ZACHARIAH MILLER PHD

SENIOR DATA SCIENTIST

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SUMMARY

Senior data scientist focused on data-driven research and solutions. I solve interesting problems with data analysis, model building, machine learning, and software design. Passionate about using scientific techniques on "non-science" puzzles to extract answers for the real-world, understanding the world via data, and making models to improve decision making.

SKILLS

PROGRAMMING: C++, Python, R, BASH, UNIX, LaTeX, Java, JavaScript, HTML, CSS, Pandas, SciKit Learn, TensorFlow
COMPUTING AND MODEL BUILDING: Machine Learning, Deep Learning, Numerical Methods, Statistics, AWS, Monte Carlo Methods, SQL, Distributed Computing, Hadoop, Spark, Big Data Architecture, Calculus, Linear Algebra
EDUCATION: Curriculum Development, Hand-on teaching, Translation of complex topics into common English, Laboratory development and administration
PHYSICS: Particle Physics, Nuclear Physics, Monte Carlo Simulations, ROOT, Computational Physics

EMPLOYMENT

Metis, *Senior Data Scientist*, Chicago, IL — Mar 2017 - Current

- Instruction/Curriculum Design for 12-week, immersive data science/machine learning bootcamps.
- Designed and delivered machine learning/data analytics corporate trainings for multiple Fortune 500 companies.
- Business model optimization initiatives, focusing on data-driven insights, with Metis' in-house data.

University of Illinois at Chicago, *Postdoctoral Researcher*, Chicago, IL — Jun 2015 - Feb 2017

- Large scale data analysis to extract physics results from petabytes of data, with C++ and Python. Big data techniques.
- Member of embedding team that produces simulations for the entire collaboration. Responsible for simulation production and quality assurance. Co-supervisor of undergraduate research students (2016).
- Member of maintenance team for Intermediate Silicon Tracker detector (decommissioned 2016)

University of Kentucky, *Research Assistant*, University of Kentucky — May 2010 - May 2015

- Research, design, and development for a prototype neutron detector for measuring neutrons produced by Uranium fission.
- Designed and built front-end GUI and back-end analyzer for a data acquisition system to interface with and record data from detectors using Java and C++. Implemented the database that stores the data.
- Measurements of neutron-induced fission cross-sections, filling in gaps in the world's knowledge about the process.

Eastern Kentucky University, *Adjunct Professor*, Richmond, KY — Aug 2011 - Dec 2011

Designed and taught Introductory Astronomy course for non-Physics Majors.

University of Kentucky/Eastern Kentucky University, *Teaching Assistant*, Lexington, KY — Aug 2007 - May 2011

Taught recitation and laboratory portions of introductory physics courses for both physics majors and non-majors.

EDUCATION

University of Kentucky
PhD Nuclear Physics 2015

University of Kentucky
MS Nuclear Physics 2012

Eastern Kentucky University
BS Physics 2009
Cum Laude

PROJECTS

Machine Learning from Scratch with Python — Sep 2017 - Current
Programming many machine learning algorithms in a pedagogically useful interesting way. Many libraries exist to use at a production level, but many of them are necessarily opaque about how the models are built. In this library, I'm making all steps easily readable, but making sure that the algorithms still converge to correct and useful models. https://github.com/ZWMiller/machine_learning_from_scratch

Particle Simulation Production and Quality Control at STAR — Jun 2016 - Feb 2017
Maintained and quality checked STAR's complex simulation framework. Produced simulations for the collaboration at-large and tested subsets of the simulated data.

Analysis Tree Production & Measurement of Bottom Quarks at STAR — Feb 2016 - Feb 2017
Software project to read, analyze, and compress terabytes of data into a smaller, more user-friendly format without losing useful information. Developed for use across entire analysis team. Analyzing multiple terabytes of physics data to extract information about the formation of the early universe with C++ and ROOT. Visualization of results, multiple speaking engagements on the topic, and detector maintenance and development with both software and hardware.

Neutron Induced Fission in Uranium Isotopes — May 2012 - Apr 2015
Developed detectors via blueprinting, machining, and assembly. Wrote analysis software and data acquisition systems to measure the fission process in uranium isotopes. Talks on this topic given at multiple conferences and national laboratories.

AWARDS

YOUNG RESEARCHER FELLOWSHIP — Jan 2017
Quark Matter 2017 Conference
A monetary award to attend the largest high energy nuclear physics conference in the world.

OUTSTANDING TEACHING ASSISTANT AWARD — May 2011
University of Kentucky Arts and Sciences
Recognizes the best teaching assistant in the physics department.

GRADUATE FELLOWSHIP — Aug 2009
University of Kentucky
A monetary award for outstanding incoming students.

VOLUNTEERING

Northwest Territory Alliance — Apr 2015 - Current
Officer/Board Member
Chicago, IL
The NWTA is a non-profit specializing in education about the American Revolutionary War and the associated era.

Adopt-a-Physicist — Sep 2016 - Oct 2016
Physicist
Chicago, IL
Pairs physicists with high schools throughout the country so that students can interact with a professional in STEM.