

## RESEARCH EXPERIENCE

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KAMLAND (KAMIOKA LIQUID SCINTILLATOR ANTINEUTRINO DETECTOR) 2009 - 2016

*Research Assistant, University of Hawaii at Manoa*

- Spearheaded development of novel directional neutrino detection technique in scintillator and demonstrated with data for the first time that this can be applied to conduct indirect dark matter searches in scintillator; first ever physics application of neutrino directionality in scintillator
- Led unprecedented particle ID capability studies in scintillator using track profile reconstruction techniques using never before observed T2K events spilling into KamLAND
- Was responsible for high energy ( $\gtrsim 1$  GeV) energy calibration using cosmic ray muons and applying this to neutrino analysis for first time

MINI-TIMECUBE (WORLD'S SMALLEST PORTABLE NEUTRINO DETECTOR) 2009 - 2016

*Research Assistant, University of Hawaii at Manoa*

- Led development of Geant4 detector simulation with team of 3 undergraduate students to conducted case studies of neutron capture doping agents in solid scintillator. Simulation results were later used to guide overall detector design during construction
- Was responsible for background studies associated with long lived cosmogenic isotopes  $^8\text{He}/^9\text{Li}$  to quantitatively determine effect on detector live time

HANO HANO (DEEP SEA-BASED MONOLITHIC SCINTILLATOR NEUTRINO DETECTOR) 2009 - 2010

*Research Assistant, University of Hawaii at Manoa*

- AAA
- BBB

CUORE (CRYOGENIC UNDERGROUND OBSERVATORY FOR RARE EVENTS) APR. 2016 - Current

*Post-doctoral Scholar, University of California, Los Angeles (UCLA)*

- Spearheading development of precision  $\alpha$  background modeling in collaboration with a graduate student with goal for further background reduction to cover inverted neutrino mass hierarchy of  $0\nu\beta\beta$  decay in  $^{130}\text{Te}$
- Mentored and worked with 2 undergraduate students for investigation of shielding structures to mitigate  $\gamma/\beta$  backgrounds for next generation  $0\nu\beta\beta$  decay searches requiring ultra-low background levels

## LEADERSHIP AND TEACHING EXPERIENCE

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MENTOR, UCLA 2016 - Current

- Taught weekly Geant4 tutorials to 3 PhD students and 3 undergraduate students for 1 semester; students are now able to take on simulation projects of their own and make original contribution

TEACHING ASSISTANT, University of Hawaii at Manoa 2007 - 2009

- Planned classwork and taught 2 weekly undergraduate Physics Laboratory classes of over 20 students each for 3 semesters, received "excellent" reviews
- Mentored undergraduate students in undergraduate Physics classwork for 2 hours each week for 3 semesters

## SKILLS

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Human Languages:	English (native), Japanese/Korean (trilingual proficiency)
Programming Languages:	Proficient in C, C++, Python, Fortran, Mathematica, Bash
Software/Tools:	ROOT, GEANT4, PADS, AUTOCAD

## EDUCATION

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PHD, EXPERIMENTAL NEUTRINO PHYSICS	2016
GPA: 4.0/4.0, University of Hawaii at Manoa	
Dissertation: High Energy Neutrino Analysis at KamLAND and Application to Dark Matter Search	
GRADUATE PROGRAM IN MATHEMATICS	2006
GPA: 4.5/4.5, Sun Moon University, S. Korea	
DOUBLE BS, PHYSICS AND MATHEMATICS	2005
GPA: 4.3/4.5, Sun Moon University, S. Korea	
President's Award 2005, Award for Outstanding Academic Achievement – Samsung Corp.	

## TALKS AND PRESENTATIONS

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- (Tentative) Monte Carlo Tools for Beyond the Standard Model Physics, Durham, UK Apr 2018  
Invited Talk: MONTE CARLO TOOLS IN CUORE
- Argonne National Laboratory Feb 2018  
Seminar: CUORE: A BOLOMETRIC SEARCH FOR LEPTON NUMBER VIOLATION
- Division of Nuclear Physics, Pittsburgh/Carnegie Mellon University Oct 2017  
Talk: CUORE AND BACKGROUND REDUCTION CASE STUDIES FOR CUPID
- Conference on Science at SURF, South Dakota May 2017  
Invited talk: STATUS OF THE CUORE  $0\nu\beta\beta$  DECAY SEARCH
- Fermilab - Frontiers of Liquid Scintillator Technology Mar 2016  
Invited talk: PARTICLE ID AND EVENT RECONSTRUCTION ALGORITHMS IN SCINTILLATOR
- Los Alamos National Laboratory Nov 2015  
Seminar: HIGH ENERGY ANALYSIS AT KAMLAND AND APPLICATION TO DARK MATTER SEARCH
- California Institute of Technology Nov 2015  
Seminar: HIGH ENERGY ANALYSIS AT KAMLAND AND APPLICATION TO DARK MATTER SEARCH
- University of California, Los Angeles Oct 2015  
Seminar: HIGH ENERGY ANALYSIS AT KAMLAND AND APPLICATION TO DARK MATTER SEARCH
- DOE project review, Honolulu, Hawaii Jul 2015  
Talk: HIGH ENERGY ANALYSIS AND APPLICATION TO DARK MATTER SEARCH IN KAMLAND
- Neutrino, Kyoto, Japan Jun 2012  
Poster: INDIRECT DARK-MATTER DETECTION THROUGH KAMLAND
- University of Hawaii Campus Open-house Nov 2010, 2011  
Talks: WHAT IS A NEUTRINO?, MINI-TIMECUBE: THE WORLD'S SMALLEST NEUTRINO DETECTOR
- Applied Antineutrino Physics, Sendai, Japan Aug 2010  
Talk: MINI-TIMECUBE: A PORTABLE DIRECTIONAL NEUTRINO DETECTOR
- DOE project review, Honolulu, Hawaii Sep 2009  
Talk: KAMLAND SUMMARY
- Fermilab - International Neutrino Summer School Jul 2009  
Talk: STUDENT PRESENTATION: HOW TO SOLVE  $\theta_{23}$  DEGENERACY

## PUBLICATIONS

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- [1] C. Alduino *et al.*, “Study of Rare Nuclear Processes with CUORE,” *Submitted to: Int. J. Mod. Phys. A*, 2018.
- [2] C. Alduino *et al.*, “First Results from CUORE: A Search for Lepton Number Violation via  $0\nu\beta\beta$  Decay of  $^{130}\text{Te}$ ,” *Phys. Rev. Lett.*, vol. 120, no. 13, p. 132501, 2018.
- [3] C. Alduino *et al.*, “Search for Neutrinoless  $\beta^+EC$  Decay of  $^{120}\text{Te}$  with CUORE-0,” 2017.
- [4] N. Moggi *et al.*, “Results from CUORE and CUORE-0,” *AIP Conf. Proc.*, vol. 1894, no. 1, p. 020016, 2017.
- [5] C. Alduino *et al.*, “Low Energy Analysis Techniques for CUORE,” *Eur. Phys. J.*, vol. C77, no. 12, p. 857, 2017.
- [6] C. Alduino *et al.*, “CUORE sensitivity to  $0\nu\beta\beta$  decay,” *Eur. Phys. J.*, vol. C77, no. 8, p. 532, 2017.
- [7] C. Alduino *et al.*, “The projected background for the CUORE experiment,” *Eur. Phys. J.*, vol. C77, no. 8, p. 543, 2017.
- [8] A. Gando *et al.*, “A search for electron antineutrinos associated with gravitational wave events GW150914 and GW151226 using KamLAND,” *Astrophys. J.*, vol. 829, no. 2, p. L34, 2016. [Erratum: *Astrophys. J.* 851, no. 1, L22(2017)].
- [9] V. A. Li *et al.*, “Invited Article: miniTimeCube,” *Rev. Sci. Instrum.*, vol. 87, no. 2, p. 021301, 2016.
- [10] K. Asakura *et al.*, “Search for the proton decay mode  $p \rightarrow \bar{\nu}K^+$  with KamLAND,” *Phys. Rev.*, vol. D92, no. 5, p. 052006, 2015.
- [11] K. Asakura *et al.*, “KamLAND Sensitivity to Neutrinos from Pre-Supernova Stars,” *Astrophys. J.*, vol. 818, no. 1, p. 91, 2016.
- [12] C. Lane *et al.*, “A new type of Neutrino Detector for Sterile Neutrino Search at Nuclear Reactors and Nuclear Nonproliferation Applications,” 2015.
- [13] K. Asakura *et al.*, “Study of electron anti-neutrinos associated with gamma-ray bursts using KamLAND,” *Astrophys. J.*, vol. 806, no. 1, p. 87, 2015.
- [14] T. I. Banks *et al.*, “A compact ultra-clean system for deploying radioactive sources inside the KamLAND detector,” *Nucl. Instrum. Meth.*, vol. A769, pp. 88–96, 2015.
- [15] A. Gando *et al.*, “ $^7\text{Be}$  Solar Neutrino Measurement with KamLAND,” *Phys. Rev.*, vol. C92, no. 5, p. 055808, 2015.
- [16] S. Abe *et al.*, “Measurement of the 8B Solar Neutrino Flux with the KamLAND Liquid Scintillator Detector,” *Phys. Rev.*, vol. C84, p. 035804, 2011.
- [17] J. Kumar, J. G. Learned, M. Sakai, and S. Smith, “Dark Matter Detection With Electron Neutrinos in Liquid Scintillation Detectors,” *Phys. Rev.*, vol. D84, p. 036007, 2011.

## REFERENCES

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Supplied upon request or please contact in person.

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