

09 June 2020 talk – University of Central Florida Astrochemistry Webinar Series

Title: *“The Unique Scientific Value of Returned Samples”*

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Abstract: Most of the materials in the universe are so distant or inaccessible that the only way we can study them is remotely using various types of telescopes. However, in some cases we can study these materials directly because the samples become physically available to us. Some samples come to us of their own accord in the form of meteorites and cosmic dust. In other cases we have to work hard to carry out sample return missions like *Apollo*, *Stardust*, *OSIRIS-REx*, *Hayabusa*, and *Hayabusa2* in order to get the samples ourselves. Once samples are physically available in terrestrial laboratories, we can learn details about their compositions and histories that could never be established by remote observations. This talk will highlight some of the unique scientific advances that can be made through the study of extraterrestrial materials, and will describe the various ways in which samples become available for study, with a focus on the acquisition of samples by sample return spacecraft missions. Aspects of NASA’s *Stardust* comet sample return mission and JAXA’s *Hayabusa* asteroid sample return mission will be highlighted and scientific highlights of these missions will be discussed. Finally, the presentation will end with an overview of the current status of NASA’s *OSIRIS-REx* mission, which will be currently at Asteroid (101955) Bennu and will be returning samples to Earth in 2023.