

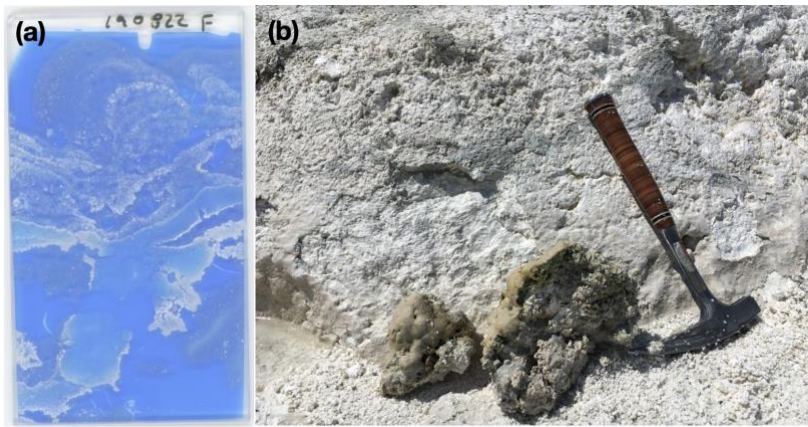
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NASA Astrobiology Early Career Collaboration Award  
Amount Awarded: \$4985  
Date Awarded: May 2020  
Trip Report (Jan 17-21, 2022)

### **Developing strategies for searching for potential biosignatures in Jezero crater with Mars 2020**

I travelled to University of Tennessee Knoxville in January 2022 to conduct research with collaborator Dr. Linda Kah. The purpose of the visit was to learn and conduct preliminary petrographic analyses on prepared thin sections of rock and sediment samples I collected in August 2019 from Lake Salda in southwestern Turkey. Lake Salda is a microbially-dominated deep closed basin alkaline lake surrounded by ultramafic lithologies and is one of the few modern environments where hydrous Mg-carbonates (e.g., hydromagnesite) are the dominant precipitates. These characteristics make Lake Salda a unique and compelling modern analog for an ancient paleolake at Jezero crater, the landing site of the Mars 2020 mission, where Mg-carbonates detected from orbit may be related to past lake activity and have high biosignature preservation potential. The objectives of this work are to characterize the microfabrics of various carbonate facies (microbialites, terraces, muds, beach sediments, deltaic deposits, etc.), investigate carbonate mineralization processes, and determine the extent to which these samples may provide biological vs. environmental markers. During the visit, I analyzed and photographed 16 prepared thin sections using a standard petrographic light microscope and a scanning electron microscope (SEM) with an energy dispersive spectroscopy (EDS) detector to identify the elemental chemistry of the fabrics. Future work will include further petrographic investigations with standard light microscopy, SEM/EDS, and fluorescence microscopy (optical, wide-band blue and UV) to highlight overall differences and investigate the presence of biotic signatures. The results of this work will not only help characterize carbonate fabrics and poorly constrained mineralization processes in a terrestrial Mg-carbonate lacustrine system, but also provide important context for investigating Mg-carbonates at Jezero crater and help refine biosignature search strategies for the Mars 2020 mission.



**Figure 1.** Conducting petrographic analyses using an optical light microscope in Dr. Linda Kah's microscopy lab at the University of Tennessee Knoxville



**Figure 2.** (a) Prepared thin section of a microbialite sample analyzed during the research visit. (b) Field photo of sample from (a) acquired during August 2019 field work at Lake Salda.