

# William Chuang

# Curriculum Vitae

Department of Mathematics  
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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

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## RESEARCH INTERESTS

I am interested in solving problems by constructing examples, proving theorems, and building mathematical theories and models that have a connection between mathematics to either

- (i) high-dimensional problems in nonparametric statistics, statistical learning and explainable machine learning, e.g. open problems in bioinformatics and finance, or
- (ii) computational and programming language for general-purpose learning system - write code to generate new symbolic and numerical data (as code) and optimize the code (as data) itself to compute geometrically, topologically, algebraically, analytically, numerically, and verbally

Whenever a connection could be built by applying techniques in math to the above two topics, or vice versa.

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## 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 Hausdorff 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

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#### 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-Soibelman 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

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#### 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

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#### 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
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#### 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
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#### 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