

**YORK UNIVERSITY  
DEPARTMENT OF EARTH AND SPACE SCIENCE AND  
ENGINEERING  
and  
CENTRE FOR RESEARCH IN EARTH AND SPACE SCIENCE  
S E M I N A R**

**Dr. Sara Seager  
Massachusetts Institute of Technology**

**The future of spectroscopic life detection on exoplanets**

ABSTRACT

The discovery and characterization of exoplanets have the potential to offer the world one of the most impactful findings ever in the history of astronomy—the identification of life beyond Earth. Life can be inferred by the presence of atmospheric biosignature gases—gases produced by life that can accumulate to detectable levels in an exoplanet atmosphere. Detection will be made by remote sensing by sophisticated space telescopes. The conviction that biosignature gases will actually be detected in the future is moderated by lessons learned from the dozens of exoplanet atmospheres studied in last decade, namely the difficulty in robustly identifying molecules, the possible interference of clouds, and the permanent limitations from a spectrum of spatially unresolved and globally mixed gases without direct surface observations. The vision for the path to assess the presence of life beyond Earth is being established.

BIOGRAPHY

Sara Seager is an astrophysicist and planetary scientist at MIT. Her science research focuses on theory, computation, and data analysis of exoplanets. Her research has introduced many new ideas to the field of exoplanet characterization, including work that led to the first detection of an exoplanet atmosphere. Professor Seager's space instrumentation group is focusing on "ExoplanetSat", a 3U CubeSat capable of high precision pointing for transiting exoplanet discovery. The prototype is intended to be the first of a planned fleet of nanosatellites, aimed to demonstrate the graduated growth of a constellation as a new paradigm for space science missions. Professor Seager is a co-I on the MIT-led TESS, a NASA Explorer Mission to be launched in 2017, and chairs the NASA Science and Technology Definition Team for a "Probe-class" Starshade and telescope system for direct imaging discovery and characterization of Earth analogs.



Refreshments will be served at 11:00 a.m. in the Paul Delaney Gallery, Bethune College.

**DATE:** **Wednesday, September 24, 2014**  
**TIME:** **11:15 a.m.**  
**LOCATION:** **P. Delaney Gallery, Bethune College**