



**5th Risk Center Dialogue Event on
Decision-Making in Complex
Environments: From Humans to Machines
20 January 2017, 13.15 to 17.30, HG F1, ETH Zürich**

The role of humans and technology in decision-making processes is about to change drastically. Algorithms to control socio-technical systems are getting more powerful and prevalent in our society. Therefore, questions about risks and safety, whether on the individual or the societal level, become crucial.

This event will address the impact of recent developments on vital socio-technical systems from a multi-disciplinary perspective.

Registration:

Please register for the event at www.event.ethz.ch/rcde17 until January, 16, 2017. This event is free of charge.

Decision-Making in Complex Environments: From Humans to Machines

As humans can be exceptionally talented decision-makers in many contexts, they are also highly fallible in many other contexts, where biases, framing, and anchoring effects can give rise to completely irrational behaviour. Algorithms and more recently machine-learning algorithms have emerged as exceptionally talented decision-makers in certain situations. They enter socio-technical systems in myriads of ways: They control robot surgery, smart grids and self-driving cars, decide about loan approvals or medical treatment.

Often, applications of these algorithms are for the benefit of the users and the society at large. But their failures, leading e.g. to road or surgical accidents, harmfully impact peoples' lives and generate serious and unprecedented consequences. The problem is exacerbated with the tighter coupling between cyber and physical components.

As the outcomes of autonomous decision processes have legal and societal impacts we need to find ways to better understand and to influence such integrated cyber-technical systems. This poses a challenge both for scientists and for regulators.

Models have become so complex that their response to shifts in the environment is difficult to anticipate or even to control. Responsibilities and consequences need to be framed legally.

Transparency and human interpretability of algorithmic designs for decision-making systems are key problems that can be only solved in a joint effort of scientists, governmental agencies, and companies.

As we are at the cusp of autonomous driving, these issues become even more pressing and new challenges and risks will emerge from them.

Scope

The aim of this year's event is to give a multi-disciplinary perspective on the topic by addressing the following questions:

- What are the limitations of and alternatives for human rationality with respect to uncertainty and how can we derive simple heuristics from it?
- Do recent approaches in algorithmic decision-making simply mimic or approximate human behaviour in a more efficient way, or does the cognitive power of machines opens new dimensions exceeding human capabilities?
- How do machine learning approaches deal with the fact that harmful outcomes often occur in regimes and operating conditions that are rare, unexpected or underdetermined, making risk assessment very challenging?
- How can we manage the risk from machine learning components in socio-technical systems?
- How does the requirement for transparency and human interpretability of algorithmic designs influence the autonomous decision processes itself and the safety of the system?
- How can we frame legal liabilities resulting from machine decision-making, how can responsibilities in interactions between machines and humans be represented?

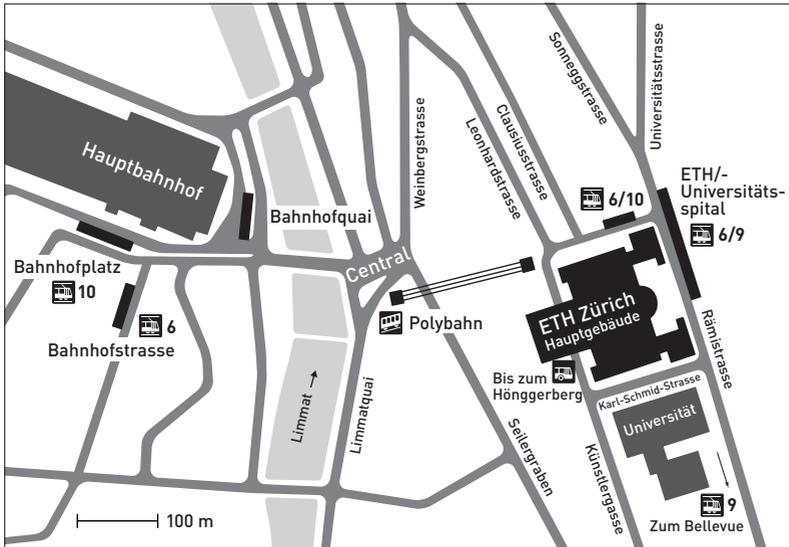
We look forward to your active participation in the dialogue!

With best regards

ETH Risk Center

Programme

- 13:15 Opening Remarks**
Prof. Frank Schweitzer, Risk Center and Chair of Systems Design, ETH Zürich
- 13:30 Prof. Ralph Hertwig, Max Planck Institut for Human Development, Berlin**
Simple Heuristics for a Complex World
- 14:00 Prof. Joachim Buhmann, Institute for Machine Learning, ETH Zürich**
Resilient Algorithmics – How Much Information is Extracted by an Algorithm from my Data?
- 14:30 Prof. Melanie Zeilinger, Intelligent Control Systems Group, ETH Zürich**
Safe Learning-based Decision-Making
- 15:00 Coffee Break**
- 15:30 Prof. John Lygeros, Automatic Control Laboratory, ETH Zürich**
Replacing Humans: The Case for Cyber-Security of the Power Transmission Grid
- 16:00 Prof. Eric Hilgendorf, Department of Criminal Law, Criminal Justice, Legal Theory, Information and Computer Science Law, University of Würzburg**
Machine Decisions Causing Harm - Who Is Liable?
- 16:30 Discussion Round**
Moderation: Dr. Jörg Behrens, Managing Partner, Fintegral
- 17:00 Aperitif (sponsored by Fintegral)**



Map

ETH Zürich, Main Building, Rämistrasse 101, 8032 Zürich

Travelling by public transport from Zurich Central Station

- From the "Bahnhofstrasse/HB": Tram no. 6 (towards Zoo) as far as the "ETH/Universitätsspital".
- From the "Bahnhofplatz/HB": Tram no. 10 (towards Airport or Oerlikon station) as far as the "ETH/Universitätsspital".
- Walk over to "Central" and take the Polybahn (departs every three minutes) to the Polyterrasse.

You will need a ticket for zone 110 (city of Zurich).

Contact

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