

MATTHEW HO

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EDUCATION

Carnegie Mellon University

Ph.D in Physics

Focus: Machine Learning Applications in Observational Cosmology

Advisor: Hy Trac

GPA: 3.85/4.0

May 2022

Pittsburgh, PA

University of Illinois at Urbana-Champaign

B.S. in Engineering Physics; Minor in Mathematics

GPA: 3.54/4.0

May 2017

Urbana, IL

RESEARCH EXPERIENCE

Research Assistant, Cosmology

McWilliams Center for Cosmology; Hy Trac Group

September 2017 - Present

Pittsburgh, Pa

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

Undergraduate Researcher, Condensed Matter Theory

University of Illinois at Urbana Champaign; Lucas Wagner Group

May 2015 - May 2017

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

National Center for Supercomputing Applications; Guy Garnett Group

September 2014 - May 2015

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

Virtu Financial (formerly KCG Holdings LLC)

May - August 2016, 2017

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

“A Robust and Efficient Deep Learning Method for Dynamical Mass Measurements of Galaxy Clusters”

Ho, M., Rau, M. M., Ntampaka, M., et al. 2019, arXiv e-prints, arXiv:1902.05950 (*Submitted to ApJ*)

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*

ACTIVITIES & LEADERSHIP

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 addresses the professional interests of our 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 brother-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

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

LinkedIn: [/matthewho3](#)

Github: [/maho3](#)