Ishita Dasgupta

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Academic CV

EDUCATION

Harvard University, Ph.D. in Physics. GPA: 4.0/4.0. Transcript available here. March 2020
Indian Institute of Technology Bombay, B.Tech. in Engineering Physics. GPA: 9.61/10. August 2014

PROFESSIONAL EXPERIENCE

Princeton University. Postdoctoral Fellow, Dept. of Computer Science. Supervisor: Prof. Tom Griffiths. 2020–present
- Researched the trade-off between efficiency and flexibility in human and artificial intelligence.
- Supervised 2 graduate and 2 undergraduate researchers, guiding them through formulating research questions, and through technical material in machine learning and **Bayesian statistics**.

Harvard University. Graduate Researcher, Dept. of Physics. Supervisor: Prof. Sam Gershman. 2015–2019
9 articles in peer-reviewed journals and conferences (8 published, 1 under review). Details on Google Scholar.
4 academic awards (3 described in the Selected Awards section).
- Formalized the computational complexity of information processing in the brain using tools from machine learning.
- Built new models of human learning and decision-making that incorporate these insights, using **Python** and **R**.
- Tested model predictions by running interactive online experiments on Amazon **MTurk**, using HTML and JavaScript.
- Explained a large number (15) of previously unexplained empirical findings from economics, neuroscience & psychology.
Selected course projects:
- Used Gaussian mixture models to estimate propensity scores in R. Stat 186, Prof. Donald Rubin
- Developed inference algorithms for network-based epidemiology models in R. Stat 211, Prof. Edoardo Airoldi

DeepMind. Research Intern, Neuroscience Research Team. Supervisor: Prof. Matt Botvinick. May–Sept. 2018
Collaborated with a large team to publish a peer-reviewed article at **NeurIPS** MetaLearn Workshop 2019.
- Built and trained artificial agents based on recurrent neural networks within a large **TensorFlow** codebase.
- Demonstrated for the first time that causal reasoning can arise from model-free reinforcement learning.

Stanford University. Visiting Researcher, Dept. of Psychology. Supervisor: Prof. Noah Goodman. May–Aug. 2017
Built lasting collaborations leading to 3 peer-reviewed articles (2 published, 1 under review).
- Led a research project examining vector embeddings of natural language sentences in **PyTorch**.
- Established that these embeddings rely on local heuristics and lack compositionality, giving poor generalization.
- Introduced a new approach using augmented training data, improving generalization performance from 50% to 85%.

TECHNICAL SKILLS

Programming: **Python** (PyTorch, TensorFlow, scikit-learn, numpy), **R** (plyr, ggplot2), JavaScript, HTML.
Background: Deep learning (natural language processing, reinforcement learning), classical machine learning (classification, variational inference, Markov chain Monte Carlo, probabilistic graphical models), statistics (regression, parameter inference, hypothesis testing, causal inference), high performance computing, data analysis, data visualization.

SCIENTIFIC PUBLISHING AND PUBLIC SPEAKING

Conference presentations: 6 presentations to audiences of 50–200, including at: **ICLR** (2020), Reinforcement Learning & Decision Making (2019), Cognitive Science Society (CogSci, 2017, 2018, 2019), **AAAI** Spring Symposium (2017).
Invited talks: 12 seminars to audiences of ∼40 at 10 universities, including Brown, Berkeley, MIT, McGill, NYU.
Journal articles: 5 articles in Psychological Review, Cognitive Psychology, Cognition, Physical Review B, Biochemistry.
Teaching: Teaching fellow for 3 courses in physics and mathematics. Student feedback available here.

SELECTED AWARDS

Mind Brain Behavior Graduate Student Award. $10K to fund a research visit to Stanford University. 2017
Student Award for Outstanding Scientific Contribution. International Conference on Thinking. 2016
Amartya Sen Fellowship. Graduate School of Arts and Sciences, Harvard University. 2014
R. P. Singh Memorial Prize. Outstanding graduating student, Department of Physics, IIT-Bombay. 2014

LEADERSHIP AND ORGANIZATION

Organized a full-day workshop (CogSci 2019) 12 speakers from industry and academia, 150+ attendees. 2019
Harvard Women in Physics. Organized a Communication and Negotiation Skills Seminar, ∼30 attendees. 2017–2018
Teach for India, Mumbai. Ran a mentorship program, pairing students with volunteers from IIT Bombay. 2011–2012

INTERESTS AND HOBBIES: Indian classical dance (Odissi), Hindustani classical and Bengali vocal music.