Zachary del Rosario

Curriculum Vitae

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Mission

"Exploratory Data Analysis is detective work"; Tukey frames EDA as a body of tools and understanding. Armed with both, statisticians and data scientists have made bold strides in solving real problems. Engineers are traditionally armed with a great deal of understanding about physical systems. **However, an engineering analogue for exploratory tools does not exist.**

My research is focused on translating ideas from EDA into engineering practice. I have developed techniques for extracting qualitative understanding in shape design problems, leveraging modern dimension reduction strategies. My cross-disciplinary background in engineering and statistics has given me a unique view into problems, and has enabled me to develop an automated detection procedure for lurking variables.

My goal in applying to the Data Challenge Lab is to build a solid foundation of practical EDA skills, both for my professional development, but also to further my research. I took my first statistics course in the summer of 2016, and have primarily learned formal tests and analysis. My current research has sprung from a casual understanding of EDA; **I seek to gain deeper insight through the Data Challenge Lab, in order to further translate these powerful ideas into engineering practice.**

Education and Qualifications

2014	BS	Olin College of Engineering
2018	MS	Stanford University
2020	PhD	Stanford University
		Co-advisors: Gianluca Iaccarino and Art B. Owen

Honors and Awards

2015 NSF Graduate Research Fellowship Program
2017 AIAA Jefferson Goblet Best Student Paper
2017 Statistical Perspectives on UQ travel award
2017 Stanford MECON Oral Presentation award, 1st place

Publications

Pre-prints

1. Constantine, P. G., Z. del Rosario, and G. Iaccarino (2016). Many physical laws are ridge functions. *arXiv preprint arXiv:1605.07974*.
2. Constantine, P. G., Z. del Rosario, and G. Iaccarino (2017, Forthcoming in JCP). Data-driven dimensional analysis: algorithms for unique and relevant dimensionless groups. *arXiv preprint arXiv:1708.04303*.
3. del Rosario, Z., M. Lee, and G. Iaccarino (2017, In review). Lurking Variable Detection via Dimensional Analysis. *arXiv preprint arXiv:1711.03918*.

Papers in conference proceedings

1. del Rosario, Z., P. Constantine, and G. Iaccarino (2017). Developing Design Insight Through Active Subspaces. In: 19th AIAA Non-Deterministic Approaches Conference, pp.1090.
2. del Rosario, Z., A. Towne, and G. Iaccarino (2018). Dimension Reduction for Shape Design Insight. In: 2018 AIAA Aerospace Sciences Meeting.

Conference talks

1. del Rosario, Z. and G. Iaccarino (2016). Pi Active Subspace. In: Thermal and Fluid Science Affiliates Conference.
2. del Rosario, Z., P. Constantine, and G. Iaccarino (2017). Algorithm-Driven Insight. In: Thermal and Fluid Science Affiliates Conference.
3. del Rosario, Z., P. Constantine, and G. Iaccarino (2017). Data-Driven Dimensional Analysis. In: CompFest.
4. del Rosario, Z., M. Lee, and G. Iaccarino (2017). Discovering Hidden Controlling Parameters using Data Analytics and Dimensional Analysis. In: 70th Annual Meeting of the American Physical Society, Division of Fluid Dynamics.
5. del Rosario, Z., A. Towne, and G. Iaccarino (2017). Handling Classes of Variables in Dimension Reduction. In: SIAM Workshop on Parameter Space Dimension Reduction (DR17).

Poster presentations

1. del Rosario, Z. and G. Iaccarino (2017). Hidden Parameter Hypothesis Testing. In: Statistical Perspectives on Uncertainty Quantification.
2. Torres, H., Z. del Rosario, and G. Iaccarino (2017). MCRT. In: WEST Conference.

Employment

Summer 2017	Northrop Grumman Corporation, Research intern

Outreach and Service

2014-2016	Chair of Teacher Development for Stanford Splash
2014-2016	FIRST (FRC) Robotics Mentor for Team 751
2017-Present	Financial Officer for ASEE Stanford Chapter
2017-Present	Founder of seeME, Stanford ME's research outreach program

Licenses and Certifications

- Private Pilot, Single engine land
- Amateur radio operator, Technician Class, callsign KC3HMT

Skills

Computer	Python, c++, MATLAB, MPI, Legion/Regent, Unix, SolidWorks, LaTeX
Machine Shop	Manual and CNC milling, Manual turning, Laser cutting, MIG welding
Academic	Linear Algebra, Aerodynamics, Optimization, Statistics, User-Centered Design

Interests

Music	Performing (bass guitar and vocals), Composing, Recording, Mixing
Writing	Creative writing, Worldbuilding, Tabletop gaming, Voracious reading