



**NOTICE OF
UNIVERSITY ORAL**
GEODESY AND GEOMATICS ENGINEERING

Master of Science in Engineering

Jianjun Wang

Tuesday, September 17, 2013 @ 11:00 am

Head Hall – ADI Studio (HC25)

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

**Examining Board: Dr. Sue Nichols, Geodesy & Geomatics Eng.
Dr. Charles Bourque, Forestry & Environmental Mgt**

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

**UNSUPERVISED DETECTION OF OPIUM POPPY FIELDS IN AFGHANISTAN FROM
EO-1 HYPERION DATA**

ABSTRACT

Satellite remote sensing has special advantages to monitor the extent of the drug production that causes serious problems to the global society. Although remote sensing has been used to monitor opium poppy fields, the main employed data were high-resolution images (≤ 1 m) like pan-sharpened IKONOS, QuickBird, etc. These images are costly, making the full coverage of the crop fields in a large area an expensive exercise. As an alternative, the imagery acquired by EO-1 Hyperion, the only available spaceborne hyperspectral sensor currently, is free. However, its spatial resolution is coarser (30 m). Until now, there is little evidence that poppy fields have been identified from aerial or satellite hyperspectral images. This thesis proposed two unsupervised methods (i.e., a MESMA-based one and a MTMF-based one), and they both could detect poppy fields in Afghanistan from Hyperion data directly. Between the two methods, the MTMF-based one has much higher computational efficiency. Moreover, the MTMF-based method performed well in both of the two main environments in Afghanistan. In addition, it was found that the moderate spatial resolution EO-1 Advanced Land Imager (ALI) multispectral data could not produce reasonable detection of poppy fields in Afghanistan.

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