SVC™
SOCIETY of VACUUM COATERS

TechCon 2023

Washington, D.C

Gaylord National Resort & Convention Center

May 6 – May 11, 2023

Keynote and Invited Speakers

Deadline for Abstracts:
February 3, 2023
(Guaranteed conference participation)

Technical Program: May 8 – 11

- **Technical Sessions**
- **Interactive Networking Forums**
  + Technology Forum Breakfasts

Education Program: May 6 – May 11

- **Problem-Solving Tutorial Courses**

Featuring Sessions on:

- Atomic Layer Processing (ALP)
- Coatings for Energy Conversion and Related Applications
- Coatings and Processes for Biomedical Applications
- Digital Transformation of Industrial Deposition Processes
- Emerging and Translational Technologies and Applications
- High-Powered Electron Beam Technology
- High-Power Impulse Magnetron Sputtering – HIPIMS
- Large Area Coatings
- Optical Coatings
- Plasma Processing & Diagnostics
- Process Monitoring, Control and Automation
- Protective, Tribological and Decorative Coatings
- Technical Poster Session
- Thin Film Sensors
- Thin Film Superconductors
- Exhibitor Innovator Showcase
- Vacuum Technology to Enable the Future of the Automotive Industry
- WebTech Roll-to-Roll Coatings for High-End Applications

For more information, contact the SVC at +1-505-897-7743
or CLICK HERE to submit an abstract

www.SVC.org

2023 SVC TechCon Call for Papers

Message from the Program Director

The 2023 SVC TechCon will be held just outside of Washington, D.C. at the Gaylord National Resort and Convention Center. The Gaylord Resort and Convention Center is the jewel of the National Harbor, a 350 acre waterfront area on the Potomac River that contains more than 160 shops, 40 restaurants, and eight hotels including a casino. This is the first time the SVC has been in this ideal location in close proximity to the industrial and government centers in this dominant Washington, D.C. – Maryland-Virginia technology hub.

The technical program will encompass a broad range of relevant issues covering thin film technology and surface engineering. The program will address applications, challenges, and technology development from a contemporary focus. The 2023 TechCon offers an industry-leading technical exhibition, abundant networking opportunities, along with an extensive educational program and in-depth technological expertise. The 2023 TechCon is a great opportunity to present your latest research results, coating processes, and equipment applications in the field.

We invite you to share your latest R&D and application successes with the SVC community. The TechCon offers a broad range of presentation options – oral, posters, or vendor innovation formats – which can accommodate the full spectrum of academic research and industrial product innovations. This is complemented by our publication options – PowerPoint presentation (static or narrated / pre-recorded) or manuscript in the conference proceedings, or peer-reviewed journal submission. The SVC Student Sponsorship Program provides financial support for a limited number of qualified applicants to encourage student participation.

We encourage you to contribute a paper, taking advantage of the opportunity for renewing or making new connections that only the SVC can offer! Our academic researchers, industrial innovators, technical practitioners, and application experts await your news and look forward to talking with you in Washington, D.C. With the addition of our freshly established Digital Transformation of Industrial Deposition Processes, Process Monitoring, Control and Automation, Thin Film Superconductors, Thin Film Sensors, and Vacuum Technology to Enable the Future of the Automotive Industry sessions, the SVC TechCon enhances its position as the worldwide forum for thin film technologies and surface engineering. Come and be a part of SVC 2.0 in 2023. See you in Washington, D.C.!

SVC™ Society of Vacuum Coaters

Our Vision: *To provide a dynamic forum for transitioning and commercializing thin film and surface engineering innovation to industry.*

Our Mission: *To promote technical excellence by providing a global forum for networking, educating, and informing the stakeholders, the technical community, and the industrial eco-system on all aspects of industrial vacuum coating, surface engineering and related technologies.*

Publication Options:

There are two publication options and one video presentation option for work presented during the 2023 Technical Program

WITHOUT PEER REVIEW

Submission Deadline: July 8, 2023

Publication in PowerPoint OR Manuscript format in Society of Vacuum Coaters Annual Technical Conference Proceedings (ISSN 0737-5921)

PEER REVIEWED

Submission Window Open May 1 – July 15, 2023

Publication in a special edition of Elsevier's Surface and Coatings Technology Journal (ISSN: 0257-8972)

VIDEO PRESENTATIONS

Submission window open **May 1– September 15, 2023**

Narrated mp4 or PowerPoint video to be posted to the SVC's dedicated YouTube Channel

SVC and SVC Foundation Support for Students

Young members and students are our future. The SVC and the SVC Foundation recognize that capturing the imagination and the interest of young technicians, engineers, and scientists are essential activites that will perpetuate the technologies and the companies that comprise the SVC. Student education scholarships and sponsorships supporting travel and conference participation are offered annually through programs that encompass a global reach to qualified and deserving individuals.

SVC Student Sponsorship Program - *Full & Part-Time Students Are Eligible*

The SVC Student Sponsorship Program provides travel support and complimentary conference registration to selected full-time students to make an oral technical presentation at the SVC Annual Technical Conference. A limited number of sponsorships will be awarded to the best applicants. Applicants from academic, research, and technical institutions from the United States and around the world are encouraged to apply. The Student Sponsorship Committee evaluates applications from students and makes selections based on the quality and relevance of the student's project to the interests and mission of the SVC. It will also consider the quality of the application itself (completeness, quality, etc.), potential quality of the oral presentation, its relevance to the specific session, as well as the need for funding.

Requirements for Participation:

The student applicant must have a sponsor. The sponsor can be a faculty member at the student's institution or another academic, technical, or research institution. The sponsor must indicate that he or she understands the nature of the conference and what SVC technical programs are about. The student must commit to providing a manuscript based on the content of the oral presentation at the TechCon for subsequent publication by the SVC before any fiancial support is provided.

During the selection process, preference will be given to those applicants who have not already received sponsorship from SVC. The successful candidates should also preferably come from different institutions.

SVC Student Sponsorship Program Abstract and Application Deadline: October 7, 2022

The SVC Foundation provides scholarships and/or stipends for travel expenses to attend the annual SVC technical conference. Scholarships are open to well-qualitified students planning to enter fields related to vacuum coatings as well as techicians already working in the field practicing the craft. The Society of Vacuum Coaters (SVC), the SVCF's founder, and AIMCAL, an organization committed to advancing vacuum roll-coating technology, and their members, provides support for the Foundation to pursue these goals. Since its inception in 2002, the SVCF has awarded more than 125 scholarships and travel awards totalling over $350,000 to students from more than 28 countries.

Please visit www.svcfoundation.org for more information

Scholarship Applications must be postmarked by October 15, 2022.

Capturing the imagination and interest of young professionals is a core mission of the SVC and SVC Foundation.

The SVC is pleased to announce a series of special promotions to reward and incentivize our stakeholders for participation in the 2023 TechCon in Washington, D.C. These promotional programs are as follows:

Student/Colleague Newcomer Credits: For every academic instructor or professional who registers for a full conference registration, any student/colleague of theirs that is either a new attendee to the TechCon or who hasn't attended in the past three years will receive a credit (after the TechCon is concluded) of 25% of their registration fee. For those "new/returning" registrants who also present either an oral or poster presentation, the credit will be increased to 50% (subject to session space availability and abstract acceptance by the SVC Program Committee).

Referral Recognition: During the conference registration process, all new/returning attendees will be asked if they were referred by any specific individual. We will track the referrals and for the top three individuals referring folks to attend the TechCon we will award a complimentary (and transferrable!) full conference registration for our 2024 TechCon in Chicago, IL, USA.

Early Bird Hotel Conference Bonus: All paid conference registrants who register for the 2023 TechCon by March 1, 2023 and make their hotel reservation at the Gaylord National Resort and Convention Center by March 1, 2023 will be entered into a raffle for a complimentary and transferrable full conference registration for our 2024 TechCon in Chicago, IL, USA. Two prizes will be awarded. The winners will be announced in our Summer 2023 SVC Bulletin magazine.

Early Bird Hotel Exhibitor Bonus: All Exhibiting companies who complete their booth registration for the 2023 TechCon by March 1, 2023 and who's staff make their hotel reservation at the Gaylord National Resort and Convention Center by March 1, 2023 will be entered into a raffle for a complimentary single booth for our 2024 TechCon in Chicago, IL, USA. The winner will be announced in our Summer 2023 SVC Bulletin magazine.

About Our Venue

Gaylord National Resort and Convention Center

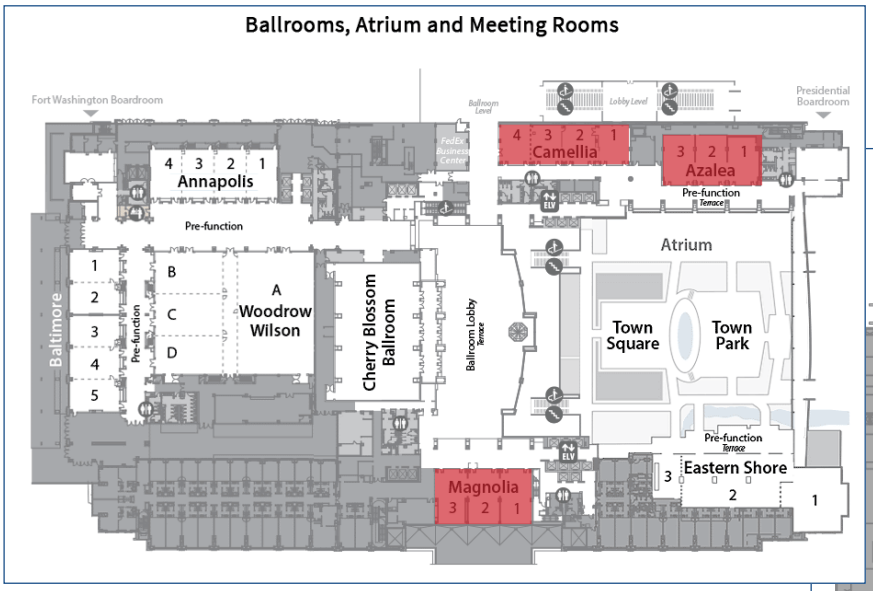
The 2023 SVC TechCon will be held at the Gaylord National Resort and Convention Center. The Gaylord National is the crown jewel of National Harbor and Washington, D.C.'s waterfront dining and entertainment district and offers a world class meeting experience that is expressly tailored to the networking driven SVC TechCon. The National Harbor is a 350 acre waterfront area on the Potomac River that contains more than 160 shops, 40 restaurants, eight hotels including a casino.

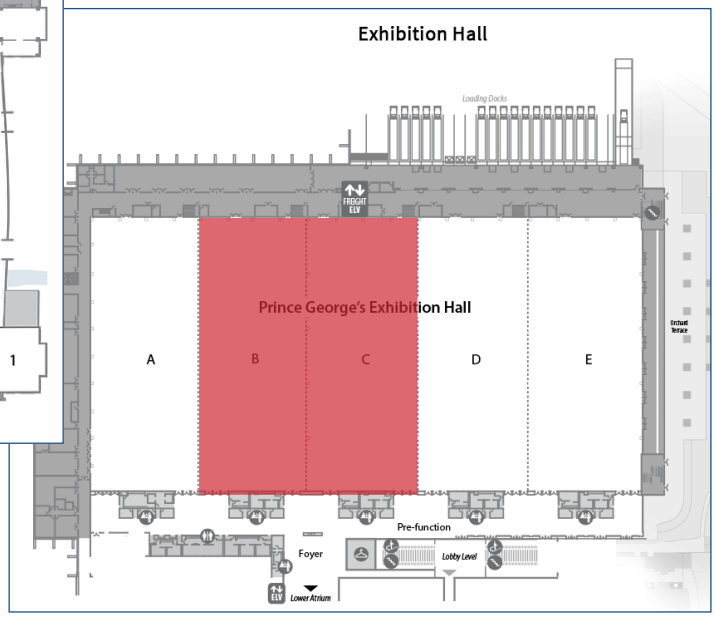
The Gaylord National features the following exhibition and meeting facilities:

- Over 545,000 sq. ft. of flexible convention, meeting, exhibition and pre-function space
- 180,000 sq. ft. exhibition hall with 17 dedicated loading docks
- 50,000 sq. ft. ballroom featuring a theatrical stage, plus an adjacent outdoor balcony offering views of the Potomac River
- Well-appointed ballrooms from 8,000 sq. ft – 30,000 sq. ft.
- Up to 101 breakout rooms with maximum flexibility
- Over 75,000 sq. ft. of outdoor special event areas, including a private pier, that overlooks the Potomac River
- Rooftop lounge, outdoor cigar terrace with fire pits, private dining rooms and more

The Gaylord National is located immediately off Interstate I-95 and has convenient shuttle access to downtown Washington, D.C. (8 miles) and all major airports (Reagan National Airport–DCA–8 miles, Dulles International Airport-IAD-35 miles, and Baltimore Washington International Airport- BWI-38 miles). Water taxi service available to and from Downtown D.C., Old Town Alexandria, Georgetown, Nationals Stadium and historic Mount Vernon.

The SVC has negotiated a discounted conference rate with the Gaylord National hotel of $264.00 USD/night (inclusive of resort fee).





Gaylord National Resort and Convention Center Floorplan

Back by Popular Demand:

FREE Technical Conference Admission for all Exhibit Visitors May 9th & 10th | www.svctechcon.com

2023 TechCon

Conference Calendar

Start planning now for your trip to Washington, D.C.

SATURDAY May 6	SUNDAY May 7	MONDAY May 8	TUESDAY May 9	WEDNESDAY May 10	THURSDAY May 11
Education Program 31 Tutorial Courses					
TechCon Registration Counter Hours: Saturday, May 6 7:00 a.m. – 10:00 a.m. Sunday, May 7 7:00 a.m. – 10:00 a.m. and 4:00 p.m. – 7:00 p.m. Monday, May 8 7:00 a.m. – 6:00 p.m. Tuesday, May 9 7:00 a.m. – 5:30 p.m. Wednesday, May 10 7:00 a.m. – 5:00 p.m. Thursday, May 11 7:00 a.m. – 12:00 p.m.		**Technical Program**			
			Exhibit **Exhibit Open Hours** **1 p.m. – 7.30 p.m. Tuesday** **10 a.m. – 4 p.m. Wednesday**		
Conference Registration Open Gaylord National Resort and Convention Center					

CONFERENCE REGISTRATION FEES*

➔ *SVC Membership is included with full conference registration.*
If not attending the conference, renew your membership for 2023 or join SVC on-line

Attendee Registration

(through 4-1-23/after 4-1-23)

- ❑ Full Conference ..... $905.00/$1005.00
- ❑ Invited/Keynote Presenter and Lifetime Member $0.00
- ❑ Media Personnel $0.00
- ❑ Student Conference ..... $400.00/$500.00
- ❑ Young Members Group Conference ..... $400.00/$500.00
- ❑ Exhibit Visitor Only ..... FREE

SVC Membership is included with full conference registration.
If not attending the conference, renew your membership for 2023 or join SVC on-line

Exhibitor Registration

(through 4-1-23/after 4-1-23)

- ❑ Exhibitor Booth Personnel and Manufacturer's Representative $0.00
- ❑ Exhibitor with Full Conference Registration ..... $905.00/$1005.00

Special Events at the TechCon

- ❑ SVC Foundation 5K Run (Tuesday Morning) includes a T-shirt $35.00
- ❑ Awards Ceremony and Welcome Reception (Tuesday Evening) ..... No Fee
- ❑ SVC Foundation Casino Night Fundraiser (Monday Evening) ..... 1 Ticket Included with Full Conference Registration (additional tickets $75.00)
- ❑ Farewell Social (Thursday Evening) ..... No Fee

** Pricing contingent on making hotel accommodation at the Gaylord National Resort and Convention Center*

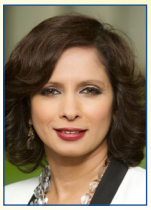
Introducing the SVC's Keynote

Seema Kumar

Global Head, Office of Innovation, Global Health and Scientific Engagement, Johnson & Johnson

Note from the Executive Director:

As a global luminary in STEM, public health, corporate diversity, and innovation, the SVC was incredibly fortunate to secure Seema Kumar for a keynote presentation. At the time of this publication's printing, the title and subject of Seema's SVC 2023 TechCon presentation has not been finalized. Once established this publication will be updated online. Please check back periodically. See you in Washington, D.C. — *Frank Zimone*



As Global Head, Office of Innovation, Global Health and Scientific Engagement, **Seema Kumar** works at the intersection of science, media, business and society to expand Johnson & Johnson's leadership as a champion of science and a global health authority. She leads global efforts to enhance public engagement with science, leveraging creative arts to build trust and advance good science and public health policy. Seema is also responsible for Johnson & Johnson's overall innovation reputation, for positioning the Johnson & Johnson R&D pipeline, and for leading the company's COVID vaccine communications and external affairs efforts.

In addition, Seema serves as a science, innovation, and public health ambassador for Johnson & Johnson to organizations including the World Economic Forum, the Gates CEO Roundtable, the New York Academy of Sciences, and other partners, where she represents the company's scientific engagement efforts and its commitment to diversity and inclusion in science and technology. A key strategic partner for Johnson & Johnson's Vice Chairman and Chief Scientific Officer, Dr. Paul Stoffels, Seema is a member of the R&D Management Committee and a member of the Global Corporate Affairs Leadership Team.

Previously, Seema drove Pharmaceutical R&D communication with the Janssen Pharmaceutical Companies of Johnson & Johnson. She was the chief communications officer at the Whitehead Institute/Massachusetts Institute of Technology Center for Genome Research, where she played a key role in enhancing worldwide public awareness and understanding of the Human Genome Project. In addition, she worked with the U.S. National Institutes of Health, and at Johns Hopkins Medical Institutions.

A passionate advocate for science and women's empowerment, Seema has published hundreds of news and feature articles on these topics. She serves on several boards and advisory committees.

Technology Opportunities in Hybrid Electronics Manufacturing

Dr. Scott Miller

Director of Technology, NextFlex

Hybrid electronics represent both an electronics packaging technology and manufacturing paradigm with applications across a broad range of industry sectors and product areas. Applications of hybrid electronics in both defense and commercial areas have been developed primarily over the last two decades; they have accelerated over the last seven years and are now rapidly emerging and entering production. By combining additive / printed electronics, conventional electronic components, and integrated bare-die chips, hybrid electronics enable devices with form factors that are not possible with traditional printed circuit boards. This talk will describe hybrid electronics manufacturing approaches for mechanically flexible devices produced through sheet-based fabrication processes, as well as those for large conformal and structurally integrated electronics. Industry roadmaps will be presented, and key opportunities will be discussed. The talk will highlight technologies and applications that have been developed by the U.S. FHE ecosystem and capabilities of the manufacturing industrial base that have been advanced through projects supported through the NextFlex Manufacturing Innovation Institute. These applications include enabling technologies for communications, such as conformal antennas, frequency selective surfaces, and sensor devices to improve factory operations. In addition to small, mechanically flexible devices, approaches to fabricating large conformal electronic systems will be presented.

Dr. Scott Miller is the Director of Technology at NextFlex, America's Flexible Hybrid Electronics (FHE) Manufacturing Institute. Dr. Miller is responsible for the portfolio of technical projects funded by NextFlex, runs its Technical Council and Technical Working Groups, leads the development of FHE industry roadmapping, oversees initiatives within the Institute, and builds and maintains relationships with government, industry, and academic partners.

Scott earned his Ph.D. in Chemical Engineering from Princeton University, where he did research on large area electronics manufacturing based on printing processes. Prior to joining NextFlex, Scott led materials R&D groups at GE Global Research supporting a diverse range of businesses. He has worked in areas including printed, flexible, and hybrid electronics; wearable devices; additive manufacturing; and bioprinting and biofabrication.

Changing the Narrative: Fostering a Culture of Belonging in the Physical Sciences

Dr. Jovonni Spinner

DrPH, MPH, CHES Diversity, Equity, and Belonging Officer, American Institutes of Physics

There is persistent marginalization and underrepresentation of racial and ethnic minority, LGBTQ+, women, and disability groups in physics and astronomy. For example, in 2016, only 4% of physics bachelor's degrees went to African Americans. Creating a diverse workforce is critical for excellence and will result in increased creativity and innovation to solve science's most challenging problems. To ensure scientific innovation, we must support pathways to diversify the workforce. Beyond building a business case, we have a moral imperative to ensure that marginalized groups can excel in the physics field.

In this presentation, Dr. Spinner will present on strategies and initiatives that the American Institute of Physics is leading to diversify the physical sciences. One initiative is TEAM-UP Together (TU-T), which is a collective action initiative of the AIP Federation to support the scientific community in doubling the number of African Americans receiving physics bachelor's degrees. We will achieve this goal by engaging stakeholders like faculty, departments, institutions, professional societies, policy leaders, and others to provide direct support for students and academic departments to change the culture of physics to engender welcoming and inclusive environments where Black scientists can thrive.

We recognize that achieving DEI is an ever-evolving journey that requires us to actively listen and learn and apply those learnings to our work so we can meet the complex needs of our scientific community. Our goal is to dismantle systemic barriers to improve diversity within the physical sciences community. Only by cultivating and leveraging the full range of talent from across our community can we be poised to effectively grow our shared mission of advancing science.

Dr. Jovonni Spinner is AIP's Diversity, Equity, and Belonging Officer. In this role, she spearheads and expands AIP's efforts to lead the physical sciences community toward an impactful understanding of how to be more welcoming and supportive of diverse physical scientists throughout their careers. To promote and advance DEI at AIP and partner organizations, she conceptualizes innovative DEI initiatives, services, products, and funding resources to support such initiatives ; builds and sustains strategic relationships and partnerships with multi-sector external groups, and serves as a proactive AIP ambassador and thought leader on DEI to the physical sciences community. Her goal is to expand AIP's efforts toward achieving our vision of being recognized as a leader in the physical sciences enterprise in promoting diversity, equity, inclusion, belonging, and accessibility. More about her can be found here: https://www.linkedin.com/in/jovonni-spinner-mph-ches/.

Robust Resistive and Mem-devices for Neuromorphic Circuits

Prof. T. Venkatesan

Director of the Center for Quantum Research and Technology (Professor of Physics and ECE) at University of Oklahoma, Norman, OK

Artificial intelligence (AI) has been heralded as the flagbearer of the fourth industrial revolution but comes with a cost and that is computing power. It is projected that by 2040, we will need more computing energy than the total energy we can produce now. So, we need devices that can offer higher computing/storage density with low energy consumption like neurons. We are addressing these challenges using oxide and molecular-electronic based memristors, which enable us to overcome the von Neuman bottleneck by co-locating the memory and computing functions on the same device, as in neuromorphic computing.

I will discuss a variety of strategies for forming oxide based memristors using different phenomena-band filling and creating a quasi-conduction band, using oxygen vacancies to create conductive percolation, using metal-insulator transitions, or using asymmetric tunneling at a ferroelectric barrier. The relative merits of the various approaches will be detailed.

In addition, I will touch upon memristive devices and circuits made from an azo-aromatic complex with extra-ordinary reproducibility, robustness, and scalability. These devices have been shown to switch with energies approaching atto-joules with measured switching times shorter than 5 ns. By using a simple cross bar array, we have shown that these devices perform with an energy-speed product 5000 times that of a state-of-the-art CMOS circuit.

Prof. T. Venkatesan is currently the Director of the Center for Quantum Research and Technology (Professor of Physics and ECE) at University of Oklahoma, and Scientific affiliate at NIST Gaithersburg. Prior to this he was Director of the Nano Institute at the National University of Singapore (NUSNNI) where he was a Professor of ECE, Physics, MSE and NGS. He wore various hats at Bell Labs and Bellcore before becoming a Professor at University of Maryland. As the inventor of the pulsed laser deposition (PLD) process, he has over 800 papers and 34 patents and is globally among the top one hundred physicists (ranked at 66 in 2000) in terms of his citations (Over 51,186 with a hirsch Index of 115-Google Scholar). He has graduated over 56 PhDs, 35 Post Docs and over 35 undergraduates. He is also the founder and Chairman of Neocera, and Neocera Magma, companies specializing in PLD and magnetic field imaging systems and co-founder of Blue Wave Semiconductors. He recently helped launch two healthcare companies in Singapore, Cellivate and Breathonix. Close to 12 of the researchers (PhD students and Post Docs) under him have become entrepreneurs starting over 25 different commercial enterprises.

He is a Fellow of the Royal Society (FRS), National Academy of Inventors (USA), Singapore National Academy of Science, Asia-Pacific Artificial Intelligence Academy, American Physical Society (APS), Materials Research Society (MRS), winner of the Bellcore Award of excellence, George E. Pake Prize awarded by APS (2012), Distinguished Lectureship on the Applications of Physics Award- APS (2020), President's gold medal of the Institute of Physics, Singapore, Guest Professor at Tsinghua University, Academician of the Asia Pacific Academy of Materials, Fellow of the World Innovation Foundation, past member of the Physics Policy Committee (Washington, D.C.), the Board of Visitors at UMD and the Chairman, Forum of Industry and Applications of Physics at APS. He was awarded the outstanding alumnus award from two Indian Institute of Technologies- Kanpur (2015) and Kharagpur (2016), India.

Introducing the SVC's Keynote Speakers for the 2023 TechCon

Solar Photovoltaic (PV) Supply Chains, Regional Manufacturing Costs, and Technology and Market Opportunities

Michael Woodhouse, PhD

Senior Energy Technologies, Economics, and Policy Analyst,
The National Renewable Energy Laboratory, Golden, CO

This talk will highlight the most recent efforts from the National Renewable Energy Laboratory (NREL) to track solar photovoltaic (PV) supply and demand in the United States and globally, as well as bottom-up calculations of manufacturing costs for facilities across the globe. We will begin with an overview of the global solar PV supply chain and 2022 benchmark input data used for NREL's bottom-up crystalline silicon (c-Si) and thin film PV module manufacturing cost models. For the polysilicon, wafer, cell conversion, and module assembly steps of the c-Si supply chain, and for thin film modules, we will review the industry-collected input data and methods used for calculating the costs of goods sold (COGS); research and development (R&D) expenses; and sales, general, and business administration (S, G, &A) expenses. This 2022 benchmark analysis is compiled for state-of-the-art c-Si and thin film PV module manufacturing in several countries and regions; and will also include a quantified summary of the impacts of the manufacturing incentives and tax credits that are available for solar manufacturing and installations within the United States.

Next generation technologies that lower PV manufacturing and installation costs, reduce operations and maintenance (O&M) expenses, and improve system energy yield will also be highlighted. We will conclude with projections of solar market penetration to 2050 from NREL's Annual Technology Baseline (ATB) model, which includes solar coupled with lower-cost storage scenarios as well as the range of future cost scenarios for other power generation sources. We look forward to sharing NREL's extensive work in these areas and discussing ideas for future directions.

Dr. Michael Woodhouse is a senior analyst and project lead at NREL. His analysis activities are focused on solar energy and storage technologies, economics, and policy; and he is currently co-leading NREL's solar and storage technoeconomic analysis portfolio for clients within the U.S. Department of Energy's (DOE) Solar Energy Technologies Office (SETO). The current scope of work for the team's DOE projects includes designing and developing bottom-up component manufacturing and system-level cost modelling software, conducting PV standalone and storage-coupled system levelized cost of energy (LCOE) calculations, lifecycle analysis (LCA), tracking current global solar and storage policy issues, and identifying research and development priorities for an accelerated global transition to clean and sustainable energy. Dr. Woodhouse also serves as the Associate Editor for Energy Economics and Policy for the Journal of Renewable and Sustainable Energy and on the Steering Committee for the International Technology Roadmap for Photovoltaics (ITRPV).

The SVC is incredibly fortunate to have secured such an esteemed roster of Keynote and Invited Speakers. As you can imagine, preparing the essence of a presentation six months in advance is a huge undertaking. A number of speakers were not able to meet our aggressive deadlines for material. Check back in our Spring 2023 Bulletin for the final list of Keynote and Invited speakers along with our conference schedule, Technical Forum Breakfast roster, Colloquium topics, and final networking schedule. Registration will open in mid-December 2022. See you there!

— Frank Zimone
SVC Executive Director

The SVC is inviting contributions in the following areas. Each area is organized by a Technical Advisory Committee (TAC) or Session Organizing Committee.

Atomic Layer Processing (ALP)

Over the last few years, atomic layer processes (ALPs), such as atomic layer deposition (ALD), atomic layer etching (ALE), molecular layer deposition (MLD), and atomic layer epitaxy (ALEp) have increased in importance, enabling many new products and applications. With excellent uniformity, nanoscale precision, and high versatility, ALPs have applications in sensing, optical coatings, energy storage, and microelectronics. Recent advances in low temperature processing makes ALP methods attractive to the processing polymers, biomaterials, and other applications with low thermal budgets.

We are soliciting oral and poster contributions to ALP sessions in areas including both established ALD technologies and creative new ALP developments. Advanced ALP technologies which successfully cross over from early stage feasibility studying into commercially viable industrial solutions are of particular interest.

Session Topics will include:

- Innovations in methods for upscaling ALPs towards high-volume industrial applications
- New business concepts or market perspectives that accelerate transfer of ALPs from the lab to commercial viability.
- Current commercial products using ALPs
- Precursor synthesis
- Fundamental aspects of ALP
- Process development
- Plasma enhanced processes
- Challenges and applications of ALPs
- Novel concepts for ALP process control, characterization, and monitoring

INVITED SPEAKER:

Improving the Speed of Atomic Layer Deposition Without Sacrificing Chemical Efficiency

Dr. Matt Weimer
ForgeNano, Thornton, CO

Next-generation nanomaterials and devices rely on precise control via atomic scale processing of conformal, dense, and pin-hole free thin films. For example, conformal coatings in through silicon vias (TSV) as a Cu nucleation and diffusion barrier layers will drive new architectures of enhanced microelectromechanical systems (MEMS). Improved device conversion efficiencies in photovoltaic can be enabled by thin conformal coatings over intricate topographies. Atomic layer deposition (ALD) is unrivaled for gas-phase deposition of atomic precision thin films to non-line-of-sight structures. Used both in additive or subtractive processing to coat nanofeatures or to template and then remove nanofeatures, ALD drives device performance. In traditional gas-phase depositions there is a tradeoff between speed of film growth, conformality, and precursor efficiency. In traditional ALD systems, a more precise film has a slower growth process (i.e., <0.5nm/minute) and suffers from poor precursor usage efficiency (normally >20%). This idea of ALD as slow and inefficient has limited its adoption in various applications due to perception of higher associated costs. Fortunately, progress has been made to increase ALD deposition speed, approaching that of less conformal techniques like CVD, without sacrificing the inherent benefits; perfect thickness conformality and dense, pin-hole free films. This talk will cover the tradeoffs in traditional ALD between uniformity/precursor efficiency and speed, next, a description of the ALDx technology to conformally coat high surface area nanofeatures at speeds exceeding 10 nm/minute, finally some topical examples of applications for ALD technology on industry relevant nanofeatures. True atomic-scale control is enabled by ALDx technology, improving viability of conformal coatings.

TAC Co-Chairs:
Lenka Zajíčková, *Central European Institute of Technology, Masaryk University*, lenkaz@physics.muni.cz
Jacob Bertrand, *Maxima Sciences LLC,* jacob@max-sci.com
Assistant TAC Chairs:
Staci Moulton, *Forge Nano, Inc.,* smoulton@forgenano.com
Craig Outten, *Universal Display Corp.,* coutten@verizon.net

Coatings and Processes for Biomedical Applications

Coatings and surface treatments are important and used in many biomedically related areas. Recent advances in knowledge related to biological systems have motivated the development and characterization of coatings with the purpose of improving osseointegration, interfacing with the nervous system, extending implanted device lifetimes, and improving biocompatibility to highlight a few. The applications also extend beyond implantable devices. For example, energy harvesting for health monitoring wearable devices requires biocompatibility and flexibility. Applications for coatings in healthcare are already broad and continue to expand.

To disseminate advances and address technical issues in this broad and growing area, The Coatings and Processes for Biomedical Applications Technical Advisory Committee (TAC) welcomes papers reporting on biomedical coatings and surface modifications, characterization of these materials and their performance, as well as advances leading to new applications in the biomedical area. The following list is intended as a guide to topics appropriate for this session but other biomedically relevant papers are also encouraged:

- Orthopaedic and osseointegration applications
- Cardiac rhythm management
- Neurostimulation
- Cardiovascular intervention
- Bio-corrosion
- Flexible electronics
- Biosensors, bioelectronics, and biochips
- Antimicrobial applications

INVITED SPEAKER:

Soft Optoelectronic Devices for Electrophysiology and Optophysiology

Dr. Luyao Lu
Assistant Professor in Biomedical Engineering, George Washington University, Washington, D.C.

Recent advances in new materials, electronics, processing and assembly techniques have allowed the design and application of soft optoelectronic systems to integrate with the living organisms for a wide range of biological and biomedical applications. In this talk, I will discuss several of our recent examples of soft bioelectronic devices enabled by new concepts in materials science, processing methods, micro- and nano-fabrication, and electrical engineering. Those functional devices integrate microscale high-performance transparent microelectrodes, light sources, and photodetectors, processed in flexible or stretchable formats, and allow for stable, high-fidelity, electrical and optical mapping and modulation of cell and tissue activity (ranging from neurons to cardiomyocytes) across different regions and spatiotemporal resolutions, both ex vivo and in vivo. We envision those materials and optoelectronic devices will open up new windows to understand important biological processes, such as studying brain/heart function, transform biology and medicine.

TAC Co-Chairs:
Hana Baránková, *Uppsala University,* hana.barankova@angstrom.uu.se
Jeff Hettinger, *Rowan University,* hettinger@rowan.edu

Coatings for Energy Conversion and Related Processes

The Coatings for Energy Conversion and Related Processes Technical Advisory Committee (TAC) welcomes papers in the following areas:
Solar and Ambient Light Energy Conversion:
- Thin-film and thin wafer photovoltaics
- Organic flexible photovoltaics (OPV)
- Semi-transparent photovoltaics
- Coatings for improved performance

Energy Harvesting:
- RF Harvesting
- Piezoelectrics
- Kinetic harvesting through body movement

Energy Storage:
- Thin flexible batteries
- Conformal batteries
- Coatings for improved stability
- Graphene and carbon nanotubes
- Protective coatings

Efficient Functional Coatings:
- Radiative cooling
- Hydrophobic and hydrophilic
- Self-cleaning catalytic coatings

Business Topics:
- Market assessment
- Advanced manufacturing processes
- Integration of functional coatings into wearable products

Other traditional subjects of the Coatings for Energy Conversion and Related Processes TAC will be considered including:
- Smart windows
- Selective radiators
- Fuel cells
- Large-scale energy conversion and storage

INVITED SPEAKER:

Vacuum Deposition of Novel Metal Halide Perovskite Semiconductors – The Role of Vacuum Coating for the Next Generation of Solar Cells

Dr. Juliane Borchert
The Fraunhofer Institute for Solar Energy Systems; Head of Junior Research Group "Optoelectronic Thin Film Materials" at the University of Freiburg, Germany

The climate crisis and global rising energy demand challenge us to rapidly increase the production of electricity from renewable energy sources. Solar cells are a crucial piece of the solution that will lead us towards a green energy future. Currently silicon solar cells are the most commonly used type of solar cell. They have reached high technological maturity and actual realized efficiencies are approaching the theoretical limit for this material. Therefore, researchers are on the look-out for semiconductor materials that will enable the next generation of solar cells. This next generation needs to be even cheaper and more efficient than current technologies. Additionally, they may allow solar panels to become bendable and lightweight, this would enable the expansion into new applications. Perovskites are a highly promising and versatile class of materials. They can be used to fabricate solar cells both on their own and in combination with silicon. When combined with silicon into tandem solar cells, efficiencies beyond the theoretical limit of silicon can be achieved. The necessary perovskite thin films can be made with a variety of methods among which vacuum based coating techniques stand out as highly promising routes from lab scale towards industrial scales. Huge progress has been made on the lab scale with perovskite based solar cells reaching record efficiencies. Now this progress needs to be translated to deposition methods that are suitable for large scale solar cell production. In this talk I will introduce the current state of the art research on metal halide perovskites and discuss potential routes towards industrial scales.

TAC Chair:
Volker Sittinger, *Fraunhofer Institute for Surface Engineering and Thin Films IST, Germany,* volker.sittinger@ist.fraunhofer.de

Assistant TAC Chairs:
Roel Bosch, *IHI Hauzer Techno Coating B.V.,* RBosch@hauzer.nl
Claes G. Granqvist, *Uppsala University,* claes-goran.granqvist@angstrom.uu.se
David Sanchez, *Materion Advanced Chemicals,* david.sanchez@materion.com
Ric Shimshock, *MLD Technologies, LLC,* ricshimshock4mld@aol.com
Michael Andreasen, *Vacuum Edge,* michael.andreasen@vacuumedge.com
Stefan Saager, *Fraunhofer-FEP*, stefan.saager@fep.fraunhofer.de

Digital Transformation of Industrial Deposition Processes

Industrial deposition processes are subject to strong competitive pressure, as better productivity is always demanded with a higher precision and increasing complexity of coating products. This increased complexity requires optimized coating processes, model-based process control and a view of the complete process chain. Therefore, a digital transformation, which will be one of the key drivers in the future for industrial deposition processes, is needed. The digital transformation includes the systematic collection of data which is generated in the different processes and the representation of the (coating) processes by means of real-time capable, digital twin. Already nowadays, the simulation, which can be part of digital twin, is a well-established tool for predicting and optimizing deposition processes. It is possible to use physical and/or chemical models to predict the behavior of the process.

Another approach of predicting processes is the use of generated data and utilize the artificial intelligence. Therefore, the data acquisition, storage, and accessibility of the data plays an important role. Artificial intelligence is already deployed for example in image recognition, predictive maintenance, and process control.

This session will cover all topics in which digitalization plays an important role. It will bring the experts for simulation and artificial intelligence together and offers a perfect floor to discuss the benefits of the digital transformation of industrial deposition processes from point of view of different technology fields.

INVITED SPEAKER:

Real Time Data Acquisition and Analysis – the Key to Cost-effective Production of Complex Large Area Coating Products

Marcus Frank
Bühler Alzenau GmbH, Alzenau, Germany

Due to new market requirements e.g., driven by new automotive coatings, the complexity and precision of large area coating products is continuously increasing. Transmission, product colors, color uniformity and sheet resistance are only a few key product requirements, which need to be achieved reliably. While single and double silver products might be adjusted by an experienced operator in a hands-on approach, for more challenging products like triple- and quadruple silver products a closed loop coater control process including precise optical models is mandatory.

The application of those models is only successful under well-defined conditions like substrate properties (thickness, absorption, surface conditions), suitable optical measurements (wavelength range, resolution, noise, reflection standards) and particularly reproducible individual sputtering processes resulting in reproducible optical constants of the incorporated layer materials.

Theses optical constants are affected by multiple conditions like the actual working point determined by suitable control loops (e.g., lambda flow control, voltage flow control, power flow control), target wear and the actual coater condition, which continuously changes during the production cycle.

In this contribution specific examples will be presented, which demonstrate, how a systematic acquisition and real time analysis of individual sputtering processes and spectral data can be used to support a spectral match of the modelled and measured data to finally make a success story out of the closed loop coater control concept.

Session Organizers:
Holger Gerdes, *Fraunhofer-IST,* holger.gerdes@ist.fraunhofer.de
Andreas Pflug, *Fraunhofer-IST,* andreas.pflug@ist.fraunhofer.de

Emerging and Translational Technologies and Applications

This session welcomes presentations related to Deposition and Surface Engineering Technologies and Applications that do not readily align with the classic Session topics of the SVC TechCon program.

Modern market needs and application requirements continuously trigger innovation in the production and development of Thin Films and coatings. There are two trajectories that historically advance the field: (a) Adjacent markets and applications expand by taking advantage of innovation in traditional technologies, and on the other side (b) established markets and applications benefit from technical innovation in fields that previously were restricted to exterior "heritage" domains.

This session seeks to highlight new applications and markets that are enabled by advances in Thin Film and coating Deposition, Interface engineering, and Surface processing. Contributed presentations may emphasize applications & markets, describe the role of enabling or cross-over technologies, as well as business topics such as market opportunity overviews, or new business and engineering concepts.

Market- and business-focused talks should generally relate to technology innovation within the SVC domain, and technology-focused talks should relate to a new market or application arena that SVC stakeholders should pay attention to.

TAC Chair:
Chris Stoessel, *Eastman Chemical Company,* stoessel@attglobal.net
Assistant TAC Chairs:
Manuela Junghähnel, *Fraunhofer-IZM,* manuela.junghaehnel@assid.izm.fraunhofer.de
Jacob Bertrand, *Maxima Sciences LLC,* jacob@max-sci.com
Clark Bright, *Bright Thin Film Solutions (3M retired),* brightcrewllc@gmail.com
Frank Papa, *GP Plasma,* frank@gpplasma.com
Maryam Olsson, *RISE,* maryam.olsson@ri.se
Stephan Barth, *Fraunhofer-FEP,* stephan.barth@fep.fraunhofer.de

High-Powered Electron Beam Technology

The High-Powered Electron Beam Technology Technical Advisory Committee (TAC) is a spin-off from the International Conference on High-Powered Electron Beam Technology, originally founded by Dr. Robert Bakish in 1983. Today, high-powered electron beam technology is well established for coating, melting and welding. The focus of the TAC is the development of new coatings and coating processes utilizing high-powered electron beam technology as well as new ebeam guns, power supplies and beam guidance systems for improved materials properties. Of particular interest are improvements to equipment that enable new applications such as additive manufacturing of turbine engine components and medical implants.

The TAC supports the technical and technological exchange of knowledge to promote high-powered electron beam technology for industrial applications and is looking for papers on the topics listed below:

- Advances in high-rate PVD by electron beam evaporation for thermal barrier coatings.
- Electron beam processes for the production of novel materials
- Additive manufacturing with electron beam
- New applications for PVD by electron beam evaporation for photovoltaics, concentrated solar, energy production (fuel cells), energy storage (batteries) and high efficiency lighting,
- Modelling of electron beam sources, processes, and systems
- New components in electron beam technology (guns, power supplies, vacuum systems, plasma assist)
- Emerging technologies (electron generation, beam guidance, etc.)
- Related and new applications for high-power electron beams

TAC Chair:
Mark Pellman, MarkAPellman@outlook.com
Assistant TAC Chairs:
Goesta Mattausch, *Fraunhofer-FEP,* goesta.mattausch@fep.fraunhofer.de
Matthias Neumann, *VON ARDENNE GmbH,* neumann.matthias@vonardenne.biz
Stefan Saager, *Fraunhofer-FEP,* Stefan.Saager@fep.fraunhofer.de

High Power Impulse Magnetron Sputtering – HIPIMS

High Power Impulse Magnetron Sputtering (HIPIMS) has moved from lab scale to industry. Today, a significant number of industrial-scale HIPIMS processes exist as well as some commercial processes and products. Both fundamental understanding and application-oriented development are essential for exploiting the full potential of this technology.

The latest results from fundamental research, new and advanced approaches for simulation and modeling, and the combination of applied research from lab scale to industrial size cathodes and machines are the focus of this TAC. The session aims to provide a forum linking scientists, technologists, and industrialists to discuss all aspects of the HIPIMS technology.

Papers are solicited, but not limited to, from the following areas:

- Fundamental research on plasma, discharge, and coatings
- Simulation and modeling of HIPIMS
- New plasma sources and process modifications
- Recent development in pulse generation and process and plasma diagnostics
- Application oriented results: tribological, optical, medical, etc.
- New coatings and products

INVITED SPEAKER:

HIPIMS From the Point of View of a (Coating) Machine Builder

Dr.-Ing. Philipp Immich, Ruud Jacobs, Gabriela Negrea, Louis Tegelaers, Michiel Eerden, Geert-Jan Fransen

IHI Hauzer Techno Coating B.V., THE NETHERLANDS

Modern manufacturing technologies for cutting tools or components are focused on easy maintenance, low production costs per part, reliable processes and high efficiency. Surface engineering is determined as one of the key disciplines for reducing CO_2 footprint e.g. extending the life time of cutting tools or components and helping to create more sustainable products.

HIPIMS is such an enabler for surface enhancement by adding or extending properties, like higher hot hardness, better corrosion resistance and many more.

Since HIPIMS first entered the research stage around the millennium, it was intensively explored by academia in different places like e.g. at the Sheffield Hallam University, Linköping University or the RWTH Aachen. A lot of advantages of this new technology were seen, but also some challenges related to the high demand capability to the coating machine were discovered: e.g. in the early stages the reliability of power supplies, how to deal with high currents and high voltages in the megawatt range, high heat load on the target, how to upscale from a lab coater to an industrial size units.

However the results of improved performance on cutting tools and components - HiPIMS gained interest of machine builders to overcome the disadvantages and provide solutions. Hauzer was involved right from the beginning of the HIPIMS development with providing solutions and ideas towards industrialisation of this technology for industrial end users.

In today's real production of coated parts the requirement is not only providing good coating properties on cutting tools or components, but also production related topics like reliability, easy maintenance, cost per part and flexibility of the coating unit itself plays an important role.

In this regard we are presenting an overview about HIPIMS development with respect to industrialisation of HIPIMS from the past to the present on different examples in modern cutting tools and components and give an outline to the future.

TAC Chair:
Arutiun P. Ehiasarian, Sheffield Hallam University, a.ehiasarian@shu.ac.uk
Assistant TAC Chairs:
Ju-Liang He, Feng Chia University, jlhe@fcu.edu.tw
Ralf Bandorf, Fraunhofer-IST, ralf.bandorf@ist.fraunhofer.de
Ian Haehnlein, Starfire Industries, ihaehnlein@starfireindustries.com
Ivan Shchelkanov, Starfire Industries, ishchelkanov@starfireindustries.com
Brian Jurczyk, Starfire Industries, bjurczyk@starfireindustries.com
Ivan Fernandez, Nano4Energy, ivan.fernandez@nano4energy.eu
Frank Papa, GP Plasma, frank@gpplasma.com

Large Area Coatings

Large Area Coatings, generally considered to be on substrates or aggregates of substrates larger than one square meter, are found all around us in applications for communication, recreation, architecture, eyewear, lighting, entertainment, electronics, airplanes, aerospace, automotive and so on.

Large Area manufacturing typically provides the benefits of low cost, high volume, excellent quality and low capital cost per unit yielded capacity. The Large Area Technical Advisory Committee solicits presentations in the following and related areas:

- Sustainability, including:
  - Battery technology (e.g. post-lithium),
  - Energy storage (hydrogen – from the cradle to the grave: generation, storage, fuel cells),
  - Life cycle management,
  - Replacing/substituting limited raw materials as well as materials whose refinement poses environmental challenges,
  - Solutions for recycling costly materials,
  - CO_2 footprint reduction in mobility and transportation,
- Communications and Displays
  - Touch screen, cell phone and other active display applications
  - Semiconductor deposition and fabrication
- Architectural and Automotive thin film materials, processes, equipment and applications including:
  - Low-emissivity, absorbing and reflective architectural coatings
  - Electrochromic and other smart window coatings
  - Transparent conductor, anti-reflection and mirror coatings
  - Temperable and bendable coatings
  - Windshield coatings (heat reflecting, hydrophobic/hydrophilic)
  - Antennas, including fractal circuits
  - Surface modification coatings: friction-reducing, wear-resistance, chemical-resistance, thermal control, anti-reflection, mirror and barrier coatings
  - Decorative coatings for automotive reflectors, trim etc.
- Green/alternative energy applications including:
  - Thin film photovoltaic and semiconductor materials

TAC Chair:
Ken Nauman, *SCI / Bühler*, knauman@sputteringcomponents.com
Assistant TAC Chairs:
Marcus Frank, *Bühler Group,* marcus.frank@buhlergroup.com
Brent Boyce, *Guardian Industries Corp.,* bboyce@guardian.com
Aneliia Wäckerlin, *Glas Trösch*, a.waeckerlin@glastroesch.ch

Optical Coatings

Exciting developments in optical coatings are stimulated by the latest trends in optics, optoelectronics, photonics, optical data processing, mobile devices, displays, biomedical, sensors, energy and photovoltaics, architectural, aerospace, astronomical, and other technologies. The Optical Coatings sessions will bring together these different aspects for technical interchange in the field of optical interference coatings. To build a well-rounded Optical Coatings session, abstracts are solicited to cover topics including coating design, development of practical manufacturing techniques, characterization methods, and a wide range of applications. Specific areas may include:

- Application of Optical Coatings for mobile electronics (e.g. fingerprint sensors, cameras, displays, touch-screens, etc.).
- Performance enhancement through optical coatings (e.g. improved efficiency for solar cells).
- Coatings on sapphire, polymers or other special substrate materials.
- Optical coatings for multifunctional requirements (scratch resistance, anti-smudge…)
- Applications in non-traditional wavelengths, from EUV to IR (e.g. IR thermal imaging).
- Complex 3-D optical devices
- Coatings for biomedical applications.
- Optical coatings for energy control and solar power.
- Optical coatings for laser applications, including femto-second laser.
- Optical coatings for display, aerospace and integrated photonic device applications.
- Novel optical coating materials, including metamaterials and metasurfaces.
- New fabrication processes for optical coatings.
- Novel optical interference design software and design techniques.
- Production issues common to the industry - including lessons learned or serendipitous discoveries that came from problems or disasters.
- Metrology of optical films (new instrumentation and software developments, in-line or in-situ approaches, etc.).
- Real-time process monitoring and control with optical coating processes.
- Industrial scale-up.

INVITED SPEAKERS:

Spatial Control of Thin-film Thickness Through Fundamental System Design and Analysis

Dr. James B. Oliver

President and owner of Vacuum Innovations, Rochester, NY

Thin-film design often assumes the deposition of the film in a spatially consistent manner, while real-world systems have inherent variations in the vapor plume, substrate shape, motion profile, and other aspects in both systematic and random ways. A thorough understanding of each aspect of the deposition system is essential in order to properly characterize the expected range of thin-film thicknesses and refractive indices, as well as the manner in which each is expected to vary.

Deposition source characterization is particularly difficult, but critical, as most commonly used assumptions are really not valid. An electron-beam source is not a point, nor is it circularly symmetric, but rather it is a broader surface which varies depending on the sweep, material, preparation, depletion, and the departure angle of the flux. Sputtering targets are even worse, given the much larger size of the surface; summation/integration over the extent of sputtered surface is required. While an exact approach is not really possible, system design can implement approaches to minimize the influence of errors in source flux from the ideal.

Substrate rotation systems are another key aspect of system design to control the film distribution, with the potential to yield highly uniform or prescribed non-uniform thickness profiles. Once again, invalid assumptions may lead to overly optimistic predictions of film performance, including "perfect" in-plane motion, ideal integer numbers of rotations, and failure to properly address departures of the substrate shape from the intended deposition surface.

Many of these issues have been studied and implemented, particularly for large-aperture optic deposition. The impact of different aspects will be addressed, and implementation of some of these approaches will be discussed in order to provide precise spatial control over the coating aperture.

Advanced Al Mirrors Protected with LiF Overcoat to Realize Stable Mirror Coatings for Astronomical Telescopes

Manuel A. Quijada[a], Javier del Hoyo[a], L. V. Rodriguez de Marcosa[b], E. J. Wollack[c]

[a]NASA Goddard Space Flight Center, Greenbelt, MD; [b]The Catholic University of America, Washington, D.C.; [c]NASA Goddard Space Flight Center, Greenbelt, MD

Pure Aluminum (Al) exhibits intrinsic high reflectance over the proposed Large UV/Optical/IR (LUVOIR) Surveyor observatory target spectral range (90-2500 nm). However, Al coatings have to be protected from oxygen exposure in order to prevent the formation of the naturally occurring Al_2O_3 oxide layer, which limit performance for use only above 160 nm. Aluminum protected with fluorides such as LiF or MgF_2 have been the most commonly used solutions. But below 102 nm and down to 90 nm, no transparent material is available to protect Al and coating mirror reflectance stays below 40%. But even above 102 nm, the reflectance of protected Al is limited by the residual absorption of the fluoride overcoats. Hence, this paper will report on recent advances in producing enhanced Al-based mirror coatings with the highest possible far-ultraviolet (FUV) reflectance, while exhibiting a more stable LiF protection layer. The process starts with a bare optically smooth glass substrate that is coated with Al in an ultra-high vacuum chamber by using the physical vapor deposition (PVD) process, which has been shown to provide the best aluminum thin-films when compared to other approaches. The next step is done by in-situ exposure of the freshly made Al film to a reactive XeF_2 gas that will grant a thin AlF_3 overcoat (2-3 nm) to the Al film that prevents further oxidation. This fluorinated Al film is then coated with a final layer of a LiF metal-fluoride overcoat. The coating process is finalized with a second exposure to the XeF_2 precursor gas. The preparation of these mirror coatings will be studied and analyzed as a function of the XeF_2 exposure time and deposition rate of the LiF layer during the PVD process. This paper will present and discuss characterization of a number of Al+XeLiF witness coupons produced with this reactive PVD (rPVD) process. These studies include characterization of specular reflectance in the 90-2500 nm spectral range, micro-roughness, long-term stability, as well as polarization characteristics in the visible and near-infrared spectral regions. These studies have been performed in order to demonstrate the improved reflectance performance, longer durability, and less hygroscopic nature of protected Al mirrors produced with the rPVD process (through exposure to XeF_2) and in comparison with the standard PVD process.

TAC Chair:
James N. Hilfiker, *J.A. Woollam Co., Inc.*, jhilfiker@jawoollam.com
Assistant TAC Chairs:
Jay Anzellotti, *IDEX Health & Science,* janzellotti@idexcorp.com
Nadja Felde, *Fraunhofer Institute for Applied Optics and Precision Engineering IOF*, nadja.felde@iof.fraunhofer.de

Plasma Processing & Diagnostics

Plasma has the unique capability of providing a diverse and complex environment that has proven to be well-suited for a wide variety of industrial applications including anisotropic dry etching, surface chemical modification, magnetron sputter-deposition and plasma enhanced chemical vapor deposition (PECVD) of thin films and coatings. Nevertheless, the potential of plasma processing on an industrial scale can only be realized when basic material processing studies are accompanied by the understanding of plasma physics, plasma chemistry and the underlying mechanisms at the plasma-surface interface, developed through both modeling and experimental efforts. More recently, the plasma processing community is exploring exciting new opportunities involving atmospheric

pressure discharges, micro-plasmas and pulsed discharges, plasma interactions with liquids, plasma-enhanced catalysis at surfaces and plasma processing of nanomaterials. These new developments along with the never-ending quest for improvement in long standing applications are the basis for an active plasma processing community engaged in the research of reactive plasma environments and exploration of new possibilities and applications.

Accordingly, the session chairs welcome papers of a fundamental and applied nature in the following topics:

- Plasma-enhanced physical or chemical vapor deposition and plasma-surface modification techniques.
- Novel and emerging plasma processing methods such as the processing of nanoparticles and nanomaterials, plasma catalysis and the treatment of non-traditional materials including liquids.
- Development of plasma sources and related technologies (ex. power electronics) to enable both conventional and novel plasma processing techniques including those operating at or near atmospheric pressure.
- Diagnostics (optical, electrical, particle, or systemic) applied to understand the plasma environment and plasma interactions with materials, along with techniques to improve diagnostics capabilities.
- Modeling of gas-phase phenomena in plasmas, plasma-surface interactions, and plasma processing systems.

INVITED SPEAKER:

Characterizing Plasma Sources for Atomic Precision Processing

David R. Boris

U.S. Naval Research Laboratory, Washington, D.C.

The inclusion of plasma in materials processing applications generally offers the benefit of substantially reduced process temperatures, greater flexibility in tailoring the gas-phase chemistry to produce desired film characteristics, and the ability to affect film crystallinity and phase. The benefits plasmas provide, however, come at the cost of a complex array of process variables that often challenge the ability to predict, a priori, the influence of any one input parameter. When the goal is control over material synthesis with atomic scale precision, a robust understanding of plasma source behavior and plasma material interactions becomes critical.

Plasma enhanced atomic layer deposition (PEALD) and plasma enhanced atomic layer etching (PEALEt) are the two techniques used to achieve atomic scale control in material processing. While the aims these two methods are in opposition the types of plasma sources used are often similar. As such the suite of diagnostics used to assess these sources are similar. This presentation will focus on what plasma parameters (electron temperature, plasma potential, and plasma density) are of interest in determining how a plasma source will interact a surface, and how one measures these plasma parameters in sources used for PEALD and PEALEt. The presentation will cover the use of probes and optical emission spectroscopy as a tools for diagnosing changes in the physico-chemical properties of the plasma and how these changes affect the delivery of reactive and energetic species to the material surface. The discussion will include the results from select processing applications, where changes in plasma properties are linked to differences in material properties.

TAC Chairs:

Lenka Zajíčková, *Central European Institute of Technology, Masaryk University,* lenkaz@physics.muni.cz

Craig Outten, *Universal Display Corp.,* coutten@verizon.net

Assistant TAC Chairs:

Adam Obrusnik, *PlasmaSolve*, obrusnik@plasmasolve.com

Oleg Zabeida, *Polytechnique Montreal*, oleg.zabeida@polymtl.ca

Process Monitoring, Control, and Automation

The fourth industrial revolution is steering manufacturing towards full automation. Producers seek robust thin-film deposition process monitoring and control solutions. They hold the key to the success of any attempt to achieve the necessary level of critical industrial process automation. The bonuses of any such successful automation include higher production rates, lower waste of materials & energy, lower operating costs, and increased overall efficiency.

Reliable monitoring and control solutions are far from readily available, and intense development efforts are underway in industry and academia across the globe. It is intensely hot around the topics related to the development and industrial application of (1) embedded sensors & actuators, (2) cyber-physical monitoring and control systems and (3) holistic process control methods and systems.

This session/TAC brings together experts, technologists, and solution providers from the thin film/surface engineering community to discuss challenges, developments, and solutions that pave the way toward enabling the autonomous operation of coating plants. Contributions that highlight particular challenges or constraints and talks that detail cutting edge control methods and their physical and digital embodiments are particularly well suited to this session.

INVITED SPEAKER:

Step Up Thin Film Coating Productivity Using Smart Control and High-level Automation

Edmund Schüngel

Evatec AG, Truebbach, Switzereland

Whether by magnetron sputtering, evaporation and/or atomic layer deposition, accurate, reliable control of the coating process is always key to achieving high process yields and low cost of ownership in mass production. Evatec offers all these different coating technologies across the semiconductor, optical, opto-electronics and packaging markets on coating tools equipped with a specific combination of monitoring, control and automation capabilities tailored to the application. Furthermore,

intelligent subsystems and components – such as process power generators and matching units – are integrated into a powerful yet data-efficient overall collection of process information that is used for status tracking and prediction. Within this paper we provide specific examples of how production tools benefit from smart control strategies, and how individual processes are embedded in a fully automated system. In a first example, batches of reactively sputtered coatings with excellent uniformity for optical applications are achieved exploiting plasma emission monitoring where the reactive gas flow is actively controlled during the deposition run. The broadband spectrometer reveals additional information on the dynamics of all species that are crucial to the process. Also, the optical performance of the coating is monitored in situ during deposition so that stacks for optical filters are produced in a very precise manner. Tool productivity is then improved even further by data driven optimization of run-to-run process settings and maintenance schedules. In a second example, a new generation of clustered evaporation systems will be presented that are kept under vacuum for extended periods thanks to the fully automated handling of substrates and coating materials. These offer the possibility of achieving new levels of throughput and process repeatability while driving down cost of ownership in mass production.

Session Organizer:
Martynas Audronis, *Nova Fabrica Ltd.*, martynas@novafabrica.biz

Protective, Tribological and Decorative Coatings

The Protective, Tribological and Decorative Coatings Technical Advisory Committee (TAC) encourages speakers to submit presentations dealing with design, research, development, applications, and production in the field of vacuum coatings and surface engineering processes, materials characterization and equipment for applications to protect components, tools, as well as decorative parts.

The use of such coatings is typically driven by performance requirements, reduction of life-cycle cost, environmental consideration, and durable cosmetic and aesthetic designs. These end-user motivations lead to dedicated coating and technology developments, vacuum coating equipment concepts, new testing procedures and methods, and production quality standards. Therefore, successful coating solutions in the marketplace require strong co-operation between market specialists, universities, suppliers, manufactures, and end-users.

The TAC seeks speakers to present on the subjects of new emerging technologies. Developing and scaling up from laboratory to high volume production at high production yields are also of high interest to the participants in this session.

Today's global landscape is changing rapidly and will drive developments that include new coatings on new applications. Environmental pressure on CO_2 emissions and electroplating as well as fast moving communication technologies are well known examples of such change. Electrification of transportation and moving away from the combustion engine are daily news.

Topics of interest for this session include, but are not limited to:

- Applications:
  - Fuel cell and energy storage technology
  - Coatings for high-performance engines
  - Coatings for cutting, forming and molding tools
  - Coatings for the reduction of friction and exhaust gas emissions
  - Low- and High-temperature coatings for aerospace applications
  - Decorative components and large area pre-fab plates
  - Corrosion protective coatings (e.g. Zn:Al) on large-area surfaces
  - Electroplating Replacements by vacuum deposited coatings and engineered surfaces
- Development:
  - Super-lubricity Coatings
  - Corrosion protection
  - New colors
  - Testing and evaluation of coating performance
  - Scale-up of vacuum coating processes for industrial demands
  - Failure analysis of coatings
  - Assessment, control and management of residual mechanical stress
  - Duplex coatings and thin-on-thick systems
  - Modelling approaches to performance analysis and prediction
- Production Related:
  - Reliability and life of coated parts and systems
  - Upscaling from laboratory to production
  - Scrap rates from percentages to ppm levels

INVITED SPEAKERS:

Low Friction and Wear Resistant Coating Solutions for the Automotive Industry Present Situation and Future Trends

André Hieke, Ton Hurkmans

IHI Ionbond Netherlands b.v., Venlo, Netherlands

Plasma-enhanced vacuum coating technology (PVD/PACVD) is one of the key contributors to improve the lifetime and efficiency of coated engine and fuel injection components for more than 20 years. Ionbond's Tribobond™ coatings increase the wear resistance and efficiency of power trains by reducing friction.

Hard and wear-resistant coatings, in particular the diamond-like carbon coatings, play an important role in combustion engines (ICE). They reduce friction, increase load-bearing capabilities and extend component lifetimes. Applied on components in state-of-the-art and future combustion engines and fuel injections systems, they protect high-loaded components in low-viscosity oils and future decarbonized e-fuels. The outstanding properties of Ionbond's DLC coatings can protect and extend the lifetime of coated components and help to reduce the global greenhouse gas problem.

The vision of a future mobility – sustainable and CO_2 neutral places increasing requirements on engineering. Higher specific mechanical and thermal loads on components and the need to minimize friction losses in tribological assemblies lead to a demand for new materials and innovative surface treatment processes.

Low friction carbon-based coatings are used already for many purposes in e-mobility applications. For instance, they are used to minimize the friction losses in electric drive trains and to extend the driving range of battery electric cars (BEV). Coated components for e-compressors, pumps, sealing, steering and braking units increase the robustness and lower the energy consumption of non-drive train systems.

A small overview will be given of present examples and an introduction to developments ongoing.

High-Performance PVD Targets: A Manufacturer's Look into the Past, a Pause at the Present, and a Peek into the Future

Paul J. Rudnik

Plansee USA LLC, Saline, MI

Physical Vapor Deposition (PVD) coatings have enabled many diverse technologies and thus become omnipresent in our daily lives over the past half-century or so. For example, hard coatings deposited on cutting tools like hobs, mills and inserts have been around for more than 40 years, and their use was a "green" technology due to the improved wear-resistance (leading to a reduction in tool consumption) before the term "green" came into the lexicon. New applications require the continuous improvement of coatings, either through new compositions, new architectures, or both. There is often a need to reduce cycle time, which requires higher power densities. Equipment manufacturers are also constantly evolving their equipment, incorporating new target designs, power supplies and/or other requirements. None of these advances can be achieved without the target manufacturers keeping pace. In fact, sometimes progress does not occur unless the target manufacturer works in tandem with consumers to find a solution. All of this requires a thorough understanding of PVD processes and their implications. To get a glimpse into the possibilities for the future of targets for hard and component coatings, it will be important to see what has been done in the past and what is being accomplished in the present in these and other applications. By illustrating the challenges that have been overcome, a better understanding of the possibilities will exist, which can help us work together to develop the products of the future. under the same HMM platform, and efforts on expanding this work towards single-molecule imaging in a wide-field configuration. Due to its high sensitivity in deep- subwavelength proximity to a surface, this HMM-based device hints at promising applications in bio- chemical sensing, particle tracking and contamination analysis.

TAC Chair:
Ton Hurkmans, *IHI Ionbond Group,* Ton.Hurkmans@ionbond.com
Assistant TAC Chairs:
Jolanta Klemberg-Sapieha, *Polytechnique Montreal,* jsapieha@polymtl.ca
Jens-Peter Heinß, *Fraunhofer-FEP,* jens-peter.heinss@fep.fraunhofer.de

Thin Film Sensors

The evolution of sensors in today's world has been driven by numerous technological advances and an explosion of new demand/applications. It is evident that as we continue to grow as a society, there are limitless ways to advance our capabilities as it pertains to health, labor, safety, transportation and economic prosperity. Sensors are becoming extremely common in our everyday lives and can be found in such items as clothing, machinery, photovoltaics, analysis of light, pressure, gas, temperature, speed, and a wide variety of health monitoring equipment. Sensor technology is frequently based on thin film technologies; principally physical vapor deposition (e.g., magnetron sputtering and thermal evaporation), and even when they incorporate additive manufacturing (such as printing and device attach) or micro-electromechanical systems (MEMS), the interfaces and multi-layer material sets of the resulting sensor structures require expert knowledge of surface and thin films engineering. The competencies found in the thin film and surface engineering community can provide solutions to advance the overall capability and efficiency of these devices. This advancement will not only accelerate the adoption of existing applications, but also enables new sensor applications and modalities.

Topics of interest to this session will include:

- Advanced photonic sensing materials design and fabrications,
- Nano plasmonic materials for environmental sensing

applications,
- Sensing modalities enabled by microfluidics and selective surface functionalities, and
- Flexible sensing materials and devices for wearable health monitoring applications.

This session /TAC seeks to connect thin film and surface engineering technologies to the myriad applications driven by the connectivity opportunities of the Internet of Things (IoT). Contributions that focus on novel solutions, techniques, and manufacturing challenges are of particular interest.

INVITED SPEAKER:

ALD and ALE for Quantum Sensors

Russ Renzas

Oxford Instruments, Reno, NV

Quantum device performance losses are predominantly from surfaces and interfaces. In diamond and SiC-based quantum sensors, for example, surface and interface defects lead to reduced spin coherence times (T2) and zero phonon line (ZPL) emission spectral diffusion. Atomic layer deposition (ALD) and atomic layer etch (ALE) enable precise engineering of materials and interfaces to minimize these losses.

Conventional etching techniques, while sufficient for many classical applications, suffer from amorphization, Ar ion implantation, and reactant diffusion in the first 3-7 nm of etched interfaces. This damaged region, also called the selvage layer, is a source of unwanted interactions and losses. Atomic Layer Etch (ALE) offers three key advantages for quantum sensor fabrication: (1) surface smoothing, (2) precise etch rate, and (3) reduced selvage layer depth.

TAC Chairs:
Jason Hrebik, *Kurt J. Lesker Company,* jasonh@lesker.com
Maciej Lisiak, *Futek,* mlisiak@futek.com
Binbin Weng, *University of Oklahoma,* binbinweng@ou.edu

Thin Film Superconductors

High temperature superconductors (HTS) based on Rare Earth Barium Copper Oxide (REBCO) are an emerging technology for a range of high-volume applications. This "coated conductor" technology is unique in the superconductor field because it is based upon a stack of multiple layers grown on a supporting tape substrate. Thus, it fundamentally enabled by a variety of vacuum-based thin film deposition techniques. This TAC aims to drive the introduction and integration of mature, high speed, high production volume technologies into the HTS coated conductor industry.

Superconductors have a key role to play in securing our energy future in an environment-friendly manner. Existing efforts for scalable power generation by nuclear fusion rely on HTS. High power-to-weight ratio machinery is being enabled by HTS as well: from wind turbines to aircraft propulsion. Electrical power transmission offers opportunities on a global scale for superconductors, and the applications are ideally suited for HTS. In addition to these there exist needs in health care (MRI) and large-scale research (particle accelerators and materials science), which HTS could serve in the future.

To give an idea of the production scales involved:

- A currently funded fusion energy reactor project will require 10,000 km of HTS conducting tape. A follow-up energy-producing reactor will require 20,000 km of such tape.
- Several funded companies are pursuing HTS technologies for power grid transformation in the US, Europe, and Asia.
- The market for the next twenty years in small jetliners, which could be equipped eventually by electric motors, is over 28,000 planes with a value of $3,000B.
- The MRI markets consumes up to 4000 tons of (low temperature) superconductors per year, for magnet construction.

Markets not fully open to HTS solutions rely on low temperature superconductors which were discovered an entire generation earlier. Only in the last 5 or so years have large applications started opening for HTS.

However, critical manufacturing issues must be addressed to take advantage of these emerging applications and markets. This session/TAC seeks to bring a diverse group of subject matter experts together to review challenges, opportunities, and developments in the following areas:

- Transformation of the REBCO production process from a materials science focus to a scalable manufacturing focus.
- Reduction of manufacturing costs. Estimates in multiple markets call for a factor of ten improvement.
- Increase in manufacturing speed, also by a factor of ten, to meet required volumes.
- Improvement of yield and tight process control.
- Innovations in streamlining and automating the production process.

INVITED SPEAKER:

The Growing Fusion Energy Industry

Andrew Holland
Fusion Industry Association, Washington, D.C.

When the history books are written about fusion energy, the last 12 months will certainly be seen as the turning point when it became clear that fusion would move out of the laboratories and into the marketplace.

For just a few examples, we saw a controlled "burning plasma" for the first time at the National Ignition Facility in California, record amounts of energy produced from the Joint European Torus in Oxford, and record lengths of high-temperature plasma confinement at KSTAR in South Korea and at EAST in China. Not to be outdone, privately-funded fusion companies reached important milestones of their own: Commonwealth Fusion Systems in Massachusetts demonstrated the most powerful large magnet in history, while Helion in Washington and Tokamak Energy in the UK each reached milestone plasma temperatures of above 100 million degrees.

Now, with those milestones achieved, private investment is coming in, allowing the fusion industry to build the proof-of-concept devices that will show that fusion energy can work. As our survey shows, private industry has secured over $2.8 billion in new private investment since our last survey a year ago, bringing total private investment to over $4.7 billion. This funding will allow fusion companies to reach for their "Kitty Hawk moment" in the coming years. And then, companies will rapidly build the pilot plants that will prove fusion energy is ready for the marketplace.

As fusion transitions from the lab to commercialization, private companies need governments to become a real partner in this effort. We must not see a "competition" between publicly-funded and privately-funded fusion approaches; instead, we must build real partnerships. As the private sector builds the power plants, governments will need to build the infrastructure and train the workforce that enable the fusion energy revolution. In a virtuous cycle, greater investment and partnerships will "crowd in" more private fusion investment and show the value of the way forward.

In the second annual "Global Fusion Industry Report" from the Fusion Industry Association, we found that the vast majority of companies are focused primarily on energy generation, however most reported at least two other potential markets for their

TAC Chair:
Larry Scipioni, *PVD Products,* lscipioni@pvdproducts.com

Exhibitor Innovator Showcase

This unique session allows our exhibitors and other vendors to introduce their company's newest products and services to the SVC community. This is an ideal way to share your company's message, new products and encourage booth traffic at the TechCon.

Session Organizers:
Jason Hrebik, *Kurt J. Lesker Company,* jasonh@lesker.com
Frank Zimone, *Society of Vacuum Coaters,* frank.zimone@svc.org

Vacuum Technology to Enable the Future of the Automotive Industry

Historically, the automotive industry has primarily utilized thin film vacuum coatings for low-e windshields, hard coatings for gears, and decorative coatings on plastic parts. The future of the automobile requires continual development of ADAS (Advanced Driver Assistance System), driver information systems, and electrification of the powertrain. Therefore, there are many upcoming technologies that will require thin film vacuum coatings.

For ADAS to increase safety while driving and to move towards autonomous vehicles, there will be many sensors and optical coatings for IR and LIDAR. The driver information systems such as Heads Up Display (HUD) and full dashboard displays will utilize reflectors, cold mirror, AR, and possibly bioactive layers in addition to the standard LCD and OLED thin film technologies.

The electrification of the powertrain will require significant improvements in the energy storage capacity and charging rates of batteries. Many companies are shifting towards thin film solid state technology to achieve the desired performance. To improve driving range, all aspects of the car will be developed to reduce power consumption and weight. An electric vehicle has no waste heat from an internal combustion engine. Therefore, the cabin HVAC and windshield defrost systems must done with electricity. This will further develop low-e and TCO coatings and Positive Thermal Coefficient (PTC) heaters.

This session will focus on the current and future thin film technologies that make this possible.

Session Organizer:
Ken Nauman, *SCI/Bühler,* knauman@sputteringcomponents.com

WebTech Roll-to-Roll Coatings for High-End Applications

WebTech is the forum for flexible web and roll-to-roll (R2R) processing at the SVC. It is the podium to present new achievements in processing of flexible substrates such as polymer or textile webs and thin glass, and encompasses manufacturing techniques, products, applications, market developments, and economical aspects of this versatile high-volume manufacturing method.

Presentations on materials, deposition processes, manufacturing techniques, use cases / application examples, market analysis and

economical perspectives in all areas related to R2R processing are welcome, and some particular highlight areas are:

- Web handling in vacuum during thermal & plasma processing
- Substrate materials & technologies
- New deposition source & layer technologies
- Inline process diagnostics & control
- New applications (energy generation, energy storage, sustainable packaging, smart systems etc.)
- Thin film nucleation & growth on flexible substrate materials within a R2R environment

INVITED SPEAKER:

Title: Manufacturing of Flexible Lightweight Solar Modules – Challenges and Opportunities

Dr. Ayodhya Nath Tiwari

Laboratory for Thin Films and Photovoltaics, Empa - Swiss Federal Laboratories for Materials Science and Technology, Düberdorf, Switzerland

Lightweight flexible thin film photovoltaic (PV) technology is innovative and different from traditional solar modules based on Si wafers, which are heavy, rigid, fragile and have some constrains for number of applications. Production of monolithically connected solar modules on polymer film with roll-to-roll (R2R) manufacturing has opened interesting application possibilities. They are especially attractive for applications on roofs and facades of buildings, greenhouses, tents, transport vehicles, airships, portable electronics, and emergency response operations.

R2R manufacturing offers potential for low cost production of solar modules but also faces challenges for coatings of high quality layers of metal, semiconductors, transparent conducting oxides (TCOs), and laser patterning. In case of $CuInGaSe_2$ (CIGS) thin film solar cells, Mo and TCO electrical contacts are sputtered, wide bandgap buffer layer is coated by chemical bath deposition, and the CIGS absorber layer with graded composition is grown by multisource evaporation.

PV devices based on organic-inorganic hybrid Perovskite semiconductors are drawing great interest with rapid progress but device structure consisting of precisely controlled multilayers are still under development to overcome the challenges of performance stability and large area processing. Different types of coating technologies are explored for device fabrication. Combination of semitransparent perovskite cell on top of low bandgap CIGS bottom cell shows the potential of all-thin-film tandem device with enhanced efficiency towards 30% in near future. The talk will provide overview of flexible CIGS and Perovskite PV technologies and emphasize the R2R manufacturing and application issues.

TAC Chair:

Chris Stoessel, *Eastman Chemical Company,* stoessel@attglobal.net

Assistant TAC Chairs:

Scott Jones, *3M,* sjjones@mmm.com
Neil Morrison, *Applied Materials,* neil_morrison@amat.com
Liz Josephson, *Intelli-Vation,* ljosephson@intelli-vation.com
Andy Jack, *Emerson & Renwick,* a.jack@eandr.com
Hazel Assender, *University of Oxford (Begbroke),* hazel.assender@materials.ox.ac.uk

Technical Poster Session

Poster Presentations serve as an important component of the Technical Porgram by providing a format for extended discussions of the results in a casual environment.
The Program Committee encourages poster presentations on all topics covered in the Call for Papers. A $200 cash award for the Best Poster will be offered. **Submit an abstract for your presentation in the Poster Session before February 1, 2023.**

Atomic Layer Processing (ALP)

TAC Co-Chairs:

Lenka Zajíčková, Central European Institute of Technology, Masaryk University, lenkaz@physics.muni.cz
Jacob Bertrand, Maxima Scineces LLC, jacob@max-sci.com

Assistant TAC Chairs:

Staci Moulton, Forge Nano, Inc., smoulton@forgenano.com
Craig Outten, Universal Display Corp., coutten@verizon.net

Coatings and Processes for Biomedical Applications

TAC Co-Chairs:

Hana Baránková, Uppsala University, hana.barankova@angstrom.uu.se
Jeff Hettinger, Rowan University, hettinger@rowan.edu

Coatings for Energy Conversion and Related Processes

TAC Co-Chair:

Volker Sittinger, Fraunhofer-IST, volker.sittinger@ist.fraunhofer.de

Assistant TAC Chairs:

Roel Bosch, IHI Hauzer Techno Coating B.V., RBosch@hauzer.nl
Claes G. Granqvist, Uppsala University, claes-goran.granqvist@angstrom.uu.se
David Sanchez, Materion Advanced Chemicals, david.sanchez@materion.com
Ric Shimshock, MLD Technologies, LLC, ricshimshock4mld@aol.com
Michael Andreasen, Vacuum Edge, michael.andreasen@vacuumedge.com
Stefan Saager, Fraunhofer-FEP, Stefan.Saager@fep.fraunhofer.de

Emerging Technologies

TAC Chair:

Chris Stoessel, Eastman Chemical Company, stoessel@attglobal.net

Assistant TAC Chairs:

Manuela Junghähnel, Fraunhofer-IZM, manuela.junghaehnel@assid.izm.fraunhofer.de
Jacob Bertrand, Maxima Sciences LLC, jacob@max-sci.com
Clark Bright, Bright Thin Film Solutions (3M retired), brightcrewllc@gmail.com
Frank Papa, GP Plasma, frank@gpplasma.com
Ladislav Bardos, Uppsala University, ladislav.bardos@angstrom.uu.se
Maryam Olsson, RISE, maryam.olsson@ri.se
Stephan Barth, Fraunhofer-FEP, stephan.barth@fep.fraunhofer.de

High-Powered Electron Beam Technology

TAC Chair:

Mark Pellman, MarkAPellman@outlook.com

Assistant TAC Chairs:

Goesta Mattausch, Fraunhofer-FEP, goesta.mattausch@fep.fraunhofer.de
Matthias Neumann, VON ARDENNE GmbH, neumann.matthias@vonardenne.biz
Stefan Saager, Fraunhofer-FEP, stefan.saager@fep.fraunhofer.de

High Power Impulse Magnetron Sputtering - HIPIMS

TAC Chair:

Arutiun P. Ehiasarian, Sheffield Hallam University, a.ehiasarian@shu.ac.uk

Assistant TAC Chairs:

Ju-Liang He, Feng Chia University, jlhe@fcu.edu.tw
Ralf Bandorf, Fraunhofer-IST, ralf.bandorf@ist.fraunhofer.de
Ian Haehnlein, Starfire Industries, ihaehnlein@starfireindustries.com
Ivan Shchelkanov, Starfire Industries, ishchelkanov@starfireindustries.com
Brian Jurczyk, Starfire Industries, bjurczyk@starfireindustries.com
Ivan Fernandez, Nano4Energy, ivan.fernandez@nano4energy.eu
Frank Papa, GP Plasma, frank@gpplasma.com

Large Area Coatings

TAC Chair:

Ken Nauman, SCI/Bühler, knauman@sputteringcomponents.com

Assistant TAC Chairs:

Marcus Frank, Bühler Group, marcus.frank@bühlergroup.com
Brent Boyce, Guardian Industries Corp., bboyce@guardian.com
Aneliia Wäckerlin, Glas Trösch, a.waeckerlin@glastroesch.ch

Optical Coatings

TAC Chair:

James N. Hilfiker, J.A. Woollam Co., Inc., jhilfiker@jawoollam.com

Assistant TAC Chairs:

Jay Anzellotti, IDEX Health & Science, janzellotti@idexcorp.com
Nadja Felde, Fraunhofer-IOF, Nadja.Felde@iof.fraunhofer.de

Plasma Processing & Diagnostics

TAC Chairs:

Lenka Zajíčková, Central European Institute of Technology, Masaryk University, lenkaz@physics.muni.cz
Craig Outten, Universal Display Corp., coutten@verizon.net

Assistant TAC Chairs:

Adam Obrusnik, PlasmaSolve, obrusnik@plasmasolve.com
Oleg Zabeida, Polytechnique Montreal, oleg.zabeida@polymtl.ca

Protective, Tribological and Decorative Coatings

TAC Chair:

Ton Hurkmans, IHI Ionbond Group, Ton.Hurkmans@ionbond.com

Assistant TAC Chairs:

Jolanta Klemberg-Sapieha, Polytechnique Montreal, jsapieha@polymtl.ca
Jens-Peter Heinß, Fraunhofer-FEP, jens-peter.heinss@fep.fraunhofer.de

Thin Film Sensors

TAC Chairs:

Jason Hrebik, Kurt J. Lesker Company, jasonh@lesker.com
Maciej Lisiak, Futek, mlisiak@futek.com
Binbin Weng, University of Oklahoma, binbinweng@ou.edu

Thin Film Superconductors

TAC Chair:
Larry Scipioni, PVD Products, lscipioni@pvdproducts.com

Exhibitor Innovator Showcase

Session Organizers:
Jason Hrebik, Kurt J. Lesker Company, jasonh@lesker.com
Frank Zimone, Society of Vacuum Coaters, frank.zimone@svc.org

WebTech Roll-to-Roll Coatings for High-End Applications

TAC Chair:
Chris Stoessel, Eastman Chemical Company, stoessel@attglobal.net
Assistant TAC Chairs:
Scott Jones, 3M, sjjones@mmm.com
Neil Morrison, Applied Materials, neil_morrison@amat.com
Liz Josephson, Intelli-Vation, ljosephson@intelli-vation.com
Andy Jack, Emerson & Renwick, a.jack@eandr.com
Hazel Assender, University of Oxford (Begbroke), hazel.assender@materials.ox.ac.uk

Special Sessions for 2023:

Vacuum Technology to Enable the Future of the Automotive Industry

Session Organizer:
Ken Nauman, SCI/Bühler, knauman@sputteringcomponents.com

Digital Transformation of Industrial Deposition Processes

Session Organizers:
Holger Gerdes, Fraunhofer-IST, holger.gerdes@ist.fraunhofer.de
Andreas Pflug, Fraunhofer-IST, andreas.pflug@ist.fraunhofer.de

Process Monitoring, Control and Automation Session

Session Organizer:
Martynas Audronis, NovaFabrica, martynas@novafabrica.biz

Networking Opportunities at the 2023 TechCon

Make Connections

The TechCon is packed with networking events designed to connect vacuum coating and surface engineering professionals with the global SVC community. Each technical and social networking event provides a different forum for invaluable face-to-face interactions and the opportunity to collaborate with technical experts.

Technology Forum Breakfasts

Vacuum coating technology spans multiple applications and processes. Join a discussion group focused on a topic that's important to you. Enjoy the conversation over breakfast before the start of the technical program Monday, Tuesday and Thursday.

To all of our SVC Stakeholders:

The **Technology Forum Breakfasts** have emerged as one of the most significant networking events at the TechCon. These breakfasts, held from 7:00 a.m. to 8:30 a.m. during the TechCon are "loosely" organized around a specific topic where we provide a moderator, a continental breakfast, plenty of seating, and an opportunity for free form discussion to take place. In the TFB's; problems are solved, new ideas are vetted, relationships are made and rekindled; all in the spirit of camaraderie that has made the SVC the most unique technical conference in our field. This year we are expanding the program even further and will offer more than 20 meetings during the TechCon Please be sure to check the daily schedule (the TFB's are offered on Monday, Tuesday, and Thursday of the TechCon) to find those topics that interest you! And remember, we are always looking for new topics as well as moderators to get the discussion going in the mornings. Good luck and have fun!

– Frank Zimone, Executive Director

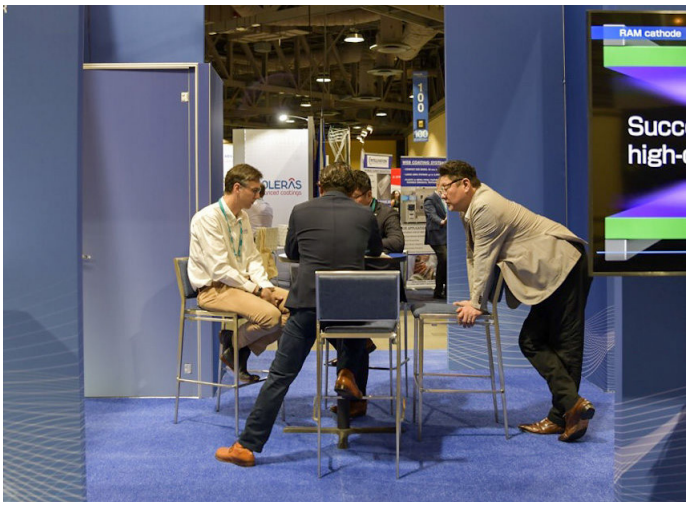


Exhibit Networking

Enjoy more opportunities than ever to visit the Exhibit Hall on May 9 – 10.

- Welcome Reception (held in Exhibit Hall)
- Poster Session ■ Beer Blast

Additional Networking:

- Technical Program Keynote Presentations
- Exhibitor Innovator Showcase
- Roundtable Discussions

SVC Foundation Networking Events

CASINO NIGHT

Come and join us for an evening of fun and networking, all to help a great cause at the Fourth Annual SVC Foundation Casino Night on Monday, May 8. ***Additional Casino Night tickets can be purchased on-line during TechCon registration or at the TechCon. This is a wonderful opportunity to entertain friends and customers who may not be registered for the conference.***

RUN FOR A CAUSE!

Register for the Annual 5K Fun Run and support the scholarship efforts of the SVC Foundation. Bib pickup is tentatively scheduled for 5:30 AM on Tuesday, May 9.

Networking Opportunities at the 2023 TechCon

2023 SVC TechCon Farewell Social

Date: **Thursday, May 11, 2023**

Everyone is invited to attend

The **Farewell Social** will be the last networking event of the TechCon and will commemorate what promises to be the most successful TechCon yet! Come join us as we celebrate our Young Members and all the new connections that were made after a densely packed four day program.

2023 SVC Awards Ceremony and Welcome Reception

Date: **Tuesday, May 9, 2023**

Everyone is invited to attend

The **Awards Ceremony** will introduce and recognize the Nathaniel Sugerman Memorial Award recipient, SVC Mentor Award recipients, and Sponsored Student awardees.

The **Welcome Reception** is a popular networking event at the TechCon. It offers a relaxed venue to meet friends and colleagues and provides the opportunity to make new connections before the start of the Technical Program.