

Social foundations for statistics and machine learning

Opening remarks

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Motivation for the workshop

Speakers and schedule

Logistics

Science has been in a “replication crisis” for a decade. Have we learned anything?

**Paperclip-making robots 'wipe out humanity' in killer AI
Doomsday experiment**

Big-Data Algorithms Are Manipulating Us All

Single agent decision theory and societal challenges

- Current foundation for both statistics and machine learning (ML):
Single-agent decision theory.
- This framework cannot address important scientific and societal challenges:
 1. **Replication crisis**, publication bias, p-hacking, pre-registration, reforms of statistics teaching and the publication system.
A single agent has no reason to mislead themselves / selectively report!
 2. The **social impact of AI**, algorithmic discrimination and inequality, value alignment of autonomous agents / robots.
A single agent has no distributional conflicts / value misalignment!
- **Multiple agents** have **different objectives** and **information**.

Science and technology are social (not single agent) activities!

- This is well understood in the philosophy, sociology, and history of science.
- But how to turn this insight into **formal**, **prescriptive** recommendations?
- Possible contributions of economics?
 - We share the languages of constrained optimization and probability theory with statistics and ML.
 - But we are also used to considering **multiple agents** with unequal endowments, conflicting interests, private information.
 - Use the toolkit of **mechanism design** to characterize optimal statistical decisions subject to constraints of **implementability**.
 - Use the toolkit of **causal inference** and **welfare economics** to analyze the social impact of algorithmic decisions, and devise alternative algorithm objectives.

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Our speakers

- Isaiah Andrews (Econometrics)
- Celestine Mendler-Dünner (Computer Science)
- Lily Hu (Philosophy)
- Carina Prunkl (Philosophy)
- Jann Spiess (Econometrics)
- Ana-Andreea Stoica (Computer Science)

Workshop schedule part 1: Tutorial lectures

- Monday, May 22
 - 12:00 Carina Prunkl: *Algorithms and social epistemology*
 - 14:15 Celestine Mender-Dünner: *Performative Prediction*
 - 16:00 Jann Spiess: *Integrating machine learning into pre-analysis plans*
- Tuesday, May 23
 - 11:30 Lily Hu: *Causal Inference and the Problem of Variable Choice*
 - 14:15 Isaiah Andrews: *Correcting for Selective Publication and Attention*
 - 16:00 Ana-Andreea Stoica: *Diagnosing and mitigating bias in networks*
- Wednesday, May 24
 - 11:30 Nika Haghtalab: *Foundations of learning and incentives*

Workshop schedule part 2: Frontier talks

- Wednesday, May 24
 - 16:00 Ana-Andreea Stoica:
New models and insights in network interference problems
- Thursday, May 25
 - 11:30 Carina Prunkl: *Noise - a flaw in algorithmic judgment?*
 - 14:15 Jann Spiess:
Explanations with a purpose: regulating black-box algorithmic decisions
 - 16:00 Celestine Mender-Dünner: *Algorithmic Collective Action in ML*
- Friday, May 26
 - 11:30 Nika Haghtalab: *Multi-objective learning: A unifying perspective on collaboration, fairness, and robustness*
 - 14:15 Isaiah Andrews: *A Model of Scientific Communication*
 - 16:00 Lily Hu: *Do Causal Diagrams Assume a Can Opener?*

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- For everyone:
 - Concluding panel discussion: Saturday, May 27, 10:00.
 - Coffee and pastries: Outside SR C.
 - Pub evening: Wednesday, May 24, 5:30pm, King's Arms.
- For speakers:
 - Lunch in the department: Common Room.
 - Break room: Room 2126.
 - Dinners at Nuffield: Tuesday & Thursday. Meet there 18:40.
 - Guided tour of Oxford: Wednesday, 13:45, starting at Manor Road.

Some other events this week

- *Panel discussion with Raj Chetty and Joseph Stiglitz*
Today, 17:00, Mathematical Institute, L1 Lecture Theatre
- *Automatic Debiased Machine Learning via Neural Nets*
Whitney Newey
Tuesday, 13:00, Manor Road Building, Skills Lab
- *Valid Heteroskedasticity Robust Testing*
Benedikt Poetscher
Friday, 14:15, Manor Road Building, Room A

Thank you!