IEEE Okanagan Subsection

Presents

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Radio Telescopes: How they Work and the Technical Challenges of Building the Square Kilometre Array

Date: Thursday, September 23, 2010
Time: 4:30 PM - 5:30 PM
Place: UBC Okanagan, Room SCI 247

Talk Abstract: Since the discovery of electromagnetic waves of extraterrestrial origin by Bell Labs engineer Carl Jansky in 1933, radio-astronomy and the instrumentation that supports it has blossomed. The technology required to build front-line telescopes is broad and state-of-the art. It involves several engineering sub-disciplines common to communications and radar systems such as antennas, microwaves, analog and digital signal processing, real-time computing and image processing, mechanical systems and cryogenics.

In this talk I outline how radio telescopes work, the principles and technologies used, and how images are made of the invisible radio-universe. I then describe the technology challenges and developments being pursued at the Dominion Radio Astrophysical Observatory near Penticton, and in other labs world-wide, to build a new telescope 100 times more powerful than currently exists: The Square Kilometre Array (SKA).

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Speaker Biography: Gary background is in digital and real-time systems. As a Systems Engineer he led the development of several instrument projects since joining the National Research Council's Dominion Radio Astrophysical Observatory (DRAO) near Penticton in 1983. He grew up in Kelowna and was part of the first graduating class of the Okanagan College's Electronics Technology program, in 1975. He obtained his Electrical Engineering degree from Lakehead University in Thunderbay Ontario in 1983, and later his Masters of Applied Science in Electrical Engineering from the University of British Columbia in 1997, in part for the development of digital spectrometer which incorporated an integrated circuit he designed. Gary has also been deeply involved in the local high-technology community for more than a decade. He is a founding member and former president of the Okanagan Science and Technology Council (OSTEC) and is also a board member of the Okanagan Research and Innovation Centre (ORIC). He is currently NRC's Liaison Engineer for the Square Kilometer Array Project and is a member of the Canadian SKA Consortium board.

Gary Hovey is currently head of the Astronomy Technology Research Group at the DRAO. The group is part of the NRC's Herzberg Institute of Astrophysics (NRC-HIA) and develops state-of-the art instrumentation for radio-telescopes world-wide involving both RF and digital systems. Recently the group developed a large digital correlator (one of the most capable of its kind) for the Expanded Very Large Array (EVLA) near Soccoro, New Mexico. The group is currently involved in developing composite antennas, phased array feeds, and digital beamformer and correlators for the next generation radio telescope: the Square Kilometer Array (SKA).