September 2012 Issue

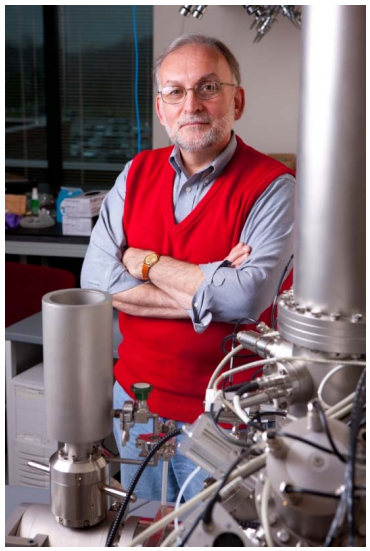
Forward to a Friend

Membership Highlights

AVS Recognition for Excellence in Leadership Presented to Prof. Joseph A. Gardella, Jr.

The AVS Membership Committee has created a new recognition for Excellence in Leadership. The AVS seeks to recognize individuals who not only excel in science and/or engineering, but who also, through mentoring, have enhanced the careers of future generations who might not otherwise have considered or had access to opportunities in science, engineering, and technology. Their leadership in the effort to develop fully the world's human resources is critical to the best scientific and engineering progress.

Recipients of this honor will have their profile displayed on the AVS Website, featured in this Newsletter and will receive a certificate of recognition. It is anticipated that such recognitions will be made periodically throughout the year. See Eligibility & Nominations criteria at the end of this article.



The AVS Membership Committee has chosen **Professor Joseph A. Gardella, Jr. to receive the inaugural AVS Recognition for Excellence in Leadership.**

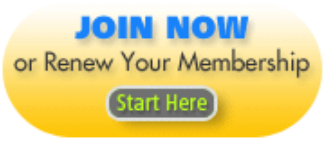
Joseph Gardella, Jr., Department of Chemistry, University at Buffalo State University of New York (UB) is recognized for his accomplishments in the development of quantitative analysis and surface chemistry applied to the investigation of environmental effects at polymer surfaces and tissue engineering using synthetic biomaterials. He also works at the intersection of environmental studies and public participation, especially in air and soil pollution. Prof. Gardella has published approximately ~245 papers in refereed journals and books, and has been awarded 9 patents based on his work.

Mentoring and Leadership Activities:
Professor Gardella is not only an accomplished scientist but is also a leader in the development of curricula for undergraduate and graduate students and is a community leader. He is an outstanding mentor to people within his research group as well as to scientists in the AVS community. For example, Prof. Gardella mentored Dr. Tammy Millilo, who is confined to a wheelchair,

Call for AVS 40-Year Members

Over the years, AVS has recognized 40-year members of the Society at the Awards Ceremony held at the International Symposium and Exhibition. The Forty-Year Club consists of current AVS members who have been active in the Society for 40 years or more. AVS would like to continue to recognize these members; however, to ensure that we capture all members from 1972 we ask that you please notify the

AVS office if you or someone you know is eligible for 40-year status. Please contact Angela Klink at 212-248-0200 x221 or angela@avs.org.



Upcoming Events

Southern California Chapter Exhibit & Short Courses
October 3, 2012
Los Angeles, CA
Website

Hudson Mohawk Fall Meeting
October 12, 2012
Albany, NY
Website

NAMBE 2012
October 14-17, 2012
Stone Mountain, CA
Website

AVS 59
Oct. 28-Nov. 2, 2012
Tampa, FL
Website

68th IUVSTA Workshop
December 9-13, 2012
Hong Kong
Website

SCiMAN 7
December 10-11, 2012
San Pedro, Montes de Oca, Costa Rica
Website

PCSI-40 2013
January 20-24, 2013
Waikoloa, HI
Website

ICMCTF
April 29-May 2, 2013
San Diego, CA

through her B.S. and Ph.D. programs in Chemistry at UB. Today she is a postdoctoral scholar in his group. Prof. Gardella leads the AVS as a member-at-large of the AVS Applied Surface Science Division and is a member of the Division's committee for student awards.

Prof. Gardella helped the UB Undergraduate College develop a new general education program that emphasises innovative science and laboratory courses for non-science majors. This was a $10 million 5 year program to enhance teacher knowledge and student performance in high needs urban middle and high schools in Buffalo, New York. He is currently a member of the UB Honors College Council, and was a founding member of the Western New York Service Learning Coalition. Prof. Gardella was also a co-PI on the Hewlett Foundation funded Community Linked Interdisciplinary Research (CLIR) Program at UB, and served as the Program Director of a NIH-funded summer undergraduate program, Research Institute in Biomedical Materials Science and Engineering. Prof. Gardella also develops innovative masters programs in the sciences, and is co-PI of the Professional Science Masters Program in CAS, funded by the Alfred P. Sloan Foundation.

Prof. Gardella is also active in environmental programs at UB and in the community. He is chair of the Lake Ontario Ordinance Works Community Action Council.

Biography: Joseph A. Gardella, Jr. joined UB in 1982, and is currently the John & Frances Larkin Professor of Chemistry and the director of the UB/Buffalo Public Schools Interdisciplinary Science and Engineering Partnership. He received a B.S. in Chemistry and B.A. in Philosophy from Oakland University, Rochester, MI, and a Ph.D. in Chemistry from the University of Pittsburgh. From 1989 to 1990 he was a program officer at the National Science Foundation Chemistry Division and from 1995 to 2005 he was the Associate Dean for External Affairs in the College of Arts and Sciences. Prof. Gardella has received many awards for both his research and community activities. These include Fellow of AVS (2004) and the Presidential Award for Excellence in Science, Mathematics and Engineering Mentorship (2005).

Interview with Professor Joseph A. Gardella, Jr.

Q: Describe a typical day in your life.
A: Balancing family concerns, especially for my disabled daughter, with a complex schedule of work related to K-12 teacher professional development, teaching, research and community outreach. Many days end with a public meeting on environmental issues in the community or environmental justice.

Q: What are your leisurely interests and activities?
A: I belong to a health club, which lowers my stress. I enjoy reading history and biography and international travel.

Q: Choose one word you feel explains you best.
A: Persistence.

Q: What do you feel you are best known for?
A: I'd like to be known for balancing family life with a consistent concern for developing human resources in academics, science, and community work.

Q: What is your favorite part of your job?
A: I love the challenge of working at excellence in science, mentoring young scientists, and working with school teachers. I'm hoping that my contributions to community and urban public education change the community for the better.

Q: Is there a quote you live by or that inspires you, if so what is it?
A: I have many. I like Churchill's quote "Never give in, never give in, never; never; never; never - in nothing, great or small, large or petty - never give in except to convictions of honor and good sense."

Q: Who has encouraged you throughout your career and/or life? Inspired you?
A: My parents, my family, my wife, daughter and son, who are supportive, and give me encouragement, while providing their own commitment and persistence as examples for me. My parents, especially their work ethic and commitment to the children they taught, to transform their lives.

[Website]

[Event Calendar]

[First Announcements]

Upcoming Board Meetings

2012
October 28, 2012
Tampa, Florida

2013
January 27, 2013
Research Triangle Park, North Carolina

April 28, 2013
San Diego, California

July 22, 2013
New York, New York

October 27, 2013
Long Beach, California

Corporate Members

Advanced Energy Industries Inc.

Agilent Technologies

AJA International, Inc.

Alicat Scientific, Inc.

Altair Technologies, Inc.

Asylum Research

BellowsTech, LLC

Bruker Nano Surfaces

Cambridge NanoTech

Capitol Vacuum Parts

CeramTec North America

Chuanbei Vacuum Technology (Beijing) Co., Ltd.

Q: Did you have a mentor?
A: Many, my research advisers, Paul Tomboulian of Oakland University, Dave Hercules of Pitt, Ted Eyring of Utah. Bob Osteryoung and Janet (Jones) Osteryoung, who mentored me as a young faculty member. Henry Blount while I was at NSF and beyond. They each taught me parts of mentoring that I use in guiding young students, faculty and community members.

Q: How did you become affiliated with AVS?
A: I joined I think as a student at Pitt. I've been involved in AVS as a member, publishing articles, organizing conferences, and serving as a member at large for my whole professional career.

Professional membership is something I valued as a student, starting with the American Chemical Society and AAAS. AVS was a very different choice, based on my research specialty, but small enough for my participation to have high impact.

Q: What has been your paramount experience with AVS?
A: Organizing the 17th International Symposium on SIMS.

Q: Do you belong to any other organizations?
Many, ACS, Society for Applied Spectroscopy, AAAS, ASMS....lots of smaller groups. I'm thrilled to have been named a fellow of AAAS, AVS and SAS!

Q: What was your reaction upon winning your award with AVS?
A: Amazement, as it is the first year of the award, I am very honored to represent such a unique statement as a "Leader."

Q: What other awards or acknowledgements have you won recently?
A: Fellow of AAAS, Fellow of SAS, Presidential Award for Excellence in Science, Mathematics and Engineering Mentorship (PAESMEM), several other community awards for my work in environmental outreach.

Q: What is the next big step in your career you plan on tackling?
A: Working toward transforming science/engineering education in Buffalo Public Schools, to transform the district's performance in educating students.

Q: If you could leave one piece of advice for our future generations, whether it is science related or not, what would it be?
A: Read.

Eligibility & Nominations for Recognition in Excellence in Leadership
Nominations from AVS members, including self-nominations, for this honor are welcome and should include the following items on one page: (1) Nominator's Name, Affiliation, E-mail, (2) Nominee's Name, Affiliation, E-mail, website/s, (3) a high-resolution photograph of the nominee in a science/engineering setting, (4) a short paragraph describing the nominee's scientific/engineering accomplishments in an area relevant to the AVS, (5) an additional paragraph describing their outstanding mentoring and effective guidance to a significant number of persons who might not otherwise have considered or had access to opportunities in science, engineering and technology (including persons with disabilities, women and minorities) and who are students at the K-12, undergraduate, or graduate education level, or early career scientists or engineers who have recently completed their degrees (this includes post-doctoral fellows, assistant professors and individuals in the private sector) and (6) a short biography of the nominee. The nominee does not need to be an AVS member. Nomination packages should be sent to **bridget_rogers@avs.org.** Nominations will be accepted on a rolling basis and will be considered for up to one year from the date of receipt. In most cases, only acknowledgement of the receipt of nominations will be made. Additional information or supporting material and letters for the top candidates may be requested.

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Symposium Overview

Denton Vacuum LLC

Duniway Stockroom Corp.

Edwards Vacuum, Inc.

Evans Analytical Group LLC

FMG Enterprises, Inc.

Gamma Vacuum

GNB Corporation

Helium Leak Testing, Inc.

Hiden Analytical, Inc.

Hine Automation

HEUTTINGER Electronic, Inc.

HVS Leak Detection

Innovative Vaccum Solutions, Inc.

Intellivation, LLC

ION-TOF USA Inc.

Kratos Analytical

Kurt J. Lesker Company

Lam Research

M&I Materials, Ltd. (Apiezon)

MeiVac, Inc.

MEWASA North America, Inc.

MKS Instruments, Inc.

Nor-Cal Products

Nordiko Technical Services Limited

Omicron Nanotechnology USA, LLC

Oxford Instruments - Austin Scientific

Pfeiffer Vacuum Technology

Physical Electronics

Plasmaterials, Inc.

Plasma-Therm

PREVAC sp. zo.o

Process Materials, Inc.

AVS 59 Technical Program Now Available

Website: www2.avs.org/symposium

The AVS 59th International Symposium and Exhibition will be held October 28-November 2, 2012, at the Tampa Convention Center in Tampa, Florida. Highlights include an extensive collection of technical sessions, exhibitor technology spotlights, short courses, and a free to attend equipment exhibition.

Division/Group Programs:

- Advanced Surface Engineering
- Applied Surface Science
- Biomaterial Interfaces
- Electronic Materials & Processing
- Magnetic Materials, Films & Interfaces
- Manufacturing Science & Technology
- MEMS & NEMS
- Nanometer-Scale Science & Technology
- Plasma Science & Technology
- Surface Science
- Thin Film
- Vacuum Technology

Focus Topics:

- Antinides & Rare Earths
- Biofilms & Biofouling: Marine, Medical, Energy
- Biointerphases
- Electron Transport at the Nanoscale
- Energy Frontiers
- Exhibitor Technology Spotlight
- Graphene & Related Materials
- Helium Ion Microscopy
- In Situ Microscopy & Spectroscopy
- Nanomanufacturing
- Oxide Heterostructures-Interface Form & Function
- Scanning Probe Microscopy
- Spectroscopic Ellipsometry
- Transparent Conductors & Printable Electronics
- Tribology

Tutorial:

- Nanomanufacturing: Current Status and Future Prospects

Short Courses on Vacuum and Equipment Technology:

- Analysis of Mass Spectrometer (RGA) Spectra
- Fundamentals of Vacuum Technology
- UHV Design and Practices

Short Courses on Materials and Interface Characterization:

- X-ray Photoelectron Spectroscopy (XPS or ESCA), and Auger Electron Spectroscopy (AES)
- Focused Ion Beams (FIB) and Secondary Ion Mass Spectrometry (SIMS)
- Composition Depth Profiling
- Comprehensive Course on Surface Analysis and Depth Profiling by XPS or ESCA, AES, FIB, & SIMS
- Scanning Electron Microscopy and X-ray Microanalysis
- Surface Characterization of Biomaterials

Short Courses on Materials Processing:

R.D. Mathis Company

RBD Instruments, Inc.

RF VII Inc.

RHK Technology Inc.

SAES Getters USA, Inc.

Scientific Instruments, Inc.

Semicore Equipment

Sequoia Brass & Copper

SPECS Surface Nano Analysis GmbH

Staib Instruments, Inc.

Sumitomo (SHI) Cryogenics of America, Inc.

Super Conductor Materials, Inc.

Ted Pella, Inc.

Thermionics Laboratories

Thermo Fisher Scientific

Transfer Engineering and Manufacturing, Inc.

Trillium US

U-C Components Inc.

Vacuum Engineering & Materials Co., Inc.

Vacuum Research Corp.

VAT Inc.

VG Scienta, Inc.

Join Now

- Atomic Layer Deposition
- Chemical Mechanical Planarization for Microelectronics Manufacturing
- **NEW!** Industrial Ion Sources
- Photolithography Process in IC Production
- Plasma Etching and RIE: Fundamentals
- Plasma Etching and RIE: Fundamentals and Applications
- Sputter Deposition

Topical Conference on Quantitative Surface Analysis:

Website:
http://www2.avs.org/symposium/AVS59/pages/qsa.html

QSA 14, a AVS topical conference on Quantitative Surface Analysis, sponsored by the Applied Surface Science Division will precede AVS 59 on Saturday, October 28th in the Conference Center in Tampa, Florida. This small topical meeting has proven to be an energetic and thought provoking meeting allowing students and others new to quantitative surface analysis to interact in an informal way with technique experts and experienced researchers. The meeting provides practical information about the use and limitations of a variety of important methods. The program will consist of invited presentations each with an extended discussion period.

The invited program at QSA 14 will focus on best practices of XPS and TOF-SIMS analysis, quantification in SIMS, and nanoscale quantification. QSA offers an intimate environment for experts and students alike to take in and freely discuss a full day of invited content, as well as a poster session. Please take the opportunity to register for QSA 14 while registering for AVS 59 and join us for this exciting meeting.

If you are interested in presenting a poster, please submit an abstract to Lance Lohstreter, **lance.b.lohstreter@medtronic.com**.

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Symposium Highlights

Preventing Infections by Blocking Initial Bacterial Attachment: New Materials En Route to Clinical Testing

Thursday, November 1, 11:40 a.m.,
Room 23, Tampa Convention Center

Bacteria's ability to cling to virtually any surface is a vexing problem in the medical community. Engineering a surface that can easily slough off these dangerous bugs has, until recently, had limited success. Recently, however, a team of British researchers has discovered a new class of materials that resists bacterial attachment. Now these scientists from the University of Nottingham, U.K., are ready to set out on the approval process that will take their research to the clinical testing stage, paving the way for medical application. The researchers will present their findings at the AVS Intenational Symposium and Exhibition.

To date, scientists have been unable to fully explain how bacteria are able to adhere so durably to virtually any surface. Despite this limited understanding of bacteria-material interactions, the researchers in this study were able to screen thousands of different chemical combinations for resistance to bacterial adhesion. The studies revealed that one particular class of compounds, acrylates with hydrophobic groups, proved highly resistant to bacteria's sticky tendencies.

"The new materials are to bacteria what non-stick cookware is to food," said

Andrew Hook, a researcher at the Nottingham School of Pharmacy. "Bacterial can stick to the surface of [traditional] medical devices and form a community, known as a biofilm, where the bacteria become highly resistant to antibiotics and the immune system."

By preventing the biofilm from forming on devices in service, the new materials help the immune system to simply eliminate the bacteria as if the device had never been inserted. In contrast, current antibacterial materials, like silver, actually kill bacteria.

After the new non-stick materials were identified, they were successfully tested on surfaces in the laboratory and on standard medical devices, such as catheters, within an animal model. In laboratory studies of the new materials, the researchers found a 96.7-percent reduction in bacterial coverage compared to commercially available silver-containing catheters for the bacterium *Staphylococcus aureus*.

But by coating medical devices with the optimal polymer composition of one of this class of acrylates, for example the compound tricyclodecane-dimethanol diacrylate that the researchers tested, scientists believe they can prevent bacteria from attaching and also prevent associated infections, which could save Americans more than $3 billion in health-care costs each year.
The researchers are now ready to take their research to the next level and prepare the regulatory package to begin clinical trials. These research trials will hopefully show that by denying bacteria a foothold on medical equipment in humans, the chances of a patient contracting a medical device-associated infection are much lower.

Nottingham pharmacy professor Morgan Alexander hopes this will lead to a method to reduce infections from bacteria without the risk of resistance development since no antibiotics are used. "The challenge now is to have materials recognized by the medical device industry," Alexander said. "That would allow us to develop products for specific applications. There's a lot of potential to improve human health, but we need to prove that."
The researchers are in discussions with potential partners to develop coated devices and are hopeful their material could reach the market in 5 to 10 years.

Strengthening Fragile Forests of Carbon Nanotubes Paves the Way for New Applications of Microscopically Tiny Engineering Components

Monday, October 29, 9:20 a.m.
Room 10, Tampa Convention Center

The downside of a holiday gathering for physicist Robert C. Davis, PhD., is that the jargon used to describe what he does every day can flummox the average party goer. Davis specializes in microelectromechanical systems research (MEMS), and the terminology can be a conversation killer if you don't know "nano" refers to particles created with dimensions of about 1-100 nanometers, and "micro" refers to technology built to a scale of 1-100 millionths of a meter. The upside is that at these same holiday gatherings Davis is likely to find a big bowl of mashed potatoes - and that's all he needs: He draws pictures in potatoes with his silverware to explain his lab life. "One Thanksgiving my sister really wanted to know what I was working on, and I ended up drawing a picture in the mashed potatoes - and it worked, sort of" explains Davis.

Davis, together with his team from Brigham Young University (BYU) in Provo, Utah, focuses on making MEMS devices out of new materials so they can perform new functions. By using a variety of materials not commonly associated with MEMS technology, the team has created stronger microstructures that can form precise, tall and narrow 3-D shapes - characteristics that were never before possible in MEMS. The researchers will present their latest findings at the AVS International Symposium and Exhibition.

Conventional MEMS structures tend to be made out of silicon-based materials familiar to the micro-electronics industry. But this ignores a suite of useful materials such as other semiconductors, ceramics, and metals. To break this materials barrier, the researchers devised a new production process called carbon nanotube templated microfabrication (CNT-M). It uses patterned,

vertically aligned carbon nanotube arrays called forests as a 3-D microfabrication scaffold. With this scaffold, they can create precise, tall and fine-featured microstructures. But the forests are extremely fragile. To make them hardier the team replaced the air spaces between the carbon nanotubes with a filler material by atomistic deposition.

The team has used their new CNT-M framework to fabricate metal components from tungsten, molybdenum and nickel. These metals provide desirable properties for MEMS applications and components, including high electrical and thermal conductivity, high melting temperatures, resistance to corrosion, low thermal expansion and hardness.
The BYU team's advances open the door for manipulating matter in novel ways that optimize efficiency, performance and cost across a range of fields, including medicine, imaging, computing, materials synthesis, chemical synthesis, and printing. Most biological and biomedical processes occur at the nanoscale. Developing models and templates at this scale enables scientists to interact with, control and leverage the unusual physical, chemical, mechanical, and optical properties of materials in naturally tiny systems.

Already, the BYU researchers have successfully used their new technique to make chemical detection devices that can validate chemical reactions during pharmaceutical production. One day, Davis imagines a role for CNT-M in devising new longer-lasting batteries - a picture many of us would like to see on our mashed potatoes.

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