Sean Zachary Roberson

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Profile

Innovative Mathematician and Graduate Teaching Assistant with a strong foundation in applied mathematics, data analysis, and educational technology. Dedicated to advancing mathematical understanding and application in academic settings.

Education

June 2022 - May 2024
Master of Science in Applied-Industrial Mathematics, *University of Texas at San Antonio*, San Antonio, TX
GPA: 3.95

August 2013 - December 2015
Bachelor of Science in Mathematics, *Texas A&M University - San Antonio*, San Antonio, TX
GPA: 3.81

August 2012 - August 2013
Associate of Science in Mathematics, *Northwest Vista College*, San Antonio, TX
GPA: 3.85

Professional Experience

July 2024 - Present
Operations Analyst, GS-09, *Air Education and Training Command, Studies and Analysis Squadron*, JBSA Randolph, TX
Utilizes mathematical and statistical knowledge to complete projects for stakeholders across the Air Education and Training Command.

June 2022 - May 2024
Graduate Teaching Assistant, *University of Texas at San Antonio*, San Antonio, TX
Supported undergraduate courses, specifically Calculus II (MAT 1223/1224). Developed and provided video review materials accessible to over 500 students per semester. Assisted in development of exams, course materials, and student instruction.

August 2021 - May 2022
Mathematics Teacher, *IDEA Walzem College Prep*, San Antonio, TX
Responsible for teaching precalculus to 50 students. Prepared junior and senior students for the TSIA2 exam, ensuring college readiness.

August 2018 - December 2021
Adjunct Professor, *Blinn College*, Bryan, TX
Instructed courses in intermediate algebra (MATH 0324), statistics (MATH 0342), and liberal arts mathematics (MATH 0332). Assessed student progress through the D2L learning management system.

August 2018 - August 2020
Adjunct Professor, *St. Philip's College, Southwest Campus*, San Antonio, TX
Instructed courses in intermediate algebra (MATH 0324). Also assisted with the Alamo Bridge program for incoming students from high school through an online course.

Relevant Coursework

Graduate, at UT San Antonio

- AIM 5113: Introduction to Industrial Mathematics

- EE 5243: Introduction to Optimal Control and Applications

- MAT 5153: Methods in Data Analytics

- MAT 5163: Probability and Computing

- MAT 5223: Complex Analysis

- MAT 5283: Linear Algebra

- MAT 5293: Numerical Linear Algebra

- MAT 5323: Mathematical Modeling

- MAT 5603: Numerical Analysis

- MAT 5673: Partial Differential Equations

- MAT 5983: Algorithmic Foundations for Data Science

Undergraduate, at TAMU San Antonio

- MATH 3320: Differential Equations

- MATH 3325: Introduction to Mathematical Proof

- MATH 3360: Modern Geometry

- MATH 3370: Discrete Mathematics

- MATH 4303: Statistical Methods

- MATH 4321: Real Variables

- MATH 4340: Modern Algebra

- MATH 4341: Linear Algebra and Matrix Theory

- MATH 4350: Probability

- MATH 4370: Vector Analysis

- MATH 4380: Special Topics - Concrete Mathematics

Academic and Extracurricular Projects

December 2023   **Photoacoustic Sensing and Imaging**, *Echolase, Inc.*, San Antonio, TX

Worked as a research intern for a medical startup focusing on photoacoustic sensing and imaging. The aim was to develop methods to detect defects in a material using a line detector. This work was conducted as part of a research internship for credit at UT San Antonio, under the supervision of Dr. Dmitry Gohkman. Research at Echolase, Inc. was supported by Dr. Randolph Glickman and Saher Maswadi.

October 2023   **Mixed-Experience Developments**, *Rowdy Datathon 2023*, UT San Antonio

Submission to a data science centered hackathon. Parent data set was on geographic and socioeconomic factors that contributed to disproportionate school enrollment, and the ability for adults to obtain a mortgage in various areas. Project was created using Python, SQL, R, and an AWS server. Joint work with K. Karr, J. Miller, and Y. Syed.

April 2023   **Analysis of a Traffic Flow Model**, *MAT 5673: Partial Differential Equations*, UT San Antonio

End of semester project on the analysis of an elementary traffic flow model. Investigated transport equations and numerical simulations using finite volume schemes with Godunov's method. Joint work with C. Ayo, E. Jones, and B. Morgan.

March 2023   **Sea to See**, *RowdyHacks VIII*, UT San Antonio

Submission to a hackathon with a theme on sustainability. Project focused on data available for sustainable fishing in the gulf coast region of the United States. Project was presented using a website hosted on an AWS web server, and statistical time series models were created to forecast total fish caught in future years. Joint work with A. Espinosa, P. Marroquin, and J. Musie.

October 2022   **Analyzing the Socioeconomic Facors of Childbirth**, *Rowdy Datathon 2022*, UT San Antonio

Submission to a data science centered hackathon. Parent data set was on birth records in the United States from the years 1969–1989. The goal was to project the number of stillbirths to Texas mothers in the year 2050. Tools used included Python and SQL. This project won first prize in the advanced track at the inaugural event. Joint work with C. Ayo, I. Castro, and K. Karr.

May 2015   **Vector Calculus and Differential Forms with Applications to Electromagnetism**, *MATH 4370: Vector Analysis*, Texas A&M University - San Antonio

Project paper submitted for an independent study course at Texas A&M University - San Antonio. The course was an extension of a usual vector calculus course with an introduction to differential geometry, differential forms, and manifolds. The project culminated in a project paper in a summary of the applications of differential forms to electromagnetism. Primary references used were *Vector Calculus, Linear Algebra, and Differential Forms*, by Barbara Burke Hubbard and John H. Hubbard, and *Electricity and Magnetism for Mathematicians*, by Thomas A. Garrity. Supervised by Dr. Donald Myers.

August 2014   **Concrete Mathematics**, *MATH 4380: Special Topics - Concrete Mathematics*, Texas A&M University - San Antonio

Project paper submitted for an independent study course at Texas A&M University - San Antonio. The course was an extension of a discrete mathematics course aimed to develop computational skills using tools from combinatorics. The project paper was a selection of solved problems from the text *Concrete Mathematics* by Donald Knuth, Ronald Graham, and Oren Patashnik. Supervised by Dr. Donald Myers.

Service

October 2024   **Mentor**, *Rowdy Datathon III*, UT San Antonio

April 2024   **Student Leader**, *Machine Learning: A Weekend*, UT San Antonio

Served as a student leader and mentor for a machine learning workshop designed for senior undergraduate and graduate students in the sciences and engineering. The focus was the integration of neural networks in physical models. Coordinated with fellow students G. Boada and I. Garcia from the UT San Antonio Department of Physics. Supervised by Dr. Vu Hoang of the UT San Antonio Department of Mathematics and Dr. Josè Morales Escalante of the UT San Antonio Departments of Mathematics and Physics. Workshop led by Dr. David Sondak of Dassault Systèmes.

March 2024   **Mentor**, *RowdyHacks IX*, UT San Antonio

Served as a mentor for the ninth edition of the RowdyHacks hackathon. Provided support to competitors working with Python, CSS, and HTML.

February 2024   **Mentor**, *Code Quantum Hack Day*, UT San Antonio

Served as a mentor for a shortened edition of the Code Quantum hackathon, a contest geared towards members of marginalized gender identities and populations. This particular iteration was designed for beginners to hackathons. Assisted competitors with projects using Python, CSS, and HTML.

Awards and Honors

o Civilian (Non-Supervisory) Category II of Q4 2024, AETC. Awarded at the squadron level and the A9 (Analysis and Assessments Directorate) level.

o Team of the Year Award, 2024, AETC. Awarded as part of the Test Command and Studies team at the squadron level.

Technical Skills

o Proficient in the Python language, including the Tensorflow and PyTorch libraries.

o Experienced with LaTeX for creating high-quality scientific documents.

o Proficient in the R language for statistical analysis.

o Proficient in the MATLAB language for scientific computation.