Khang M. Nguyen

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EDUCATION

University of Texas at Arlington August 2020 – May 2024
B.Sc. *(Hons.)* in Computer Science, Minor in Bioengineering & Mathematics Arlington, TX, U.S.

Cumulative GPA: 3.82/4.00 **Major GPA:** 3.90/4.00 **COE Dean's List:** 5 semesters from Spring 2021 to Spring 2023.

Coursework: Advanced Linear Algebra, Algorithms & Data Structures, Artificial Intelligence, Autonomous Robots, Computer Vision, Engineering Probability & Statistics, Machine Learning, Medical Imaging, Multivariable Calculus, Neural Networks & Deep Learning, Signal Processing, Statistical Inference, Operating Systems, and Unmanned Vehicle Systems.

Thesis: In-progress *Advisor:* *Dr. Manfred Huber*

RESEARCH ACTIVITIES

Conference Proceedings:

[5] **K. Nguyen**, T. Dang, and M. Huber, "Online 3D Deformable Object Classification for Mobile Cobot Manipulation" at *the 56th International Symposium on Robotics* (ISR Europe '23). Stuttgart, Baden-Württemberg, Germany.
▷ Paper | Code | Demo | Slides | Talk

[4] T. Dang, **K. Nguyen**, and M. Huber, "Multiplanar Self-Calibration for Mobile Cobot 3D Object Manipulation using 2D Detectors and Depth Estimation" at *the 2023 IEEE/RSJ International Conference on Intelligent Robots and Systems* (IROS '23). Detroit, MI, U.S.
▷ Paper | Code | Demo

[3] T. Dang, **K. Nguyen**, and M. Huber, "*ExtPerFC*: An Efficient 2D and 3D Perception Software-Hardware Framework for Mobile Cobot" at `arXiv (06/08/23)`.
▷ Paper | Code | Demo

[2] T. Dang, **K. Nguyen**, and M. Huber, "*PerFC*: An Efficient 2D and 3D Perception Software-Hardware Framework for Mobile Cobot" at *the 36th International Florida AI Research Society Conference* (FLAIRS-36). Clearwater Beach, FL, U.S.
▷ Paper | Code | Demo

[1] T. Dang, T. Tran, **K. Nguyen**, T. Pham, N. Pham, T. Vu, and P. Nguyen, "*IoTree*: A Battery-free Wearable System with Biocompatible Sensors for Continuous Tree Health Monitoring" at *the 28th ACM International Conference on Mobile Computing And Networking* (MobiCom '22). Sydney, NSW, Australia.
▷ Paper | Code | Demo

Abstract & Poster Presentations:

[2] **K. Nguyen** and W.J. Beksi, "An Autonomous Indoor Personal Robot with Real-Time Object Detection" at *the Annual UTA Innovation Day 2023.* Arlington, TX, U.S.
▷ Poster | Code

[1] H. Affleck, **K. Nguyen**, K. Brown, and Y. Liao, "The Use of Social Media Advertisements to Recruit a Diverse Sample of Hispanic and Black Women for a Virtual Focus Group Study" at *the 150th American Public Health Association Annual Meeting & Expo* (APHA '22). Boston, MA, U.S.

Conference Reviewing:

- *The 19th IEEE International Conference on Automation Science and Engineering* (CASE '23).
- *The 20th IEEE International Conference on Ubiquitous Robots* (UR '23).

Professional Affiliations:

- *IEEE Member* (2023 – Present)
- *ACM Member* (2023 – Present)

RESEARCH EXPERIENCE

Learning and Adaptive Robotics Lab August 2022 – Present
Undergraduate Research Assistant Arlington, TX, U.S.

Deformable Object Classification Project: `(Undergraduate Thesis)`

- Auto-generated a synthetic dataset from 3D scans of real-world deformable objects, including various-sized soda cans, toy balls, and disposal cups, using a proposed intuitive **Laplacian-based mesh deformation** procedure.
- Designed a lightweight 3D deformable object classification network with spatial transformer, which is **less than 100 KB**, achieves **95.23% classification accuracy** on the synthetic dataset and **23 ms of inference time** on onboard Intel CPU.

Baxter Mobile Cobot Perception Project: (Led by Tuan Dang, Ph.D. Student)

- Modeled the **scale factor calibration process** for multiplanar self-calibration on arbitrary planes within the robot workspace, resulting in **mean distance error of 3.9 mm and 6.5 mm** at depths of 0.57 m and 0.77 m, respectively.
- Integrated the **Intel RealSense RGB-D camera D435i** to the distributed Intel NUC5i7RYH Mini PC with ROS Melodic distribution for RGB-D images and point cloud data acquisition.

Robotic Vision Lab October 2022 – May 2023
Undergraduate Research Assistant Arlington, TX, U.S.

TurtleBot Project: (Sponsored by UTA COE Innovation Day)

- Deployed **MobileNet SSD v2** for real-time object detection with an integrated Intel Realsense RGB-D camera D455 on the TurtleBot3 robot with the NVIDIA Jetson Nano 2GB single board computer.

Wireless and Sensor Systems Lab August 2021 – August 2022
Undergraduate Research Assistant Arlington, TX, U.S.

IoTree Project: (Led by Tuan Dang, Ph.D. Student)

- Designed the **block anticipation algorithm** for adaptive block-based for wind-powered intermittent computing on the MSP430FR2433 microcontroller to minimize the **wasted energy down to 10.4%** in worst-case scenarios.
- Developed the nutrients (NH_3 and K_2O) estimation model for trees from their impedance profiles using the IRLS algorithm, and obtained the **accuracies of 91.08% and 90.51%**, respectively, in ten different nutrient levels.

Battery-free UAV Project: (Led by Tien Pham, M.Sc Student)

- Modeled the torque of the ornithopter wings from the torque of the brushless DC motor using equations of motion based on **Lagrangian mechanics** and simulated the dynamic model on MATLAB Simulink.

Drone Localization Project: (Led by Tuan Dang, Ph.D. Student)

- Reshifted and denoised the input audio using **Wiener filter** on the ReSpeaker 6-Mic circular array.
- Trained and tested the cross-modal learning model with **YOLOv5 and ResNet** backbone with data of different weather and lighting conditions, and achieved the **IoU accuracy up to 89%**.

OUTREACH ACTIVITIES

UTA Senior Design Team September 2023 – Present
Team Leader Arlington, TX, U.S.

- Leading a four-student team to develop a vision-based pipeline for the Sawyer cobot to manipulate glass beakers and flasks.

HackMIT Hackathon October 2022
Participant Boston, MA, U.S.

- Self-led in "*Spidey*: An Autonomous Spatial Voice Localization Crawling Robot" project.

GaTech IEEE RoboTech Hackathon April 2022
Team Leader/Participant Atlanta, GA, U.S.

- Led three peers in "*iPlanter*: An Autonomous Ground Monitoring & Tree Planting Robot" project.

Wolfram High School Summer Camp June 2019 – July 2019
Participant Boston, MA, U.S.

TEACHING EXPERIENCE

OurCS@DFW Workshop: CPS-Health (Teaching Assistant) February 2022

UTA Department of Mathematics (Teaching Assistant) February 2022 – May 2022

ACADEMIC AWARDS & HONORS

UTA Research Experiences for Undergraduates Sponsorship October 2022
Sponsored by UTA COE and UTA Robotic Vision Lab

Sponsorship Award for Assistive Technologies at HackMIT October 2022

Top 8 of GaTech IEEE RoboTech Hackathon April 2022

2nd Prize in Body Track & 3rd Prize in Electrical Track April 2022
Awarded by GT IEEE RoboTech Hackathon Committee

UTA Freshman Distinction Roll Recognition Recipient December 2020

UTA Maverick Academic Scholarship Recipient August 2020

College Board AP Scholar with Distinction Recipient July 2020

Honorable Mention of the 14th Geometrical Olympiad in Honor of I. F. Sharygin August 2018
Ranked 10th over 49 participants in the Final Round

Honorable Mention of Singapore Mathematical Olympiad Open June 2018

Bronze Award of Singapore and Asian Schools Math Olympiad May 2018

Bronze Medal of Vietnamese Mathematical Youth Talent Search April 2018
Ranked 13th over 198 participants in Grade 10

Bronze Ruler of the 4th Iranian Geometrical Olympiad September 2017
Ranked 4th nationally - Ranked 57th internationally

Second Prize of the Municipal Mathematical Competition March 2017

TECHNICAL COMPETENCIES

Coding & Software: Python, C/C++, MATLAB, Mathematica, HTML/CSS, JS, Java, and ROS.
Designing & Fabrication Tools: Arduino, SOLIDWORKS, Prusa, Formlabs, NVIDIA Jetson, and Raspberry Pi.

PROFESSIONAL REFERENCES

Dr. Manfred Huber, Ph. D.
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Director, Learning and Adaptive Robotics Lab
The University of Texas at Arlington
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Dr. Vassilis Athitsos, Ph. D.
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Dr. William Beksi, Ph. D.
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