

CURRICULUM VITAE

Catherine M. Mader

Hope College
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Education

August 1993	Ph.D., Physics
Michigan State University	<i>Equilibrium and Non-Equilibrium Models for Particle Production in Heavy Ion Collisions</i>
December 1989	M.Sc., Engineering Physics
Colorado School of Mines	<i>Sub-Coulomb Deuteron-Nucleus Collisions Using the Cayley Equation</i>
May 1987	B.Sc., Engineering Physics
Colorado School of Mines	Nuclear Energy (minor)

Employment

July 2008 - present	Professor of Physics, Hope College
September 2007 - present	Education Projects Consultant, American Physical Society
July 2006 - 2009	Chair, Department of Physics, Hope College
July 2005 - July 2006	Chair, Department of Physics & Engineering, Hope College
July 2004 - June 2005	Acting Chair, Department of Physics & Engineering, Hope College
August 1999 - 2008	Associate Professor, Hope College
September 2000 - July 2001	Visiting Scientist, Lawrence Berkeley National Laboratory
August 1994 - 1999	Assistant Professor, Hope College
August 1993 - 1994	Visiting Assistant Professor, Hope College
July 1990 - August 1993	Research Assistant, Michigan State University

Professional Memberships

American Association of Physics Teachers	American Physical Society
American Physical Society - Division of Nuclear Physics	Project Kaleidoscope Faculty 21
American Association of University Women	Sigma Xi
NSF Physics REU Leadership Group	Council on Undergraduate Research
Society of Physics Students	$\Sigma\Pi\Sigma$

Professional Activities

- American Physical Society - Division of Nuclear Physics Education Committee (2011 - present)
- American Physical Society Committee on Careers and Professional Development member (2009-2011), committee chair (2010-2011)
- NSF Physics REU Leadership Group Executive Committee member and chair (2008-2012)
- Reviewer for several NSF programs; Research Corporation; Project SPIN; Am. Journal of Physics; several textbooks; External Departmental review team member for several colleges
- Society of Physics Students Zone Councilor (2005-2007)
- Council on Undergraduate Research Physics and Astronomy Division Councilor (2006-2008)

Grants, Fellowships and Awards

- 2010 NSF S-STEM Grant: *Scholarships to support the Hope STEM Scholars Program participants*
- 2010 NSF-ARI Grant: *Providing STEM Research Infrastructure for VanderWerf Hall at Hope College*
- 2009 AIP Meggers Project Award: *Hope College Nuclear Forensics Workshops for High School Teachers*
- 2008 NSF Grant: *Physics REU Directors' Workshop*
- 2007 Michigan Space Grant Consortium Grant: *Hope Creative Science Initiative Outreach Program*
- 2005 NSF-REU Grant: *Research Experiences for Undergraduates in Physics and Engineering at Hope College*
- 2003 NSF-CCLI Grant: *Adaptation of "6 Ideas that Shaped Physics" for Life-Sciences Majors at Hope College*
- 1998 NSF-RUI Grant: *Theoretical Study of the Space-time Evolution of Heavy-Ion Collisions at Hope College*
- 1997 Hope College - Howard Hughes Medical Institute Faculty Development Grant: *Theoretical Studies in Nuclear Physics*
- 1995 NSF-RUI Grant: *Theoretical Study of the Space-time Evolution of Heavy-Ion Collisions at Hope College*
- 1995 Research Corporation Cottrell College Science Award: *A study of the space-time evolution of the hadronic reaction zone formed in heavy-ion collisions*
- 1994 Hope College Howard Hughes Medical Institute Program: *Full-scale implementation of Computer-Assisted Personalized Assignments (CAPA) in the General Physics course.*
- 1993 *Sherwood K. Haynes Award for Outstanding Graduate Student of 1993-1994*, Department of Physics and Astronomy, MSU
- 1992 *1991-1992 Outreach Award for Science Theatre work*, Dept. of Physics & Astronomy, MSU

Publications

1. John Krupczak, Jr., Joseph Kaloust, Michael Misovich, Janice Pawloski, Roger Veldman, Paul DeYoung, Peter Gonthier, Catherine Mader, and Mark Little, "Results from Replacing General Physics with Introduction to Engineering in the First Year", Proceedings of the American Society for Engineering Education Annual Conference (2004).
2. C. M. Mader, A. Chappars, J. B. Elliot, L. G. Moretto, L. Phair, G. J. Wozniak, "The three-dimensional Ising model: A paradigm of liquid-vapor coexistence in nuclear multifragmentation", **Phys. Rev. C**68, 064601 (2003).
3. L. G. Moretto, J. B. Elliot, L. Phair, G. J. Wozniak, C. M. Mader, A. Chappars, "Theoretical approaches and experimental evidence for liquid-vapor phase transitions in nuclei", *AIP Conference Proceedings, April 2, 2002* 610, 182-196 (2002).
4. G. F. Peaslee, C. M. Mader, P. L. Jolivette, P. A. DeYoung, "The Restructured Advanced Laboratory at Hope College - A Step Toward Independence"; *Application of Accelerators in Research and Industry: 15th International Conference*, AIP Press 475, 1110-1113 (1999).

5. P. A. DeYoung, *et. al.*, C. Dykstra, P. Gonthier, C. Mader, G. F. Peaslee, D. Peterson, R. Sedlar, S. Sundbeck, N. Shaw, G. D. Westfall, D. Craig, R. A. Lacey, T. Li, T. Reposeur, A. M. Vander Molen, J. Winfield, S. J. Yennello, A. Nadasen, “Sensitivity of small-angle correlations of light charged particles to reaction mechanisms in the $^{16}\text{O} + ^{27}\text{Al}$ Reaction at 44 MeV/nucleon”; *Phys. Rev.* **C56**, 244 (1997).
6. P. A. DeYoung, *et. al.*, R. Bennink, T. Butler, W. Chung, C. Dykstra, G. Gilfoyle, J. Hinnefeld, M. Kaplan, J. J. Kolata, R. A. Kryger, J. Kugi, C. Mader, M. Nimchek, P. Santi, A. Snyder, “Small Angle Neutron-Neutron Correlation Functions for the $^{16}\text{O} + ^{27}\text{Al}$ Reaction at 220 MeV”; *Nucl. Phys.* **A597**, 127 (1996).
7. W. J. Llope, *et. al.*, W. Bauer, D. Craig, E. Gualtieri, S. Hannuschke, R. A. Lacey, J. Lauret, T. Li, C. M. Mader, A. Nadasen, E. Norbeck, R. Pak, G. Peilert, N. T. B. Stone, A. M. Vander Molen, G. D. Westfall, J. Yee, and S. J. Yennello, “Sphericity of central heavy-ion reactions.”; *Phys. Rev.* **C52**, 1 (1995).
8. W. J. Llope, *et. al.*, J. A. Conrad, C. M. Mader, G. Peilert, W. Bauer, D. Craig, E. Gualtieri, S. Hannuschke, R. A. Lacey, J. Lauret, T. Li, A. Nadasen, E. Norbeck, R. Pak, N. T. B. Stone, A. M. Vander Molen, G. D. Westfall, J. Yee, and S. J. Yennello, “Autocorrelations and Intermediate-Mass-Fragment Multiplicities in Central Heavy-Ion Collisions”; *Phys. Rev.* **C51**, 1325 (1995).
9. D. O. Handzy, *et. al.*, M. A. Lisa, C. K. Gelbke, W. Bauer, F. C. Daffin, T. Decowski, W. Gong, E. Gualtieri, S. Hannuschke, R. Lacey, T. Li, W. G. Lynch, C. M. Mader, G. F. Peaslee, T. Reposeur, A. M. Vander Molen, G. D. Westfall, J. Yee and S. J. Yennello, “Two-proton Correlation Functions for $^{36}\text{Ar} + ^{45}\text{Sc}$ at $E/A = 80$ MeV”, *Phys. Rev.* **C50**, 858 (1993).
10. G. F. Peaslee, *et. al.*, “Energy Dependence of Multifragmentation in $^{84}\text{Kr} + ^{197}\text{Au}$ Reactions”; *Phys. Rev.* **C49**, R2271 (1993).
11. M. A. Lisa, *et. al.*, “Impact Parameter Selected Two-Proton Intensity Interferometry for $^{36}\text{Ar} + ^{45}\text{Sc}$ at $E/A = 80$ MeV”; *Phys. Rev. Lett.* **70**, 3709 (1993).
12. C. M. Mader, W. Bauer, “Impact Parameter Dependence of Two-proton Correlation Functions”, *Ninth Winter Workshop on Nuclear Dynamics, Key West, Florida, January 30-February 6*, 86 (1993), World Scientific.
13. D. R. Bowman, *et. al.*, “Intermediate Mass Fragment Emission as a Probe of Nuclear Dynamics”; *Phys. Rev.* **C46**, 1834 (1992).
14. C. M. Mader, W. Bauer, G. D. Westfall, “K/ π Ratios in Relativistic Heavy Ion Collisions”; *Eighth Winter Workshop on Nuclear Dynamics, Jackson Hole, Wyoming, January 18-25*, 286 (1992), World Scientific.
15. C. M. Mader, W. Bauer, and G. D. Westfall, “K/ π Ratios in Relativistic Heavy Ion Collisions”; *Phys. Rev.* **C45**, 2438 (1992).
16. C. M. Mader, “Equilibrium and Non-Equilibrium Models for Particle Production in Heavy Ion Collisions”; Ph.D. Thesis, 1993, unpublished.
17. C. M. Mader, “Sub-Coulomb Deuteron-Nucleus Collisions Using the Cayley Equation”; Ms. Sc. Thesis, 1987, unpublished.

Presentations

- “Teaching Nuclear Science Using Case Studies in Nuclear Forensics”, one-day workshop for High School science teachers at Hope College, November, 2011.
- “Nuclear Forensics-Related Radiodating Activities and Experiments for the High School Classroom”, ChemEd2011, July, 2011.
- “Teaching nuclear science using hands-on, interactive lessons in nuclear forensics”, ChemEd2011, July 2011.

- “Nuclear Forensics for High School Science”, APS April Meeting 2011.
- “Physics REU sites: What works? How do we know? How do we improve?”, Invited talk, APS April Meeting 2011.
- “Teaching Nuclear Science Using Case Studies in Nuclear Forensics”, Michigan AAPT, April, 2011.
- “Teaching nuclear science using hands-on, interactive lessons in nuclear forensics”, Michigan Science Teachers Association, February 2011.
- “Teaching Nuclear Science Using Case Studies in Nuclear Forensics”, one-day workshop for High School science teachers at Hope College, October, 2010.
- “Careers for Physicists”, University of Wisconsin, River Falls Department Awards Banquet, March 2010.
- “Teaching Nuclear Science Using Case Studies in Nuclear Forensics”, two-day workshop for High School science teachers at Hope College, February and April, 2010.
- “Careers for Physicists”, 2009 APS April Meeting, Future Physicists Day Luncheon, April 2009.
- “Nuclear Science + Forensics = N-CSI?”, Departmental seminar at Grand Valley State University, November 2008.
- “Careers for Physicists”, 2008 AAPT/APS Physics Department Chairs Conference.
- “Nuclear Science + Forensics = N-CSI?”, Departmental seminar at James Madison University, April 2008.
- “Modifying “Six Ideas that Shaped Physic” for a Life-Science major audience at Hope College”, American Association of Physics Teachers Summer meeting, July 2005.
- “Theoretical Nuclear Physics at Hope College”, Kavli Institute for Theoretical Physics workshop on Theoretical Physics research at PUIs, July, 2003.
- “Hope College: Preparing future STEM leaders via undergraduate research and interdisciplinary studies”, C. Barney, J. Andersen, L. Chase, M. Seymore, C. Mader, P-Kal Assembly on Motivating Students to Pursue Careers in STEM Fields, August 2003.
- 2001 Spring meeting of the American Chemical Society. C. M. Mader, “Understanding the liquid-vapor coexistence in nuclear multifragmentation using the 3-dimensional Ising model”, April 3, 2001.
- Departmental Seminar at the Colorado School of Mines. C. M. Mader, “Understanding the liquid-vapor coexistence in nuclear multifragmentation using the 3-dimensional Ising model”, March 27, 2001.
- Nuclear Theory Seminar at Lawrence Berkeley National Laboratory. C. M. Mader, “Flow and Correlation Studies using the BUU Hadronic Transport Model”, August 5, 1999.
- P-Kal Faculty for the 21st Century National Assembly. C. M. Mader, G. F. Peaslee, E. Sanford, “Building and Sustaining a Successful Research Program at Hope College”, September, 1998.
- 1998 Spring meeting of the American Physics Society. C. M. Mader, M. Nelson, “Pion Correlations in Relativistic Heavy Ion Collisions”, Bulletin of the American Physical Society, 43 (1998) 1177.
- Departmental Seminar at Calvin College. C. M. Mader, “Nuclear Temperatures and Pressures: How do we measure them and what do we learn from them?”, November, 25, 1997.

- Departmental Seminar at Ball State University. C. M. Mader, “Probing the Nuclear Equation of State through Heavy-Ion Reactions”, March 27, 1997.
- 1997 Summer meeting of the American Association of Physics Teachers. C. M. Mader, “Introductory Physics Reform at Hope College”, American AAPT Announcer, 27 (1997) 126.
- 1993 Annual Meeting of the American Physical Society Division of Nuclear Physics, C. M. Mader, W. Bauer, “Two-Particle Intensity Interferometry”, Bulletin of the APS, 38 (1993) 1848.
- 1992 Annual Meeting of the American Physical Society Division of Nuclear Physics, C. M. Mader, W. Bauer, “Two-Proton Intensity Interferometry”, Bulletin of the APS, 37 (1993) 1300.
- 1991 Annual Meeting of the American Physical Society Division of Nuclear Physics, C. M. Mader, W. Bauer, G. D. Westfall, “K/ π ratios in Relativistic Heavy Ion Collisions using the Nuclear Firestreak model.” Bulletin of the APS, 36 (1991) 2146.

Students with whom I’ve worked:

Joshua Levy	Eric Wondergem	Amber Chappars	Erica Oosting
Ryan Bennink	Steven Sundbeck	Lee Kiessel	William Statema
Steven Coll	Casey Carney	Tina Pike	Elizabeth Lawrence
Scott Slezak	Mark Nelson	Ryan Fedewa	Sarah Prill
Heidi Johnson	Dana Burd	Jordan Siemon	
Mary MacDermaid	Dan Valente	Elizabeth Carlson	

Papers and Presentations of Students under my supervision

- D. Valente, “Modeling Pion Flow In A $^{139}\text{La} + ^{139}\text{La}$ Collision”, Journal of Undergraduate Research in Physics, 18, 39-44 (2002).
- D. Valente, “Studying Collective Flow of Pions in La + La Collisions”, Fall Meeting of the Division of Nuclear Physics of the American Physical Society, 1999.
- J. D. Levy, “Diffraction Patterns of Light from Helical Objects: Measurement and Calculation”, Journal of Undergraduate Research in Physics, 16, 55-58 (1998).
- S. Coll “The BUU Model and Classical Conservation Laws”, Pew Midstates Science and Mathematics Consortium Undergraduate Research Symposium in the Physical Sciences and Mathematics, 1995.