Coordinates

CSCAMM, U. Maryland
4146 CSIC #4112
8169 Paint Branch Dr
College Park, MD
+1 (240) 507 8479
cdock@umd.edu

Human Languages

English (native)
French (fluent)

Software Languages

Python
Javascript
nodeJS
ReactJS
React Native
Matlab, Mathematica
Ruby (on Rails)
C, C++, C#
HTML, CSS(3)
D3, R, SQL

Grades

UC Berkeley
GPA: 3.59
Physics+Math GPA: 3.7
U Maryland
GPA: 3.84

education

2017–Pres. **Ph.D.** in Applied Mathematics — The University of Maryland: College Park

2013–2017 **Bachelor** of Physics and Mathematics — The University of California: Berkeley

2009–2013 **Diploma** High School — Sidwell Friends School, Washington D.C.

experience

2017-Pres. **University of Maryland: College Park** — College Park, Maryland
Teaching Assistant and Research Assistant
I teach introductory undergraduate mathematics and perform research on harmonic analysis, frame theory, and machine learning.

Smr. 2019 **Tesla** — Fremont, California
Machine Learning and Statistics Intern
As part of the Demand Planning team at Tesla I built systems to forecast supply chain stresses resulting from the fluctuating demand for thousands of Tesla parts at service centers around the world. Methods included LSTM networks as well as recurrent neural networks and a variety of classical techniques (ARIMA, hierarchical time series forecasting, vector auto regression) as well as ideas from compressed sensing (sparsity, L1 regularization).

Smr. 2017 **JDoe** — Berkeley, California
Lead Developer
I engineered the case-building software JDoe (jdoe.io) uses to assist law firms involved in sexual misconduct cases. I also led the development and design of their iOS and Android applications.

2015/2016 **University of Maryland: College Park** — College Park, Maryland
MAPS-REU NSF Sponsored Researcher in Nonlinear-Dynamics
I worked with Professor James Yorke on chaotic dynamics. My work included the application of Birkhoff averages in identifying the presence of quasiperiodicity.

2014-2016 **Club Z Tutoring** — Berkeley, California
Tutor in High School Level Physics and Mathematics
I tutored high school students in AP Physics and Calculus and test prep.

Smr. 2014 **RankedHire** — Santa Monica, California
Lead Web Developer for Application Prototype
I built RankedHire's prototype application. They used my prototype to garner investments during their acceleration phase.

2014–2015 **Lawrence Berkeley National Laboratory** — Berkeley, California
Undergraduate Researcher for the SNO+ Research Group
I developed statistical characterizations of data resulting from anomalous instrumental sources, so that it could be filtered out of the experimental data from the the Sudbury Neutrino Observatory.

honors

2017 **Honors in Physics** — UC: Berkeley
I graduated with honors in Physics, having a sufficiently high upper division Physics GPA and having completed both honors courses and an honors thesis on my research with Professor Hallatschek.

2014 & 2016 **Berkeley Physics Undergraduate Research Scholarship (BPURS)** — UC: Berkeley
Awarded by the Physics Department for enthusiastic and high quality work in Undergraduate Research. I received it twice.

2013 **AP Scholar with Distinction** — College Board
Awarded for receiving an average score of at least 3.5 on all AP tests and for receiving 3 or more on at least 5 of these tests.

2013 **Career Athlete Award** — Sidwell Friends School
Awarded for receiving 8 Varsity Letters. I was a member of Cross Country Varsity and Track and Field Varsity for four years.

presentations

2019 **Approximation Theory 16 Conference** U. Vanderbilt
I gave a talk on using Lipschitz analysis to show feasibility of quantum tomography in the impure states case.

2015-2016 **REU Presentations** UM: College Park
As a part of my REUs, I regularly gave talks on my research in chaotic dynamics and evolutionary dynamics to interested faculty and to fellow REU members at the University of Maryland.

2015-2016 **BPURS Presentations** UC: Berkeley
As a part of being awarded BPURS, I participated in a poster session in which I presented my work at SNO+ to interested Berkeley Physics faculty. In 2016 I presented on my work with Oskar Hallatschek on disease dynamics.

2012 **Interactive Booth Presentation** USA Science and Engineering Festival in D.C.
I helped present "Pathways for Inexpensive Underwater Robotics," designed to encourage interest in STEM in DC public high schools.

2011 **Oral Presentation** Society for Neuroscience Symposium in D.C.
I gave a talk on the possibility of doing experimental neuroscience education in high school, focusing specifically on useful 'model organisms' and the acquisition of inexpensive neuroscience equipment.

research

2021 **Lipschitz Analysis of Phase Retrievable Matrix Frames** Arxiv (under review)
This paper demonstrates feasibility of quantum tomography in the impure states case via techniques from Lipschitz analysis and differential geometry.

2016 **Measuring Quasiperiodicity** Journal: European Physical Letters
This paper develops applications of the technique developed by our team at the Maryland REU program for analyzing the presence of Quasiperiodicity in non-linear systems.

2014 **Visualization of Holomorphically Mapped Lissajous Curves** Published by Wolfram
This small application demonstrates the beauty and symmetry of complex analysis using different branches of nth-root mappings of Lissajous curves.

2013 **Visualization of Complex Projective Line** Published by Wolfram
Tool for demonstrating the power of Stereographic Projection in analyzing functions of infinite extent

scores

2018 **PhD Qualifying Exams** U. Maryland
Analysis: 60/60

2016 **GRE Tests** UC: Berkeley
Verbal: 169/170, Quantitative: 163/170, Physics GRE: 920/990 (87th percentile)

2010-2012 **AP Tests** Sidwell Friends School
French: 3/5, Chemistry: 4/5, U.S. History: 4/5, English Literature: 5/5, B.C. Calculus: 5/5, Physics (Mechanics): 5/5, Physics (Electromagnetism): 5/5, Computer Science A.B: 5/5

2009-2011 **SAT Tests** Sidwell Friends School
Molecular Biology: 800/800, Chemistry: 770/800, Mathematics II: 800/800, Reasoning: 2250/2400