

# Nanosensor Manufacturing: Finding Better Paths to Products

## Day 1 Speaker Bios

### Joseph Stetter, SPEC Sensors

For nearly 40 years Dr. Stetter has been on the forefront of electrochemical sensor technology. After obtaining a PhD in Physical Chemistry from the University at Buffalo (SUNY) in 1975, he developed the first diffusion-type electrochemical CO sensors, and solid-state gas sensors for CO, NO<sub>x</sub>, SO<sub>2</sub>, and other toxic gases for Becton Dickinson and Company. He led the development of the first operational sensor-array instrument with pattern recognition (“electronic nose”) at Argonne National Laboratory (1980-84). Dr. Stetter also founded Transducer Research, Inc. (TRI), producing gas sensing solutions including portable instruments for protecting human health and the environment. After selling TRI, he became a professor at Illinois Institute of Technology and founded its International Center for Sensor Research and Engineering. He later founded Transducer Technology, Inc. (TTI) and then merged this nanotechnology sensors startup with KWJ Engineering, Inc., an instrument company. During this time, he was also the Director of the Microsystems Innovation Center for SRI International (2004-8), which focused on new chem/bio sensors, unique materials, micro-/nanostructures, and bio-MEMS. After he completed a leveraged buyout of Eco-sensors to TTI-KWJ, his full-time effort (2009-present) has been bridging the gap of new government (NSF, NIH, DOD) funding to practical sensor products in the Internet of Things (IoT), consumer, industrial, medical, health, and wellness markets for the social good.



Dr. Stetter has published more than 200 technical articles/book chapters, holds more than 40 domestic and foreign patents, and has been on boards of many technical societies (including being the Chairman of the Electrochemical Society’s Sensor Division) and several start-up companies. He still serves as editor and reviewer for scientific and engineering journals and has received awards for tech transfer and for technology and business development, including the 2002 TMAC Entrepreneur of the Year award. There are many commercial products based on Dr. Stetter’s work that are in worldwide use today, protecting human health and the environment.

### Mei He, Kansas State University

Dr. He received her doctorate at the University of Alberta in 2008. She did her post-doctoral research at the University of California, Berkeley, in the Bioengineering Department. She worked with the Center of Integrated Nanomechanical Systems (COINS) and the California Institute for Quantitative Bioscience (QB3) to translate engineering innovations for complex biological systems. Dr. He started her assistant professorship at Kansas State University in 2014. She has represented K-State as a member of review committee for proposals to the USDA Nanotechnology program, is a councilor of the American Electrophoresis Society, and is a member of the American Society of Mechanical Engineers. Dr. He’s research expertise includes solving translational challenges in diagnostics and therapeutics, sensing device integration and automation, and the point-of-care diagnosis. Dr. He is also an affiliated faculty with K-State’s Terry C. Johnson Cancer Research Center and its Nanotechnology Innovation Center. She has published extensively in microfluidic technology and POC



diagnosis, has been granted six patents, and is involved in technology transfer and licensing with various biotech companies and startups. Her recent publications in 3D printing-based mobile diagnostic technology have been highlighted by *ScienceDaily News* and *3D Printing Industry News*.

#### **Ahmed Busnaina, Northeastern University**

Prof. Busnaina is the William Lincoln Smith Chair Professor, Distinguished University Professor, and founding Director of National Science Foundation's Nanoscale Science and Engineering Center for High-rate Nanomanufacturing at Northeastern University, Boston, MA. Prof. Busnaina is recognized for his work on directed assembly-based printing of micro- and nanoscale devices for electronics, sensors, energy, biomedical, and materials applications. His research support exceeds \$53 million. He has authored more than 600 papers in journals, proceedings, and conferences in addition to 80 filed and awarded patents. He is an editor of the *Microelectronic Engineering* journal and associate editor of the *Journal of Nanoparticle Research*. He is a fellow of the American Society of Mechanical Engineers and the Adhesion Society, and is a Fulbright Senior Scholar.



#### **Michael Huff, MNX**

Dr. Michael A. Huff is Founder and Director of the MEMS and Nanotechnology Exchange (MNX) located in Reston, Virginia. The MNX was established as a national-level program with support from DARPA to provide access to MEMS and nanotechnology implementation resources as well as to develop manufacturing techniques to help advance these technologies. The MNX was established in 1998 and continues to grow, now serving over 9,000 customers from over 1,000 organizations around the country.



Dr. Huff has held a variety of notable positions, from industry to academia, working to advance and mature MEMS and Nanotechnology for commercial applications. Prior to establishing the MNX, Dr. Huff was on the faculty in the Department of Electrical Engineering at Case Western Reserve University (CWRU) in Cleveland, Ohio. At CWRU his research was focused on developing MEMS microfluidic components for healthcare and defense applications, including a novel MEMS-based insulin pump, which received national attention and was portrayed in the book [One Digital Day](#) by Rick Smolan.

Dr. Huff is a contributing author to 10 books on MEMS and Nanotechnology fabrication and manufacturing methods and is currently authoring a technical volume on Microsystems Manufacturing for Springer. He also has received over 24 patents on devices and/or fabrication methods. He has a Ph.D. in EECS from MIT.

#### **Abhishek Motayed, N5 Sensors**

Dr. Motayed is founder and CEO of N5 Sensors, Inc. Before founding N5 Sensors, he was an assistant research scientist at the Institute for Research in Electronics and Applied Physics at the University of Maryland, College Park. He has over 10 years of experience in the field of semiconductor devices, specializing in wide-bandgap materials/devices, low-dimensional semiconducting structures, micro/nanofabrication, device modeling, and characterization. Dr. Motayed received his PhD in 2007 from the University of Maryland in Electrical and Computer Engineering. In 2012 he founded N5 Sensors, Inc., to commercialize hybrid sensor technology licensed from the



University of Maryland. N5 currently has 10 full-time employees and several SBIR programs funded by the Environmental Protection Agency, the National Science Foundation, the Department of Homeland Security, and the Department of Defense.

#### **Susan Rose-Pehrsson, U.S. Naval Research Laboratory**

Dr. Susan L. Rose-Pehrsson is the Director of the Navy Technology Center for Safety and Survivability in the Chemistry Division at the Naval Research Laboratory (NRL), Washington, DC. The Navy Technology Center conducts basic and applied research and development programs aimed at the solution of current and future Navy needs in the fields of combustion, fire extinguishment, fire modeling and scaling, damage control, fuels chemistry, lithium battery safety, and hazardous chemical and explosives detection. The research scope spans closely coupled theoretical and experimental studies in laboratory-scale to intermediate and real-scale. Dr. Rose-Pehrsson also leads the Sensor Lab in the Laboratory for Autonomous Systems Research at NRL. Dr. Rose-Pehrsson received her BS in chemistry from the University of Virginia in 1979 and her MS in Analytical Chemistry in 1981 from Pennsylvania State University. She began her career as a research chemist in the Chemistry Division at the Naval Research Laboratory in 1981. In 1984, she was selected by NRL for the Edison Memorial Graduate Training Program at Pennsylvania State University. She received her PhD in Analytical Chemistry from Pennsylvania State University in 1988 (Thesis Title: Pattern Recognition Analysis of Sensor Arrays for Toxic Vapor Detection). She conducts research in toxic vapor detection, explosives detection, trace analysis, sensor development, and data analysis. These activities are directed to method and instrument development for the support and protection of personnel. Dr. Rose-Pehrsson is the author of numerous journal articles, professional society presentations, technical reports, and she holds nine patents. NRL honored her with the Berman Publication Award in 1984, 1986, and 2001; the Technology Transfer Award in 1992 and 2007; and the Edison Patent Award in 2007. In 2003, she received the NASA Certificate of Recognition for the creative development of a scientific contribution. She was awarded the Royal Institution of Naval Architects (RINA) 2003 RINA-Lloyds Register Safer Ship Award for "Advanced Damage Control Technology Through Sensors, Protection Systems, and Automated Control Architecture," and the 2004 Harry C. Bigglestone Award for Excellence in Communication of Fire Protection Concepts.



#### **Sameh Dardona, United Technologies Research Center**

Sameh Dardona is a seasoned research and development professional with extensive experience in advanced sensing, flexible electronics, additive manufacturing, materials characterization, designs for additive manufacturing, and project management. He is currently leading external and internal programs in the area of direct-write technology and flexible hybrid electronics manufacturing. Dr. Dardona has extensive industrial experience in developing new innovative products and systems, is responsible for numerous peer reviewed scientific articles and presentations, and has more than 20 patents/patent applications.

