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Cleveland, Ohio • October 13, 2022

Presented by the

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A Tribute to our Friend Peter Grelle

Peter F. Grelle
1952-2022

It is with heavy hearts that we announce the passing of our dear friend and a long time SPE Detroit Section and Injection Molding Division Board member, Peter F. Grelle on Thursday August 11, 2022. Peter was a light in this world, and now we need to continue shining his light by carrying it within us in our own lives.

Peter was a native of Lawrence, Massachusetts. He was born in Lawrence, MA on May 5, 1952, to the late Peter and Frances Grelle. Peter was a compassionate and a caring man, who loved and valued his family and friendships.

Peter loved the plastics industry and was involved in many plastics societies, events, and conferences. His interest in Plastics started while attending Lowell Technical Institute (now University of Massachusetts at Lowell), he decided to study Plastics Engineering based on a suggestion by his mother Frances Grelle. She told him, from 1934-1936 she was the first female injection molding machine operator in the General Tire Rubber Company in Lawrence, MA. In 1974 Peter received his Bachelor of Science degree in Plastics Technology and followed in 1980 his Master of Science degree in Plastics Engineering.

Peter F. Grelle was employed in the plastics industry for more than 45 years. He was the owner/president of Plastics Fundamentals Group LLC, a company specializing in Plastics Technology training, and an adjunct instructor in the Plastics Technology Program at Schoolcraft College, Livonia, MI. Peter was employed by the Dow Chemical Company for nearly 20 years, and prior to Dow was employed by the Monsanto Company, the Winchester Group of Olin Corporation, and Wellman Inc. Plastics Division.

He was one of the super active members of SPE. Peter joined SPE in 1972. He served as the board member of the Injection Molding Division since 1991. From 1993 – 1996 Peter served as the Director on the SPE Rochester NY Board of Directors. He was a Chairperson of the Division from 1997-1998. Since 1999, peter served as the Technical Director of the Injection Molding Division and in 2000 he received the Division Engineer of the Year Award. In 2006, Peter received the SPE Honored Service Member Award.

In 2009, Peter became a member of the SPE Detroit Section Board of Directors and became a President of the Detroit Section from 2013 – 2014. In 2015, Peter received the Lifetime Achievement Award from the SPE Detroit Section.

In addition to the SPE activities, Peter was very active on the Society of Plastics Industry Structural Plastics Conference Committee from 1994 to 2007 and became the Conference Chair from 1999 – 2001.

AGENDA

7:30- 8:30	**Registration & Continental Breakfast**
8:30- 8:45	**Opening Remarks:** *Susan Montgomery, Conference Chair*
8:45-9:25	**KEYNOTE:** **A Resin Supplier's Perspective on Partnerships for the Circular Economy** *Dr. Kim McLoughlin, Senior Research Engineer, Global Materials Science, Braskem*
9:30-10:05	**Recovery of High Purity Polypropylene from Mixed Plastic Waste** *Dr. Joseph Lawrence, Senior Director and Research Professor, University of Toledo*
10:05-10:40	**Design Strategies and Mechanical Properties of Thick & Recyclable Thermoplastic Foams** *Dr. Alicyn Rhoades, Associate Professor in Engineering, Plastics Engineering Technology and Polymer and Engineering Science, Penn State Erie, The Behrend College*
10:45-11:00	**BREAK** *Sponsored by:* Polymer Institute
11:05-11:40	**Developing Circular Solutions in the Petrochemical Industry** *Mr. Tom Giovannetti, Technical Service Engineer, Injection and Rotational Molding and CAE, Chevron Phillips Chemical Company*
11:40-12:15	**Circularity Through Redesign: Creating New Polymer Systems That are 100% Biobased and Recyclable** *Mr. James Sternberg, Senior Scientist and Research Assistant Professor, Department of Automotive Engineering, Clemson University*
12:15-1:30	**LUNCH**
1:30-2:10	**KEYNOTE:** **The Future of Plastics Molding** *Dr. Gamini Mendis, Assistant Professor in Plastics Engineering Technology, Penn State Erie, The Behrend College*

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FRIDAY OCTOBER 28 | 1:30P-6:00P

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- Job Fair
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- Industry 4.0 Technologies
- Startup Manufacturing Spaces
- Engineering Support
- Workforce Engagement Activities
- Job Concierge
- STEM-Themed Park & Playground

Scan the code to stay current on all the Open House activities.

2:15-2:50	**Enabling Circular Economy for Plastics and Composites Industry via Networked Manufacturing** *Dr. Saeed Farahani, Assistant Professor, Mechanical Engineering Department, Cleveland State University*
2:55-3:10	**BREAK** *Sponsored by:* Polymer Institute
3:15-3:45	**Loc Check for GSM Tracking of Injection Molds** *Mr. Matt Hammernik, Northeast Account Manager, Hasco America*
3:45- 4:05	**MAGNET Overview and Sustainability for Manufacturing** *Ms. Darlyn McDermott, Director of Client Engagement, MAGNET; and, Mr. David Leff, Vice President, Team Leader, Risk Control, The Huntington Bank*
4:10-4:30	**Process Optimization Utilizing Simulation and In Mold Cavity Sensors** *Mr. Michael Prisby, Application Development and Plastics Products Specialist, Kistler Instrument Corporation*
4:30-6:00	**NETWORKING RECEPTION** *Sponsored by the SPE Injection Molding Division and Cleveland SPE Chapter*

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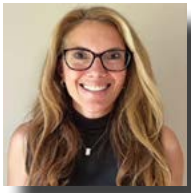

KEYNOTE:
A Resin Supplier's Perspective on Partnerships for the Circular Economy

Dr. Kim McLoughlin, Senior Research Engineer, Global Materials Science, Braskem

ABSTRACT: The plastics industry is experiencing a time of unprecedented change, challenge, and opportunity related to environmental sustainability.

Companies across our supply chain, from material suppliers to brand owners, have made bold public commitments to achieve ambitious Circular Economy targets. Molders have a central role in helping stakeholders across the supply chain to achieve those targets.

I will discuss Circular Economy targets, implications for molders, and resources available to molders as they help drive this transition. I will focus on the ways in which partnerships can foster successful sustainability initiatives. Finally, I will share my experience coordinating an industry-academic recycling collaboration, which is facilitated and funded by the REMADE institute.

BIO: Dr. Kim McCoughlin drives technology programs at Braskem to develop advanced polyolefins with improved recyclability and sustainability. As Principal Investigator on a REMADE-funded collaboration, Kim leads a diverse industry-academic team that is developing a process to recycle elastomers as secondary feedstock. Kim has a PhD in Chemical Engineering from Cornell. She is an inventor on more than 25 patents and applications for novel polyolefin technologies. Kim is on the Board of Directors of SPE's Thermoplastic Materials & Foams Division, where she has served as Education Chair and Councilor.

Recovery of High Purity Polypropylene from Mixed Plastic Waste

Dr. Joseph Lawrence, Senior Director and Research Professor, University of Toledo

ABSTRACT: Despite being widely utilized, only about 1% of the polypropylene (PP) produced globally are recycled. A particular challenge is to recover PP from mixed polyolefins float fraction that are typically part of commercial plastic waste recycling. In this talk, we present a sustainable approach to selectively dissolve and recover PP from mixed plastic waste us-

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ing a biodegradable, non-toxic, and bio-sourced "Green Solvent". Among all the major polymers, PP alone dissolved in this Green Solvent while other plastics remain insoluble. The dissolved PP is then re-precipitated with an anti-solvent to obtain virgin like material. We have demonstrated PP separation and recovery from a variety of feedstocks, including PP-PE pellets mixtures, melt blended PP and PE pellets, post-consumer polyolefin waste (e.g. takeout containers), floatables from commercial PET recycling, discarded face masks, and multilayer flexible food packaging. Peak temperature for degradation, melting point, melt flow index (MFI), and material structure of recovered PP will be presented. This environment friendly process can recover PP from mixed plastic waste and separate PP and PE from a mixture without significant loss of polymeric material properties.

BIO: Dr. Joseph Lawrence is a Research Professor and Senior Director of the Polymer Institute and the Center for Materials and Sensor Characterization at the University of Toledo. He is a Chemical Engineer by training and after working in the process industry, he has been engaged in polymers and composites research for 18+ years. In the Polymer Institute he leads research on renewably sourced polymers, plastics recycling, and additive manufacturing. He is also the lead investigator of the Polyesters and Barrier Materials Research Consortium funded by industry. Dr. Lawrence has advised 20 graduate students, mentored 8 staff scientists and several undergraduate students. He is a peer reviewer in several journals, has authored 30+ peer-reviewed publications and serves on the board of the Injection Molding Division of SPE.

Design Strategies and Mechanical Properties of Thick & Recyclable Thermoplastic Foams

Dr. Alicyn Rhoades, Associate Professor in Engineering, Plastics Engineering Technology and Polymer and Engineering Science, Penn State Erie, The Behrend College

ABSTRACT: Moxietec injection molded thick thermoplastic foams routinely challenge and exceed longstanding industrial expectations in part design and physical properties, with density reductions from 20 – 80% of the solid equivalent. This talk will describe injection molded thick foam samples of up to 9" in thickness that are realistic alternatives to rigid thermoset urethane foam systems, multi-part assemblies, and other non-recyclable options.

BIO: Dr. Alicyn Rhoades is an Associate Professor in Engineering in both the Plastics Engineering Technology and the Polymer Engineering & Science Departments at Penn State Behrend. She is also the former Technology Director for Moxietec, LLC and currently leads the Scientific Advisory Board for the company. Prior to joining Penn State, Alicyn spent 5 years in the polymer industry, most recently with Bayer

Material Science (Covestro) in Pittsburgh, PA. She has numerous awards including an NSF CAREER Award, and was named one of the 2018 Top 20 Under 40 Engineering Professors in the US by the American Association for Engineering Education.

Developing Circular Solutions in the Petrochemical Industry

Mr. Tom Giovannetti, Technical Service Engineer, Injection and Rotational Molding and CAE, Chevron Phillips Chemical Company

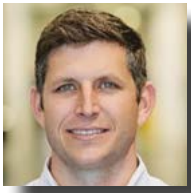
ABSTRACT: Since the development of the polymers industry, plastics have become a widely accepted packaging option worldwide for good reason — these materials are known their high strength, light weight, extraordinary flexibility, low energy usage and low toxicity. But these same materials that offer so many societal advantages are also under increasing environmental scrutiny due largely to gaps in the infrastructure required to handle post use materials.

Industry is engaged in an unprecedented effort to create and deploy sustainable circular approaches that address end of life innovations designed to reclaim valuable hydrocarbon resources and return them to commerce — that is, developing a circular economy.

In this seminar, we will explore the innovations that have made synthetic polymers the material of choice for so many applications, the drivers behind the growth of this industry, the challenges we face, solutions under development and the collaborative efforts needed to responsibly repurpose post use plastics to circular solutions that meet societal needs.

BIO: Mr. Tom Giovannetti holds a Degree in Mechanical Engineering from The University of Tulsa and for the last 26 years has worked for Chevron Phillips Chemical Company. Tom started his plastics

career by designing various injection molded products for the chemical industry including explosion proof plugs and receptacles, panel boards and detonation arrestors for 24 inch pipelines. Tom also holds a patent for design of a poly-phenylene sulfide sleeve in a nylon coolant cross-over of an air intake manifold and is a Certified Plastic Technologist through the Society of Plastic Engineers. Tom serves on the Oklahoma Section Board as Councilor, is also the past president of the local Oklahoma SPE Section, and as well serves on the SPE Injection Molding Division board.



Circularity Through Redesign: Creating New Polymer Systems that are 100% Biobased and Recyclable

Mr. James Sternberg, Senior Scientist and Research Assistant Professor, Department of Automotive Engineering, Clemson University

ABSTRACT: Polyurethanes rank among the 6th most produced plastic globally and carry significant risks to health and safety due to the use of isocyanates in the polymer composition. In addition, polyurethanes are some of the least recycled materials due to their crosslinked nature precluding typical thermal processing techniques. To address these issues and enable a sustainable and circular design to polyurethane synthesis, a biobased and non-isocyanate route has been innovated that introduces chemical linkages capable of dissociation post-synthesis for chemical recycling. Lignin, as a highly abundant by-product of the paper pulping industry, is utilized as an alternative feedstock to create the non-isocyanate polyurethanes (NIPUs). While only a few examples of NIPU foams can be found in the scientific literature, the lignin-based foams described here combine a lightweight, flexible and 100% biobased nature. As lignin is typically used in the formulation of rigid polymers and foams, the foams presented here are the first to demonstrate flexible properties and densities near commercial materials. The raw materials of the composition can be recovered after chemical recycling of the foams using a high-pressure hydrolysis technique. The recycled precursors are demonstrated capable of reuse in second generation foams enabling a circular lifecycle.

BIO: Mr. James Sternberg is a Senior Scientist at the Clemson Composites Center in Greenville, SC and a Research Assistant Professor in the Department of Automotive Engineering at Clemson University. James comes from a chemistry background having completed his B.S. and M.S. in chemistry before studying biobased polymers under Srikanth Pilla at Clemson. James's work focuses on redesigning polymer systems to be biobased and chemically recyclable. His projects have included recycling and/or redesigning polyurethane foams, nylons, composites, and 3D printing materials. He is currently the leader of the chemical recycling and upcycling group at the Clemson Composites Center.

KEYNOTE: The Future of Plastics Molding

Dr. Gamini Mendis, Assistant Professor in Plastics Engineering Technology, Penn State Erie, The Behrend College

ABSTRACT: The plastics industry is changing. Consumers are more worried about sustainability and environmental challenges and the U.S. government is paying attention. In this talk, I will outline some of the challenges on the horizon for the plastics industry and discuss a variety of upcoming technological solutions to address these challenges. These solutions include new materials systems, improved manufacturing efficiency through smart and sustainable manufacturing methods, and changes to end-of-life materials management. I will also discuss how the industry can come together to adapt to a changing social and policy environment.

BIO: Dr. Gamini Mendis has a BS and PhD from Purdue University in Materials Engineering and Sustainability. He joined Penn State as a Post Doctorate Scholar in 2020 prior to his professorship appointment. He works closely with PA plastics manufacturers to implement sustainability programs in their plants.

Enabling Circular Economy for Plastics and Composites Industry via Networked Manufacturing

Dr. Saeed Farahani, Assistant Professor,
Mechanical Engineering Department, Cleveland State University

ABSTRACT: The circular economy is an economic system that aims at reducing resource consumption and eliminating waste while promising economic development continuity. With this definition, the advances in the areas of digitalization and data analytics, which are known as Industry 4.0 technologies, can provide a breeding ground for circular economy targets. In this context, the plastics and composites manufacturing industry is taking a slightly longer time to visibly adopt these technologies. The main reason is that plastics and composites manufacturing is more challenging than other industries in terms of data collection and analysis due to their inherent complexity. The extensive possible combinations of fibers, fillers, and polymers; the multi-physics nature of their manufacturing processes; their complex tooling systems; and the requirement of human expertise in some sections complicate every aspect of their design and manufacture. To mitigate these complexities and address the need for modernizing the conventional production lines by employing advances in the areas of industrial IoT and data analytics, we have worked on the concept of networked manufacturing – broadly refers to the connection of multiple manufacturing equipment and processes into a large system in which those individual components communicate with each other and transfer actionable data to improve their processes. In this presentation, the implementation route map of networked manufacturing systems will be explained, and its potential challenges and opportunities will be highlighted. Subsequently, several case studies will be presented to demonstrate the capabilities of such connected systems in terms of developing quality monitoring, process control, and predictive maintenance systems for injection molding plant.

BIO: Dr. Saeed Farahani is currently working as an Assistant Professor in the Department of Mechanical Engineering at Cleveland State University. He has B.S. and M.S. degrees in Mechanical Engineering from Sharif University and Ph.D. in Automotive Engineering (manufacturing field) from Clemson University. His research is primarily in the field of plastics and composites manufacturing, particularly in the areas of hybrid and networked production system involving integrated analytical models, numerical simulations, statistical and machine learning methods, sensors, and industrial IoT solutions to advance manufacturing systems for polymers, and composites. Dr. Farahani has more than 10 years of working in industry in the Design Strategies and Mechanical Properties of Thick & Recyclable Thermoplastic Foams.

Loc Check for GSM Tracking of Injection Molds

Mr. Matt Hammernik, Northeast Account Manager, Hasco America

ABSTRACT: The HASCO Loc Check allows you to monitor the location of a tool easily and quickly at any time with your cellular device. This HASCO component also allows injection molders to keep track through the shipment process all the way to the press. Whether it is being shipped after the completion of the tool to their facility. Or, possibly transported to another injection molding facility for production. Loc Check provides sustainability in the mold industry by reducing waste/loss. Loss that could be your mold at the building phase or a fully assembled mold ready for trial. This component gives you the security in the palm of your hand to keep tabs on your valuable tools in this global market. This rechargeable device travels with your molds to make sure they end up where you need them most.

BIO: Mr. Matt Hammernik serves as Hasco America's Northeast Area Account Manager covering the states Michigan, Ohio, Indiana, and Kentucky. He started with Hasco America at the beginning of March 2022. Matt started in the Injection Mold Industry roughly 10 years ago as an estimator quoting injection mold base steel, components and machining. He advanced into outside sales and has been serving molders, mold builders and mold makers for about 7 years.

MAGNET: Manufacturing Partnerships in NE OH

Ms. Darlyn McDermott, Director of Client Engagement, MAGNET

BIO: Ms. Darlyn McDermott is a Market Leader and Director of Client Engagement responsible for the Northern and Eastern Region of MAGNET of NE Ohio. She is specializes in identifying and solving complex Manufacturing and Tech Services sector barriers to growth for the manufacturing community. As a Market Leader her current responsibilities include new business development technical discussions, industry leadership strategic partner relationships, Smart Factory implementation strategic and operations topics. MAGNET 's state of the art manufacturing facility is located in downtown Cleveland, Ohio and has 4 satellite offices across Ohio. Darlyn holds BA and Master's Degrees from Malone College and is a Six Sigma Green Belt.

Sustainable Manufacturing

Mr. David Leff, Vice President, Team Leader, Risk Control, The Huntington Bank

BIO: Mr. David Leff holds a strong professional background helping colleagues and clients understand risk, improving safety performance, and implementing programs to create a positive safety culture. He began his career at Worthington Industries as a Plant Engineer where he was responsible for managing all facets of engineering, maintenance, and supervision of multiple projects and different disciplines. He went on to hold positions with Worthington Industries including Supervisor, Environmental, Health and SafetyManager, and Corporate Manager of Environmental, Health, Safety and Security (EHSS). He has been with Huntington Insurance since 2017. David earned his Bachelors in Physics with a minor in Management from Wittenberg University in Springfield, OH and his Master's degree in Manufacturing Engineering from Ohio State University in Columbus, OH.

Process Optimization Utilizing Simulation and In Mold Cavity Sensors

Mr. Michael Prisby,
Application Development and Plastics Products Specialist,
Kistler Instrument Corporation

ABSTRACT: Plastic processing is made transparent with the use of in-mold cavity pressure sensors. It is within the mold cavities that the PVT behavior of the melt determines the final part quality. Process control solutions for injection molding based upon in mold cavity data and analysis will be highlighted, including: strategies to reduce defects, hot runner mold processing and simulation.

BIO: Mr. Michael Prisby has over 25 years of experience in the plastics industry. With in-depth knowledge of tooling, processing and instrumentation, he has driven significant process improvements at Continental, Bosch and Magna. Mile's experience includes process engineering roles at Capsonic, Intec Group, Molex and Plainfield Precision Molding. As a specialist in automotive process improvement, he holds a co-patent award for a sensor over-mold design.

Mike holds a BS in Automated Manufacturing and AAS in electronics.

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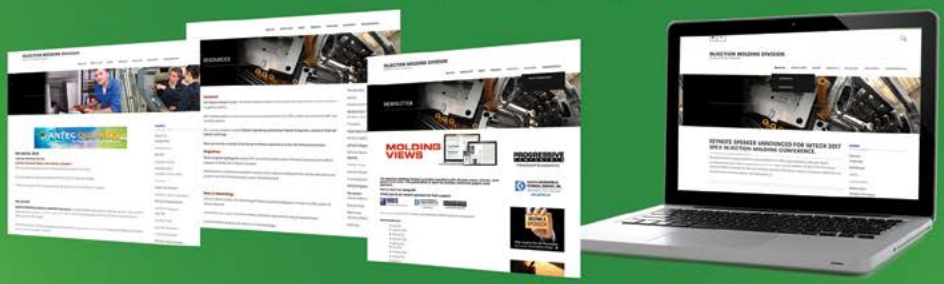

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