Xueyan ZHANG

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I am an independent researcher with strong abstract reasoning and a deep interest in applied mathematics and computational mathematics. I work best when focusing on complex problems and developing ideas rigorously. My academic performance has improved as I refined my research focus, especially through coursework on geometry.

Education

Master in Mathematics, **Università di Padova**, Italy — Oct 2022 – Ongoing

- **Field of Study:** Mathematics, with a focus on Riemannian Geometry
- **Thesis:** Frobenius Manifolds and Flat Pencils of Metrics
- **Supervisor:** Prof. Paolo Rossi
- **Relevant Coursework:** Introduction to Stochastic Process (30 L/30), Introduction to Partial Differential Equations, Differential Geometry
- **Final Semester Grade:** 30 L/30 **Final Year Grade:** 27.5/30 **Overall Grade:** 24.4/30

Bachelor of Science, **Southern University of Science and Technology (SUSTech) "Double First-Class Construction"**, China — Sept 2018 – July 2022

- **Field of Study:** Mathematics and Applied Mathematics, with a focus on Real Analysis
- **Thesis:** An Example of Hausdorff Dimension
- **Supervisor:** Prof. Bochen Liu
- **Relevant Coursework:** Time Series Analysis, Probability Theory, Mathematical Statistics, Numerical Analysis, Applied Stochastic Process

Selected Theoretical Research Experience

Frobenius Manifolds and Flat Pencils of Metrics (Master Thesis) | **Thesis Draft** — Dec 2024 – July 2025

- Established the equivalence between Frobenius manifolds and flat pencils of metrics ;
- Constructed Frobenius structures and studied associated bihamiltonian systems with examples of Hurwitz spaces;
- Conducted original research to expand the research to supermanifolds.

Seminar: Distinguished Triangles and Triangulated Categories | **Info** | **Notes** — Apr 2025

- Studied distinguished triangles and triangulated categories, highlighting the categorical foundations;
- Delivered a compact 60-minute and received positive feedback for clear exposition.

An Introductory Study on Well-Posedness for Moreau's Sweeping Process | **Notes** — Sept 2023

- Modelled the process with a Lipschitz moving convex set, constructed approximate solutions via the catching-up algorithm, and proved their unique Lipschitz continuous convergence;
- Proved existence, uniqueness, stability, and continuous dependence on initial data for Moreau's sweeping process in a Hilbert space.

Selected Projects

Stochastic Modeling of a Structured Markov Chain (Python) | **Project Files** — Nov 2024

- Studied pendulums with oscillating suspension points, periodic length variation, and external forcing,
- Drew period shift maps, plotted parameter spaces, analyzed fixed points, and computed Lyapunov indicators to interpret dynamical behavior.

Research of Pendulums with Specific Characteristics (Mathematica) | **Project Files** — Sept 2024

- Studied pendulums with oscillating suspension points, periodic length variation, and external forcing,
- Drew period shift maps, plotted parameter spaces, analyzed fixed points, and computed Lyapunov indicators to interpret dynamical behavior.

Crime Analysis in Washington D.C. (Python) | **Project Files** June 2021

- Conducted data exploration and preprocessing in Python;
- Analyzed correlations between crime patterns and variables such as time and location using visualization tools;
- Applied and evaluated a kNN algorithm for both crime analysis and housing price prediction.

Interpolation and Error Analysis (MATLAB) | **Project Files** Jan 2021

- Built and tested interpolation methods; studied error behavior;
- Visualized approximation quality and convergence using MATLAB.

Work Experience

Data Analyst (Intern), Tencent – Shenzhen, China July 2021 – Aug 2021

- Developed Python scripts and web crawlers to automate data collection and cleaning processes.
- Contributed optimization ideas for user interface and webpage functionality to enhance user experience.
- Streamlined workflows, reducing manual effort and improving team efficiency.

Personal Math Tutor, Individual Sept 2018 – Jan 2023

- Provided assistance in mathematics, addressing a wide range of questions from secondary school topics to university-level calculus, linear algebra, operations research, etc.
- Supported students from various disciplines by explaining key mathematical concepts clearly and efficiently.
- Assisted 20+ university/college students and 15+ high school students through individual support.

Scholarships and Academic Competitions

- Team Member, China International College Students' Innovation Competition 2024 (CICSIC)
  Project name: 3D Human Pose and Shape Estimation from RGB Images
- Scholarship for Outstanding Freshmen, SUSTech, 2018

Extracurricular Practical Activities

Volunteer, CKOU South China Kendo Competition June 2021

Publicity Director and Vice President, Esports Club, SUSTech Oct 2018 – June 2022

Skills and Interests

Language Skills

- Chinese (native), English (B2-C1), Italian (basic user), Japanese (basic user)

Computer skills

- **Programming & Tools:** Python, C++, Java, SageMath, Mathematica
- **Modeling & Optimization:** MATLAB, AMPL
- **Other Software:** LaTeX, Adobe Photoshop, Adobe Premiere

Interests

- Photography, Kendo, Guzheng, Bass guitar, Rubber stamp sculpture, Rubik's cube