

Dr. Graham T. West

Computational and Data Scientist

Education

Degrees

2015 - 2021, Ph.D. in Computational and Data Science

Middle Tennessee State University (MTSU)

magna cum laude

2015 - 2017, M.S. in Mathematics

Middle Tennessee State University (MTSU)

magna cum laude

2011 - 2015, B.S. in Mathematics and Physics

Trevecca Nazarene University (TNU)

summa cum laude

Teaching Experience

Positions

2023-present: Lecturer, Middle Tennessee State University

Courses:

- ▶ Introduction to Data Science (DATA 1500)
- ▶ Data Cleansing and Feature Engineering (DATA 3500)
- ▶ Data Understanding (DATA 6300)
- ▶ Predictive Modeling (DATA 6320)

2022-2023: Adjunct Instructor, Middle Tennessee State University

Courses:

- ▶ Data Understanding (DATA 6300)

2023: Adjunct Instructor, Trevecca Nazarene University

Courses:

- ▶ Intermediate Algebra (INT 0960)
- ▶ Engineering Programming II (EEC 3150)

2022: Adjunct Instructor, Cumberland University

Courses:

- ▶ Basic Algebra (MATH 098)
- ▶ Algebra Workshop (MATH 100)

2015-2021: Graduate Teaching Assistant, Middle Tennessee State University

Courses (as instructor):

- ▶ College Algebra (MATH 1710)

Courses (as assistant):

- ▶ Intro to Astronomy (ASTR 1030)
- ▶ Fundamentals of Scientific Computing (COMS 6500)

Dr. Graham T. West
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Courses (as tutor):

- ▶ College Algebra
- ▶ General Physics I/II (Algebra-based and Calculus-based)
- ▶ Modern Physics
- ▶ Statics

Undergraduate research mentorship:

- ▶ 2020: Ethan Lawing
 - Project: “Regression analysis of human-scored galaxy models using WNDCHRM image features”
 - Faculty supervisor: John Wallin
- ▶ 2019: William Smith
 - Project: “Estimating tidal distortion of interacting galaxies with the impulse approximation”
 - Faculty supervisor: John Wallin
- ▶ 2017: Matthew Ogden
 - Project: “Creation of realistic galaxy images from simulations”
 - Faculty supervisor: John Wallin

2014-2015: Tutor, Trevecca Nazarene University

Courses (as tutor):

- ▶ Intro to Computer Technology for the Sciences (SCI 2150)
- ▶ Calculus I (MATH 1510)

Research

Dissertation

2021

G. West. “On fitting the morphology of simulations of interacting galaxies to synthetic data,” Defended November 9, 2021.

Journal Articles

Under revision

G. West, M. I. Swindall, B. Keener, T. Player, A. C. Williams, J. H. Brusuelas, and J. F. Wallin. “An Approach for Noisy, Crowdsourced Datasets Utilizing Ensemble Modeling, Normalized Distributions of Annotations, and Entropic Measures of Uncertainty,” *Journal of Data Mining and Digital Humanities, Special Issue: Historical Documents and Automatic Text Recognition*. <https://arxiv.org/abs/2210.16380>.

2023

G. West, M. Ogden, and J. Wallin. “A robust fitness function and genetic algorithm to morphologically constrain the dynamics of interacting galaxies,” *Astronomy and Computing*, 42.
<https://doi.org/10.1016/j.ascom.2023.1006>.

2022

G. West, Z. Sinkala, and J. Wallin. “A kernel mixing strategy for use in stochastic optimization and adaptive Markov chain Monte Carlo contexts,” *Frontiers in Applied Mathematics and Statistics*, 8.
<https://doi.org/10.3389/fams.2022.9>.

Conference Proceedings

2022

J. H. Brusuelas, M. I. Swindall, J. F. Wallin and G. West. "Crowd-sourced datasets and Deep Learning," *American Mathematical Society, Special Session on Methods and Applications in Data Science*, University of Texas at El Paso, El Paso, TX. (1179-68-15190).

2022

G. West, M. Ogden, and J. Wallin. "Data-driven fitness functions for optimizing simulations of interacting galaxies," *Astronomical Society of the Pacific Conference Series*, 532. Virtual conference held November 9-12, 2020. <https://ui.adsabs.harvard.edu/abs/2022ASPC..532..299W>

2020

G. West, M. Ogden, J. Wallin, Z. Sinkala, and W. Smith. "Optimizing Numerical Simulations of Colliding Galaxies I: Fitness Functions and Optimization Algorithms," *Research Notices of the American Astronomical Society*, 4, 136. doi.org/10.3847/2515-5172/abad9b.

2020

M. Ogden, G. West, J. Wallin, Z. Sinkala, and W. Smith. "Optimizing Numerical Simulations of Colliding Galaxies II: Comparing Simulations to Astronomical Observations," *Research Notices of the American Astronomical Society*, 4, 136. doi.org/10.3847/2515-5172/abad9c.

2013

G. West and A. Fowler. "Improving Radio Astronomy Using High Altitude Balloons as Calibration Sources," *2013 Academic High Altitude Balloon Conference*. doi.org/10.31274/ahac.5604.

Presentations and Seminars

2020

G. West, M. Ogden, J. Wallin, Z. Sinkala, and W. Smith. "Using two-factor similarity scoring functions to quantify and optimize the morphological similarity of models of interacting galaxies," *MTSU College of Basic and Applied Science's Scholar's Week*.

2019

M. Ogden, G. West, and J. Wallin. "Towards a semi-automated computing pipeline for the fitting of simulations of interacting galaxies to observational data," *MTSU Computational Science Seminar*.

2018

G. West, Z. Sinkala, and J. Wallin. "RSAP: An adaptive Metropolis algorithm with rejection-based Gaussian proposal-scaling for fast convergence in multimodal parameter spaces," *MTSU Computational Science Seminar*.

2015

G. West. "Genetic Algorithms: A Biology-Inspired Approach to the Longest Path Problem," *TNU Undergraduate Research Symposium*.

2013

G. West. "Improving Radio Astronomy Using High Altitude Balloons as Calibration Sources," *TNU Undergraduate Research Symposium*.

Relevant Coursework

- ▶ Numerical Methods
- ▶ Mathematical Modeling
- ▶ Computational Statistics
- ▶ Data Mining
- ▶ Data Visualization
- ▶ Parallel Programming
- ▶ Advanced Differential Equations
- ▶ Special Topics: Fourier Spectral Methods for the Fractional Nonlinear Schrodinger Equation

Software Skills

Python (and packages):

- ▶ numpy/scipy
- ▶ pandas
- ▶ matplotlib/seaborn
- ▶ sklearn/skimage/cv2
- ▶ tensorflow/keras
- ▶ BeautifulSoup

Other:

- ▶ Linux
- ▶ Github
- ▶ LaTeX
- ▶ Fortran
- ▶ Mathematica
- ▶ C/C++ (w/ MPI)
- ▶ Maple
- ▶ Java
- ▶ Matlab

Awards

2015: Excellence in Mathematics (Trevecca Nazarene University)

Awarded to the top student in their final year of a bachelor's degree.

2011-2015: Dean's List (Trevecca Nazarene University)

Awarded to students each semester with a GPA of 3.5 or higher.

Memberships

- ▶ Society of Industrial and Applied Mathematics (SIAM)
- ▶ American Astronomical Society (AAS)
- ▶ Phi Delta Lambda Honor's Society
- ▶ Sigma Zeta National Science and Mathematics Honor's Society

Interests

Teaching

- ▶ Data science
- ▶ Mathematical modeling and numerical methods
- ▶ Statistics
- ▶ Applied mathematics
- ▶ Student research mentorship

Research

- ▶ Machine learning in digital humanities
- ▶ Extragalactic astronomy
- ▶ Markov chain Monte Carlo methods