XINYI (ELENA) WANG

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EDUCATION

Michigan State University — **East Lansing, MI**
PhD in Computational Mathematics, Science, and Engineering — *Expected May 2025*
Research Area: Topological Data Analysis — Advisor: Dr. Elizabeth Munch

College of the Holy Cross — **Worcester, MA**
BA in Music and Mathematics with High Honors, Cum Laude — *May 2020*
Thesis: *Invariant Theory in Characteristic p* — Advisor: Dr. John Little

RESEARCH AND WORK EXPERIENCE

Main Interests: Topological Data Analysis, Computational and Applied Topology, Machine Learning

Michigan State University — **East Lansing, MI**
Graduate Research Assistant — *Fall 2020 – Present*
-Research on computational geometry, applied topology, and topological and geometric data analysis (TGDA)
-Integrate topological/geometric ideas with machine learning framework to develop new data analysis methods
-Current Project: Embedded Graph distance via topological signatures (Python with multiprocessing)

College of the Holy Cross — **Worcester, MA**
Undergraduate Researcher — *September 2017 – May 2020*
-Investigated and used the theory of S.A.G.B.I. bases to construct full generating sets of invariants for four and higher dimensional indecomposable modular representations.
-Proved that an isometric immersion of Clairaut metric is formally determined by two functions of one variable, uniquely up to coordinate reflection and ambient Euclidean motions.

Caitong Fund Management Company — **Shanghai, China**
Research Analyst Intern — *May - September 2020*
-Structured company financial data to assess relative value of large cap Chinese stocks via similarity

RECENT PROJECTS

Euler Characteristic Transform (ECT) of Embedded Graphs — **East Lansing, MI**
Graduate Research Mentor — *September 2022 – Present*

- Mentor an undergraduate senior performing Euler Characteristic Transform on graph data, to apply ML techniques on graphical signals for classification
- Prove theoretical properties of ECT to improve complexity by partitioning the domain into key angles

Classical Music Recommendation on Spotify Universe — *In Progress*

- Structure track meta data: composer vs performer, fuzzy matching identical pieces under different titles
- Design a recommendation system based on composer and style of piece, but also style of performer

Predictive Wine Quality Modelling — *January - May 2022*

- Implemented regression model to predict critic scores of vinho verde using physicochemical features
- Preprocessed data and applied suite of supervised methods (OLS, RF, MLP, resampling)

PUBLICATIONS

- A. Hwang, **X. Wang**."Clairaut Surfaces in Euclidean Three-Space," In: *Töhoku Math. J.*, **74** no. 2, 215–227
- R. Liu, S. Canturk, F. Wenkel, S. McGuire, **X. Wang**, A. Little, L. O'Bray, M. Perlmutter, B. Rieck, M. Hirn, G. Wolf, L. Rampašek. "Taxonomy of Benchmarks in Graph Representation Learning," Available on arXiv, submitted to LoG

AWARDS AND HONORS

Distinguished Engineering Scholar, Michigan State University — *Fall 2020 – Present*
Pi Mu Epsilon (Mathematical Honors Society), College of the Holy Cross — *Inducted 2020*
MAA Outstanding Poster Awards, Joint Mathematics Meeting — *January 2019*
The Beethoven Prize, College of the Holy Cross — *May 2020*

SKILLS AND INTERESTS

Programming: Python, LaTeX, SQL, MATLAB, Magma, Maple, Fortran
Interests: Piano Performance, Cooking and Gastronomy