



POLITECNICO
DI TORINO



UNIVERSITÀ
DEGLI STUDI
DI TORINO



Dipartimento Interateneo di Scienze, Progetto e Politiche del Territorio



PhD Excellence Course

Data intensive approaches to urban and regional development

The interdisciplinary course is addressed to provide a sound knowledge regarding acquisition and methods to analyse data (earth, smart phone, satellite, GPS) , complex networks resilience and vulnerability, cybersecurity and privacy which are becoming every day more essential to the management of urban services and infrastructures.

Data Science has become a key ingredient for the management of the modern urban and regional infrastructures. The number and size of the relevant datasets is growing and become increasingly heterogeneous: map data, mobility data, space usage, human driving behavior and infrastructures data will be continuously linked to each other to serve to the scope of each single user worldwide.

On one hand data and platform access can add clues to solve a number of issues, in order to make infrastructure interoperability and performances efficient for the users and for public and private investors.

On the other hand data access may imply a number of risks, intrinsically related to the individual privacy and social security.

The course is addressed to provide a sound knowledge regarding acquisition and methods to analyse data (earth, smart phone, satellite, GPS), complex networks resilience and vulnerability, cybersecurity and privacy.

The course will be jointly held by outstanding scholars with high international reputation in the above field.

Scientific Coordinator: Cristina Pronello

Lecturers: Kay Axhausen (ETH Zurich)
Shlomo Havlin (Bar-Ilan University)
Meiko Jensen (German Research Center for Privacy and Security)
Aki-Hiro Sato (Kyoto University)

Formative Credit Units (CFU): 4

Calendar: 14th, 15th, 16th, 17th, 19th, 20th October 2015

Venue: Sala Vigliano – Interuniversity Department of Regional and Urban Studies and Planning - DIST
Castello del Valentino. Viale Mattioli, 30. 10125 Torino

Politecnico e Università di Torino: Dottorato di Ricerca in Urban and Regional Development

c/o DIST
Castello del Valentino
Viale Mattioli, 39 – 10125 TORINO Italy
tel: +39 011 090 6439 fax +39 011 090 7461
e-mail: assegnidottorati.d.ist@polito.it

Course scheduling

14 October 2015

9:00-13:00

Opening and plenary session of the International Conference:
Challenges in Data Science: a complex systems perspective
October 14-17 2015. Castello del Valentino. Torino, Italy

**The students can attend to the conference plenary in video streaming,
in Sala Vigliano - DIST**

Topics and programme at: <http://bit.do/DataScienceChallenges>

15:00-17:00

Prof. Aki-Hiro Sato

Participatory design from a data-centric point of view

- Guidance (0.5h)
- Lectures on data-centric science (1.5h)
 1. Open data
 2. Government open data (e-Stat)
 3. Design with data
 4. Types of data
 5. Grid square statistics data
 6. Exemplar studies

15 October 2015

11:00-13:00

Prof. Aki-Hiro Sato

Participatory design from a data-centric point of view (continues)

- Practical data analysis and visualization technique (2h)
 1. Data analysis
 2. Visualization

15:00-16:00

Prof. Aki-Hiro Sato

Participatory design from a data-centric point of view (continues)

- Brain storming (1h)

16:00-18:00

Prof. Shlomo Havlin

Percolation of Complex Networks (2 hours)

16 October 2015

9:00-11:00

Prof. Kay Axhausen

Social media and travel behaviour.

Smart cards in transport research: limits and potentials (2h)

11:00-13:00

The students can attend to the conference plenary in video streaming, in Sala Vigliano - DIST

15:00-18:30

Prof. Aki-Hiro Sato

Participatory design from a data-centric point of view (continues)

- Participatory design work (2.5h)
- Presentation (1.0h)

17 October 2015

9:00-13:00

14:30-19:00

Last plenary session of the International Conference:

Challenges in Data Science: a complex systems perspective

October 14-17 2015

Castello del Valentino

Torino, Italy

The students can attend to the conference plenary in video streaming, in room 8V

Topics and programme at: <http://bit.do//DataScienceChallenges>

19 October 2015

9:00-12:00

Prof. Meiko Jensen

Introduction and Assessment of Privacy Idea (1h)

Lecture: Privacy laws, concepts, protection goals (2h)

14:00-17:00

Prof. Meiko Jensen

Exercise: Privacy-relevant data: what is that? (1h)

Lecture: Privacy from a technical point of view (2h)

20 October 2015

9:00-11:00

Prof. Meiko Jensen

Open discussion: Privacy in data science (2h)

The teachers (in alphabetical order)

K.W. Axhausen is Professor of Transport Planning at the Eidgenössische Technische Hochschule (ETH) Zürich (Swiss Federal Institute of Technology). He holds his post in the Institute for Transport Planning and Systems of the Department of Civil, Environmental and Geomatic Engineering. Before his appointment at ETH he worked at the Leopold-Franzens Universität, Innsbruck, Imperial College London and the University of Oxford. He holds a PhD in Civil Engineering from the Universität Karlsruhe (now KIT) and an MSc from the University of Wisconsin – Madison. He has been involved in the measurement and modelling of travel behaviour for the past 30 years contributing especially to the literature on stated preferences, micro-simulation of travel behaviour, valuation of travel time and its components, parking behaviour, activity scheduling and travel diary data collection. One strand of his current work focuses on the micro-simulation of daily travel behaviour and long-term mobility choices (See www.matsim.org for details). This work is supported by analyses of human activity spaces and their dependence on the traveller's personal social network. Recent work is experimenting with direct demand models as a radical alternative to disaggregate and aggregate models. The second strand of his work is dedicated to the evaluation of transport projects. The current work on land use transport modelling is motivated by the shortcomings of standard cost-benefit analysis (See www.sustainability.eu). He led the effort for the new Swiss cost-benefits guideline (SN 640 820ff) and of the recent German value of time study.

He was the chair of the International Association of Travel Behaviour Research (IATBR) and is editor-in-chief of *Transportation* and earlier of *DISp*, both ISI indexed journals.

Shlomo Havlin is head of the **Complex Networks National Excellence Centre**. He is a Professor in the Department of Physics at Bar-Ilan University, Ramat-Gan, Israel. (URL: <http://havlin.biu.ac.il>). He served as President of the Israel Physical Society (1996-1999), Dean of Faculty of Exact Sciences (1999-2001), Chairman, Department of Physics (1984-1988). He obtained the *Rothschild Prize* for Physics and Chemistry, the *Lilienfeld Prize* of the American Physical Society (2010), the *Weizmann Prize* (Israel, 2009), the *Nicholson Medal* of the American Physical Society (2006), the Humboldt Senior Scientist Award (Germany, 1992) and the *Landau Prize* for outstanding Research (1988). He is a Fellow of the American Physical Society since 1995 and a Fellow of the Institute of Physics in England since 2000. He is currently Director of the Excellence National Network Center supported by the Israel Science Foundation. He is in the Editorial Boards of *Physica A*, *New Journal of Physics*, *Fractals* and Co-Editor of *Europhysics Letters*. He published more than 700 scientific papers and 12 books. He is highly cited: according to the ISI Web of Science, Havlin got over 32000 citations with over 3000 citations last year. Sixty three papers with more than 100 citations, 82 papers with more than 82 citations (H=82). Ten papers of the last 10 years are between the top 1% cited. In Google Scholar: over 52000 citations with over 6000 last year, H = 103, and H=70 in the last 5 years. His h-index is 82. Havlin presented over 230 plenary and invited talks at international conferences.

Meiko Jensen graduated in computer science at the Christian-Albrechts-University of Kiel, Germany, and received his Ph.D. in engineering from Ruhr-University Bochum, Germany, in 2011. After that he became research scientist at the Independent Centre for Privacy Protection Schleswig-Holstein (ULD), focusing on technical and legal aspects of privacy, cryptography, big data, and cloud security. He was appointed as an associate professor for cybersecurity at Southern Denmark University in 2014, and also held several adjunct professor positions in Kiel and Hamburg universities. Recently, he returned to ULD, where he currently works as a senior researcher. Meiko has written more than 50 scientific publications, holds 3 patents, and has contributed to several international initiatives in his domains of expertise. For instance, he acted as “invited expert” of the W3C working group on XML security, served on the IEEE Technical Committee on Services Computing, and is a fellow of the Ruhr-University Research School. Right now, Meiko works on the establishment of a pan-European identity management architecture in the European research project FutureID (<http://futureid.eu/>), on a trustworthy cloud architecture in the SPLITCloud project (<http://www.splitcloud.de>), and on a large-scale European project for advancement of attribute-based credentials for trust and privacy (<https://abc4trust.eu/>). Also, Meiko is part of the German national Privacy Forum (<https://www.forum-privatheit.de>), and a member of IEEE and ACM.

Aki-Hiro Sato graduated in mechanical engineering at Tohoku University, Japan in 1997 and received the Doctor of Information Sciences in Graduate School of Information Sciences from Tohoku University, Sendai, Japan, in 2001. He worked with H. Takayasu and Y. Sawada on stochastic processes and nonlinear dynamics with applications in financial markets and agent-based modeling during his Ph.D studies. From 2000 to 2001 he worked as a Doctoral Fellow of Japan Society for the Promotion of Science in Research Institute of Electrical Communication of Tohoku University. From 2001 to 2006, he worked as a Research Associate in Graduate School of Informatics, Kyoto University. Since 2007, he has been an Assistant Professor in Graduate School of Informatics, Kyoto University, Kyoto, Japan. A.-H. Sato’s research has concerned on issues of microscopic dynamics and statistical properties in complex socio-economic systems. His research methodology is of data-driven investigation which has been recently enabled by development and spread of information and communication technology. From a practical point of view, risk assessment of complex socio-economic systems is of crucial issues in order to make our decision in actual environments. A.-H. Sato’s current interests are in understanding both external and internal environments of our society such as cognitive patterns of market participants in financial markets, production-consumption of goods driven by demand-supply imbalance, risk assessments under uncertain environments, and so forth. He attempts to shed a light on these problems from viewpoints of similarity, causality, and universality. His recent other interests are related to system design to rebuild our society from a man-machine point of view. He recently has published a book entitled “Applied Data-Centric Social Sciences”, Springer, Tokyo (2014).