

The National Academies of
SCIENCES • ENGINEERING • MEDICINE

Chemical Engineering in the 21st Century: Challenges and Opportunities

Manufacturing Team Meeting

February 11, 2021

11:00 am – 12:30 pm ET

Join Link:

<https://nasem.zoom.us/j/98572248270?pwd=cndjaG9KZTdHU09vbmRpZTRGdTlmQT09>

Open Session Agenda

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| 11:00 AM | Sustainable Manufacturing
<i>Dr. Phil Hustad and Dr. Annabelle Watts</i>
3M |
| 11:45 AM | Discussion |
| 12:30 PM | Adjourn Open Session |

Closed Session Discussion 12:30-2 pm ET

Speaker Biographies

Phil Hustad joined 3M in October 2019 as a Staff Scientist in the Polymer Science Group in the Corporate Research Materials Laboratory. Prior to joining 3M, he was a Fellow in Performance Plastics R&D at Dow where he had technical oversight for catalysis and new product development for Dow's >\$4B Polyolefin Elastomers portfolio. He joined Dow in 2002 and was an inventor of "chain shuttling catalysis" and the world's first commercial olefin-based block copolymer materials, INFUSE™ Olefin Block Copolymers (OBCs) and INTUNE™ Polypropylene-based OBCs, as well as the new impact modifiers ENGAGE™ XLT Polyolefin Elastomers. He then transitioned to lead Dow's efforts in block copolymers and ancillary materials for semiconductor patterning. Dr. Hustad holds 94 US Patents with >100 pending published applications and has coauthored three book chapters and more than 40 journal publications. He is a recipient of the 2010 AIChE Industrial R&D Award and several Dow awards, including Dow's Excellence in Science Award, a 2017 Dow Performance Silicones Technical Achievement Award, a Core R&D Team Technical Award, and the 2014 Electronic Materials Community Award. Technology he coinvented has received two R&D 100 Awards and an ICIS Innovation Award. He is currently a Scientific Advisor to The Institute for Cooperative Upcycling of Plastics and previously served the same role for the Center for Hierarchical Materials Design. He participated in the 2016 NSF "Frontiers in Polymer Science and Engineering" workshop and serves as a member of the Editorial Board at the Journal of Polymer Science. He has also served as an organizer or advisory board member of international symposia for the ACS, MRS, IEEE, and Japan's Society of Photopolymer Science and Technology. He is also a strong ally and advocate for women through participation on the Steering Team for Dow's Women's Innovation Network, where he was recognized as one of Dow's 6 worldwide Women's Champions in 2018. He received his PhD from Cornell University in the lab of Geoff Coates where he focused on developing advanced catalysts for olefin polymerization.

Annabelle Watts is a 3M Senior Research Scientist. Dr. Watts joined the Corporate Research Lab at 3M in January 2019. During her time at 3M, she has been involved developing materials for biological purification applications as well as sustainable materials development. She is passionate about sustainability and is actively engaged with efforts to advance the Science for Circular pillar within 3M. Prior to 3M, her PhD thesis focused on the structure-property relationships of sustainable thermoplastic elastomers under the advisement of Marc Hillmyer within the NSF Center for Sustainable Polymers. Dr. Watts received her PhD in Chemistry at University of Minnesota.