

# Thomas Armstrong

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## RESEARCH INTERESTS

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Human-Computer Interaction, Natural Language Processing, Computer Vision, Cybersecurity

## EDUCATION

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### University of Maryland College Park

2020 - 2024

Bachelor's Degree in Computer Science | Computer Science Honors

Specialization: Machine Learning | Minor: Statistics

Honors College | Advanced Cybersecurity Experience for Students Living-Learning Program

Cumulative GPA: 3.84 / 4.00

## RESEARCH

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### University of Maryland College Park

January 2023 - Present

- Created a shift equivariant vision transformer for image classification.
- Trained several different vision transformers and tested them with multiple types of adversarial attacks.
- Currently developing a neural network for object detection using UMD's EVIMO dataset using only spiking neurons for applications under low power constraints.

## EXPERIENCE

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### Johns Hopkins Applied Physics Laboratory

*College Intern - Asymmetric Operations*

May 2021 - Present

- Developed a communication script between GPT 3.5 Turbo and Dolly 12B or Stable Vicuna 13B allowing them to engage in a directed dialog designed to eliminate manual testing of large language models by 15 staff.
  - Employed prompt engineering to ensure each model performed as intended.
- Built a standardized machine learning environment including PyTorch and TensorFlow using Docker for use by all APL employees.
  - Established a thorough dynamic Gitlab CI/CD pipeline to ensure stability of the environment across a variety of GPUs.
- Created Longformer machine learning model to detect anomalous network traffic in near-real time.
  - Longformer model maintains comparable speed to the previous LSTM model but greatly improved accuracy to more than 99%.
- Developed a Siamese BERT model with PyTorch to extrapolate moral foundations from text.

*High School Intern - Asymmetric Operations*

May 2018 - August 2019

- Created LSTM machine learning model for detecting malicious network traffic in near-real time.
  - Constructed standardized methods for testing the model.
  - Tuned hyperparameters to optimize the models.
- Built a TensorFlow LSTM model to extract relationships between entities in a given labeled text.
- Established automated annotations of network traffic to train a supervised machine learning model in a classification task.
- Supported development in VMware vCenter of a cyber experiment center used to reconstruct networks and create ground truth network data to train machine learning models to detect anomalous network behavior.
- Presented research and findings at the end of each summer to senior leadership.

## SKILLS

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- **Programming Languages:** Python, Java, Ruby, C#, JavaScript
- **Software/Packages:** Git, PyTorch, Pandas, NumPy, LangChain, TensorFlow