

ASTRONOMY COLLOQUIUM

**CHRISTOPHER S. EDWARDS
NORTHERN ARIZONA UNIVERSITY**

Christopher S. Edwards is a Professor of Planetary Science at Northern Arizona University (NAU) and the Director of NAU's Radiant Center for Remote Sensing. He is a science team member and instrument scientist for the Emirates Mars Infrared Spectrometer (EMIRS) on the Emirates Mars Mission "Hope", the principal investigator of the Emirates Main Belt Infrared Spectrometer (EMBIRS) on the Emirates Mission to the Asteroid belt, a participating scientist on NASA's Mars Science Laboratory Curiosity Rover, a participating scientist on JAXA's Martian Moons eXploration mission and has worked on numerous other Mars missions including the 2001 Mars Odyssey Thermal Emission Imaging System, Mars Global Surveyor Thermal Emission Spectrometer, and the Mars Reconnaissance Orbiter Compact Reconnaissance Imaging Spectrometer for Mars. Edwards participated on these science and instrument teams while perusing his Ph.D. at Arizona State University, as the prize Planetary Science Postdoctoral Fellow at the California Institute of Technology, as a Research Scientist at the U.S. Geological Survey Astrogeology Science Center and now at NAU. He is a remote sensing scientist at heart, using light emitted and reflected from planetary surfaces to characterize these places without ever setting foot on them. His research focuses on the composition, physical properties and processes, and morphology of planetary surfaces, with an emphasis on rocky bodies including the Earth. A major element of his research has been the design and development of infrared remote sensing instruments for use in space, the laboratory, and for fieldwork. His research uses infrared spectroscopy, radiometry, laboratory spectroscopic measurements, geologic field observations, and numerical modeling, and has taken him to field sites in the western U.S., Yellowstone, Hawaii, and Spain, as well as the Himalayan mountains of Bhutan and glaciers of Iceland.

WHEN:

Monday, April 20th,
3:45 PM

WHERE:

Physical Sciences,
Bldg. 19,
Room 103



The past several years have marked a pivotal moment for planetary exploration, with a new generation of lunar and Mars missions reshaping our understanding of the inner solar system. This colloquium draws on work and collaborations from a sabbatical in Paris and beyond, with a brief survey of recent results and upcoming instrumentation across two planetary targets. On the Moon, the 2025 loss of Lunar Trailblazer, a \$72M NASA water-mapping mission that failed one day after launch due to a solar panel pointing error compounded by cascading fault management failures, offers important lessons for the new era of lower-cost missions. However, NAU's engagement continues to grow. Two instruments now in development under NASA's Moon to Mars program chart the path forward: ARIES, the Artemis Infrared Reflectance and Emission Spectrometer, for which Edwards serves as Deputy PI, with NAU building the context camera featuring automated rock detection; and EMILIA-3D, a NAU-built stereo imager with an integrated thermal camera for simultaneous characterization of surface texture and thermophysical properties. Mars, NASA's latest featured goal, covers Thermal Emission Imaging System (THEMIS) observations of Deimos and the Emirates Mars Mission Emirates Mars InfraRed Spectrometer (EMIRS) observations of Phobos), which provide close-looks at these moons and shed new light on their composition and origin in preparation for JAXA's Martian Moons eXploration mission on which Edwards serves as a Participating Scientist. Leveraging the technology from EMIRS, as PI, I lead the development of the Emirates Main Belt InfraRed Spectrometer (EMBIRS) for the Emirates Mission to the Asteroid Belt extends these observations to main belt asteroids. Taken together, these projects span a coherent program of solar system exploration, linking NAU-developed lunar instrumentation to international efforts at Mars and the asteroid belt.

