OSIRIS-REX MISSION SAMPLE SCIENCE: ANALYSIS OF ASTEORID BENNU REGOLITH. H. C. Connolly Jr.[1,2,3], D. S. Lauretta[3], S. Messenger[4] and the OSIRIS-REx Team. [1]Dept. Physical Sciences, Kingsborough Community College of CUNY, Brooklyn NY 11235 & Dept. Earth & Environmental Sciences, The Graduate Center of CUNY, 365 5th Ave., New York, New York, USA (hconnolly@gc.cuny.edu); [2]Dept. Earth & Planetary Sciences, AMNH, New York, NY 10024 USA; [3]LPL, University of Arizona, Tucson, AZ 85721, USA; [4]ARES, NASA JSC, Houston, TX 77058, USA.

Introduction: The **O**rigins, **S**pectral **I**nterpretation, **R**esource **I**dentification, and **S**ecurity-**R**egolith **E**xplorer (OSIRIS-REx) asteroid sample return mission was selected by NASA in May 2011 as the third New Frontiers mission. The target, (101955) Bennu, is a B-type near-Earth asteroid, hypothesized to be similar to CI or CM carbonaceous chondrites [1]. The key science objectives of the mission are summarized in [2] with the major goal of returning at least 60 g of pristine asteroid regolith. OSIRIS REx Mission Sample Science (MSS) will manage the returned sample analyses to achieve key science objectives following an approach summarized here and in [3].

Discussion: MSS is led by a Mission Scientist and structured into the following working groups (WG): Carbonaceous Meteorite (CMWG), Dynamical Evolution (DEWG), Regolith Development (RDWG), Sample Analysis (SampleWG), Sample Site Science (SSSWG), and TAGSAM (TAGSAMWG). The DEWG is charged with constraining the history of Bennu from main belt to near-Earth asteroid (NEA) whereas the SampleWG focuses on documenting Contamination Knowledge, defining the Sample Analysis Plan, and performing the analyses of the returned samples. These two working groups have created a framework to align the Sample Analysis Plan and the sample scientists with mission science goals, known as the Sample Analysis Science Report (SASR). The SASR defines a series of hypotheses that will be tested through the analysis of the returned sample and includes the follow epochs in the life of the asteroid and its components: (1) Pre-solar phase, (2) Pre-accretion, post-disk collapse phase, (3) Post-accretion and geological activity phase, (4) Regolith evolution and surface processes, (5) Dynamical disruption from the main belt phase, (6) Dynamical evolution into a NEA phase. Finally, not an epoch but of great significance, we will (7) Relate the physical and chemcial characteristics of returned samples to the remote sensing data. Fundamentally, these 7 areas of high-level science research and related hypotheses also define the framework for the SAT and respected sub-groups. The SAT sub-groups will be established following the overarching components 1-7 and each sub-groups will test the hyptheses established within the corresponding section of the SASR, or in the case of 7, explore the relationships between the phsyical and chemical properties of the returned sample to the remote sensing data generated by the instrument payload.

References: [1] Clark et al., 2011. *Icarus*, **216**.[2] Lauretta D. S. and The OSIRIS-REx Science Team, 2012. 43rd *LPSC*, Abstract# 2491. [3] Messenger S., Connolly H.C., Lauretta D.S., Bottke W.F., and the OSIRIS-REx Science team, 2014. 45th *LPSC*, Abstract #1904.