Bohao Zhang

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EDUCATION

Southern University of Science and Technology Shenzhen, China

Bachelor of Science, Major in Mathematics and Applied Mathematics *09/2023-Present*

Relevant Coursework: Mathematical Analysis, Advanced Linear Algebra, Ordinary Differential Equations, and Probability

North Carolina State University Raleigh, United States

Non-credit Summer GEARS Seminar Program *07/2025-08/2025*

Research Topic: Efficient Algorithms for Data Science

HENG SHUI FU YANG HIGH SCHOOL Hengshui, China

Academic Level: **A** (Excellent) *09/2019-07/2023*

PROJECT EXPERIENCES

Efficient Algorithms for Data Science Raleigh, United States

Research Group Member *07/2025-08/2025*

- Focused on efficient randomized algorithms for the fixed-precision low-rank matrix approximation to accelerate matrix computations in data science applications, which improved my skills in implementing numerical algorithms in high-performance computing (HPC) environments.
- Explored and optimized existing factorization methods for low-rank matrices, such as partial singular value decomposition (SVD) and rank-revealing QR factorization, and proposed randomized algorithms based on QB factorization (randQB_EI and randQB_FP), which utilize a Frobenius norm error indicator to enable adaptive rank determination and avoid explicitly computing the residual matrix.
- Participated in developing the efficient randQB_FP algorithm, a single-pass method that significantly reduces matrix accesses and addresses numerical precision issues, making it well-suited for processing sparse or implicit matrices.
- Conducted numerical experiments in ***MATLAB*** on a multi-core computer to evaluate the algorithm's performance in terms of speed and accuracy. Achieved up to $2\times$ speedup compared to existing methods (e.g., randQB_EI), demonstrating superior performance in image compression and information retrieval tasks.

Design of the Control Circuit for a Kitchen Exhaust Hood Shenzhen, China

Team Member, Instructed by Wei Wang & Yuhui Bai *09/2024-01/2025*

- Identified the project requirements and objectives through group discussions, defined project tasks and team responsibilities, gathered relevant information, and drafted project submodule documentation.
- Contributed to designing and implementing a basic state machine for a kitchen hood in ***Vivado 2017.4***, incorporating button debouncing, rising edge detection, timed state transitions, timer design, and bonus features (audio output and Bluetooth I/O).
- Improved code readability and reliability by adding comments and clarifying terminology; debugged and fixed potential issues in sub-module code. For example, resolved problems in the buzzer module by analyzing inter-module interactions, sourcing a suitable buzzer, which addressed issues with tone frequency control and low volume.
- Achieved an excellent overall score of 126.7/110.

CONTEST EXPERIENCE

Mathematical Contest in Modeling Shenzhen, China

Team Leader *01/2025*

- Analyzed 2023 data on Juneau's tourism industry and the retreat of the Mendenhall Glacier; aimed to predict future changes in regional glaciers and develop a sustainable tourism model.
- Constructed a predictive model using the elemental dynamic system method and AHP analysis, integrating factors such as visitor numbers, total revenue, and management strategies. Defined optimization objectives and constraints to demonstrate the model's adaptability to other destinations affected by overtourism.

- Estimated reasonable tax rates and visitor limits, provided dynamic policy advice to decision-makers, planned the allocation of additional revenue, and incorporated feedback into the model to support the sustainable development of tourism in Juneau.
- Awarded with **Successful Participan**t

EXTRACURRICULAR ACTIVITIES

Zhiren College, Southern University of Science and Technology Shenzhen, China

Mental Health Representative *09/2023-Present*

- Provided psychological support to students, listened to and helped address peers' emotional concerns, and paid close attention to potential mental health issues, recognizing and responding to them in time.
- Organized and planned mental health-related activities, such as psychological lectures, group counseling sessions, and stress-relief sports events, which helped improve students' mental well-being and academic performance.
- Collaborated with the school's counseling center and counselors to facilitate access to mental health resources, advocate for mental health awareness, and help connect students with professional psychotherapy services.
- Awarded the title of "Outstanding Mental Health Representative"

Guangdong-Hong Kong-Macao Greater Bay Area Culture and Arts Festival Shenzhen, China

Volunteer *10/2023*

- Gathered and prepared performer information and arranged the stage show venue, including placing seats, displaying posters, and testing on-site computer equipment.
- Oversaw on-site coordination, such as guiding audiences to enter the venue in sequence and greeting guests to their designated seats to ensure the smooth implementation of the event.
- Interviewed artists and audiences to collect feedback, and prepared press releases according to show materials, photos, and videos; posted them on the official media platform.

HONORS&AWARDS

- **Successful Participant-**Mathematical Contest in Modeling, 2025
- **Top 30%-**The Third SUSTech Land Rowing Proficiency Competition, 2024

SKILLS&INTERESTS

- **Interests:** Table tennis, Fitness-type music game
- **Computer:** Proficient in MatLab, Python, R, Microsoft Software, Adobe Photoshop, Verilog
- **Language:** Chinese (First Language), English (Proficient), Japanese (Average)