

## EDUCATION

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### TEXAS CHRISTIAN UNIVERSITY

#### College of Science and Engineering

#### John V. Roach Honors College

Bachelor of Science in Mathematics

Bachelor of Science in Computer Science

Fort Worth, Texas

Sep 2021 - May 2025

Current GPA: 4.0/4.0

#### *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

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### Texas Christian University, Department of Mathematics

#### *Honor Research Program*

Advisor: Dr. Ken Richardson

Fort Worth, Texas

September 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 construction from bubble soap film using Fermat-Torricelli points

### Texas Christian University, Department of Computer Science

#### *Research Assistant for GO2AI project*

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

Fort Worth, Texas

September 2022-Present

- 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

#### *Research Experiences for Undergraduate (REU) STAT-DATASCI*

Advisor: Dr. Eric C. Chi

Houston, Texas

May 2023-July 2023

- 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

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- 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

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- 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

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- 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

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### 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

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