Jesse Slaten

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Research Interests

- Turbulence Modeling
- High-Performance Computing
- Mixing and Diffusion Processes
- Atmospheric Turbulence
- Geophysical Fluid Mechanics
- Dynamical Systems Modeling

Education

University of Texas at San Antonio (UTSA), San Antonio, TX — Graduation Expected May 2023
Ph.D. in Mechanical Engineering: Concentration in Fluids and Thermal Systems
- Advisor Kiran Bhaganagar Ph.D.

Texas A&M University Corpus Christi (TAMUCC), Corpus Christi, TX
Master of Science in Applied and Computational Mathematics Thesis Track — Graduated August 2019
- Advisor Alexey Sadovski Ph.D.

Bachelor of Science in Mathematics, minor in Philosophy — Graduated May 2017

Research Experience

University of Texas at San Antonio, Department of Mechanical Engineering — Dec 2019 - Present
Graduate Research Volunteer — 20 Hours/Week
Project: Turbulent Entrainment of Heated Negatively Buoyant Plumes in a Convective Atmosphere.
Supervisor: Prof. Kiran Bhaganagar.

Texas A&M University Corpus Christi, College of Mathematics and Statistics — Jan 2018 - August 2019
Graduate Research Assistant and Thesis — 20 Hours/Week
Project: Kalman Filtering and Applications to Storm Surge Forecasting.
Supervisor: Prof. Alexey Sadovski.

Texas A&M University Corpus Christi, College of Science and Engineering — Jan - March 2017
Undergraduate Research Assistant — 20 Hours/Week
Project: : Analysis of Abel's Integral in Turbulence.
Supervisor: Prof. D. Bogucki & D. Palaniappan

Undergraduate Research Assistant — June - Dec 2016
Project: : Investigation of minor meteorological anomaly and modeling. — 12 Hours/Week
Supervisor: Prof.Chuntao Liu

Relavent Projects

For Masters Project used applications of Kalman Filtering to develop and improve forecasts of storm surge from high-impact weather systems, additionally included a progressive alert system for local communities.

Currently my research focuses on analysis and development of numerical models for buoyancy and thermally driven fluid flows in neutral and stratified atmospheric conditions. We wish to understand the underlying physics and mechanics of turbulence in these flows to better control and predict mechanisms such as mixing, and dilution found in oceanic plumes (thermal vents) and wildland fires. We are currently using an inhouse solver of a modified known as **WRF-LES-bPlume** (buoyancy plume) which allows for control and study of these plumes as well as gravity currents, in use at supercomputing facilities including **Stampede2, UTSA Cluster**

Expertise

- High Performace CFD (Weather Research and Forecast Model, WRF)
- Data Analyses/Visualization (Matlab and Python/Jupyter Notebooks)
- Proprietary Software (COMSOL, ABAQUS)

Presentations

- "Characterizing the Entrainment of Starting Turbulent Buoyant Plumes in a Convective Atmosphere". *American Meteorological Society 101 Annual Meeting Virtual Conference*,(Poster) Virtual January 14, 2021.
- "Turbulent Entrainment of Heated Buoyant Starting Plumes in a Neutral Atmopshere." *Inaugural Extreme Environments Conference*, (Oral)
  San Antonio TX, Agusut 20, 2020.
- "Occurrences of the First Type of Abel's Integral in Turublence". *2nd Coastal Bend Mathematics & Statistics Symposium*, (Oral)
  Kingsville, TX, April 1, 2017.

Select Courses

Graduate: Computational Fluid Dynamics, Matrix Analysis, Numerical Analysis, Fluid Dynamics of Ocean and Atmosphere, Fluids in Natural Systems (Turbulence), Spatial Statistics, Advanced Fluid Mechanics, Applied Partial Differential Equations, Finite Element Analysis, Oceanography, Data Science/Machine Learning, Introduction to Deep learning, Statistical Mechanics

Teaching Experience

Graduate Teaching Assistant August-2017 - May 2019
Texas A&M University Corpus Christi, College of Mathematics and Statistics. 20 Hours/Week
- Teaching laboratory and recitation for Calculus 1-3 and Statistics for Life Sciences.
MATH 2413, MATH 2414, MATH 2415, MATH 1442. Three sections every semester.

Volunteer: Coastal Bend Mathematics Conference 2018, Texas A&M University Corpus Christi. March 30, 2018

Seminars:

Houston Summer School on Dynamical Systems, May 16-24 2018
Basic Weather and Research Model Tutorial, Boulder CO, January 27-31 2020