DUC TOAN NGUYEN

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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

RESEARCH EXPERIENCE

TCU Department of Mathematics — Fort Worth, Texas
Geodesic Nets Construction — Sep 2022-Present

- 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 using Fermat-Torricelli points

Rice University Department of Statistics - REU STAT-DATASCI — Houston, Texas
Nonnegative Matrix Factorization — May 2023-July 2023

- Explore and compare multiple optimization algorithms for finding nonnegative matrix factorization
- Find a new optimization method to enhance the efficiency of an existing algorithm
- Implement algorithms in R to analyze Single Cell RNAs Sequence

TCU Department of Computer Science — Fort Worth, Texas
AI2GO — Sep 2022-Present

- Implement Monte Carlo Search Tree and CNNs into playing the game Go
- Explore new method to optimize the strategy for playing

ACADEMIC 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.
- Nguyen, Duc Toan and Van Thanh Son Nguyen. "Solution for Problems from Entrance Exam to Le Quy Don High School For The Gifted, Da Nang city, Vietnam, in 2019." *Vnexpress.net*, June 5, 2019.

POSTERS/PRESENTATION

- Nguyen, Duc Toan. "Geodesic Nets construction using Genetic Algorithm." *Student Research Symposium (SRS), Texas Christian University,* April 2023 (poster).

WORK EXPERIENCE

TCU Department of Computer Science — Fort Worth, Texas
Research Assistant — January 2023-Present

- Analyzed the structure and performance of AlphaGo against human players
- Learned key machine learning concepts such as Reinforcement Learning, Monte Carlo Search Tree, CNNs
- Contributed to development of a new game-playing algorithm that outperformed existing methods

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

RELEVANT COURSES

- **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

TECHNICAL SKILLS

Programming languages: Python, Java, R, Matlab, C++, HTML, JS, PHP, Octave
Operating Systems: Linux, MacOS, Windows

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
TCU Scholar (GPA 4.0)

MEMBERSHIP

Pi Mu Epsilon - TCU Texas Alpha chapter