Cameron Beebe, Ph.D.

Linked**in**
 GitHub.
 Email

 612 398 2940
U.S. Citizen located in
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Artificial intelligence researcher and mathematical philosopher. Current research focus on knowledge transfer and model-based reasoning, including aspects of machine learning and AI. Experience with deep learning tools including **tf.keras**, **pytorch**, **anaconda**. Experimented with neural network models on HPC machines. Experience on the kinds of problems and methods that machine learning researchers work on, which overlap with the methods employed by formal philosophers of science (e.g. logic, Bayesianism). Aware of foundational issues (bias, explainability, interpretability). Also worked extensively on problems in the philosophy and foundations of quantum theory and quantum computation.

- Ph.D. from Munich's Graduate School of Systemic Neuroscience (GSN).

- Experience training machine learning models on HPC clusters at Cray.

- Mathematical philosophy and philosophy of science at Munich Center for Mathematical Philosophy (MCMP).

- Languages: Python and German.

⇅ Experience

2015–2021 PhD at GSN. Researched theoretical AI, cybernetics, and systems theory. Took math and programming courses. Presented research at international conferences.

Dissertation on Knowledge Transfer in Cognitive Systems Theory, looking at transfer learning in connectionist neural networks as an example of effective transfer of control. Like general cognition in humans enabled by analogical or model-based transfer, transfer learning in artificial neural networks has great potential for artificial general intelligence.

Other related projects included taking a quantum information course, critiquing quantum-like models of cognition, defending and bolstering W.R. Ashby's structural view of systems (cybernetics), and advocating for a model-based view of computation in a world with increasingly diverse computational devices.

2021 The SciPhi Initiative, LLC. Part time online tutoring in basic formal methods, mathematical philosophy, and philosophy of science. (**Logic, Probability, Python, Jupyter**)

2019 Deep Learning Intern at Cray, Inc. Worked with Cray's Distributed Deep Learning Plugin team. Applied, tested, and experimented with the Plugin across multiple GPUs (gradient averaging using MPI), on a variety of architectures including: LSTM, CNN, RL/DQN, CapsNet. Worked mainly with Keras, scheduled jobs via Slurm, managed ML/DL packages and versions with Anaconda and pip, and committed code to internal git repos. (**Python, Jupyter, Slurm, Linux, Keras, Anaconda, Bash, Git**).

2013–2015 Open Access: Part time development and data entry for Open Access LMU.

🧩 Projects (See more on ⭘ & ResearchGate)

2021 Code Example Toy Model for Ashby's Game Theoretic Foundation for Cybernetics (WIP)

2018 Published Model-Based Computation.

2018 Project/Talk *Black Boxes or Rube Goldberg Machines? ANNs as Ashby Regulators.* Epistemic Opacity in Computer Simulation and Machine Learning, HLRS. (Related Repo)

2018 Project/Talk Transfer Learning in Artificial Neural Networks: Introductory Tutorial to Transfer Learning with **Keras** (**Jupyter** Notebook for PyData Meet-up)

2016 Published Sequent Calculus Representations for Quantum Circuits

2014 Project Modeling Memory in Signaling Games (Reinforcement learning in **Netlogo** w/ Dropout)

🏛 Education

2021 Ph.D. in Systemic Neuroscience. from GSN, LMU Munich.
Dissertation: *Knowledge Transfer in Cognitive Systems Theory*
Committee: Stephan Hartmann, Christian Leibold, Ulrike Hahn, Gregory Wheeler

2015 Masters in Logic and Philosophy of Science from MCMP, LMU Munich.
Supervisor: Karim Thébault, Reviewer: Michael Cuffaro
Thesis: *Fluid Mechanical Models in Physical and Computational Contexts*

Coursework and research in basic formal methods and philosophy of specialized sciences, including Bayesian networks, stats, proof theory, foundations of quantum mechanics, theoretical computer science, information theory, and basic simulation programming (**Netlogo**).

2012 B.A. in Philosophy from Montana State University.
Thesis: *Uncertainty in Quantum Theory*

📖 Publications

Model-Based Computation. Natural Computing, Volume 17, Issue 2, p. 271-281. 2018.

Sequent Calculus Representations for Quantum Circuits. Electronic Proceedings in Theoretical Computer Science, volume 214, p. 3-15. 2016.

WIP Manuscripts (More on my ResearchGate Profile.)

Artificial Neural Networks as Cybernetic Regulators.

Transfer Learning: The Logic of Discovery for Artificial General Intelligence

Bayesian Confirmation from Analog Models. With Roland Poellinger.

Decoherence and Survival: Why Incompatible Observables Should be Compatible.