

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: Coded aperture imaging of low-energy gamma-rays with CdZnTe detectors in both planar and spherical configurations.◦ Advisor: 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: 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</i> <i>University of California, 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</i> Nuclear and Chemical Sciences Division, 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</i> <i>University of California, 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</i> Nuclear and Chemical Sciences Division, 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.	June 2014 - Aug 2014 <i>Livermore, CA</i>

- Studied the feasibility of nuclear reactor directionality using antineutrino-electron elastic scattering in WATCHMAN.

Graduate Research Assistant

Texas A&M University

Department of Nuclear Engineering

- 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

College Station, TX

TEACHING EXPERIENCE

Lab Instructor

Texas A&M University

Department of Nuclear Engineering

- 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.

Sep 2014 - Dec 2014

College Station, TX

Math/Physics Tutor

Campus Learning and Assistance Services

University of California, Santa Barbara

- 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.

Jan 2013 - Mar 2013

Santa Barbara, CA

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++, bash
ROOT, Mathematica, Matlab
Geant4, MCNP5/MCNPX, Serpent
GENIE-2000, MAESTRO
ORIGEN2, CINDER-90, TransLAT
make, CMake
Mac, Linux, MS Windows
Doxygen, Sphinx
git
L^AT_EX, 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 56th 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

Aug 2016

Fukushima, Japan

Python Boot Camp

UC Berkeley, NSF, Berkeley Institute for Data Science

Aug 2016

Berkeley, CA

Nuclear Safeguards Policy and Information Analysis Course Middlebury Institute for International Studies at Monterey	June 2016 Monterey, CA
Next Generation Fukushima Workshop IRC, LBNL, FREA, Koriyama City	Apr 2016 Koriyama, Japan
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”, Submitting 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. Kamyshev, 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) [*in progress*]
 - 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.