NOTICE OF
UNIVERSITY ORAL

GEODESY AND GEOMATICS ENGINEERING

Master of Science in Engineering

Zhongwei Huang

Thursday, August 27, 2015 @ 2:00 pm

Head Hall – Room E-11

Board of Examiners: **Supervisor:**   **Dr. Yun Zhang, Geodesy & Geomatics Eng.**

                            Examining Board: **Dr. Raid Al-Tahir, Geodesy & Geomatics Eng.**
                            Dr. David MacLean, Forestry & Environmental Mgmt

                            Chair: **Dr. Emmanuel Stefanakis, Geodesy & Geomatics Eng.**

REMOTE SENSING OF SPRUCE BUDWORM DEFOLIATION IN QUEBEC, CANADA USING EO-1 HYPERION DATA

ABSTRACT

Satellite remote sensing has special advantages for monitoring the extent of defoliation caused by insects. Remote sensing has been used to monitor spruce budworm defoliation, mostly using the data captured by multispectral sensors such as Landsat (MSS, TM, and ETM+), MODIS and SPOT. However, these images have a low spectral resolution (using 4 to 36 spectral bands each covers a broad spectral bandwidth) which limited their abilities to identify small spectral variations in individual pixels for diagnosing specific forest insect infection. As an alternative, the hyperspectral data provided by EO-1 Hyperion sensor provides a high spectral resolution using 242 spectral bands from 0.4 to 2.5 µm (each band covers a very narrow spectral bandwidth). However, little study has been conducted on using Hyperion or other satellite hyperspectral images for monitoring spruce budworm defoliation. Taking advantage of the rich spectral information, this thesis proposed methods for remotely sensing, estimating and mapping spruce budworm (SBW) defoliation using the spectral information, i.e. vegetation indices (VIs), extracted from Hyperion images. 15% of accuracy improvement in SBW defoliation estimation and mapping has been achieved by applying the developed Hyperion VIs compared with conventional multispectral VIs. Highly accurate mapping results have been generated by developing suitable feature extraction method.

Faculty Members and Graduate Students are invited to attend this presentation.