

# Schoenborn 2020 Graduate Research Symposium

**8:15 – 9:00 AM** Continental Breakfast / Welcome

## **9:00 – 11:45 AM** Oral Presentations Session I: Biotechnology

- 9:00 AM** Sahand Saberi Bosari *Integrating microfluidics and deep learning for biology*
- 9:15 AM** Kaitlyn Bacon *Quantitative analysis of protein-protein interactions using a yeast-yeast two hybrid model*
- 9:30 AM** Bharadwaja S.T.P. *Antimicrobial Polymers: Strategic Pathways for Application as Broad-Spectrum Anti-Infective Materials*
- 9:45 AM** Kevin Day *Light-Responsive Peptide Affinity Ligands*
- 10:00 AM** Jessica Lee *Engineering Chromatin as a Signal Processor*
- 10:15 AM** John Schneible *A Synergistic Toolbox for Cancer Therapy*
- 10:30 – 11:00 AM** Coffee Break
- 11:00 AM** Dilara Sen *Human cerebral organoids reveal early spatiotemporal dynamics and pharmacological responses of UBE3A*
- 11:15 AM** Daniel Midkiff *Identifying C. elegans Aging Mutants by Screening for Increased Protein Aggregation*
- 11:30 AM** Ria D. Corder *Using Rheology to Quantify the Effects of Collagenase Treatments on Tumor Digestion*

## **11:45 – 12:30 PM** Oral Presentations Session II: Catalysis and Computation

- 11:45 AM** Ryan Dudek *Design of Redox Catalysts for Intensified Ethylene Production from Naphtha via Redox Oxidative Cracking*
- 12:00 PM** Jeffrey Bennett *Pseudo-Heterogeneous Polymer-metal Catalysts for Continuous Flow Chemical Synthesis*
- 12:15 AM** Kaihang Shi *Next-generation high-pressure manufacturing: defining and understanding the pressure tensor in thin adsorbed films on solid substrate*

## **12:30 – 2:30 PM** Lunch

- 1:00 PM** Announcement of Vivian T. Stannett Fellow Award
- 1:20 PM** Announcement of Linde Exceptional Teaching Assistant Award
- 1:35 PM** Keynote Address: Dr. Caryn Heldt, Michigan Technological University  
*How I got excited about viruses and their surface interactions*

## **2:30 – 4:15 PM** Oral Presentations Session III: Materials

- 2:30 PM** Yunhu Peng *Lubricated friction of textured soft substrates*
- 2:45 PM** Cathryn Conner *Benign-by-design scalable synthesis of functional nanoparticles from sustainable biomaterials*
- 3:00 PM** Robert Epps *Autonomous Reaction Studies of Colloidal Perovskite Nanocrystals through a Machine Learning-Guided Fluidic Microreactor*
- 3:15 – 3:45 PM** Coffee Break
- 3:45 PM** Heather Barton *Enhanced Hydrolysis and Photo-Oxidation of Chemical Warfare Agents and Simulants by PCN-222 Functionalized Fiber Mats*
- 4:00 PM** Taylor V. Neumann *Additive Manufacturing of Liquid Metals for Soft Electronics*
- 4:15 PM** Minyung Song *Surface oxidation: The best surfactant ever?*

**4:30 – 6:00 PM** Poster Session

**5:00 – 6:00 PM** Symposium Happy Hour

## *Keynote Presentation*

### **How I got excited about viruses and their surface interactions**

**Dr. Caryn Heldt**

Associate Professor, Chemical Engineering, Michigan Technological University

Viruses are unique biomolecules that cause disease. However, we have harnessed their ability to deliver DNA to create gene therapy vectors and we use their unique shape to create vaccines that trick our immune system into creating antibodies against a benign invader. However, it is difficult to manufacture large amounts of these therapies without a strong understanding of their surface interactions. To enhance the toolbox of available characterization tools, chemical force microscopy (CFM) is being pioneered for viral particle characterization. CFM measures the adhesion force between a particle, in this case a virus particle, and a functionalized atomic force microscopy (AFM) tip. CFM reduces many of the difficulties of bulk characterization techniques by measuring adhesion of individual virus particles, likely reducing purification affects that can change surface properties. We have used CFM to study the electrostatic and hydrophobic interactions of two model viruses, porcine parvovirus (PPV) and bovine viral diarrhea virus (BVDV). These viruses were chosen because one is non-enveloped and one is enveloped, demonstrating the wide applicability of this method. The application of this technique is wide spread and will help create manufacturing platforms quicker and with less cost.

**Biography:** Dr. Caryn L. Heldt is the Director of the Health Research Institute, the James and Lorna Mack Chair in Bioengineering, an Associate Professor in the Department of Chemical Engineering, and an Adjunct Associate Professor in Biological Sciences at Michigan Technological University. She received her B.S. in Chemistry and Chemical Engineering from Michigan Technological University in 2001. She worked for two years at BASF Corporation before commencing her Ph.D. studies. Upon receiving her Ph.D. in Chemical Engineering from North Carolina State University in 2008 under the guidance of Dr. Ruben Carbonell, she joined Rensselaer Polytechnic Institute for her 2-year postdoctoral training under the guidance of Dr. Georges Belfort. In 2010, Dr. Heldt began as an Assistant Professor at Michigan Technological University and was promoted to Associate Professor in 2015. In 2015, Dr. Heldt was awarded an NSF CAREER award to study virus surface chemistry. Her lab is focused on the purification, removal, inactivation and detection of viruses and gene therapy vectors.

