Jacob Stinnett

PhD Candidate, NRC Research Fellow

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EDUCATION

University of Illinois at Urbana-Champaign Urbana, IL
PhD in Nuclear, Plasma, and Radiological Engineering *Fall 2016*

University of Illinois at Urbana-Champaign Urbana, IL
MS in Nuclear, Plasma, and Radiological Engineering *May 2014*

University of Oklahoma Norman, OK
BS in Physics and BA in Mathematics *May 2012*

EXPERIENCE

University of Illinois at Urbana-Champaign Urbana, IL
NRC Research Fellow *May 2013- Present*

- **Isotope Identification**: Developed various Bayesian classifiers for automated isotope identification on low-resolution gamma-ray detectors.
- **Library Generation**: Created method to generate tailored isotope libraries for different detectors that is coupled to the feature extraction method.
- **Spectra Simulations**: Simulated detector response functions for arbitrary radiation energy. Built Python code to generate pseudospectra for arbitrary gamma-ray sources.
- **Feature Extraction**: Various contributions to a wavelet/NNLS feature extraction code, including line-detection routines and porting the code to Python.
- **Neural Networks**: Wrote a simulated annealing training method in MATLAB and showed proof of concept for using NNs for spectra classification.

Los Alamos National Laboratory Los Alamos, NM
Guest Scientist *Summer 2015*

- **Neutron simulations**: Built simulations in MCNP for neutron flux calculations for nuclear threat detection scenarios.
- **Gamma spectroscopy**: Measured spectra of Category I quantities of special nuclear materials at the Nevada National Security Site.

University of Illinois at Urbana-Champaign Urbana, IL
Teaching Assistant *August 2012- May 2013*

- **NPRE451 Nuclear Radiations Lab**: Led a lab section covering nuclear instrumentation, radiation data analysis, and nuclear safety.
- **NPRE446 Interactions of Radiation with Matter**: Head TA for course on classical and quantum mechanics for engineers, with emphasis on neutron and electron interactions.

University of Oklahoma Norman, OK
Undegraduate Research Assistant *Jan 2009 - May 2012*

- **Diatomic Spectroscopy**: Performed calculations and simulations of a NO-He van der Waals complex to explain experimental observation of a linear Stark effect in NO. Built laboratory hardware and operated laser optics.

SELECTED PAPERS AND PRESENTATIONS

- **Performance of an Automated Isotope Identification Algorithm for Handheld NaI Detectors**: J. Stinnett and C.J. Sullivan. *IEEE Nuclear Science Symposium Conference Record.* 2015
- **Validation of a Bayesian-Based Isotope Identification Algorithm**: C.J. Sullivan and J. Stinnett. *Nuclear Instruments and Methods in Physics Research A.* 2014
- **Investigation of the Use of He-Diatomic Van Der Waals Complexes as as Probe of Time-Reversal Violation**: J. Stinnett, E. Abraham, N. Shafer-Ray. *66th Symposium on Molecular Spectroscopy.* 2011

PROGRAMMING SKILLS

- **Languages**: Python, MATLAB, Wolfram Language **Technologies**: MCNP