

# ANDREW CONANT

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## EDUCATION

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### Georgia Institute of Technology

*Candidate for Ph.D. in Nuclear Engineering*

*Jan 2016 - Aug 2019*

GPA: 4.00/4.00

Minor in Nuclear Security & Nonproliferation

Dissertation: “Antineutrino Spectrum Characterization and Sensitivity Using Neutronic Simulations of the High Flux Isotope Reactor”

*M.S. in Nuclear Engineering*

*Aug 2014 - Dec 2015*

GPA: 4.00/4.00

Thesis: “Sensitivity and Uncertainty Analysis of Pu and Cs Isotope Ratios in BR3 Core 4A/B Fuel Rod”

*B.S. in Nuclear & Radiological Engineering*

*Aug 2010 - May 2014*

Minor in French

Overall GPA: 3.85/4.00

## RESEARCH AREAS

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Reactor physics  
Safety analysis  
Sensitivity & uncertainty analysis  
Nonproliferation & safeguards policy  
Antineutrino detection  
Nuclear forensics

## EXPERIENCE

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### Oak Ridge National Laboratory

Oak Ridge, TN

*Postdoctoral Research Associate in Nuclear Engineering M&S*

*August 2019 - Present*

- Performed simulations of graphite Magnox reactors using a suit of deterministic and Monte Carlo codes
- Panel Chair for Antineutrino Reactor Monitoring Scoping Study

*HFIR Nuclear Safety Intern*

*May 2016 - Aug 2016, June 2018 - July 2019*

- Simulated reactor models to generate reaction rates for antineutrino production
- Contributed to neutronic analysis for the November 2018 HFIR event
- Aided with calibration of PROSPECT antineutrino detector
- Analyzed reactivity changes for changes in flux trap target irradiation materials
- Modeled gamma decay heating of HFIR spent fuel assemblies
- Calculated poison concentrations in beryllium reflector for safety calculations
- Analyzed fuel plate homogeneity data and methodology for overloaded regions

### Lawrence Livermore National Laboratory

Livermore, CA

*Nuclear Forensics Intern*

*May 2014 - Aug 2014*

- Modeled a PWR fuel assembly in MCNP to examine axial distributions of plutonium isotopes

- Performed parametric studies of reactor conditions on isotope concentrations
- Learned optimization strategies for simulating reactor models in MCNP
- Prepared and presented results to laboratory scientists in poster and presentation format

**Areva, Inc.**

*Engineering Intern, Core Design & Analysis*

Lynchburg, VA

*May 2013 - July 2013*

- Compared automated statistical processes to current reactivity bias calculations for reload licensing
- Calculated nuclear analysis parameters using diffusion codes
- Learned nuclear industry operations, reload licensing processes, and regulatory safety policies

**University of Nevada, Las Vegas**

*Radiochemistry Summer Researcher*

Las Vegas, NV

*June 2012 - July 2012*

- Participated in a summer school at UNLV focused on radiochemistry and the nuclear fuel cycle
- Grinded and polished metals using radiation safety and detection techniques
- Studied the interaction of simulated uranium-zircaloy fuel with iron cladding for a fast reactor

**SKILLS**

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<b>Computer Languages</b>	Python, MATLAB, Perl, R, C++ (basic)
<b>Simulation Codes</b>	MCNP, SCALE, SERPENT, HFIRCON, ADVANTG, NJOY
<b>Software</b>	Linux OS, MPI, LaTeX
<b>Languages</b>	French - reading, writing, speaking
<b>Teaching</b>	Lecturer: Reactor Physics, Problems in Proliferation
<b>Certifications</b>	Engineer in Training (EIT)

**AWARDS**

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Nuclear Nonproliferation International Safeguards Fellowship	<i>2017-Present</i>
Nuclear Engineering Student Delegation 2018 Member	<i>2018</i>
American Nuclear Society Graduate Scholarship	<i>2017, 2018</i>
Roy G. Post Foundation Graduate Student Scholarship	<i>2018</i>
Department of Energy Nuclear Energy IUP Graduate Fellowship	<i>2014-2017</i>
Georgia Tech Sam Nunn Security Program Fellowship	<i>2016-2017</i>
American Nuclear Society SSC Commendation for Leadership	<i>2015</i>
Nuclear Regulatory Commission Nuclear Engineering Scholarship	<i>2013-2014</i>
Nuclear Energy University Programs (NEUP) Scholarship	<i>2012-2014</i>

**JOURNAL PUBLICATIONS**

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J. Ashenfelter et al (PROSPECT Collaboration). "Measurement of the Antineutrino Spectrum from 235U Fission at HFIR with PROSPECT." *Phys. Rev. Lett.* 122. (June 2019).

J. Ashenfelter et al (PROSPECT Collaboration). "The PROSPECT Reactor Antineutrino Experiment." *Nuclear Instruments and Methods in Physics Research Section A.* 922, 1. (April 2019).

J. Ashenfelter et al (PROSPECT Collaboration). "A Low Mass Optical Grid for the PROSPECT Reactor Antineutrino Detector." *Journal of Instrumentation.* 14, 04. (April 2019).

J. Ashenfelter et al (PROSPECT Collaboration). "Lithium-loaded Liquid Scintillator Production for the PROSPECT Experiment." *Journal of Instrumentation.* 14, 03. (March 2019).

J. Ashenfelter et al (PROSPECT Collaboration). "First Search for Short-Baseline Neutrino Oscillations at HFIR with PROSPECT." *Phys. Rev. Lett.* 121, 251802 (December 2018).

M. Robel, B. Isselhardt, E. Ramon, A. Hayes, A. Gaffney, L. Borg, R. Lindvall, A. Erickson, K. Carney, T. Battisti, **A. Conant**, B. Ade, H. Trellue, and C. Weber. “A Composite Position Independent Monitor of Reactor Fuel Irradiation Using Pu, Cs, and Ba Isotope Ratios.” *Journal of Environmental Radioactivity*. 195, pp 9-19 (September 2018).

J. Ashenfelter et al (PROSPECT Collaboration). “Performance of a segmented 6Li-loaded liquid scintillator detector for the PROSPECT experiment.” *Journal of Instrumentation*, 13 (June 2018).

B. Littlejohn, **A. Conant**, D. Dwyer, A. Erickson, I. Gustafon, and K. Hermanek (2018). “Impact of Fission Neutron Energies on Reactor Antineutrino Spectra,” *Physical Review D*. 97, 073007. (April 2018).

**A. Conant**, A. Erickson, M. Robel, & B. Isselhardt (2017). “Sensitivity and Uncertainty Analysis of Plutonium and Cesium Isotopes in Modeling of BR3 Reactor Spent Fuel,” *Nuclear Technology*, 197:1, 12-19. (February 2017).

J. Ashenfelter et al (PROSPECT Collaboration). “The PROSPECT Physics Program.” *Journal of Physics G: Nuclear and Particle Physics*, 43 (October 2016).

## TECHNICAL REPORTS

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B. Betzler, E. Davidson, G. Davidson, T. Evans, S. Wilson, S. Mosher, G. Ilas, C. Daily, **A. Conant**, D. Chandler “Reactor Physics Modeling of the Cycle 483 Event in the High Flux Isotope Reactor.” ORNL/TM-2018/1102. (December 2018).

## BOOK CHAPTERS

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**A. Conant**. (2019) “Additive Manufacturing and WMD Proliferation.” *Disruptive and Game Changing Technologies in Modern Warfare*. Part of the Advanced Sciences and Technologies for Security Applications. Switzerland: Springer, Cham. DOI: <https://doi.org/10.1007/978-3-030-28342-1>.

## CONFERENCE PRESENTATIONS

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**A. Conant** & A. Erickson. “Candidates for Non-Fuel Antineutrino Emissions in the High Flux Isotope Reactor.” ANS Annual Meeting. Minneapolis, MN. June 2019.

**A. Conant** & A. Erickson. “Reactor Simulation of Evolution in Detector Baseline for Antineutrino Monitoring at the High Flux Isotope Reactor.” Advances in Nonproliferation Technology and Policy Conference. Orlando, FL. November 2018.

**A. Conant**. “Use of ORIGEN for Safeguards Applications of the PROSPECT Antineutrino Experiment.” SCALE User;s Group Workshop. Oak Ridge, TN. August 2018.

**A. Conant**, N. Bowden, & A. Erickson. “Antineutrino Detection at HFIR Using the PROSPECT Experiment.” MARC XI. Kailua-Kona, HI. April 2018.

**A. Conant**, P. Mumm, & A. Erickson. “Safeguards Impacts of Antineutrinos from Activation of Structural Elements in Power and Research Reactors.” PHYSOR. Cancun, Mexico. April 2018.

**A. Conant**, P. Mumm, & A. Erickson. “Comparison of Aluminum Activation Rates in HFIR and NBSR for Antineutrino-Based Safeguards.” 2017 American Nuclear Society Winter Meeting. Washington, D.C. November 2017.

M. Robel, B. Isselhardt, E. Ramon, A. Hayes, A. Gaffney, R. Lindvall, K. Carney, **A. Conant**, & A. Erickson. “A Position Independent Monitor of Reactor Fuel Irradiation Using Pu and Cs Isotope Ratios.” 6th Asia-Pacific Symposium on Radiochemistry. Jeju Island, Korea. September 2017.

**A. Conant**. “HFIR Core Modeling and Analysis for PROSPECT Reactor Antineutrino Experiment.” American Nuclear Society Winter Meeting. Las Vegas, NV. November 2016.

**A. Conant**, A. Erickson, & M. Robel. "Sensitivity and Uncertainty Analysis of Modeled Pu and Cs Isotope Ratios in a Test Pressurized Water Reactor." 2015 American Nuclear Society Winter Meeting. Washington, D.C. November 2015.

**A. Conant**, A. Erickson, & M. Robel. "Sensitivity Analysis of Modeled Pu and Cs Isotope Ratios in a Test Pressurized Water Reactor." 2015 American Nuclear Society Student Conference. College Station, TX. April 2015.

**A. Conant**, M. Robel, & A. Erickson. "Reactor Modeling of Pu and Cs Isotope Ratios in Pressurized Water Reactor Fuel Assemblies." Poster. 2014 American Nuclear Society Winter Meeting. Anaheim, CA. November 2014.

## LEADERSHIP

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### **American Nuclear Society**

*Student Program Co-Chair* *November 2018*

- Coordinated session assignments and other logistics for a national meeting
- Facilitated the attendance of 80 students at ANS Winter Meeting

*Student Sections Committee Member* *Aug 2017 - August 2020*

- Participated in selection of awards to students and conference host locations
- Served as Recruitment Subcommittee Chair and encouraged student participation

*Georgia Tech Student Section President* *Apr 2013 - Apr 2015*

- Supervised a team of 9 officers to put on professional, social, and outreach events
- Facilitated more than 15 outside-meeting events per year
- Organized agenda for biweekly meetings for 40-50 members
- Started a mentorship program for underclassmen

*Georgia Tech Student Section Professional Development Chair* *Jan 2016 - May 2016*

- Organized workshops to advance professional and career skills of members

*Georgia Tech Student Section Public Relations Chair* *Apr 2012 - Apr 2013*

- Organized professional speakers and tours of nuclear facilities
- Established expectation for professional speakers at each meeting

### **Georgia Tech Leadership Education and Development**

*Leadership Fellow* *Aug 2017 - May 2018*

- Coached undergraduate students in leadership skills
- Instructed leadership development courses for first-year students

### **GT 1000 First Year Seminar**

*Instructor* *Aug 2014 - Dec 2017*

- Prepared course material in assisting first-year students transition to college
- Coordinated expectations and grading with co-instructor and team leaders
- Facilitated small-group discussion of topics to include resumes, career paths, and time management

### **Georgia Tech Department of Housing**

*Resident Advisor* *Aug 2012 - May 2014*  
*Atlanta, GA*

- Supervised the living situation of 50 people each year
- Created a safe and positive community that connected students, faculty, and staff
- Resolved conflict and led hall programs to promote academic, social, and professional development

### **Georgia Tech Student Center**

*Guest Services Manager* *Jan 2012 - May 2014*  
*Atlanta, GA*

- Supervised operations of a 100,000 square foot building
- Set up meeting rooms and activity space for small- and large-scale events
- Implemented communication and conflict resolution skills to handle customer needs

**Georgia Tech Center for Academic Enrichment**

*1-to-1 Tutor*

Jan 2012 - May 2013

*Atlanta, GA*

- Tutored 5-8 individual students per week in physics, statistics, and thermodynamics
- Developed communication skills and understanding of learning styles