# Developing Mathematical Models to Study Immune Checkpoint Interactions

## PROJECT DESCRIPTION

T-cells play an important role in the cell-mediated immunity in humans. When activated, they can scan and kill any foreign substances inside the human body cells. The T-cell responses are mainly regulated by the different types of signals, including co-stimulation and co-inhibition by different receptors, known as immune checkpoint receptors. Recent clinical trials have shown that blockade of the key protein-protein interactions triggering T-cell inhibitory signals can be a powerful strategy in anti-cancer therapy. However, designing effective immune-checkpoint blockers require deeper understanding about protein-protein interactions at various levels. This project will focus on developing mathematical models based on ordinary differential equations (ODEs) to model and simulate different dynamic immune checkpoint interactions involved in the T-cell regulation processes. The model will also be a predictive tool to study the antibody- (and/or small-molecule-) mediated effects on the immune checkpoint interactions.

Prerequisites: Candidates with knowledge and experience in MATLAB and mathematical modelling and simulations are particularly encouraged to apply.

## FACULTY-DEPARTMENT

Pharmacy

## DESIRED FIELD OF (STUDENT) STUDY

Mathematics, Physics, Computer Science

## INTERNSHIP LOCATION

University of Alberta Main Campus - Edmonton

## NUMBER OF INTERNSHIP POSITIONS

1

## INTERNSHIP START DATE

January 2, 2018

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Contact: Brendan Cavanagh, Internship Coordinator (Inbound)
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INTERNSHIP END DATE

12 weeks after start date

ARE THE DATES FLEXIBLE?

Yes