

Daniel Hellfeld

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OBJECTIVE	To conduct scientific research in the field of nuclear engineering, specifically in the areas of radiation detection and nuclear nonproliferation.	
EDUCATION	Doctor of Philosophy (PhD) , Nuclear Engineering (4.0/4.0) <i>University of California, Berkeley</i> <ul style="list-style-type: none">◦ Fellow at the Nuclear Science and Security Consortium (NSSC).◦ Area of current research: Omnidirectional gamma-ray imaging with a hand-held CdZnTe-based spherical active coded aperture.◦ Advisor: Prof. Kai Vetter.	Aug 2015 - Present <i>Berkeley, CA</i>
	Master of Science (MS) , Nuclear Engineering (4.0/4.0) <i>Texas A&M University</i> <ul style="list-style-type: none">◦ Member of the Nuclear Security Science and Policy Institute (NSSPI).◦ Thesis: <i>Feasibility of Remote Nuclear Reactor Antineutrino Directionality via Elastic Electron Scattering in the WATER CHerenkov Monitor of ANtineutrinos (WATCHMAN)</i>.◦ Advisor: Prof. Craig Marianno.	Aug 2013 - May 2015 <i>College Station, TX</i>
	Bachelor of Science (BS) , Physics (3.89/4.0) <i>University of California, Santa Barbara</i>	Sep 2009 - June 2013 <i>Santa Barbara, CA</i>
RESEARCH EXPERIENCE	NSSC Graduate Research Fellow <i>Nuclear Science and Security Consortium, UC Berkeley</i> <ul style="list-style-type: none">◦ Analyzing the coded aperture imaging performance of a spherical active coded aperture CdZnTe-based imaging system.◦ Optimized the coded configuration of detectors using simulations and iterative techniques.◦ Currently investigating the feasibility of real-time 3D imaging and scene data fusion as the system is moved freely through an environment.	Aug 2015 - Present <i>Berkeley, CA</i>
	Graduate Student Intern <i>Lawrence Livermore National Laboratory, NACS Division</i> Rare Event Detection Group <ul style="list-style-type: none">◦ Investigated the impact of cosmogenic radionuclide backgrounds as a function of detector overburden and the effects on directional sensitivity.◦ Integrated reactor antineutrino-electron scattering event generator into the RAT-PAC Geant4 simulation package.	June 2015 - July 2015 <i>Livermore, CA</i>
	NSSC Graduate Research Fellow <i>Nuclear Science and Security Consortium, UC Berkeley</i> <ul style="list-style-type: none">◦ Analyzed antineutrino directional reconstruction and background suppression techniques.◦ Performed simulations and analysis of antineutrino scattering background sources in water.	Nov 2014 - May 2015 <i>Berkeley, CA</i>
	Graduate Student Intern <i>Lawrence Livermore National Laboratory, NACS Division</i> Rare Event Detection Group <ul style="list-style-type: none">◦ Conducted Geant4 simulations and data analysis in ROOT for the proposed WATER CHerenkov Monitor of AntiNeutrinos (WATCHMAN) detector.◦ Studied the feasibility of nuclear reactor directionality using antineutrino-electron elastic scattering in WATCHMAN.	June 2014 - Aug 2014 <i>Livermore, CA</i>

	Graduate Research Assistant <i>Department of Nuclear Engineering, Texas A&M University</i> <ul style="list-style-type: none"> Investigated the use of silicon photodiodes to enhance scintillation detection capabilities. Designed and constructed a multi-detector (NaI) housing for a vehicle-mounted radiation detection system. 	Sep 2013 - Nov 2014 <i>College Station, TX</i>
TEACHING EXPERIENCE	Lab Instructor <i>Department of Nuclear Engineering, Texas A&M University</i> <ul style="list-style-type: none"> Responsible for the setup and teardown of weekly laboratory experiments for the graduate radiation detection course, NUEN 605. Assisted students with lab procedures and answered any questions regarding experiments or course content. Math/Physics Tutor <i>Campus Learning and Assistance Services, UC Santa Barbara</i> <ul style="list-style-type: none"> Tutored UCSB's Astronomy 1: Introduction to Astronomy. Instructed four 50-minute sessions a week with 20 students each. Reviewed confusing concepts, prepared example problems and study sheets, and answered any individual questions. 	Sep 2014 - Dec 2014 <i>College Station, TX</i> Jan 2013 - Mar 2013 <i>Santa Barbara, CA</i>
SCIENTIFIC COMPUTING SKILLS	Languages: Mathematical/Analysis Software: Monte Carlo Particle Transport Software: Gamma Spectroscopy Software: Nuclear Burnup Software: Build Systems: Operating Systems: Documentation: Version Control: Other Software:	Python, C++, C, bash ROOT, Mathematica, Matlab Geant4, MCNP5/MCNPX, Serpent GENIE-2000, MAESTRO, GammaVision ORIGEN2, CINDER-90, TransLAT make, CMake Mac, Linux, MS Windows Doxygen, Sphinx git L ^A T _E X, MS Office
PROFESSIONAL SOCIETY MEMBERSHIPS	IEEE Nuclear and Plasma Sciences Society Institute of Nuclear Materials Management American Nuclear Society National Society of Collegiate Scholars Golden Key International Honor Society	2016 - Present 2014 - Present 2013 - Present 2009 - 2013 2009 - 2013
AWARDS	Nuclear Science and Security Consortium Fellowship , UC Berkeley JD Williams Best Poster Award , INMM 56 th Annual Meeting Nuclear Science and Security Consortium Fellowship , UC Berkeley Graduate Enhancement Fellowship , Texas A&M University Highest Academic Honor Award , UC Santa Barbara, Physics Dept. Highest Honors , UC Santa Barbara	Aug 2015 July 2015 Nov 2014 Aug 2013 May 2013 May 2013
WORKSHOPS & SEMINARS	Fukushima Fieldwork for Radiation Disaster Recovery Phoenix Program, Hiroshima University Python Boot Camp UC Berkeley, NSF, Berkeley Institute for Data Science Nuclear Safeguards Policy and Information Analysis Course Middlebury Institute for International Studies at Monterey Next Generation Fukushima Workshop IRC, LBNL, FREA, Koriyama City	Aug 2016 <i>Fukushima, Japan</i> Aug 2016 <i>Berkeley, CA</i> June 2016 <i>Monterey, CA</i> Apr 2016 <i>Koriyama, Japan</i>

International Symposium for Resilient Communities

IRC, LBNL, FREA, Koriyama City

Apr 2016

Koriyama, Japan

Applied Antineutrino Physics Workshop

Center for Neutrino Physics, Virginia Tech University

Dec 2015

Arlington, CA

Public Policy and Nuclear Threats Summer Boot Camp

Institute on Global Conflict and Cooperation, UC San Diego

June 2015

San Diego, CA

Global Nuclear HR Development for Safety, Security & Safeguards

Academy for Global Nuclear Safety and Security Agent, Tokyo Tech

Feb 2015

Tokyo, Japan

NDA Fundamentals for Nuclear Safeguards

Next Generation Safeguards Initiative, Oak Ridge National Laboratory

Nov 2014

Oak Ridge, TN

CONFERENCE
PROCEEDINGS

- [1] **D. Hellfeld**, P. Barton, D. Gunter, L. Mihailescu, K. Vetter, "Optimization of a Spherical Active Coded Mask Imager", in Proc. IEEE NSS/MIC, Strasbourg, France, 2016. Oral presentation.
- [2] **D. Hellfeld**, A. Bernstein, S. Dazeley, C. Marianno, "Directional Reconstruction of Reactor Antineutrinos via Electron Scattering in Gd-doped Water Cherenkov Detectors", in Proc. IEEE NSS/MIC, Strasbourg, France, 2016. Poster presentation.
- [3] **D. Hellfeld**, A. Bernstein, S. Dazeley, C. Marianno, "Nuclear Reactor Antineutrino Directionality via Elastic Electron Scattering in a Gd-Doped Water Cherenkov Detector", in Proc. INMM Annual Meeting, Indian Wells, CA, 2015. Poster presentation.

PUBLICATIONS
& PAPERS

- [1] **D. Hellfeld**, P. Barton, D. Gunter, L. Mihailescu, K. Vetter, "A Spherical Active Coded Aperture for 4π Gamma-ray Imaging", Submitted to IEEE Trans. Nucl. Sci. (2017).
- [2] **D. Hellfeld**, S. Dazeley, A. Bernstein, C. Marianno, "Reconstructing the Direction of Reactor Antineutrinos via Electron Scattering in Gd-Doped Water Cherenkov Detectors", Nucl. Instrum. Methods A, 841 (2017) 130-138.
- [3] N. S. Bowden, K. M. Heeger, P. Huber, C. Mariani, R. B. Vogelaar. "Applied Antineutrino Physics 2015 - Conference Summary". arXiv:1602.04759 (2015).
- [4] **D. Hellfeld**, C. Marianno, W. Charlton, R. Webb, "Feasibility of Nuclear Reactor Antineutrino Directionality via Elastic Electron Scattering in the WATER CHerenkov Monitor of ANTineutrinos (WATCHMAN)", Master's Thesis, Texas A&M University, 2015.
- [5] M. Askins, M. Bergevin, A. Bernstein, S. Dazeley, S. T. Dye, T. Handler, A. Hatzikoutelis, **D. Hellfeld**, P. Jaffke, Y. Kamyshkov, B. J. Land, J. G. Learned, P. Marleau, C. Mauger, G. D. Orebi Gann, C. Roecker, S. D. Rountree, T. M. Shokair, M. B. Smy, R. Svoboda, M. Sweany, M. R. Vagins, K. A. van Bibber, R. B. Vogelaar, M. J. Wetstein, M. Yeh, "The Physics and Nuclear Nonproliferation Goals of WATCHMAN: A WATER CHerenkov Monitor for ANTineutrinos", arXiv:1502.01132 (2015).

RELEVANT
COURSEWORK**University of California, Berkeley**

- Nuclear Security: The Nexus Between Policy and Technology (NE 285)
- Numerical Simulation in Radiation Transport (NE 255)
- Medical Imaging Signals and Systems (BIOENG/ELENG 261)
- Teaching Techniques in Nuclear Engineering (NE 375)
- Analytical Methods for Nonproliferation (NE 230)
- Nuclear Physics (NE 201)
- Nuclear Reactor Theory (NE 250)
- Nuclear Reactions and Radiation (NE 101)
- Nuclear Materials (NE 120)

Texas A&M University

- Radiation Interactions and Shielding (NUEN 604)

- Radiation Detection and Nuclear Materials Measurement (NUEN 605)
- Reactor Theory (NUEN 601)
- Nuclear Fuel Cycles and Nuclear Materials Safeguards (NUEN 651)
- Nuclear Reactor Analysis and Experimentation (NUEN 606)
- Nuclear Nonproliferation and Arms Control (NUEN 650)
- Monte Carlo Computational Particle Transport (NUEN 630)
- Special Topics: Introduction to Geant4 Monte Carlo Transport (NUEN 689)
- Statistical Analysis (STAT 601)

University of California, Santa Barbara

- Classical Mechanics (PHYS 105A/B)
- Electromagnetism (PHYS 110A/B)
- Quantum Mechanics (PHYS 115A/B/C)
- Nuclear Physics (PHYS 150)
- Mathematical Methods for Theoretical Physics (PHYS 100A/B)
- Thermodynamic and Statistical Physics (PHYS 119A)
- Particle Physics (PHYS 125)
- Astronomy/Cosmology (ASTRO1/2)
- Analog Electronics (PHYS 127AL)
- Advanced Physics Laboratory (PHYS 128AL/BL)
- California Physics (PHYS 120)
- Differential Equations and Linear Algebra (MATH 3C/5A)
- Vector Calculus (MATH 5B/C)

REFERENCES

Available upon request.