PHUC 'JERRY' NGO

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EDUCATION

Beloit College *Beloit, WI*
Computer Science and Mathematics Major August 2019 - Present
GPA: 3.91/4.0
Expected Graduation Date: December 2022

RESEARCH AND WORK EXPERIENCE

Embodied Intelligence Group @ MIT CSAIL *September 2022 - Present*
Research Assistant *Advised by Yoon Kim*

- Proposed a collaborative project on leveraging in-context learning to improve LLM's lack of grounding.
- Provide Codex, a code generation model, with graphics code examples and assess its effect on the model's visual understanding.

Computer Vision Group @ MIT CSAIL *August 2021 - Present*
Undergraduate Researcher *Advised by Phillip Isola*

- Design a pipeline to test how a large vision-language model, CLIP, performs as a visual system.
- Generate images of optical illusion, shape and color to compute CLIP's response to those stimuli.
- Discover that CLIP is fooled by human optical illusions and that CLIP's understanding of cognitive concepts like color-emotion association or shape language is correlated with human psycho-visual experiments.

Theory of Computation Group @ MIT CSAIL *June 2021 - August 2021*
Undergraduate Researcher *Advised by Aleksander Mądry*

- Researched the effect of data augmentation on deep representations.
- Trained ResNet18 models on CIFAR-10 with augmentation like grayscale, rotation and adversarial attack.
- Discovered that data augmentation is not enough to achieve rotation invariant from standard and augmented representation analysis

Mathematics and Computer Science Department, Beloit College *October 2019 - June 2021*
Research Assistant (2021) *Advised by Donghoon Kwon*

- Performed a deep comparative analysis on machine learning models such as KNN, SVM, ANN using leaf dataset.
- Achieved an accuracy of 76.18% with ANN.

Research Assistant (2019, 2020) *Advised by Darrah Chavey*

- Derived bit-manipulation functions to exchange row and column of a compressed adjacency matrix for a graph iterator program that produces all possible graphs with specific attributes.

Information Technology Department, Beloit College *October 2020 - June 2021*
IT Programmer

- Wrote automated scripts that process raw student data.
- Managed users in Active Directory and Google servers.

PUBLICATIONS

P. H. Ngo and D. Kwon, "A Study on Comparative Analysis of Machine Learning Algorithms Using the Leaf Data Set," Journal of Industrial Information Technology and Application (JIITA), Vol. 5, Number 4, 2021.

PREPRINTS

Jerry Ngo, Swami Sankaranarayanan and Phillip Isola, "Is CLIP Fooled by Optical Illusions?" [PDF]

PROJECTS

StyleWav: Guiding Image Synthesis Using Audio *2022*

- Coded a pipeline combining CLIP with StyleGAN to generate photos of human faces from voice audio. [PDF]

TALKS

Washington University in St. Louis, Midstates Research Symposium In Physical Sciences *November, 2022*
University of Chicago, Midstates Research Symposium In Biological Sciences and Psychology *November, 2022*
MIT, MIT Summer Research Program Poster Session [Poster] *August, 2022*
MIT CSAIL, LLM Summer Working Group *July, 2022*
Beloit College, Annual Student Symposium *April, 2022*
University of Chicago (online), Midstates Research Symposium In Physical Sciences *November, 2021*
MIT (online), IEEE MIT Undergraduate Research Technology Conference *October, 2021*
MIT, MIT Summer Research Program Poster Session [Poster] *August, 2021*
Beloit College, Annual Student Symposium *May, 2021*
Jeju Island (online), ISIITA *February, 2021*
Beloit College, Annual Student Symposium *May, 2020*

AWARDS

Presidential Scholarship: Awards $32,000 annually *2019-2023*
Beloit College Grant: Awards $10,300 annually *2019-2023*
MIT Summer Research Program, *Participant* *2021, 2022*
Ferwerda Merit Scholars: Awards 15 students at Beloit College with academic excellence in STEM *2021, 2022*
Google Computer Science Research Mentorship Program, *Recipient* *2021*
Jackson J. Bushnell Mathematics Prize: Recognizes excellence in mathematics of one freshman *2020*
Consolation Prize in the **Vietnamese National Olympiad in Informatics**, *Top 100* *2018*

TEACHING EXPERIENCE

Learning Enrichment & Disability Services, Beloit College *November 2021 - Present*
Tutor
- Courses: Discrete Structures, Calculus I.
- Host one-on-one tutoring sessions to help students with coursework.

Mathematics and Computer Science Department, Beloit College *August 2020 - December 2021*
Teaching Assistant
- Courses: Intro to Object Oriented Programming, Data Structures and Algorithms.
- Organize office hours each week to help students understand programming concepts and approach the projects.
- Create JUnit tests for weekly course projects.

RELEVANT COURSEWORK

Computer Science: Convolutional Neural Networks for Visual Recognition, Neural Networks and Deep Learning, Algorithm Design & Analysis, Data Structures and Algorithms, Threads & Operating Systems, Computer Architecture, Computer Models & Languages, Computer Network.
Math: Linear Algebra, Mathematical Statistics, Vector Calculus, Real Analysis, Abstract Algebra.
Other Courses: Introduction to Cognitive Science, Principles of Economics.

LEADERSHIP AND COMMUNITY INVOLVEMENT

MakerLab *President, Supervisor* *February 2020 - May 2022*
- Oversee and instruct students how to use the 3D scanner, soldering iron, laser cutter, heat gun, and etc.
- Coordinate and prepare the material for monthly events.

Beloit College Minecraft Server *Administrator* *November 2020 - May 2022*
- Get funded by Beloit College to maintain a school Minecraft server.
- Code and install plugins, mods for the server.
- Manage the player base using database and Discord.

Putnam Practice Group *Member* *September 2020 - June 2021*
- Meet weekly to practice solving mathematical problems from the Putnam competition.

Students Who Code Project *President* *July 2017 - September 2020*
- Founded the first programming organization for high school students in Can Tho City.
- Developed simplified guides on modern languages, such as XML, Python, C++, with many real-life projects and even mobile applications.
- Introduced programming language to more than 200 students and held five events at school.