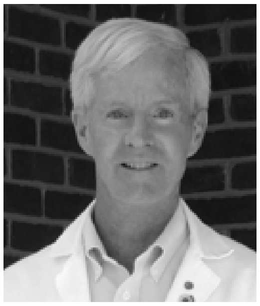
Stephenson School of Biomedical Engineering
Seminar Series Presents

AUTOMATED 3D CELL CULTURE PROVIDES STANDARDIZED, BIOLOGICALLY RELEVANT AND HIGH CAPACITY PRODUCTION OF HUMAN CELLS



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Professor of Pathology
Associate Director Clinical Chemistry
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1:30 p.m., Friday, November 2, 2018
CEC, Rm. 100

BIO:
Dr. Robin Felder, professor of Pathology, Associate Director of Laboratory Medicine at the University of Virginia and chair of Medical Automation.org, has published over 300 papers, reviews and chapters, co-edited three textbooks on medical automation and founded the leading journal on laboratory automation. He has 27 patents and founded nine biotech companies, including two non-profit organizations: the Association for Laboratory Automation and Medical Automation.org. He received his PhD in Biochemistry from Georgetown University and post doc at the NIH. He has received numerous awards including the Engelberger Robotics Award, UVA's first Innovator of the Year, Annual Research Awards from the American Association for Clinical Chemistry, and National Academy for Clinical Biochemistry.

ABSTRACT:

The consistent and optimized production of living human cells for drug discovery and regenerative medicine faces many challenges including the need for cost effective large-scale expansion, improved representation of in vivo cellular physiology and the ability to achieve reproducible cellular products and research data. The need is so great that the National Institutes of Health has published a special funding opportunity for Regenerative Medicine Innovation Project to develop clinical grade bioreactors that incorporate "good laboratory practice" and good manufacturing practice standards. In order to achieve these goals, there has been an evolution in the methods used to culture cells involving the use of 3D approaches that include the growth of cells in and on biomimetic substrates, optimization of cell culture media, and exposing cells to shear forces and oxygen tension that more closely mimics the in vivo environment.

We have designed and constructed a fully automated 3D cell culture robotic system that allows for parallel or random-access processing of many 64 cell lines, each sourced from unique individuals. The robotic process can perform cell-based assays on biologically diverse individuals in order to test lead compounds for their biodiverse effects, such as their range of effective doses and toxicology. The specific example of screening novel compounds for the treatment of hypertension and/or salt sensitivity to blood pressure will be discussed.

PBL-driven curriculum in biomedical engineering and has since seen this approach migrate to aerospace and mechanical engineering. This talk will cover the basics of PBL, show example problems and also present new "spin-off" models for engineering education that have come from experimenting with PBL in engineering education.

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