Researcher, Responsible AI, Google Research
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Mel Andrews

Research Areas

AOS **Philosophy of Science, Philosophy of Technology, AI Ethics, Philosophy of the Cognitive and Neurosciences**.

AOC **Philosophy of Biology, Philosophy of Applied Mathematics, Philosophy of Mind**.

Work

Current **Student Researcher**, *Responsible AI Team*, Google Research, Mountain View, CA.

2022-2024 **Research Associate**, *Department of Machine Learning (MLD)*, Carnegie Mellon University, Pittsburgh, P.A..

Education

Current **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 Modelling Strategies*

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

Fellowships, Grants, & Awards

2024 **Taft Fellowship**, The University of Cincinnati.

2023 **Visiting Fellowship**, *Philosophy Department*, Australian National University.

2023 **Racial Equity in Technology Policy Accelerator**, *Federation of American Scientists*.

2022 **Fellowship**, *Oxford & Czech Academy of Sciences*, Principles of Intelligent Behaviour in Biological & Social Systems.

2021 **Visiting Scholarship**, *University of Pittsburgh*, Department of History & Philosophy of Science.

2019 **Graduate Dean's Excellence Scholarship**, *University of Cincinnati*.

Publications

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

Forthcoming

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

Under Review

Andrews, M. (*Under Review*), The Immortal Science of ML: Machine Learning & the Theory-Free Ideal. DOI:10.13140/RG.2.2.28311.75685

Andrews, M. (*Contracted & In Prep*), A Theory of Representation for Scientific ML, in *The Role of Artificial Intelligence in Science: Methodological and Epistemological Studies*, Curtis-Trudel, A. E., Rowbottom, D., & Barack, D., (Eds)., Routledge.

Public Writing

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

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.

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**.

Invited Talks & Workshops

Andrews, M. (*2024*), Responsible AI Acknowledges Representation, *Johns Hopkins University, Baltimore, M.D.*

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

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 role of mathematics in theorising in the cognitive and brains science,* presented at the Nencki School of Ideas in Neuroscience, Warsaw, PL

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

Curtis-Trudel, A., & **Andrews, M.** (*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 COVID*

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 COVID*

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 COVID*

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

Conference Posters

Andrews, M. (*2020*), *Is the FEP Epistemologically Applicable?* Presented at POBAM (Philosophy of Biology at the Mountains) 2020, Salt Lake City, UT, USA

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, MA, USA

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, NL, USA

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, RI, USA

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

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 Gersham, 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.

Services to the Field

2023-2024 **Program Committee**, *ACM FAccT 2024 - Association for Computing Machinery Conference on Fairness, Accountability, and Transparency*.

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, 2022 **Reviewer**, *Synthese*.

Professional References

Angela Potochnik, Department of Philosophy, University of Cincinnati, **potochaa@ucmail.uc.edu**.

Julian Jara-Ettinger, Department of Cognitive Science, Yale University, **julian.jara-ettinger@yale.edu**.

Colin Allen, Department of Philosophy, University of California Santa Barbara, **colinallen@ucsb.edu** .

Zvi Biener, *Department of Philosophy*, University of Cincinnati, **zvi.biener@uc.edu**.

Anthony Chemero, *Department of Philosophy*, University of Cincinnati, **chemeray@ucmail.uc.edu**.