Daniel Ralston

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Education

University of California Santa Barbara — Goleta, CA
PhD, Mathematics — 2021 - Present

Bowdoin College — Brunswick, ME
BA *Magna Cum Laude* — 2017 - 2021
Mathematics (major), English (minor), *GPA: 3.92*

Coding Experince

Diffusion Mapping Project — Summer 2022
UCSB, advised by Professor Paul Atzberger

- Experimented with new variations on the diffusion mapping algorithm (a manifold dimension reduction algorithm) by incorperating k-NN algorithm and different metric assumptions of underlying dataset
- Currently investigating convergence of Laplacian-Beltrami Operator (the function that provides mathematical rigor to the algorithm) under different norms

Stochastic Neighborhood Embedding Project — Fall 2020, Summer 2022

- Wrote basic stochastic neighborhood embedding algrithm from ground up, the underlying process behind the t-SNE and UMAP dimension reduction methods
- Prepared detailed report comparing the t-SNE and UMAP algorithms based off of orginal the papers, specifically explaining their similarities which are presented from different mathematical persectives

Machine Learning on MRI Data — Summer 2020
Harvey Mudd College, advised by Professor Weiqing Gu

- Introduction to machine learning and data science best practices working with convolutional neural network architectures on volumetric MRI brain scan data

Mathematics Experince

PhD Progress

- Graduate coursework in statstical machine learning, probability and stochastics, topology, and algebra
- Passed qualfying exams in topology and analysis (real and complex) at the PhD level
- Teaching Assitant experince in differential equations, linear algebra, and differential and integral calculus (all course evaluations available on request)

Toroidal Circle Packing — Summer 2019
National Science Foundation, advised by Professor William Dickinson

- Identified optimal packings of two circles with radius ratio $\sqrt{2}-1$ on any flat torus; further details availible on dralston78.github.io/projects/

Technical Strengths

Scripting Languages:	Python (Libraries: Numpy, Scipy, Pandas, Matplotlib)
Database Management:	SQL (SQLite)
Modeling and Analysis:	Mathematica, MATLAB