Chanel F. Cheng

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B.Sc. student at Rochester Institute of Technology. I am broadly interested in research that connects artificial intelligence and the biological brain and am working towards the ultimate goal of reconstructing brain functionality and human behavior.

EDUCATION:

Rochester Institute of Technology, Rochester, NY
Bachelor of Science in Computer Science; 3.99 GPA; Expected May 2024

Relevant Coursework:
Machine Learning, Biorobotics/Cybernetics, Introduction to Biological Physics, Project-Based Calculus I & II, Multivariable & Vector Calculus, Differential Equations, Probability and Statistics, Linear Algebra

RESEARCH EXPERIENCE:

MIT Summer Research Program Scholar, Jun 2023 – Present
MIT McGovern Institute, Cambridge, MA

- Employed convolutional neural network (CNN) modeling to explore whether divisive normalization (DN), found in biological hearing systems, may have evolved to improve performance in auditory tasks. Advised by Dr. Josh McDermott.
- Preliminary results reveal that following optimization of CNNs for speech recognition, nonlinear phenomena akin to those found in hearing systems emerge within networks equipped with DN.

Cybersecurity Visiting Student Research Program Scholar, May 2022 – Jun 2023
RIT ESL Global Cybersecurity Institute, Rochester, NY

- Studied continual learning techniques for network intrusion detection. Advised by Dr. Jay Yang.
- Designed a network intrusion detection system that continually learns to recognize new attack patterns across networks without forgetting, using an experience replay technique.

Air Force Research Lab Phillips Scholar, May 2021 – Dec 2021
Air Force Research Laboratory, Albuquerque, NM

- Investigated the use of Bayesian modeling approaches for high power microwave (HPM) device optimization. Advised by Dr. Ashar Ali.
- Developed Gaussian process surrogate models that located the optimal set of HPM device parameters using active querying of labels.

PRESENTATIONS:

Modeling Divisive Normalization in the Central Auditory Pathway With Convolutional Neural Networks presented at MIT Summer Research Program Symposium, Cambridge, MA, August 2023 (poster)

Cross-Organizational Continual Learning of Cyber Threat Models presented at Columbia University, Northeast Big Data Innovation Hub, New York, NY, January 2023 (poster)

Cross-Organizational Continual Learning of Cyber Threat Models presented at Annual Computer Security Applications Conference, Austin, TX, December 2022 (poster)

Cross-Organizational Continual Learning of Cyber Threat Models presented at Rochester Institute of Technology, Cyber Visiting Student Research Program Symposium, Rochester, NY, August 2022 (oral)

ORGANIZATIONS AND MEMBERSHIPS:

RIT Neurotechnology Exploration Team, Aug 2022 - Present

- Designed meta learning neural networks to predict emotional thought across multiple subjects in real-time using electroencephalogram (EEG) devices.

Air Force Reserve Officers' Training Corps, Detachment 538, Aug 2019 - Apr 2022

- Engaged in leadership activities and trained alongside fellow cadets in group leadership projects, field training exercises, and drill practice.

Arnold Air Society, Colonel Andrew J. Dougherty Squadron, Sep 2019 - Apr 2022

- Joined initiatives to foster partnerships with local organizations and enhance community education about the Air Force within the Rochester area

CERTIFICATES AND AWARDS:

RIT's Dean's List, Aug 2019 – Present
MIT Summer Research Program in Neuroscience Certificate, Aug 2023
Northeast Big Data Innovation Hub: Cybersecurity Student Research Award, Jan 2023
Biomedical Responsible Conduct of Research Certificate, Oct 2022
Cybersecurity Visiting Student Research Program Certificate, Jul 2022
The American Legion Scholastic Excellence Award, Aug 2020
RIT Presidential Scholarship, Aug 2019

TECHNICAL SKILLS:

- ***Computational***: Python, C++, C, MATLAB, Jupyter Notebook, Java, SciPy, Sklearn, PyTorch, Tensorflow, Brian/Brian2, SQL
- ***Hardware:*** Arduino, Raspberry Pi, OpenBCI EEG, BioRadio EMG/EOG/ECG
- ***Software***: Git, Vim, VS Code, IntelliJ, PyCharm, LaTeX, Microsoft Office, Google Drive