



THE SIXTH IEEE CONFERENCE ON SENSORS  
**IEEE SENSORS 2007**

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# **FINAL PROGRAM**

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**OCTOBER 28-31, 2007**

HYATT REGENCY ATLANTA • ATLANTA GEORGIA, USA



Sponsored by



**SENSORS Council**

# PROGRAM AT A GLANCE

		Session Rooms			
		Regency VI, VII	Regency V	Hanover C,D,E	Hanover F,G
<b>Sunday</b>	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			
<b>Monday</b>	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.	<b>Special Session A2L-A</b> Nanobiosensors for Cancer & Medical Applications	<b>Special Session A2L-B</b> Novel Sensors for Human Breath Analysis	<b>Session A2L-C</b> Sensor Systems & Circuits	<b>Special Session A2L-D</b> Sensor Reliability
	10:30 a.m. - 11:00 a.m.	Break & Exhibit Inspection			
	11:00 a.m. - 12:30 p.m.	<b>Special Session A3L-A</b> In-Vivo Sensor Systems	<b>Session A3L-B</b> Modeling & Simulation	<b>Session A3L-C</b> Inertial Sensors	<b>Session A3L-D</b> 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.	<b>Session A5L-A</b> Biomicrosystems	<b>Session A5L-B</b> Phenomena	<b>Session A5L-C</b> IR & THz Sensors	<b>Special Session A5L-D</b> Smart CMOS Image Sensors
	8:00 a.m. - 8:45 a.m.	Keynote Presentation B1K-A - Gijs Krijnen, University of Twente			
<b>Tuesday</b>	9:00 a.m. - 10:30 a.m.	<b>Session B2L-A</b> Carbon Nanotubes & Nanocrystals	<b>Session B2L-B</b> Optical Sensors I	<b>Session B2L-C</b> Optical Biosensors	<b>Special Session B2L-D</b> Sensors in Extreme Environments
	10:30 a.m. - 11:00 a.m.	Break & Exhibit Inspection			
	11:00 a.m. - 12:30 p.m.	<b>Session B3L-A</b> Nanostructure for Chemical Sensors	<b>Session B3L-B</b> Optical Sensors II	<b>Session B3L-C</b> Biosensors	<b>Special Session B3L-D</b> Sensing Interfaces with Electrochemical Scanning Probes
	12:30 p.m. - 2:00 p.m.	Lunch on Your Own & Exhibit Inspection			
	2:00 p.m. - 4:00 p.m.	POSTER SESSION B4P			
	4:00 p.m. - 5:30 p.m.	<b>Session B5L-A</b> Hydrogen Sensors & Recognition Structures	<b>Session B5L-B</b> Mechanical Sensors	<b>Session B5L-C</b> Magnetic Biosensors	<b>Special Session B5L-D</b> Smart Sensors & Interface Electronics
	7:30 p.m. - 10:00 p.m.	Conference Banquet featuring Student Paper & Best Poster Awards			
	8:00 a.m. - 8:45 a.m.	Keynote Presentation C1K-A - Kiyoshi Itao, Tokyo University of Science			
<b>Wednesday</b>	9:00 a.m. - 10:30 a.m.	<b>Session C2L-A</b> DNA Sensors & Electro Physiology	<b>Session C2L-B</b> Acoustic & Resonant Sensors	<b>Session C2L-C</b> Optical (Bio)-Chemical Sensors	<b>Session C2L-D</b> Applications of Sensors I
	10:30 a.m. - 11:00 a.m.	Break			
	11:00 a.m. - 12:30 p.m.	<b>Session C3L-A</b> Sensor Arrays & Parameter Modulation	<b>Session C3L-B</b> Evaluation	<b>Session C3L-C</b> Optical Chemical Sensors	<b>Session C3L-D</b> Applications of Sensors II
	12:30 p.m. - 2:00 p.m.	Lunch on Your Own			
	2:00 p.m. - 3:30 p.m.	<b>Special Session C4L-A</b> Molecular Level Detection Mechanism for Bio & Chemical Sensors	<b>Special Session C4L-B</b> Quantum Cascade & Mid-Infrared Laser Based Sensors	<b>Session C4L-C</b> Preconcentrators & Spectrometers	<b>Session C4L-D</b> Sensor Systems & Actuators
	3:30 p.m. - 4:00 p.m.	Break			
	4:00 p.m. - 5:30 p.m.	<b>Special Session C5L-A</b> The Challenges of Sensing Oxygen	<b>Session C5L-B</b> Acoustic/Resonant Chemical Sensors	<b>Session C5L-C</b> Electrochemical Biosensors	<b>Session C5L-D</b> Physical Sensors
	5:30 p.m.	Conference Adjourns			

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# 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**

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## Dialing Codes

USA's International Country code: +1  
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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.

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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.

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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.

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

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15% is standard for meals. For skycaps, doormen, porters and bellman, \$1.00 per bag is standard and \$1.00 per night for house-keeping.

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

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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.

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

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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.



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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** = Phenomena, 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*.....

**p. 1**

SPECIAL SESSION A2L-A Nanobiosensors for Cancer & Medical Applications  SESSION CHAIR L.A. Nagahara, <i>NIH</i>	SPECIAL SESSION A2L-B Novel Sensors for Human Breath Analysis  SESSION CHAIR C. Davis, <i>University of California</i>	SESSION A2L-C Sensor System & Circuits  SESSION CHAIRS R. Gao, <i>University of Massachusetts</i> G.C.M. Meijer, <i>Delft University</i>	SPECIAL SESSION A2L-D Sensor Reliability  SESSION CHAIR X. Wang, <i>GE Global Research</i>
Regency VI, VII	Regency V	Hanover C,D,E	Hanover F,G
<b>9:15 a.m.</b>			
<p style="text-align: center;"><b>INVITED</b></p> <p><b>MICRODEVICES FOR BIOMOLECULAR AND SINGLE CELL DETECTION</b> <b>S. Manalis</b> <i>Massachusetts Institute of Technology, USA</i></p> <p style="text-align: right;"><b>p. 3</b></p>	<p style="text-align: center;"><b>INVITED</b></p> <p><b>MODULAR SAMPLING AND ANALYSIS TECHNIQUES FOR THE REAL-TIME ANALYSIS OF HUMAN BREATH</b> <b>M. Frank<sup>1</sup></b>, G. Farquar<sup>1</sup>, K. Adams<sup>1</sup>, M. Bogan<sup>1</sup>, A. Martin<sup>1</sup>, H. Benner<sup>1</sup>, C. Spadaccini<sup>1</sup>, P. Steele<sup>1</sup>, S. Sankaran<sup>2</sup>, B. Loyola<sup>2</sup>, J. Morgan<sup>2</sup>, and C. Davis<sup>2</sup> <sup>1</sup><i>Lawrence Livermore National Laboratory, USA</i> and <sup>2</sup><i>University of California, Davis, USA</i></p> <p style="text-align: right;"><b>p. 11</b></p>	<p><b>UNIVERSAL SMART SENSORS INTERFACE AND SIGNAL CONDITIONER</b> S.Y. Yurish <i>Universitat Politècnica de Catalunya, SPAIN</i></p> <p style="text-align: right;"><b>p. 19</b></p>	<p style="text-align: center;"><b>INVITED</b></p> <p><b>RELIABILITY ISSUES IN MINIATURIZED SENSORS: IMPORTANCE OF STANDARDS. WHAT IS NEEDED?</b> <b>A. Hartzell</b> and M. da Silva <i>Exponent/Failure Analysis Associates, USA</i></p> <p style="text-align: right;"><b>p. 29</b></p>
<b>9:30 a.m.</b>			
↓	↓	<p><b>WIRELESS MEASUREMENT SYSTEM FOR CAPACITIVE PRESSURE SENSORS USING STRAIN COMPENSATED SiGeB</b> K. Arshak<sup>1</sup>, E. Jafer<sup>1</sup>, T. McGloughlin<sup>1</sup>, T. Corbett<sup>1</sup>, S. Chatzandroulis<sup>2</sup>, and D. Goustouridis<sup>2</sup> <sup>1</sup><i>University of Limerick, IRELAND</i> and <sup>2</sup><i>NCSR Demokritos, GREECE</i></p> <p style="text-align: right;"><b>p. 21</b></p>	↓
<b>9:45 a.m.</b>			
<p><b>EMERGING NANOSTRUCTURES AND DEVICES FOR DIAGNOSTICS AND THERAPEUTICS</b> V.P. Dravid, M. Aslam, S. Sharma, G. Shekhawat, T. Meade, and S. Tark <i>Northwestern University, USA</i></p> <p style="text-align: right;"><b>p. 5</b></p>	<p><b>PHOTO-IONIZATION MASS SPECTROMETRY FOR ON-LINE ANALYSIS OF ORGANIC COMPOUNDS IN HUMAN BREATH AND IN TOBACCO SMOKE UPON INHALATION</b> R. Zimmermann, C. Mocker, T. Adam, F. Mühlberger, and S. Mitschke <i>Institute of Ecological Chemistry, GERMANY</i> and <i>University of Augsburg, GERMANY</i></p> <p style="text-align: right;"><b>p. 13</b></p>	<p><b>HARDWARE-SOFTWARE DESIGN FOR AUTONOMOUS SENSORS</b> F. Martínez, Á. Velázquez, R. Palacios, M. Martínez, and G. Obieta <i>INKERLAN Technological Research Centre, SPAIN</i></p> <p style="text-align: right;"><b>p. 23</b></p>	<p><b>AN APPROACH FOR THE STUDY OF RELIABILITY FOR A MEMS MAGNETIC ACTUATOR</b> E. Berkcan, S. Chandrasekaran, and M. Aimi <i>GE Global Research, USA</i></p> <p style="text-align: right;"><b>p. 31</b></p>

## TECHNICAL PROGRAM MONDAY

SPECIAL SESSION A2L-A <i>continued</i>	SPECIAL SESSION A2L-B <i>continued</i>	SESSION A2L-C <i>continued</i>	SPECIAL SESSION A2L-D <i>continued</i>
<b>10:00 a.m.</b>			
MICROCANTILEVER BIOSENSORS R. Datar, A. Passian, R. Desikan, and T. Thundat <i>Oak Ridge National Laboratory, USA</i>  p. 7	MICROFABRICATED DIFFERENTIAL MOBILITY SPECTROMETERS FOR BREATH ANALYSIS S. Sankaran, W. Zhao, B. Loyola, J. Morgan, M. Molina, M. Shivo, R. Rana, N. Kenyon, and C. Davis <i>University of California, Davis, USA</i>  p. 15	CONTACTLESS EXCITATION AND READ- OUT OF PASSIVE SENSING ELEMENTS MADE BY MINIATURIZED MECHANICAL RESONATORS M. Baú, V. Ferrari, D. Marioli, E. Sardini, M. Serpelloni, and A. Taroni <i>University of Brescia, ITALY</i>  p. 25	WAFER-LEVEL ENCAPSULATION AND SEALING OF ELECTROSTATIC HARPPS TRANSDUCERS S. Pourkamali and F. Ayazi <i>Georgia Institute of Technology, USA</i>  p. 33
<b>10:15 a.m.</b>			
INTEGRATING MAGNETIC AND OPTICAL NANOTECHNOLOGY FOR SELECTIVE CAPTURE AND MULTIPLEXED ANALYSIS OF RARE TUMOR CELLS T. Sathe <sup>1</sup> , A. Saheb <sup>1</sup> , and S. Nie <sup>1,2</sup> <sup>1</sup> <i>Georgia Institute of Technology, USA</i> and <sup>2</sup> <i>Emory University, USA</i>  p. 9	COMPACT MID-IR BREATH ANALYSIS SYSTEM M. Pushkarsky, M. Weida, T. Day, D. Arnone, and R. Pritchett <i>Daylight Solutions, Inc., USA</i>  p. 17	A LOW-NOISE SWITCHED-CAPACITOR FRONT END FOR CAPACITIVE SENSOR A. Heidary and G.C.M. Meijer <i>Delft University of Technology, THE NETHERLANDS</i>  p. 27	DEVELOPMENT OF RELIABILITY TEST GUIDE- LINES FOR MICROELECTROMECHANICAL SYSTEMS IN MILITARY APPLICATIONS R. Mason <sup>1</sup> , M. Miller <sup>1</sup> , J. Kannard <sup>1</sup> , M. Singleton <sup>1</sup> , D. Skelton <sup>2</sup> , and J. Zunino <sup>2</sup> <sup>1</sup> <i>Concurrent Technologies Corporation, USA</i> and <sup>2</sup> <i>US Army Corrosion Office, USA</i>  p. 35
10:30 a.m.	Break & Exhibit Inspection		
SPECIAL SESSION A3L-A In-Vivo Sensor Systems	SESSION A3L-B Modeling & Simulation	SESSION A3L-C Inertial Sensors	SESSION A3L-D Sensor Networks
<b>SESSION CHAIRS</b> P. French, <i>Delft University</i> D. Tanase, <i>Delft University</i>	<b>SESSION CHAIRS</b> Q.-A. Huang, <i>Southeast University</i> B. Mizaiakoff, <i>Georgia Institute of Technology</i>	<b>SESSION CHAIRS</b> G. Fedder, <i>Carnegie Mellon University</i> L. Sarro, <i>Delft University</i>	<b>SESSION CHAIRS</b> Q. Lin, <i>Columbia University</i> K. Subramanian, <i>GE Global Research</i>
Regency VI, VII	Regency V	Hanover C,D,E	Hanover F,G
<b>11:00 a.m.</b>			
INVITED PACKAGING OF IMPLANTABLE MICROSYSTEMS K. Najafi <i>University of Michigan, USA</i>  p. 37	CONCEPT OF A MINIATURIZED ION MOBILITY SPECTROMETER AND A NUMERICAL MODEL FOR FAST SYSTEM DESIGN AND OPTIMIZATION S. Barth, W. Baether, and S. Zimmermann <i>Draegerwerk AG, GERMANY</i>  p. 47	CONCEPTS AND LIMITS FOR THE MINIA- TURIZATION OF SILICON DIFFERENTIAL VIBRATING INERTIAL MICRO-BEAM ACCELEROMETER B. Le Foulgoc <sup>1</sup> , O. Le Traon <sup>1</sup> , T. Bourouina <sup>2</sup> , A. Bosseboeuf <sup>3</sup> , F. Marty <sup>2</sup> , H. Mathias <sup>3</sup> , and A. Parent <sup>1</sup> <sup>1</sup> <i>ONERA, FRANCE</i> , <sup>2</sup> <i>ESIEE, FRANCE</i> and <sup>3</sup> <i>Université Paris XI, FRANCE</i>  p. 59	INTEGRATED SENSOR NETWORK WITH EVENT-DRIVEN ACTIVATION FOR RECORDING IMPACT EVENTS IN TEXTILE- REINFORCED COMPOSITES K.-U. Roscher <sup>1</sup> , H. Grätz <sup>1</sup> , A. Heinig <sup>1</sup> , W.-J. Fischer <sup>2</sup> , G. Pfeifer <sup>2</sup> , and E. Starke <sup>2</sup> <sup>1</sup> <i>Fraunhofer IPMS, GERMANY</i> and <sup>2</sup> <i>Technical University of Dresden, GERMANY</i>  p. 71
<b>11:15 a.m.</b>			
	SIMPLE BUT ACCURATE MODELS FOR SQUEEZE-FILM DAMPERS T. Veijola <i>Helsinki University of Technology, FINLAND</i>  p. 49	A COMPARATIVE STUDY OF CONDITION- ING ARCHITECTURES FOR CONVECTIVE ACCELEROMETERS O. Leman, F. Maily, L. Latorre, and P. Nouet <i>University Montpellier, FRANCE</i>  p. 61	OPTIMAL ON-DEMAND MOBILE SENSOR ALLOCATION R.K. Guha <sup>1</sup> and S. Ray <sup>2</sup> <sup>1</sup> <i>University of Pennsylvania, USA</i> and <sup>2</sup> <i>University of Bridgeport, USA</i>  p. 73
<b>11:30 a.m.</b>			
A LOW POWER, LOW VOLTAGE CURRENT READ-OUT CIRCUIT FOR IMPLANTABLE ELECTRO-CHEMICAL SENSORS M.A. Huque, M.R. Haider, M. Zhang, T. Oh, and S.K. Islam <i>University of Tennessee, USA</i>  p. 39	DESIGN, MODELING AND SIMULATION OF A CLOSED-LOOP CONTROLLER FOR A DUAL BACKPLATE MEMS CAPACITIVE MICROPHONE K. Kadirvel, D.T. Martin, J. Liu, R. Fox, M. Sheplak, L.N. Cattafesta, and T. Nishida <i>University of Florida, USA</i>  p. 51	A NOVEL IN-OPERATION HIGH g-SURVIVABLE MEMS GYROSCOPE K. Azgin, Y. Temiz, and T. Akin <i>Middle East Technical University, TURKEY</i>  p. 63	A ZIGBEE SENSOR ELEMENT FOR DISTRIBUTED MONITORING OF SOIL PARAMETERS IN ENVIRONMENTAL MONITORING A. Valente, R. Morais, C. Serôdio, P. Mestre, S. Pinto, and M. Cabral <i>Universidade de Trás-os-Montes e Alto Douro, PORTUGAL</i>  p. 75

# TECHNICAL PROGRAM MONDAY

SPECIAL SESSION A3L-A <i>continued</i>	SESSION A3L-B <i>continued</i>	SESSION A3L-C <i>continued</i>	SESSION A3L-D <i>continued</i>
<b>11:45 a.m.</b>			
<p><b>OXYGEN-TENSION MEASUREMENTS - THE FIRST STEP TOWARDS PREVENTION AND EARLY DETECTION OF ANASTOMOTIC LEAKAGE</b> D. Tanase<sup>1</sup>, N. Komen<sup>2</sup>, A. Draaijer<sup>3</sup>, G.J. Kleinrensink<sup>2</sup>, J. Jeekel<sup>2</sup>, J.F. Lange<sup>2</sup>, and P.J. French<sup>1</sup> <sup>1</sup><i>Delft University of Technology, THE NETHERLANDS</i>, <sup>2</sup><i>Erasmus Medical Centre, THE NETHERLANDS</i> and <sup>3</sup><i>TNO Quality of Life, THE NETHERLANDS</i></p> <p style="text-align: right;"><b>p. 41</b></p>	<p><b>RAPID DETECTION OF ANALYTES WITH IMPROVED SELECTIVITY USING COATED MICROCANTILEVER CHEMICAL SENSORS AND ESTIMATION THEORY</b> M.J. Wenzel<sup>1</sup>, F. Josse<sup>1</sup>, E. Yaz<sup>1</sup>, S.M. Heinrich<sup>1</sup>, and P.G. Datskos<sup>2</sup> <sup>1</sup><i>Marquette University, USA</i> and <sup>2</sup><i>Oak Ridge National Laboratory, USA</i></p> <p style="text-align: right;"><b>p. 53</b></p>	<p><b>VIBRATION SENSITIVITY OF MEMS TUNING FORK GYROSCOPES</b> S.W. Yoon, S.W. Lee, N.C. Perkins, and K. Najafi <i>University of Michigan, USA</i></p> <p style="text-align: right;"><b>p. 65</b></p>	<p><b>A SIMPLE WIRELESS BATTERYLESS SENSING PLATFORM FOR RESISTIVE AND CAPACITIVE SENSORS</b> T. Ativanichayaphong, J. Wang, W. Huang, S. Rao, and J.-C. Chiao <i>University of Texas, Arlington, USA</i></p> <p style="text-align: right;"><b>p. 77</b></p>
<b>12:00 p.m.</b>			
<p><b>A MULTI-LAYER PARYLENE ELECTRODE ARRAY FOR USE IN AN IMPLANTABLE MICROSYSTEM FOR TREATMENT OF NEUROLOGICAL DISORDERS</b> C.A. Mousoulis and D.P. Papageorgiou <i>Northeastern University, USA</i></p> <p style="text-align: right;"><b>p. 43</b></p>	<p><b>3D SIMULATION OF CONJUGATE HEAT TRANSFER OF ULP HOTPLATES FOR A MOX GAS SENSING DEVICE</b> M. Messina<sup>1</sup>, F. Franzé<sup>1</sup>, N. Speciale<sup>1</sup>, E. Cozzani<sup>2</sup>, and A. Roncaglia<sup>2</sup> <sup>1</sup><i>University of Bologna, ITALY</i> and <sup>2</sup><i>National Research Council of Italy, ITALY</i></p> <p style="text-align: right;"><b>p. 55</b></p>	<p><b>MULTI-DEGREE OF FREEDOM TUNING FORK GYROSCOPE DEMONSTRATING SHOCK REJECTION</b> A.R. Schofield, A.A. Trusov, and A.M. Shkel <i>University of California, Irvine, USA</i></p> <p style="text-align: right;"><b>p. 67</b></p>	<p><b>REALISING WACNET THROUGH A ZIGBEE-BASED ARCHITECTURE</b> A. Desmet, F. Naghdy, and M. Ros <i>University of Wollongong, AUSTRALIA</i></p> <p style="text-align: right;"><b>p. 79</b></p>
<b>12:15 p.m.</b>			
<p><b>FULLY PACKAGED NON-ENZYMATIC GLUCOSE MICRO-SENSOR FOR IN-VIVO AND CONTINUOUSLY MONITORING SYSTEM APPLICATIONS</b> D.J. Park, Y.J. Lee, and J.Y. Park <i>Kwangwoon University, KOREA</i></p> <p style="text-align: right;"><b>p. 45</b></p>	<p><b>PACKAGE-LEVEL SIMULATION AND VERIFICATION OF MICROSYSTEMS</b> J. Song, M. Li, Q.-A. Huang, and J.-Y. Tang <i>Southeast University, CHINA</i></p> <p style="text-align: right;"><b>p. 57</b></p>	<p><b>NOVEL 3-AXIS GYROSCOPE ON A SINGLE CHIP USING SOI-TECHNOLOGY</b> M. Traechtler, T. Link, J. Dehnert, J. Auber, P. Nommensen, and Y. Manoli <i>HSG-IMIT, GERMANY</i></p> <p style="text-align: right;"><b>p. 69</b></p>	<p><b>AN ENVIRONMENTALLY AWARE, INTELLIGENTLY CONTROLLED SYSTEM FOR POWER EFFICIENT WIRELESS SENSOR NETWORKS</b> J. Podpora and L. Reznik <i>Rochester Institute of Technology, USA</i></p> <p style="text-align: right;"><b>p. 81</b></p>

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*

<b>A4P-E1</b>	<p><b>SPIRAL <math>\mu</math>-PRECONCENTRATOR FOR GAS SENSOR DETECTION IN THE ppb RANGE</b> P. Ivanov<sup>1</sup>, I. Gracia<sup>1</sup>, F. Blanco<sup>2</sup>, N. Sabaté<sup>1</sup>, X. Vilanova<sup>2</sup>, A. Vergara<sup>2</sup>, X. Correig<sup>2</sup>, E. Figueras<sup>1</sup>, L. Fonseca<sup>1</sup>, and C. Cané<sup>1</sup> <sup>1</sup><i>National Centre of Microelectronics, SPAIN</i> and <sup>2</sup><i>University Rovira i Virgili, SPAIN</i>.....</p> <p style="text-align: right;"><b>p. 83</b></p>
<b>A4P-E2</b>	<p><b>NEW SENSING MATERIALS FOR SAW SENSORS USING POLYMER-SILICATE COMPOSITES</b> M. Rapp and S. Rupp <i>Institute of Microstructure Technology, GERMANY</i>.....</p> <p style="text-align: right;"><b>p. 85</b></p>
<b>A4P-E3</b>	<p><b>INTEGRATED TEMPERATURE, HUMIDITY AND GAS SENSORS ON FLEXIBLE SUBSTRATES FOR LOW-POWER APPLICATIONS</b> A. Oprea<sup>1</sup>, J. Courbat<sup>2</sup>, N. Bärsan<sup>1</sup>, D. Briand<sup>2</sup>, N.F. de Rooij<sup>2</sup>, and U. Weimar<sup>1</sup> <sup>1</sup><i>University of Tuebingen, GERMANY</i> and <sup>2</sup><i>University of Neuchâtel, SWITZERLAND</i>.....</p> <p style="text-align: right;"><b>p. 87</b></p>
<b>A4P-E4</b>	<p><b>COMPARATIVE STUDY OF IRRADIATED AND ANNEALED ZnO THIN FILMS FOR ROOM TEMPERATURE AMMONIA GAS SENSING</b> A. Kshirsagar<sup>1</sup>, A.B. Joshi<sup>1</sup>, A. Joshi<sup>1</sup>, D.K. Avasthi<sup>2</sup>, T.M. Bhawe<sup>1</sup>, and S.A. Gangal<sup>1</sup> <sup>1</sup><i>University of Pune, INDIA</i> and <sup>2</sup><i>Inter University Accelerator Centre, INDIA</i>.....</p> <p style="text-align: right;"><b>p. 89</b></p>

# TECHNICAL PROGRAM MONDAY

<b>A4P-E5</b>	<b>Pt/SnO<sub>2</sub> NANOWIRES/SiC BASED HYDROGEN GAS SENSOR</b> M. Shafiei <sup>1</sup> , K. Kalantar-Zadei <sup>1</sup> , W. Wlodarski <sup>1</sup> , E. Cimini <sup>2</sup> , S. Bianchi <sup>2</sup> , and G. Sberveglieri <sup>2</sup> <sup>1</sup> RMIT University, AUSTRALIA and <sup>2</sup> University of Brescia, ITALY .....p. 91
<b>A4P-E6</b>	<b>ULTRA LOW POWER MOX SENSORS WITH ppb-LEVEL VOC DETECTION CAPABILITIES</b> I. Elmi, S. Zampolli, E. Cozzani, M. Passini, G. Pizzochero, G.C. Cardinali, and M. Severi National Research Council, ITALY .....p. 93
<b>A4P-E7</b>	<b>ODOR RECORDER USING MASS SPECTROMETRY AND LARGE-SCALE DATA</b> T. Nakamoto and T. Nakama Tokyo Institute of Technology, JAPAN .....p. 95
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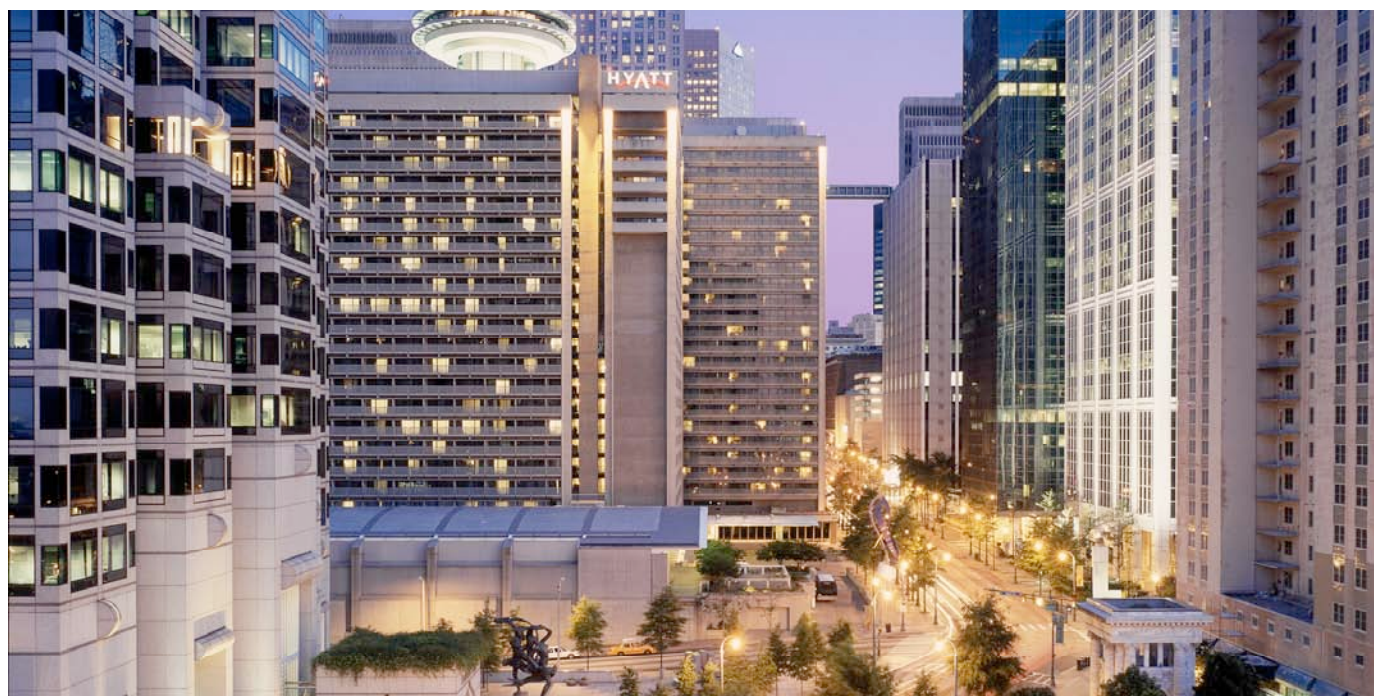
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<b>Regency VI, VII</b>	<b>Regency V</b>	<b>Hanover C,D,E</b>	<b>Hanover F,G</b>
<b>4:00 p.m.</b>			
<b>THERMALLY ADJUSTABLE MICROLENSSES FOR BIOLOGICAL IMAGING</b> L. Wang <sup>1</sup> , C.-M. Cheng <sup>1</sup> , Q. Lin <sup>2</sup> , and P.R. Leduc <sup>1</sup> <sup>1</sup> <i>Carnegie Mellon University, USA</i> and <sup>2</sup> <i>Columbia University, USA</i>  <b>p. 233</b>	<b>A NOVEL CIRCULAR SAW (SURFACE ACOUSTIC WAVE) DEVICE IN CMOS</b> O. Tigli and M.E. Zaghloul <i>George Washington University, USA</i>  <b>p. 245</b>	<b>HIGH YIELD FRONT-ETCHED STRUCTURE FOR CMOS COMPATIBLE IR DETECTOR</b> T. Li, Y. Liu, P. Zhou, Y. Wang, and Y. Wang <i>Chinese Academy of Science, CHINA</i>  <b>p. 257</b>	<b>INVITED POWER AND AREA EFFICIENT COLUMN-PARALLEL ADC ARCHITECTURES FOR CMOS IMAGE SENSORS</b> M.F. Snoeiij <sup>1</sup> , A.J.P. Theuwissen <sup>1,2</sup> , J.H. Huijsing <sup>1</sup> , and <b>K.A.A. Makinwa<sup>1</sup></b> <sup>1</sup> <i>Delft University of Technology, THE NETHERLANDS</i> and <sup>2</sup> <i>DALSA Semiconductors, THE NETHERLANDS</i>  <b>p. 269</b>
<b>4:15 p.m.</b>			
<b>APPLICATION OF AN INTEGRATED MICROFLUIDIC TOTAL INTERNAL REFLECTION (TIR)-BASED CHIP TO NANO-PARTICLE IMAGE VELOCIMETRY (NANO-PIV)</b> N.C.H. Le, R. Yokokawa, D.V. Dao, T.D. Nguyen, J. Wells, and S. Sugiyama <i>Ritsumeikan University, JAPAN</i>  <b>p. 235</b>	<b>SAW STREAMING IN ZnO SURFACE ACOUSTIC WAVE MICROMIXER AND MICROPUMP</b> Y.Q. Fu <sup>1</sup> , X.Y. Du <sup>1</sup> , J.K. Luo <sup>1</sup> , A.J. Flewitt <sup>1</sup> , W.I. Milne <sup>1</sup> , D.S. Lee <sup>2</sup> , N.M. Park <sup>2</sup> , S. Maerg <sup>2</sup> , S.H. Kim <sup>2</sup> , Y.J. Choi <sup>2</sup> , and J. Park <sup>2</sup> <sup>1</sup> <i>University of Cambridge, UK</i> and <sup>2</sup> <i>Electronics and Telecommunications Research Institute (ETRI), KOREA</i>  <b>p. 247</b>	<b>TUNNELING QUANTUM DOT SENSORS FOR MULTI-BAND INFRARED AND TERAHERTZ RADIATION DETECTION</b> G. Ariyawansa <sup>1</sup> , S.G. Matsik <sup>1</sup> , A.G.U. Perera <sup>1</sup> , X.H. Su <sup>2</sup> , and P. Bhattacharya <sup>2</sup> <sup>1</sup> <i>Georgia State University, USA</i> and <sup>2</sup> <i>University of Michigan, USA</i>  <b>p. 259</b>	
<b>4:30 p.m.</b>			
<b>MICRO ANALYSIS SYSTEM FOR DIGESTIVE ENZYMES BASED ON INTEGRATED AUTOMATIC pH-STATS</b> K. Morimoto, J. Fukuda, and H. Suzuki <i>University of Tsukuba, JAPAN</i>  <b>p. 237</b>	<b>TEMPERATURE DEPENDENCE OF HIGH FREQUENCY PARAMETERS OF PVDF FOR LENGTH MODE ULTRASONIC AIR TRANSDUCERS</b> M. Toda and M. Thompson <i>Measurement Specialties Inc., USA</i>  <b>p. 249</b>	<b>SINGLE AND MULTI EMITTER TERAHERTZ DETECTORS USING n-TYPE GaAs/AlGaAs HETEROSTRUCTURES</b> A.B. Weerasekara <sup>1</sup> , R.C. Jayasinghe <sup>1</sup> , M.B.M. Rinzan <sup>1</sup> , S.G. Matsik <sup>1</sup> , A.G.U. Perera <sup>1</sup> , M. Buchanan <sup>2</sup> , H.C. Liu <sup>2</sup> , G. von Winckel <sup>3</sup> , A. Stintz <sup>3</sup> , and S. Krishna <sup>3</sup> <sup>1</sup> <i>Georgia State University, USA</i> , <sup>2</sup> <i>Institute for Microstructural Sciences, CANADA</i> and <sup>3</sup> <i>University of New Mexico, USA</i>  <b>p. 261</b>	<b>RESPONSIVITY OF GATED PHOTODIODE IN SOS TECHNOLOGY</b> A. Fish <sup>1</sup> , O. Yadid-Pecht <sup>2</sup> , and E. Culurciello <sup>3</sup> <sup>1</sup> <i>University of Calgary, CANADA</i> <sup>2</sup> <i>Ben-Gurion University, ISRAEL</i> and <sup>3</sup> <i>Yale University, USA</i>  <b>p. 271</b>
<b>4:45 p.m.</b>			
<b>HOT-EMBOSSED PIEZOELECTRIC POLYMER MICRO-DIAPHRAGM ARRAYS INTEGRATED WITH LAB-ON-A-CHIP FOR PROTEIN ANALYSIS</b> C. Li, P.-M. Wu, A. Browne, S. Lee, and C.H. Ahn <i>University of Cincinnati, USA</i>  <b>p. 239</b>	<b>A METHOD TO REALIZE CONTROLLED AIR/LIQUID INTERFACES AND INTERFACIAL POLYMER MICRO MEMBRANES IN MICROFLUIDIC CHANNELS</b> D. Cheng, Y.P. Choe, and H. Jiang <i>University of Wisconsin, Madison, USA</i>  <b>p. 251</b>	<b>FABRICATION AND EXPERIMENTAL TESTING OF INDIVIDUAL MULTI-WALLED CARBON NANOTUBE (GNT) BASED INFRARED SENSORS</b> J. Zhang, N. Xi, H. Chen, and K.W.C. Lai <i>Michigan State University, USA</i>  <b>p. 263</b>	<b>A CMOS IMAGE SENSOR WITH ON CHIP IMAGE COMPRESSION BASED ON PREDICTIVE BOUNDARY ADAPTATION AND QTD ALGORITHM</b> S. Chen <sup>1</sup> , A. Bermak <sup>1</sup> , Y. Wang <sup>1</sup> , and D. Martinez <sup>2</sup> <sup>1</sup> <i>Hong Kong University of Science and Technology, HONG KONG</i> and <sup>2</sup> <i>LORIA-CNRS, FRANCE</i>  <b>p. 273</b>

# TECHNICAL PROGRAM MONDAY

SESSION A5L-A <i>continued</i>	SESSION A5L-B <i>continued</i>	SESSION A5L-C <i>continued</i>	SPECIAL SESSION A5L-D <i>continued</i>
<b>5:00 p.m.</b>			
<p><b>MICROFLUIDIC FLOW CYTOMETER WITH ON-CHIP LENS SYSTEMS FOR IMPROVED SIGNAL RESOLUTION</b> J. Godin and Y.-H. Lo <i>University of California, San Diego, USA</i></p> <p style="text-align: right;"><b>p. 241</b></p>	<p><b>METAL/SnO<sub>2</sub> INTERFACE EFFECTS ON CO SENSING, OPERANDO STUDIES</b> J. Bertrand<sup>1</sup>, A. Haensch<sup>2</sup>, D. Koziej<sup>2</sup>, N. Barsan<sup>2</sup>, C. Pijolat, U. Weimar, and J.-P. Viricelle<sup>1</sup> <sup>1</sup><i>Ecole Nationale Supérieure des Mines, FRANCE</i> and <sup>2</sup><i>University of Tuebingen, GERMANY</i></p> <p style="text-align: right;"><b>p. 253</b></p>	<p><b>DESIGN OF A NOVEL FULLY INTEGRATED IR – ABSORPTION SENSOR SYSTEM</b> J. Kasberger<sup>1</sup> and B. Jakoby<sup>2</sup> <sup>1</sup><i>Integrated Microsystems Austria, AUSTRIA</i> and <sup>2</sup><i>Johannes Kepler University Linz, AUSTRIA</i></p> <p style="text-align: right;"><b>p. 265</b></p>	<p><b>A UV PHOTODETECTOR WITH INTERNAL GAIN FABRICATED IN SILICON ON SAPPHIRE CMOS</b> M. Adlerstein Marwick and A.G. Andreou <i>Johns Hopkins University, USA</i></p> <p style="text-align: right;"><b>p. 275</b></p>
<b>5:15 p.m.</b>			
<p><b>MICROFLUIDIC DEVICE FOR ON-CHIP MANIPULATION OF LIQUID PLUGS FOR BIOSENSING APPLICATIONS</b> Y. Shimizu, W. Satoh, A. Takashima, F. Sassa, J. Fukuda, and H. Suzuki <i>University of Tsukuba, JAPAN</i></p> <p style="text-align: right;"><b>p. 243</b></p>	<p><b>p-Si MICROPROBE ARRAYS GROWN AT LOW TEMPERATURE BY SELECTIVE VLS USING <i>IN-SITU</i> DOPING AND THEIR PROPERTIES</b> M.S. Islam, T. Kawashima, K. Sawada, and M. Ishida <i>Toyohashi University of Technology, JAPAN</i></p> <p style="text-align: right;"><b>p. 255</b></p>	<p><b>AMORPHOUS Ge<sub>x</sub>Si<sub>1-x</sub>O<sub>y</sub>:H MICROBOLOMETERS WITH HIGH RESPONSIVITY</b> M.M. Rana and D.P. Butler <i>University of Texas, Arlington, USA</i></p> <p style="text-align: right;"><b>p. 267</b></p>	

5:30 p.m.

| **Adjourn for the Day**

**TECHNICAL PROGRAM TUESDAY**

**Tuesday, October 30, 2007**

8:00 a.m.

**KEYNOTE PRESENTATION B1K-A**

Chair: A. Hierlemann, *ETH Zurich*

**CRICKET INSPIRED FLOW-SENSOR ARRAYS**

**Gijs Krijnen<sup>1</sup>, T. Lammerink<sup>1</sup>, R. Wiegerink<sup>1</sup> and J. Casas<sup>2</sup>**

<sup>1</sup>*University of Twente, THE NETHERLANDS* and <sup>2</sup>*Université François Rabelais, FRANCE* ..... **p. 277**

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
<b>SESSION CHAIRS</b> M. Atashbar, <i>Western Michigan University</i> L. Sarro, <i>Delft University</i>	<b>SESSION CHAIRS</b> H. Jiang, <i>University of Wisconsin</i> E. Lewis, <i>University of Limerick</i>	<b>SESSION CHAIRS</b> M. Eickhoff, <i>Technische Universität München</i> E. Kharlampieva, <i>Georgia Institute of Technology</i>	<b>SESSION CHAIR</b> M.M. Disko, <i>ExxonMobil</i>
<b>Regency VI, VII</b>	<b>Regency V</b>	<b>Hanover C,D,E</b>	<b>Hanover F,G</b>

**9:00 a.m.**

<b>GAS SENSING PROPERTIES OF SWCNT AND TEFLON AF COMPOSITES</b> A. Kärkkänen, T. Avarmaa, and R. Jaaniso <i>University of Tartu, ESTONIA</i> <b>p. 279</b>	<b>COHERENCE MULTIPLEXING OF ABSORPTION SENSORS</b> Z.-G. Guan, B. Zhou, G. Liu, and S. He <i>Zhejiang University, CHINA</i> <b>p. 289</b>	<b>A NEW FLUORESCENT VESICULAR SENSOR FOR SACCHARIDES BASED ON BORONIC ACID-DIOL RECOGNITION ON THE INTERFACES OF VESICLES</b> G. Li, T. Jiang, X. Zhang, Q. Wang, and G. Li <i>Jilin University, CHINA</i> <b>p. 301</b>	<b>INVITED</b> <b>SENSING REQUIREMENTS FOR REAL-TIME MONITORING AND CONTROL ON ENERGY PRODUCTION</b> <b>R.N. Ghosh</b> and R. Loloee <i>Michigan State University, USA</i> <b>p. 313</b>
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**9:15 a.m.**

<b>GAS SENSING PROPERTIES OF CNT-SnO<sub>2</sub> NANOCOMPOSITE THIN FILM PREPARED BY E-BEAM EVAPORATION</b> A. Wisitorsaat <sup>1</sup> , E. Comini <sup>2</sup> , G. Sberveglieri <sup>2</sup> , W. Wlodarski <sup>3</sup> , and A. Tuantranont <sup>1</sup> <sup>1</sup> <i>National Electronics and Computer Technology Center, THAILAND</i> , <sup>2</sup> <i>University of Brescia, ITALY</i> and <sup>3</sup> <i>RMIT University, AUSTRALIA</i> <b>p. 281</b>	<b>RESONANT DETECTION AND MODULATION OF TERAHERTZ RADIATION BY 2DEG PLASMONS IN GaN GRATING-GATE STRUCTURES</b> N. Pala <sup>1</sup> , D. Veksler <sup>2</sup> , A. Muravjov <sup>2</sup> , W. Stillman <sup>2</sup> , R. Gaska <sup>1</sup> , and M. Shur <sup>2</sup> <sup>1</sup> <i>Sensor Electronic Technology, Inc., USA</i> and <sup>2</sup> <i>Rensselaer Polytechnic Institute, USA</i> <b>p. 291</b>	<b>SURFACE PLASMON RESONANCE ENHANCED COMMON PATH INTERFEROMETRY FOR HIGH SENSITIVITY LABEL FREE BIOMOLECULE INTERACTION ANALYSIS</b> C. Greef <sup>1</sup> , V. Petropavlovskikh <sup>1</sup> , O. Nilsen <sup>1</sup> , B. Hacioglu <sup>1</sup> , B. Khattatov <sup>1</sup> , and J. Hall <sup>2</sup> <sup>1</sup> <i>AlphaSniffer, LLC, USA</i> and <sup>2</sup> <i>Hall Stable Lasers, LLC, USA</i> <b>p. 303</b>	
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**9:30 a.m.**

<b>CARBON NANOTUBE-BASED HYDROGEN GAS SENSOR ELECTROCHEMICALLY FUNCTIONALIZED WITH PALLADIUM</b> J. Suehiro, S. Yamane, and K. Imasaka <i>Kyushu University, JAPAN</i> <b>p. 283</b>	<b>TEMPERATURE-DEPENDENT-FREE PIGTAILED ELECTRO-OPTIC SENSORS FOR VECTORIAL MEASUREMENT OF MICROWAVE SIGNALS</b> M. Bernier <sup>1</sup> , L. Duvillaret <sup>1</sup> , G. Gaborit <sup>1</sup> , A. Paupert <sup>2</sup> , and J.-L. Lasserre <sup>2</sup> <sup>1</sup> <i>Institut de Microélectronique d'Electromagnétisme et Photonique, FRANCE</i> and <sup>2</sup> <i>Centre d'Etude de Gramat, FRANCE</i> <b>p. 293</b>	<b>A NOVEL RING SHAPED PHOTODIODE FOR REFLECTANCE PULSE OXIMETRY IN WIRELESS APPLICATIONS</b> S. Duun, R.G. Haahr, K. Birkelund, P. Raahauge, P. Petersen, H. Dam, L. Nørgaard, and E.V. Thomsen <i>Technical University of Denmark, DENMARK</i> <b>p. 305</b>	<b>OPTICAL OXYGEN SENSORS USING TUNABLE DIODE LASER SPECTROSCOPY: APPLICATION TO HARSH REACTIVE PROCESSES</b> V. Ebert <sup>1</sup> and J.W. Fleming <sup>2</sup> <sup>1</sup> <i>Heidelberg University, GERMANY</i> and <sup>2</sup> <i>Naval Research Laboratory, USA</i> <b>p. 315</b>
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**9:45 a.m.**

<b>LARGE AREA NANOCRYSTALLINE GRAPHITE FILMS ON SiC FOR GAS SENSING APPLICATIONS</b> M.V.S. Chandrashekhara <sup>1</sup> , M. Qazi <sup>2</sup> , J. Lu <sup>1</sup> , G. Koley <sup>2</sup> , and M.G. Spencer <sup>1</sup> <sup>1</sup> <i>Cornell University, USA</i> and <sup>2</sup> <i>University of South Carolina, USA</i> <b>p. 285</b>	<b>SMART BI-SPECTRAL IMAGE SENSOR FOR 3D VISION</b> A. Kolar <sup>1</sup> , T. Graba <sup>1</sup> , A. Pinna <sup>1</sup> , O. Romain <sup>1</sup> , E. Belhaire <sup>2</sup> , and B. Granado <sup>1</sup> <sup>1</sup> <i>Université Pierre et Marie CURIE, FRANCE</i> and <sup>2</sup> <i>Universite Paris-Sud, FRANCE</i> <b>p. 295</b>	<b>OPTICAL SENSORS BASED ON S-LAYER PROTEINS</b> S. Scheicher <sup>1</sup> , B. Kainz <sup>2</sup> , S. Köstler <sup>3</sup> , C. Konrad <sup>3</sup> , M. Suppan <sup>3</sup> , A. Bizzarri <sup>3</sup> , D. Pum <sup>2</sup> , V. Ribitsch <sup>1</sup> , and U.B. Sleytr <sup>2</sup> <sup>1</sup> <i>Karl-Franzens University, AUSTRIA</i> , <sup>2</sup> <i>University of Natural Resources and Applied Life Sciences, AUSTRIA</i> and <sup>3</sup> <i>Joanneum Research, AUSTRIA</i> <b>p. 307</b>	<b>EXPLORING SILICON CARBIDE FOR THERMAL INFRARED RADIATORS</b> L. Chen and M. Mehregany <i>Case Western Reserve University, USA</i> <b>p. 317</b>
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## TECHNICAL PROGRAM TUESDAY

SESSION B2L-A <i>continued</i>	SESSION B2L-B <i>continued</i>	SESSION B2L-C <i>continued</i>	SPECIAL SESSION B2L-D <i>continued</i>
<b>10:00 a.m.</b>			
NANOSTRUCTURED THIN FILMS OF Ba DOPED $\text{In}_2\text{O}_3$ SENSORS FOR MONITORING TRACE LEVELS OF $\text{NO}_x$ K.I. Gnanasekar, C. Shekhar, E. Prabhu, V. Jayaraman, and T. Gnanasekaran <i>Indira Gandhi Centre for Atomic Research, INDIA</i> <b>p. 287</b>	ELECTRICAL MODEL OF A SINGLE PIXEL SOI PHOTOTRANSISTOR RELYING ON THE TRANSIENT CHARGE PUMPING TECHNIQUE L. Harik, M. Kayal, and J.-M. Sallese <i>Ecole Polytechnique Fédérale de Lausanne (EPFL), SWITZERLAND</i> <b>p. 297</b>	FIBER-OPTIC COUPLER BIOSENSOR H. Tazawa and T. Kanie <i>Sumitomo Electric Industries, Ltd., JAPAN</i> <b>p. 309</b>	A LOW TCR NANOCOMPOSITE STRAIN GAGE FOR HIGH TEMPERATURE AEROSPACE APPLICATIONS O.J. Gregory and X. Chen <i>University of Rhode Island, USA</i> <b>p. 319</b>
<b>10:15 a.m.</b>			
	SINGLE PHOTON AVALANCHE DETECTORS IN STANDARD CMOS M. Dandin <sup>1</sup> , N. Nelson <sup>1</sup> , V. Saveliev <sup>1</sup> , I. Weinberg <sup>2</sup> , H. Ji <sup>1</sup> , and P. Abshire <sup>1</sup> <sup>1</sup> University of Maryland, USA and <sup>2</sup> Fast Imaging Company, USA <b>p. 299</b>	TAPERED OPTICAL FIBER BIOSENSOR FOR THE DETECTION OF ANTI-GLIADIN ANTIBODIES J.M. Corres, J. Bravo, I.R. Matias, and F.J. Arregui <i>Universidad Publica de Navarra, SPAIN</i> <b>p. 311</b>	
<b>10:30 a.m.   Break &amp; Exhibit Inspection</b>			
<b>SESSION B3L-A</b> Nanostructure for Chemical Sensors  <b>SESSION CHAIRS</b> F. Arregui, <i>Public University of Navarre</i> R. Gao, <i>University of Massachusetts</i>	<b>SESSION B3L-B</b> Optical Sensors II  <b>SESSION CHAIRS</b> G. Pickrell, <i>Virginia Tech</i> A. Zribi, <i>GE Research</i>	<b>SESSION B3L-C</b> Biosensors  <b>SESSION CHAIRS</b> J. Yeow, <i>University of Toronto</i> B. Ziaie, <i>Purdue University</i>	<b>SPECIAL SESSION B3L-D</b> Sensing Interfaces with Electrochemical Scanning Probes  <b>SESSION CHAIR</b> C. Kranz, <i>Georgia Institute of Technology</i>
<b>Regency VI, VII</b>	<b>Regency V</b>	<b>Hanover C,D,E</b>	<b>Hanover F,G</b>
<b>11:00 a.m.</b>			
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 <i>Tokyo University of Agriculture and Technology, JAPAN</i> <b>p. 321</b>	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'Farrell <sup>1</sup> , C. Sheridan <sup>1</sup> , E.L. Lewis <sup>1</sup> , W.Z. Zhao <sup>2</sup> , K.T.V. Grattan <sup>2</sup> , T. Sun <sup>2</sup> , J. Kerry <sup>3</sup> , and N. Jackman <sup>3</sup> <sup>1</sup> University of Limerick, IRELAND <sup>2</sup> City University London, UK and <sup>3</sup> Jackman Food Solutions International Ltd, IRELAND <b>p. 333</b>	DETECTION OF ALCOHOL WITH VERTICALLY ALIGNED CARBON NANOFIBER (VACNF) M.L. Weeks <sup>1</sup> , T. Rahman <sup>1</sup> , P.D. Frymier <sup>1</sup> , S.K. Islam <sup>1</sup> , and T.E. McKnight <sup>2</sup> <sup>1</sup> University of Tennessee, USA and <sup>2</sup> Oak Ridge National Laboratory, USA <b>p. 345</b>	<b>INVITED</b> AFM/EC NANO PROBING OF SINGLE CELLS AND ORGANELLES R. Fasching, W.-H. Ryu, S.-J. Bai, J.-S. Park, T. Fabian, J. Moseley, A. Grossman, and F. Prinz <i>Stanford University, USA</i> <b>p. 357</b>
<b>11:15 a.m.</b>			
NANOWIRE SENSOR FOR VOLATILE ORGANIC COMPOUNDS BY FORMATION OF CHARGE TRANSFER COMPLEX K. Masunaga, M. Sato, K. Hayashi, and K. Toko <i>Kyushu University, JAPAN</i> <b>p. 323</b>	A RANGE FINDING ARRAY SENSOR PERFORMING CORRELATED CALCULATIONS WITH A PN CODE MODULATION LIGHT T. Joboji <sup>1</sup> and S. Sugawa <sup>2</sup> <sup>1</sup> Hamamatsu Photonics K.K., JAPAN and <sup>2</sup> Tohoku University, JAPAN <b>p. 335</b>	REAL-TIME PROTEIN BINDING DETECTION WITH NEUROMORPHIC INTEGRATED SENSOR B.C. Jacquot <sup>1</sup> , N.L. Muñoz <sup>1</sup> , D.W. Branch <sup>2</sup> , and E.C. Kan <sup>1</sup> <sup>1</sup> Cornell University, USA and <sup>2</sup> Sandia National Laboratory, USA <b>p. 347</b>	
<b>11:30 a.m.</b>			
CHEMICAL SENSORS FROM LEAD METALLOPHTHALOCYANINE WHISKERS E. Strelkov and A. Kolmakov <i>Southern Illinois University, USA</i> <b>p. 325</b>	DESIGN AND FABRICATION OF AN EXTREME TEMPERATURE SENSING OPTICAL PROBE USING SILICON CARBIDE TECHNOLOGIES N.A. Riza <sup>1</sup> , M. Sheikh <sup>1</sup> , and F. Perez <sup>2</sup> <sup>1</sup> University of Central Florida, USA and <sup>2</sup> Nuonics, Inc., USA <b>p. 337</b>	BIOCHEMICAL RESPONSES OF NANOPILLAR GATE FIELD-EFFECT DEVICES Y. Miyahara <sup>1</sup> , T. Sakata <sup>2</sup> , A. Matsumoto <sup>2</sup> , C. Kataoka-Hamai <sup>1</sup> , H. Inoue <sup>1</sup> , N. Sato <sup>2</sup> , and I. Makino <sup>2</sup> <sup>1</sup> National Institute for Materials Science, JAPAN and <sup>2</sup> University of Tokyo, JAPAN <b>p. 349</b>	COMPARISON OF TWO REDOX COUPLES FOR AFM-SECM P.L.T.M. Frederix <sup>1</sup> , P.D. Bosshart <sup>1</sup> , T. Akiyama <sup>2</sup> , N.F. De Rooij <sup>2</sup> , U. Stauer <sup>2</sup> , and A. Engel <sup>1</sup> <sup>1</sup> University of Basel, SWITZERLAND and <sup>2</sup> University of Neuchâtel, SWITZERLAND <b>p. 359</b>

## TECHNICAL PROGRAM TUESDAY

SESSION B3L-A <i>continued</i>	SESSION B3L-B <i>continued</i>	SESSION B3L-C <i>continued</i>	SPECIAL SESSION B3L-D <i>continued</i>
<b>11:45 a.m.</b>			
OPTICAL TRANSDUCTION OF THE CHEMICAL SENSITIVITY OF PORPHYRIN NANOTUBES BY CSPT PLATFORM E. Martinelli <sup>1</sup> , F. Dini <sup>1</sup> , D. Monti <sup>1</sup> , R. Paolesse <sup>1</sup> , D. Filippini <sup>2</sup> , A. D'Amico <sup>1</sup> , I. Lundström <sup>2</sup> , and C. Di Natale <sup>1</sup> <sup>1</sup> University of Rome Tor Vergata, ITALY and <sup>2</sup> University of Linköping, SWEDEN <b>p. 327</b>	Au-(Y <sub>2</sub> O <sub>3</sub> ) <sub>x</sub> (ZrO <sub>2</sub> ) <sub>1-x</sub> 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 <b>p. 339</b>	DEVELOPMENT OF POLYETHYLENEGLYCOL MONOLAYER-BASED SPR IMMUNOSENSOR FOR DETECTION OF LOW-MOLECULAR-WEIGHT FRAGRANTS K.V. Gobi <sup>1</sup> , K. Matsumoto <sup>1</sup> , K. Toko <sup>1</sup> , H. Ikezaki <sup>2</sup> , and N. Miura <sup>1</sup> <sup>1</sup> Kyushu University, JAPAN and <sup>2</sup> Insent Inc., JAPAN <b>p. 351</b>	ELECTROCHEMICAL CANTILEVER SENSORS AND SCANNING PROBE MICROSCOPY T. Thundat, and G.M. Brown Oak Ridge National Laboratory, USA <b>p. 361</b>
<b>12:00 p.m.</b>			
RAPID FABRICATION OF A NANO INTERDIGITATED ARRAY ELECTRODE AND ITS AMPEROMETRIC CHARACTERIZATION AS AN ELECTROCHEMICAL SENSOR A.K. Samarao <sup>1</sup> , M.J. Rust <sup>2</sup> , and C.H. Ahn <sup>2</sup> <sup>1</sup> Georgia Institute of Technology, USA and <sup>2</sup> University of Cincinnati, USA <b>p. 329</b>	ANALYSIS OF PHOTO-ELASTIC MODULATION IN ACCELERATION SENSING F. Chen and Z. Salcic University of Auckland, NEW ZEALAND <b>p. 341</b>	DEVELOPMENT OF A SHEAR HORIZONTAL SAW RFID BIOSENSOR J.K. Perng <sup>1</sup> , P.J. Edmonson <sup>2</sup> , and W.D. Hunt <sup>1</sup> <sup>1</sup> Georgia Institute of Technology, USA and <sup>2</sup> P.J. Edmonson, Ltd., CANADA <b>p. 353</b>	NEW METHODS FOR CALIBRATED SCANNING THERMAL MICROSCOPY (SThM) P.S. Dobson <sup>1</sup> , G. Mills <sup>2</sup> , and J.M.R. Weaver <sup>1</sup> <sup>1</sup> University of Glasgow, UK and <sup>2</sup> Kelvin Nanotechnology, UK <b>p. 363</b>
<b>12:15 p.m.</b>			
A LOW VOLTAGE GAS IONIZATION SENSOR BASED ON SPARSE GOLD NANORODS R.B. Sadeghian and M. Kahrizi Concordia University, CANADA <b>p. 331</b>	A 3.2 kHz, 13-BIT OPTICAL ABSOLUTE ROTARY ENCODER WITH A CMOS PROFILE SENSOR Y. Sugiyama, Y. Matsui, H. Toyoda, N. Mukozaka, A. Ichori, T. Abe, M. Takabe, and S. Mizuno Hamamatsu Photonics K.K., JAPAN <b>p. 343</b>	HYDROGEL-BASED INTEGRATED ANTENNA-pH SENSOR S.-N. Lee <sup>1</sup> , Z. Ding <sup>2</sup> , J.-I. Kim <sup>2</sup> , J.-G. Yook <sup>1</sup> , B. Ziaie <sup>2</sup> , and D. Peroulis <sup>2</sup> <sup>1</sup> Yonsei University, KOREA and <sup>2</sup> Purdue University, USA <b>p. 355</b>	DEVELOPMENTS IN NANOWIRE SCANNING ELECTROCHEMICAL - ATOMIC FORCE MICROSCOPY (SECM-AFM) PROBES D.P. Burt <sup>1</sup> , P.S. Dobson <sup>1</sup> , J.M.R. Weaver <sup>1</sup> , N.R. Wilson <sup>2</sup> , P.R. Unwin <sup>2</sup> , and J.V. Macpherson <sup>2</sup> <sup>1</sup> University of Glasgow, UK and <sup>2</sup> University of Warwick, UK <b>p. 365</b>

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Lunch on your Own &amp; Exhibit Inspection

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4:00 p.m.

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<b>B4P-G29</b>	<b>PRECISE THERMOGRAPHY OF MICROSYSTEMS IN THE VISIBLE REGION USING A STANDARD CCD CAMERA</b> D. Teyssieux <sup>1</sup> , D. Briand <sup>2</sup> , L. Thiery <sup>1</sup> , N.F. de Rooij <sup>2</sup> , and B. Cretin <sup>1</sup> <sup>1</sup> FEMTO-ST, FRANCE and <sup>2</sup> University of Neuchâtel, SWITZERLAND ..... p. 475	<b>p. 475</b>
<b>B4P-G30</b>	<b>A THICKNESS SHEAR MODE ZINC OXIDE LIQUID SENSOR WITH OFF-AXIS EXCITATION</b> C.D. Corso, A. Dickherber, and W.D. Hunt Georgia Institute of Technology, USA ..... p. 477	<b>p. 477</b>
<b>B4P-G31</b>	<b>NANOMETER SCALE COMPLEMENTARY SILICON MOSFETS AS DETECTORS OF TERAHERTZ AND SUB-TERAHERTZ RADIATION</b> W. Stillman <sup>1,2</sup> , F. Guarin <sup>2</sup> , V.Y. Kachorovskii <sup>1,3</sup> , N. Pala <sup>1,4</sup> , S. Rumyantsev <sup>1,3</sup> , M.S. Shur <sup>1</sup> , and D. Veksler <sup>1</sup> <sup>1</sup> Rensselaer Polytechnic Institute, USA, <sup>2</sup> IBM Microelectronics, USA <sup>3</sup> Ioffe Institute of Russian Academy of Sciences, RUSSIA and <sup>4</sup> Sensor Electronics Technology, Inc., USA ..... p. 479	<b>p. 479</b>
<b>B4P-G32</b>	<b>A NOVEL CHARACTERIZATION METHOD FOR THERMAL THIN-FILM PROPERTIES APPLIED TO PECVD SILICON NITRIDE</b> R. Beigelbeck <sup>1</sup> , F. Kohl <sup>1</sup> , J. Kuntner <sup>2</sup> , F. Keplinger <sup>2</sup> , and B. Jakoby <sup>3</sup> <sup>1</sup> Austrian Academy of Sciences, AUSTRIA, <sup>2</sup> Vienna University of Technology, AUSTRIA and <sup>3</sup> Johannes Kepler University Linz, AUSTRIA ..... p. 481	<b>p. 481</b>
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<b>B4P-G34</b>	<b>EARLY-WARNING WIRELESS TELEMETER FOR HARSH-ENVIRONMENT BEARINGS</b> A. Kovacs, D. Peroulis, and F. Sadeghi Purdue University, USA ..... p. 485	<b>p. 485</b>
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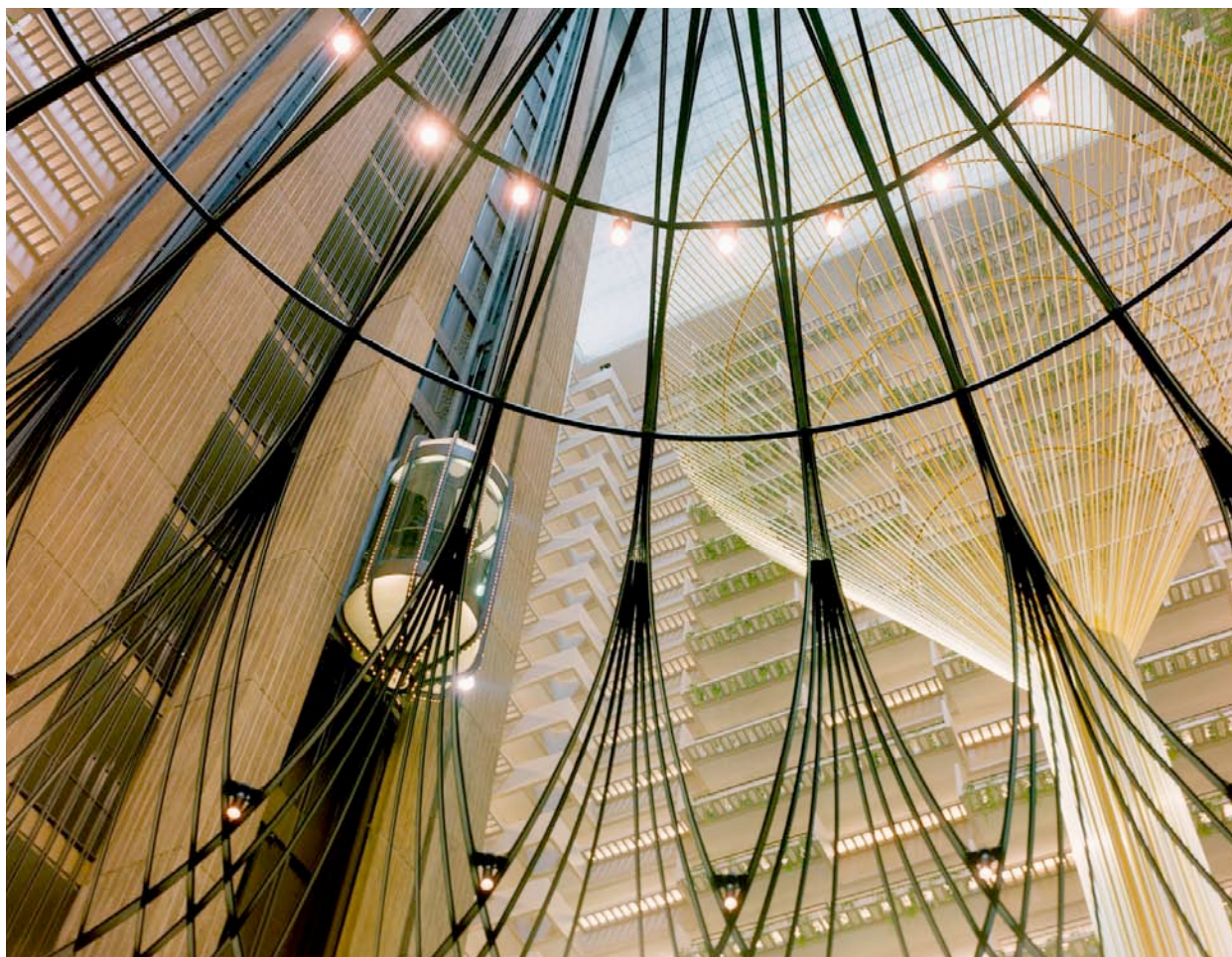
# TECHNICAL PROGRAM TUESDAY

## Applications - CHAIR: K. Rajanna, *Indian Institute of Science*


<b>B4P-H1</b>	<p><b>A CMOS INTEGRATED CAPACITANCE-TO-FREQUENCY CONVERTER WITH DIGITAL COMPENSATION CIRCUIT DESIGNED FOR SENSOR INTERFACE APPLICATIONS</b>  C.-T. Chiang<sup>1,2</sup>, C.-S. Wang<sup>2</sup>, and Y.-C. Huang<sup>2</sup>  <sup>1</sup><i>Industrial Technology Research Institute, TAIWAN</i> and <sup>2</sup><i>National Chiao Tung University, TAIWAN</i> ..... <b>p. 489</b></p>
<b>B4P-H2</b>	<p><b>FAST SAW BASED SENSOR SYSTEM FOR REAL-TIME ANALYSIS OF VOLATILE ANAESTHETIC AGENTS</b>  N. Barié<sup>1</sup>, A. Voigt<sup>1</sup>, J. Marcoll<sup>2</sup>, and M. Rapp<sup>1</sup>  <sup>1</sup><i>Institute of Microstructure Technology, GERMANY</i> and <sup>2</sup><i>Drägerwerk AG, GERMANY</i> ..... <b>p. 491</b></p>
<b>B4P-H3</b>	<p><b>A MISiCFET BASED GAS SENSOR SYSTEM FOR COMBUSTION CONTROL IN SMALL-SCALE WOOD FIRED BOILERS</b>  M. Andersson<sup>1</sup>, L. Everbrand<sup>1</sup>, A. Lloyd Spetz<sup>1</sup>, T. Nyström, M. Nilsson, C. Gauffin, and H. Svensson  <sup>1</sup><i>Linköping University, SWEDEN</i> and <sup>2</sup><i>NIBE AB, SWEDEN</i> ..... <b>p. 493</b></p>
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<b>B4P-H8</b>	<p><b>SILICON SUBSTRATE MICROELECTRODES VOLTAMMETRY PERFORMANCES IN WHITE WINE FAULTS IDENTIFICATION AND QUANTIFICATION</b>  L. Francioso<sup>1</sup>, R. Bjorklund<sup>2</sup>, T.K. Rulcker<sup>2</sup>, and P. Siciliano<sup>1</sup>  <sup>1</sup><i>CNR-IMM Lecce, ITALY</i> and <sup>2</sup><i>Linköping University, SWEDEN</i> ..... <b>p. 503</b></p>
<b>B4P-H9</b>	<p><b>COLLISION AVOIDANCE BY THE FUSION OF DIFFERENT BEAM-WIDTH ULTRASONIC SENSORS</b>  C.-Y. Lee, H.-G. Choi, J.-S. Park, K.-Y. Park, and S.-R. Lee  <i>Kyungpook National University, KOREA</i> ..... <b>p. 505</b></p>
<b>B4P-H10</b>	<p><b>A NON-INVASIVE AND REMOTE INFANT MONITORING SYSTEM USING CO<sub>2</sub> SENSORS</b>  H. Cao, L.-C. Hsu, T. Ativanichayaphong, J. Sin, and J.-C. Chiao  <i>University of Texas, Arlington, USA</i> ..... <b>p. 507</b></p>
<b>B4P-H11</b>	<p><b>IN SITU MEASUREMENT OF PLAYING CHILDREN BY WIRELESS WEARABLE ELECTROMYOGRAPHY</b>  G. Kawakami<sup>1</sup>, Y. Nishida<sup>2</sup>, and H. Mizoguchi<sup>1</sup>  <sup>1</sup><i>Tokyo University of Science, JAPAN</i> and <sup>2</sup><i>National Institute of Advanced Industrial Science and Technology (AIST), JAPAN</i> ..... <b>p. 509</b></p>
<b>B4P-H12</b>	<p><b>VOICE RECOGNITION ALGORITHM FOR PORTABLE ASSISTIVE DEVICES</b>  H.G. Nik, G.M. Gutt, and N. Peixoto  <i>George Mason University, USA</i> ..... <b>p. 511</b></p>
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# TECHNICAL PROGRAM TUESDAY

<b>B4P-H15</b>	<b>MICRO-CANTILEVER ARRAY PRESSURE MEASUREMENT SYSTEM FOR BIOMEDICAL INSTRUMENTATION</b> W. Qu, S.K. Islam, G. To, and M. Mahfouz <i>University of Tennessee, USA</i> .....	<b>p. 517</b>
<b>B4P-H16</b>	<b>FEASIBILITY OF A GIANT MAGNETOIMPEDANCE SANDWICH MAGNETOMETER FOR SPACE APPLICATIONS</b> J. Moutoussamy <sup>1</sup> , C. Coillot <sup>1</sup> , G. Chanteur <sup>1</sup> , and F. Alvès <sup>2</sup> <sup>1</sup> <i>CETP, FRANCE</i> and <sup>2</sup> <i>LGEF, FRANCE</i> .....	<b>p. 519</b>
<b>B4P-H17</b>	<b>VELOCITY MEASUREMENT OF MULTI-PHASE FLOWS BASED ON ELECTRICAL CAPACITANCE VOLUME TOMOGRAPHY</b> Q. Marshdeh <sup>1</sup> , F. Wang <sup>1</sup> , W. Warsito <sup>2</sup> , and L.-S. Fan <sup>1</sup> <sup>1</sup> <i>Ohio State University, USA</i> and <sup>2</sup> <i>University of Indonesia, INDONESIA</i> .....	<b>p. 521</b>
<b>B4P-H18</b>	<b>MAGNETOPNEUMOGRAPHY – SUPPRESSION OF BACKGROUND FIELD VARIATIONS IN SCANNED DATA FOR INVERSION USING MULTIPLE FLUXGATES</b> J. Tomek and A. Platil <i>Czech Technical University, CZECH REPUBLIC</i> .....	<b>p. 523</b>
<b>B4P-H19</b>	<b>AN ELECTROMAGNETICALLY ACTUATED MICROMACHINED LOUDSPEAKER FOR HEARING AIDS APPLICATIONS</b> S.-S. Je and J. Chae <i>Arizona State University, USA</i> .....	<b>p. 525</b>



## TECHNICAL PROGRAM TUESDAY

SESSION B5L-A Hydrogen Sensors & Recognition Structures  SESSION CHAIRS E. Comini, <i>University of Brescia</i> P. Hauptmann, <i>University of Magdeburg</i>	SESSION B5L-B Mechanical Sensors  SESSION CHAIRS K. Rajanna, <i>Indian Institute of Science</i> A. Selvakumar, <i>Colibrys</i>	SESSION B5L-C Magnetic Biosensors  SESSION CHAIRS H. Suzuki, <i>University of Tsukuba</i> A. Zribi, <i>GE Research</i>	SPECIAL SESSION B5L-D Smart Sensors & Interface Electronics  SESSION CHAIRS K.A.A. Makinwa, <i>Delft University</i> G.C.M. Meijer, <i>Delft University</i>
Regency VI, VII	Regency VI, VII	Hanover C,D,E	Hanover F,G
<b>4:00 p.m.</b>			
<b>IN SITU DRIFT STUDY OF HYDROGEN AND CO ADSORPTION ON Pt/SiO<sub>2</sub> MODEL SENSORS</b> E. Becker <sup>1</sup> , M. Andersson <sup>2</sup> , A.L. Spetz <sup>2</sup> , and M. Skoglundh <sup>1</sup> <sup>1</sup> Chalmers University of Technology, SWEDEN and <sup>2</sup> Linköping University, SWEDEN <b>p. 527</b>	<b>A FULLY INTEGRATED CAPACITIVE PRESSURE SENSOR WITH HIGH SENSITIVITY</b> X.-D. Huang, J.-Q. Huang, M. Qin, and Q.-A. Huang <i>Southeast University, CHINA</i> <b>p. 539</b>	<b>A MAGNETO-INDUCTIVE SENSOR BASED WIRELESS PHARMACEUTICAL COMPLIANCE MONITORING SYSTEM</b> X. Huo <sup>1</sup> , and M. Ghovanloo <sup>2</sup> <sup>1</sup> North Carolina State University, USA and <sup>2</sup> Georgia Institute of Technology, USA <b>p. 551</b>	<b>INVITED STANDARD CMOS HALL-SENSOR WITH INTEGRATED INTERFACE ELECTRONICS FOR A 3D COMPASS SENSOR</b> J. van der Meer <sup>1</sup> , F. Riedijk <sup>1</sup> , K. Makinwa <sup>2</sup> , and J. Huijsing <sup>2</sup> <sup>1</sup> Xensor Integration, THE NETHERLANDS and <sup>2</sup> Delft University of Technology, THE NETHERLANDS <b>p. 563</b>
<b>4:15 p.m.</b>			
<b>SAFE MEMBRANE-RELEASING PROCESS FOR THERMOELECTRIC HYDROGEN GAS SENSOR</b> L.F. Houlet, W. Shin, M. Nishibori, N. Izu, T. Itoh, and I. Matsubara <i>National Institute of Advanced Industrial Science and Technology (AIST), JAPAN</i> <b>p. 529</b>	<b>A HIGHLY VERSATILE AND ROBUST TACTILE SENSING SYSTEM</b> D. Göger and H. Wörn <i>University of Karlsruhe, GERMANY</i> <b>p. 541</b>	<b>DEVELOPMENT OF A NOVEL MICRO IMMUNE-MAGNETOPHORESIS CELL SORTER</b> J. Kim <sup>1,2</sup> , U. Steinfeld <sup>1</sup> , H.-H. Lee <sup>1</sup> , and H. Seidel <sup>2</sup> <sup>1</sup> Korea Institute of Science and Technology-Europe, GERMANY and <sup>2</sup> University of Saarland, GERMANY <b>p. 553</b>	
<b>4:30 p.m.</b>			
<b>CROSS SENSITIVITY AND STABILITY OF FET-BASED HYDROGEN SENSORS</b> T. Galonska <sup>1</sup> , W. Widarnato <sup>1</sup> , C. Senft <sup>1</sup> , O. Senftleben <sup>1</sup> , I. Eisele <sup>1</sup> , H.P. Frerichs <sup>2</sup> , and Ch. Wilbertz <sup>2</sup> <sup>1</sup> University of the Federal Armed Forces, GERMANY and <sup>2</sup> Micronas GmbH, GERMANY <b>p. 531</b>	<b>HIGH PERFORMANCE SOI-CMOS WALL SHEAR STRESS SENSORS</b> I. Haneef, S.Z. Ali, F. Udrea, J.D. Coull, and H.P. Hodson <i>University of Cambridge, UK</i> <b>p. 543</b>	<b>CHARACTERIZATION OF PHAGE-COUPLED MAGNETOELASTIC MICRO-PARTICLES FOR THE DETECTION OF BACILLUS ANTHRACIS SPORES</b> J. Wan, M.L. Johnson, S. Horikawa, V.A. Petrenko, and B.A. Chin <i>Auburn University, USA</i> <b>p. 555</b>	<b>MICROPOWER SENSORS FOR NEURO-PROSTHESIS</b> T. Denison, W. Santa, G. Molnar, and K. Miesel <i>Medtronic Neurological Technologies, USA</i> <b>p. 565</b>
<b>4:45 p.m.</b>			
<b>CAPACITIVE BASED LIQUID CRYSTAL CHEMICAL AND BIOLOGICAL SENSORS</b> A. Abu-Abed <sup>1</sup> , S. Jovanov <sup>1</sup> , E. Jovanov <sup>1</sup> , R.G. Lindquist <sup>1</sup> , J. Namkung <sup>1</sup> , and N. Abbott <sup>2</sup> <sup>1</sup> University of Alabama, USA and <sup>2</sup> University of Wisconsin, USA <b>p. 533</b>	<b>COUPLING HIGH FORCE SENSITIVITY AND HIGH STIFFNESS IN PIEZORESISTIVE CANTILEVERS WITH EMBEDDED SI-NANOWIRES</b> K. Naeli and O. Brand <i>Georgia Institute of Technology, USA</i> <b>p. 545</b>	<b>A FERROFLUID IMMUNOASSAY BASED ON MAGNETIC FIELD-INDUCED BIREFRINGENCE</b> B.Y. Ku and D.A. Horsley <i>University of California, Davis, USA</i> <b>p. 557</b>	<b>WIRELESS VESTIBULAR EVOKED MYOGENIC POTENTIALS SYSTEM</b> T. Torfs <sup>1</sup> , R.F. Yazicioglu <sup>1,2</sup> , P. Merken <sup>1</sup> , B. Gyselincx <sup>3</sup> , R. Puers <sup>2</sup> , R. Vanspauwen <sup>4</sup> , F.L. Wuyts <sup>1</sup> , and C. Van Hoof <sup>1,2</sup> <sup>1</sup> IMEC, BELGIUM, <sup>2</sup> Catholic University of Leuven, BELGIUM, <sup>3</sup> IMEC-NL, BELGIUM and <sup>4</sup> University of Antwerp, BELGIUM <b>p. 567</b>
<b>5:00 p.m.</b>			
<b>A LIQUID CRYSTAL BASED GAS SENSOR USING MICROFABRICATED PILLAR ARRAYS AS A SUPPORT STRUCTURE</b> S.S. Sridharamurthy, K.D. Cadwell, N.L. Abbott, and H. Jiang <i>University of Wisconsin, Madison, USA</i> <b>p. 535</b>	<b>FEASIBILITY STUDY FOR A THREE-AXIAL JOYSTICK BASED ON AN ARRAY OF LATERAL HALL ELEMENTS</b> H. Zangl <sup>1</sup> , T. Bretterkieber <sup>1</sup> , G. Steiner <sup>1</sup> , and K. Riedmüller <sup>2</sup> <sup>1</sup> Graz University of Technology, AUSTRIA and <sup>2</sup> austriamicrosystems AG, AUSTRIA <b>p. 547</b>	<b>THE EFFECT OF PHAGE SOLUTION CHEMISTRY ON THE SPORE BINDING AFFINITY OF MAGNETOELASTIC BIOSENSORS</b> S. Huang, H. Yang, M.L. Johnson, R.S. Lakshmanan, I. Chen, V.A. Petrenko, J.M. Barbaree, and B.A. Chin <i>Auburn University, USA</i> <b>p. 559</b>	<b>INTERFACING WITH NEURONS AT HIGH SPATIOTEMPORAL RESOLUTION</b> U. Frey, J. Sedivy, F. Heer, S. Hafizovic, and A. Hierlemann <i>ETH Zürich, SWITZERLAND</i> <b>p. 569</b>
<b>5:15 p.m.</b>			
<b>SELECTIVE RECOGNITION OF BILE ACIDS BY MOLECULAR IMPRINTS</b> R. Zhang, S. Wei, and B. Mizaikoff <i>Georgia Institute of Technology, USA</i> <b>p. 537</b>	<b>BIOMIMETIC FLOW-SENSOR ARRAYS BASED ON THE FILIFORM HAIRS ON THE CERCI OF CRICKETS</b> R.J. Wiegerink, A. Floris, R.K. Jaganatharaja, N. Izadi, T.S.J. Lammerink, and G.J.M. Krijnen <i>University of Twente, THE NETHERLANDS</i> <b>p. 549</b>	<b>INTERDIGITATED ARRAY ELECTRODES WITH MAGNETIC FUNCTION AS A PARTICLE-BASED BIOSENSOR</b> Z. Peng <sup>1</sup> , X. Yang <sup>2</sup> , G. Zhang <sup>2</sup> , and P.J. Hesketh <sup>1</sup> <sup>1</sup> Georgia Institute of Technology, USA and <sup>2</sup> University of Georgia, USA <b>p. 561</b>	<b>A SMART ANGULAR RATE SENSOR SYSTEM</b> A. Sharma, M.F. Zaman, and F. Ayazi <i>Georgia Institute of Technology, USA</i> <b>p. 571</b>

5:30 p.m.

Adjourn for the Day

7:30 p.m.

CONFERENCE BANQUET

Student Paper &amp; 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*

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SESSION C2L-A DNA Sensors & Electro Physiology  SESSION CHAIRS H.-I. Jung, <i>Yonsei University</i> M.J. Vellekoop, <i>Vienna University of Technology</i>	SESSION C2L-B Acoustic & Resonant Sensors  SESSION CHAIRS E. Obermeier, <i>Technical University of Berlin</i> P. Ruther, <i>University of Freiburg</i>	SESSION C2L-C Optical (Bio)-Chemical Sensors  SESSION CHAIRS J.Y. Park, <i>Kwangwoon University</i> W. Wlodarski, <i>RMIT University</i>	SESSION C2L-D Applications of Sensors I  SESSION CHAIRS C. Pijolat, <i>EMSE</i> S. Wang, <i>Lockheed Martin</i>
Regency VI, VII	Regency V	Hanover C,D,E	Hanover F,G
<b>9:00 a.m.</b>			
DNA SENSORS BASED ON CONDUCTING POLYMERS FUNCTIONALIZED WITH CONJUGATED SIDE CHAIN H. Peng, C. Soeller, and J. Travas-Sejdic <i>University of Auckland, NEW ZEALAND</i>  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 <i>National Tsing Hua University, TAIWAN</i>  p. 587	FIBER-OPTIC-BASED CORROSION SENSOR USING OTDR J.F. Martins-Filho <sup>1</sup> , E. Fontana <sup>1</sup> , J. Guimarães <sup>1</sup> , D.F. Pizzato <sup>1</sup> , and I.J. Souza Coelho <sup>2</sup> <sup>1</sup> <i>Federal University of Pernambuco (UFPE), BRAZIL</i> and <sup>2</sup> <i>UNIVASF, BRAZIL</i>  p. 599	AN ACOUSTIC POSITION SENSING SYSTEM FOR LARGE SCALE INTERACTIVE DISPLAYS M. Reynolds <sup>1</sup> , A. Mazalek <sup>1</sup> , and G. Davenport <sup>2</sup> <sup>1</sup> <i>Georgia Institute of Technology, USA</i> and <sup>2</sup> <i>Massachusetts Institute of Technology, USA</i>  p. 611
<b>9:15 a.m.</b>			
A NOVEL NEURAL RECORDING PROBE WITH BUILT-IN LOAD SENSORS C.-C. Wen, Y.-T. Lee, S.-R. Yeh, and W. Fang <i>National Tsing Hua University, TAIWAN</i>  p. 577	CHARACTERIZATION AND NOISE ANALYSIS OF CAPACITIVE MEMS ACOUSTIC EMISSION TRANSDUCERS W. Wu, D.W. Greve, and I.J. Oppenheim <i>Carnegie Mellon University, USA</i>  p. 589	GaN QUANTUM DOTS AS OPTICAL TRANSDUCERS IN FIELD EFFECT CHEMICAL SENSORS O. Weidemann <sup>1</sup> , E. Monroy <sup>2</sup> , G. Jegert <sup>1</sup> , S. Birner <sup>1</sup> , M. Stutzmann <sup>1</sup> , and M. Eickhoff <sup>1</sup> <sup>1</sup> <i>Technische Universität München, GERMANY</i> and <sup>2</sup> <i>CEA-Grenoble, FRANCE</i>  p. 601	PROLONGED WEARABLE ECG MONITORING – A WAVELET BASED APPROACH S. Zaunseder <sup>1</sup> , W.-J. Fischer <sup>1</sup> , R. Poll <sup>2</sup> , S. Netz <sup>1</sup> , and M. Rabenau <sup>2</sup> <sup>1</sup> <i>Fraunhofer Institute for Photonic Microsystems, GERMANY</i> and <sup>2</sup> <i>Technical University of Dresden, GERMANY</i>  p. 613
<b>9:30 a.m.</b>			
SnO <sub>2</sub> NANOWIRE BIO-TRANSISTOR FOR ELECTRICAL DNA SENSING S. Todros <sup>1</sup> , C. Baratto <sup>1</sup> , E. Comini <sup>1,2</sup> , G. Faglia <sup>1</sup> , M. Ferroni <sup>1</sup> , G. Sberveglieri <sup>1,2</sup> , G. Andreano <sup>2</sup> , L. Cellai <sup>2</sup> , A. Flamini <sup>2</sup> , G. Marrazza <sup>3</sup> , A. Nannini <sup>4</sup> , G. Pennelli <sup>4</sup> , and M. Piotta <sup>4</sup> <sup>1</sup> <i>University of Brescia, CNR, ITALY</i> , <sup>3</sup> <i>University of Florence, ITALY</i> and <sup>4</sup> <i>University of Pisa, ITALY</i>  p. 579	A NOVEL MICRO RATE SENSOR USING A SURFACE-ACOUSTIC-WAVE (SAW) DELAY-LINE OSCILLATOR S.W. Lee <sup>1,2</sup> , J.W. Rhim <sup>1</sup> , S.W. Park <sup>2</sup> , and S.S. Yang <sup>2</sup> <sup>1</sup> <i>Agency for Defense Development, KOREA</i> and <sup>2</sup> <i>Ajou University, KOREA</i>  p. 591	OPTICAL TASTE SENSOR USING DYE-DOPEDED HETERO-STRUCTURED LB FILM M. Morisawa, K. Miyazawa, and S. Muto <i>University of Yamanashi, JAPAN</i>  p. 603	TESTING AND CALIBRATION OF SMART PEBBLE FOR RIVER BED SEDIMENT TRANSPORT MONITORING E. Akeila <sup>1</sup> , Z. Salcic <sup>1</sup> , N. Kularatna <sup>2</sup> , B. Melville <sup>1</sup> , and A. Dwivedi <sup>1</sup> <sup>1</sup> <i>University of Auckland, NEW ZEALAND</i> and <sup>2</sup> <i>University of Waikato, NEW ZEALAND</i>  p. 615
<b>9:45 a.m.</b>			
A COMPACT SYSTEM FOR SINGLE ION CHANNEL RECORDING M. Rossi, M. Bennati, F. Lodesani, S. Branchetti, and M. Tartagni <i>University of Bologna, ITALY</i>  p. 581	MONITORING THE EVAPORATION OF FEMTOLITER DROPLETS WITH CMOS INTEGRATED NANOMECHANICAL MASS SENSORS J. Arcamone <sup>1</sup> , T. Ondarçuhu <sup>2</sup> , E. Dujardin <sup>2</sup> , G. Rius <sup>1</sup> , and F. Pérez-Murano <sup>1</sup> <sup>1</sup> <i>CNM - IMB (CSIC), SPAIN</i> and <sup>2</sup> <i>CEMES-CNRS, FRANCE</i>  p. 593	FUNCTIONALIZED LATERAL SURFACE COATED LASERS FOR CHEM-BIO DETECTION L.L. Goddard, T.C. Bond, G.D. Cole, and E.M. Behymer <i>Lawrence Livermore National Laboratory, USA</i>  p. 605	HUMAN JOINT MOVEMENT RECOGNITION BY USING ULTRASOUND ECHO BASED ON TEST FEATURE CLASSIFIER Y. Tsutsui <sup>1</sup> , Y. Sakata <sup>1</sup> , T. Tanaka <sup>1</sup> , S. Kaneko <sup>1</sup> , and M.Q. Feng <sup>2</sup> <sup>1</sup> <i>Hokkaido University, JAPAN</i> and <sup>2</sup> <i>University of California, Irvine, USA</i>  p. 617



## TECHNICAL PROGRAM WEDNESDAY

SESSION C2L-A <i>continued</i>	SESSION C2L-B <i>continued</i>	SESSION C2L-C <i>continued</i>	SESSION C2L-D <i>continued</i>
<b>10:00 a.m.</b>			
NERVE SIGNAL MONITORING USING AN IMPLANTABLE MICROELECTRODE Y.-H. Kim <sup>1</sup> , K.-M. Ahn <sup>2</sup> , C. Lee <sup>1</sup> , Y.-J. Kim <sup>1</sup> , J.-H. Lee <sup>3</sup> , and M. Lee <sup>1</sup> <sup>1</sup> Yonsei University, KOREA, <sup>2</sup> University of Ulsan, KOREA and <sup>3</sup> Seoul National University, KOREA <b>p. 583</b>	POLYMER MASS LOADING OF CMOS/MEMS MICROSLOT CANTILEVER FOR GRAVIMETRIC SENSING S.S. Bedair and G.K. Fedder Carnegie Mellon University, USA <b>p. 595</b>	SILICON STRAIGHT TUBE FLUID DENSITY SENSOR M. Najmzadeh <sup>1</sup> , S. Haasi <sup>2</sup> , and P. Enoksson <sup>1</sup> <sup>1</sup> Chalmers University of Technology, SWEDEN and <sup>2</sup> Imego AB, SWEDEN <b>p. 607</b>	PROTOTYPE OF INFANT DROWNING PREVENTION SYSTEM AT HOME WITH WIRELESS ACCELEROMETER Y. Nishida <sup>1</sup> , K. Hiratsuka <sup>2</sup> , and H. Mizoguchi <sup>2</sup> <sup>1</sup> AIST, JAPAN and <sup>2</sup> Tokyo University of Science, JAPAN <b>p. 619</b>
<b>10:15 a.m.</b>			
A DRUG-DELIVERY PROBE WITH AN IN-LINE FLOWMETER BASED ON TRENCH REFILL AND CHEMICAL MECHANICAL POLISHING TECHNIQUES Y. Li, K. Baek, M. Gulari, and K.D. Wise University of Michigan, USA <b>p. 585</b>	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 <b>p. 597</b>	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. Ansllyn University of Texas, Austin, USA <b>p. 609</b>	2D SOUND SOURCE LOCALIZATION IN AZIMUTH & ELEVATION FROM MICROPHONE ARRAY BY USING A DIRECTIONAL PATTERN OF ELEMENT A. Ikeda <sup>1</sup> , Y. Sasaki <sup>1</sup> , S. Kagami <sup>2</sup> , H. Mizoguchi <sup>1</sup> , and T. Enomoto <sup>3</sup> <sup>1</sup> Tokyo University of Science, JAPAN, <sup>2</sup> AIST, JAPAN and <sup>3</sup> Kansai Electric Power Co. Inc., JAPAN <b>p. 621</b>
10:30 a.m.   <b>Break &amp; Exhibit Inspection</b>			
SESSION C3L-A Sensor Arrays & Parameter Modulation	SESSION C3L-B Evaluation	SESSION C3L-C Optical Chemical Sensors	SESSION C3L-D Applications of Sensors II
<b>SESSION CHAIRS</b> C. Liu, University of Illinois H. Suzuki, University of Tsukuba	<b>SESSION CHAIRS</b> P. French, Delft University S. Lee, Sungkyunkwan University	<b>SESSION CHAIRS</b> F.J. Arregui, Public University of Navarre M. Su, University of Central Florida	<b>SESSION CHAIRS</b> J.-B. Lee, University of Texas X. Wang, GE Global Research
<b>Regency VI, VII</b>	<b>Regency V</b>	<b>Hanover C,D,E</b>	<b>Hanover F,G</b>
<b>11:00 a.m.</b>			
A COMPARISON OF MULTI-TRANSDUCER ARRAYS AND SINGLE-TRANSDUCER ARRAYS FOR THE DETERMINATION OF MULTI-VAPOR MIXTURES C. Jin <sup>1</sup> , E.T. Zellers <sup>1</sup> , P. Kurzwaski <sup>2</sup> , and A. Hierlemann <sup>2</sup> <sup>1</sup> University of Michigan, USA and <sup>2</sup> ETH Zurich, SWITZERLAND <b>p. 623</b>	CHARACTERIZATION OF A NOZZLE-INTEGRATED CAPACITIVE SENSOR FOR MICROFLUIDIC JET SYSTEMS M. van der Velden, J. Wei, J.W. Spronck, R.H. Munnig Schmidt, and P.M. Sarro Delft University of Technology, THE NETHERLANDS <b>p. 635</b>	HOLLOW WAVEGUIDE GAS SENSOR FOR MID-INFRARED TRACE GAS ANALYSIS S.-S. Kim <sup>1</sup> , C. Young <sup>1</sup> , J. Chan <sup>2</sup> , C. Carter <sup>2</sup> , and B. Mizaikoff <sup>1</sup> <sup>1</sup> Georgia Institute of Technology, USA and <sup>2</sup> Lawrence Livermore National Laboratory, USA <b>p. 647</b>	A SELF-LEARNING MULTI-SENSING SELECTION PROCESS: MEASURING OBJECTS ONE BY ONE A. Golfarelli, R. Codeluppi, and M. Tartagni University of Bologna, ITALY <b>p. 659</b>
<b>11:15 a.m.</b>			
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 <b>p. 625</b>	INFLUENCE ON MOISTURE SENSOR PERFORMANCES, AND CHARACTERIZATION OF DIFFERENT SPECIFIC AREA POROUS SILICON LAYERS W. Ludurczak <sup>1</sup> , C. Pellet <sup>1</sup> , O. Garel <sup>2</sup> , E. Dufour-Gergam <sup>2</sup> , and F. Verjus <sup>3</sup> <sup>1</sup> University of Bordeaux, FRANCE, <sup>2</sup> University of Paris, FRANCE and <sup>3</sup> NXP Semiconductors, FRANCE <b>p. 637</b>	HIGH-RESPONSIVITY 2.3- $\mu$ m HETEROJUNCTION PHOTOTRANSISTOR WITH A STRAINED InAs/InGaAs MQW ABSORPTION LAYER FOR GAS SENSING H. Fukano, T. Sato, M. Mitsuahara, Y. Kondo, and H. Yasaka NTT Corporation, JAPAN <b>p. 649</b>	ROBUST ADAPTIVE ELECTRONICS FOR SENSOR CONDITIONING G. Zatorre <sup>1</sup> , N. Medrano <sup>2</sup> , M.T. Sanz <sup>2</sup> , P.A. Martínez <sup>2</sup> , S. Celma <sup>2</sup> , and J. Bolea <sup>2</sup> <sup>1</sup> Teltronic, S.A.U., SPAIN and <sup>2</sup> University of Zaragoza, SPAIN <b>p. 661</b>
<b>11:30 a.m.</b>			
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 <b>p. 627</b>	GAS PRESSURE SENSING BASED ON MEMS RESONATORS K. Brückner, V. Cimalla, F. Niebelschütz, R. Stephan, K. Tonisch, O. Ambacher, and M.A. Hein Technische Universität Ilmenau, GERMANY <b>p. 639</b>	SURFACE CUSTOMIZED OPTICAL MICRORESONATOR SENSORS FOR INTEGRATED CHIP-SCALE PORTABLE SENSING APPLICATIONS S.-Y. Cho <sup>1</sup> , G. Dobbs <sup>2</sup> , N.M. Jokerst <sup>1</sup> , and B. Mizaikoff <sup>2</sup> <sup>1</sup> Duke University, USA and <sup>2</sup> Georgia Institute of Technology, USA <b>p. 651</b>	A NEW APPROACH OF A PIEZOELECTRIC VIBRATION-BASED POWER GENERATOR TO SUPPLY NEXT GENERATION TIRE SENSOR SYSTEMS M. Keck Ilmenau Technical University, GERMANY <b>p. 663</b>

## TECHNICAL PROGRAM WEDNESDAY

SESSION C3L-A <i>continued</i>	SESSION C3L-B <i>continued</i>	SESSION C3L-C <i>continued</i>	SESSION C3L-D <i>continued</i>
<b>11:45 a.m.</b>			
IDENTIFICATION OF VAPOURS USING A SINGLE CARBON BLACK/POLYMER COMPOSITE SENSOR AND A NOVEL TEMPERATURE MODULATION TECHNIQUE T. Iwaki, J.A. Covington, and J.W. Gardner <i>University of Warwick, UK</i> <span style="float: right;">p. 629</span>	DESIGN OF AN OPTIMIZED ELECTROTHERMAL FILTER FOR A TEMPERATURE-TO-FREQUENCY CONVERTER S. Xia and K.A.A. Makinwa <i>Delft University of Technology, THE NETHERLANDS</i> <span style="float: right;">p. 641</span>	ADVANCED EMBEDDED CONTROL AND DATA ACQUISITION SYSTEMS FOR LASER-BASED QUARTZ-ENHANCED PHOTOACOUSTIC SPECTROSCOPY S.G. So, O.A. Rifai, G. Wysocki, A.A. Kosterev, and F.K. Tittel <i>Rice University, USA</i> <span style="float: right;">p. 653</span>	UNBALANCED LOAD ESTIMATION ALGORITHM USING MULTIPLE MECHANICAL MEASUREMENTS FOR HORIZONTAL WASHING MACHINES Y. Yuan, A. Buendia, R. Martin, and F. Ashrafzadeh <i>Whirlpool Corporation, USA</i> <span style="float: right;">p. 665</span>
<b>12:00 p.m.</b>			
DESIGN OF AN ELECTROCHEMICAL IMPEDANCE TEST CELL WITH SERVOMECHANICALLY ADJUSTABLE CELL CONSTANT H. Ma, J.H. Lang, and A.H. Slocum <i>Massachusetts Institute of Technology, USA</i> <span style="float: right;">p. 631</span>	SENSOR CALIBRATION OF PLANAR FOUR-CONTACT DEVICES WITH UP TO TWO EXTENDED CONTACTS M. Cornils and O. Paul <i>University of Freiburg, GERMANY</i> <span style="float: right;">p. 643</span>	OPTICAL COHERENCE-MULTIPLEXED SENSORS BASED ON IN-FIBER MICHELSON M. Jiang, Z. Guan, and S. He <i>Zhejiang University, CHINA</i> <span style="float: right;">p. 655</span>	MEASURING 6D CHIP ALIGNMENT IN MULTI-CHIP PACKAGES A. Chow, D. Hopkins, R. Ho, and R. Drost <i>Sun Microsystems Laboratories, USA</i> <span style="float: right;">p. 667</span>
<b>12:15 p.m.</b>			
THERMOPILE SENSORS FOR THE DETECTION OF AIRBORNE POLLUTANTS D.J. Lawrence, G.L. Coffman, T.C. DeVore, P.T. Olin, and W.G. Tucker <i>James Madison University, USA</i> <span style="float: right;">p. 633</span>	HIGH PRECISION IMAGE SENSOR SCALE FACTOR CALIBRATION E. Shen <sup>1</sup> , H. Mebrahtu <sup>2</sup> , W. Gao <sup>1</sup> , A. Badali <sup>1</sup> , P. Thomas <sup>3</sup> , and R. Hornsey <sup>1</sup> <sup>1</sup> York University, CANADA, <sup>2</sup> Duke University, USA and <sup>3</sup> Topaz Technology Inc., CANADA <span style="float: right;">p. 645</span>	DEVELOPMENT OF A FIBRE-OPTIC DOAS SENSOR FOR THE DETECTION OF EXHAUST GASES USING RATOMETRIC SEPARATION TECHNIQUES G. Dooly, C. Fitzpatrick, P. Chambers, and E. Lewis <i>University of Limerick, IRELAND</i> <span style="float: right;">p. 657</span>	DEVELOPMENT OF A UNIVERSAL WIRELESS SENSOR SYSTEM FOR AUTOMATED ENVIRONMENTAL EVENT MONITORING L. Yambem, M. Yapici, and J. Zou <i>Texas A&amp;M University, USA</i> <span style="float: right;">p. 669</span>


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

SPECIAL SESSION C4L-A Molecular Level Detection Mechanism for Bio & Chemical Sensors  SESSION CHAIR A. Lloyd-Spez, <i>Linköping University</i>	SPECIAL SESSION C4L-B Quantum Cascade & Mid-Infrared Laser Based Sensors  SESSION CHAIR C. Gmachl, <i>Princeton University</i>	SESSION C4L-C Preconcentrators & Spectrometers  SESSION CHAIRS D. Briand, <i>University of Neuchâtel</i> R. Okojie, <i>NASA</i>	SESSION C4L-D Sensor Systems & Actuators  SESSION CHAIRS C. van Hoof, <i>IMEC</i> S.-S. Yang, <i>Ajou University</i>
Regency VI, VII	Regency V	Hanover C,D,E	Hanover F,G
<b>2:00 p.m.</b>			
INVITED VIBRATIONAL ANALYSIS OF H <sub>2</sub> AND NH <sub>3</sub> ON Pt/SiO <sub>2</sub> AND Ir/SiO <sub>2</sub> MODEL SENSORS M. Wallin <sup>1</sup> , M. Byberg <sup>1</sup> , H. Grönbeck <sup>1</sup> , A. Lloyd Spetz <sup>2</sup> , M. Eriksson <sup>2</sup> , and M. Skoglundh <sup>1</sup> <sup>1</sup> Chalmers University of Technology, SWEDEN and <sup>2</sup> Linköping University, SWEDEN <span style="float: right;">p. 671</span>	INVITED QUANTUM CASCADE LASER BASED TRACE GAS SENSOR TECHNOLOGY: RECENT ADVANCES AND APPLICATIONS F.K. Tittel, Y. Bakhirkin, R.F. Curl, A. Kosterev, R. Lewicki, S. So, and G. Wysocki <i>Rice University, USA</i> <span style="float: right;">p. 681</span>	A FIVE-MICROVALVE FULLY INTEGRATED PRECONCENTRATOR B. Bae, J. Yeom, R.I. Masel, and M.A. Shannon <i>University of Illinois, Urbana-Champaign, USA</i> <span style="float: right;">p. 691</span>	INTEGRATED SENSING SYSTEM FOR STAMPING MONITORING CONTROL N. Mahayotsanun <sup>1</sup> , J. Cao <sup>1</sup> , M. Peshkin <sup>1</sup> , S. Sah <sup>2</sup> , R. Gao <sup>2</sup> , and C.T. Wang <sup>3</sup> <sup>1</sup> Northwestern University, USA, <sup>2</sup> University of Massachusetts, USA and <sup>3</sup> General Motors, USA <span style="float: right;">p. 703</span>
<b>2:15 p.m.</b>			
↓	↓	PRECONCENTRATING MINICOLUMN SENSORS FOR TRACE ENVIRONMENTAL MONITORING J.W. Grate <sup>1</sup> , O.B. Egorov <sup>2</sup> , R. Ozanich <sup>1</sup> , J.S. Hartman <sup>1</sup> , and M.J. O'Hara <sup>1</sup> <sup>1</sup> Pacific Northwest National Laboratory, USA and <sup>2</sup> Isoray Medical, Inc., USA <span style="float: right;">p. 693</span>	INTEGRATION OF MEMS ACTUATORS WITH MAGNETIC TUNNEL JUNCTION SENSORS G. Martinez Jaramillo, M.-L. Chan, and D.A. Horsley <i>University of California, Davis, USA</i> <span style="float: right;">p. 705</span>

## TECHNICAL PROGRAM WEDNESDAY

SPECIAL SESSION C4L-A <i>continued</i>	SPECIAL SESSION C4L-B <i>continued</i>	SESSION C4L-C <i>continued</i>	SESSION C4L-D <i>continued</i>
<b>2:30 p.m.</b>			
COMPARISON OF THE PERFORMANCES OF B-ALUMINA AND YSZ POTENTIOMETRIC GAS SENSORS FOR EXHAUST AUTOMOTIVE APPLICATION J.P. Viricelle, P. Breuil, C. Pijolat, J.C. Marchand, and G. Tournier <i>Ecole Nationale Supérieure des Minnes, FRANCE</i> p. 673	BREATH-ANALYSIS USING MID-IRRED TUNABLE LASER SPECTROSCOPY K. Namjou, C.B. Roller, and G. McMillen <i>Ekipis Technologies Inc., USA</i> p. 683	NOVEL GAS CHROMATOGRAPHIC MICRO-SYSTEM WITH VERY LARGE SENSOR ARRAYS FOR ADVANCED ODOUR DISCRIMINATION F.K. Che Harun, P.H. King, J.A. Covington, and J.W. Gardner <i>University of Warwick, UK</i> p. 695	NOVEL MICROFABRICATED BATTERIES FOR MARINE SENSORS: IN-SITU CATHOLYTE GENERATION VIA WATER ADDITION A.M. Cardenas-Valencia <sup>1</sup> , J. Bumgarner <sup>1</sup> , C.J. Biver <sup>2</sup> , J. Dlutowski <sup>2</sup> , and L. Langebrake <sup>1</sup> <sup>1</sup> <i>SRI International, USA</i> and <sup>2</sup> <i>University of South Florida, USA</i> p. 707
<b>2:45 p.m.</b>			
TIN, NIOBIUM AND VANADIUM MIXED OXIDE THIN FILMS BASED GAS SENSORS FOR CHEMICAL WARFARE AGENT ATTACKS PREVENTION E. Comini, A. Ponzoni, I. Alessandri, E. Bontempi, L.E. Depero, and G. Sberveglieri <i>Brescia University, ITALY</i> p. 675	COMPACT QUANTUM CASCADE LASER INSTRUMENT FOR RAPID HIGH SENSITIVITY MEASUREMENTS OF TRACE GASES IN AIR J.B. McManus, J.H. Shorter, D.D. Nelson, and M.S. Zahniser <i>Aerodyne Research, Inc., USA</i> p. 685	GAS DETECTION USING A MICROMACHINED FTIR SPECTROMETER D. Briand <sup>1</sup> , O. Manzardo <sup>1</sup> , J. Hildenbrand <sup>2</sup> , J. Wöllenstein <sup>2</sup> , and N.F. de Rooij <sup>1</sup> <sup>1</sup> <i>University of Neuchâtel, SWITZERLAND</i> and <sup>2</sup> <i>Fraunhofer-IPM, GERMANY</i> p. 697	CONTROL OF PLURAL NUMBER OF ARRAYED MICROVALVES USING pH-RESPONSIVE HYDROGEL J.Y. Park <sup>1</sup> , C. Liu <sup>2</sup> , and S.H. Lee <sup>1</sup> <sup>1</sup> <i>Korea University, KOREA</i> and <sup>2</sup> <i>Beijing Jiaotong University, CHINA</i> p. 709
<b>3:00 p.m.</b>			
HYDROGEN RESPONSE MECHANISM OF A PROTON PUMPING GATE FET GAS SENSOR K. Tsukada, T. Yamaguchi, T. Kiwa, and H. Yamada <i>Okayama University, JAPAN</i> p. 677	OPTIMIZING GAS SENSORS BASED ON QUANTUM CASCADE LASERS AND PHOTONIC BANDGAP HOLLOW WAVEGUIDES C. Young <sup>1</sup> , S. Hartwig <sup>2</sup> , A. Lambrecht <sup>2</sup> , S.-S. Kim <sup>1</sup> , and B. Mizaikoff <sup>1</sup> <sup>1</sup> <i>Georgia Institute of Technology, USA</i> and <sup>2</sup> <i>Fraunhofer Institute for Physical Measurement Techniques, GERMANY</i> p. 687	PHOTONIC MEMS FOR NIR <i>IN-SITU</i> GAS DETECTION AND IDENTIFICATION T.C. Bond, G.D. Cole, L.L. Goddard, and E.M. Behymer <i>Lawrence Livermore National Laboratory, USA</i> p. 699	LOW POWER, PIEZOELECTRIC MICRO MASS FLOW CONTROLLER FOR LIQUID FUEL INJECTION M. Schiffer <sup>1</sup> , C. Stefanini <sup>2</sup> , V. Manente <sup>3</sup> , P. Tunestål <sup>3</sup> , and E. Obermeier <sup>1</sup> <sup>1</sup> <i>Technical University of Berlin, GERMANY</i> , <sup>2</sup> <i>Scuola Superiore Sant'Anna, ITALY</i> and <sup>3</sup> <i>Lund Institute of Technology, SWEDEN</i> p. 711
<b>3:15 p.m.</b>			
SENSING MECHANISMS OF POLYTHIOPHENE CHEMICAL SENSORS B. Li and D.N. Lambeth <i>Carnegie Mellon University, USA</i> p. 679	MODELING AND DESIGN OF A HIGHLY COMPACT CHAOTIC CAVITY FOR OPTICAL GAS SENSING APPLICATIONS D. Qu and C. Gmachl <i>Princeton University, USA</i> p. 689	A NOVEL ION SOURCE AND DETECTOR FOR A MINIATURE MASS SPECTROMETER K.H. Gilchrist <sup>1</sup> , C.A. Bower <sup>1</sup> , S. Natarajan <sup>2</sup> , M.R. Lueck <sup>1</sup> , J.R. Piascik <sup>1</sup> , C.B. Parker <sup>2</sup> , J.T. Glass <sup>2</sup> , and B.R. Stoner <sup>1</sup> <sup>1</sup> <i>RTI International, USA</i> and <sup>2</sup> <i>Duke University, USA</i> p. 701	INDUCTIVELY COUPLED SENSOR/ACTUATOR SYSTEM FOR CLOSED-LOOP CONTROL APPLICATIONS AT HIGH TEMPERATURES AND IN AGGRESSIVE ENVIRONMENTS A. Kiefer and L.M. Reindl <i>University of Freiburg, GERMANY</i> p. 713
3:30 p.m.   <b>Break &amp; Exhibit Inspection</b>			
<b>SPECIAL SESSION C5L-A</b> The Challenges of Sensing Oxygen  <b>SESSION CHAIR</b> R. Ghosh, <i>Michigan State University</i>	<b>SESSION C5L-B</b> Acoustic/Resonant Chemical Sensors  <b>SESSION CHAIRS</b> E. Comini, <i>University of Brescia</i> C. Pijolat, <i>EMSE</i>	<b>SESSION C5L-C</b> Electrochemical Biosensors  <b>SESSION CHAIRS</b> P. Hauptmann, <i>University of Magdeburg</i> L.-P. Wang, <i>Intel</i>	<b>SESSION C5L-D</b> Physical Sensors  <b>SESSION CHAIRS</b> M. Atashbar, <i>Western Michigan University</i> O. Brand, <i>Georgia Institute of Technology</i>
<b>Regency VI, VII</b>	<b>Regency VI, VII</b>	<b>Hanover C,D,E</b>	<b>Hanover F,G</b>
<b>4:00 p.m.</b>			
<b>INVITED</b> NEW DEVELOPMENTS OF AN OPTOCHEMICAL MEASUREMENT SYSTEM FOR THE CONTINUOUS MONITORING IN SUBCUTANEOUS TISSUE BY MICRODIALYSIS A. Bizzarri, C. Konrad, M. Cajlakovic, and V. Ribitsch <i>Joanneum Research Forschungsgesellschaft mbH, AUSTRIA</i> p. 715	ODOR SENSING SYSTEM USING BALL SAW DEVICES FUNCTIONALIZED WITH SELF-ASSEMBLED LIPOPOLYMERS B. Wyszynski <sup>1</sup> , M. Sekine <sup>1</sup> , T. Nakamoto <sup>1</sup> , N. Nakaso <sup>2</sup> , and K. Noguchi <sup>2</sup> <sup>1</sup> <i>Tokyo Institute of Technology, JAPAN</i> and <sup>2</sup> <i>Toppan Printing Corporation, JAPAN</i> p. 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 <i>Georgia Institute of Technology, USA</i> p. 735	AN ENERGY HARVESTING MEMS FREQUENCY DETECTOR I. Sari, T. Balkan, and H. Kulah <i>Middle East Technical University, TURKEY</i> p. 745

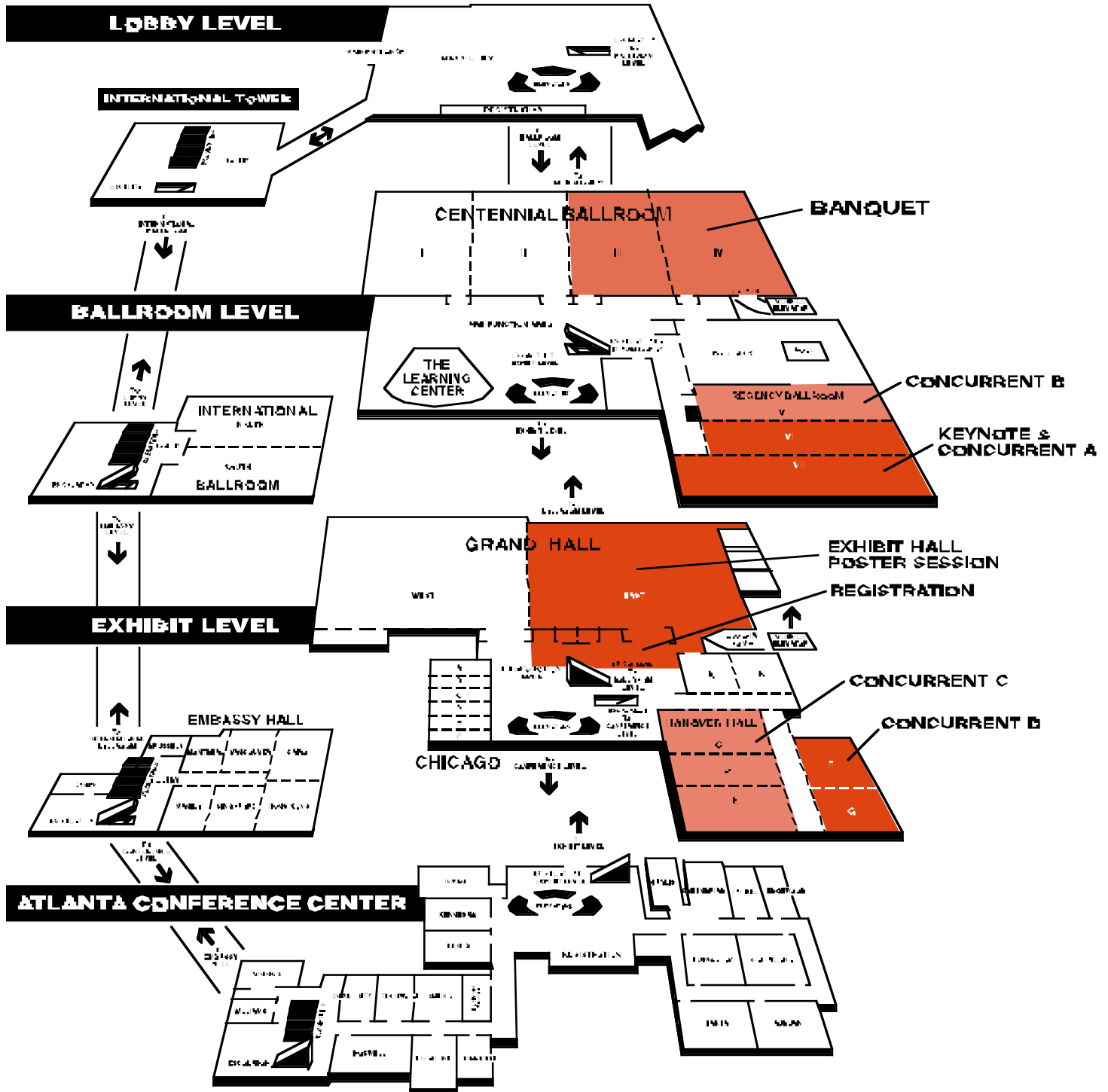
## TECHNICAL PROGRAM WEDNESDAY

SPECIAL SESSION C5L-A <i>continued</i>	SESSION C5L-B <i>continued</i>	SESSION C5L-C <i>continued</i>	SESSION C5L-D <i>continued</i>
<b>4:15 p.m.</b>			
	LIQUID-PHASE DETECTION OF ORGANOPHOSPHATES PESTICIDES USING GUIDED SH-SAW SENSOR A. Mensah-Brown <sup>1</sup> , M.J. Wenzel <sup>1</sup> , F. Josse <sup>1</sup> , E. Yaz <sup>1</sup> , and O. Sadik <sup>2</sup> <sup>1</sup> Marquette University, USA and <sup>2</sup> State University of New York at Binghamton, USA <b>p. 725</b>	A FULLY DIFFERENTIAL RAIL-TO-RAIL CAPACITANCE MEASUREMENT CIRCUIT FOR INTEGRATED CELL SENSING S.B. Prakash and P. Abshire University of Maryland, USA <b>p. 737</b>	AN AIR-COUPLED CAPACITIVE MICROMACHINED ULTRASOUND TRANSDUCER FOR NONCONTACT NONDESTRUCTIVE EVALUATION X. Wang <sup>1</sup> , Y. Fan <sup>1</sup> , W.-C. Tian <sup>1</sup> , H.-J. Kwon <sup>2</sup> , S. Kennerly <sup>1</sup> , G. Claydon <sup>1</sup> , and A. May <sup>1</sup> <sup>1</sup> GE Global Research Center, USA and <sup>2</sup> GE Sensing, USA <b>p. 747</b>
<b>4:30 p.m.</b>			
DISSOLVED OXYGEN SENSING IN A FLOW STREAM USING MOLYBDENUM CHLORIDE OPTICAL INDICATORS R. Loloee, P.A. Askeland, and R.N. Ghosh Michigan State University, USA <b>p. 717</b>	PLANO-CONVEX SHAPED LANGASITE MICROBALANCES FOR HIGH TEMPERATURE APPLICATIONS E. Ansoorge <sup>1</sup> , J. Sauerwald <sup>2</sup> , H. Fritze <sup>2</sup> , and B. Schmidt <sup>1</sup> <sup>1</sup> Otto von Guericke University Magdeburg, GERMANY and <sup>2</sup> Clausthal University of Technology, GERMANY <b>p. 727</b>	AN ELECTROCHEMICAL DOPAMINE SENSOR WITH CMOS DETECTION CIRCUIT F.-L. Zhan <sup>1</sup> , W.-Y. Chang <sup>2</sup> , L.-M. Kuo <sup>1</sup> , S.-W. Wang <sup>1</sup> , C.-H. Lin <sup>2</sup> , Y.-S. Yang <sup>2</sup> , and M.S.-C Lu <sup>1</sup> <sup>1</sup> National Tsing Hua University, TAIWAN and <sup>2</sup> National Chiao Tung University, TAIWAN <b>p. 739</b>	SMOOTH CONTACT MODE CAPACITIVE PRESSURE SENSOR WITH POLYIMIDE DIAPHRAGM J. Han, J. Yeom, J. Lee, R.I. Masel, and M.A. Shannon University of Illinois, Urbana-Champaign, USA <b>p. 749</b>
<b>4:45 p.m.</b>			
OXYGEN CONSUMPTION OF MAMMALIAN EMBRYOS AND OOCYTES MONITORED BY SCANNING ELECTROCHEMICAL MICROSCOPY H. Shiku, T. Yasukawa <sup>1</sup> , T. Matsue <sup>1</sup> , T. Ito-Sasaki <sup>1</sup> , M. Yokoo <sup>1</sup> , H. Abe <sup>1</sup> , and S. Aoyagi <sup>2</sup> <sup>1</sup> Tohoku University, JAPAN and <sup>2</sup> Hokuto Denko Co., JAPAN <b>p. 719</b>	INDIUM PHOSPHIDE RESONANT CHEMICAL SENSOR WITH A MONOLITHICALLY INTEGRATED OPTICAL READOUT SCHEME N.P. Siwak, X.Z. Fan, N. Goldsman, and R. Ghodssi University of Maryland, USA <b>p. 729</b>	LABEL-FREE DIFFERENTIAL LEUKOCYTE COUNTS USING A MICROFABRICATED, SINGLE-CELL IMPEDANCE SPECTROMETER D. Holmes, T. Sun, J. Holloway, J. Cakebread, D. Davis, and H. Morgan University of Southampton, UK <b>p. 741</b>	OPTICAL MICROPHONE STRUCTURES FABRICATED FOR BROAD BANDWIDTH AND LOW NOISE M. Okandan <sup>1</sup> , N. Hall <sup>1,2</sup> , B. Bicen <sup>2</sup> , C. Garcia <sup>2</sup> , and F.L. Degertekin <sup>2</sup> <sup>1</sup> Sandia National Laboratories, USA and <sup>2</sup> Georgia Institute of Technology, USA <b>p. 751</b>
<b>5:00 p.m.</b>			
MICROFABRICATED CLARK-TYPE SENSOR FOR MEASURING DISSOLVED OXYGEN J. Park <sup>1</sup> , J.-H. Chang <sup>1</sup> , M. Choi <sup>1</sup> , D.-Y. Lee <sup>2</sup> , Y.K. Pak <sup>2</sup> , and J.J. Pak <sup>1</sup> <sup>1</sup> Korea University, KOREA and <sup>2</sup> University of Ulsan, KOREA <b>p. 721</b>	DESIGN AND TESTING OF SINGLE AND DOUBLE SIDED CANTILEVERS FOR CHEMICAL SENSING A. Choudhury <sup>1</sup> , R. Vujanic <sup>2</sup> , P.J. Hesketh <sup>1</sup> , Z. Hu <sup>3</sup> , and T.G. Thundat <sup>3</sup> <sup>1</sup> Georgia Institute of Technology, USA <sup>2</sup> ETH Zürich, SWITZERLAND and <sup>3</sup> Oak Ridge National Laboratory, USA <b>p. 731</b>	DETECTION OF PHOTOSYSTEM I REACTION CENTERS USING CHEMICALLY DERIVATIZED HIGH ELECTRON MOBILITY TRANSISTOR S.A. Eliza <sup>1</sup> , S.K. Islam <sup>1</sup> , I. Lee <sup>2</sup> , E. Greenbaum <sup>2</sup> , M.N. Ericson <sup>2</sup> , and M.A. Khan <sup>3</sup> <sup>1</sup> University of Tennessee, USA, <sup>2</sup> Oak Ridge National Laboratory, USA and <sup>3</sup> University of South Carolina, USA <b>p. 743</b>	A MICROMECHANICAL PARYLENE SPIRAL-TUBE SENSOR AND ITS APPLICATIONS OF UNPOWERED ENVIRONMENTAL PRESSURE/TEMPERATURE SENSING P.-J. Chen and Y.-C. Tai California Institute of Technology, USA <b>p. 753</b>
<b>5:15 p.m.</b>			
	MICROFABRICATION AND CHARACTERIZATION OF SiO <sub>2</sub> MICROCANTILEVER FOR HIGH SENSITIVE MOISTURE SENSOR Q. Chen, J. Fang, H.-F. Ji, and K. Varaahramyan Louisiana Tech University, USA <b>p. 733</b>		A VERTICAL HALL DEVICE IN STANDARD SUBMICRON CMOS TECHNOLOGY J. Pascal, L. Hébrard, J.-B. Kammerer, V. Frick, and J.-P. Blondé Université Louis Pasteur, Strasbourg, FRANCE <b>p. 755</b>

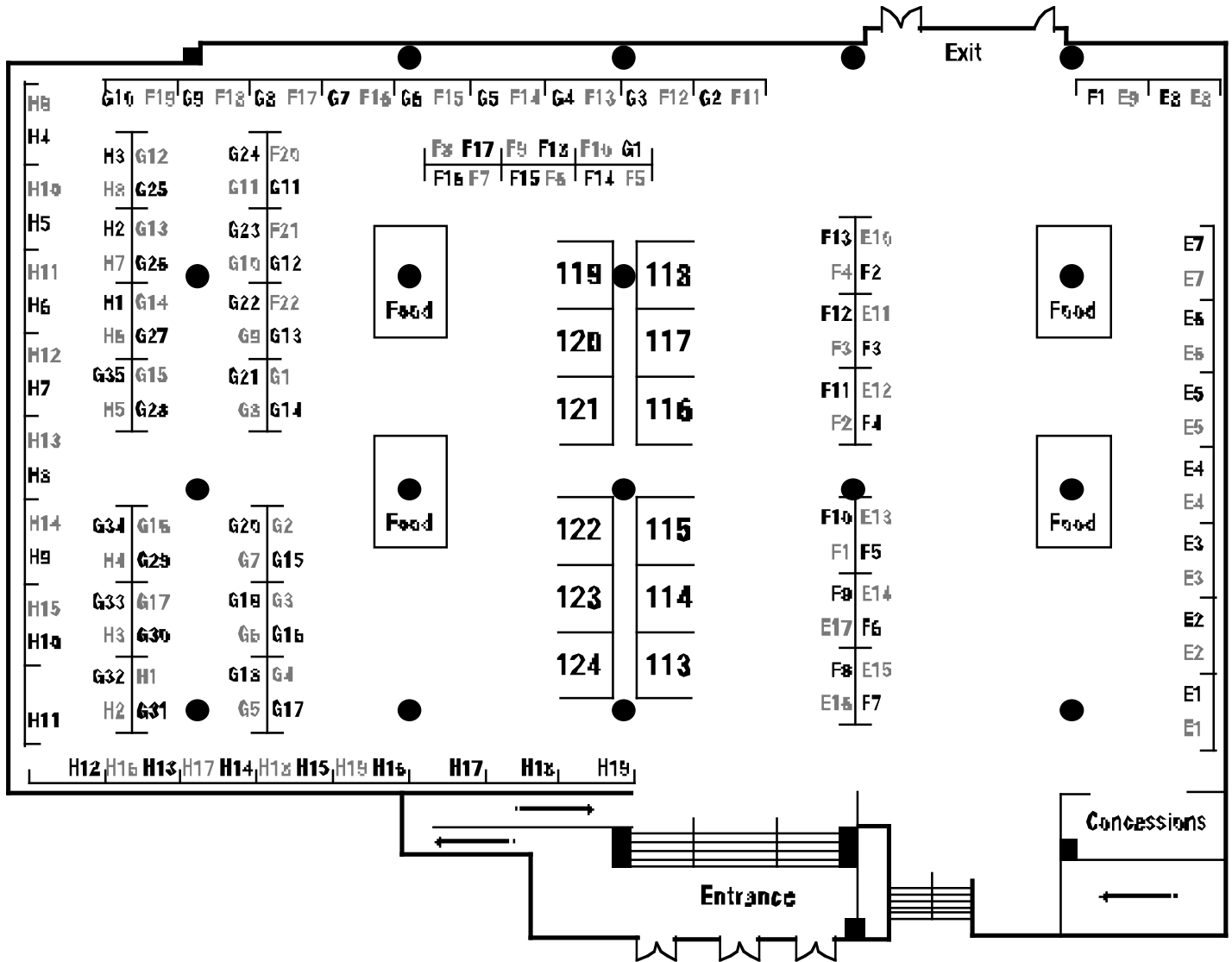
5:30 p.m.

Conference Adjourns

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