

Yan HUANG

1088 Xueyuan Avenue, Nanshan District, Shenzhen, Guangdong Province, China
Tel: +86 18848443560 | Email: 11911011@mail.sustech.edu.cn | Webpage: <https://hv1000.github.io/>

RESEARCH INTERESTS Numerical Solution of PDEs, Applied Mathematics, Machine Learning, and Data-driven Scientific Computing.

EDUCATION **Southern University of Science and Technology (SUSTech)** Shenzhen, China
B.S. Mathematics and Applied Mathematics (Honors Program) Expected Jul. 2023
GPA: 3.79/4 (90.92/100), Ranking: 4/35

SELECTED COURSES

- **Undergraduate Courses:** Mathematical Analysis (honor), Complex Analysis (honor), Real Analysis (honor), Functional Analysis, ODE (honor), PDE (honor), Advanced Linear Algebra, Abstract Algebra (honor), Elementary Number Theory, Topology, Differential Geometry, Probability Theory, Applied Stochastic Processes, Mathematical Statistics, Operations Research, Introduction to Theoretical and Practical Data Science, Numerical Analysis, Numerical Solution of PDEs
- **Graduate Courses:** Algorithms for Convex Optimization, PDE I (in progress), Advanced Probability (in progress), Methods of Applied Math (in progress), Computational Fluid Dynamics and Deep Learning (auditor)

SCHOLARSHIPS & AWARDS

- SUSTech Second Class of the Merit Student Scholarship Nov. 2022
- First Class Award of the 13th National College Students Mathematics Competition in the Guangdong division Dec. 2021
- SUSTech Second Class of the Merit Student Scholarship Nov. 2021
- SUSTech Third Class of the Merit Student Scholarship Nov. 2020
- SUSTech Third Class of the Freshman Scholarship Nov. 2019

TEACHING EXPERIENCE **Department of Mathematics, SUSTech**
• Teaching Assistant, MA327, Differential Geometry Feb. - Jun. 2022

ACADEMIC EXPERIENCE **Acceleration of Variable Frequency Fourier Transform** Jul. 2022 - Present

- Worked with [Prof. Zhen Zhang](#) at SUSTech to complete a research project on the acceleration of variable frequency Fourier transform.
- Accomplished a part of theoretical deduction, and implemented the acceleration algorithm by MATLAB and Python; achieved a faster performance than the baseline algorithm.
- Currently working on improving the algorithm by parallel computing.

Regarding Neural Networks as Gaussian Processes Jun. 2022

- Studied the literature *Deep Neural Networks as Gaussian Processes* and completed a 7-page literature review as a course project for *Applied Stochastic Processes*.

Numerical Solution of Allen-Cahn Equation May. 2022

- Wrote a MATLAB program to solve the Allen-Cahn equation subject to periodic boundary conditions and the random initial values by semi-implicit Euler method with a stabilized term as a course project for *Numerical Solution of PDEs*.

Diagnosing and Forecasting PM2.5 Pollutant Levels in Beijing May. 2022

- Wrote a Python program to diagnose and forecast PM2.5 pollutant levels in Beijing as a course project for *Introduction to Theoretical and Practical Data Science*.
- Preprocessed the hourly data between 2010 to 2014, used a machine learning algorithm (XGBoost) to fit the training data, and achieved $R^2 = 0.71$ on the test data; made feature selection and dimensionality reduction; classified the PM2.5 data into three classes. Completed a 50-page slide and successfully passed the defense.

Data-driven Scientific Computing Feb. 2022

- Studied literature *PINN*, *DeepRitz*, *DeepONet*, *FNO*, and *SINDy*, and completed an oral report to Prof. Zhen Zhang.

Prediction of Decomposition Rates and Interspecific Interactions of Fungi

Feb. 2021

- Built mathematical models and wrote a MATLAB program to quantify the decomposition rates and the interspecific interactions of fungi in various environments.
- Used the Lotka-Volterra model to quantify the fungal interspecific interactions on their hyphal length in various environments; found that increasing biodiversity in the tropical rainforest can double the decomposition rate after four days. Entered the Mathematical Contest in Modeling and completed a 21-page paper.

Checkers Programming Project

Jun. 2020

- Wrote a Java program to implement the checkers game as a course project for *Introduction to Computer Programming A*
- The game supports multiplayer and man-machine games. We archived game progresses, enabled built-in sound effects and other features, and designed and implemented a GUI for visualization. Presented a 10-page slide report and successfully passed the defense.

**SEMINARS
ATTENDED**

Neural Differential Equations

Mar. - May. 2022

- Studied Patrick Kidger's doctoral thesis *On Neural Differential Equations* and other relevant publications.
- Presented and led the discussion on Numerical Solvers for Neural Differential Equations; studied ResNet, VAE, Variational Inference, GAN, W-GAN, Neural ODE, and Neural SDE.

Machine Learning

Jul. - Aug. 2021

- Studied Trevor Hastie et al.'s book *The Element of Statistical Learning* and Shai Shalev-Shwartz et al.'s book *Understanding Machine Learning*.
- Presented and led the discussion on Ridge Regression and Lasso; studied PAC learning theory covering VC-dimension, Rademacher Complexity, and convergence analysis of some machine learning algorithms.

Fourier Analysis

Jul. 2021

- Studied Elias M. Stein et al.'s book *Fourier Analysis*.
- Presented and led the discussion on the Convergence of Fourier Series and Fourier Transforms of d-dimensional Euclidean Spaces.

SKILLS

- **Computer:** Python, MATLAB, Java, LaTeX, Origin
- **Language:** Chinese (native), TOEFL (Reading 28, Listening 25, Writing 23, Speaking 23)