Carbon has been accumulating in northern high latitude terrestrial ecosystems for thousands of years, but as the climate warms, the large pool of carbon is at risk of being thawed, decomposed, and transferred to the atmosphere. Despite the potential importance of changes in northern carbon cycling for global climate, both the sign and magnitude of the current and future carbon balance of the Arctic remain highly uncertain. To address this uncertainty, I will present ecosystem carbon cycling results from a warming and drying experiment in a sub-arctic tundra landscape, and then I will focus on carbon cycling in the Arctic during the period of greatest uncertainty, the nongrowing season (NGS; fall, winter, spring). Using a new synthesis of NGS CO2 fluxes that span northern high latitude terrestrial ecosystems, I examine the drivers of NGS respiration, estimate current NGS CO2 emissions for the northern permafrost region, and project NGS CO2 emissions under two future climate scenarios—Representative Concentration Pathways (RCP) 4.5 and 8.5. While climate change may shift the Arctic from a carbon sink to a source, the magnitude of this response will be highly dependent on future climate change mitigation efforts.
# Fall 2018 Environmental Science Seminar Series

Wednesdays 2:30-3:30 pm  
James Hall G46  
The University of New Hampshire

**Mini-series on Navigating the New Arctic**

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| October 3     | **Shifting Carbon Dynamics in the Arctic and Implications for Global Climate**  
                Dr. Sue Natali, Associate Scientist, Woods Hole Research Center  
                (hosted by Bianca Rodriguez-Cardona, NRESS Ph.D. Student) |                                                                                      |
| November 7    | **Preparing for Surprises**  
                Dr. Radley Horton, Associate Research Professor, Lamont-Doherty Earth Observatory, The Earth Institute, Columbia University  
                (hosted by the UNH Arctic Network) |                                                                                      |
| November 14   | **Understanding Terrestrial Arctic Water and Carbon Cycles and the Impacts of Climate Warming**  
                Dr. Michael Rawlins, Associate Director of the Climate System Research Center, UMass-Amherst  
                (hosted by Steve Frolking, NRESS Chair) |                                                                                      |
| November 28   | **Developing a Climate Adaptation Baseline for Wabanaki Tribal Nations: Diplomacy, Research Methods and Priorities**  
                Dr. Darren Ranco, Associate Professor of Anthropology and Coordinator of Native American Research, University of Maine  
                (hosted by the UNH Arctic Network) |                                                                                      |

*The Fall Environmental Sciences Seminar Series is sponsored by Natural Resources and Earth Systems Science (NRESS) Ph.D Program, in partnership with the Earth Systems Research Center, and the Natural Resources and the Environment and Earth Science Departments. Navigating the New Arctic mini-series is co-sponsored by the UNH Arctic Network.*