

# Tyler Millhouse

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**Areas of Specialization**    Philosophy of Science, Philosophy of Cognitive Science

**Areas of Competence**    Philosophy of Mind, Moral Psychology

## Education

PhD, Philosophy, University of Arizona (Expected Spring 2020)

MA, Philosophy, Tufts University (2014)

BA, Philosophy, Ashland University (2011)

## Dissertation

*Title*                    *Really Real Patterns*

*Committee*          Shaun Nichols (chair), Terry Horgan, Jonathan Weinberg

*Abstract*            In his classic paper “Real Patterns,” Daniel Dennett argues that the non-fundamental sciences (like biology, economics, and psychology) are concerned with the discovery and characterization of patterns in the physical world. Drawing on results in information theory, Dennett argues that the ability to construct a simple and predictive model of a system depends on the existence of patterns in the behavior of that system. For example, even if we could (in principle) predict a person’s behavior at the neurophysiological level, we could also employ a simple and predictive psychological model of that behavior (e.g., a belief-desire model). On Dennett’s view, the success of such a model is to be explained by the existence of patterns in the activity of the brain. More controversially, Dennett suggests that the posits of such a model (e.g., beliefs and desires) may pick out abstract or holistic properties of these patterns rather than specific structures within the brain. This “mild realism” has proven attractive to a number of philosophers (including David Wallace, James Ladyman, and Don Ross) who have developed the view in various ways. In my dissertation, I directly address Dennett’s information-theoretic argument for real patterns. Underlying this argument is an analogy between compressed files (e.g., .zip or .jpg files) and simple models. In Chapter 1, I conduct two detailed case studies of real-world modeling, arguing that Dennett neglects an important stage of the modeling process (i.e., feature extraction), a stage which exhibits important disanalogies with file compression. In Chapter 2, I suggest an alternative analysis of this stage of modeling and explore the implications of this analysis for Ladyman and Ross’s account of real patterns. In Chapter 3, I develop my own account of real patterns, drawing together results from Chapters 1 and 2. Finally, in Chapter 4, I apply my account to the case of computer implementation, suggesting a criterion for determining when a physical system counts as a computer. Ultimately, my account retains the information-theoretic spirit of Dennett’s original, but substantially strengthens and clarifies its realist commitments.

## Publications

Millhouse, T. (forthcoming). “Compressibility and the Reality of Patterns.” *Philosophy of Science*.

Millhouse, T. (2019). “A Simplicity Criterion for Physical Computation.” *The British Journal for the Philosophy of Science*. 70(1), 153-178. <https://doi.org/10.1093/bjps/axx046>.

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- Millhouse, T., Ayars, A., & Nichols, S. (2019). "Learnability and Moral Nativism: Exploring Wilde Rules," in J. Suikkanen and A. Kauppinen (eds.), *Methodology and Moral Philosophy*. New York, NY: Routledge, 73-90.
- Millhouse, T. (2018). "Virtual Machines and Real Implementations." *Minds and Machines*. 28(3), 465-489. <https://doi.org/10.1007/s11023-018-9472-7>.
- Millhouse, T., Bush, L.S. & Moss, D. (2016). "The Containment Problem and the Evolutionary Debunking of Morality," in T.K. Shackelford and R.D. Hansen (eds.), *The Evolution of Morality*. Cham, Switzerland: Springer, 115-135.

## Work in Progress

- "Really Real Patterns"
- "What's Wrong with Mechanistic Computation?"
- "Miracles, Skepticism, and Realist Priors"
- "Real Features"
- "Surreal Patterns"
- "Data and the Heuristic Division of Labor"
- "The Care and Feeding of Boltzmann Brains"
- "Confounds for Research on Moral Relativism" (with L.S. Bush, Cornell)

## Presentations

### Upcoming:

"Really Real Patterns," APA Central Division Meeting, Chicago, February 26-29, 2020.

### Past:

- "Compressibility and the Reality of Patterns," Society for the Metaphysics of Science, University of Toronto, November 7-9, 2019.
- "The Care and Feeding of Boltzmann Minds," Center for the Study of Language and Information Workshop, Stanford University, June 3, 2017.
- "Operationalizing Metaethics: The Disagreement Paradigm in Empirical Moral Psychology" (with L.S. Bush), Society for Philosophy & Psychology, University of Texas, Austin, June 4, 2016.
- "Possible Metaethics and Alternative Moral Domains" (with L.S. Bush), Boston Area Moral Cognition Research Group, Boston University, March 25, 2014.

## Research

Research Assistant, Christopher Hamilton, University of Arizona (Summer 2017 - Fall 2017)

I developed deep neural networks for classifying images from the Mars Reconnaissance Orbiter. The primary aim of the project was to map the extent of volcanic rootless cones, which indicate the presence of water in the ancient past.

Research Assistant, Shaun Nichols, University of Arizona (Fall 2016)

I collaborated with Shaun Nichols to design and conduct studies on moral psychology and moral rule learning. In particular, we investigated whether (and how easily) individuals can learn uncommon or unusual kinds of rules.

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Research Assistant, Liane Young, Boston College (Summer 2013 - Fall 2013)

While pursuing my MA at Tufts University, I worked as a research assistant in Liane Young's Morality Lab at Boston College. I conducted studies designed by Larisa Heiphetz on the development of metaethical views in children (aged 4-6).

## Teaching

### Instructor

Minds, Brains, and Computers, University of Arizona (Spring 2019)

Minds, Brains, and Computers, University of Arizona (Fall 2018)

The Moral Mind, University of Arizona (Summer 2018)

The Moral Mind, University of Arizona (Spring 2018)

Minds, Brains, and Computers, University of Arizona (Fall 2017)

Minds, Brains, and Computers, University of Arizona (Summer 2017)

Practical Thinking, Ashland University (Spring 2017)

The Moral Mind, University of Arizona (Summer 2016)

Minds, Brains, and Computers, University of Arizona (Summer 2015)

### Teaching Assistant

Philosophical Perspectives on the Individual, University of Arizona (Terry Horgan, Spring 2017)

Practical Thinking, University of Arizona (Jonathan Weinberg, Spring 2016)

Mind, Matter, and God, University of Arizona (Terry Horgan, Fall 2015)

Justice and Virtue, University of Arizona (Michael Gill, Spring 2015)

Logic, Tufts University (Susan Russinoff, Fall 2013)

Philosophy of Language, Tufts University (Dilip Ninan, Spring 2013)

## Graduate Coursework

### Philosophy of Mind/Cognitive Science

Philosophy of Mind, University of Arizona (Terry Horgan, Fall 2016)

Bayesian Modeling and Inference, University of Arizona (Clayton Morrison, Spring 2016)

Introduction to Machine Learning, University of Arizona (Clayton Morrison, Fall 2015)

Computational Cognitive Neuroscience, University of Arizona (Robert Wilson, Fall 2015)

Knowledge and Cognition, University of Arizona (Juan Comensaña, Fall 2015)

Artificial Intelligence, University of Arizona (Clayton Morrison, Spring 2015)

Philosophy of Mind, University of Arizona (Jonathan Weinberg, Spring 2015)

Philosophy and Cognitive Science, University of Arizona (Shaun Nichols, Fall 2014)

Statistics Fundamentals, University of Arizona (Lee Sechrest, Fall 2014)

Intuitions (Independent Study), Tufts University (Daniel Dennett, Fall 2013)

Chomsky, Tufts University (Jody Azzouni, Spring 2013)

Semantics, Tufts University (Ray Jackendoff, Spring 2013)

Foundations of Cognitive Science, Tufts University (Daniel Dennett, Fall 2012)

### Philosophy of Science

Philosophy of Physical Science, University of Arizona (Richard Healey & Jenann Ismael, Fall 2016)

Philosophy of Science, Tufts University (George Smith, Spring 2014)

Nature and Norms, Tufts University (Mario De Caro, Fall 2012)

### Moral Psychology/Value Theory

Moral Philosophy, University of Arizona (Julia Annas, Spring 2015)

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Social Norms, University of Arizona (Gerald Gaus, Fall 2014)  
Cultural Evolution, Tufts University (Daniel Dennett, Spring 2014)  
Evolution of Minds and Morals, Tufts University (Patrick Forber, Spring 2014)

## References

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University Professor  
Tufts University  
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Terrence Horgan  
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Jenann Ismael  
Professor of Philosophy  
Columbia University  
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Jonathan Weinberg  
Associate Professor of Philosophy  
University of Arizona  
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