Dr. James Girard Summer Undergraduate Research Program
Faculty Mentor – Project Application

Due Date: ***January 17, 2020 by 5pm***

Faculty Name: Sarah E. Powers

Department: Biology

Research Project Title: Evaluation of Cellular Factors Mediating Cyclin D3-Driven Transcriptional Regulation

Research Project Abstract (Please provide an overview of your project -- this will be shared with students as a project description; maximum 250 words):

In eukaryotes, the decision for the cell to move into cell cycle and prepare for a round of division is mediated by a family of proteins known as the D-type cyclins, of which there are three members. Initial characterization of cell cycle regulatory mechanisms suggested that, interchangeably, cyclin D1, cyclin D2 or cyclin D3 could interact with binding partner CDK4/6 to ultimately induce the cellular pathway necessary for DNA duplication and then division into two independent cells. Subsequent investigations have demonstrated that these proteins are not functionally redundant; for instance, in mammals cyclin D3 is uniquely required for development of B and T cells. In this scenario, cyclin D3 is fundamentally important for regulation of cellular division at critical stages of the developmental pathway, but also in the process of determining expression versus repression of other genes critical for lineage establishment. The mechanism for how one protein can participate in these two distinct functional roles is not currently understood, and the aim of this project is to better understand the structural interactions of cyclin D3 with other cellular components such that it can play a role in modifying gene transcription.