

Brian de Silva — Research scientist

CONTACT INFORMATION	University of Washington Department of Applied Mathematics 202 Lewis Hall UW Box 353925 Seattle, Washington 98195-3925	(707)673-7736 bdesilva@uw.edu www.briandesilva.com https://github.com/briandesilva
RESEARCH INTERESTS	Machine learning, scientific computing, reduced order modeling, and numerical analysis	
EDUCATION	University of Washington PhD, Applied Mathematics, March 2020 <ul style="list-style-type: none">• Dissertation: <i>Data-driven discovery and model reduction of complex systems</i>• Advisor: J. Nathan Kutz• Advanced Data Science Option University of California at Los Angeles B.S. in Applied Mathematics, December 2013 <ul style="list-style-type: none">• Specialization in computing	
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
PUBLICATIONS	<ul style="list-style-type: none">❑ de Silva, Brian, et al. “PySINDy: A Python Package for Identifying Nonlinear Dynamical Systems from Data.” <i>Journal of Open Source Software</i> (Submitted 2020).❑ de Silva, Brian, et al. “Discovery of Physics from Data: Universal Laws and Discrepancies.” <i>arXiv preprint arXiv:1906.07906</i> (2019).❑ de Silva, Brian and Ryan Compton. “Prediction of Foreign Box Office Revenues Based on Wikipedia Page Activity.” <i>arXiv preprint arXiv:1405.5924</i> (2014).❑ Maria-Grazia Ascenzi, et al. “Automated Cell Detection and Morphometry on Growth Plate Images of Mouse Bone.” <i>Applied Mathematics, Special issue on Mathematical modeling and experimentation</i>, 5.18 (2014): 2866.	

DATA SCIENCE PROJECTS	<ul style="list-style-type: none"> ❑ <i>Detecting scam pages</i>: 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 and feedforward neural networks. ❑ <i>Studying approaches for utilizing cross-domain data</i>: Investigated different methods of incorporating cross-domain features into in-domain models. Tools used: Sparse neural networks, two-tower sparse neural networks. ❑ <i>Clustering documents using nonnegative matrix factorization</i>: Classified text files based on thematic content. Tools used: Nonnegative matrix factorization and K-means. ❑ <i>Using recurrent neural networks to generate haiku</i>: 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 which we extracted from a large set of text documents. Tools used: RNNs and LSTMs. ❑ <i>Financial fraud detection</i>: Utilized cost-sensitive algorithms to detect fraudulent transactions in a Kaggle data set. Tools used: logistic regression, decision trees, and random forests. 	
GRADUATE COURSEWORK	<ul style="list-style-type: none"> ❑ Machine Learning ❑ Data Visualization ❑ Numerical Optimization ❑ Numerical Solution of Differential Equations ❑ Approximation Theory & Spectral Methods 	<ul style="list-style-type: none"> ❑ Machine Learning For Big Data ❑ Data Analysis ❑ Statistics ❑ Numerical Linear Algebra ❑ Numerical Analysis
PROGRAMMING SKILLS	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, <i>Introduction to Differential Equations and Applications</i> Summer 2017 Instructor, <i>Introduction to Differential Equations and Applications</i> Spring 2017 TA, <i>Graduate Numerical Analysis of Time Dependent Problems</i> Winter 2017 Instructor, <i>Numerical Linear Algebra and Numerical Analysis</i> Autumn 2016 TA, <i>Graduate Vector Calculus and Complex Variables</i> Summer 2016 Instructor, <i>Numerical Linear Algebra and Numerical Analysis</i> Spring 2016 TA, <i>Calculus III</i> Winter 2016 TA, <i>Calculus II</i> Autumn 2015 TA, <i>Beginning Scientific Computing</i> Spring 2015 TA, <i>Beginning Scientific Computing</i> Winter 2015 TA, <i>Calculus I</i> Autumn 2014 TA, <i>Calculus I</i>	
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	
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	