Ionatan J. Kuperwajs — Curriculum Vitae

Contact Information

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Research Interests

My research interests lie at the intersection of cognitive science and computer science. I primarily use tools from artificial intelligence and reinforcement learning to infer what algorithms people use to plan sequences of actions in complex environments. My current focus is on developing theoretical frameworks for optimizing planning depth and training deep neural networks to reproduce human play in a large-scale combinatorial game.

Education

Ph.D. Candidate in Neural Science 2018-Present
New York University (New York, NY)
Systems, Cognition, and Computation Track

B.A. in Neuroscience, Computer Science, & Mathematics 2014-2018
Macalester College (St. Paul, MN)
Honors in Mathematics, Magna Cum Laude

Summer Schools

IBRO-Simons Computational Neuroscience Imbizo 2018
Cape Town, South Africa

Publications

Preprints

- van Opheusden, B., Galbiati, G., **Kuperwajs, I.**, Bnaya, Z., Li, Y., & Ma, W.J. (2021). Revealing the impact of expertise on human planning with a two-player board game. *PsyArXiv*. pdf

Conference articles

- **Kuperwajs, I.** & Ma, W.J. (2021). Planning to plan: a Bayesian model for optimizing the depth of decision tree search. *CogSci*. pdf
- **Kuperwajs, I.**, van Opheusden, B., & Ma, W.J. (2019). Prospective planning and retrospective learning in a large-scale combinatorial game. *Cognitive Computational Neuroscience*. pdf

Honors & Awards

National Science Foundation Graduate Research Fellowship 2020-2023
Computational Psychology
Three years of NSF financial support for outstanding graduate students in research-based STEM disciplines.

Trainee Travel Grant 2019
Cognitive Computational Neuroscience (CCN)
National Science Foundation funding for highly-rated submissions.

Henry Mitchell McCracken Fellowship 2018
Graduate School of Arts and Sciences, New York University

Multi-year full funding support for doctoral students.

National Honor Society Member 2018
Epsilon of Minnesota, Phi Beta Kappa
Inducted students have a GPA in the upper 12 percent of their graduating class, a commitment to liberal studies, and knowledge of mathematics and a foreign language.

Outstanding Graduate Award 2018
Neuroscience Department, Macalester College
Awarded by faculty to the graduating senior with the highest achievement and promise in the field.

Undergraduate Travel Grant 2018
Computational and Systems Neuroscience (Cosyne)
Coverage of travel and meeting attendance costs for undergraduate students with a strong interest in neuroscience.

Dean's List 2014-2018
Macalester College
Awarded to full-time students with a semester GPA of at least 3.75.

Undergraduate Scholars Program 2017
Janelia Research Campus, Howard Hughes Medical Institute
10-week summer program aimed at well-prepared, independent, and committed undergraduate students with significant research experience.

Men's Soccer Academic All-Conference Team 2015-2017
Minnesota Intercollegiate Athletic Conference
Awarded to student-athletes with a minimum career GPA of 3.5 who meet sport-specific athletic requirements.

National Science Foundation Undergraduate Research Program 2016
Center for Neural Science, New York University
10-week summer program for undergraduates with a strong interest in neuroscience and a research-centered career.

DeWitt Wallace Distinguished Scholar 2014
Macalester College
4-year merit scholarship ($64,000) awarded to academically excellent applicants.

Teaching Experience

Teaching Assistant, New York University
- Mathematical Tools for Neural and Cognitive Science (NEURL-GA 2201) F 19

Teaching Assistant, Macalester College
- Algorithm Design and Analysis (COMP 221) F 17, S 18
- Brain, Mind, and Behavior (PSYC 180) F 16
- Core Concepts in Computer Science (COMP 123) S 16, F 16

Talks

- Planning to plan: a Bayesian model for optimizing the depth of decision tree search
  CogSci July 2021
  Vienna, Austria
- Model-based and model-free decision-making in a complex planning task
  CNS Lab Talks February 2020

Center for Neural Science, New York University

- Prospective and retrospective mechanisms in complex sequential decision-making
  First Year Talk December 2019
  Center for Neural Science, New York University
- Human planning in large state spaces
  Concepts and Categories Seminar Series November 2019
  Department of Psychology, New York University
- Combinatorial planning
  Artificial and Biological Computation Lab Meeting June 2019
  Center for Neural Science, New York University

Poster Presentations

- Prospective planning and retrospective learning in a large-scale combinatorial game
  Workshop on Big Data in Cognitive Science December 2019
  Princeton, New Jersey
- Prospective planning and retrospective learning in a large-scale combinatorial game
  Cognitive Computational Neuroscience September 2019
  Berlin, Germany

Technical Skills

Programming: Comfortable in Python and MATLAB. Familiar with R, Java, C, C++, HTML/CSS, and bash.
Coursework: Graduate-level courses in mathematical tools for neuroscience, machine learning, Bayesian and cognitive modeling, and cellular and systems neuroscience.
Methodologies: Behavioral modeling, reinforcement learning, statistical inference, deep learning.
Lab: Experience with human psychophysics and fMRI.
Other Skills: Experience with object-oriented programming, parallel programming, computer vision, network science.
Languages: Fully proficient in English, Spanish, and Hebrew.

Service & Activities

- **Scientist Action and Advocacy Network (ScAAN)** 2018-Present
  President of a pro-bono science group. Work typically consists of evidence-based reports and data analysis/visualization for partner non-profit organizations.
- **Commencement Speaker Selection Committee** 2018
  One of four student representatives nominated to select the Macalester College commencement speaker.
- **Macalester Software Development Organization (MacHack)** 2015-2018
  Hosted events and gatherings for students interested in programming.
- **Macalester College Varsity Men's Soccer Team** 2014-2018
  Member of the nationally-ranked men's soccer team, won conference title and made an NCAA tournament appearance in 2015.