Seminar Schedule for 2022-23

September 23, 2022 - Professor Matt Carter (Biology)
1:00pm in Wachenheim Room 102

"Strategies for Designing and Delivering a Scientific Presentation"
A hands-on workshop for GEOS thesis students or anyone that will be presenting at conference(s). A copy of Prof. Carter's book "Designing Science Presentations: A Visual Guide to Figures, Papers, Slides, Posters, and More" is available in the GEOS student lounge.

September 30, 2022 - Dr. JoanMarie Del Veccio, Dartmouth College
4:00pm in Wachenheim Room 113

"*Small satellites, big data, and the fate of permafrost landscapes*"
Amplified warming at high latitudes threatens permafrost landscapes and their stored carbon, but we understand very little about the climate, vegetation and geologic conditions that promote disturbance in permafrost landscapes. We need innovative and cross-disciplinary approaches to quantify high-latitude carbon fluxes, one of the biggest "known unknowns" of future climate projections. Geoscientists, previously limited to low-resolution and infrequent data, can now investigate the Arctic at unprecedented resolution in time and space thanks to better computers, better algorithms and better data. I leverage these tools to learn about permafrost landscapes at levels of detail that had been limited to well-studied landscapes in lower latitudes, where most geomorphic laws have been formulated and tested…until now. I ask: are landscapes underlain by permafrost different enough from their temperate counterparts to warrant their own rules and models? If so, we're going to have to rethink how we predict Arctic carbon fluxes.

October 17, 2022 - Thesis Previews with our Class of 2023 thesis students: Nick Ambeliotis, Dasha Belobokova, SJ Brusini, Rheanna Fleming, Mariana Hernandez, Emily Hugo, Ashlyn Oh and TJ Watkins. Come hear what they'll be working on in lab all year.
3:00pm in Bronfman Auditorium

October 28, 2022 - Joint Seminar with Dr. Robin McDowell, University of Washington, St. Louis, Dr. Priscilla McCutcheon, University of Kentucky and Dr. Brittany Mechè, Williams College and Dr. Allison Guess, Williams College
3:00pm in Griffin Room 6
Recording: https://youtu.be/OveUKHbZ4VU

"*Witnessing Lands, Witnessing Possession*"
Witnessing Lands, Witnessing Possession' will be a wide-ranging discussion on the geographies of colonialism and rebellion, food sovereignty movements across the African diaspora, and global environmental futures.

November 18, 2022 - Dr. Alejandra Geiger-Ortiz, Colby College
4:00pm in Wachenheim Room 113

"Atoll Resiliency: Understanding the processes driving tropical island evolution with remote sensing, AI, and computer modeling"
Within our lifetime, climate change has the potential to drastically alter coastal resiliency. Atoll island nations are particularly vulnerable to climate change: from increasing ocean temperatures (causing coral die-off), to ocean acidification (decreasing coral resiliency), to increasing SLR. We must understand what will happen to the atoll islands because they are the inhabited portion of these systems. However, we lack a comprehensive understanding about the primary processes driving atoll island evolution under rising sea levels and varying wave climate. This uncertainty in predictions hinders local communities' preparation for the future; we must understand how atoll islands respond and evolve with changing environmental forcings on a global scale. To predict the response of these islands to changing climate, we must understand the feedbacks between physical and ecological processes at different temporal and spatial scales. In addition, we must account for the actions and processes taken by humans driving landscape change on these islands. My lab has focused on investigating the feedbacks inherent in these landscapes using numerical modeling and remote sensing. Recent work using AI, a global atoll database of Landsat Imagery, and a case study of Glover's Reef Atoll off the coast of Belize will be presented.

February 2, 2023 - Dr. Anika Daniels-Osaze, Associate Dean for Education at the School of Public Health at SUNY Downstate Health Sciences University
2:00pm in Bronfman Auditorium (Wachenheim Room B11)

"Social Justice in the STEM fields: How Knowing Our Story Can Enhance True Inclusiveness"
In discussing diversity and inclusion in the STEM fields and the impact on our underrepresented STEM students, we often neglect to discuss the history that created the situation that divides us as a people. This is due to fear, insufficient knowledge, lack of compassion, misunderstandings and more often than not, inadequate effort. This talk will explore the reasons why we are still having these discussions and challenges today, and tangible academic and support-based solutions that get to the root of the matter.

February 24, 2023 - Dr Sasha Wagner, RPI
4:00pm in Wachenheim Room 114

"Where does ancient black carbon in the deep ocean come from?"
In the deep ocean persists an enigmatic class of organic compounds that are presumed to have a condensed aromatic structure, are biologically unreactive, and are broadly termed "black carbon". In the dissolved phase, black carbon comprises ~2% of the total dissolved organic carbon (DOC) housed in the ocean, which is roughly equivalent in size to the amount of CO 2 in the atmosphere. In the abyssal ocean, dissolved black carbon (DBC) is about 15,000 14 C-years older than bulk DOC, suggesting that the DBC fraction is particularly important for evaluating stability of the marine organic carbon pool over multi-millennial timescales. However, the answer to one key question continues to elude us: Where does ancient DBC in the deep ocean come from? The path to the answer is littered with sampling and methodological limitations, dead ends, and surprise detours. It was thought that most DBC in the ocean originated from wildfires on land, but results from compound-specific stable carbon isotopic analyses suggest otherwise. Photochemical breakdown of DBC in sunlit waters may explain some aspects of the

environmental trends observed, but not all. Petrogenic and hydrothermal sources of DBC are also being considered. This talk describes a persistent quest to figure out where oceanic DBC comes from and the analytical and environmental challenges encountered along the way.

February 28, 2023 - Dr. Mason Stahl, Union College
7:30pm in Griffin 3
Sponsored by the Class of 1960 Scholars Program in Environmental Studies and the Center for Environmental Studies (CES)

"The Rhythm of Water: How Seasonal Cycles Affect Water Quality, Sustainability, and Human Health"
Mason Stahl is an Assistant Professor in the Environmental Science, Policy and Engineering Program and the Geosciences Department at Union College. His research spans the fields of hydrogeology, geochemistry, and water resources and he studies how perturbations to the environment influence the flows of water, the cycling of elements, and the quality of our water resources. Much of his research falls into two key areas: (1) characterizing soil moisture and groundwater recharge processes; (2) elemental cycling in groundwater and surface water systems with a strong focus on the cycling of arsenic. A primary goal of his research is to help answer questions about how groundwater and surface water quality will respond to natural and anthropogenic changes to the environment and what this means for the health of people and the environment.

April 7, 2023 - Dr. Sarah Mazza, Smith College
4:00pm in Wachenheim Room 114

"Solving the mystery of Bermuda: A unique volcanic history"
Bermuda is an intraplate volcano found off the coast of the Carolinas in the Atlantic Ocean. New geochemical data suggest that Bermuda sampled a previously unknown mantle domain, characterized by silica undersaturated melts that have significant enrichments in incompatible elements and volatiles, and a unique, extreme isotopic signature (Mazza et al., 2019). Bermuda records the most radiogenic $^{206}Pb/^{204}Pb$ isotopes ever documented in an ocean basin (19.9-21.7), coupled with low $^{207}Pb/^{204}Pb$ (15.5-15.6) and relatively invariant Sr, Nd, and Hf isotopes, suggesting that this source must be <650 Ma. These silica undersaturated melts are interpreted to be sourced in the transition zone, tapping a young mantle reservoir that resulted from recycling and storage of incompatible element and volatile rich material. Ongoing work explores the nature of the carbonate source for Bermuda with thin section analysis of ocelli and stable zinc isotopes.

April 21, 2023 - Dr. Ana Gonzalez-Nayeck, Williams College
4:00pm in Wachenheim Room 114

"Where does all the photosynthetic sugar go? Carbon isotopes as indicators of carbon allocation in natural environments"
Photosynthetic organisms perform a critical service to the biosphere: converting carbon dioxide into sugars which feed not only the photosynthetic organism but also the surrounding heterotrophic community. The amount and types of sugar that are released by photosynthetic microbes depends on environmental conditions including light, oxygen and nutrient availability;

as such, these parameters (amount and type of sugar) might be useful towards understanding environmental conditions today and in the geologic past. In this talk, we will explore the potential for using natural abundance carbon stable isotope ratios of sugars as indicators for how microbes are storing, sharing and chemically altering photosynthetic carbon. By the end, I hope to convince the audience that the rapidly growing field of stable isotope geochemistry needs to explicitly consider these processes when analyzing the carbon isotope compositions of individual organisms and of both dissolved and particulate organic matter in modern ecosystems.

April 28, 2023 - Dr. Elizabeth Ultee, Middlebury College
4:00pm in Wachenheim Room 114

"Modelling the effect of glaciers on future droughts through the end of this century"
Global climate model projections suggest that 21st century climate change will bring increased drought risk in many areas. Runoff from glaciers is known to lower drought risk in glaciated basins ("glacial drought buffering"), but glacier model projections indicate that glacial runoff will generally diminish through the 21st century. So, to what extent can we expect retreating glaciers to protect downstream areas from drought as the climate continues to change? Answering this question has been difficult, because glacier change is not included in global climate models. In this talk, I will demonstrate how we have combined climate model output (such as precipitation and evapotranspiration) with runoff simulated by a global glacier model to evaluate glacial buffering of droughts. We find that accounting for glacial runoff tends to reduce drought frequency and severity, even in basins with glacier cover of less than 2% by area. We also find that the strength and future trend of glacial drought buffering depends on how arid the basin is and the total glacier coverage in the basin, and does not depend on other characteristics such as total basin area or latitude. Finally, I discuss the process of global glacier modelling and show how different assumptions affect simulated runoff.

May 15, 2023 - GEOS Thesis Presentations
10:00am in Wacheheim Room 114

Nicholas Ambeliotis: *Exploring the Effect of Surface Ocean Nutrient Availability on Picophytoplankton and Carbon Export in the Sargasso Sea*
Dasha Belobokova: *Did Seafloor Methane Release in the Bering Sea Occur during Climate Warming?*
SJ Brusini: *Investigating Cliff Retreat Rates at Dún Aonghasa and Dún Duchathair, Aran Islands, Ireland, Using Sublittoral Geomorphology and Ecology*
Rheanna Fleming: *Tracing Isotope Hydrology in Hopkins Memorial Forest*
Mariana Hernandez: *Enigmatic Fossils from the Middle Cabrian of Yukon Territory, Canada*
Emily Hugo: *River Planform as a Driver of Organic Pollutant Storage on the Floodplain*
Ashlyn Oh: *Digital analysis of boulder beach clast-size distributions: methods development and ground-truthing*