

Henry H. Zheng

(650)-798-4075
Bay Area, California

<https://github.com/zhenghenry>
henryzheng@stanford.edu

Education

Stanford University

Physics Ph.D, Advisors: Leonardo Senatore, Eva Silverstein

University of Chicago

B.A. Physics with Honors

Stanford, US
Sep 2019 – Present
Illinois, US
Sep 2015 – Jun 2019

Technical Skills

Programming Python, Rust, \LaTeX , C++, R, Mathematica, Tensorflow, Pytorch, JAX, MCMC, Cython, Git
Statistics & Modeling Machine Learning, MCMC, Bayesian inference, Summary statistics

Research Experience

Graduate Researcher, SITP and KIPAC

Sep 2019 – Present

- Developing an emulator of PyBird, a python code for computing one-loop EFT predictions of two and three point correlators with application to various JAX based samplers.
- Further developing the theoretical framework of a new Hamiltonian based optimizer (MCHMC) and benchmarking its capabilities to problems such as knowledge distillation.
- Forecasting next generation galaxy surveys DESI and MegaMapper's cosmological parameter constraints with Fisher methodology. Constructed theoretically motivated priors that improve constraints on hard-to-measure non-Gaussianities by a factor of 2.
- Developed an algorithm for solving generic one-loop QFT integrals with complex masses in 3d. Optimized in both Cython and in Rust to achieve $\mathcal{O}(1000)$ times speedup compared to FFTLog when applied to the one-loop bispectrum in the EFTofLSS.
- Built python and mathematica pipeline for Fisher analysis to forecast cosmological parameter constraints using one-loop galaxy powerspectrum and bispectrum for future surveys such as DESI and Megamapper.
- Performed MCMC analysis on Stanford cluster Sherlock using a suite of data sets to constrain Rock N' Roll and Early Dark Energy models of the early universe.

Undergraduate Researcher, University of Chicago

Jun 2017 – Jun 2019

- Worked on high voltage (HV) electronics design, serial communication design, physics data analysis in ROOT and detector simulations using GEANT4.

SULI Summer Intern, SLAC SSRL

May – Sep 2017

- Modeled ion diffusion through epitaxial thin films using time series X-ray reflectivity data to measure the ion diffusion coefficient.

Talks and Teaching

- ETH QCD Group Meeting Informal Talk: Brief Introduction to Modern Cosmology
- ETH Cosmology Group Meeting Informal Talk: Loop Integrals in EFTofLSS
- Teaching Assistant for PHYS 16, PHYS 21, PHYS 23, PHYS 25, PHYS 43, PHYS 81, and PHYS 331

Publications

5 Publications with > 300 citations

[Google Scholar Profile](#)