K. Alexandria Bond, PhD

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INTERESTS

representation learning | reinforcement learning | human performance | *in silico* & human learning systems

EDUCATION

CARNEGIE MELLON UNIVERSITY | CARNEGIE MELLON NEUROSCIENCE INSTITUTE
PhD in Cognitive Neuroscience with computational emphasis
May 2022 | Pittsburgh, PA
Dissertation: Adaptive Decision Policy Dynamics

UNIVERSITY OF ALABAMA IN HUNTSVILLE
BS in Psychobiology
May 2012 | Huntsville, AL

EXPERIENCE

CARNEGIE MELLON UNIVERSITY Cognitive Axon Lab | Postdoctoral Researcher | Special Faculty
May 2022 – Present | Pittsburgh, PA
Developed cognitive and computational models of dynamic decision-making, simulated predicted behavioral and functional results using neural networks, and validated out-of-set theoretical predictions with human fMRI and behavioral data. Designed and taught a Cognitive Neuroscience Research Methods course using educational research principles.

CARNEGIE MELLON UNIVERSITY Cognitive Axon Lab | Graduate Student Researcher
July 2017 – May 2022 | Pittsburgh, PA
Investigated how agents explore and decide when the environment changes. I approached this problem from a cognitive computational neuroscience perspective to ask how the human brain implements the underlying learning algorithms that drive adaptive behavior, combining computational modeling of neural networks and cognitive processes, computational neuroimaging, physiological measures (pupillometry, ECG, pulse oximetry, respiration), and behavioral methods.

PRINCETON UNIVERSITY Intelligent Performance and Adaptation Lab | Lab Manager
May 2014 – July 2017 | Princeton, NJ
Initiated and conducted motor control and learning research. Published 3 papers in the Journal of Neuroscience, Journal of Neurophysiology, and eNeuro.

EXPERIMENTAL SKILLS

Experimental design & validation | Eyetracking & pupillometry | Multimodal physiological recording Generalization testing | Behavioral analysis | fMRI

COMPUTATIONAL & ANALYTIC SKILLS

Applied machine learning | Artificial agent development | Cognitive modeling | Computational neuroimaging and neural decoding | Inferential statistics | Simulation | Time series analysis | Bayesian analysis and numerical estimation | Signal processing | Feature extraction | Dimensionality reduction | Python | R | SQL | High Performance Computing | Linux

HONORS

2020 Carnegie Mellon Graduate Student Representative Award
2019 Carnegie Mellon Neuroscience Institute Presidential Fellow
2017 National Institutes of Health (NIH) Behavioral Brain Research Training Fellowship

PUBLICATIONS

Bond K., Rubin, J., Verstynen, T. The representational form of spatial reinforcement learning. *In prep.*

Bond K., Rasero J., Madan, R., Bahuguna, J., Rubin, J., Verstynen, T. Competing neural representations of choice shape evidence accumulation in humans. bioRxiv. October 2022. Under review at eLife.

Bond K., Dunovan, K., Alexis Porter, Jonathan E Rubin, and Timothy Verstynen. Dynamic decision policy reconfiguration. eLife. December; 2021;10:e65540.

Bond K. and Taylor J.A. Structural learning in a visuomotor adaptation task is explicitly accessible. eNeuro. August; 10.1523/eneuro.0122-17.2017.

Bond K. and Taylor J.A. Flexible explicit but rigid implicit learning in a visuomotor adaptation task. The Journal of Neurophysiology. March; 10.1152/jn.00009.2015.

McDougle S.M., Bond K., and Taylor J.A. Implications of plan-based generalization in sensorimotor adaptation. The Journal of Neurophysiology. April; 10.1152/jn.00974.2016.

McDougle S.M., Bond K., and Taylor J.A. Explicit and implicit processes constitute the fast and slow processes of sensorimotor learning. The Journal of Neuroscience. July; 10.1523/jneurosci.5061-14.2015.

LEADERSHIP

CMU GRADUATE STUDENT ASSEMBLY EXECUTIVE BOARD 1 of 8 | Vice President of Academic Affairs
October 2021 – May 2022

Elected GSA Executive Board member. Collaborated with Vice Provost of Education and other University leadership to meet academic needs of GS. Selection of successful initiatives:

- Completely free health insurance for all GS, minimum stipend of 27k across departments, and reasonable leave policies. Implemented in Fall 2022.

- Assessed need for empirically supported mentorship skills for both GS and advisors. Enabled informed, targeted development of University-level mentorship training and time-sensitive mental health checks by GS year.

CMU VICE PROVOST OF RESEARCH SEARCH COMMITTEE | Invited advisor
UNIVERSITY STUDENT ADVISING COMMITTEE | Invited advisor
UNIVERSITY EDUCATION COUNCIL | Invited advisor
ASSOCIATE DEANS FOR GRADUATE PROGRAMS | Invited advisor
THREE MINUTE THESIS (3MT) COMPETITION JUDGE 1 of 1 | Invited Graduate Student Thesis Judge for CMU

SCIENTIFIC OUTREACH

- Carnegie Mellon University Psychology and Cognitive Neuroscience Outreach Program for underserved communities (2017 - present)
- Trenton STEM-to-Civics Charter School | Science Outreach Voluntseer (2017)
- Hopewell Elementary School | Science Fair Judge (2017)

ADVISING & TEACHING

- Advised Raghav Madan, Engineering & Tech. M.S. student (2019-2020) | now: PhD candidate at Washington University in Biomedical and Health Informatics
- Advised Jadelyn Flores, New Brunswick High School student participating in the Princeton Laboratory Learning Program (2015) | now: graduate of Princeton University
- Designed data science tutorials (coauthored Jupyter book; Spring 2019) | Teaching Assistant, Data Science for Psychology and Neuroscience
- Designed evaluation methods and managed a team of UG Teaching Assistants (Fall 2018) | Teaching Assistant, Cognitive Psychology