

Mel Andrews

Postdoctoral Associate, Princeton University

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Research Areas

- AOS **AI Ethics, Philosophy of Science & Technology, Philosophy of the Cognitive & Neurosciences.**
- AOC **Philosophy of Mind, Philosophy of Mathematics, Philosophy of Biology.**

Work

- 2025-2027 **Principle Investigator, Epistemic Credentials of AI in Science Evaluation**, The Alfred P. Sloan Foundation Metascience & AI Grant.
Princeton University, Princeton, NJ
- 2025-2027 **Postdoctoral Research Associate, Center for Information Technology Policy (CITP)**.
Princeton University, Princeton, NJ
- 2025-2027 **Postdoctoral Research Associate, The Natural and Artificial Minds (NAM) Initiative, the AI Lab at Princeton**.
Princeton University, Princeton, NJ
- 2024-2025 **Student Researcher, Responsible AI Team**.
Google Research, Mountain View, CA
- 2022-2024 **Research Associate, Department of Machine Learning (MLD)**.
Carnegie Mellon University, Pittsburgh, PA
- 2019-2022 **Graduate Teaching Assistant, Department of Philosophy**.
The University of Cincinnati, Cincinnati, OH

Education

- 2025 **PhD, Philosophy**, University of Cincinnati.
Dissertation Chair: Angela Potochnik. Dissertation Committee: Colin Allen, Zvi Biener, Anthony Chemero. Dissertation Title: *The Math & the Territory: On the Scientific Uses & Abuses of Machine Learning & Other Mathematical Modeling Strategies*
- 2014 - 2018 **Bachelor of Science**, Tufts University, Psychology, Cognitive & Brain Sciences.

Grants, Fellowships, & Awards

- 2025-2027 **Metascience and AI Grant**, USD \$250,000, The Alfred P. Sloan Foundation.
- 2024 **Taft Fellowship**, USD \$48,775, The University of Cincinnati.
- 2023 **Racial Equity in Technology Policy Accelerator**, USD \$3,000, Federation of American Scientists.
- 2022 **AI Alignment Summer Fellowship**, USD \$36,000, Principles of Intelligent Behaviour in Biological & Social Systems.
- 2019 **Graduate Dean's Excellence Scholarship**, USD \$3,000, University of Cincinnati.

Publications

Andrews, M. (2025), The Immortal Science of ML: Machine Learning & the Theory-Free Ideal. DOI:10.1007/s10670-025-01010-x

Andrews, M. (2025), Towards an Applied Philosophy of Mathematics, in Currie, A., & Veigl, S. (Eds.) *Methods in the Philosophy of Science: A User's Guide*. The MIT Press.

Andrews, M., Smart, A., & Birhane, A., (2024), The Reanimation of Pseudoscience in Machine Learning & its Ethical Repercussions. *Patterns*, Cell Press. DOI:10.1016/j.patter.2024.101027

Fawkes, J., Fishman, N., **Andrews, M.**, Lipton, Z. (2024), The Fragility of Fairness: Causal Sensitivity Analysis for Assessing the Robustness of Fair Machine Learning, *Proceedings of the 38th International Conference on Neural Information Processing Systems (NeurIPS)*. DOI:10.48550/arXiv.2410.09600

Andrews, M. (2022), Making Reification Concrete: A Response to Bruineberg et al. *Behavioral and Brain Sciences (BBS)*, Cambridge University Press. DOI:10.1017/S0140525X22000310

Andrews, M. (2021), The Math is Not the Territory: Navigating the Free Energy Principle. *Biology & Philosophy*. 36(3), 1-19, Springer. DOI:10.1007/s10539-021-09807-0

Feldman, D. H. & **Andrews, M.** (2017), Parenting Talented Children, in *Handbook of Parenting*, (3rd ed.) (Ed. Bornstein), Psychology Press. DOI:10.4324/9780429440847-12

Public Philosophy

Andrews, M. (2023), Philosophy in the Trenches and Laboratory Benches of Science. *The Philosopher*.

Andrews, M., and Polt, R. (2020), The Philosophers' Touch. *ETCetera Journal*.

Andrews, M. & Feiten, E. (2018), Conference Report: The Generalized Theory of Evolution, *The Reasoner*, 12(5).

Teaching

Andrews, M. (2024, Summer), Instructor, Summer School, Philosophy of Science for AI Ethics, SEMF Interdisciplinary Summer School, Valencia Polytechnic University, Valencia, E.S.

2023, Spring **Co-Instructor**, Carnegie Mellon University, **Philosophical Foundations of Machine Intelligence**, Graduate Seminar on Philosophy of Machine Learning & Artificial Intelligence for graduate students in the school of computer science.

Andrews, M. (2022, Summer), Instructor, Summer School, *Mathematical Modeling in the Cognitive and Brain Sciences*, Nencki School of Ideas in Neuroscience, Warsaw, P.L.

2022, Spring **Teaching Assistant**, University of Cincinnati, **Introduction to Philosophy**.

2021, Fall **Instructor**, University of Cincinnati, **Introduction to Cognitive Science**.

2021, **Instructor**, University of Cincinnati, **Introduction to Cognitive Science**.

2021, Spring **Instructor**, University of Cincinnati, **Medical Ethics: Moral Issues in Medical AI**.

2020, Fall **Teaching Assistant**, University of Cincinnati, **Contemporary Moral Issues**.

2020, Spring **Teaching Assistant**, University of Cincinnati, **Introduction to Cognitive Science**.

2019, Fall **Teaching Assistant**, University of Cincinnati, **Introduction to Philosophy**.

2018, Summer **Co-Instructor**, Binghamton University, **Topics in Theoretical Biology & Philosophy of Biology**.

2018, Spring **Teaching Assistant**, Tufts University, **Intellectual Development**.

2018, Spring **Co-Instructor**, Binghamton University, **Topics in Theoretical Biology & Philosophy of Biology**.

2017, Fall **Co-Instructor**, Binghamton University, **Topics in Theoretical Biology & Philosophy of Biology**.

Invited Talks & Workshops

Andrews, M. (2026), Title TBD, Cultural AI Conference, NYU Digital Theory Lab, NYU, NYC, NY

Andrews, M. (2025), Title TBD, Workshop on AI in Science, University of Cincinnati, Cincinnati, OH

Andrews, M. (2025), Invited Keynote Presentation: What could an AI ethics be? An epistemological proposal, Conference on Philosophy of Computing, Universidad Nacional Autónoma de México, Mexico City, MX

Andrews, M. (2025), Representation in Brains & Neural Networks, *Johns Hopkins University, Baltimore, M.D.*

Andrews, M. (2025), Machine Learning & Neuroscience: Curious (& Spurious) Connections, *Centre for Cognitive Science (COGS), University of Sussex, Brighton, U.K.*

Andrews, M. (2024), Empirical Grounding in (Neuro)scientific ML, *Philosophy and Psychology of Generalization and Creativity Group, Simons Institute for the Theory of Computing, Berkeley, C.A.*

Andrews, M. (2024), Responsible AI is Sound Science *Workshop on Causation, Complexity, Cognition, and Representation for Responsible AI*, Google & the Santa Fe Institute (SFI)

Andrews, M. (2023), Machine Learning & The Theory-Free Ideal *Workshop on Philosophy of AI in Science*, Cambridge University, Cambridge, UK

Andrews, M. (2023), Panelist on AI Alignment and Artificial Life *ALIFE 2023 (Conference on Artificial Life)*, Sapporo, JP

Andrews, M. (2023), The Devil in the Data: Assessing the Atheoreticity of Scientific Machine Learning *Foundations of Computation Workshop*, presented at the Department of Philosophy, Australian National University, Canberra, AU

Andrews, M. (2022), *Workshop on the Free Energy Principle as Model Structure or Model Template*, presented at the Department of Philosophy, Universität Wien, Wien, AT

Andrews, M. (2022), *Workshop on metascience and theorising*, Leiden, NL

Andrews, M. (2022), *Reification in ML & the FEP* “The Free Energy Principle: Science, Tech and Philosophy” Conference, The Berlin School of Mind and Brain, Humboldt-Universität zu Berlin, Berlin, DE

Andrews, M. (2021), *Recognising & Rectifying Reification: Machine Learning & Model-Target Misidentification*, Keynote Presented at COGNITIO 2021, Université du Québec à Montréal, Québec, CA

Refereed Talks & Workshops

Andrews, M., & Smart, A. (2024), *Militarising ML: Functionality & Harm*, Presented to conference *Harms and Risks of AI in the Military*, Mila - Quebec AI Institute in Montréal, Montreal, CA

Andrews, M. & Curtis-Trudel, A., (2024), *Machine learning, cognitive prosthetics, and the future of science*, Presented to conference *Philosophy of Science: Past, Present and Future*, Minnesota Center for Philosophy of Science, Minneapolis, MN, USA

Andrews, M. (2023), *Machine Learning & The Theory-Free Ideal*, Accepted to conference *Philosophy of Science of ML*, Tübingen, DE *not presented due to pandemic*

Andrews, M. (2021), *Between Oracular Modelling & the Theory-Free Ideal* Talk accepted at the East European Network for Philosophy of Science, Tartu, EE *not presented due to pandemic*

Andrews, M. (2021), *Assessing the FEP in Scientific Practice* Talk Presented at the 5th International Conference on Interactivity, Language & Cognition: Integrating Quantitative and Qualitative Methods in the Cognitive and Language Sciences, Warszawa, PL

Andrews, M. (2021), *Machine Learning as Model & as Metaphor* Talk accepted at the joint conference of the International Society of Ethics and Information Technology/International Association for Computing and Philosophy, Universität Hamburg, DE *not presented due to pandemic*

Andrews, M. (2021), *Machine Learning in Scientific Practice: Normative & Descriptive Aims* Presented at the CUNY Graduate Center Graduate Conference on Artificial Intelligence, NY, NY, USA

Andrews, M. (2021), *Machine learning & the scientific method: the case of the Free Energy Principle* Presented at Digital Studies of Digital Science, Université catholique de Louvain, Louvain-la-Neuve, BE

Andrews, M. (2018), *A Theory of Representation with Error in Deacon & Bickhard* Presented at The Peripatetic Conference for Cognitive Systems Modeling, Małe Ciche, PL

Andrews, M. (2018), *Mind the (Informational) Gap: Mind, Machine, & the Space in Between* Presented at a workshop on Machine Learning and Explanation in Cognitive Science hosted by the Czech Academy of Sciences, Prague, CZ

Andrews, M. (2018), *Life-mind (dis-)continuities: bridging biological selfhood and biosemiosis*. Presented at The 18th Annual Biosemiotics Gathering, Berkeley, CA, USA

Andrews, M. (2018), *On the subject of evolution: towards a biological basis of subjectivity, selfhood, and agency*. Presented at The Science of Consciousness Conference, Tucson, AZ, USA

Andrews, M. (2018), *Adapting evolution: complexity & culture within a universal Darwinian framework*. Presented at The Generalized Theory of Evolution Conference, Düsseldorf, DE

Organization Experience

- 2022 **Conference Co-Organizer**, University of Cincinnati, Machine Learning, Abstract Thought, and the Expanding Reach of A.I.: Ethical and Conceptual Frontiers, Featuring talks by Zachary Lipton, Kathleen Creel, Cameron Buckner, Subbarao Kambhampati, S. Matthew Liao, Mariya Toneva, & Ahmed Elgammal.
- 2019-2021 **Organized and ran international reading and working group on mathematical modelling across physics, biology, and neuroscience.**
- 2018 **Conference Co-Organizer**, Tufts University, Predictive Processing: A Critical Evaluation of its Prospects, Featuring talks by Daniel Dennett, Lisa Feldman Barrett, Fiery Cushman, Bryce Huebner, Sam Gershman, Krzysztof Dołęga, Rosa Cao, Enoch Lambert, Matteo Colombo, & Philipp Schwartenbeck.
- 2018 **Organizer and Editor with David Sloane Wilson, Special Issue, This View of Life**, Reflections on the notion of ‘teleology’ & ‘consciousness’ in evolution, Featuring contributions by Massimo Pigliucci, Eva Jablonka & Simona Ginsburg, Lenny Moss, Liane Gabora, Steven Hayes, and Stanley Salthe.