

Invitation to Upcoming Public Lectures on the Development of Canadian Optical Satellite Sensor Technologies

Dr. Shen-En Qian, senior research scientist with Canadian Space Agency, the scientific authority of Canadian government contracts in the development of space technologies and satellite missions, and head of an in-house R&D team in the development of space technologies and space-borne electro-optical instruments and their applications for Earth observation, will come to UNB on March 16, 2010 and deliver two lectures to UNB community and general public who are interested in Canadian space technology development.

I. Short presentation to general public:

Topic: Rapid Prototype Activities for Optical Satellite Sensors at Canadian Space Agency

Time: March 16, 2010 (Tuesday), 12:30 – 1:20 PM (30 min. presentation, 20 min. question)

Place: Head Hall, Room **E4**

II. Technical presentation to those who are interested in sensor development

Topic: Increase Signal-to-Noise Ratio of Satellite Sensor Data using Numerical Processing Approach (A rapid prototype activity at Canadian Space Agency)

Time: March 16, 2010 (Tuesday), 1:30 – 3:00 PM (1 hour presentation, half hour question)

Place: Head Hall, Room **E52** (GGE Conference Room)

Abstract of the short presentation:

Rapid Prototype Activities for Optical Satellite Sensors at Canadian Space Agency

This presentation briefly reviews and summarizes the R&D activities at the Canadian Space Agency (CSA) within its rapid prototype program in the last decade. It will focus on the R&D activities for spaceborne optical sensors and the related satellite missions in collaboration with its partners in other government departments, academia and Canadian industry. The review will cover mission definition study (Phase-A) of a Canadian hyperspectral satellite, on-board satellite near lossless compression technologies, enhancement of satellite sensor performance using numerical processing approach, and dimensionality reduction of multi-dimensional optical sensor data.

Abstract of the technical presentation:

Increase Signal-to-Noise Ratio of Satellite Sensor Data using Numerical Processing Approach
(A rapid prototype activity at Canadian Space Agency)

Signal-to-noise ratio (SNR) is one of the key parameters in designing and building a satellite sensor. Satellite data users always prefer and/or require receiving data with high SNR in order to accurately obtain information and better serve their applications. Designing and building a satellite sensor with a considerably high SNR is one of the challenges, as this could be prohibitively expensive and/or constrained by technology availability. The CSA scientists developed a novel technology (patent pending) to increase SNR of satellite sensor data using numerical processing approach. This is a more cost-effective way to enhance/complement the performance of satellite sensors irrespective of sensor size. In the presentation, Dr. Qian, the lead scientist, will describe the technology, the effectiveness of the technology tested in CSA lab, and the assessment of the technology in collaborating with the satellite data user community using statistics based measures and Earth observation applications.

Bio of the lecturer:

Dr. Shen-En Qian is currently a senior research scientist with Canadian Space Agency, St-Hubert, Quebec, where he has been since 1994. He is the scientific authority of Canadian government contracts in the development of space technologies and satellite missions. He is the head of an in-house R&D team in the development of space technologies and spaceborne electro-optical instruments and their applications for Earth observation. He led Canadian industry teams built compressor prototypes for on-board processing and led a multi-disciplinary user acceptability study to assess the impact of data compression on Earth observation applications. He is a representative of the Canadian government in the Consultative Committee for Space Data Systems (CCSDS). He contributed to two issued international standards for satellite data systems and currently is working on the development of new international standards for satellite multispectral and hyperspectral data compression within the CCSDS organization.

He holds 6 U.S. patents, 3 European patents and several pending patents. Previously he was a professor with University du Quebec, Montreal, Canada, a professor with the Changchun Institute of Optics & Fine Mechanics, Chinese Academy of Sciences, China, and European Community Research Chair with the Departement de Recherche Spatiale, CNRS, Paris, France. He is an author or co-author of two books and over 100 scientific papers in the areas of spaceborne optical sensors, satellite sensor data enhancement, compression, processing and analysis, and Earth observation applications, data handling systems of spacecraft payloads, space data and information systems, opto-electronic signal detection and reception, weak-signal detection, intelligent instrumentation.

Dr. Qian received the Marie Curie Award (European Community International Scientific Cooperation Program) in 1992. He was twice the recipient of the Director Award of Federal Government of Canada in 1999 and 2002, respectively, for his outstanding contribution to R&D in space technology and satellite mission within the government facility. He received the Award of Canadian Government Invention in 2004 for his outstanding contribution to the inventions for space technologies. He is a senior member of the IEEE.