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Ph.D. Program in Electronics, Computer Science and Electrical Engineering

Seminar

Recent Progress in Small Satellite Constellations, Beam-Steering Arrays, and Cognitive Sensing for Microwave Imaging and Sounding of the Atmosphere

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Lincoln Laboratory, Massachusetts Institute of Technology (USA)

11:00-13:00 Dec. 4th, 2025 (Aula Seminari Magenta)

Abstract

New Earth atmospheric remote sensing systems provide observations with low noise, fine spatial and spectral resolution, broad coverage, and better revisit rates relative to current state-of-the-art. These new systems increasingly must be low-cost, feasible for accommodation on a wide range of launch vehicles and hosted payload platforms, and provide flexibility in how they are deployed and used. These considerations motivate the use of relatively low-cost CubeSat or small satellite platforms. The seminar will explore the emergence of small satellites for addressing some of the most challenging remote sensing problems and examine in detail the design, analysis, and implementation of missions that rely upon small satellite platforms to execute the mission. Additionally, we will consider a new class of large-format/large-aperture beam-steering array sensors that are lightweight and foldable, making them compatible with small satellite platforms. These highly configurable sensors permit new “cognitive sensing” concepts, where the sensor is aware of the characteristics of the scene to be viewed and can reconfigure itself in real time to adjust where it is looking, the dwell time, the spatial resolution, and depending on the platform, the geometrical vantage point.

Biography

William J. Blackwell received the B.E.E. degree in electrical engineering from Georgia Institute of Technology, Atlanta, and the S.M. and Sc.D. degrees in electrical engineering and computer science from MIT, Cambridge. He is currently a Laboratory Fellow with the Applied Space Systems Group, MIT Lincoln Laboratory, Lexington, MA, where he leads a number of projects involving the development and calibration of airborne/spaceborne microwave sensors, the retrieval of geophysical products from remote radiance measurements, and the application of electromagnetic, signal processing, and estimation theory. He is the Principal Investigator of the NASA TROPICS Earth Venture Mission and was previously the National Polar-orbiting Operational Environmental Satellite System (NPOESS) Integrated Program Office Sensor Scientist for the Advanced Technology Microwave Sounder on the Suomi National Polar Partnership satellite launched by the National Oceanic and Atmospheric Administration (NOAA) and the Atmospheric Algorithm Development Team Leader of the NPOESS Microwave Imager/Sounder.

Organizer

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Seminar in English

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