Frederick Callaway

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EMPLOYMENT

New York University (2024 –) Postdoctoral Associate Advisor: Marcelo Mattar

Harvard University (2022 – 2024) Postdoctoral Fellow Advisor: Fiery Cushman

EDUCATION

Princeton University (2018 – 2022)
PhD in Psychology
Advisor: Tom Griffiths

University of California Berkeley (2016 – 2018)
PhD candidate in Psychology
Advisor: Tom Griffiths

Cornell University (2012 – 2016)
BA *summa cum laude*
Majors in psychology and linguistics
Minors in computer science and cognitive science

AWARDS AND HONORS

2023 Robert J. Glushko Dissertation Prize
2017 Outstanding Paper award at the NeurIPS workshop for Cognitively Informed AI
2016 Arthur Ryan prize for best undergraduate thesis in Psychology

PUBLICATIONS

Asterisks indicate shared lead/senior authorship.

In preparation

CG Correa, S Sanborn, MK Ho, F Callaway, ND Daw, TL Griffiths (in prep). Exploring the hierarchical structure of human plans via program generation.

F Callaway*, G Karreskog*, TL Griffiths (in prep). Rational Heuristics for One-Shot Games.

R Frömer, F Callaway, T Griffiths, A Shenhav (in prep). Considering what we know and what we don't know: Expectations and confidence guide value integration in value-based decision-making.

Journal articles

F Callaway, TL Griffiths, KA Norman (2023). Optimal metacognitive control of memory recall. *Psychological Review*.

PM Krueger*, F Callaway*, S Gul, F Lieder*, TL Griffiths* (in press). Identifying resource-rational heuristics for risky choice. *Psychological Review*.

F Callaway*, M Hardy*, TL Griffiths (2023). Optimal nudging for cognitively bounded agents: A framework for modeling, predicting, and controlling the effects of choice architectures. *Psychological Review*.

CG Correa, MK Ho, F Callaway, ND Daw, TL Griffiths (2023). Humans decompose tasks by trading off utility and computational cost. *PLOS Computational Biology*.

MY Li, F Callaway, WD Thompson, RP Adams, TL Griffiths (2023). Learning to learn functions. *Cognitive Science*.

F Callaway, YR Jain, B van Opheusden, P Das, G Iwama, S Gul, PM Krueger, F Becker, TL Griffiths*, F Lieder* (2022). Leveraging artificial intelligence to improve people's planning strategies. *Proceedings of the National Academy of Sciences*.

F Callaway, B van Opheusden, S Gul, PK Krueger, P Das, F Lieder*, TL Griffiths* (2022). Rational use of cognitive resources in human planning. *Nature Human Behavior*.

YR Jain, F Callaway, TL Griffiths, P Dayan, PM Krueger, F Lieder (2022). A computational process-tracing method for measuring people's planning strategies and how they change over time. *Behavioral Research Methods*.

F Callaway, A Rangel, TL Griffiths (2021). Fixation patterns in simple choice reflect optimal information sampling. *PLoS Computational Biology*.

TL Griffiths, F Callaway, MB Chang, E Grant, PM Krueger, F Lieder (2019). Doing more with less: meta-reasoning and meta-learning in humans and machines. *Current Opinion in Behavioral Sciences*.

Refereed conference papers

SJ Cheyette, F Callaway, NR Bramley, JD Nelson, J Tenenbaum (2023). People seek easily interpretable information. *CogSci*.

EG Liquin, F Callaway, T Lombrozo (2021). Developmental change in what elicits curiosity. *CogSci*.

A Kemtur, YR Jain, A Mehta, F Callaway, S Consul, J Stojcheski, F Lieder (2020). Leveraging machine learning to automatically derive robust planning strategies from biased models of the environment. *CogSci*.

F Callaway*, M Hardy*, TL Griffiths (2020). Optimal nudging. *CogSci*.

EG Liquin, F Callaway, T Lombrozo (2020). Quantifying curiosity: A formal approach to dissociating causes of curiosity. *CogSci*.

CG Correa, MK Ho, F Callaway, TL Griffiths (2020). Resource-rational task decomposition to minimize planning costs. *CogSci*.

YJ Raj, F Callaway, FL Lieder (2019). Measuring how people learn how to plan. *CogSci*.

F Callaway*, S Gul*, PM Krueger, TL Griffiths, F Lieder* (2018). Learning to select computations. *Uncertainty in Artificial Intelligence*.

F Callaway*, F Lieder*, P Das, S Gul, PM Krueger, TL Griffiths (2018). A resource-rational analysis of human planning. *CogSci*.

F Callaway, JB Hamrick, TL Griffiths (2017). Discovering simple heuristics from mental simulation. *CogSci*.

Conference presentations

F Callaway, E Russek, TL Griffiths (2023). Inverting cognitive models with machine learning to infer preferences from fixations. *Gaze Meets ML workshop @ NeurIPS*.

F Callaway, F Cushman (2023). A rational model of perceived control, negative thinking, and avoidance. *Computational Psychiatry Conference*.

A Radulescu*, B van Opheusden*, TL Griffiths, JM Hillis (2020). From heuristic to optimal models in naturalistic visual search. *Bridging AI and Cognitive Science workshop @ ICLR*.

F Callaway, B van Opheusden, E Grant, TL Griffiths (2020). Generalization in planning by metalearning to metareason. *Generalization in planning workshop @ AAAI*.

F Callaway, TL Griffiths (2019). Attention in value-based choice as optimal sequential sampling. *RLDM*.

F Lieder*, F Callaway*, YR Jain, PM Krueger, P Das, S Gul, TL Griffiths (2019). A cognitive tutor for helping people overcome present bias. *RLDM*.

CallawayF Correa C., M Ho, TL Griffiths (2019). Compositional subgoal representations for planning and problem-solving. *CogSci*.

P Das, F Callaway, TL Griffiths, F Lieder (2019). Remediating cognitive decline with cognitive tutors. *RLDM*.

S Gul, PM Krueger, F Callaway, TL Griffiths, F Lieder (2018). Discovering rational heuristics for risky choice. *KogWis*.

MK Ho*, S Sanborn*, F Callaway*, D Bourgin, TL Griffiths (2018). Human priors in hierarchical program induction. *CCN*.

F Lieder*, PM Krueger*, F Callaway*, TL Griffiths (2017). A reward shaping method for promoting metacognitive learning. *RLDM*.

F Callaway*, F Lieder*, PM Krueger*, TL Griffiths (2017). Mouselab-MDP: A new paradigm for tracing how people plan. *RLDM*.

F Callaway, F Lieder, TL Griffiths (2017). Helping people choose subgoals with sparse pseudo rewards. *RLDM*.

INVITED TALKS

2023 Brown University, Shenhav Lab
2023 Harvard University, Cognition, Brain, and Behavior seminar
2022 UC San Diego, Mattar Lab
2022 Sloan-NOMIS Summer school on the Cognitive Foundations of Economic Behavior
2022 Yale University, Computational Social Cognition Lab
2022 UC Irvine, Computational Cognitive Neuroscience Lab
2021 Brown University, Shenhav Lab
2020 Harvard University, Moral Psychology Research Lab
2020 Pompeu Fabra University, Theoretical and Cognitive Neuroscience lab meeting
2020 University of Minnesota, Hayden Lab
2020 UC Berkeley, Computation and Language Lab
2020 New York University, ConCats (Concepts and Categories) Seminar
2019 Sloan-NOMIS Workshop on the Cognitive Foundations of Economic Behavior
2018 Columbia University, Cognition and Decision Lab

GRANTS AND FELLOWSHIPS

2020 Graduate Student Research Grant, Princeton Program in Cognitive Science ($5,000)
2020 Graduate Fellow, Princeton Program in Cognitive Science ($1,000)

SERVICE

Ad Hoc Reviewing

In total, I have reviewed 12 journal submissions (not including resubmissions) and 20 conference and workshop submissions across the following venues:

Advances in Cognitive Psychology
Brain and Behavior
Cognitive Science
Cognitive, Affective, & Behavioral Neuroscience
Computational Brain and Behavior
eLife
Journal of Experimental Psychology: General
PLoS Computational Biology
Proceedings of the Annual Meeting of the Cognitive Science Society
Proceedings of the National Academy of Sciences
Scientific Reports
Workshop on Human and Machine Decisions @ NeurIPS

Mentoring

2023 Sarah Borges: Undergraduate research assistant.
2020 Michael Li: Undergraduate thesis student. *Probing the adaptivity of the human kernel*.
2018 Sophie Shang: Undergraduate thesis student. *Illusory correlation and biased memory*.