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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.**

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## 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

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## 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.

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## 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.

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## 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

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## 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).

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## 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, Summer **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*.

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## 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

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## 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

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## 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.