

Ph.D. in “Life Course Research” – Socio-demographic curriculum  
Academic Year 2025-2026

**Computational Social Science**

Prof. M. Tizzoni

**Objectives**

This short course aims to provide doctoral students with the necessary elementary ingredients to familiarize themselves with machine learning and computational modelling for the investigation of social science research problems. It will be delivered in two distinct lessons, each lasting three hours. The first lecture will introduce some basic concepts of machine learning with a focus on applications to the social sciences. The second lecture will focus on mechanistic, individual-based modelling for the social sciences.

**Program**

*May 27, Wednesday 15.00-18.00*

– Introduction to machine learning for the social sciences: a brief history of ML; the two cultures; to explain or to predict? A practical example: the Fragile Families Challenge.

*May 28, Thursday 10.00-13.00*

– Introduction to mechanistic modelling for the social sciences. Models of segregation, opinion dynamics, social contagion, cultural evolution.

**Suggested lectures**

- Molina, M., & Garip, F. (2019). Machine Learning for Sociology. *Annual Review of Sociology*, 45 (1), 27–45. <https://doi.org/10.1146/annurev-soc-073117-041106>
- Breiman, L. (2001). Statistical Modeling: The Two Cultures (with comments and a rejoinder by the author). *Statistical Science*, 16 (3), 199–231. <https://doi.org/10.1214/ss/1009213726>
- Lazer, D., Pentland, A., Adamic, L., Aral, S., Barabasi, A.-L., Brewer, D., Christakis, N., Contractor, N., Fowler, J., Gutmann, M., Jebara, T., King, G., Macy, M., Roy, D., & Alstyn, M. V. (2009). Computational Social Science. *Science*, 323 (5915), 721–723. <https://doi.org/10.1126/science.1167742>
- Acerbi, A., Mesoudi, A. & Smolla, M. (2022). Individual-based models of cultural evolution. A step-by-step guide using R. Routledge (available at <https://albertoacerbi.github.io/IBM-cultevo/>).

**Requirements**

None