

New Tools and Technology to Accelerate Process Chemical Research and Discovery

Jason Hein

The University of British Columbia, Vancouver Campus, 2036 Main Mall,
Vancouver BC, V6T 1Z1 Canada
jhein@chem.ubc.ca

The constant pressure to accelerate the chemical research and discovery enterprise forces us to continually challenge and optimize our workflows. This exercise is facilitated through new enabling technology, which often is born out of early-stage prototypes from academic laboratories. The journey from first proof of concept to deployed technology is a convoluted and challenging process, and requires a diverse interdisciplinary team and excellent communication to ensure the goals from all stakeholders are being addressed. Evolving a system from the academic inception to a deployable technology that meets the needs of industrial research can prove to be a research project in itself.

This presentation will highlight several case studies focused on transferring new automation hardware in service of autonomous laboratory experimentation. These new tools are the product of the fusion of machine learning (ML) with advanced robotics and online analytics, which has given rise to the “self-driving” laboratory; a hybrid hardware/software system capable of executing iterative experiments while learning on the fly and deciding what to do next. These tools present enormous potential and may radically alter how scientific research and discovery is executed by dramatically shortening both the time and burden needed to explore new research challenges.