COLLEGE OF BIOLOGICAL SCIENCE
Department of Molecular and Cellular Biology

ANNOUNCEMENT: Interested members of the University Community are invited to attend the Final Oral Examination for the Degree of **Master of Science** of

Haidun Liu

of the Department of Molecular and Cellular Biology
on Friday, January 20, 2017 at 9:00 am in SSC 1511

Thesis Title: **How do regulated thin filaments with hypertrophic cardiomyopathy-linked α-cardiac actin affect actomyosin interactions?**

Examination Committee:
Dr. A. Nassuth, Dept. of Molecular and Cellular Biology (Chair)
Dr. J. Dawson, Dept. of Molecular and Cellular Biology
Dr. T. Martino, Dept. of Biomedical Science
Dr. G. Pyle, Dept. of Biomedical Science

ABSTRACT

Haidun Liu B.Sc. (Hons.) **Advisor: Dr. John Dawson**

Hypertrophic cardiomyopathy (HCM) is a heart disease associated with substitution mutations of sarcomeric proteins. This thesis describes investigations of the effects of mutations in α-cardiac actin (ACTC) subdomain 1 (E99K, R95C, F90Δ, and H88Y) on actomyosin interactions. ACTC proteins were expressed in a Sf21/baculovirus system and used in biochemical and biophysical assays to calculate the duty ratio (r). Compared to human ACTC (WTrec), E99K, R95C, F90Δ, and H88Y yielded higher, lower, or similar r. The varying r suggested that actomyosin changes may occur at the level of regulation by troponin and tropomyosin. Compared to WTrec regulated thin filaments (RTFs), R95C RTFs yielded no changes in r and E99K RTF yielded a decreased r, suggesting that the binding of myosin to actin may not be altered. However, E99K and R95C RTFs showed lower sensitivity to calcium, suggesting the altered cross-bridge cycling rate might lead to HCM.

CURRICULUM VITAE:

Haidun obtained his Bachelor of Science (Hons.) in Human Kinetics from the University of Guelph in 2014, then began his M.Sc. in the lab of Dr. John Dawson in September 2014.