

Sean Dae Houlihan

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<https://daeh.info>

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APPOINTMENTS

Postdoc.	Dartmouth College Department of Psychological and Brain Sciences Department of Computer Science Program in Cognitive Science	2022—
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EDUCATION

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

2024	Glushko Dissertation Prize, Cognitive Science Society (CogSci)
2023	Best Dissertation Award, Society for Affective Science (SAS)
2023—	Neukom Institute for Computational Science Postdoctoral Fellowship
2019–2020	Friends of the McGovern Institute Fellowship
2018	Austen Riggs Scholar in Computational Psychiatry Award
2018	Cognitive Computational Neuroscience (CCN) Travel Award
2017—	Fellow at The Dalai Lama Center for Ethics and Transformative Values
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

[* Equal Contribution | 📖 Book Chapter]

Chen, T.*, **Houlihan, S. D.***, Chandra, K., Tenenbaum, J. B., & Saxe, R. (2024). Intervening on emotions by planning over a Theory of Mind. *Proceedings of the Annual Meeting of the Cognitive Science Society*, 46, 5887-5894. <https://escholarship.org/uc/item/4gz7c85c>

Halchenko, Y. O., Goncalves, M., Ghosh, S., Velasco, P., di Castello, M. V. O., Salo, T., Wodder, J. T., Hanke, M., Sadil, P., Gorgolewski, K. J., Ioanas, H.-I., Rorden, C., Hendrickson, T. J., Dayan, M., **Houlihan, S. D.**, Kent, J., Strauss, T., Lee, J., To, I., ... Kennedy, D. N. (2024). HeuDiConv — Flexible DICOM conversion into structured directory layouts. *Journal of Open Source Software*, 9(99), 5839. <https://doi.org/10.21105/joss.05839>

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 Annual Meeting of the Cognitive Science Society*, 44, 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

PUBLICATIONS (IN PROGRESS)

Zhang, C., Lo, S.-Y., Lee, K., Agarwal, N., Ouyang, Z., **Houlihan, S. D.**, Vosoughi, S. (2024). *Scaling multimodal Theory-of-Mind with weak-to-strong Bayesian reasoning*. [Manuscript submitted for publication].

Houlihan, S. D., Ong, D., Cusimano, M., & Saxe, R. (2024). *Causal inference over an intuitive theory of emotion*. [Manuscript in preparation].

Houlihan, S. D., Tenenbaum J.B., & Saxe R. (2024). *Neuro-symbolic emotional intelligence: a stimulus-computable generative model for multitask social cognition*. [Manuscript in preparation].

Aczel, B., Szaszi, B., Clelland, H. T., Kovacs, M., Schulz-Kümpel, H., Holzmeister, F., Nilsson, G., Hoffmann, S., Kosa, L., Torma, Z. A., Abdelfatah, Y., Aberson, C. N., Acar, O. A., Acem, E., Adamkovic, M., Adamovich, T., Adiasto, K., Ahnström, L., ... **Houlihan, S. D.**, ... Nosek, B. A. (2024). *Investigating the analytical robustness of the social and behavioural sciences*. [Manuscript in preparation].

INVITED PRESENTATIONS (SELECTED)

2024	Cognition Colloquium, University of California, Berkeley
2024	Conference of the Cognitive Science Society (Rotterdam, Netherlands)
2024	Conference of the Society for Affective Science (New Orleans, LA)
2022	Consortium for Interacting Minds, Dartmouth College
2022	Machine Common Sense Working Group, IBM-MIT-Harvard
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 (San Francisco, CA)
2016	Peabody Essex Museum (Salem, MA)
2016	SinhaLab (Prof. Pawan Sinha), MIT

CONFERENCE PRESENTATIONS (ORAL)

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 (POSTERS)

- Houlihan, S. D.**, Xiao G., & Phillips J. (August 2024). *Contextual dependence of the “Knobe effect”: reversals under counterfactual contrasts*. Poster presented at the Conference on Cognitive Computational Neuroscience (CCN). Cambridge, MA.
- 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.

TEACHING EXPERIENCE (FULL TERM, SOLE INSTRUCTOR)

2024 Winter COGS 50.09: *Computational Models of Social Cognition*, Dartmouth College

TEACHING EXPERIENCE (WORKSHOPS)

2024 *Bayesian Theory of Mind Models* – Methods Workshop given at the Society for Affective Science (SAS) Conference in New Orleans, LA.

TEACHING EXPERIENCE (OTHER)

2023 Summer TA – *Methods In Neuroscience At Dartmouth (MIND)*, Dartmouth College
2017 Fall TA – HST583: *Functional Magnetic Resonance Imaging, Data Acquisition and Analysis*, Harvard University
2017 Summer TA – *Brains, Minds, and Machines Summer Course*, CBMM (a NSF STC)
2016 Fall TA – 9.46: *Neuroscience of Morality*, MIT [**Award for excellence in undergraduate teaching**]
2016 IAP Instructor – S10607: *The Neuroscience of Meditation*, MIT ESP
2015 IAP Instructor – S9746: *The Neuroscience of Meditation*, MIT ESP
2012 Spring Co-instructor – Bio 230A: *Scientific Instrumentation I*, Berkeley City College
2012 Spring TA – Bio 230B: *Scientific Instrumentation II*, Berkeley City College
2012 Spring TA – Bio 33: *Applied Immunology*, Berkeley City College
2012 Spring TA – Bio 10: *Introduction to Biology*, Berkeley City College
2012 Fall TA – Bio 34: *Genetics*, Berkeley City College
2012 Fall TA – Bio 230A: *Scientific Instrumentation I*, Berkeley City College
2011 Summer Instructor – *Rocky Mountain Lightweight Backpacking Seminar*, National Outdoor Leadership School (NOLS)
2009 Spring TA – Bio 1A: *General Biology*, Berkeley City College
2009 Fall TA – Bio 1A: *General Biology*, Berkeley City College
2009 Summer TA – Bio 1A: *General Biology*, Berkeley City College
2008 Fall TA – Bio 1A: *General Biology*, Berkeley City College
2008 Fall TA – Bio 10: *Introduction to Biology*, Berkeley City College

PROFESSIONAL SERVICE

2024 Thesis Awards Committee Member – Society for Affective Science (SAS)
2023 Editor – Application Statement Feedback Program (ASFP)
Reviewer Cognition, Open Mind, Developmental Psychology, IEEE Transactions on Affective Computing, Topics in Cognitive Science (topiCS), CogSci, CCN

PRESS

2023 Society for Affective Science Newsletter, Understanding emotions: How do we predict what others are feeling?, by Dr. Marissa Ogren
2023 MIT News, Computational model mimics humans' ability to predict emotions, by Anne Trafton