AN XUAN NGO

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RESEARCH INTERESTS

Human-Computer Interaction, AI for Healthcare, AI for Education.

EDUCATION

Texas A&M University, College Station, Texas, USA — Aug 2026 – Present
Ph.D. in Computer Science
Bucknell University, Lewisburg, Pennsylvania, USA — Aug 2022 – May 2026
B.A. in Computer Science and Mathematics

RESEARCH EXPERIENCE

Texas A&M University — College Station, Texas
Graduate Research Assistant. Advisor: Dr. Ricardo Gutierrez-Osuna — Aug 2026 – Present

- **Wearable Arterial Blood Flow Sensing**
  - Developing methods to measure arterial blood flow with a wrist-worn quad-sensor TAG system that captures arterial dilation as each pulse of blood passes through.

Bucknell University — Lewisburg, Pennsylvania
Research Assistant. Mentor: Dr. Rajesh Kumar — Sep 2022 – May 2026

- **Project 1: Robustness of Signature Verification Models against Deep Generative Attacks**
  - Engineered a deep generative attack framework using Conditional GANs and VAEs that exposed a critical vulnerability across two benchmark datasets (CEDAR, BHSig260), increasing false acceptance rates from 3% to 25%.
  - Designed a novel explanatory metric based on Structural Similarity Index (SSIM) to quantify correlations between generated forgeries and model susceptibility across 100+ signature samples.
  - Developed an SSIM-guided adversarial sampling strategy for systematic exploration of attack difficulty across the latent space.
  - Implemented an adversarial training pipeline incorporating synthetic examples, reducing attack success rates from 25% to under 3% and fully mitigating the identified vulnerability.
- **Project 2: LLM-assisted cheating detection in Korean language via keystrokes**
  - Architected an interpretable feature extraction pipeline capturing keystroke dynamics (pauses, bursts, timing irregularities) to detect LLM-assisted cheating from typing rhythm patterns across 69 Korean users (2 sessions, 18 questions each).
  - Introduced 10 novel keystroke features with superior robustness across varying cognitive load scenarios (Bloom's taxonomy: Remember through Create) compared to traditional KHT-KIT features, building on Crossley (2024).
  - Achieved 85%+ accuracy across all cognitive levels — within 3% of traditional keystroke-based methods (88%) — validating the approach as a trustworthy, explainable alternative for academic integrity monitoring.
  - Preparing extended manuscript for submission to IEEE Transactions on Biometrics, Behavior, and Identity Science (TBIOM).
- **Project 3: Vietnamese keystrokes-signature multimodal dataset**
  - Curated a multimodal keystroke and signature dataset from 45 Vietnamese participants across two educational levels, collecting up to 14,000 keystrokes per sample across 2 sessions of 18 questions.
  - Designed experimental protocols spanning three scenarios (question answering, paraphrasing, transcription) with Bloom's taxonomy-based task structuring to capture diverse cognitive load levels.
  - Built a preprocessing and quality assurance pipeline using the Gemini API to validate response relevance, depth, coherence, and grammatical correctness for downstream behavioral analysis.
  - Data served as the foundation for a paper on robust detection of AI-assisted Vietnamese writing via keystroke dynamics, accepted to ICTAI 2026.
  - Mentoring an undergraduate researcher on a follow-up project collecting coding keystroke data for plagiarism detection analysis.

University of California, Berkeley — Berkeley, California
Undergraduate Researcher — Feb 2023 – May 2023

- Collaborated in a cross-functional team of 5 to develop time series forecasting models (LSTM, RNN) for predicting nighttime ecosystem respiration using 7+ years of environmental data (70,000+ data points across 2 sites).

- Improved prediction accuracy by 5% RMSE over traditional ecological models by integrating Random Forest-derived environmental features with deep learning architectures in TensorFlow.
- Presented research findings as a student poster at the 2023 UCB Data Discovery Program.

Dominguez Center for Data Science Bucknell University, Pennsylvania
Student Fellow Jan 2026 – May 2026

- Engineered an end-to-end OCR pipeline processing 70+ years of historical newspaper archives (1920–1990), enabling full-text search across degraded document scans.
- Conducted comparative benchmarking of Vision-Language Model-based OCR against Tesseract, achieving a 12 percentage point improvement (80% → 92%) in dictionary match rate on degraded historical documents.
- Performed Named Entity Recognition (NER) and text analytics on a 1960s corpus using spaCy and NLTK, transforming unstructured archival text into structured, analyzable datasets.

Knovel Engineering Singapore
AI Research Intern (Part-time, Remote) Jan 2025 – Apr 2026

- Fine-tuned Google's MedGemma large language model for chain-of-thought (CoT) reasoning on a dementia VQA dataset of 10,000+ medical image–question pairs.
- Improved diagnostic accuracy by 14.5 percentage points over the non-chain-of-thought baseline (44.91% → 59.41%) through structured reasoning prompt engineering.
- Co-authored S-Chain: Structured Visual Chain-of-Thought for Medicine, a dataset and framework for interpretable medical VQA reasoning (arXiv:2510.22728).

PUBLICATIONS

** denotes equal contribution*

Conference Papers

- Dong, T.*, **Ngo, A.***, Dau, M., and Kumar, R. (2026). Detecting LLM-assisted Vietnamese writing via keystrokes under behavioral manipulation. *2026 IEEE International Conference on Tools with Artificial Intelligence (ICTAI).* [Link] [Code]
- Roh, D. H., Kumar, R., and **Ngo, A.** (2025). LLM-assisted cheating detection in Korean language via keystrokes. *2025 IEEE International Joint Conference on Biometrics (IJCB).* [Accept rate: 39.1%]. A top-tier conference in Biometrics. [Link]
- **Ngo, A.**, Kumar, R., and Cao, P. (2024, September). Deep generative attacks and countermeasures for data-driven offline signature verification. In *2024 IEEE International Joint Conference on Biometrics (IJCB)* (pp. 1–10). [Accept rate: 32.2%]. [Link] [Code]
- Hai, Y. T. T., **Ngo, A.**, Dat, N. Q., and Solanki, V. K. (2021). Multi-input LSTM for water level forecasting in Black River at the border of Vietnam–China. In *Proceedings of the 2021 IEEE International Conference on Machine Learning and Applied Network Technologies (ICMLANT)*, Soyapango, El Salvador.
- **Ngo, A.**, Minh, N. N., Dat, N. Q., and Solanki, V. K. (2022). Hybrid model Seasonal ARIMA-LSTM for prediction water level in Black River on the border Vietnam–China. In *Computational Intelligence in Machine Learning: Select Proceedings of ICCIML 2021.*

Preprints

- S-Chain: Structured Visual Chain-of-Thought for Medicine. arXiv preprint. [Link]
  (Work conducted during Knovel Engineering AI Research Internship.)

PRESENTATIONS

Deep Generative Attacks and Countermeasures for Data-Driven Offline Signature Verification Sep 2024
Poster presentation at IJCB 2024, Buffalo, USA

HONORS AND AWARDS

Honorable Mention, CRA Outstanding Undergraduate Researcher Award 2025
First Place, Vietnam Foreign Trade University's Student Scientific Research Contest 2025
Treasurer, Pi Mu Epsilon Pennsylvania Beta Chapter 2025
Dean's List, Bucknell University 2022–2026
Recipient, Program for Undergraduate Research Grant, Bucknell University 2024
Recipient, College of Engineering Summer Research Grant, Bucknell University 2023

INDUSTRY EXPERIENCE

Viettel Institute of Strategic Industrial Technology Vietnam
Robotics AI Engineer May 2026 – Aug 2026

- Architected an end-to-end Vietnamese ASR pipeline for a quadruped robot on the Qualcomm Dragonwing QI9075 edge AI platform using ROS 2.
- Optimized Whisper model inference through ONNX Runtime with systematic latency–accuracy benchmarking, achieving 4× speedup (3s CPU → 800ms on-device) at 90% command recognition accuracy.
- Designed a cosine similarity-based semantic matching module for robust mapping of diverse Vietnamese utterances to 18 predefined robot commands, handling spontaneous speech variability.
- Performed LiDAR–camera extrinsic calibration using a checkerboard-based approach with the Kalibr toolbox, enabling accurate multi-sensor alignment for robotic perception.
- Built a real-time ROS 2 sensor fusion pipeline synchronizing LiDAR point cloud projections with RGB camera frames at 15–20 FPS for downstream perception tasks.
- Integrated YOLO-based object detection with fused LiDAR–camera data to estimate 3D object locations and enable real-time tracking on the quadruped robot platform.

TEACHING EXPERIENCE

Bucknell University, Lewisburg, Pennsylvania, USA
Teaching Assistant, CSCI 379: Introduction to Biometrics Jan 2026 – May 2026

- Designed and delivered quizzes, programming assignments, and laboratory exercises for an undergraduate biometrics course covering fingerprint, face, and signature recognition technologies.

Teaching Assistant, Math 241: Discrete Structures Jan 2025 – Aug 2025

- Evaluated and provided detailed feedback on daily student submissions for a discrete mathematics course covering logic, set theory, and graph theory.

Teaching Assistant, CSCI 204: Data Structures and Algorithms Jan 2023 – Aug 2024

- Facilitated weekly lab sessions, guiding students through practical implementation of data structures and algorithmic problem-solving in Python and C++.
- Assessed and graded weekly programming assignments and lab exercises.

TECHNICAL SKILLS

Programming Languages: Python, C++, Java, SQL
Machine Learning: PyTorch, TensorFlow, ONNX Runtime, HuggingFace Transformers, scikit-learn
Robotics: ROS 2, Kalibr, Intel RealSense, LiDAR, Sensor Fusion, Robot Perception
Computer Vision: OpenCV, YOLO, Vision-Language Models (LLaVA, InternVL)
Systems: Linux, Docker, Git, FastAPI
Edge AI: Qualcomm Dragonwing QI9075, ONNX Runtime