**2021 CPAC Virtual Summer Institute**

**Mornings of July 20 and 21, 2021**

**Expanding Process Understanding based on the Use of Sensors and Data Handling**

**Tuesday, July 20, 2021 Day One Morning Session**

**(The times for all presentations will be US Pacific Daylight Time)**

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|  | **Day One: Next Generation Processing Approaches to Enable Maximum Efficiency in the Production of Pharmaceutics, Chemicals, and Biomaterials** |
| 8:00-8:10 | **Introduction to the Program and the Theme for Each Morning**Mel Koch, CPAC and MK Optimization and Control |
|  | ***We will start with an area of advances in Bio-based manufacturing – often working towards a Circular Economy Goal.*** |
| 8:10-8:30 | **How the Emphasis on Circular Economy has Influenced the State of Bioeconomy in Europe**Ludo Diels, VITO Belgium |
| 8:30-8:50 | **Carbon Recycling: Bio-based Products from Gas Fermentation and Process Integration** Taylor Schultz, LanzaTech USA |
| 8:50-9:10 | **Unmodulated Process for the Production of Plant-based Glycols** Alex Buck, Iowa Corn Promotion Board USA |
| 9:10-9:30 | **Advances in Recycling of Plastics** Linda Shi Cheng andKurt VandenBussche. UOP USA |
| 9:30- 9:45 | **Break – Discussion** |
| 9:45-10:05 | **Tracking the Effects of Feedstock Variability on Biorefinery Unit Operations Performance Using LabKey Server** James Collett, Pacific Northwest National Laboratory (PNNL) USA |
| 10:05-10:25 | **Enabling Knowledge Management through Control Strategy and PAT Application Design**Hossein Hamedi and Dan Hill, Biogen USA  |
| 10:25-10:45 | **Resilient, Self-Sustained, Local Production in the Post-Covid era: Ammonia Fertilizer by Use of Plasma Technologies with Green/Turquoise Hydrogen** Volker Hessel, University of Adelaide, Australia |
|  | ***The next section will describe Advances in Measurement Science to provide more information about complex reaction environments to aid in process control.*** |
| 10:45-11:05 | **Continuous Protein Production with some Sensor Components** ClemFurlong, UW MedicalGenetics **(**CPAC PI) USA |
| 11:05-11:15 | **Break** |
| 11:15-11:35 | **Applications of Portable NMR to Industrial Problems** Matt Augustine, UC Davis (CPAC PI) USA |
| 11:35-11:55 | **Improvements in Biopharma PAT with Sequential Injection**  Scott Schroeder, FIAlab: Fluidics Intelligently Automated USA |
| 11:55-12:15 | **Advances in Analytical Sensing (Innovations in Process Raman)** Brian Marquardt, MarqMetrix(also CPAC PI) USA |
| 12:15 | **Discussion** |
| **12:45** | **End of Session** |

**Day Two: Enabling More Efficient Measurement Tools and Complex Process Optimization Approaches**

**Wednesday, July 21, 2021 Day Two Morning Session**

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| 8:00-8:10 | **Introduction to the Summer Institute Theme** Mel Koch, CPAC, APL, UW |
| 8:10-8:30 | **Advanced Data Processing toward Model Predictive Control in Continuous API Synthesis** Jason Williams, RCPE GmbH, Austria  |
| 8:30-8:50 | **The Impact of Process Intensification on Valuable Pharmaceutical Products** Paul Watts, Nelson Mandela University, South Africa |
|   | ***Data handling of sensor based data is key to developing effective process control. The next section addresses this.*** |
| 8:50-9:10 | **Real Time PAT Based Knowledge Management and Control in Continuous Processes** Martin Gadsby, Optimal Industrial Automation Ltd. UK |
| 9:10-9:30 | **Optimizing the Use of Chemometrics**  Brian Rohrback, Infometrix, Inc. USA |
| 9:30-9:45 | **Break / Discussion / Questions (additional comments by Ray Chrisman).**  |
| 9:45-10:05 | **Ocean Plastic Waste Management – A Supply Chain Approach to Solve Ghost Net Issue** Bahar Aliakbarian, Michigan State University USA |
|  | ***The next section will feature a series of presentations - new approaches to measurement science, including key Vendors as Solution Providers. Both providing an aid the improvements in processing.*** |
| 10:05-10:25 | **New Approaches to Achieve Process Knowledge and Optimization** Ernie Hillier, Consultant, USA |
| 10:25-10:45 | **Fiber Solutions in Life Science and Process Control** Viacheslav Artyushenko, Art Photonics, Germany  |
| 10:45-11:05 | **Quantification by Benchtop NMR of Analytes in Liquid Formulations** Hector Robert Magritek, USA |
| 11:05-11:20 | **Break / Discussion** |
| 11:20-11:40 | **Ammonia Sensing with Single-Walled Carbon Nanotubes**  Alex Mamishev, SEAL Lab, Electrical Engineering, UW (CPAC PI) USA |
| 11:40-12:00 | **Milling and Dispersion Characterization** Richard Becker, Blaze Metrics, USA |
| 12:00-12:20 | **Improving Pharmaceutical Manufacturing Processes with Molecular Rotational Resonance (MRR) Spectroscopy** Justin Neill, Bright Spec, USA |
| 12:20-12:40 | **Gas Chromatography with Chemometrics for Discovery and Process Analysis**Timothy J. Trinklein, Robert E. Synovec. UW Chemistry (CPAC PI) USA |
| 12:40-1:10 | **Wrap up Discussion and Summary** |
|  | ***If this was the normal CPAC Summer Institute, we would reconvene at a mountain retreat outside of Seattle for continued discussion, networking, and memorable experiences. Sorry about that – you will have to plan to join us in July 2022.*** |
| **1:15** | **End of Session**  |