# Fran Herr

# EDUCATION

May 2024

University of Chicago – Chicago, IL	University of Washington – Seattle, WA
M.S. in mathematics – 2024	B.S. in mathematics, honors – 2022
PhD candidate in mathematics	B.A. in dance – 2022

# Research and Explanatory Papers

Unpacking Thurston's Theorem for post-critically finite maps	2024
<ul> <li>Final paper for Differential Topology graduate course.</li> <li>Classifying which topological branched coverings of S<sup>2</sup> are rational maps by looking at an acti space.</li> </ul>	ion on a Teichmüller
Modular Multiplication and Dancing Planets pdf. Github Repository. YouTube video.	2024
➤ MMTs are visual representations of multiplying members of Z/mZ by some integer a. The car are epicycloids.	ustics of the pictures
$\succ$ 1 connect these to a continuous dynamical system and classify the patterns that appear.	
<ul> <li>All cellular strings on polytopes at once <i>pdf</i>.</li> <li>➤ Senior thesis for UW Mathematics major.</li> <li>➤ Investigating a generalized version of the Baues problem on polytopes.</li> </ul>	2022
Iterated Jump Graphs joint with Legrand Jones II. arxiv. publication.	2022
<ul> <li>Published in Rose-Hulman Undergraduate Journal.</li> <li>We look at the jump graph operation under iteration and find the end behavior of any given g</li> </ul>	graph.
A characterization of two-dimensional Buchsbaum matching complexes <i>joint with Jones, Goeckner, Rowlands. arxiv. publication.</i>	2021
<ul> <li>Published in The Electronic Journal of Combinatorics.</li> <li>We characterize all graphs whose matching complex is a two-dimensional Buchsbaum complex</li> </ul>	ζ.
<ul> <li>The Platonic Solids Strike Again! pdf.</li> <li>➢ Final paper for Complex Analysis at UW.</li> <li>➢ Explanatory paper about the finite subgroups of Möbius Transformations.</li> </ul>	2020
Other Projects	
YouTube Channel GrapefruitGecko       Jun         Math communication and visual explanation through physical demonstration.       Jun	ie 2019 - present

- $\succ$  A dance film about configuration spaces of points in the plane.
- $\succ\,$  Premiered at Bridges Conference film festival.

Braiding Through Time *link*.

### UW Dance Majors Concert choreography

September 2024 - June 2025

May 2019 - September 2020

July 2022 - July 2023

#### I lift up my eyes to the hills.

- $\succ$  Dance piece inspired by the optimal solution to the Tower of Hanoi puzzle.
- $\succ$  I set up a display with the Tower of Hanoi and information about the puzzle in the lobby.
- > Experimenting in ways to engage a general audience with math.

# Relevant Work Experience

- Teaching Assistant at U Chicago Running office hours, interacting with students, giving feedback on work.
- National Museum of Mathematics Working as a docent, interacting with visitors, developing math communication content.
- Mathnasium of Northwest Seattle Tutoring children in various levels of math (6 - 16 yrs).

## Activites and Interests

- Leadership for the UChicago Association for Women in Mathematics
- Dance (modern, contemporary, swing, ballet)
- Crocheting mathematical spaces
- Programming in Sage, Python, Java, MATLAB, Html
- LaTex and Beamer formatting
- Video and sound editing
- Photography and videography
- Obscure Rubik's cube puzzles

## AWARDS AND SCHOLARSHIPS

- McCormick Fellowship 2023-2025 U Chicago fellowship for an incoming graduate student.
- Dean's Medal for the Natural Sciences 2022 Award for a single undergraduate in the natural sciences at U Washington. Nominated by math faculty and selected by a committee of natural sciences faculty.
- Barbara Sando Scholarship in Mathematics 2020-21, 2021-22 Scholarship for outstanding undergraduate women in mathematics.
- WA State Opportunity Scholarship 2018 2022 Scholarship for promising WA state students in STEM fields.
- Annual Dean's List of Academic Excellence 2019, 2020, 2021, 2022