

# Laboratory Automation and Accelerated Synthesis: Empowering Tomorrow's Chemist—A Workshop

## Committee

### Martin Burke

#### Member

Martin Burke is the May and Ving Lee Professor of Chemical Innovation at University of Illinois at Urbana-Champaign. The Burke research group is pioneering the development of "molecular prosthetics"—small molecules that mimic the functions of deficient proteins that underlie a wide range of human diseases. The group has also created an automatable lego-like platform for synthesis that is broadly enabling and expanding access to the molecule-making process. The Burke group has harnessed this platform to advance molecular prosthetics for treating cystic fibrosis into clinical trials and to enable preclinical testing of molecular prosthetics for anemia and a new class of nontoxic fungicidal agents. Dr. Burke also recently helped launch the Carle Illinois College of Medicine and is serving as the inaugural associate dean of research. Dr. Burke has received the American Chemical Society Nobel Laureate Signature Award for Graduate Education in Chemistry and is a founder of four biotechnology companies. He received his PhD from Harvard University and an MD from Harvard Medical School.

### Timothy Jamison

#### Member

Timothy Jamison is Robert R. Taylor Professor of Chemistry and associate provost at the Massachusetts Institute of Technology (MIT) and leads his own research group. His research program focuses on the development of new methods of organic synthesis and their implementation in the total synthesis of natural products. He currently serves as the associate editor of Chemical Reviews. Dr. Jamison received the Council of Chemical Research Collaboration Award in 2014 and was awarded the MIT School of Science's Teaching Prize for Undergraduate Education in 2013. In 2012, he was named a fellow of the Royal Society of Chemistry and received the society's Merck Award. Dr. Jamison received his PhD from Harvard University. He received a Fulbright Scholarship to conduct research at the ETH in Zürich, Switzerland and later was a Damon Runyon-Walter Winchell postdoctoral fellow in the laboratory at Harvard University.

## **Shane W. Krska**

### **Member**

Shane W. Krska is senior principal scientist in the High-Throughput Experimentation and Lead Discovery Capabilities Division of Merck Research Laboratories, a division he helped found in 2002. His research interests center around applications of transition metal catalysis to pharmaceutical synthesis and the use of high-throughput experimentation to accelerate reaction development. He has authored or co-authored 30 scientific publications and six patents and was named an American Chemical Society Young Industrial Investigator in 2008. He received his PhD in inorganic chemistry at Massachusetts Institute of Technology where his research focused on the synthesis of main group organometallic polymers and dendrimers. He conducted postdoctoral research at University of California, Berkeley on the synthesis and reactivity of early transition metal imido complexes.

## **Anne M. LaPointe**

### **Member**

Anne M. LaPointe is the director of the Catalyst Discovery and Development Laboratory in the Department of Chemistry and Chemical Biology and has been a researcher at Cornell University since 2010. Prior to Cornell, she was a senior staff scientist at Symyx Technologies. While at Symyx, Dr. LaPointe developed methods for high-throughput catalyst screening and discovered several new families of olefin polymerization catalysts, some of which are used commercially. Dr. LaPointe's research interests include inorganic and organometallic chemistry, homogeneous and heterogeneous catalysis, polymer chemistry, sustainable chemistry, and high-throughput experimentation. She is an inventor on more than 40 U.S. and international patents. Dr. LaPointe received her PhD in inorganic chemistry from the Massachusetts Institute of Technology.

## **Robert E. Maleczka, Jr.**

### **Member**

Robert E. Maleczka, Jr. is a professor of chemistry at Michigan State University (MSU). His research group is focused on the invention of “green” reactions for organic synthesis and the total synthesis of natural products. Dr. Maleczka has received numerous awards, including the Merck Technology Collaboration Award, the Environmental Protection Agency (EPA) 2008 Presidential Green Chemistry Challenge Award, the Astellas USA Foundation Faculty Award, the Novartis Lecturer title at Yale University, and Mentor of the Year award from the MSU Chapter of the National Society for the Professional Advancement of Black Chemists and Chemical Engineers. He has also been named as an American Chemical Society (ACS) Fellow. In 2006, Dr. Maleczka became a co-founder of BoroPharm, Inc. a Michigan-based company dedicated to the preparation and commercialization of novel building blocks for pharmaceutical syntheses. Among his service and outreach roles, he has served as a Diversity Scholar in the Center for the Integration of Research, Teaching, and Learning, as an invited participant ACS/EPA Green Chemistry Market Roundtable and White House Forum, as a member and Chair of the ACS Award for Affordable Green Chemistry Selection Committee, and as an elected member of the Executive Committee of the ACS Division of Organic Chemistry. He earned his PhD from The Ohio State University.

## **Arsalan Mirjafari**

### **Member**

Arsalan Mirjafari is an Associate Professor in the Department of Chemistry and Physics at Florida Gulf Coast University, a Primary Undergraduate Institution. His research focuses on development of organic materials, which aims to address key societal challenges such as resources, energy and medicine. Particularly, over the past eight years, his UG research group works on rational design, synthesis, and applications of functional ionic liquids as a versatile class of organic materials, with a wide array of applications, i.e., electrolytes for energy storage devices, gene delivery, biomolecules preservation, bio-inspired materials, liquid crystals, catalysis, and carbon dioxide capture. Dr. Mirjafari received his Ph.D. in Organic Chemistry from the University of Isfahan, in Iran in 2009 and did his postdoctoral training with Prof. James Davis at University of South Alabama from 2010 to 2012.

# Nicola Pohl

## Member

Nicola Pohl is professor of chemistry and the Joan and Marvin Carmack Chair in Bioorganic Chemistry at Indiana University Bloomington. She was a professor of chemistry and of chemical and biological engineering and held the Wilkinson Professor of Interdisciplinary Engineering at Iowa State University before moving to Indiana University. The Pohl research group works to find new ways to make and analyze sugars to dissect their important roles in plant, animal, and human biology and to design therapeutics. One major long-term goal of the group is to develop rational designs of therapeutic interventions, such as vaccines and glycoproteins, on the basis of a deeper knowledge of the role of carbohydrates. Her research group created the first automated solution-phase method for readily synthesizing oligosaccharides and is now working to expand the scope of those methods to tackle the equal challenge of providing building blocks to feed their automated oligosaccharide synthesis machines. Dr. Pohl received her PhD in chemistry from the University of Wisconsin-Madison and completed a National Institutes of Health Postdoctoral Fellowship in the Department of Chemical Engineering at Stanford University.