Lindley Winslow

Curriculum Vitae

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Education

2008 **Ph.D., Physics**, *University of California, Berkeley*,
"First Solar Neutrinos from KamLAND: A Measurement of ^{8}B Solar Neutrino Flux",
Advisor: Prof. Stuart J. Freedman.

2007 **M.A., Physics**, *University of California, Berkeley*.

2001 **B.A., Physics and Astronomy**, *University of California, Berkeley*.

Appointments

2015-Present **Assistant Professor**, *Massachusetts Institute of Technology*.

2012-2014 **Assistant Professor**, *University of California, Los Angeles*.

2008-2012 **Postdoctoral Fellow**, *Massachusetts Institute of Technology*.

2001-2008 **Graduate Research Assistant**, *Nuclear Science Division, Lawrence Berkeley National Lab*.

2000-2001 **Undergraduate Research Assistant**, *Space Sciences Laboratory, University of California, Berkeley*.

1998-1999 **Undergraduate Research Assistant**, *Cryogenic Dark Matter Search, University of California, Berkeley*.

Awards and Fellowships

2014 **UCLA Hellman Fellow**.

2012 **MIT School of Science Infinite Kilometer Award**.

2011 **Michelson Postdoctoral Prize Lectureship**.

2010 **L'Oréal for Women in Science Fellowship**.

2004-2005 **Mentored Research Award**, *Office of the President of the University of California*.

2001 **Dorothea Klumke Roberts Prize**, *Astronomy Department, University of California, Berkeley*.

2001 **Department Service Award**, *Physics Department, University of California, Berkeley*.

2000-2001 **Isidore Pomerantz Scholarship**, *Physics Department, University of California, Berkeley*.

Research and Scientific Collaborations

2012–Present **CUORE**, *Cryogenic Underground Observatory for Rare Events.*

- Responsible for design and organization of slow monitoring system and interfaces.
- Chair CUORE Publications Board

2012–Present **KamLAND-Zen**, *KamLAND Zero-Neutrino Double-Beta Decay experiment.*

- With NuDot, exploring options for upgrades in the next few years.
- With IsoDAR, exploring options for sterile neutrino search at KamLAND.
- Participating in compilation long paper on KamLAND reactor analysis.

2010–Present **NuDot**, *Development of Directional Scintillation Detectors.*

- Leader and founder of effort to develop novel scintillators based on quantum dots.
- Formed collaboration with University of Chicago to use photodetectors with picosecond timing to extract directional signal.
- Completed preliminary design of prototype directional scintillation-based detector.

2010–Present **DAEδALUS and IsoDAR**, *Development of Cyclotrons for Neutrino Beams.*

- Founding member of DAEδalus and IsoDAR collaborations.
- Liaison with KamLAND Collaboration for IsoDAR.
- Performed background analysis for IsoDAR neutrino-electron scattering measurement.

2008–2012 **Double Chooz**, θ_{13} *Reactor Antineutrino Experiment.*

- U.S. Analysis coordinator, led analysis of θ_{13} which became published analysis.
- Data Production coordinator, helped write tools and organized team to process the data and produce Monte Carlo.
- Slow Monitoring coordinator, installed and commissioned slow monitoring system and programmed the software interfaces.
- Detector Filling expert, organized experts and data from different parts of the system and took part in this difficult operation.
- Thermal Group leader, worked with an engineering firm to create a thermal model of the detector and worked with others to evaluate risks to acrylic vessels.

2001–2008 **KamLAND**, *Kamioka Liquid Scintillator Antineutrino Detector.*

- Led analysis of ^{8}B solar neutrinos, only published U.S. based analysis.
- Led analysis and simulation of muon spallation products.
- Led upgrade of the gas system and glovebox for the low background phase of KamLAND.
- Lead graduate student on the full volume calibration system, involved in all aspects of the design and commissioning with special focus on instrumentation, radio-cleanliness and operation documentation.
- Participated in refurbishment of a muon tracking system including the design and fabrication of new front-end electronics and frame for mechanical support.

Teaching

Spring 2015 **Physics 8.022**, *Introductory Electricity and Magnetism.*
Fall 2014 **Physics 124**, *Introduction to Nuclear Physics for junior/senior majors.*
Spring 2014 **Physics 6A**, *Introductory Mechanics for biology majors.*
Winter 2013 **Physics 110A**, *Electricity and magnetism for junior/senior majors.*
Fall 2012 **Physics 269A**, *Special topics in nuclear physics, graduate seminar on the neutrino.*

Professional Activities

2015-Present Department of Energy reviewer
2015-Present German Research Foundation (DFG) reviewer
2013-Present National Science Foundation reviewer
2013-Present Nuclear Instruments and Methods A referee
2013-Present Physical Review C referee
2012-Present Journal of Instrumentation referee
2004-2006 American Physical Society Forum on Graduate Student Affairs, Chair Sucession

Conference Organization

2015 Division of Particles and Fields Conference 2015 - Organizer Parallel Neutrino Sessions

2013 Institute for Nuclear and Particle Astrophysics and Cosmology General Meeting (INPAC)
Organizing Committee Member
Asilomar, CA April 26−28, 2013
`http://cosmology.berkeley.edu/inpac-mrpi/GeneralMeeting2013`

2005 Canadian-American-Mexican Physics Graduate Student Conference (CAM)
Organizing Committee Member
San Diego, CA August 19-21, 2005
`http://cam2005.ps.uci.edu/`

Department Service

2015-Present Laboratory for Nuclear Science Colloquium Committee
2013-2014 Academic Affairs Committee
2012-2014 Graduate Student Recruitment Committee
2012-2014 Faculty Mentor for Women in Physics Group

Outreach

Summer 2015	Science Advisor - “Flapjack", a major motion picture by Sony Pictures
Nov 2014	Public Lecture - Wildwood School Santa Monica, CA
Feb 2013	Aspen Physics Cafe - informal discussion about neutrino physics.
Sept 2012	Exploring Your Universe - Public Lecture “Neutrinos - You can’t see them but they’re everywhere!”
July 2011	Talk Science! - A NSF-funded Inquiry Project Video on particle model of gases.
July 2011	I ♡ Neutrinos Worked with video artist Jwest on mixed media film inspired by neutrinos.
2009-2010	Physics for the 21st Century -Annenberg Foundation Project Online course including interactive demonstration of neutrino oscillations.
2002-2006	Coordinator of Society of Women in the Physical Sciences, UC Berkeley Started department orientation for undergraduates and outreach to middle school girls through the “Expanding Your Horizons Conference”.

Advising and Mentoring

Current Postdoctoral Researchers

2015-Present Dr. Jonathan Ouellet
- NuDot and CUORE R&D and analysis

2014-Present Dr. Laura Gladstone
- CUORE slow monitoring, R&D and analysis

Current Graduate Student Researchers

2015-Present Alex Leder
- CUORE analysis and R&D
- Thesis Topic: Double electron capture of ^{120}Te

2013-Present Erin Hansen
- CUORE analysis and R&D
- Thesis Topic: Majoron double beta decay modes

Current Undergraduate Student Researchers

Spring 2015 Vincent Canel
- MIT Visitor, ENS Cachan, characterized photo-multiplier tubes for NuDot

2015-Present Gailin Pease
- MIT, balloon construction for KamLAND-Zen

2015-Present Emmett Krupczak
- MIT, balloon construction for KamLAND-Zen

2014-Present Yocheved Ungar
- UCLA, studied geoneutrino rates and chemistry and computing for NuDot

2014-Present Jesse Santana
- UCLA, LED calibration source for NuDot

Former Postdoctoral Researchers

2013-2014 Dr. Kevin Hickerson
- CUORE slow monitoring and analysis

2012-2013 Dr. Christoph Aberle
- Quantum dot scintillator development and direction reconstruction studies

Former Undergraduate Student Researchers

Summer 2013 Athena Ierokomos
- UCLA REU, UC Berkeley, studied solvents for quantum-dot-doped scintillators.

Spring 2013 Timothée de Guillebon
- UCLA Visitor, ENS Cacahn, studied solvents for quantum-dot-doped scintillators.

2012-2014 Elizabeth Friedman
- UCLA, studied CUORE crystal test runs.

2012-2014 Ruben Gutierrez
- Participated in ion source beam test at Best Cyclotrons Inc. and analyzed data.
- UCLA Undergraduate Research Fellow

2012-2014 Christopher Coy
- UCLA, studied attenuation length of quantum-dot-doped scintillators.
- William and Mary University REU 2013

Invited Talks and Lectures

2015 APS April Meeting 2015
Recent Results from Double-Beta Decay Experiments

2014 Neutrino 2014
Discovering the Majorana Neutrino: The Next Generation of Experiments

2013 International Symposium: Opportunities in Underground Physics for Snowmass (ISOUPS)
Status of IsoDAR and DAEδALUS

2013 New Directions in Neutrino Physics 2013
Development of Quantum Dot Doped Scintillator for $0\nu\beta\beta$

2012 NuFACT 2012
New Results from Double Chooz

2012 APS April Meeting 2012
Overview of Reactor Neutrino Experiments

2011 Cosmogenic Activity and Background Workshop
Muon Spallation Results from KamLAND

2010 SLAC Summer Institute 2010
Status of Double Chooz

2009 Rencontres de Moriond 2009
New Results from KamLAND

2009 Aspen Winter 2009 - Workshop on Physics at the LHC Era
Current Status and Prospects for Measuring θ_{13}

Seminars and Colloquium

2014 UC Santa Barbara (Colloquium)
2014 MIT (Laboratory for Nuclear Science Colloquium)
2014 UC Davis (Colloquium)
2013 UC Berkeley (Colloquium)
2013 Kansas State University (Colloquium)
2013 MIT (Seminar)
2013 UC Davis(Seminar)
2013 SLAC (Seminar)
2012 Notre Dame University (Colloquium)
2012 MIT (Seminar)
2012 Cornell University (Seminar)
2012 Yale University (Seminar)
2011 UCLA (Seminar)
2011 University of Washington (Colloquium)
2011 Los Alamos National Lab (Seminar)
2011 Case-Western Reserve University (Colloquium)
2010 Amhearst College (Colloquium)
2009 Fermi National Lab (Colloquium)
2009 Drexel University (Colloquium)
2009 Yale University (Seminar)
2008 MIT (Laboratory for Nuclear Science Colloquium)
2008 Sandia National Lab (Seminar)
2008 Lawrence Berkeley National Lab, INPA (Seminar)
2007 Los Alamos National Lab (Seminar)
2007 Columbia University (Seminar)
2006 SUNY Stony Brook (Seminar)

Publications

The collaborations listed below are on the order of ∼20-100 physicists, therefore I have made some contribution to all listed papers. I have indicated those where I wrote a significant portion of the text and performed a significant portion of the analysis as **Lead Author** publications and those where I performed a smaller but important task are listed as **Significant Contribution** publications. Please also note that American Physical Society journals like *Physical Review Letters* and *Physical Review D* do not use traditional page numbers and the correct citations are listed below.

A. Peer Reviewed Publications:

[A1] CUORE Collaboration, D. Artusa *et al.*, "Searching for neutrinoless double-beta decay of ^{130}Te with CUORE," `arXiv:1402.6072 [physics.ins-det]`, (19 Pages). Accepted by Advances in High Energy Physics for special Pontecorvo review edition. **(REVIEW ARTICLE)**.

[A2] CUORE Collaboration, C. Aguirre *et al.*, "Initial performance of the CUORE-0 experiment," `arXiv:1402.0922 [physics.ins-det]`, (7 Pages). Submitted to NIM A. **(RESEARCH ARTICLE)**.

[A3] Double Chooz Collaboration, Y. Abe *et al.*, "Background-independent measurement of θ_{13} in Double Chooz," `arXiv:1401.5981 [hep-ex]`, (7 Pages). Submitted to Phys. Rev. D. **(RESEARCH ARTICLE)**.

[A4] KamLAND Collaboration, G. Keefer *et al.*, "Laboratory Studies on the Removal of Radon-Born Lead from KamLAND's Organic Liquid Scintillator," `arXiv:1312.0977 [physics.ins-det]`, (14 Pages). Submitted to JINST. **(RESEARCH ARTICLE)**.

[A5] DAEdALUS Collaboration, A. Adelmann, , *et al.*, "Cyclotrons as Drivers for Precision Neutrino Measurements," `arXiv:1307.6465 [physics.acc-ph]`, (34 Pages). Accepted by Advances in High Energy Physics for special Pontecorvo review edition. **(REVIEW ARTICLE - Significant Contribution)**.

[A6] C. Aberle, A. Elagin, H. Frisch, M. Wetstein, and L. Winslow, "Measuring Directionality in Double-Beta Decay and Neutrino Interactions with Kiloton-Scale Scintillation Detectors," `arXiv:1307.5813 [physics.ins-det]`, (7 Pages). Accepted by JINST. **(RESEARCH ARTICLE - Lead Author)**.

[A7] J. Conrad, M. Shaevitz, I. Shimizu, J. Spitz, M. Toups, and L. Winslow, "Precision $\bar{\nu}_e$-electron Scattering Measurements with IsoDAR to Search for New Physics," `arXiv:1307.5081 [hep-ex]`, (7 Pages). Accepted by Phys.Rev.D. **(RESEARCH ARTICLE - Lead Author)**.

[A8] C. Aberle, J. Li, S. Weiss, and L. Winslow, "Optical Properties of Quantum-Dot-Doped Liquid Scintillators," *JINST* **8** (2013) P10015, `arXiv:1307.4742 [physics.ins-det]`, (17 Pages). **(RESEARCH ARTICLE - Lead Author)**.

[A9] Double Chooz Collaboration, Y. Abe *et al.*, "First Measurement of θ_{13} from Delayed Neutron Capture on Hydrogen in the Double Chooz Experiment," *Phys.Lett.* **B723** (2013) 66–70, `arXiv:1301.2948 [hep-ex]`, (6 Pages). **(RESEARCH ARTICLE - Significant Contribution)**.

[A10] Double Chooz Collaboration, Y. Abe *et al.*, "Direct Measurement of Backgrounds using Reactor-Off Data in Double Chooz," *Phys.Rev.* **D87** (2013) 011102, arXiv:1210.3748 [hep-ex], (7 Pages). **(RESEARCH ARTICLE)**.

[A11] Double Chooz Collaboration, Y. Abe *et al.*, "First Test of Lorentz Violation with a Reactor-based Antineutrino Experiment," *Phys.Rev.* **D86** (2012) 112009, arXiv:1209.5810 [hep-ex], (6 Pages). **(RESEARCH ARTICLE - Significant Contribution)**.

[A12] Double Chooz Collaboration, Y. Abe *et al.*, "Reactor electron antineutrino disappearance in the Double Chooz experiment," *Phys.Rev.* **D86** (2012) 052008, arXiv:1207.6632 [hep-ex], (21 Pages). **(RESEARCH ARTICLE - Lead Author)**.

[A13] IsoDAR Collaboration, A. Bungau *et al.*, "Proposal for an Electron Antineutrino Disappearance Search Using High-Rate ^{8}Li Production and Decay," *Phys.Rev.Lett.* **109** (2012) 141802, arXiv:1205.4419 [hep-ex], (5 Pages). **(RESEARCH ARTICLE - Significant Contribution)**.

[A14] L. Winslow and R. Simpson, "Characterizing Quantum-Dot-Doped Liquid Scintillator for Applications to Neutrino Detectors," *JINST* **7** (2012) P07010, arXiv:1202.4733 [physics.ins-det], (11 Pages). **(RESEARCH ARTICLE - Lead Author)**.

[A15] Double Chooz Collaboration, Y. Abe *et al.*, "Indication for the disappearance of reactor electron antineutrinos in the Double Chooz experiment," *Phys.Rev.Lett.* **108** (2012) 131801, arXiv:1112.6353 [hep-ex], (7 Pages). **(RESEARCH ARTICLE - Lead Author)**.

[A16] C. Jones, A. Bernstein, J. Conrad, Z. Djurcic, M. Fallot, L. Giot, G. Keefer, A. Onillon, and L. Winslow, "Reactor Simulation for Antineutrino Experiments using DRAGON and MURE," *Phys.Rev.* **D86** (2012) 012001, arXiv:1109.5379 [nucl-ex], (10 Pages). **(RESEARCH ARTICLE - Lead Author)**.

[A17] J. Lopez, K. Terao, J. Conrad, D. Dujmic, and L. Winslow, "A Prototype Detector for Directional Measurement of the Cosmogenic Neutron Flux," *Nucl.Instrum.Meth.* **A673** (2012) 22–31, arXiv:1108.4894 [physics.ins-det], (26 Pages). **(RESEARCH ARTICLE - Lead Author)**.

[A18] KamLAND Collaboration, S. Abe *et al.*, "Measurement of the 8B Solar Neutrino Flux with the KamLAND Liquid Scintillator Detector," *Phys.Rev.* **C84** (2011) 035804, arXiv:1106.0861 [hep-ex], (6 Pages). **(RESEARCH ARTICLE - Lead Author)**.

[A19] E. Adelberger *et al.*, "Solar fusion cross sections II: the pp chain and CNO cycles," *Rev.Mod.Phys.* **83** (2011) 195, arXiv:1004.2318 [nucl-ex], (54 Pages). **(REVIEW ARTICLE)**.

[A20] KamLAND Collaboration, S. Abe *et al.*, "Production of Radioactive Isotopes through Cosmic Muon Spallation in KamLAND," *Phys.Rev.* **C81** (2010) 025807, arXiv:0907.0066 [hep-ex], (16 Pages). **(RESEARCH ARTICLE - Lead Author)**.

[A21] KamLAND Collaboration, B. Berger *et al.*, "The KamLAND Full-Volume Calibration System," *JINST* **4** (2009) P04017, arXiv:0903.0441 [physics.ins-det], (30 Pages). **(RESEARCH ARTICLE - Lead Author)**.

[A22] KamLAND Collaboration, S. Abe *et al.*, "Precision Measurement of Neutrino Oscillation Parameters with KamLAND," *Phys.Rev.Lett.* **100** (2008) 221803, arXiv:0801.4589 [hep-ex], (5 Pages). **(RESEARCH ARTICLE)**.

[A23] KamLAND Collaboration, T. Araki *et al.*, "Search for the invisible decay of neutrons with KamLAND," *Phys.Rev.Lett.* **96** (2006) 101802, arXiv:hep-ex/0512059 [hep-ex], (5 Pages). **(RESEARCH ARTICLE)**.

[A24] KamLAND Collaboration, T. Araki *et al.*, "Experimental investigation of geologically produced antineutrinos with KamLAND," *Nature* **436** (2005) 499–503, (5 Pages). **(RESEARCH ARTICLE)**.

[A25] KamLAND Collaboration, T. Araki *et al.*, "Measurement of neutrino oscillation with KamLAND: Evidence of spectral distortion," *Phys.Rev.Lett.* **94** (2005) 081801, arXiv:hep-ex/0406035 [hep-ex], (5 Pages). **(RESEARCH ARTICLE)**.

[A26] KamLAND Collaboration, K. Eguchi *et al.*, "A High sensitivity search for anti-nu(e)'s from the sun and other sources at KamLAND," *Phys.Rev.Lett.* **92** (2004) 071301, arXiv:hep-ex/0310047 [hep-ex], (5 Pages). **(RESEARCH ARTICLE)**.

[A27] KamLAND Collaboration, K. Eguchi *et al.*, "First results from KamLAND: Evidence for reactor anti-neutrino disappearance," *Phys.Rev.Lett.* **90** (2003) 021802, arXiv:hep-ex/0212021 [hep-ex], (6 Pages). **(RESEARCH ARTICLE)**.

B. Unrefereed Publications:

[B1] DAEdALUS Collaboration, C. Aberle *et al.*, "Whitepaper on the DAEdALUS Program," arXiv:1307.2949 [physics.acc-ph], (19 Pages). **(WHITEPAPER)**.

[B2] L. Winslow, "Next-Generation Liquid-Scintillator-Based Detectors: Quantums Dots and Picosecond Timing," arXiv:1307.2929 [physics.ins-det], (2 Pages). Whitepaper for Snowmass 2013. **(WHITEPAPER)**.

[B3] DAEdALUS Collaboration, A. Adelmann *et al.*, "Cost-effective Design Options for IsoDAR," arXiv:1210.4454 [physics.acc-ph], (33 Pages). **(RESEARCH ARTICLE)**.

[B4] L. Winslow, "The KamLAND muon tracking system," *Nucl.Phys.Proc.Suppl.* **221** (2011) 414, (1 Pages). Proceedings from Neutrino 2006. **(CONFERENCE PROCEEDINGS)**.

[B5] L. Winslow, "Simulation of Reactors for Antineutrino Experiments Using DRAGON," arXiv:1109.6632 [nucl-ex], (5 Pages). Proceedings from DPF 2011. **(CONFERENCE PROCEEDINGS)**.

[B6] DAEdALUS Collaboration, J. Alonso *et al.*, "A Study of Detector Configurations for the DUSEL CP Violation Searches Combining LBNE and DAEdALUS," arXiv:1008.4967 [hep-ex], (12 Pages). **(RESEARCH ARTICLE)**.

[B7] DAEdALUS Collaboration, J. Alonso *et al.*, "Expression of Interest for a Novel Search for CP Violation in the Neutrino Sector: DAEdALUS," arXiv:1006.0260 [physics.ins-det], (97 Pages). **(LETTER OF INTENT)**.

[B8] R. Jerry, L. Winslow, L. Bugel, and J. Conrad, "A Study of the Fluorescence Response of Tetraphenyl-Butadiene," `arXiv:1001.4214 [physics.ins-det]`, (10 Pages). **(RESEARCH ARTICLE)**.

[B9] L. A. Winslow, *First Solar Neutrinos from KamLAND: A Measurement of the B-8 Solar Neutrino Flux*. PhD thesis, University of California, Berkeley, 2008. ISBN-9781109098198.