

Sean Dae Houlihan

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<https://daeh.info>

<https://github.com/daeh>

APPOINTMENTS

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| Postdoc. | Dartmouth College | 2022– |
| | Fellow, Neukom Institute for Computational Science | 2023– |
| | Lecturer, Program in Cognitive Science | 2023– |

EDUCATION

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|-------|--|-----------|
| Ph.D. | Massachusetts Institute of Technology Department of Brain and Cognitive Sciences Dissertation: <i>A computational framework for emotion understanding</i> Advisors: Rebecca Saxe, Josh Tenenbaum, John Gabrieli Committee: <i>Ibid.</i> , Luke Chang | 2015–2022 |
| B.A. | University of Colorado, Boulder Molecular, Cellular, and Developmental Biology (Major) Biochemistry (Major) | 2004–2008 |

AWARDS, HONORS, FELLOWSHIPS

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| 2023 | Best Dissertation Award, Society for Affective Science (SAS) |
| 2023– | Neukom Institute for Computational Science Postdoctoral Fellowship |
| 2017– | Fellow at The Dalai Lama Center for Ethics and Transformative Values |
| 2019–2020 | Friends of the McGovern Institute Fellowship |
| 2018 | Austen Riggs Scholar in Computational Psychiatry |
| 2018 | Cognitive Computational Neuroscience (CCN) Travel Award |
| 2017 | Angus MacDonald Award for Excellence in Undergraduate Teaching |
| 2014 | Mind and Life, Summer Research Institute Fellowship |
| 2013 | California Institute of Regenerative Medicine (CIRM), Bridges Award |
| 2004–2008 | University of Colorado Boulder, Honors Program |
| 2004 | M.R. Hellie Memorial Scholarship |

PUBLICATIONS

Chen, T.^{*}, **Houlihan, S. D.**^{*}, Chandra, K., Tenenbaum, J. B., & Saxe, R. (*submitted*). Intervening on emotions by planning over a theory of mind.

^{*} Equal contribution.

Houlihan, S. D., Kleiman-Weiner, M., Hewitt, L. B., Tenenbaum, J. B., & Saxe, R. (2023). Emotion prediction as computation over a generative theory of mind. *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, 381(2251), 20220047. <https://doi.org/10.1098/rsta.2022.0047>

- Houlihan, S. D.**, Ong, D., Cusimano, M., & Saxe, R. (2022). Reasoning about the antecedents of emotions: Bayesian causal inference over an intuitive theory of mind. *Proceedings of the 44th Annual Conference of the Cognitive Science Society*, 854-861. <https://escholarship.org/uc/item/7sn3w3n2>
- Anzellotti, S., **Houlihan, S. D.**, Liburd Jr., S., & Saxe, R. (2021). Leveraging facial expressions and contextual information to investigate opaque representations of emotions. *Emotion*, 21(1), 96-107. <https://doi.org/10.1037/emo0000685>
- Houlihan, S. D.**, Tenenbaum, J. B., & Saxe, R. (2021). Linking models of Theory of Mind and measures of human brain activity. In M. Gilead & K. N. Ochsner (Eds.), *The Neural Basis of Mentalizing* (pp. 209-235). Springer International Publishing. https://doi.org/10.1007/978-3-030-51890-5_11
- Saxe, R., & **Houlihan, S. D.** (2017). Formalizing emotion concepts within a Bayesian model of theory of mind. *Current Opinion in Psychology*, 17, 15-21. <https://doi.org/10.1016/j.copsyc.2017.04.019>
- van Lutterveld, R., **Houlihan, S. D.**, Pal, P., Sacchet, M. D., McFarlane-Blake, C., Patel, P. R., Sullivan, J. S., Ossadtchi, A., Druker, S., Bauer, C., & Brewer, J. A. (2017). Source-space EEG neurofeedback links subjective experience with brain activity during effortless awareness meditation. *NeuroImage*, 151, 117-127. <https://doi.org/10.1016/j.neuroimage.2016.02.047>
- Houlihan, S. D.**, & Brewer, J. A. (2016). The emerging science of mindfulness as a treatment for addiction. In E. Shonin, W. V. Gordon, & M. D. Griffiths (Eds.), *Mindfulness and Buddhist-Derived Approaches in Mental Health and Addiction* (pp. 191-210). Springer International Publishing. https://doi.org/10.1007/978-3-319-22255-4_9

INVITED PRESENTATIONS (SELECTED)

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| 2024 | Society for Affective Science, New Orleans |
| 2022 | Consortium for Interacting Minds, Dartmouth College |
| 2022 | Machine Common Sense Working Group, IBM-Harvard-MIT |
| 2021 | Center for Brain Minds and Machines Annual Retreat, MIT |
| 2018 | Morality Lab (Prof. Liane Young), Boston College |
| 2017 | Cognitive Lunch, MIT |
| 2016 | Biology Department, Berkeley City College |
| 2016 | Consciousness Hacking SF |
| 2016 | Peabody Essex Museum |
| 2016 | SinhaLab (Prof. Pawan Sinha), MIT |

CONFERENCE PRESENTATIONS (SELECTED TALKS)

- Houlihan, S. D.**, Ong, D. C., Cusimano, M., & Saxe R. (November 2023). *Inferring others' decisions by reasoning about their emotions*. Talk given at New England Research on Decision Making (NERD). Harvard University; Cambridge, MA.
- Houlihan, S. D.**, Ong, D. C., Cusimano, M., & Saxe R. (July 2022). *Reasoning about the antecedents of emotions: Bayesian causal inference over an intuitive theory of mind*. Talk given at the 44th Annual Conference of the Cognitive Science Society (CogSci). Toronto, Canada.

- Houlihan, S. D.**, Ong, D. C., & Saxe R. (April 2022). *Reasoning about emotions, expressions, and events: Bayesian causal inference over an intuitive theory*. Talk given at the Society for Affective Science (SAS) Conference. Remote. **Top Ranked Abstract**.
- Houlihan, S. D.**, Kleiman-Weiner M., Tenenbaum J. B., & Saxe R. (October 2019). *A generative model of context-based emotion reasoning*. Talk given at the Interdisciplinary Advances in the Development of Emotion Understanding Pre-conference, at the Biennial Meeting of the Cognitive Development Society (CDS). Louisville, KY.
- Houlihan, S. D.**, Kleiman-Weiner M., Tenenbaum J. B., & Saxe R. (September 2018). *Modeling emotion attribution as inverse inference in an intuitive theory of mind*. Talk given at the Conference on Cognitive Computational Neuroscience (CCN). Philadelphia, PA. **CCN Student Travel Award**.
- Houlihan, S. D.**, Kleiman-Weiner M., Tenenbaum J. B., & Saxe R. (May 2018). *Emotion attribution as Bayesian inference in an intuitive theory of mind*. Talk given at the symposium, “Predictive Social Cognition: Neural and Computational Approaches to Understanding How Perceivers Glimpse the Social Future,” at the 30th Association for Psychological Science (APS) Annual Convention. San Francisco, CA.

CONFERENCE PRESENTATIONS (SELECTED POSTERS)

- Houlihan S. D.**, Tenenbaum J. B., & Saxe R. (November 2023). *Expressions in context: a neuro-symbolic approach to building stimulus-computable models of emotion understanding*. Poster presented at the Princeton Summit on Affective Science (PSAS). Princeton, NJ.
- Houlihan S. D.**, Kleiman-Weiner M., Tenenbaum J. B., & Saxe R. (July 2019). *Emotion attributions echo the structure of people’s intuitive theory of psychology*. Poster presented at the 41st Annual Conference of the Cognitive Science Society (CogSci). Montreal, Canada.
- Houlihan S. D.**, Kleiman-Weiner M., Tenenbaum J. B., & Saxe R. (October 2018). *Formalizing people’s intuitive theory of emotions as a probabilistic program*. Poster presented at the International Conference on Probabilistic Programming (PROBPROG). Boston, MA.
- Houlihan S. D.**, Kleiman-Weiner M., Tenenbaum J. B., & Saxe R. (September 2018). *A generative model of people’s intuitive theory of emotions: inverse planning in rich social games*. Poster presented at Duality’s End: Computational Psychiatry and the Cognitive Science of Representation. Stockbridge, MA. **Erikson Institute Travel Award**.
- Houlihan S. D.**, Kleiman-Weiner M., Tenenbaum J. B., & Saxe R. (July 2018). *A generative model of people’s intuitive theory of emotions: inverse planning in rich social games*. Poster presented at the 40th Annual Conference of the Cognitive Science Society (CogSci). Madison, WI.
- Houlihan S. D.**, Kleiman-Weiner M., Tenenbaum J. B., & Saxe R. (March 2018). *Reverse-engineering emotional intelligence: generative models of an intuitive theory of emotions*. Poster presented at MIT Intelligence Quest (MITIQ). Cambridge, MA.

Anzellotti S., **Houlihan S. D.**, & Saxe R. (September 2017). *Nonlinear statistical dependence outperforms linear dependence in Bayesian inferences about the neural networks underlying simulated fMRI data*. Poster presented at the Conference on Cognitive Computational Neuroscience (CCN). New York City, NY.

Houlihan S. D., & Saxe R. (April 2017). *Modeling emotion attributions as inference in an intuitive theory of mind*. Poster presented at the Wisconsin Symposium on Emotion. Madison, MI.

Houlihan S. D., van Lutterveld R., Pal P., Sacchet M. D., McFarlane-Blake C., Patel P. R., Bauer C., & Brewer J. A. (February 2015). *Source-estimated EEG neurofeedback for effortless awareness meditation*. Poster presented at the Real-time Functional Imaging and Neurofeedback Conference. Gainesville, FL.

Amin N., **Houlihan S. D.**, & Kaufer D. (November 2014). *The role of stress hormones in prosociality in rats*. Poster presented at the Science of Compassion Conference. San Francisco, CA.

Houlihan S. D., van Lutterveld R., Pal P., McFarlane-Blake C., Patel P., Garrison K. A., Whitfield-Gabrieli S., & Brewer J.A. (November 2014). *Multimodal real time neurofeedback to dissect default network function related to meditation, addiction and stress*. Poster presented at the Basic Research/Graduate School of Biomedical Sciences Retreat, University of Massachusetts Medical School. Amherst, MA.

Houlihan S. D., Taravosh-Lahn K., Hamilton J., Francis D., & Kaufer D. (July 2014). *Hippocampal white-matter remodeling due to early life environment*. Poster presented at the CIRM Bridges Trainee Conference, California Institute of Regenerative Medicine. Burlingame, CA.

COURSES TAUGHT (FULL TERM, SOLE INSTRUCTOR)

Dartmouth

COGS 50.09: Computational Models of Social Cognition.
2024 Winter.

WORKSHOPS TAUGHT

Bayesian Theory of Mind Models.

March 2024, at the Society for Affective Science (SAS) Conference in New Orleans, LA.

TEACHING EXPERIENCE (OTHER)

Dartmouth

Methods In Neuroscience At Dartmouth (MIND)
2023 Summer (TA on 9-day summer school).

Harvard

HST583: Functional Magnetic Resonance Imaging, Data Acquisition and Analysis.
2017 Fall (TA for Profs. Jon Polimeni & Susan Whitfield-Gabrieli).

MIT

Brains, Minds, and Machines.
2017 Summer (TA on 3-week summer school).

9.46: Neuroscience of Morality.
2016 Fall (TA for Prof. Rebecca Saxe). **Award for excellence in undergraduate teaching.**

MIT Educational Studies Program

S10607: The neuroscience of meditation.
2016 (Instructor, 1-day course during Independent Activities Period).

S9746: The neuroscience of meditation.
2015 (Instructor, 1-day course during Independent Activities Period).

Berkeley City College

Bio 230A: Scientific Instrumentation I.
2012 Spring (Co-instructor with Dr. Scott Blitch).
2012 Fall (TA for Dr. Barbara Des Rochers).

Bio 230B: Scientific Instrumentation II.
2012 Spring (TA for Dr. Brandon Celaya).

Bio 33: Applied Immunology.
2012 Spring (TA for Dr. Barbara Des Rochers).

Bio 34: Genetics.
2012 Fall (TA for Dr. Ann Marie Faust).

Bio 10: Introduction to Biology.
2012 Spring (TA for Dr. Linda McPheron).
2008 Fall (TA for Dr. Pieter de Haan).

Bio 1A: General Biology.
2009 Spring (TA for Javier Silva).
2009 Fall (TA for Javier Silva).
2009 Summer (TA for Javier Silva).
2008 Fall (TA for Javier Silva).

National Outdoor Leadership School

Rocky Mountain Lightweight Backpacking Seminar.
2011 Summer (Instructor, 1-week wilderness skills course).

POSITIONS HELD

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| 2014–2015 | Research Assistant – UMass Medical School (PI: Judson Brewer) |
| 2013–2014 | CIRM Bridges Fellow – University of California, Berkeley (PI: Daniela Kaufer) |

EMPLOYMENT

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| 2012.01–2013.01 | Berkeley City College – Co-Instructor, Curriculum Developer |
| 2011.05–2011.12 | National Outdoor Leadership School (NOLS) – Field Instructor |
| 2011.04–2011.04 | The Pianist Lost Production – Helicopter Camera Operator |
| 2011.02–2011.05 | ChromaDex – Analytical Chemistry Technician |
| 2011.01–2011.05 | Longmont Tutoring Club – Math and Science Tutor |
| 2010.01–2010.12 | Math and Biology Tutor |
| 2008.09–2010.01 | Berkeley City College – Instructional Assistant |