JOSHUA LYTLE

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PROFILE/OBJECTIVE

I am a recent graduate from Brigham Young University with a PhD in applied mathematics, with a focus on fluid dynamics and nonlinear PDEs, numerical analysis, and scientific computing. I am currently interested in applications of statistics, data science and machine learning, and helping organizations make data-driven decisions.

PROFESSIONAL EXPERIENCE

Data Scientist
Geisinger Medical Center, 2016-2017
Danville, PA

- Analyzed methods of imputing clinical lab measures in Geisinger's EHR data
- Refined the BTI Institute's use of permuted, model permuted, and rank permuted p-values in genome-wide association studies (GWAS)
- Applied path-based techniques, Markov models and Bayesian networks to Geisinger's sepsis data to predict the onset of septic shock

Researcher
Brigham Young University, 2009—2017
Provo, UT

- Examined the stability of viscous detonations in the multi-dimensional reactive Navier-Stokes equations, covering a large parameter space with parallel processing tools and BYU's supercomputer
- Author of StabLabPy, a Python package providing numerical tools for studying the stability of traveling waves (see https://github.com/nonlinear-waves/stablab_python)
- Used numerical continuation to track unstable eigenvalues of the high Lewis number combustion system, reducing computation time from several weeks to several hours
- Used the numerical Evans function to observe and track unstable spectra of traveling wave solutions of high Lewis number combustion system as exothermicity increased
- Led a research seminar discussing traveling wave solutions of conservation laws

Content Developer and Programmer
Brigham Young University, 2013—2015
Provo, UT

- Developed and taught a year-long sequence of computational labs in Python, for BYU's applied mathematics program for senior undergraduate students (see www.acme.byu.edu and https://github.com/Foundations-of-Applied-Mathematics/Labs.git)

- Labs introduce applications of ODEs and PDEs, the calculus of variations and optimal control, and cover the finite difference, finite element, and pseudospectral methods

TEACHING EXPERIENCE (BYU- 2007–2015)

Teaching Assistant, Calculus I and II
Teaching Assistant, Dynamical Systems and Linear Functional Analysis

Instructor, Model Dynamics and Control Lab I and II
Instructor, College Algebra, Multivariable Calculus
Instructor, Business Calculus and Calculus II
Instructor, Traveling Waves Seminar

MathLab Tutor (College Algebra, Calculus, Differential Equations, and Linear Algebra)

Programmer
Linguistic Technologies, Inc, 2013—2015
Spanish Fork, UT

Conversion work in Python for modules of the WordMAP writing aides software, originally written in QuickBASIC/Assembler. The software represents an interesting application of natural language processing to education, with power to predict student achievement on national placement exams.

SOFTWARE PROFICIENCIES

- Scientific computation and visualization using Python (NumPy, SciPy, Matplotlib, pandas, and scikit-learn), MATLAB, and R
- Experienced Python developer — general systems tasks, GUI development, and interfacing with legacy code in Fortran and C/C++ with f2py and Cython
- Familiar with version control (Git), unit testing, profiling, and other best practices in code management and development
- Familiar with shell scripting, PostgreSQL, MongoDB, and Python's parallel processing tools

EDUCATION

Brigham Young University, Provo, UT
PhD, Mathematics, 2017

MS, Mathematics, 2011

BS, Mathematics, 2008, Cum Laude
(Heritage Scholarship - 4 yrs)