Contact: Rachel Boon

FACULTY RESEARCH PRESENTATION: ASTROBIOLOGY UNDERGROUND FOR UNDERGRADS

Summary: How do you understand the moons of the Solar System and their potential for life without leaving Earth? Start by visiting the most extreme places on Earth and look for what life lives there. Life as we know it requires three dominant items for survival: water, carbon-based material, and energy. By studying life in environments where one (or more) of these needs are limited, comparisons can be drawn between the extreme environs on Earth and the potential habitability of similar areas in the Solar System. Since 2019, a team of UNI students and faculty spanning the disciplines of biochemistry, biology, chemistry, and earth and environmental sciences have teamed up with NASA scientists and National Park Service personnel to explore the potential for Wind Cave National Park in South Dakota and Coldwater Cave in Iowa to serve as an analog system to the icy moons of the gas giants. From training for tight places, to designing new techniques, the team has logged over 100 hours of underground science in 2022 with a student film team capturing the action.

Presenter: Dr. Joshua Sebree is an Associate Professor in the Department of Chemistry and Biochemistry at the University of Northern Iowa (UNI). He received his B.S. in Chemistry from the University of Kansas in 2006 and received his Ph.D. in Physical Chemistry in 2011 from Purdue University. From 2011-2013, Dr. Sebree worked as a Postdoctoral Fellow at NASA Goddard Space Flight. While at NASA, Dr. Sebree studied the atmospheres of other planets and moons while building strong connections within the NASA community. In 2013, Dr. Sebree began work at UNI where his primary research focus is in the fields of astrobiology and astrochemistry in the characterization of primordial environments.

Dr. Sebree has worked with over 100 undergraduate students in undergraduate research, 17 of which successfully wrote undergraduate research grants that received funding during their time in the lab. In 2022, Dr. Sebree was awarded the Beverly Funk Barnes Educator Excellence Award. Dr. Sebree is currently the principal investigator of UNI's Base program awarded by the Iowa Space Grant Consortium entitled "Wind Cave as a Terrestrial Analog for Possible Exobiological Environments off Earth." The project, now in its third year, is focused on how Wind Cave can serve as a model system for the icy moons of the solar system and has provided unique research opportunities for over 50 UNI students. In addition to the base project, he has received multiple other grants from the Iowa Space Grant Consortium and NASA.