## PROGRAM AT A GLANCE

**Session Rooms**

<table>
<thead>
<tr>
<th>Session Rooms</th>
<th>Regency VI, VII</th>
<th>Regency V</th>
<th>Hanover C,D,E</th>
<th>Hanover F,G</th>
</tr>
</thead>
</table>

### Sunday
- **4:30 p.m. - 7:00 p.m.**
  - Conference Registration & Check-In
- **5:00 p.m. - 7:00 p.m.**
  - Welcome Reception in Exhibit Hall
- **7:00 a.m. - 5:40 p.m.**
  - Registration
- **8:00 a.m. - 8:15 a.m.**
  - Opening Remarks
- **8:15 a.m. - 9:00 a.m.**
  - Keynote Presentation A1K-A - David R. Smith, Duke University
- **9:15 a.m. - 10:30 a.m.**
  - Special Session A2L-A: Nanosensors for Cancer & Medical Applications
  - Special Session A2L-B: Novel Sensors for Human Breath Analysis
  - Session A2L-C: Sensor Systems & Circuits
  - Special Session A2L-D: Sensor Reliability
- **10:30 a.m. - 11:00 a.m.**
  - Break & Exhibit Inspection
- **11:00 a.m. - 12:30 p.m.**
  - Special Session A3L-A: In-Vivo Sensor Systems
  - Session A3L-B: Modeling & Simulation
  - Session A3L-C: Inertial Sensors
  - Session A3L-D: Sensor Networks
- **12:30 p.m. - 2:00 p.m.**
  - Lunch on Your Own & Exhibit Inspection
- **2:00 p.m. - 4:00 p.m.**
  - Poster Session A4P
- **4:00 p.m. - 5:30 p.m.**
  - Session A5L-A: Biosensors
  - Session A5L-B: Photovoltaics
  - Session A5L-C: IR & THz Sensors
  - Special Session A5L-D: Smart CMOS Image Sensors
- **8:00 a.m. - 8:45 a.m.**
  - Keynote Presentation B1K-A - Gijs Krijnen, University of Twente
- **9:00 a.m. - 10:30 a.m.**
  - Session B2L-A: Carbon Nanotubes & Nanocrystals
  - Session B2L-B: Optical Sensors I
  - Session B2L-C: Optical Biosensors
  - Special Session B2L-D: Sensors in Extreme Environments
- **10:30 a.m. - 11:00 a.m.**
  - Break & Exhibit Inspection
- **11:00 a.m. - 12:30 p.m.**
  - Session B3L-A: Nanostructures for Chemical Sensors
  - Session B3L-B: Optical Sensors II
  - Session B3L-C: Biosensors
  - Special Session B3L-D: Sensing Interfaces with Electrochemical Scanning Probes
- **12:30 p.m. - 2:00 p.m.**
  - Lunch on Your Own & Exhibit Inspection
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  - Poster Session B4P
- **4:00 p.m. - 5:30 p.m.**
  - Session B5L-A: Hydrogen Sensors & Recognition Structures
  - Session B5L-B: Mechanical Sensors
  - Session B5L-C: Magnetic Sensors
  - Special Session B5L-D: Smart Sensors & Interface Electronics
- **7:30 p.m. - 10:00 p.m.**
  - Conference Banquet featuring Student Paper & Best Poster Awards

### Monday
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- **12:30 p.m. - 2:00 p.m.**
  - Lunch on Your Own
- **2:00 p.m. - 3:30 p.m.**
  - Special Session C4L-A: Molecular-Level Detection Mechanism for Bio & Chemical Sensors
  - Special Session C4L-B: Quantum Cascade & Mid-Infrared Laser Based Sensors
  - Session C4L-C: Preconcentration & Spectrometers
  - Session C4L-D: Sensor Systems & Actuators
- **3:30 p.m. - 4:00 p.m.**
  - Break
- **4:00 p.m. - 5:30 p.m.**
  - Special Session C5L-A: The Challenges of Sensing Oxygen
  - Session C5L-B: Acoustic/Resonant Chemical Sensors
  - Session C5L-C: Electrochemical Biosensors
  - Session C5L-D: Physical Sensors
- **5:30 p.m.**
  - Conference Adjourns
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welcome</td>
<td>ii</td>
</tr>
<tr>
<td>Conference Officials</td>
<td>iii</td>
</tr>
<tr>
<td>General Information</td>
<td>vi</td>
</tr>
<tr>
<td>Contributors &amp; Exhibitors</td>
<td>vii</td>
</tr>
<tr>
<td>Technical Program Information</td>
<td>ix</td>
</tr>
<tr>
<td>Technical Program:</td>
<td></td>
</tr>
<tr>
<td>Monday</td>
<td>x</td>
</tr>
<tr>
<td>Monday - Posters</td>
<td>xii</td>
</tr>
<tr>
<td>Monday Abstracts</td>
<td>1-276</td>
</tr>
<tr>
<td>Tuesday</td>
<td>XX</td>
</tr>
<tr>
<td>Tuesday - Posters</td>
<td>xxii</td>
</tr>
<tr>
<td>Tuesday Abstracts</td>
<td>277-572</td>
</tr>
<tr>
<td>Wednesday</td>
<td>XXX</td>
</tr>
<tr>
<td>Wednesday Abstracts</td>
<td>573-756</td>
</tr>
<tr>
<td>Hotel/Meeting Room Floorplan</td>
<td>XXXV</td>
</tr>
<tr>
<td>Exhibit &amp; Poster Floorplan</td>
<td>xxxvi</td>
</tr>
</tbody>
</table>

THE SIXTH IEEE CONFERENCE ON SENSORS
IEEE SENSORS 2007
WELCOME

On behalf of the Organizing Committee of the 6th IEEE SENSORS CONFERENCE 2007, it is a great honor and pleasure to welcome you to Atlanta, Georgia, USA!

IEEE SENSORS 2007 is the International Conference for the presentation, discussion, and exchange of information regarding research and development in sensors and its related fields. IEEE SENSORS brings together researchers, developers, and practitioners from diverse fields related to sensors technology. The members of the Organizing Committee are making all efforts to meet your expectations and to ensure a successful Conference. We hope to create an opportunity for meeting old and making new friends and colleagues, and more importantly, to become acquainted with the latest developments in the sensors community. We also hope you experience the flavor of the South, as Atlanta offers a wide variety of cultural landmarks, and recreational opportunities. Furthermore, Atlanta is among the favorite destinations for international conventions due to its preferable access, high-class conference facilities, a wide range of qualified accommodations, and outstanding services.

I hope that you take this opportunity to explore one of the most vibrant cities in the world. Welcome to Atlanta, USA!

Boris Mizaikoff
General Chair of IEEE SENSORS 2007
Georgia Institute of Technology
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- Electromagnetic Compatibility .................................................... Andrew Podgorski, ASR Technologies Inc., CANADA
- Electron Devices ............................................................... Brian T. Cunningham, University of Illinois at Urbana-Champaign, Urbana, IL, USA
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GENERAL INFORMATION

Conference Location
All sessions will be held at the Hyatt Regency Atlanta.

The Hyatt Regency Atlanta
265 Peachtree Street
Atlanta, Georgia, USA 30303
Tel: +1-404-577-1234
Fax: +1-404-588-4137
Web: www.atlantaregency.hyatt.com

Dialing Codes
USA's International Country code: +1
Atlanta's Local Area Codes: 404, 678 and 770.

Registration & Information Desk
The Registration and Information Desk will be open during the following times:
- October 28 Sunday . . . . . . . . . . . . . . . . . 4:30 p.m. - 7:00 p.m.
- October 29 Monday . . . . . . . . . . . . . . . . 7:00 a.m. - 5:40 p.m.
- October 30 Tuesday . . . . . . . . . . . . . . . . 7:00 a.m. - 5:40 p.m.
- October 31 Wednesday . . . . . . . . . . . . 7:30 a.m. - 5:40 p.m.

Exhibit Hours
- Sunday, October 28 - 5:00 p.m. to 7:00 p.m.
- Monday, October 29 - 7:00 a.m. to 4:15 p.m.
- Tuesday, October 30 - 7:00 a.m. to 4:15 p.m.
See page xxxvi for exhibit hall floorplan.

Name Badges
All attendees must wear their name badge at all times to gain admission to all sessions, exhibits and reception.

Technical Digest and Book of Abstracts Sets
One copy of the Technical Digest on a SanDisk® USB Flashdisk and Book of Abstracts set is included in your bag. Additional copies may be purchased at the Registration Desk. Purchase price of the Technical Digest and Book of Abstracts set will increase after the Conference so be sure to order your additional copies in advance.
Additional Technical Digest Set - $125 (each) IEEE Member
$150 (each) IEEE Non-Member

Chimes
The chimes will ring five minutes before the end of each scheduled break. The sessions will begin on time, so please return to the sessions when you hear the chimes.

Evaluation
There is a Conference Evaluation Form in your packet. Your feedback is very important to the improvement and development of this Conference. Please return completed form to the Conference Registration Desk.

Message and Job Market Board
The Message and Job Market Board will be located near the Conference Registration Desk.

Internet Access
Attendees who reserved a sleeping room within the group hotel block will receive complimentary wired High Speed Internet Access in their sleeping rooms. For those not staying at the hotel, T-Mobile wireless internet service is available in the main hotel lobby.

Traveler’s Checks and Credit Cards
Credit cards, including MasterCard®, Discover®, Visa® and American Express®, as well as traveler’s checks are accepted at most hotels, restaurants, department stores, and souvenir shops.

Tipping Standards
15% is standard for meals. For skycaps, doormen, porters and bellman, $1.00 per bag is standard and $1.00 per night for housekeeping.

Cellular Phones, Pagers and Watch Alarms
As a courtesy to our speakers and other attendees, please turn off any cellular phones, pagers and watch alarms during sessions.

Cameras and Video Tape Recording
Cameras and video tape recorders are strictly prohibited in the sessions, poster presentations and the exhibit area. Film or video will be confiscated.

Smoking
All meeting rooms and seated functions are smoke free.

Currency Exchange
Only US dollars are acceptable at regular stores and restaurants. The exchange rate fluctuates daily.

Shipping Service
If you need to ship or mail any packages, please check with your hotel concierge.

SOCIAL PROGRAM

Sunday Welcome Reception
An informal Wine and Cheese Welcome Reception will be held in conjunction with registration from 5:00 p.m. - 7:00 p.m. The reception will be held in Exhibit Hall.

Conference Banquet
No Conference is complete without a banquet. Join us for a wonderful evening on Tuesday, October 29th. The Student Paper and Best Poster Awards will be announced at the banquet.

Your paid registration fee includes one banquet ticket. Guest tickets can be purchased for $50.00 each. Tickets are required and may be purchased by 11:00 a.m. on Monday.
CONTRIBUTORS

We gratefully acknowledge, at the time of printing, the support of the Conference from the following:

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EXHIBITORS

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<tr>
<td>Brewer Science, Inc.</td>
<td>115</td>
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<tr>
<td>2401 Brewer Drive</td>
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<tr>
<td>Rolla, MO 65401 USA</td>
<td></td>
</tr>
<tr>
<td>phone: 1-573-364-0300</td>
<td></td>
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<tr>
<td>fax: 1-573-365-6880</td>
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<tr>
<td><a href="http://www.brewerscience.com">www.brewerscience.com</a></td>
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Brewer Science is a leading-edge material and equipment supplier to the semiconductor, optoelectronics, and MEMS industries. Product lines include anti-reflective coatings, carbon nanotube coating, precision benchtop and flange-mount material processing equipment, and materials that enable thin wafer handling, TSV formation, wafer thinning, wafer etching, and bulk micromachining.

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<tr>
<th>Exhibitor</th>
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<tr>
<td>Georgia Tech - Microelectronics Research Center</td>
<td>119</td>
</tr>
<tr>
<td>791 Atlantic Drive</td>
<td></td>
</tr>
<tr>
<td>Atlanta, GA 30332 USA</td>
<td></td>
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<tr>
<td>phone: 1-404-894-0479</td>
<td></td>
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<tr>
<td>fax: 1-404-894-5028</td>
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<td><a href="http://www.mirc.gatech.edu">www.mirc.gatech.edu</a></td>
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Georgia Tech’s Microelectronics Research Center (MiRC) is a member of the NSF-funded National Nanotechnology Infrastructure Network (NNIN), which provides expertise, facilities, infrastructure, and teaming environments to enable and facilitate interdisciplinary research in microelectronics, integrated optoelectronics, MEMS, sensors and actuators. The Georgia Tech node is NNIN emphasizes the applications of nanofabrication to bioengineering and biomedicine, and is an open facility that welcomes researchers from academia, industry, and government laboratories.
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TECHNICAL PROGRAM INFORMATION

The technical program consists of three Keynote Sessions, four parallel Lecture/Special Sessions of contributed papers, and two Poster Sessions.

Guide to Understanding Session Numbering
Each session in the technical program is assigned a unique number, which clearly indicates when and where the session is presented.

The number of each session is shown before the session title. A typical number is shown below:

Typical Session Number: A2L-A

The first character (i.e., A) indicates the day of the Conference:

A = Monday
B = Tuesday
C = Wednesday

The second character (i.e., 2) shows the time of the day the session is held:

1 = 8:00 a.m. – 9:00 a.m.
2 = 9:00 a.m. – 10:30 a.m.
3 = 11:00 a.m. – 12:30 p.m.
4 = 2:00 p.m. – 4:00 p.m.
5 = 4:00 p.m. – 5:30 p.m.

The third character (i.e., L) indicates what type of paper the session is:

K = Keynote Session
L = Lecture Session
P = Poster Session

The fourth character (i.e., A) indicates which room the session is held in:

A = Regency Ballroom VI, VII
B = Regency Ballroom V
C = Hanover C, D, E
D = Hanover F, G

See page xxxv for meeting room floorplan.

Poster Session
Two poster sessions will be held in the Grand Hall East, from 2:00 p.m. to 4:00 p.m. on Monday and Tuesday. Posters will be on display and authors will be available for questions during their appointed time. All poster papers are listed in this program on the day that they are on display. Please note that posters will be available for viewing starting at 7:00 a.m. on Monday until 4:00 p.m. on Tuesday.

Guide to Understanding Poster Numbering
Each poster in the technical program is assigned a unique number, which clearly indicates when and where the poster is presented. The number of each poster is shown on the left-hand side, before the title. A typical number is shown below:

Typical Poster Number: A4P-E1

The first character (i.e., A) indicates the day of the Conference that the poster will be on display:

A = Monday
B = Tuesday

The second character (i.e., 4) shows the time of the day the session is held:

4 = 2:00 p.m. – 4:00 p.m.

The third character (i.e., P) shows that the paper is a poster.

The fourth character (i.e., E) indicates the category of the poster for that day:

Monday Session
E = Chemical & Gas Sensors
F = Sensor & Actuator Systems and Networks
G = Phenoma, Modeling & Evaluation
H = Optical Sensors III

Tuesday Session
E = Biosensors II
F = Mechanical Sensors II
G = Physical Sensors II
H = Applications

The fifth character (i.e., 1) indicates the sequence number within the category.

See page xxxvi for poster floorplan.

BOOK OF ABSTRACTS

Page numbers can be found in RED (i.e., p. 123), after each paper’s program listing.
TECHNICAL PROGRAM

Monday, October 29, 2007

8:00 a.m. | Opening Remarks

8:15 a.m. | KEYNOTE PRESENTATION A1K-A
Chair: C. Liu, University of Illinois, USA

THE ROLE OF METAMATERIALS AND PLASMONS FOR NOVEL SENSING APPLICATIONS
David R. Smith
Duke University, USA

SPECIAL SESSION A2L-A
Nanobiosensors for Cancer & Medical Applications

SESSIO N CHAIR
L.A. Nagahara, NIH

SPECIAL SESSION A2L-B
Novel Sensors for Human Breath Analysis

SESSIO N CHAIR
C. Davis, University of California

SESSION A2L-C
Sensor System & Circuits

SESSIO N CHAIRS
R. Gao, University of Massachusetts
G.C.M. Meijer, Delft University

SPECIAL SESSION A2L-D
Sensor Reliability

SESSIO N CHAIR
X. Wang, GE Global Research

Regency VI, VII
Regency V
Hanover C,D,E
Hanover F,G

9:00 a.m.

9:15 a.m.

9:30 a.m.

9:45 a.m.

INVITED
MICRODEVICES FOR BIOMOLECULAR AND SINGLE CELL DETECTION
S. Manalis
Massachusetts Institute of Technology, USA

INVITED
MODULAR SAMPLING AND ANALYSIS TECHNIQUES FOR THE REAL-TIME ANALYSIS OF HUMAN BREATH
M. Frank1, G. Farquhar1, K. Adams1, M. Bogan1, A. Martin1, H. Benner1, C. Spadaccini1, P. Steele1, S. Sankaran2, B. Loyola2, J. Morgan2, and C. Davis2
1Lawrence Livermore National Laboratory, USA and 2University of California, Davis, USA

UNIVERSAL SMART SENSORS INTERFACE AND SIGNAL CONDITIONER
S.Y. Yurish
Universitat Politècnica de Catalunya, SPAIN

INVITED
RELIABILITY ISSUES IN MINIATURIZED SENSORS: IMPORTANCE OF STANDARDS. WHAT IS NEEDED?
A. Hartzell and M. da Silva
Exponent/Failure Analysis Associates, USA

WIRELESS MEASUREMENT SYSTEM FOR CAPACITIVE PRESSURE SENSORS USING STRAIN COMPENSATED SiGeB
K. Arshak1, E. Jafer1, T. McGoughlin1, T. Corbett1, S. Chatzandroulis1, and D. Goustouridis1
1University of Limerick, IRELAND and 2NCSR Demokritos, GREECE

EMERGING NANOSTRUCTURES AND DEVICES FOR DIAGNOSTICS AND THERAPEUTICS
V.P. Dravid, M. Aslam, S. Sharma, G. Shekhavat, T. Meade, and S. Tank
Northwestern University, USA

PHOTO-IONIZATION MASS SPECTROMETRY FOR ON-LINE ANALYSIS OF ORGANIC COMPOUNDS IN HUMAN BREATH AND IN TOBACCO SMOKE UPON INHALATION
R. Zimmermann, C. Mocke, T. Adam, F. Mühlberger, and S. Mitschke
Institute of Ecological Chemistry, GERMANY and University of Augsburg, GERMANY

HARDWARE-SOFTWARE DESIGN FOR AUTONOMOUS SENSORS
F. Martínez, A. Velázquez, R. Palacios, M. Martínez, and G. Obieta
INKERLAN Technological Research Centre, SPAIN

AN APPROACH FOR THE STUDY OF RELIABILITY FOR A MEMS MAGNETIC ACTUATOR
E. Berkcan, S. Chandrasekaran, and M. Aimi
GE Global Research, USA

p. 3

p. 11

p. 19

p. 29

p. 5

p. 13

p. 23

p. 31
## TECHNICAL PROGRAM MONDAY

<table>
<thead>
<tr>
<th>SPECIAL SESSION A2L-A continued</th>
<th>SPECIAL SESSION A2L-B continued</th>
<th>SESSION A2L-C continued</th>
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<tr>
<td>MICROCANTILEVER BIOSENSORS</td>
<td>MICROFABRICATED DIFFERENTIAL MOBILITY SPECTROMETERS FOR BREATH ANALYSIS</td>
<td>CONTACTLESS EXCITATION AND READ-OUT OF PASSIVE SENSING ELEMENTS MADE BY MINIATURIZED MECHANICAL RESONATORS</td>
<td>WAFER-LEVEL ENCAPSULATION AND SEALING OF ELECTROSTATIC HARPPS TRANSUCERS</td>
</tr>
<tr>
<td>Oak Ridge National Laboratory, USA</td>
<td>University of California, Davis, USA</td>
<td>University of Brescia, ITALY</td>
<td>Georgia Institute of Technology, USA</td>
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<tr>
<td>p. 7</td>
<td>p. 15</td>
<td>p. 25</td>
<td>p. 33</td>
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<td><strong>10:15 a.m.</strong></td>
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<tr>
<td>INTEGRATING MAGNETIC AND OPTICAL NANOTECHNOLOGY FOR SELECTIVE CAPTURE AND MULTIPLEXED ANALYSIS OF RARE TUMOR CELLS</td>
<td>COMPACT MID-IR BREATH ANALYSIS SYSTEM</td>
<td>A LOW-NOISE SWITCHED-CAPACITOR FRONT END FOR CAPACITIVE SENSOR</td>
<td>DEVELOPMENT OF RELIABILITY TEST GUIDELINES FOR MICROELECTROMECHANICAL SYSTEMS IN MILITARY APPLICATIONS</td>
</tr>
<tr>
<td>T. Sathe¹, A. Saheb¹, and S. Nie¹,²</td>
<td>M. Pushkarsky, M. Weida, T. Day, D. Arnone, and R. Pritchett</td>
<td>A. Heidary and G.C.M. Meijer</td>
<td>R. Mason¹, M. Miller¹, J. Kannard¹, M. Singleton¹, D. Selknot², and J. Zumin²</td>
</tr>
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<td>¹Georgia Institute of Technology, USA and ²Emory University, USA</td>
<td>Daylight Solutions, Inc., USA</td>
<td>Delft University of Technology, THE NETHERLANDS</td>
<td>¹Concurrent Technologies Corporation, USA and ²US Army Corrosion Office, USA</td>
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<td>p. 9</td>
<td>p. 17</td>
<td>p. 27</td>
<td>p. 35</td>
</tr>
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<td><strong>10:30 a.m.</strong></td>
<td>BREAK &amp; EXHIBIT INSPECTION</td>
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<td>SPECIAL SESSION A3L-A</td>
<td>SESSION A3L-B</td>
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<td>SPECIAL SESSION A3L-A</td>
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<td>SESSION A3L-C</td>
<td>SESSION A3L-D</td>
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<td>In-Vivo Sensor Systems</td>
<td>Modeling &amp; Simulation</td>
<td>Inertial Sensors</td>
<td>Sensor Networks</td>
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<td>SESSION CHAIRS</td>
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<td>D. Tanase, Delft University</td>
<td>B. Mizaikoff, Georgia Institute of Technology</td>
<td>L. Sarro, Delft University</td>
<td>K. Subramanian, GE Global Research</td>
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<td>INVITED</td>
<td>CONCEPTS AND LIMITS FOR THE MINIATURIZATION OF SILICON DIFFERENTIAL VIBRATING INERTIAL MICRO-BEAM ACCELEROMETER</td>
<td>INTEGRATED SENSOR NETWORK WITH EVENT-DRIVEN ACTIVATION FOR RECORDING IMPACT EVENTS IN TEXTILE-REINFORCED COMPOSITES</td>
<td></td>
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<tr>
<td>PACKAGING OF IMPLANTABLE MICROSYSTEMS</td>
<td>B. Le Foulgoc, O. Le Traon¹, T. Bourouina, A. Bosseboul¹, F. Marty², H. Mathias³, and A. Parent¹</td>
<td>K.-U. Roscher¹, H. Grätz¹, A. Heinig¹, W.-J. Fischer², G. Pleifer², and E. Starke²</td>
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<tr>
<td>K. Najafi</td>
<td>¹ONERA, FRANCE; ²ESIEE, FRANCE and ³Université Paris XI, FRANCE</td>
<td>¹Fraunhofer IPMS, GERMANY and ²Technical University of Dresden, GERMANY</td>
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<td>University of Michigan, USA</td>
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<tr>
<td>p. 37</td>
<td>p. 47</td>
<td>p. 59</td>
<td>p. 71</td>
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<td>SIMPLE BUT ACCURATE MODELS FOR SQUEEZE-FILM DAMPERS</td>
<td>A COMPARATIVE STUDY OF CONDITIONING ARCHITECTURES FOR CONVECTIVE ACCELEROMETERS</td>
<td>OPTIMAL ON-DEMAND MOBILE SENSOR ALLOCATION</td>
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<td>T. Veijola</td>
<td>O. Leman, F. Mailly, L. Latorre, and P. Nolet</td>
<td>R.K. Guha¹ and S. Ray²</td>
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<td>Helsinki University of Technology, FINLAND</td>
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<td>University of Pennsylvania, USA and University of Bridgeport, USA</td>
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<td>p. 49</td>
<td>p. 61</td>
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<td><strong>11:30 a.m.</strong></td>
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<td>A LOW POWER, LOW VOLTAGE CURRENT READ-OUT CIRCUIT FOR IMPLANTABLE ELECTRO-CHEMICAL SENSORS</td>
<td>DESIGN, MODELING AND SIMULATION OF A CLOSED-LOOP CONTROLLER FOR A DUAL BACKPLATE MEMS CAPACITIVE MICROPHONE</td>
<td>A NOVEL IN-OPERATION HIGH g-SURVIVABLE MEMS GYROSCOPE</td>
<td>A ZIGBEE SENSOR ELEMENT FOR DISTRIBUTED MONITORING OF SOIL PARAMETERS IN ENVIRONMENTAL MONITORING</td>
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<td>University of Tennesee, USA</td>
<td>University of Florida, USA</td>
<td>Middle East Technical University, TURKEY</td>
<td>Universidade de Trás-os-Montes e Alto Douro, PORTUGAL</td>
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<tr>
<td>p. 39</td>
<td>p. 51</td>
<td>p. 63</td>
<td>p. 75</td>
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### TECHNICAL PROGRAM MONDAY

<table>
<thead>
<tr>
<th>SPECIAL SESSION A3L-A continued</th>
<th>SESSION A3L-B continued</th>
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<td>OXYGEN-TENSION MEASUREMENTS - THE FIRST STEP TOWARDS PREVENTION AND EARLY DETECTION OF ANASTOMOTIC LEAKAGE D. Tanase¹, N. Komen², A. Draaijer³, G.J. Kleinrensink³, J. Jeekel⁴, J.F. Lange⁴, and P.J. French⁴</td>
<td>RAPID DETECTION OF ANALYTES WITH IMPROVED SELECTIVITY USING COATED MICROCANTILEVER CHEMICAL SENSORS AND ESTIMATION THEORY M.J. Wenzel¹, F. Josse¹, E. Yaz¹, S.M. Heinrich¹, and P.G. Datkos²</td>
<td>VIBRATION SENSITIVITY OF MEMS TUNING FORK GYROSCOPES S.W. Yoon, S.W. Lee, N.C. Perkins, and K. Najafi University of Michigan, USA</td>
<td>A SIMPLE WIRELESS BATTERYLESS SENSING PLATFORM FOR RESISTIVE AND CAPACITIVE SENSORS T. Ativanchayaphong, J. Wang, W. Huang, S. Rao, and J.-C. Chiao University of Texas, Arlington, USA</td>
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<td>p. 41</td>
<td>p. 53</td>
<td>p. 65</td>
<td>p. 77</td>
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<td><strong>12:00 p.m.</strong></td>
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<td>A MULTI-LAYER PARYLENE ELECTRODE ARRAY FOR USE IN AN IMPLANTABLE MICROSYSTEM FOR TREATMENT OF NEUROLOGICAL DISORDERS C.A. Moussoulis and D.P. Papageorgiou Northeastern University, USA</td>
<td>3D SIMULATION OF CONJUGATE HEAT TRANSFER OF ULIP HOTPLATES FOR A MOX GAS SENSING DEVICE M. Messina¹, F. Franzé¹, N. Speciale¹, E. Cozzani², and A. Roncaglia²</td>
<td>MULTI-DEGREE OF FREEDOM TUNING FORK GYROSCOPES DEMONSTRATING SHOCK REJECTION A.R. Schofield, A.A. Trusov, and A.M. Shkel University of California, Irvine, USA</td>
<td>REALISING WACNET THROUGH A ZIGBEE-BASED ARCHITECTURE A. Desmet, F. Naghd, and M. Ros University of Wollongong, AUSTRALIA</td>
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<tr>
<td>p. 43</td>
<td>p. 55</td>
<td>p. 67</td>
<td>p. 79</td>
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<td><strong>12:15 p.m.</strong></td>
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<td>p. 45</td>
<td>p. 57</td>
<td>p. 69</td>
<td>p. 81</td>
</tr>
</tbody>
</table>

### 12:30 p.m. Lunch on your Own & Exhibit Inspection

### 2:00 p.m. - 4:00 p.m.

**POSTER SESSION A4P** (See page xxxvi for floorplan)

### Chemical & Gas Sensors - CHAIR: C. Liu, University of Illinois

**A4P-E1**

SPIRAL μ-PRECONCENTRATOR FOR GAS SENSOR DETECTION IN THE ppb RANGE
- P. Ivanov¹, I. Gracia¹, F. Blanco², N. Sabatè³, X. Vilanova³, A. Verge⁴, E. Figueras⁴, L. Fonseca⁴, and C. Cané⁴
- ¹National Centre of Microelectronics, SPAIN and ²University Rovira i Virgili, SPAIN

**A4P-E2**

NEW SENSING MATERIALS FOR SAW SENSORS USING POLYMER-SILICATE COMPOSITES
- M. Rapp and S. Rupp
- Institute of Microstructure Technology, GERMANY

**A4P-E3**

INTEGRATED TEMPERATURE, HUMIDITY AND GAS SENSORS ON FLEXIBLE SUBSTRATES FOR LOW-POWER APPLICATIONS
- A. Oprea¹, J. Courtat², N. Bärsan³, D. Briand², N.F. de Rooje², and U. Weimar²
- ¹University of Tubingen, GERMANY and ²University of Neuchâtel, SWITZERLAND

**A4P-E4**

COMPARATIVE STUDY OF IRRADIATED AND ANNEALED ZnO THIN FILMS FOR ROOM TEMPERATURE AMMONIA GAS SENSING
- A. Kshirsagar¹, A.B. Joshi¹, A. Joshi¹, D.K. Avasthi², T.M. Bhave¹, and S.A. Gangal¹
- ¹University of Pune, INDIA and ²Inter University Accelerator Centre, INDIA
TECHNICAL PROGRAM MONDAY

A4P-E5  
**Pt/SnO₂ NANOWIRES/SIC BASED HYDROGEN GAS SENSOR**  
M. Shafiei¹, K. Kalantar-Zadeh¹, W. Wlodarski³, E. Cómini², S. Bianchi², and G. Sberveglieri²  
¹RMIT University, AUSTRALIA and ²University of Brescia, ITALY  
................................................................................................................................. p. 91

A4P-E6  
**ULTRA LOW POWER MOX SENSORS WITH ppb-LEVEL VOC DETECTION CAPABILITIES**  
National Research Council, ITALY  
................................................................................................................................. p. 93

A4P-E7  
**ODOR RECORDER USING MASS SPECTROMETRY AND LARGE-SCALE DATA**  
T. Nakamoto and T. Nakama  
Tokyo Institute of Technology, JAPAN  
................................................................................................................................. p. 95

A4P-E8  
**MICROBOLOMETER ON POLYMER MEMBRANE WITH HEAT FEEDBACK CONTROL FOR NON RADIATIVE APPLICATIONS**  
M. Denoual¹, S. Delaunay¹, F. Durante¹, B. Guillet¹, S. Lebargy¹, J. Bastie², and D. Robbes¹  
¹ENSICAEN, FRANCE and ²CNAM, FRANCE  
................................................................................................................................. p. 97

A4P-E9  
**DESIGN STUDY OF MICROMACHINED THERMAL EMITTERS FOR NDIR GAS SENSING IN THE 9-12 µM WAVELENGTH RANGE**  
E. Cozzani, C. Summonte, L. Belsito, G.C. Cardinali, and A. Roncaglia  
National Research Council, ITALY  
................................................................................................................................. p. 99

A4P-E10  
**THIN FILM BULK ACOUSTIC RESONATOR VAPOR SENSORS WITH SINGLE-WALLED CARBON NANOTUBES-BASED NANOCOMPOSITE LAYER**  
M. Penza¹, E. Verona², W. Wlodarski³, G. Cassano³, P. Aversa¹, D. Suriano¹, M. Benetti², D. Cannatà³, and F. Di Pietrantonio³  
¹ENEA, ITALY, ²CNR, ITALY and ³RMIT University, AUSTRALIA  
................................................................................................................................. p. 101

A4P-E11  
**STABILITY OF FET – BASED HYDROGEN SENSORS AT HIGH TEMPERATURES**  
C. Sent¹, W. Widanarto¹, H.P. Freirichs², Ch. Wilbert², and I. Eisele¹  
¹University of the Federal Armed Forces, GERMANY and ²Micronas GmbH, GERMANY  
................................................................................................................................. p. 103

A4P-E12  
**DEVELOPMENT OF A NEW WIRELESS CHEMICAL SENSOR FOR CO₂ DETECTION**  
W. Wang, T. Kim, K. Lee, H. Oh, and S. Yang  
Ajou University, KOREA  
................................................................................................................................. p. 105

A4P-E13  
**A HIGHLY SENSITIVE MICRO-THERMAL SENSOR FOR HYDROGEN DETECTION**  
S.-C. Park, S.-I. Yoon, C.-I. Lee, S. Song, and Y.-J. Kim  
Yonsei University, KOREA  
................................................................................................................................. p. 107

A4P-E14  
**DETECTION OF AGRICULTURAL CHEMICALS OF LEAF VEGETABLES USING A POSITIVELY CHARGED LIPID MEMBRANE SENSOR**  
Y. Naito¹, H. Ikezaki¹, and K. Toko²  
¹Intelligent Sensor Technology Inc., JAPAN and ²Kyushu University, JAPAN  
................................................................................................................................. p. 109

A4P-E15  
**DEVELOPMENT OF NITRATE-SELECTIVE ELECTROCHEMICAL SENSOR WITH INTEGRATED MICRO-FLUIDICS**  
S. Aravamudhan, S. Ketkar, and S. Bhansali  
University of South Florida, USA  
................................................................................................................................. p. 111

A4P-E16  
**INVESTIGATION OF FUNCTIONALIZATION LAYERS FOR NO₂ DETECTION**  
M. Gazi, S. Park, T. Vogt, and G. Koley  
University of South Carolina, USA  
................................................................................................................................. p. 113

A4P-E17  
**SEMICONDUCTOR QUANTUM DOT/POLYMER THIN FILM BASED HYDROCARBON SENSOR: CHARACTERIZATION OF SENSING PROPERTIES**  
Z. Zhao, M. Arrandale, O. Vassilitsova, M.A. Petrukhtina, and M.A. Carpenter  
University at Albany, USA  
................................................................................................................................. p. 115
Sensor & Actuator Systems and Networks - CHAIR: S.-S. Yang, Ajou University

A4P-F1 DEVELOPMENT OF 6-AXIS FORCE/MOMENT SENSOR FOR HUMANOID ROBOT’S FOOT
G.-S. Kim, H.-J. Shin, and J. Yoon
Gyeongsang National University, KOREA ................................................................. p. 117

A4P-F2 SENSOR PROPERTY OF A NOVEL EAP DEVICE WITH IONIC-LIQUID-BASED BUCKY GEL
N. Kamamichi1,2, M. Yamaika3, K. Asaka2,3, Z.-W. Luo2,3, and T. Mukai2
1Tokyo Denki University, JAPAN, 2RIKEN, JAPAN, 3Tokyo Institute of Technology, JAPAN, 4National Institute of Advanced Industrial Science and Technology (AIST), JAPAN, and 5Kobe University, JAPAN ........................................ p. 119

A4P-F3 PIEZOELECTRIC POLYMER SENSOR ARRAYS FOR INFORMATION INPUT DEVICES
B. Elling1, R. Danz2, I. Haulsen3, and K. Tehranii
1Fraunhofer Institute for Applied Polymer Research, GERMANY and 2Fraunhofer Institute FIRST, GERMANY ................................................................. p. 121

A4P-F4 A HYBRID MEMS-BASED NAVIGATION SYSTEM AND ITS NUMERICAL ANALYSIS
R. Zhu and Z. Zhou
Tsinghua University, CHINA ......................................................................................... p. 123

A4P-F5 SENSOR FOR ENTRY GUIDE GAP MEASUREMENT IN HOT STRIP MILL
Steel Authority of India Limited, INDIA ........................................................................ p. 125

A4P-F6 DEVELOPMENT OF A HIGH-SPEED CAPACITIVE SURFACE SENSOR FOR FLUID DISTRIBUTION IMAGING
S. Thiele, M.J. Da Silva, and U. Hampel
Forschungszentrum Dresden-Rossendorf e.V., GERMANY........................................... p. 127

A4P-F7 A CMOS 2D MICRO-FLUXGATE EARTH MAGNETIC FIELD DETECTING SYSTEM WITH RS232 DIGITAL OUTPUT
M. Ferri1, A. Rossini1, A. Baschirrotto2, G. Venchi3, E. Dallago1, and P. Malcovati1
1University of Pavia, ITALY and 2University of Salento, ITALY ........................................ p. 129

A4P-F8 A STANDALONE PROGRAMMABLE SIGNAL PROCESSING UNIT FOR VERSATILE CHARACTERIZATION OF MEMS GYROSCOPES
A.A. Trusov, I. Chepurko, A.R. Schofield, and A.M. Shkel
University of California, Irvine, USA ............................................................................. p. 131

A4P-F9 DETECTION OF EXPLOSIVES VAPORS WITH A PORTABLE DETECTOR BASED ON QUARTZ CRYSTAL MICROBALANCE
F. Parret, P. Montmét, and P. Prénè
CEA Le Ripault, FRANCE .............................................................................................. p. 133

A4P-F10 BATTERYLESS-WIRELESS MEMS SENSOR SYSTEMS WITH A 3D LOOP ANTENNA
S. Sasaki1, T. Seki1, K. Imanaka1, T. Toriyama1, M. Kimata2, T. Miyano2, and S. Sugiyama2
1Omron Corporation, JAPAN and 2Ritsumeikan University, JAPAN ........................ p. 135

A4P-F11 AN ECG ANALYSIS ON SENSOR NODE FOR REDUCING TRAFFIC OVERLOAD IN u-HEALTHCARE WITH WIRELESS SENSOR NETWORK
D.-S. Lee1, S. Bhardwaj1, E. Alasaarela2, and W.-Y. Chung1
1Dongseo University, KOREA and 2University of Oulu, FINLAND .............................. p. 137

A4P-F12 DESIGN, FABRICATION, AND CHARACTERIZATION OF A READOUT INTEGRATED CIRCUIT (ROIC) FOR CAPACITIVE MEMS SENSORS
M. Lee, S. Lee, S. Jung, C. Je, G. Hwang, and C. Choi
Electronics & Telecommunications Research Institute (ETRI), KOREA ......................... p. 139

A4P-F13 AUTONOMOUS LOW POWER MICROSYSTEM POWERED BY VIBRATION ENERGY HARVESTING
University of Southampton, UK ..................................................................................... p. 141

A4P-F14 A SENSOR INTERFACE SYSTEM FOR MEASURING THE IMPEDANCE (Cg, Rg) OF SOIL AT A SIGNAL FREQUENCY OF 20MHz
Z.-Y. Chang, B.P. Iliev, and G.C.M. Meijer
Delft University of Technology, THE NETHERLANDS .................................................. p. 143

A4P-F15 PERFORMANCE TRADEOFFS OF THREE CONTACTLESS ANGLE DETECTION SYSTEMS
A.J. Lopez-Martín and A. Carlosena
Public University of Navarra, SPAIN ............................................................................. p. 145
A4-P16  
FPGA BASED SYSTEM DESIGN SUITABLE FOR WIRELESS HEALTH MONITORING EMPLOYING INTELLIGENT RF MODULE  
K. Arshak1, E. Jaffer1, and C.S. Ibara2  
1University of Limerick, IRELAND and 2XILINX, IRELAND…………………………………p. 147

A4-P17  
COMPACT RF IMPEDANCE-SPECTRUM-ANALYZER FOR LATERAL FIELD EXCITED LIQUID ACOUSTIC WAVE SENSORS  
T. Schneider1, U. Hempel1, S. Doern1, D. McCann2, J.F. Vetelino2, and P.R. Hauptmann1  
1University Magdeburg, GERMANY and 2University of Maine, USA………………………….p. 149

A4-P18  
ELECTROSTATICALLY DRIVEN TOUCH-MODE POLY-SIC MICROSPAKER  
R.C. Roberts, J. Du, A. Ongkodjojo Ong, D. Li, C.A. Zorman, and N.C. Tien  
Case Western Reserve University, USA…………………………………………………………………….p. 151

A4-P19  
A BIDIRECTIONAL READOUT INTEGRATED CIRCUIT (ROIC) WITH CAPACITANCE-TO-TIME CONVERSION OPERATION FOR HIGH PERFORMANCE CAPACITIVE MEMS ACCELEROMETERS  
Electronics and telecommunications Research Institute (ETRI), KOREA……………………………p. 153

A4-P20  
DEVELOPMENT AND EVALUATION OF AN ATTITUDE MEASURING SYSTEM THAT USES ACCELERATION INFORMATION OF WALKING FOR BIPED ROBOTS  
M. Takahashi1,2, K. Nishiwaki2, S. Kagami1,2, and H. Mizoguchi1,2  
1Tokyo University of Science (TUS), JAPAN and 2National Institute of Advanced Industrial Science and Technology (AIST), JAPAN……………………………………p. 155

A4-P21  
FULLY INTEGRATED MICROFLUIDIC DEVICE WITH CARBON SENSING ELECTRODE  
A.A. Davoudi1 and R. Jankowiak2  
1Iowa State University, USA and 2Kansas State University, USA ……………………………………….p. 157

A4-P22  
A WIRELESS DATA AND POWER TELEMETRY SYSTEM USING NOVEL BPSK Demodulator FOR NON-DESTRUCTIVE EVALUATION OF STRUCTURES  
S.R. Sonkusale and Z. Luo  
Tufts University, USA…………………………………………………………………………………………p. 159

Phenomena, Modeling & Evaluation - CHAIR: F. Creemer, Delft University

A4-P1  
EVAPORATION MODEL OF MICRO-MENISCUS FOR THERMOELECTRIC DROP SENSOR  
J. Ni, W. Benecke, and W. Lang  
Universität of Bremen, GERMANY………………………………………………………………………p. 161

A4-P2  
REMOTE MOISTURE SENSING UTILIZING ORDINARY RFID TAGS  
J. Sidén1, X. Zeng1,2, T. Unander1,3, A. Koptyug4, and H.-E. Nilsson1  
1Mid-Sweden University, SWEDEN, 2Jiangsu University, CHINA, 3SCA R&D Centre AB, SWEDEN and 4Sensible Solutions Sweden AB, SWEDEN……………………………………………………………….p. 163

A4-P3  
FRACIAL BROWNIAN MOTION FOR FEATURE EXTRACTION IN NOISY SIGNALS FROM GAS SENSORS  
J.S. gonscherowski1, G.C.S. Quispe1, F.J.R. Fernandes1, W.J. Salcedo2, and N. Peixoto2  
1Universidade de São Paulo, BRASIL and 2George Mason University, USA………………………………………………………………………………………….p. 165

A4-P4  
APPLICATION OF ARTIFICIAL NEURAL NETWORK (ANN) FOR PREDICTING THE BEHAVIOR OF MICROMACHINED DIAPHRAGM ACTUATED ELECTROSTATICALLY  
H.W. Lee1, M.I. Syono1, and I.H.A. Acid2  
1MIMOS Berhad, MALAYSIA and 2Universiti Sains Malaysia, MALAYSIA……………………………………p. 167

A4-P5  
MODELING AND SIMULATION OF A RESISTIVE THERMAL PROBE  
D.-K. Min and S. Hong  
Samsung Advanced Institute of Technology, KOREA…………………………………………………p. 169

A4-P6  
THE SWELLING EFFECTS DURING THE DEVELOPMENT PROCESSES OF DEEP UV LITHOGRAPHY OF SU-8 PHOTORESISTS: THEORETICAL STUDY, SIMULATION AND VERIFICATION  
Southeast University, CHINA………………………………………………………………………………………p. 171

A4-P7  
HIGH-ACCURACY IMAGE CENTROIDING ALGORITHM FOR CMOS-BASED DIGITAL SUN SENSORS  
Korea Aerospace University, KOREA………………………………………………………………………………p. 173
## Technical Program Monday

<table>
<thead>
<tr>
<th>Session Code</th>
<th>Title</th>
<th>Authors and Affiliations</th>
<th>Page</th>
</tr>
</thead>
</table>
| A4P-G8       | A Completely Scalable Lumped-Circuit Model for Horizontal and Vertical Hall Devices | P.D. Dimitropoulos¹, N. Nastos¹, S. Reymond¹, P.M. Drljaca¹, and R.S. Popovic¹  
¹Swiss Federal Institute of Technology Lausanne (EPFL), SWITZERLAND and ²University of Thessaly, GREECE | 175  |
| A4P-G9       | Comparison of the Dynamic Response of Calorimetric and Hot-Film Flow Transducers | F. Kohl¹, R. Beigelbeck¹, S. Cerimovic¹, A. Talic¹, J. Schalko², and A. Jachimovicz²  
¹Austrian Academy of Sciences, AUSTRIA and ²Vienna University of Technology, AUSTRIA | 177  |
| A4P-G10      | Bayesian Network Modeling of Acoustic Sensor Measurements              | C. Cai, M. Qian, and S. Ferrari  
Duke University, USA | 179  |
| A4P-G11      | The Nonlinear Behavior of a Post-Buckled Circular Plate               | M. Williams, B. Griffin, B. Homejeer, B. Sankar, and M. Sheplak  
University of Florida, USA | 181  |
University of South Florida, USA | 183  |
| A4P-G13      | 3D Modeling and Simulation of SH-Saw Devices Using the Finite Element Method | S. Krishnamurthy¹, M.Z. Atashbar¹, and K. Kalantar-Zaadeh²  
¹Western Michigan University, USA and ²RMIT University, AUSTRALIA | 185  |
| A4P-G14      | Model-Based Object Characterization with Active Infrared Sensor Array  | V. Pavlov, H. Ruser, and M. Horn  
Bundeswehr University Munich, GERMANY | 187  |
| A4P-G15      | Single-Element Weather Sensor for Automatic Windows                   | M. Horn and H. Ruser  
Bundeswehr University Munich, GERMANY | 189  |
| A4P-G16      | Effect of the Electrical Double Layer on the Performance of Nanometer Interdigitated Electrodes | X. Yang and G. Zhang  
University of Georgia, USA | 191  |
| A4P-G17      | Improving Measurement Accuracy in Sensor Networks by an Object Model Generation and Application | L. Reznik and K.A. Kluver  
Rochester Institute of Technology, USA | 193  |

---

### Optical Sensors - Chair: M.J. Vellekoop, Vienna University of Technology

<table>
<thead>
<tr>
<th>Session Code</th>
<th>Title</th>
<th>Authors and Affiliations</th>
<th>Page</th>
</tr>
</thead>
</table>
| A4P-H1       | Molecular Probe Based on Photonic Crystal Fiber (PCF) and Surface Enhanced Raman Scattering (SERS) | Y. Zhang, C. Shi, C. Gu, L. Seballos, and J.Z. Zhang  
University of California, Santa Cruz, USA | 195  |
| A4P-H2       | Magnetic Garnets for Lightning Current Measurements                 | S.G.M. Kraemer¹, F.P. Leon¹, and Y.N. Mendoza Hernández²  
¹Technical University München, GERMANY and ²GE Global Research, GERMANY | 197  |
| A4P-H3       | Displacement Estimation with an Optical Feedback Interferometer Using an Evolutionary Algorithm | A. Doncescu¹, C. Bes², and T. Bosch²  
¹LAAS-CNRS, FRANCE and ²ENSEEIHT, INP, FRANCE | 199  |
| A4P-H4       | Laser Diode Under Strong Feedback for Mechatronics Applications      | J. El Assad¹, T. Bosch¹, and G. Plantier²  
¹Université de Toulouse, FRANCE and ²ESEO, FRANCE | 201  |
<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
<th>Affiliations</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A4P-H5</td>
<td>DISTRIBUTED SENSING SYSTEM OF OPTICAL LOW-COHERENCE REFLECTOMETRY USING AN ARRAY OF IDENTICAL FIBER BRAGG GRATINGS</td>
<td>W. Liu, Z.-G. Guan, G. Liu, and S. He</td>
<td>Zhejiang University, CHINA</td>
<td>p. 203</td>
</tr>
<tr>
<td>A4P-H6</td>
<td>PECVD SILICON CARBIDE WAVEGUIDES FOR MULTICHANNEL SENSORS</td>
<td>G. Pandraud, P.J. French, and P.M. Sarro</td>
<td>Delft University of Technology, THE NETHERLANDS</td>
<td>p. 205</td>
</tr>
<tr>
<td>A4P-H7</td>
<td>STUDY ON WHITE LIGHT OPTICAL FIBER INTERFEROMETRY FOR pH SENSOR APPLICATIONS</td>
<td>J. Goicoechea, C.R. Zamarreño, I.R. Matias, and F.J. Arregui</td>
<td>Universidad Pública de Navarra, SPAIN</td>
<td>p. 207</td>
</tr>
<tr>
<td>A4P-H8</td>
<td>DEVELOPMENT OF OPTICAL 3-AXIS DISTRIBUTED FORCES SENSORS FOR WALKING ANALYSIS</td>
<td>M. Ueda, H. Uno, H. Takemura, and H. Mizoguchi</td>
<td>Tokyo University of Science, JAPAN</td>
<td>p. 209</td>
</tr>
<tr>
<td>A4P-H11</td>
<td>Au-(Y₂O₃)ₓ(ZrO₂)₁₋ₓ THIN FILMS FOR HIGH TEMPERATURE GAS DETECTION VIA CHANGES IN OPTICAL ABSORPTION: INTERFACIAL INFLUENCES ON METALLIC NANOPARTICLE OPTICAL PROPERTIES</td>
<td>P.H. Rogers, G. Sirinakis, and M.A. Carpenter</td>
<td>University at Albany, USA</td>
<td>p. 215</td>
</tr>
<tr>
<td>A4P-H12</td>
<td>MULTIMODE VCSELs FOR SELF-MIXING VELOCITY MEASUREMENTS</td>
<td>J. Perchoux and T. Bosch</td>
<td>ENSEEIHT-INS, FRANCE</td>
<td>p. 217</td>
</tr>
<tr>
<td>A4P-H13</td>
<td>OPTICAL DETECTION HETEROGENEously INTEGRATED WITH A COPLANAR DIGITAL MICROFLUIDIC LAB-ON-A-CHIP PLATFORM</td>
<td>R. Evans, L. Luan, N.M. Jokerst, and R.B. Fair</td>
<td>Duke University, USA</td>
<td>p. 219</td>
</tr>
<tr>
<td>A4P-H14</td>
<td>ADDRESSABLE MICROMACHINED UV LIGHT SOURCES FOR ACTIVE PATTERNING</td>
<td>Y. Choi, R. DeVireddy, Y. Jung, and A.B. Frazier</td>
<td>Georgia Institute of Technology, USA</td>
<td>p. 221</td>
</tr>
<tr>
<td>A4P-H15</td>
<td>PLASMON ENHANCEMENTS FOR FIR DETECTION</td>
<td>A.G.U. Perera¹, S.G. Matsik², P.V. Jayawera², D.H. Huang², H.C. Liu², and M. Buchanan²</td>
<td>¹Georgia State University, USA, ²U.S. Air Force Research Lab, USA and ³National Research Council-Canada, CANADA</td>
<td>p. 223</td>
</tr>
<tr>
<td>A4P-H17</td>
<td>A PLANAR LIQUID LENS DESIGN BASED ON ELECTROWETTING</td>
<td>J. Park, C.-X. Liu, and J.-W. Choi</td>
<td>Louisiana State University, USA</td>
<td>p. 227</td>
</tr>
<tr>
<td>A4P-H18</td>
<td>DETECTION AND HOMODYNE MIXING OF TERAHERTZ GAS LASER RADIATION BY SUBMICRON GaAs/AlGaAs FETs</td>
<td>D. Vekeler, A. Muravijov, W. Stillman, N. Pala, and M. Shur</td>
<td>Rensselaer Polytechnic Institute, USA</td>
<td>p. 229</td>
</tr>
<tr>
<td>A4P-H19</td>
<td>MICROFABRICATED OPTICAL COMPRESSION LOAD SENSORS</td>
<td>G.D. Cole, J. Kotovsky, K.L. Lin, and H.E. Petersen</td>
<td>Lawrence Livermore National Laboratory, USA</td>
<td>p. 231</td>
</tr>
</tbody>
</table>
SESSION A5L-A
Biomicrosystems

SESSION CHAIRS
Y. Miyahara,
National Institute of Materials Science
S. Sonkusale, Tufts University

SESSION A5L-B
Phenomena

SESSION CHAIRS
F. Creemer, Delft University
J. Zou, Texas A&M University

SESSION A5L-C
IR and THz Sensors

SESSION CHAIRS
E. Lewis, University of Limerick
G. Pickrell, Virginia Tech

SESSION A5L-D
Smart CMOS Image Sensors

SESSION CHAIRS
A. Fish, University of Calgary
O. Yadid-Pecht, Ben-Gurion University

Regency VI, VII
Regency V
Hanover C,D,E
Hanover F,G

4:00 p.m.

THERMALLY ADJUSTABLE MICROLENSES FOR BIOLOGICAL IMAGING
L. Wang¹, C.-M. Cheng¹, Q. Lin², and P.R. Leduc¹
¹Carnegie Mellon University, USA and
²Columbia University, USA

A NOVEL CIRCULAR SAW (SURFACE ACOUSTIC WAVE) DEVICE IN CMOS
O. Tigi and M.E. Zaghoul
George Washington University, USA

HIGH YIELD FRONT-ETCHED STRUCTURE FOR CMOS COMPATIBLE IR DETECTOR
T. Li, Y. Liu, P. Zhou, Y. Wang, and Y. Wang
Chinese Academy of Science, CHINA

4:15 p.m.

APPLICATION OF AN INTEGRATED MICROFLUIDIC TOTAL INTERNAL REFLECTION (TIR)-BASED CHIP TO NANO-PARTICLE IMAGING (NANO-PIV)
Ritsumeikan University, JAPAN

SAW STREAMING IN ZnO SURFACE ACOUSTIC WAVE MICROMIXER AND MICROPUMP
Y.Q. Fu¹, X.Y. Du¹, J.K. Luo¹, A.J. Flewitt, W.I. Milne¹, D.S. Lee², N.M. Park², S. Maerq², S.H. Kim², Y.J. Choi², and J. Park²
¹University of Cambridge, UK and
²Electronics and Telecommunications Research Institute (ETRI), KOREA

TUNNELING QUANTUM DOT SENSORS FOR MULTI-BAND INFRARED AND TERAHertz RADIATION DETECTION
G. Ariyawansa¹, S.G. Matsik¹, A.G.U. Perera¹, X.H. Su², and P. Bhattacharya²
¹Georgia State University, USA and
²University of Michigan, USA

4:30 p.m.

MICRO ANALYSIS SYSTEM FOR DIGESTIVE ENZYMES BASED ON INTEGRATED AUTOMATIC pH-STAS
K. Morimoto, J. Fukuda, and H. Suzuki
University of Tsukuba, JAPAN

TEMPERATURE DEPENDENCE OF HIGH FREQUENCY PARAMETERS OF PVDF FOR LENGTH MODE ULTRASONIC AIR TRANSUDERS
M. Toda and M. Thompson
Measurement Specialties Inc., USA

SINGLE AND MULTI EMITTER TERAHertz DETECTORS USING n-TYPE GaAs/AlGaAs HETEROSTRUCTURES
A.B. Weerasekara¹, R.C. Jayasinghe¹, M.B.M. Rinzan¹, S.G. Matsik¹, A.G.U. Perera¹, M. Buchanan², H.C. Liu², G. von Wincke³, A. Stintz³, and S. Krishna³
¹Georgia State University, USA, ²Institute for Microstructural Sciences, CANADA and ³University of New Mexico, USA

RESPONSIVITY OF GATED PHOTODIODE IN SOS TECHNOLOGY
A. Fish¹, O. Yadid-Pecht², and E. Culucchio³
¹University of Calgary, CANADA
²Ben-Gurion University, ISRAEL and
³Yale University, USA

4:45 p.m.

HOT-EMBOSSED DIELECTRIC POLYMER MICRO-DIAPHRAGM ARRAYS INTEGRATED WITH LAB-ON-A-CHIP FOR PROTEIN ANALYSIS
C. Li, P.-M. Wu, A. Browne, S. Lee, and C.H. Ahn
University of Cincinnati, USA

A METHOD TO REALIZE CONTROLLED AIR/LIQUID INTERFACES AND INTERFACIAL POLYMER MICRO MEMBRANES IN MICROFLUIDIC CHANNELS
D. Cheng, Y.P. Choe, and H. Jiang
University of Wisconsin, Madison, USA

FABRICATION AND EXPERIMENTAL TESTING OF INDIVIDUAL MULTI-WALLED CARBON NANOTUBE (CNT) BASED INFRARED SENSORS
J. Zhang, N. Xi, H. Chen, and K.W.C. Lai
Michigan State University, USA

A CMOS IMAGE SENSOR WITH ON CHIP IMAGE COMPRESSION BASED ON PREDICTIVE BOUNDARY ADAPTATION AND QTQ ALGORITHM
S. Chen¹, A. Berns², Y. Wang¹, and D. Martinez²
¹Hong Kong University of Science and Technology, HONG KONG and ²LORIA-CNRS, FRANCE
### TECHNICAL PROGRAM MONDAY

<table>
<thead>
<tr>
<th>SESSION A5L-A</th>
<th>SESSION A5L-B</th>
<th>SESSION A5L-C</th>
<th>SPECIAL SESSION A5L-D</th>
</tr>
</thead>
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</tbody>
</table>

**5:00 p.m.**

- MICROFLUIDIC FLOW CYTOMETER WITH ON-CHIP LENS SYSTEMS FOR IMPROVED SIGNAL RESOLUTION
  J. Godin and Y.-H. Lo  
  University of California, San Diego, USA
  
  p. 241

- METAL/SnO₂ INTERFACE EFFECTS ON CO SENSING, OPERANDO STUDIES
  J. Bertrand¹, A. Haensch², D. Koziej³, N. Barsan⁴, C. Pijolat, U. Weimar, and J.-P. Viricelle⁴  
  ¹Ecole Nationale Supérieure des Mines, FRANCE and  
  ²University of Tuebingen, GERMANY
  
  p. 253

- DESIGN OF A NOVEL FULLY INTEGRATED IR – ABSORPTION SENSOR SYSTEM
  J. Kasberger⁵ and B. Jakoby⁵  
  ¹Integrated Microsystems Austria, AUSTRIA and ²Johannes Kepler University Linz, AUSTRIA
  
  p. 265

- A UV PHOTODETECTOR WITH INTERNAL GAIN FABRICATED IN SILICON ON SAPPHIRE CMOS
  M. Adlerstein Marwick and A.G. Andreou  
  Johns Hopkins University, USA
  
  p. 275

**5:15 p.m.**

- MICROFLUIDIC DEVICE FOR ON-CHIP MANIPULATION OF LIQUID PLUGS FOR BIOSENSING APPLICATIONS
  University of Tsukuba, JAPAN
  
  p. 243

- p-Si MICROPROBE ARRAYS GROWN AT LOW TEMPERATURE BY SELECTIVE VLS USING IN-SITU DOPING AND THEIR PROPERTIES
  M.S. Islam, T. Kawashima, K. Sawada, and M. Ishida  
  Toyohashi University of Technology, JAPAN
  
  p. 255

- AMORPHOUS GeₓSi₁₋ₓOᵧ:H MICROBOLOMETERS WITH HIGH RESPONSIVITY
  M.M. Rana and D.P. Butler  
  University of Texas, Arlington, USA
  
  p. 267

5:30 p.m. | Adjourn for the Day
Tuesday, October 30, 2007

8:00 a.m. | KEYNOTE PRESENTATION B1K-A
Chair: A. Hierlemann, ETH Zurich

CRICKET INSPIRED FLOW-SENSOR ARRAYS
Gijs Krijnen¹, T. Lammerink¹, R. Wiegerink¹ and J. Casas²
¹University of Twente, THE NETHERLANDS and ²Université François Rabelais, FRANCE

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SESSION B2L-A
Carbon Nanotubes & Nanocrystals

SESSION CHAIRS
M. Atashbar, Western Michigan University
L. Sarro, Delft University

SESSION B2L-B
Optical Sensors I

SESSION CHAIRS
H. Jiang, University of Wisconsin
E. Lewis, University of Limerick

SESSION B2L-C
Optical Biosensors

SESSION CHAIRS
M. Eickhoff, Technische Universität München
E. Kharlamieva, Georgia Institute of Technology

SESSION B2L-D
Sensors in Extreme Environments

SESSION CHAIR
M.M. Disko, ExxonMobil

Regency VI, VII | Regency V | Hanover C,D,E | Hanover F,G

GAS SENSING PROPERTIES OF SWCNT AND TEFLOM AF COMPOSITES
A. Kärkkäinen, T. Avarmaa, and R. Jaaniso
University of Tartu, ESTONIA

COHERENCE MULTIPLEXING OF ABSORPTION SENSORS
Z.-G. Guan, B. Zhou, G. Liu, and S. He
Zhejiang University, CHINA

A NEW FLUORESCENT VESICULAR SENSOR FOR SACCHARIDES BASED ON BORONIC ACID-DIOL RECOGNITION ON THE INTERFACES OF VESICLES
G. Li, T. Jiang, X. Zhang, Q. Wang, and G. Li
Jilin University, CHINA

INVITED
SENSING REQUIREMENTS FOR REAL-TIME MONITORING AND CONTROL ON ENERGY PRODUCTION
R.N. Ghosh and R. Lolee
Michigan State University, USA

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GAS SENSING PROPERTIES OF CNT-SnO₂ NANOCOMPOSITE THIN FILM PREPARED BY E-BEAM EVAPORATION
A. Wogisarat¹, E. Comini², G. Sverdugli³, W. Wlodarski³, and A. Tuantranont¹
¹National Electronics and Computer Technology Center, THAILAND,
²University of Brescia, ITALY and
³RMIT University, AUSTRALIA

RESONANT DETECTION AND MODULATION OF TERAHERTZ RADIATION BY 2DEG PLASMONS IN GaN GRATING-GATE STRUCTURES
N. Pala¹, D. Veklerov¹, A. Muravyov², W. Stiller³, R. Gaska¹, and M. Shur¹
¹Sensor Electronic Technology, Inc., USA and ²Rensselaer Polytechnic Institute, USA

SURFACE PLASMON RESONANCE ENHANCED COMMON PATH INTERFEROMETRY FOR HIGH SENSITIVITY LABEL FREE BIOMOLECULE INTERACTION ANALYSIS
C. Greif², V. Petropavlovskikh³, O. Nilsen¹, B. Hacioglu¹,
B. Khattatov¹, and J. Halí³
¹AlphaSniffer, LLC, USA and ²2nd Stable Lasers, LLC, USA

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CARBON NANTOTUBE-BASED HYDROGEN GAS SENSOR ELECTROCHEMICALLY FUNCTIONALIZED WITH PALLADIUM
J. Suehiro, S. Yamane, and K. Inasaka
Kyushu University, JAPAN

TEMPERATURE-DEPENDENT-FREE PIGTAILED ELECTRO-OPTIC SENSORS FOR VECTORIAL MEASUREMENT OF MICROWAVE SIGNALS
M. Bernier¹, L. Duvilleire¹, G. Gaborit¹, A. Paupert¹, and J.-L. Lasserre²
¹Institut de Microélectronique d’Electromagnétisme et Photonique, FRANCE and ²Centre d’Etude de Gramat, FRANCE

A NOVEL RING SHAPED PHOTODIODE FOR REFLECTANCE PULSE OXIMETRY IN WIRELESS APPLICATIONS
S. Duun, R.G. Haahr, K. Birkelund, P. Raahauge, P. Petersen, H. Dam,
L. Nergaard, and E.V. Thomsen
Technical University of Denmark, DENMARK

OPTICAL OXYGEN SENSORS USING TUNABLE DIODE LASER SPECTROSCOPY: APPLICATION TO HARSH REACTIVE PROCESSES
V. Ebert¹ and J.W. Fleming²
¹Heidelberg University, GERMANY and ²Naval Research Laboratory, USA

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LARGE AREA NANOCRYSTALLINE GRAPHITE FILMS ON SiC FOR GAS SENSING APPLICATIONS
M.V.S. Chandrareshékhar¹, M. Oazi², J. Lu¹, G. Koley², and M.G. Spencer¹
¹Cornell University, USA and
²University of South Carolina, USA

SMART BI-SPECTRAL IMAGE SENSOR FOR 3D VISION
A. Kolar¹, T. Graba¹, A. Pinna¹, O. Romaní¹, E. Belhaire², and B. Granado¹
¹Université Pierre et Marie CURIE, FRANCE and ²Universite Paris-Sud, FRANCE

OPTICAL SENSORS BASED ON S-LAYER PROTEINS
S. Scheicher¹, B. Kainz², S. Köstler², C. Konrad³, M. Suppan³, A. Bizzarri³,
D. Pum³, V. Ribitsch¹, and U.B. Sleytr²
¹Karl-Franzens University, AUSTRIA, ²University of Natural Resources and Applied Life Sciences, AUSTRIA and
³Joanneum Research, AUSTRIA

EXPLORING SILICON CARBIDE FOR THERMAL INFRARED RADIATORS
L. Chen and M. Mehregany
Case Western Reserve University, USA

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9:45 a.m.

XX

IEEE SENSORS 2007
### TECHNICAL PROGRAM TUESDAY

<table>
<thead>
<tr>
<th>SESSION B2L-A continued</th>
<th>SESSION B2L-B continued</th>
<th>SESSION B2L-C continued</th>
<th>SPECIAL SESSION B2L-D continued</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>10:00 a.m.</strong></td>
<td><strong>10:15 a.m.</strong></td>
<td><strong>10:30 a.m.</strong></td>
<td><strong>11:00 a.m.</strong></td>
</tr>
</tbody>
</table>

| **10:15 a.m.**          | **11:00 a.m.**          | **11:15 a.m.**          | **11:30 a.m.**                  |
| SINGLE PHOTON AVALANCHE DETECTORS IN STANDARD CMOS M. Dandini¹, N. Nelson¹, V. Saveliev¹, I. Weinberg², H. Ji³, and P. Abshire¹ | DESIGN OF A SLIM-LINE INTEGRATED PROBE USING OPTICAL FIBRE TECHNOLOGY THAT IS SUITABLE FOR MICROWAVE ENVIRONMENTS AND MEASURES REFLECTION SPECTROSCOPY AND TEMPERATURE M. O’Farrell¹, C. Sheridan¹, E.L. Lewis¹, W.Z. Zhao¹, K.T.V. Grattan², T. Sun¹², J. Kerry¹, and N. Jackman¹ | DETECTION OF ALCOHOL WITH VERTICALLY ALIGNED CARBON NANOFIBER (VACNF) M.L. Weeks¹, T. Rahman¹, P.D. Frymier¹, S.K. Islam¹, and T.E. McKnight¹ | INVITED AFM/EC NANO PROBING OF SINGLE CELLS AND ORGANELLES R. Fasching, W.-H. Ryu, S.-J. Bai, J.-S. Park, T. Fabian, J. Msoley, A. Grossman, and F. Prinz Stanford University, USA |

| **10:30 a.m.**          | Break & Exhibit Inspection | **11:00 a.m.**          | **11:15 a.m.**                  |
| SESSION B3L-A Nanostructure for Chemical Sensors | SESSION B3L-B Optical Sensors II | SESSION B3L-C Biosensors | SESSION B3L-D Sensing Interfaces with Electrochemical Scanning Probes |
| SESSION CHAIRS F. Arregui, Public University of Navarre R. Gao, University of Massachusetts | SESSION CHAIRS G. Pickrell, Virginia Tech A. Zribi, GE Research | SESSION CHAIRS J. Yeow, University of Toronto B. Ziaie, Purdue University | SESSION CHAIR C. Kranz, Georgia Institute of Technology |
| Regency VI, VII | Regency V | Hanover C,D,E | Hanover F,G |

| **11:00 a.m.**          | **11:15 a.m.**          | **11:30 a.m.** | **11:30 a.m.**                  |
| COMPACT SPR GAS SENSOR FOR MOBILE ROBOT Olfaction USING METAL NANOSTRUCTURE AND LED LIGHT SOURCE Y. Kagawa, M. Satoh, T. Numata, H. Ishida, and N. Umeda Tokyo University of Agriculture and Technology, JAPAN | A RANGE FINDING ARRAY SENSOR PERFORMING CORRELATED CALCULATIONS WITH A PN CODE MODULATION LIGHT T. Joboji¹ and S. Sugawa² | REAL-TIME PROTEIN BINDING DETECTION WITH NEUROMORPHIC INTEGRATED SENSOR B.C. Jacquot¹, N.L. Muñoz¹, D.W. Branch¹, and E.C. Kan¹ | COMPARISON OF TWO REDOX COUPLES FOR AFM-SECm P.L.T.M. Frederik¹, P.D. Bosshart¹, T. Akiyama¹, N.E. De Rooij¹, U. Staufer², and A. Engel¹ |

| **11:15 a.m.** | **11:30 a.m.**          | **11:30 a.m.**          | **11:30 a.m.**                  |
| NANOWIRE SENSOR FOR VOLATILE ORGANIC COMPOUNDS BY FORMATION OF CHARGE TRANSFER COMPLEX K. Masunaga, M. Sato, K. Hayashi, and K. Toko Kyushu University, JAPAN | DESIGN AND FABRICATION OF AN EXTREME TEMPERATURE SENSING OPTICAL PROBE USING SILICON CARBIDE TECHNOLOGIES N.A. Riza¹, M. Sheikh¹, and F. Perez² | BIOCHEMICAL RESPONSES OF NANOPILLAR GATE FIELD-EFFECT DEVICES Y. Miyahara¹, T. Sakata², A. Matsumoto², C. Karatza-Hamai¹, H. Inoue¹, N. Sato¹, and I. Makiya² | University of Basel, SWITZERLAND and University of Neuchâtel, SWITZERLAND |

| **11:30 a.m.**          | **11:30 a.m.**          | **11:30 a.m.**          | **11:30 a.m.**                  |
| CHEMICAL SENSORS FROM LEAD METALLOPHOTOTOCHROMIC WHISKERS E. Streikov and A. Kolmakov Southern Illinois University, USA | DESIGN AND FABRICATION OF AN EXTREME TEMPERATURE SENSING OPTICAL PROBE USING SILICON CARBIDE TECHNOLOGIES N.A. Riza¹, M. Sheikh¹, and F. Perez² | BIOCHEMICAL RESPONSES OF NANOPILLAR GATE FIELD-EFFECT DEVICES Y. Miyahara¹, T. Sakata², A. Matsumoto², C. Karatza-Hamai¹, H. Inoue¹, N. Sato¹, and I. Makiya² | University of Basel, SWITZERLAND and University of Neuchâtel, SWITZERLAND |
### TECHNICAL PROGRAM TUESDAY

#### 11:45 a.m.

**SESSION B3L-A** continued  
**OPTICAL TRANSDUCTION OF THE CHEMICAL SENSITIVITY OF PORPHYRIN NANOTUBES BY CSPT PLATFORM**  
E. Martineili1, F. Dini2, D. Monti2, R. Paollesse1, D. Filippini1, A. D’Amico1, I. Lundström2, and C. Di Natale1  
1University of Rome Tor Vergata, ITALY and 2University of Linköping, SWEDEN  
p. 327

**SESSION B3L-B** continued  
**Au-(Y2O3) x (ZrO2)1-x THIN FILMS AS AN ALL-OPTICAL METHOD FOR MEASURING EMISSIONS AT HIGH TEMPERATURES**  
P.H. Rogers, G. Sirinakis, and M.A. Carpenter  
University at Albany, USA  
p. 339

**SESSION B3L-C** continued  
**DEVELOPMENT OF POLYETHYLENEGLYCOL MONOLAYER-BASED SPR IMMUNOSensor FOR DETECTION OF LOW-MOLECULAR-WEIGHT FRAGMENTS**  
K.V. Gobi1, K. Matsumoto1, K. Toko1, H. Ikezaki2, and N. Miura1  
1Kyushu University, JAPAN and 2Insect Inc., JAPAN  
p. 351

**SPECIAL SESSION B3L-D** continued  
**ELECTROCHEMICAL CANTILEVER SENSORS AND SCANNING PROBE MICROSCOPY**  
T. Thundat, and G.M. Brown  
Oak Ridge National Laboratory, USA  
p. 361

#### 12:00 p.m.

**SESSION B3L-A** continued  
**RAPID FABRICATION OF A NANO INTERDIGITATED ARRAY ELECTRODE AND ITS AMPEROMETRIC CHARACTERIZATION AS AN ELECTROCHEMICAL SENSOR**  
A.K. Samara1, M.J. Rust1, and C.H. Ahn2  
1Georgia Institute of Technology, USA and 2University of Cincinnati, USA  
p. 329

**SESSION B3L-B** continued  
**ANALYSIS OF PHOTO-ELASTIC MODULATION IN ACCELERATION SENSING**  
F. Chen and Z. Salic  
University of Auckland, NEW ZEALAND  
p. 341

**SESSION B3L-C** continued  
**DEVELOPMENT OF A SHEAR HORIZONTAL SAW RFID BIOSENSOR**  
J.K. Permin1, P.J. Edmonson2, and W.D. Hunt3  
1Georgia Institute of Technology, USA and 2P.J. Edmonson, Ltd., CANADA  
p. 353

**SPECIAL SESSION B3L-D** continued  
**NEW METHODS FOR CALIBRATED SCANNING THERMAL MICROSCOPY (STM)**  
P.S. Dobson1, G. Mills2, and J.M.R. Weaver1  
1University of Glasgow, UK and 2Kelvin Nanotechnology, UK  
p. 363

#### 12:15 p.m.

**A LOW VOLTAGE GAS IONIZATION SENSOR BASED ON SPARSE GOLD NANORODS**  
R.B. Sadeghian and M. Kahari  
Concordia University, CANADA  
p. 331

**SESSION B3L-B** continued  
**A 3.2 kHz, 13-BIT OPTICAL ABSOLUTE ROTARY ENCODER WITH A CMOS PROFILE SENSOR**  
Hamamatsu Photonics K.K., JAPAN  
p. 343

**SESSION B3L-C** continued  
**HYDROGEL-BASED INTEGRATED ANTENNA-pH SENSOR**  
S.-N. Lee1, Z. Ding2, J.-I. Kim2, J.-G. Youk1, B. Ziaie2, and D. Peroulis2  
1Yonsei University, KOREA and 2Purdue University, USA  
p. 355

**SPECIAL SESSION B3L-D** continued  
**DEVELOPMENTS IN NANOWIRE SCANNING ELECTROCHEMICAL - ATOMIC FORCE MICROSCOPY (SECM-AFM) PROBES**  
P.D. Burt1, P.S. Dobson1, J.M.R. Weaver1, N.R. Wilson2, P.R. Unwin2, and J.V. Macpheerson2  
1University of Glasgow, UK and 2University of Wa rnick, UK  
p. 365

#### 12:30 p.m.

**Lunch on your Own & Exhibit Inspection**

#### 2:00 p.m.

**POSTER SESSION B4P** (See page xxxvi for floorplan)

### Biosensors - CHAIR: J.Y. Park, Kwangwoon University

**B4P-E1**  
**MULTI-CHIP HIGH-DENSITY MICROELECTRODE SYSTEM FOR ELECTROGENIC-CELL RECORDING AND STIMULATION**  
ETH Zürich, SWITZERLAND  
p. 367

**B4P-E2**  
**MICRO FLUIDIC BIOSENSOR SYSTEM BASED ON QUARTZ CRYSTAL RESONATORS FOR FAST ONLINE ADHERENT CELL PROLIFERATION AND STIMULATION ANALYSIS**  
T. Jacobs, A. Gomide, T. Kähne, A. Kienle, M. Naumann, and P. Hauptmann  
Otto von Guericke University Magdeburg, GERMANY  
p. 369

**B4P-E3**  
**BIOCHIP FOR DNA AMPLIFICATION AND LABEL-FREE DNA DETECTION**  
G. Hairer1, M.H. Mansfeld2, C. Nöhhammer1, and M.J. Vellekoop1  
1Vienna University of Technology, AUSTRIA and 2Austrian Research Centers GmbH-ARC, AUSTRIA  
p. 371

**B4P-E4**  
**A NOVEL DETECTION FOR BIOMOLECULE USING RF LC RESONATOR**  
Y.I. Kim1, Y. Park2, and H. Baei  
1Samsung Advanced Institute of Technology, KOREA and 2Yonsei University, KOREA  
p. 373
B4P-E5  USING MAGNETO-INDUCTIVE SENSORS TO DETECT TONGUE POSITION IN A WIRELESS ASSISTIVE TECHNOLOGY FOR PEOPLE WITH SEVERE DISABILITIES
X. Huo¹, J. Wang², and M. Ghovanloo²
¹North Carolina State University, USA and ²Georgia Institute of Technology, USA ................................................................. p. 375

B4P-E6  DIELECTROPHORETIC WHOLE BLOOD SEPARATION DEVICE INTEGRATING A SPIRAL PUMP AND CYTOMETRY
J. Gregory, Y.S. Ng, E.M. Jung, and S. Kodandaramaiah
University of Michigan, USA .................................................................................................................................................. p. 377

B4P-E7  DUAL MICRO-THERMOPILE BASED BIOCALORIMETER FOR ENZYME-SUBSTRATE REACTION
Yonsei University, KOREA .................................................................................................................................................. p. 379

B4P-E8  AMPEROMETRIC MICROBIOSENSORS FOR STUDYING ATP AT THE CAROTID BODY
J.-F. Masson¹, C. Kranz², E.B. Gauda³, and B. Mizaikoff²
¹Université de Montréal, CANADA, ²Georgia Institute of Technology, USA and ³Johns Hopkins University, USA ...................................................... p. 381
**B4P-F12**

**TACTILE SENSOR WITHOUT WIRE AND SENSING ELEMENT IN THE TACTILE REGION BASED ON EIT METHOD**

Y. Katou\(^1\), T. Hayakawa\(^1\), T. Shibata\(^1\), and T. Mukai\(^1\)

\(^1\)RIKEN, JAPAN and \(^2\)Tokai Rubber Industries Ltd, JAPAN .................................................. p. 405

---

**B4P-F13**

**A HIGHLY SENSITIVE STRAIN SENSOR USING SURFACE ACOUSTIC WAVE AND ITS EVALUATION FOR WIRELESS BATTERY-LESS SENSOR NETWORK**

R. Konno\(^1\), M. Mitsui\(^1\), H. Kiuwano\(^1\), S. Nagasawa\(^1\), K. Sano\(^2\), and J. Hayasaka\(^2\)

\(^1\)Tohoku University, JAPAN and \(^2\)NEC TOKIN, JAPAN ............................................................... p. 407

---

**B4P-F14**

**DECOUPLED Z-AXIS MICROGYROSCOPE USING OBLIQUE COMB FOR FREQUENCY TUNING**

C.-P. Hsu, D.-H. Tsai, M.-C. Yip, and W. Fang

National Tsing Hua University, TAIWAN .......................................................................................... p. 409

---

**B4P-F15**

**CORROSION ENHANCED CAPACITIVE STRAIN GAUGE AT 370°C**


University of California, Berkeley, USA ........................................................................................... p. 411

---

**B4P-F16**

**A HIGH-SENSITIVITY 3-D TACTILE SENSOR FOR MINIMALLY INVASIVE SURGERY**

R.B. Katragadda, Z. Wang, and Y. Xu

Wayne State University, USA ............................................................................................................. p. 413

---

**B4P-F17**

**ADVANCED MEMS DEVELOPMENT FOR HIGH POWER SENSOR APPLICATION**

B.C. Kim\(^1\) and R. Kasim\(^2\)

\(^1\)University of Alabama, USA and \(^2\)Intel Corporation, USA ........................................................ p. 415

---

**B4P-F18**

**SUPER FLEXIBLE SENSOR SKIN USING LIQUID METAL AS INTERCONNECT**

H. Hu, K. Shaikh, and C. Liu

University of Illinois, Urbana-Champaign, USA ............................................................................... p. 417

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**Physical Sensors - CHAIR: K.A.A. Makinwa, Deft University**

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**B4P-G1**

**STABILIZED ARC DISCHARGES AS HARSH ENVIRONMENT TRANSUDCERS**

A. May and E. Andarawis

General Electric, USA ......................................................................................................................... p. 419

---

**B4P-G2**

**SUB-100m CHARGE RESOLUTION FOR ROOM TEMPERATURE ELECTROMETRY**

J. Lee, Y. Zhu, and A. Seshia

University of Cambridge, UK ............................................................................................................. p. 421

---

**B4P-G3**

**A SMALL SIZE HIGH PRESSURE SENSOR BASED ON METAL THIN FILM TECHNOLOGY**

A. Stoitzerl\(^1\), H.P. Dirda\(^1\), D. Dittmann\(^1\), R. Henn\(^2\), A. Jasenek\(^2\), F. Klop\(^2\), M. Metz\(^2\), A. Scharping\(^2\), and W. Frey\(^2\)

\(^1\)Robert Bosch GmbH, GERMANY and \(^2\)Bosch Research and Technology Center North America, USA .................................................................................................................. p. 423

---

**B4P-G4**

**THERMOELECTRIC FLOW SENSORS WITH MONOLITHICALLY INTEGRATED CHANNEL STRUCTURES FOR MEASUREMENTS OF VERY SMALL FLOW RATES**

R. Buchner, P. Bhargava, C. Cosna, W. Benecke, and W. Lang

University of Bremen, GERMANY ......................................................................................................... p. 425

---

**B4P-G5**

**AN ACOUSTIC TEMPERATURE SENSOR TO MONITOR VARIABLE FREQUENCY MICROWAVE CURING OF POLYMER DIELECTRICS**

C.E. Davis, A.J. Dickherber, W.D. Hunt, and G.S. May

Georgia Institute of Technology, USA .................................................................................................. p. 427

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**B4P-G6**

**DEVELOPMENT OF A INFRARED THERMOPILE DETECTOR WITH A THIN SELF-SUPPORTING SU-8 MEMBRANE**

C.G Mattsson\(^1\), G. Thungström\(^1\), K. Bertilsson\(^1\), H.-E. Nilsson\(^1\), and H. Martin\(^2\)

\(^1\)Mid Sweden University, SWEDEN and \(^2\)SenseAir AB, SWEDEN .................................................................................................................. p. 429

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**B4P-G7**

**A STUDY OF CROSS-AXIS EFFECT FOR MICROMACHINED THERMAL GAS INERTIAL SENSOR**

R. Zhu\(^1\), H. Ding\(^1\), Y. Su\(^1\), and Y. Yang\(^2\)

\(^1\)Tsinghua University, CHINA and \(^2\)Nanjing University of Science & Technology, CHINA and \(^3\)The 13th Research Institute of CETC, CHINA ..................................................................................... p. 431

---

**B4P-G8**

**ONE-SIDE-ELECTRODE-TYPE FLUID-BASED INCLINOMETER COMBINED WITH CMOS CIRCUITRY**

A.B.A. Manaf, K. Nakamura, J. Onishi, and Y. Matsumoto

Keio University, JAPAN ...................................................................................................................... p. 433
B4P-G9  INTEGRATED GMR BASED WHEEL SPEED SENSOR FOR AUTOMOTIVE APPLICATIONS
K. Kapser1 and J. Sterling2
1Infineon Technologies AG, GERMANY and 2Infineon Technologies North American Corp., USA ................................................................. p. 435

B4P-G10  CLOSED LOOP PCB FLUXGATE WITHOUT COMPENSATION COIL
L. Rovati1, S. Cattinii, M. Marchesi3, and E. Dallago4
1Università degli Studi di Modena e Reggio Emilia, ITALY, 2STMicroelectronics, ITALY and 3Università degli Studi di Pavia, ITALY .................. p. 437

B4P-G11  LOW-POWER OPERATION OF A PRECISION CMOS TEMPERATURE SENSOR BASED ON SUBSTRATE PNPs
A.L. Alta1,2 and K.A.A. Makinwa2
1Federal University of Santa Maria, BRAZIL and 2Delft University of Technology, THE NETHERLANDS................................................................. p. 439

B4P-G12  TRUE 2D CMOS INTEGRATED HALL SENSOR
S. Reymond, P. Kejik, and R.S. Popovic
Swiss Federal Institute of Technology, SWITZERLAND................................................................. p. 441

B4P-G13  DESIGN, OPTIMIZATION AND CHARACTERIZATION OF AN ACOUSTIC PLATE MODE VISCOMETER
J. Andle, R. Haskell, R. Sbardella, G. Morehead, M. Chap, J. Columbus, and D. Stevens
Vextron International, USA............................................................................................................. p. 443

B4P-G14  DESIGN, PACKAGING AND CHARACTERIZATION OF A TWO-PORT BULK WAVE LANGASITE VISCOMETER
J. Andle, R. Haskell, R. Sbardella, G. Morehead, M. Chap, J. Columbus, and D. Stevens
Vextron International, USA............................................................................................................. p. 445

B4P-G15  A NOVEL SENSOR SYSTEM FOR LIQUID PROPERTIES BASED ON A MICROMACHINED BEAM AND A LOW-COST OPTICAL READOUT
C. Riesch1, E.K. Reichenl1, A. Jachimowicz1, F. Kiplinger1, and B. Jakoby2
1Vienna University of Technology, AUSTRIA and 2Johannes Kepler University, AUSTRIA................................................................. p. 447

B4P-G16  A CORIOLIS VIBRATING GYRO MADE OF A STRONG PIEZOELECTRIC MATERIAL
A. Parent, O. Le Traon, S. Masson, and B. Le Foulgoc
ONERA, FRANCE......................................................................................................................... p. 449

B4P-G17  AN ULTRA LOW-NOISE VIBRATION MONITORING SYSTEM
F. Gerfers1, H. Bar2, T. Northemann3, M. Kuderer4, A. Buhmann5, Y. Manoli5, M. Kohlstedt1, and L.-P. Wang5
1Intel Corporation, USA, 2Intel Corporation, ISRAEL and 3Albert-Ludwigs University, GERMANY................................................................. p. 451

B4P-G18  A 0.35um-CMOS, WIDE-BAND, LOW-NOISE HALL MAGNETOMETER FOR CURRENT SENSING APPLICATIONS
P.D. Dimitropoulos, P.M. Drjaca, and R.S. Popovic
Swiss Federal Institute of Technology Lausanne (EPFL), SWITZERLAND................................................................. p. 453

B4P-G19  A NOVEL 2-D CAPACITIVE SILICON FLOW SENSOR
Z.-W. Wei, M. Qin, and Q.-A. Huang
Southeast University, CHINA............................................................................................................. p. 455

B4P-G20  MAGNETOSTRICTIVE/PIEZOELECTRIC MAGNETOELECTRIC TRANSUCER WITH AN ELASTIC SUBSTRATE
L. Bian, Y. Wen, P. Li, L. Cheng, and P. Liu
Chongqing University, CHINA............................................................................................................. p. 457

B4P-G21  MICRO STRUCTURED PLANAR GRADIENT COILS FOR LOW FIELD MAGNETIC RESONANCE IMAGING
D. Ellersiek, S. Harms, F. Casanova, B. Blümich, G. Dura, W. Mokwa, and U. Schnakenberg
RWTH Aachen University, GERMANY............................................................................................................. p. 459

B4P-G22  PRESSURE SENSOR USING ELECTROKINETIC ENERGY CONVERSION PHENOMENA
D. Kim1, D.-K. Kim2, S.-J. Park1, and S.J. Kim2
1Korea Institute of Machinery and Materials, KOREA and 2Korea Advanced Institute of Science and Technology(KAIST), KOREA................................................................. p. 461

B4P-G23  MICRO IR SPECTROMETER BASED ON BLAZE GRATING
H. Zhou, T. Li, Y. Wang, X. Li, and Y. Wang
Shanghai Institute of Microsystem and Information Technology, CHINA............................................................................................................. p. 463
B4P-G24 A NOVEL COMBINED RHEOMETER AND DENSITY METER SUITABLE FOR INTEGRATION IN MICROFLUIDIC SYSTEMS
E.K. Reicher1, C. Ries2, and B. Jakoby1
1Johannes Kepler University, AUSTRIA and 2Vienna University of Technology, AUSTRIA
p. 465

B4P-G25 PROPERTIES OF InSb THIN FILMS SANDWICHED BY Al0.1In0.9Sb INSULATING LAYERS GROWN ON GaAs(100) SUBSTRATES BY MOLECULAR BEAM EPITAXY
I. Shibasaki1, H. Geka2, S. Yamada3, A. Okamoto2, and H. Goto3
1Asahikasei Corporation, JAPAN and 2Asahikasei EMD Corporation, JAPAN
p. 466

B4P-G26 DESIGN AND FABRICATION OF A CONVECTIVE 3-DOF ANGULAR RATE SENSOR
V.T. Dau, T.X. Dinh, D.V. Dao, O. Tomonori, and S. Sugiyama
Ritsumeikan University, JAPAN
p. 469

B4P-G27 MEMS BASED PRESSURE SENSOR WITH TRIPLE MODULAR REDUNDANCY
P. Venkata Reddy1, M.M. Nayak2, and K. Rajanna2
1Indian Space Research Organization, INDIA and 2Indian Institute of Science, INDIA
p. 471

B4P-G28 PRINCIPLE OF A DUAL-BAND SEARCH COIL MAGNETOMETER: A NEW INSTRUMENT TO INVESTIGATE MAGNETIC FIELDS FLUCTUATION IN SPACE
C. Colliot, J. Moutoussamy, and G. Chanteur
CEP/CNRS, FRANCE
p. 473

B4P-G29 PRECISE THERMOGRAPHY OF MICROSYSTEMS IN THE VISIBLE REGION USING A STANDARD CCD CAMERA
D. Teyssieux1, D. Briand2, L. Thierry1, N.F. de Rooij2, and B. Cretin1
1FEMTO-ST, FRANCE and 2University of Neuchâtel, SWITZERLAND
p. 475

B4P-G30 A THICKNESS SHEAR MODE ZINC OXIDE LIQUID SENSOR WITH OFF-AXIS EXCITATION
C.D. Corso, A. Dicktherber, and W.D. Hunt
Georgia Institute of Technology, USA
p. 477

B4P-G31 NANOmeter SCALE COMPLEMENTARY SILICON MOSFETs AS DETECTORS OF TERAHERTZ AND SUB-TERAHERTZ RADIATION
W. Stillman1,2, F. Guarino1, V.V. Kachorovskii1,3, N. Pala4,5, S. Rumyantsev1,3, M.S. Shur1, and D. Veksler1
1Rensselaer Polytechnic Institute, USA, 2IBM Microelectronics, USA
3Ioffe Institute of Russian Academy of Sciences, RUSSIA and 4Sensor Electronics Technology, Inc., USA
p. 479

B4P-G32 A NOVEL CHARACTERIZATION METHOD FOR THERMAL THIN-FILM PROPERTIES APPLIED TO PECVD SILICON NITRIDE
R. Beigelbeck1, F. Kohl1, J. Kunter1, F. Keplinger2, and B. Jakoby2
1Austrian Academy of Sciences, AUSTRIA, 2Vienna University of Technology, AUSTRIA and 3Johannes Kepler University Linz, AUSTRIA
p. 481

B4P-G33 4H SiC BETA-POWERED TEMPERATURE TRANSDUCER
M.V.S. Chandrashekar1, R. Duggirala, A. Lal, and M.G. Spencer
Cornell University, USA
p. 483

B4P-G34 EARLY-WARNING WIRELESS TELEMETER FOR HARSH-ENVIRONMENT BEARINGS
A. Kovacs, D. Peroulis, and F. Sadeghi
Purdue University, USA
p. 485

B4P-G35 AN EVASIVE-MODE CAVITY RESONATOR BASED THERMAL SENSOR
A. Mahmood, H.H. Sigmansson, H. Joshi, W.J. Chappell, and D. Peroulis
Purdue University, USA
p. 487
<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
</tr>
</thead>
</table>
| B4P-H1  | A CMOS INTEGRATED CAPACITANCE-TO-FREQUENCY CONVERTER WITH DIGITAL COMPENSATION CIRCUIT DESIGNED FOR SENSOR INTERFACE APPLICATIONS | C.-T. Chiang\(^1\), C.-S. Wang\(^2\), and Y.-C. Huang\(^2\)  
\(^1\) Industrial Technology Research Institute, TAIWAN and \(^2\) National Chiao Tung University, TAIWAN                              |
| B4P-H2  | FAST SAW BASED SENSOR SYSTEM FOR REAL-TIME ANALYSIS OF VOLATILE ANAESTHETIC AGENTS | N. Bari\(^1\), A. Voigt\(^1\), J. Marcolli\(^1\), and M. Rapp\(^1\)  
\(^1\) Institute of Microstructure Technology, GERMANY and \(^2\) Drägerwerk AG, GERMANY                                        |
| B4P-H3  | A MISICFET BASED GAS SENSOR SYSTEM FOR COMBUSTION CONTROL IN SMALL-SCALE WOOD FIRED BOILERS | M. Andersson\(^1\), L. Everbrand\(^1\), A. Lloyd Speitz\(^1\), N. Nyström, M. Nilsson, C. Gauffin, and H. Svensson  
\(^1\) Linköping University, SWEDEN and \(^2\) NIBE AB, SWEDEN                                                                 |
| B4P-H4  | MICRO ACOUSTIC MONITORING WITH MEMS ACCELEROMETERS: TOWARDS A WSN IMPLEMENTATION | C. Alippi, C. Galperti, and M. Zanchetta  
Politecnico di Milano, ITALY                                                                                     |
| B4P-H5  | TALKER IDENTIFICATION USING REVERBERATION SENSING SYSTEM             | A.R. Abu-El-Quran, J.S. Gammal, R.A. Gouban, and A.D.C. Chan  
Carleton University, CANADA                                                                                     |
| B4P-H6  | LOCAL SEALING OF HIGH ASPECT RATIO VIAS FOR SINGLE STEP BOTTOM-UP COPPER ELECTROPLATING OF THROUGH WAFER INTERCONNECTS | M. Saadaoui, W. Wien, H.V. Zeijl, H. Schellevis, M. Laros, and P.M. Sarro  
Delft University of Technology, THE NETHERLANDS                                                                |
| B4P-H7  | MULTI-POINT SENSING SYSTEM FOR PLANTAR PRESSURE MEASUREMENT          | Venugopal G\(^1\), B.J. Parmar\(^1\), M.M. Nayak\(^2\), and K. Rajanna\(^1\)  
\(^1\) Indian Institute of Science, INDIA and \(^2\) Indian Space Research Organization, INDIA |
<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
<th>Institution</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>B4P-H15</td>
<td>MICRO-CANTILEVER ARRAY PRESSURE MEASUREMENT SYSTEM FOR BIOMEDICAL INSTRUMENTATION</td>
<td>W. Qu, S.K. Islam, G. To, and M. Mahfouz</td>
<td>University of Tennessee, USA</td>
<td>p. 517</td>
</tr>
<tr>
<td>B4P-H16</td>
<td>FEASIBILITY OF A GIANT MAGNETOIMPEDANCE SANDWICH MAGNETOMETER FOR SPACE APPLICATIONS</td>
<td>J. Moutoussamy¹, C. Coillot¹, G. Chanteur¹, and F. Alvès²</td>
<td>¹CETP, FRANCE and ²LGE, FRANCE</td>
<td>p. 519</td>
</tr>
<tr>
<td>B4P-H17</td>
<td>VELOCITY MEASUREMENT OF MULTI-PHASE FLOWS BASED ON ELECTRICAL CAPACITANCE VOLUME TOMOGRAPHY</td>
<td>O. Marashdeh¹, F. Wang¹, W. Warsito², and L.-S. Fan¹</td>
<td>¹Ohio State University, USA and ²University of Indonesia, INDONESIA</td>
<td>p. 521</td>
</tr>
<tr>
<td>B4P-H18</td>
<td>MAGNETOPNEUMOGRAPHY – SUPPRESSION OF BACKGROUND FIELD VARIATIONS IN SCANNED DATA FOR INVERSION USING MULTIPLE FLUXGATES</td>
<td>J. Tomek and A. Platil</td>
<td>Czech Technical University, CZECH REPUBLIC</td>
<td>p. 523</td>
</tr>
<tr>
<td>B4P-H19</td>
<td>AN ELECTROMAGNETICALLY ACTUATED MICROMACHINED LOUDSPEAKER FOR HEARING AIDS APPLICATIONS</td>
<td>S.-S. Je and J. Chae</td>
<td>Arizona State University, USA</td>
<td>p. 525</td>
</tr>
</tbody>
</table>
TECHNICAL PROGRAM TUESDAY

SESSION B5L-A  Hydrogen Sensors & Recognition Structures
SESSION CHAIRS  E. Comini, University of Brescia
                P. Hauptmann, University of Magdeburg
Regency VI, VII  4:00 p.m.

IN SITU DRIFT STUDY OF HYDROGEN AND CO ADSORPTION ON Pt/3SrO2
MODEL SENSORS
E. Becker1, M. Andersson1, A.L. Spetz2, and M. Skoglundh1
1Chalmers University of Technology, SWEDEN
2Linköping University, SWEDEN
p. 527

SESSION B5L-B  Mechanical Sensors
SESSION CHAIRS  K. Rajanna, Indian Institute of Science
                A. Selvakumar, Colibrys
Regency VI, VII  4:15 p.m.

A FULLY INTEGRATED CAPACITIVE PRESSURE SENSOR WITH HIGH SENSITIVITY
X.-D. Huang, J.-G. Huang, M. Qin, and Q.-A. Huang
Southeast University, CHINA
p. 539

SESSION B5L-C  Magnetic Biosensors
SESSION CHAIRS  H. Suzuki, University of Tsukuba
                A. Zribi, GE Research
Hanover C,D,E  4:30 p.m.

A MAGNETO-INDUCTIVE SENSOR BASED WIRELESS PHARMACEUTICAL
COMPLIANCE MONITORING SYSTEM
X. Huo1, and M. Ghovanloo2
1North Carolina State University, USA and
2Georgia Institute of Technology, USA
p. 551

SESSION B5L-D  Smart Sensors & Interface Electronics
SESSION CHAIRS  K.A.A. Makimaa, Delft University
                G.C.M. Meijer, Delft University
Hanover F,G  4:45 p.m.

INVITED STANDARD CMOS HALL-SENSOR WITH INTEGRATED INTERFACE ELECTRONICS
FOR A 3D COMPASS SENSOR
J. van der Meer1, F. Riedijk1, K. Makinaa2, and J. Huisjings
1Sensor Integration, THE NETHERLANDS and
2Delft University of Technology, THE NETHERLANDS
p. 563

SAFE MEMBRANE-RELEASING PROCESS FOR THERMOELECTRIC HYDROGEN GAS SENSOR
National Institute of Advanced Industrial Science and Technology (AIST), JAPAN
p. 529

HIGH PERFORMANCE SOI-CMOS WALL SHEAR STRESS SENSORS
J. Haneef, S.Z. Ali, F. Udrea, J.D. Coul, and H.P. Hodson
University of Cambridge, UK
p. 541

CHARACTERIZATION OF PHAGE-COUPLED MAGNETOELASTIC MICRO-PARTICLES FOR
THE DETECTION OF BACILLUS ANTHRACIS STERENE SPORES
J. Wan, M.L. Johnson, S. Horikawa, V.A. Petrenko, and B.A. Chin
Auburn University, USA
p. 553

MICROPARTICLE SENSORS FOR NEURO-PROSTHESIS
T. Denison, W. Santa, G. Molnar, and K. Miesel
Medtronic Neurological Technologies, USA
p. 565

CAPACITIVE BASED LIQUID CRYSTAL CHEMICAL AND BIOLOGICAL SENSORS
A. Abu-Abdi1, S. Jovanov1, E. Jovanov2, R.G. Lindquist1, J. Namkung1, and N. Abbott2
1University of Alabama, USA and
2University of Wisconsin, USA
p. 531

COUPLING HIGH FORCE SENSITIVITY AND HIGH STIFFNESS IN PIEZORESISTIVE
CANTILEVERS WITH EMBEDDED Si-NANOWIRES
K. Naoli and G. Brand
Georgia Institute of Technology, USA
p. 543

A FERROFLUID IMMUNOASSAY BASED ON MAGNETIC FIELD-INDUCED
BIREFRINGENCE
B.Y. Ku and D.A. Horsley
University of California, Davis, USA
p. 555

WIRELESS VESTIBULAR EVOKED MYOGENIC
POTENTIALS SYSTEM
T. Tofsl1, R. Vazic6gul2, P. Merken1, B. Gyselinckx1, R. Pears1, R. Vanspaunven1, F.L. Wuyts1, and C. Van Houdt2
1IMEC, BELGIUM, 2 Catholic University of Leuven, BELGIUM, 3IMEC-NL, BELGIUM
and 4University of Antwerp, BELGIUM
p. 567

A LIQUID CRYSTAL BASED GAS SENSOR USING MICROFABRICATED PILLAR ARRAYS
AS A SUPPORT STRUCTURE
S.S. Sritharanuruthy, K.D. Cadwell, N.L. Abbott, and H. Jiang
University of Wisconsin, Madison, USA
p. 533

FEASIBILITY STUDY FOR A THREE-AXIAL JOYSTICK BASED ON AN ARRAY OF
LATERAL HALL ELEMENTS
H. Zang1, T. Bretteklier1, G. Steiner1, and K. Riedmüller1
1Graz University of Technology, AUSTRIA and
2austriamicrosystems AG, AUSTRIA
p. 545

THE EFFECT OF PHAGE SOLUTION CHEMISTRY ON THE SPORE BINDING
AFFINITY OF MAGNETOELASTIC BIOSENSORS
S. Huang, H. Yang, M.L. Johnson, R.S. Lakshmanan, I. Chen, V.A. Petrenko, J.M. Barbaroe, and B.A. Chin
Auburn University, USA
p. 557

INTERFACING WITH NEURONS AT HIGH SPATIOTEMPORAL RESOLUTION
ETH Zürich, SWITZERLAND
p. 569

SELECTIVE RECOGNITION OF BILE ACIDS BY MOLECULAR IMPRINTS
R. Zhang, S. Wei, and B. Mizakoff
Georgia Institute of Technology, USA
p. 535

BIOMIMETIC FLOW-SENSOR ARRAYS BASED ON THE FILIFORM HAIRS ON THE
CECI OF CRICKETS
University of Twente, THE NETHERLANDS
p. 547

INTERDIGITATED ARRAY ELECTRODES WITH MAGNETIC FUNCTION AS A
PARTICLE-BASED BIOSENSOR
Z. Peng1, X. Yang2, G. Zhang3, and P.J. Hesketh1
1Georgia Institute of Technology, USA and
2University of Georgia, USA
p. 559

5:00 p.m.

A SMART ANGULAR RATE SENSOR SYSTEM
A. Sharma, M.F. Zaman, and F. Ayazi
Georgia Institute of Technology, USA
p. 561

5:15 p.m.

SESSION B5L-E  Enzyme and Immunoassay Sensors
SESSION CHAIRS  P. Krammer, University of Leuven
                E. Kruis, Delft University

SESSION B5L-F  Immunoassay and Chemical Sensors
SESSION CHAIRS  G. Albrecht, Unitn
                T. Denison, Delft University

5:30 p.m.
Adjourn for the Day

CONFERENCE BANQUET
Student Paper & Best Poster Awards
# Technical Program Wednesday

**Wednesday, October 31, 2007**

## 8:00 a.m.

**KEYNOTE PRESENTATION C1K-A**  
Chair: S.-S. Yang, Ajou University  
**WEARABLE SENSOR NETWORK CONNECTING ARTIFACTS, NATURE AND HUMAN BEINGS**  
Kiyoshi Itao  
*University of Tokyo, JAPAN*

<table>
<thead>
<tr>
<th>SESSION C2L-A</th>
<th>SESSION C2L-B</th>
<th>SESSION C2L-C</th>
<th>SESSION C2L-D</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DNA Sensors &amp; Electro Physiology</strong></td>
<td><strong>Acoustic &amp; Resonant Sensors</strong></td>
<td><strong>Optical (Bio)-Chemical Sensors</strong></td>
<td><strong>Applications of Sensors I</strong></td>
</tr>
</tbody>
</table>
| **SESSION CHAIRS**  
H.-L. Jung, Yonsei University  
M.J. Vellekoop,  
Vienna University of Technology | **SESSION CHAIRS**  
E. Obermeier, Technical University of Berlin  
P. Ruther, University of Freiburg | **SESSION CHAIRS**  
J.Y. Park, Kwangwoon University  
W. Wlodarski, RMIT University | **SESSION CHAIRS**  
C. Pijolat, EMSE  
S. Wang, Lockheed Martin |

## 9:00 a.m.

**DNA SENSORS BASED ON CONDUCTING POLYMERS FUNCTIONALIZED WITH CONJUGATED SIDE CHAIN**  
H. Peng, C. Soeller, and J. Travs-Sejdic  
*University of Auckland, NEW ZEALAND*  
*p. 575*

**DESIGN AND CHARACTERIZATION OF A CMOS MICROMACHINED CAPACITIVE ACOUSTIC SENSOR**  
M.-H. Chen, S.-J. Hung, J.-H. Hsu, and M.S.-C. Lu  
*National Tsing Hua University, TAIWAN*  
*p. 587*

**FIBER-OPTIC-BASED CORROSION SENSOR USING OTDR**  
J.F. Martins-Filho¹, E. Fontana²,  
J. Guimarães¹, D.F. Pizzato¹, and I.J. Souza Colliço¹  
¹Federal University of Pernambuco (UFPE),  
BRAZIL and ²UNIVASF, BRAZIL  
*p. 599*

**AN ACOUSTIC POSITION SENSING SYSTEM FOR LARGE SCALE INTERACTIVE DISPLAYS**  
M. Reynolds¹, A. Mazalek¹, and G. Davenport²  
¹Georgia Institute of Technology, USA and  
²Massachusetts Institute of Technology, USA  
*p. 611*

## 9:15 a.m.

**A NOVEL NEURAL RECORDING PROBE WITH BUILT-IN LOAD SENSORS**  
C.-C. Wen, Y.-T. Lee, S.-R. Yeh, and W. Fang  
*National Tsing Hua University, TAIWAN*  
*p. 577*

**CHARACTERIZATION AND NOISE ANALYSIS OF CAPACITIVE MEMS ACOUSTIC EMISSION TRANSDUCERS**  
W. Wu, D.W. Greve, and I.J. Oppenheim  
*Carnegie Mellon University, USA*  
*p. 589*

**GAN QUANTUM DOTS AS OPTICAL TRANSDUCERS IN FIELD EFFECT CHEMICAL SENSORS**  
O. Weidemann¹, E. Monroy²,  
G. Jegert¹, S. Birner¹, M. Stutzmann¹, and M. Eckhoff¹  
¹Technische Universität München, GERMANY and  
²CENBGrenoble, FRANCE  
*p. 601*

**PROLONGED WEARABLE ECG MONITORING – A WAVELET BASED APPROACH**  
S. Zausender¹, W.-J. Fischer¹, R. Pol²,  
S. Netz¹, and M. Rabaeanu²  
¹Fraunhofer Institute for Photonic Microsystems, GERMANY and  
²Technical University of Dresden, GERMANY  
*p. 613*

## 9:30 a.m.

**SnO2 NANOWIRE BIO-TRANSISTOR FOR ELECTRICAL DNA SENSING**  
S. Todros¹, C. Baratto¹, E. Comini¹, ²,  
G. Faglia¹, M. Ferroni¹,  
G. Sberveglieri¹, ², G. Andreano²,  
L. Cellai¹, A. Flaminì¹, G. Marrazza¹,  
A. Namini¹, G. Pernelli¹, and M. Piotto²  
¹University of Brescia, ²CNR, ITALY and  
³University of Florence, ITALY and  
⁴University of Pisa, ITALY  
*p. 579*

**A NOVEL MICRO RATE SENSOR USING A SURFACE-ACOUSTIC-WAVE (SAW) DELAY-LINE OSCILLATOR**  
S.W. Lee¹, ², J.W. Rhim¹, S.W. Park², and S.S. Yang²  
¹Agency for Defense Development,  
KOREA and ²Ajou University, KOREA  
*p. 591*

**OPTICAL TASTE SENSOR USING DYE-DOPED HETERO-STRUCTURED LB FILM**  
M. Morisawa, K. Miyazawa, and S. Muto  
*University of Yamanashi, JAPAN*  
*p. 603*

**TESTING AND CALIBRATION OF SMART PEBBLE FOR RIVER BED SEDIMENT TRANSPORT MONITORING**  
E. Akeila¹, Z. Salcie¹, N. Kularatna²,  
B. Melville¹, and A. Dwivedi¹  
¹University of Auckland, NEW ZEALAND and ²University of Waikato, NEW ZEALAND  
*p. 615*

## 9:45 a.m.

**A COMPACT SYSTEM FOR SINGLE ION CHANNEL RECORDING**  
M. Rossi, M. Bennati, F. Lodesani,  
S. Branchetti, and M. Tartagni  
*University of Bologna, ITALY*  
*p. 581*

**MONITORING THE EVAPORIZATION OF FEMTOLITER DROPLETS WITH CMOS INTEGRATED NANO-MECHANICAL MASS SENSORS**  
J. Arcamone¹, T. Ondarçuhu²,  
E. Dujardin², G. Rius³, and F. Pérez-Murano¹  
¹CMN – IMB (CSIC), SPAIN and  
²CEMES-CNRS, FRANCE  
*p. 593*

**FUNCTIONALIZED LATERAL SURFACE COATED LASERS FOR CHEM-BIO DETECTION**  
L.L. Goddard, T.C. Bond, G.D. Cole, and E.M. Behymer  
*Lawrence Livermore National Laboratory, USA*  
*p. 605*

**HUMAN JOINT MOVEMENT RECOGNITION BY USING ULTRASOUND ECHO BASED ON TEST FEATURE CLASSIFIER**  
Y. Tsutsui¹, Y. Sakata¹, T. Tanaka¹,  
S. Kaneko¹, and M.Q. Feng²  
¹Hokkaido University, JAPAN and  
²University of California, Irvine, USA  
*p. 617*
## TECHNICAL PROGRAM WEDNESDAY

<table>
<thead>
<tr>
<th>SESSION C2L-A</th>
<th>SESSION C2L-B</th>
<th>SESSION C2L-C</th>
<th>SESSION C2L-D</th>
</tr>
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<tbody>
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</tbody>
</table>

### 10:00 a.m.

- **Nerve Signal Monitoring Using an Implantable Microelectrode**
  - Y.-H. Kim¹, K.-M. Ahn², C. Lee³
  - Y.-J. Kim⁴, J.-H. Lee⁵, and M. Lee⁶
  - ¹Yonsei University, Korea
  - ²University of Ulsan, Korea
  - ³Seoul National University, Korea

- **Polymer Mass Loading of CMOS/MEMS Microslab Cantilever for Gravitimetric Sensing**
  - S.S. Bedair and G.K. Fedder
  - Carnegie Mellon University, USA

- **Silicon Straight Tube Fluid Density Sensor**
  - M. Najmzadeh¹, S. Haas², and P. Enoksson³
  - ¹Chalmers University of Technology, Sweden
  - ²Imego AB, Sweden

- **Prototype of Infant Drowning Prevention System at Home with Wireless Accelerometer**
  - Y. Nishida¹, K. Hiratsuka², and H. Mizoguchi³
  - ¹AIST, Japan
  - ²Tokyo University of Science, Japan
  - ³Kansai Electric Power Co., Inc., Japan

**Page Numbers:** p. 583, p. 595, p. 567, p. 619

### 10:15 a.m.

- **A Drug-Delivery Probe with an In-Line Flowmeter Based on Trench Refill and Chemical Mechanical Polishing Techniques**
  - Y. Li, K. Baek, M. Gulati, and K.D. Wise
  - University of Michigan, USA

- **Doubly Clamped Nanobeam as a Piezoresistive Mass Sensor**
  - J. Jiao, Q. Zhao, H. Yang, T. Li
  - X. Li, and Y. Wang
  - Chinese Academy of Sciences, China

- **Smart Microplates: Photodiode Within Silicon Pyramidal Cavity for Detecting Bead-Based Chemiluminescence and AC Characterization for RFID-Type Readout**
  - Y.S. Park, M.A. Andringa, D.P. Neikirk, H.S. Hewage, and E.V. Anslyn
  - University of Texas, Austin, USA

- **2D Sound Source Localization in Azimuth & Elevation from Microphone Array by Using a Directional Pattern of Element**
  - A. Ikeda¹, Y. Sasaki², S. Kagami³, H. Mizoguchi⁴, and T. Enomoto⁵
  - ¹Tokyo University of Science, Japan
  - ²AIST, Japan
  - ³Kansai Electric Power Co., Inc., Japan

**Page Numbers:** p. 585, p. 597, p. 609, p. 621

### 10:30 a.m. | Break & Exhibit Inspection

### 11:00 a.m.

#### SESSION C3L-A

**Sensor Arrays & Parameter Modulation**

**Session Chairs**
- C. Liu, University of Illinois
- H. Suzuki, University of Tsukuba

- **Regency VI, VII**

- **Regency V**

#### SESSION C3L-B

**Evaluation**

**Session Chairs**
- P. French, Delft University
- S. Lee, Sungkyunkwan University

- **Hanover C,D,E**

#### SESSION C3L-C

**Optical Chemical Sensors**

**Session Chairs**
- F.J. Arregui, Public University of Navarre
- M. Su, University of Central Florida

- **Hanover F,G**

#### SESSION C3L-D

**Applications of Sensors II**

**Session Chairs**
- J.-B. Lee, University of Texas
- X. Wang, GE Global Research

- **A Comparison of Multi-Transducer Arrays and Single-Transducer Arrays for the Determination of Multi-Vapor Mixtures**
  - C. Jin¹, E.T. Zellers², P. Kurzawski², and A. Hierlemann²
  - ¹University of Michigan, USA
  - ²ETH Zurich, Switzerland

- **Characterization of a Nozzle-Integrated Capacitive Sensor for Microfluidic Jet Systems**
  - M. van der Velden, J. Wei, J.W. Spronck, R.H. Munning Schmidt, and P.M. Sarro
  - Delft University of Technology, The Netherlands

- **Hollow Waveguide Gas Sensor for Mid-Infrared Trace Gas Analysis**
  - S.-S. Kim¹, C. Young¹, J. Chai², C. Carter³, and B. Mizaiok⁴
  - ¹Georgia Institute of Technology, USA
  - ²Lawrence Livermore National Laboratory, USA

- **A Self-Learning Multi-Sensing Selection Process: Measuring Objects One by One**
  - A. Golfairelli, R. Codeluppi, and M. Tartagni
  - University of Bologna, Italy

- **A Hierarchical Strategy for Underground Early Fire Detection Based on a T-Cycled Semiconductor Gas Sensor**
  - T. Conrad, P. Reimann, and A. Schütze
  - Saarland University, Germany

- **Influence on Moisture Sensor Performances and Characterization of Different Specific Area Porous Silicon Layers**
  - W. Ludruczak¹, C. Pellet¹, O. Gare³, E. Dufour-Gargami², and F. Verjus¹
  - ¹University of Bordeaux, France
  - ²University of Paris, France
  - ³NXP Semiconductors, France

- **High-Responsivity 2.3-μm Heterojunction Phototransistor with a Strained InAlGaAs MQW Absorption Layer for Gas Sensing**
  - H. Fukano, T. Sato, M. Mitsuhasha, Y. Kondo, and H. Yasaki
  - NTT Corporation, Japan

- **Robust Adaptive Electronics for Sensor Conditioning**
  - G. Zatorre¹, N. Medrano², M.T. Sanz², P.A. Martinez³, S. Cema³, and J. Bolea³
  - ¹Teltronic, S.A.U., Spain
  - ²University of Zaragosa, Spain

- **A Multi-Parameter Platform for Gas Sensing Using Semiconducting Metal Oxide Films**
  - G. Zhong, G. Bernhardt, R. Lad, S. Collins, and R. Smith
  - University of Maine, USA

- **Gas Pressure Sensing Based on MEMS Resonators**
  - K. Brückner, V. Cimalla, F. Nibeluschütz, R. Stephan, K. Tonisch, O. Ambacher, and M.A. Hein
  - Technische Universität Ilmenau, Germany

- **Surface Customized Optical Microresonator Sensors for Integrated Chip-Scale Portable Sensing Applications**
  - S.-Y. Cho¹, G. Dobbs², N.M. Jokerst¹, and B. Mizaiok³
  - ¹Duke University, USA
  - ²Georgia Institute of Technology, USA

- **A New Approach of a Piezoelectric Vibration-Based Power Generator to Supply Next Generation Tire Sensor Systems**
  - M. Keck
  - Ilmenau Technical University, Germany

**Page Numbers:** p. 623, p. 635, p. 647, p. 659

### 11:30 a.m.

- **Session C3L-E**

- **Session F,G**

- **Session H,I**

**Page Numbers:** p. 625, p. 637, p. 649, p. 661
### TECHNICAL PROGRAM WEDNESDAY

<table>
<thead>
<tr>
<th>SESSION C3L-A continued</th>
<th>SESSION C3L-B continued</th>
<th>SESSION C3L-C continued</th>
<th>SESSION C3L-D continued</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDENTIFICATION OF VAPOURS USING A SINGLE CARBON BLACK/POLYMER COMPOSITE SENSOR AND A NOVEL TEMPERATURE MODULATION TECHNIQUE</td>
<td>DESIGN OF AN OPTIMIZED ELECTROTHERMAL FILTER FOR A TEMPERATURE-TO-FREQUENCY CONVERTER</td>
<td>ADVANCED EMBEDDED CONTROL AND DATA ACQUISITION SYSTEMS FOR LASER-BASED QUARTZ-ENHANCED PHOTOACOUSTIC SPECTROSCOPY</td>
<td>UNBALANCED LOAD ESTIMATION ALGORITHM USING MULTIPLE MECHANICAL MEASUREMENTS FOR HORIZONTAL WASHING MACHINES</td>
</tr>
<tr>
<td>University of Warwick, UK</td>
<td>Delft University of Technology, THE NETHERLANDS</td>
<td>Rice University, USA</td>
<td>Whirlpool Corporation, USA</td>
</tr>
<tr>
<td>p. 629</td>
<td>p. 641</td>
<td>p. 653</td>
<td>p. 665</td>
</tr>
</tbody>
</table>

| 11:45 a.m. |
|-------------------------|-------------------------|-------------------------|-------------------------|
| DESIGN OF AN ELECTROCHEMICAL IMPEDANCE TEST CELL WITH SERVOMECHANICALLY ADJUSTABLE CELL CONSTANT | SENSOR CALIBRATION OF PLANAR FOUR-CONTACT DEVICES WITH UP TO TWO EXTENDED CONTACTS | OPTICAL COHERENCE-MULTIPLEXED SENSORS BASED ON IN-FIBER MICHELSON | MEASURING 6D CHIP ALIGNMENT IN MULTI-CHIP PACKAGES |
| Massachusetts Institute of Technology, USA | University of Freiburg, GERMANY | Zhejiang University, CHINA | Sun Microsystems Laboratories, USA |
| p. 631 | p. 643 | p. 655 | p. 667 |

| 12:00 p.m. |
|-------------------------|-------------------------|-------------------------|-------------------------|
| THERMOPILE SENSORS FOR THE DETECTION OF AIRBORNE POLLUTANTS | HIGH PRECISION IMAGE SENSOR SCALE FACTOR CALIBRATION | DEVELOPMENT OF A FIBRE-OPTIC DOAS SENSOR FOR THE DETECTION OF EXHAUST GASES USING RADIOMETRIC SEPARATION TECHNIQUES | DEVELOPMENT OF A UNIVERSAL WIRELESS SENSOR SYSTEM FOR AUTOMATED ENVIRONMENTAL EVENT MONITORING |
| D.J. Lawrence, G.L. Coffman, T.C. DeVore, P.T. Olin, and W.G. Tucker | E. Shen1, H. Mebrahtu1, W. Gao1, A. Badali1, P. Thomas1, and R. Hornsey1 | G. Dooly, C. Fitzpatrick, P. Chambers, and E. Lewis | L. Yambar, M. Yapici, and J. Zou |
| James Madison University, USA | 1York University, CANADA, 1Duke University, USA and 1Topaz Technology Inc., CANADA | University of Limerick, IRELAND | Texas A&M University, USA |

12:30 p.m. | Lunch on your Own & Exhibit Inspection |

<table>
<thead>
<tr>
<th>SPECIAL SESSION C4L-A Molecular Level Detection Mechanism for Bio &amp; Chemical Sensors</th>
<th>SPECIAL SESSION C4L-B Quantum Cascade &amp; Mid-Infrared Laser Based Sensors</th>
<th>SPECIAL SESSION C4L-C Preconcentrators &amp; Spectrometers</th>
<th>SPECIAL SESSION C4L-D Sensor Systems &amp; Actuators</th>
</tr>
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<tr>
<td>A. Lloyd-Spetz, Linköping University</td>
<td>C. Gmachi, Princeton University</td>
<td>D. Briand, University of Neuchâtel</td>
<td>C. van Hoof, IMEC</td>
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<td>R. Okoji, NASA</td>
<td>S.-S. Yang, Ajou University</td>
</tr>
</tbody>
</table>

### Regency VI, VII

#### Regency V

<table>
<thead>
<tr>
<th>Hanover C,D,E</th>
<th>Hanover F,G</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2:00 p.m.</strong></td>
<td></td>
</tr>
</tbody>
</table>

**INVITED**

VIBRATIONAL ANALYSIS OF H2 AND NH3 ON P/SiO2 AND Ir/SiO2 MODEL SENSORS
M. Wallin1, M. Byberg1, H. Grönbeck1, A. Lloyd-Spetz2, M. Eriksson2, and M. Skoglund3
1Chalmers University of Technology, SWEDEN and 2Linköping University, SWEDEN

A FIVE-MICROVALE FULLY INTEGRATED PRECONCENTRATOR
B. Bae, J. Yeom, R. J. Masel, and M.A. Shannon
University of Illinois, Urbana-Champaign, USA

INTEGRATED SENSING SYSTEM FOR STAMPING MONITORING CONTROL
N. Mahayotu1, J. Cao1, M. Peshkin1, S. Sah2, R. Gao2, and C.T. Wang1
1Northwestern University, USA, 2University of Massachusetts, USA and 3General Motors, USA

### Regency VI

#### 2:15 p.m.

**INVITED**

QUANTUM CASCADE LASER BASED TRACE GAS SENSOR TECHNOLOGY: RECENT ADVANCES AND APPLICATIONS
F.K. Tittel, Y. Bakhchina, R.F. Curl, A. Kosterev, R. Lewicki, S. So, and G. Wysocki
Rice University, USA

PRECONCENTRATING MICROCOLUMN SENSORS FOR TRACE ENVIRONMENTAL MONITORING
J.W. Grate1, O.B. Egorov2, R. Ozanich1, J.S. Hartman1, and M.J. O’Hara1
1Pacific Northwest National Laboratory, USA and 2Isoray Medical, Inc., USA

INTEGRATION OF MEMS ACTUATORS WITH MAGNETIC TUNNEL JUNCTION SENSORS
G. Martinez Jaramillo, M.-L. Chan, and D.A. Horsley
University of California, Davis, USA

| p. 671 | p. 681 | p. 689 | p. 703 | p. 705 |
## TECHNICAL PROGRAM WEDNESDAY

### SPECIAL SESSION C4L-A continued

**COMPARISON OF THE PERFORMANCES OF B-ALUMINA AND YSZ POTENOMETRIC GAS SENSORS FOR EXHAUST AUTOMOTIVE APPLICATION**
J.P. Vircelle, P. Breuil, C. Pijolat, J.C. Marchand, and G. Tournier
École Nationale Superieure des Minnes, FRANCE

- Page: 673

### SPECIAL SESSION C4L-B continued

**BREATH-ANALYSIS USING MID-INFRARED TUNABLE LASER SPECTROSCOPY**
K. Samimi, C.B. Roller, and G. McMillen
Ekips Technologies Inc., USA

- Page: 683

### SESSION C4L-C continued

**NOVEL GAS CHROMATOGRAPHIC MICROSYSTEM WITH VERY LARGE SENSOR ARRAYS FOR ADVANCED ODOUR DISCRIMINATION**
F.K. Che Harun, P.H. King, J.A. Covington and J.W. Gardner
University of Warwick, UK

- Page: 695

### SESSION C4L-D continued

**NOVEL MICROFABRICATED BATTERIES FOR MARINE SENSORS: IN-SITU CATHOLYTE GENERATION VIA WATER ADDITION**
A.M. Cardenas-Valencia1, J. Bumgarner1, C.J. Biver2, J. Dlugowski2, and E. Langebrake2
1SRI International, USA
2University of South Florida, USA

- Page: 707

### 2:45 p.m.

**TIN, NIOBUM AND VANADIUM MIXED OXIDE THIN FILMS BASED GAS SENSORS FOR CHEMICAL WARFARE AGENT ATTACKS PREVENTION**
E. Comini, A. Porzoni, I. Alessandri, E. Bontempi, L.E. Depezo, and G. Sberveglieri
Brescia University, ITALY

- Page: 675

### 3:00 p.m.

**COMPACT QUANTUM CASCADE LASER INSTRUMENT FOR RAPID HIGH SENSITIVITY MEASUREMENTS OF TRACE GASES IN AIR**
Aerodyne Research, Inc., USA

- Page: 685

**PHOTONIC MEMS FOR NIR IN-SITU GAS DETECTION AND IDENTIFICATION**
T.C. Bond, G.D. Cole, L.L. Goddard, and E.M. Behymer
Lawrence Livermore National Laboratory, USA

- Page: 699

**LOW POWER, PIEZOELECTRIC MICRO MASS FLOW CONTROLLER FOR LIQUID FUEL INJECTION**
M. Schiffer1, C. Stefanini2, V. Manente3, P. Tunesi4, and E. Obermeier5
1Technical University of Berlin, GERMANY
2Scuola Superiore Sant’Anna, ITALY and Lund Institute of Technology, SWEDEN

- Page: 711

### 3:15 p.m.

**SENSING MECHANISMS OF POLYTHIOPHENE CHEMICAL SENSORS**
B. Li and D.N. Lambeth
Carnegie Mellon University, USA

- Page: 677

**MODELING AND DESIGN OF A HIGHLY COMPACT CHAOTIC CAVITY FOR OPTICAL GAS SENSING APPLICATIONS**
D. Ou and C. Gmachl
Princeton University, USA

- Page: 687

**A NOVEL ION SOURCE AND DETECTOR FOR A MINIATURE MASS SPECTROMETER**
1RTI International, USA and 2Duke University, USA

- Page: 699

**INDUCTIVELY COUPLED SENSOR ACTUATOR SYSTEM FOR CLOSED-LOOP CONTROL APPLICATIONS AT HIGH TEMPERATURES AND IN AGGRESSIVE ENVIRONMENTS**
A. Kifer and L.M. Reindl
University of Freiburg, GERMANY

- Page: 713

### 3:30 p.m.

Break & Exhibit Inspection

### 3:45 p.m.

**NEW DEVELOPMENTS OF AN OPTOCHEMICAL MEASUREMENT SYSTEM FOR THE CONTINUOUS MONITORING IN SUBCUTANEOUS TISSUE BY MICRODIALYSIS**
A. Bizzarri, C. Konrad, M. Cajakovic, and V. Ribičić
Joanneum Research
Forschungsgesellschaft mbH, AUSTRIA

- Page: 715

**ODOR SENSING SYSTEM USING BALL SAW DEVICES FUNCTIONALIZED WITH SELF-ASSEMBLED LIPOLYMERs**
B. Wyszynski1, M. Seki2, T. Nakamot3, N. Nakaso2, and K. Noguchi2
1Tokyo Institute of Technology, JAPAN and 2Tohoku University, JAPAN

- Page: 723

**STABILITY OF A RF SPUTTERED ZnO SOLIDLY MOUNTED RESONATOR SENSOR IN VARYING TEMPERATURE AND CONDUCTIVITY ENVIRONMENTS**
A. Dickherber, C.D. Corso, and W. Hunt
Georgia Institute of Technology, USA

- Page: 735

### 4:00 p.m.

**AN ENERGY HARVESTING MEMS FREQUENCY DETECTOR**
I. Sari, T. Balkan, and H. Kulah
Middle East Technical University, TURKEY

- Page: 745
### TECHNICAL PROGRAM WEDNESDAY

<table>
<thead>
<tr>
<th>SPECIAL SESSION C5L-A continued</th>
<th>SESSION C5L-B continued</th>
<th>SESSION C5L-C continued</th>
<th>SESSION C5L-D continued</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>4:15 p.m.</strong></td>
<td><strong>4:30 p.m.</strong></td>
<td><strong>4:45 p.m.</strong></td>
<td><strong>5:00 p.m.</strong></td>
</tr>
<tr>
<td>LIQUID-PHASE DETECTION OF ORGANOPHOSPHATES PESTICIDES USING GUIDED SH-SAW SENSOR A. Mensah-Brown1, M.J. Wenzel1, F. Josse1, E. Yaz1, and O. Sadik2 1Marquette University, USA and 2State University of New York at Binghamton, USA</td>
<td><strong>A FULLY DIFFERENTIAL RAIL-TO-RAIL CAPACITANCE MEASUREMENT CIRCUIT FOR INTEGRATED CELL SENSING</strong> S.B. Prakash and P. Abshire University of Maryland, USA</td>
<td><strong>AN AIR-COUPLED CAPACITIVE MICROMACHINED ULTRASOUND TRANSUDER FOR NONCONTACT NONDESTRUCTIVE EVALUATION</strong> X. Wang1, Y. Fan1, W.-C. Tian1, H.-J. Kwon2, S. Kennerly3, G. Claydon4, and A. May1 1GE Global Research Center, USA and 2GE Sensing, USA</td>
<td><strong>Dissolved Oxygen Sensing in a Flow Stream Using Molybdenum Chloride Optical Indicators</strong> R. Loloee, P.A. Askeland, and R.N. Ghosh Michigan State University, USA</td>
</tr>
</tbody>
</table>

5:30 p.m. | Conference Adjourns
EXHIBIT & POSTER FLOORPLAN