

Dr. Todd K. Pedlar, Ph.D.

Department of Physics
Luther College
700 College Drive
Decorah, IA 52101
(563) 387-1628 (office)
(563) 419-3516 (mobile)
email: pedlto01@luther.edu

Professional Preparation

Whitman College, Walla Walla, WA.

B.A. in Physics with Honors - *summa cum laude*. May 1991

Northwestern University, Evanston, IL.

Ph.D. in Physics (Concentration: Elementary Particle Physics), May 1999

Advisor: Professor Kamal K. Seth

Dissertation: "Study of Two Photon Decays of Charmonium Resonances Formed in Proton-Antiproton Annihilations."

The Ohio State University (positioned at Wilson Laboratory, Cornell University, Ithaca, NY)

Postdoctoral Research Associate, May 1999-April 2003

Supervisor: Klaus Honscheid

Cornell University, Ithaca, NY

Postdoctoral Research Associate, May 2003 - July 2003

Supervisor: Richard S. Galik

Professional Appointments

August 2017- present: Professor of Physics, Luther College, Decorah, IA

August 2010 – August 2017: Associate Professor of Physics, Luther College, Decorah, IA

June 2012-May 2013 (*on sabbatical leave*): Visiting Research Fellow, Pacific Northwest National Laboratories, Richland, WA

August 2004 – August 2010: Assistant Professor of Physics, Luther College, Decorah, IA

August 2003 - August 2004: Visiting Assistant Professor of Physics, Luther College, Decorah, IA

Teaching responsibilities include *General Physics I & II, Classical Physics I, Advanced Laboratory, Quantum Mechanics, Electricity and Magnetism, Particle and Nuclear Physics, Thermal Physics, Physical Science, Energy and the Physical World, FY Seminar: Relativity, the Quantum and All That, Paideia I, Paideia II: Energy, Ethics and Climate Policy.*

May 2003 – July 2003: Postdoctoral Research Associate, Cornell University

May 1999 – April 2003: Postdoctoral Research Associate, The Ohio State University

Pursued research in elementary particle physics with the CLEO Collaboration while stationed at Wilson Laboratory, Cornell University. Held both collaboration-wide research and analysis team leadership positions. Particular area of expertise: production and decay of heavy quarkonium resonances, electronics and data acquisition systems.

Honors and Awards

- University Fellowship, Northwestern University (1991-1992)
- Pew Foundation Fellowship, Stanford University (1990)
- Phi Beta Kappa, Whitman College (1990)
- Northwest Conference Scholar-Athlete Award (1990,1991)
- National Merit Scholar (1987-1991)

Research Grants Received

RUI: Studies of Heavy Quarkonium Spectroscopy with the Belle and Belle II Experiments

National Science Foundation. Submitted September 2017; funding period: June 2018 - May 2021
Grant budget: \$178,507

RUI: Studies of Heavy Quarkonium Spectroscopy with the Belle and Belle II Experiments

National Science Foundation. Submitted September 2014; funding period: June 2015 - May 2018
Grant budget: \$150,561

RUI: Studies of Heavy Quarkonium Spectroscopy with the Belle and Belle II Experiments

National Science Foundation. Submitted September 2011; funding period: June 2012 - May 2015
Grant budget: \$134,592

RUI: Studies of Heavy Quarkonium Spectroscopy with the CLEO and CLEO-c Experiments

National Science Foundation. Submitted September 2008; funding period: June 2009 - May 2012
Grant budget: \$161,012 - Revised to \$135,000.

RUI: Studies of Heavy Quarkonium Spectroscopy with the CLEO and CLEO-c Experiments

National Science Foundation. Submitted October 2005; funding period: June 2006 - May 2009
Grant budget: \$138,242

Studies of Heavy Quarkonium Spectroscopy with the CLEO and CLEO-c Experiments

The Research Corporation. Submitted: November 2005; funding period: June 2006 - May 2008
Grant budget: \$36,076 (declined)

Investigation of Hadronic Transitions Among States of Heavy Quarkonium with the CLEO Experiment

Iowa College Foundation - R. J. McElroy Trust. Submitted: April 2006; funding period May 2006 - May 2007
Grant amount: \$2,000

Investigation of Hadronic Transitions in the Bottomonium System

Luther College (Summer Student Faculty/Collaborative Research Projects). Submitted March 2005; funding period: June 2005 - August 2005. Grant amount: \$3,500

Research Students entering Graduate Programs in Physics or Related Fields

- Zachariah Martin, Purdue University, Ph.D. Program, Sept 2019
- Joshua Jackson, Indiana University, Ph.D. Program, Sept 2018
- William Imoehl, Indiana University, Ph.D. Program, Sept 2017
- Zach Stottler, Virginia Polytechnic and State University, Ph.D. Program, Sept. 2015
- Jon Zarling, Indiana University, Ph.D. (2019), Postdoctoral Researcher U. of Regina (2019-)
- Christina Storlie, University of Minnesota, M.S. in Statistics (2015)
- Dallas Wulf, University of Wisconsin-Madison, Ph.D. (2018). Postdoctoral Scientist, McGill University (2019-)
- Andrew Webber, University of Wisconsin-Madison, M.S. Electrical Engineering (2011).
- Kris Klein, University of Iowa, Ph. D. Program, Sept. 2008 (Ph.D. obtained 2013). Research Scientist, U. of New Hampshire (2014-2016), U. of Michigan (2016-2018); Assistant Professor of Physics, U. of Arizona (2019-)
- Shovit Bhari, Cal State Fullerton, M.S. in Physics (2009), Lecturer/Staff Physicist, CSU Fullerton (2009-)

Leadership activities within Experimental Collaborations

CLEO Collaboration: co-convenor of Heavy Quarkonium Physics Analysis Group (2003-2009)

Belle II Collaboration: Coordinator of Hadronic Particle ID software for Proton-ID (2015-present); Coordinator for Event Generation validation and liaison to the Physics Analysis Group (2018-present); Membership on Outreach Committee, (2015-present), Chair of Outreach Committee (2019-present); Co-convenor of Heavy Quarkonium Physics Working Group (2014-2017)

Conference Talks and Posters, Seminar, and Colloquium Presentations

Invited Talks (all by T. Pedlar)

6th International Conference on Exotic Atoms and Related Topics, Sept, 2017, Vienna, Austria.
13th International Conference on Heavy Quarks and Leptons, May, 2016, Blacksburg, VA.
American Physical Society National Meeting, April 2012, Atlanta, GA.
44th Rencontres de Moriond, March, 2009, La Thuile, Italy.
Rencontres du Physique de la Valee d'Aoste, February, 2008, La Thuile, Italy.
BaBAR Collaboration Symposium on Bottomonium Physics, February, 2008, Stanford, CA.
8th Int'l. Conference on Heavy Quarks and Leptons, October, 2006, Munich, Germany.
American Physical Society National Meeting, April, 2006, Dallas, TX.
Aspen Winter Conference on High Energy Physics, February, 2004, Aspen, CO.

Contributed Talks or Posters (all T. Pedlar and () Luther College students)*

*Jackson, J., *Z. Martin, and *T. Proksch: Midstates Consortium for Math and Science Undergraduate Research Symposium, November, 2017, University of Chicago.
Nishida, S. et al. : International Conference on High Energy Physics, August, 2016, Chicago, IL.
*Stottler, Z. and *R. Stuart: Midstates Consortium for Math and Science Undergraduate Research Symposium, November, 2014, Washington University.
*Wulf, D.: American Physical Society National Meeting, April 2012, Atlanta, GA.
Pedlar, T.: American Physical Society National Meeting, April, 2008, St. Louis, MO.
*Klein, K. : American Physical Society National Meeting, April, 2008, St. Louis, MO. Midstates Consortium for Math and Science Undergraduate Research Symposium, November, 2007, University of Chicago.
*Klein, K.: R. J. McElroy Trust Student/Faculty Research Symposium, April 2007, Waverly, IA.
*Xavier, J.: American Physical Society National Meeting, April, 2007, Jacksonville, FL.
*Xavier, J.: R. J. McElroy Trust Student/Faculty Research Symposium, April 2007, Waverly, IA.
*Bhari, S.: American Physical Society National Meeting, April, 2006, Dallas, TX.
*Bhari, S.: Midstates Consortium for Math and Science Undergraduate Research Symposium, November, 2005, University of Chicago.

Seminars and/or Public Outreach Talks

HEP Seminar, Indiana University Department of Physics, Bloomington, IN, March 2018.
HEP Seminar, Wayne State University, Detroit, MI, March 2017.
Physics Seminar, Pacific Northwest National Laboratory, Richland, WA, April 2013.
Physics Seminar, Whitman College, Walla Walla, WA, March 2013.
Minnesota State University-Mankato, Mankato, MN, April 2011.

Papers Published in or Submitted to Refereed Journals

The following articles are those papers which I have been one of the principal authors (marked with a *, ** or ***), or to which I have made significant contributions in analysis and writing as a chief internal reviewer and editor (marked with a #). I have marked with a * publications on which I was a principal author, but without student contributions. I have indicated with a ** publications on which I was a principal author, and Luther College students made substantial contributions but were not given authorship by the collaboration due to collaboration bylaws for level of contribution. Finally, I have used *** to mark publications on which I was a principal author and for which Luther College students (with their names) are listed as co-authors. This list includes only papers published since my arrival at Luther. A full list of approximately 350 papers on which I am credited as an author is available on request, but these publications listed here accurately reflect my direct scholarly contributions.

1. ** “Observation of $\Upsilon(2S) \rightarrow \gamma\eta_b(1S)$ decay”, B.G. Fulsom, T.K. Pedlar, *et al.*, (Belle Collaboration), in review with *Physical Review Letters*.
2. #“Energy scan of the $e^+e^- \rightarrow h_b(nP) \pi^+\pi^-$ ($n = 1, 2$) cross sections and evidence for $\Upsilon(11020)$ decays into charged bottomonium-like states”, R. Mizuk, et al., (Belle Collaboration), *Physical Review Letters* 117,142001 (2018).
3. #“First Observation of the Hadronic Transition $\Upsilon(4S) \rightarrow \eta h_b(1P)$ and New Measurement of the $h_b(1P)$ and $\eta_b(1S)$ Parameters”, U. Tamponi, et al., (Belle Collaboration), *Phys. Rev. Lett.* 115, 142001 (2015).
4. **“The Physics of the B Factories”, A. Bevan, et al., *European Physical Journal C*74:3026 (2014). Also published in book form by Springer Verlag as “The Physics of the B Factories,” ISBN 978-3-662-44990-5.
5. **“Results in B_s Physics and Bottomonium Spectroscopy using the Belle $\Upsilon(5S)$ Data Sample”, C. Oswald and T. K. Pedlar, *Modern Physics Letters A*28,1330036 (2013).
6. **“Recent Results in Bottomonium Spectroscopy”, C. Patrignani, T. K. Pedlar and J. L. Rosner, *Annual Reviews of Nuclear and Particle Science*, 63:21-70 (2013).
7. **“Quarkonium at the Frontiers of High Energy Physics: A Snowmass White Paper”, G. T. Bodwin, E. Braaten, E. Eichten, S. L. Olsen, T. K. Pedlar and J. Russ, arXiv:1307.7425, submitted to the 2013 Snowmass Community Summer Study, August 2013.
8. #“Study of the hadronic transitions $\Upsilon(2S) \rightarrow (\eta, \pi^0) \Upsilon(1S)$ at Belle”, U. Tamponi, et al., (Belle Collaboration), *Phys. Rev. D*87, 011104(R) (2013).
9. ***“Evidence for $\eta_b(2S)$ and observation of $h_b(1P) \rightarrow \eta_b(1S)\gamma$ and $h_b(2P) \rightarrow \eta_b(1S)\gamma$ ”, R. Mizuk, et al., (Belle Collaboration), *Phys. Rev. Lett.* 109:232002 (2012).
10. ***“First observation of the P-wave singlet bottomonium states $h_b(1P)$ and $h_b(2P)$ ”, I. Adachi, et al., (Belle Collaboration), *Phys. Rev. Lett.* 108, 032001 (2012)
11. **“Branching fractions for $\Upsilon(3S) \rightarrow \pi^0 h_b$ and $\psi(2S) \rightarrow \pi^0 h_c$ ”, J. Y. Ge, et al., (CLEO Collaboration), *Phys. Rev. D*84, 032008 (2011).
12. **“Measurements of branching fractions for electromagnetic transitions involving the $\chi_{bJ}(1P)$ states,” M. Kornicer, et al. (CLEO Collaboration), *Phys. Rev. D*83, 054003 (2011).
13. #“Measurement of the $\eta_b(1S)$ mass and of the Branching Fraction for $\Upsilon(3S) \rightarrow \gamma\eta_b(1S)$ ”, G. Bonvicini, et al. (CLEO Collaboration), *Phys. Rev. D*81, 031104(R) (2010).
14. ***“Improved Measurement of Branching Fractions for $\pi\pi$ Transitions among $\Upsilon(nS)$ states”, S.R. Bhari, et al. (CLEO Collaboration) *Phys. Rev. D*79, 011103(R) (2009).
15. #“Inclusive $\chi_{bJ}(nP)$ decays to $D^0 X$ ”, R. A. Briere, et al. (CLEO Collaboration), *Phys. Rev. D*78, 092007 (2008).
16. ***“Observation of $\Upsilon(2S) \rightarrow \eta \Upsilon(1S)$ and Search for Related Transitions”, Q. He, et al. (CLEO Collaboration) *Phys. Rev. Lett.* 101, 192001 (2008).
17. #“Study of Dipion Transitions among $\Upsilon(3S)$, $\Upsilon(2S)$ and $\Upsilon(1S)$ States”, D. Cronin-Hennessy et al. (CLEO Collaboration), *Phys. Rev. D*76, 072001 (2007).
18. #“Experimental Study of $\chi_b(2P) \rightarrow \pi\pi\chi_b(1P)$ ”, C. Cawlfeld, et al. (CLEO Collaboration) *Phys. Rev. D*73, 012003 (2006)
19. #“Observation of $\psi(3770) \rightarrow \pi\pi J/\psi$ and Measurement of $\Gamma_{ee}(\psi(2S))$ ”, N. E. Adam et al. (CLEO Collaboration), *Phys. Rev. Lett* 96, 082004 (2006).
20. **“Observation of the Hadronic Transitions $\chi_{b0,2} \rightarrow \omega \Upsilon(1S)$ ”, D. Cronin-Hennessy, et al. (CLEO Collaboration), *Phys. Rev. Lett* 92, 222002 (2004).
21. **“Measurement of the Resonance Parameters of the Charmonium Ground State, $\eta_c(1S)$ ”, M. Ambrogiani et al. (E835 Collaboration), *Phys. Lett. B*566, 45 (2003).

Grant and Publication Reviews

- Ad-hoc and Panel Grant Proposal Reviewer – National Science Foundation and US Department of Energy
- Manuscript Reviewer for *The Physics Teacher* (peer-reviewed journal published by the APS/AAPT) and *The Physical Review, Physics Education* (peer-reviewed journal published by the APS)

Physics Textbook Reviewing and Authoring

- *Textbook Reviewer* for W.H. Freeman and Company, Pearson/Addison Wesley, and McGraw-Hill
- *Textbook Problem Author* for W. H. Freeman & Company, Tipler & Mosca, *Physics for Scientists and Engineers, 6e*
- *Textbook and Test Bank Problem Author* for McGraw-Hill, 1st Edition, Bauer & Westfall, *University Physics* and 4th Edition, Giambattista, Richardson and Richardson, *College Physics*

Service and Outreach Activities

Internal

- Department Head, Physics (August 2018-present)
- Member, Academic Planning Committee, and Course Planning and Review subcommittee (Sept 2014-May 2017). CPR Chair (2015-2016), Full APC Chair, (Sept. 2016-May 2017).
- Member, Organizing Committee for the 2017 Reformation Commemoration (Spring 2014-May 2017)
- Member Paideia Writing Committee: February 2018-present
- Member, Paideia Planners Committee: February 2014-December 2017, February 2016-December 2017
- Member, Faculty Research Symposium Steering Committee, Fall 2013-present
- Faculty blogwriter at Ideas and Creations since Fall 2013.
- Lutherlag teacher: 2004, 2010, 2011, 2013.
- Science Div. Faculty Rep. to the Board of Regents (2011-2012)
- Member of the Honors Advisory Committee (2008-2010)
- Member of Faculty/Executive/Staff search committees for
 - Vice President for Student Life (2011-12)
 - English (2011-12)
 - Art (2007-8)
 - Physics (2004-5, 2005-6, 2009-10)
 - SSS Director (2007-2008)
- Co-organizer/presenter, Faculty Workshop on First Year Seminars, (w/R. Caldwell and L. Pickard, Summer, 2008)
- Chapter President, Phi Beta Kappa, Eta of Iowa chapter (Fall, 2006 – Spring 2012)
- Served on the ad- hoc committee on First-Year Student Advising, 2005-6 that was tasked with development of the First-Year Advising program
- Co-organizer and presenter, Faculty Workshop on Modern Physics and Literature, “The Quantum Generation” (with Lise Kildegaard, funded by Jones Professorship, Summer, 2005)

External

- Member of the Belle II Outreach Committee, June 2015-present, co-coordinator for social media, Chair since June, 2019
- Representative to the Exec. Board of Midstates Consortium for Math and Science (2009 – present)
- Member, Iowa Section, American Association of Physics Teachers. Vice President for Four-Year Colleges, Iowa Section of the AAPT (2005-2011). Local Coordinator, American Association of Physics Teachers (AAPT) Tri-State (IA, WI, MN) Sectional meeting hosted at Luther College, October 21-22, 2005.
- Luther College PARTNERS project participant (PARTNERS pairs Luther College faculty with area high school teachers to bring physics instruction and enrichment to their classes)
 - January, 2009: w/Jim Fritz and Jeannette Spilde at Decorah High School: *The Physics of Music*
 - May, 2006: w/Caroline Scheidel, Turkey Valley: *Trebuchets and other Medieval Throwing Weapons*
 - January, 2005: (with Brad Chamberlain and our Physical Science students) with South Winneshiek - *Physics Competition instruction and preparation.*
 - December 2003: with Caroline Scheidel at Turkey Valley - *Nuclear Physics*
- Organizer and presenter: Luther College Physics outreach events and shows in schools and on campus (2003-present)