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Professional Summary

Particle astrophysicist with ve years of experience performing data-driven research and analysis in Python, building statistical models, and communicating complex, technical results to diverse audiences. Analytical problem solver looking forward to collaborating across disciplines to tackle novel, human-oriented problems.

Skills

General: Data science, statistics, data visualization, machine learning, deep learning, computer vision

Technical: Python, NumPy, SciPy, scikit-learn, Tensor ow, matplotlib, scikit-image, HTCondor, linux, Git

Mathematics: Monte Carlo simulation, hypothesis testing, con dence interval estimation, linear algebra

Other: Scienti c communication, technical problem solving, teaching, mentoring, outreach

Work Experience

Wisconsin IceCube Particle Astrophysics Center Madison, WI

Research Assistant May 2014 { Present

Performed big data analysis of astrophysical data from NASA’s telescope on a distributed, high-throughput computing cluster (100 GB - 100 TB scale pipelines)

Developed, validated, and deployed a convolutional neural network to identify images of particles detected by a network of smartphones with 95% accuracy

Rapidly prototyped data pipelines and performed exploratory data analysis and visualization when presented with new problems

Collaborated with a team of international scientists to identify research problems and formulate analysis plans Utilized Monte-Carlo simulations to model systems, quantify algorithmic biases, and understand systematic

uncertainties in data sets

Performed statistical hypothesis tests to compare scenarios of interest to alternative hypotheses

Developed machine learning models to solve classi cation and regression problems, e.g., convolutional neural networks, decision trees

Worked in an international collaboration of 400+ scientists, coordinated working group, co-chaired weekly international conference calls

Mentored undergraduate researchers and high school students on data analysis projects

Regularly presented work to scientists at national and international conferences and lay audiences in outreach settings

Department of Physics, University of Wisconsin-Madison Madison, WI

Teaching Assistant August 2013 { May 2014

Taught calculus-based electricity and magnetism course to 50 engineering students each semester and received Honored Instructor award for teaching excellence (nominated by students)

Education

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| University of Wisconsin-Madison | Madison, WI |
| Ph.D., Physics (graduating Dec 2018) | 2013 { 2018 |
| M.S., Physics | 2013 { 2016 |
| Kutztown University of Pennsylvania | Kutztown, PA |
| B.S., Physics, Minor, Mathematics | 2010 { 2013 |

Selected Publications

M. Winter, J. Bourbeau, M. Meehan, J. Vandenbroucke, et al., Particle Identi cation In Camera Image Sensors Using Computer Vision. Astroparticle Physics, 104 (2018), 42-53. https://doi.org/10.1016/j.astropartphys.2018.08.009.