
CURRICULUM VITAE

EMILY MAHER

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EDUCATIONAL BACKGROUND

- 09/99 – 10/05 University of Minnesota, Minneapolis, MN
Ph.D., Department of Physics, emphasis on experimental high energy physics
Thesis: “A Measurement of the Interaction Charged-Current Cross Section of the
Tau Neutrino”
- 09/95 – 05/99 Hendrix College, Conway, AR
B.A., Department of Physics

TEACHING EXPERIENCE

- 06/12 - present Chair of the physics department at Massachusetts College of Liberal Arts (MCLA),
North Adams, MA
- 05/11 – present Associate Professor, MCLA
- 09/06 – 05/11 Assistant Professor, MCLA
Course taught for non-majors: Concepts of Physics, Quarks and Quasars, Energy
and the Environment with Lab
Courses taught for majors: Introduction to Mechanics, Introduction to Electricity
and Magnetism, Introduction to Waves, Optics, and Thermodynamics, Classical Me-
chanics I & II, Methods of Experiential Physics I & II (electronics and modern physics
experiments), Modern Physics I & II, Advanced Physics Laboratory I & II (semester-
long group and individual research projects), Introduction to Particle Physics, Ad-
vanced Electricity and Magnetism, Quantum Mechanics, and Physics Seminar
- 08/05 – 09/06 Visiting Assistant Professor, College of the Holy Cross, Worcester, MA
Courses taught: General Physics 1 & 2, Mathematical Methods of Physics, Topics in
Physics: Science in the News
- 01/05 – 05/05 Adjunct Professor, University of St. Thomas, St. Paul, MN
Course taught: Modern Physics
- 09/03 – 12/03 Teaching Assistant, University of Minnesota, Minneapolis, MN
Course taught: Methods of Experimental Physics I. Included digital and analog elec-
tronics and experimental methods
- 06/02 – 08/02 Co-taught course, University of Minnesota, Minneapolis, MN
Introductory Physics for Science and Engineering I. Taught this course with Professor
Jim Eckert (Harvey Mudd College). We devised homeworks and exams together. We
also shared the lectures.

09/00 – 12/00	Head Teaching Assistant Introductory College Physics I. Was responsible for organizing course information and meetings in addition to the normal TA responsibilities
09/99 – 05/01	Teaching Assistant Introductory Physics for Science and Engineering I & II

TEACHING ACTIVITIES

01/15 - 05/15	Mentored a high school student through an internship program at Berkshire Arts and Technology Charter Public School (BART), helping her develop research skills and better understand careers in science.
09/13 – present	Serving on the advisory board for the STEM Pathways Program, which involves choosing grant candidates, working with these students throughout their time at MCLA, and overseeing the STEM mentors
09/13 - 08/14	During sabbatical leave, headed a curriculum reform in the MCLA physics department.
04/10	Berkshire County goes to College Day, which provides the opportunity for every sixth-grade student in the county to visit a local college campus in early April in an effort to raise awareness of college in Berkshire County residents at an early age
09/09 – 05/10	Co-Domain Leader for Core Curriculum Science and Technology (CCST) domain, which involved selecting a CCST outcome and working with all faculty teaching CCST courses to assess this outcome
06/08	Workshop Leader at an Expanding Your Horizons conference, a career conference designed to nurture girls' interest in science and mathematics, Berkshire Community College, Pittsfield, MA
05/07 – present	Judge for local and regional middle and high school science fairs
11/07	Attended AAPT/APS New Faculty Workshop for Physics Professors at the American Center for Physics, College Park, MD
11/04	Workshop Leader at an Eye to the the Future conference, a career conference for young women in math and science, Augsburg College, Minneapolis, MN
09/03 – 12/03	Completed a course in the Preparing Future Faculty program entitled, "Teaching in Higher Education". The PFF program provides a teaching and learning forum for graduate students. Program participants discuss learning theory and strategies, develop teaching and assessment skills, and create classroom materials.
06/03 – 08/03	Supervised students during a Research Experience for Undergraduates (REU) summer program at the University of Minnesota
01/02 – 05/02	Supervised undergraduate student in neutrino research project at the University of Minnesota
09/97 – 05/03	Private Tutor Tutored students in physics at the college level

RESEARCH EXPERIENCE

- 09/13 – 08/14 During my sabbatical leave, served as Medium Energy Data Quality Coordinators for the MINER ν A experiment. Arranged Medium Energy low-level data analysis, regular physics distribution production, and calibration procedure upgrades from the Low Energy run as needed.
- 06/12 – present Serving as Calibration Coordinator for the MINER ν A experiment. Oversaw and participated in calibrating all of our Low Energy data. Currently working with my group to calibrate the Medium Energy data. Run bi-weekly meetings to discuss current progress on calibrations, issues which arise, and solutions to said issues.
- 04/11 Reviewer for Proceedings of the National Conference on Undergraduate Research
- 09/07 – present Collaborator in MINER ν A (Main INjector ExepeRiment for ν -A), Fermilab Experiment 938, Batavia, IL and North Adams, MA
- Initially developed analysis and calibration code and participated in the installation and commissioning of the detector. Served as a member of the production group, which oversaw batch processing of the MINER ν A data. Served on the MINER ν A Speakers Committee and coordinated practice talks. Currently serve as calibrations coordinator and on the MINER ν A Executive Committee.
- Worked with three MCLA undergraduate students: Darsa Donelan (summer 2009), Max Eve (summer 2010), and Mike Testa (summer 2011). Each student spent at least one month at Fermilab, and each was involved in a project using both data and Monte Carlo simulations.
- 01/01 – 09/05 Research Assistant, DONuT (Direct Observation of Nu Tau), Fermilab Experiment 872, Minneapolis, MN
- Refined event location analysis software in an emulsion detector for the purposes of discovering the first interactions of the tau neutrino. Refined probability analysis for tau neutrino events. Measured the first interaction cross section of the tau neutrino.
- 06/01 – 08/02 Research Assistant, MINOS (Main Injector Neutrino Oscillation Search), Fermilab Experiment 875, Minneapolis, MN and Soudan, MN
- Constructed parts of the far detector for the MINOS experiment which is looking for neutrino oscillations. Installed and debugged electronics for data acquisition
- 06/99 – 08/99 Research Assistant, Fermilab Experiment 872, Minneapolis, MN
- Located neutrino events in emulsion data using software algorithms
- 05/98 – 03/99 Research Assistant, Hendrix College, Conway AR
- Developed methods to detect metallic ions in the plume of rockets. Contributed to the development of a ring laser gyroscope to measure variations in Earth's rate of rotation.

GRANTS AND AWARDS

- 2013 Awarded a five-year NSF grant (Award No. DUE-1356726) to MCLA under the direction of five MCLA faculty members. This project, entitled STEM Pathways Program allows us to select a group of students interested in a STEM major and provide both financial and moral support to these students as they progress through their majors at MCLA.

- 2013 Awarded Guest and Visitors Funds from Fermilab to fund a series of trips which allowed me to spend five months at Fermilab during my sabbatical leave. These funds also provided salary support.
- 2011 Received Guest and Visitor Funds from Fermilab to fund a six week trip to Fermilab with an MCLA student to collaborate on the MINERvA experiment
- 2008 Awarded a Cottrell College Science Award from the Research Corporation, a foundation for the advancement of science. Grant total: \$33,286
- 2008 Awarded a Faculty Incentive Award for Research Projects from MCLA
- 2007 Received Title 3 Project Grant for academic technology advancement from MCLA
- 2004 President's Student Leadership and Service Award, University of Minnesota
- 2001 Outstanding TA Award, University of Minnesota
- 1999 Graduated with highest distinction, Hendrix College
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PUBLICATIONS

- 2015 "Single neutral pion production by charged antineutrino interactions on plastic scintillator 4 GeV", L. Trung *et. al.* (MINERvA Collaboration), Phys. Lett. B749 130-136.
- 2015 "Measurement of muon proton final states in ν_μ CH interactions at average energy = 4 GeV", T. Walton *et. al.* (MINERvA Collaboration), Phys. Rev. D 91, 071301
- 2015 "MINERvA neutrino detector response measured with test beam data", L. Aliagaa *et. al.* (MINERvA Collaboration), Accepted by NIM A
- 2015 "Charged Pion Production from CH in a Neutrino Beam", B. Eberly *et. al.* (MINERvA Collaboration), Submitted to Phys. Rev. D
- 2014 "Measurement of Coherent Production of π^\pm in Neutrino and Anti-Neutrino Beams on Carbon from $E_{\nu\mu}$ of 1.5 to 20 GeV", A. Higuera, A. Mislivec *et. al.* (MINERvA Collaboration), Phys. Rev. Lett. 113, 261802 (2014)
- 2014 "MINERvA Searches for Wisdom Among Neutrinos", E. Maher, D. Harris, and K. McFarland, CERN Courier, April, 2014, 26-29.
- 2014 "Measurement of Ratios of Muon Neutrino Charged-Current Cross Sections on C, Fe, and Pb to CH at Neutrino Energies 2-20 GeV", B.G. Tice *et al.* (MINERvA Collaboration), Phys. Rev. Lett. 112, 231801.
- 2014 "Design, Calibration and Performance of the MINERvA Detector", L. Aliagia *et. al.* (MINERvA Collaboration), Nuclear Instruments and Methods, A743 (2014) 130.
- 2013 "Measurements of $d\sigma/dQ^2$ and Final State Nucleons in Muon Neutrino Quasi-Elastic Scattering on a Hydrocarbon Target", G. A. Fiorentini, D. W. Schmitz, P. A. Rodrigues *et al.* (MINERvA Collaboration), Phys. Rev. Lett. 111, 022502.
- 2013 "Measurement of $d\sigma/dQ^2$ in Muon Anti-Neutrino Quasi-Elastic Scattering on a Hydrocarbon Target", L. Fields, J. Chvojka *et al.* (MINERvA Collaboration), Phys. Rev. Lett. 111, 022501.
- 2012 "The MINERvA Data Acquisition System and Infrastructure", G. N. Perdue, *et. al.* (MINERvA Collaboration), Nuclear Instruments and Methods A: Volume 694, 179.
- 2012 "Arachne - A web-based event viewer for MINERvA", N. Tagg, *et. al.* (MINERvA Collaboration), Nuclear Instruments and Methods, v. 676, 44.

- 2012 “Communication using Neutrinos”, D. D. Stancil, *et. al.* (MINERvA Collaboration), Modern Phys. Lett. A 27, 1250077.
- 2008 “A First Measurement of the Interaction Cross Section of the Tau Neutrino”, K. Kodama, *et. al.*, Phys. Rev. D78.
- 2006 “Observation of Muon Neutrino Appearance with the MINOS Detectors in the NuMI Neutrino Beam”, D. G. Michael, *et. al.*, Phys. Rev. Lett. 97, 191801.
- 2006 “First Observation of Separated Atmospheric Muon Neutrino and Muon Anti-neutrino Events in the MINOS Detector”, P. Adamson *et. al.*, Phys. Rev. Lett. 97, 191801.
- 2003 “Users Guide to the FarDet DAQ System”, NuMI-Note-900, with J. Hartnell and A. Rahman
- 2001 “Muon Containment in the Near Detector”, NuMI-Note-702, with J. Nelson

WORKING PAPERS

- 2015 “Identification of nuclear effects in neutrino-carbon interactions at low three-momentum transfer”, P.A. Rodrigues, *et. al.* (MINERvA Collaboration), submitted
- 2015 “Measurement of electron neutrino CCQE-like cross-sections in MINERvA”, J. Wolcott *et. al.* (MINERvA Collaboration), submitted
- 2015 “First Measurement of Partonic Nuclear Effects in Deep-INelastic Neutrino Scattering on C, Fe, and Pb at MINERvA”, J. Mousseau *et. al.*, in preparation
- 2015 “Observation of neutral-current diffractive pi-0 production in neutrino interactions on hydrocarbon”, J. Wolcott *et. al.* (MINERvA Collaboration), in preparation
- 2015 “Measurement of the NuMI Flux using Neutrino-Electron Elastic Scattering”, K. McFarland *et. al.* (MINERvA Collaboration), in preparation

CONFERENCES, WORKSHOPS, AND SELECTED PRESENTATIONS

- 04/15 “Seeing the Invisible: Neutrinos, Fermilab, and the MINERvA Experiment”, presented at the MCLA Brown Bag Lecture Series
- 02/15 “Recent Results from the MINERvA Experiment”, presented at the Lake Louise Winter Institute 2015 at Chateau Lake Louise in Alberta, Canada
- 04/14 “Neutrinos and the MINERvA Experiment”, presented at the Physics and Astronomy Colloquium Series at Union College, Schenectady, NY
- 04/14 “Deriving the Calibration Constants”, presented at the MINERvA Data Management Review, Fermilab, Batavia, IL
- 03/13 “Neutrinos and the MINERvA Experiment”, presented at the MCLA Brown Bag Lecture Series
- 11/12 Attended New England Section Fall 2012 APS Joint Meeting, Williamstown, MA
- 10/12 “Anti-Neutrino Quasi-Elastic Scattering at MINERvA”, presented at the American Society of Physics Division of Nuclear Physics annual meeting, Newport Beach, CA
- 07/12 Attended NUFACT 2012 (International Workshop on Neutrino Factories, Superbeams, and Beta Beams), College of William and Mary, Williamsburg VA and Jefferson National Lab, Newport News, VA.

- 02/11 “Neutrinos and the MINERvA Experiment”, presented at the Physics Colloquium at Bates College, Lewiston, ME
- 04/10 “Absolute Calibration of the MINERvA Detector”, presented at American Physical Society April Meeting 2010, Washington DC
- 11/08 “Final Tau-Neutrino Results from the DONuT Experiment”, presented at the Physics Colloquium at Williams College, Williamstown, MA
- 08/08 Attended the SENCER (Science Education for New Civic Engagement) Summer Institute, Santa Clara, CA
- 10/07 Attended MINERvA Tracking Prototype Workshop, University of Rochester, NY
- 10/07 Hosted MCLA Workshop on Hardware and Calibration Databases for MINERvA, North Adams, MA
- 12/07 - present Numerous presentations at MINERvA internal collaboration meetings
- 09/07 “Massachusetts College of Liberal Arts Application to Join MINERvA”, presented at a MINERvA collaboration meeting at Fermilab, Batavia, IL
- 07/07 Attended American Association of Physics Teachers Conference, Greensboro, NC
- 07/07 Attended Workshops: “Learning Physics While Practicing Science”, “Physics by Inquiry”, and “Advanced and Intermediate Instructional Laboratories”, Greensboro, NC
- 05/07 Attended Fifth International Workshop on Neutrino-Nucleon Interactions in the Few-GeV Region, Fermilab, Batavia, IL
- 05/07 Attended Main INjector Experiment for ν -A (MINERvA) collaboration meeting, Fermilab, Batavia, IL
- 10/05 “Measuring the Tau Neutrino Charged-Current Cross Section”, presented at the High Energy Physics Seminar at the University of Minnesota, Minneapolis, MN
- 05/05 “Results of Parameter Analysis of Tau Neutrino and Charm Candidates”, presented at Nagoya University, Nagoya, Japan
- 04/05 “Searching for the Tau Neutrino”, presented at a physics seminar at the College of the Holy Cross, Worcester, MA
- 03/05 “The First Measurement of the CC Cross Section of the Tau Neutrino”, presented at the High Energy Physics seminar at the University of Pennsylvania, University Park, PA
- 02/05 “Searching for the Tau Neutrino”, presented at the physics seminar at University of Pennsylvania, Altoona, PA
- 01/05 “DONUTs and Tau Neutrinos”, presented at the physics seminar, Guilford College, Greensboro, NC
- 08/04 “Creating a Mentoring Program for New Graduate Students”, presented at the American Association of Physics Teachers meeting, Sacramento, CA
- 08/04 “New Results from the DONuT Experiment”, presented at the physics seminar at the University of Hawaii, Honolulu, HI
- 11/03 Attended 2003 CIRTL (Center for the Integration of Research, Teaching, and Learning) Forum, Madison WI
- 07/03 “Status Report from the DONuT Experiment”, presented at the Department of Energy Review, University of Minnesota, Minneapolis, MN

04/03	“New Nu’s from the DONuT Experiment”, presented at the High Energy Physics seminar at the University of Minnesota, Minneapolis, MN
05/02	“Further Results from the DONuT Collaboration”, presented at American Physics Society Division of Particles and Fields meeting, Williamsburg, VA
04/99	“Monitoring Metallic Compounds in Rocket Plumes”, National Conference on Undergraduate Research, Rochester, NY
03/99	“Monitoring Metallic Compounds in Rocket Plumes”, presented at the the American Physics Society, Atlanta, GA
01/01 - 09/08	Numerous presentations at DONuT internal collaboration meetings

OTHER ACTIVITIES

2015 – present	Serving as vice-chair of the MCLA All College Committee
2014 - present	Serving on the MINERvA Executive Committee
2014 – present	Serving as physics department webmaster
2012 – 2013	Served on MCLA Academic Policies Committee
2011 – 2012	Served on MCLA Committee on Promotions
2011 – present	Serving as advisor of the Sigma Pi Sigma Physics Honors Society MCLA Chapter
2010 – present	Serving as advisor of Society of Physics Students (SPS) MCLA chapter
2010 – 2014	Served on the MINERvA Speakers Committee, a committee designed to organize and oversee all public talks given by MINERvA collaborations
2008 – present	Serving on MINERvA Institutional Board
2007 – 2011	Served on MCLA Curriculum Committee
2006 – 2008	Participated in the CASTL (Center for Advanced Study of Teaching and Learning) Roundtable program at MCLA
2003	Created and served as an officer for a mentoring program for first year graduate students in the physics department at the University of Minnesota
2003	Served as an officer for WIPA (Women In Physics and Astronomy) group, University of Minnesota
2002	Lobbied for increased funding to the US Department of Energy Office of Science during the 2002 Congressional session, Washington, District of Columbia

PROFESSIONAL AND ACADEMIC AFFILIATIONS

2004 – present	American Association of Physics Teachers
1999 – present	Sigma Pi Sigma: The National Physics Honor Society
1998 – present	American Physical Society

REFERENCES

References provided upon request.