

BIOENGINEERING & BIOMEDICAL ENGINEERING RESEARCH SEMINAR



Dr. James M. Piret
University of British Columbia
Department of Chemical & Biological Engineering

Dr. Piret is a Professor in the Department of Chemical & Biological Engineering and the Michael Smith Laboratories at the University of British Columbia. He has a Bachelor's degree from Harvard in Applied Mathematics to Biochemistry and a Chemical Engineering doctoral degree from MIT. At UBC since 1989 his research focus has been on innovative process and device technology for mammalian cell culture therapeutic protein or cell production.

His multi-disciplinary research ranges from bioreactor engineering to molecular biology, often including collaborative work with scientists and industry. He is the leader for bioengineering of CellCAN, a network of major cell therapy facilities established across Canada. His recognitions range from Teaching Excellence from students, to the Canadian RS Jane Award, to the Cell Culture Engineering Award from the Engineering Conferences International.

November 7, 2019
Macdonald 267
9h00 AM

ACOUSTIC CELL WASHING & RAMAN SPECTROSCOPY TECHNOLOGIES TO ADDRESS CELL THERAPY BIOPROCESS CHALLENGES

A major wave of promising cell therapies is progressing through clinical trials, stimulating the need for more economical methods to manufacture safe and effective cell products. We are in a unique window of opportunity for tailored innovative technologies to better address the emerging specialized needs of cell therapy manufacturing. A common unit operation is to wash cells between process stages, such as from cryopreservation to cell culture media. We previously developed an acoustic cell separation device, widely used for CHO cell perfusion cultures. This technology acts as a non-fouling filter using the forces generated in ultrasonic standing wave fields. We have recently enhanced this acoustic technology to perfuse >100 million CHO cell/mL cultures, maintaining >99% cell separation efficiencies. This technology is providing an alternative high performance closed manufacturing system, to perfuse, concentrate and wash cells, with no physical filter barrier or mechanical moving parts.

Also, while many clinical trials have had few adverse events, the great promise of cellular therapies comes with grave risks, such as from potentially oncogenic pluripotent cells present in embryonic stem cell derived populations. There is an urgent need for improved process analytical technologies to non-invasively monitor mammalian cell populations and to increase the reliability of manufactured cell products. We are using Raman spectroscopy to track stem cell differentiation, measuring macromolecular cell changes in the process used to manufacture insulin-producing cells for the treatment of diabetes.



Department of **Bioengineering**
Department of **Biomedical Engineering**