

FRONTIERS IN MATERIALS MANUFACTURING

# TRANSFORMING POLYMERS FOR A CIRCULAR ECONOMY PROFILES

March 18, 2021

**Ron Abbott***Sustainability Technical Manager, Chevron Phillips Chemical Company*

**Ron Abbott is Chevron Phillips Chemical Company's Sustainability Technical Manager, responsible for advancing technical programs to advance long term global sustainability objectives.** Prior to assuming this role in 2018, he served as the Planning and Strategy Manager in the Corporate Planning and Development group where he oversaw the strategic planning process for Chevron Phillips Chemical Company. In this role, he led a team that developed Chevron Phillips Chemical's most recent corporatewide strategic business plan.

Ron began his career with Phillips Petroleum Company as a catalyst chemist. Throughout nearly three decades with Phillips Petroleum Company, Chevron Chemical Company and now Chevron Phillips Chemical Company, he has held a range of management assignments including Facility Manager for the Kingwood Research & Technology Center, Petrochemicals R&D Manager, Normal Alpha Olefins Global Product Manager and Polyethylene Catalyst R&D Manager. He has led teams that successfully commercialized several key technologies including the world's first on-purpose 1-Hexene process, the Phillips ReVap alkylation process and CPChem's high viscosity PAO process. Ron holds 26 U.S. patents in 1-Hexene catalyst and process technology, polyethylene catalysis, advanced polymer applications and HF alkylation technology.

He earned his B.S. in chemistry from the University of Vermont, his Ph.D. in inorganic chemistry under F. Albert Cotton at Texas A&M University and worked as a postdoctoral research associate under Dr. Richard Lagow at The University of Texas at Austin.



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**Gretchen Baier***Executive External Strategy and Communications Leader, Dow*

**Gretchen Baier is currently Executive External Strategy and Communications Leader, where she is responsible for monitoring for disruptive technologies, applying for external awards that recognize Dow products or researchers, and being the R&D liaison to Dow's sustainability goals.**

Previously, she was Associate R&D Director of External Technology, leading a group responsible for creating strategic external collaborations. Earlier she was a technical leader in Ventures and New Business Development and a chemical engineer in the Process Optimization group and the Process Separations Skill Center.

She is on the Visiting Committee for Chemical Engineering at MIT, and the Advisory Board for the MIT Practice School. Other recent responsibilities have included Chair of the Advisory Board for the Department of Energy Critical Materials Institute, and co-Chair of the University-Industry Demonstration Partnership Project Committee. She has held Board positions for ASTRA and the Council of Chemical Research, as well as a member of the Industrial Research Institute's External Technology Network.

Prior to joining Dow, Gretchen was a Process Engineer at Dow Corning Corporation and later at Shell Oil Company. She has a B.S. in Chemical Engineering from M.I.T. and a Ph.D. from the University of Wisconsin at Madison.



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## Max Delferro

*Chemist and Group Leader for Catalysis Science, Argonne National Laboratory*



**Massimiliano “Max” Delferro is a chemist and group leader of the Catalysis Science Program in the Chemical Sciences and Engineering Division at Argonne National Laboratory.**

Max’s work focuses on plastics recycling and the development of cleaner, safer solutions that benefit industries and individuals around the world. He is also a principal investigator of the Inorganometallic Catalyst Design Center, an Energy Frontier Research Center funded by the U.S. Department of Energy.

His research interests include the synthesis and characterization of multimetallic single-site hydrogenation/dehydrogenation catalysts to atomic layer deposition, polymer recycling and upcycling, additives for tribological applications, and supported organometallic catalysis for C-H and C-C transformation.

Max earned his doctorate in organometallic chemistry from the University of Parma, Italy in 2008. He is a member of the American Chemical Society and has served as the president and program chair of the Catalysis Club of Chicago since 2016.



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## Juan de Pablo

*Vice President for National Laboratories, Science Strategy, Innovation, and Global Initiatives, and Liew Family Professor of Molecular Engineering, University of Chicago;*  
*Senior Scientist, Argonne National Laboratory*

Panelist Moderator



**Juan de Pablo is a leader of simulations of polymeric materials, including DNA dynamics — how DNA molecules arrange and organize themselves and interact with other DNA molecules.** He also studies protein aggregation and its poorly understood relationship to various diseases, including type II diabetes and neurodegenerative disorders.

Prof. de Pablo joined the University of Wisconsin faculty in 1992 and served as the Howard Curler Distinguished Professor and Hilldale Professor of Chemical Engineering. He holds over 20 patents on multiple technologies, including nine jointly with PME Brady W. Dougan Professor of Molecular Engineering Paul Nealey and others, and is the author or co-author of approximately 500 publications.

A fellow of the American Academy of Arts and Sciences and of the American Physical Society, de Pablo also has received the 2011 Charles Stine Award from the American Institute of Chemical Engineers, the DuPont Medal for Excellence in Nutrition and Health Sciences in 2016, and the Intel Patterning Science Award in 2015. He currently chairs the Mathematical and Physical Sciences Advisory Committee of the National Science Foundation, and the Committee on Condensed Matter and Materials Research at the National Research Council. He is the founding editor of *Molecular Systems Design and Engineering*, and co-director of the new Center for Hierarchical Materials Design.

Prof. de Pablo earned a bachelor's degree in chemical engineering from Universidad Nacional Autónoma de México in 1985. After completing his doctorate in chemical engineering from the University of California, Berkeley, in 1990, he conducted postdoctoral research at the Swiss Federal Institute of Technology in Zurich, Switzerland.



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## Jay Fitzgerald

Chief Scientist in the Bioenergy Technologies Office, U.S. Department of Energy



**Dr. Jay Fitzgerald is the chief scientist in the Bioenergy Technologies Office at the U.S. Department of Energy (DOE).**

Previously, he is a technology manager for the Conversion Program in the Bioenergy Technologies Office at DOE. In that role, he managed a portfolio of research and development projects focused on overcoming the challenges in converting biomass into fuels, chemicals, and materials. Specifically, he focused on biological conversion using engineered enzymes and organisms to convert biomass in a cost-effective and environmentally friendly manner.

Jay was previously an American Association for the Advancement of Science (AAAS) Science and Technology Policy Fellow at the DOE Office of Science's Office of Biological and Environmental Research.

He completed his doctorate in organic chemistry at Stanford University in Dr. Chaitan Khosla's laboratory, focusing on the biosynthesis of medicinally useful polyketides. He also holds a bachelor's degree in biochemistry and a minor in economics from Middlebury College.



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## Michelle Hoffmann

Senior Vice President of Deep Tech, P33



**Michelle is P33's Senior VP of Deep Tech.** She brings extensive experience in the life science and healthcare industry most recently as senior VP for Back Bay Life Science Advisors. At Back Bay, she used knowledge and understanding of innovation within pharma, biotech, and medtech/diagnostics combined with operational and transactional expertise to help her clients to make critical, strategic decisions. She brings that deep understanding and experience of the health and life sciences industries to Chicago and will work closely with the local community to facilitate planning and growth of these industries.

Michelle has a Ph.D. in Molecular Neuroscience from the University of California, Berkeley and a B.A. from Cornell University.



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## Cynthia Jenks

*Director of the Chemical Sciences and Engineering Division,  
Argonne National Laboratory*  
Moderator



**Dr. Cynthia Jenks is the director of the Chemical Sciences and Engineering Division at Argonne National Laboratory.**

She has more than 10 years of leadership experience in science management and strategic planning, in addition to a background in both the chemical sciences and chemical engineering.

Before joining Argonne, Dr. Jenks served as the assistant director for scientific planning and as the director of the Chemical and Biological Sciences Division at Ames Laboratory. As assistant director, Dr. Jenks played a central role in developing the laboratory's new strategic plan and communication plans.

Dr. Jenks' research areas of expertise include surface structure and reactivity, surface structure-property relationships, catalysis, chemical conversions for sustainable energy, and thin film growth. In 2011, she was elected a fellow of the American Association for the Advancement of Science for contributing "major discoveries about surfaces of aluminum-rich quasicrystals," and for "sustained scientific outreach and leadership in scientific planning within the Ames Laboratory of the U.S. Department of Energy."

Dr. Jenks holds a Ph.D. and an MPhil in chemistry, and an M.S. in chemical engineering from Columbia University. She holds a B.S. in chemical engineering from the University of California at Los Angeles.



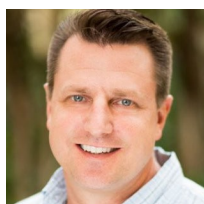
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## Eric Klingenberg

*Materials Science Lead, Mars Inc.*



**Eric is part of the Mars Advanced Research Institute (MARI) where he leads the Materials Science Platform.**

His interests include the development of new materials and processes to reduce the environmental impact of plastic packaging. He also serves on several university advisory boards and is a technical advisor for the Center for Hierarchical Materials Design, a consortium of national labs and universities working to develop and expand the use of data and computation tools to accelerate advanced materials design.

Eric has a B.S. in chemistry with a minor in biology from Geneva College and a Ph.D. in polymer chemistry from The Pennsylvania State University. During his 20+ year career as an industrial researcher and R&D leader, he has worked in multiple fields of study, including new material development, manufacturing scale-up, and process optimization.





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## Jack Lewnard

*Program Director in the Advanced Research Projects Agency–Energy (ARPA-E),  
U.S. Department of Energy*



**Dr. Jack Lewnard currently serves as a Program Director at the Advanced Research Projects Agency-Energy (ARPA-E).** His focus at ARPA-E is on methane production, distribution, and use.

Jack joins ARPA-E from Chesapeake Utilities Corporation where he served as Vice President of Business Development. At Chesapeake, he was responsible for identifying and developing new business opportunities in areas including natural gas, alternative fuels, combined heat and power systems, and renewable energy. Before joining Chesapeake, Jack served as Vice President and Chief Technology Officer at the Gas Technology Institute (GTI) where he led the Office of Technology and Innovation. In that role, he led the development and implementation of the company's technical strategy and vision and managed the internal research and development program.

Jack earned a B.S. in Chemical Engineering from the University of Cincinnati and a Ph.D. in Chemical Engineering from the University of California, Berkeley.



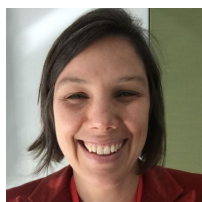
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March 18, 2021

## Kate Peretti

*Technology Manager, Advance Manufacturing Office, U.S. Department of Energy*  
Panelist Moderator



**Kate Peretti is the Technology Manager in the Advanced Manufacturing Office at the Department of Energy.**

She is responsible for managing funding in modular chemical process intensification work through the RAPID Institute and work aimed at reducing plastic waste through technology development.



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## Jeff Spangenberg

*Group Leader for Materials Recycling R&D, Argonne National Laboratory*



**Jeff Spangenberg is the Materials Recycling Group Leader in the Applied Materials Division.**

His group works to solve material separation, recovery, and recycling challenges resulting in cost effective and environmentally sustainable processes resulting in commercialized plants.

Jeff and his team have demonstrated the recovery of plastics, metals and materials from numerous waste streams such as auto shredder residue, electronic waste, and furniture at scales ranging from bench to commercial. He has received four patents related to this effort.

In recent years, his research has expanded into lithium ion battery recycling and is leading Argonne's advanced battery recycling program to evaluate and advance the cost effective and sustainable recycling of end-of-life batteries.

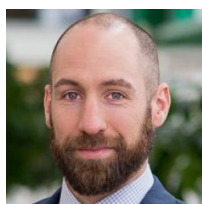
He also leads the ReCell Center, a national collaboration — located at Argonne — of industry, academia and national laboratories working together to advance recycling technologies along the entire battery life-cycle for current and future battery chemistries.



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**Eric Tyo***Business Development Executive, Argonne National Laboratory*

**Eric supports industry partnerships and commercialization of Argonne technologies in the areas of catalysis, transportation research, and X-ray and accelerator sciences.**

Eric joined Argonne from Johnson Matthey, where he created advanced catalytic converters for global automotive manufacturers. In his work he investigated novel materials, created new processing methods, and designed unique emission control systems. Eric was also lead scientist for Johnson Matthey's global Three-Way Catalyst patent portfolio, in which he evaluated invention disclosures and drafted intellectual property portfolio strategy.

Previously, Eric was a Postdoc and Assistant Chemist at Argonne in the Materials Sciences Division from 2012–2015. His areas of research covered the fabrication and investigation of nanomaterials with a focus on the heterogeneous catalytic and electrocatalytic properties of these novel materials. Much of his time was spent at the Advanced Photon Source where in-situ X-ray scattering and fluorescence experiments were employed to determine structure-function relationships.

Eric earned an MBA from the Darden School of Business at the University of Virginia. He received his Ph.D. in Physical Chemistry from The Pennsylvania State University. He also earned a B.S. with distinction in Chemistry from Clarkson University.

