Cameron Beebe, Ph.D.

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$\langle \texttt{sci}|\texttt{phi} \rangle_i$

Philosopher of science specializing in philosophy & foundations of physics, computation, and AI. Practical experience with python, numpy, anaconda, jupyter. Interested in working on hard problems with interdisciplinary methods and diverse teams. Currently thinking about structural idealism and quantum probabilities. To see details of this WIP as I make updates, please visit the github repository.

- 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

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

2015–2021 PhD at GSN. Researched theory of AI, cybernetics, and philosophy of systems theory. Took math and programming courses. Presented at international conferences. Soft skills training and interdisciplinary collaboration.

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. **Heroes: Ashby**, **Carver Mead**, and **John S. Bell**.

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 data entry and development for Open Access LMU database.

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.

Bayesian Confirmation from Analog Models. With Roland Poellinger.

Transfer Learning: The Logic of Discovery for Artificial General Intelligence

Decoherence and Survival: Why Incompatible Observables Should be Compatible.