

# SAMUEL D. MCDERMOTT

samueldmcdermott + { .github.io, @gmail.com }

I'm a senior academic physicist skilled in model building, data analysis (including machine learning), and parameter estimation looking for new career opportunities. My skillset includes techniques ranging from high-dimensional parameter sampling (nested sampling and Hamiltonian Monte Carlo) to core machine learning modalities (Bayesian neural networks and simulation-based inference) to the cutting edge of machine learning research (creating new deep neural network architectures). Throughout my career, I've maintained large and diverse networks of collaborators, both within my institutions and outside of them, and I'm excited to meet new people working on interesting and important problems where I can bring my quantitative and qualitative skills to bear!

## EDUCATION

---

University of Michigan

Ph.D., Physics, 2009-2014

University of Pennsylvania

B.A., Physics and B.A., Math, *Summa cum Laude*, 2005-2008


## PROFESSIONAL EXPERIENCE

---

University of Chicago

Sept 2022-present

postdoctoral scholar, Department of Astronomy & Astrophysics Chicago, IL and Philadelphia, PA


- senior member of Deep Skies Lab leading internal collaborations on new machine learning architectures, simulation-based inference for CMB delensing, and uncertainty quantification
- developed new neural network block based on the wavelet decomposition which outperforms a comparable convolutional neural network, resulting in a paper submitted to NeurIPS and code 
- created group training materials for research computing, including guidance on the `slurm` workload manager, GPU usage (with both Apple MPS and NVIDIA CUDA architectures), package management with `pip`, `conda`, and `micromamba`, and package development with the PyCharm CDE and `git`

Fermi National Accelerator Laboratory

Sept 2017 - Sept 2022

Schramm Fellow, Astrophysics Group, Theory Division

Batavia, IL


- senior postdoctoral scholar with world-leading research program in dark matter phenomenology, particle cosmology, and gravitational wave data analysis
- developed `gcepy`  for accurate parameter estimation across several leading models of the Galactic center excess with an autodifferentiable likelihood based on `jax` and using advanced sampling techniques (nested sampling with `dynesty` and Hamiltonian Monte Carlo with `numpyro`)

C. N. Yang Institute for Theoretical Physics

Sept 2014 - Sept 2017

postdoctoral associate, phenomenology group

Stony Brook, NY

- created new techniques for accurate calculation of particle emission from ultra-dense supernova interiors
- co-developed `dmdd`  based on `Cython` for simulation of dark matter direct detection experiments and using `PyMultiNest` for Bayesian posterior analysis, used by seven different experimental collaborations for final results

## *Accomplishments and Recognition*

- 49 research papers with over 4500 total citations and *h*-index of 32 (via INSPIRE-hep)
- five colloquia and conference plenary talks and over 100 invited seminars and parallel talks
- referee at six journals and invited to review panel of national funding organization
- four international conferences organized with over \$130,000 total funds awarded
- nine popular articles and radio interviews featuring my scientific work
- three open-source software packages developed and available on `github`