Planetary Causal Inference: Understanding Society and Economy through Earth Observation

Connor T. Jerzak

(University of Texas)

23/10/2024, 4:15 pm

Department of Statistics, Ludwigstr. 33, Room 144
and online via Zoom (Link)
(Meeting-ID: 631 1190 7291; Password: StatsCol)

The book "Planetary Causal Inference" explores how Earth observation (EO) data can enhance social science research, advancing our understanding of human impact on the environment, society, and economy. While traditional methods using surveys and national statistics can be costly and limited, EO data from satellites offers a global, real-time perspective for studying phenomena like urbanization, poverty, conflict, and deforestation at fine resolutions. The book introduces causally-oriented EO-based machine learning (ML), where spatial data from images are analyzed to create proxies for social science metrics and for use in causal inference. These planetary causal inference methods can provide high-resolution insights into global social issues, offering new ways to assess conflict, sustainable development, and other phenomena. By combining insights from geography, history, and multi-scale analysis, "Planetary Causal Inference" provides a foundation for researchers to address integrated questions across household, neighborhood, regional, and global scales. The book's cookbook-style framework of 'ingredients' and 'recipes' empowers social scientists to adopt EO-ML methods, develop their own research approaches, and tackle pressing questions on a planetary scale.

About the Speaker:
Connor T. Jerzak is an Assistant Professor in the Department of Government at the University of Texas at Austin. His research interests are political methodology, causal inference, AI & global development, computational text analysis and substantive applications. He is a Visiting Fellow of the Center for Advanced Studies (CAS) at LMU in October 2024 at the invitation of Prof. Dr. Paul Thurner (LMU) in the context of the CAS Research Focus Prevention of Conflict.

The book "Planetary Causal Inference" is based on the following papers:

Connor T. Jerzak, Fredrik Johansson, Adel Daoud. Image-based Treatment Effect Heterogeneity. *Proceedings of the Second Conference on Causal Learning and Reasoning (CLeaR), Proceedings of Machine Learning Research (PMLR),* 213: 531-552, 2023. [PDF]

Kazuki Sakamoto, Connor T. Jerzak, Adel Daoud. A Scoping Review of Earth Observation and Machine Learning for Causal Inference: Implications for the Geography of Poverty. *To appear in: Hall, Ola and Ibrahim Wahab (eds.), Geography of Poverty*, 2024. [PDF]

Connor T. Jerzak, Ritwik Vashistha, Adel Daoud. Effect Heterogeneity with Earth Observation in Randomized Controlled Trials: Exploring the Role of Data, Model, and Evaluation Metric Choice. *ArXiv Preprint*, 2024. [PDF]

Connor T. Jerzak, Fredrik Johansson, Adel Daoud. Integrating Earth Observation Data into Causal Inference: Challenges and Opportunities. *ArXiv Preprint*, 2023. [PDF]

Connor T. Jerzak, Adel Daoud. CausalImages: An R Package for Causal Inference with Earth Observation, Bio-medical, and Social Science Images. *ArXiv Preprint*, 2023. [PDF]