

Luca Verginer

ECONOMIST · DATA SCIENTIST

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Currently Postdoc at the Chair of Systems Design at ETH Zürich. I am an Economist analysing through the tools of complex network, machine learning and econometrics supply networks in the pharmaceutical and automotive sector among several major projects. I am, first and foremost, an economist looking to identify causal relationships exploiting shocks and disruption. To produce convincing, relevant research, it is necessary to keep up with cutting edge methods and techniques. For this reason, I am an avid programmer with proven software development skills.

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.

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 area 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.

Education

IMT School for Advanced Studies Lucca

Lucca, Italy

PH.D IN ECONOMICS AND DATA SCIENCE

Nov. 2015 — Feb. 2019

Selected Publications

Talent Goes to Global Cities: The World Network of Scientists' Mobility

Luca Verginer, Massimo Riccaboni

Research Policy 50.1 (Jan. 2021) p. 104127. 2021

The Impact of the COVID-19 Pandemic on Scientific Research in the Life Sciences

Luca Verginer, Massimo Riccaboni

2021

The mobility network of scientists: Analyzing temporal correlations in scientific careers

Giacomo Vaccario, Luca Verginer, Frank Schweitzer

Applied Network Science 5.1 (July 2020) p. 36. 2020

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