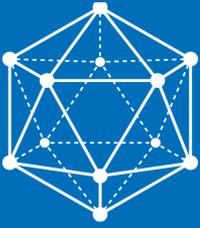


Second Annual



Erich Bloch

MDI SYMPOSIUM

Presented by the

**Department of
Materials Design
and Innovation**

June 4 - 5, 2018 | University at Buffalo
buffalo.edu/ebs2018

UB University
at Buffalo
The State University of New York



About Erich Bloch

Erich Bloch (January 9, 1925 – November 25, 2016) was a German-born American electrical engineer and administrator. He was involved with developing IBM's first transistorized supercomputer, 7030 Stretch, and mainframe computer, System/360. He served as director of the National Science Foundation from 1984 to 1990.

Bloch lost his parents in the Holocaust, survived the war in a refugee camp in Switzerland and immigrated in 1948 to the United States. He studied electrical engineering at ETH Zürich and received his bachelor of science in electrical engineering from the University of Buffalo.

Bloch joined IBM after graduating in 1952. He was engineering manager of IBM's STRETCH supercomputer system and director of several research sites during his career. In June 1984, Ronald Reagan nominated Bloch to succeed Edward Alan Knapp as director of the National Science Foundation. The same year, he was elected a foreign member of the Royal Swedish Academy of Engineering Sciences. In 1985, Bloch was awarded one of the first National Medals of Technology and Innovation along with Bob O. Evans and Fred Brooks for their work on the IBM System/360.

After stepping down as director of the National Science Foundation, Bloch joined the Council on Competitiveness as its first distinguished fellow. The IEEE Computer Society awarded him the Computer Pioneer Award in 1993 for high speed computing. In 2002, the National Science Board honored Bloch with the Vannevar Bush Award. He was made a Fellow of the Computer History Museum in 2004 "for engineering management of the IBM Stretch supercomputer, and of the Solid Logic Technology used in the IBM System/360, which revolutionized the computer industry."

In 2014, Bloch donated \$1.5 million to the University at Buffalo to establish the Erich Bloch Endowed Chair for the new Department of Materials Design and Innovation.

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Acknowledgements

The Erich Bloch Symposium has received generous support from the University at Buffalo and the JPB Foundation. Numerous individuals have helped with the organization of the meeting, but special thanks go to:

The Symposium Advisory Committee: Dr. Grace Wang, Interim Provost and Senior Vice Chancellor for Research and Economic Development, State University of New York and Professor, Department of Materials Design and Innovation, University at Buffalo; Dr. Liesl Folks, Dean, School of Engineering and Applied Sciences; Dr. Robin Schulze, Dean, College of Arts and Sciences; Alexandra McPherson, Principal, Niagara Share; Dr. Mark Rossi, Executive Director, Clean Production Action; Dr. Chitra Rajan, Associate Vice President for Research Advancement, University at Buffalo.

Symposium Staff: Margie Poniatowski, Assistant to the Chair, Department of Materials Design and Innovation; Jennifer Giegel, Director of Strategic Initiatives, School of Engineering and Applied Sciences; Margaret Shea, Staff Assistant, Research and Economic Development; Michelle Bowen, Outreach Coordinator, School of Engineering and Applied Sciences; Jane Stoyle Welch, Director of Communications, School of Engineering and Applied Sciences; Holly Acito, Assistant Director of Communications, School of Engineering and Applied Sciences; Sarah D'Iorio, Assistant Director of Communications, School of Engineering and Applied Sciences

A Message from the Chair



It is with great pleasure that I welcome you to the Second Annual Erich Bloch Symposium in Materials Design and Innovation at the University at Buffalo (UB). The symposium is dedicated to the late Erich Bloch, former director of the National Science Foundation, who helped endow the new Department of Materials Design and Innovation at UB. The conference will focus on innovative strategies for research and education in the field of materials and related sciences, with the overarching goal of identifying accelerated solutions to address a broad range of societal needs. This event honors Erich Bloch's legacy and embodies the essence of his philosophy that "...science is changing, the tools of science are changing, and that requires different approaches."

The Department of Materials Design and Innovation (MDI) at the University at Buffalo is a forward-leaning, interdisciplinary initiative, with a new paradigm for materials science research and education. MDI harnesses information and data science tools to advance knowledge discovery in materials science. It addresses societal needs for significant acceleration of new materials design and discovery, emergent properties and processing strategies. In that spirit, this year's theme is "Accelerating Innovation for a Regenerative Economy."

MDI trains a new genre of materials scientists and engineers using advanced computational tools, in conjunction with bench science, to reduce the cost and time it takes to discover and develop new materials and technologies that can positively impact economic projects. The department forges critical partnerships between government, industry, community groups and academic enterprises, and pushes the boundaries of traditional materials science research to establish new paradigms for materials design and innovation.

Erich Bloch's commitment to the promotion of an inclusive workforce by providing opportunities for women and other underrepresented groups, serves as a guiding principal for the MDI. The Department also emphasizes the importance of forging critical partnerships with community groups and non-governmental organizations to ensure that our research and educational activities have the greatest impact on a broad range of areas such as health, climate change, and energy sustainability. We are fortunate to have some of the most innovative thought leaders at the Erich Bloch Symposium who will challenge us to push the boundaries of conventional thinking as we explore some of today's most pressing societal challenges.

On behalf of the faculty, staff and students of the Department of Materials Design and Innovation, welcome!



Dr. Krishna Rajan

Erich Bloch Endowed Chair and
Empire Innovation Professor
University at Buffalo Department of
Materials Design and Innovation

Department of Materials Design and Innovation Faculty



Krishna Rajan

Erich Bloch Chair and Empire Innovation Professor

ScD, Materials Science, Massachusetts Institute of Technology

Research Interests: Materials informatics, quantitative high-resolution imaging, and atom probe tomography



Scott Broderick

Research Assistant Professor

PhD, Materials Science and Engineering, Iowa State University

Research Interests: Statistical learning for materials design and high throughput characterization



David Eason

Research Assistant Professor

PhD, North Carolina University

Research Interests: Thin film deposition



Erik Einarsson

Assistant Professor

PhD, Mechanical Engineering, University of Tokyo

Research Interests: Synthesis of low-dimensional materials such as graphene and single-walled carbon nanotubes, materials characterization, and THz applications of nanoscale materials



Alan Friedman

Research Associate Professor

PhD, Chemistry, University of California at Santa Barbara

Research Interests: Analytical chemistry, organometallic chemistry, photochemistry



Quanxi Jia

Empire Innovation Professor and National Grid Professor of Materials Research; Scientific Director, New York State Center of Excellence in Materials Informatics

PhD, Electrical and Computer Engineering, University at Buffalo

Research Interests: Thin film nanostructured multifunctional materials



Eaton Lattman

Research Professor

PhD, Biophysics, Johns Hopkins University

Research Interests: X-ray free-electron lasers in biological scattering, protein folding, development and improvement of methods in protein crystallography



Baishakhi Mazumder

Assistant Professor

PhD, Physics and Materials Science, University of Rouen, France

Research Interests: Chemical imaging through atom probe tomography



Prathima Nalam

Assistant Professor

PhD, Materials Science, ETH Zurich

Research Interests: Tribology, soft mechanics, surface and interfacial forces, and atomic force microscopy



E. Bruce Pitman

Professor

PhD, Mathematics, Duke University

Research Interests: Applied mathematics and statistics for materials design



Kristofer Reyes

Assistant Professor

PhD, Applied Mathematics, University of Michigan
Research Interests: Statistical modeling and simulation



Jung-Hun Seo

Assistant Professor

PhD, Electrical and Computer Engineering, University of Wisconsin–Madison
Research Interests: Materials design for flexible electronics



Edward Snell

Professor, Director of BioXFEL; Senior Scientist; CEO of Hauptman-Woodward Medical Institute, Department of Structural Biology, Jacobs School of Medicine and Biomedical Sciences

PhD, Chemistry, University of Manchester
Research Interests: Bioinformatics, protein function and structure, proteins and metalloenzymes, structural biology, x-ray crystallography



Grace Wang

Interim Provost and Senior Vice Chancellor for Research and Economic Development, State University of New York; and Professor, Department of Materials Design and Innovation, University at Buffalo

PhD, Materials Science and Engineering, Northwestern University
Research Interests: Development of materials for microelectronics



Olga Wodo

Assistant Professor

PhD, Mechanical Engineering and Computer Sciences, Czestochowa University of Technology, Poland
Research Interests: Informatics and high performance computing for materials design and manufacturing



Fei Yao

Assistant Professor

PhD, Energy Science, Sungkyunkwan University, Korea; Physics, Ecole Polytechnique, France

Research Interests: Nanomaterials and nanostructures for energy storage and conversion

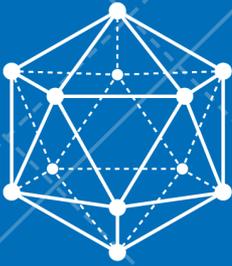


Xian Zhang

Assistant Professor

PhD, Mechanical Engineering, Columbia University

Research Interests: Numerical methods, theory and modeling of nano-mechanical systems



SYMPOSIUM **Agenda**

Agenda

Day 1 – Monday, June 4

» 8:30 a.m. – Registration and breakfast

9:30 – 10:00 - Welcome and Overview

» 9:30 – 9:45 – Welcome

Robin Schulze, Dean, College of Arts and Sciences; and Professor of English, University at Buffalo

Welcome

» 9:45 – 10:00 – Overview

Krishna Rajan, Erich Bloch Chair, Department of Materials Design and Innovation, University at Buffalo

Why Do Materials Matter? And Why Do Material Scientists Matter?

10:00 - 11:30 - Session One Materials Matter: From Molecules to Neighborhoods

This session explores how innovations in materials science can lead to positive societal impact in areas such as health, energy, and environmental sustainability. The Materials Design and Innovation department's highly interdisciplinary activities facilitate the application of fundamental research to education, economic development, and industry / community engagement.

MODERATOR:

David Castillo, Professor of Romance Languages and Literatures; and Director, Humanities Institute, University at Buffalo

» 10:00 – 10:45 – Keynote

KEYNOTE SPEAKER:

Michael Ward, Silver Chair Professor of Chemistry; and Director, Molecular Design Institute, New York University

Fact Driven Science Policy: A Case Study of Crystalline Insecticides

» 10:45 – 11:30 – MDI Jamboree I: Poster Session

Two minute 'flash presentations' by MDI students to communicate the innovative aspects of their research and why it matters for a regenerative economy. The poster session at the end of the day provides an opportunity for students to explain their research in more detail.

» 11:45 – 12:45 - Lunch

1:00 - 4:00 - Session Two

Materials Matter: Emerging Trends and Opportunities

Science for the public good: how can national research priorities help with community advancement? How do we develop research agendas and approaches that are more intentional in solving community challenges?

MODERATOR:

Grace Wang, Interim Provost and Senior Vice Chancellor for Research and Economic Development, State University of New York; and Professor, Department of Materials Design and Innovation, University at Buffalo

» 1:00 – 2:00 - Keynote

KEYNOTE SPEAKER:

Linda Sapochak, Director, Division of Materials Research, National Science Foundation

Big Idea Challenges for Materials Research

» 2:00 – 4:00 - Panel Discussion

Trends and opportunities for renewable energy, green materials, and resource conservation.

INVITED SPEAKERS:

Mark Shima, President, Panasonic ECO Solutions Solar of New York

Frits Abell, Managing Director, Echo Creative Ventures, Inc.

Jonathan Bird, Professor and Chair, Department of Electrical Engineering, University at Buffalo

Kemper Lewis, Professor and Chair, Mechanical and Aerospace Engineering; and Director, Sustainable Manufacturing and Advanced Robotic Technologies, University at Buffalo

» 4:00 – 5:00 - MDI Jamboree II: Poster Session

(Refreshments served)

Day 2 – Tuesday, June 5

» 8:00 – 9:00 – Registration and breakfast

9:00 - 10:00 - Plenary Talk

Kristina M. Johnson, Chancellor, State University of New York; and Professor of Electrical Engineering, University at Buffalo

On Erich Bloch: *The Legacy and the Path to Sustainability*

MODERATOR: **Liesl Folks**, Dean, School of Engineering and Applied Sciences; and Professor of Electrical Engineering, University at Buffalo

10:00 - 11:30 - Session Three Enabling a Regenerative Economy

The building blocks of a regenerative economy: how do scientists, academics, NGO's, community and corporate activists work on the various components of a regenerative economy?

MODERATOR:

Krishna Rajan, Erich Bloch Chair, Department of Materials Design and Innovation, University at Buffalo

» 10:00 – 10:45 – Keynote

KEYNOTE SPEAKER:

Don Sadoway, John F. Elliott Professor of Materials Chemistry, Massachusetts Institute of Technology

Understanding the Science of Materials to Generate Disruptive Technologies: The Liquid Metal Batteries Story

» 10:45 – 11:25 – Invited Talks

INVITED SPEAKERS:

Payal Sampat, Mining Program Director, Earthworks

Non-renewable Resources for Renewable Technologies- A Critical Assessment

Sheila Davis, Executive Director, Silicon Valley Toxics Coalition

Moving Toward a Just and Sustainable Solar Industry and the Benefits of Designing a Circular Economy

» 11:25 – 11:45 – Group Photo

» 11:45 – 12:30 – Lunch

12:30 - 2:00 - Session Four Innovation with Intent

This session provides different views on the development and use of materials from a systems perspective.

MODERATOR:

Krishna Rajan, Erich Bloch Chair; Empire Innovation Professor, Department of Materials Design and Innovation, University at Buffalo

» 12:30 – 1:15 - Keynote

KEYNOTE SPEAKER:

William Petuskey, Professor, School of Molecular Sciences; and Director, Advanced Materials Initiatives, Arizona State University
Materials for a Regenerative Economy

» 1:15 – 2:00 - Invited Talks

INVITED SPEAKERS:

Mark Rossi, Executive Director, Clean Production Action
The Safer Chemicals and Chemical Footprint Project

David Furrer, Senior Fellow Discipline Lead, Pratt and Whitney; and President of ASM International, the Materials Information Society
Data Needs for Materials Processing

2:00 - 3:30 - Session Five Reimagining Industry within a Regenerative Economy

Will the 4th Industrial Economy inevitably bring with it some negative consequences (environmental impact, labor displacement, income inequality) or will it better position us to address complex societal challenges like climate change, poverty, health and well-being?

MODERATOR:

Christina Orsi, Associate Vice President, Economic Development, University at Buffalo

» 2:00 – 2:45 - Keynote

KEYNOTE SPEAKER:

Helga Vanthournout, Senior Knowledge Expert, Center for the Business and the Environment, McKinsey & Company, Geneva, Switzerland

The View from the World Economic Forum: Circular Economies

» 2:45 – 3:30 – Invited Talks

INVITED SPEAKERS:

John Fullerton, Founder and President, Capital Institute
Regenerative Capitalism: Implications for Emerging Economies, and its Potential Impact on Industrial Regions like Buffalo Niagara

Charles Ruffing, Director, New York State Pollution Prevention Institute, Rochester Institute for Technology
Integrating Sustainability into Diverse Business Models with Implications for a Regional Circular Economy

» 3:30 – 3:45 – Break

3:45 - 5:00 - Session Six Mapping Pathways to Solutions

A holistic approach to developing safer options to hazardous chemicals in products, manufacturing, and supply chains. This panel will highlight the current challenges with hazardous chemicals and materials management in the value chain – especially in the electronic and building product sectors – and identify solutions for accelerating the substitution of hazard chemicals with safer solutions.

MODERATOR:

Alexandra McPherson, Principal, Niagara Share

» 3:45 – 5:00 – Panel Discussion

INVITED SPEAKERS:

Lauren Asplen, Director, Healthy Sustainability Program, BlueGreen Alliance
Engaging Front-line Workers in Identifying Energy Efficiency Opportunities

Ken Geiser, Professor Emeritus, University of Massachusetts, Lowell
Sustainable Production and Industrial Development

Sarah O'Brien, Director, Clean Electronics Production Network
Clean Production Electronics Network's Approach to Industry-wide Innovation – A Model for the 'Factory of the Future'

Jim Vallette, Research Director, Health Building Network
Creating a Chemical and Material Library to Advance Green Building Materials

» 5:00 – 7:00 – Reception

2018 MDI Summer Institute

This year, the Summer Institute includes additional events in conjunction with the Erich Bloch Symposium.

On June 6, 2018, the Collaboratory for a Regenerative Economy* (CoRE – <https://www.corebuffalo.org>) hosts the CoRE Change Agent Summit at the University at Buffalo. The theme of the 2018 CoRE Change Agent Summit is “The Regenerative Factory of the Future.”

On June 2, 2018, MDI faculty and CoRE participated in the 2nd Annual Western New York Youth Climate Action Summit (<https://wnyyouthclimatesummit.org/>). MDI faculty presented a “Materials Matter” educational module to show how materials science can help develop technologies that mitigate the impact of climate change.

**CoRE is funded with generous support from the JPB Foundation.*



Speakers

Speakers



E. Frits Abell

Managing Director, Echo Creative Ventures, Inc.

Over the past 18 years, Frits Abell has helped found and/or build several companies in Boston, Buffalo and New York City; these include a digital media company, a business consultancy, and an investment bank. As such, Frits has developed deep experience in marketing, corporate development and operations for startups and mid-stage ventures, for which he manages all aspects of new business formation. Frits has a deep network that ranges from financial and strategic investors to entrepreneurs of early stage ventures to strategic acquirers. Frits is unwavering about three things: his drive to start new initiatives, his passion for social ventures, and his love for connecting people. As such, his focus has been on the formation and/or growth of a number of Buffalo-based early stage ventures, including Viridi Parente, Inc. (Green Machine), Plume Coffee & Roastery, echo Art Fair, Solid716, Coolture, and Anna Kaplan Contemporary. He has also served on boards/committees for Arts Services Initiative (ASI), Preservation Buffalo Niagara (PBN), Legacy Cities, Visit Buffalo Niagara (VBN), and DesignBuffalo.



Lauren Asplen

Director, Healthy Sustainability Program, BlueGreen Alliance

Lauren Asplen is the Director of the BlueGreen Alliance's Healthy Sustainability Program. Asplen has more than two decades' experience working with trade unions, primarily in the manufacturing and transportation sectors. Most recently, she spearheaded a program that gained White House recognition as a "Champion of Change" for engaging front-line workers in identifying energy efficiency opportunities.



Jonathan Bird

Professor and Chair, Department of Electrical Engineering, University at Buffalo

Jonathan Bird is both the chair of the Electrical Engineering Department and an Adjunct Professor in the Department of Physics, as well as a Visiting Professor at Chiba University in Japan. Prior to joining UB, Bird was an Associate Professor in the Department of Electrical Engineering at Arizona State University. He is a Fellow of the Institute of Physics and was NYSTAR Distinguished Professor of 2003.



David Castillo

Professor of Romance Languages and Literatures; and Director, Humanities Institute, University at Buffalo

David Castillo is the UB Director of the Humanities Institute and Professor of Spanish in the Department of Romance Languages and Literatures, where he served as Chair between 2009 and 2015. He is the

author of "Awry Views: Anamorphosis, Cervantes and the Early Picaresque and Baroque Horrors: Roots of the Fantastic in the Age of Curiosities" and co-author of "Zombie Talk: Culture, History, Politics and Medialogies: Reading Reality in the Age of Inflationary Media." He is a habitual UB "Scholar on the Road," and has made media appearances in The New York Times, The Voice of America, NPR, and other outlets.



Sheila Davis

Executive Director, Silicon Valley Toxics Coalition

In her time at the Silicon Valley Toxics Coalition, Sheila Davis has had an important hand in shaping environmental policy in the high-tech industry.

She researched and developed the first electronic recycling legislation to be passed in California, and spearheaded the first pilot programs in the country

to collect and recycle residential electronic waste. Before becoming SVTC's executive director, she served as program director of SVTC's Sustainable Technologies Program. Davis served as a journalist, state legislative aide and community development specialist before joining the staff of SVTC.



Liesl Folks

Dean, School of Engineering and Applied Sciences; and Professor of Electrical Engineering, University at Buffalo

Liesl Folks is Dean of the School of Engineering and Applied Sciences and a professor in electrical engineering at the University at Buffalo. Prior to

joining UB in 2012, she spent 16 years in research and development in the magnetic data storage industry in Silicon Valley, working for IBM, Hitachi and Western Digital. Her research is in the fields of magnetic materials and devices, nanoscale metrology, and spin-electronic devices. She was president of the IEEE's Magnetics Society in 2013-2014 and in 2012, she served on the congressionally mandated panel for the Triennial Review of the National Nanotechnology Initiative, facilitated by the National Academy of Sciences.



John Fullerton

Founder and President, Capital Institute

John Fullerton is the Founder and President of Capital Institute, a collaborative working to explore and effect the economic transition to a more just, regenerative, and sustainable way of living on this earth through the transformation of finance. He is also the Principal of Level 3 Capital Advisors, LLC.

Previously, Fullerton was a Managing Director of JPMorgan. He is a Co-Founder and Director of Grasslands, LLC, a holistic ranch management company in partnership with the Savory Institute, and a Director of New Day Farms, Inc., New Economy Coalition, and Savory Institute.



David U. Furrer

Senior Fellow Discipline Lead, Pratt and Whitney; incoming President of ASM International, the Materials Information Society

David U. Furrer leads all of the materials discipline chiefs and materials fellows at Pratt & Whitney in developing technical strategy and improving all materials engineering work. Previously he served as Chief of Strategic Materials and Process Technology at Rolls-Royce and Chief Metallurgist at Ladish Company Inc. Throughout his career, Furrer has worked to establish closer links between materials technology and other engineering functions. His contributions have advanced processing methods for a wide range of materials, enabling higher-performance components for turbine engines, airframes, and rocket applications.



Kenneth Geiser

Professor Emeritus, University of Massachusetts, Lowell

Kenneth Geiser is Professor of Work Environment and Director of the Lowell Center for Sustainable Production at the University of Massachusetts Lowell. He is one of the authors of the Massachusetts Toxics Use Reduction Act and served as Director of the Massachusetts Toxics Use Reduction Institute from its founding in 1990 to 2003. His research and writing focus on pollution prevention and cleaner production, toxic chemicals management, international chemicals policy, safer technologies, and green chemistry. He has served on various advisory committees for the U.S. Environmental Protection Agency, and the United Nations Environment Program.



Kristina M. Johnson

Chancellor, State University of New York; and Professor of Electrical Engineering, University at Buffalo

Kristina M. Johnson is the 13th Chancellor of The State University of New York. Immediately prior to joining SUNY, Dr. Johnson was co-founder and CEO of Cube

Hydro Partners, LLC, a clean-energy infrastructure company focused on building and operating hydropower plants in North America. Johnson served as Under Secretary of Energy at the U.S. Department of Energy, and has served as Provost and Senior Vice President for Academic Affairs at Johns Hopkins University and as Dean of the Pratt School of Engineering at Duke University. Johnson was inducted into the Women in Technology International Hall of Fame and the National Inventors Hall of Fame.



Kemper Lewis

Professor and Chair, Department of Mechanical and Aerospace Engineering, University at Buffalo; and Director, Sustainable Manufacturing and Advanced Robotic Technologies (SMART) Community of Excellence;

Kemper Lewis is professor and chair of the Department of Mechanical and Aerospace

Engineering at the University at Buffalo. He is also the director of UB's Community of Excellence in Sustainable Manufacturing and Advanced Robotic Technologies, an initiative that harnesses the strengths of faculty across the university to develop advanced manufacturing processes and technologies that enable cost-effective design of highly customizable, high-quality products. He teaches and conducts research in the areas of design theory, system optimization, decision modeling and design analytics.



Alexandra McPherson

Principal, Niagara Share

Alexandra McPherson has spent the last twenty years leading innovative environmental initiatives that leverage the collective creativity of communities and industries. Niagara Share builds cross sectoral partnerships that advance social and environmental

entrepreneurship. She co-leads the Collaborative for the Regenerative Economy with the University at Buffalo's Materials Design and Innovation Department and Clean Production Action. McPherson also leads the Investor Environmental Health Network, an investor collaborative housed

at CPA, that builds corporate support for green chemistry initiatives in partnership with its membership network of 30 investment organizations managing over \$60B in assets.



Sarah O'Brien

Director, Clean Electronics Production Network

As Director of the Clean Electronics Production Network, Sarah O'Brien supports leading electronics stakeholders pursuing the audacious goal of moving toward elimination of worker exposure to toxic chemicals in the electronics supply chain. O'Brien

served as an expert on environmentally sustainable purchasing on the stakeholder development team that created the original environmental electronics procurement criteria and system, then engaged for a decade with purchasers and manufacturers around the world to 'green' their production and procurement of electronics. Previously, with Hospitals for a Healthy Environment and INFORM, O'Brien assisted organizations in improving their environmental performance through procurement policy and contract development.



Christina Orsi

Associate Vice President, Economic Development, University at Buffalo

As the Associate Vice President, Economic Development, Christina Orsi works to help businesses and other community partners connect with UB researchers and resources, including workforce development training, entrepreneur support and

access to programs like START-UP NY, to advance UB's mission as an economic engine in Western New York and beyond. Orsi supervises the WNY Incubator Network and UB's Center for Advanced Biomedical and Bioengineering Technology. Prior to joining UB, she provided strategic direction for the Western New York Regional Economic Development Council and played an integral role in NYS State Governor Cuomo's Buffalo Billion economic development plan.



William T. Petuskey

Professor, School of Molecular Sciences; and Director, Advanced Materials Initiatives, Arizona State University

William T. Petuskey is Professor of chemistry and biochemistry in the School of Molecular Science at Arizona State University and is also Director of ASU's Advanced Materials Initiative. Prior to joining ASU,

he was research associate at the Universität Hannover, Germany and assistant professor of ceramic engineering at the University of Illinois at Urbana Champaign. He served ASU as chairman of its Department of Chemistry and Biochemistry and Associate Vice President of Science, Engineering and Technology. His research activities are devoted to the synthesis and physical chemistry of nano-scaled ceramics.



Krishna Rajan

Erich Bloch Chair and Empire Innovation Professor, Department of Materials Design and Innovation, University at Buffalo

Krishna Rajan, the Erich Bloch Chair and Empire Innovation Professor of the University at Buffalo's Department of Materials Design and Innovation.

He is the founding editor-in-chief of the new journal *Materials Discovery*, and serves on numerous national and international panels, including the National Academy of Sciences' Member Science and Technology Experts Group: National Academies of Sciences, Engineering, and Medicine. He has received numerous awards and recognitions, including most recently the Alexander von Humboldt Research Award. He was a staff scientist at the National Research Council of Canada and then served on the faculties at Rensselaer Polytechnic Institute and Iowa State University.



Mark Rossi

Executive Director, Clean Production Action

Part of the Clean Production Action team since 2004, Mark Rossi has the unique ability to bring together diverse groups and achieve innovative outcomes. In 2006, he founded BizNGO, a collaboration of organizations who work together to advance safer chemicals and sustainable materials. Innovative

products of BizNGO include the Alternatives Assessment Protocol, Guide to Safer Chemicals, and Plastics Scorecard. He is also the co-author of the hazard assessment tool GreenScreen. In 2014, he co-founded the Chemical Footprint Project, an initiative to benchmark corporations on their overall chemical management performance. Rossi is a research fellow at the Lowell Center for Sustainable Production.



Charles Ruffing

Director, New York State Pollution Prevention Institute, Rochester Institute for Technology

Charles Ruffing has 23 years of experience in health safety and environment technical science and management. As the Director of the New York State

Pollution Prevention Institute, he leads a team of 21 engineers, technical staff, outreach specialists and students in delivering pollution prevention information, research, and direct assistance to NYS businesses and citizens. Prior to joining NYSP2I, Chuck held various positions at Eastman Kodak Company spanning 20 years, and since 2010 held the position of Vice President of Health, Safety, Environment and Sustainability at Eastman Kodak Company.



Donald R. Sadoway

**John F. Elliott Professor of Materials Chemistry,
Massachusetts Institute of Technology**

Don Sadoway's research seeks to establish the scientific underpinnings of technologies that make efficient use of energy and natural resources in an environmentally sound manner. Sadoway is a co-founder of Ambri, Inc., which is commercializing the liquid metal battery technology for grid-scale energy storage, and a co-founder of Boston Metal, which is commercializing molten oxide electrolysis for the production of metals. Sadoway's influence reaches beyond the lecture hall – his TED Talk has more than 1.8 million views, he has appeared on widely-watched TV shows such as the Colbert Report, and in 2012 he was named by TIME magazine as one of the 100 most influential people in the world.



Payal Sampat

Mining Program Director, Earthworks

Payal Sampat currently leads Earthworks' No Dirty Gold corporate/markets campaign, and leads their global efforts to monitor and reform the mining industry, working with communities affected by mining and local organizations from around the world. Sampat joined Earthworks in 2002 from the Worldwatch Institute where she remains a Senior Fellow. At Worldwatch, she researched and wrote about mining, materials, freshwater, and natural resources issues. Sampat began her environmental career as an organizer for the Bombay Environmental Action Group, in Bombay, India, where she worked on campaigns to protect coastal areas and public lands.



Linda Sapochak

**Director, Division of Materials Research,
National Science Foundation**

Linda Sapochak is the Division Director for the Division of Materials Research at the National Science Foundation. She has worked in DMR since 2008 as Program Director for the Solid State and

Materials Chemistry Program, and the Materials Research Science and Engineering Center program since 2014. She also managed projects under the Emerging Frontiers in Research and Innovation: Green Sustainable Buildings, Sustainable Energy Pathways and I-Corps. Prior to her position at NSF, Sapochak was an Assistant Professor in the Chemistry Department at the University of Nevada, Las Vegas.



Robin Schulze

**Dean, College of Arts and Sciences; and
Professor of English, University
at Buffalo**

Robin Schulze is the Dean of the College of Arts and Sciences and a professor of English at the University at Buffalo. She specializes in modernist American poetry, textual scholarship and editorial theory, and modernist literature and culture. Prior to her appointment, Schulze served as Associate Dean for the Humanities, College of Arts and Sciences, at the University of Delaware. She came to Delaware from Penn State University, where she taught for more than a decade before accepting the position of head of the Department of English in 2007. Schulze has received prestigious grants from the UNIDEL Foundation, the American Philosophical Society, and the Oregon State University Center for the Humanities, among others.



Mark Shima

**President, Panasonic Eco Solutions Solar New
York**

Mark is a leading international expert on next generation solar manufacturing, and has overseen factories in Oregon and across Asia. He now leads the Buffalo manufacturing site. In his role at Panasonic,

Shima has extolled the company's philosophy to, "develop people before producing the products," as he has expanded the workforce in Buffalo.



Jim Vallette

Research Director, Health Building Network

In his role as Research Director for the Health Building Network, Jim Vallette works to understand and explain industry's impacts on people and the planet. His findings have supported major global policy developments like the Basel Convention ban on toxic waste trade and national and international finance

bans on overseas fossil fuel extraction. Vallette has helped to develop the Healthy Building Network's groundbreaking research on how building materials are made, and what the impacts are on building occupants, construction workers, fenceline communities, and the global environment.



Helga Vanthournout

Senior Knowledge Expert, Center for Business and the Environment, McKinsey & Company, Geneva, Switzerland

Helga Vanthournout has worked around the world with clients in the materials, engineering, and consumer sectors to identify how they can grow and innovate by reducing their lifetime material intensity. In the field of waste management, Vanthournout has helped regional, state, and city governments to develop new management strategies, evaluate privatization options, and craft implementation plans. She has also done substantial work on organizations' broader sustainability agendas. Before joining McKinsey in 2006, Vanthournout was a scientific officer at the European Chemicals Bureau of the European Commission, where she researched life-cycle assessment approaches.



Grace Wang

Interim Provost and Senior Vice Chancellor for Research and Economic Development, State University of New York; and Professor, Department of Materials Design and Innovation, University at Buffalo

Grace Wang was appointed vice chancellor for research and economic development by the SUNY Trustees in January 2017. Wang supports the SUNY Chancellor and Provost in advancing SUNY's overall strategy and mission, and serves as a liaison to the SUNY Board of Trustees in the areas of research and economic development. Prior to joining SUNY, Wang served as acting assistant director for engineering at the National Science Foundation (NSF). In this role, she led the Engineering Directorate, managing a funding portfolio of over \$900 million dedicated to conducting frontier engineering research, supporting engineering education, and fostering innovation and technology commercialization.

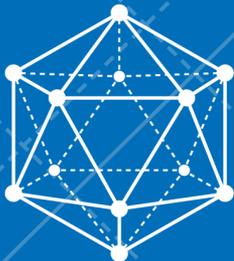


Michael Ward

Silver Chair Professor of Chemistry; and Director, Molecular Design Institute, New York University

Michael D. Ward is the Silver Chair Professor of Chemistry and the founder of the Ward Group at NYU - a highly interdisciplinary research group at the intersection of organic solid-state chemistry, physical chemistry, materials science, and biomedical chemistry. He has served as an editor for the ACS journal Chemistry of Materials since 1998, and is a Fellow of the Materials Research Society, the American Chemical Society, the American Association for the Advancement of Science, and the European

Academy of Sciences. As Director of two NSF-supported MRSECs at two different institutions he has steered research programs impacting hundreds of undergraduates, graduate students and postdocs.



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Nanotribological Properties of 2D Nanomaterials in Petroleum - Based Lubricants

Behnoosh Sattari Baboukani, Zhijiang Ye, Prathima Nalam

AI-Enabled Search for Critical Phenomena in High Energy Physics Experiments

Soojung Baek, Kristofer Reyes , James Dunlop, Zhangbu Xu, Francis Alexander

Biology with X-ray Free Electron Lasers (BioXFEL)- A Science and Technology Center (STC) funded by the National Science Foundation

Bill Bauer and Eddie Snell

Correlative In-Operando Microscopy for Catalysis and Battery Materials

S. Broderick, F. Yao, T. Zhang, X. Shen, O. Wodo, E.B. Pitman and K. Rajan

Automated Analysis of Phase Diagrams for Identification of New Metallic Glasses

Aparajita Dasgupta, Scott Broderick, Srirangaraj Setlur, Venu Govindaraju, Krishna Rajan

Mapping Chemical and Processing Pathways through Manifold Learning: Computational Data

A. Dasgupta, Y. Gao, T. Stone Almeida, S. Broderick, E. B. Pitman, K. Rajan

Machine-Learning Enabled Search for The Next-Generation Catalyst for Hydrogen Evolution Reaction

Surya V Devaguptapu, Sichen Wei, Soojung Baek, Kristofer Reyes and Fei Yao

Materials Design and Informatics for Greener Solar Panel Manufacturing

Ibrahim Diallo, Peter Lisker, Erik Einarsson, Scott Broderick, Krishna Rajan

A New Paradigm for Materials Science Education: Integrating the Science of Data into the Science of Materials

Erik Einarsson, Olga Wodo, Prathima Nalam, Florian Gollier, Kristofer Reyes, Scott Broderick, and E. Bruce Pitman

Green and Biodegradable Flexible Electronics

Md Nazmul Hasan, Jung-Hun Seo

Microstructure Data Analytics - Robust Skeletal Representation for Microstructure Quantification and Design

Devyani Jivani, Amal Abdoulhassan, Markus Hadwiger, Rahul Rai, Olga Wodo

Mechanics of Anisotropic Biological Networks: A Structure-Mechanical Property Study of Mycelium

Mugdha R. Kasarekar, Jessie Kaplan-Bie, Gavin McIntyre, Prathima C. Nalam

Bond Strength Of Al_xGa_{1-x}N Heterostructures Through Big Data Analysis

O. G. Licata, S. R. Broderick, K. Rajan and B. Mazumder

Unsupervised Machine Learning Based “Focusing” of 3D Atom Probe Images

A. Mukherjee, S. Broderick, T. Zhang and K. Rajan

Towards Design of Materials for Manufacturing: Surrogate Models of Materials' Behavior During Additive Manufacturing

Mriganka Roy, Olga Wodo

Accelerated Computational Methods for Multi-component Systems

Xiaozhou Shen, Tianmu Zhang, Scott Broderick, E. Bruce Pitman and Krishna Rajan

The role of ontologies for materials development

Aditi Sonal, Kristofer Reyes

STEM in Summer: The Eric Pitman Summer Workshop in Computational Science

Jeanette M. Sperhac, Benjamin D. Plessinger, Mark Pitman, Abigail Gervase, Thomas R. Furlani, E. Bruce Pitman

Prediction of the Optical Bandgap of $(Al_xGa_{1-x})_2O_3$ Using Material Informatics

Edward Swinnich, Jung-Hun Seo

Data Analytics for Mapping Catalytic Activity from High Throughput Cyclic Voltammetry

K. Vaddi, S.V. Devaguptapu, T. Zhang, X. Shen, S. Broderick, E.B. Pitman, F. Yao, O. Wodo, K. Rajan

Thermal Conductivities of WS_2 and Interfacial Thermal Conductance Between WS_2 and MoS_2

Xian Zhang, Fei Lu, Yixiong Zheng, Erik Einarsson

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Erich Bloch **MDI SYMPOSIUM**

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