*Welcome seminar for new faculty*

# Doing research on shifting sands:Causal inference and machine learning in the social sciences


## *A seminar by Bruno Arpino*

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## Friday 13 Oct 2023 | 12:30 p.m.
## Room Benvenuti
## Department of Statistical Sciences


Social scientists are often interested in estimating the causal effect of a given event or behavior on certain outcomes. In this field, designing a randomized experiment is usually not a feasible strategy, and social scientists have to rely on observational studies characterized by all sort of complications, including the presence of observed and unobserved confounders, measurement errors and reverse causality.

In this seminar, I will summarize my research interests with a special focus on contributions in the area of causal inference. In this field of research, propensity score methods are used to estimate the effect of a treatment under the assumption that conditional on observed confounders the treatment is independent of potential outcomes. Propensity scores, defined as the conditional probability of the treatment given observed variables, provide a unidimensional synthesis of the set of observed variables. Under certain assumptions, conditioning on the propensity score guarantees balancing the distribution of confounders across treatment groups, and removing bias of causal effects estimators.

I will discuss how propensity score methods can be adapted in the presence of hierarchically structured data to also reduce bias due to unobserved group-level factors. Usually, true propensity scores are unknown to the researcher and need to be estimated. I will show the utility of machine learning techniques in the estimation of propensity scores to guarantee a (semi-)automatic and better balancing of confounders.

I will conclude the seminar with my plans for future research in the short run, which include machine learning techniques for predicting social behaviors characterized by a high degree of heterogeneity.



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