



EAEPE Special Session on

## **Machine learning, AI, and Robotization: Effects on socio-economic systems and opportunities for economic analysis**

at the EAEPE Annual Conference (Warsaw, September 12-15, 2019)

### **Organizers**

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<b>Torsten Heinrich</b>	<b>Alessandro Caiani</b>	<b>Magda Fontana</b>	<b>Andrea Roventini</b>
University of Oxford	University of Pavia	University of Turin	Sant'Anna School of Advanced Studies - Pisa

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The special session is a cooperation of *Research Areas [Q] - Economic Complexity* and *Research Areas [S] - Evolutionary Economic Simulation* of the European Association for Evolutionary Political Economy.

### **Keynote Speakers**

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<b>Giovanni Dosi</b>	<b>Amir Sani</b>
Sant'Anna School of Advanced Studies - Pisa	University of Oxford

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### **Scope**

The dawn of new technologies based on machine learning, big data, and artificial intelligence poses important questions and challenges for economists and social scientists in general.

These technologies are exerting a huge impact on the everyday life of individuals by changing the way they consume, relate with each other, gather and distribute information, access services and interact with institutions.

Hailed for their potential to improve our lives, these technologies have nonetheless downsides. The widespread adoption of AI technologies has also raised serious concerns for its socio-economic implications. Automation and robotization are radically changing the way production is organized and carried out. Robots are now replacing humans not only in the carrying out of traditional "routine" tasks but also in more complex operations. Jobless recovery, job polarisation, and skill-biased technological change (e.g. Acemoglu and Autor, 2011) testify to the pervasive effects exerted by new technologies on employment patterns within and across sectors. This entails important questions for economists and policy makers: Which categories of workers are most affected by the diffusion of robotization? How do new technologies affect the return on education and the distribution of income? How can we deal with technological unemployment?

Furthermore, the rise of big data analytics and the corresponding recording, storage, and computation infrastructure heralds the end of privacy in the traditional sense. The technological feasibility of recovering social information from limited online social networking data, even about third persons that were not represented in the original data set (“shadow profiles”), has been conclusively demonstrated (Garcia, 2017). At the same time, access to data is becoming more central in economic systems. This industry is subject to heavy network effects and increasing returns, both aspects that are known to favor big firms and technological lock-ins (Arthur, 1989). While the increasing fears of social control, surveillance, and political manipulation appear to be overstated, it is likely that socio-economic systems are entering a phase of significant change. Evolutionary theory and complexity economics provide a privileged theoretical framework to address these issues: The research on technological paradigms, techno-economic paradigms, great surges of development (see for example Dosi, 1982, Freeman 1991, and Perez, 2007) provides a valuable perspective to investigate the complex relationships between innovations and the evolution of economic systems, allowing to spot analogies, novelties and discrepancies with previous waves of innovations.

## Program

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### Session MACHINE1

**Chair:** Torsten Heinrich

**Venue:** Aud.VII

**Friday, Sep 13 2019, 14:30-16:30**

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**Keynote:**  
**Amir Sani**

**Simulating Complex Asymmetries in the Age of AI**

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Thomas Marmefelt

Artificial Intelligence, Complexity, and the Economy as Emergent Order

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Marta Simoes, Pedro Bação,  
Vanessa Gaudêncio

AI, Demand and Employment: a Sectoral Analysis of the Portuguese Economy

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Filippo Bertani, Linda  
Ponta, Marco Raberto,  
Andrea Teglio, Silvano  
Cincotti

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The Complexity of the Intangible Digital Economy: An Agent-Based Approach

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### Session MACHINE2

**Chair:** Andrea Roventini

**Venue:** Aud.V

**Saturday, Sep 14 2019, 16:30-18:30**

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**Keynote:**  
**Giovanni Dosi**

**Whither the Evolution of the Contemporary Social Fabric? New Technologies and Old Socio-Economic Trends**

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Jakub Growiec

The Hardware-Software Model: A New Conceptual Framework of Production, R&D, and Growth with AI

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Jacopo Staccioli, Fabio  
Montobbio, Marco Viva-  
relli, Maria Enrica Virgillito

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Robots and Their Knowledge Generation: Patenting and Firm-Level Performance

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## Topics

Agent-based models provide a fundamental tool to analyse the micro- and macroeconomic implications of technological change, to test the efficacy and desirability of alternative policies and regulation schemes, and to carry out counterfactual experiments.

The development of these computational tools has notably been significantly affected by the rise of machine learning and other digital technologies. Data Science and machine learning tools represent a key ingredients in the process of designing, calibrating, estimating, analysing, and validating these models.

AI, robotization and new digital technologies have the potential to provide solutions to societal challenges and to promote sustainable and inclusive growth. At the same time, they pose new threats and new challenges related to their governance.

Interestingly, while agent-based models and complexity systems science provide a powerful and comprehensive framework to analyze the role of AI and machine learning in our societies, their own development has been increasingly affected by these new technologies.

The special session aims to provide a forum for the discussion of both the research potential and the social and economic consequences of machine learning, big data, artificial intelligence and other data science concepts. For this reason, we welcome methodological, empirical and theoretical contributions in the following fields:

- The economic and social impact of AI, machine learning and automation-robotization;
- Agent-based and network models of technological change;
- Machine learning and data science tools for economic simulation.