

The complex systems laboratory at Politecnico di Torino, directed by Prof. Alessandro Rizzo, is looking for a Ph.D. candidate to carry out research on the research theme

“Hacking a complex world: unraveling the mechanisms underlying complex social and technological phenomena”

The research will be developed in collaboration with the Dynamical Systems Laboratory at the New York University Tandon School of Engineering (NYU-Tandon), directed by Prof. Maurizio Porfiri. The duration of the Ph.D. program is three years and includes a mandatory visiting period at NYU-Tandon of at least 18 months, fractioned in at most three six-months periods.

The research project will establish a new theoretical and translational framework to model, monitor, and control complex temporal networks representative of social and technological systems, with particular emphasis on the spread of infectious diseases and cooperative robotics. This framework will overcome many of the critical constraints of traditional network models. Epidemic spreading is of extremely wide interest, since it is representative of many phenomena occurring in populations, such as gossiping, propagation of fake news, payments, and diffusion of innovation. The selected modeling paradigm will account for inherent heterogeneity issues in the mobility, behavior, and propensity to make contacts individuals in a population. In this regard, we will advance the field of activity-driven networks (ADNs), to encapsulate these phenomena and many others, such as the variation of individual activity due to health status or risk perception.

Our proposed research capitalizes on compelling preliminary results on modeling epidemic spreading using ADNs and a strong expertise on time-varying networks. The specific objectives of the collaboration are:

1. Design of realistic epidemic models based on activity-driven networks
2. Community detection in complex societies
3. Optimization of non-therapeutical containment procedures
4. Translating complex networks analysis and control to technological systems

The ideal candidate should have a solid background in dynamical systems, complex networks, and statistics. Knowledge of a programming language for the simulation of dynamical systems and visualization of the results is mandatory (Matlab, R, Python, C++, etc.).

Salary is EUR 17500 before taxes, and will be incremented by 50% during the periods spent abroad. Additional funds to cover further expenses will be assigned by the supervisor upon performance assessment.

Prospective candidates must apply to the official Ph.D. selection of Politecnico di Torino, following this link <http://dottorato.polito.it/en/scholarships> and specifying that they want to apply to the specific project. The new fellowships have not been published yet, the deadline to apply will be set around Summer 2018.

For further information, contact

Prof. Alessandro Rizzo – Politecnico di Torino

Web <http://staff.polito.it/alessandro.rizzo>

Email [alessandro.rizzo@polito.it](mailto:alessandro.rizzo@polito.it)