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Allison Liu

Applied Math Masters student excited about using programming and mathematical analysis to solve difficult scientific problems

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WORK EXPERIENCE

Laboratory for Atmospheric and Space Physics (LASP) - University of Colorado Boulder
Student Research Assistant, February 2021 – Present

- Building, training, and optimizing a generative adversarial network to create a machine-learning ready dataset for solar flare prediction. Using historic and current magnetogram data—Data pre-processing and exploration, feature engineering, and statistical analysis of results.

Kapteyn-Murnane Group, JILA - University of Colorado Boulder
Student Research Assistant, June 2017 – August 2020

- Designed and built a commercial-quality M^2 laser diagnostic device in MATLAB. I interfaced multiple pieces of scientific equipment and created a graphical user interface to collect and analyze data. Later implemented a modified phase-retrieval algorithm to fully characterize a laser beam.
- Interfaced a novel laser system with an existing chemical engineering experiment.

EDUCATION

B.S. Applied Math, Computer Science Minor
University of Colorado Boulder, August 2018 – May 2022

- **GPA: 3.71/4.000**
- Relevant Coursework: Computer Science- Data Structures, **Algorithms**, **Artificial Intelligence, Machine Learning**, **Software Development, Database Systems,** Dynamic Models in Biology
  Math- Calculus, Probability, **Linear Algebra, Numerical Analysis, Statistics,** Chaos/Dynamical Systems, **Complex Analysis, Applied Deep Learning**
- Awards and Honors: Engineering Honors Program, BOLD Scholar, Esteemed Scholar, Dean's List
- Clubs and Organizations: Society of Women Engineers (SWE), CU Women's Ultimate Frisbee

PUBLICATIONS/PRESENTATIONS

- Data Augmentation of Magnetograms for Solar Flare Prediction using Generative Adversarial Networks. A. Liu, W. Carande. *Poster Presented at the American Geophysical Union Conference: New Orleans, LA (2021)*. DOI: 10.1002/essoar.10510080.1.
- Generation of extreme-ultraviolet beams with time-varying orbital angular momentum. L. Rego, K. Dorney, N. Brooks, Q. Nguyen, C. T. Liao, J. San Román, D. Couch, **A. Liu**, E. Pisanty, M. Lewenstein, L. Plaja, H. C. Kapteyn, M. M. Murnane, & C. Hernández-García. *Science 364*, 6447 (2019). DOI: 10.1126/science.aaw9486
- Detection of the Keto-Enol Tautomerization in Acetaldehyde, Acetone, Cyclohexanone, and Methyl Vinyl Ketone with a Novel VUV Light Source. D. Couch, Q. Nguyen, **A. Liu**, D. Hickstein, H. Kapteyn, M. Murnane, & N. Labbe. *Proc. Combust. Inst. 38* (2021). DOI: 10.1010/j.proci.2020.06.139

VOLUNTEERING

Machine Learning STEM Camp, May 2021 – July 2021

- Developed and taught machine learning curriculum to high school students for a STEM summer camp

Partnerships for Informal Education in the Community (PISEC), February 2020 – May 2020

- Volunteered weekly as a mentor for STEM students of underrepresented minorities outside of Boulder

ADDITIONAL SKILLS AND INTERESTS

- Technical Languages: Python, MATLAB, C++, SQL, HTML, CSS
- Tools and Technologies: Mathematica, Unix/Linux, Git, Latex, Bash Shell
- CPR and First-Aid Certification
- Climbing gym routesetter at University of Colorado Boulder (September 2020-Present)