MATTHEW HO

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EDUCATION

Carnegie Mellon University   May 2022
Ph.D in Physics   *Pittsburgh, PA*
    Focus: Machine Learning Applications in Observational Cosmology
    Advisor: Hy Trac
    GPA: 3.88/4.0

University of Illinois at Urbana-Champaign   May 2017
B.S. in Engineering Physics; Minor in Mathematics   *Urbana, IL*
    GPA: 3.54/4.0

RESEARCH EXPERIENCE

Research Assistant, Cosmology   September 2017 - Present
McWilliams Center for Cosmology; Hy Trac Group   *Pittsburgh, Pa*

· Investigating uses of machine learning to improve measurements in observational cosmology.

Undergraduate Researcher, Condensed Matter Theory   May 2015 - May 2017
University of Illinois at Urbana Champaign; Lucas Wagner Group   *Urbana, IL*

· Developed Materials Search, a full-stack data mining software designed to gather, parse, and analyze published results regarding magnetic and electronic properties of known superconductors.
· Identified new potential superconductors based on structural patterns of known materials.

Undergraduate Researcher, Informatics   September 2014 - May 2015
National Center for Supercomputing Applications; Guy Garnett Group   *Urbana, IL*

· Designed a set of motion classifiers based on Laban Movement Analysis to aid computer detection of human movements.
· Implemented a simulation control system to visualize artistic expression in live performance.

WORK EXPERIENCE

Quantitative Trading Intern   May - August 2016, 2017
Virtu Financial (formerly KCG Holdings LLC)   *New York City, NY; Chicago, IL*

· Applied machine learning and data mining techniques to signal research in ETF, Eurodollar future, and commodity future markets.

SELECTED PUBLICATIONS

"Aging Halos: Implications of the Magnitude Gap on Conditional Statistics of Stellar and Gas Properties of Massive Halos" Farahi, A., Ho, M., & Trac, H. 2020 MNRAS, 255

"A Robust and Efficient Deep Learning Method for Dynamical Mass Measurements of Galaxy Clusters" Ho, M., Rau, M. M., Ntampaka, M., et al. 2019, ApJ, 887, 1

SELECTED TALKS

"Galaxy Cluster Mass Estimation Using Deep Learning" Weak Lensing Seminar, Universitaets-Sternwarte der Ludwig-Maximilians-Universitaet, June 2019

"A Robust and Efficient Deep Learning Method for Dynamical Mass Measurements of Galaxy Clusters" Artificial Intelligence Methods in Cosmology Workshop, Ascona, Switzerland, June 2019

"Improving Mass Measurements of Galaxy Clusters through Applications of Machine Learning" Machine Learning in Science and Engineering Conference, Carnegie Mellon University, May 2018

"Dynamic Particle Control and Simulation" NCSA Students Pushing Innovation Seminar, National Center for Supercomputing Applications, April 2015

"Gestural Recognition of Human Expression" NCSA Students Pushing Innovation Seminar, National Center for Supercomputing Applications, December 2014, *Awarded Top 3 Presenter*

ACTIVITES & LEADERSHIP

Project Lead September 2019 - Present
CMU Data Science Club

Led a diverse team of undergraduate and graduate students in creating artistic visualizations of astrophysical simulations using generative adversarial neural networks.

Industry Speaker Series Organizer December 2017 - Present
CMU Department of Physics

Established a semesterly seminar series to bring in CMU alumni and industry professionals to discuss careers outside of academia for science PhDs. Worked closely with the physics department head and representatives from the Mellon College of Science Corporate Relations Office to construct a seminar program that sufficiently addressed the professional interests of CMU's graduate students.

President December 2015 - December 2016
Triangle Fraternity - Illinois

Led and organized an engineering fraternity of over 80 members. Fostered the establishment of two independent member-run technology startups, a green energy microgrid project, and a 10% increase in overall house GPA.

Design Lead September 2014 - May 2016
UIUC iRobotics

Led design and construction of motorized robotic systems to place in the Top 5 teams at the Midwestern Robotics Design Competition for two subsequent years.

Chemical Lead September 2014 - May 2016
Student Space Systems, Propulsion

Led theoretical analysis and performance prediction of a Class N hybrid rocket engine design.

MEDIA

Murray, Elizabeth. "3 NCSA Interns Honored for Progress on Projects." NCSA Press Room *12 March 2015*: n. pag. National Center for Supercomputing Applications. University of Illinois. Web. Link.

Rivenberg, Paul. "Fusor Team Wins CPS Plasma Excellence Award at Intel ISEF." Plasma Page 16 *July 2013*: 1. Coalition for Plasma Science. Web. Link

TECHNICAL STRENGTHS

Physics	Cluster Cosmology, Cosmological Simulation, Weak Lensing
Data Science	Deep Learning, Unsupervised Learning, Bayesian Modeling, Genetic Algorithms
Computer Languages	Python, C++, Java, MATLAB, SQL, HTML/CSS, Javascript
Tools	Git, Vim, LaTeX

LinkedIn: /matthewho3   **Github**: /maho3