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Byrd Polar & Climate Research Center
Director Candidate
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Decoding Climate System Secrets

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With a record of over 4 billion years, Earth's archives should provide a rich catalogue of information that can inform us about how the climate system responds to variable forcing. Indeed, the information extracted from archives such as ice cores and marine sediments makes it very clear that human society has prospered in a rather unique and abbreviated interval of Earth's long and dynamic climate history. But while these archives have informed us about how variable the climate system of Earth is, we still lack a fundamental understanding of WHY the climate system responded as it did. This is the frontier in climate science, to pursue a comprehensive understanding of Earth System dynamics. This frontier offers great opportunities for interdisciplinary collaborations.

In this talk I will discuss what I term the Grand Challenges in Climate Science. I begin by describing what motivates my research and how my research has been shaped by the explorations, by the discoveries, and by the applied investigatory endeavors that involved interdisciplinary collaborations. I will then focus on one specific climate mystery, the Earth's glacial to interglacial transitions during the late Pleistocene. These transitions mark some of Earth's largest climatic events, the most recent of which heralded in the expansion of human populations. An extensive array of archives from this period document how the Earth environment changed during the glacial-to-interglacial transitions. This includes a detailed record of atmospheric greenhouse gases, changes in radiative forcing, and ocean dynamics that varied in response to these forcings. And yet, after decades of dedicated research, the climate science community has been unable to fully decode the secrets that would explain why these glacial to interglacial transitions varied so systematically from one glaciation to the next and why the transitions were so closely coupled to temperature variability at the poles. I will describe a new and provocative hypothesis we have put forth to account for this systematic behavior and the link to high latitude climate variability. Importantly, this hypothesis builds on recent discoveries made by non-climate scientists who are decoding other parts of Earth's dynamic behavior. I will discuss how we have begun to test this hypothesis. And hopefully, this will serve to illustrate how the Grand Challenges in climate science will likely to be conquered by bringing together interdisciplinary efforts that can bridge the traditional disciplinary categories and unlock Earth's encryption.

Thursday, March 31, 2016
Room 177 Scott Hall @ 12:00 noon

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Everyone is welcome to attend!!