

Monday, March 23, 2015

07:30 - 16:00

Tutorial Registration

Room: Prefunction Area

08:00 - 10:00

Tutorial 1: Coriolis Vibratory Gyroscopes

Instructor: David Lynch, Independent Consultant

Room: Hau/Lehua

10:00 - 10:30

Coffee Break

Room: Hau/Lehua

10:30 - 12:30

Tutorial 2: Atomic Inertial Sensors

Instructor: Michael Larsen, Northrop Grumman

Room: Hau/Lehua

12:30 - 14:00

Lunch

Room: Breezeway

14:00 - 16:00

Tutorial 3: Fundamental Inertial Navigation

Instructor: Randall Jaffe, L-3 Communications

Room: Hau/Lehua

17:00 - 19:00

Welcome Reception

Room: Courtyard

All attendees are invited to the Welcome Reception for drinks and light hors d'oeuvres

Tuesday, March 24, 2015

08:00 - 17:00

Registration

Room: Prefunction Area

08:45 - 09:00

Opening Remarks

Andrei Shkel, General Chair, IEEE ISISS 2015

Room: Makai Salon

09:00 - 09:25

A1L-A: Invited Talk

Room: Makai Salon

Session Chair: Andrei Shkel (University of California, Irvine, USA)

Trends in Inertial Sensors and Applications

Earl T. Benser

Honeywell Aerospace, USA

09:30 - 10:30

A2L-A: Solid-state Gyroscopes

Room: Makai Salon

Session Chair: Ryan Lu (SPAWAR Systems Center Pacific, USA)

Co-Chair: Alexander Trusov (Northrop Grumman, USA)

Yet Another Tuning Fork Gyroscope

Roman Forke³, Karla Hiller¹, Susann Hahn¹, Stefan Konietzka², Tim Moti², Daniel Köhler², Steffen Heinz², Detlef Billep³, Thomas Gessner³

¹Center for Microtechnologies, Germany; ²Electronic Design Chemnitz, Germany; ³Fraunhofer ENAS, Germany

Disk Resonator Gyroscope with Whole-Angle Mode Operation

Parsa Taheri-Tehrani³, Oleg Izyumin², Igor Izyumin², Chae H. Ahn¹, Eldwin J. Ng¹, Vu A. Hong¹, Yushi Yang¹, Thomas W. Kenny¹, Bernhard E. Boser², David A. Horsley³

¹Stanford University, United States; ²University of California, Berkeley, United States;

³University of California, Davis, United States

Effect of Metal Annealing on the Q-Factor of Metal-Coated Fused Silica Micro Shell Resonators

Tal Nagourney, Jae Yoong Cho, Ali Darvishian, Behrouz Shiari, Khalil Najafi

University of Michigan, United States

11:00 - 12:00

A3L-A: Advanced Test and Evaluation

Room: Makai Salon

Session Chair: Ryan Lu (SPAWAR Systems Center Pacific, USA)

Co-Chair: Michael Larsen (Northrop Grumman, USA)

Continuously Self-Calibrating CVG System Using Hemispherical Resonator Gyroscopes

Alexander A. Trusov, Mark R. Phillips, George H. McCammon, David M. Rozelle, A. Douglas Meyer

Northrop Grumman Systems Corporation, United States

**Measurement of Angle Error of Gyroscopes Using a Rotary Table
Enhanced by Self-calibratable Rotary Encoder**

Wataru Kokuyama, Tsukasa Watanabe, Hideaki Nozato, Akihiro Ota
*National Metrology Institute of Japan/National Institute of Advanced Industrial Science and
Technology, Japan*

High Performance Fog: an Industrial Feedback From Mass Production

Yves Paturel, André Couderette
iXBlue, France

12:00 - 13:30

Lunch

Room: Mauka Salon

13:30 - 14:30

A4L-A: Atomic Inertial Sensors

Room: Makai Salon

Session Chair: Michael Larsen (Northrop Grumman, USA)

Co-chair: Igor Prikhodko (Analog Devices, USA)

Nuclear Magnetic Resonance Gyroscope

Michael Larsen
Northrop Grumman, United States

Synchronously Pumped NMR Gyro

Thad G. Walker, Anna Korver, Daniel Thrasher, Michael Bulatowicz
University of Wisconsin-Madison, United States

Inertial Sensors Using Atom Interferometry

Grant Biedermann, Akash Rakholia, Hayden McGuinness, David Wheeler, Yuan-Yu Jau
Sandia National Laboratories, United States

14:30 - 15:00

Coffee Break

Room: Makai Salon

15:00 - 15:30

A5P-B: POSTER SESSION: Sensor Phenomena and Sensor Systems

Room: Makai Salon

Session Chair: Andrei Shkel (University of California, Irvine, USA)

A5P-1: A Low-Power Interface Circuit for Multi-Sensor Applications

Po-Chang Wu¹, Bin-Da Liu¹, Chih-Yuan Yeh², Sih-Yu Chen², Hann-Huei Tsai², Ying-Zong Juang²

¹National Cheng-Keng University, Taiwan; ²National Chip Implementation Center, Taiwan

A5P-2: Nuclear Magnetic Resonance Gyroscope with Hybrid Optical Pumping

Jie Qin, ShuangAi Wan, XiaoGuang Sun, Xiaoqian Tian
Beijing Automation Control Equipment Institute, China

A5P-3: Research on a Dual-mass Decoupled Tuning Fork Micro-gyroscope

Bo Yang¹, Bo Dai¹, Xiaojun Liu²

¹Southeast University, China; ²Nanjing University of Information, China

A5P-4: Design of a Superluminal Ring Laser Gyroscope Using Multilayer Optical Coatings with Huge Group Delay

Tianliang Qu, Kaiyong Yang, Xiang Han, Suyong Wu, Yun Huang, Hui Luo
National University of Defence Technology, China

A5P-5: Measurement Technique of Vibrational Distribution using Static Electricity and Capacitance

Kazuya Kikunaga, Hiroshi Yamashita, Masahiro Egashira, Kazuhiro Nonaka
National Institute of Advanced Industrial Science and Technology, Japan

A5P-6: Robust, Compact Sources for Alkali-Atom Systems

Spencer Olson, Christopher Erickson, Matthew Squires, Brian Kasch, John Burke
Air Force Research Laboratory, United States

A5P-7: A Single Mass Two-Axis Capacitive MEMS Accelerometer with Force Rebalance

Talha Kose², Yunus Terzioğlu², Kivanc Azgin¹, Tayfun Akin³

¹*Dept. of Mechanical Engineering, Middle East Technical University, Turkey;* ²*METU-MEMS Research and Application Center, Turkey;* ³*METU-MEMS Research and Application Center, Dept. of Electrical and Electronics Engineering, Middle East Technical University, Turkey*

**** Session will be "Lightning Round" Presentations (3 min X 10 posters) in Makai Salon**

19:00 - 21:00

Banquet Dinner

Room: Mauka Salon

Wednesday, March 25, 2015

08:00 - 17:00

Registration

Room: Prefunction Area

08:45 - 09:00

Welcome Comments Day 2 – Andrei Shkel, General Chair

Room: Makai Salon

09:00 - 09:25

B1L-A: Invited Talk

Room: Makai Salon

Session Chair: Andrei Shkel (University of California, Irvine, USA)

How to Invent (or Not Invent) the First Silicon MEMS Gyroscope

Marc S. Weinberg

Draper Laboratory, USA

09:30 - 10:30

B2L-A: Sensors Systems

Room: Makai Salon

Chair: Doug Meyer (Northrop Grumman, USA)

Co-Chair: Igor Prikhodko (Analog Devices, USA)

Origami-Like Folded MEMS for Realization of TIMU: Fabrication Technology and Initial Demonstration

Alexandra Efimovskaya, Doruk Senkal, Sina Askari, Andrei Shkel

UCI, United States

An Inertial and Environmental Wireless Platform with Advanced Energy Harvesting Capabilities

M. Galizzi², D. Comotti², A. Gasparini¹, B. Nodari², S. Ramorini¹, V. Re², A. Vitali³

¹AMS Division, STMicroelectronics, Italy; ²University of Bergamo, Italy; ³AST Division, STMicroelectronics, United States

Bias Self-Calibration Techniques Using Silicon Disc Resonator Gyroscope

Howard Ge, John Liu, Bryan Buchanan

Boeing Company, United States

10:30 - 11:00

B3P-B: POSTER SESSION: Aiding Technology and Emerging Applications

Room: Makai Salon

Chair: Ryan Supino (Honeywell, USA)

B3P-1: Design and Implementation of Map System for Indoor Navigation - An Example of an Application of a Platform which Collects and Provides Indoor Positions

Chokatsu Yara, Yuta Noriduki, Shigenori Ioroi, Hiroshi Tanaka

Kanagawa Institute of Technology, Japan

B3P-2: A Novel Model Order Reduction Approach for Generating Efficient Nonlinear Verilog - A Models of MEMS Gyroscopes

Arnaud Parent¹, Arnaud Krust¹, Gunar Lorenz¹, Tommi Piirainen²

¹Coventor SARL, France; ²Murata Electronics Oy, Finland

B3P-3: A Wafer Level Vacuum Packaged Silicon Vibration Beam Accelerometer

Guo-Ming Xia, An-ping Qiu, Qin Shi, Yan Su
Nanjing University of Science & Technology, China

B3P-4: Effect of Substrate Thickness on Quality Factor of Mechanical Resonators

Ali Darvishian, Behrouz Shiari, Guohong He, Khalil Najafi
Center for Wireless Integrated MicroSensing and Systems (WIMS2), University of Michigan, United States

B3P-5: Die Size Reduction by Optimizing the Dimensions of the Vertical Feedthrough Pitch and Sealing Area in the Advanced MEMS (aMEMS) Process

Mustafa Mert Torunbalci¹, Said Emre Alper¹, Tayfun Akin²
¹*Middle East Technical University, MEMS Research and Applications Center, Turkey;* ²*Middle East Technical University, Dept. of Electrical and Electronics Eng., Turkey*

B3P-6: A Novel Butterfly Torsional Accelerometer with Double Differential and Self-charging Configuration

Dingbang Xiao, Qingsong Li, Zhanqiang Hou, Shijie Cao, Gao Liu, Zhihua Chen, Xuezhong Wu
National University of Defense Technology, China

B3P-7: The Concept of "Collapsed Electrodes" for Glassblown Spherical Resonators Demonstrating 200:1 Aspect Ratio Gap Definition

Joan Giner, Andrei Shkel
University of California, Irvine, United States

B3P-8: Shape sensing based on acceleration and magnetic sensor system

Atis Hermanis, Ricards Cacurs, Modris Greitans
Institute of Electronics and Computer Science, Latvia

B3P-9: Optomechanical sensing of wine-glass modes of a BAW resonator

Ajay K. Bhat², Matthew J. Storey², Sunil A. Bhav¹
¹*Analog Devices Inc, United States;* ²*Cornell University, United States*

10:30 - 11:00

Coffee Break

Room: Makai Salon

11:00 - 12:00

Exhibits

Room: Makai Salon

12:00 - 14:00

Lunch

Room: Mauka Salon

14:00 - 14:25

B4L-A: Invited Talk

Room: Makai Salon

Chair: Andrei Shkel (University of California, Irvine, USA)

Inertial Sensors to Motion Sensing

Jean-Cristophe Eloy

Yole Développement, France

14:30 - 15:30

B5L-A: Sensor Systems and Aiding Technology

Room: Makai Salon

Chair: Randall Jaffe (L-3 Communications, USA)

Wake Up MEMS for Inertial Sensors

Chris Stoeckel², Detlef Billep², Stefan Konietzka¹, Sven Zimmermann³, Thomas Otto²

¹EDC Electronic Design Chemnitz GmbH, Germany; ²Fraunhofer ENAS, Germany;

³Technische Universität Chemnitz, Germany

milli-HRG Inertial Sensor Assembly – a Reality

D.M. Rozelle, A.D. Meyer, A.A. Trusov, D.K. Sakaida

Northrop Grumman Systems Corporation, United States

15:30 - 16:00

Coffee Break

Room: Makai Salon

16:00 - 17:20

B6L-A: Sensor Phenomena and Modeling Session

Room: Makai Salon

Chair: Alexander Trusov (Northrop Grumman, USA)

Co-Chair: Ryan Lu (SPAWAR Systems Center Pacific, USA)

Simultaneous exploitation of the fundamental and higher order wineglass modes in a vibratory gyro

Howard H. Ge, Dennis Kim, Robert M'Closkey

University of California, Los Angeles, United States

On the stability of atom chip interferometers

Matthew B. Squires², Brian Kasch², Spencer E. Olson², James Stickney¹

¹Space Dynamics Laboratory, United States; ²Air Force Research Laboratory

Synchronous integrator based on digital control system for silicon micromachined gyroscope

Cheng Yang, Hongsheng Li

Southeast University, China

Thursday, March 26, 2015

08:00 - 12:00

Registration

Room: Prefunction Area

09:00 - 09:25

C1L-A: Invited Talk

Room: Makai Salon

Chair: Andrei Shkel (University of California, Irvine, USA)

Accurately measuring human movement using magneto-inertial sensors: techniques and challenges

Andrea Cereatti, Diana Trojaniello, Ugo Della Croce

University of Sassari, Italy

09:30 - 11:45

Late News

Room: Makai Salon

Chair: Randall Jaffe (L-3 Com, USA)

Co-Chair: Igor Prikhodko (Analog Devices, USA)

Wafer-scale etch process for precision frequency tuning of MEMS gyros

Dennis Kim², Amir Behbahani², Robert M'Closkey², Phil Stupar¹, Jeffrey Denatale¹

¹Teledyne Scientific & Imaging, United States; ²University of California, Los Angeles, United States

Oxide-coated polysilicon disk resonator gyroscope (DRG) within the wafer-scale encapsulation process

C.H. Ahn², E. Ng², V.A. Hong², J. Huynh², T.W. Kenny², S. Wang¹

¹Apple Inc., United States; ²Stanford University, United States

Multi-Modal Mechanical Stimuli Stage for in-Situ Calibration of MEMS Gyroscopes

Sachin Nadig, Visarute Pinrod, Serhan Ardanuç, Amit Lal

Cornell University, United States

Minimal Realization of Dynamically Balanced Lumped Mass WA Gyroscope: Dual Foucault Pendulum

Doruk Senkal, Alexandra Efimovskaya, Andrei Shkel

University of California, Irvine, United States

11:45 - 12:00

Closing Remarks

Room: Makai Salon

Andrei Shkel, General Chair

Following the close of IEEE Inertial Sensors & Systems Symposium 2015, a workshop entitled, "**Miniaturized Inertial Sensors in Competitive Sports**," will occur in Hau/Lehua, and lunch will be provided in Mauka Salon. Registration for the workshop is separate.