

Research Areas

- AOS **Philosophy of Artificial Intelligence, History & Philosophy of Science, Philosophy of the Cognitive and Neurosciences.**
- AOC **AI Ethics, Philosophy of Biology, Philosophy of Applied Mathematics, Philosophy of Mind.**

Work

- Current **Predocctoral Research Associate**, *Department of Machine Learning (MLD)*, Carnegie Mellon University, Pittsburgh, PA.

Education

- Current **PhD, Philosophy of Science**, University of Cincinnati.
- 2014 - 2018 **Bachelor of Science - Tufts University**, Psychology & Cognitive & Brain Sciences.

Fellowships, Grants, & Awards

- 2023 **Visiting Scholar**, *Philosophy Department*, Australian National University.
- 2023 **Racial Equity in Technology Policy Accelerator.**
- 2022 **Fellow**, *Oxford & Czech Academia of Sciences*, Principles of Intelligent Behaviour in Biological & Social Systems, \$10,000 USD.
- 2021 **Visiting Scholar**, *University of Pittsburgh*, Department of History & Philosophy of Science.
- 2019 **Graduate Dean's Excellence Scholarship**, *University of Cincinnati*, \$3,000 USD.

Teaching

- 2023, Spring **Co-Instructor**, *Carnegie Mellon University*, MLG-10721 | **Philosophical Foundations of Machine Intelligence**, Graduate Seminar on Philosophy of Machine Learning & Artificial Intelligence for graduate students in the school of computer science.
- 2022, Spring **Teaching Assistant**, *University of Cincinnati*, PHIL-1000 | **Introduction to Philosophy.**
- 2021, Fall **Instructor**, *University of Cincinnati*, PSYCH-1006 | PHIL-1006 | **Introduction to Cognitive Science.**
- 2021, Summer **Instructor**, *University of Cincinnati*, PSYCH-1006 | PHIL-1006 | **Introduction to Cognitive Science.**
- 2021, Spring **Instructor**, *University of Cincinnati*, PHIL-2029 | **Medical Ethics: Moral Issues in Medical AI.**
- 2020, Fall **Teaching Assistant**, *University of Cincinnati*, PHIL-1025 | **Contemporary Moral Issues.**
- 2020, Spring **Teaching Assistant**, *University of Cincinnati*, PSYCH-1006 | PHIL-1006 | **Introduction to Cognitive Science.**
- 2019, Fall **Teaching Assistant**, *University of Cincinnati*, PHIL-1000 | **Introduction to Philosophy.**
- 2018, Summer **Co-Instructor**, *Binghamton University*, **Topics in Theoretical Biology & Philosophy of Biology.**
- 2018, Spring **Teaching Assistant**, *Tufts University*, CSHD-0051 | **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**.

Publications

Andrews, M. (2022), Making Reification Concrete: A Response to Bruineberg et al. *Brain and Behavioural Sciences*.

Andrews, M. (2021), The Math is Not the Territory: Navigating the Free Energy Principle. *Biology & Philosophy*. 36(3), 1-19.

Feldman, D. H. & Andrews, M. (2017), Parenting Talented Children, in *Handbook of Parenting*, (3rd ed.) (ed. Bornstein), Psychology Press.

Forthcoming & Under Review

Andrews, M. (*Under Review*), The Immortal Science of ML: Machine Learning & the Theory-Free Ideal.

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

Fawkes, J., Fishman, N., Andrews, M., Lipton, Z. (*Under Review*), The Fragility of Fairness: Causal Sensitivity Analysis for Assessing the Robustness of Fair Machine Learning.

Invited Talks & Workshops

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

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, A.U.

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

Andrews, M. (2022), *Workshop on role of mathematics in theorising in the cognitive and brains science*, presented at the Nencki School of Ideas in Neuroscience, Warsaw, P.L.

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

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, D.E.

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

Refereed Talks & Workshops

Andrews, M. (2023), Machine Learning & The Theory-Free Ideal *Conference Philosophy of Science of ML*, Tübingen, D.E.

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, P.L.

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

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, B.E.

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

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, C.Z.

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

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, A.Z.

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

Conference Posters

Andrews, M. (2020), *Is the FEP Epistemologically Applicable?* Presented at POBAM 2020

Andrews, M. (2018), *Explanatory limits of blanket assumptions: the free energy principle and Markov blanket models of mind and life*. Presented at The Predictive Processing Conference, Medford, M.A.

Feldman, D.H. & Andrews, M. (2018), *The dynamic complexity of cultural construction*. Presented at the 48th annual meeting of the Jean Piaget Society: The Dynamics of Development: Process, (Inter-)action, & Complexity, Amsterdam, N.L.

Feldman, D. H. & Andrews, M. (2017), *Cultural evolution is not evolution*. Presented at the Society for the Study of Human Development's 2017 Annual Conference, Providence, R.I.

Andrews, M., Liu, S., & Spelke, E. (2017), *Do infants exhibit preferences for rational agents?* Presented to the Laboratory for Developmental Studies, Harvard University, Cambridge, M.A.

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).

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**, *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.

Services to the Field

- 2021-2022 **Chair**, *University of Cincinnati Minorities in Philosophy (MAP) Chapter*.
- 2019 **Editor**, *The Cartesian Semantics of the Port Royal Logic*.
- 2022 **Reviewer**, *The British Journal for the Philosophy of Science (BJPS)*.
- 2021 **Reviewer**, *Behavioral & Brain Sciences*.
- 2021 **Reviewer**, *Mind & Language*.
- 2020 **Reviewer**, *Biology & Philosophy*.
- 2020, 2021, **Reviewer**, *Synthese*.
- 2022