

# CBC Virtual Seminar Series



**Dr Eric Charles Peterson**

**Singapore Institute of Food and Biotechnology Innovation (SIFBI), Singapore**

## **Partitioning polymers and where to find them: in situ product recovery of fragrances and organic acids in TPPBs**

Downstream purification is a major component of fermentation costs, and by facilitating in situ product recovery (ISPR) via direct inclusion of absorptive polymers, two phase partitioning bioreactors (TPPBs) afford significant process benefits. Specifically, absorption into solid polymer pellets allows for mechanical removal from fermentation broth and avoids emulsification associated with traditional liquid organic solvents, simplifying downstream purification and reusability. Additionally, both solid and liquid absorptive phases reduce end-product inhibition arising from the accumulation of target molecule concentrations, which improves both bioprocess rates and yields. This approach has been applied to a range of biologically produced molecules, and is currently being used at SIFBI for the bioproduction of fragrances including viridiflorol, ionone, and linalool. However, partitioning with soft polymers is not without challenges, and work must be done to further characterize optimal polymer composition and physical properties to achieve desirable uptake. This talk will outline the steps taken to develop a rational, first-principles approach to predicting thermodynamic affinity of a polymer for a given target molecule, while also considering polymer properties necessary for rapid and effective uptake. Furthermore, work done for more challenging molecules such as organic acids, which exhibit pH-dependent partitioning, will be considered, and approaches and novel reactor designs to facilitate ISPR of these important molecules, and how they could be applied to mixed-culture biomass conversions will also be covered.

### **Biography**

Dr. Peterson is a Canadian interdisciplinary engineering biologist, with a passion for combining engineering and ecology to find global solutions for sustainability and food security. As a senior researcher fellow at the Singapore Institute for Food and Biotechnology Innovation (SIFBI) of A\*STAR, Dr. Peterson works on biomass valorisation, bioreactor design, insect protein and tropical agricultural fermentations (i.e. coffee and cocoa). Before coming to Singapore in 2018, he was a Professor of Biochemical Engineering at Universidad Icesi in Cali, Colombia, where he lectured and developed affordable bioenergy systems for families in post-conflict zones of rural Colombia.

**Date:** 28th August 2020, Friday  
**Time:** 4.00pm to 5.30pm  
**Venue:** Zoom Platform  
**Host:** Dr Ken Lee

**For Zoom registration:**

