DUC TOAN NGUYEN

duc.toan.nguyen@tcu.edu | ductoanng.github.io | 3145 Cockrell Ave, Fort Worth, TX 76109 | (682) 408-9409

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 some properties of Geodesic Nets on Euclidean Space and other surfaces
- Investigate some small geodesic nets with 5 balanced vertices on the flat torus using Genetic Algorithm
- Find a method to construct a Geodesic Net inspired from Steiner Tree construction from bubble soap film using Fermat-Torricelli points

Texas Christian University, Department of Computer Science — Fort Worth, Texas
Research Assistant for GO2AI project — September 2022-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
- Explore Grad-CAM method to see which region of input important for final decision
- Implement Grad-CAM to GUI of Go playing for further analysis and education

Rice University, Department of Statistics — Houston, Texas
Research Experiences for Undergraduate (REU) STAT-DATASCI — May 2023-July 2023
Advisor: Dr. Eric C. Chi

- Explore minimum-volume optimization algorithms for nonnegative matrix factorizations
- Apply the Majorization-Minimization principle for a new variant of minimum-volume NMF
- Test the new variant with large datasets of hyperspectral images and get a better results 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. “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

- TCU Student Research Symposium Best Undergraduate Poster Presentation Finalist 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 with their academic path
- Teach students to think critically and how to deal with complicated Math problems
- Inspire students with the language of math and efficient coding

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