

**TECHNICAL DIGEST**

# **mems 2002**

ieee international conference

# **las vegas**

**The Fifteenth IEEE International Conference on  
Micro Electro Mechanical Systems**

Sponsored by:



IEEE and the



Robotics and Automation Society

**2002**

**LAS VEGAS, NEVADA, USA  
JANUARY 20-24, 2002**

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Welcome to Las Vegas, Nevada and the 15<sup>th</sup> IEEE International Micro Electro Mechanical Systems (MEMS) Conference. The IEEE MEMS Conference series began in 1987 as the Micro Robots and Teleoperators Workshop in the USA. It was subsequently renamed the IEEE Micro Electro Mechanical Systems Workshop, and since 1999 it has been known as the IEEE International Micro Electro Mechanical Systems Conference.

An examination of the proceedings of the MEMS conferences over the years reveals not only the growth and maturation of the MEMS research but also indications of future directions. Existing thrusts in arenas such as environmental sensors, inertial sensors, and machining of silicon and metal derivatives have been supplemented with a surge of activity in optical MEMS, RF devices, NEMS, microfluidics, and biomedical microsystems, accompanied by the expanding use of unconventional organic and inorganic materials. The enthusiasm of this research community is evident from creativity and speed with which this field is evolving.

The technical program for this year's MEMS conference offers three invited oral presentations, 41 contributed oral presentations, and 134 contributed posters. The contributed presentations were selected from a total of more than 454 submissions. The conference retains a single-session format, with oral sessions in the mornings and poster sessions in the afternoons. This year, even more so than in the past, the poster sessions are the highlights of this conference. We have made arrangements for all the posters to be on display throughout the conference, and divided their presentations into three whole-afternoon sessions to facilitate interaction with authors. All presentations at the conference are included in the Technical Digest.

Our sincere thanks to the authors of all the submitted abstracts. It is their highest quality work that serves as the foundation for the success of this conference series. The papers were selected by a technical program committee made up with equal representation from the regional divisions, which include the American sub-continent, Europe and Africa, and Asia and Australia. In order to facilitate detailed review of the large number of submitted abstracts, three sub-committees were formed to examine abstracts in different subject categories. The committee recommendations on the acceptance and declination of papers were taken as binding. We are also greatly indebted to the members of the Technical Program Committee for volunteering so much of their time and sharing their technical expertise and insight in the paper selection process, made all the more difficult by the very high standard of the submissions. We are grateful to the International Steering Committee and the Advisory Co-Chairs, Henry Baltes and Siebe Bouwstra, for generously sharing their experiences. This conference was managed by Ms. Katharine Cline and her team at Preferred Meeting Management, Inc. (PMMI). Their expertise, diligence, and commitment to this conference were evident in every stage of its preparation. We are thankful to the IEEE Robotics and Automation Society for their support of this meeting. With the climactic international events taking place at the time of this writing, we are grateful for your continued enthusiasm and support of this conference.

Best regards,



Dr. Yogesh B. Gianchandani  
University of Michigan  
MEMS 2002 Conference Co-Chair



Dr. Yu-Chong Tai  
California Institute of Technology  
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Left to right

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Center:

S.-W. Lee, Y.B. Gianchandani, T.W. Kenny, C.-M. Ho, O. Tabata, Y.-H. Cho

Back:

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Missing:

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[illegible]

4:00 p.m. -  
8:00 p.m.

8:00 a.m.

**Y.B. Gianchandani and Y.-C. Tai**  
Conference Co-Chairmen

8:20 a.m.

1

University of California at Los Angeles, USA

**Session Chairs:**

R. Miyake, Hitachi Ltd., JAPAN

9:00 a.m.

6

G. Waibel<sup>1</sup>, J. Kohnle<sup>1</sup>, R. Cernosa<sup>1</sup>, M. Storz<sup>1</sup>, M. Schmitt<sup>3</sup>, H. Ernst<sup>1</sup>, H. Sandmaier<sup>1</sup>,  
R. Zengerle<sup>2</sup>, and T. Strobel<sup>1</sup>

and <sup>3</sup>University of Stuttgart, GERMANY

9:20 a.m.

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H. Sano<sup>1</sup>, H. Kabata<sup>1</sup>, O. Kurosawa<sup>2</sup>, and M. Washizu<sup>1</sup>

<sup>1</sup>Kyoto University, JAPAN and <sup>2</sup>Advance Co., JAPAN

9:40 a.m.

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T.-H. Wang, P.K. Wong, and C.-M. Ho

University of California at Los Angeles, USA

10:00 a.m.

**BREAK**



Session Chairs:  
S.-W. Lee, Samsung Advanced Institute of Technology, KOREA  
Y. Zohar, Hong Kong University of Science & Technology, CHINA



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<sup>1</sup>*Korea Advanced Institute of Science and Technology, KOREA*  
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<sup>1</sup>*Micronit Microfluidics B.V., THE NETHERLANDS*,  
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January 22, 2002**

8:00 a.m.	<b>INVITED SPEAKER</b> <b>Saving Energy and Natural Resource by Micro-Nanomachining</b> M. Esashi Tohoku University, JAPAN	220
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**SESSION 3 - POWER MEMS**

Session Chairs:

T. Akin, Middle East Technical University, TURKEY  
K.S.J. Pister, University of California at Berkeley, USA

8:40 a.m.	<b>Development of a Catalytic Silicon Micro-Combustor for Hydrocarbon-Fueled Power MEMS</b> C.M. Spadaccini <sup>1</sup> , X. Zhang <sup>2</sup> , C.P. Cadou <sup>3</sup> , N. Miki <sup>1</sup> , and I.A. Waitz <sup>1</sup> <sup>1</sup> <i>Massachusetts Institute of Technology, USA</i> , <sup>2</sup> <i>Boston University, USA</i> , and <sup>3</sup> <i>University of Maryland, USA</i>	228
9:00 a.m.	<b>A Microfabricated Suspended-Tube Chemical Reactor for Fuel Processing</b> L.R. Arana, S.B. Schaevitz, A.J. Franz, K.F. Jensen, and M.A. Schmidt <i>Massachusetts Institute of Technology, USA</i>	232
9:20 a.m.	<b>Electrolyte based On-Demand and Disposable Microbattery</b> K.B. Lee and L. Lin <i>University of California at Berkeley, USA</i>	236
9:40 a.m.	<b>Disposable Air-Bursting Detonators as an Alternative On-Chip Power Source</b> C.-C. Hong, J.-W. Choi, and C.H. Ahn <i>University of Cincinnati, USA</i>	240
10:00 a.m.	<b>BREAK</b>	





**Session Chairs:**  
**T.W. Kenny, Stanford University, USA**  
**O. Tabata, Ritsumeikan University, JAPAN**