William Chuang — Curriculum Vitae

Department of Mathematics
University of Arizona
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Education

University of Arizona
PhD Student in Mathematics, Fall 2022 – Present

San Francisco State University
M.A., Mathematics, Spring 2022
Thesis: The Hausdorff Dimension of Limit Sets of Well-distributed Schottky Groups
Advisor: Dr. Chun-Kit Lai

University of San Francisco
B.S., Mathematics, Fall 2018
Major GPA: 3.88/4.00
Minor in Computer Science
Graduated with Honors

Research Interests

I am interested in solving problems that have a connection between mathematics to either

(i) bioinformatics,
(ii) nonparametric and high-dimensional statistics,
(iii) statistical learning and explainable machine learning, or
(iv) computational language and programming language in general-purpose intelligence - write code to write (symbolic and numerical) code/data to compute geometrically, topologically, algebraically, analytically, numerically, and verbally

by constructing examples, proving theorems, and building mathematical theories and models - whenever a connection could be built by applying techniques in math to the above four topics, or vice versa.

Other Independent Projects

San Francisco State University

The Computation of Hausdorff Dimension of Limit Sets of Schottky Groups with Dr. Chun-Kit Lai, June 2021 – May 2022

San Francisco State University

Independent Study: A Study on Prime Geodesic Theorem and Limit Sets of Schottky groups, January 2021 – May 2021
Write a document summarizing modern approach to prove the theorem with an emphasis on the growth rate based on the Haussdorff dimension of the limit set of the Schottky group.
Advisor: Dr. Chun-Kit Lai

San Francisco State University

Topology Project: A Study on Fundamental Groups, September 2020 – December 2020
Advisor: Dr. Emily Clader

San Francisco State University

Independent Study: A Study on Hom-Polytopes, September 2019 – December 2019
Combinatorics Project: A Study on Simplicial Complexes, January 2019 – May 2019
Advisor: Dr. Joseph Gubeladze

University of San Francisco

Independent Study: A Study on Prime Number Theorem, January 2018 – May 2018
Advisor: Dr. Paul Zeitz

Pennsylvania State University–University Park

Functional Analysis Project: A Study on Hardy's Proof on Uniform Distribution, January 2018 – May 2018
Independent Study: Reading "Lecture Notes on Functional Analysis: With Applications to Linear Partial Differential Equations", January 2018 – May 2018
Advisors: Dr. Sergei Tabachnikov and Dr. Moisey Guysinsky

Pennsylvania State University–University Park

Topology Project: Solving $(9, 8, 4, 3, 7)$-linkage problem, January 2018 – May 2018
Topology Final Project: Conway's Basic Theorem, September 2017 – December 2017
Advisor: Dr. Sergei Tabachnikov

University of San Francisco

Capstone Project: Using Graph Theory to Implement a Search Engine in Inverted Index Data Structure, January 2018 – May 2018
Advisor: Dr. Chris Bryan

University of San Francisco

Capstone Project: Applying Method of Steepest Descent and Cauchy Contour Integrals on Fisher Exact Test, January 2018 – May 2018
Advisor: Dr. Xuemei Chen

University of San Francisco

Research Assistant, August 2016 – May 2017
Worked on Lecture Notes for MSAN504 Review of Probability and Statistics
Advisor: Dr. Jeff Hamrick

University of San Francisco

Summer Research Project: Applying Combinatorics, Differential Geometry, Graph Theory, and Deep Learning in Therapeutic Video Games for Disabled Patients, June 2016 – September 2016
Capstone Project: Implementing Applications of Dijkstra Algorithm, Spring 2016
Advisor: Dr. David Galles

Pre-Baccalaureate Independent Projects

National Taiwan University

Reading papers on Ads/CFT (Gauge/Gravity duality), September 2011 – May 2013
Advisor: Dr. Pisin Chen

National Taiwan University

Studying Kontsevich-Soibelmann wall crossing formula derivations and applications for mathematical quantum field theory, January 2012 – May 2012
Advisor: Dr. Heng-Yu Chen

National Taiwan University

A Study on Lee-Yang Theorem and the application of Riemann zeta function in Statistical Mechanics, January 2012 – May 2012
Advisor: Dr. Ning-Ning Pang

Teaching Experience

University of Arizona

Graduate Teaching Assistant of MATH 112 College Algebra, Fall 2022
Advisor: Mitchell Wilson, Tina Deemer, and Catherine Yslas

San Francisco State University

Graduate Teaching Assistant of Calculus, Spring 2022
Grader of MATH 227 [05] Calculus II
Instructor of MATH 226 [38] Calculus I (the fourth hour of MATH 226 [37])
Instructor of MATH 227 [06] Calculus II (the fourth hour of MATH 226 [05])
Instructor of MATH 227 [36] Calculus II (the fourth hour of MATH 226 [35])
Advisors: Dr. Kim Seashore, Dr. Shandy Hauk, and Dr. Eric Hsu

San Francisco State University

Graduate Teaching Assistant of Pre-Calculus, Fall 2019
Advisor: Dr. Kim Seashore

University of San Francisco

San Francisco Math Circle, Fall 2016
Advisor: Dr. Paul Zeitz

National Dong Hwa University

Tutor of Calculus and General Physics, August 2008 – December 2009

Supervised by Department of Physics

Awards and Honors

- Nominated for MSRI Summer Graduate School on Metric Geometry and Geometric Analysis at University of Oxford, UK, Fall 2021
- Dean's Honor Roll, University of San Francisco, Spring 2018
- Mathematics Advanced Study Scholarship and Internal Scholarship (from MASS program), The Pennsylvania State University–University Park, Fall 2017
- Dean's Honor Roll, University of San Francisco, Spring 2015, Fall 2016, and Spring 2017
- Pi Mu Epsilon Honor Society at University of San Francisco
- President's List, National Dong Hwa University, March 2008, November 2008, March 2009, March 2010

Certificates

- MASS Program, achieved all requirements of the 2017 Mathematics Advanced Study Semesters program at The Pennsylvania State University
- ACM Special Interest Group on Management of Data, SIGMOD 2016, recognition of service award
- Tackling the Challenges of Big Data, an online program developed by the faculty of the MIT Computer Science and Artificial Intelligence Laboratory, Feb 3–March 17, 2015

Skills

- Problem Solving; Can learn new skills quickly.
- Programming Languages: C/C++, Python, R, Java, Racket, Shell Script, Sed and Awk, LaTex, Mathematica
- Packages and Libraries: Vimtex, TiKz, Numpy, Pandas, Scikit, Matplotlib, Orge3D
- Simulation, write code to automatically generate data of mathematical objects
- Applying machine learning to make new examples