# Michael Phillips

Quantitative Scientist
Python Pro

lets.ask.mike@gmail.com
linkedin.com/in/michaelphillipshuman
github.com/mikeisahuman
mikeisahuman.com


**Key Skills**

- General: Adaptability and Agility, Analytical Thinking, Creative Problem Solving, Technical Curiosity
- Coding: Python, C++, Java, Mathematica, bash / zsh
- Packages: pandas, numpy, scipy, matplotlib, pyopencl, pycuda, numba
- Usage: object class development, multidimensional optimization, GPU parallelization, visualization
- Science / Math / Statistics: Markov network analysis, Bayesian inference on distributions and timeseries, thermodynamics and phase diagrams, mean-field and Gaussian fluctuation modeling
- Familiarity: PCA, k-means clustering, Monte Carlo & Molecular Dynamics simulations, Machine Learning

**Select Projects**

(1) Forward and Backward Modeling of Timeseries Data

- Built two independent simulations to generate synthetic timeseries data from Markov networks with fixed transition rates; applied Master Equation to analyze and interpret results.
- Built analysis and computational tools for Bayesian inference of transition rates from real-world timeseries data. Maximum Likelihood inference from both distributional and dynamical properties.
- Developed GPU kernels for use with PyOpenCL to build large arrays (~18M entries) efficiently.

(2) Physics-based Modeling of Cooperative Phenomena

- Developed object-oriented approach to informatic analysis of biomolecules, such as proteins.
- Built modular computationally intensive models, analyzers, and visualizers for high throughput calculations of protein properties across scales; applied to datasets of up to 30k, running in ~8 hours.
- Robust coding practices: designed models for simultaneous deployment, enhanced readability, ensured broad applicability, and improved efficiency – my code consistently runs ~50% faster than others.

**Experience**

(1) Theoretical Biophysics Researcher – University of Denver (2021-present)

- First Year: began with zero experience in the field, learned key technologies of the group, developed Python code from scratch, became subject expert and leader of code benchmarks within ~6 months.
- During 4 Years: wrote 150+ files of Python code, including 10+ original classes/objects, obtaining results and writing articles for 5+ intensive projects, saving weeks of computation time over competitors.

(2) College Instructor / Independent Researcher – Central New Mexico Community College (2017-2021)

- Built Python scripts for grade calculations and statistical analysis in support of teaching duties.
- Developed prototypical models of student behavior, including deterministic and Monte Carlo models.
- Constructed and rigorously analyzed a toy model of human behavior, with Python.

**Education**

(1) University of California, Riverside – Ph.D. in Physics (2012-2016)

- Used Mathematica and Python to do intensive calculations and visualize results in theoretical physics.

(2) University of New Mexico – B.S. in Mathematics and Physics (2006-2011)

- Used LabView to program control of semi-automated electronic probes, and VHDL to program FPGAs for medium-throughput testing of assembled semiconductor devices.