

# AAKRITI KUMAR

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## EDUCATION

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- PhD in Cognitive Science** *2018 - 2023 (expected)*  
University of California, Irvine  
Advisor: Mark Steyvers
- MS in Statistics** *2018 - 2022 (expected)*  
University of California, Irvine
- BTech in Engineering** *2011 - 2015*  
Indian Institute of Technology, Madras

## RESEARCH PROJECTS

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### Theory of Mind & Theory of Machine

Advisor: [Mark Steyvers](#)

*Human-Computer Interaction*

**Question:** How do humans assess their ability, the ability of others, and how good they are at it?

- Developing Bayesian cognitive models to capture a human's assessment of their own and another agent's (human/AI) ability (data collected via a human subject study)

### AI-assisted Decision Making

Advisor: [Mark Steyvers](#)

*Human-Computer Interaction*

**Question:** Do humans form good mental models of AI assistance that is readily available?

- Developing a Bayesian cognitive model of participants' reliance behavior on AI agents of varying capabilities (in a noisy image classification task)

### Algorithm Aversion & Metacognitive Bandits

Advisor: [Mark Steyvers](#)

*Human-Computer Interaction*

**Question:** How do humans decide on when to ask for AI advice?

- Constructed new cognitive models (based on the bandit framework) of humans' advice seeking behavior when working with an AI assistant
- Demonstrated that algorithm aversion, a widely reported bias, can be explained as the result of a quasi-optimal sequential decision-making by the human

### AI for Social Good: Improving Maternal Health Outcomes

Collaboration with [Milind Tambe](#)

*Google Research - India*

**Question:** Do AI tools help increase engagement in a maternal healthcare program?

- Assessing the impact of deploying Restless Bandits to prevent drop-off from a maternal health information program for new and expectant mothers in India

### Human-AI Complementarity

Advisor: [Mark Steyvers](#), [Padhraic Smyth](#)

*Human-Computer Interaction*

**Question:** Do humans and an AI agent show complementary ability at a Natural Language Understanding task?

- Designed and ran an interactive human subject experiment on Amazon MTurk, using HTML and JavaScript
- Carried out a comparative study of human performance and machine predictions to investigate complementary abilities of humans and machine

## Trust between Humans and Machines

Advisor: Mark Steyvers

Human-Computer Interaction

**Question:** What factors influence trust between humans and machines?

- [Reviewed](#) and synthesized existing literature on human-AI trust and collaboration.

## Reliability in Inhibitory Control

Collaboration with [Pradeep Shenoy, Google Research - India](#)

Cognitive Control & Meta-Learning

**Question:** Can flexible functions (RNNs) reliably identify people across sessions of a cognitive control task?

- Proposed and evaluated recurrent neural network models to learn individual-specific parameters in cognitive control task data

## Learning and Forgetting in Lumosity Data

Advisor: Mark Steyvers, Aaron Benjamin (UIUC)

Human Learning

**Question:** What is the effect of long delays between cognitive games on forgetting and skill learning?

- Analysed large-scale game play data from the Lumosity platform and proposed a computational model to characterise learning and forgetting behavior across individuals and cognitive tasks over time

## Individual differences in Inhibition

Advisor: [Jeff Rouder](#)

Cognitive Control

**Question:** Is inhibition a unified concept?

- Developed Bayesian hierarchical models to separate trial noise from other covariation in low signal, high-noise inhibition task data

## PUBLICATIONS & PRESENTATIONS

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**Aakriti Kumar**, Trisha Patel, Aaron Benjamin, Mark Steyvers (2021). Explaining Algorithm Aversion with Metacognitive Bandits  
**Cognitive Science 2021**[\[paper\]](#)

**Aakriti Kumar**, Trisha Patel, Aaron Benjamin, Mark Steyvers (2021). Explaining Algorithm Aversion with Metacognitive Bandits  
**Workshop on Human-AI Collaboration in Sequential Decision-Making, ICML 2021**

**Aakriti Kumar**, Trisha Patel, Aaron Benjamin, Mark Steyvers (2021). Metacognitive Bandits: When Do Humans Seek AI Assistance?

**Social Intelligence in Humans and Robots Workshop, ICRA 2021**

**Aakriti Kumar**, Aaron S. Benjamin, Andrew Heathcote, Mark Steyvers (2021). Comparing models of learning and relearning in large-scale cognitive training data sets [In submission]

**Aakriti Kumar**, Soumya Chatterjee, Pradeep Shenoy (2021). Meta-learning of Dynamic Policy Adjustments in Inhibitory Control Tasks [In submission]

Jeffrey N. Rouder, **Aakriti Kumar**, Julia M. Haaf (2019). Why Most Studies of Individual Differences With Inhibition Tasks Are Bound To Fail [\[preprint\]](#)

## AWARDS AND FELLOWSHIPS

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[Irvine Initiative in AI, Law, and Society Fellowship 2022](#)

Total Award: \$22,000

Irvine Initiative in AI, Law, and Society Fellowship 2021

Total Award: \$22,000

Graduate Dean's Recruitment Fellowship 2018, UCI

Total Award: \$5000

Recruitment Fellowship Award, 2018, Department of Cognitive Science, UCI

Total Award: \$5000

## TEACHING EXPERIENCE

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Teaching Assistant, UC Irvine: Probability and Statistics in Psychology I, II, III *Fall 2019 - Spring 2020*  
Lead Teaching Assistant, UC Irvine: Introduction to Human Memory *Winter 2019*  
Teaching Assistant, UC Irvine: Introduction to Psychology *Fall 2018*

## SKILLS

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**Programming:** Python (pandas, numpy, matplotlib, scikit-learn, pytorch, tensorflow), R, Stan, HTML/CSS

**Research Methods:** Experiment Design, Computational Cognitive Models, Generalised Linear Models, Bayesian Statistics, Probabilistic Learning, Deep Learning

## PROFESSIONAL EXPERIENCE

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**Research Associate, IIT Madras** *Mar'17 - May'18*  
Consultant on analytics projects involving fraud detection.

**Associate Program Manager, Ola cabs** *Jun'15 - Aug'16*  
Corporate Strategy & Process Excellence

**Ola Store, City Manager (Chennai):** Led a team of 40 employees to launch operations of hyper-local delivery services arm

**Ola Airport Pickup Process (Bangalore, Mumbai):** Designed a process for smooth passenger and driver movement. Worked with the product team to add driver side demand based alert features on the app

## MEMBERSHIPS AND SERVICE

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Department Colloquium Coordination Committee Member *2021 - 2022*

Cognitive Science Society Student Member

Psychonomic Society Student Member

Contributed to [Advancing the Understanding of Attentional Control](#) *Psychonomics 2018*