

EDUCATION

TEXAS CHRISTIAN UNIVERSITY

Fort Worth, Texas

College of Science and Engineering

Sep 2021 - May 2025

John V. Roach Honors College

Bachelor of Science in Mathematics

Current GPA: 4.0/4.0

Bachelor of Science in Computer Science

Relevant Coursework:

- **Mathematics Courses:** Applied Linear Algebra, Applied Differential Geometry, Geometric PDEs, Real Analysis I, Abstract Algebra I, Multivariable Analysis, Statistics, Topology, Numerical Analysis
- **Computer Science Courses:** Data Structures, Artificial Intelligence, Intro to Data Science, Deep Learning, Database Systems, UNIX/Linux Admin, Analysis of Algorithms

RESEARCH EXPERIENCE

Texas Christian University, Department of Mathematics

Fort Worth, Texas

Honor Research Program

September 2022-Present

Advisor: Dr. Ken Richardson

- Study properties of Geodesic Nets on Euclidean Space and higher-dimension manifolds
- Propose an algorithm to construct approximate Steiner Tree with arbitrary number of points using Fermat-Torricelli points and inspired from bubble soap film
- Apply Riemannian Metrics to the algorithm to construct geodesic nets on higher-dimension manifolds

Texas Christian University, Department of Computer Science

Fort Worth, Texas

Research Assistant for GO2AI project

January 2023-Present

Advisors: Dr. Liran Ma, Dr. Ze-li Dou

- Implement Monte Carlo Search Tree and CNNs into the policy of AI agent playing the game Go
- Implement Grad-CAM to investigate the robustness of Go playing agent for further analysis and education
- Optimize performance of AI agent by improving the training process

Rice University, Department of Statistics

Houston, Texas

Research Experiences for Undergraduate (REU) STAT-DATASCI

May 2023-July 2023

Advisor: Dr. Eric C. Chi

- Investigate the dependence of optimal tuning parameter on the noise level of existing NMF methods
- Propose a new algorithm for NMF called Square-Root Min-Vol NMF with convergence guarantee proof
- Test the algorithm with large noisy datasets of hyperspectral images and get a better errors than recent algorithms

ACADEMIC PUBLICATION

- Duc Toan Nguyen and Eric C. Chi. "Towards tuning-free minimum-volume nonnegative matrix factorization", *Proceedings of the 2024 SIAM International Conference on Data Mining (SDM24)*. Society for Industrial and Applied Mathematics, 2024 (accept for publication).
- Nguyen, Duc Toan. "[Anti-Steiner Point Revisited](#)." *Mathematical Reflections*, no. 6, 2020,
- Nguyen, Duc Toan. "Problems with two tangent homothetic circles." *The mathematical solving methods through Olympiads*, 2019.

POSTERS/PRESENTATION

- Nguyen, Duc Toan. "A Majorization-Minimization Variant For Minimum-Volume Nonnegative Matrix Factorization." *National Collegiate Research Conference (NCRC), Harvard University*, January 2024.
- Nguyen, Duc Toan. "Towards Tuning-Free Minimum-Volume Nonnegative Matrix Factorization." *Gulf Coast Undergraduate Research Symposium (GCURS), Rice University*, October 2023.
- Nguyen, Duc Toan. "Searching for networks of minimum length." *Research and Creative Activities Week, Texas Christian University*, September 2023 (poster).
- Nguyen, Duc Toan. "Geodesic Nets construction using Genetic Algorithm." *Student Research Symposium (SRS), Texas Christian University*, April 2023 (poster).

HONORS/AWARDS

- Outstanding Session Presentation, Computational Mathematics and Operations Research, GCURS 2023
- Best Undergraduate Poster Presentation Finalist of TCU Student Research Symposium 2023
- Top 500 in the 83rd William Lowell Putnam Mathematical Competition 2022
- First prize in TCU Math Department Calculus Bee 2022 and 2023
- Third prize in Vietnam Mathematical Olympiad in 2019
- Pi Mu Epsilon - TCU Texas Alpha chapter
- TCU Scholar (GPA 4.0)

WORK EXPERIENCE

TRIO Program - TCU College of Education

Fort Worth, Texas

SSS Peer Tutor

January 2022-Present

- Support lower-income and first-generation students under federally funded program
- Teach 10 students to think critically and perform better in elective Math and Computer Science courses
- Tutor multiple graduate Math courses including Real Analysis I and Real Analysis II

TCU Department of Mathematics

Fort Worth, Texas

Math Grader/Teaching Assistant

January 2022-Present

- Grade student's homework assignments and give them detailed feedback
- Discuss with Professor some problems in grading and other mathematical topics
- Review foundational topics to create a strong math base for future research

TECHNICAL SKILLS

- **Programming Languages:** Python, Java, MATLAB, R, MySQL, C++, HTML, JS, PHP
- **Operating Systems:** Linux, MacOS, Windows