7th International Workshop on Nanomechanical Cantilevers - Program Schedule

May 26 (Wednesday)

8:30 - 8:45 — **Opening Remarks (Local organizer: Stephane Evoy)**

Session 1 : Micro/nanocantilevers for biochemical detection I (chair: Maria Tenje)

8:45 - 9:00 — **WA1**

Nanomechanical sensors for fast microorganism growth detection

Gyöngyi Lukács, Niall Maloney, Martin Hegner

CRANN and the School of Physics, Trinity College Dublin, Ireland

9:00 - 9:15 — **WA2**

A label-free, real-time technique for investigating the early stage fibril formation involved in Parkinson's disease

Jason Jensen[1], Margherita Farina[2], Giampaolo Zuccheri[2] and Martin Hegner[1]

[1] *Centre for Research on Adaptive Nanostructures and Nanodevices and School of Physics, Trinity College Dublin, Dublin 2, Ireland*

[2] *Department of Biochemistry, Università di Bologna, Bologna, Italy*

9:15 - 9:45 — **WA3**

Genetic analysis using nanomechanics of hybridized DNA/RNA molecules (Invited Talk)

Sudhir Husale[1], Henrik H. J. Persson[2], and Ozgur Sahin[1]

[1] *The Rowland Institute at Harvard, Harvard University, Cambridge, MA 02142, USA*

[2] *Stanford Genome Technology Center, Palo Alto, CA 94304, USA*

9:45 - 10:00 — **WA4**

Flow rate detection and preliminary biological molecule sensing results with photonic microcantilever array

Gregory P. Nordin, Seunghyun Kim, Jong Wook Noh, Weisheng Hu, Ryan Anderson,

Brigham Young University , ECE Dept, 458 CB, Provo, UT 84602

10:00 - 10:15 — **WA5**

Cantilevers sensors - a variable technology platform: from carbohydrate-protein recognition to inter-cellular forces

Felice Mauro Battiston[1], Urs Hubler[1], K. M. Gruber[2], B. A. Hermann[2], Joachim Köser[3], Jasmin Althaus[4] and Bert Müller[5]

[1] *Concentris GmbH, Davidsbodenstrasse 63, CH-4056 Basel, Switzerland.*

[2] *Walther-Meissner-Institute & CeNS, Walther-Meissner-Str. 8, 85748 Garching, Germany*

[3] *University of Applied Sciences Northwestern Switzerland, Gründenstrasse 40, CH-4132 Muttenz, Switzerland*

[4] *Paul Scherrer Institute, Laboratory for Micro- and Nanotechnology, CH-5232 Villigen, Switzerland*

[5] *University of Basel, Biomaterials Science Centre, c/o University Hospital, CH-4031 Basel, Switzerland*

10:15 - 10:30 — **COFFEE BREAK**

10:30 - 10:45 — **WA6**

Damping in 50 Giga Hertz Nanomechanical Resonators

John E. Sader[1], Matthew Pelton[2], Julien Burgen[3], Mingzhao Liu[2,3], Philippe Guyot-Sionnest[3] and David Gosztola[2]

[1] *Department of Mathematics and Statistics, The University of Melbourne, Victoria 3010, Australia*

[2] *Center for Nanoscale Materials, Argonne National Laboratory, Argonne, Illinois 60439, USA*

[3] *James Franck Institute, The University of Chicago, Chicago, Illinois 60637, USA*

10:45 - 11:00	**Electrochemical micromechanical cantilever biosensor system** Jorge Dulanto[1], Ann-Lauriene Haag[1,4], Yoshihiko Nagai[2], Aleksander Labuda[1], Yoichi Miyahara[1], Bruce Lennox[3] and Peter Grutter[1] *[1] Department of Physics, McGill University, Montreal, Quebec, Canada* *[2] Research Institute of McGill University Medical Centre, Montreal, Quebec, Canada* *[3] Department of Chemistry, McGill University, Montreal, Quebec, Canada* *[4] Department of Physics, University of Basel, Basel, Switzerland*	**WA7**
11:00 - 11:30	**Probing single cell response to microenvironmental stiffness with AFM (Invited Talk)** Kevin Webster, Ailey Crow, and Daniel A Fletcher *Biophysics and Bioengineering, UC Berkeley, Berkeley, CA*	**WA8**
11:30 - 11:45	**Inverted tapered pillars for self-assembled monolayer studies** Mauro Melli[1,2], Alessandro Pozzato[1], Marco Lazzarino[1] and Giacinto Scoles[2] *[1] CNR-INFM-TASC, Area Science Park Basovizza I34149 Trieste, Italy* *[2] SISSA, via Beirut 2,4 I34151 Trieste, Italy*	**WA9**
11:45 - 12:00	**Education laboratory kit for studying kinetics of sorption DNA using BioScan nanomechanical cantilever system** Gleb A. Kiselev[1,4], Peter V. Gorelkin[2,4], Dmitry S. Mukhin[3,4],, Igor V. Yaminsky[2,3] *[1] A.N. Frumkin Institute of Physical Chemistry and Electrochemistry RAS* *[2] M.V. Lomonosov Moscow State University, Faculty of Chemistry, Moscow, Russia* *[3] M.V. Lomonosov Moscow State University, Faculty of Physics, Moscow Russia* *[4] Biosensor Academy*	**WA10**
12:00 - 1:30	**LUNCH**	

Session 2 : Micro/nanocantilevers for biochemical detection II (chair: Thomas Thundat)

1:30 - 2:00	**An ultra sensitive polymer composite microcantilever platform for explosive detection (Invited Talk)** V Seena, Sudip Nag, Sheetal Patil, Soumyo Mukherji, V Ramgopal Rao *Center for Excellence in Nanoelectronics, Indian Instituite of Technology Bombay, Mumbai, Maharashtra, INDIA*	**WP1**
2:00 - 2:15	**Isotope effects in the interaction between gas phase substances and polymer coated porous-silicon-over-silicon microcantilevers** A. Shemesh[1], S. Stolyarova, Y. Nemirovsky, Yoav Eichen[1] *[1] Schulich Faculty of Chemistry, 2Department of Electrical Engineering, Technion-Israel Institute of Technology*	**WP2**
2:15 - 2:30	**Combining cantilever-based sensing modes for selective gas detection** Albert Loui, Scott K. McCall, Sarah C. Chinn, and Robert S. Maxwell *Lawrence Livermore National Laboratory, California, U.S.A.*	**WP3**
2:30 - 2:45	**Pd-functionalized MEMS resonator for hydrogen gas sensing at ambient pressure** Jonas Henriksson, Guillermo Villanueva, Thomas Kiefer and Jürgen Brugger *Microsystems Laboratory, École Polytéchnique Fédérale de Lausanne, Switzerland*	**WP4**
2:45 - 3:00	**Differential thermal analysis measurement technique for trace explosive detection** Jesper Olsen[1] , Anders Greve[1], Larry Senesac[2], Thomas Thundat[2], and Anja Boisen[1] *[1] Department of Micro- and Nanotechnology Technical University of Denmark Lyngby, Denmark* *[2] Life Sciences Division Oak Ridge National Laboratory Oak Ridge, USA.*	**WP5**

3:00 - 3:15	**COFFEE BREAK**	
3:15 - 3:45	**Towards an ultra-compact, all-polymer electronic nose (Invited Talk)** Søren Dohn[1], Anders Greve[1], Claus H. Nielsen[1], David Larsson[2], Kresten Yvind[2], Niels B. Larsen[1], Jørn M. Hvam[2], Winnie E. Svendsen[1], and Anja Boisen[1] [1] *Department of Micro- and Nanotechnology, Technical University of Denmark, DTU Nanotech, Building 345 East, DK-2800 Kongens Lyngby, Denmark* [2] *Department of Photonics Engineering, Technical University of Denmark, DTU Nanotech, Building 343, DK-2800 Kongens Lyngby, Denmark*	WP6
3:45 - 4:00	**Spectacular surface stress amplification for drug screening** Manuel Vögtli[1], Joseph Wafula Ndieyira[1], Gabriel Aeppli[1], and Rachel A. McKendry[1] [1] *London Centre for Nanotechnology, University College London, 17-19 Gordon Street, London, WC1H 0AH, UK*	WP7
4:00 - 4:30	**Label-free detection of DNA hybridization based on hydration-induced tension in nucleic acid films (Invited Talk)** Johann Mertens, Priscila Kosaka, Montserrat Calleja and Javier Tamayo *Bionanomechanics Lab (IMM-CNM), CSIC 28760 Tres Cantos, Madrid, Spain*	WP8
4:30 - 4:45	**Effect of adsorbed DNA on the resonance frequency of microcantilever biosensors in liquid** Seonghwan Kim[1], Dechang Yi[1], Ali Passian[1,2], and Thomas Thundat[1,2,3] [1] *Biosciences Division, Oak Ridge National Laboratory, Oak Ridge, TN 37831, USA* [2] *Department of Physics, University of Tennessee, Knoxville, TN 37996, USA* [3] *Department of Mechanical, Aerospace and Biomedical Engineering, University of Tennessee, Knoxville, TN 37996, USA*	WP9
6:00	**POSTER SESSION**	
P.1	**Degeneration breakage of flexural modes on nanowire resonators** Eduardo Gil-Santos[1], Daniel Ramos[1], Javier Martinez[1], Alvaro San-Paulo[2], Montserrat Calleja[1], and Javier Tamayo[1] [1] *Instituto de Microelectronica de Madrid, IMM-CNM (CSIC), Isaac Newton 8 (PTM), Tres Cantos, 28760 Madrid, Spain* [2] *Instituto de Microelectronica de Barcelona, IMB-CNM (CSIC), Campus de la UAB, Cerdanyola del Vallés, 08193 Barcelona, Spain*	
P.2	**Novel batch fabricated SPM cantilevers with outstanding thickness uniformity** Laure Aeschimann[1], Mathieu Burri[1] and Emiliano Descrovi[2] [1] *NanoWorld AG, Neuchâtel, Switzerland* [2] *Politecnico di Torino, Dipartimento di Fisica, Torino, Italy*	
P.3	**Analytical and finite element modeling of transient deformation of viscoelastically coated cantilevers: static-mode response of chemical sensors** Cédric Ayela[1], Stephen Heinrich[2], Fabien Josse[2] and Isabelle Dufour[1] [1] *Université de Bordeaux, Laboratoire IMS, UMR CNRS 5218, Talence, France* [2] *Marquette University, Milwaukee, Wisconsin 53201, USA*	
P.4	**Advances towards nanomagnetomechanical systems: Focused ion Beam Milling of Ferrimagnetic Garnets** Alastair E. Fraser[1], Shawn R. Compton[1], Doug Vick[2], Mark R. Freeman[1,2] [1] *Department of Physics, University of Alberta, Edmonton, Alberta, Canada T6G 2G7* [2] *National Institute for Nanotechnology, Edmonton, Alberta, Canada T6G 2M9*	
P.5	**MHz-Tip Resonators on Base of Low Frequency Cantilevers** Elena Amelie Ilin, Bernhard Schaaf, Raoul Tholl, Egbert Oesterschulze *University of Kaiserslautern, Erwin-Schrödinger Strasse 46, 67663 Kaiserslautern, Germany*	

P.6	**A Piezoresistive Bridge-Microcantilever Biosensor by CMOS Process for Surface Stress Measurement** S.M. Yang and C. Chang *Department of Aeronautics and Astronautics, National Cheng Kung University, Taiwan, ROC*
P.7	**Fabrication of Device Over-shields for Use in Mass Sensing** Vincent Sauer[1,3], Mark R. Freeman[2,3], and Wayne K. Hiebert[3] *[1] Department of Electrical and Computer Engineering, University of Alberta, Edmonton, Alberta T6G 2M9, Canada* *[2] Department of Physics, University of Alberta, Edmonton, Alberta T6G 2G7, Canada* *[3] National Institute for Nanotechnology, Edmonton, Alberta T6G 2M9, Canada*
P.8	**Rapid Thermal Lysis of Cells using Silicon-Diamond Microcantilever Heaters** Yi-Shao Liu[2], Natalya Privorotskaya[1], Jungchul Lee[1], Hongjun Zeng[5], John A. Carlisle[5], Adarsh Radadia[2,4], Larry Millet[2,4], Rashid Bashir[2,3,4], and William P. King[1,4] *[1] Department of Mechanical Science and Engineering, [2] Department of Electrical and Computer Engineering, [3] Department of Bioengineering* *[4] Micro and Nanotechnology Laboratory, University of Illinois Urbana-Champaign, [5] Advanced Diamond Technologies, Inc., Romeoville IL*
P.9	**Nanomechanical Thermal Analysis of Indium Using Silicon Microcantilevers** Changyong Yim, Namchul Jung, Sangmin Jeon *Department of Chemical Engineering, Pohang University of Science and Technology (POSTECH), Pohang, Kyungbuk 790-784, Korea*
P.10	**Nanomechanical Thermal Analysis of Photocrosslinkable Polymers Using microcantilevers** Minhyuk Yun[1], Namchul Jung[1], Changyong Im[1], and Sangmin Jeon[1] *[1] Department of Chemical Engineering, Pohang University of Science and Technology, Pohang, Korea*
P.11	**Microthermogravimety of a single microcapsule using microcantilevers** Namchul Jung[1], Dongkyu Lee[1], Yongbeom Park[1], Soohyun Cho[2] and Sangmin Jeon[1] *[1] Department of Chemical Engineering, Pohang University of Science and Technology, Pohang, Korea* *[2] POSCO, Technical Research Laboratory, 699, Gumho-Dong, Gwangyang, Jeonnam, 549-090, Korea (south)*
P.12	**Analysis of the Temperature Dependent Frequency Shift of Micromechanical Columnar Silicon Resonators** Elena Amelie Ilin, J. Kehrbusch, Egbert Oesterschulze *Physics und Technology of Nanostructures, Physics Department, University of Kaiserslautern, Erwin-Schrödinger Strasse 46, 67663 Kaiserslautern, Germany*
P.13	**High Selective DNT Molecule Detection Using Microcantilever Coated with Peptide Receptor** Yoonhyuk Shin[1], Hyunjin Jung[1], Yeon Gyu Yu[2] and Si-Hyung Lim[3] *[1] Department of Mechanics Design, Kookmin University, Seoul, Korea* *[2] Department of Bio and Nano Chemistry, Kookmin University, Seoul, Korea* *[3] School of Mechanical Engineering, Kookmin University, Seoul, Korea*
P.14	**Analysis on Evaporation Kinetics of Water Microdrops on Nanoporous Structure** Moonchan Lee, Dongkyu Lee, Sangmin Jeon[1] *[1] Department of Chemical Engineering, Pohang University of Science and Technology, Pohang, Korea*
P.15	**Photocatalytic Silver-enhanced Biosensing using Piezoelectric Cantilevers** Wooree Ko, Hyejung Seo, Sangkyu Lee and Sangmin Jeon *Department of Chemical Engineering, Pohang University of Science and Technology, San 31 Namgu Hyojadong, Pohang 790-784, Republic of Korea*
P.16	**Optical Sequential Illumination for Microcantilever Array** Xue Changguo, Zhang Qingchuan, Wu Xiaoping *Key Laboratory of Mechanical Behavior and Design of Material of Chinese Academy of Sciences, University of Science and Technology of China, Hefei 230027, People's Republic of China*

P.17 **Reversible Microcantilever Bending Induced by Dewetting-rewetting**

Jichun You, Sebastian Lenz, Sebastian Emmerling, Jannis Ochsmann, Jochen Gutmann

Max-Planck Institute for Polymer Research, Ackermannweg 10, D-55128, Mainz, Germany

P.18 **Fabrication of High Yield Resonator Arrays using Nanoimprint Lithography**

Alex Janzen[1], Csaba Guthy[1], Stephane Evoy[1]

[1] *Department of Computer and Electrical Engineering, University of Alberta, and National Institute for Nanotechnology, Edmonton, Alberta, Canada*

P.19 **Dynamic Response Modeling of Fluid-Loaded Microcantilevers: A State-Space and Nonlinear Estimation Approach to Determining Viscosity and Density of Fluids**

Mohammad N. ElBsat[1], Edwin Yaz[1], Fabien Josse[1], and Isabelle Dufour[2]

[1] *Department of EECE, Marquette University, Milwaukee, WI 53201-1881, USA*

[2] *Université de Bordeaux, IMS Laboratory, UMR CNRS 5218, 33405 Talence, France*

P.20 **Piezoresistive Cantilevers Optimized for Kilohertz Force Sensing in Aqueous Solutions**

Joseph C. Doll[1], Bryan C. Petzold[1], Miriam B. Goodman[2], and Beth L. Pruitt[1]

Departments of Mechanical Engineering[1] and Molecular and Cellular Physiology[2], Stanford University, Stanford, CA 94305, USA

P.21 **Fabrication of sub-30 nm silicon carbon nitride resonators using low voltage electron beam lithography and cold development**

M. A. Mohammad[1], Csaba Guthy[2], S. Evoy[1,2], S. K. Dew[1], and M. Stepanova[2]

[1] *Department of Electrical and Computer Engineering, University of Alberta, Edmonton*

[2] *National Institute for Nanotechnology NRC, Edmonton, Alberta, Canada T6G 2M9*

P.22 **Micromachined array of self-actuated piezoresistive proximal probes for parallel surface imaging**

T. Gotszalk[1], P. Zawierucha[1], M. Zielony[1], J. Zöllner[2], Y. Sarov[2], A. Frank[2], Tzv. Ivanov[2], I.W. Rangelow[2], N. Nikolov[3], R. Pedreau[4], Paule-Emile Latimer[4]

[1] *Wroclaw University of Technology, Faculty of Mikrosystems, Electronics and Photonics, 50-372 Wroclaw, Poland*

[2] *MNES, IMNE, FEI, Technical University of Ilmenau, Gustav-Kirchhoff-Str.1, 98684 Ilmenau, Germany*

[3] *Microsystems Ltd., 9010 P.O. Box 147 Varna, Bulgaria*

[4] *ID-MOS, 16, Cours du Général de Gaulle, 33170 Gradignan, France*

P.23 **STM Downmixing Readout of Nanomechanical Motions**

Meng Kan[1], Eric Finley[2], Mark Freeman[1,2], and Wayne Hiebert[2]

[1] *Department of Physics, University of Alberta, Edmonton, Alberta T6G 2G7, Canada*

[2] *National Institute for Nanotechnology, Edmonton, Alberta T6G 2M9, Canada*

P.24 **Strain Amplification Schemes for Piezoresistive Cantilevers**

Genki Yoshikawa[1] and Heinrich Rohrer[2]

[1] *World Premier International (WPI) Research Center, International Center for Materials Nanoarchitectonics (MANA), National Institute for Materials Science (NIMS), Ibaraki 305-0044, Japan*

[2] *Rebbergstrasse 9d, Wollerau CH-8832, Switzerland*

P.25 **Spectroscopy with microcantilevers**

L. Tetard[1,2], A. Passian[1,2], R. H. Farahi[1,2], and T. Thundat[1,2]

[1] *Biosciences Division, Oak Ridge National Laboratory, Oak Ridge, TN 37831, USA*

[2] *Department of Physics, University of Tennessee, Knoxville, TN 37996, USA*

P.26 **Point and Standoff Photothermal Deflection Spectroscopy Using Quantum Cascade Lasers**

Charles W. Van Neste, Larry Senesac, Marissa E. Morales, and Thomas Thundat[1,2,3]

[1] *Biosciences Division, Oak Ridge National Laboratory, Oak Ridge, TN 37831, USA*

[2] *Department of Physics, University of Tennessee, Knoxville, TN 37996, USA*

[3] *Department of Mechanical, Aerospace and Biomedical Engineering, University of Tennessee, Knoxville, TN 37996, USA*

P.27 **Layer-by-layer assemblies on cantilever surfaces**

Petr V. Gorelkin [1,3], Dimitry A. Davidov[1], Gleb A. Kiselev[2,3], Igor V. Yaminsky[1,3], Alexander A. Yaroslavov[1]

[1] *Chemical and Physical Departments, M.V. Lomonosov Moscow State University, Moscow 119991, Russia*

[2] *A.N. Frumkin Institute of Physical Chemistry and Electrochemistry RAS, Moscow 119991, Russia*

[3] *Biosensor Academy, Moscow 119311. Russia.*

May 27 (Thursday)

Session 3 : Micro/nanoresonators for the detection of masses and forces (chair: Peter Grutter)

8:30 - 9:45 — **TA1**

High bandwidth electronic readout for high frequency nanomechanical resonator sensors

Jennifer Campbell, Benjamin Lucht, Joshua Rideout, Devon Stopps, Robert G. Knobel

Department of Physics, Engineering Physics and Astronomy, Queen's University, Kingston, Ontario, Canada

8:45 - 9:00 — **TA2**

Mass sensing based on deterministic and stochastic response of elastically coupled nanocantilevers

Eduardo Gil-Santos[1], Daniel Ramos[1], Anirban Jana[2], Montserrat Calleja[1], Arvind Raman[3], Javier Tamayo[1]

[1] Instituto de Microelectrónica de Madrid, IMM-CNM (CSIC), Isaac Newton 8 (PTM), Tres Cantos, 28760 Madrid, Spain

[2] Pittsburgh Supercomputing Center, Carnegie Mellon University, 300 S. Craig Street Pittsburgh, Pennsylvania 15213, USA

[3] The Birck Nanotechnology Center and School of Mechanical Engineering, Purdue University, West Lafayette, Indiana 47907, USA

9:00 - 9:30 — **TA3**

Mass spectrometry using nanomechanical cantilevers (Invited Talk)

Michael Roukes

California Institute of Technology, Pasadena, Ca, USA

9:30 - 9:45 — **TA4**

Latticework nanostructure: an alternative way to enhance mass sensitivity of mechanical microresonators

Giancarlo Canavese[1], Riccardo Castagna[2], Ivan Ferrante[2], Simone Marasso[2], Alessandro Ricci[2], Valentina De Renzi[3,4], Gian Carlo Gazzadi[4] and Carlo Ricciardi[2]

[1] IIT - Italian Institute of Technology at Polito, Center for Human Space Robotics – C. Trento 21, Torino, Italy

[2] Materials Science and Chemistry Dept – Politecnico di Torino – C. Duca degli Abruzzi 24, Torino, Italy

[3] Physics Dept - Università degli Studi di Modena e Reggio Emilia, V. Campi 213A, Modena, Italy

[4] CNR - INFM S3 National Research Center - Via Campi 213A, Modena, Italy

9:45 - 10:00 — **TA5**

Mass and position determination of multiple attached particles on cantilever based mass sensors

Silvan Schmid, Søren Dohn, Sine Olesen, Mikkel Stensberg and Anja Boisen

Department of Micro- and Nanotechnology, Technical University of Denmark, DTU Nanotech, Building 345 East, DK-2800 Kongens Lyngby, Denmark

10:00 - 10:15 — **TA6**

Nanomechanical resonator arrays for the specific detection of proteins

Csaba Guthy[1], Amit Singh[1], Jamshid Tanha[2] and Stephane Evoy[1]

[1] Department of Electrical and Computer Engineering, University of Alberta, and National Institute for Nanotechnology, Edmonton, Alberta, Canada

[2] Institute of Biological Sciences, Ottawa, ON, K1A 0R6, Canada

10:15 - 10:30 — **COFFEE BREAK**

10:30 - 11:00 — **TA7**

Towards nanomagnetomechanical systems: time-domain control of nanomechanical oscillations (Invited Talk)

Ning Liu[1], Alastair Fraser[1], Joseph Losby[1], Jacob A.J. Burgess[1], John P. Davis[1], David C. Fortin[1], Doug Vick[2], Oleksiy Svitelskiy[1,2], Vincent Sauer[1,2], Wayne K. Hiebert[2], Mark R. Freeman[1,2]

[1] Department of Physics, University of Alberta, Edmonton, Alberta T6G 2G7, Canada

[2] National Institute for Nanotechnology, Edmonton, Alberta T6G 2M9, Canada

11:00 - 11:15 — **TA8**

Nanomechanical torque magnetometry using permalloy cantilevers

Joseph Losby[1,3], Chris M.B. Holt[2,3], Jacob A.J. Burgess[1,3], Jocelyn N. Westwood[1], W.K. Hiebert[3], David Mitlin[2,3] and Mark R. Freeman[1,3]

[1] Department of Physics, University of Alberta, Edmonton, Alberta T6G 2G7, Canada

[2] Department of Chemical and Materials Engineering, University of Alberta, Edmonton, Alberta, T6G 2V4, Canada

[3] National Institute for Nanotechnology (NINT), Edmonton, Alberta T6G 2M9, Canada

11:15 - 11:30	**Sensitive charge detection using perfectly tuned coupled nanomechanical oscillators** Hajime Okamoto[1], Norihito Kitajima[1,2], Koji Onomitsu[1], Reo Kometani[2], Shin-ichi Warisawa[2], Sunao Ishihara[2], and Hiroshi Yamaguchi[1] [1] *NTT Basic Research Laboratories, NTT Corporation, Atsugi-shi, Kanagawa 243-0198, Japan* [2] *Department of Engineering Synthesis, Tokyo University, Bunkyou, Tokyo 113-0033, Japan*	TA9
11:30 - 12:00	**Quantitative theoretical model for nanomechanical cantilever sensing (Invited Talk)** Maria L. Sushko[1] [1] *Pacific Northwest National Laboratory, Richland, Washington 99352, USA*	TA10
12:00 - 1:00	**LUNCH**	
1:00 - 5:00	**EXCURSION** **Excursion participants must meet outside the professional development center at 1:00 p.** **Preregistration to the excusrion is required.**	
6:00	**Banquet** **Typical "western style" outdoors BBQ at Brewster's Mountainside Barbecue** **Registrants must meet outside professional development center at 6:00 p to catch bus**	

May 28 (Friday)

Session 4 : Physical phenomena in micro/nanocantilevers (chair: Sangmin Jeon)

8:30 - 9:45	**Elastic modulus of thin plasma polymerized films determined by micromechanical cantilever sensors** S.A. Pihan[1], and R. Berger[1] [1] *Max Planck Institute for Polymer Research, Mainz, Germany*	FA1
8:45 - 9:00	**Effective Young's modulus measurement of plasma-polymerized allylamine films swelling under humidity ambient** Akiko N. Itakura[1], Masaya Toda[2,3], Renate Foerch[3] and Rüdiger Berger[3] [1] *National Institute for Materials Science, 1-2-1 Sengen, Tsukuba 305-0047, Japan* [2] *Tohoku University, 6-6-01 Aramaki-Aza-Aoba, Aoba-ku, Sendai 980-8579, Japan* [3] *Max Planck Institute for Polymer Research, Ackermannweg 10, Mainz D-55128, Germany*	FA2
9:00 - 9:30	**Surface mechanics and full-field measurements for micromechanical sensors (Invited Talk)** Fabien Amiot[1] , Yasmina Fedala[2], Cécile Flammier[1], Nicolas Garraud[2], Frédéric Kanoufi[3], Jean Paul Roger[2], Gilles Tessier[2] [1] *Institut FEMTO-ST, CNRS-UMR 6174 / UFC / ENSMM / UTBM, 24 chemin de l'Épitaphe, F-25030 Besançon, France* [2] *Institut Langevin, CNRS UMR 7587 / ESPCI ParisTech, 10 rue Vauquelin, F-75231 Paris Cedex 05, France* [3] *PECSA, CNRS-UMR 7195 / ESPCI ParisTech, 10 rue Vauquelin, F-75231 Paris Cedex 05, France.*	FA3
9:30 - 9:45	**Thermally driven piezoresistive cantilevers for multiresonance shear-force microscopy** T.P. Gotszalk[1], M. Woszczyna[1], P. Zawierucha[1], M. Zielony[1], I. W. Rangelow[2], Tzv. Ivanow[2], Y. Sarov, A. Frank[2], J. Zoellner[2], N. Nikolov[3] [1] *Wrocław University of Technology, Faculty of Microsystem Electronics and Photonics, ul. Janiszewskiego 11/17, 50-372 Wrocław, Poland* [2] *Ilmenau University of Technology, Institute of Micro- and Nanoelectronicsystems, Gustav Kirchoffstr. 1, 98-693 Ilmenau, Germany* [3] *Microsystems Ltd., Bul. Levski, Computer Centre "Risk Electronik", 9010 Varna, Bulgaria*	FA4
9:45 - 10:15	**Microcantilevers meet microdrops (Invited Talk)** Dmytro S. Golovko[1], Chuanjun Liu[1,4], Günter K. Auernhammer[1], Hans-Jürgen Butt[1], Paolo Bonanno[2], Roberto Raiteri[2], Anja Boisen[3], Stephan Keller[3], and Elmar Bonaccurso[1,4] [1] *Max-Planck Institute for Polymer Research, Ackermannweg 10, D-55128 Mainz, Germany* [2] *Department of Biophysical and Electronic Engineering, University of Genova, Via Opera Pia 11a, I-16145 Genoa, Italy* [3] *Department of Micro- and Nanotechnology, Technical University of Denmark, Building 345 East, 2800 Lyngby, Denmark* [4] *Center of Smart Interfaces, Technical University Darmstadt, 64289 Darmstadt, Germany*	FA5
10:15 - 10:30	**COFFEE BREAK**	
10:30 - 10:45	**Triple coupled cantilever systems** Hossein Pakdast and Marco Lazzarino *CNR-IOM Laboratorio TASC, Area Science park – Basovizza 34149 Trieste Italy*	FA6
10:45 - 11:00	**Nanomechanical thermal analysis of various materials using microcantilevers** Dongkyu Lee, Namchul Jung, Changyong Yim, Minhyuk Yun, and Sangmin Jeon *Department of Chemical Engineering, POSTECH, Pohang, Korea*	FA7
11:00 - 11:30	**Development of infrared FPA using bimaterial microcantilever arrays (Invited Talk)** Xiaomei Yu[1], Yongjun Zheng[1], Guowei Chen[1], Yuejin Zhao[2], Xiaohua Liu[2], Liquan Dong[2] [1] *National Key Laboratory of Science and Technology on Micro/Nano Fabrication, Institute of Microelectronics, Peking University, Beijing 100871, China* [2] *School of Optoelectronics, Beijing Institute of Technology, Beijing 100081, China*	FA8

11:30 - 11:45	**Effects of thin metallic coatings on quality factors of silicon cantilevers** Srikar Vengalatorre *Dept of Mechanical Engineering, McGill University, Montreal, QC, Canada*	FA9
11:45 - 12:00	**Electrochemical microfluidic cantilever DNA-biosensor** Ann-Lauriene Haag[1,3], Yoshihiko Nagai[2], Jorge Dulanto[1] and Peter Grütter[1] [1] *Department of Physics, McGill University, Montreal, Quebec, Canada* [2] *Research Institute of McGill University Medical Centre, Montreal, Quebec, Canada* [3] *Department of Physics, University of Basel, Switzerland*	FA10
12:00 - 1:30	**LUNCH**	

Session 5 : Novel Technologies (chair: Rudiger Berger)

1:30 - 2:00	**Wiring NEMS with optical circuits (Invited Talk)** Hong Tang *Yale University, New Haven, CT*	FP1
2:00 - 2:15	**A novel route to prepare asymmetric coatings of NMCS - Patterning of surface-immobilized ATRP-starter** Sebastian G. J. Emmerling[1,2], R. Berger[1], Jochen S. Gutmann[1,2] [1] *Department of Polymer Physics, Max-Planck-Institute for Polymer Research, Mainz, Germany* [2] *Institute of Physical Chemistry, Johannes-Gutenberg University, Mainz, Germany*	FP2
2:15 - 2:30	**Longitudinal vibration mode for resonant microcantilever-based sensors in liquid media** Christophe Castille[1], Isabelle Dufour[1], Claude Lucat[1] [1] *Université de Bordeaux, IMS Laboratory, UMR CNRS 5218, Talence, France*	FP3
2:30 - 2:45	**Simultaneous investigation of microcantilever sensors by phase shifting interferometry and µ-focus x-rays** Jannis W. Ochsmann[1], Sebastian Lenz[1], Rüdiger Berger[1] and Jochen S. Gutmann[1,2] [1] *Max Plank Institute for Polymer Research, Ackermannweg 10, D-55128 Mainz, Germany* [2] *Institute of Physical Chemistry University of Mainz, Welderweg 11, D-55099 Mainz, Germany*	FP4
2:45 - 3:00	**An analytical model for in-plane flexural vibrations of thin cantilever-based sensors in viscous fluids: applications to chemical sensing in liquids** S.M. Heinrich[1], R. Maharjan[1], L. Beardslee[3], O. Brand[3], I. Dufour[4], F. Josse[2] [1] *Civil and Environmental Engineering,* [2] *Electrical and Computer Engineering, Marquette University, Milwaukee, WI 53201-1881, USA* [3] *Electrical and Computer Engineering, Georgia Tech, Atlanta, GA 30332-0250, USA* [4] *Université de Bordeaux, Laboratoire IMS, UMR CNRS 5218, 33405 Talence, FR*	FP5
3:00 - 3:15	**COFFEE BREAK**	
3:15 - 3:30	**Cantilevers with plasmonic focusing tips for Tip Enhanced optical microscopy** Francesco De Angelis[1,2], Gobind Das[2], Enzo Di Fabrizio[1,2], Alpan Bek[3] and Marco Lazzarino[3,4] [1] *BIONEM lab, University of Magna Graecia, 88100 Catanzaro, Italy* [2] *Istituto Italiano di Tecnologia, via Morego 30, 16163, Genova, Italy* [3] *CBM scrl Area Science Park – Basovizza, 34012 Trieste, Italy* [4] *CNR-INFM-TASC, Area Science Park – Basovizza, 34012 Trieste, Italy*	FP6

3:30 - 3:45	**Three orders of magnitude detection sensitivity enhancement in piezoelectric microcantilever sensors through a unique Young's modulus change mechanism** Wan Y. Shih *School of Biomedical Engineering, Science, and Health Systems, Drexel University, Philadelphia, PA, 10104, USA*	FP7
3:45 - 4:00	**Pressurized fluid damping of nanoelectromechanical systems** Oleksiy Svitelskiy[1,2], Vince Sauer[1], Ning Liu[2], Kar-Mun Cheng[1], Eric Finley[1], Mark R. Freeman[1,2], and Wayne K. Hiebert[1] [1] *National Institute for Nanotechnology, Edmonton, Alberta T6G 2M9, Canada* [2] *Department of Physics, University of Alberta, Edmonton, Alberta T6G 2G7, Canada*	FP8
4:15 - 4:30	**Concluding Remarks: Stephane Evoy**	

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