NICHOLAS TAPP - HUGHES

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Unit A
Chapel Hill, NC 27516

Objective

Highly motivated UNC student seeking a technical summer internship position where I can apply my domain knowledge of computer science and applied mathematics.

Education

University of North Carolina at Chapel Hill

B.S. Applied Mathematics, B.S. Computer Science — *August 2017 – May 2021*

- Cumulative GPA: 3.92/4, Math GPA: 3.87/4, CS GPA: 3.97/4

M.S. Computer Science, Accepted October 2020 — *August 2021–May 2022 (expected)*

North Carolina School of Science and Mathematics — *August 2015 – May 2017*

Experience

Honors Thesis Student — *UNC Chapel Hill, Spring and Fall 2020*

- Applied state-of-the-art deep learning-based methods to medical image analysis problems with applications in the research of common neurological developmental disorders
- Created NetSeg, a user-friendly GUI tool for deep learning-based 3D segmentation of subcortical brain structures in MRI. Continuing development and integrating latest segmentation methods
- Authored an undergraduate thesis and was awarded honors for a successful defense before an expert faculty panel including professors Martin Styner and Stephen Pizer at UNC Chapel Hill.

Summer Undergraduate Research Fellow — *UNC Chapel Hill, Summer 2020*

- Devised a segmentation pipeline containing pre- and post-processing steps in series with a convolutional neural network inspired by the U-net, continuing honors thesis work
- Processed data, scheduled computational jobs, and kept an organized personal directory on a GPU-accelerated research computing server

Deep Learning / Graphics Graduate Seminar Student — *UNC Chapel Hill, Fall 2019*

- Participated in graduate seminar led by David Leubke, vice president of graphics research at NVIDIA
- Read and summarized approx. 25 papers in deep learning and computer graphics
- Presented *Deep Radiance Caching: Convolutional Autoencoders Deeper in Ray Tracing* (Jiang, Kainz 2020) to an audience of approx. 20 graduate students and provoked a scientific discussion

Cornell Mathematics REU Researcher — *Ithaca, NY, Summer 2019*

- Conducted research during a 9-week NSF-funded undergraduate research program in applied mathematics, focused on physical dynamics and optimal control
- Investigated a novel optimal control problem with a team of undergraduate researchers from across the U.S. under professor Andy Borum
- Preparing a manuscript to be submitted to *IEEE Transactions on Automatic Control*

Math and Computer Science Tutor — *UNC Chapel Hill, Spring 2018 – Present*

- Tutored students from the elementary to collegiate level either pro bono or for a small fee
- Scheduled regular sessions with multiple tutees, including one middle school student whose family I became close to over the course of a year of tutoring

Differential Equations Learning Assistant — *UNC Chapel Hill, Spring 2019*

- Served as an undergraduate learning assistant for MATH383: A first course in differential equations
- Held weekly office hours where I assisted students with homework problems and course material
- Gave review lectures before the midterm and final exams

Projects

NetSeg

- A GUI tool for deep-learning based segmentation of MR images, developed while conducting research for an honors thesis under Dr. Martin Styner. (link)

Sushi Game

- A sushi chef game inspired by Kurama, a sushi-belt restaurant in Chapel Hill. Developed in Java over the course of a semester in COMP401: Foundations of Programming. (link)

Hook Length Calculator

- A CLI tool for calculating the number of linear extensions of a directed-complete partially ordered set. Completed while participating in the math Directed Reading Program at UNC studying combinatorics and representation theory. (link)

Extracurriculars

President, Carolina Math Club *UNC Chapel Hill, Fall 2020 – Spring 2021*

- Coordinated social and competitive events, faculty talks, professional development events, and study sessions for undergraduate mathematics students at UNC
- Facilitated outreach and publicity, ensured steady club membership by organizing 2 events per month with leadership team
- Collaborated on events with other UNC organizations such as the MathGems Seminar Series, Association for Women in Mathematics (AWM), UNC Society for Industrial and Applied Mathematics (SIAM), and the UNC Math Problem Solving Seminar
- Fostered an environment centered on community, learning, and growth

Volunteering and Service
Consistent practice of volunteer service among wide range of community needs including Immigrant and Family Health, Beds for Kids, UNC Hospitals, The Laurels & The Haven Senior Living, Morrison Family YMCA, and the Julia Robinson Math Festival.

Hobbies and Interests
I greatly enjoy hiking, running, and playing chess in my free time.

Honors

Phi Beta Kappa, Member *Fall 2020 – Present*

Graduate with honors and highest distinction *Expected May 2021*

Dean's List *August 2017 – Dec 2020*

Technical Skills

Highly Proficient: Python, TensorFlow, Vim, bash

Proficient: C/C++, Java, Rust, SQL, MongoDB, Javascript, Git, LaTeX, QT, MATLAB, Mathematica, R, PyTorch, Numpy, Pandas, MatPlotLib, ITK, ARM

Areas of expertise: Deep Learning, Differential Equations, Numerical Analysis, Scientific Writing

Publications

Tapp Hughes, Nicholas, "A 3d U-net for Segmentation of Subcortical Structures In Mr Images of 12 and 24 Month-old Infants," Available: Carolina Digital Repository, https://cdr.lib.unc.edu/concern/honors_theses/4f16c8286.