Nicole Ackerman, Assistant Professor of Physics

Agnes Scott College
Department of Physics and Astronomy
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Education

Stanford University, Stanford, CA

Ph.D., Physics, June 2013
Thesis: *Toward a Gold Standard for Dose Enhanced Radiotherapy: Physics Simulations and Biological Experiments to Better Understand the Mechanisms of a New Cancer Treatment*
Adviser: Professor Edward. E. Graves
Area of Study: Medical Physics

M.S., Physics, January 2011
Adviser: Professor Martin Breidenbach
Area of Study: Particle Physics

Massachusetts Institute of Technology, Cambridge, MA

S.B., Physics, June 2007
Thesis: *Study of Michel Spectrum of Tau Decay*
Adviser: Professor Peter Fisher

Research Interests

Geant4 Monte Carlo simulations, Cerenkov imaging, physics education research, cellular scale dosimetry, radiobiology, PET imaging, nanotechnology

Selected Research Experience

Department of Physics, Agnes Scott College 2013 – Present
Cerenkov Imaging: Simulation and Experiment
- 2015-2016: One directed research student
- Summer 2015: Two research students
- 2014-2015: Three directed research students, one senior seminar advisee
- Spring 2014: Two senior seminar project students

Microdosimetry of antibody-targeted ^{212}Pb in Vasculature Model May 2016 – Present
- Collaboration with Oxford University and UNICAMP
- Provided Geant4 expertise and mentored Masters student

Department of Radiation Oncology, Stanford 2010 – 2013
Geant4 Microdosimetry
Physics simulations for Cerenkov Luminescence Imaging

SLAC National Accelerator Laboratory 2007 – 2010
EXO-200, a low-background neutrino experiment to measurement neutrinoless double beta decay

Laboratory for Nuclear Science, MIT 2004 – 2007
BaBar, Adviser: Prof. Peter Fisher
ATLAS, Adviser: Dr. Frank Taylor

Publications & Proceedings

V. Wood, **N. Ackerman** *Cherenkov Light Production from the α-emitting Decay Chains of ^{223}Ra, ^{212}Pb, and ^{149}Tb for Cherenkov Luminescence Imaging* (Under Review, Submitted to "Applied Radiation and Isotopes") (2016)

N. Ackerman *Instant Feedback on Multiple Choice Tests: Improving Assessment, Decreasing Anxiety?* (In revision, Submitted to "The Physics Teacher") (2016)

N. Ackerman, A. Lovell, M. Franklin, R. Cupp, Y. Wan, V. Wood, C. Day, E. Whisnant *"Integrating Commercial Solar Panels in the Physics Curriculum"* Proceedings of the 2015 Conference on Laboratory Instruction Beyond the First Year of College (2015)

N. Ackerman, T. Atherton, W. Deconinck, M. Falk, S. Garmon, E. Henry, E. Long *"Gender and Sexual Diversity Issues in Physics: The Audience Speaks"* arXiv:1206.4112 (2012)

N. Ackerman, E. Graves *"The Potential for Cerenkov luminescence imaging of alpha emitting radionuclides"* Phys Med Biol. 2012 Feb 7; 57 771-83 (2012)

N. Ackerman *et al "Observation of Two-Neutrino Double-Beta Decay in Xe-136 with EXO-200"* Phys Rev Lett. 107, 212501 (2011)

A. Dobi *et al "A xenon gas purity monitor for EXO"* Nucl. Inst. Meth. A 659, (2011)

M. Montero Diez *et al. "A simple radionuclide-driven single-ion source"*, Rev.Sci.Instrum. 81 (2010) [physics.atom-ph/1008.3422]

N. Ackerman *"Status of EXO-200"*, Proceedings of DPF-2009, Detroit, MI, July 2009, eConf C090726, (2009) [hep-ex/0909.1826].

R. Neilson *et al. "Characterization of large area APDs for the EXO-200 detector"*, Nucl. Inst. Meth. A 608, 68-75 (2009).

Teaching

Assistant Professor of Physics, Agnes Scott College

Physics 150: Waves Around the World: Global Music and Physics	Fall 2016
Physics 203: Intro Physics II: Electricity and Magnetism	Spring 2016
Physics 361: Quantum Physics	Spring 2016
Leadership 102: The Art of Communicating Science	Spring 2016
Peak Week Workshop: Electronics for Everyone	Spring 2016
Alumnae Winter Seminar: The Physics of Music	January 2016
Physics 202: Intro Physics I: Mechanics	F2016, F2015
Physics 210: Modern Physics	F2016, F2015, F2014, F2013
Physics 242: Analog Electronics	F2015, F2014, F2013
Physics 311: Laboratory Physics	Spring 2015
Physics 111: Magnetism, Heat, Sound, Light (Lecture)	S2015, S2014
Physics 243: Digital Electronics	F2016, S2015, S2014
Physics 410: Particle Physics (Independent Study)	Fall 2014
Physics 110: Introduction to Mechanics and Electricity (Lecture)	F2014, F2013

Teaching (Continued)

Instructor, Emory Tibet Science Initiative

Mechanics at Drepung Monastery (Karnataka, India)	Summer 2016
Mechanics at Drepung Monastery (Karnataka, India)	Summer 2015

Physics Department Teaching Assistant, Stanford

Electromagnetism (Phys 120), Prof. Steven Kahn	Winter 2012
Modern Physics (Phys 25), Prof. Lenny Susskind	Spring 2010
Introduction to Laboratory Physics (Phys 67), Dr. Rick Pam	Spring 2009

Physics Department Teaching Mentor, Stanford

Small Group Evaluator	January 2012 – March 2013

AARC (Athletic Academic Resource Center) Tutor, Stanford

Physics 21, 23, 25, 41, 43, 45	Fall 2010 – Spring 2011

Grants, Fellowships, & Awards

Summit Faculty Development Grant Award	2016
Mellon Digital Faculty Fellow	Fall 2016
Professional Development Grant: "Improve Pedagogical Strategies for Introductory Physics"	2014
Professional Development Grant: "Develop Nuclear Lab and Experiments for Physics 311"	2014
Diversifying Academia Recruiting Excellence Fellowship	2011 – 2013
APS FGSA Travel Award for Excellence in Graduate Research	2012
Paul Kirkpatrick Award for Graduate Teaching in Physics	2012
Stanford Bio-X Travel Grant	2011
Weiland Fellowship (Stanford Graduate Fellowship)	2008 – 2011
Lindau Nobel Laureate Meeting US DOE Travel Award	2010
ESOF Robert Bosch Stiftung Lindau Fellowship	2010
Stanford School of Humanities and Sciences Fellowship	2007 – 2008
National Science Foundation GRFP Honorable Mention	2007
Reed Research Funding Award	2006
National Merit Scholarship	2003

Colloquia, Invited Talks, & Workshops

Agnes Scott College — March 2016
Digital Pedagogy Series
"Active learning with the i>Clicker System"

University of Northern Alabama — March 2016
Physics Talk
"Cancer in Collision: Particle Physics in Medicine"

Drexel University — March 2016
Physics Colloquium
"Cherenkov radiation: New Applications in Oncology"

Colloquia & Invited Talks (Continued)

Agnes Scott College — December 2015
Special Public Lecture
"The "nu"s of the 2015 Nobel Prize in Physics: Neutrinos"

University of Michigan — November 2014
Physics Seminar
"Cerenkov Radiation: New Applications in Oncology"

Southern Methodist University — March 2014
Physics Seminar
"Cerenkov Applications in Oncology"

Agnes Scott College — December 2012
Physics Seminar
"Accelerating Drug Design with 'Faster-Than-Light' Particles: Biomedical Applications of the Cerenkov Effect"

Lafayette College — December 2012
Physics Seminar
"Accelerating Drug Design with 'Faster-Than-Light' Particles: Biomedical Applications of the Cerenkov Effect"

DePauw University — December 2012
Physics Seminar
"Accelerating Drug Design with 'Faster-Than-Light' Particles: Biomedical Applications of the Cerenkov Effect"

Fresno State University — November 2012
Colloquium and Public Talk
"Particle Physics in Medicine"

Sonoma State University — October 2011
"What Physicists Do" Series: Colloquium and Public Talk
"Cancer+Physics: Mice, Dice, and Faster than Light Particles"

Contributed Presentations & Posters

SACS-AAPT Spring Meeting 2016 — April 2016
"Physics and Astronomy in a new Leadership Development and Global Learning Curriculum"

AAPT Summer Meeting 2015 — July 2015
"Scratcher (IFAT) Forms for Conceptual Test Questions in Introductory Courses"

BFY II — July 2015
Poster: "Integrating Commercial Solar Panels in the Physics Curriculum"

Southeastern Section of APS — November 2013
"Computer Simulations for Understanding Dose Enhancement Through Microdosimetry"

Radiation Research Society — September 2012
Poster: "Geant4 microdosimetry for dose enhancement and radiobiology"

Contributed Presentations & Posters (Continued)

Radiation Chemistry Gordon Research Conference — August 2012
Poster: "Monte Carlo Simulations for Radiobiology"

Radiation Chemistry Gordon Research Seminar — July 2012
Poster: "'Monte Carlo Simulations for Radiobiology"

Stanford CBIS Symposium — April 2012
Poster: "Physics Simulations for Cerenkov Imaging"

APS March Meeting — February 2012
"Monte Carlo Simulations for Radiobiology"

Stanford Radiation Oncology Physics Seminar — November 2011
"Simulations for Cerenkov Imaging"

APS California-Nevada Section meeting — November 2011
"Geant4 Microdosimetry for Simulation of Dose Enhancement in vivo at Orthovoltage energy"

Stanford Bio-X IIP Symposium — September 2011
Poster: "Physics Simulations for Cerenkov Imaging"

NSBP/NSHP Joint Conference — September 2011
"Physics Simulations for Cerenkov Imaging"

AAPM/COMP Joint Meeting — July 2011
Poster: "GEANT4 Microdosimetry for Simulation of Dose Enhancement in Vivo at Orthovoltage Energy"

APS April Meeting: Press Conference — April 2011
"Illuminating Biology with Faster Than Light Particles"

APS April Meeting — April 2011
"Cerenkov Radiation as a New In Vivo Imaging Modality"

SLAC Association for Student Seminars — April 2011
"Cerenkov Imaging in Biomedicine"

International Workshop on the Interconnection between Particle Physics and Cosmology July 2010
Poster: "Searching for double beta decay with the EXO experiment"

SLAC Association for Student Seminars — October 2009
"What You Didn't Know About Neutrinos"

APS Division of Particles and Fields Meeting — July 2009
"EXO-200"

SLAC Association for Student Seminars — December 2008
"Diversity in Physics"

APS April Meeting — April 2008
"EXO-200 Status"

Service & Outreach

Professional

Reviewer for Nature Nanotechnology	2016
Associate Editor for Medical Physics Journal	2016
Reviewer for Physica Scripta	2016
Reviewer for Medical Physics Journal	2013 – Present
Reviewer for BFYII Proceedings	August 2015
Panelist/Facilitator for CUWiP	January 2015
Poster judge at oSTEM/NOGLSTP Meeting	November 2014
Session Chair for Gordon Research Seminar in Radiation Chemistry	July 2012
Organizing Committee for APS March Meeting Session "Sexual and Gender Diversity Issues in Physics"	May 2011 – March 2012

Agnes Scott College

Curriculum Committee	September 2014 – Present
Core Team Member, Application to HHMI Inclusive Excellence: 2017 Undergraduate Science Education Grants	2015
Co-organizer of Agnes Scott Maker Faire Booth	2014, 2015

Stanford University

Diversity Advocacy Committee	August 2008 – June 2013
Student Hosted Colloquia Committee	June 2008 – June 2013
Organizing Committee for UGWP Conference	July 2011 – January 2012
SPLASH Teacher	November 2010

SLAC National Accelerator Laboratory

Tour Guide (paid)	June 2009 – September 2010
Kid's Day Opening Talk	August 2010
Representative on QuantumDiaries.org	March 2009 – March 2010
SLAC User's Congressional Outreach in DC	February 2010
SLAC Association for Student Seminars Czar	July 2008 – December 2008

Professional Memberships

AAPT Southeast Atlantic Coast Section	2016 – Present
Advanced Laboratory Physics Association (ALPhA)	2015 – Present
American Physical Society	2006 – Present
American Association of Physics Teachers	2009 – Present
National Society of Black Physicists	2011 – Present