TRIVIK VERMA

DELFT, ETH, UNIVERSITY OF LISBON
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EDUCATION

Feb 2013 - Jan 2016
Switzerland

● PhD in **Computational Statistics** : Mobility Networks
at ETH Zurich

All networks set up with an economy and a system for incentives eventually drift towards a small group of controlling core and a loose periphery. My dissertation sheds light on how social and infrastructural networks fundamentally function. Using data science and statistical analysis, computer simulations show the emergence of physical laws that direct the evolution of such networks.

Sep 2010 - Aug 2012
Netherlands

● MSc, Computer Engineering / **Networks and Distributed Systems**
at Delft University of Technology

Traditional scientific approaches underestimate the vulnerability of complex real-world infrastructures which affects efficiency and throughput. A new methodology that takes into account the functionality of underlying networks proves to give more accurate results.

Aug 2006 - Jun 2010
India

● Bachelors, **Computer Science and Engineering**
at Manipal University

A diverse program combining all fields of computer science and software development together with an in depth study of networks, data structures, computer hardware, information theory, mathematics and design.

PUBLICATIONS

CURRENT WORK

» Moutsinas, G., Verma, T., Guo, W. (In Progress) Universal Node Resilience of Power Grids.
» Promise and Perils of an Algorithm-driven Society. (Book Chapters)
» Verma, T., Rebelo, L., Araújo, N. A. M. (Manuscript submitted to Plos One) Distance Transformed Tourism.
» Verma, T., Folini, M., Wang, Yi., Heinimann, H. R., Araújo, N. A. M. (In Progress) Navigation in cities - A new GPS.
» Krummenacher, F., Verma, T., Heinimann, H. R. (Modelling) DNA of cities
» Kornecki, I., Verma, T., Araújo, N. A. M. (Modelling) From mobility to population dynamics: Where do people live and work?
» Verma, T. (Modelling and Simulation) Structural correlations in evacuation dynamics of cities.

PUBLISHED (* representative publications)

* Verma, T., Russmann, F., Araújo, N. A. M., Nagler, J., & Herrmann, H. J. (2016). Emergence of core–peripheries in networks. Nature Communications, 7, 10441.

* Verma, T., Araújo, N. A., & Herrmann, H. J. (2014). Revealing the structure of the world airline network. Scientific Reports, 4, 5638.

* Koc, Y., **Verma, T.**, Araujo, N. A., & Warnier, M. (2013, November). Matcasc: A tool to analyse cascading line outages in power grids. In Intelligent Energy Systems (IWIES), 2013 IEEE International Workshop on Intelligent Energy Systems (pp. 143-148). IEEE.

Verma, T., Ellens, W., & Kooij, R. E. (2015). Context-independent centrality measures underestimate the vulnerability of power grids. *International Journal of Critical Infrastructures* 7, 11(1), 62-81.

Verma, T., Araújo, N. A. M., Nagler, J., Andrade Jr, J. S., & Herrmann, H. J. (2016). Model for the growth of the world airline network. *International Journal of Modern Physics C*, 27(12), 1650141.

Louzada, V. H., Araújo, N. A., **Verma, T.**, Daolio, F., Herrmann, H. J., & Tomassini, M. (2015). Critical cooperation range to improve spatial network robustness. *PloS one*, 10(3), e0118635.

Orbe, C., **Verma, T.**, Balac, M., & Ciari, F. (2015). Evaluating the effects of variable user demand on a round-trip, one-way, and free-floating car sharing fleet in the city of Zurich, Switzerland. In 4th Symposium of the *European Association for Research in Transportation* (hEART 2015): Abstracts (p. 50). hEART 2015.

Rosas-Casals, M., Bologna, S., Bompard, E. F., D'Agostino, G., Ellens, W., Pagani, G. A., ... & **Verma, T.** (2015). Knowing power grids and understanding complexity science. *International Journal of Critical Infrastructures*, 11(1), 4-14.

SKILLS

Engineering Sciences

Algorithmic Design
Stochastic Modelling
Statistical Analyses
Network Analyses
Machine Learning
Bayesian Modelling
Data Mining
Game Theory
Graphics & Visualization

Programming Languages

C++, Java
R, Python, Matlab
Latex, Markup
Bash
CSS, PHP, HTML
JavaScript
PostgreSQL

MEDIA COVERAGE

» MIT Technology Review
» ETH News
» University of Illinois at Chicago
» Lëtzebuerger Journal

GRANTS & AWARDS

» **TU Delft Top Talent Fellowship 2010-2012**
» ETH48 **PhD Scholarship** from **Swiss Re**
» LuxInnovation 2017 research grant (€ 100k - partially funded)
» Booking.com Booster Lab (€ 20,000)
» Branco Weiss Fellowship 2018 (Rejected)
» National Geographic Fellowship 2018 onwards

TEACHING

Spatial Analysis, Modelling and Optimization
Environmental Science at ETH Zurich, 2018

National Geographic University Workshops
Churchill Northern Studies Centre, Canada 2018

REVIEWING FOR JOURNALS

» **Physical Review Letters (PRL)**
» PloS One
» IJMPC
» Physica

WORK EXPERIENCE

Dec 2017 - Present
Switzerland

Senior Postdoctoral Fellow
at Dept. of Environmental Systems Science, ETH Zurich
Modelling and Simulation of physical laws in **Urban Infrastructure Systems**, and using the insights to learn from city dynamics on a global scale.

April 2015 - Present
Luxembourg

Board Member (non-executive)
at The Outdoor Journal & Voyage

Mar 2016 - Present
Portugal

Collaborator, Center for **Theoretical and Computational Physics**
at FCUL, University of Lisbon
Mentoring Master Projects in Computaional Statistics and Network Science

April 2015 - Nov 2017
Luxembourg

Chief Data Scientist, Co-Founder (€ 1 million Seed)
at The Outdoor Journal & Voyage
Lead global scientific operations including grant applications, design, research and hiring.

April 2015 - Nov 2017
India

Head of Publishing
at The Outdoor Journal & Voyage
Directed and produced print and web media content.

Apr 2011 - Dec 2012
Netherlands

Research Scientist
at TNO, Performance of Networks and Systems
Sole engineer in a five-member team which established an **Agent-Based** Smart-Grid Energy model for the Dutch Government as a prototype.

Jan 2010 - May 2010
India

Network Security Engineer
at Cisco Systems
Engineered dummy setups for troubleshooting client operations and setting up client side network mirrors for safety backups.

Jun 2009 - Jul 2009
India

Web Design Architect
at HSBC
Designed Learning Management Systems; Syntax, Language and Semantic design. Exposure to web technologies and a global banking structure.

INVITED TALKS

Socially Optimal Traffic and the DNA of Cities Guest Tutorial
Web Science Summer School
at Leibniz University, Hannover in Aug 2018

Forecasting Air-Traffic Network Demand and Supply Seminar
Swiss Re Institute
at Swiss Re HQ, Switzerland in Feb 2016

Transport Networks: Growth and Optimization Seminar
ETH Risk Center
at ETH Zurich, Switzerland in July 2015

Structure of Transport Networks Lightening Talk
NetSci: International School and Conference on Network Science
at Berkeley, California in June 2014

Emergence of Risk: Cascading Failure and Damage Control Partner Council Meeting
ETH Risk Center
at ETH Zurich, Switzerland in May 2013

Vulnerability of Power Grids to Cascading Failures Seminar
Performance of Networks and Systems
at TNO, Delft, Netherlands in July 2012

ACADEMIC MENTORING

- » Franziska Krummenacher, Master Thesis, ETH Zurich, Feb 2019
- » Itto Kornecki, Master Thesis, ETH Zurich, Feb 2019
- » Luís Rebelo, Master Thesis, FCUL Portugal, Sep 2018
- » Marc Folini, Research Assistant, ETH Zurich, Dec 2017-Present
- » Fabian Russmann, Master Thesis, ETH Zurich, March 2015

STRENGTHS

Entrepreneurship

Research & Development
Project Management
Grant Pitching
Presentation
Technical Leadership
Networking
Operations Management
Resilience

Media and Technology

Editing
Publishing
CMS Operations
Photography
Adobe Suite
Office Suite
Video Production
Graphic Design

COLLABORATIONS

Complex Networks
- » Robert Kooij, TU Delft, Master Advisor
- » Nuno Araújo, FCUL Lisbon, PhD Supervisor
- » Raissa D'Souza, UC Davis

Systems Engineering
- » Martijn Warnier, TU Delft, Master Coadvisor
- » Weisi Guo, Warwick & Alan Turing Institute
- » Sybil Derrible, University of Illinois at Chicago

Agent Based Modelling
- » Dirk Helbing, ETH Zurich, PhD Coadvisor
- » Frank Schweitzer, ETH Zurich

Computational Social Science
- » Ryan Murphy, ETH, University of Zurich & Morningstar, Inc.
- » Jan Nagler, ETH Zurich & Frankfurt School of Finance & Management
- » Marco Tomassini, EPFL

Computational Statistics
- » Hans Herrmann, ETH Zurich
- » José S. Andrade Jr., Universidade

CERTIFICATIONS

- » National Geographic Teaching Instructor
- » Cisco Certified Network Associate (CCNA)
- » International Student Coach, TU Delft
- » Wilderness First Aid and CPR - Aerie Backcountry Medicine, USA

INTERESTS

- » Climbing, Snowboarding, & Mountaineering
- » Journalism and Writing
- » Adventure Photography
- » Environmental Conservation

LANGUAGES

English (F), Hindi (N), Russian (I), German (B)