Evan M. Tilton

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Scientist, programmer, & engineer with an astrophysics PhD. Creator of data-driven solutions using advanced mathematical, experimental, & statistical models. Years of teaching and writing experience.

EDUCATION

Ph.D. in Astrophysics (2017) & **M.S.** in Astrophysics (2013)
University of Colorado - Boulder. Boulder, CO

B.S. in Physics, Astronomy, and minor in Anthropology (2010)
University of Florida. Gainesville, FL

EXPERIENCE

Comcast

Data Engineer 4, Enterprise Data Analytics 2023 –

Data Analyst 4, Enterprise Data Analytics 2022 – 2023

Conducted statistical data analysis, ETL design, and software development in Python, SQL (Teradata, Trino, SQL Server), and C# in support of financial big-data analytics.

Regis University, Department of Physics & Astronomy, Denver, CO

Assistant Professor 2019 – 2022

Instructor 2017 – 2019

Led research teams and advised student researchers, resulting in 5 data-driven publications in globally-recognized journals. Taught 39 highly-technical courses that included modern programming, statistics, visualization, and collaboration techniques.

University of Colorado, Boulder, CO

Graduate Researcher 2011 – 2017

Instructor, Teaching Assistant, and Research Mentor 2010 – 2015

Conducted NASA-funded research using datasets of thousands of features from space-telescopes, resulting in 8 published projects that have been scientifically cited over 500 times. Created physical & statistical models to explain phenomena driven by many variables. Taught undergraduate students in both classroom and research settings.

University of Florida, Gainesville, FL

Research Assistant, Department of Astronomy 2009 – 2010

Determined optimal methods for periodicity extraction from sparse time-series data.

Supplemental Physics Instructor 2009 – 2010

KEY SKILLS

Real-World Problem Solving: Experienced in experimental design and data analysis, with extensive experience applying these skills in research (see list of published projects on next page) and corporate big-data environments.

Data analysis: Experience understanding, simplifying, and visualizing large, multi-dimensional data sets. Knowledge of advanced physical, mathematical, and statistical techniques, including Bayesian inference and machine learning.

Programming: Skilled in Python (including its major packages, e.g., `numpy`, `scipy`, `pandas`, `emcee`, `scikit-learn`, `matplotlib`, etc.), C#, and various other languages. Comfortable with `git`/GitHub.

Other Technical Skills: SQL, Tableau, scientific software such as photoionization codes, typesetting (e.g., LaTeX, Markdown), Unix-like systems, and data reduction.

Leadership: Experience leading research and developement projects and working in teams, both with novice analysts and international collaborations of experts.

Communication: University teaching/curriculum-design experience. Scientific public-outreach outreach communicator. Extensive experience writing for publication.

SELECTED DATA PROJECTS PUBLISHED IN TOP JOURNALS

Variable Star Period Determination for Datasets with Sparse Time Sampling *E. Tilton*, et al. 2010, Bulletin of the American Astronomical Soc., 42, 275.

- Conducted time-series analysis to determine optimal statistical methods for periodicity extraction from noisy data with irregular, sparse sampling.

Ultraviolet Emission-Line Correlations in Hubble/COS Spectra of Active Galactic Nuclei: Single-Epoch Black Hole Masses. *Evan M. Tilton* & J. Michael Shull. 2013, The Astrophysical Journal, 774, 67.

- Modeled 44 spectral datasets, each with thousands of data points.
- Used regression models to extract physical parameters from noisy, unclean data, and used principal component analysis (PCA) to identify observable variables that are statistically predictive of black hole masses.
- Used Bayesian Gaussian-mixture regression models to infer black hole mass scaling relationships.

***HST*-COS Observations of AGNs. III. Spectral Constraints in the Lyman Continuum from Composite COS/G140L Data**. *Evan M. Tilton*, et al. 2016, The Astrophysical Journal, 817, 56.

- Mined archival data and experimentally obtained necessary supplemental data to determine the average light-emission properties of gas around black holes.
- Developed a Bayesian pipeline to process data and account for non-linear data transformations with non-Gaussian uncertainties.
- Robustly determined the posterior probability distributions of unknown parameters of cosmological importance.

An Ultraviolet Survey of Low-Redshift Partial Lyman-Limit Systems with the HST Cosmic Origins Spectrograph J. Michael Shull, Charles W. Danforth, *Evan M. Tilton*, et al. 2017, The Astrophysical Journal, 849, 106.

- Implemented a Python-based Bayesian Markov Chain Monte Carlo model to determine the multivariate posterior probability distribution that describes intergalactic gas occurrence frequency in space and time.
- Accounted for non-Gaussian uncertainties on parameters measured via regressions on numerous spectral datasets.

Complete list of publications available at `http://evantilton.com/research/`

Combined, these data projects have been cited over 500 times.