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EDUCATION and EMPLOYMENT

Indiana University	**Assistant Professor**, Physics	2002-present
Harvard University	**Research Associate**, Physics	1999-2002
Boston University	**Ph.D.**, Physics	1994-1999
Congressional Research Service, Library of Congress		1993-1994
Massachusetts Institute of Technology	**B.S.**, Physics	1989-1993

RESEARCH

Department of Energy Outstanding Junior Investigator
Awarded in 2003 for "Development of an Experiment to Search for Oscillations of ν_μ to ν_e Using the NuMI Neutrino Beam".

NOvA Experiment (FNAL E929)
• Elected co-spokesman for 2006-2008 term.
• The NOvA experiment is to be placed in the NuMI beamline to search for electron neutrino appearance. The experiment plans to operate a prototype detector in the NuMI beam in 2007 and complete the full detector in 2011. Responsibilities include calculations of the neutrino fluxes at various proposed detector locations, R&D of the possible use and locations of a near detector. Working with an undergraduate student to develop the scientific case for supernova detection by the NOvA experiment.

MINOS and MIPP Experiments (FNAL E875 and E907)
• Studies of the quality of proton-nucleus interaction cross-sections and their impact on the prediction of the MINOS neutrino spectra. Work on MIPP experiment (Fermilab E907) which will make measurements of hadron production in support of the MINOS experiment. Primary responsibilities on MIPP was refurbishment and maintenance of the RICH counter, a 10 m long, 2.4 m diameter vessel viewed by 2848 1/2" photomultiplier tubes and coordination of running using the NuMI/MINOS target. Additional responsibilities include construction of a portion of the interaction trigger used by the experiment during thin target running, and construction of the trigger used during NuMI target running. Other responsibilities include coordination and production of a portion of the online software as well as the offline reconstructions tools for use by the entire experiment. To date, the MIPP experiment has collected a total of 15 million events on nuclear targets ranging from H_2 to Bi. Of particular importance to MINOS are the 1.5M events collected on the NuMI target. Supervising one post-doc researcher and a graduate student who will complete thesis work on the MIPP experiment.
• NuMI Beam Monte Carlo Coordinator and Neutrino Beam Systematics Working Group Coordinator with responsibility for the development and maintenance of beam transport Monte Carlo simulation programs used to predict the MINOS neutrino fluxes, optimize beam line design, and estimate the backgrounds and sources of uncertainties in physics measurements.

Will include incorporation of the data from MIPP when it is available.
• Chair of the atmospheric neutrino paper committee, MINOS's first publication of physics data recorded with the far detector.
• Supervise and guide work by graduate students as well as summer undergraduate students. Projects include development of DAQ monitoring software for the MIPP experiment, and studies of the optimal representation of the MINOS magnetic field in software.

Super–Kamiokande Experiment (1996-2006)
• Continued data analysis in the Atmospheric Neutrino and Proton Decay group, including analysis of oscillations of muon neutrinos to mixed sterile and active states which limits coupling muon neutrinos to sterile states. Worked with IU Professor Alan Kostelecky to investigate possible signatures of CPT violation in the SK atmospheric neutrino data.
• Work on paper committees for combined analysis of SK-I fully-contained, partially-contained, and upward-going muon atmospheric neutrino data, and analysis of the possibility of neutrino decay.
• Supervised REU student who studied alternate reconstruction techniques to separate multi-prong events from single-prong events.

Boston University 1995-1999
Super–Kamiokande Experiment, Research Assistant with Professor James Stone
Thesis: Evidence for Oscillations of Atmospheric Neutrinos with Super–Kamiokande
• Primary author *Phys. Rev. Let.*: "Evidence for oscillation of atmospheric neutrinos".
• Coordinated construction, testing, and maintenance of outer-detector front-end electronics: 2000 channels of charge-to-time converter circuits including coincidence trigger.

Congressional Research Service, Library of Congress 1993-1994
• Conducted survey of state support for environmental technology R&D.

Massachusetts Institute of Technology 1992-1993
Radio Astronomy
Undergraduate Research with Professor Jacqueline Hewitt
Thesis: A Search for Variability in the Einstein Ring MG1131+0456
• Examined the suitability of the gravitational lens system MG1131+0456 for use in Hubble constant measurement.

TEACHING

Indiana University

• Awarded Department of Physics Excellence in Teaching Award, 2004
• Nominated by students for Student Alumni Association Student Choice Award, 2004
• Spring 2005: P453, Quantum physics I for undergraduates
• Fall 2004 and 2005: Instructor for P309, Intermediate Physics Laboratory. Laboratory course for 2nd year physics majors covering topics in electronics, mechanics, vibrations and waves, and atomic physics. Introduction to basic data analysis techniques, error analysis, and statistics.
• Fall 2004: Instructor for P801, Readings in physics. Devised an individual course of study for graduate student who was preparing for PhD qualifying examination.
• Fall 2002 - Spring 2004: Instructor for P221 (fall semesters) and P222 (spring semesters), Physics I and II for science majors, calculus based. Textbook by Halliday, Resnick, and Walker. Led lecture and discussion sections.

SERVICE, LEADERSHIP, and OUTREACH

• U.S. coordinator for the neutrino oscillations working group for the Neutrino Factory workshops in 2005 and 2006
• Organized IU High energy physics seminars 2002-2005.
• Department committee work including graduate admissions, graduate recruitment day, department awards, and computer facilities.
• Elected to the Fermilab User's Executive Committee, 2003-2004
• Reviewed experimental proposals for DOE and NSF
• Participated in discussions of revisions to the neutrino pages in the particle data handbook in light of recent neutrino oscillation results.
• Participated in meetings at the Indiana Department of Education to set content and format of the high school Physics Core 40 End-of-Course Assessment test.
• Presented talks about neutrino physics to group of high school teachers visiting IU, groups of undergraduate physics club students visiting IU, and to general public at IU's annual physics open house.

PUBLICATIONS

[1] "Evidence for oscillation of atmospheric neutrinos," Y. Fukuda *et al.*, *Phys. Rev. Lett.***81** (1998) 1562 [arXiv:hep-ex/9807003].
[2] "Proposal for continuously-variable neutrino beam energy for the NuMI facility", M.Kostin *et al.*, FERMILAB-TM-2353-AD, July 2006.
[3] "Review of neutrino oscllations experiments", M. D. Messier, eConf **C060409**, 018 (2006) [arXiv:hep-ex/0606013].
[4] "Search for diffuse astrophysical neutrino flux using ultra-high energy upward-going muons in Super-Kamiokande I," M. E. C. Swanson *et al.*, submitted to Astrophys.J., arXiv:astro-ph/0606126.
[5] "High energy neutrino astronomy using upward-going muons in Super-Kamiokande-I," K. Abe *et al.*, submitted to Astrophys.J., arXiv:astro-ph/0606413.
[6] "Three flavor neutrino oscillation analysis of atmospheric neutrinos in Super-Kamiokande," J. Hosaka *et al.*, Phys. Rev. D **74**, 032002 (2006). [arXiv:hep-ex/0604011].

[7] "Summary of the neutrino oscillations working group at NuFact05," K. Long, M. D. Messier and O. Yasuda, Nucl. Phys. Proc. Suppl. **155**, 102 (2006).
[8] "First observations of separated atmospheric ν_μ and anti-ν_μ events in the MINOS detector," P. Adamson *et al.* [MINOS Collaboration], Phys. Rev. D **73**, 072002 (2006) [arXiv:hep-ex/0512036].
[9] "Solar neutrino measurements in Super-Kamiokande-I," J. Hosaka *et al.* [Super-Kamkiokande Collaboration], arXiv:hep-ex/0508053.
[10] "Observation of the anisotropy of 10-TeV primary cosmic ray nuclei flux with the Super-Kamiokande-I detector," G. Guillian *et al.* [Super-Kamiokande Collaboration], arXiv:astro-ph/0508468.
[11] "Search for nucleon decay via modes favored by supersymmetric grand unification models in Super-Kamiokande-I," K. Kobayashi *et al.* [Super-Kamiokande Collaboration], arXiv:hep-ex/0502026.
[12] "A measurement of atmospheric neutrino oscillation parameters by Super-Kamiokande I," Y. Ashie *et al.* [Super-Kamiokande Collaboration], Phys. Rev. D **71**, 112005 (2005) [arXiv:hep-ex/0501064].
[13] "Testing CPT conservation using atmospheric neutrinos", M.D.Messier for the Super–Kamiokande Collaboration, Proceedings of the *Third Meeting On CPT and Lorentz Symmetry (CPT'04)*, Indiana University, Bloomington, Indiana, August 4-7, 2004.
[14] "NOvA: Proposal to build an off-axis detector to study muon-neutrino to electron-neutrino oscillations in the NuMI beamline", I. Ambats *et al.*[NOvA Collaboration]. FERMILAB-PROPOSAL-0929, Mar 2004.
[15] "Evidence for an oscillatory signature in atmospheric neutrino oscillation", Y. Ashie *et al.*[Super–Kamiokande Collaboration], Phys.Rev.Lett.**93**:101801,2004. [arXiv:hep-ex/0404034].
[16] "Search for dark matter wimps using upward through-going muons in Super–Kamiokande", S. Desai *et al.*[Super–Kamiokande Collaboration], Submitted to Phys.Rev.D [arXiv:hep-ex/0404025].
[17] "Limits on the neutrino magnetic moment using 1496 days of Super–Kamiokande-I solar neutrino data", D.W. Liu *et al.*[Super–Kamiokande Collaboration], Phys.Rev.Lett.**93**:021802,2004 [arXiv:hep-ex/0402015].
[18] "Precise measurement of the solar neutrino day/night and seasonal variation in Super-Kamiokande-I," M.B. Smy *et al.*[Super-Kamiokande Collaboration], Phys.Rev.**D69**:011104,2004 [arXiv:hep-ex/0309011].
[19] "A search for periodic modulations of the solar neutrino flux in Super-Kamiokande-I," J. Yoo *et al.*[Super-Kamiokande Collaboration], Phys.Rev.**D68**:092002,2003 [arXiv:hep-ex/0307070].
[20] "The MINOS Experiment", M. D. Messier, *Prepared for 3rd Workshop on Neutrino Oscillations and Their Origin (NOON 2001), Kashiwa, Japan, 5-8 Dec 2001*
[21] "Status of the atmospheric neutrino studies," M. D. Messier, *Prepared for 3rd Workshop on Neutrino Oscillations and Their Origin (NOON 2001), Kashiwa, Japan, 5-8 Dec 2001*
[22] "The Super-Kamiokande detector," Y. Fukuda *et al.*, Nucl. Instrum. Meth. A **501**, 418 (2003).
[23] "Detector R&D for future neutrino experiments with the NuMI beamline," G. Barenboim *et al.*, FERMILAB-PUB-02-377-E [arXiv:hep-ex/0304017].
[24] "Search for anti-ν_e from the sun at Super-Kamiokande-I," Y. Gando *et al.*

[Super-Kamiokande Collaboration], Phys. Rev. Lett. **90**, 171302 (2003) [arXiv:hep-ex/0212067].
[25] "The Minos Scintillator Calorimeter System," P. Adamson *et al.* [MINOS Collaboration], IEEE Trans. Nucl. Sci. **49**, 861 (2002).
[26] "Letter of intent to build an off-axis detector to study nu/mu → nu/e oscillations with the NuMI neutrino beam," D. Ayres *et al.*, arXiv:hep-ex/0210005.
[27] "Search for supernova relic neutrinos at Super-Kamiokande," M. Malek *et al.* [Super-Kamiokande Collaboration], arXiv:hep-ex/0209028.
[28] "The hadron hose: Continuous toroidal focusing for conventional neutrino beams," J. Hylen *et al.*, Nucl. Instrum. Meth. A **498**, 29 (2003) [arXiv:hep-ex/0210051].
[29] "The hadron hose: Continuous toroidal focusing for conventional neutrino beams," J. Hylen *et al.*, arXiv:hep-ex/0210051.
[30] "Determination of solar neutrino oscillation parameters using 1496 days of Super–Kamiokande-I data," S. Fukuda *et al.*, *Phys. Lett.* **B539**, 179 (2002).
[31] "Search for neutrinos from gamma-ray bursts using Super-Kamiokande," S. Fukuda *et al.*, arXiv:astro-ph/0205304.
[32] "Atmospheric Neutrino Results From Super-Kamiokande," M. D. Messier, Int. J. Mod. Phys. A **16S1B**, 733 (2001).
[33] "Constraints on neutrino oscillations using 1258 days of Super–Kamiokande solar neutrino data", S.Fukuda *et al.*, *Phys. Rev. Lett.* **86** (2001) 5656-5660. hep-ex/0103033
[34] "Solar B^8 and hep neutrino measurements from 1258 days of Super–Kamiokande data", S.Fukuda *et al.*, *Phys. Rev. Lett.***86** (2001) 5651-5655. hep-ex/0103033
[35] "Tau neutrinos favored over sterile neutrinos in atmospheric muon neutrino oscillations", S.Fukuda *et al.*, *Phys. Rev. Lett.***85** (2000) 3999, hep-ex/0009001.
[36] "Neutrino induced upward stopping muons in Super-Kamiokande", Y.Fukuda *et al.*, *Phys. Lett.* **B467** (1999), 185. hep-ex/9908049.
[37] "Observation of the east-west anisotropy of the atmospheric neutrino flux.", T.Futagami *et al.*, *Phys. Rev. Lett.***82**, (1999), 5194. astro-ph/9901139.
[38] "Measurement of the flux and zenith angle distribution of the upward through going muons by Super-Kamiokande", Y.Fukuda *et al.*, *Phys. Rev. Lett.***82**, (1999), 2644. hep-ex/9812014.
[39] "Study of the atmospheric neutrino flux in the multi-GeV energy range", Y.Fukuda *et al.*, *Phys. Lett.* **B436** (1998) 33. hep-ex/9805006
[40] "Measurement of a small atmospheric ν_μ/ν_e ratio", Y.Fukuda *et al..*, *Phys. Lett.* **B433** (1998) 9. hep-ex/9803006
[41] "Search for proton decay through $p \to \bar{\nu}K^+$ in a large water Cherenkov detector", Y.Hayato *et al..*, *Phys. Rev. Lett.***83** (1999) 1529. hep-ex/9904020.
[42] "Search for proton decay via $p \to e^+\pi^0$ in a large water Cherenkov detector", M.Shiozawa *et al.*, *Phys. Rev. Lett.***81** (1998) 3319. hep-ex/9806014
[43] "Measurement of the solar neutrino energy spectrum using neutrino electron scattering", Y.Fukuda *et al.Phys. Rev. Lett.***82** (1998) 2430. hep-ex/9812011.
[44] "Constraints on neutrino oscillation parameters from the measurement of the day night solar neutrino fluxes at Super-Kamiokande", Y.Fukuda *et al.Phys. Rev. Lett.***82** (1999) 1810. hep-ex/9812009.
[45] "Measurements of the solar neutrino flux from Super-Kamiokande's first 300 days", Y.Fukuda *et al.*, *Phys. Rev. Lett.***81** (1998) 1158. hep-ex/9805021

[**46**] "Measurement of Radon concentrations at Super-Kamiokande", Y.Takeuchi *et al.*. *Phys. Lett.* **B452** (1999) 418. hep-ex/9903006.
[**47**] "Calibration of Super-Kamiokande using an electron linac", Y.Fukuda *et al.*, *Nuclear Instruments and Methods* **A421** (1999) 113. hep-ex/9807027
[**48**] "Variability in the Einstein ring gravitational lens MG 1131+0456", J.N.Hewitt, G.H.Chen, M.D.Messier, Astronomical Journal **109**, (1995) 1956.

PRESENTATIONS

Neutrino oscilation working group report - Experiments, 8$^{\text{th}}$ International Workshop on Neutrino Factories, Superbeams, and Betabeams, UC Irvine, California, August 24-30, 2006.
NOvA and Other U.S. Activities, 2nd International Workshop on a Far Detector in Korea for the J-PARC Neutrino Beam, Soeul, Korea, July 13,14. 2006.
The MIPP Experiment at Fermilab, III International Workshop on "Neutrino Oscillations in Venice", Istituto Veneto di Scienze, Lettere ed Arti, Palazzo Franchetti - Campo S.Stefano Venice, Italy. February 7-10, 2006,

The MIPP Experiment, 5$^{\text{th}}$ International Workshop on Neutrino Beams and Instrumentation, Fermilab, IL, July 6-11, 2005.

Physics reach of future superbeam facilities, Plenary talk to the 7$^{\text{th}}$ International Workshop on Neutrino Factories and Superbeams, Frascati, Italy, June 21-26, 2005.

Atmospheric and Accelerator Neutrinos Experiments, Invited talk, Joint meeting of the DPF and DNP divisions of the American Physical Society, Tampa, FL, April 16-19, 2005.

Life in the Neutrino Matrix, Current and Future Directions in Neutrino Physics, Physics Department Colloquium, Indiana University, February 2, 2005.
Much Ado About (Almost!) Nothing: Experimental Searches for Neutrino Mass and Mixing, Physics Department Colloquium, Boston University, October 19, 2004.

The NOvA Experiment, XXIst International Conference on Neutrino Physics and Astrophysics (Neutrino'04), Paris, France, June 14-19, 2004.

Capabilities of a Super–Kamiokande Class Detector for Use in Long Baseline Experiments, Neutrino Super Beam, Detectors and Proton Decay, Joint BNL/UCLA - American Physical Society Workshop, Brookhaven National Laboratory, March 3-5, 2004.

Pion Production Experiments, Weak Interactions and Neutrinos (WIN'03), Lake Geneva, Wisconsin, October 6-11, 2003.

The MIPP Experiment, Indiana University Cyclotron Facility Seminar Series, January 31, 2003.

Experimental Search for Neutrino Oscillations, Physics Department Colloquium, Indiana University, November 6, 2002.

ICHEP Conference Summary (Neutrinos and Particle Astrophysics), HEP Seminar, Indiana University, September 9, 2002.

Electron Neutrino Appearance Searches, New Initiatives for the NuMI Neutrino Beam, Fermilab, May 2002.

Latest News on NuMI Beam Simulations, and, *E907 Experiment Status*, 3$^{\text{rd}}$ International Workshop on Neutrino Beams and Instrumentation, CERN, March 2002.

Neutrino Oscillations with Super–Kamiokande and MINOS, HEP Seminar, Indiana University, February 25, 2002.

Present status of the atmospheric neutrino studies, and, *The MINOS Experiment*, Neutrino Oscillations and their Origin (NOON2001), ICRR, Univ. of Tokyo, Japan, December 2001.

Atmospheric Neutrino and Proton Decay Results from Super–Kamiokande, and, *Water Cherenkov Detectors as Targets for Long-baseline Experiments*, Conference on Underground Science, Lead, South Dakota, October 2001.

The MINOS Experiment, PHENO 2001 Symposium, University of Wisconsin, Madison, May 2001.

Simulation of the NuMI Neutrino Beam, 2nd International Workshop on Neutrino Beams and Instrumentation, Fermilab, September 2000.

Atmospheric Neutrino Oscillation Results from Super-Kamiokande, American Physical Society, Division of Particles and Fields Conference (DPF'00), Columbus, OH, August 2000.

Super-Kamiokande and Feldman-Cousins, Workshop on Confidence Limits, Fermilab, March 2000.

Neutrino Oscillations at Super-Kamiokande and MINOS, Seminar, University of Massachusetts, Amherst, February 2000.

Update on the Super-Kamiokande and K2K Experiments, UK HEP Forum on Neutrino Physics, Abington, UK, June 1999.

Atmospheric Neutrinos in Super-Kamiokande, American Physical Society, Division of Particles and Fields Conference (DPF'99), UCLA, January 1999.