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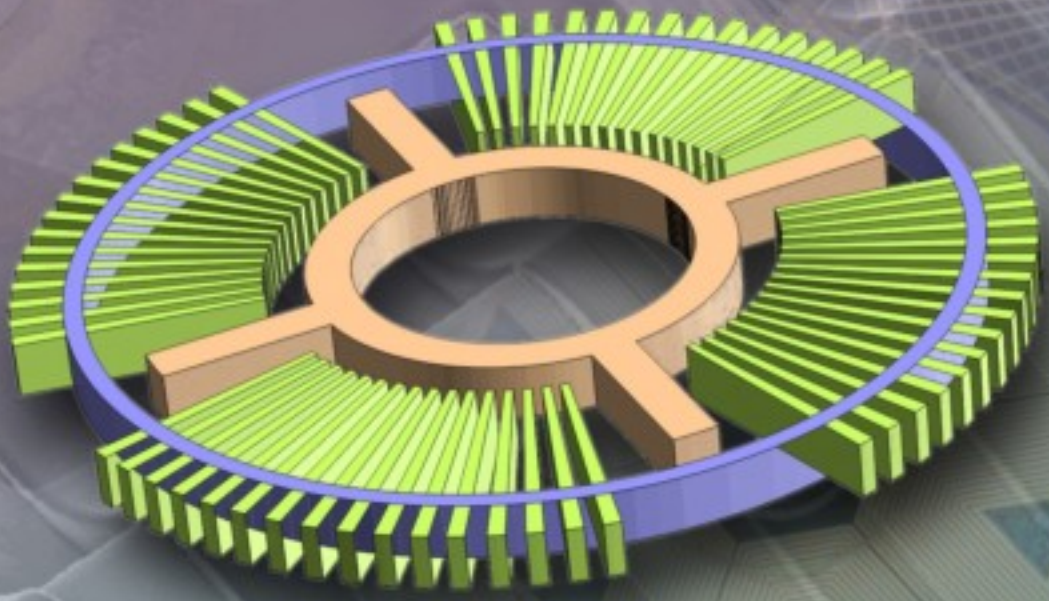

Microsystems: Technology and Applications

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Research Articles

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Foreword

The 11th annual NSTI Nanotechnology Conference and Trade Show was held this year in June 1st-5th at the Hynes Convention Center, Boston, Massachusetts, U.S.A. The conference was co-located with Nano & Clean Technology Ventures, a series of Nanotech Workshops, Clean Technology 2008 and TechConnect 2008 - IP & Ventures. Overall, in excess of 4000 attendees and 300 exhibitors were hosted by the conference organizers, while the resulting proceedings boasts over 3000 pages of peer-reviewed micro and nanotechnology research.

For a second year in a row, a number of authors publishing in the *Joint Electronics and Microsystems Symposia* track were invited to submit a revised version of their papers to this journal special issue. Invitations were issued to best papers selected from a number of symposia within the track, including: MEMS & NEMS, Sensors & Systems, Micro & Nano Fluidics, and MSM – Modeling Microsystems. These symposia brought together researchers from a number of disciplines to discuss topics ranging from theoretical developments, to design and fabrication, through to industrial applications of MEMS and NEMS sensors, devices and systems.

The joint symposia are motivated by the dream of smarter, smaller, and more complex systems that integrate micro and nano system technologies with intelligence, power and communication ability at the same micro or nano scale. The resulting increase in complexity poses an enormous challenge to engineers when designing, modeling, and fabricating such integrated micro and nano systems. The joint symposia aimed at bringing together researchers from different disciplines to exchange ideas about how to best develop deployable micro and nano systems. A special feature of this year's *Smart Sensors and Systems Symposium* were the two special sessions: *Micro-Nano Integration,* organized by Dr. Larz Heinze, VDI/VDE Innovation + Technik GmbH, DE and *Healthcare & Well-being Requirements for NEMS & MEMS* organized by Dr. Alberto Sanna and Marco Nalin, Scientific Institute H San Raffaele, IT. The keynotes to the symposium have been delivered by:

- William (Cy) Wilson, NASA Langley Research Center, Topic: *NASA NDE Applications for Mobile MEMS Devices and Sensors*
- Rolf Aschenbrenner, Head of Chip Interconnection Technologies Department, Fraunhofer Institute for Reliability and Microintegration Berlin (IZM), Germany, Topic: *Nano-Technology for Heterogeneous System Integration*
- Jerry Hallmark, Manager - Energy System Technologies, Motorola - Mobile Devices, Topic: *Technologies for Portable Electronics*
- Lewis Girod, Postdoctoral Researcher, Computer Science and AI Laboratory, Massachusetts Institute of Technology, Topic: *Distributed Acoustic Sensing*

As with the joint symposia, this journal special issue includes papers ranging from those with a high level, sensing applications and systems focus to those covering low-level physical aspects of MEMS and NEMS devices and their modeling and fabrication. Samples of leading-edge research are brought to you, on: novel micro-motors and rotational actuators, reduced noise MEMS accelerometers, FEA advances towards characterization of 3D carbon dielectrophoresis and viscousious streaming analysis, micro valves, sensor systems for physiological monitoring and biosensors.

From the symposia submissions, 30 papers were selected and authors invited to submit extended versions of their conference publication. Of these, following peer-reviewing, 10 were selected to be published in this special issue.

We are very thankful both to the NSTI directors and Nanotech chairs (Dr. Matthew Laudon and Dr. Bart Romanovicz) and to the *Sensors & Transducers* editors for offering the opportunity to publish this special issue.

Enjoy!

Elena Gaura and James Brusey

Guest Editors
Sensors & Transducers

Dr. Elena Gaura

Reader in Pervasive Computing
Director of Cogent Computing Applied Research Centre
Faculty of Engineering and Computing
Coventry University, UK
e.gaura@coventry.ac.uk
www.cogentcomputing.org

Dr. James P. Brusey

Senior Lecturer in Systems Engineering
Senior Research Fellow of Cogent Computing Applied Research Centre
Faculty of Engineering and Computing
Coventry University, UK
j.brusey@coventry.ac.uk
www.cogentcomputing.org

Guide for Contributors

Aims and Scope

Sensors & Transducers Journal (ISSN 1726-5479) provides an advanced forum for the science and technology of physical, chemical sensors and biosensors. It publishes state-of-the-art reviews, regular research and application specific papers, short notes, letters to Editor and sensors related books reviews as well as academic, practical and commercial information of interest to its readership. Because it is an open access, peer review international journal, papers rapidly published in *Sensors & Transducers Journal* will receive a very high publicity. The journal is published monthly as twelve issues per annual by International Frequency Association (IFSA). In additional, some special sponsored and conference issues published annually. *Sensors & Transducers Journal* is indexed and abstracted very quickly by Chemical Abstracts, IndexCopernicus Journals Master List, Open J-Gate, Google Scholar, etc.

Topics Covered

Contributions are invited on all aspects of research, development and application of the science and technology of sensors, transducers and sensor instrumentations. Topics include, but are not restricted to:

- Physical, chemical and biosensors;
- Digital, frequency, period, duty-cycle, time interval, PWM, pulse number output sensors and transducers;
- Theory, principles, effects, design, standardization and modeling;
- Smart sensors and systems;
- Sensor instrumentation;
- Virtual instruments;
- Sensors interfaces, buses and networks;
- Signal processing;
- Frequency (period, duty-cycle)-to-digital converters, ADC;
- Technologies and materials;
- Nanosensors;
- Microsystems;
- Applications.

Submission of papers

Articles should be written in English. Authors are invited to submit by e-mail editor@sensorsportal.com 8-14 pages article (including abstract, illustrations (color or grayscale), photos and references) in both: MS Word (doc) and Acrobat (pdf) formats. Detailed preparation instructions, paper example and template of manuscript are available from the journal's webpage: http://www.sensorsportal.com/HTML/DIGEST/Submition.htm Authors must follow the instructions strictly when submitting their manuscripts.

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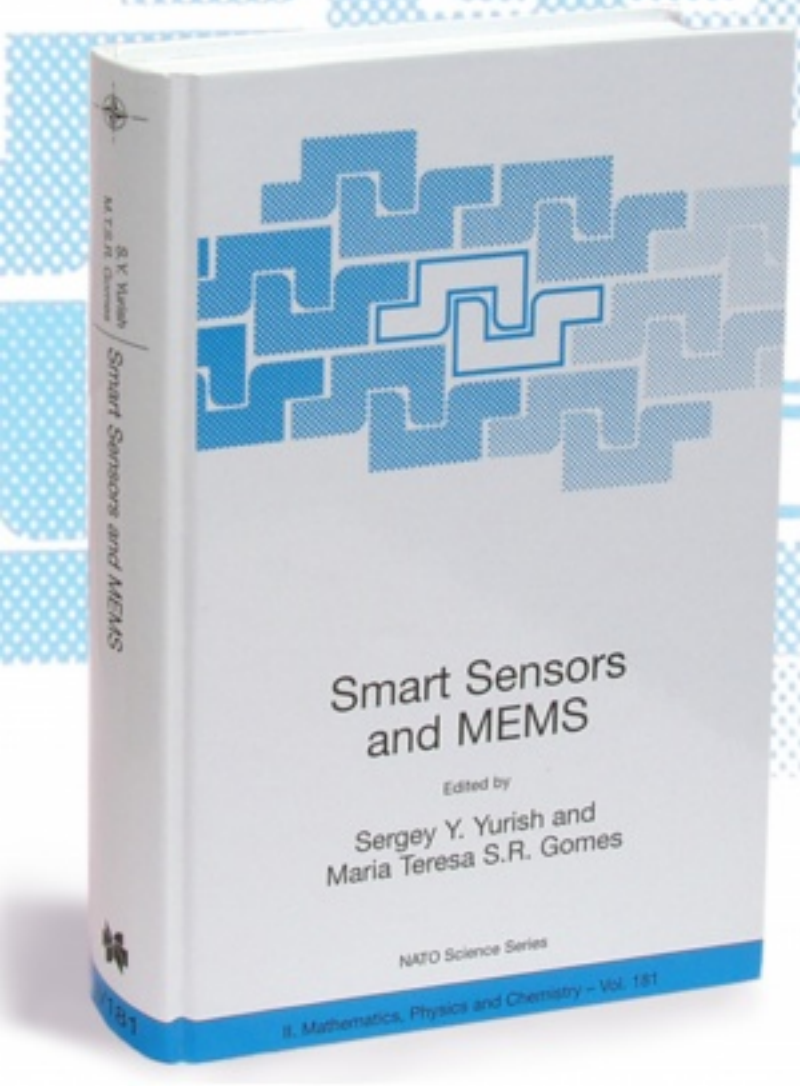

Smart Sensors and MEMS

Edited by

Sergey Y. Yurish and
Maria Teresa S.R. Gomes

The book provides an unique collection of contributions on latest achievements in sensors area and technologies that have made by eleven internationally recognized leading experts ...and gives an excellent opportunity to provide a systematic, in-depth treatment of the new and rapidly developing field of smart sensors and MEMS.

The volume is an excellent guide for practicing engineers, researchers and students interested in this crucial aspect of actual smart sensor design.

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