



POSTDOCTORAL FELLOW POSITIONS STEM CELL BIOENGINEERING LAB

SCHOOL OF BIOMEDICAL ENGINEERING UNIVERSITY OF BRITISH COLUMBIA

Seeking two postdoctoral fellows to work on **ENGINEERING DEVELOPMENT**

Research Program Overview

Two postdoctoral fellow positions are available in the Zandstra Stem Cell Bioengineering laboratory (<http://stemcellbioengineering.ca/>), which is in the School of Biomedical Engineering, and is affiliated with the Michael Smith Laboratories, at the University of British Columbia's Vancouver campus. The successful candidates will be expected to investigate the use of pluripotent stem cells in modeling early development and tissue specification. This well-funded multidisciplinary program integrates researchers in stem cell biology, biological computation, microfabrication, and developmental biology, with the goal of developing in vitro and in silico representations of complex tissue and organ development. Our research program is based on understanding how individual cells form complex functional tissues and organs by studying multiscale interactions between cells, their internal regulatory networks, and the external microenvironment, and then mobilizing our findings to generate therapeutically relevant blood cells from stem cells.

Qualifications

PhD required. Background in bioengineering an asset.

Seeking two creative individuals who can integrate bioengineering and developmental biology strategies on projects focusing on synthetic biology, computational biology or artificial intelligence technologies. Ideal candidates must have experience in some or all of the below:

- Computational biology;
- Mammalian cell and molecular biology;
- Flow cytometry;
- PCR;
- Image analysis;
- Transfection;
- Designing and generating DNA constructs;
- Pathway simulations / computational modeling of synthetic gene circuits (Project 1); &
- Genome editing / novel gene circuit construction (CRISPR/Cas9 or large gene circuits preferred) (Project 2).

Individuals must also:

- Work well in a goal-oriented team environment;
- Have a proven track record of research (i.e. publication record);
- Possess excellent communication skills – both verbal and written;
- Have the ability to work independently and organize own workload;
- Have the ability to design and analyze experiments, keep meticulous records of experiments and data, report on research progress and outcomes openly, and review methodologies in response to feedback; &
- Have the ability to update knowledge in their specialized area and implement relevant technologies to advance the project.

Projects

1. Building multiscale simulations of human organogenesis

Understanding *de novo* blood development requires connecting stem cell regulatory networks to blood-forming multi-cellular niches and functional blood cells. Our group has pioneered the development of mathematical models of the intracellular signaling networks that regulate stem cell pluripotency and early mesoderm differentiation, intercellular simulation networks in the context of hematopoiesis, and, more recently, gene regulatory network (GRN) inference and simulation strategies. This project will continue to develop new and more predictive Boolean, graph theory-based, and agent-based modeling approaches, as well as others, to simulate the GRN responses of pluripotent stem cells (PSCs) and blood stem cells to microenvironmentally coded input signals, and to link these responses to stem cell fate transitions including signaling pathway activation and spatially-explicit predictions of morphogen gradients during gastrulation-like events.

2. Designing and generating synthetic cells for regenerative medicine

The conventional paradigm for directing PSC-derived blood development uses cytokine and small molecule supplementation to mimic in vivo environments and developmental events. As an alternative to this strategy, we have begun to apply synthetic biology approaches to engineer detection, selection, and control of functional tissue development from PSCs. This project will build on the current work being developed in our lab to generate PSCs with synthetic DNA sensors that recognize input molecules, and integrate these signals to produce user-selected multiple output molecules (for instance a fluorescent reporter to characterize cell fate) to advance our methods for PSC-derived blood differentiation and T-cell development.

Other considerations

The Zandstra laboratory is situated on UBC Vancouver campus in the Biomedical Research Centre, and is also affiliated with the Michael Smith Laboratories.

Both positions are available immediately and will be based on a one- to two-year renewable contract, up to a maximum of 5 years duration. Salary will be commensurate with qualifications and experience. Candidates are also encouraged to apply for competitive fellowship awards.

A cover letter, accompanied by a detailed curriculum vitae including a list of publications, and contact details for 3 references, should be sent by email to:

Professor Peter Zandstra
admin@stemcellbioengineering.ca

Please include “Engineering Development PDF search” in the e-mail subject line. Applications will remain open until the positions are filled. Review of applications will begin immediately and continue until the positions are filled. The anticipated start date for these positions is ASAP.

Equity and diversity are essential to academic excellence. An open and diverse community fosters the inclusion of voices that have been underrepresented or discouraged. We encourage applications from members of groups that have been marginalized on any grounds enumerated under the B.C. Human Rights Code, including sex, sexual orientation, gender identity or expression, racialization, disability, political belief, religion, marital or family status, age, and/or status as a First Nation, Metis, Inuit, or Indigenous person. All qualified candidates are encouraged to apply; however Canadians and permanent residents will be given priority.