Richard Knoche

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EXPERIENCE

University of Maryland, Physics Department

- Graduate Research Assistant — 2011 – Present
  - Worked with an international collaboration to produce the world's most sensitive limits on dark matter interaction.
  - Developed analysis techniques that produced the world's most accurate and most precise calibrations of a dark matter detector. These were used to remove over 99.9% of backgrounds from our data, and have been adopted by experiments in Asia and Europe.
  - Used regression algorithms to model the position and temporal dependence of 650 TB of data, and produced corrections for these effects that improved our detector's sensitivity by an order of magnitude.
  - Automated the extraction of hundreds of data features from calibration data. Results were maintained in a MySQL database and used in a profile likelihood analysis to extract world leading physics measurements.

National Aeronautics and Space Administration, Goddard Space Flight Center

- Research Assistant — 2010
  - Analyzed data from the Swift Burst Alert Telescope (BAT) to search for hard X-ray emissions around the on-set time of supernovae.
  - Quantified the X-ray counterpart to Fermi-LAT pulsar observations using X-ray emission data from the Chandra and BeppoSax missions.

James Madison University, Physics Department

- Undergraduate Research Assistant — 2008 – 2011
  - Designed and maintained table-top experiments to characterize the complex, non-linear behavior of granular systems.
  - Implemented optical polarization and computer vision techniques to quantitatively characterize particle movement in a two dimensional shear flow.

EDUCATION

University of Maryland, College Park, Maryland, USA

- Doctor of Philosophy (Ph.D.) in Physics — Aug 2011– Dec 2016 (Expected)
  - Thesis: Signal Corrections and Calibrations in the LUX Dark Matter Detector

James Madison University, Harrisonburg, Virginia, USA

- Bachelor of Science (B.S.) in Physics, magna cum laude — Aug 2007 – May 2011

SKILLS

Physics	Mathematics	Data Analysis	Statistics
Matlab	Python	C++	MySQL
HTML	CSS	Bash	Git
Machine Learning	Machining		

HONORS

John Mather Nobel Scholar Award — Aug 2010
- Awarded for high academic achievement, and contributions to research at NASA's Goddard Space Flight Center. Funded by money from John Mather's Nobel Prize in physics.

Henry W. Leap Scholarship — Mar 2010
- Awarded to one student each year for academic excellence and significant research contributions.

Sigma Pi Sigma Inductance — Mar 2010
- Accepted into the national physics honors society.

President's List, James Madison Univesity — 2009 – 2011
- Awarded for academic excellence (3.9 GPA or higher). Received this honor every semester from Fall 2009 until graduation in Spring 2011.

Dean's List, James Madison Univesity — 2008 – 2011
- Awarded for academic excellence (3.5 GPA or higher). Received this honor every semester from Fall 2008 until graduation in Spring 2011.

References and publications available upon request