

Brian de Silva — Research scientist

CONTACT INFORMATION	University of Washington Department of Applied Mathematics 202 Lewis Hall UW Box 353925 Seattle, Washington 98195-3925		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>Frontiers in Artificial Intelligence</i> 3 (2020): 25.❑ 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 semantic 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>: Used 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	<div>C++</div> <div>MATLAB</div> <div>Python</div> <div>Mathematica</div> <div>SQL</div> <div>TensorFlow</div>	<div>Four years, used for numerical methods and scientific computing</div> <div>Six years, used for numerical methods and scientific computing</div> <div>Four years, used for machine learning and numerical methods</div> <div>Two years, used for symbolic calculations and visualization</div> <div>Six months, used throughout machine learning internships</div> <div>Three months, used for machine learning research</div>
TEACHING EXPERIENCE	<div>Autumn 2018</div> <div>Summer 2017</div> <div>Spring 2017</div> <div>Winter 2017</div> <div>Autumn 2016</div> <div>Summer 2016</div> <div>Spring 2016</div> <div>Winter 2016</div> <div>Autumn 2015</div> <div>Spring 2015</div> <div>Winter 2015</div> <div>Autumn 2014</div>	<div>Instructor, <i>Introduction to Differential Equations and Applications</i></div> <div>Instructor, <i>Introduction to Differential Equations and Applications</i></div> <div>TA, <i>Graduate Numerical Analysis of Time Dependent Problems</i></div> <div>Instructor, <i>Numerical Linear Algebra and Numerical Analysis</i></div> <div>TA, <i>Graduate Vector Calculus and Complex Variables</i></div> <div>Instructor, <i>Numerical Linear Algebra and Numerical Analysis</i></div> <div>TA, <i>Calculus III</i></div> <div>TA, <i>Calculus II</i></div> <div>TA, <i>Beginning Scientific Computing</i></div> <div>TA, <i>Beginning Scientific Computing</i></div> <div>TA, <i>Calculus I</i></div> <div>TA, <i>Calculus I</i></div>
HONORS AND AWARDS	<div>2019</div> <div>2017</div> <div>2015</div>	<div>Finalist in the Terminal Live, UW coding competition</div> <div>Boeing Award for Excellence in Service</div> <div>Joseph Hammack Endowment Award for Outstanding Work in Applied Mathematics</div>
EXTRA-CURRICULARS	<div>2017–Present</div> <div>2015–2018</div> <div>2017–2018</div> <div>2016–2017</div> <div>2015–2016</div>	<div>Member of Applied Math Diversity Committee</div> <div>Principal organizer for the Numerical Analysis Research Club</div> <div>Member of Applied Math Teaching Club</div> <div>Graduate Student Representative of Applied Math Department</div> <div>Vice President of the UW SIAM student chapter</div>