Zachary Hafen-Saavedra

PhD, Physics and Astronomy
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Experience

McCue Prize Postdoctoral Fellow July 2020 - Present
University of California, Irvine Irvine, CA

- Led a cross-discipline, international collaboration to enable an analysis requiring four types of expertise.
- Extended the database and visualization capacities of forward-modeling software to enable more-accurate, more-interpretable predictions.
- Led incremental testing of statistical methodology to identify valid applications.
- Extended the compatibility of statistical software to enable application to arbitrary input.
- Employed Bayesian statistics to conduct an evaluation of parameter estimation accuracy.
- Developed a custom-built C++ backend wrapped in a user-friendly Python frontend to enable large-scale processing of NASA ADS data.
- Employed natural-language processing of scientific text to extract actionable quantitative trends.
- Interfaced custom code with modern APIs to extract a large-but-selective volume of data.
- Developed application-agnostic data-management software to reduce micro-managing of analysis pipelines.
- Organized a meeting of key galaxy-shape experts to communicate novel findings and identify next steps.

GK-12 Graduate Fellow June 2014 - July 2020
Northwestern University Evanston, IL

- Processed tens of TB of (3+N)-dimensional data using high-performance-computing resources to reduce to $<$100 GB of highly-interpretable data.
- Created bread-and-butter quantitative visualizations, educational explanatory visualizations, and award-winning artistic visualizations to communicate core messages.
- Utilized and modified viz software to create interactive 3D visualizations.
- Developed public code for time-dependent analysis of MHD simulations to isolate driving behavior.
- Utilized and modified a C simulation code to generate supercomputer simulations of galaxies.
- Employed modern software development best practices (unit testing, version control, etc.) to maintain a broad suite of essential software.
- Led new initiatives to build data-science education for high school students.
- Developed data-exploration software to enhance analysis speed and accessibility.
- Collaborated with a broad range of scientists to publish (to date) 35 papers, 6 as a lead author.

Skills

Techniques: data analysis (time-series, messy/dirty, sparse, big data), frequentist/Bayesian statistics, simulation development and analysis, code testing (unit, integration, functional), multiscale/hierarchical modeling, analysis pipeline development, technical writing, forward modeling/mock data.
Soft skills: scientific leadership and management, public speaking, mentoring (technical, professional).
Tools: Python (numpy, pandas, scikit, matplotlib), Unix, parallel computing, git, nltk.

Education

Northwestern University May 2020
PhD, Physics and Astronomy Evanston, IL
specialization: computational and theoretical astrophysics

University of Northern Colorado May 2014
BS, Physics (math emphasis) Greeley, CO