

Benjamin A Newman

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Education

Carnegie Mellon University

Doctor of Philosophy in Robotics

Thesis Title: *Assistive value alignment using in-situ, naturalistic human behaviors*

Thesis Committee Chairs: Henny Admoni, Kris Kitani

Thesis Committee Members: Andrea Bajcsy, Dylan Losey (UVA), Christopher Paxton (Hello Robot)

2016 - 2024

Pittsburgh, PA

Indiana University, Bloomington

Bachelor of Science Computer Science, *Highest Honors*

Bachelor of Science Cognitive Science, *Highest Honors*

Minor in Mathematics

2013 - 2016

Bloomington, IN

Awards and Honors

Meta AI Mentorship Program, Meta Platforms, Inc.

2022 - 2024

Quality of Life Technology Fellowship, Carnegie Mellon University

2018

Graduate Research Fellowship Award, National Science Foundation

2016 - 2021

College of Arts and Sciences General Scholarship Endowment, Indiana University

2015

School of Informatics and Computing Deans Advisory Council Scholarship, Indiana University

2015

Hutton Honors College Research Grant, Indiana University

2015

Indiana University Founders Scholar, Indiana University

2013-2016

Indiana University Executive Dean's List, Indiana University

2013-2016

Publications

- [C5] Majumdar, A., Ajay, A., Zhang, X., Putta, P., Yenamandra, S., Henaff, M., Silwal, S., Mcvay, P., Maksymets, O., Arnaud, S., Yadav, K., Li, Q., **Newman, B.A.**, Sharma, M., Berges, V., Zhang, S., Agrawal, P., Bisk, Y., Batra, D., Kalakrishnan, M., Meier, F., Paxton, C., Sax, A., and Rajeswaran, A. OpenEQA: Embodied Question Answering in the Era of Foundation Models. *The IEEE / CVF Computer Vision and Pattern Recognition Conference (CVPR)*, 2024.
- [C4] **Newman, B.A.**, Paxton, C., Kitani, K., and Admoni, H. Bootstrapping Linear Models for Fast Online Adaptation in Human-Agent Collaboration. *The International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 2024.
- [W2] **Newman, B.A.**, Gupta, P., Bisk, Y., Kitani, K., Admoni, H., and Paxton, C. Leveraging Vision and Language Models for Zero-Shot, Personalization of Household Multi-Object Rearrangement Tasks. *The Workshop on Human - Large Language Model Interaction at the International Conference on Human-Robot Interaction (HRI)*, 2024.
- [C3] **Newman, B.A.**, Jason, C., Kitani, K., and Admoni, H. Towards Online Adaptation for Autonomous Household Assistants. *Companion of the ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, 2023.
- [J2] **Newman, B.A.**, Aronson, R., Kitani, K., and Admoni, H. Helping People Through Space and Time: Assistance as a Perspective on Human-Robot Interaction. *Frontiers in Robotics and AI*, 2022.
- [J1] **Newman, B.A.***, Aronson, R.*, Srinivasa, S., Kitani, K., and Admoni, H. HARMONIC: A Multimodal Dataset of Assistive Human-Robot Collaboration. *The International Journal of Robotics Research (IJRR)*, 2022.
- [C2] **Newman, B.A.***, Biswas, A.*, Ahuja, S., Girdhar, S., Kitani, K., and Admoni, H. Examining the Effects of Anticipatory Robot Assistance on Human Decision Making. *The International Conference on Social Robotics (ICSR)*, 2020.
- [W1] Baikovitz, A., Duffy, J., Sussman, Z., **Newman, B.A.**, and Admoni, H. In-Sight: Tension-Based Haptic Feedback to Improve Navigation for People who are Blind. *The Workshop on Hacking Blind Navigation at The International Conference ACM Conference on Human Factors in Computing Systems (CHI)*, 2019.
- [C1] Romberg, A., Zhang, Y., **Newman, B.A.**, Triesch, J., and Yu, C. Global and Local Statistical Regularities Control Visual Attention to Object Sequences. *IEEE Joint International Conference on Development and Learning and Epigenetic Robotics (ICDL-EpiRob)*, 2016.

Pre-Prints

- [M2] **Newman, B.A.**, Gupta, P., Kitani, K., Bisk, Y., Admoni, H., and Paxton, C. DegustaBot: Zero-Shot Visual Preference Estimation for Personalized Multi-Object Rearrangement. *arXiv*, 2024.
- [M1] **Newman, B.A.**, Carlberg, K., and Desai, R. Optimal Assistance for Object-Rearrangement Tasks in Augmented Reality. *arXiv*, 2020.

Patents

- [P1] **Newman, B.A.**, Carlberg, K., Desai, R., and Hillis, J. Optimal Assistance for Object-Rearrangement Tasks in Augmented Reality. US Patent No. US-2022-01143660A1, 2022.

Research and Work Experience

Meta Platforms, Inc. Fundamental AI Research (FAIR), Pittsburgh, PA **2022 - 2024**
Visiting Researcher at FAIR with Dr. Christopher Paxton
Researching human preference learning through online interactions in household tasks as part of the Meta AI Mentorship Program [W2, C3, C4, C5].

Meta Platforms, Inc. Reality Labs, Redmond, WA **2019 - 2020**
Research Intern with Dr. Ruta Desai and Dr. Kevin Carlberg
Developed an algorithm to provide optimal assistance to novice users completing household rearrangement task using a simulated AR device and conducted a user study to understand behavioral effects. [M2, P1]

Ernst and Young LLP Financial Services Organization, McLean, VA **2015**
Technology Advisory Intern
Contributed to building an application to facilitate trading and lending in the secondary mortgage marketplace.

Indiana University Computer Vision Lab, Computational Cognitive Science Lab, Bloomington, IN **2014 - 2016**
Undergraduate Researcher with Prof. David Crandall and Prof. Chen Yu
Developed an application to collect eye gaze during free viewing tasks to replicate and research a common model of novelty and familiarity during free viewing tasks. [C1]

JPMorgan Chase & Co Corporate Investment Banking, Chicago, IL **2014**
Applications Development Intern
Wrote production level code to purge unused data in the client facing ACCESS reporting center application

Indiana University Intelligent Motion Laboratory, Bloomington, IN **2014**
Undergraduate Researcher with Prof. Kris Hauser
Developed a 2D vehicle simulator to analyze collisions under different rule based driving patterns and multi-agent communication paradigms.

Tufts University Psychopharmacology Laboratory, Medford, MA **2013**
Laboratory Assistant with Prof. Klaus Miczek
Researched how varied operant conditioning schedules could affect the motivation of outbred mice to self-administer alcohol.

Haemonetics Corporation Procurement Department, Braintree, MA **2012**
Procurement Intern
Optimized Haemonetics' non-conforming materials process, reducing stagnant inventory to less than half of initial value

Haemonetics Corporation Quality Assurance Department, Braintree, MA **2012**
Quality Assurance Intern
Organized and analyzed post-market failure data for Haemonetics' products to prioritize critical defects

Teaching Experience

Graduate Teaching Assistant, CMU 16-881 Deep Reinforcement Learning for Robotics **Spring 2019**
Graduate Teaching Assistant, CMU 16-467 Human-Robot Interaction **Spring 2018**
Undergraduate Teaching Instructor, IU COGS-Q350 Math & Logic for Cognitive Science **Fall 2014**
Undergraduate Teaching Instructor, IU CSCI-C211 Introduction to Computer Science **Spring 2014**
Undergraduate Teaching Instructor, IU C211 Introduction to Computer Science **Fall 2013**

Mentorship

Ravi Pandya, CMU PhD Robotics
Alexander Baikovitz, CMU Undergraduate
Jonathan Duffy, CMU Undergraduate
Zachary Sussman, CMU Undergraduate

Service and Leadership Experience

Reviewer

Conference on Robot Learning (CoRL)
International Conference on Robotics and Automation (ICRA)
International Conference on Intelligent Robots and Systems (IROS)
Human Robot Interaction (HRI)
International Conference on Social Robotics (ICSR)
Conference on Human Factors in Computing Systems (CHI)
Robotics and Automation Letters (RA-L)
Transactions on Human-Robot Interaction (THRI)

Committee Member

Program Committee, HRI Workshop on HRI for Aging in Place, 2024
Admissions Committee, CMU Robotics Institute Summer Scholars (RISS), 2021
Admissions Committee, CMU Masters in Computer Vision (MSCV), 2019
Admissions Committee, CMU Masters in Computer Vision (MSCV), 2018

CMU AI Undergraduate Research Mentor, CMU

2020

Met monthly with an undergraduate from an underrepresented background on conducting research at CMU.

Member of the 94th board of Aeons, IU

2015-2016

Appointed by the President to be one of 12 members of a research advisory board that made recommendations directly to the Office of the President on how to make updates to the University's General Education requirements.

Vice President of the Computer Science Club, IU

2014-2016

Organized and held events, such as Tech Talks and Graduate Admissions Panels, catered to the computer science interested community at Indiana University, Bloomington

Invited Talks and Outreach

Towards Online Adaptation for Autonomous Household Assistants

Meta FAIR Conference

October 2023

Technical Skills

Graduate Coursework

16-811 Mathematical Foundations for Robotics
16-720 Computer Vision
10-701 Machine Learning
16-741 Mechanics of Manipulation
16-867 Human Robot Interaction
16-824 Visual Learning and Recognition
16-831 Statistical Techniques in Robotics
11-777 Advanced Multimodal Machine Learning

Robotics and Machine Learning

Languages Python, MATLAB, C/C++, R, Java, C#, Scheme/Racket
Deep Learning PyTorch
Tools ROS, OpenCV
Robots Kinova Mico
LLMs GPT4o, Claude, Gemini