JONATHAN WILDER LAVINGTON

Website ◇ https://wilderlavington.github.io

2250 Wesbrook Mall ◇ Vancouver BC, V6T 1W6

+1-778-723-2087 ◇ jola2372@cs.ubc.ca

EDUCATION

University of British Columbia, Vancouver *Fall 2018 - Present*
PhD Student in Computer Science, Emphasis: Machine Learning and Artificial Intelligence, GPA: -
University of Colorado Boulder, College of Engineering *Fall 2013 - Spring 2018*
Masters Degree in Applied Mathematics, Emphasis: Mathematical Biology, GPA: 3.814
Bachelors Degree in Applied Mathematics, Emphasis: Computational Statistics, GPA: 3.251

TECHNICAL STRENGTHS

Programming Languages	C/C++, MATLAB, R/RShiny, Python, Hive/Oracle SQL, Clojure/Racket
Software Packages	Tensorflow, PyTorch, Theano, Keras, Networkx, Pandas, Scikitlearn, Scipy, Numpy
Software & Tools	LaTeX, Tableau, Mathematica, ChemPlot, Db Visualizer, Alteryx, Knime
Database Systems	Hadoop, Oracle
Operating Systems	Linux, OSX, Windows
GitHub	https://github.com/WilderLavington

PROFESSIONAL EXPERIENCE

Data Science Intern (Summer) May 2017 - August 2017
Seagate Technologies *Longmont, CO*

· At Seagate, I produced GUI in R-shiny that creates statistical visualizations of driver data for engineering divisions.
· The program queried N-way join data from Hadoop clusters, pushed it to an Oracle server, then dynamically generated and pushed SQL queries built from user picks.
· Using the dynamically queried data, I then generated interpretable statistical metrics and visualizations within the GUI for the user. (R, R-shiny, Apache Hive, Oracle SQL)

Data Science Intern (Spring) February 2017 - May 2017
Seagate Technologies *Longmont, CO*

· I also performed a software evaluation report that reviewed current citizen data science platforms, as well as statistical visualization and GUI tool boxes. (Alteryx, KNIME, Tableau, R-shiny, SAS)

Marketing Analyst Intern May 2016 - August 2016
Analytic Partners *Broomfield, CO*

· My work consisted of data mining, data preparation, marketing model creation using time series analysis. Most of my work was done in R, VBA, Excel, SQL, and proprietary software.

TEACHING EXPERIENCE

Teaching Assistant September 2018 - Present
Computer Science Department *University of British Columbia, Vancouver*

· In Fall 2018 and Spring 2019, I worked as a teaching assistant for an introduction to machine learning course. Tasks included: grading, office hours, and recitation style tutorials.

Teaching Assistant September 2017 - May 2018
Applied Mathematics Department *University of Colorado, Boulder*

- In Fall 2017 I ran two recitation sections of pre-calculus, two one hour lectures once a week.
- In Spring 2018, I ran one calculus three recitation, which consisted of a single, one hour lecture once a week.
- For these courses I was responsible for the creation of quizzes and review sheets, as well as grading and proctoring.

Learning Assistant September 2015 - May 2017
Applied Mathematics Department *University of Colorado, Boulder*

- I worked as a learning assistant for courses including: Applied Probability (Fall 2015, Spring 2017), Scientific Computing in Matlab (Spring 2016), and Intermediate Numerical Analysis I (Fall 2016).

RESEARCH EXPERIENCE

Research Assistant February 2016 - May 2018
Professor Manuel Lladser's Research Group *University of Colorado, Boulder*

- My research focused on using probabilistic modeling to describe the formation of R loops within CRISPR molecular binding systems. The majority of my project was programed within Matlab (for numerical simulation) and python (for data management). I used machine learning and Monte Carlo simulation in conjunction with intuitive physical models to create accurate predictions and interpretable heuristics for future experimentation within the field.

Lab Assistant May 2014 - July 2015
Professor Steven Mojzsis' Research Group *University of Colorado, Boulder*

- While at the Astrobiology Materials Lab, I was tasked with processing and analysis of zircon carrying mineral samples for use pre-archean geochemistry research. Tasks included, creation of thin sections for the use in mass spectrometry, heavy liquid separation, stone cutting, and image processing.

GRANTS

Expeditions in Training, Research, and Education for Mathematics and Statistics through Quantitative Explorations of Data (EXTREEMS) Fall 2016 - Fall 2017
Undergraduate student grant *Awarded*

- Created a probabilistic binding model for the CRISPR-Cas9 enzyme in bacterial genomes. The model leverages a discrete Markov Chain to probabilistically approximate the sequential nature of R loop formation within CRISPR.

Undergraduate Research Opportunities Program (UROP) Fall 2015
Undergraduate student grant *Awarded*

- Project focused on the investigation of the mass fractionation of sulfide isotopes in Pre-Archean zircons.

CONFERENCES

Society for Industrial and Applied Mathematics (SIAM) March 2017, 2018
Undergraduate Student Conference *Denver, CO*

- Presented results of a probabilistic model applied to prediction of CRISPR-dCas9 system. The model was applied to a yellow fluorescent protein (YFP) repression dataset provided by Katia Tarasava of Gill Lab at CU Boulder earlier that year.

PUBLICATIONS

A Probabilistic Modeling Approach to CRISPR-Cas9 Fall 2017
J. Lavington *Accepted*

- My masters thesis, which consisted of an overview, implementation, and then comparison of a biophysical modeling approach and a machine learning model approach for prediction of gene expression within CRISPR-Cas systems.

A Zipper Model of R-loop Formation in CRISPR-dCas9 Systems Fall 2017
J. Lavington, K. Tarasava, M. Lladser *To be submitted*

- Investigation and modeling of targeting efficiency within CRISPR-dCas binding systems with respect to changes in the target RNA sequence composition via Markov chains.

RELEVANT COURSE WORK

Matrix Methods & Applications	Advanced Topics in Convex Optimization
Numerical Linear Algebra	Differential Equations with Linear Algebra
Intermediate Numerical Analysis I, II	Data Structures
Complex Variables and Applications	Scientific Computing in Matlab
Applied Probability	General Physics I,II
Calculus I, II, III	Organic Chemistry I
Markov Chains, Queues, and Monte-Carlo Simulations	Discrete Mathematics
Fourier Series and Boundary Value Problems	Random Graphs
Applied Analysis I	Introduction to Mathematical Statistics
Introduction to Artificial Intelligence	Mathematical Modeling
Computational Bayesian Statistics	Experimental Physics
Computer Systems	Spatial Statistics
Machine Learning	Network Analysis and Modeling
Graduate Numerical Analysis I, II	Probabilistic Programming

CLASS PROJECTS

Probabilistic Programming: — Fall 2018
- Reinforcement Learning as Probabilistic Inference in Locomotion

Network Analysis and Modeling: — Spring 2017
- Leveraging Graph Diversity via the Joint Degree Distribution

Machine Learning: — Spring 2017
- Optimizing Predator-Prey Behavior Through Q-Learning

Advanced Topics in Convex Optimization: — Fall 2017
- A Review of the Adjoint State Method

Spatial Statistics: — Fall 2017
- A Review of the Link between Gaussian Random Fields and Gauss-Markov Random Fields

Complex Variables and Applications: — Spring 2016
- PDE Solutions in Polygons Using the Schwarz-Christoffel Transformation

Numerical Linear Algebra: — Spring 2016
- Neural Networks Versus Principal Component Analysis in Facial Recognition

Modeling in Applied Mathematics: — Fall 2016
- Financial Time Series Modeling

Intermediate Numerical Analysis I: — Summer 2015
- Fluid Flow Over a Flat Plate: Kinematic Viscosity and Heat Diffusion
- Modeling a Non-adiabatic Explosion

Matrix Methods & Applications — Fall 2014
- Applications of Spectral Clustering in Image Segmentation

VOLUNTEER WORK AND EXTRA-CURRICULAR ACTIVITIES

Volunteer Firefighter — June 2013-September 2015
Sunshine Canyon — *Sunshine Fire Department*

- Member of the Sunshine Volunteer Fire Department. Worked as a volunteer first responder for roughly two years at a volunteer fire department within Boulder County. I currently have certificates in wilderness first aid, and wild-land behavior (S130/S190).

College Radio Station — February 2013 - May 2018
Radio 1190 — *University of Colorado, Boulder*

· Aside from acting as a director of the station in 2014, along with two other students within the Applied Mathematics Department, I started a talk radio show and podcast titled "Probably Novel" where we invited undergraduate researchers from CU to talk about their work. The goal of the show is not only to display the amazing undergraduate research being done at CU, but to make scientific topics digestible for a lay audience, and to inspire other undergraduates to become active researchers.