees C.J.N
University of Twente
Mesa Research Institute
P.O. Box 217
Enschede 7500 AE NETHERLANDS
Telephone: 31-53-892715/F-300547

/ Fair, Richard B. - President
MTC Corporation
P.O. Box 51115
Durham, NC 27717
Telephone: 919-493-4293/F-same

/ Fischer, Philippe
FSRM
Swiss Found. Res. Microtech.
Orangerie 8
Neuchatel 2000 SWITZERLAND
Telephone: 41-38-200830/F-247145

Friedrich, Craig - Associate Professor
Louisiana Tech University
Inst. for Micromanufacturing
P.O. Box 10348
Ruston, LA 71272
Telephone: 318-257-2274/F-3999

/ Fujita, Hiroyuki - Professor
University of Tokyo, IIT
7-22-1 Roppongi
Minato-ku
Tokyo 106 JAPAN
Telephone: 81-3-3402-6231/F-5078

PARTICIPANTS LIST Page # 4

- / Gutierrez, Adolfo O. - Staff Scientist
Interscience, Inc.
105 Jordan Road
-ERROR- TEXT cannot be added to .
-ERROR- Expression cannot be evaluated
Troy, NY
Telephone: 518-283-7500/F-7502
- / Hamel, Guy - Technical Supervisor
Mitel Semiconductor
18 Airport Boulevard
Bromont, Quebec JOE 1L0 CANADA
Telephone: 514-534-2321/F-3201
- / Hazelrigg, George A. - Senior Advisor
National Science Foundation
Eng/DMII
4201 Wilson Blvd.
Arlington, VA 22230
Telephone: 703-306-1330/F-0298
- / Jamiolkowski, Michael - VP, Business Development
Integrated Silicon Systems
210 Willesden Drive
Cary, NC 27513
Telephone: 919-677-9616/F-361-2019
- Jara-Almonte, James - Professor
Louisiana Technical University
Inst. for Micromanufacturing
P.O. Box 10348
Ruston, LA 71272-0046
Telephone: 318-257-4127/F-3999
- / Jerman, Hal - Director of Technology
IC Sensors
1701 McCarthy Boulevard
Milpitas, CA 95035
Telephone: 408-955-1211/F-434-6687
- / Jerominek, Hubert
National Optics Institute
369 Franquet Street
Sainte-Foy, Quebec G1P 4N8 CANADA
Telephone: 418-657-7006/F-7009
- / Kaiser, Todd
M.S. Sapuppo & Associates
27 Clinton Way
Marlboro, MA 01752
Telephone: 508-460-1053

Lam, Juan - Senior Scientist
Hughes Research Laboratories
301 Malibu Canyon Road
RL6S
Malibu CA 90265

PARTICIPANTS LIST Page # 5

✓ Lee, Soo Young S. - Principal Scientist

Tektronix Inc.
P.O. Box 500
MS 50-324
Beaverton, OR 97077
Telephone: 503-627-2259/F-5177

✓ Lokuta, Michael F. - Director, R & D

Reflectone
4810 Londonderry Drive
Tampa, FL 33647
Telephone: 813-977-7616

✓ Mallon, Joseph R.

Stanford University
43517 Ocaso Corte
Fremont, CA 94539
Telephone: 510-651-9776/F-same

✓ Markus, Karen W. - Director, MEMS Technology

MCNC
P.O. Box 12889
Research Triangle Park, NC 27709-2889
Telephone: 919-248-1437/F-1455

✓ Martin, Samuel B. - Manager

Sandia National Laboratories
MS 0319, Department 2641
P.O. Box 5800
Albuquerque, NM 87185-0319
Telephone: 505-845-8278/F-844-3593

✓ Maseeh, Fariborz - President

Intellisense Corporation
16 Upton Drive
Wilmington, MA 01887
Telephone: 508-988-8000/F-8001

McArdle, Donna Marie

Engineering Foundation
345 East 47th Street
New York, NY 10017

McCormick, Rod - Specialist Assistant

North Carolina State Univ.
NC Star
Box 7518
Raleigh, NC 27695-7518
Telephone: 919-515-4498/F-4496

✓ McKinnon, Graham H. - Manager, Rsearch Laboratory

Alberta Microelectronic Centre
#318, 11315-87 Avenue
Edmonton, Alberta T6G 2T9 CANADA
Telephone: 403-492-3914/F-1643

PARTICIPANTS LIST Page # 6

/Mehalso, Robert M. - President
Microtec Associates
39 Emerald Hill Circle
Fairport, NY 14450
Telephone: 716-223-3052/F-427-0552

/Muir, Andrew R. - Vice President/ R & D
Chemcore Corporation
481 Jerusalem Road
Cohasset, MA 02025
Telephone: 617-383-2114/F-2616

/Nagel, David J.
Naval Research Laboratory
4555 Overlook Avenue, SW
Code 6000
Washington, DC 20375-5345
Telephone: 202-767-2931/F-3709

/Sapuppo, Michele S.
M.S. Sapuppo & Associates
93 Border Street
West Newton, MA 02165
Telephone: 617-965-1346/F-244-7726

/Sapuppo, Nunzi M.
M.S. Sapuppo & Associates
P.O. Box A3326
Chicago, IL 60690
Telephone: 312-482-8160

/Schmidt, Frank W. - Emeritus Professor of ME
Pennsylvania State University
Mechanical Engineering Dept.
201A Reber Building
University Park, PA 16802
Telephone: 814-865-2072/F-863-4848

/Schrodt, Ariel G. - President
TVJ Electroforming
2929 North Campbell Avenue
Chicago, IL 60618
Telephone: 312-478-2022/F-0008

/Schrodt, James L. G. - Petroleum Engineer
TVJ Electroforming
2929 North Campbell Avenue
Chicago, IL 60618
Telephone: 312-267-6886/F-478-0008

/Senturia, Stephen D. - Professor of EE
MA Institute of Technology
77 Massachusetts Avenue
Room 39-567
Cambridge, MA 02139
Telephone: 617-253-6869/F-9606

PARTICIPANTS LIST Page # 7

—Sevrain, Christophe J.D. - VP, Business Development

Micropump Corporation
1402 N.E. 136th Avenue
Vancouver, WA 98684
Telephone: 206-253-2008/F-8294

—Sickafus, Edward N. - Senior Staff Scientist

Ford Motor Company
Electronics Division ETC-8315
17000 Rotunda Drive
Dearborn, MI 48121-6010
Telephone: 313-322-3912/F-337-1768

—Skeath, Perry R. - President

Integrated Tech For Medicine
1113 Dennis Avenue
Silver Spring, MD 20901-2163
Telephone: 301-681-8307/F-8301

—Stichman, John H. - Director

Surety Components & Inst. Ctr.
P.O. Box 5800
MS 0985
Albuquerque, NM 87185-0985
Telephone: 505-845-9994/F-844-5916

—Stoppok, Christoph

VDI/VDE Technology Center
Informationstechnik GmbH.
Rheinstrasse 10 8
D-14513 Teltow GERMANY
Telephone: 49-33-28-435-213/F-141

—Sulouff, B. E. - Director, Accelerometers

Analog Devices, Inc.
831 Woburn Street
Wilmington, MA 01887-3462
Telephone: 617-937-1656/F-1607

—Tolfree, David W.L.

DRAL Daresbury Laboratory
Warrington WA4 4AD UNITED KINGDOM
Telephone: 44-925-603-607/F-196

—Van Der Schoot, Bart H. - Project Leader

University of Neuchatel
Institute of Microtechnology
Rue A. L. Breguet 2
CH-2000 Neuchatel SWITZERLAND
Telephone: 41-38-205-387/F-617

—Verpoorte, Elisabeth - Senior Scientist

Ciba-Geigy Ltd.
Corporate Analytical Research
FO3.2, K-127.1.12
CH-4002 Basel SWITZERLAND
Telephone: 41-61-696-6731 /F-4504

PARTICIPANTS LIST Page # 8

Vladimirsky, Yuli
Louisiana State University
CAMD
3990 West Lake Shore Drive
Baton Rouge, LA 70803
Telephone: 504-388-8887/F-6954

Warrington, Robert O. - Director
Louisiana Tech. University
Inst. for Micromanufacturing
P.O. Box 10348
Ruston, LA 71272-0046
Telephone: 318-257-2357/F-3999

/ Watson, Steve Reed - Program Manager
U.S. Government
11550 Water Oak Court
Woodbridge, VA 22192
Telephone: 703-590-7000

/ Wegeng, Robert S. - Senior Research Engineer
Batelle
Pacific Northwest Laboratory
P.O.Box 999 M/S K7-97
Richland, WA 99352
Telephone: 509-375-6517/F-6417

/ Younse, Jack M. - Program Manager
Texas Instruments
P.O. Box 655474
MS 429
Dallas, TX 75265
Telephone: 214-995-7793/F-2217

PARTICIPANT LIST ADDENDUM

✓ Hanns Fahlbusch
BMFT (Federal Ministry for Research and Technology)
Heinemannstrasse 2
53175 Bonn
Germany
49-228-59-3373/3601 (fax)

✓ Henry Guckel - Professor
University of Wisconsin
1415 Johnson Dr.
Madison, WI 53706
608-263-4723

Thomas M. Hinkes - Sr. Licensing Associate
WI Alumni Research Foundation
P.O. Box 7365
Madison, WI 53711
608-263-2828/1064 (fax)

✓ Marc J. Madou - Principal
Microfabrications Appl.
Palo Alto, CA 94306
415-858-1663/0223 (fax)

David G. Sutton - Dept. Director
The Aerospace Corp.
P.O. Box 92957
Los Angeles, CA 90009
310-336-5049/5846 (fax)

— Lubomyr Romankiw - IBM Fellow & Head/CETAM
IBM
TJ Watson Research Ctr.
P.O. Box 218
Yorktown Heights, NY 10598
914-945-1208/4520 (fax)

— Weijie Yun - Director of Microengineering
BEI Electronics Inc.
39055 Hastings St., Suite 207A
Freemont, CA 94538
510-790-9498/9486 (fax)

✓ Mark Zdeblick - Chief Tech Officer
Redwood Microsystems
959 Hamilton Ave.
Menlo Park, CA 94025
415-617-1200/326-1899 (fax)