Hua Cailong

📞 651 6756613   @ hua00023@umn.edu

Education

UNIVERSITY OF MINNESOTA - TWIN CITIES

PhD Student in Electrical and Computer Engineering

📅 2019 - Present   📍 Minnesota, US

GPA 3.947/4.0

IMPERIAL COLLEGE LONDON

MSc. in Control Systems

📅 2016-2017   📍 London, UK

Graduated with Distinction

GPA: 75.4/100

POLITECNICO DI MILANO

BSc. in Automation Engineering

📅 2015-2016   📍 Milano, Italy

GPA: 110/110

TONGJI UNIVERSITY

BSc. in Electronic Information and Engineering

📅 2012-2016   📍 Shanghai, China

GPA: 89.52/100 (4.45/5.0)

Links

🔗 huacailong.github.io

🐙 github.com/huacailong

in www.linkedin.com/in/cailong-hua-a9aa5719a

Main Courses

Machine Learning • Artificial Intelligence • Optimal Control and Reinforcement Learning • Intelligent Agents • Deep Learning

Skills

Python • Matlab • Simulink • C++ • LaTeX • AFM • Optical Tweezer

Languages

English • Chinese • Italian

Honors

2019 ECE Fellowship

2016 Outstanding Graduate

2014 & 2015 & 2016 Third-Class Scholarship

2015 China Scholarship Council Scholarship

2013 China National Scholarship

2013 First-Class Scholarship

Research Experience

NON-EQUILIBRIUM EXPERIMENTS STUDY

Universoty of Minnesota

📅 2020 – Present   📍 Minnesota, US

- Developed algorithm for quantifying errors in non-equilibrium experiments
- Implemented the algorithm with a Python-based toolbox
- Validated the algorithm through a simulated spring-mass system under non-equilibrium conditions
- Established a proof by conducting experiments with Optical Tweezers and aligning the outcomes with a corresponding simulation

MODELING OF MUSCLE PROTEINS

Universoty of Minnesota

📅 2021 – Present   📍 Minnesota, US

- Carried out cell transfection, protein purification, and gel assays for muscle proteins utrophin and dystrophin
- Designed force spectroscopy experiments characterizing muscle proteins using Atomic Force Microscopy
- Investigated the impact of different expression systems on protein behavior through experiments
- Automated analysis of experimental data with Matlab
- Developed Monte Carlo simulation to replicate experimental processes
- Developed muscle protein modeling by conducting a statistical analysis of experimental data.

Projects

RECENT PROJECTS

📅 2021 – Present   📍 Minnesota, US

- Uncovered causal relations from protein pulling data and quantified the change of effects among protein properties
- Employed Langevin-based sampling techniques in conjunction with energy-based models to address the challenging partition function issue
- Employed a model based on Generative Adversarial Networks (GANs) to synthesize a realistic image of the person with the target pose based on a source image showing the person with a given pose
- Explored the effect of different fine-tuning layers and pooling strategies on the performance of the BERT model, a transformer based machine learning technique for NLP
- Designed an unsupervised agent to play the Flappy Bird game based on vector data instead of images with Reinforcement Learning technique

Publications

Ramirez, M. P., Rajaganapathy, S., Hagerty, A. R., **Hua, C.**, Baxter, G. C., Vavra, J., ... & Ervasti, J. M. (2023). "Phosphorylation alters the mechanical stiffness of a model fragment of the dystrophin homologue utrophin." Journal of Biological Chemistry, 299(2).

Rajaganapathy, S., **Hua, C.** and Salapaka, M., "Confidence bounds for the Jarzynski estimator." In APS March Meeting Abstracts (Vol. 2022, pp. S09-007), 2022.