Celebrating **150** *years of agriculture*

Mapping agriculture from space: Is it really rocket science?

Heather McNairn, Ph.D.
Andrew Davidson, Ph.D.

Abstract:
Canadian farmers have a new tool to help them feed Canadians and the world – Satellites! Did you know that sensors placed on board Earth-orbiting satellites can be used to map and monitor agricultural systems and deliver timely and relevant information to Canada's agriculture sector? Did you know that AAFC scientists obtain such information from Canadian, American, European, Chinese and other international satellites to provide useful national, cost-effective, timely and accurate information on land use, crop condition and soil moisture, as well as their changes through time? In this seminar, Drs McNairn and Davidson will outline the ways in which AAFC uses state-of-the-art space-based technologies to serve Canada's agricultural sector. Discussion will include the principles of satellite monitoring and how AAFC monitors different aspects of Canada's agricultural resources using sensors that monitor in different regions of the electromagnetic spectrum (e.g. visible, near-infrared, shortwave infrared, thermal infrared, microwave). The challenges to current and future technologies will also be discussed, along with how the Government of Canada's move towards Open Data can revolutionize data distribution.

Biography:
Heather McNairn's research focuses on the development of methods (models, algorithms) that turn the energy recorded by satellites into information meaningful for the sector. This information is wide ranging and has included, as examples, identifying what type of crop is growing in a field, determining the productivity of the crop, identifying the crop growth stage, estimating how much residue is left on the soil after harvest and estimating how much water is in the soil. Dr. McNairn has worked in hyperspectral and optical remote sensing, but has spent much of the last 25 years developing models that use radar data from satellites like RADARSAT-2. Radar satellites provide many advantages for monitoring agriculture.

Andrew Davidson is the Manager of EO Operations in Agriculture and Agri-Food Canada's Centre for AgroClimate, Geomatics and Earth Observation (ACGEO). ACGEO is responsible for the operationalization of AAFC's geospatial research. This work includes the AAFC annual space-based crop inventory for Canada as well as the Canadian Ag-Land Monitoring System (CALMS), a satellite-based system that monitors vegetation conditions within Canada's agricultural extent in near-real-time. Dr. Davidson also maintains strong links to academia. He is an Adjunct Research Professor in the Department of Geography and Environmental Studies at Carleton University, where he has taught and supervised students since 2003.