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MESSAGE FROM THE CHAIRPERSONS

Dear IEEE SENSORS 2015 participants, welcome to Busan, South Korea!

On behalf of the Organizing committee of the 14th IEEE SENSORS Conference, it is a great honor and pleasure to welcome you to the Republic of Korea and to the city of Busan, the 2nd-largest city and the #1 trading port in Korea. For the conference venue we have selected BEXCO, a world class conference & exhibition center.

IEEE SENSORS 2015 is honored to have as a technical co-sponsor the Korean Sensor Society (KSS), under the leadership of Shinwon Kang. The partnership with KSS began with the 2012 submission of a bid package to the IEEE Sensors Council for the 2015 SENSORS conference. The selection of KSS and Busan, South Korea started a long partnership, the highlight of which is the IEEE 2015 SENSORS conference.

The Korean Sensors Society is a non-profit, non-political, and learned society in the ROK with a 24-year history that supports scientific activities in sensor- and actuator-related sciences including readout and control circuit technologies. KSS supports an annual national conference and symposium, and publishes *Journal of Sensor Science and Technology* published in Korean and English, respectively.

2015 is a year of firsts for IEEE SENSORS, with several exciting additions to the conference: (1) a full-day Industry Program organized by Industry committee chairs Chae Deok Lee and Sri Chandrasekaran; (2) live sensor demonstrations under the leadership of Sandro Carrara; (3) technical tours on Thursday following the conference, organized by committee chair Seok Jin Yoon and local chair Wan-Young Chung; and (4) extensive Social Media communications led by social media chair Frederick Livingston. Following the success of recent years, a Young Professionals reception will again be held on Monday afternoon, hosted by Sensors Council Young Professionals Rep Sinead O'Keefe and other Council leaders. If you are within 15 years of your first degree please join us for this networking event.

The number of abstract submissions, 950++, is close to the all-time record of 1092 (2009). The acceptance rate is <60%. Of the 533 accepted papers, 272 will be presented in oral and 261 in poster sessions. Poster and oral paper submissions went through identical peer reviews. The papers are presented as a poster or paper depending on where the paper best fits into the technical program.

The success of a conference depends not only on the technical program but also on the social program. The highlights of this year's social program will be the welcome reception at the Paradise hotel on the beautiful Haeundae Beach. The BEXCO Center was chosen for the exceptional banquet facilities accommodating the large number of dinner guests, and the live entertainment stage and sound equipment. Banquet entertainment includes a local mix of three Korean performances; Lion Dance, Korean traditional performance with 4 different musical instruments and also mixture of Korean traditional songs and dance with b-boying.

Thanks to all the volunteers who contributed! The technical core of the conference excels because of the authors who are sharing their technical research and knowledge with the professional community. However, the reality of IEEE SENSORS 2015 is due to the dedication of more than 270 volunteers that have worked for years to bring this conference to kick off in Busan. The Technical Program Committee (TPC) alone consisted of 220 volunteers. We especially appreciate the efforts of our Technical Program Chairs: Srinivas Tadigadapa and Junghoon Lee. Please review the following pages to see the list of other significant contributors, including 26 track chairs, chairs of Tutorials, Special Sessions, Publicity, Exhibits, Student Paper Awards, Publications, and Fundraising, as well as the Conference Treasurers and Secretary.

We wish to recognize and sincerely thank our esteemed Keynote Speakers: Dr. Suntae Jung of Samsung Electronics, Korea; Prof. Uwe D. Hanebeck of Karlsruhe Institute of Technology, Germany; and Prof. Andrew Cleland of University of Chicago, USA; whose participation in this conference is invaluable. We appreciate their expertise and willingness to share their time with us in Busan, and look forward to their stimulating visionary talks with great anticipation.

We also wish to thank the professional conference organizers of Conference Catalysts, LLC, under the leadership of Chris Dyer. Lauren Pasquarelli served as the Conference Catalysts lead for this conference, and everyone involved appreciates her focus and determination to keep this conference on schedule and within budget.

IEEE has more than 426,000 members in more than 160 countries worldwide, more than 117,000 student members. IEEE has 39 societies and six technical councils representing the wide range of IEEE Technical interests. IEEE SENSORS conference is sponsored by the IEEE Sensors Council, which has 26 member IEEE Societies. The Council is a multidisciplinary technical area of mutual interest, which promotes the sensors field primarily through conferences and publications.

IEEE SENSORS is the flagship conference of the IEEE Sensors Council. The international location rotates geographically on a three year cycle; 1. Asia/Pacific, 2. Americas, 3. Europe/Africa. Next year, IEEE SENSORS will be held in Orlando, FL, USA, 3 to 6 November 2016. In 2017, IEEE SENSORS will be held in Glasgow Scotland. We hope to see you in Orlando & Glasgow!

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General Co-Chair

Srinivas Tadigadapa
Technical Program Co-Chair

Junghoon Lee
Technical Program Co-Chair

GENERAL INFORMATION

Registration & Information Desk

The Registration and Information Desk is located in the 1F lobby.
Registration hours:

Sunday, November 1	7:30 -18:00
Monday, November 2	7:30 -18:00
Tuesday, November 3	8:00 -18:00
Wednesday, November 4	8:00 -17:30

Meeting Room Locations

Concurrent Sessions A: Room 201
Concurrent Sessions B: Room 202
Concurrent Sessions C: Room 203
Concurrent Sessions D: Room 204
Concurrent Sessions E: Room 206
Concurrent Sessions F: Room 207
Concurrent Sessions G: Room 208
Poster Sessions: Rooms 101-110

Name Badges

Name badges are required for access to all Conference events.

Electronic Proceedings

One copy of the electronic proceedings will be provided to each attendee on a flash drive. Additional copies may be purchased at the Conference registration desk. The purchase price of the electronic proceedings will increase after the Conference, so be sure to order your additional copies in advance. In addition to the proceedings on the flash drive, a download option is also available to attendees during the week of the Conference.

Message and Job Market Board

The Message and Job Market Board will be located near the Conference registration desk. Posting is allowed by job seekers. Recruiters are not allowed to post.

Conference Attire

Attire during the duration of the Conference is business casual.

Coffee Breaks

Coffee and light snacks are available each morning and afternoon to registered attendees. Conference breaks are located in the 2F lobby.

Lunches

Lunch is provided each day to Conference registrants in the 3F Grand Ballroom. Tickets are provided in attendee badges. Attendees are required to remit a valid lunch ticket for entrance.

Cellular Phones

As a courtesy to fellow attendees, please silence electronic devices.

WiFi

WiFi access is available to attendees. Login information is available at registration.

GENERAL INFORMATION

Local Information

The Busan Tourism Organization and Korea Tourism Organization booths are located on the 1F and will be open during registration hours.

Smoking

BEXCO is a non-smoking facility. Please use designated smoking areas outside the building.

Restrooms

Restrooms are located on each floor. Refer to the venue map for additional information.

Social Media

Capture the spirit of IEEE SENSORS 2015 in a Tweet using #IEEESENSORS for the chance to win a set of Sony – EX Series Earbud Headphones. Two prizes available daily.

Conference App

Download the IEEE SENSORS 2015 app to enhance your Conference experience. The app is available for Android, iOS, Windows Phone and Amazon Kindle Fire. Search for “Conference4Me” to download the app then sync the IEEE SENSORS 2015 schedule.

Exhibits

Exhibits are located in the 2F Lobby. Exhibit hours:

Monday, November 2 – 08:30-18:00

Tuesday, November 3 – 08:30-17:30

Wednesday, November 4 – 08:30-16:00

SOCIAL PROGRAM

SUNDAY, NOVEMBER 1

Event: Tutorial Lunch

Time: 13:10-14:10

Location: BEXCO Room 202

**Available to tutorial registrants only*

Event: Welcome Reception

Time: 18:00-20:00

Location: Paradise Hotel Busan

The Paradise Hotel Busan is located in Busan's Haeundae Beach area, where the skies and ocean meet. Attendees will have the opportunity to enjoy the outdoor area (weather permitting) so please dress accordingly. Please note that transportation is not provided. Directions are included in the attendee bag.

MONDAY, NOVEMBER 2

Event: Conference Lunch

Time: 11:30-12:30

Location: BEXCO Grand Ballroom

Event: Young Professionals Reception

Time: 18:00-19:00

Location: BEXCO 211-212

Young Professionals are defined as post-Student members who are within 15 years of receiving their first professional degree. Join us for refreshments, hors d'oeuvres and networking.

TUESDAY, NOVEMBER 3

Event: Conference Lunch & Awards

Time: 11:30-12:30

Location: BEXCO Grand Ballroom

Event: Banquet Dinner

Time: 18:30-22:00

Location: BEXCO Grand Ballroom

IEEE SENSORS 2015 will host a Conference Banquet on Tuesday, November 3. The Banquet will be held at BEXCO and will feature local entertainment and cuisine. Entertainment will be provided by the well-known performance group Namsannorimadang. They will perform three traditional dances including Saja-chum, Poongmul-Pangood, and modern combination of hip-hop and Poongmul.

Your paid registration fee includes one banquet ticket. Guest tickets can be purchased for \$80.00 USD each at the Registration Desk.

WEDNESDAY, NOVEMBER 4

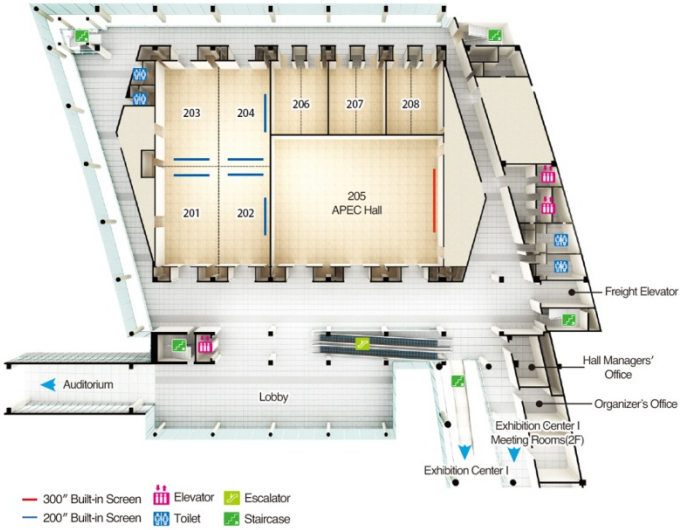
Event: Conference Lunch

Time: 11:30-12:30

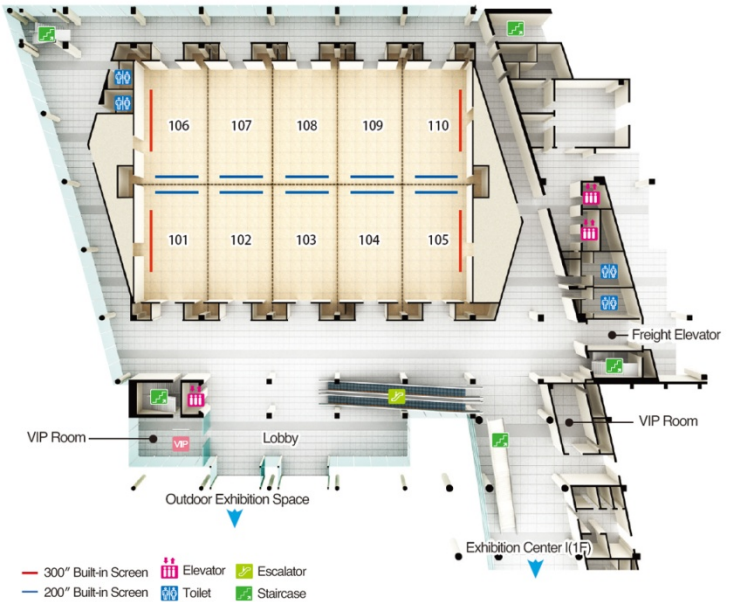
Location: BEXCO Grand Ballroom

BEXCO FLOOR PLAN

1st Floor

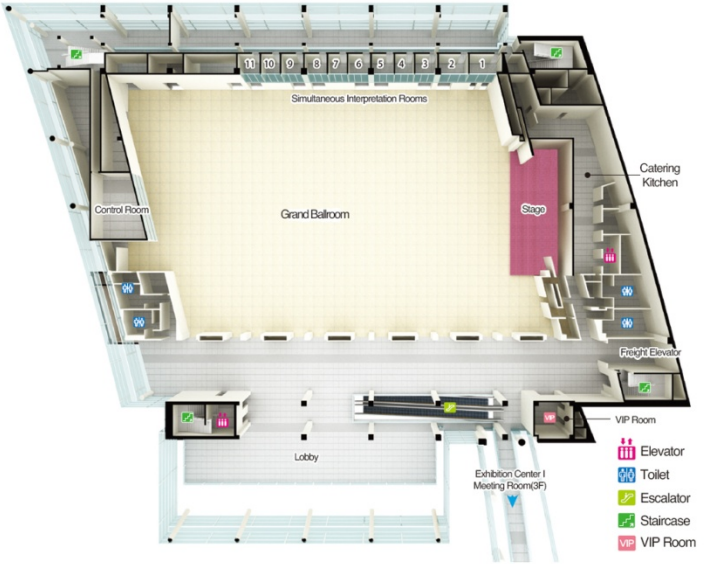


2nd Floor



BEXCO FLOOR PLAN

3rd Floor



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<http://iot.ieee.org/>



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<http://www.evgroup.com/en/>



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<http://www.senko.co.kr/en/>



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http://www.kofst.or.kr/kofst_us/index.html



<http://www.visitkorea.or.kr/intro.html>



<http://www.bto.or.kr/eng/main/main.php>

TECHNICAL PROGRAM INFORMATION

The technical program consists of three Keynote Sessions, six parallel Lecture/Special Sessions of contributed papers, and three 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*: **B2L-A**

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

A = Monday; **B** = Tuesday; **C** = Wednesday

The second character (i.e., 2) indicates the session time:

1 = morning; **2** = mid-morning; **3** = afternoon; **4** = late-afternoon

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

L = Lecture Session **P** = Poster Session

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

A= Room 201
B= Room 202
C= Room 203
D= Room 204
E= Room 206
F= Room 207
G= Room 208

TECHNICAL PROGRAM - POSTER INFORMATION

Three poster sessions will be held in rooms 101-110 after the lunch each day on Monday, Tuesday, and Wednesday. Posters will be on display for the duration of the conference 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 presented.

Each poster in the technical program is assigned a unique number, which clearly indicates the paper track 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:

1-35

Paper Title

The first number indicates the paper track:

- | | |
|----|--|
| 1 | Phenomena, Modeling and Evaluation |
| 2 | Chemical and Gas Sensors |
| 3 | Biosensors |
| 4 | Optical Sensors |
| 5 | Mechanical, Magnetic, and Physical Sensors |
| 6 | Sensor/Actuator Systems |
| 7 | Sensor Networks |
| 8 | Applications |
| 9 | Other Sensor Topics - Materials, Processes, Circuits, Signals & Interfaces, etc. |
| 13 | Late News |
| 15 | Open Poster |

The second number indicates the board location. Please refer to the poster board layout handout in the attendee bag.

SENSORS JOURNAL

The *IEEE Sensors Journal* is a peer-reviewed scientific journal covering research on sensors and sensing phenomena. It is published monthly on-line and bi-monthly in print by the IEEE Sensors Council. According to the Journal Citation Reports, the *IEEE Sensors Journal* has a 2014 impact factor of 1.852. The average time for making an editorial decision on regular papers is just below 2 months.

The topics of interest of the *IEEE Sensors Journal* include:

“all types of sensing: mechanical, thermal, optical, magnetic, radiation, microwave, chemical, biological, mass, etc., both on the macro and micro levels. Also of interest are sensor packaging, interconnection, modeling, wireless sensing, CAD, stability (e.g., noise), characterization, sensor signal processing, sensor arrays (e.g., e-nose), sensor systems, intelligent sensors, sensor actuators, and applications.”

SUBMISSION: Submissions, original papers only, are to be made electronically through IEEE Manuscript Central, over its Webpage. This site contains instructions on how authors proceed with a submission. Please do not send submissions or revisions directly to the Editor-in-Chief or Associate Editors: mc.manuscriptcentral.com/sensors

Authors are required to prepare manuscripts employing the double column style template developed by IEEE. Information for authors, on article preparation and submission, templates, etc. can be found at: www.ieee-sensors.org/information-for-authors The *IEEE Sensors Journal* does not republish papers that have appeared in conference proceedings unless the paper has been expanded; i.e., unless the paper contains substantial new material. (See the special instructions for expanding conference papers on our website). The IEEE Sensors Journal also publishes “letters”.

www.ieee-sensors.org/journals

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**The Professional Development Track will include Journal author and reviewer training sessions*

PRESENTATION DOWNLOADS

Because of the parallel sessions, IEEE SENSORS 2015 participants will probably miss some important presentations they would have liked to see. Therefore, as an extra benefit for conference participants, about 200* presentations are being recorded (with the presenters' consent). The recordings consist of the authors' slides and voice (no video).

The recordings are available for downloading, free to conference attendees only, from the day after the presentation until noon, Eastern USA time, Monday, 9 November. Last year, more than 14,000 presentations were downloaded by attendees; 529 of the attendees downloaded at least one presentation.

The presentations may be downloaded until Monday, November 9 at <http://ieee-sensors2015online.org/>

After 9 November, the plan is to make the recorded presentations available in IEEE Xplore together with the customary proceedings articles.

** We regret that poster papers and presentations by authors who opted out of being recorded will not be available for downloading. Authors who opted out and now wish to be recorded - please sign a new copyright form at least a half day before your talk, at the registration desk, and we will try to add your paper to the list of papers to be recorded.*

NEW FOR 2015: DEMOS

This year's program will include Live Demonstrations. Demos give attendees the opportunity to have an interactive experience with new technological devices. Demonstrations will reveal the essence of the research and provide further understanding for attendees.

Demos will be on Monday, November 1 during the poster session. The letter preceding the demo indicates the demo position.

13:00 - 14:30

A3P-R: LIVE DEMONSTRATIONS

SPECIAL POSTERS

SESSION CHAIR: Sandro Carrara (EPFL)

A: MODULAR MULTI-RADIO WIRELESS SENSOR PLATFORM WITH PLUG&PLAY MODULES CONNECTION

*Konstantin Mikhaylov, Juha Petäjälä, Marko Mäkeläinen, Anton Paatelma, Tuomo Hänninen
University of Oulu, Finland*

B: PROSTHETIC HANDS CONTROLLED WITH A HIGHLY USABLE SEMG SENSOR

*Shintaro Sakoda, Yoshiko Yabuki, Yinlai Jiang
University of Electro-Communications, Japan*

C: UPPER LIMB PROSTHETIC CONTROL USING TOE GESTURE SENSORS AND VARIOUS TOUCH INTERFACES

*Ravinder Dahiya
University of Glasgow, United Kingdom*

D: LIVE DEMONSTRATION OF A MUTUAL-CAPACITIVE TOUCH SENSOR ROIC USING A PLL TO REDUCE LCD NOISE BY SYNCHRONIZING ROIC TX CLOCK TO LCD CLOCK

*Dong-Hee Yeo, Seon-Ho Kim, Hyeon-Kyu Noh, Jae-Yoon Sim, Byungsup Kim, Hong-June Park
Pohang University of Science and Technology, South Korea*

E: MICROSYSTEM INTEGRATION OF A PALLADIUM-BASED MEMS HYDROGEN GAS SENSOR

(related conference paper ID 1704)

*Thomas Walewyns⁽²⁾, Carl Emmerechts⁽¹⁾, Pierre Gérard⁽²⁾, Nicolas André⁽²⁾, Laurent A. Francis⁽²⁾
⁽¹⁾Sirris, Belgium; ⁽²⁾Université Catholique de Louvain, Belgium*

F: RIPPLE SORT' ALGORITHM, CIRCUIT IMPLEMENTATION AND VERIFICATION USING VHDL SYNTHESISABLE TESTBENCH VERIFICATION TECHNIQUE

*Ching Man⁽¹⁾, Elfed Lewis⁽²⁾, Brian Moss⁽²⁾
⁽¹⁾Analog Devices, Inc. / University Of Limerick, Ireland; ⁽²⁾University of Limerick, Ireland*

G: LDV_UPI System for Structural Health Monitoring of Composite Material

Thanh Chung Truong⁽²⁾, Jae-Yoon Park⁽²⁾, Jae Kyeong Jang⁽¹⁾, Jung Ryul Lee⁽²⁾

⁽¹⁾Chonbuk National University, Korea; ⁽²⁾Korea Advanced Institute of Science and Technology, Korea

H: CMOS BEOL-EMBEDDED 3-AXIS ACCELEROMETER

Piotr Michalik⁽²⁾, Josep Maria Sánchez-Chiva⁽²⁾, Daniel Fernández⁽¹⁾, Jordi Madrenas⁽²⁾

⁽¹⁾Nanusens, Spain; ⁽²⁾Universitat Politecnica de Catalunya, Spain

I: A NEW ADAPTIVE FRONT-END READOUT CIRCUIT FOR HIGH-RESOLUTION MAGNETIC SCALES

Ping-Chieh Chien, Yung-Hua Kao, Hong-Yang Chen, Jing-Hao Huang, Paul C.-P. Chao, Chin-Long Wey

National Chiao Tung University, Taiwan

NEW FOR 2015: PROFESSIONAL DEVELOPMENT PROGRAM

The Professional Development Program will be held on Tuesday, November 3.

14:00-15:30

Professional Development Program I
Room 208

14:00 - SENSORS COUNCIL AWARDS PROGRAM

Mike McShane (Council Awards Chair)

14:15 - IEEE FELLOWS PROGRAM

Gianluca Lazzi (Council Fellows Committee Chair) & Troy Nagle (Council President)

14:30 - YOUNG PROFESSIONALS PROGRAM

Sinead O'Keeffe (Council Young Professionals Chair)

14:45 - ORGANIZING COUNCIL CHAPTERS

Ramesh Ramadoss (San Francisco Bay Area Council Chapter Chair) & Hulya Kirkici (Council Distinguished Lecturer Program Chair)

15:00 - MENTORING ROUNDTABLE

Sharon Peng (Harman International, USA) & Chris Schober (IEEE SENSORS 2015 General Co-Chair) & Jill Gostin (Council Secretary – Treasurer)

16:00-17:30

Professional Development Program II
Room 208

16:00 - ORGANIZING GREAT CONFERENCES

Yu-Cheng Lin (Council VP Conferences)

16:30 - SENSORS COUNCIL STANDARDS INITIATIVE

Sri Chandrasekaran (IEEE-SA, India)

16:45 - SOLICITING & TRAINING JOURNAL REVIEWERS

Krikor Ozanyan (Sensors Journal Editor-in-Chief)

17:00 - AUTHOR TRAINING FOR JOURNALS AND CONFERENCE PROCEEDINGS

John Vig (Council VP Publications)

NEW FOR 2015: INDUSTRY TRACK

New this year: Industry Track will be held on Wednesday, November 4.

10:00-11:30
INDUSTRY TRACK I
ROOM 208

10:00
LOWER POWER, BATTERY OPERATED WIRELESS SENSING
OPTIONS
Jim Philipp (Murata, USA)

10:45
WEARABLE LOW-POWER SENSORS
Veena Misra (NCSU/NSF – ASSIST, USA)

11:30-12:30
LUNCH/PANEL ON WEARABLE TECHNOLOGIES
GRAND BALLROOM

Moderator: Veena Misra (NCSU/NSF – ASSIST, USA)
Gerry Hayes (Wireless Center of NC, USA)
Brian Kim (RaonTech, Korea)
Younghyun Kim (Samsung Electronics, Korea)
Brian Carrigan (Smashing Boxes, USA)
Jan Svoboda (Firefly Solutions, USA)

14:00-15:30
INDUSTRY TRACK II
ROOM 208

14:00-14:30
SENSORS ACTIVITIES AT MEMS INDUSTRY GROUP (MIG) & IEEE
2700 (SENSOR PERFORMANCE)
Michael Gaitan (MIG/NIST, USA)

14:30-15:00
SMART SENSOR AND NETWORK INTERFACES TO IOT IN SUPPORT
OF BIG DATA
John L. Schmalzel (Rowan University, USA)

15:00-15:30
STANDARDS: IEEE P2413 – ARCHITECTURAL FRAMEWORK FOR
INTERNET OF THINGS
Sri Chandrasekaran (IEEE-SA, India)

16:00-17:30
STANDARDS PANEL
ROOM 208

Moderator: Gerry Hayes (Wireless Center of NC, USA)
Jim Philipp (Murata, USA)
Mike Gaitan (NIST/MIG, USA)
Younghyun Kim (Samsung, Korea)

SESSION GRID: SUNDAY, NOVEMBER 1

	Room 201	Room 202	Room 203	Room 204	Room 206	Room 207	Room 208
0800-1730	REGISTRATION						
0800-0830	INSTRUCTORS' BREAKFAST Room 207						
0830-0930					TUTORIAL 1: Next generation telecom fibers - new opportunities for optical fiber sensing, Marco Petrovich		
0940-1040					TUTORIAL 2: Thermal ablation of tumors: an emerging application for sensors, Daniele Tosi		
1040-1100	MORNING BREAK						
1100-1200					TUTORIAL 3: Optical fiber sensing technologies based on sensitive thin films and coatings, Minghong Yang		
1210-1310					TUTORIAL 4: Hyperspectral Imaging: fundamentals and case studies, Silvia Serranti & Giuseppe Bonifazi		
1310-1410	LUNCH Room 202						
1410-1510					TUTORIAL 5: Sensing in extreme environments, Alton Horsfall		
1520-1620					TUTORIAL 6: Screen printed sensors, John K. Atkinson		
1630-1730					TUTORIAL 7: Air-microfluidics: an introduction to theory and applications, Igor Paprotny		
Evening	WELCOME RECEPTION <i>Paradise Hotel</i> 1800-2000						

SESSION GRID: MONDAY, NOVEMBER 2

	Room 201	Room 202	Room 203	Room 204	Room 206	Room 207	Room 208
0800-1800	REGISTRATION						
0800-0830	SPEAKERS' BREAKFAST Room 211-212						
0830-0900	Opening Session Grand Ballroom						
0900-1000	A1L-A: KEYNOTE: Uwe Hanebeck "Hot Topics in Multisensor Data Fusion" Grand Ballroom						
1000-1030	MORNING BREAK						
1030-1200	A2L-A: Chemical and fuel-cell Applications <i>Track: Applications</i>	A2L-B: SPECIAL SESSION: Structural Sensing <i>Track: SPECIAL SESSIONS</i>	A2L-C: Optical Sensing Applications I <i>Track: Applications</i>	A2L-D: Optical Chemical Sensor Systems <i>Track: Chemical and Gas Sensors</i>	A2L-E: Immunosensors <i>Track: Biosensors</i>	A2L-F: Physical Sensor System <i>Track: Sensor/Actuator Systems</i>	A2L-G: Student Award Competition Presentations
1200-1300	LUNCH Grand Ballroom						
1300-1430	Poster Session: A3P-G - A3P-Q Rooms 101-110						
1430-1600	A4L-A: Printed and Flexible Chemical Sensors <i>Track: Chemical and Gas Sensors</i>	A4L-B: Accelerometers <i>Track: Mechanical, Magnetic, and Physical Sensors</i>	A4L-C: Motion and Location Tracking <i>Track: Applications</i>	A4L-D: Optical Sensor Systems <i>Track: Optical Sensors</i>	A4L-E: Physical Biosensors <i>Track: Biosensors</i>	A4L-F: Inertial Sensor System <i>Track: Sensor/Actuator Systems</i>	
1600-1630	AFTERNOON BREAK						
1630-1800	A5L-A: Metal Oxide Gas Sensors <i>Track: Chemical and Gas Sensors</i>	A5L-B: Gyroscope & Resonators <i>Track: Mechanical, Magnetic, and Physical Sensors</i>	A5L-C: Fluidic Systems <i>Track: Applications</i>	A5L-D: Fiber Optic Sensors <i>Track: Optical Sensors</i>	A5L-E: Cell-based Biosensors <i>Track: Biosensors</i>	A5L-F: Multi-sensor and Sensor-network Systems <i>Track: Applications</i>	
Evening	YOUNG PROFESSIONALS RECEPTION 1800-1900						

SESSION GRID: TUESDAY, NOVEMBER 3

	Room 201	Room 202	Room 203	Room 204	Room 206	Room 207	Room 208
0800-1800	REGISTRATION						
0800-0830	SPEAKERS' BREAKFAST Room 211-212						
0830-0930	B1L-A: KEYNOTE: Andrew Cleland "Mechanical Systems in the Quantum Limit" Grand Ballroom						
0930-1000	MORNING BREAK						
1000-1130	B2L-A: Advanced Materials or Architectures for Chemical Sensing <i>Track: Chemical and Gas Sensors</i>	B2L-B: Ultrasonic, Acoustic, Magnetic Sensors <i>Track: Mechanical, Magnetic, and Physical Sensors</i>	B2L-C: Force and Pressure Based Sensing Applications <i>Track: Applications</i>	B2L-D: Optical Sensing <i>Track: Optical Sensors</i>	B2L-E: Electrochemical Biosensors <i>Track: Biosensors</i>	B2L-F: Sensors Readout/Interface/Circuits I <i>Track: Other Sensor Topics - Materials, Processes, Circuits, Signals & Interfaces, etc.</i>	
1130-1230	LUNCH & AWARDS Grand Ballroom						
1230-1400	Poster Session: B3P-G - B3P-Q Rooms 101-110						
1400-1530	B4L-A: Electrochemical Sensors <i>Track: Chemical and Gas Sensors</i>	B4L-B: Pressure & Strain Sensors <i>Track: Mechanical, Magnetic, and Physical Sensors</i>	B4L-C: Acoustic Structures <i>Track: Phenomena, Modeling and Evaluation</i>	B4L-D: Optical Biosensors <i>Track: Biosensors</i>	B4L-E: Chemical & Bio Sensor System <i>Track: Sensor/Actuator Systems</i>	B4L-F: Sensors Readout/Interface/Circuits II <i>Track: Other Sensor Topics - Materials, Processes, Circuits, Signals & Interfaces, etc.</i>	B4L-G: Professional Development Program I <i>Track: Professional Development</i>
1530-1600	AFTERNOON BREAK						
1600-1730	B5L-A: Acoustic Wave Chemicals Sensors <i>Track: Chemical and Gas Sensors</i>	B5L-B: Physical Sensors I <i>Track: Mechanical, Magnetic, and Physical Sensors</i>	B5L-C: Methods/Characterization/Systems <i>Track: Other Sensor Topics - Materials, Processes, Circuits, Signals & Interfaces, etc.</i>	B5L-D: Imaging Sensors <i>Track: Optical Sensors</i>	B5L-E: Applications in Agriculture and the Environment <i>Track: Applications</i>	B5L-F: Electronics <i>Track: Applications</i>	B5L-G: Professional Development Program II <i>Track: Professional Development</i>
Evening	CONFERENCE BANQUET BEXCO Grand Ballroom Featuring Korean Entertainment 1830-2200						

SESSION GRID: WEDNESDAY, NOVEMBER 4

	Room 201	Room 202	Room 203	Room 204	Room 206	Room 207	Room 208
0800-1730	REGISTRATION						
0800-0830	SPEAKERS' BREAKFAST Room 211-212						
0830-0930	C1L-A: KEYNOTE: Suntae Jung "Sensing Technology for Upcoming Healthcare System" Grand Ballroom						
0930-1000	MORNING BREAK						
1000-1130	C2L-A: SPECIAL SESSION: 3D Printed Sensors & Actuators <i>Track: SPECIAL SESSIONS</i>	C2L-B: Environmental Sensors <i>Track: Mechanical, Magnetic, and Physical Sensors</i>	C2L-C: Modeling and Simulation of Novel Devices <i>Track: Phenomena, Modeling and Evaluation</i>	C2L-D: Photodiodes & Photodetectors Based Sensors I <i>Track: Optical Sensors</i>	C2L-E: Application and Energy Management <i>Track: Sensor Networks</i>	C2L-F: Devices/Systems I <i>Track: Other Sensor Topics - Materials, Processes, Circuits, Signals & Interfaces, etc.</i>	C2L-G: Industry Track I <i>Track: Industry</i>
1130-1230	LUNCH Grand Ballroom Panel discussion on wearable technologies (engagement with local experts)						
1230-1400	Poster Session: C3P-G - C3P-P Rooms 101-110						
1400-1530	C4L-A: Fabrication/Technology I <i>Track: Other Sensor Topics - Materials, Processes, Circuits, Signals & Interfaces, etc.</i>	C4L-B: Tactile Sensors & Smart Skin <i>Track: Mechanical, Magnetic, and Physical Sensors</i>	C4L-C: Theory and New Approach <i>Track: Sensor Networks</i>	C4L-D: Photodiodes & Photodetectors Based Sensors II <i>Track: Optical Sensors</i>	C4L-E: Energy & Power Systems <i>Track: Other Sensor Topics - Materials, Processes, Circuits, Signals & Interfaces, etc.</i>	C4L-F: Devices/Systems II <i>Track: Other Sensor Topics - Materials, Processes, Circuits, Signals & Interfaces, etc.</i>	C4L-G: Industry Track II <i>Track: Industry</i>
1530-1600	AFTERNOON BREAK						
1600-1730	CSL-A: Biological & Chemical Sensors <i>Track: Chemical and Gas Sensors</i>	CSL-B: Physical Sensors II <i>Track: Mechanical, Magnetic, and Physical Sensors</i>		CSL-D: Human Activity Monitoring <i>Track: Applications</i>		CSL-F: Sensor Packaging <i>Track: Other Sensor Topics - Materials, Processes, Circuits, Signals & Interfaces, etc.</i>	CSL-G: Standards Panel <i>Track: Industry</i>

KEYNOTE SPEAKERS

Monday, November 2

Uwe Hanebeck, Karlsruhe Inst. of Technology
"Hot Topics in Multisensor Data Fusion"

Several hot topics of high practical relevance in the context of recursive estimation of states and parameters based on data from multiple sensors will be discussed. First, new types of nonlinear Kalman filters based on optimal deterministic sampling approximations of continuous density functions are shown. These filters provide an adjustable tradeoff between estimation quality and computational complexity. They also allow the optimal estimation of periodic quantities, such as angles or orientations. Second, the direct fusion of two estimates characterized by data points only is discussed. This is a practically relevant problem, as often no further knowledge about the estimates is available. It arises, e.g., when fusing the output of two particle filters. Third, when tracking multiple objects with high-resolution sensors, the problem of associating sensor data with objects and object parts arises. In this talk, I will argue for association-free methods that never explicitly associate sensor data with objects and provide high-quality estimates with a low computational complexity.

All methods are based on a new distance measure between probability density functions. This distance can handle a comparison between arbitrary continuous and discrete densities, in particular between empirical distributions. It can efficiently be computed and is continuously differentiable, which makes it useful for optimization purposes. Some application examples such as object tracking for belt sorting of bulk material, person tracking in extended range telepresence systems, and surface reconstruction in beating heart surgery will be shown.

Uwe D. Hanebeck is a chaired professor of Computer Science at the Karlsruhe Institute of Technology (KIT) in Germany and director of the Intelligent Sensor-Actuator-Systems Laboratory (ISAS). Since 2005, he is the chairman of the Research Training Group RTG 1194 "Self-Organizing Sensor-Actuator-Networks" financed by the German Research Foundation. Prof. Hanebeck obtained his Ph.D. degree in 1997 and his habilitation degree in 2003, both in Electrical Engineering from the Technical University in Munich, Germany. His research interests are in the areas of information fusion, nonlinear state estimation, stochastic modeling, system identification, and control with a strong emphasis on theory-driven approaches based on stochastic system theory and uncertainty models. Research results are applied to various application topics like localization, human-robot-interaction, assistive systems, sensor-actuator-networks, medical engineering, distributed measuring systems, and extended range telepresence.

Professor Hanebeck has held important leadership positions in numerous IEEE conferences. He is a Member of the Board of Directors of the International Society of Information Fusion (ISIF), Editor-in-chief of its *Journal of Advances in Information Fusion* (JAIF), and associate editor for the letter category of the *IEEE Transactions on Aerospace and Electronic Systems* (TAES). He is author and coauthor of more than 350 publications in various high-ranking journals and conferences.

KEYNOTE SPEAKERS

Tuesday, November 3

Andrew Cleland, University of Chicago

"Mechanical Systems in the Quantum Limit"

There has been much progress recently in developing mechanical devices that can be operated in the quantum limit. This effort has combined geometric designs with materials research, as well most significantly the development of methods to cool mechanical systems to the quantum ground state and then perform measurements that are not too invasive. I will describe our approach, in which we succeeded in both cooling a mechanical mode to the ground state, using conventional refrigeration techniques, and then injecting and measuring single phonons, the quanta of acoustic vibrations. This was achieved by coupling a microwave frequency superconducting quantum bit to a microwave frequency mechanical resonator.

More recently, we have begun developing analogous technology to attempt to build elements for a quantum repeater, a device that will be central for applications to quantum communication. This device relies on a parametric conversion of signals between microwave and optical frequencies, is coupled to a fiber optic for transmission of quantum (or classical) information, and ultimately would be coupled to a microwave frequency quantum bit, either based on superconducting or semiconducting quantum technology. I will include a brief description of this approach and a description of its status.

Andrew Cleland is the John A. Maclean Sr. Professor for Quantum Engineering Innovation, and is a member of the Institute of Molecular Engineering at the University of Chicago. He is also the Director of the Pritzker Nanofabrication Facility, on the University of Chicago campus. His research focus is on the developing of superconducting quantum circuit; nanoscale devices integrating electronic, mechanical and optical fields, while operating at the quantum limit; and microfluidic technology for practical applications, with a focus on high-throughput nanoparticle analysis. To date, his accomplishments have included the first demonstration of a mechanical system cooled to its quantum ground state; the demonstration of a high fidelity, scalable superconducting quantum bit that should allow construction of a simple, error-correcting quantum circuit; and the development of an electrooptomechanical system operating in the microwave and optical frequency domains.

Cleland is the author or co-author of over 120 peer-reviewed publications. He is a Fellow of the American Association for the Advancement of Science and the American Physical Society. His work was recognized as the Science "Breakthrough of the Year" for 2010, and selected as one of the "Top Ten Discoveries in Physics" by the Institute of Physics (United Kingdom) in both 2010 and 2011.

He earned a BS in engineering physics and a PhD in physics from the University of California, Berkeley. Prior to joining the University of Chicago, Cleland was a professor of physics at the University of California, Santa Barbara, and served as the Associate Director of its California Nanosystems Institute.

KEYNOTE SPEAKERS

Wednesday, November 4

Suntae Jung, Samsung Electronics

“Sensing Technology for Upcoming Healthcare System”

An aging population and a continually increasing number of chronic disease patients have caused a focal shift in healthcare from therapy and treatment to prevention and management. The upcoming Healthcare System brings more connectivity between consumers and hospitals by enabling the medical staff to check the health status of a patient outside of the hospital without disturbing their daily life. In addition, doctors and nurses can communicate with their patients remotely and more frequently for preventative health measures. It may also reduce time to recover from disease by intelligent analysis of collected data. Sensors are widely adopted and researched in the field of healthcare and environmental monitoring with applications for wearable devices, smart phones, and home monitoring systems. This includes analysis of vital signs, POC (point of care), and images, ultimately reaching towards innovative non-intentional, non-invasive, and complex measurement technologies. We are expecting sensors to take an essential role in the upcoming healthcare era, and intensive effort should be focused in the research.

Suntae Jung completed his Ph.D. in Materials Science at Seoul National University at 1995, following M.S. and B.S. in the same university at 1988 and 1990, respectively. Between 1995 and 1996 he was a researcher at the Beckman institute at University of Illinois, Urbana-Champaign. He joined Samsung Electronics 1996, and was involved in developing optical communication devices such as AWG (Arrayed Wave Guide) multiplexers and de-multiplexers for WDM (Wavelength Division Multiplexing) until 2004. Starting in 2005, he led the development of Waveguide Keypad, Flexible Display Keypad, Pen Touch for innovative smartphone input technologies as well as Mobile Health Sensors, including mobile ECG, stress Index, photoplethysmography, and accelerometer applications. Such innovations earned him honors from National IR52 (Industrial Research) in 2009 and 2012. Currently, Dr. Jun has interest in Mobile Healthcare and IoT Sensing. He leads Samsung's activities in the development of healthcare technologies in Prevention, Medical Treatment and Prognosis Management based on IT and IoT sensing technologies.

SUNDAY, NOVEMBER 1 - TUTORIALS

08:00 – 17:30
REGISTRATION
1F LOBBY

**All tutorials are located in room 206*

08:30 - 09:30
NEXT GENERATION TELECOM FIBERS - NEW OPPORTUNITIES
FOR OPTICAL FIBER SENSING

Marco Petrovich, *University of Southampton, UK*

09:40 - 10:40
THERMAL ABLATION OF TUMORS: AN EMERGING APPLICATION
FOR SENSORS

Daniele Tosi, *Nazarbayev University, Kazakhstan*

10:40 - 11:00
MORNING BREAK
OUTSIDE 200'S

11:00 - 12:00
OPTICAL FIBER SENSING TECHNOLOGIES BASED ON
SENSITIVE THIN FILMS AND COATINGS

Minghong Yang, *Wuhan University of Technology, P.R. China*

12:10 - 13:10
HYPERSPECTRAL IMAGING: FUNDAMENTALS AND CASE
STUDIES

Silvia Serranti & Giuseppe Bonifazi, *University of Rome "La Sapienza", Italy*

13:10 - 14:10
LUNCH
ROOM 202

14:10 - 15:10
SENSING IN EXTREME ENVIRONMENTS

Alton Horsfall, *Newcastle University, UK*

15:20 - 16:20
SCREEN PRINTED SENSORS

John K. Atkinson, *University of Southampton, UK*

16:30 - 17:30
AIR-MICROFLUIDICS: AN INTRODUCTION TO THEORY AND
APPLICATIONS

Igor Paprotny, *University of Illinois, USA*

18:00 – 20:00
WELCOME RECEPTION
PARADISE HOTEL

MONDAY, NOVEMBER 2

08:00 - 08:30

**MONDAY LECTURE AUTHOR BREAKFAST
ROOM 211-212**

08:30 -09:00

**OPENING SESSION
GRAND BALLROOM**

09:00 - 10:00

KEYNOTE: Hot Topics in Multisensor Data Fusion

Uwe Hanebeck

Karlsruher Institut für Technologie, Germany

GRAND BALLROOM

10:00 - 10:30

**MONDAY MORNING BREAK
2F LOBBY**

10:30 - 12:00

**A2L-A: CHEMICAL AND FUEL-CELL APPLICATIONS
ROOM 201**

**SESSION CHAIRS : Hongrui Jiang (University of Wisconsin)
Venkat Bhethanabotla (University of South Florida)**

10:30

AN ENZYMATIC GLUCOSE BIOFUEL CELL BASED ON AU NANO-ELECTRODE ARRAY

*Tanmay A. Kulkarni, Deepa Gupta, Gymama Slaughter
University of Maryland Baltimore County, USA*

10:45

**CELL INTEGRATED THIN-FILM MULTI-JUNCTION
THERMOCOUPLE ARRAY FOR IN-SITU TEMPERATURE
MONITORING OF SOLID OXIDE FUEL CELLS**

*Manoj Ranaweera, Indae Choi, Jung-Sik Kim
Loughborough University, United Kingdom*

11:00

**AN IMPLEMENTATION OF AN ELECTRONIC TONGUE SYSTEM
BASED ON A MULTI-SENSOR POTENTIOMETRIC READOUT
CIRCUIT WITH EMBEDDED CALIBRATION AND TEMPERATURE
COMPENSATION**

Wen-Yaw Chung⁽¹⁾, Angelito Silverio⁽¹⁾, Vincent F.S. Tsai⁽⁴⁾, Cheanyeh Cheng⁽¹⁾, Shu-Yu Chang⁽¹⁾, Ming-Ying Zhou⁽¹⁾, Chi-Ying Kao⁽¹⁾, Si-Yuan Chen⁽²⁾, Dorota Pijanowska⁽³⁾

⁽¹⁾Chung Yuan Christian University, Taiwan; ⁽²⁾Jimei University, China;

⁽³⁾Polish Academy of Sciences, Poland; ⁽⁴⁾Ten Chen Medical Group, Taiwan

11:15

**PORTABLE WIRELESS DEVICE FOR HEMOGLOBIN LEVEL
MONITORING**

Dae-Sik Lee, W.-J. Kim, M.-Y. Jung, B.-G. Jeon

Electronics and Telecommunications Research Institute, Korea

11:30

**ODOR ASSESSMENT OF AUTOMOBILE INTERIOR COMPONENTS
USING ION MOBILITY SPECTROMETRY**

Juan Li⁽²⁾, Ricardo Gutierrez-Osuna⁽³⁾, Ryan D. Hodges⁽²⁾, Gail Luckey⁽¹⁾, Joel Crowell⁽¹⁾, Susan S. Schiffman⁽²⁾, H. Troy Nagle⁽²⁾

⁽¹⁾Hyundai Motor Group, USA; ⁽²⁾North Carolina State University, USA;

⁽³⁾Texas A&M University, USA

11:45

**A THRESHOLD VOLTAGE VARIATION CALIBRATION
ALGORITHM FOR AN ISFET-BASED LOW-COST PH SENSOR
SYSTEM**

Ikho Lee, Donghoon Kim, Jeong-Soo Lee, Byungsub Kim, Chanoh Park

Pohang University of Science and Technology, Korea

10:30 - 12:00

**A2L-B: SPECIAL SESSION: STRUCTURAL SENSING
ROOM 202**

SESSION CHAIR : Jung-Ryul Lee (KAIST)

10:30

**INVITED: KOREA AIR FORCE STANDARD NDE COUPON TEST OF
FULL-FIELD PULSE-ECHO LASER ULTRASONIC PROPAGATION
IMAGING SYSTEM**

Seung-Chan Hong⁽²⁾, Jung-Ryul Lee⁽²⁾, Jongwoon Park⁽¹⁾

⁽¹⁾Aero Technology Research Institute, Logistics Command, Republic of Korea Air Force, Korea; ⁽²⁾Korea Advanced Institute of Science and Technology, Korea

11:00

**A HAPTIC-INSPIRED APPROACH OF ULTRASONIC
NONDESTRUCTIVE DAMAGE CLASSIFICATION**

Zhu Mao⁽²⁾, Michael Todd⁽²⁾, David Mascareñas⁽¹⁾

⁽¹⁾Los Alamos National Laboratory, USA; ⁽²⁾University of California, San Diego, USA

11:15

**REMOTE IMAGING OF LOCAL RESONANCE FOR INSPECTION OF
HONEYCOMB SANDWICH COMPOSITE PANELS**

Suji Han⁽¹⁾, Jung-Ryul Lee⁽²⁾, Eric Flynn⁽³⁾

⁽¹⁾Chonbuk National University, Korea; ⁽²⁾Korea Advanced Institute of Science and Technology, Korea; ⁽³⁾Los Alamos National Laboratory, USA

11:30

**INVESTIGATION ON OPTIMAL POLING CONDITION OF PNN-
PZT/EPOXY PAINT SENSOR AND ITS SENSITIVITY
IMPROVEMENT**

*Dae-Hyun Han, Myeongcheol Kang, Lae-Hyong Kang
Chonbuk National University, Korea*

11:45

**A VIBRO-HAPTIC INTERFACE DEVELOPMENT FOR IMPACT
DETECTION ON UAV WINGS**

*Hwee Kwon Jung, Myung Jun Lee, Chang Won Lee, Gyuhae Park
Chonnam National University, Korea*

10:30 - 12:00

**A2L-C: OPTICAL SENSING APPLICATIONS I
ROOM 203**

SESSION CHAIRS: Huikai Xie (University of Florida)

David Horsley (University of California, Davis)

10:30

**INVITED: PLASMONIC PIEZOELECTRIC NEMS RESONANT
INFRARED DETECTORS**

*Matteo Rinaldi, Yu Hui, Zhenyun Qian, Vageeswar Rajaram, Ryan
Sungho Kang*

Northeastern University, USA

11:00

**AN OPTICAL HEAD-POSE TRACKING SENSOR FOR POINTING
DEVICES USING IR-LED BASED MARKERS AND A LOW-COST
CAMERA**

*Edwin Walsh, Walter Daems, Jan Steckel
Universiteit Antwerpen, Belgium*

11:15

MEASUREMENT OF THE TEMPERATURE SENSITIVITY OF PHASE MODAL BIREFRINGENCE OF POLARIZATION MAINTAINING OPTICAL FIBERS USING A SAGNAC INTERFEROMETER BASED TEMPERATURE SENSOR

Cezary Kaczmarek

Lublin University of Technology, Poland

11:30

TEMPORAL PATTERN RECOGNITION FOR GAIT ANALYSIS APPLICATIONS USING AN "INTELLIGENT CARPET" SYSTEM

Omar Costilla-Reyes, Patricia J. Scully, Krikor B. Ozanyan

University of Manchester, United Kingdom

11:45

SMART FUNCTIONS FOR CARBON NANOTUBE BOLOMETER

Mathieu Denoual⁽¹⁾, Mathieu Pouliquen⁽¹⁾, Gilles Allègre⁽¹⁾, Nathan Tomlin⁽²⁾, John Lehman⁽²⁾

⁽¹⁾École nationale supérieure d'ingénieurs de Caen & Centre de Recherche, France; ⁽²⁾National Institute of Standards and Technology, USA

10:30 - 11:45

A2L-D: OPTICAL CHEMICAL SENSOR SYSTEMS

ROOM 204

SESSION CHAIRS: Michael McShane (Texas A&M University)

Yu-Cheng Lin (National Cheng Kung University)

10:30

ODOR SOURCE SHAPE VISUALIZATION BY MULTISPECTRAL FLUORESCENCE SENSING

Hiro-Taka Yoshioka, Chuanjun Liu, Kenshi Hayashi

Kyushu University, Japan

10:45

HIGH PHOTOCURRENT AND HIGH FREQUENCY RESPONSE OF LIGHT-ADDRESSABLE POTENTIOMETRIC SENSOR WITH THIN SI SUBSTRATE AND SURFACE ROUGHNESS

Wei-Yin Zeng, Cong-Cheng Chen, Chia-Ming Yang, Chao-Sung Lai

Chang Gung University, Taiwan

11:00

REAL-TIME 2D PH IMAGES BY FAST SCANNING LIGHT-ADDRESSABLE POTENTIOMETRIC SENSOR SYSTEM CONTROLLED BY LABVIEW PROGRAM

Hui-Ling Liu⁽¹⁾, Yi-Ming Chen⁽¹⁾, Chia-Ming Yang⁽¹⁾, Chao-Sung Lai⁽¹⁾, Chang Ren⁽²⁾, Chen-Gang Lyu⁽²⁾

⁽¹⁾Chang Gung University, Taiwan; ⁽²⁾Tianjin University, China

11:15

DETERMINATION OF SAFRANAL CONCENTRATION IN SAFFRON SAMPLES BY MEANS OF VE-TONGUE, SPME-GC-MS, UV-VIS SPECTROPHOTOMETRY AND MULTIVARIATE ANALYSIS

Khalid Tahrir⁽²⁾, Madiha Bougrini⁽²⁾, Tarik Saidi⁽²⁾, Carlo Tiebe⁽¹⁾, Nadia El Alami-El Hassani⁽²⁾, Nezha El Bari⁽²⁾, Thomas Hübert⁽¹⁾, Benachir Bouchikhi⁽³⁾

⁽¹⁾Federal Institute for Materials Research and Testing, Germany;

⁽²⁾Moulay Ismaïl University, Morocco; ⁽³⁾Moulay Ismaïl University / Sensor Electronic & Instrumentation Group, Morocco

11:30

GAS VISUALIZATION BASED ON LOCALIZED SURFACE PLASMON RESONANCE OF GOLD NANOPARTICLE FILMS

*Tomoki Koga, Hiro-Taka Yoshioka, Chuanjun Liu, Kenshi Hayashi
Kyushu University, Japan*

10:30 - 12:00

A2L-E: ENVIRONMENTAL SENSORS AND NETWORKS

ROOM 206

SESSION CHAIRS: Deepak Uttamchandani (University of Strathclyde)

Zhihong Li (Peking University)

10:30

INVITED: THE INTELLIGENT CONTAINER - WHAT CAN MEMS DO FOR LOGISTICS OF FOOD?

*Walter Lang, Reiner Jedermann
Universität Bremen, Germany*

11:00

APPLICATION OF WATER QUALITY INDEX FOR POLLUTION DETECTION AT LUTON HOO LAKE

*Tochukwu Anyachebelu, Marc Conrad, David Rawson, Tahmina Ajmal
University of Bedfordshire, United Kingdom*

11:15

THE INTERNET OF THINGS BASED MEDICAL EMERGENCY MANAGEMENT USING HADOOP ECOSYSTEM

*Muhammad Mazhar Rathore, Awais Ahmad, Anand Paul
Kyungpook National University, Korea*

11:30

PERFORMANCE IMPROVEMENT OF OPTICAL FIBRE OXYGEN SENSOR DETECTION SCHEME INCORPORATING NARROW BANDPASS EMISSION OPTICAL FILTER

Suhairi Saharudin⁽¹⁾, Mohamad Yusri Mohamad Yusof⁽¹⁾, Zharfan Hamdan⁽¹⁾, Maizatul Zolkipli⁽²⁾, Wan Fazlida Hanim Abdullah⁽²⁾, Sukreen Hana Herman⁽²⁾

⁽¹⁾MIMOS Berhad, Malaysia; ⁽²⁾Universiti Teknologi MARA, Malaysia

11:45

DEVELOPMENT OF A QUASI TIME STRETCH TECHNOLOGY FOR INDOOR POSITIONING SYSTEM BASED ON PULSE MODULATED ULTRA HIGH FREQUENCY RADIO

Renhai Xiong⁽¹⁾, Stefan van Waasen⁽¹⁾, Jakob Schelten⁽¹⁾, Mario Schloesser⁽¹⁾, Carl Rheinländer⁽²⁾, Norbert Wehn⁽²⁾

⁽¹⁾Forschungszentrum Juelich GmbH, Germany; ⁽²⁾Technische Universität Kaiserslautern, Germany

10:30 - 11:45

A2L-F: PHYSICAL SENSOR SYSTEMS

ROOM 207

SESSION CHAIRS: Zheyao Wang (Tsinghua University)

Oliver Paul (University of Freiburg)

10:30

INVITED: ATOMIC LAYER 2D NANO-ELECTROMECHANICAL SYSTEMS (NEMS) FOR PHYSICAL SENSING APPLICATIONS

Philip X.-L. Feng

Case Western Reserve University, USA

11:00

EVALUATING TRANSPARENT LIQUID SCREEN OVERLAY AS A HAPTIC CONDUCTOR

Ahmed Farooq⁽²⁾, Grigori Evreinov⁽²⁾, Roope Raisamo⁽²⁾, Daisuke Takahata⁽¹⁾

⁽¹⁾Fukoku Japan Inc, Japan; ⁽²⁾University Of Tampere, Finland

11:15

VERSATILE AIR-COUPLED PHASED ARRAY TRANSDUCER FOR SENSOR APPLICATIONS

Alexander Unger⁽³⁾, Eric Konetzke⁽¹⁾, Matthias Rutsch⁽³⁾, Maik Hoffmann⁽¹⁾, Sivaram Nishal Ramadas⁽²⁾, Steve Dixon⁽⁴⁾, Mario Kupnik⁽³⁾

⁽¹⁾Brandenburgische Technische Universität, Germany; ⁽²⁾Elster-Instromet, Belgium; ⁽³⁾Technische Universität Darmstadt, Germany;

⁽⁴⁾University of Warwick, United Kingdom

11:30

ACTIVE BIOACOUSTIC MEASUREMENT FOR HUMAN-TO-HUMAN SKIN CONTACT AREA DETECTION

Kei Nakatsuma, Ryoma Takedomi, Takaaki Eguchi, Yasutaka Oshima, Ippei Torigoe

Kumamoto University, Japan

12:00 - 13:00

MONDAY LUNCH

GRAND BALLROOM

MONDAY, NOVEMBER 2 – POSTER SESSION

13:00 - 14:30

A3P-G: SENSOR MODELING & CHARACTERIZATION I
ROOMS 101-110

SESSION CHAIR: Erwin Reichel (JKU University)

1-1

**CHARACTERIZING CONDUCTIVE YARNS FOR PRESSURE
SENSORS APPLICATIONS**

*Edward Grant⁽²⁾, Frderick Livingston⁽²⁾, Matthew Craver⁽²⁾, Meghan
Hegarty-Craver⁽²⁾, Simon McMaster⁽¹⁾*

*⁽¹⁾Footfalls & Heartbeats Ltd., New Zealand; ⁽²⁾North Carolina State
University, USA*

1-4

HEAT CONDUCTION IN MULTI-LAYER CIRCUIT ELEMENTS

Daniel Schumayer, Timothy Molteno
University of Otago, New Zealand

1-7

**DESIGN OF A NEW DIFFERENTIAL SILICON RESONANT
ACCELEROMETER WITH DUAL PROOFMASSES USING TWO-
STAGE MICROLEVER**

Cheng Li⁽¹⁾, Yue Wen⁽¹⁾, Shangchun Fan⁽¹⁾, Baoxi Kan⁽²⁾, Chao Wang⁽²⁾
*⁽¹⁾Beihang University, China; ⁽²⁾China Academy of Aerospace
Electronics Technology, China*

1-10

ACOUSTIC SCENE CHANGE DETECTION

Chang-Hong Lin, Ming-Yen Chen, Chen-Kuei Chang
Industrial Technology Research Institute, Taiwan

1-13

**EXPERIMENTAL VERIFICATION OF A TACTILE SENSOR BASED
ON IONIC POLYMER-METAL COMPOSITES**

Takashi Nagai, Norihiro Kamamichi
Tokyo Denki University, Japan

1-16

**PRELIMINARY DESIGN OF A MAGNETIC POSITION SENSOR
BASED ON A BIOCYBERNETIC SYSTEM APPROACH**

Christoph Weissinger, Hans-Georg Herzog
Technische Universität München, Germany

1-19

A CONTINUOUS CELLULAR AUTOMATON METHOD FOR THE SIMULATION OF FOCUSED ION BEAM FABRICATION OF MICRO/NANO STRUCTURES

Yuan Li⁽¹⁾, Yan Xing⁽¹⁾, Hui Zhang⁽¹⁾, Xiaoli Qiu⁽¹⁾, Miguel Gosálvez⁽²⁾

⁽¹⁾Southeast University, China; ⁽²⁾University of the Basque Country, Spain

1-21

A PLANAR COIL FLUXGATE MAGNETOMETER USING MULTI-CORE CONFIGURATION

Maha Aldoumani, Turgut Meydan, Paul Williams

Cardiff University, United Kingdom

13-251

SOFT DEFECTS LOCALIZATION BY SIGNATURE MAGNIFICATION WITH SELECTIVE WINDOWING

Soumaya Sallem⁽²⁾, Nicolas Ravot⁽¹⁾

⁽¹⁾CEA LIST, France; ⁽²⁾WiN MS, France

13-254

JAMF-BASED REPRESENTATION FOR COMPUTATIONAL LUNG SOUND ANALYSIS

Nick Michiels⁽¹⁾, Edwin Walsh⁽¹⁾, Dennis Laurijssen⁽¹⁾, Glenn

Leemans⁽²⁾, Wilfried De Backer⁽²⁾, Jan Steckel⁽¹⁾

⁽¹⁾Universiteit Antwerpen, Belgium; ⁽²⁾University Hospital Antwerp, Belgium

13-257

REDUCING MAGNETO-INDUCTIVE POSITIONING ERRORS IN A METAL-RICH INDOOR ENVIRONMENT

Orfeas Kypris, Traian Abrudan, Andrew Markham

University of Oxford, United Kingdom

13:00 - 14:30

A3P-H: ADVANCED MATERIALS FOR CHEMICAL SENSING ROOMS 101-110

SESSION CHAIR: Ravinder Dahiya (University of Glasgow)

2-23

THE EFFECT OF SURFACE MORPHOLOGY OF ZNO NANORODS ON THE SENSING RESPONSE OF GRAPHITE/ZNO NANOROD JUNCTIONS

Roman Yatskiv, Jan Grym

Institute of Photonics and Electronics, Academy of Sciences CR, v.v.i., Czech Rep.

2-26

DETECTION OF INDIVIDUAL CO₂ MOLECULES ADSORPTION WITH SUSPENDED GRAPHENE IN AN ELECTRICAL FIELD

Jian Sun, Manoharan Muruganathan, Hiroshi Mizuta

Japan Advanced Institute of Science and Technology, Japan

2-29

THIN FILM TRANSISTORS GAS SENSORS BASED ON POLY(3-HEXYLTHIOPHENE)/ ZINC OXIDE-NANORODS COMPOSITE FILM FOR NITROGEN DIOXIDE DETECTION

Tao Xie, Guangzhong Xie, Zongbiao Ye, Hongfei Du, Yuyan Chen, Yadong Jiang, Huiling Tai

University of Electronic Science and Technology of China, China

2-32

EFFECTS OF PALLADIUM NANOCRYSTAL MORPHOLOGIES ON HYDROGEN SENSORS BASED ON PALLADIUM-GRAPHENE HYBRID

Duy-Thach Phan, Gwi-Yang Chung

University of Ulsan, Korea

2-35

ACETYLENE GAS SENSING PROPERTIES OF SILVER NANOPARTICLES DECORATED ZNO MORPHOLOGIES WITH REDUCED GRAPHENE OXIDE HYBRIDS

A.S.M. Iftakhar Uddin, Gwi-Yang Chung

University of Ulsan, Korea

2-38

3-D NANOSTRUCTURED TUNGSTEN-OXIDE GAS-SENSING FILM VIA ANODIZING SPUTTER-DEPOSITED AL/W METAL LAYERS

Alexander Mozalev⁽¹⁾, Zdenek Pytlíček⁽¹⁾, Maria Bendova⁽¹⁾, Rosa Maria Vazquez⁽²⁾, Eduard Llobet⁽²⁾, Jaromir Hubalek⁽¹⁾

⁽¹⁾Brno University of Technology, Czech Rep.; ⁽²⁾Universitat Rovira i Virgili, Spain

2-45

ULTRASENSITIVE FORMALDEHYDE GAS SENSORS BASED ON A HOLLOW ASSEMBLY AND ITS 3-DIMENSIONAL NETWORK FORMATION OF SINGLE-CRYSTALLINE CO₃O₄ NANOPARTICLES

N.-J. Choi⁽¹⁾, H.J. Park⁽¹⁾, M.Y. Jung⁽¹⁾, Dae-Sik Lee⁽¹⁾, J.-Y. Kim⁽²⁾, J.M. Kim⁽²⁾, H. Song⁽²⁾

⁽¹⁾Electronics and Telecommunications Research Institute, Korea;

⁽²⁾Korea Advanced Institute of Science and Technology, Korea

2-49

FUNCTIONALIZED MULTI-WALLED CARBON NANOTUBE BASED SENSORS FOR DISTRIBUTED METHANE LEAK DETECTION

Md Tanim Humayun⁽⁴⁾, Ralu Divan⁽¹⁾, Liliana Stan⁽¹⁾, Daniel Rosenmann⁽¹⁾, David Gosztola⁽¹⁾, Lara Gundel⁽²⁾, Paul Solomon⁽³⁾, Igor Paprotny⁽⁴⁾

⁽¹⁾Argonne National Laboratory, USA; ⁽²⁾Lawrence Berkeley National Laboratory, USA; ⁽³⁾U.S. Environmental Protection Agency, USA;

⁽⁴⁾University of Illinois at Chicago, USA

2-51

A CAPACITIVE MICROMACHINED ULTRASONIC TRANSDUCER (CMUT) ARRAY AS A LOW-POWER MULTI-CHANNEL VOLATILE ORGANIC COMPOUND (VOC) SENSOR

Marzana Mantasha Mahmud, Mohit Kumar, Xiao Zhang, Feysel Yamaner, H. Troy Nagle, Omer Oralkan
North Carolina State University, USA

13:00 - 14:30

A3P-J: BIOSENSORS I

ROOMS 101-110

SESSION CHAIR: Sung-Hoon Choa (Seoul National University Of Science And Technology)

3-55

DESIGN, FABRICATION AND PERFORMANCE EVALUATION OF INTERDIGITAL CAPACITIVE SENSOR FOR DETECTION OF CARDIAC TROPONIN-I AND HUMAN EPIDERMAL GROWTH FACTOR RECEPTOR 2

Divya Mahalingam, Yasar Gurbuz, Anjum Qureshi, Javed H. Niazi
Sabanci University, Turkey

3-58

NONINVASIVE MEASUREMENT OF AQUEOUS GLUCOSE SOLUTION AT PHYSIOLOGICALLY RELEVANT BLOOD CONCENTRATION LEVELS WITH DIFFERENTIAL CONTINUOUS-WAVE LASER PHOTOACOUSTIC TECHNIQUE

Yujiro Tanaka, Yuichi Higuchi, Serge Camou
Nippon Telegraph and Telephone Corporation, Japan

3-61

ELECTRODELESS, NON-INVASIVE STIMULATION OF RETINAL NEURONS USING TIME-VARYING MAGNETIC FIELDS

Jong Yoon Shin⁽²⁾, Jae-Hyun Ahn⁽²⁾, Kilhwa Pi⁽²⁾, Dong-Il Cho⁽²⁾, Yong Sook Goo⁽¹⁾

⁽¹⁾Chungbuk National University, Korea; ⁽²⁾Seoul National University, Korea

3-64

A BIOMICROSYSTEM FOR SIMULTANEOUS OPTICAL AND ELECTROCHEMICAL MONITORING OF ELECTROACTIVE MICROBIAL BIOFILM

Arwa Fraiwan, Seokheun Choi

Binghamton University, State University of New York, USA

3-67

TRACE LEVEL VOC GAS DETECTION OF DEVELOPED CNT BASED MICROPRECONCENTRATOR FOR BREATH ANALYSIS

Koji Oyama⁽²⁾, Ryohei Komiyama⁽²⁾, Hidetoshi Miyashita⁽²⁾, Sang-Seok Lee⁽²⁾, Jeong-O Lee⁽¹⁾

⁽¹⁾Korea Research Institute of Chemical Technology, Japan; ⁽²⁾Tottori University, Japan

3-70

FAST AND LOW-COST DETECTION OF SILVER NANOPARTICLES BY USING THE AG+-SPECIFIC CYTOSINE PROBE

Joonhyub Kim, Namki Min

Korea University, Korea

3-73

SINGLE-LOOP FIBER ATR SENSOR ENHANCED BY SILVER NANOPARTICLES FOR CONTINUOUS GLUCOSE MONITORING

Yanwen Sun⁽²⁾, Changyue Sun⁽²⁾, Haixia Yu⁽²⁾, Dachao Li⁽²⁾, Songlin Yu⁽¹⁾

⁽¹⁾Tianjin Institute of Metrological Supervision Testing, China; ⁽²⁾Tianjin University, China

3-76

SENSITIVE AND QUANTITATIVE DNA DETECTION BY BEADS-BASED DIELECTROPHORETIC IMPEDANCE MEASUREMENT

Michihiko Nakano, Hiromichi Kasahara, Zhenhao Ding, Junya Suehiro
Kyushu University, Japan

3-79

DESIGN AND FABRICATION OF SIO₂ WAVEGUIDE-BASED SAW SENSORS WITH FILLED MICROCAVITIES

Shuangming Li⁽³⁾, Mandek Richardson⁽⁴⁾, Subramanian Sankaranarayanan⁽¹⁾, Chunhai Fan⁽²⁾, Yan Su⁽²⁾, Venkat Bhethanabotla⁽⁴⁾

⁽¹⁾Argonne National Laboratory, USA; ⁽²⁾Nanjing University of Science and Technology, China; ⁽³⁾Nanjing University of Science and Technology & University of South Florida, China; ⁽⁴⁾University of South Florida, USA

3-82

DEVELOPMENT OF FLEXIBLE DRY ECG ELECTRODES BASED ON MWCNT/PDMS COMPOSITE

Amer Abdulmahdi Chlaihawi, Binu Baby Narakathu, Sepehr Emamian, Ali Eshkeiti, Sai Guruva Avuthu Reddy, Bradley Bazuin, Massood Zandi Atashbar

Western Michigan University, USA

13-260

WEARABLE WIRELESS SENSOR FOR ESTRUS DETECTION IN COWS BY CONDUCTIVITY AND TEMPERATURE MEASUREMENTS

Lars Mattias Andersson⁽²⁾, Hironao Okada⁽²⁾, Yi Zhang⁽²⁾, Toshihiro Itoh⁽²⁾, Ryotaro Miura⁽¹⁾, Koji Yoshioka⁽¹⁾

⁽¹⁾National Agriculture and Food Research Organization, Japan;

⁽²⁾National Institute of Advanced Industrial Science and Technology, Japan

13:00 - 14:30

A3P-K: OPTICAL SENSORS I

ROOMS 101-110

SESSION CHAIR: Rihito Kuroda (Tohoku University)

4-86

PIEZO-PHOTOTRONIC UV PHOTOSENSING WITH ZNO NANOWIRES ARRAY

Yuanjie Su, Guangzhong Xie, Tao Xie, Yin Long, Zongbiao Ye, Xiaosong Du, Zhiming Wu, Yadong Jiang

University of Electronic Science and Technology of China, China

4-89

USE OF METAL MESH SENSORS WITH PERIODIC MICROSTRUCTURES TO SENSE AND SEPARATE AEROSOL PARTICLES IN KENYA

Koki Yamamoto⁽²⁾, Emi Kitanishi-Shira⁽²⁾, Yuka Inoue⁽²⁾, Makoto Hasegawa⁽²⁾, Ernest Wandera⁽³⁾, Yoshio Ichinose⁽³⁾, Seiji Kanba⁽¹⁾, Takashi Kondo⁽¹⁾

⁽¹⁾Murata Manufacturing Company, Japan; ⁽²⁾Nagahama Institute of Bio-Science and Technology, Japan; ⁽³⁾Nagasaki University, Japan

4-92

A PROPOSED OPTICAL-BASED SENSOR FOR ASSESSMENT OF HAND MOVEMENT

Lefan Wang, Turgut Meydan, Paul Williams, Tomasz Kutrowski
Cardiff University, United Kingdom

4-95

**NEW SETUP FOR A REAL TIME HIGH RESOLUTION UV-LED
ABSORPTION SPECTROSCOPY**

Eric Ebert, Nils Damaschke, Hendrik Krüger, Hartmut Ewald, Marian Rabe

Universität Rostock, Germany

4-98

**RAMAN SPECTROSCOPY FOR ANALYZING ANTHOCYANINS OF
LYOPHILIZED BLUEBERRIES**

Belén Gordillo Arrobas⁽²⁾, Leonardo Ciaccheri⁽¹⁾, Andrea Azelio Mencaglia⁽¹⁾, Francisco J. Rodríguez-Pulido⁽²⁾, Carla Stinco⁽²⁾, Maria Lourdes González-Miret⁽²⁾, Francisco J. Heredia⁽²⁾, Anna Grazia Mignani⁽¹⁾

⁽¹⁾CNR - Istituto di Fisica Applicata Nello Carrara, Italy; ⁽²⁾Universidad de Sevilla, Spain

4-101

**PHOTONIC CRYSTAL BASED FORCE SENSOR ON SILICON
MICROCANTILEVER**

Sreenivasulu Tupakula, V R Kollu, Anusree K, Yadunath Tr, Badrinarayana T, Talabattulla Srinivas, Gopal Krishna Hegde, S Mohan

Indian Institute of Science, India

4-104

**MAGNETIC FIELD SENSOR BASED ON A SINGLE MODE-
MULTIMODE-SINGLE MODE OPTICAL FIBER STRUCTURE**

Joaquin Ascorbe, Jesus Maria Corres, Francisco Javier Arregui, Ignacio R. Matías-Maestro

Universidad Pública de Navarra, Spain

13:00 - 14:30

**A3P-L: MECHANICAL, MAGNETIC & PHYSICAL SENSORS I
ROOMS 101-110**

SESSION CHAIR: Joseph Talghader (University of Minnesota)

5-105

**VERY HIGH DISPLACEMENT TO VOLTAGE RATIO MEMS
THERMAL ACTUATOR**

Kyuhyun Kwack, Kukjin Chun

Seoul National University, Korea

5-107

**ELIMINATION OF NONLINEARITY IN SIGMA DELTA MEMS
ACCELEROMETER**

Yixing Chu, Yunfeng Liu, Jingxin Dong, Baoyong Chi

Tsinghua University, China

5-109

ULTRA-THIN FILM PIEZOELECTRIC ALN CANTILEVERS FOR FLEXIBLE MEMS SENSORS

*Md Sajeeb Rayhan, Donald Butler, Zeynep Celik-Butler
University of Texas at Arlington, USA*

5-111

TOWARDS RESONANT SENSING IN LIQUIDS BY USING CMOS MEMS CAPACITIVE OSCILLATORS

*Mu-Chi Chou, Che-Hao Chiang, Michael S.-C. Lu
National Tsing Hua University, Taiwan*

5-113

REDUCTION OF CONTACT FORCE DEPENDENCE ON THE MEMS HARDNESS SENSOR USING REFERENCE PLANE TO DETECT HUMAN BODY HARDNESS

*Yusaku Maeda, Kyohei Terao, Fusao Shimokawa, Hidekuni Takao
Kagawa University, Japan*

5-115

A PDMS BASED TRIBOELECTRIC ENERGY HARVESTER AS SELF-POWERED, ACTIVE TACTILE SENSOR SYSTEM FOR HUMAN SKIN

*Mohammad Sala Uddin Rasel, Miah A. Halim, Jae Yeong Park
Kwangwoon University, Korea*

5-117

A CMOS STRESS SENSOR CHIP WITH INTEGRATED SIGNAL PROCESSING CIRCUITS

*Shujie Yang⁽²⁾, Dong Wu⁽²⁾, Zheyao Wang⁽²⁾, Xiaoming Li⁽¹⁾
⁽¹⁾Langfang Teachers University, China; ⁽²⁾Tsinghua University, China*

5-119

EXTRACTION OF HEARTBEAT SIGNAL FROM AIRFLOW AT MOUTH BY FLOW SENSOR

*Hidetaka Kawaoka⁽¹⁾, Takayuki Yamada⁽²⁾, Miyoko Matsushima⁽²⁾,
Tutomu Kawabe⁽²⁾, Yoshihiro Hasegawa⁽¹⁾, Mitsuhiro Shikida⁽¹⁾
⁽¹⁾Hiroshima City University, Japan; ⁽²⁾Nagoya University, Japan*

5-121

RESPONSIBLE TIME SHORTING OF FLEXIBLE THERMAL FLOW SENSOR FOR MEDICAL APPLICATIONS

*Kodai Imaeda⁽²⁾, Shunji Shibata⁽²⁾, Miyoko Matsushima⁽²⁾, Tutomu
Kawabe⁽²⁾, Mitsuhiro Shikida⁽¹⁾
⁽¹⁾Hiroshima City University, Japan; ⁽²⁾Nagoya University, Japan*

13:00 - 14:30

A3P-M: SENSOR SYSTEMS

ROOMS 101-110

SESSION CHAIR: Kenichi Takahata (University of British Columbia)

6-123

IN-PLANE BULK-MICROMACHINING FABRICATION OF HIGH DYNAMIC RANGE TACTICAL GRADE OPEN LOOP AND CLOSED LOOP MEMS ACCELEROMETERS

Aviram Feingold, Boris Grinberg

Physical Logic Ltd., Israel

6-125

TOWARD A WIRELESS CONTACT LENS SENSOR SYSTEM WITH A MICRO-CAPACITOR FOR INTRAOCULAR PRESSURE MONITORING ON IN-VITRO PORCINE EYE

Guan-Ting Yeh, Tsung-Wei Wu, Shang-Wei Tsai, Shun-Hsi Hsu, Jin-Chern Chiou

National Chiao Tung University, Taiwan

6-127

MICROMACHINED SILICON HEMISPHERICAL RESONATORS WITH SELF-ALIGNED SPHERICAL CAPACITIVE ELECTRODES

Xuye Zhuang⁽¹⁾, Xinlong Wang⁽¹⁾, Lei Yu⁽¹⁾, Pinghua Li⁽¹⁾, Bo Chen⁽¹⁾, Qunying Guo⁽¹⁾, Shuwen Guo⁽²⁾

⁽¹⁾East China Institute of Photo-Electronic IC, China; ⁽²⁾Soochow University, China

6-129

NOVEL PCB-BASED THERMAL FLOW SENSORS FOR AIR CONDITIONING SYSTEMS

Thomas Glatz⁽¹⁾, Samir Cerimovic⁽¹⁾, Harald Steiner⁽¹⁾, Almir Talic⁽¹⁾, Artur Jachimowicz⁽¹⁾, Thilo Sauter⁽¹⁾, Franz Keplinger⁽²⁾

⁽¹⁾Danube University Krems, Austria; ⁽²⁾Technische Universität Wien, Austria

6-131

TEMPERATURE ROBUSTNESS DESIGN FOR DOUBLE-CLAMPED MEMS SENSORS BASED ON TWO ORTHOGONAL STRESS-IMMUNITY STRUCTURE

Xinghua Wang, Dingbang Xiao, Zhanqiang Hou, Qingsong Li, Zhihua Chen, Xuezhong Wu

National University of Defense Technology, China

6-133

ELECTROCHEMICAL VIBRATION SENSOR WITH FORCE BALANCE FEEDBACK SYSTEM

Junbo Wang, Zhengyu Zhang, Guanglei Li, Deyong Chen, Jian Chen
Institute of Electronics, Chinese Academy of Sciences, China

6-135

TEMPERATURE DEPENDENCE OF THE QUALITY FACTOR IN LC-TYPE PASSIVE WIRELESS TEMPERATURE SENSORS

*Qing-Ying Ren, Li-Feng Wang, Qing-An Huang
Southeast University, China*

6-137

DETECTION OF ULTRASOUND PRESSURE DISTRIBUTION FOR REMOTE MEASUREMENT OF HAPTIC SURFACE ROUGHNESS

*Takaaki Kamigaki, Kei Nakatsuma, Yasutaka Oshima, Ippei Torigoe
Kumamoto University, Japan*

6-139

MEMS μ -WIRE MAGNETIC FIELD DETECTION METHOD@CERN

*Michael Stifter⁽¹⁾, Harald Steiner⁽¹⁾, Wilfried Hortschitz⁽¹⁾, Thilo Sauter⁽¹⁾,
Thomas Glatzl⁽¹⁾, Alexander Dabsch⁽²⁾, Franz Keplinger⁽²⁾
⁽¹⁾Danube University Krems, Austria; ⁽²⁾Technische Universität Wien,
Austria*

6-141

SAW DEVICE FOR LIQUID VAPORIZATION RATE AND REMAINING MOLECULE SENSING

*Thu Hang Bui⁽¹⁾, Bruno Morana⁽¹⁾, An Tran⁽¹⁾, Tom Scholtes⁽¹⁾, Trinh
Chu Duc⁽²⁾, Pasqualina M. Sarro⁽¹⁾
⁽¹⁾Technische Universiteit Delft, Netherlands; ⁽²⁾University of
Engineering and Technology, VNU, Hanoi, Vietnam*

6-143

A MINIATURE SYSTEM FOR PARTICULATE MATTER (PM) MEASUREMENT

*Jianwen Sun⁽²⁾, Zewen Liu⁽²⁾, Kun Yang⁽¹⁾, Yanwu Lu⁽¹⁾
⁽¹⁾Beijing Jiaotong University, China; ⁽²⁾Tsinghua University, China*

6-145

NON-INVASIVE MONITORING OF ELECTRICAL PARAMETERS OF SCHEFFLERA ARBORICOLA LEAF

*Kushagra Sinha, Olutosin Fawole, Massood Tabib-Azar
University of Utah, USA*

6-147

A PORTABLE E-NOSE SYSTEM FOR CLASSIFICATION OF CHINESE LIQUOR

*Peifeng Qi, Qinghao Meng, Yu Zhou, Yaqi Jing, Ming Zeng
Tianjin University, China*

6-149

THE FLUID VISCOSITY MEASUREMENT BASED ON VARIABLE CROSS-SECTION MEMS CANTILEVER UNDER TORSIONAL EXCITATION

*Yingjie Hu, Libo Zhao, Tongdong Wang, Yulong Zhao, Guoying Yuan, Zhuangde Jiang
Xi'an Jiaotong University, China*

6-151

DEVELOPMENT OF PATCH-TYPE SENSOR MODULE FOR BATTERY-FREE POWER TRANSFER AND DATA TRANSMISSION

*Janghyun Lee, Young Su Kim, Woo Young Kim, Youn Tae Kim
Chosun University, Korea*

6-153

HIGHLY SENSITIVE CAPACITIVE TACTILE SENSOR BASED ON SILVER NANOWIRE USING PARYLENE-C STENCIL PATTERNING METHOD

*Youngseok Kim, Namsun Chou, Sohee Kim
Gwangju Institute of Science and Technology, Korea*

13:00 - 14:30

**A3P-N: SENSOR NETWORK AND APPLICATION I
ROOMS 101-110**

SESSION CHAIR: Ryutaro Maeda (AIST)

7-157

ENABLING MODULAR PLUG&PLAY WIRELESS SENSOR AND ACTUATOR NETWORK NODES: SOFTWARE ARCHITECTURE

*Konstantin Mikhaylov, Anton Paatelma
University of Oulu, Finland*

7-160

CONFIGURING ARTIFICIAL NEURAL NETWORKS FOR THE PREDICTION OF AVAILABLE ENERGY IN SOLAR-POWERED SENSOR NODES

*Florian Gebben, Sebastian Bader, Bengt Oelmann
Mid Sweden University, Sweden*

7-162

GDOP INDEX IN UWB INDOOR LOCATION SYSTEM EXPERIMENT

*Gaoang Feng, Chong Shen, Chunhua Long, Fang Dong
Hainan University, China*

7-165

ANALYSIS OF THE NLOS CHANNEL ENVIRONMENT OF TDOA MULTIPLE ALGORITHMS

*Jie Zhang, Fang Dong, Gaoang Feng, Chong Shen
Hainan University, China*

7-167

SENSOR NETWORK SERIAL COMMUNICATION SYSTEM WITH HIGH TOLERANCE TO TIMING AND TOPOLOGY VARIATIONS

Travis Bartley⁽²⁾, Shuji Tanaka⁽²⁾, Yutaka Nonomura⁽¹⁾, Takahiro Nakayama⁽⁴⁾, Yoshiyuki Hata⁽³⁾, Masanori Muroyama⁽²⁾

⁽¹⁾Meijo University & Toyota Central R&D Labs. Inc., Japan; ⁽²⁾Tohoku University, Japan; ⁽³⁾Toyota Central R&D Labs. Inc., Japan; ⁽⁴⁾Toyota Motor Corporation, Japan

7-170

AUGMENTED DTN BASED ENERGY EFFICIENT ROUTING PROTOCOL FOR VEHICULAR AD HOC NETWORKS

Balasubramanian Paramasivan, M Bhuvaneshwari, K Mohaideen Pitchai

National Engineering College, India

7-172

MODEL-BASED RENDEZVOUS CALIBRATION OF MOBILE SENSOR NETWORKS FOR MONITORING AIR QUALITY

Adrian Arfire, Ali Marjovi, Alcherio Martinoli

École Polytechnique Fédérale de Lausanne, Switzerland

7-174

PATH PREDICTION-BASED SENSOR FILTERING METHOD

Sukhoon Lee⁽¹⁾, Dongwon Jeong⁽²⁾, Doo-Kwon Baik⁽¹⁾

⁽¹⁾Korea University, Korea; ⁽²⁾Kunsan National University, Korea

13:00 - 14:30

A3P-P: MECHANICAL, MAGNETIC AND PHYSICAL SENSING APPLICATIONS

ROOMS 101-110

SESSION CHAIR: Byeongha Lee (Gwangju Institute of Science and Technology)

8-175

DESCRIPTION AND RECOGNITION BASED ON DIRECTIONAL MOTION VECTOR FOR SPATIAL HAND GESTURES

Kyoung-Ju Noh, Dong-Woo Lee, Hyun-Tae Jeong

Electronics and Telecommunications Research Institute, Korea

8-177

A SMALL ACOUSTIC GONIOMETER TARGETED FOR INFRASONIC MEASUREMENTS

Michael Pook, Sin Ming Loo

Boise State University, USA

8-180

INERTIAL SENSING FOR GAIT ANALYSIS AND THE SCOPE FOR SENSOR FUSION

*Tahmina Zebin, Patricia J. Scully, Krikor B. Ozanyan
University of Manchester, United Kingdom*

8-182

A NOVEL FREQUENCY TUNING DESIGN FOR VIBRATION-DRIVEN ELECTROMAGNETIC ENERGY HARVESTER

*Byung-Chul Lee, Gwi-Yang Chung
University of Ulsan, Korea*

8-184

PORE WATER PRESSURE SENSOR FOR LANDSLIDE PREDICTION

*Cristian Zet, Cristian Fosala, Daniel Petrisor
Gheorghe Asachi Technical University of Iasi, Romania*

8-187

SINGLE IMAGE SUPER RESOLUTION INFRARED CAMERA USING CARBON NANOTUBE PHOTODETECTOR

*Liangliang Chen⁽¹⁾, Zhanxin Zhou⁽¹⁾, Liangjian Deng⁽²⁾, Ning Xi⁽¹⁾, Bo Song⁽¹⁾, Yongliang Yang⁽¹⁾, Yujie Hao⁽¹⁾, Zhiyong Sun⁽¹⁾
⁽¹⁾Michigan State University, USA; ⁽²⁾University of Electronic Science and Technology of China, China*

8-189

DOWNHOLE VISCOSITY MEASUREMENT PLATFORM USING TUNING FORK OSCILLATORS

*Miguel González⁽¹⁾, Greg Ham⁽¹⁾, Ali Al Haddad⁽²⁾, Greg Bernero⁽¹⁾, Max Deffenbaugh⁽¹⁾
⁽¹⁾Aramco Services Company, USA; ⁽²⁾University of Michigan, USA*

8-191

ELECTROMAGNETICALLY CONTROLLED CONVEX MICROMIRROR FOR FOCAL LENGTH VARIATION

*Md. Mahabub Hossain, Wu Bin, Seong Ho Kong
Kyungpook National University, Korea*

8-193

A NOVEL MEMS CHIP-BASED ATMOSPHERIC ELECTRIC FIELD SENSOR FOR LIGHTNING HAZARD WARNING APPLICATIONS

*Pengfei Yang⁽³⁾, Bo Chen⁽¹⁾, Xiaolong Wen⁽⁴⁾, Chunrong Peng⁽¹⁾, Shanrong Xia⁽²⁾, Yilong Hao⁽³⁾
⁽¹⁾Chinese Academy of Sciences, China; ⁽²⁾Institute of Electronics, Chinese Academy of Sciences, China; ⁽³⁾Peking University, China; ⁽⁴⁾Tsinghua University, China*

8-195

A BAROMETER-IMU FUSION METHOD FOR VERTICAL VELOCITY AND HEIGHT ESTIMATION

Youngbin Son, Seyoung Oh

Pohang University of Science and Technology, Korea

8-197

NON-CONTACT ELECTRIC-COUPPLING-BASED AND MAGNETIC-FIELD-SENSING-ASSISTED TECHNIQUE FOR MONITORING VOLTAGE OF OVERHEAD POWER TRANSMISSION LINES

Ke Zhu, Wing Kin Lee, Wing Tat Pong

University of Hong Kong, Hong Kong

8-199

OPTIMIZING PRESSURE SENSOR ARRAY DATA FOR A SMART-SHOE FALL MONITORING SYSTEM

Janet Light, Sangwhan Cha, Maksudul Alam Chowdhury

University of New Brunswick, Canada

8-201

AGE DETECTION OF LUBRICATING OIL WITH ON-LINE SENSORS

Ying Du, Tonghai Wu, Jun Cheng

Xi'an Jiaotong University, China

8-203

DETECTION OF ABNORMAL NOISES FROM TAPERED ROLLER BEARINGS BY A SOUND SENSING SYSTEM

Zhiyi Zhang⁽²⁾, Daoyong Sun⁽¹⁾, Yinling Wang⁽¹⁾, Feng Xu⁽¹⁾, Zhangliang Xu⁽²⁾, Xiaochuan Xie⁽²⁾, Hui Chen⁽²⁾, Yong Yuan⁽²⁾

⁽¹⁾CSR Sifang Co Ltd., China; ⁽²⁾Southwest Jiaotong University, China

8-205

AN 8-CHANNELS 0.13 μ M-CMOS FRONT-END FOR ATLAS MDT-DETECTORS

Marcello De Matteis⁽²⁾, Federica Resta⁽²⁾, Robert Richter⁽¹⁾, Hubert Kroha⁽¹⁾, Markus Fras⁽¹⁾, Yazhou Zhao⁽¹⁾, Varuzhan Danielyan⁽¹⁾, Sergey Abovyan⁽¹⁾, Andrea Baschirotto⁽²⁾

⁽¹⁾Max-Planck-Institute for Physics, Germany; ⁽²⁾Università degli Studi di Milano-Bicocca, Italy

8-207

THE IOT WEARABLE STRETCH SENSOR USING 3D-GRAPHENE FOAM

Natthapol Watthanawisuth, Thitima Maturos, Assawapong Sappat, Adisorn Tuantranont

National Electronics and Computer Technology Center, Thailand

8-210

ON-SITE NON-INVASIVE CURRENT MONITORING OF UNDERGROUND POWER CABLES WITH A MAGNETIC FIELD SENSING PLATFORM AT A SUBSTATION

Ke Zhu⁽²⁾, Cher Leung Sum⁽¹⁾, Wing Kin Lee⁽²⁾, Wing Tat Pong⁽²⁾

⁽¹⁾Hongkong Electric Company Ltd, Hong Kong; ⁽²⁾University of Hong Kong, Hong Kong

13:00 - 14:30

A3P-Q: OTHER SENSORS TOPICS I

ROOMS 101-110

SESSION CHAIR: Sung-Hoon Choa (Seoul National University of Science And Technology)

9-212

ZNO ACTIVATION OF ALUMINUM FOR ENERGY GENERATION IN PHYSIOLOGICAL SALINE BUFFER

Gymama Slaughter, Brian Stevens, Larry Morton Jr.

University of Maryland Baltimore County, USA

9-215

OPTICAL MOUSE AS PH ANALYZER

Altamash Fakki⁽²⁾, Salahaldein Ahmed⁽²⁾, Jongwon Park⁽¹⁾, Chang-Soo Kim⁽²⁾

⁽¹⁾Kyungil University, Korea; ⁽²⁾Missouri University of Science and Technology, USA

9-218

CNC MACHINING OF LITHIUM NIOBATE FOR RAPID PROTOTYPING OF SENSORS

Zeyad Al-Shibaany, Zi Choong, Dehong Huo, John Hedley, Zhongxu Hu

Newcastle University, United Kingdom

9-221

COMPENSATION OF THZ SPECTRUM SPURIOUS OSCILLATIONS BY LOCAL APODIZATION

Miguel Angel Bañuelos-Saucedo

Universidad Nacional Autónoma de México, Mexico

9-224

DEVELOPMENT OF A HIGH-GAIN HIGH-ISOLATION LOW-POWER RECEIVER FOR WIRELESS BODY AREA SENSOR NETWORK APPLICATION SYSTEM

I-Yu Huang⁽²⁾, Wen-Hui Huang⁽²⁾, Ren-Wu Luo⁽²⁾, Je-Wei Lan⁽²⁾, Chia-Hsu Hsieh⁽²⁾, Yu-Cheng Lin⁽¹⁾

⁽¹⁾National Cheng Kung University, Taiwan; ⁽²⁾National Sun Yat-sen University, Taiwan

9-227

AN AUTOMATED, SELF SUSTAINED SOIL MOISTURE MEASUREMENT SYSTEM USING LOW POWER DUAL PROBE HEAT PULSE (DPHP) SENSOR

Vinay Palaparthy, Shahbaz Sarik, Aakash Mehta, Kamlesh Singh, Maryam Baghini

Indian Institute of Technology Bombay, India

9-230

OXIDE OR METAL INTERFACE DAMAGE IMPROVEMENT OF DEEP SILICON ETCH PROCESS BY LOW POWER RF OF LOW FREQUENCY

Shyh-Wei Cheng⁽¹⁾, Jui-Chun Weng⁽²⁾, Chung-Hsien Hung⁽²⁾, Chun-Peng Li⁽²⁾, Chin-Hau Meng⁽²⁾, Kai-Chih Liang⁽¹⁾, Weileun Fang⁽¹⁾

⁽¹⁾National Tsing Hua University, Taiwan; ⁽²⁾Taiwan Semiconductor Manufacturing Company, Limited, Taiwan

9-233

FABRICATION OF TIO₂ NANOTUBE ON SILICON SUBSTRATE BY TWO-STEP ANODIC OXIDATION FOR WAFER LEVEL SUPERCAPACITORS APPLICATION

Gang Li⁽²⁾, Junhui Zhang⁽²⁾, Lifang Guo⁽²⁾, Qinghua Zhao⁽²⁾, Wendong Zhang⁽²⁾, Jie Hu⁽²⁾, Wei Sun⁽¹⁾

⁽¹⁾Hyperion electronics technology Wuxi Co., China; ⁽²⁾Taiyuan University of Technology, China

9-236

A THIN FILM FLEXIBLE THERMOELECTRIC GENERATOR WITH A FULLY ELECTRICAL, LOW STARTUP VOLTAGE AND HIGH EFFICIENCY DC - DC CONVERTER

Carlo Veri⁽²⁾, Mirko Pasca⁽²⁾, Stefano D'Amico⁽²⁾, Luca Francioso⁽¹⁾, Chiara De Pascali⁽¹⁾, Pietro Siciliano⁽¹⁾

⁽¹⁾National Research Council of Italy, Italy; ⁽²⁾Università del Salento, Italy

9-239

A LOW-POWER WIRELESS BONDWIRE INERTIAL SENSOR SYSTEM

Shih-Chieh Huang⁽²⁾, Shao-Yung Lu⁽¹⁾, Fu-Yuan Cheng⁽²⁾, Tsung-Heng Tsai⁽²⁾, Yu-Te Liao⁽¹⁾

⁽¹⁾National Chiao Tung University, Taiwan; ⁽²⁾National Chung Cheng University, Taiwan

9-242

COMPOSITE RUBBER ELECTRET WITH PIEZOELECTRIC 31 AND 33 MODES FOR ELASTICALLY ELECTROMECHANICAL SENSORS

Jhih-Jhe Wang, Hao-Yu Liang, Weileun Fang, Yu-Chuan Su
National Tsing Hua University, Taiwan

9-248

3D PRINTED FEATURES IN THE 100 μ M RANGE FOR APPLICATION IN SENSING

*Jort Verhaar, Remco Sanders, Gijs Krijnen
Universiteit Twente, Netherlands*

13:00 - 14:30

**A3P-R: LIVE DEMONSTRATIONS
SPECIAL POSTERS**

SESSION CHAIR: Sandro Carrara (EPFL)

A

MODULAR MULTI-RADIO WIRELESS SENSOR PLATFORM WITH PLUG&PLAY MODULES CONNECTION

*Konstantin Mikhaylov, Juha Petäjälä, Marko Mäkeläinen, Anton Paatelma, Tuomo Hänninen
University of Oulu, Finland*

B

PROSTHETIC HANDS CONTROLLED WITH A HIGHLY USABLE SEMG SENSOR

*Shintaro Sakoda, Yoshiko Yabuki, Yinlai Jiang
University of Electro-Communications, Japan*

C

UPPER LIMB PROSTHETIC CONTROL USING TOE GESTURE SENSORS AND VARIOUS TOUCH INTERFACES

*Ravinder Dahiya
University of Glasgow, United Kingdom*

D

LIVE DEMONSTRATION OF A MUTUAL-CAPACITIVE TOUCH SENSOR ROIC USING A PLL TO REDUCE LCD NOISE BY SYNCHRONIZING ROIC TX CLOCK TO LCD CLOCK

*Dong-Hee Yeo, Seon-Ho Kim, Hyeon-Kyu Noh, Jae-Yoon Sim, Byungsup Kim, Hong-June Park
Pohang University of Science and Technology, South Korea*

E

MICROSYSTEM INTEGRATION OF A PALLADIUM-BASED MEMS HYDROGEN GAS SENSOR

(related conference paper id 1704)

*Thomas Walewyns⁽²⁾, Carl Emmerechts⁽¹⁾, Pierre Gérard⁽²⁾, Nicolas André⁽²⁾, Laurent A. Francis⁽²⁾
⁽¹⁾Sirris, Belgium; ⁽²⁾Université catholique de Louvain, Belgium*

F

RIPPLE SORT' ALGORITHM, CIRCUIT IMPLEMENTATION AND VERIFICATION USING VHDL SYNTHESISABLE TESTBENCH VERIFICATION TECHNIQUE

*Ching Man⁽¹⁾, Elfed Lewis⁽²⁾, Brian Moss⁽²⁾
⁽¹⁾Analog Devices, Inc. / University Of Limerick, Ireland; ⁽²⁾University of Limerick, Ireland*

G

LDV_UPI SYSTEM FOR STRUCTURAL HEALTH MONITORING OF COMPOSITE MATERIAL

Thanh Chung Truong⁽²⁾, Jae-Yoon Park⁽²⁾, Jae Kyeong Jang⁽¹⁾, Jung Ryul Lee⁽²⁾

⁽¹⁾Chonbuk National University, Korea; ⁽²⁾Korea Advanced Institute of Science and Technology, Korea

H

CMOS BEOL-EMBEDDED 3-AXIS ACCELEROMETER

Piotr Michalik⁽²⁾, Josep Maria Sánchez-Chiva⁽²⁾, Daniel Fernández⁽¹⁾, Jordi Madrenas⁽²⁾

⁽¹⁾Nanusens, Spain; ⁽²⁾Universitat Politècnica de Catalunya, Spain

I

A NEW ADAPTIVE FRONT-END READOUT CIRCUIT FOR HIGH-RESOLUTION MAGNETIC SCALES

Ping-Chieh Chien, Yung-Hua Kao, Hong-Yang Chen, Jing-Hao Huang, Paul C.-P. Chao, Chin-Long Wey

National Chiao Tung University, Taiwan

14:30 - 16:00

A4L-A: PRINTED AND FLEXIBLE CHEMICAL SENSORS

ROOM 201

SESSION CHAIRS: Massood Atashbar (Western Michigan University)

Ravinder Dahiya (University of Glasgow)

14:30

DEVELOPMENT OF SCREEN PRINTED ELECTROCHEMICAL SENSORS FOR SELECTIVE DETECTION OF HEAVY METALS

Sai Guruva Reddy Avuthu, Jared Thomas Wabeke, Binu Baby Narakathu, Dinesh Maddipatla, Ali Eshkeiti, Sepehr Emamian, Amer Abdulmahdi Chlaihawi, Margaret Joyce, Sherine Obare, Massood Zandi Atashbar

Western Michigan University, USA

14:45

DETECTION OF HEAVY METAL IONS USING SCREEN PRINTED WIRELESS LC SENSOR

Sai Guruva Reddy Avuthu, Jared Thomas Wabeke, Binu Baby Narakathu, Dinesh Maddipatla, Sepehr Emamian, Ali Eshkeiti, Amer Abdulmahdi Chlaihawi, Bradley Bazuin, Sherine Obare, Massood Zandi Atashbar

Western Michigan University, USA

15:00

DISPOSABLE BREATH TUBES WITH ON-TUBE NANOWIRE SENSOR ARRAY FOR NON-INVASIVELY ON-SITE SENSING OF LUNG CANCER BIOMARKER

Chung-Hsuan Wu, Shih-Pang Wang, Chien-Chong Hong
National Tsing Hua University, Taiwan

15:15

INKJET-PRINTED DUAL MICROFLUIDIC-BASED SENSOR INTEGRATED SYSTEM

Wenjing Su⁽¹⁾, James Cooper⁽¹⁾, Benjamin Cook⁽¹⁾, Manos Tentzeris⁽¹⁾, Chiara Mariotti⁽²⁾, Luca Roselli⁽²⁾

⁽¹⁾Georgia Institute of Technology, USA; ⁽²⁾Università degli Studi di Perugia, Italy

15:30

A FLEXIBLE ELECTROCHEMICAL SENSOR MODIFIED BY GRAPHENE AND AUNPS FOR CONTINUOUS GLUCOSE MONITORING

Zhihua Pu, Ridong Wang, Kexin Xu, Dachao Li, Haixia Yu
Tianjin University, China

15:45

CARBON NANOTUBE BASED GAS SENSOR ARRAYS ON RIGID AND FLEXIBLE SUBSTRATES

Ahmed Abdelhalim, Florin Loghin, Maximilian Winkler, Christopher Zeiser, Alaa Abdellah, Paolo Lugli
Technische Universität München, Germany

14:30 - 16:00

A4L-B: ACCELEROMETERS

ROOM 202

SESSION CHAIRS: Koichi Awazu (AIST)

Yogesh Gianchandani (University of Michigan)

14:30

A SUB-1G CMOS-MEMS ACCELEROMETER

Daisuke Yamane⁽²⁾, Toshifumi Konishi⁽¹⁾, Motohiro Takayasu⁽²⁾, Hiroyuki Ito⁽²⁾, Shiro Doshō⁽²⁾, Noboru Ishihara⁽²⁾, Hiroshi Toshiyoshi⁽³⁾, Kazuya Masu⁽²⁾, Katsuyuki Machida⁽²⁾

⁽¹⁾NTT Advanced Technology Corporation, Japan; ⁽²⁾Tokyo Institute of Technology, Japan; ⁽³⁾University of Tokyo, Japan

14:45

A TUNABLE DIGITALLY OPERATED MEMS ACCELEROMETER

Varun Kumar, Xiaobo Guo, Roozbeh Jafari, Siavash Pourkamali
University of Texas at Dallas, USA

15:00

DESIGN AND FABRICATION OF SELF-PACKAGED, FLEXIBLE MEMS ACCELEROMETER

Sohel Mahmood, Zeynep Celik-Butler, Donald Butler
University of Texas at Arlington, USA

15:15

**A SIMPLE OUT-OF-PLANE CAPACITIVE MEMS
ACCELEROMETER UTILIZING LATERAL AND VERTICAL
ELECTRODES FOR DIFFERENTIAL SENSING**

*Yunus Terzioglu, Talha Kose, Kivanc Azgin, Tayfun Akin
Middle East Technical University, Turkey*

15:30

**FABRICATION OF A THREE-AXIS CAPACITIVE MEMS
ACCELEROMETER ON A SINGLE SUBSTRATE**

*Akin Aydemir, Tayfun Akin
Middle East Technical University, Turkey*

15:45

**DIGITAL OUTPUT FLEXIBLE TILT SENSOR WITH CONDUCTIVE
MICROSPHERES**

*Lars Büthe⁽¹⁾, Christian Vogt⁽¹⁾, Luisa Pettit⁽¹⁾, Giuseppe Cantarella⁽¹⁾,
Gerhard Tröster⁽¹⁾, Niko Münzenrieder⁽²⁾*

⁽¹⁾*Eidgenössische Technische Hochschule Zürich, Switzerland;*

⁽²⁾*University of Sussex, United Kingdom*

14:30 - 16:00

**A4L-C: MOTION AND LOCATION TRACKING
ROOM 203**

**SESSION CHAIRS: Darrin Young (University of Utah)
Andrei Shkel (University of California, Irvine)**

14:30

**ENHANCED TRACKING SYSTEM BASED ON MICRO INERTIAL
MEASUREMENTS UNIT TO TRACK SENSORIMOTOR
RESPONSES IN PIGEONS**

*Noor Aldoumani, Turgut Meydan, Christopher Dillingham, Jonathan
Erichsen
Cardiff University, United Kingdom*

14:45

**HUMAN GAIT MONITORING USING BODY-WORN INERTIAL
SENSORS AND KINEMATIC MODELLING**

*Amin Ahmadi⁽¹⁾, Francois Destelle⁽¹⁾, David Monaghan⁽¹⁾, Kieran
Moran⁽¹⁾, Noel O'Connor⁽¹⁾, Luis Unzueta⁽²⁾, Maria Teresa Linaza⁽²⁾*

⁽¹⁾*Dublin City University, Ireland;* ⁽²⁾*Vicomtech-IK4, Spain*

15:00

**EFFICIENT CHARACTERIZATION OF TENNIS SHOTS AND GAME
ANALYSIS USING WEARABLE SENSORS DATA**

*Rupika Srivastava⁽¹⁾, Ayush Patwar⁽¹⁾, Sunil Kumar⁽¹⁾, Gaurav Mishra⁽¹⁾,
Lakshmi Kaligounder⁽¹⁾, Purnendu Sinha⁽²⁾*

⁽¹⁾*Samsung R&D Institute, India;* ⁽²⁾*Samsung R&D Institute India Pvt.
Ltd., India*

15:15

HIDDEN MARKOV MODEL BASED DRIVING EVENT DETECTION AND DRIVER PROFILING FROM MOBILE INERTIAL SENSOR DATA

*Saurabh Daptardar, Vignesh Lakshminarayanan, Sharath Reddy, Suraj Nair, Saswata Sahoo, Purnendu Sinha
Samsung R&D Institute India Pvt. Ltd., India*

15:30

NOVEL MULTIPLE-FUNCTIONAL IMU-BASED WEARABLE AIR MOUSE FOR THE SIMULTANEOUS OPERATION WITH (AIR) KEYBOARDS

*Hebeom Han, Sang Won Yoon
Hanyang University, Korea*

15:45

AN EMG-BASED SYSTEM FOR PRE-IMPACT FALL DETECTION

*Alessandro Leone, Gabriele Rescio, Andrea Caroppo, Pietro Siciliano
National Research Council of Italy, Italy*

14:30 - 15:45

A4L-D: OPTICAL SENSOR SYSTEMS

ROOM 204

SESSION CHAIRS: Anna Mignani (Institute of Applied Physics, IFAC)

Sinead O'Keeffe (University of Limerick)

14:30

INVITED: MINIATURE FOURIER TRANSFORM SPECTROMETERS BASED ON ELECTROTHERMAL MEMS MIRRORS WITH LARGE PISTON SCAN RANGE

Huikai Xie⁽¹⁾, S. Lan⁽²⁾, D. Wang⁽²⁾, W. Wang⁽¹⁾, J. Sun⁽²⁾, H. Liu⁽²⁾, J. Cheng⁽²⁾, J. Ding⁽²⁾, Z. Qin⁽²⁾, Q. Chen⁽²⁾, H. Kang⁽³⁾, Z. Tian⁽³⁾

⁽¹⁾University of Florida, USA; ⁽²⁾WiO Technologies Ltd. Co., China;

⁽³⁾Xiamen University, China

15:00

A FIBER FABRY-PEROT INTERFEROMETER FOR GEOPHYSICS APPLICATIONS

Han Cheng Seat⁽⁴⁾, Michel Cattoen⁽⁴⁾, Françoise Lizion⁽⁴⁾, Maha Suleiman⁽¹⁾, Frédéric Boudin⁽⁶⁾, Jean Chéry⁽⁶⁾, Christophe Brunet⁽³⁾, Pascal Bernard⁽³⁾, Patrick Chawah⁽⁷⁾, Anthony Sourice⁽²⁾, G. Plantier⁽²⁾, D. Boyer⁽⁵⁾, A. Cavailhou⁽⁵⁾, S. Gaffet⁽⁵⁾

⁽¹⁾CNRS-INSA-UJF-UPS, France; ⁽²⁾Ecole Supérieure d'Electronique de l'Ouest, France; ⁽³⁾Institut de Physique du Globe de Paris, France;

⁽⁴⁾LAAS-CNRS et University of Toulouse, France; ⁽⁵⁾Laboratoire

Souterrain à Bas Bruit, France; ⁽⁶⁾Université Montpellier

15:15

**PHOTOACOUSTIC SIGNAL MEASUREMENT USING THIN FILM
FABRY-PEROT OPTICAL INTERFEROMETER FOR
PHOTOACOUSTIC MICROSCOPY**

Soongho Park, Jonghyun Eom, Byeong Ha Lee

Gwangju Institute of Science and Technology, Korea

15:30

**AN ULTRA-HIGH SENSITIVITY FABRY-PEROT ACOUSTIC
PRESSURE SENSOR USING A MULTILAYER SUSPENDED
GRAPHENE DIAPHRAGM**

*Cheng Li⁽¹⁾, Qianwen Liu⁽¹⁾, Tingting Guo⁽¹⁾, Jun Xiao⁽¹⁾, Shangchun
Fan⁽¹⁾, Wei Jin⁽²⁾*

*⁽¹⁾Beihang University, China; ⁽²⁾Hong Kong Polytechnic University,
China*

14:30 - 16:00

A4L-E: PHYSICAL BIOSENSORS

ROOM 206

SESSION CHAIRS: Paddy French (Delft University of Technology)

Tamina Ajmal (University of Bedfordshire)

14:30

**INVITED: BIOMEDICAL APPLICATIONS OF TUNABLE LIQUID
LENSES**

Hongrui Jiang, Aditi Kanhere

University of Wisconsin-Madison, USA

15:00

**A CALORIMETRIC BIOSENSING SYSTEM FOR CLINICAL
DIAGNOSTIC APPLICATIONS**

David Gaddes, Srinivas Tadiadapa

Pennsylvania State University, USA

15:15

**CANTILEVER SENSORS BASED ON SIALYLGLYCOPOLYMER
VIRUS RECEPTOR WITH DIFFERENT READOUT SYSTEMS**

*Petr Gorelkin⁽³⁾, Alexander Erofeev⁽³⁾, Gleb Kiselev⁽³⁾, Dmitry Kolesov⁽³⁾,
Alexandra Gambaryan⁽³⁾, Igor Yaminsky⁽³⁾, Jeong Soo Lee⁽¹⁾, Chae-
Deok Lee⁽¹⁾, Gyoung Soo Kim⁽¹⁾, Kyu Ho Song⁽¹⁾, Jungsun Han⁽¹⁾, Eun
Hwa Choi⁽¹⁾, Keumcheol Kwak⁽¹⁾, Irina Borodina*

*⁽¹⁾LG Electronics Inc. / M&C Advanced Research Institute, Korea; ⁽²⁾LG
Electronics Russia R&D Lab, Russia; ⁽³⁾Moscow State University,
Russia*

15:30

MONITORING YEAST ACTIVATION WITH SUGAR AND ZERO-CALORIE SWEETENER USING TERAHERTZ WAVES

*Olutosin Fawole, Kushagra Sinha, Massood Tabib-Azar
University of Utah, USA*

15:45

RESONATOR SENSOR ARRAY FOR SYNOVIAL FLUID CHARACTERIZATION

Ali Abdallah⁽¹⁾, Erwin Konrad Reichel⁽¹⁾, Stefan Clara⁽¹⁾, Sabrina Mairhofer⁽¹⁾, Bernhard Jakoby⁽¹⁾, Christian Feichtenschlager⁽²⁾, Martin Kramer⁽²⁾, Andreas Moritz⁽²⁾

⁽¹⁾Johannes Kepler Universität Linz, Austria; ⁽²⁾Justus Liebig-Universität Gießen, Germany

14:30 - 16:00

A4L-F: INERTIAL SENSOR SYSTEMS

ROOM 207

SESSION CHAIRS: Oliver Paul (University of Freiburg)

Tony Jun Huang (Pennsylvania State University)

14:30

A MONOLITHICALLY INTEGRATED MULTI-SENSOR PLATFORM

*Niladri Banerjee, Aishwaryadev Banerjee, Nazmul Hasan, Shashank Pandey, Bishnu Gogoi, Carlos H. Mastrangelo
University of Utah, USA*

14:45

EFFECTS OF STABILITY ASYMMETRY IN PARAMETRICALLY ACTUATED MEMS SENSORS ON PHASE FLIP PROBABILITY

Lily Li, Kimberly Turner

University of California, Santa Barbara, USA

15:00

±2PPM FREQUENCY DRIFT AND 300X REDUCTION OF BIAS DRIFT OF COMMERCIAL 6-AXIS INERTIAL MEASUREMENT UNITS USING A LOW-POWER OVEN-CONTROL MICRO PLATFORM

Donguk Yang⁽³⁾, Jong-Kwan Woo⁽³⁾, Khalil Najaff⁽³⁾, Sangwoo Lee⁽¹⁾, Jay Mitchell⁽¹⁾, Dorian Challoner⁽²⁾

⁽¹⁾ePack, Inc., USA; ⁽²⁾Inertialwave, USA; ⁽³⁾University of Michigan, USA

15:15

DEVELOPMENT OF SAW ACCELERATION SENSOR WITH EXCELLENT TEMPERATURE STABILITY

Wen Wang, Yangqing Huang, Xinlu Liu

Institute of Acoustics, Chinese Academy of Sciences, China

15:30

THE PHASE SENSITIVITY AND RESPONSE TIME OF AN X-BAND DUAL CHANNEL MICROWAVE PHASE DETECTOR

Hao Yan, Xiaoping Liao, Di Hua
Southeast University, China

15:45

A NOVEL HIGH SENSITIVITY MEMS ACOUSTIC GYROSCOPE BY MEASURING PHASE SHIFT

Yuanyuan Yu⁽²⁾, Buyun Chen⁽²⁾, Jin Tao⁽²⁾, Xuejiao Chen⁽²⁾, Hao Zhang⁽²⁾, Wei Pang⁽²⁾, Daihua Zhang⁽²⁾, Hao Luo⁽¹⁾
⁽¹⁾Intel Labs, USA; ⁽²⁾Tianjin University, China

16:00 - 16:30

MONDAY AFTERNOON BREAK
2F LOBBY

16:30 - 17:45

A5L-A: METAL OXIDE GAS SENSORS

ROOM 201

SESSION CHAIRS: Inkyu Park (KAIST)

Phillip Feng (Case Western Reserve University)

16:30

INVITED: OXIDE NANOSTRUCTURES AND 2-DIMENSIONAL MATERIALS FOR CHEMORESISTIVE GAS SENSING

Ho Won Jang
Seoul National University, Korea

17:00

CHEMICAL SENSING VIA SINGLE INPUT - MULTI OUTPUT APPROACH

Corentin Jorel⁽²⁾, Didier Robbes⁽²⁾, Constantin Radu⁽¹⁾, Matthieu Denoual⁽¹⁾, Julien Grand⁽¹⁾, Philippe Bazin⁽¹⁾, Svletana Mintova⁽¹⁾
⁽¹⁾École nationale supérieure d'ingénieurs de Caen & Centre de Recherche, France; ⁽²⁾Université de Caen Normandie, France

17:15

DEVELOPMENT OF NEW GAS SENSORS BASED ON OXIDIZED GALINSTAN

Mahnaz Shafiei, Nunzio Motta, Faegheh Hoshyargar, Anthony P. O'Mullane
Queensland University of Technology, Australia

17:30

A MICRO ELECTROCHEMICAL SENSOR BASED ON BISMUTH-MODIFIED MESOPOROUS CARBON FOR HEXAVALENT CHROMIUM DETECTION

Sixing Xu, Xiaohong Wang, Chen Zhou
Tsinghua University, China

16:30 - 18:00

A5L-B: GYROSCOPE & RESONATORS

ROOM 202

SESSION CHAIRS: Tayfun Akin (Middle East Technical University)

Martin Heinisch (Johannes Kepler University)

16:30

MODE ORDERING IN TUNING FORK STRUCTURES WITH NEGATIVE STRUCTURAL COUPLING FOR MITIGATION OF COMMON-MODE G-SENSITIVITY

Brenton R. Simon, Sambuddha Khan, Alexander A. Trusov, Andrei M. Shkel

University of California, Irvine, USA

16:45

TACTICAL GRADE MEMS GYRO WITH LOW ACCELERATION SENSITIVITY

Qin Shi, Anping Qiu, Guoming Xia, Yan Su

Nanjing University of Science and Technology, China

17:00

ALL-DIGITAL MEMS GYRO-SENSOR USING TAD-DIGITAL-SYNCHRONOUS-DETECTION (TAD-DSD) BY TAD-ADPLL

Takamoto Watanabe, Shigenori Yamauchi

Denso Corporation, Japan

17:15

A TEMPERATURE COMPENSATION METHOD FOR MICROMACHINED THERMAL GAS GYROSCOPE

Shi Qiang Liu, Rong Zhu, Heng Gao Ding

Tsinghua University, China

17:30

TRANSDUCTION PERFORMANCE OF PIEZORESISTIVE SILICON NANOWIRES ON THE FREQUENCY RESOLUTION OF A RESONANT MEMS SENSOR

Guillaume Lehée⁽⁴⁾, Frédéric Souchon⁽²⁾, Jean-Christophe Riou⁽¹⁾, Alain Bosseboeuf⁽³⁾, Guillaume Jourdan⁽²⁾

⁽¹⁾Safran Corp., France; ⁽²⁾Université Grenoble Alpes / CEA-LETI,

France; ⁽³⁾Université Paris-Sud, France; ⁽⁴⁾Université Paris-Sud / Safran Corp., France

17:45

**SENSOR BASED ON THE MODE-LOCALIZATION EFFECT IN
ELECTROSTATICALLY-COUPLED MEMS RESONATORS
FABRICATED USING AN SOI PROCESS**

*Graham Stewart Wood⁽²⁾, Chun Zhao⁽²⁾, Ibrahim Sari⁽²⁾, Suan Hui Pu⁽³⁾,
Michael Kraft⁽¹⁾*

*⁽¹⁾Université de Liège, Belgium; ⁽²⁾University of Southampton, United
Kingdom; ⁽³⁾University of Southampton Malaysia Campus, Malaysia*

16:30 - 18:00

A5L-C: FLUIDIC SYSTEMS

ROOM 203

SESSION CHAIRS: Michael McShane (Texas A&M University)

16:30

**DETERMINATION OF GAS SOURCE EXISTENCE IN A SPECIFIED
AREA BY ACTIVE AIRFLOW GENERATOR ROBOTS**

*Takashi Yoshida, Ryuichi Takemura, Haruka Matsukura, Hiroshi Ishida
Tokyo University of Agriculture and Technology, Japan*

16:45

**RAPID PROTOTYPING OF A FLEXIBLE MICROFLUIDIC SENSING
SYSTEM USING INKJET AND SCREEN PRINTING PROCESSES**

*Binu Baby Narakathu, Sai Guruva Avuthu Reddy, Dinesh Maddipatla,
Sepehr Emamian, Ali Eshkeiti, Amer Abdulmahdi Chlaihawi, Bradley
Bazuin, Massood Zandi Atashbar
Western Michigan University, USA*

17:00

**A MICROFLUIDIC PROTOTYPE FOR SCALING-UP MICROBIAL
FUEL CELL SYSTEMS**

*Hankeun Lee, Seokheun Choi
Binghamton University, State University of New York, USA*

17:15

**ENHANCING ROBUSTNESS AND APPLICABILITY OF
CONTACTLESS INDUCTIVE FLOW TOMOGRAPHY**

*Matthias Ratajczak, Thomas Wondrak, Till Zürner, Frank Stefani
Helmholtz-Zentrum Dresden-Rossendorf, Germany*

17:30

**FLOW SENSOR FOR FIELD MEASUREMENT OF VISCOUS LIQUID
USAGE FOR CONSUMER STUDIES**

*Christian Hatzfeld⁽²⁾, Christian Schröder⁽¹⁾, Alexander Unger⁽²⁾, Olivia
Morar⁽¹⁾, Torsten Klemm⁽¹⁾, Mario Kupnik⁽²⁾, Roland Werthschützky⁽²⁾
⁽¹⁾Procter & Gamble Co., Germany; ⁽²⁾Technische Universität
Darmstadt, Germany*

17:45

ACOUSTIC SENSOR FOR IN-LINE MONITORING IN POLYMER EXTRUSION DIES

Ali Abdallah⁽²⁾, Stefan Clara⁽²⁾, Erwin Konrad Reichel⁽²⁾, Gert Brabants⁽³⁾, Bernhard Jakoby⁽²⁾, Thomas Voglhuber-Brunnmaier⁽¹⁾, Hans-Jürgen Luger⁽²⁾, Ivana Burzic⁽²⁾, Alexander Lepschi⁽²⁾, Jürgen Miethlinger⁽²⁾, Veronika Putz⁽⁴⁾

⁽¹⁾Danube University Krems, Austria; ⁽²⁾Johannes Kepler Universität Linz, Austria; ⁽³⁾Johannes Kepler Universität Linz & Katholieke Universiteit Leuven, Austria; ⁽⁴⁾Linz Center of Mechatronics GmbH, Austria

16:30 - 18:00

A5L-D: IMAGING SENSORS

ROOM 204

SESSION CHAIRS: Rihito Kuroda (Tohoku University)

Payman Zarkesh-Ha (University of New Mexico)

16:30

INVITED: PHYSICAL LIMITS OF THERMAL INFRARED SENSING

Joseph Talghader

University of Minnesota, USA

17:00

A NOVEL NEAR-FIELD TERAHERTZ IMAGING PROBE FOR BIOLOGICAL IMAGING

Olutosin Fawole, Massood Tabib-Azar

University of Utah, USA

17:15

OPTICAL SENSOR SYSTEM FOR THE DETECTION OF MOLD

Roland Blank, P. P. Vinayaka, M. W. Tahir, Michael J. Vellekoop, Walter Lang

Universität Bremen, Germany

17:30

ENHANCEMENT OF ENDOSCOPIC FLUORESCENCE IMAGING BY SUPER-RESOLUTION MICROLENS

Feifei Wang⁽²⁾, Yangdong Wen⁽²⁾, Lianqing Liu⁽²⁾, Haibo Yu⁽²⁾, Peng Yu⁽²⁾, Yuechao Wang⁽²⁾, Wen Jung Li⁽¹⁾

⁽¹⁾City University of Hong Kong, Hong Kong; ⁽²⁾Shenyang Institute of Automation, Chinese Academy of Sciences, China

17:45

DESIGN AND DEVELOPMENT OF A TEST SYSTEM FOR CHARACTERIZATION OF PIXEL CROSSTALK IN CMOS IMAGE SENSORS

Mahmoud Joz Tavassoli⁽²⁾, Marzieh Asadeh Parchami⁽³⁾, Uwe Apel⁽³⁾, Mehdi Safarpour⁽⁴⁾, Uli Lemmer⁽¹⁾

⁽¹⁾Karlsruher Institut für Technologie, Germany; ⁽²⁾Karlsruher Institut für Technologie / Robert BOSCH GmbH, Germany; ⁽³⁾Robert Bosch GmbH, Germany; ⁽⁴⁾University of Zanjan, Iran

16:30 - 18:00

A5L-E: CELL-BASED BIOSENSORS

ROOM 206

SESSION CHAIRS: Marina Cole (University of Warwick)

Yuji Murakami (Toyohashi University of Technology)

16:30

INVITED: PALMTOP SENSOR FOR DETECTION OF VIRUSES BASED ON OPTICAL WAVEGUIDE MODE

Koichi Awazu

National Institute of Advanced Industrial Science and Technology, Japan

17:00

INVITED: MICROFABRICATED OPTOELECTRONIC NEURAL IMPLANTS FOR OPTOGENETICS

Wen Li⁽¹⁾, Bin Fan⁽¹⁾, Ki Yong Kwon⁽²⁾, Arthur Weber⁽¹⁾

⁽¹⁾Michigan State University, USA; ⁽²⁾Plexon Inc., USA

17:30

UPSIDE-DOWN CARBON NANOTUBE (CNT) MICRO-ELECTRODE ARRAY (MEA)

Nikolas Gaio⁽²⁾, Berend van Meer⁽¹⁾, Cinzia Silvestri⁽²⁾, Saeed Khoshfetrat Pakazad⁽²⁾, Sten Vollebregt⁽²⁾, Christine L. Mummery⁽¹⁾, Ronald Dekker⁽²⁾

⁽¹⁾Leiden University Medical Centre, Netherlands; ⁽²⁾Technische Universiteit Delft, Netherlands

17:45

A CELL-BASED ODOR SENSING SYSTEM USING FLUORESCENT TECHNIQUE AND LOCK-IN MEASUREMENT ROBUST AGAINST DISTURBANCE

Totok Mujiono⁽¹⁾, Yuji Sukekawa⁽¹⁾, Takamichi Nakamoto⁽¹⁾, Hidefumi Mitsuno⁽³⁾, Ryohei Kanzaki⁽³⁾, Nobuo Misawa⁽²⁾

⁽¹⁾Tokyo Institute of Technology, Japan; ⁽²⁾Toyohashi University of Technology, Japan; ⁽³⁾University of Tokyo, Japan

16:30 - 17:45

**A5L-F: MULTI-SENSOR AND SENSOR-NETWORK SYSTEMS
ROOM 207**

**SESSION CHAIRS: Walter Lang (University of Bremen)
Martin Heinisch (Johannes Kepler University)**

16:30

**BASIC STUDY FOR TACTILE AND VISUAL TEXTURE
MEASUREMENT BY MULTIMODAL MEMS SENSOR WITH FORCE
AND LIGHT SENSITIVITY**

*Kenta Takahashi⁽¹⁾, Takashi Abe⁽¹⁾, Masayuki Sohgewa⁽¹⁾, Masanori
Okuyama⁽²⁾, Haruo Noma⁽³⁾*

*⁽¹⁾Niigata University, Japan; ⁽²⁾Osaka University, Japan; ⁽³⁾Ritsumeikan
University, Japan*

16:45

**WIRELESS SENSORS FOR AUTOMATED CONTROL OF TOTAL
INCOMBUSTIBLE CONTENT (TIC) OF DUST DEPOSITED IN
UNDERGROUND COAL MINES**

*Omid Mahdavi⁽⁵⁾, Timothy Mueller-Sim⁽⁵⁾, Dorsa Fahimi⁽⁴⁾, Skot
Croshere⁽³⁾, Pit Pillatsch⁽³⁾, Jusuf Merukh⁽³⁾, Valentino Zegna Baruffa⁽⁴⁾,
John Sabino⁽⁴⁾, Koji Tran⁽⁴⁾, Giovanni Alanis⁽⁴⁾, Paul Solomon⁽²⁾, Paul
Wright⁽³⁾, Richard White⁽³⁾, Lara Gundel*

*⁽¹⁾Lawrence Berkeley National Laboratory, USA; ⁽²⁾U.S. Environmental
Protection Agency, USA; ⁽³⁾University of California, Berkeley, USA;
⁽⁴⁾University of Illinois, USA; ⁽⁵⁾University of Illinois at Chicago, United*

17:00

**WIRELESS SENSOR NETWORK BASED FLOOD/DROUGHT
FORECASTING SYSTEM**

*Feeza Khan, Saira Memon, Imran Jokhio, Sana Jokhio
Mehran University of Engineering and Technology, Pakistan*

17:15

**WEARABLE DRIVER DROWSINESS DETECTION SYSTEM BASED
ON BIOMEDICAL AND MOTION SENSORS**

Boon-Leng Lee⁽²⁾, Boon-Giin Lee⁽¹⁾, Wan-Young Chung⁽³⁾

*⁽¹⁾Keimyung University, Korea; ⁽²⁾Pukyong National University, Korea;
⁽³⁾Pukyong National University, Korea*

17:30

**WIRELESS LOW-POWER TEMPERATURE PROBES FOR
FOOD/PHARMACEUTICAL PROCESS MONITORING**

*Nithin Raghunathan, Xiaofan Jiang, Dimitrios Peroulis, Arnab Ganguly
Purdue University, USA*

18:00 - 19:00

**YOUNG PROFESSIONALS RECEPTION
ROOM 211-21**

TUESDAY, NOVEMBER 3

08:00 - 08:30

TUESDAY LECTURE AUTHOR BREAKFAST
ROOM 211-212

08:30 -09:30

KEYNOTE: Mechanical Systems in the Quantum Limit

Andrew Cleland

University of Chicago, USA

GRAND BALLROOM

09:30 - 10:00

TUESDAY MORNING BREAK
2F LOBBY

10:00 - 11:15

**B2L-A: ADVANCED MATERIALS OR ARCHITECTURES FOR
CHEMICAL SENSING**

ROOM 201

SESSION CHAIRS: John Atkinson (University of Southampton)

**Sangmin Jeon (POSTECH Pohang University of Science and
Technology)**

10:00

**NOVEL POLYMER MATERIALS FOR LOW-COST NITRO VAPOR
DETECTION SENSORS**

*Robert Blue, Deepak Uttamchandani, Neil Thomson, Peter Skabara
University of Strathclyde, United Kingdom*

10:15

**SELECTIVE HYDROGEN SENSING BY COBALT DOPED ZNO THIN
FILMS: A STUDY ON CARRIER REVERSAL CONDUCTIVITY**

Abhishek Ghosh⁽¹⁾, Rittick Bannerjee⁽²⁾, Subhasish Basu Majumder⁽¹⁾

⁽¹⁾Indian Institute of Technology Kharagpur, India; ⁽²⁾Siksha 'O'

Anusandhan University, India

10:30

**HIGHLY SENSITIVE, GRAPHENE OXIDE SUPPORTED ZINC
STANNATE (ZN₂SNO₄) NANOCUBES AND THEIR ROOM
TEMPERATURE NO₂ GAS SENSOR PROPERTIES**

Dinesh Veeran Ponnuvelu, Biji Pullithadathil

PSG Institute of Advanced Studies, India

10:45

THE INVESTIGATION OF REDUCED GRAPHENE OXIDE/TITANIUM DIOXIDE-BASED SENSOR FOR FORMALDEHYDE DETECTION AT ROOM TEMPERATURE

Zongbiao Ye, Hailing Tai, Chunhua Liu, Zhen Yuan, Tao Xie, Yuanjie Su, Yadong Jiang

University of Electronic Science and Technology of China, China

11:00

A NOVEL LOW-COST PRE-CONCENTRATOR CONCEPT TO BOOST SENSITIVITY AND SELECTIVITY OF GAS SENSOR SYSTEMS

Andreas Schütze⁽³⁾, Martin Leidinger⁽³⁾, Bastian Schmitt⁽³⁾, Tilman Sauerwald⁽³⁾, Max Rieger⁽¹⁾, Christine Alépée⁽²⁾

⁽¹⁾Fraunhofer Institute for Chemical Technology, Germany; ⁽²⁾SGX Sensortech SA, Switzerland; ⁽³⁾Universität des Saarlandes, Germany

10:00 - 11:30

**B2L-B: ULTRASONIC, ACOUSTIC, MAGNETIC SENSORS
ROOM 202**

**SESSION CHAIRS: David Horsley (University of California, Davis)
Venkat Bhethanabotla (University of South Florida)**

10:00

A CUSTOM REAL-TIME ULTRASONIC INSTRUMENT FOR SIMULTANEOUS MIXTURE AND FLOW ANALYSIS OF BINARY GASES IN THE CERN ATLAS EXPERIMENT

Cecilia Rossi⁽⁶⁾, M. Alhroob^{10}, R. Bates^{9}, M. Battistin⁽⁶⁾, S. Berry⁽⁶⁾, A. Bitadze^{9}, P. Bonneau⁽⁶⁾, G. Boyd^{10}, O. Crespo-Lopez⁽⁶⁾, C. Deterre⁽⁵⁾, B. DiGirolamo⁽⁶⁾, M. Doubek⁽⁴⁾, J. Godlewski⁽⁶⁾, G. Hallewell⁽³⁾, A. Hasib^{10}, S. Katunin⁽¹⁾, S. Mc

⁽¹⁾B.P. Konstantinov Petersburg Nuclear Physics Institute, Russia;

⁽²⁾Cavendish Laboratory, United Kingdom; ⁽³⁾Centre de Physique des Particules de Marseille, France; ⁽⁴⁾Czech Technical University, Czech Rep.; ⁽⁵⁾Deutsches Elektronen-Synchrotron, Germany;

10:15

DEVELOPMENT OF A BIOMIMETIC EARDRUM FOR ACOUSTIC SENSING

Pieter Westerik, Erwin Berenschot, Gijs Krijnen

Universiteit Twente, Netherlands

10:30

INVESTIGATIONS OF PMN-PT COMPOSITES FOR HIGH SENSITIVE ULTRASONIC PHASED ARRAY PROBES IN NDE

Susan Walter⁽²⁾, Thomas Herzog⁽²⁾, Frank Schubert⁽²⁾, Henning Heuer⁽²⁾, Tae-Young Han⁽²⁾, Sang-Goo Lee⁽³⁾, Hee Man Chae⁽¹⁾, Cheeyoung Joh⁽¹⁾, Hee-Seon Seo⁽¹⁾

⁽¹⁾Agency for Defense Development, Korea; ⁽²⁾Fraunhofer Institute for Ceramic Technologies and Systems, Germany; ⁽³⁾IBULE Photonics, Korea

10:45

OPTIMAL GEOMETRY OF CMOS VOLTAGE-MODE AND CURRENT-MODE VERTICAL MAGNETIC HALL SENSORS

Hadi Heidari⁽²⁾, Edoardo Bonizzoni⁽¹⁾, Umberto Gatti⁽¹⁾, Franco Maloberti⁽¹⁾, Ravinder Dahiya⁽²⁾

⁽¹⁾Università degli Studi di Pavia, Italy; ⁽²⁾University of Glasgow, United Kingdom

11:00

A NONINVASIVE AC CURRENT SENSOR WITH PERMANENT-MAGNET BIASED PZT CANTILEVER

*Jing'ao Huang, Xiaoming Wu, Xiaohong Wang
Tsinghua University, China*

11:15

A MAGNETIC SENSOR TO MEASURE WEAR IN CENTRIFUGAL PUMPS

*Ramin Khoie, Bhushan Gopaluni, James Olson, Boris Stoeber
University of British Columbia, Canada*

10:00 - 11:30

B2L-C: FORCE AND PRESSURE BASED SENSING APPLICATIONS

ROOM 203

**SESSION CHAIRS: Michael Lu (National Tsing Hua University)
Matteo Rinaldi (Northeastern University)**

10:00

INVITED: MICROFABRICATED MAGNETOELASTIC SENSORS AND ACTUATORS

*Scott Green, Yogesh Gianchandani
University of Michigan, USA*

10:30

UPPER LIMB PROSTHETIC CONTROL USING TOE GESTURE SENSORS

*William Taube Navaraj, Hadi Heidari, Anton Polishchuk, Dhayalan Shakthivel, Dinesh Bhatia, Ravinder Dahiya
University of Glasgow, United Kingdom*

10:45

A TWO-DIMENSIONAL DISTRIBUTED-DEFLECTION SENSOR FOR CONTACT LOCALIZATION

*Yichao Yang, Zhili Hao
Old Dominion University, USA*

11:00

PRINTED CAPACITIVE TOUCH SENSORS EMBEDDED IN ORGANIC COATINGS ON SHEET STEEL

*Johannes Sell⁽¹⁾, Herbert Enser⁽¹⁾, Bernhard Jakoby⁽¹⁾, Wolfgang Hilber⁽¹⁾, Michaela Schatzl-Linder⁽²⁾, Bernhard Strauß⁽²⁾
⁽¹⁾Johannes Kepler Universität Linz, Austria; ⁽²⁾voestalpine Stahl GmbH, Austria*

11:15

A PRESSURE / TEMPERATURE SENSOR EMBEDDED IN AN ENDOSCOPY HOOD FOR INTRALUMINAL MONITORING DURING FLEXIBLE ENDOSCOPIC OPERATION

*Yusaku Maeda, Yusaku Maeda, Hideki Kobara, Hirohito Mori, Hidekuni Takao
Kagawa University, Japan*

10:00 - 11:15

B2L-D: OPTICAL SENSING

ROOM 204

**SESSION CHAIRS: Ignacio Matias (Public University of Navarra)
Krikor B. Ozanyan (University of Manchester)**

10:00

HYDROGEN PEROXIDE PLASMONIC SENSING BASED ON AG-AU TRIANGULAR NANOFrames

*Yiting Wu, Ting Feng, Junwei Di
Soochow University, China*

10:15

MINIATURE SELF-CALIBRATED FIBER OPTIC TIP TEMPERATURE AND PRESSURE SENSOR

*Zhipeng Tian, Anthony Nelson, Sadiya Afroz, Vaishnavi Srinivasaraghavan, Muhammad Akbar, Zhao Li, Anbo Wang, Masoud Agah
Virginia Polytechnic Institute and State University, USA*

10:30

FLAT PANEL FINGERPRINT OPTICAL SENSOR USING TFT TECHNOLOGY

*Yi-Huan Liao, Chun Chang, Chih-Hao Lin, Jhen-Yu You, Hao-Lun Hsieh, Jing-Wen Chen, An-Thung Cho, Yu-Rong Liu, Ying-Hui Lai, Jen-Pei Tseng, Min-Feng Chiang, Yu-Chieh Lin
AU Optronics Corporation, Taiwan*

10:45

**ROBUST FRINGE DETECTION BASED ON BI-WAVELET
TRANSFORM FOR SELF-MIXING DISPLACEMENT SENSOR**

Olivier Daniel Bernal⁽²⁾, Han Cheng Seat⁽²⁾, Usman Zabit⁽³⁾, Frédéric Surre⁽¹⁾, Thierry Bosch⁽²⁾

⁽¹⁾City University London, United Kingdom; ⁽²⁾LAAS-CNRS et University de Toulouse, France; ⁽³⁾Riphah University, Pakistan

11:00

**MULTIMODE SEMICONDUCTOR LASERS FOR ADAPTIVE SELF-
MIXING SENSORS**

Frederic Surre⁽¹⁾, Thanh Binh Pham⁽²⁾, Han Cheng Seat⁽²⁾, Olivier Daniel Bernal⁽²⁾

⁽¹⁾City University London, United Kingdom; ⁽²⁾LAAS-CNRS et University de Toulouse, France

10:00 - 11:15

B2L-E: ELECTROCHEMICAL BIOSENSORS

ROOM 206

**SESSION CHAIRS: Adeel Afzal (King Fahd University of
Petroleum and Minerals)**

Mohamed Abdelmoneum (Intel Corporation)

10:00

**A MICROFABRICATED LOW-COST AU NANOTIP PYRAMIDAL
ELECTRODE ARRAY USING ANISOTROPIC ETCHING FOR
ENHANCED PERFORMANCE OF A GLUCOSE BIOSENSOR**

Gymama Slaughter, Deepa Gupta, Tanmay A. Kulkarni, Larry Morton Jr.

University of Maryland Baltimore County, USA

10:15

**A SIMPLE AND HIGHLY SENSITIVE ELECTROCHEMICAL
PLATFORM FOR DETECTION OF MICRORNAS**

Pawan Jolly, Lai Chun Caleb Wong, Anna Miodek, Mark Lindsay, Pedro Estrela

University of Bath, United Kingdom

10:30

**HIGH ROFF/RON RATIO LIQUID BASED MEMRISTOR SENSOR
USING SOL GEL SPIN COATING TECHNIQUE**

Nor Shahanim Mohamad Hadis⁽¹⁾, Asrulnizam Abd Manaf⁽¹⁾, Sukreen Hana Herman⁽²⁾, Siti Hawa Ngalim⁽¹⁾

⁽¹⁾Universiti Sains Malaysia, Malaysia; ⁽²⁾Universiti Teknologi MARA, Malaysia

10:45

A HIGHLY USABLE AND CUSTOMIZABLE SEMG SENSOR FOR PROSTHETIC LIMB CONTROL USING POLYPYRROLE-COATED NONWOVEN FABRIC SHEET

Yinlai Jiang⁽²⁾, Shintaro Sakoda⁽²⁾, Masami Togane⁽²⁾, Soichiro Morishita⁽²⁾, Baoliang Lu⁽¹⁾, Hiroshi Yokoi⁽²⁾

⁽¹⁾Shanghai Jiao Tong University, China; ⁽²⁾University of Electro-Communications, Japan

11:00

THREE-DIMENSIONAL GRAPHENE-POLYDIMETHYLSILOXANE COMPOSITE AS A CONDUCTIVE SUBSTRATE FOR CELL-BASED ELECTROCHEMICAL DETECTION

Uraivan Waiwijit, Tanom Lomas, Adisorn Tuantranont, Thitima Maturos, Ditsayut Phokaratkul, Anurat Wisitsoraat
National Electronics and Computer Technology Center, Thailand

10:00 - 11:30

**B2L-F: SENSORS READOUT/INTERFACE/CIRCUITS I
ROOM 207**

**SESSION CHAIRS: Alton Horsfall (Newcastle University)
Phillip Feng (Case Western Reserve University)**

10:00

A FULLY INTEGRATED CMOS INTERFACE ASIC FOR TWO-AXIS PIEZOELECTRIC ANGULAR RATE MEMS INERTIAL SENSORS

Sultan A. Alqarni, Abdulfattah M. Obeid, Mohammed S. BenSaleh, Syed Manzoor Qasim

King Abdulaziz City for Science and Technology, Saudi Arabia

10:15

CALCULATING DEPTH IMAGE WITH PIXEL-PARALLEL PROCESSOR FOR A TOF IMAGE SENSING SYSTEM

Zhe Chen, Liyuan Liu, Nanjian Wu

Institute of Semiconductors, Chinese Academy of Sciences, China

10:30

A NEW ADAPTIVE FRONT-END CIRCUIT FOR HIGH-RESOLUTION MAGNETIC SCALES

Ping-Chieh Chien, Yung-Hua Kao, Hong-Yang Chen, Jing-Hao Huang, Paul C. -P. Chao, Chin-Long Wey

National Chiao Tung University, Taiwan

10:45

A SMART SENSORY PLATFORM BASED ON FIELD PROGRAMMABLE ANALOG ARRAY

Tao Yin, Xiaoyan Cheng, Fubin Xin, Qisong Wu, Fei Wang, Haigang Yang

Institute of Electronics, Chinese Academy of Sciences, China

11:00

MEASUREMENT UNCERTAINTY OF TIME-BASED AND VOLTAGE-BASED WHEATSTONE BRIDGE READOUT CIRCUITS

*Jan Lotichius, Stefan Wagner, Mario Kupnik, Roland Werthschützky
Technische Universität Darmstadt, Germany*

11:15

A LOW-POWER READOUT CIRCUIT DESIGN FOR CAPACITIVE MICROSENSORS

*Fatemeh Aezinia, Behraad Bahreyni
Simon Fraser University, Canada*

11:30 - 12:30

**TUESDAY LUNCH & AWARDS
GRAND BALLROOM**

TUESDAY, NOVEMBER 3 – POSTER SESSION

12:30 - 14:00

B3P-G: SENSOR MODELING & CHARACTERIZATION II

ROOMS 101-110

SESSION CHAIR: Tania Mukherjee (Indian Institute of Technology Kharagpur)

1-2

MATHEMATICAL MODEL FOR BIOMOLECULAR QUANTIFICATION USING SURFACE-ENHANCED RAMAN SPECTROSCOPY BASED SIGNAL INTENSITY DISTRIBUTIONS

Mirko Palla⁽²⁾, Filippo Giacomo Bosco⁽³⁾, Jaeyoung Yang⁽¹⁾, Tomas Rindzevicius⁽³⁾, Tommy Sonne Alstrom⁽³⁾, Michael Stenbæk Schmidt⁽³⁾, Qiao Lin⁽¹⁾, Jingyue Ju⁽¹⁾, Anja Boisen⁽³⁾

⁽¹⁾Columbia University, USA; ⁽²⁾Harvard University, USA; ⁽³⁾Technical University of Denmark, Denmark

1-5

TOWARDS PROPER ACCELERATION ESTIMATE BY USING SPECTRAL ACCELERATION INFORMATION. APPLICATION TO TRAIN TRANSPORTATION

*Damien Veillard, Frederick Mailly, Philippe Fraisse
Université de Montpellier / CNRS, France*

1-8

ACOUSTIC STREAMING DRIVEN BY IMMERSSED RESONATOR STRUCTURES

*Erwin Konrad Reichel, Bernhard Jakoby
Johannes Kepler Universität Linz, Austria*

1-11

MICROCAVITY ASSISTED ACOUSTIC WAVE CHANNELING CAN LEAD TO HIGH SENSITIVITY AND ULTRA-LOW POWER SAW SENSORS

Sina Koochakzadeh⁽²⁾, Mandek Richardson⁽²⁾, Venkat Bhethanabotla⁽²⁾, Subramanian Sankaranarayanan⁽¹⁾

⁽¹⁾Argonne National Laboratory, USA; ⁽²⁾University of South Florida, USA

1-14

BEHAVIORAL MODELING AND EXPERIMENTAL VALIDATION OF UNCOOLED MICROBOLMETER

*Gyungtae Kim, Hyoungko Ko
Chungnam National University, Korea*

1-17

ONE COMPUTER-AIDED EQUIVALENT CIRCUIT MODEL OF A MEMS PHASE DETECTOR APPLIED IN PHASE LOCKED LOOPS

*Juzheng Han, Xiaoping Liao
Southeast University, China*

1-20

ADAPTIVE SENSOR FUSION TECHNOLOGY FOR MOBILE AND WEARABLE APPLICATIONS

*Ramasamy Kannan⁽¹⁾, Ankur Garg⁽²⁾
⁽¹⁾Samsung Electronics, Korea; ⁽²⁾Samsung R&D Institute India
Bangalore, India*

1-22

MODAL COUPLING ERROR SUPPRESSION IN MICROMACHINED GYROSCOPES BY UV LASER TRIMMING

*Zhanqiang Hou, Xuezhong Wu, Dingbang Xiao, Xinghua Wang,
Zhihua Chen
National University of Defense Technology, China*

13-249

A NOVEL FEATURE EXTRACTION ALGORITHM FOR ON THE SENSOR NODE PROCESSING OF COMPRESSIVE SAMPLED PHOTOPLETHYSMOGRAPHY SIGNALS

*Venkata Rajesh Pamula⁽²⁾, Marian Verhelst⁽³⁾, Chris Van Hoof⁽²⁾, Refet Fira Yazicioglu⁽¹⁾
⁽¹⁾imec, Belgium; ⁽²⁾imec/Katholieke Universiteit Leuven, Belgium;
⁽³⁾Katholieke Universiteit Leuven, Belgium*

13-252

IMPROVED PATH LOSS PREDICTION MODEL FOR SHORT RANGE INDOOR POSITIONING USING BLUETOOTH LOW ENERGY

*Subha Viswanathan, Sreedevi Srinivasan
Cisco Systems Pvt Ltd, India*

12:30 - 14:00

B3P-H: CHEMICALS SENSORS

ROOMS 101-110

SESSION CHAIR: Binu Narakathu (Western Michigan University)

2-24

DETECTION OF VOLATILE ORGANIC SULFUR COMPOUNDS (VOSCS) BY SAW SENSOR BASED ON HYDROGEN-BOND ACIDIC POLYMERS

*Yin Long, Xiaosong Du, Yang Wang, Luhua Cheng, Penglin Wu,
Yuanjie Su, Yadong Jiang
University of Electronic Science and Technology of China, China*

2-27

OPTICAL GAS SENSOR BASED ON LSPR USING ZNO NANOPARTICLES AND AAO NANOSTRUCTURE

Sae-Wan Kim, Seung-Hwan Cha, Byoung-Ho Kang, Sang-Won Lee, Jae-Sung Lee, Ju-Seong Kim, Sai-Anand Gopalan, Shon-Won Kang
Kyungpook National University, Korea

2-30

ENHANCEMENT HUMIDITY SENSING PROPERTIES OF GRAPHENE OXIDE/POLY(ETHYLENEIMINE) FILM QCM SENSORS

Zhen Yuan, Huiling Tai, Xiaohua Bao, Zongbiao Ye, Chunhua Liu, Yadong Jiang
University of Electronic Science and Technology of China, China

2-33

ALIGNMENT-LESS MICROCHANNEL INTEGRATION ONTO A STACKED CARBON ELECTRODE SET FOR HIGHLY SENSITIVE ELECTROCHEMICAL SENSOR APPLICATIONS

Jongmin Lee, Yeongjin Lim, Heungjoo Shin
Ulsan National Institute of Science and Technology, Korea

2-36

THE EFFECT OF ELECTROLYTE CONCENTRATION ON THE CHARACTERISTICS OF MEMS BASED ELECTROCHEMICAL SEISMIC SENSORS

Guanglei Li, Junbo Wang, Deyong Chen, Yonghao Xing, Jian Chen
Institute of Electronics, Chinese Academy of Sciences, China

2-39

INK-JET PRINTED FLEXIBLE GAS SENSORS BASED ON ELECTROMAGNETIC TRANSDUCTION AND CARBON MATERIALS

Prince Bahoumina⁽²⁾, Hamida Hallil⁽²⁾, Jean-Luc Lachaud⁽²⁾, Corinne Dejous⁽²⁾, Dominique Rebière⁽²⁾, Carlos Paragua⁽³⁾, Kamel Frigui⁽³⁾, Stéphane Bila⁽³⁾, Dominique Baillargeat⁽³⁾, Sébastien Pacchini⁽¹⁾, Philippe Coquet⁽¹⁾, E. Pichonat⁽⁴⁾, H. Happy⁽⁴⁾

⁽¹⁾Nanyang Technological University, Singapore; ⁽²⁾Université de Bordeaux, France; ⁽³⁾Université de Limoges / CNRS / XLIM Research Institute, France; ⁽⁴⁾Université Lille 1, France

2-41

A HIGHLY SELECTIVE MEMS TRANSDUCER FOR HYDROGEN SENSING BASED ON STRESS MODIFICATION IN PALLADIUM THIN FILMS

Thomas Walewyns⁽²⁾, Carl Emmerechts⁽¹⁾, Pierre Gérard⁽²⁾, Nicolas André⁽²⁾, Laurent A. Francis⁽²⁾

⁽¹⁾Sirris, Belgium; ⁽²⁾Université catholique de Louvain, Belgium

2-43

THE ELECTROCHEMICAL SENSOR BASED ON CTS@FE3O4 NANOCOMPOSITE FOR THE DETECTION OF TRICHLOROACETIC ACID

Yuanhong Wang⁽²⁾, Yifeng Tu⁽²⁾, Haiying Gu⁽¹⁾

⁽¹⁾Nantong University, China; ⁽²⁾Soochow University, China

2-47

INVESTIGATION OF ZINC PHTHALOCYANINE FILMS FOR QCM SENSING APPLICATIONS

*Amani Hamid, Alan Holloway, Aseel Hassan, Alexei Nabok
Sheffield Hallam University, United Kingdom*

2-53

THE GAS MULTISENSOR CHIP FABRICATED BY DIRECT ELECTROCHEMICAL DEPOSITION OF TIN OXIDE

Fedor Fedorov⁽³⁾, Dmitry Podgainov⁽³⁾, Alexey Varezchnikov⁽³⁾, Andrey Lashkov⁽³⁾, Vyacheslav Dykin⁽³⁾, Maria Eugenia Toimil-Molares⁽¹⁾, Victor Sysoev⁽²⁾

⁽¹⁾GSI Helmholtzzentrum für Schwerionenforschung, Germany;

⁽²⁾Saratov State Technical University, Russia; ⁽³⁾Yuri Gagarin State Technical University of Saratov, Russia

13-255

SELECTIVE QUANTIFICATION OF HUMIDITY AND AMMONIA BY OPTICAL EXCITATION OF MOLECULAR SEMICONDUCTOR-DOPED INSULATOR (MSDI) SENSORS

Marco Schüller⁽¹⁾, Tilman Sauerwald⁽¹⁾, Andreas Schütze⁽¹⁾, Pierre Gaudillat⁽²⁾, Jean-Moise Suisse⁽²⁾, Marcel Bouvet⁽²⁾

⁽¹⁾Universität des Saarlandes, Germany; ⁽²⁾Université de Bourgogne Franche-Comté, France

13-258

NICKEL OXIDE THIN FILM SENSOR FOR FLUCTUATION-ENHANCED GAS SENSING OF FORMALDEHYDE

Umut Cindemir⁽²⁾, Lars Österlund⁽²⁾, Gunnar Niklasson⁽²⁾, Claes-Göran Granqvist⁽²⁾, Maciej Trawka⁽¹⁾, Janusz Smulko⁽¹⁾

⁽¹⁾Gdansk University of Technology, Poland; ⁽²⁾Uppsala University, Sweden

12:30 - 14:00

B3P-J: BIOSENSORS II

ROOMS 101-110

SESSION CHAIR: Achi Fethi

3-56

DESIGN AND FABRICATION OF A MEMS MAGNETIC SENSOR UTILIZING FERROMAGNETIC-PIEZOELECTRIC COMPOSITES

*Peng Qu, Hongwei Qu, Sreenivasulu Gollapudi, Rao Bidthanapally,
Gopalan Srinivasan
Oakland University, USA*

3-59

ULTRA-SENSITIVE AND LABEL-FREE BIOSENSORS USING SURFACE PLASMON RESONANCE OF NANO-GRATING STRUCTURE IN NANOFUIDIC PRECONCENTRATOR

Wei-Hang Lee⁽²⁾, Pei-Shan Chung⁽²⁾, Meng-Lin You⁽¹⁾, Kuang-Li Lee⁽¹⁾, Pei-Kuen Wei⁽¹⁾, Wei-Cheng Tian⁽²⁾

⁽¹⁾Academia Sinica, Taiwan; ⁽²⁾National Taiwan University, Taiwan

3-62

HYDROGEL MATRIX EFFECTS ON OXYGEN DIFFUSION: CONTROLLING PROPERTIES FOR BIOSENSOR APPLICATIONS

Rachel Unruh, Jenna Weaver, Mike McShane

Texas A&M University, USA

3-65

A STRETCHABLE AND WEARABLE PRINTED SENSOR FOR HUMAN BODY MOTION MONITORING

Ali Eshkeiti, Zeinab Ramshani, Sepehr Emamian, Binu Baby Narakathu, Sai Guruva Reddy Avuthu, Mohamed Mohammed Ali, Amer Abdulmahdi Chlahawi, Margaret Joyce, Massood Zandi Atashbar

Western Michigan University, USA

3-68

NON-ENZYMATIC GRAPHENE-BASED BIOSENSORS FOR CONTINUOUS GLUCOSE MONITORING

Mahmoud Sakr, Mohamed Serry

American University in Cairo, Egypt

3-71

ELECTRICAL CHARACTERIZATION OF NANOSTRUCTURED 3D MICROELECTRODES FOR RETINAL NEURON STIMULATION

Kilhwa Pi, Jong Yoon Shin, Suk Won Jung, Sangmin Lee, Dong-Il Cho
Seoul National University, Korea

3-74

THERMAL MEASUREMENT OF CEREBROSPINAL FLUID FLOW RATE IN HYDROCEPHALUS SHUNT

Sathish Rajasekaran⁽¹⁾, Hongwei Qu⁽¹⁾, Karol Zakalik⁽²⁾

⁽¹⁾Oakland University, USA; ⁽²⁾William Beaumont Hospitals, USA

3-77

DROPLET DNA BINDING DETECTION ON MICROFLUIDIC FLOW-FOCUSING

Sunggu Kim, Junghoon Lee

Seoul National University, Korea

3-80

DEVELOPMENT OF AMPEROMETRIC ION SENSOR ARRAY FOR MULTI-ION DETECTION

*Shinya Mizutani, Sou Takahashi, Akiteru Kono, Toshiaki Hattori, Tatsuya Iwata, Makoto Ishida, Kazuaki Sawada
Toyoashi University of Technology, Japan*

3-83

HIGHLY SENSITIVE SAM MODIFIED ELECTROSPUN ZINC OXIDE NANOFIBER BASED LABEL FREE BIOSENSING PLATFORM

*Brince Paul, M Durga Prakash, Shiv Govind Singh, Siva Rama Krishna Vanjari
Indian Institute of Technology Hyderabad, India*

3-85

DETECTION OF L-HISTIDINE USING SOLUTION-PROCESSED ZNO NANOPILLAR

*Milan Sasmal, Tapas Kumar Maiti, Tarun Kanti Bhattacharyya
Indian Institute of Technology Kharagpur, India*

12:30 - 14:00

B3P-K: OPTICAL SENSORS II

ROOMS 101-110

SESSION CHAIR: Rihito Kuroda (Tohoku University)

4-87

FREQUENCY CHARACTERISATION OF AN OPTICALLY-INTERROGATED ROGOWSKI COIL FOR SMART GRID PROTECTION APPLICATIONS

Grzegorz Fusiek⁽²⁾, John Nelson⁽²⁾, Philip Orr⁽¹⁾, Pawel Niewczas⁽²⁾, Campbell Booth⁽²⁾

⁽¹⁾Synaptec Ltd, United Kingdom; ⁽²⁾University of Strathclyde, United Kingdom

4-90

D-SHAPE OPTICAL FIBER PH SENSOR BASED ON LOSSY MODE RESONANCES (LMRS)

*Pablo Zubiate, Carlos Ruiz Zamarreño, Ignacio Del Villar, Ignacio R. Matías-Maestro, Francisco Javier Arregui
Universidad Pública de Navarra, Spain*

4-93

EXTRINSIC OPTICAL FIBRE BENDING SENSOR FOR SPINE MONITORING

*Mohd Anwar Zawawi, Sinead O'Keeffe, Elfed Lewis, Kieran O'Sullivan
University of Limerick, Ireland*

4-96

**LENS-FREE AUTOMATED CELL DETECTION SYSTEM FOR
TELEMEDICINE APPLICATION**

*Mohendra Roy⁽³⁾, Dongmin Seo⁽³⁾, Yongha Hwang⁽³⁾, Jaewoo Kim⁽³⁾,
Kiyounng Ann⁽³⁾, Yeon Hwa Kwak⁽¹⁾, Sungkyu Seo⁽³⁾, Sangwoo Oh⁽²⁾,
Moonjin Lee⁽²⁾*

*⁽¹⁾Korea Electronics Technology Institute, Korea; ⁽²⁾Korea Research
Institute of Ships and Ocean Engineering, Korea; ⁽³⁾Korea University,
Korea*

4-99

**DYNAMIC POSITIONING SENSING SYSTEM FOR ESTIMATING
SIZE AND DEPTH OF EMBEDDED OBJECTS**

*Firdous Saleheen, Chang-Hee Won
Temple University, USA*

4-102

**A FIBER-OPTIC PH SENSOR WITH WIRELESS RADIO OVER
FIBER READ-OUT**

*Tobias Schuster, Niels Neumann, Dirk Plettemeier, Rene Körbitz,
Andreas Richter
Technische Universität Dresden, Germany*

12:30 - 14:00

**B3P-L: MECHANICAL, MAGNETIC & PHYSICAL SENSORS II
ROOMS 101-110**

SESSION CHAIR: Alton Horsfall (Newcastle University)

5-156

**CURRENT SOURCE DEDICATED FOR DIRECT DIGITAL
SYNTHESIZERS: APPLICATION TO THE GIANT MAGNETO-
IMPEDANCE (GMI) SENSORS**

*Aktham Asfour, Jean-Paul Yonnet, Manel Zidi, Julie Nabias, Papa Silly
Traore
Université Grenoble Alpes, France*

5-106

**TUNABLE EDDY CURRENT DEVICE FOR THE CONTACTLESS
CHARACTERIZATION OF A LARGE VARIETY OF
SEMICONDUCTOR MATERIALS**

*Florent Loete, Yann Le Bihan, Josué Ferreira, Denis Mencaraglia
École Supérieure d'Électricité, France*

5-110

**A TEMPERATURE SELF-CALIBRATING TORSIONAL
ACCELEROMETER WITH FULLY DIFFERENTIAL
CONFIGURATION AND INTEGRATED REFERENCE CAPACITOR**

*Dingbang Xiao, Dewei Xia, Qingsong Li, Yulie Wu, Zhihua Chen,
Xuezhong Wu
National University of Defense Technology, China*

5-114

MEMS FLOW SENSORS WITH SILICON-CARBIDE EROSION RESISTANT COATING

Duy Son Nguyen⁽¹⁾, Pit Pillatsch⁽¹⁾, Igor Paprotny⁽²⁾, Paul Wright⁽¹⁾, Richard White⁽¹⁾

⁽¹⁾University of California, Berkeley, USA; ⁽²⁾University of Illinois at Chicago, USA

5-118

FABRICATION OF A HIGH SENSITIVITY MEMS ACCELEROMETER WITH SYMMETRICAL DOUBLE-SIDED SERPENTINE BEAM-MASS STRUCTURE

Qingsong Li, Dingbang Xiao, Zhanqiang Hou, Xinghua Wang, Zhihua Chen, Xuezhong Wu

National University of Defense Technology, China

5-122

DEVELOPMENT OF STRETCHABLE STRAIN SENSOR USING ELASTIC FIBROUS MEMBRANE COATED WITH CONDUCTING POLYMER

Hyungkook Jeon⁽²⁾, Geunbae Lim⁽²⁾, Seong J. Cho⁽¹⁾

⁽¹⁾Chungnam National University, Korea; ⁽²⁾Pohang University of Science and Technology, Korea

5-126

INDUCTIVE DETECTION OF GAS BUBBLES IN A LIQUID METAL FLOW

Thomas Gundrum⁽¹⁾, Philipp Büttner⁽¹⁾, Bachir Dekdouk⁽²⁾, Anthony Peyton⁽²⁾, Thomas Wondrak⁽¹⁾, Vladimir Galindo⁽¹⁾, Sven Eckert⁽¹⁾

⁽¹⁾Helmholtz-Zentrum Dresden-Rossendorf, Germany; ⁽²⁾University of Manchester, United Kingdom

5-130

IMPLEMENTATION OF THE DIGITAL-DOWN-CONVERSION (DDC) AND SOFTWARE FOR THE OPTIMIZATION OF THE GIANT MAGNETO-IMPEDANCE (GMI) SENSORS

Papa Silly Traore, Aktham Asfour, Jean-Paul Yonnet

Université Grenoble Alpes, France

13-261

PERFORMANCE ANALYSIS OF MINIATURIZED PCB COILS FOR SMALL-APERTURE MAGNET QUALIFICATION

Pasquale Arpaia⁽²⁾, Marco Buzio⁽¹⁾, Olaf Dunkel⁽¹⁾, Mauro D'arco⁽²⁾, Stephan Russenschuck⁽¹⁾, Giordana Severino⁽¹⁾

⁽¹⁾European Organization for Nuclear Research, Switzerland;

⁽²⁾Università degli Studi di Napoli Federico II, Italy

13-263

DEVELOPMENT OF A HALL-EFFECT BASED SKIN SENSOR

Tito Pradhono Tomo⁽²⁾, Sophon Somlor⁽²⁾, Alexander Schmitz⁽²⁾, Shuji Hashimoto⁽²⁾, Shigeki Sugano⁽²⁾, Lorenzo Jamone⁽¹⁾

⁽¹⁾Instituto Superior Técnico, Portugal; ⁽²⁾Waseda University, Japan

12:30 - 14:00

B3P-M: ACTUATOR & ENERGY HARVESTER

ROOMS 101-110

SESSION CHAIR: Pit Pillatsch (University of California, Berkeley)

6-134

WI-FI-CONNECTED RADIATION MEASUREMENT SYSTEM BY SMALL-SCALE SOLAR ENERGY HARVESTING

Yoshinori Matsumoto⁽¹⁾, Masatoshi Satoh⁽²⁾

⁽¹⁾Keio university, Japan; ⁽²⁾Yaguchi ELeCtric Co.,Ltd., Japan

6-138

A HANDY MOTION DRIVEN, FREQUENCY UP-CONVERTING PIEZOELECTRIC ENERGY HARVESTER USING FLEXIBLE BASE FOR WEARABLE SENSORS APPLICATIONS

Md. Abdul Halim Miah, Hyunok Cho, Jae Yeong Park

Kwangwoon University, Korea

6-142

PRESSURE COMPENSATION BEHAVIOR INSIDE AN EWOD OSCILLATOR

Andreas Tröls, Bernhard Jakoby

Johannes Kepler Universität Linz, Austria

6-146

ELECTROWETTING INTERFACIAL TENSION MEASUREMENT SYSTEM

Seungyul Choi, Junghoon Lee

Seoul National University, Korea

6-150

THE STUDY OF A RF MEMS SWITCH BASED ON LCP SUBSTRATE

Xiaofeng Gao, Lei Han, Meng Nie, Qing-An Huang

Southeast University, China

6-152

A MILLI-VOLT TRIGGERED MEMS PADDLE SWITCH

Aishwaryadev Banerjee, Shashank Pandey, Niladri Banerjee, Nazmul Hasan, Carlos H. Mastrangelo

University of Utah, USA

6-154

FABRICATION OF MICROCOIL WITH LARGE TILT-ANGLE ON POLYMER TUBE FOR ELECTROMAGNETICALLY-DRIVEN SCANNER IN SINGLE FIBER ENDOSCOPE

Zhuoqing Yang⁽²⁾, Qihuan Zhang⁽²⁾, Yi Zhang⁽¹⁾, Toshihiro Itoh⁽¹⁾, Ryutaro Maeda⁽¹⁾, Jinyuan Yao⁽²⁾, Guifu Ding⁽²⁾

⁽¹⁾National Institute of Advanced Industrial Science and Technology, Japan; ⁽²⁾Shanghai Jiao Tong University, China

13-265

STUDY ON THE PZT DIAPHRAGM ACTUATED MULTIPLE JET FLOW IN A CIRCULATORY MINIATURIZED SYSTEM

Tung Thanh Bui⁽²⁾, Thien Xuan Dinh⁽³⁾, Phan Thanh Hoa⁽¹⁾, Van Thanh Dau⁽⁴⁾

⁽¹⁾Hanoi University of Industry, Vietnam; ⁽²⁾National Institute of Advanced Industrial Science and Technology, Japan; ⁽³⁾Ritsumeikan University, Japan; ⁽⁴⁾Sumitomo Chemical. Ltd, Japan

13-267

A WIRELESS MULTI-SENSOR SYSTEM FOR SOIL MOISTURE MEASUREMENT

Aravind P, Mangesh Gurav, Aakash Mehta, Rohan Shelar, Jobish John, Vinay S Palaparthi, Kamlesh Kumar Singh, Shahbaz Sarik, Maryam Shojaei Baghini

Indian Institute of Technology Bombay, India

12:30 - 14:00

B3P-N: SENSOR NETWORK AND APPLICATION II

ROOMS 101-110

SESSION CHAIR: Mohamed Abdelmoneum (Intel Corporation)

7-158

ACOUSTIC ECHO PATH DELAY ESTIMATION BY MEANS OF A BOC-BPSK CORRELATION METHOD

Florian Beaubois, Ikhlas Selmi, Jean-Bernard Choquel, Jean-Charles Noyer, Serge Reboul

University of Littoral Côte Opale, France

7-161

HRCCTP: A HYBRID RELIABLE AND CONGESTION CONTROL TRANSPORT PROTOCOL FOR WIRELESS SENSOR NETWORKS

Trilok Chand, Bhisham Sharma

PEC University of Technology, India

7-163

DUX-MAC: A DUAL CHANNEL X-MAC PROTOCOL FOR WSNS

Shafika Showkat Moni⁽¹⁾, Md Al Mamun⁽²⁾, Mohammad Shah Alam⁽¹⁾

⁽¹⁾Bangladesh University of Engineering and Technology, Bangladesh;

⁽²⁾Rajshahi University of Engineering and Technology, Bangladesh

7-166

INTERNET OF THINGS: SENSOR TO SENSOR COMMUNICATION

Rajeshkumar Gunasagaran, Latifah Munirah Kamarudin, Ammar Zakaria, Ericson Kanagaraj, Muhammad Shaiful Alimon, Ali Yeon Md. Shakaff, Phaklen Ehkan, Retnam Visvanathan, Mohd Hafiez Mohd Razali

Universiti Malaysia Perlis, Malaysia

7-168

CLOUD-BASED REMOTE ENVIRONMENTAL MONITORING SYSTEM WITH DISTRIBUTED WSN WEATHER STATIONS

Ericson Kanagaraj, Latifah Munirah Kamarudin, Ammar Zakaria, Rajeshkumar Gunasagaran, Ali Yeon Md. Shakaff

Universiti Malaysia Perlis, Malaysia

13-269

UBIQUITOUS MONITORING OF PEDESTRIAN DYNAMICS: EXPLORING WIRELESS AD HOC NETWORK OF MULTI-SENSOR TECHNOLOGIES

Bilal Farooq, Alexandra Beaulieu, Marwan Ragab, Viet-Dang Ba
Polytechnique Montreal, Canada

13-271

A MESH NETWORK FOR MOBILE DEVICES USING BLUETOOTH LOW ENERGY

Shruthi Sirur⁽²⁾, Praneeth Juturu⁽²⁾, Hari Prabhat Gupta⁽²⁾, Pramod Reddy Serikar⁽²⁾, Yaswanth Kumar Reddy⁽²⁾, Sulekha Barak⁽²⁾, Bonggon Kim⁽¹⁾

⁽¹⁾Samsung Electronics, Korea; ⁽²⁾Samsung R&D Institute Bangalore, India

13-273

TRCCTP: A TRAFFIC REDIRECTION BASED CONGESTION CONTROL TRANSPORT PROTOCOL FOR WIRELESS SENSOR NETWORKS

Trilok Chand, Bhisham Sharma, Manpreet Kour
PEC University of Technology, India

12:30 - 14:00

**B3P-P: OPTICAL SENSING APPLICATIONS II
ROOMS 101-110**

SESSION CHAIR: Harald Steiner (Danube University Krems)

8-176

DESIGN OF CRYOGENIC FLOW METER USING FIBER BRAGG GRATING SENSORS

Sankar Ram Thekkethil, Venkatraman Narayanan Venkatesan, Holger Neumann, Rajinikumar Ramalingam
Karlsruher Institut für Technologie, Germany

8-178

MOBILE ROBOT LOCALIZATION SYSTEM USING MULTIPLE CEILING MOUNTED CAMERAS

Retnam Visvanathan, Syed Muhammad Mamduh, Kamarulzaman Kamarudin, Ahmad Shakaff Ali Yeon, Ammar Zakaria, Ali Yeon Md. Shakaff, Latifah Munirah Kamarudin, Fathinul Syahir Ahma Saad
Universiti Malaysia Perlis, Malaysia

8-183

STR-OCTREE INDEXING METHOD FOR PROCESSING LIDAR DATA

Permata Nur Miftahur Rizki⁽¹⁾, Jaehwan Park⁽¹⁾, Sangyoon Oh⁽¹⁾, Heezin Lee⁽²⁾

⁽¹⁾Ajou University, Korea; ⁽²⁾University of California, Berkeley, USA

8-185

TURBIDITY MONITORING OF LAKE WATER BY TRANSMITTANCE MEASUREMENT WITH A SIMPLE OPTICAL SETUP

Ryohei Komiyama, Tomoaki Kageyama, Masashi Miura, Hidetoshi Miyashita, Sang-Seok Lee
Tottori University, Japan

8-188

REFLECTION BASED BLOOD PULSATION MEASUREMENT USING LINEAR POLARIZATION OF LIGHT

Deepak Mishra, Supriya Chakraborty, Mukul Sarkar
Indian Institute of Technology Delhi, India

8-192

HYPERSPECTRAL IMAGING APPLIED TO THE IDENTIFICATION AND CLASSIFICATION OF ASBESTOS FIBERS

Giuseppe Bonifazi, Giuseppe Capobianco, Silvia Serranti
Sapienza - Università di Roma, Italy

8-196

IN-ORBIT ERROR CALIBRATION OF STAR SENSOR BASED ON HIGH RESOLUTION IMAGING PAYLOAD

Jing Yang⁽¹⁾, Kang Wang⁽¹⁾, Kai Xiong⁽²⁾

⁽¹⁾Beihang University, China; ⁽²⁾Beijing Institute of Control Engineering, China

8-200

A PORTABLE SYSTEM FOR ESTIMATION OF CHEMICAL OXYGEN DEMAND IN WASTEWATER USING ULTRAVIOLET-VISIBLE SPECTROSCOPY

Tasnim Alam⁽²⁾, Babak Rezaia⁽¹⁾, Behraad Bahreyni⁽²⁾

⁽¹⁾Prongineer R&D Ltd, Canada; ⁽²⁾Simon Fraser University, Canada

8-204

FOURTH-PERSON SENSING FOR A SERVICE ROBOT

*Kazuto Nakashima, Yumi Iwashita, Pyo Yoonseok, Asamichi Takamine, Ryo Kurazume
Kyushu University, Japan*

8-208

SENSING FRESH WATER CONTAMINATION USING FLUORESCENCE METHODS

*Julius Okache, Barry Hagggett, Robin Maytum, Andrew Mead, David Rawson, Tahmina Ajmal
University of Bedfordshire, United Kingdom*

12:30 - 14:00

**B3P-Q: OTHER SENSORS TOPICS II
ROOMS 101-110**

SESSION CHAIR: Marina Cole (University of Warwick)

9-213

REAL-TIME WHITENING APPLICATION TO TWO MICROPHONE SENSORS FOR COMB FILTERING AND SMOOTHING

*Jinsoo Jeong
Universiti Kuala Lumpur, Malaysia*

9-216

A NOVEL DUAL PIPELINE ULTRAFAST REAL-TIME 'RIPPLE SORT' ALGORITHM AND CIRCUIT IMPLEMENTATION

*Ching Man⁽²⁾, Elfed Lewis⁽²⁾, Brian Moss⁽¹⁾
⁽¹⁾InvenSense Inc., Ireland; ⁽²⁾University of Limerick, Ireland*

9-219

FABRICATION OF CMUTS WITH A LOW TEMPERATURE WAFER BONDING TECHNOLOGY

*Zhikang Li, Libo Zhao, Zhuangde Jiang, Ping Li, Yingjie Hu, Yulong Zhao
Xi'an Jiaotong University, China*

9-222

A FLUXGATE MAGNETOMETER FOR NAVIGATION AND SENSING: NOISE CHARACTER AND DIGITAL FILTERING

*Jiabo Wang, Xi Chen
Tsinghua University, China*

9-225

FABRICATION OF SWNTS/ALPHA-FE2O3 AS ROOM-TEMPERATURE LPG SENSOR

*Buaworn Chaitongrat, Sutichai Chaisitsak
King Mongkut's Institute of Technology Ladkrabang, Thailand*

9-228

GEMINI, A CMOS 180 NM MIXED-SIGNAL 16-CHANNEL ASIC FOR TRIPLE-GEM DETECTORS READOUT

Alessandro Pezzotta⁽²⁾, Giovanni Corradi⁽¹⁾, Gabriele Croci⁽²⁾, Marcello De Matteis⁽²⁾, Fabrizio Murtas⁽¹⁾, Diego Tagnani⁽¹⁾, Giuseppe Gorini⁽²⁾, Andrea Baschirotto⁽²⁾

⁽¹⁾INFN Laboratori Nazionali di Frascati, Italy; ⁽²⁾Università degli Studi di Milano-Bicocca, Italy

9-231

MULTI-DIMENSIONAL VIBRATION ENERGY HARVESTER FOR EFFICIENT USE IN COMMON ENVIRONMENT

Jeongjin Yeo, Heajeong Park, Jonghyun Jo, Yoonseok Yang

Chonbuk National University, Korea

9-234

ENERGY HARVESTING FROM FOOD WASTE BY INOCULATION OF VERMICOMPOSTED ORGANIC MATTER INTO MICROBIAL FUEL CELL (MFC)

Sangyeon Youn, Jeongjin Yeo, Hyeyoun Jung, Yoonseok Yang

Chonbuk National University, Korea

9-237

A HIGH-PERFORMANCE SELF-CLOCKED DIGITAL-OUTPUT QUARTZ GYROSCOPE

Ayman Ismail, Khaled Ashraf, Ahmed Metawea, Islam Mostfa, Ahmed Saeed, Eslam Helal, Mostafa Essawy, Mohamed Abdelazim, Mostafa Ibrahim, Ramy Raafat, Eslam Abdelbary, Islam Alaa, Marawan Nabil, Abdelrahman Mansour, Bassem Ibrahim, Ayman Elsayed

Si-ware Systems, Egypt

9-240

A CHARACTERIZATION METHOD FOR PROJECTED CAPACITIVE TOUCH SCREEN PANEL USING 3-PORT IMPEDANCE MEASUREMENT TECHNIQUE

Chang-Ju Lee⁽²⁾, Do-Yeon Kim⁽²⁾, Jong Kang Park⁽²⁾, Jong Tae Kim⁽²⁾, Jung-Hoon Chun⁽²⁾, Jin-Bong Kim⁽¹⁾, Yoon-Kyung Choi⁽¹⁾, Hwi-Taek Jeong⁽¹⁾, Gyoo-Cheol Hwang⁽¹⁾

⁽¹⁾Samsung Electronics, Korea; ⁽²⁾Sungkyunkwan University, Korea

9-244

INFLUENCE OF DEPOSITION TEMPERATURE ON TIO₂-X FILMS FOR INFRARED IMAGE SENSOR APPLICATIONS

Y. Ashok Kumar Reddy, Young Bong Shin, In-Ku Kang, Hee Chul Lee

Korea Advanced Institute of Science and Technology, Korea

9-246

**CUSTOM PXIE-567X SOFTWARE DEFINED INTERROGATION
SIGNAL GENERATOR FOR SURFACE ACOUSTIC WAVE BASED
PASSIVE RFID**

*Aina Heritiana Rasolomboahanginatovo, Yamoussa Sanogo, Frederic Domingue, Adel Omar Dahmane
Universite du Quebec a Trois-Rivieres, Canada*

14:00 - 15:30

**B4L-A: ELECTROCHEMICAL SENSORS
ROOM 201**

**SESSION CHAIRS: John Atkinson (University of Southampton)
Binu Narakathu (Western Michigan University)**

14:00

**PHOSPHATE SENSORS BASED ON CO-CU ELECTRODES
FABRICATED WITH A SACRIFICIAL GLASS FIBER PAPER
TEMPLATE**

*Xiaochen Wang, Jared Church, Woo Hyoung Lee, Hyoung Jin Cho
University of Central Florida, USA*

14:15

**ISFET-BASED PH SENSOR COMPOSED OF A HIGH
TRANSCONDUCTANCE CMOS CHIP AND A DISPOSABLE TOUCH
PANEL FILM AS THE SENSING LAYER**

Shang-Jing Wu⁽²⁾, Yung-Chen Wu⁽²⁾, Hann-Huei Tsaï⁽¹⁾, Hsin-Hao Liao⁽¹⁾, Ying-Zong Juang⁽¹⁾, Che-Hsin Lin⁽²⁾

⁽¹⁾National Applied Research Laboratories, Taiwan; ⁽²⁾National Sun Yat-sen University, Taiwan

14:30

**SELECTIVE ELECTROCHEMICAL SENSOR FOR PHOSPHATE
DETERMINATION TOWARD A SILICATE INTERFERENCE FREE
METHOD IN FRESHWATER**

*Yu Song, Chao Bian, Jianhua Tong, Yang Li, Shanhong Xia
Institute of Electronics, Chinese Academy of Sciences, China*

14:45

CHEMICAL ANALYSIS OF THIN ALD-AL₂O₃ FILMS AND THEIR APPLICATIONS AS PH-SENSITIVE LAYERS IN CMOS-COMPATIBLE ION-SENSITIVE CAPACITORS (ISCAP)

*Berni Perez Ramos, Alejandro Diaz Sanchez, Joel Molina Reyes
Instituto Nacional de Astrofisica, Optica y Electronica, Mexico*

15:00

A MICROFLUIDIC DEVICE FULLY INTEGRATED WITH THREE PH SENSING ELECTRODES AND PASSIVE MIXER FOR NANOPARTICLE SYNTHESIS

*Ryohei Komiyama⁽²⁾, Hidetoshi Miyashita⁽²⁾, Tomoaki Kageyama⁽²⁾,
Koutoku Ohmi⁽²⁾, Sang-Seok Lee⁽²⁾, Hiroshi Okura⁽¹⁾*

⁽¹⁾Merck Ltd., Japan; ⁽²⁾Tottori University, Japan

14:00 - 15:30

B4L-B: PRESSURE & STRAIN SENSORS

ROOM 202

SESSION CHAIRS: Massood Atashbar (Western Michigan University)

Tania Mukherjee (Indian Institute of Technology Kharagpur)

14:00

INVITED: EVALUATING CONTACT FORCE BASED ON DISPLACEMENT MEASUREMENT OF CANTILEVER BEAMS FOR MEMS SWITCHES AND SENSOR APPLICATIONS

John McBride⁽¹⁾, A. P. Lewis⁽²⁾, M. P. Down⁽²⁾

⁽¹⁾University of Southampton, United Kingdom; ⁽²⁾University of Southampton Malaysia Campus, United Kingdom

14:30

MEMS-BASED CAPACITIVE PRESSURE SENSORS WITH PRE-STRESSED SENSING DIAPHRAGMS

Duy Son Nguyen⁽²⁾, Pit Pillatsch⁽²⁾, Yiping Zhu⁽¹⁾, Igor Paprotny⁽³⁾, Paul Wright⁽²⁾, Richard White⁽²⁾

⁽¹⁾East China Normal University, Shanghai, China; ⁽²⁾University of California, Berkeley, USA; ⁽³⁾University of Illinois at Chicago, USA

14:45

NOVEL METHOD TO OPERATE PIEZO-FET-BASED STRESS SENSOR OFFERS TENFOLD INCREASE IN SENSITIVITY

*Felix Becker, Matthias Kuhl, Yiannos Manoli, Oliver Paul
Albert-Ludwigs-Universität Freiburg, Germany*

15:00

CHARACTERIZATION OF BIFE03 THIN FILM FOR TACTILE SENSOR USING MICROCANTILEVERS WITH PIEZOELECTRIC CAPACITOR AND STRAIN-GAUGE

Takeshi Kohno⁽¹⁾, Takashi Abe⁽¹⁾, Masayuki Sohgawa⁽¹⁾, Masanori Okuyama⁽²⁾, Haruo Noma⁽³⁾

⁽¹⁾Niigata University, Japan; ⁽²⁾Osaka University, Japan; ⁽³⁾Ritsumeikan University, Japan

15:15

MICROCANTILEVER ARRAYS COATED WITH PHOTOACTIVE POLYMERIC BRUSHES AS SYSTEMS TO MEASURE PHOTO-INDUCED SURFACE STRESS CHANGES

Larisa Florea⁽¹⁾, Slavica Koprivica⁽¹⁾, Silvia Scarmagnani⁽¹⁾, Dermot Diamond⁽¹⁾, Fernando Benito-Lopez⁽²⁾, Catherine Grogan⁽³⁾, Fran Pedreschi⁽³⁾, Luke O'Neill⁽³⁾, Fiona Lyng⁽³⁾, Roberto Raiteri⁽⁴⁾

⁽¹⁾Dublin City University, Ireland; ⁽²⁾Dublin City University & University of the Basque Country, Spain; ⁽³⁾Dublin Institute of Technology, Ireland; ⁽⁴⁾Università degli Studi di Genova, Italy

14:00 - 15:30

B4L-C: ACOUSTIC STRUCTURES

ROOM 203

SESSION CHAIRS: Svetlana Tatic-Lucic (Lehigh University USA)

Erwin Reichel (JKU University, Linz, Austria)

14:00

TUNABLE QUALITY FACTOR THROUGH 1:1 MODAL COUPLING IN A DISK RESONATOR

Ian Flader, Chae Ahn, Yushi Yang, Eldwin Ng, Vu Hong, Jeesu Baek, Thomas W. Kenny

Stanford University, USA

14:15

HIGHLY-SYMMETRIC SILICON DIOXIDE SHALLOW SHELL RESONATORS WITH ANGSTROM-LEVEL ROUGHNESS

Benoit Hamelin, Vahid Tavassoli, Farrokh Ayazi

Georgia Institute of Technology, USA

14:30

DEGENERATE MODES OF OPERATION IN LITHIUM NIOBATE SENSORS

Zeyad Al-Shibaany, John Hedley, Zhongxu Hu

Newcastle University, United Kingdom

14:45

SENSOR DESIGN AND CALIBRATION OF PIEZORESISTIVE COMPOSITE MATERIAL

Veit Müller⁽¹⁾, Markus Fritzsche⁽²⁾, Norbert Elkmann⁽²⁾

⁽¹⁾Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V., Germany; ⁽²⁾Fraunhofer-Institut für Fabrikbetrieb und -automatisierung IFF, Germany

15:00

NONLINEAR DYNAMICS OF CIRCULAR CAPACITIVE MICROMACHINED ULTRASONIC TRANSDUCERS

Najib Kacem, Aymen Jallouli, Vincent Walter, Gilles Bourbon, Patrice Lemoal, Joseph Lardies

FEMTO-ST Institute, France

15:15

A NEW METHOD FOR MAPPING FIELDS IN COUPLED CYLINDRICAL DIELECTRIC RESONATORS

Olutosin Fawole, Massood Tabib-Azar

University of Utah, USA

14:00 - 15:00

B4L-D: OPTICAL BIOSENSORS

ROOM 204

**SESSION CHAIRS: Paddy French (Delft University of Technology)
Elfed Lewis (University of Limerick)**

14:00

A TWO-DIMENSIONAL FLUOROMETRIC IMAGING "SNIFFER CAMERA" OF ETHANOL VAPOR FOR EVALUATION OF ALCOHOL METABOLISM USING ENZYMATIC REACTION

Takahiro Arakawa, Koji Toma, Kohji Mitsubayashi, Kenta Iitani, Toshiyuki Sato

Tokyo Medical and Dental University, Japan

14:15

DISCRIMINATION OF TARGET PROTEINS USING ARRAYED FLUORESCENT LIPOSOMES INCORPORATED WITH CHOLESTEROL BY PRINCIPAL COMPONENT ANALYSIS

Ryota Imamura⁽¹⁾, Ziyang Zhang⁽¹⁾, Tomoki Yoshikawa⁽¹⁾, Naoki Murata⁽¹⁾, Kaoru Yamashita⁽¹⁾, Masayuki Fukuzawa⁽¹⁾, Minoru Noda⁽¹⁾, Toshinori Shimanouchi⁽²⁾

⁽¹⁾Kyoto Institute of Technology, Japan; ⁽²⁾Okayama University, Japan

14:30

SERS-BASED HYDROGEL SENSORS FOR PH AND ENZYMATIC SUBSTRATES

*Yil-Hwan You, Ashvin Nagaraja, Aniket Biswas, Haley Marks, Gerard Côté, Michael McShane
Texas A&M University, USA*

14:45

HIGH-THROUGHPUT DROPLET-BASED SCREENING SYSTEM FOR INVESTIGATING MICROALGAE LIBRARY

*Hyun Soo Kim, Adrian Guzman, Nebras Sobahi, Hem Thapa, Timothy Devarenne, Arum Han
Texas A&M University, USA*

14:00 - 15:30

B4L-E: CHEMICAL & BIO SENSOR SYSTEMS

ROOM 206

**SESSION CHAIRS: Walaa Khalaf (Almustansiriya University)
Tony Jun Huang (Pennsylvania State University)**

14:00

INVITED: NANOMATERIAL INTEGRATED MICROFLUIDIC DEVICES FOR VIRUS ANALYSIS

*Yin-Ting Yeh, Yiqiu Xia, Xu Yu, Si-Yang Zheng
Pennsylvania State University, USA*

14:30

INTEGRATION OF FRACTAL BIOSENSOR IN A DIGITAL MICROFLUIDIC PLATFORM

*Yusuf Mashraei, Shilpa Sivashankar, Ulrich Buttner, Khaled Nabil Salama
King Abdullah University of Science and Technology, Saudi Arabia*

14:45

AN ELECTROCHEMICAL SENSOR SYSTEM WITH RENEWABLE COPPER MODIFIED ELECTRODE FOR CONTINUOUS NITRATE DETERMINATION

*Yang Li, Heng Li, Yu Song, Hua Lu, Jizhou Sun, Jianhua Tong, Chao Bian, Shanhong Xia
Institute of Electronics, Chinese Academy of Sciences, China*

15:00

A RENEWABLE BOD MICROSENSOR BASED ON MAGNETICALLY FUNCTIONALIZED MICROORGANISM AND ULTRAMICROELECTRODE ARRAY

*Jinfen Wang, Chao Bian, Yijin Li, Jianhua Tong, Jizhou Sun, Wen Hong, Shanhong Xia
Institute of Electronics, Chinese Academy of Sciences, China*

15:15

FACILE DETECTION OF TROPONIN I USING DENDRITIC PLATINUM NANOPARTICLES AND CAPILLARY TUBE INDICATORS

*Sanghee Lee, Donghoon Kwon, Changyong Yim, Sangmin Jeon
Pohang University of Science and Technology, Korea*

14:00 - 15:15

**B4L-F: SENSORS READOUT/INTERFACE/CIRCUITS II
ROOM 207**

**SESSION CHAIRS: Takahito Ono (Tohoku University)
Ulrich Schmid (Vienna University of Technology)**

14:00

MULTIMODAL ANALOG FRONT-END FOR WEARABLE BIO-SENSORS

*Insoo Kim, Ryan Lobo, Johnny Homer, Yusuf Bhagat
Samsung Research America, USA*

14:15

A MUTUAL-CAPACITIVE TOUCH SENSOR ROIC USING A PLL TO REDUCE LCD NOISE BY SYNCHRONIZING ROIC TX CLOCK TO LCD CLOCK

*Dong-Hee Yeo, Seon-Ho Kim, Hyeon-Kyu Noh, Jae-Yoon Sim,
Byungsub Kim, Hong-June Park
Pohang University of Science and Technology, Korea*

14:30

ALL-DIGITAL-ADC TAD IN SENSOR DIGITIZATION FOR SCALING OVER WIDE TEMPERATURE RANGES

*Takamoto Watanabe, Tomohito Terasawa
Denso Corporation, Japan*

14:45

SILICON CARBIDE BASED INSTRUMENTATION AMPLIFIERS FOR EXTREME APPLICATIONS

*Hua-Khee Chan, Neal Wood, Konstantin Vassilevski, Nick Wright, Amy Peters, Alton Horsfall
University of Newcastle, United Kingdom*

15:00

INTERFACE CIRCUIT FOR THREE-ELECTRODE METAL-OXIDE (MOX) GAS SENSOR

*Jeong-Ho Park, Kwang-Min Park, Tae-Wan Kim, Chong-Ook Park,
Hyung-Joun Yoo
Korea Advanced Institute of Science and Technology, Korea*

14:00 - 15:30

**PROFESSIONAL DEVELOPMENT PROGRAM I
ROOM 208**

14:00

Gianluca Lazzi (University of Utah, USA)

Troy Nagle (North Carolina State University, USA)

14:15

SENSORS COUNCIL AWARDS PROGRAM

Mike McShane (Texas A&M University, USA)

14:30

YOUNG PROFESSIONALS PROGRAM

Sinead O'Keeffe (University of Limerick, Ireland)

14:45

ORGANIZING COUNCIL CHAPTERS

Ramesh Ramadoss (San Francisco Bay Area Council Chapter Chair, USA)

15:00

MENTORING ROUNDTABLE

Sharon Peng (Harman International, USA)

15:30 - 16:00

**TUESDAY AFTERNOON BREAK
2F LOBBY**

16:00 - 17:15

**B5L-A: ACOUSTIC WAVE CHEMICALS SENSORS
ROOM 201**

SESSION CHAIRS: Matteo Rinaldi (Northeastern University)

Junghoon Lee (Seoul National University)

16:00

**CONCENTRATION-INDEPENDENT FINGERPRINT LIBRARY OF
VOLATILE ORGANIC COMPOUNDS BASED ON GAS-SURFACE
INTERACTIONS BY SELF-ASSEMBLED MONOLAYER
FUNCTIONALIZED FILM BULK ACOUSTIC RESONATOR ARRAYS**

*Yao Lu, Ye Chang, Ning Tang, Hemi Qu, Wei Pang, Daihua Zhang,
Hao Zhang, Xuexin Duan*

Tianjin University, China

16:15

**CHEMICAL SENSING BASED ON GRAPHENE-ALUMINUM
NITRIDE NANO PLATE RESONATORS**

*Zhenyun Qian, Yu Hui, Fangze Liu, Swastik Kar, Matteo Rinaldi
Northeastern University, USA*

16:30

POLYMER COATED FILM BULK ACOUSTIC RESONATOR (FBAR) ARRAYS FOR INDOOR AIR QUALITY (IAQ) MONITORING

Si Hoon Lee, Yongmi Jung, Taepyeong Kim, Taegy Kim, Younghwan Kim, Suntae Jung

Samsung Electronics, Korea

16:45

INKJET - PRINTED GRAPHENE LAYER BY LAYER ON SAW DEVICES FOR GAS DETECTION APPLICATIONS

Ioannis Nikolaou⁽²⁾, Hamida Hallil⁽²⁾, Corinne Dejous⁽²⁾, Dominique Rebière⁽²⁾, George Deligeorgis⁽³⁾, Veronique Conedera⁽¹⁾

⁽¹⁾LAAS CNRS, France; ⁽²⁾Université de Bordeaux, France; ⁽³⁾University of Crete, Greece

17:00

A POLYMER BASED SENSOR FOR PHOSPHATE DETECTION IN WATER

Faezeh Arab Hassani, Nicola A Morley, Maria Romero-González
University of Sheffield, United Kingdom

16:00 - 17:30

**B5L-B: PHYSICAL SENSORS I
ROOM 202**

SESSION CHAIRS: Jurgen Kosel (King Abdullah University of Science and Technology (KAUST))

Sina Akhbari (University of California at Berkeley)

16:00

TOWARDS LOW-COST PRINTED FLOW SENSORS

Harald Steiner⁽²⁾, Thomas Glatz⁽²⁾, Almir Talic⁽²⁾, Samir Cerimovic⁽²⁾, Franz Kohl⁽²⁾, Marlies Schlauf⁽¹⁾, Thomas Schalkhammer⁽¹⁾, Franz Keplinger⁽³⁾, Thilo Sauter⁽²⁾

⁽¹⁾atophotonics GmbH, Austria; ⁽²⁾Danube University Krems, Austria;

⁽³⁾Technische Universität Wien, Austria

16:15

A 2D PARTICLE VELOCITY SENSOR WITH MINIMAL FLOW-DISTURBANCE

Olti Pjetri, Remco Wiegerink, Gijs Krijnen
Universiteit Twente, Netherlands

16:30

U-SHAPED WIRE BASED RESONATORS FOR MASS DENSITY AND VISCOSITY SENSING

Martin Heinisch⁽²⁾, Erwin Konrad Reichel⁽²⁾, Ali Abdallah⁽²⁾, Stefan Clara⁽²⁾, Bernhard Jakoby⁽²⁾, Thomas Voglhuber-Brunnmaier⁽¹⁾, Isabelle Dufour⁽³⁾

⁽¹⁾Danube University Krems, Austria; ⁽²⁾Johannes Kepler Universität

Linz, Austria; ⁽³⁾Université de Bordeaux, France

16:45

APPLICATION OF CARBON NANOTUBE AND GRAPHENE NANOCOMPOSITES FOR FABRICATION OF MICRO-BOLOMETERS

*Ibrahim El-Chami⁽¹⁾, Oberon Dixon-Luinenburg⁽²⁾, Behraad Bahreyni⁽¹⁾
(¹)Simon Fraser University, Canada; (²)University of Waterloo, Canada*

17:00

MOS-CAPACITOR-BASED IONIZING RADIATION SENSORS FOR OCCUPATIONAL DOSIMETRY APPLICATIONS

*Sean Scott⁽²⁾, Charilaos Mousoulis⁽²⁾, Nithin Raghunathan⁽²⁾, Dimitrios Peroulis⁽²⁾, Daniel Valentino⁽¹⁾, Paul Alexander Walerow⁽¹⁾, Mark Salasky⁽¹⁾, Harikrishna Rajabather⁽¹⁾, James Thistlethwaite⁽¹⁾, Timothy McNamee⁽¹⁾
(¹)Landauer, Inc., USA; (²)Purdue University, USA*

17:15

CMOS BEOL-EMBEDDED LATERAL ACCELEROMETER

*Piotr Michalik⁽²⁾, Josep Maria Sánchez-Chiva⁽²⁾, Daniel Fernández⁽¹⁾, Jordi Madrenas⁽²⁾
(¹)Nanusers / Universitat Politècnica de Catalunya, Spain; (²)Universitat Politècnica de Catalunya, Spain*

16:00 - 17:30

**B5L-C: METHODS/CHARACTERIZATION/SYSTEMS
ROOM 203**

**SESSION CHAIRS: Joseph Talghader (University of Minnesota)
Donald Malocha (University of Central Florida)**

16:00

AN INTEGRATED POTENTIOSTAT SENSOR WITH DIGITALLY-CONTROLLED INPUT-PARASITIC COMPENSATION FOR NANOPORE APPLICATIONS

*Jeong-Dae Yun⁽¹⁾, Jungsuk Kim⁽¹⁾, Jong-Bum Park⁽²⁾
(¹)Gachon University, Korea; (²)Korea Electronics Technology Institute, Korea*

16:15

A NEW METHOD FOR MEASURING THE TEMPERATURE-DEPENDENT DIELECTRIC CONSTANT OF THE PDMS FLUIDS

*Qing-Ying Ren, Li-Feng Wang, Qing-Ying Huang
Southeast University, China*

16:30

A DELAY LOCKED LOOP FOR INSTANTANEOUS TIME-OF-FLIGHT SENSING BASED ON A CMOS DEMODULATION DETECTOR

*Robin Deleener, Hans Ingelberts, Maarten Kuijk
Vrije Universiteit Brussel, Belgium*

16:45

ROBUST DIGITAL CALIBRATION ENGINE FOR MEMS INERTIAL SENSOR SYSTEMS

*Sascha Heinssen, Nico Hellwege, Nils Heidmann, Steffen Paul,
Dagmar Peters-Drolshagen
Universität Bremen, Germany*

17:00

SMARTPHONE-BASED SYSTEM FOR THE MONITORING OF VITAL PARAMETERS AND STRESS CONDITIONS OF AMATORIAL RACECAR DRIVERS

*Claudio Crema, Alessandro Depari, Alessandra Flammini, Angelo Vezzoli, Claudio Benini, Daniel Chindamo, Marco Gadola, Matteo Romano
Università degli Studi di Brescia, Italy*

17:15

HIGH TEMPERATURE RELIABILITY AND FAILURE OF W-BASED MICROHOTPLATES

*Junwei Zhou, Jun Yu, Zhongzhou Li, Kaiqiang Liu, Zhenan Tang
Dalian University of Technology, China*

16:00 - 17:15

B5L-D: FIBER OPTIC SENSORS

ROOM 204

**SESSION CHAIRS: Ignacio Matias (Public University of Navarra)
Huikai Xie (University of Florida)**

16:00

RADIOLUMINESCENCE BASED OPTICAL FIBRE SENSOR FOR RADIATION MONITORING DURING BRACHYTHERAPY

*Sinead O'Keeffe⁽³⁾, Peter Woulfe⁽¹⁾, Francis J. Sullivan⁽²⁾
⁽¹⁾Galway Clinic, Ireland; ⁽²⁾NUI Galway, Ireland; ⁽³⁾University of Limerick, Ireland*

16:15

TAPERED PHOTONIC CRYSTAL FIBER BASED MACH-ZEHNDER INTERFEROMETER FOR ENHANCED REFRACTIVE INDEX SENSING

*Farid Ahmed, Martin Jun
University of Victoria, Canada*

16:30

**INTERFEROMETRIC FIBER-OPTIC CURRENT SENSOR WITH
INHERENT SOURCE WAVELENGTH SHIFT COMPENSATION**

*Miklos Lenner, Wei Quan, Georg Müller, Lin Yang, Andreas Frank,
Klaus Bohnert*

ABB Switzerland Ltd., Switzerland

16:45

**REFRACTOMETER USING PHOTONIC CRYSTALS FOR
FERMENTATION PROCESS CHARACTERIZATION**

Andras Kovacs, Alexey Ivanov, Ulrich Mescheder

Hochschule Furtwangen University, Germany

17:00

**TEMPERATURE-COMPENSATED OPTIMIZED RELATIVE
HUMIDITY AND REFRACTIVE INDEX SENSORS USING A HYBRID
FIBRE GRATING CONFIGURATION**

Lourdes Alwis⁽²⁾, Tong Sun⁽¹⁾, Kenneth Grattan⁽¹⁾

*⁽¹⁾City University London, United Kingdom; ⁽²⁾Edinburgh Napier
University, United Kingdom*

16:00 - 17:30

**B5L-E: APPLICATIONS IN AGRICULTURE AND THE
ENVIRONMENT**

ROOM 206

**SESSION CHAIRS: Yu-Cheng Lin (National Cheng Kung
University)**

Junghoon Lee (Seoul National University)

16:00

**HEAT EVENT DETECTION IN DAIRY COWS WITH COLLAR
SENSORS: AN UNSUPERVISED MACHINE LEARNING
APPROACH**

*Md Sumon Shahriar⁽¹⁾, Daniel Smith⁽¹⁾, Ashfaqur Rahman⁽¹⁾, Dave
Henry⁽¹⁾, Greg Bishop-Hurley⁽¹⁾, Richard Rawnsley⁽²⁾, Mark Freeman⁽²⁾,
James Hills⁽²⁾*

*⁽¹⁾Commonwealth Scientific and Industrial Research Organisation,
Australia; ⁽²⁾University of Tasmania, Australia*

16:15

**A STUDY OF SENSOR DERIVED FEATURES IN CATTLE
BEHAVIOUR CLASSIFICATION MODELS**

*Daniel Smith, Bryce Little, Paul Greenwood, Philip Valencia, Ashfaqur
Rahman, Aaron Ingham, Greg Bishop-Hurley, Sumon Shahriar,
Andrew Hellicar*

*Commonwealth Scientific and Industrial Research Organisation,
Australia*

16:30

DESIGN OF A MEMORY-CARD BASED LOW-COST GPS DATA-LOGGER FOR LIVESTOCK MONITORING

Suleman Mazhar⁽⁴⁾, Jahanzeb Gul⁽³⁾, Faisal Mueen⁽²⁾, Masroor Hussain⁽¹⁾

⁽¹⁾Ghulam Ishaq Khan Institute of Engineering Sciences and Technology, Pakistan; ⁽²⁾International Centre for Integrated Mountain Development, Nepal; ⁽³⁾Jeju National University, Korea; ⁽⁴⁾Punjab University College of Information Technology / Unive

16:45

VISUALISATION OF ACOUSTIC ENTROPY INDEX FOR RAINFOREST HEALTH MONITORING SYSTEM

*Mohd Hafiez Mohd Razali, Ammar Zakaria, Ali Yeon Md. Shakaff, Retnam Visvanathan, Fathinul Syahir Ahma Saad, Latifah Munirah Kamarudin, N. S. Hj Abdullah
Universiti Malaysia Perlis, Malaysia*

17:00

DETECTION OF GUNSHOTS USING MICROPHONE ARRAY MOUNTED ON A MOVING PLATFORM

*Thyagaraju Damarla
US Army Research Laboratory, USA*

17:15

COMBINATION OF RADAR AND AUDIO SENSORS FOR IDENTIFICATION OF ROTOR-TYPE UNMANNED AERIAL VEHICLES (UAVS)

*Seongha Park⁽²⁾, Sangmi Shin⁽²⁾, Yongho Kim⁽²⁾, Eric Matson⁽²⁾, Kyu Hwan Lee⁽²⁾, Paul Kolodzy⁽¹⁾, Joseph Slater⁽⁴⁾, Matthew Scherreik⁽⁴⁾, Monica Sam⁽⁴⁾, John Gallagher⁽⁴⁾, Benjamin Fox⁽³⁾, Michael Hopmeier⁽³⁾
⁽¹⁾Kolodzy Consulting, USA; ⁽²⁾Purdue University, Korea;
⁽³⁾Unconventional Concepts, Inc., USA; ⁽⁴⁾Wright State University, USA*

16:00 - 17:30

B5L-F: ELECTRONICS

ROOM 207

SESSION CHAIRS: Michael Lu (National Tsing Hua University)

Hongrui Jiang (University of Wisconsin)

16:00

**A 0.13 μ M-CMOS 90 μ W 51DB-SNR CONTINUOUS-TIME
ACCELEROMETER FRONT-END WITH 10B SAR-ADC**

Marcello De Matteis⁽²⁾, Alessandro Pezzotta⁽²⁾, Marco Sabatini⁽¹⁾, Marco Grassi⁽³⁾, Marco Croce⁽³⁾, Piero Malcovati⁽³⁾, Andrea Baschirotto⁽²⁾

⁽¹⁾Pirelli Tyre, Italy; ⁽²⁾Università degli Studi di Milano-Bicocca, Italy;

⁽³⁾Università degli Studi di Pavia, Italy

16:15

**A CMOS DIGITIZED MONOLITHIC SUN SENSOR TRANSDUCER
WITH CALIBRATION CIRCUITS FOR MONITORING SOLAR
RADIATION OF TOMATO CROPS**

Cheng-Ta Chiang, Jian-Xiang Lin

National Chia Yi University, Taiwan

16:30

HVC MOS PIXEL SENSORS

Ivan Peric, Felix Ehrler, Richard Leys, Roberto Blanco

Karlsruher Institut für Technologie, Germany

16:45

**BATTERYLESS 900- μ S-LATENCY FM TRANSMITTER POWERED
BY PIEZOELECTRIC GENERATOR FOR WIRELESS ELECTRONIC
DRUMS**

Kengo Takemura, Ayumu Yoshimi, Hisashi Nishikawa, Ami Tanaka,
Takakuni Douseki

Ritsumeikan University, Japan

17:00

**TEMPERATURE COMPENSATED MEMS OSCILLATOR USING
STRUCTURAL RESISTANCE BASED TEMPERATURE SENSING**

Chang-Shun Liu, Roozbeh Tabrizian, Farrokh Ayazi

Georgia Institute of Technology, USA

17:15

**BATTERYLESS SENSORLESS BICYCLE SPEED RECORDER
WITH HUB DYNAMO AND STT-MRAM**

Ami Tanaka⁽³⁾, Takakuni Douseki⁽³⁾, Yohei Umeki⁽²⁾, Hiroshi

Kawaguchi⁽²⁾, Masahiko Yoshimoto⁽²⁾, Koji Tsunoda⁽¹⁾, Toshihiro Sugii⁽¹⁾

⁽¹⁾Fujitsu Laboratories Ltd., Japan; ⁽²⁾Kobe University, Japan;

⁽³⁾Ritsumeikan University, Japan

16:00 - 17:30

**PROFESSIONAL DEVELOPMENT PROGRAM II
ROOM 208**

16:00

ORGANIZING GREAT CONFERENCES

Yu-Cheng Lin (National Cheng Kung University, Taiwan)

16:20

SENSORS COUNCIL STANDARDS INITIATIVE

Sri Chandrasekaran (IEEE-SA, India)

16:40

SOLITICING & TRAINING JOURNAL REVIEWERS

Krikor Ozanyan (University of Manchester, United Kingdom)

17:00

**AUTHOR TRAINING FOR JOURNALS AND CONFERENCE
PROCEEDINGS**

John Vig (Consultant, USA)

18:30 - 22:00

**CONFERENCE BANQUET
BEXCO GRAND BALLROOM**

WEDNESDAY, NOVEMBER 4

08:00 - 08:30

WEDNESDAY LECTURE AUTHOR BREAKFAST
ROOM 211-212

08:30 -09:30

KEYNOTE: Sensing Technology for Upcoming Healthcare System
Suntae Jung
SAMSUNG Electronics Co., Ltd.
GRAND BALLROOM

09:30 - 10:00

WEDNESDAY MORNING BREAK
2F LOBBY

10:00 - 11:30

C2L-A: SPECIAL SESSION: 3D PRINTED SENSORS & ACTUATORS
ROOM 201
SESSION CHAIR: Gijs Krijnen (University of Twente)

10:00

INVITED: POLYMER COMPOSITES FOR 3D PRINTING OF FUNCTIONAL SENSORS AND TRANSDUCERS

Simon Leigh, Christopher Purssell, James Covington, Duncan Billson, David Hutchins, David Woodward, Nishal Ramadas
University of Warwick, United Kingdom

10:30

MULTI-FUNCTIONAL 3D PRINTED AND EMBEDDED SENSORS FOR SATELLITE QUALIFICATION STRUCTURES

Corey Shemelya⁽³⁾, Luis Banuelos-Chacon⁽³⁾, Adrian Melendez⁽³⁾, Craig Kief⁽²⁾, David Espalin⁽³⁾, Ryan Wicker⁽³⁾, Gijs Krijnen⁽¹⁾, Eric MacDonald⁽³⁾

⁽¹⁾Universiteit Twente, Netherlands; ⁽²⁾University of New Mexico, USA;

⁽³⁾University of Texas at El Paso, USA

10:45

A SURVEY OF PRINTABLE PIEZOELECTRIC SENSORS

Sampo Tuukkanen, Satu Rajala
Tampere University of Technology, Finland

11:00

3D PRINTED BIO-INSPIRED ANGULAR ACCELERATION SENSOR

Joël van Tiem, Jarno Groenesteijn, Remco Sanders, Gijs Krijnen
Universiteit Twente, Netherlands

11:15

3D PRINTED MULTI-CHANNEL EEG SENSORS FOR ZEBRAFISH
Sung-Joon Cho⁽²⁾, Tae-Seung Nam⁽¹⁾, Seok-Yong Choi⁽¹⁾, Myung-Kyu Kim⁽¹⁾, Sohee Kim⁽²⁾

⁽¹⁾Chonnam National University Medical Center, Korea; ⁽²⁾Gwangju Institute of Science and Technology, Korea

10:00 - 11:30

C2L-B: ENVIRONMENTAL SENSORS

ROOM 202

SESSION CHAIRS: Harald Steiner (Danube University Krems)
Lina Sarro (Delft University of Technology)

10:00

MOBALL: AN INTELLIGENT WIND-OPPORTUNISTIC MOBILE SENSOR TO MONITOR THE POLAR REGIONS

Faranak Davoodi⁽²⁾, Junichi Asama⁽³⁾, Mina Rais-Zadeh⁽⁴⁾, Joel Burdick⁽¹⁾, Cyrus Shahabi⁽⁵⁾

⁽¹⁾California Institute of Technology, USA; ⁽²⁾Intelligent Buoy Networks, Inc., USA; ⁽³⁾Shizuoka University, Japan; ⁽⁴⁾University of Michigan, USA; ⁽⁵⁾University of Southern California, USA

10:15

AN ELECTROCHEMICAL SEISMOMETER WITH FREQUENCY FEATURES UNDER REGULATION

Zhenyuan Sun, Wentao He, Guanglei Li, Deyong Chen, Junbo Wang, Jian Chen

Institute of Electronics, Chinese Academy of Sciences, China

10:30

FABRICATION OF A HYDROPHILIC PROPERTY IMPEDANCE SENSOR TO STABLY MONITOR SOIL WATER CONTENT FOR SLOPE FAILURE PROGNOSTICS

Masato Futagawa⁽⁵⁾, Tatsumi Ito⁽⁵⁾, Arumi Kuni⁽³⁾, Minoru Watanabe⁽²⁾, Hikofumi Suzuki⁽⁴⁾, Yasushi Fuwa⁽⁴⁾, Yuji Takeshita⁽¹⁾, Mitsuru Komatsu⁽¹⁾

⁽¹⁾Okayama University, Japan; ⁽²⁾OKI Semiconductor, Japan; ⁽³⁾OKI Semiconductor Miyagi, Japan; ⁽⁴⁾Shinsyu University, Japan; ⁽⁵⁾Shizuoka University, Japan

10:45

A SURFACE CONDUCTANCE BASED FULLY INTEGRATED STANDARD CMOS HUMIDITY SENSOR WITHOUT POST-PROCESSING

Jinsoo Choi⁽¹⁾, Gysuk Kim⁽²⁾, Hyun-Ho Yang⁽³⁾, Jun-Bo Yoon⁽¹⁾, Seonghwan Cho⁽¹⁾

⁽¹⁾Korea Advanced Institute of Science and Technology, Korea; ⁽²⁾PIXELPLUS, Korea; ⁽³⁾University of California, San Diego, USA

11:00

SEPARATE EXPERIMENTAL INVESTIGATION OF THE INFLUENCE OF LIQUIDS' MASS DENSITIES AND VISCOSITIES ON THE FREQUENCY RESPONSE OF RESONANT SENSORS USING DESIGNATED LIQUID SERIES

Martin Heinisch⁽²⁾, Erwin Konrad Reichel⁽²⁾, Bernhard Jakoby⁽²⁾, Thomas Voglhuber-Brunnmaier⁽¹⁾, Isabelle Dufour⁽³⁾

⁽¹⁾Danube University Krems, Austria; ⁽²⁾Johannes Kepler Universität Linz, Austria; ⁽³⁾Université de Bordeaux, France

11:15

A NOVEL MEMS-BASED PIEZOELECTRIC MULTI-MODAL VIBRATION ENERGY HARVESTER CONCEPT TO POWER AUTONOMOUS REMOTE SENSING NODES FOR INTERNET OF THINGS (IOT) APPLICATIONS

Jacopo Iannacci⁽¹⁾, Guido Sordo⁽¹⁾, Enrico Serra⁽¹⁾, Ulrich Schmid⁽²⁾

⁽¹⁾Fondazione Bruno Kessler, Italy; ⁽²⁾Technische Universität Wien, Austria

10:00 - 11:15

**C2L-C: MODELING AND SIMULATION OF NOVEL DEVICES
ROOM 203**

**SESSION CHAIRS: Sang-Seok Lee (Tottori University, Japan)
Deepak Uttamchandani (University of Strathclyde)**

10:00

INVITED: MAGNETIC DOMAIN OBSERVATION OF STEPPED GIANT MAGNETO-IMPEDANCE SENSOR WITH SUBJECTING TO NORMAL MAGNETIC FIELD

Tomoo Nakai

Industrial Technology Institute, Miyagi Prefectural Government, Japan

10:30

ASYNCHRONOUS, ELECTROMAGNETIC SENSOR FUSION IN RATSLAM

Rafael Berkvens, Maarten Weyn, Herbert Peremans

Universiteit Antwerpen, Belgium

10:45

IMPROVED DROPLET SIZE STABILITY USING PHASE-GUIDE STRUCTURES

Stefan Clara⁽¹⁾, Ali Abdallah⁽¹⁾, Bernhard Jakoby⁽¹⁾, Mahmuda Akhtar⁽²⁾, Michael J. Vellekoop⁽²⁾

⁽¹⁾Johannes Kepler Universität Linz, Austria; ⁽²⁾Universität Bremen, Germany

11:00

TOMOGRAPHY DEFINED AS SENSOR FUSION

Krikor Ozanyan

University of Manchester, United Kingdom

10:00 - 11:15

**C2L-D: PHOTODIODES & PHOTODETECTORS BASED SENSORS I
ROOM 204**

SESSION CHAIRS: Frederic Surre (City University London)

Byeongha Lee (Gwangju Institute of Science and Technology)

10:00

**LOW TEMPERATURE, 400 °C, PURE BORON DEPOSITION: A
SOLUTION FOR INTEGRATION OF HIGH-PERFORMANCE SI
PHOTODETECTORS AND CMOS CIRCUITS**

Vahid Mohammadi, Stoyan Nihtianov

Technische Universiteit Delft, Netherlands

10:15

**PULSED TOF LASER RANGEFINDING WITH A 2D SPAD-TDC
RECEIVER**

Sahba Jahromi, Jussi-Pekka Jansson, Juha Kostamovaara

University of Oulu, Finland

10:30

**A NOVEL BLUE-ENHANCED PHOTODETECTOR USING
HONEYCOMB STRUCTURE**

*Javad Ghasemi⁽²⁾, Asif Chowdhury⁽¹⁾, Alexander Neumann⁽²⁾, Bassem
Fahs⁽¹⁾, Mona Hella⁽¹⁾, Steve Brueck⁽²⁾, Payman Zarkesh-Ha⁽²⁾*

*⁽¹⁾Rensselaer Polytechnic Institute, USA; ⁽²⁾University of New Mexico,
USA*

10:45

**CONTINUOUS-WAVE TIME-OF-FLIGHT CMOS DETECTOR WITH
COMMON-MODE FEEDBACK FOR STRONG BACKGROUND
LIGHT APPLICATIONS**

Hans Ingelberts, Robin Deleener, Sven Boulanger, Maarten Kuijk

Vrije Universiteit Brussel, Belgium

11:00

**A HIGH EFFICIENCY UV-VIS ORGANIC PHOTODETECTOR BY AN
INVERTED PTB7: PC71BM BULK HETEROJUNCTION
STRUCTURE**

*Yan-Rung Lin⁽¹⁾, Jung-Hao Chang⁽²⁾, Wei-Lun Tsai⁽²⁾, Chia-Hung Cho⁽¹⁾,
Hao-Wu Lin⁽²⁾*

*⁽¹⁾Industrial Technology Research Institute, Taiwan; ⁽²⁾National Tsing
Hua University, Taiwan*

10:00 - 11:00

**C2L-E: APPLICATION AND ENERGY MANAGEMENT
ROOM 206**

SESSION CHAIRS: Jafri Roozber

Walter Lang (Institute for Microsensors, University of Bremen)

10:00

**POWER ALLOCATION IN SENSOR NETWORKS FOR
SURVEILLING SECURITY ZONES**

Gholamreza Alirezaei, Denise Cappel

Rheinisch-Westfälische Technische Hochschule Aachen, Germany

10:15

**VIBRATION ENERGY HARVESTING AND MANAGEMENT FOR
WIRELESS SENSOR NETWORKS IN BRIDGE STRUCTURAL
MONITORING**

Wei Liu⁽¹⁾, Zhengqiang Wang⁽¹⁾, Shaohua Qu⁽¹⁾, Rong Luo⁽²⁾

⁽¹⁾Hubei University of Arts and Science, China; ⁽²⁾Tsinghua University, China

10:30

RF ENERGY HARVESTER-BASED WAKE-UP RADIO

K Kaushik⁽¹⁾, Deepak Mishra⁽¹⁾, Swades De⁽¹⁾, Jun-Bae Seo⁽¹⁾, Soumya Jana⁽²⁾, Kaushik Chowdhury⁽³⁾, Stefano Basagni⁽³⁾, Wendi Heinzelman⁽⁴⁾

⁽¹⁾Indian Institute of Technology Delhi, India; ⁽²⁾Indian Institute of Technology Hyderabad, India; ⁽³⁾Northeastern University, USA;

⁽⁴⁾University of Rochester, USA

10:45

**ANALYSIS OF LOW ENERGY CONSUMPTION WIRELESS
SENSOR WITH BLE**

Zengtao Feng, Lingfei Mo, Meng Li

Southeast University, China

10:00 - 11:30

C2L-F: DEVICES/SYSTEMS I

ROOM 207

SESSION CHAIRS: Kenichi Takahata (University of British Columbia)

Svetlana Tatic-Lucic (Lehigh University USA)

10:00

INVITED: PIEZOELECTRIC MICROMACHINED ULTRASONIC TRANSDUCERS FOR HUMAN-MACHINE INTERFACES AND BIOMETRIC SENSING

David Horsley⁽³⁾, Ofer Rozen⁽³⁾, Yipeng Lu⁽³⁾, Stefon Shelton⁽¹⁾, Andre Guedes⁽¹⁾, Richard Przybyla⁽¹⁾, Hao-Yen Tang⁽²⁾, Bernhard Boser⁽²⁾

⁽¹⁾Chirp Microsystems, USA; ⁽²⁾University of California, Berkeley, USA;

⁽³⁾University of California, Davis, USA

10:30

TACTILE AND PROXIMITY MEASUREMENT BY 3D TACTILE SENSOR USING SELF-CAPACITANCE MEASUREMENT

Satoshi Tsuji, Teruhiko Kohama

Fukuoka University, Japan

10:45

DESIGN AND MODELING OF 1000PPI FINGERPRINT SENSOR

Sheng-Miao Huang, Yu-Sheng Huang, Cheng-Nan Yeh, Norio Sugiura, Jhen-Yu You, Chien-Huan Peng

AU Optronics Corporation, Taiwan

11:00

AN INTEGRATED AND WEARABLE HEALTHCARE-ON-A-PATCH FOR WIRELESS MONITORING SYSTEM

Seok-Oh Yun⁽¹⁾, Moon-Keun Lee⁽¹⁾, Kyoung G. Lee⁽¹⁾, Jinsung Yi⁽²⁾, Su Jeong Shin⁽¹⁾, MinHo Yang⁽¹⁾, Namho Bae⁽¹⁾, Tae Jae Lee⁽¹⁾, Jinho Ko⁽²⁾, Seok Jae Lee⁽¹⁾

⁽¹⁾National NanoFab Center, Korea; ⁽²⁾PHYCHIPS Inc., Korea

11:15

DESIGN OF A NOVEL MAGNETIC FIELD GENERATOR APPLIED IN DYNAMIC CHARACTERISTICS MEASUREMENT OF MAGNETO-DEPENDENT SENSORS

Yuan Tian, Zheng Qian, Xiaodong Zhao, Yongfu Deng

Beihang University, China

10:00 - 11:30

INDUSTRY TRACK I

ROOM 208

10:00

**LOWER POWER, BATTERY OPERATED WIRELESS SENSING
OPTIONS**

Jim Philipp (Murata, USA)

10:45

WEARABLE LOW-POWER SENSORS

Veena Misra (NCSU/NSF – ASSIST, USA)

11:30 - 12:30

WEDNESDAY LUNCH & PANEL

GRAND BALLROOM

WEARABLE TECNOLOGIES

Moderator: Veena Misra (NCSU/NSF – ASSIST, USA)

Gerry Hayes (Wireless Center of NC, USA)

Brian Kim (RaonTech, Korea)

Younghyun Kim (Samsung Electronics, Korea)

Brian Carrigan (Smashing Boxes, USA)

Jan Svoboda (Firefly Solutions, USA)

12:30 - 14:00

C3P-G: SENSOR MODELING & CHARACTERIZATION III

ROOMS 101-110

SESSION CHAIR: Tayfun Akin (Middle East Technical University)

1-3

A THERMAL NETWORK MODEL FOR PIEZORESISTIVE PRESSURE SENSORS

Jan Lotichius⁽²⁾, Timo Singer⁽²⁾, Geert Brokmann⁽¹⁾, Hartmut Übensee⁽¹⁾, Thomas Ortlepp⁽¹⁾, Mario Kupnik⁽²⁾, Roland Werthschützky⁽²⁾

⁽¹⁾CiS Forschungsinstitut, Germany; ⁽²⁾Technische Universität Darmstadt, Germany

1-6

RESEARCH ON RESPONSE TIME OF THERMOELECTRIC POWER SENSOR

*Jiabin Yan, Xiaoping Liao, Zhenxiang Yi
Southeast University, China*

1-9

3D MODEL OF THE THERMOELECTRIC MICROWAVE POWER SENSOR BY MEMS TECHNOLOGY

*Zhenxiang Yi, Xiaoping Liao
Southeast University, China*

1-12

MODELING MEMRISTIVE BIOSENSORS

Ioulia Tzouvadaki⁽¹⁾, Francesca Puppo⁽¹⁾, Marie-Agnès Doucey⁽²⁾, Giovanni De Micheli⁽¹⁾, Sandro Carrara⁽¹⁾

*⁽¹⁾École Polytechnique Fédérale de Lausanne, Switzerland;
⁽²⁾Université de Lausanne, Switzerland*

1-15

DETECTION OF UNGROUNDED OBJECTS ON MUTUAL CAPACITANCE TOUCH SCREENS

*Christian Thoresen, Ulrik Hanke, Kjell Øvergård
Buskerud and Vestfold University College, Norway*

1-18

DIFFERENTIAL CAPACITIVELY COUPLED CONTACTLESS CONDUCTIVITY DETECTION (DC4D) SENSOR FOR DETECTION OF OBJECT IN MICROFLUIDIC CHANNEL

Quang Loc Do⁽²⁾, Tung Thanh Bur⁽¹⁾, Thi Thuy Ha Tran⁽²⁾, Katsuya Kikuchi⁽¹⁾, Masahiro Aoyagi⁽¹⁾, Trinh Chu Duc⁽²⁾

⁽¹⁾National Institute of Advanced Industrial Science and Technology, Japan; ⁽²⁾Vietnam National University, Vietnam

12:30 - 14:00

C3P-H: METAL OXIDE BASED GAS SENSORS

ROOMS 101-110

SESSION CHAIR: Inkyu Park (KAIST)

2-25

NEAR REAL-TIME RECONSTRUCTION OF 2D SOIL GAS DISTRIBUTION FROM A REGULAR NETWORK OF LINEAR GAS SENSORS

Patrick Neumann⁽¹⁾, Matthias Bartholmai⁽¹⁾, Detlef Lazik⁽²⁾

⁽¹⁾Federal Institute for Materials Research and Testing, Germany;

⁽²⁾Helmholtz Centre for Environmental Research, Germany

2-28

ROOM TEMPERATURE SENSING PERFORMANCE OF GRAPHENE-LIKE SNS2 TOWARDS AMMONIA

Hao Wang, Keng Xu, Dawen Zeng

Huazhong University of Science and Technology, China

2-31

[6,6]-PHENYL C61 BUTYRIC ACID METHYL ESTER/ALPHA-SEXITHIOPHENE HETERO-JUNCTION THIN FILM TRANSISTORS GAS SENSORS FOR AMMONIA DETECTION

Yuyan Chen, Guangzhong Xie, Tao Xie, Hongfei Du, Qiuping Zhang, Yuanjie Su, Yadong Jiang

University of Electronic Science and Technology of China, China

2-34

AMORPHOUS INDIUM GALLIUM ZINC OXIDE THIN FILM-BASED OZONE SENSORS

Chiu-Hsien Wu, Guo-Jhen Jiang, Kai-Wei Chang, Zu-Yin Deng, Kuen-Lin Chen

National Chung Hsing University, Taiwan

2-37

FAST RESPONSE OF PULSED LASER DEPOSITED ZNFE2O4 THIN FILM AS A CHEMO-RESISTIVE GAS SENSOR

Saptarshi De, Narayanan Venkataramani, Rajiv Dusane, Shiva Prasad

Indian Institute of Technology Bombay, India

2-40

DETECTION OF SEASONAL ALLERGIC RHINITIS FROM EXHALED BREATH VOCS USING AN ELECTRONIC NOSE BASED ON AN ARRAY OF CHEMICAL SENSORS

Tarik Saidi⁽¹⁾, Khalid Tahri⁽¹⁾, Nezha El Bari⁽¹⁾, Radu Ionescu⁽³⁾, Benachir Bouchikhi⁽²⁾

⁽¹⁾Moulay Ismaïl University, Morocco; ⁽²⁾Moulay Ismaïl University /

Sensor Electronic & Instrumentation Group, Morocco; ⁽³⁾Rovira i Virgili University, Spain

2-42

DOPAMINE SENSING UPON AMPHETAMINE ADMINISTRATION

*Tanmay A. Kulkarni, Deepa Gupta, Dan Covey, Joseph Cheer,
Gymama Slaughter
University of Maryland Baltimore County, USA*

2-44

**AN EXPERIMENTAL STUDY OF 3D ODOR PLUME TRACKING
USING MULTICOPTER WITH GAS SENSOR ARRAY**

*Shinji Tanaka, Yoshinori Takei, Kazuki Hirasawa, Hidehito Nanto
Kanazawa Institute of Technology, Japan*

2-46

**HIGH-SENSITIVITY PARAMETRICALLY AMPLIFIED CHEMO-
MECHANICAL VAPOR SENSORS**

*Shashank Pandey, Niladri Banerjee, Aishwaryadev Banerjee, Nazmul
Hasan, Hanseup Kim, Carlos Mastrangelo
University of Utah, USA*

2-48

**THIN FILM ZINC OXIDE GAS SENSOR VIA NEAR-FIELD
ELECTROSPRAY**

*Jianyi Zheng, Weiwei Huang, Lingling Sun, Jiaxin Jiang, Gaofeng
Zheng, Daoheng Sun
Xiamen University, China*

2-50

**ROOM TEMPERATURE ALCOHOL SENSORS BASED ON
PANI/MWCNT COMPOSITE THIN FILM**

*Rawat Jaisutti⁽²⁾, Kalya Eaiprasertsak⁽²⁾, Tanakorn Osotchan⁽¹⁾
⁽¹⁾Mahidol University, Thailand; ⁽²⁾Thammasat University, Thailand*

2-52

**EFFECTS OF POST-THERMAL ANNEALING ON THE
PERFORMANCE CHARACTERISTICS OF PD/GAN SCHOTTKY
DIODES HYDROGEN SENSORS**

*Youngran Choi, Hyunsoo Kim
Chonbuk National University, Korea*

2-54

**ROOM TEMPERATURE GAS SENSING WITH POTASSIUM
TITANATE NANOWIRES**

*Igor Burmistrov⁽²⁾, Alexey Varezchnikov⁽²⁾, Vyacheslav Musatov⁽²⁾,
Andrey Lashkov⁽²⁾, Alexander Gorokhovskiy⁽²⁾, Tatyana Yudinceva⁽¹⁾,
Victor Sysoev⁽¹⁾
⁽¹⁾Saratov State Technical University, Russia; ⁽²⁾Yuri Gagarin State
Technical University of Saratov, Russia*

12:30 - 14:00

C3P-J: BIOSENSORS III

ROOMS 101-110

SESSION CHAIR: Sangmin Jeon (POSTECH Pohang University of Science and Technology)

3-57

DIRECT PARTIAL CH₃ TERMINATION INTO CARBOXYL TERMINATED DIAMOND SURFACE FOR BIOSENSOR

*Evi Suaebah, Takuro Naramura, Hiroshi Kawarada
Waseda University, Japan*

3-60

FABRICATION OF FERROCENE MODIFIED MICROSENSORS FOR THE SENSITIVE DETECTION OF GLUTAMATE

*Tina T.-C. Tseng, Peter W.-H. Chen, Lewis H.-Y. Chang
National Taiwan University of Science and Technology, Taiwan*

3-63

DEVELOPMENT OF A REAL-TIME QCM BOND-RUPTURE SYSTEM FOR POCT APPLICATIONS

*Yong Yuan⁽²⁾, Kui Han⁽¹⁾
⁽¹⁾Nanjing Haida Molecular Diagnostics Ltd, China; ⁽²⁾Southwest Jiaotong University, China*

3-66

PATTERNING AN ENZYME-MEMBRANE OF BIO-IMAGE SENSOR USING LITHOGRAPHY TECHNIQUE

*You-Na Lee, Tomoko Horio, Koichi Okumura, Tatsuya Iwata, Kazuhiro Takahashi, Makoto Ishida, Kazuaki Sawada
Toyoashi University of Technology, Japan*

3-69

HIGH SENSITIVITY RARE CELL CAPTURING BIOCHIP WITH SEPARABLE MICROSTRUCTURES

*Okju Kim, Daewon Lee, Amose Chungwon Lee, Sunghoon Kwon
Seoul National University, Korea*

3-72

SENSING AND QUANTIFICATION OF SALIVARY BETA-AMYLOID PEPTIDES AND PROTEIN SEQUENCING FOR THE SALIVA OF NORMAL AND AD PATIENTS

*Ki Bong Song, Chang-Bum Kim, Yo-Han Choi
Electronics and Telecommunications Research Institute, Korea*

3-75

CHEMOSTAT-LIKE MICROFLUIDIC PLATFORM FOR HIGHLY SENSITIVE DETECTION OF HEAVY METAL IONS USING MICROBIAL BIOSENSORS

Ji Won Lim⁽²⁾, Minseok Kim⁽²⁾, Sung Kuk Lee⁽²⁾, Taesung Kim⁽²⁾, Hyun Ju Kim⁽¹⁾, Sang Jun Lee⁽¹⁾

⁽¹⁾Korea Research Institute of Bioscience and Biotechnology, Korea;

⁽²⁾Ulsan National Institute of Science and Technology, Korea

3-78

DEVELOPMENT OF INTEGRATED FLEXIBLE PENETRATING MICROELECTRODE ARRAY WITH INTERCONNECTION CABLE FOR USE IN VARIOUS NERVOUS SYSTEMS

Donghak Byun, Keonghwan Oh, Sohee Kim

Gwangju Institute of Science and Technology, Korea

3-81

MICROFLUIDIC PAPER-BASED PRECONCENTRATOR BASED ON ION CONCENTRATION POLARIZATION

Sung Il Han⁽²⁾, Rhokyun Kwak⁽¹⁾, Ki-Back Lee⁽²⁾, Yong Kyoung Yoo⁽²⁾, Junwoo Lee⁽²⁾, Cheonjung Kim⁽²⁾, Kyo Seon Hwang⁽¹⁾, Jeong Hoon Lee⁽²⁾

⁽¹⁾Korea Institute of Science and Technology, Korea; ⁽²⁾Kwangwoon University, Korea

3-84

NEW COPOLYMER BRUSHES FOR LABEL-FREE AFFINITY BIOSENSORS

Eduard Brynda⁽¹⁾, Frantisek Surman⁽¹⁾, Cesar Rodriguez-Emmenegger⁽¹⁾, Tomas Riedel⁽¹⁾, Hana Lisalova Vaisocherova⁽²⁾

⁽¹⁾Academy of Sciences of the Czech Republic, Czech Rep.; ⁽²⁾Institute of Photonics and Electronics, Academy of Sciences CR, v.v.i., Czech Rep.

12:30 - 14:00

C3P-K: OPTICAL SENSORS III

ROOMS 101-110

SESSION CHAIR: Jeong Bong Lee (University of Texas at Dallas)

4-88

HIGH-THROUGHPUT AND REAL-TIME MICROALGAE MONITORING PLATFORM USING LENS-FREE SHADOW IMAGING SYSTEM (LSIS)

Dongmin Seo⁽³⁾, Mohendra Roy⁽³⁾, Jaewoo Kim⁽³⁾, Kiyoungh Ann⁽³⁾, Yongha Hwang⁽³⁾, Yeon Hwa Kwak⁽¹⁾, Sangwoo Oh⁽²⁾, Moonjin Lee⁽²⁾, Jae Woo Lee⁽³⁾, Sungkyu Seo⁽³⁾

⁽¹⁾Korea Electronics Technology Institute, Korea; ⁽²⁾Korea Research Institute of Ships and Ocean Engineering, Korea; ⁽³⁾Korea University, Korea

4-91

**GE1-XSNX/GE HETEROSTRUCTURE INFRARED
PHOTODETECTOR**

Khurelbaatar Zagarzusem⁽¹⁾, Yeon-Ho Kif⁽¹⁾, Sim-Hoon Yuk⁽¹⁾, Taek Sung Kim⁽²⁾, Zumuukhorol Munkhsaihan⁽¹⁾, Chel-Jong Choi⁽¹⁾, Kyu-Hwan Shim⁽¹⁾

⁽¹⁾Chonbuk National University, Korea; ⁽²⁾Kunsan National University, Korea

4-94

**TIME-RESOLVED DETECTION OF X-RAY GENERATED PULSES
ON COPLANAR STRIPLINE SENSORS**

Stephen Durbin⁽²⁾, Amer Mahmood⁽³⁾, David Lubelski⁽²⁾, Bernhard Adams⁽¹⁾

⁽¹⁾Argonne National Laboratory, USA; ⁽²⁾Purdue University, USA;

⁽³⁾Qatar Environment & Energy Research Institute, Qatar

4-97

**FIBER OPTIC REFRACTOMETER BASED IN MULTIMODE
INTERFERENCE EFFECTS (MMI) USING INDIUM TIN OXIDE (ITO)
COATING**

Adolfo Rodríguez-Rodríguez⁽²⁾, René Domínguez-Cruz⁽²⁾, Daniel May-Arrijoja⁽¹⁾, Ignacio R. Matías-Maestro⁽³⁾, Francisco Javier Arregui⁽³⁾, Carlos Ruiz-Zamarreño⁽³⁾

⁽¹⁾Centro de Investigaciones en Óptica, Spain; ⁽²⁾Universidad Autónoma de Tamaulipas, Mexico; ⁽³⁾Universidad Pública de Navarra, Spain

4-100

**ROOM TEMPERATURE DEPOSITION OF HIGHLY SENSITIVE
VANADIUM OXIDE FILMS FOR INFRARED LIGHT SENSING
APPLICATIONS**

Siamack Vosoogh Grayli, Ibrahim El-Chami, Behraad Bahreyni, Gary Leach

Simon Fraser University, Canada

4-103

**UTILIZING NEW ERBIUM-DOPED FIBER LASER SCHEME FOR
LONG-DISTANCE FIBER BRAGG GRATING (FBG) SENSOR
SYSTEM**

C. H. Yeh⁽¹⁾, Z. H. Chen⁽¹⁾, J. Y. Chen⁽¹⁾, C. W. Chow⁽²⁾

⁽¹⁾Feng Chia University, Taiwan; ⁽²⁾National Chiao Tung University, Taiwan

13-250

**MODE-SWITCHING VCO AND DOUBLE BALANCED MIXER IN
OPTICAL COMMUNICATION AND SENSOR APPLICATION**

Wen Cheng Lai, Sheng-Lyang Jang, Ching-Wen Hsue

National Taiwan University of Science and Technology, Taiwan

12:30 - 14:00

**C3P-L: MECHANICAL, MAGNETIC & PHYSICAL SENSORS III
ROOMS 101-110
SESSION CHAIR: Ulrich Schmid (Vienna University of
Technology)**

5-155

**MASH2-0 ELECTROMECHANICAL SIGMA-DELTA MODULATOR
FOR CAPACITIVE MEMS SENSORS WITH DIGITAL FILTER
CALIBRATION USING SIMULATED ANNEALING**

Bader Almutairi⁽¹⁾, Ali Alshehri⁽¹⁾, Michael Kraft⁽²⁾

⁽¹⁾King Abdulaziz City for Science and Technology, Saudi Arabia;

⁽²⁾Université de Liège, Belgium

5-108

**OPTIMIZATION OF A BIO-INSPIRED SOUND LOCALIZATION
SENSOR FOR HIGH DIRECTIONAL SENSITIVITY**

*Andrew Reid, Deepak Uttamchandani, James F.C. Windmill
University of Strathclyde, United Kingdom*

5-112

**A NOVEL FLEXOGRAPHIC PRINTED STRAIN GAUGE ON PAPER
PLATFORM**

*Dinesh Maddipatla⁽²⁾, Binu Baby Narakathu⁽²⁾, Sai Guruva Reddy
Avuthu⁽²⁾, Sepehr Emamian⁽²⁾, Ali Eshkeiti⁽²⁾, Amer Abdulmahdi
Chlaihawi⁽²⁾, Bradley Bazuin⁽²⁾, Margaret Joyce⁽²⁾, Christie Wong
Barrett⁽¹⁾, Massood Zandi Atashbar⁽²⁾*

⁽¹⁾Mac Arthur Corporation, USA; ⁽²⁾Western Michigan University, USA

5-116

**MEASUREMENT OF 3-D VIBRATION BY DYNAMIC
PHOTOGRAMMETRY USING LEAST-SQUARE IMAGE MATCHING
FOR SUB-PIXEL TARGETING**

Hyoseong Lee⁽³⁾, Huinam Rhee⁽³⁾, Jae-Hong Oh⁽¹⁾, Jin-Ho Park⁽²⁾

*⁽¹⁾Chonnam National University, Korea; ⁽²⁾Korea Atomic Energy
Research Institute, Korea; ⁽³⁾Sunchon National University, Korea*

5-120

**A FLEXIBLE STRAIN-GAUGE SENSOR FOR FLEXIBLE INPUT
DEVICES**

Yeon Hwa Kwak⁽¹⁾, Sungkyu Seo⁽²⁾, Kunyun Kim⁽¹⁾

*⁽¹⁾Korea Electronics Technology Institute, Korea; ⁽²⁾Korea University,
Korea*

5-124

**DESIGN AND FABRICATION OF BUCKLED METAL STRAIN
GAUGES USING SHAPE MEMORY POLYMER AND INKJET
ADDITIVE MICROFABRICATION**

*Robert Roberts, Sheng Zeng, Norman Tien
University of Hong Kong, Hong Kong*

5-128

DESIGN AND FABRICATION OF INDIVIDUALIZED CAPACITIVE MICROSENSOR FOR TILT MEASUREMENT

*Cyril Baby Karuthedath, Norbert Schwesinger
Technische Universität München, Germany*

5-132

UNDERWATER OBSERVATION OF VIBRATION BEHAVIOR OF THE MINIATURE CIRCULAR PIEZOELECTRIC MICROMACHINED ULTRASONIC TRANSDUCERS

*Daisuke Akai, Makoto Ishida, Daisuke Takashima
Toyohashi University of Technology, Japan*

5-136

HIGHLY FLEXIBLE AND SENSITIVE GRAPHENE-SILVER NANOCOMPOSITE STRAIN SENSOR

*Nagarjuna Neella, Venkateswarlu Gaddam, Konandur Rajanna, M.M. Nayak, Talabattulla Srinivas
Indian Institute of Science, India*

6-140

PVDF BASED ARTIFICIAL CANAL LATERAL LINE FOR UNDERWATER DETECTION

*Jianchao Fu, Yonggang Jiang, Deyuan Zhang
Beihang University, China*

13-253

SKIN FORCE SENSOR USING PIEZORESISTIVE PEDOT:PSS WITH ARABITOL ON FLEXIBLE PDMS

*Mengying Xie, Kean Aw, Wei Gao
University of Auckland, New Zealand*

13-256

HIGH TEMPERATURE PRESSURE SENSOR USING CU-SN WAFER LEVEL BONDING

*Guandong Liu, Chengchen Gao, Y.X Zhang, Yilong Hao
Peking University, China*

12:30 - 14:00

C3P-M: SENSOR APPLICATIONS

ROOMS 101-110

SESSION CHAIR: Sang-Seok Lee (Tottori University, Japan)

6-144

**HIGH-SPEED SENSING OF SOFTNESS DURING GRASPING
PROCESS BY ROBOT HAND EQUIPPED WITH TACTILE SENSOR**

*Yugo Katsuki⁽²⁾, Yuji Yamakawa⁽²⁾, Masatoshi Ishikawa⁽²⁾, Makoto
Shimojo⁽¹⁾*

*⁽¹⁾University of Electro-Communications, Japan; ⁽²⁾University of Tokyo,
Japan*

6-148

**DEVELOPMENT OF AN ACTUATION SYSTEM FOR A ROTARY
HYDRAULIC BRAKE ON A LOW COST LIGHT WEIGHT KNEE-
ANKLE-FOOT ORTHOSIS**

*Murray Lawn⁽²⁾, Makoto Takashima⁽²⁾, Makoto Ninomiya⁽¹⁾, Jiangli Yu⁽²⁾,
Kayano Soma⁽²⁾, Takakazu Ishimatsu⁽²⁾*

⁽¹⁾Nagasaki Kanae Co.Ltd, Japan; ⁽²⁾Nagasaki University, Japan

12:30 - 14:00

C3P-N: SENSOR NETWORK AND APPLICATION III

ROOMS 101-110

SESSION CHAIR: Ryutaro Maeda (AIST)

7-159

**ENERGY EFFICIENT ROUTING SCHEME USING LEADER
ELECTION IN AMBIENT ENERGY HARVESTING WIRELESS AD-
HOC AND SENSOR NETWORKS**

Md. Enam Haque, Uthman Baroudi

King Fahd University of Petroleum and Minerals, Saudi Arabia

7-164

**DISTANCE CONTROL BETWEEN MULTIPLE DRONES FOR
STABLE COMMUNICATION**

*Riho Motooka⁽²⁾, Takeru Katagiri⁽¹⁾, Shintaro Murayama⁽²⁾, Junji
Takahashi⁽²⁾, Yoshito Tobe⁽²⁾, Ryo Nishikawa⁽²⁾*

*⁽¹⁾Aoyama Gakuin University, Japan; ⁽²⁾Aoyama Gakun University,
Japan*

7-169

**DEPLOYMENT ALGORITHMS FOR COVERAGE IMPROVEMENT IN
A NETWORK OF MOBILE SENSORS WITH MEASUREMENT
ERROR IN THE PRESENCE OF OBSTACLES**

Hamid Mahboubi, Fabrice Labeau

McGill University, Canada

7-171

TRAFFIC DEDUCTION EXPLORING SENSOR DATA'S INTRA-CORRELATIONS IN TRAIN TRACK MONITORING WSN

*Zhi Liu, Toshitaka Tsuda, Hiroshi Watanabe
Waseda University, Japan*

7-173

COMPACT WIRELESS SENSOR NETWORK FOR WEB AND MOBILE APPLICATIONS

*Dongyu Wang, Kazunori Sugiura
Keio University, Japan*

13-259

COMPARATIVE ANALYSIS OF A CONTENTION BASED (RI-MAC) AND TDMA BASED (ATMA) MAC PROTOCOLS FOR WIRELESS SENSOR NETWORKS

*Trilok Chand, Arvind Kakria
PEC University of Technology, India*

13-262

DESIGN AND IMPLEMENTATION OF A CONNECTED FARM FOR SMART FARMING SYSTEM

*Minwoo Ryu, Jaeseok Yun, Ting Miao, Il-Yeup Ahn, Sung-Chan Choi,
Jaeho Kim
Korea Electronics Technology Institute, Korea*

12:30 - 14:00

**C3P-P: (BIO-)CHEMICAL AND GAS SENSING APPLICATIONS
ROOMS 101-110**

SESSION CHAIR: Siyang Zheng (Penn State University)

8-179

CAPACITOR CHARGING USING ALUMINUM/PHOSPHATE-BASED CELL

*Gymama Slaughter, Joshua Sunday, Tanmay A. Kulkarni
University of Maryland Baltimore County, USA*

8-181

DYNAMICAL THRESHOLD SETTING METHOD USING OUTLIER REJECTION TEST FOR SENSOR REACTION DETECTION

Kazuki Hirasawa⁽¹⁾, Rika Takahashi⁽¹⁾, Yoshinori Takei⁽¹⁾, Hidehito Nanto⁽¹⁾, Atsushi Saitoh⁽²⁾

⁽¹⁾Kanazawa Institute of Technology, Japan; ⁽²⁾Shibaura Institute of Technology, Japan

8-186

FLUIDICS-BASED PLANT STUDY PLATFORM WITH COLORIMETRIC HUMIDITY MONITORING

*Satya Achanta, Sanghan Park, Chang-Soo Kim
Missouri University of Science and Technology, USA*

8-190

SMART CHAIR BASED ON MULTI HEART RATE DETECTION SYSTEM

*Byeong Gu Ahn, Yun Hong Noh, Do Un Jeong
Dongseo University, Korea*

8-194

PHOTOPLETHYSMOGRAPHY AS A FORM OF BIOMETRIC AUTHENTICATION

*Anthony Lee, Younghyun Kim
Samsung Electronics, Korea*

8-198

ROBOTIC GAS SOURCE LOCALIZATION ASSISTED BY ACTIVE AIRFLOW GENERATION

*Ayano Murai, Kamon Yoshimoto, Ryuichi Takemura, Haruka Matsukura, Hiroshi Ishida
Tokyo University of Agriculture and Technology, Japan*

8-202

EXPERIMENTAL VALIDATION OF MOUSE EEG SENSOR THROUGH THE ANALYSIS OF VISUALLY EVOKED POTENTIAL ELICITED BY SUCCESSIVE FLASH STIMULI

*Donghyeon Kim, Chanmi Yeon, Euiheon Chung, Kiseon Kim
Gwangju Institute of Science and Technology, Korea*

8-206

3D MULTI-FUNCTION BIO-SPHERE DROSOPHILA BEHAVIOR PLATFORM

*Hao-Yu Liang, Wei-Cheng Lai, Pei-Hsuan Lo, Weileun Fang
National Tsing Hua University, Taiwan*

8-209

IMPLEMENTATION OF WIDE RANGE SOIL MOISTURE PROFILE PROBE BY COPLANAR PLATE CAPACITOR ON FILM SUBSTRATE

*Yasutomo Shirahama, Ryo Shigeta, Yoshihiro Kawahara, Tohru Asami, Yuki Kojima, Kazuhiro Nishioka
University of Tokyo, Japan*

8-211

ELECTROCHEMICAL IMPEDANCE SPECTROSCOPY FOR IN SITU MONITORING OF EARLY ZEOLITE FORMATION

Gert Brabants⁽²⁾, Erwin Konrad Reichel⁽¹⁾, Ali Abdallah⁽¹⁾, Francis Taulelle⁽³⁾, Christine Kirschhock⁽³⁾, Johan Martens⁽³⁾, Bernhard Jakoby⁽¹⁾

⁽¹⁾Johannes Kepler Universität Linz, Austria; ⁽²⁾Johannes Kepler Universität Linz & Katholieke Universiteit Leuven, Austria; ⁽³⁾Katholieke Universiteit Leuven, Belgium

12:30 - 14:00

C3P-Q: INTERFACE CIRCUITS

ROOMS 101-110

SESSION CHAIR: Zheyao Wang (Tsinghua University, Peking)

13-264

**A CMOS BEOL ACCELEROMETER LOW-NOISE READOUT
AMPLIFIER WITH 4.2 ZF/RT-HZ TOTAL NOISE FLOOR**

*Josep Maria Sánchez-Chiva⁽²⁾, Piotr Michalik⁽²⁾, Daniel Fernández⁽¹⁾,
Jordi Madrenas⁽²⁾*

*⁽¹⁾Nanusens / Universitat Politècnica de Catalunya, Spain; ⁽²⁾Universitat
Politécnica de Catalunya, Spain*

13-266

**THEORETICAL ANALYSIS AND SIMULATION OF SU-8
MICRONEEDLES FOR EFFECTIVE SKIN PENETRATION AND
DRUG DELIVERY**

*Richa Mishra, Tarun Kanti Bhattacharyya, Tapas Kumar Maiti
Indian Institute of Technology, Kharagpur, India*

13-268

**SIMPLE AND EFFICIENT INTERFACE CIRCUIT FOR VIBRATION
ELECTROSTATIC ENERGY HARVESTERS**

*Jie Wei⁽²⁾, Sarah Risquez⁽²⁾, Hervé Mathias⁽²⁾, Elie Lefeuvre⁽²⁾, François
Costa⁽¹⁾*

*⁽¹⁾Université Paris-Est / CNRS, France; ⁽²⁾Université Paris-Sud / CNRS,
France*

13-270

**BIRDCAGE TYPE NMR RECEIVER COIL SENSOR WITH
INTEGRATED DETUNING CIRCUIT FOR 3T MRI SYSTEM**

*Sheikh Faisal Ahmad, Young Cheol Kim, Ick Chang Choi, Hyun Deok
Kim*

Kyungpook National University, Korea

13-272

**A LOW-POWER INTEGRATED CIRCUIT FOR INTERFACING A
CAPACITIVE MICROMACHINED ULTRASONIC TRANSDUCER
(CMUT) BASED RESONANT GAS SENSOR**

*Mohit Kumar, Chunkyun Seok, Marzana Mantasha Mahmud, Xiao
Zhang, Omer Oralkan*

North Carolina State University, USA

13-274

**INDUCTIVE SENSING TECHNIQUE FOR LOW POWER
IMPLANTABLE HYDROGEL-BASED BIOCHEMICAL SENSORS**

*Yuechuan Yu, Vishal Bhola, Prashant Tathireddy, Darrin Young, Shad
Roundy*

University of Utah, USA

12:30 - 14:00

C3P-R: OPEN POSTERS

SPECIAL POSTERS

15-214

**SOOT-PARTICULATE MATTER SENSOR USING PT-GAN
SCHOTTKY CONTACTS AT HIGH TEMPERATURES**

*Hongyun So, Minmin Hou, Sambhav Jain, Jongwoo Lim, Debbie Senesky
Stanford University, USA*

15-217

**SURFACE DOPING OF LA IONS INTO ZNO NANOCRYSTALS TO
LOWER THE OPTIMAL WORKING TEMPERATURE FOR HCHO
SENSING PROPERTIES**

*Shouqin Tian⁽²⁾, Neng Li⁽²⁾, Dawen Zeng⁽¹⁾, Xiujian Zhao⁽²⁾
⁽¹⁾Huazhong University of Science and Technology, China; ⁽²⁾Wuhan
University of Technology, China*

15-220

**GAS SENSING CHARACTERISTICS OF NANOSTRUCTURED
METAL OXIDE COATINGS PRODUCED BY ULTRASHORT
PULSED LASER DEPOSITION**

*Ville Kekkonen⁽¹⁾, Christine Alepee⁽³⁾, Jari Liimatainen⁽¹⁾, Fergus
Clarke⁽¹⁾, Tilman Sauerwald⁽²⁾, Andreas Schuetze⁽²⁾
⁽¹⁾Picodeon Oy Ltd, Finland; ⁽²⁾Saarland University, Germany; ⁽³⁾SGX
Sensortech AG, Switzerland*

15-223

**ZERO POWER SENSOR NETWORK - A FULLY PASSIVE
WIRELESS SENSING PLATFORM**

*Colm Mc Caffrey, Nadine Pesonen, Jacek Flak, Pekka Pursula
VTT - Technical Research Centre of Finland, Finland*

15-226

**INDOOR SNOWFALL SIMULATION CHAMBER FOR THE
PERFORMANCE EVALUATION OF VISION-BASED SAFETY
SENSORS**

*Bong Keun Kim, Yasushi Sumi
AIST, Japan*

15-229

BIOMIMICKING GRAPHENE MECHANORECEPTOR

*Onejae Sul⁽²⁾, Eunseok Choi⁽²⁾, Hongjun Kim⁽¹⁾, Kyumin Kim⁽²⁾, Juyoung
Kim⁽²⁾, Seung-Beck Lee⁽²⁾
⁽¹⁾Hanyang Univeristy, Korea; ⁽²⁾Hanyang University, Korea*

15-232

FABRICATION AND MEASUREMENT OF ARTIFICIAL COCHLEAR DEVICE

*Jun-Hyuk Kwak, Youngdo Jung, Shin Hur
KIMM, Korea*

15-235

SIMULATION OF IMPROVED SENSITIVITY OF WHISPERING GALLERY MODES SENSOR BY NANO STRUCTURE CHIP

*Tae Young Kang, Kyujung Kim
Pusan National University, Korea*

15-238

SIGNAL ACQUISITION USING THE SERIAL SEARCH METHOD FOR MOVING TARGETS ON INDOOR POSITIONING SYSTEM USING SPREAD SPECTRUM ULTRASONIC WAVES

*Yasuaki Miyara, Taketoshi Iyota
Soka University, Japan*

15-241

HIGHLY SENSITIVE AND SELECTIVE MULTI-CHANNEL CHEMIREISISTIVE ELECTRONIC NOSE

*Hi Gyu Moon, Soo Deok Han, Youngmo Jung, Chulki Kim, Taikjin Lee, Seok Lee, Jin-Sang Kim, Hyung-Ho Park, Chong-Yun Kang
KIST, Korea*

15-243

PH SENSITIVITY COMPARISON BETWEEN INVERSION AND DEPLETION MODE SILICON NANOWIRE FIELD-EFFECT TRANSISTOR (SI-NWFET)

*Sung Keun Yoo, Jin-Hee Moon, In-Ho Song, Jin-Won Kim, Seung-A Lee, Ha-Chul Jung, Dong-Jun Moon
Osong Medical Innovation Foundation, Korea*

15-245

NANOSTRUCTURAL VANADIUM DIOXIDE THIN FILM BY GLANCING ANGLE DEPOSITION FOR THERMAL BIOSENSOR APPLICATION

*Soo Deok Han⁽¹⁾, Bo Yun Kim⁽²⁾, Dong Ha Kim⁽²⁾, Hi Gyu Moon⁽¹⁾, Jin Sang Kim⁽¹⁾, Sahn Nahm⁽²⁾, Chong Yun Kang⁽¹⁾
⁽¹⁾Korea Institute of Science and Technology, Korea; ⁽²⁾Korea University, Korea*

15-247

NEW STUDY OF SEMICONDUCTOR LASER UNDER OPTICAL FEEDBACK WITH HIGH SPEED MODULATION OF THE EXTERNAL CAVITY

*Laura Le Barbier⁽²⁾, Han-Cheng Seat⁽³⁾, Olivier Bernal⁽³⁾, Jérôme Luc⁽¹⁾, Thierry Bosch⁽³⁾
⁽¹⁾CEA, France; ⁽²⁾CEA - LAAS-CNRS, France; ⁽³⁾LAAS-CNRS INPT, France*

14:00 - 15:30

C4L-A: FABRICATION/TECHNOLOGY I

ROOM 201

SESSION CHAIRS: Lina Sarro (Delft University of Technology)

Wen Li (Michigan State University)

14:00

INVITED: ADVANCED CONFORMAL PARYLENE FABRICATION FOR MICRO/NANO DEVICES

Wei Wang⁽²⁾, Yaoping Liu⁽²⁾, Dongyang Kang⁽¹⁾, Lingqian Zhang⁽²⁾, Yu-Chong Tai⁽¹⁾

⁽¹⁾California Institute of Technology, USA; ⁽²⁾Peking University, China

14:30

EMBEDDED SACRIFICIAL LAYERS FOR CMUT FABRICATION

Rupak Bardhan Roy⁽¹⁾, Ayhan Bozkurt⁽¹⁾, Omid Farhanieh⁽¹⁾, A Sanli Ergun⁽²⁾

⁽¹⁾Sabancı University, Turkey; ⁽²⁾TOBB University of Economics and Technology, Turkey

14:45

DIRECTED GROWTH OF METAL NANOPARTICLES ON SUBSTRATES BY POLARIZED LIGHT IRRADIATION

Masashi Watanabe, Satoshi Araki, Kenshi Hayashi

Kyushu University, Japan

15:00

PIEZOELECTRIC STRAIN SENSOR ARRAY FABRICATED BY TRANSFER PRINTING METHODS

Takahiro Yamashita, Seiichi Takamatsu, Hironao Okada, Toshihiro Itoh, Takeshi Kobayashi

National Institute of Advanced Industrial Science and Technology, Japan

15:15

MOS₂ NANOSENSORS FABRICATED BY DIELECTROPHORETIC ASSEMBLY FOR ULTRASENSITIVE AND RAPID SENSING OF VOLATILE ORGANIC COMPOUNDS

Shih-Pang Wang, Chung-Hsuan Wu, Chien-Chong Hong

National Tsing Hua University, Taiwan

14:00 - 15:30

C4L-B: TACTILE SENSORS & SMART SKIN

ROOM 202

SESSION CHAIRS: Kwang-Seok Yun (Sogang University)

Larisa Florea (Dublin City University)

14:00

BIOMIMETIC MAGNETIC NANOCOMPOSITE FOR SMART SKINS

Ahmed Alfadhel, Jurgen Kosel

King Abdullah University of Science and Technology, Saudi Arabia

14:15

A FLEXIBLE TACTILE SENSOR FOR DISTRIBUTED-DEFLECTION DETECTION AND ITS RADIAL ARTERY MEASUREMENT

Jiayue Shen, Dan Wang, Zhili Hao

Old Dominion University, USA

14:30

UNIVERSAL DOUBLE-SPATIAL-RESOLUTION SOLUTION FOR CAPACITIVE TACTILE SENSORS

Mochtar Chandra, Rongshun Chen, Cheng-Yao Lo

National Tsing Hua University, Taiwan

14:45

PIEZOELECTRIC PVDF THIN FILMS WITH ASYMMETRIC MICROPOROUS STRUCTURES FOR PRESSURE SENSING

Dajing Chen, Muyue Hang, Kaina Chen, Kristopher Brown, John Zhang

Dartmouth College, USA

15:00

SILVER NANOWIRE STRAIN SENSORS FOR WEARABLE BODY MOTION TRACKING

Shanshan Yao⁽¹⁾, Jeong Seok Lee⁽²⁾, K'ehleyr James⁽¹⁾, Jace Miller⁽³⁾, Venkataramana Narasimhan⁽³⁾, Andrew Dickerson⁽³⁾, Xu Zhu⁽⁴⁾, Yong Zhu⁽¹⁾

⁽¹⁾North Carolina State University, USA; ⁽²⁾Samsung Electronics, Korea;

⁽³⁾Samsung Electronics America, Inc., USA; ⁽⁴⁾Samsung Research America, USA

15:15

FULLY PRINTED AND FLEXIBLE PIEZOELECTRIC BASED TOUCH SENSITIVE SKIN

Sepehr Emamian, Sai Guruva Reddy Avuthu, Binu Baby Narakathu, Ali Eshkeiti, Amer Abdulmahdi Chlaihawi, Bradley Bazuin, Margaret Joyce, Massood Zandi Atashbar

Western Michigan University, USA

14:00 - 15:30

C4L-C: THEORY AND NEW APPROACH

ROOM 203

SESSION CHAIRS: Takahiro Yamashita (AIST)

Gijs Krijnen (University of Twente)

14:00

**GAME THEORETIC APPROACH TOWARDS ENERGY-EFFICIENT
TASK DISTRIBUTION IN WIRELESS SENSOR NETWORKS**

*Mo Haghghi, Konstantinos Maraslis, Theo Tryfonas, George
Oikonomou*

University of Bristol, United Kingdom

14:15

**ENERGY EFFICIENT WEIGHTED SAMPLING MATRIX BASED CS
TECHNIQUE FOR WSN**

R Monika, R Hemalatha, S Radha

SSN College of Engineering, India

14:30

IMPROVING SENSOR-FUSION WITH ENVIRONMENTAL MODELS

*Goncalo Jesus⁽¹⁾, Anabela Oliveira⁽¹⁾, Alberto Azevedo⁽¹⁾, Antonio
Casimiro⁽²⁾*

*⁽¹⁾Laboratório Nacional de Engenharia Civil, Portugal; ⁽²⁾Universidade
de Lisboa, Portugal*

14:45

**ARMAC: ADAPTIVE RMAC, A MEDIUM ACCESS CONTROL
PROTOCOL FOR WIRELESS SENSOR NETWORKS**

Jenifar Rahman, Shamim Ara Shawkat, Mohammad Shah Alam

Bangladesh University of Engineering and Technology, Bangladesh

14:00 - 15:30

C4L-D: PHOTODIODES & PHOTODETECTORS BASED SENSORS

II

ROOM 204

SESSION CHAIRS: Jeong Bong Lee (University of Texas at Dallas)

Yan-Rung Lin (Industrial Technology Research Institute)

14:00

AN ULTRAVIOLET RADIATION SENSOR USING DIFFERENTIAL SPECTRAL RESPONSE OF SILICON PHOTODIODES

*Yhang Ricardo Sipaubo Carvalho Da Silva, Yasumasa Koda, Satoshi Nasuno, Rihito Kuroda, Shigetoshi Sugawa
Tohoku University, Japan*

14:15

IMPROVED PHOTO RESPONSE OF HYBRID ZNO/P3HT BILAYERED PHOTO DIODE

*Anubha Bilgaiyan, Tejendra Dixit, Iyamperumal Anand Palani, Vipul Singh
Indian Institute of Technology Indore, India*

14:30

ORGANIC PHOTODETECTORS WITH ACTIVE LAYER PATTERNED BY LITHOGRAPHY

*Pawel Malinowski, Epimitheas Georgitzikis, Caterin Salas Redondo, David Cheyns, Soeren Steudel, Sarah Schols, Paul Heremans
imec, Belgium*

14:45

X-RAY DETECTORS BASED ON P+-SI/N-ZNO ABRUPT HETEROJUNCTIONS

*Xiaolong Zhao⁽²⁾, Yongning He⁽²⁾, Liang Chen⁽¹⁾, Jinliang Liu⁽¹⁾, Yang Ouyang⁽¹⁾
⁽¹⁾Northwest Institute of Nuclear Technology, China; ⁽²⁾Xi'an Jiaotong University, China*

15:00

HIGH-SPEED GATED CMOS DETECTOR FOR FLUORESCENCE LIFETIME MICROSCOPY EXTENDING TO NEAR-INFRARED WAVELENGTHS

*Hans Ingelberts, Maarten Kuijk
Vrije Universiteit Brussel, Belgium*

15:15

IMPROVING THE RELIABILITY OF CARBON NANOTUBE BASED INFRARED SENSORS

*Liangliang Chen, Ning Xi, Zhanxin Zhou, Bo Song, Yongliang Yang, Yujie Hao, Zhiyong Sun
Michigan State University, USA*

14:00 - 15:30

C4L-E: ENERGY & POWER SYSTEMS

ROOM 206

SESSION CHAIRS: Wen Li (Michigan State University)

Pit Pillatsch (University of California, Berkeley)

14:00

**SPHERICAL MAGNETIC ENERGY HARVESTER WITH THREE
ORTHOGONAL COILS**

Josef Joos, Oliver Paul

Albert-Ludwigs-Universität Freiburg, Germany

14:15

**LOW POWER ADAPTIVE POWER MANAGEMENT WITH ENERGY
AWARE INTERFACE FOR WIRELESS SENSOR NODES POWERED
USING PIEZOELECTRIC ENERGY HARVESTING**

Zheng Jun Chew, Meiling Zhu

University of Exeter, United Kingdom

14:30

**A PIEZOELECTRIC MICRO-ENERGY HARVESTER FOR
NANOSENSORS**

Yi Li, Zeynep Celik-Butler, Donald Butler

University of Texas at Arlington, USA

14:45

**ELECTRET STABILITY RELATED TO THE CRYSTALLINITY IN
POLYPROPYLENE**

Anders Thyssen, Kristoffer Almdal, Erik Vilain Thomsen

Technical University of Denmark, Denmark

15:00

**PLUG-THROUGH ENERGY MONITOR FOR PLUG LOAD
ELECTRICAL DEVICES**

Michael Lorek, Fabien Chraim, Kristofer Pister

University of California, Berkeley, USA

14:00 - 15:30

C4L-F: DEVICES/SYSTEMS II

ROOM 207

SESSION CHAIRS: Donald Malocha (University of Central Florida)

14:00

MINIATURIZED TWO STAGE AEROSOL IMPACTOR WITH CHIP-SCALE STAGES FOR AIRBORNE PARTICULATE SIZE SEPARATION

Maribel Maldonado-Garcia⁽²⁾, Varun Kumar⁽²⁾, Siavash Pourkamali⁽²⁾, J.C. Wilson⁽¹⁾

⁽¹⁾University of Denver, USA; ⁽²⁾University of Texas at Dallas, USA

14:15

COMPARISON OF TWO TYPES OF TACTILE SENSING LAYER IN TOUCH SCREEN PANEL FOR FORCE SENSITIVE DETECTION

Yeon Hwa Kwak⁽¹⁾, Wonhyo Kim⁽¹⁾, Sungkyu Seo⁽²⁾, Kunnyun Kim⁽¹⁾

⁽¹⁾Korea Electronics Technology Institute, Korea; ⁽²⁾Korea University, Korea

14:30

FULLY BIODEGRADABLE PRESSURE SENSOR, VISCOELASTIC BEHAVIOR OF PGS DIELECTRIC ELASTOMER UPON DEGRADATION

Clementine Marie Boutry, Amanda Nguyen, Qudus Omotayo Lawal, Alex Chortos, Zhenan Bao

Stanford University, USA

14:45

LATEST RESULTS ON THE HV-CMOS PIXEL SENSOR IN THE AMS H18 PROCESS

Simon Feigl

Istituto Nazionale di Fisica Nucleare, Switzerland

15:00

A MOTION-TOLERANT HEART RATE DETECTION METHOD USING BIO-IMPEDANCE AND MUSIC ALGORITHM

Jonghwa Lee, Seonghwan Cho

Korea Advanced Institute of Science and Technology, Korea

15:15

**DEVELOPMENT OF A THREE-DIMENSIONAL INTEGRATED
IMAGE SENSOR WITH PIXEL-PARALLEL SIGNAL PROCESSING
ARCHITECTURE**

*Kei Hagiwara⁽¹⁾, Masahide Goto⁽¹⁾, Yuki Honda⁽¹⁾, Masakazu Nanba⁽¹⁾,
Hiroshi Ohtake⁽¹⁾, Yoshinori Iguchi⁽¹⁾, Takuya Saraya⁽²⁾, Masaharu
Kobayashi⁽²⁾, Hiroshi Toshiyoshi⁽²⁾, Eiji Higurashi⁽²⁾, Toshiro Hiramoto⁽²⁾*
*⁽¹⁾Japanese Broadcasting Corporation, Japan; ⁽²⁾University of Tokyo,
Japan*

14:00 - 15:30

**INDUSTRY TRACK II
ROOM 208**

14:00

**SENSORS ACTIVITIES AT MEMS INDUSTRY GROUP (MIG) & IEEE
2700 (SENSOR PERFORMANCE)**

Michael Gaitan (MIG/NIST, USA)

14:30

**SMART SENSOR AND NETWORK INTERFACES TO IOT IN
SUPPORT OF BIG DATA**

John L. Schmalzel (Rowan University, USA)

15:00

**STANDARDS: IEEE P2413 – ARCHITECTURAL FRAMEWORK FOR
INTERNET OF THINGS**

Sri Chandrasekaran (IEEE-SA, India)

15:30 - 16:00

**WEDNESDAY AFTERNOON BREAK
2F LOBBY**

16:00 - 17:15

**C5L-A: BIOLOGICAL & CHEMICAL SENSORS
ROOM 201**

**SESSION CHAIRS: Siyang Zheng (Penn State University)
Koichi Awazu (AIST)**

16:00

**TERAHERTZ GAS-SENSORS: GAS-PHASE SPECTROSCOPY AND
MULTIVARIATE ANALYSIS FOR MEDICAL AND SECURITY
APPLICATIONS**

*Philipp Neumaier⁽¹⁾, Klaus Schmalz⁽²⁾, Johannes Borngräber⁽²⁾, Dietmar
Kissinger⁽²⁾, Heinz-Wilhelm Hübers⁽¹⁾*
*⁽¹⁾German Aerospace Center, Germany; ⁽²⁾Leibniz-Institut für innovative
Mikroelektronik, Germany*

16:15

A TWO-CHANNEL BACTERIA-BASED BIOSENSOR FOR WATER QUALITY MONITORING

Weiyang Yang, Xuejian Wei, Seokheun Choi

Binghamton University, State University of New York, USA

16:30

A NOVEL OLFACTORY NEURAL NETWORK FOR CLASSIFICATION OF CHINESE LIQUORS USING ELECTRONIC NOSE

Yaqi Jing, Qinghao Meng, Peifeng Qi, Ming Zeng

Tianjin University, China

16:45

PORTABLE ACTIVE SENSORS FOR HUMAN SWEAT RATE MONITORING

Jai Kyoung Sim, Young-Ho Cho

Korea Advanced Institute of Science and Technology, Korea

17:00

TDLAS USING FPGA-BASED LOCK-IN DETECTION FOR MULTI-CHANNEL CHEMICAL SPECIES TOMOGRAPHY

Andrea Chighine⁽¹⁾, Stylianos-Alexios Tsekenis⁽¹⁾, Edward Fisher⁽¹⁾, Nick Polydorides⁽¹⁾, David Wilson⁽²⁾, Michael Lengden⁽²⁾, Walter Johnstone⁽²⁾, Hugh McCann⁽¹⁾

⁽¹⁾University of Edinburgh, United Kingdom; ⁽²⁾University of Strathclyde, United Kingdom

16:00 - 17:30

C5L-B: PHYSICAL SENSORS II

ROOM 202

SESSION CHAIRS: Andrei Shkel (University of California, Irvine)

Sinead O'Keeffe (University of Limerick)

16:00

AN RF/MICROWAVE MICROFLUIDIC SENSOR FOR MINIATURIZED DIELECTRIC SPECTROSCOPY BASED ON SENSOR TRANSMISSION CHARACTERISTICS

Michael Suster, Debnath Maji, Nicholas Vitale, Umut Gurkan, Pedram Mohseni

Case Western Reserve University, USA

16:15

**PERFORMANCE OF THE ENGINEERING MODEL OF THE CSES
HIGH PRECISION MAGNETOMETER**

*Bingjun Cheng^{2}, Bin Zhou^{2}, Werner Magnes^{3}, Roland Lammegger^{1},
Andreas Pollinger^{3}, Michaela Ellmeier^{1}, Christian Hagen^{3}, Irmgard
Jernej^{3}*

*^{1}Graz University of Technology, Austria; ^{2}National Space Science
Center, Chinese Academy of Sciences, China; ^{3}Space Research
Institute, Austrian Academy of Sciences, Austria*

16:30

**A MACHINE LEARNING APPROACH TO FIND ASSOCIATION
BETWEEN IMAGING FEATURES AND XRF SIGNATURES OF
ROCKS IN UNDERGROUND MINES**

*Ashfaqur Rahman, Md Sumon Shahriar, Greg Timms, Craig Lindley,
Andrew Boo Davie, David Biggins, Andrew Hellicar, Charlotte
Sennersten, Greg Smith, Mac Coombe
Commonwealth Scientific and Industrial Research Organisation,
Australia*

16:45

**A NOVEL CAPACITIVE MICROMACHINED TRANSDUCER FOR
MICRO-PRESSURE MEASUREMENT**

*Zhikang Li^{2}, Libo Zhao^{2}, Yingjie Hu^{2}, Sina Akhbari^{1}, Zhuangde
Jiang^{2}, Liwei Lin^{1}*

*^{1}University of California, Berkeley, USA; ^{2}Xi'an Jiaotong University,
China*

17:00

**A SURFACE ACOUSTIC WAVE SENSOR TERMINAL BASED ON
ONE-PORT RESONATOR FOR CONTACT STRESS
MEASUREMENT IN SLITS**

Haining Li^{2}, Jiexiong Ding^{2}, Zhipeng Zhou^{2}, Guangmin Liu^{1}

*^{1}China Academy of Engineering Physics, China; ^{2}University of
Electronic Science and Technology of China, China*

17:15

ESTIMATING PARTICULATE MATTER USING COTS CAMERAS

*Hsin-Hung Hsieh, Hu-Cheng Lee, Wen-Liang Hwang, Ling-Jyh Chen
Academia Sinica, Taiwan*

16:00 - 17:30

C5L-D: HUMAN ACTIVITY MONITORING

ROOM 204

SESSION CHAIRS: Darrin Young (University of Utah)

Anna Mignani (Institute of Applied Physics, IFAC)

16:00

FINGER MOTION DETECTION GLOVE TOWARD HUMAN-MACHINE INTERFACE

*Ji-Hoon Suh, Morteza Amjadi, Inkyu Park, Hyung-Joun Yoo
Korea Advanced Institute of Science and Technology, Korea*

16:15

REAL-TIME RECONSTRUCTION OF FOOTPRINT POSITIONS USING AN "INTELLIGENT CARPET" IMAGING SENSOR

*Jose Antonio Cantoral-Ceballos, Paul Wright, John Vaughan, Patricia J. Scully, Krikor B. Ozanyan
University of Manchester, United Kingdom*

16:30

VISION-BASED INTERFACE FOR PEOPLE WITH SERIOUS SPINAL CORD INJURY

*Chao Zhang, Takakazu Ishimatsu, Naoya Shiraishi, Jiangli Yu, Lawn Murray
Nagasaki University, Japan*

16:45

SMART OPTRODE FOR NEURAL STIMULATION AND SENSING

*Fahimeh Dehkhoda⁽²⁾, Ahmed Soltan⁽²⁾, Reza Ramezani⁽²⁾, Hubin Zhao⁽²⁾, Yan Liu⁽¹⁾, Tim Constandinou⁽¹⁾, Patrick Degenaar⁽²⁾
⁽¹⁾Imperial College London, United Kingdom; ⁽²⁾Newcastle University, United Kingdom*

17:00

MEMRISTOR-BASED PIXEL FOR EVENT-DETECTION VISION SENSOR

*Olufemi Olumodeji⁽¹⁾, Alessandro Bramanti⁽²⁾, Massimo Gottardi⁽¹⁾
⁽¹⁾Fondazione Bruno Kessler, Italy; ⁽²⁾ST Microelectronics, Italy*

17:15

THREE SOURCES, THREE RECEIVERS, SIX DEGREES OF FREEDOM: AN ULTRASONIC SENSOR FOR POSE ESTIMATION & MOTION CAPTURE

*Dennis Laurijssen, Steven Tuijten, Wim Saeys, Jan Steckel
Universiteit Antwerpen, Belgium*

16:00 - 17:00

C5L-F: SENSOR PACKAGING

ROOM 207

SESSION CHAIRS: Zhihong Li (Peking University)

Takahito Ono (Tohoku University)

16:00

WAFER-LEVEL FABRICATION OF STRAIN GAUGES ON PDMS MEMBRANES FOR LOW-PRESSURE SENSING

William Fausto Quirós-Solano, Gregory Pandraud, Pasqualina M. Sarro

Technische Universiteit Delft, Netherlands

16:15

ENCROACHMENT AND LINE OF SIGHT BLOCKING IN MICRO-CAVITY SEALING

Niladri Banerjee, Aishwaryadev Banerjee, Shashank Pandey, Bishnu Gogoi, Carlos H. Mastrangelo

University of Utah, USA

16:30

MODULATE THE CHAMBER PRESSURE OF THE HERMETIC SEALED MEMS DEVICE BY VARYING THE CAVITY DEPTH OF CAP SI

Shyh-Wei Cheng⁽¹⁾, Jui-Chun Weng⁽²⁾, His-Cheng Hsu⁽²⁾, Yi-Chiang Sun⁽¹⁾, Yang-Che Chen⁽²⁾, Weileun Fang⁽¹⁾

⁽¹⁾National Tsing Hua University, Taiwan; ⁽²⁾Taiwan Semiconductor Manufacturing Company, Limited, Taiwan

16:45

A NOVEL OPTICAL SELF-ALIGNMENT TECHNOLOGY FOR REALIZATION OF COMPACT OPTICAL MULTI-GAS SENSOR SYSTEM

Yoshiya Yamamoto⁽¹⁾, Ryosuke Shinozaki⁽¹⁾, Ippei Asahi⁽²⁾, Hideki Ninomiya⁽²⁾, Fusao Shimokawa⁽¹⁾, Hidekuni Takao⁽¹⁾

⁽¹⁾Kagawa University, Japan; ⁽²⁾Shikoku Research Institute, Japan

16:00 - 17:30

STANDARDS PANEL

ROOM 208

Moderator: Gerry Hayes (Wireless Center of NC, USA)

Jim Philipp (Murata, USA)

Mike Gaitan (NIST/MIG, USA)

Younghyun Kim (Samsung, Korea)

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