

**ATS/CIRA Colloquium**

**Imme Ebert-Uphoff**

**Visiting ATS from CSU Department of Electrical and Computer Engineering**

**Causality 101 for Geoscientists**

**Hosted by Libby Barnes**

**Friday, March 30, 2018**

**ATS room 101**

**Discussion will begin at 11:15 a.m.**

**Refreshments will be served at 10:45 a.m. in the weather lab**

This talk provides a basic introduction to the principles of causal discovery, i.e. the process of detecting potential cause-effect relationships from data. The primary goal is to teach the audience how to think about causality conceptually, and to provide an intuitive understanding of some of the opportunities and limitations of today's causal discovery methods. We introduce basic concepts, such as graphs as universal language for causality, intervention vs. observation analysis, and Granger vs. Pearl causality. We cover one method for identifying potential cause-effect relationships from observed data in detail, namely constraint-based structure learning based on conditional independence tests. Finally, we illustrate the use of this method for several climate applications. Time permitting, we will highlight common steps to successful collaboration between a geoscientist and a causality scientist, and the important roles that both scientists play in such a collaborative effort.

Link to colloquia page: <https://www.atmos.colostate.edu/colloquia/>