Announcing the Final Examination of Salem El-Nimri for the degree of Doctor of Philosophy

Time & Location: November 2, 2009 at 9:00 AM in ENG III 450
Title: Development of Radiative Transfer Model for Ocean Surface Wind Speed

An electromagnetic model is being developed for predicting the microwave blackbody emission from the ocean surface over a wide range of frequencies, incidence angles, and wind vector (speed and direction) for both horizontal and vertical polarizations. This ocean emissivity model will be incorporated into a larger radiative transfer model used to infer ocean surface wind vector from remotely sensed radiometric brightness temperature. The model development is based on a collection of measurements obtained from different platforms as satellites, aircrafts, field experimental observations, and laboratory measurements. This dissertation presents the methods used in the wind vector model development and comparisons with current emissivity models and radiometric measurements.

The ocean emissivity model relates changes in measured radiometric brightness temperatures to physical changes in the ocean surface. These surface modifications are the result of the drag of surface winds that roughen the sea surface, produce waves, and create white caps and foam from the breaking waves. SFMR brightness temperature measurements from hurricane flights and independent measurements of surface wind speed are used to define empirical relationships between microwave brightness temperature and surface wind speed. The wind speed model employs statistical regression techniques to develop a physical-based ocean emissivity model with empirical coefficients dependent on geophysical parameters, such as wind speed, wind direction, sea surface temperature, and observational parameters, such as electromagnetic frequency, electromagnetic polarization, and incidence angle.

Major: Electrical Engineering

Educational Career:
Bachelor's of Electronics Engineering, BS, 2004, Princess Sumaya University for Technology
Master's of Electrical Engineering, MS, 2006, University of Central Florida

Committee in Charge:
Dr. Linwood Jones, Chair, EECS
Dr. Parveen Wahid, EECS
Dr. Takis Kasparis, EECS
Dr. Peter Gaiser, Naval Research Laboratory
Dr. Timothy Miller, NASA Marshall Space Flight Center

Approved for distribution by Dr. Linwood Jones, Committee Chair, on October 16, 2009.

The public is welcome to attend.