Luca **Verginer**

Economist · Data Scientist

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I am an Economist analysing through the tools of complex network, machine learning, econometrics and lab experiments various aspects of socio-economic systems.

Experience

ETH Zürich   *Zürich, CH*
Postdoc   *April 2019 (current position)*
- **Research:** I work on several research projects involving network analytics, economics and data science. See the projects section for details.
- **Teaching:** I am teaching the tutorial classes for "Complex Networks", a course taught to master students with ca 60 participants every year. The course focuses on teaching methods for the statistical analysis of networks (e.g., social networks, power grids).
- **Supervision:** I supervise PhD students in formulating their research plan and carrying out the research. I also supervise MSc and BSc students from various departments.

Education

Ph.D in Economics and Data Science   *Lucca, Italy*
IMT School for Advanced Studies Lucca   *Nov. 2015 — Feb. 2019*

MSc in Economics   *Trento, Italy*
University of Trento   *Oct. 2012 — Feb. 2015*

BSc in Accounting and Finance   *Bradford, UK*
University of Bradford   *Nov. 2009 — Feb. 2012*

Publications

Peer-reviewed

The Impact of the COVID-19 Pandemic on Scientific Research in the Life Sciences
   Massimo Riccaboni, Luca Verginer
   PLOS ONE 17.2 (Feb. 2022) e0263001. 2022

Analysis and Visualisation of Time Series Data on Networks with Pathpy
   Jürgen Hackl, Ingo Scholtes, Luka V. Petrović, Vincenzo Perri, Luca Verginer, Christoph Gote
   Companion Proceedings of the Web Conference 2021, 2021, Ljubljana Slovenia

A Network Approach to Expertise Retrieval Based on Path Similarity and Credit Allocation
   Xiancheng Li, Luca Verginer, Massimo Riccaboni, P. Panzarasa
   Journal of Economic Interaction and Coordination (July 2021). 2021

Reproducing Scientists' Mobility: A Data-Driven Model
   Giacomo Vaccario, Luca Verginer, Frank Schweitzer
   Scientific Reports 11.1 (Dec. 2021) p. 10733. 2021

Stem Cell Legislation and Its Impact on the Geographic Preferences of Stem Cell Researchers
   Luca Verginer, Massimo Riccaboni
   Eurasian Business Review 11.1 (Mar. 2021) pp. 163–189. 2021

Talent Goes to Global Cities: The World Network of Scientists' Mobility
   Luca Verginer, Massimo Riccaboni
   Research Policy 50.1 (Jan. 2021) p. 104127. 2021

Foreword to the Special Issue on Success in Science
   Luca Verginer, Giacomo Vaccario, Alexander M Petersen
   Advances in Complex Systems (2021) p. 2. 2021

Should the Government Reward Cooperation? Insights from an Agent-Based Model of Wealth Redistribution
   Frank Schweitzer, Luca Verginer, Giacomo Vaccario
   Advances in Complex Systems 23.07 (Nov. 2020) p. 2050018. 2020

The Mobility Network of Scientists: Analyzing Temporal Correlations in Scientific Careers
   Giacomo Vaccario, Luca Verginer, Frank Schweitzer
   Applied Network Science 5.1 (Dec. 2020) p. 36. 2020

Cities and Countries in the Global Scientist Mobility Network
  Luca Verginer, Massimo Riccaboni
  Applied Network Science 5.1 (Dec. 2020) p. 38. 2020

PREPRINTS

The Role of Network Embeddedness on the Selection of Collaboration Partners: An Agent-Based Model with Empirical Validation
  Frank Schweitzer, Antonios Garas, Mario V. Tomasello, Giacomo Vaccario, Luca Verginer
  arXiv:1403.3298 [physics] (Jan. 2022). 2022

The Impact of Acquisitions on Inventors' Turnover in the Biotechnology Industry
  Luca Verginer, Federica Parisi, Jeroen van Lidth de Jeude, Massimo Riccaboni
  arXiv:2203.12968 [econ, q-fin] (Mar. 2022). 2022

When Standard Network Measures Fail to Rank Journals: A Theoretical and Empirical Analysis
  Giacomo Vaccario, Luca Verginer
  arXiv:2106.15541 [physics] (June 2021). 2021

Teaching

COURSES

Complex Networks   *ETH Zürich*

MSc AND PHD COURSE   *2021*

- I teach the tutorial classes for the course. The corse covers fundmantals of graph theory and introduces the students to advanced methods to analyse socio-economic systems.

SUPRVISION

Tai Hong   *MSc Thesis*

CRITICAL NODES IN A DISTRIBUTION NETWORK   *2021*

Jan Thurnheer   *BSc Thesis*

MODELLING DISTRIBUTED PRODUCTION AND FLOW OF INVESTMENTS   *2021*

Yansong Yun   *Semester Thesis*

MODELLING CHARACTERISTIC DISTRIBUTION TIMES IN SUPPLY CHAINS   *2020*

Amirhossein Kazemi   *Semester Thesis*

STOCHASTIC ACTOR-ORIENTED MODELS IN R&D NETWORKS   *2018*

Current Research Projects

Quantifying resilience in pharmaceutical distribution networks   *Pharmaceutical Sector*

KEYWORDS: PHARMACEUTICAL INDUSTRY, NETWORK ANALYSIS, SHOCK SIMULATIONS, SUPPLY CHAINS

- Thanks to a unique dataset covering a decade of daily opioid shipments, we can track billions of pills from manufacturing to prescription. We develop methods to **identify critical suppliers and manufacturers** for the entire US. The project aims to develop techniques to extract critical nodes from massive real-world supply chain networks to formulate best response and prevention policies.

Estimating the impact of COVID 19 on the automotive industry's supply networks   *Automotive Sector*

KEYWORDS: AUTOMOTIVE INDUSTRY, NETWORK ANALYSIS, IMPACT ASSESSMENT

- Using a sizeable proprietary database containing factories, OEM's, sales and assembly details for hundreds of car models, we develop models to approximate the global automotive industry's supply chain. Specifically, by exploiting the COVID 19 demand shock, we want to identify the **shock diffusion mechanisms** and the size of the amplification of losses up and downstream.

Quantifying intellectual property competition and litigation from patent data   *Intellectual Property*

KEYWORDS: PATENTS, NATURAL LANGUAGE PROCESSING (NLP), COMPETITION, LITIGATION

- Global companies, especially in specific sectors (e.g. pharmaceutical, tech), rely on intellectual property (IP) for their competitive advantage. This is illustrated by the size of patent portfolios and aggressive litigation. Using patent citation and patent claims (processed with NLP), we aim to develop a score to quantify **IP and R&D rivalry** among international firms. This score estimates the likelihood of litigation and payment of licensing fees.

Increasing cooperation in prisoner dilemma (PD) games   *Behavioural Experiments*

KEYWORDS: BEHAVIOURAL ECONOMICS, GAME THEORY, EXPERIMENT DESIGN, ECONOMETRICS

- I am developing with colleagues a **behavioural experiment** to validate several theoretical mechanisms, developed at the chair, to increase collaboration between real players. The project aims to identify if and which of these interventions has the potential to increase real-world cooperative behaviour.

Pathpy: A temporal network analysis package for python   *Software Development*

KEYWORDS: TEMPORAL NETWORKS, SOFTWARE DEVELOPMENT, DATA ANALYSIS

- As part of a group of researchers from several universities, I develop as a core contributor, a temporal network analysis library, pathpy. Temporal networks are a new and exciting research are to analyze sequential and temporal data. The project aims to build a high quality library to address several shortcomings of current network analysis tools. See `http://www.pathpy.net` for more details.

Skills

Programming	Go, Python, R, Mathematica, Bash
DataBases	SQL, Neo4j, PostGis
Machine Learning	Tensorflow, PyTorch, FastAi, Numpy
DevOps	Docker, AWS, Git
Front-end	Hugo, HTML, JavaScript, SCSS, Django, LaTeX, Adobe Illustrator, Adobe InDesign
Languages	German, English, Italian, Rhaeto-Romance

Languages

Native/Bilingual	German, Italian, Rhaeto-Romance
Full Professional Proficiency	English
Limited Working Proficiency	French