

CATHERINE FIELDER, PH.D.

📍 Tucson, AZ (Open to relocation)

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SUMMARY

Data scientist with a Ph.D. in Physics and 10+ years of experience in statistical modeling, machine learning, and large-scale data analysis. Adept at building reproducible workflows, mentoring teams, and translating complex scientific results into actionable insights. Seeking to bring analytical rigor and communication skills to a data-driven industry role outside academia.

EDUCATION

University of Pittsburgh, Pittsburgh, PA <i>Ph.D. Physics & Astronomy</i>	2022
University of Pittsburgh, Pittsburgh, PA <i>M.S. Physics & Astronomy</i>	2016
Texas Tech University, Lubbock, TX <i>B.S. Physics, Magna Cum Laude</i>	2014

TECHNICAL SKILLS

Programming: Python (primary), Bash, C/C++, IDL, SQL, HTML/CSS, Mathematica
Data Analysis and Visualization: Pandas, NumPy, SciPy, Matplotlib, Seaborn, Plotly, Jupyter, Astropy
Machine Learning: Scikit-learn, PyTorch, TensorFlow, GPyTorch, GPFlow
Statistical Techniques: Linear regression, Gaussian process regression, robust regression, k-nearest neighbors, tree-based methods, Bayesian inference, time series analysis
Tools & Platforms: Git/GitHub, Linux, macOS, L^AT_EX, Microsoft Office, Adobe

PROFESSIONAL SKILLS

Communication: 11+ years of experience conveying complex technical concepts to a range of audiences, including domain experts, students, and the public
Collaboration: Led working groups and coordinated across international, interdisciplinary teams to drive research outcomes and meet project goals
Project Management: Independently led and managed multi-year research projects from design to publication, including data pipeline development, analysis, and dissemination
Proposal & Report Writing: Authored successful telescope proposals, research grants, peer-reviewed publications, technical reports, and public-facing press releases
Presentations: Presented findings in both talk and poster format at international conferences, in written reports, and through outreach efforts tailored to technical and non-technical stakeholders
Leadership & Mentorship: Mentored 3 undergraduate and 2 graduate students in research methods, coding, and scientific communication; led outreach and DEI initiatives such as the Gender Minorities at Steward and LGBTQ+ coffee hour programs

EXPERIENCE

Postdoctoral Research Associate 2022-present
Steward Observatory, Tucson, AZ

Summary: Led independent research projects involving large-scale data processing, statistical modeling, and cross-institution collaboration.

- Developed and optimized Python-based data pipelines for large-scale image processing and quantitative analysis
- Applied statistical modeling techniques to high-dimensional datasets, including robust regression and uncertainty quantification

- Analyzed and validated deep imaging data using custom-built software tools, enabling insights into complex spatial distributions in observational datasets
- Managed end-to-end workflows for multi-institution research projects, including proposal planning/writing, data acquisition, and results dissemination
- Collaborated with international interdisciplinary teams and presented technical findings to both expert and general audiences, including international conferences and international peer-reviewed journals
- Contributed to machine learning workflows through visual validation and quality assurance of convolutional neural network outputs
- Organized inclusion-focused programming and mentored early-career researchers to support inclusion and career development in science

Graduate Research Assistant

2014-2022

University of Pittsburgh, Pittsburgh, PA

Summary: Applied machine learning and statistical modeling to large observational and simulated datasets; led software development and independent analysis efforts.

- Developed an end-to-end ML pipeline to predict multivariate physical properties using Gaussian Process Regression (GPR):
 - Consolidated and cleaned multi-source datasets; performed feature engineering and cross-validation to optimize model performance
 - Tuned model hyperparameters across multiple libraries (scikit-learn, GPFlow, GPyTorch); selected kernel functions for best performance and interpretability
 - Visualized results using confidence intervals and statistical summaries for publication
- Conducted large-scale simulation data analysis and statistical modeling to identify structure-property correlations, including Bayesian analysis, least squares fitting to numerous analytic prescriptions, working with clustered hardware, performed fit quality assessments, and built Poisson maximum likelihood models with robust regression techniques
- Developed efficient and updated algorithms for targeted parameter searches ([cfelder/Milky-Way-Analogs](#))
- Published original research in top international peer-reviewed journals, and presented technical results at international conferences
- Developed curriculum, taught in support roles for a large variety of undergraduate physics and astronomy courses

Post Baccalaureate Researcher

2014

Los Alamos National Labs, Los Alamos, NM

- Co-developed a Python software package to analyze spectral data from transient events
- Applied data cleaning and visualization techniques to identify patterns in time-variable phenomena
- Created reusable templates for classification within a scientific database
- Recognized with “Outstanding Talk” at the 2014 Summer Research Forum

Undergraduate Research Assistant

2012-2014

Texas Tech University, Lubbock, TX

- Applied data mining techniques to search large databases for unusual signals in binary star systems
- Performed statistical and pattern analysis to identify anomalous cases in a large-scale dataset
- As president of the Society of Physics Students (2012-2014) planned annual departmental banquet and various outreach and social events

PUBLICATIONS

First-author publications: 7 | Co-author: 15+ | Conference talks: 20+ | Posters: 3

Example: Fielder et al. (2022), “Inferring the SED of the Milky Way with Gaussian Processes”, ApJ

Full list available at: [the astrophysics data system](#)