

Patrick V. O'Melveny

San Francisco, CA

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Education

San Francisco State University

CANDIDATE FOR MASTER OF ARTS IN MATHEMATICS

San Francisco, CA

Expected 2022

Sonoma State University

BACHELOR OF ARTS IN MUSIC

Rohnert Park, CA

2014

Research

Mixed Volumes of Normal Complexes

ADVISOR: DUSTIN ROSS

San Francisco State University

July 2021 - Current Work

- Developed a theory of mixed volumes on truncations of tropical fans, called normal complexes, and extended the relationship between their (mixed) volume and (mixed) degrees of divisors of the corresponding Chow ring
- Used the theory of mixed volumes of normal complexes to provide a volume theoretic proof of the Heron-Rota-Welsh conjecture on the log-concavity of characteristic polynomials of matroids

Teaching

MATH 123: Mathematics for Elementary Statistics

SAN FRANCISCO STATE UNIVERSITY

San Francisco, CA

Fall 2022

MATH 198: Prelude to Calculus Semester II

SAN FRANCISCO STATE UNIVERSITY

San Francisco, CA

Spring 2022

MATH 197: Prelude to Calculus Semester I

SAN FRANCISCO STATE UNIVERSITY

San Francisco, CA

Fall 2021

MATH 228 Supplemental: Calculus I Lab

SAN FRANCISCO STATE UNIVERSITY

San Francisco, CA

Fall 2021, Fall 2022

Professional Experience

San Francisco State University

RESEARCH ASSISTANT - MATH CURRICULUM DEVELOPMENT

San Francisco, California

Aug. 2022 - Current

- Work with Dr. Kimberly Seashore on developing an innovative curriculum for San Francisco State's Calculus I supplementary lab
- Adapt and develop labs that center group work while reinforcing core concepts in calculus

Stanford University

TECHNICAL CONSULTANT AND DEVELOPER

Palo Alto, California

Jun. 2022 - Current

- Consult on the technical implementation on the curriculum of a data science class for high school students
- Develop code supporting and used by students in the data science course

San Francisco State University

RESEARCH ASSISTANT - MATHEMATICAL RESEARCH

San Francisco, California

Aug. 2021 - Current

- Perform research under the guidance Dr. Dustin Ross on the relationship between tropical fans and the divisors of their Chow ring
- Supported by NSF RUI: Compacifying moduli spaces of orbits, covers, and curves

San Francisco State University

GRADUATE TEACHING ASSOCIATE

San Francisco, California

Aug. 2021 - Current

- Instructor of record for undergraduate precalculus and statistics classes

Posit Science Corporation

San Francisco, California

SOFTWARE ENGINEER

Jan. 2017 - June 2021

- Developed software for the needs of multiple research studies on neuroplasticity
- Maintained and extended data pipelines, allowing for efficient and secure access to clinical data
- Developed back-end event scheduling systems and data models for efficient distributed computing

Posit Science Corporation

San Francisco, California

RESEARCH ASSOCIATE & DATA ANALYST

Jul. 2015 - Jan. 2017

- Created in-house tools for automation of R&D tasks; including study measure analytics, reporting dashboards, graphing tools and study-flow monitoring
- Performed exploratory data analysis for research studies and produced graphs and figures for publications
- Coordinated multi-site research trial, maintaining compliance with FDA regulations for Phase II clinical research

Northern California Institute for Research and Education

San Francisco, California

RESEARCH ASSOCIATE II

Mar. 2014 - Jul. 2015

- Coordinated and ran fMRI experiments exploring the relation of neurotransmitters and social cognition in schizophrenia
- Developed analysis pipelines for data collected in the course of fMRI and MEG experiments

Sonoma State University

Rohnert Park, California

INSTRUCTIONAL STUDENT ASSISTANT

Sep. 2011 - Aug. 2013

- Tutored students in Music Theory I-IV, Music History, and Ear Training

Presentations

2022

- Mixed Volumes of Normal Complexes
Western Algebraic Geometry Symposium, Fall '22, Poster Session

Conferences Attended

2022

- Western Algebraic Geometry Symposium Fall '22 - UC Riverside
- $\text{Spec}(\overline{\mathbb{Q}})$ - Fields Institute
- Western Algebraic Geometry Symposium Spring '22 - Colorado State University

Outreach

Mathematistas

San Francisco, CA

MEMBER, FACILITATION TEAM

August 2020 - Current

Mathematistas is a student community that supports and builds towards gender equity in pursuit of higher mathematics.

Learning Home Volunteers

Redwood City, CA

VOLUNTEER

February 2019 - Current

Learning Home Volunteers is a non-profit organization working to address the kindergarten-readiness gap by empowering and equipping parents to engage their young children in joyful learning through play.

Technical Skills

Programming Languages

C++, Python, R, Haskell, \LaTeX

Software

Linux, Git, Cloud Services and Web Hosting, Mathematica, SageMath

Languages

English (native), French (limited working proficiency)