Toby Shearman

Applied Mathematician & Data Scientist

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As an applied mathematician, I thrive on tackling challenging problems and communicating their solutions. With 3+ years experience as a data scientist, I leverage my expertise to translate strategic business motivations into rigorous mathematical formulations and extract actionable insights using visualization and modern computational frameworks.

Expertise: Optimization, discrete and differential geometry, software development, statistical and causal inference, data visualization, parallel and distributed computing, petabyte-scale data analytics

EDUCATION

The University of Arizona
Tucson, Arizona
2009 – 2017

Ph.D. Applied Mathematics
Thesis: Energy Minimization and Regularity in non-Euclidean Elastic Sheets

Virginia Tech
Blacksburg, Virginia
2003 – 2009

B.Sc. Mathematics
B.Sc. Chemical Engineering

PROFESSIONAL EXPERIENCE

Director
Epsilon
Chicago, Illinois
July 2021 –

Manage a team of data scientists using the Scrum methodology to continually develop and deliver *scalable* and *performant* machine learning platforms on-time, communicating results directly to VP and SVP stakeholders

Associate Director
Epsilon
Apr 2020 - June 2021

Senior Scientist
Epsilon
Apr 2019 – Mar 2020

Scientist
Epsilon
Aug 2017 – Apr 2019

Propose, design, and implement state-of-the-art machine learning tools to extract business insights at the scale of billions of customer-client interactions per day:

- Causal inference methods measuring and optimizing the impact of digital advertising
- Deep learning to understand the path-to-conversion
- Game theoretic ideas attributing purchases to advertising
- Petabyte-scale, distributed computing

Redesign existing Scala and Python source:

- Reducing overall resource usage by over 50%
- Reducing source lines and complexity by over 70%
- Greatly expanding platform expressiveness and reducing time-to-launch of new products

Organize and curate weekly journal club to keep the department up-to-date on modern techniques and establish shared fundamentals

Graduate Research Assistant
Los Alamos National Laboratory
Los Alamos, New Mexico
Summer 2013 & 2014

Developed and published modern machine learning tools to classify materials and optimize materials design research

STRENGTHS AND SKILLS

Professional Strengths

- Mathematical modeling of complex, multi-scale systems
- Statistical data exploration
- Collaborative & interdisciplinary science
- Concisely relaying ideas and results to collaborators and stakeholders

Programming Languages & Technologies

- Python
- Scala
- Haskell
- Spark
- Hadoop
- SQL
- CICD
- Unix
- Docker
- Git
- LaTeX

[1] **TS** and Shankar Venkataramani. "Distributed Branch Points and the Shape of Elastic Surfaces with Constant Negative Curvature". In: *Journal of Nonlinear Science* 31.1 (2021), pp. 1–60.

[2] Kenneth Yamamoto, **TS**, Erik Struckmeyer, John Gemmer, and Shankar Venkataramani. *Nature's forms are frilly, flexible, and functional (preprint)*. 2021. arXiv: 2103.10509 [cond-mat.soft].

[3] Kenneth Yamamoto, **TS**, and Shankar Venkataramani. "The Role of Weak Forces in the Self-Similar Buckling of Non-Euclidean Elastic Sheets". In: *APS March Meeting Abstracts*. Vol. 2018. 2018, B48–004.

[4] Prasanna V Balachandran, **TS**, James Theiler, and Turab Lookman. "Predicting displacements of octahedral cations in ferroelectric perovskites using machine learning". In: *Acta Crystallographica Section B: Structural Science, Crystal Engineering and Materials* 73.5 (2017), pp. 962–967.

[5] John Gemmer, Eran Sharon, **TS**, and Shankar C Venkataramani. "Isometric immersions, energy minimization and self-similar buckling in non-Euclidean elastic sheets". In: *EPL (Europhysics Letters)* 114.2 (2016), p. 24003.

[6] T Lookman, PV Balachandran, D Xue, G Pilania, **TS**, J Theiler, JE Gubernatis, J Hogden, K Barros, E BenNaim, et al. "A Perspective on Materials Informatics: State-of-the-Art and Challenges". In: *Information Science for Materials Discovery and Design*. Springer, 2016, pp. 3–12.

[7] Pablo Díaz, Michael Gillespie, Justin Krueger, José Pérez, Alex Radebaugh, **TS**, Garret Vo, and Christine Wheatley. "A mathematical model of the immune system's role in obesity-related chronic inflammation". In: *SIAM Undergraduate Research Online (SIURO)* 2.2 (2009).