

Solid-State Sensor, Actuator and Microsystems Workshop
June 4 – 8, 2006
Crowne Plaza Resort
Hilton Head Island, South Carolina

Sunday, June 4

6:00 p.m. –
9:00 p.m. **Registration and Welcome Reception**

Monday, June 5

7:30 a.m. **Breakfast**

7:45 a.m. **Welcome and Introduction**

Session 1 - Micromirrors and Displays

8:15 a.m. Invited Speaker
TOWARD AN iMoD ECOSYSTEM
M. Miles
Qualcomm MEMS Technologies, USA

9:00 a.m. MAGNETIC TWO-AXIS MICROMIRROR FOR 3D OCT ENDOSCOPY
J.J. Bernstein¹, T.W. Lee¹, F.J. Rogomentich¹, M. Bancu¹, J. DeBoer², B. Bouma², G. Maguluri²,
and K.H. Kim²
¹Draper Laboratory and ²Massachusetts General Hospital

9:25 a.m. MEMS SPATIAL LIGHT MODULATOR FOR OPTICAL MASKLESS LITHOGRAPHY
V.A. Aksyuk, R. Cirelli, F. Klemens, O.D. Lopez, W.M. Mansfield, A.R. Papazian, F. Pardo,
M.E. Simon, T. Sorsch, and G.P. Watson
Lucent

9:50 a.m. AN OPTICAL MICROSYSTEM FOR ULTRA-HIGH PIXEL COUNT DISPLAY SYSTEMS
B. Winkler¹, A. Tanner, D. Elkins, V. Ramsey, R. Cuff, and L. Spangler
¹E&S and ²Aspen Technologies

10:15 a.m. **Break**

Session 2 - Motors

10:40 a.m. DYNAMIC CHARACTERIZATION OF A LINEAR VARIABLE-CAPACITANCE
MICROMOTOR
N. Ghalichechian¹, A. Modafe¹, A. Frey¹, J.H. Lang², and R. Ghodssi¹
¹University of Maryland and ²Massachusetts Institute of Technology

11:05 a.m. MODELING AND CONTROL OF A 3-D.O.F. WALKING MICROROBOT
Y.M. Chen and K.F. Böhringer
University of Washington

11:30 a.m. **Poster/Oral Session Preview Presentations**

12:30 p.m. **Lunch**

2:00 p.m. –
5:00 p.m. **Contributed Posters and Late News Poster**

Tuesday, June 6

7:30 a.m. **Breakfast**

Session 3 - Mechanical Structures

8:15 a.m. **Invited Speaker**

SISONIC – THE FIRST COMMERCIALIZED MEMS MICROPHONE
P.V. Loeppert and S.B. Lee
Knowles Electronics, LLC

9:00 a.m. A MICROMACHINED PIEZOELECTRIC MICROPHONE FOR AEROACOUSTIC APPLICATIONS

S.B. Horowitz, T. Nishida, L.N. Cattafesta, and M. Sheplak
University of Florida

9:25 a.m. FLEXIBLE WIRELESS PASSIVE PRESSURE SENSORS FOR BIOMEDICAL APPLICATIONS

M.A. Fonseca¹, J. Kroh², J. White², and M.G. Allen¹
¹*Georgia Institute of Technology* and ²*CardioMEMS, Inc*

9:50 a.m. A HIERARCHICAL GECKO-INSPIRED SWITCHABLE ADHESIVE

K.L. Turner¹, C. Greiner², E. Arzt², and K. Turner¹
¹*University of California at Santa Barbara* and ²*MPI, Stuttgart, GERMANY*

10:15 a.m. **Break**

Session 4 - Processes

10:40 a.m. SOI MEMS PROCESS INSENSITIVE TO SACRIFICIAL OXIDE ETCH INDUCED SUBSTRATE ANCHOR PERIMETER VARIATION

G. O'Brien¹, K. Najafi², and D. Monk³
¹*Arizona State University*, ²*University of Michigan*, and ³*Freescale Semiconductor*

11:05 a.m. A PLANAR GLASS/SI MICROMACHINING PROCESS FOR THE HEAT EXCHANGER IN A J-T CRYOSURGICAL PROBE

W. Zhu¹, D.W. Hoch², G.F. Nellis², S.A. Klein², and Y.B. Gianchandani¹
¹*University of Michigan* and ²*University of Wisconsin*

11:30 a.m. LIGHT ACTUATED AC ELECTROOSMOSIS FOR OPTICAL MANIPULATION OF NANOSCALE PARTICLES

P.Y. Chiou, A.T. Ohta, A. Jamshidi, H.Y. Hsu, J.B. Chou, and M.C. Wu
University of California at Berkeley

Late News Papers Oral

11:55 a.m. #1

12:10 p.m. #2

12:25 p.m. –
1:30 p.m. **Lunch**

7:00 p.m. –
9:00 p.m. **Banquet**

Wednesday, June 7

7:30 a.m. **Breakfast**

Session 5 - Actuators

8:15 a.m. **Invited Speaker**

D. Meyer
Seagate

9:00 a.m. AUTOMATED OPTICAL FIBER ALIGNMENT IN 2-AXES USING 3D SHAPED ACTUATORS
B. Morgan and R. Ghodssi
University of Maryland

9:25 a.m. HALF-MILLIMETER-RANGE VERTICALLY SCANNING MICROLENSSES FOR MICROSCOPIC FOCUSING APPLICATIONS
A. Jain and H. Xie
University of Florida

9:50 a.m. BILLION-CYCLE ULV ELECTROSTATIC RF MEMS SWITCH
T.A. Chou, H. Bar, J. Heck, Q. Ma, J. Melki, Q. Tran, S. Tubul, B. Weinfeld, and N. Ziharev
Intel Corp.

10:15 a.m. **Break**

Session 6 - Resonators

10:40 a.m. COUPLED TORSIONAL CANTILEVERS FOR LABEL-FREE SINGLE MOLECULAR LEVEL BIO-DETECTION AND NANOMATERIALS CHARACTERIZATION
O. Sahin¹, H. Persson², C. Quate², and O. Solgaard²
¹*Harvard University* and ²*Stanford University*

11:05 a.m. DISSIPATION IN SINGLE-CRYSTAL 3C-SIC ULTRA-HIGH FREQUENCY NANOMECHANICAL RESONATORS
X.L. Feng¹, C.A. Zorman², M. Mehregany², and M.L. Roukes¹
¹*California Institute of Technology* and ²*Case Western Reserve University*

11:30 a.m. **NONLINEAR MODELLING OF AMPLITUDE NOISE INDUCED PHASE NOISE IN ELECTROSTATIC MEMS RESONATORS**
M. Agarwal, B. Kim, K.K. Park, M.A. Hopcroft, S.A. Chandorkar, C.M. Jha, R. Melamud, R.N. Candler, B. Murmann, and T.W. Kenny
Stanford University

11:55 a.m. **Lunch**

Late News Papers Oral

1:15 p.m. #3

1:30 p.m. #4

1:45 p.m. #5

2:00 p.m. #6

2:15 p.m. #7

2:30 p.m. #8

2:45 p.m. #9

6:00 p.m. –
8:00 p.m. **Educational Posters and Open Posters**

8:00 p.m. –
10:00 p.m. **Rump Session**

Thursday, June 8

7:30 a.m. **Breakfast**

Session 7 - Micro Devices

8:15 a.m. **Invited Speaker**
CHIP-SCALE ATOMIC DEVICES
J. Kitching
National Institute of Standards and Technology

9:00 a.m. **A MEMS SINGLET OXYGEN GENERATOR**
T.F. Hill¹, L.F. Velasquez-Garcia¹, B.A. Wilhite², A.H. Epstein¹, K.F. Jensen¹, and C. Livermore¹
¹Massachusetts Institute of Technology and ²University of Connecticut

9:25 a.m. **A MICRO DIRECT METHANOL FUEL CELL WITH SELF-CIRCULATION OF LIQUID FUEL**
D.D. Meng and C.-J. Kim
University of California at Los Angeles

- 9:50 a.m. AN IMPROVED SILICON DIRECT FORMIC ACID FUEL CELL FOR PORTABLE POWER GENERATION
K.L. Chu, R.I. Masel, and M.A. Shannon
University of Illinois at Urbana-Champaign
- 10:15 a.m. **Break**
- Session 8 - Chemical Devices**
- 10:40 a.m. CHANNEL TO DROPLET EXTRACTIONS FOR ON-CHIP SAMPLE PREPARATION
U.-C. Yi, W.P. Liu, P.-P. de Guzman, and C.-J. Kim
Core Microsolutions, Inc.
- 11:05 a.m. HYDROPHOBIC NON FOULING SURFACES FOR DROPLET BASED MICROFLUIDIC BIONALYTICAL SYSTEMS
A. Shastry, S. Goyal, B.D. Ratner, and K.F. Bohringer
University of Washington at Seattle
- 11:30 a.m. A NOVEL BENZOCYCLOBUTENE-BASED DEVICE FOR STUDYING THE PHYSICS OF THE EBULLITION PROCESS
S. Moghaddam, K. Kiger, A. Modafe, and R. Ghodssi
University of Maryland
- 11:55 a.m. STREAMLINE BASED DESIGN OF A MEMS DEVICE FOR CONTINUOUS BLOOD CELL SEPARATION
S. Zheng and Y.-C. Tai
California Institute of Technology
- 12:20 p.m. –
2:00 p.m. **Lunch**

Contributed Posters/Oral

Monday, June 5
2:30 p.m. - 5:30 p.m.

Chemical

A LOW POWER PRESSURE- AND TEMPERATURE-PROGRAMMABLE MICRO GC COLUMN

J.A. Potkay, G.R. Lambertus, R.D. Sacks, and K.D. Wise

University of Michigan

A NANO INTERDIGITATED ELECTRODES ARRAY ON POLYMER FOR DISPOSABLE IMPEDIMETRIC BIOSENSORS

Z. Zou, J. Kai, M.J. Rust, and C.H. Ahn

University of Cincinnati

A NOVEL MICROMACHINED INKING CHIP FOR SCANNING PROBE NANOLITHOGRAPHY USING LOCAL VAPOR INKING METHOD

S.F. Li, K.A. Shaikh, S. Szegedi, E. Goluch, and C. Liu

University of Illinois at Urbana-Champaign

A PNEUMATICALLY-ACTUATED MICROVALVE FOR SPATIALLY-SELECTIVE CHEMICAL DELIVERY

K. Baek, Y. Li, M. Gulari, and K.D. Wise

University of Michigan

CHARACTERIZATION AND DESIGN OF DIGITIZING PROCESSES IN EWOD DIGITAL MICROFLUIDICS FOR UNIFORM AND CONTROLLABLE DROPLET VOLUME

J. Gong and C.J. Kim

University of California at Los Angeles

DEVELOPMENT OF A WATER MONITORING SYSTEM BASED ON INTEGRATED POLYMER MICROFLUIDICS

L. Zhu¹, D. Meier², Z. Boger², C. Montgomery², S. Semancik², and D. DeVoe¹

¹University of Maryland and ²National Institute of Standards and Technology

EXPERIMENTAL CHARACTERIZATION OF FREQUENCY DEPENDENT ELECTROSTATIC ACTUATOR FOR AQUEOUS MEDIA

V. Mukundan and B.L. Pruitt

Stanford University

LAB-ON-A-CHIP ASSAY FOR ENTERIC PATHOGENS

B. Weigl¹, J. Gerdes², P. Tari³, P. Yager³, L. Dillman¹, R. Peck¹, S. Ramachandran³, M. Lemba³, M. Kokoris², M. Nabavi², F. Battrell², D. Hoekstra², E.J. Klein⁴, and D.M. Denno⁴

¹Program for Appropriate Technology in Health, ²Micronics, Inc., ³Washington University at St. Louis, and ⁴Children's Hospital

IMPEDANCE BASED BIOSENSOR WITH DIELECTROPHORESIS CONCENTRATION FOR CARDIOMYOCYTE HYPERTROPHY SENSING

M. Yang¹, C.C. Lim¹, R. Liao², and X. Zhang¹

¹Boston University and ²Harvard Medical School

IN-DROPLET PARTICLE SEPARATION BY TRAVELING WAVE DIELECTROPHORESIS (TWDEP) AND EWOD

Y. Zhao¹, U.-C. Yi², and S.K. Cho¹

¹University of Pittsburgh and ²Core Micro Solutions

MEASUREMENT OF INSECT FLIGHT FORCES USING A MEMS BASED PHYSICAL SENSOR

M. Nasir¹, M. Dickinson², and D. Liepmann¹

¹University of California at Berkeley and ²California Institute of Technology

METAL-CORED CARBON MICROPOSTS FOR THREE-DIMENSIONAL LI+ MICROBATTERY

F. Chamran, U.-C. Yi, and C.-J. Kim

University of California at Los Angeles

MICRO-MRI VELOCIMETRY IN MICROCHANNEL NETWORKS

L.G. Raguin, D.V. Karampinos, J.G. Georgiadis, and S. Honecker

University of Illinois at Urbana-Champaign

MICROFLUIDIC MIXERS FOR THE INVESTIGATION OF PROTEIN FOLDING USING SYNCHROTRON RADIATION CIRCULAR DICHROISM SPECTROSCOPY

A.S. Kane¹, D. Hertzog², P. Baumgaertel³, J. Felderman³, D. Horsley¹, B. Schuler⁴, and O. Bakajin²

¹University of California at Davis, ²Lawrence Livermore National Laboratory,

³University of Potsdam, GERMANY, and ⁴University of Zurich, SWITZERLAND

MULTILAYERED POLYMER MICROFLUIDIC CHIP WITH NANOFLUIDIC INTERCONNECTS FOR MOLECULAR MANIPULATIONS

B.R. Flachsbart, K. Wong, J.I. Iannaccone, E.N. Abante, R.L. Vlach, P.A. Rauchfuss, P.W. Bohn, J.V. Seedler, and M.A. Shannon

University of Illinois at Urbana-Champaign

NANO SELF-ASSEMBLED ION-SENSITIVE FIELD-EFFECT TRANSISTOR FOR ACETYLCHOLINE BIOSENSING

Y. Liu, A.G. Erdman, and T. Cui

University of Minnesota

SURFACE-MICROMACHINED IN-CHANNEL PARYLENE DUAL VALVES FOR UNPOWERED MICROFLOW REGULATION

P.-J. Chen¹, D.C. Rodger¹, E. Meng², M.S. Humayun², and Y.-C. Tai¹

¹California Institute of Technology and ²University of Southern California

SURGICALLY IMPLANTED MICRO-PLATFORMS IN MANDUCA-SEXTA

A. Paul, A. Bozkurt, J. Ewer, A. Lal, and B. Blossey

Cornell University

WIRELESS CHEMICAL SENSORS FOR HIGH TEMPERATURE ENVIRONMENTS

E.D. Birdsell and M.G. Allen

Georgia Institute of Technology

Physical

2D ARRAYS OF COUPLED NANOMECHANICAL RESONATORS

M.K. Zalalutdinov¹, J.W. Baldwin², M.H. Marcus², R.B. Reichenbach³, J.M. Parpia³, and B.H. Houston²
¹SFA, Inc., ²Naval Research Laboratory, and ³Cornell University

A 2-AXIS QUASI-PASSIVE INTEGRATION PLATFORM FOR NANOSCALE PHOTONIC ASSEMBLY

B. Li, M. Pietrusky, and A. Sharon
Fraunhofer USA

A CMOS-MEMS 3-AXIS ACCELEROMETER WITH A LOW-NOISE, LOW-POWER DUAL-CHOPPER AMPLIFIER

H. Qu, D. Fang, and H. Xie
University of Florida

A COMBUSTIBLE/ELECTRONEGATIVE GAS DETECTOR UTILIZING URANIUM DOPED CAST CERAMIC MICROCHANNELS

J.D. Olivier and C.G. Wilson
Louisiana Tech. University

A DIGITAL MEMS OPTICAL SWITCH

R.C. Gutierrez, T.K. Tang, R. Calvet, K. Jayaraj, S. Vargo, and D. Harrington
Siimpel Corporation

A MAGNETICALLY ENHANCED WIRELESS MICROGEIGER COUNTER

C.K. Eun¹, R. Gharpurey², and Y.B. Gianchandani¹
¹University of Michigan and ²University of Texas at Austin

A MICROASSEMBLED LARGE-DEFLECTION TIP/TILT MICROMIRROR FROM A SINGLE-MASK DRIE PROCESS

M.E. Last, V. Subramaniam, and K.S.J. Pister
University of California at Berkeley

A NANOMECHANICAL PROTEIN CONCENTRATION DETECTOR USING A NANO-GAP SQUEEZING ACTUATOR WITH COMPENSATED DISPLACEMENT MONITORING ELECTRODES

W.C. Lee^{1,2}, Y.-H. Cho², and A.P. Pisano¹
¹University of California at Berkeley and ²KAIST, KOREA

A PIEZOELECTRICALLY ACTUATED CERAMIC-SI-GLASS MICROVALVE FOR DISTRIBUTED COOLING SYSTEMS

J.M. Park¹, R.P. Taylor², A.T. Evans¹, T.R. Brosten², G.F. Nellis², S.A. Klein², J.R. Feller³, L. Salerno³, and Y.B. Gianchandani¹
¹University of Michigan, ²University of Wisconsin, and ³NASA Ames Research Center

A RESONANT SISO SENSOR BASED ON A COUPLED ARRAY OF MICROELECTROMECHANICAL OSCILLATORS

J.F. Rhoads¹, B.E. DeMartini², S.W. Shaw¹, and K.L. Turner²
¹Michigan State University and ²University of California at Santa Barbara

A VARIABLE FOCUS MICROLENS USING EWOD ON TAPERED SU-8 STRUCTURE

Y.-J. Chang, E. Schonbrun, K. Mohseni, and V.M. Bright
University of Colorado at Boulder

ABSORPTION FILTERS FOR WAVELENGTH TUNING AND FINESSE SWITCHING OF LONG WAVE INFRARED THERMAL DETECTORS

Y. Wang, B.J. Potter, M. Sutton, and J.J. Talghader

University of Minnesota

ADHESION AND FRICTION MEASUREMENT METHOD FOR A MEMS PROBE ARRAY

W.S. Smith, P.G. Hartwell, and R.G. Walmsley

Hewlett-Packard Labs

DESENSITIZING METHOD FOR MEASUREMENT OF THIRD-ORDER INTERMODULATION DISTORTION

C.-C. Lo and G. Fedder

Carnegie Mellon University

DESIGN & CHARACTERIZATION OF A MEMS THERMAL SWITCH

J.H. Cho¹, C.D. Richards¹, J. Jiao², D.F. Bahr¹, and R.F. Richards¹

¹*Washington State University* and ²*Portland State University*

DESIGN, FABRICATION, AND DEMONSTRATION OF A MICROTURBOPUMP FOR A MICRO RANKINE CYCLE POWER GENERATION

C. Lee¹, M. Liamini², and L. Frechette²

¹*Columbia University* and ²*University of Sherbrooke, CANADA*

DEVELOPMENT AND CHARACTERIZATION OF HIGH-SENSITIVITY BIOINSPIRED ARTIFICIAL HAIRCELL SENSOR

N. Chen

University of Illinois at Urbana-Champaign

HIGH FREQUENCY LOW IMPEDANCE CAPACITIVE SILICON BAR STRUCTURES

S. Pourkamali and F. Ayazi

Georgia Institute of Technology

FLOW-STRUCTURE INSTABILITY PREVENTION IN A HIGH GAS FLOW MEMS VALVE

A.J. Knobloch, C.E. Seeley, A. Mulay, and R.J. Saia

General Electric

INTEGRATED PERISTALTIC 18-STAGE ELECTROSTATIC GAS MICRO PUMP WITH ACTIVE MICROVALVES

H. Kim, K. Najafi, A.A. Astle, L.P. Bernal, and P.D. Washabaugh

University of Michigan

LOW-POWER ELECTROSTATIC HELMHOLTZ-RESONANCE MICROJET GENERATOR FOR PROPULSION AND COOLING

H. Kim, A.H. Jauregui, C. Morrison, K. Najafi, L.P. Bernal, and P.D. Washabaugh

University of Michigan

MEMS FILTER WITH VOLTAGE TUNABLE CENTER FREQUENCY AND BANDWIDTH

L.F. Cheow, H. Chandralalim, and S.A. Bhawe

Cornell University

MICROFABRICATED PROBES FOR LABORATORY PLASMAS

J.A. Stillman, F.C. Chiang, P.A. Pribyl, M. Nakamoto, W.N. Gekelman, and J.W. Judy

University of California at Los Angeles

MICROMECHANICAL TIME DELAY MECHANISMS FOR ORDNANCE FUSING

J. Liu¹, L. Fan², and D.L. DeVoe¹

¹University of Maryland and ²Naval Surface Warfare Center, Indian Head

MULTI-LAYER EMBEDMENT OF CONDUCTIVE AND NON-CONDUCTIVE PDMS FOR ALL-ELASTOMER MEMS

J.M. Engel, N. Chen, K. Ryu, S. Pandya, C. Tucker, and C. Liu

University of Illinois at Urbana-Champaign

PRESSURE ENHANCED AIR DAMPING IN ENCLOSED LATERALLY OSCILLATING MICROSTRUCTURES

K.Y. Yasumura¹ and H. Jerman²

¹FormFactor Inc. and ²Coherent Inc.

SELF-POWERED HUMIDITY SENSOR POWERED BY NICKEL-63 RADIOISOTOPE

R. Duggirala¹, M. Kranz², C. Pollock¹, and A. Lal³

¹Cornell University, ²Morgan Research Corporation, and ³DARPA

SINGLE-WALLED CARBON NANOTUBE MICROPATTERNS AND CANTILEVER ARRAY FABRICATED WITH ELECTROSTATIC LAYER-BY-LAYER NANO SELF-ASSEMBLY AND LITHOGRAPHY

W. Xue and T. Cui

University of Minnesota

TEMPERATURE STABLE, POST-PROCESS TUNABLE, HIGH Q HBARS AT 3~5 GHZ

H. Yu, H. Zhang, W. Pang, and E.S. Kim

University of Southern California

THERMAL AND MECHANICAL CHARACTERIZATION AND CALIBRATION OF HEATED MICROCANTILEVERS

J. Lee, T. Beecham, K. Park, Z. Zhang, S. Graham, and W. King

Georgia Institute of Technology

WIDE DYNAMIC RANGE MICROELECTROMECHANICAL VISCOSITY SENSOR

R.L. Borwick, III, P.A. Stupar, and J.F. DeNatale

Rockwell Scientific

WIREBONDER ASSEMBLY OF HINGELESS 90 DEGREE OUT-OF-PLANE MICROSTRUCTURES

S. Tsang, D. Sameoto, A. Leung, and M. Parameswaran

Simon Fraser University

Technical

3-D METAL PATTERNED MICROSTRUCTURES USING INCLINED UV EXPOSURE AND METAL TRANSFER MICROMOLDING

S. Choi, S. Rajaraman, Y. Yoon, X. Wu, and M.G Allen

Georgia Institute of Technology

BACKSIDE RESISTIVE LOCALIZED HEATING FOR LOW TEMPERATURE WAFER LEVEL PACKAGING

J.S. Mitchell and K. Najafi

University of Michigan

EFFECTS OF THE NONLINEAR ELECTROSTATIC ACTUATION FORCE ON THERMOELASTIC DAMPING/QUALITY FACTOR IN MEMS

S.K. De and N.R. Aluru

Beckman Institute for Advanced Science and Technology

EVALUATION OF AN O₂ PLASMA AND XEF₂ VAPOR ETCH RELEASE PROCESS FOR RF MEMS SWITCHES FABRICATED USING CMOS INTERCONNECT PROCESSES

C.V. Jahnes, N. Hoivik, J.M. Cotte, M. Lu, and J.H. Magerlein

International Business Machines

FORCE-DISTANCE SPECTROSCOPY: A GENERIC METHOD TO DETERMINE THE YOUNG'S MODULUS OF FREESTANDING NANOSTRUCTURES

Q. Xiong, N. Duarte, S. Tadigadapa, and P. Eklund

Pennsylvania State University

HIGH SPEED DRY ANISOTROPIC ETCHING PROCESSES FOR MICROSYSTEM APPLICATIONS

A. Goyal, S. Subasinghe, and S. Tadigadapa

Penn State University

LATERAL LAMINATION APPROACH FOR MULTILAYER PIEZOELECTRIC MICROACTUATOR

X. Wu, G. Yuan, S. Choi, Y. Zhao, S. Kim, and Y. Yoon

Georgia Institute of Technology

LONG-TERM RELIABILITY, BURN-IN, AND ANALYSIS OF OUTGASSING IN AU-SI EUTECTIC WAFER-LEVEL VACUUM PACKAGES

J.S. Mitchell, G.R. Lahiji, and K. Najafi

University of Michigan

MEMS CANTILEVER BEAM ELECTROSTATIC PULL-IN MODEL WITH CLOSED FORM SOLUTION

G. O'Brien¹, D. Monk², and L. Lin³

¹Arizona State University, ²Freescal Semiconductor, and ³University of California at Berkeley

MICROMACHINED PMN-PT SINGLE CRYSTAL FOR ADVANCED TRANSDUCERS

X.N. Jiang¹, A. Cheng², G. Lavelle², P.W. Rehrig¹, K. Snook¹, S. Kwon¹, W.S. Hackenberger¹, J. Catchmark², J.R. Yuan³, J. McIntosh², and X. Geng⁴

¹TRS Technologies, Inc., ²Penn State University, ³Boston Scientific Corp., and ⁴Blatek, Inc.

MICROMANIPULATOR CONTROLLED FABRICATION OF MICRO- AND NANOSCALE POLYMER FIBERS AND APPLICATION AS SACRIFICIAL STRUCTURES IN THE PRODUCTION OF MICROCHANNELS

S.M. Berry, T.J. Roussel, S.D. Cambron, R.W. Cohn, and R.S. Keynton

University of Louisville

OPTIMAL PARAMETERS FOR ARF EXCIMER LASER MICROMACHINING OF SIC AND PZT

J.-P. Desbiens, and P. Masson

Universite de Sherbrooke

SHOCK PROTECTION USING SOFT COATINGS AS SHOCK STOPS

S.W. Yoon, S. Lee, N.C. Perkins, and K. Najafi

University of Michigan

TESTING AND ASSEMBLY OF WIMS CUBES CONTAINING PASSIVE AND ACTIVE INTEGRATED CABLES

A.B. Ucok, J.M. Giachino, and K. Najafi
University of Michigan

WIRELESS SENSING OF DISCHARGE CHARACTERISTICS FOR QUALITY CONTROL IN BATCH MODE MICRO-ELECTRO-DISCHARGE MACHINING

M.T. Richardson¹, R. Gharpurey², and Y.B. Gianchandani¹
¹*University of Michigan* and ²*University of Texas at Austin*

Educational Posters

Wednesday, June 7
6:00 p.m. - 8:00 p.m.

A MEMS/MICROSYSTEMS CURRICULUM WITH INTERNATIONAL DISSEMINATION

L.C. McAfee, K. Najafi, Y. Gianchandani, K.D. Wise, M.M. Maharbiz, D. Aslam, P. Bergstrom, and C. Friedrich
University of Michigan

ADAPTING INTERDISCIPLINARY MEMS TEACHING AND TRAINING IN A SMALL FACULTY ENVIRONMENT

S. Bhansali
University of South Florida

AN INTERDISCIPLINARY LABORATORY COURSE IN MICROSYSTEM DEVELOPMENT

K.D. Wise, K.T. Beach, T.F. Briggs, R.J. Gordenker, and M.N. Gulari
University of Michigan

BENCHTOP POLYMER MEMS AS A LOW-COST EDUCATIONAL TOOL

M.G. Urdaneta, R.A. Delille, and E. Smela
University of Maryland

HANDS-ON MEMS: BUILDING COMPETENCE THROUGH PRACTICAL LEARNING EXPERIENCES

L.G. Fr chet
Universit  de Sherbrooke

INTRODUCTORY MICROMACHINING AND MEMS COURSE FOR GRADUATE AND UNDERGRADUATE STUDENTS

J.W. Judy and P.S. Motta
University of California at Los Angeles

MEMS CURRICULUM AT THE ALABAMA MICROELECTRONICS SCIENCE AND TECHNOLOGY CENTER

R. Ramadoss
Auburn University

MEMS CURRICULUM AT UCLA

J.W. Judy, C.J. Kim, C.P. Carmen, Y. Chen, N.M. Ghoniem, V. Gupta, C.M. Ho, Y.S. Ju, P. Kavehpour, and C.D. Montemagno
University of California at Los Angeles

MEMS EDUCATION AT STANFORD UNIVERSITY

A.A. Barlian, K. Cho, K.E. Goodson, R.T. Howe, T.W. Kenny, M. McGehee, J.G. Santiago, O. Solgaard,
and B.L. Pruitt

Stanford University

NSF/NASA MEMS EDUCATION WORKSHOP OUTCOMES

B.L. Pruitt¹, M.T. Saif², R. Ghodssi³, K.L. Turner⁴, J.W. Judy⁵, and M.A. Schmidt⁶

¹*Stanford University*, ²*University of Illinois at Urbana-Champaign*, ³*University of Maryland*,

⁴*University of California at Santa Barbara*, ⁵*University of California at Los Angeles*, and

⁶*Massachusetts Institute of Technology*

SELF-ASSEMBLY OF A BIOMEMS SYLLABUS: TEACHING BIOMEMS THROUGH THE DEVELOPING ORGANISM

M.M. Maharbiz

University of Michigan

THE 18MM2 CLASSROOM

T. Dallas, R. Gale, and J. Berg

Texas Tech University

WHAT SHOULD A FIRST COLLEGE COURSE ON MEMS BE?

K. Najafi and M. Maharbiz

University of Michigan