

**ATS/CIRA Colloquium**

**Richard A. Anthes**

**President Emeritus, UCAR and UCAR COSMIC program**

**Therese Rieckh**

**Ph.D. Student, University of Graz, Austria, and UCAR COSMIC program**

**Shay Gilpin**

**UC Santa Cruz , current UCAR SOARS student, COSMIC program**

**Contributions of Radio Occultation to Weather and Climate**

*Using the world's most accurate and  
precise thermometer from space*

**Hosted by Thomas H. Vonder Haar**

**Friday, September 2, 2016**

**ATS room 101; Discussion will begin at 11:15am**

**Refreshments will be served at 10:45am in the weather lab**

The launch of the proof-of-concept mission GPS/MET (Global Positioning System/Meteorology) in 1995 began a revolution in profiling Earth's atmosphere through radio occultation (RO). The six-satellite constellation, FORMOSAT-3/COSMIC (Formosa Satellite mission #3)/Constellation Observing System for Meteorology, Ionosphere, and Climate), launched in 2006, has proven the theoretical capabilities of RO to provide accurate and precise profiles of electron density in the ionosphere and refractivity, containing information on temperature and water vapor, in the stratosphere and troposphere.

Radio occultation has been dubbed "the most accurate and precise thermometer from space." No other observing system provides such high-quality, global observations of the ionosphere, stratosphere and troposphere. These are having a high impact in operational weather forecasting, climate monitoring and research, as well as ionospheric research and space weather. Radio occultation typically ranks in the top five of all observing systems in contributing to the accuracy of operational global numerical weather prediction models. The relatively low cost of RO compared to other space-based systems make them highly cost-effective for research and applications.

A follow-on mission, COSMIC-2, will consist of two 6-satellite constellations, one in Equatorial orbit and producing 5,000 soundings per day between 30°N and 30°S; and the other in polar orbit, producing another 5,000 soundings globally. The Equatorial constellation will be launched in 2017 and the polar constellation in 2019 or 2020. Both constellations will have more advanced RO receivers and higher-gain antennas, and should produce even higher quality soundings than COSMIC. The Equatorial constellation will be particularly valuable for studying tropical cyclones.

Our talk introduces RO, highlights recent scientific results using RO observations, and introduces COSMIC-2.

Link to colloquium videos and announcement page: <http://www.atmos.colostate.edu/dept/colloquia.php>