

DANIEL RALSTON

(607) 544-4162 ♦ danielralston@math.ucsb.edu ♦ dralston78.github.io ♦ github.com/dralston78/

EDUCATION

University of California Santa Barbara
PhD, Mathematics

Goleta, CA
2021 - Present

Bowdoin College
BA *Magna Cum Laude*
Mathematics (major), English (minor), *GPA: 3.92*

Brunswick, ME
2017 - 2021

CODING EXPERIENCE

Diffusion Mapping Project

Summer 2022

- Experimented with new variations on the diffusion mapping algorithm (a manifold dimension reduction algorithm) by incorporating 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 algorithm 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 the original papers, specifically explaining their similarities which are presented from different mathematical perspectives

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 EXPERIENCE

PhD Progress

- Graduate coursework in statistical machine learning, probability and stochastics, topology, and algebra
- Passed qualifying exams in topology and analysis (real and complex) at the PhD level
- Teaching Assistant experience 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 available on dralston78.github.io/projects/

TECHNICAL STRENGTHS

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