Brian de Silva

CONTACT INFORMATION	University of Washington Department of Applied Mathematics 202 Lewis Hall UW Box 353925 Seattle, Washington 98195-3925	bdesilva@uw.edu https://briandesilva.github.io/ https://github.com/briandesilva

RESEARCH INTERESTS

Machine learning, scientific computing, reduced order modeling, and numerical analysis

EDUCATION

University of Washington

Ph.D. candidate, Applied Mathematics (expected spring 2020)
- Advisor: J. Nathan Kutz
- GPA: 3.9
- Advanced Data Science Option

M.S. in Applied Mathematics, December 2015

University of California at Los Angeles

B.S. in Applied Mathematics, December 2013
- Specialization in computing

PUBLICATIONS

❑ de Silva, Brian, et al. *Discovery of Physics from Data: Universal Laws and Discrepancy Models. arXiv preprint arXiv:1906.07906* (2019).

❑ de Silva, Brian and Ryan Compton. Prediction of Foreign Box Office Revenues Based on Wikipedia Page Activity. *arXiv preprint arXiv:1405.5924* (2014).

❑ Maria-Grazia Ascenzi, et al. Automated Cell Detection and Morphometry on Growth Plate Images of Mouse Bone. *Applied Mathematics, Special issue on Mathematical modeling and experimentation, 5.18* (2014): 2866.

DATA SCIENCE PROJECTS

❑ *Detecting scam pages*: Deployed three image-retrieval based models and trained a multi-channel page embedding for scam page detection. Tools used: K-nearest neighbors, proprietary retrieval methods, nonlinear embeddings, convolutional neural networks, and feedforward networks.

❑ *Studying approaches for utilizing cross-domain data*: Investigated different methods of incorporating cross-domain features into in-domain models. Tools used: Sparse neural networks, two-tower sparse neural networks.

❑ *Clustering documents using nonnegative matrix factorization*: Classified text files based on their thematic content. Tools used: Nonnegative matrix factorization and K-means. See the project section of my `AMath582` github repository.

❑ *Using recurrent neural networks to generate haiku*: Compared the performance of recurrent neural networks against LSTMs on the task of generating haiku. The training data consisted of a set of "artificial" haiku (sentences not intended to be haiku, but which had the syllabic structure of a haiku) which we extracted from a large set of text documents. Tools used: RNNs and LSTMs.

❑ *Financial fraud detection*: Utilized cost-sensitive algorithms to detect fraudulent transactions in a Kaggle data set. Tools used: cost-sensitive versions of logistic regression, decision tree, and random forest. See the project section of my `CSE 547 ML For Big Data` github repository.

GRADUATE COURSEWORK	❏ Machine Learning ❏ Data Visualization ❏ Numerical Optimization ❏ Numerical Solution of Differential Equations ❏ Approximation Theory & Spectral Methods	❏ Machine Learning For Big Data ❏ Data Analysis ❏ Statistics ❏ Numerical Linear Algebra ❏ Numerical Analysis

HONORS AND AWARDS	2019	Finalist in the Terminal Live, UW coding competition
	2017	Boeing Award for Excellence in Service
	2015	Joseph Hammack Endowment Award for Outstanding Work in Applied Mathematics

SCIENTIFIC RESEARCH EXPERIENCE	Summer 2019	Software Engineer Internship Facebook, Seattle, WA Machine learning Embeddings, Image Retrieval
	Summer 2018	Software Engineer Internship Facebook, Seattle, WA Machine learning Sparse Neural Networks, Embeddings
	2013–2014	Information and Systems Sciences Internship HRL Laboratories, Malibu, CA Social and Information Networks Social modeling, Data collection
	Summer 2013	Applied Mathematics Research Experience for Undergraduates UCLA, Los Angeles, CA Social Networks and Large Data Sets Topic Modeling, Nonnegative Matrix Factorization

PROGRAMMING LANGUAGES	C++	Four years, used for numerical methods and scientific computing
	MATLAB	Six years, used for numerical methods and scientific computing
	Python	Four years, used for machine learning and numerical methods
	Mathematica	Two years, used for symbolic calculations and visualization
	SQL	Six months, used throughout machine learning internships
	TensorFlow	Three months, used for machine learning research

TEACHING EXPERIENCE	Autumn 2018	Instructor, *Introduction to Differential Equations and Applications*
	Summer 2017	Instructor, *Introduction to Differential Equations and Applications*
	Spring 2017	TA, *Graduate Numerical Anaylsis of Time Dependent Problems*
	Winter 2017	Instructor, *Numerical Linear Algebra and Numerical Analysis*
	Autumn 2016	TA, *Graduate Vector Calculus and Complex Variables*
	Summer 2016	Instructor, *Numerical Linear Algebra and Numerical Analysis*
	Spring 2016	TA, *Calculus III*
	Winter 2016	TA, *Calculus II*
	Autumn 2015	TA, *Beginning Scientific Computing*
	Spring 2015	TA, *Beginning Scientific Computing*
	Winter 2015	TA, *Calculus I*
	Autumn 2014	TA, *Calculus* I

EXTRA–CURRICULARS	2017–Present	Member of Applied Math Diversity Committee
	2015–2018	Principal organizer for the Numerical Analysis Research Club
	2017–2018	Member of Applied Math Teaching Club
	2016–2017	Graduate Student Representative of Applied Math Department
	2015–2016	Vice President of the UW SIAM student chapter