

# Physics Seminar

Monday, February 5, 3:30 pm  
Science & Engineering Building Room 144

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## **Air-Shower Reconstruction and Anisotropy: the search for high-energy cosmic-ray sources**

As recent discoveries with neutrinos and gravitational waves usher in a new era of multi-messenger astronomy, it is important to look at the particles that started the whole field: cosmic rays. These charged particles from space include the highest-energy particles ever detected, with energies many times greater than anything produced on Earth. Now, over a hundred years after their discovery, we are still asking some fundamental questions, namely, "What are they made of?" and "Where do they come from?" My work is dedicated to answering these two questions. To reconstruct cosmic-ray composition, I am coupling machine-learning techniques with advanced simulation of air showers observed at ground level. To determine their origins, I use data from the IceCube Detector at the South Pole to look for nearby sources and study how cosmic rays interact with the local Galactic magnetic field. This work is part of a larger effort in multi-messenger astronomy to "see" the Universe in a completely new light; it is a science of discovery where we don't know what we will find!

*Please join us for light refreshments at  
3:15pm in the SEB Lobby.*