

Mary Pavan Watson

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EDUCATION

- 2001–2006 **Ph.D., Chemistry.** *University of California, Irvine, CA 92697.*
Dissertation Advisor: Larry E. Overman. Dissertation Thesis: Investigation of the Asymmetric Allylic Imidate Rearrangement Catalyzed by Palladium(II) Compounds with Planar Chiral Ligands.
- 1996–2000 **B.A., Chemistry,** Magna cum Laude. *Harvard College, Cambridge, MA 02138.*

RESEARCH EXPERIENCE

- July 2009–present **Assistant Professor of Chemistry.**
Department of Chemistry and Biochemistry, University of Delaware, Newark, DE.
- 2006–2009 **NIH NRSA Postdoctoral Fellow.** Advisor: Eric N. Jacobsen.
Department of Chemistry and Chemical Biology, Harvard University, Cambridge, MA.

HONORS AND AWARDS

- 2013 Rising Star Award, American Chemical Society Women Chemists' Committee
- 2012 Thieme Chemistry Journal Award
- 2012 NSF Early Faculty Career Award
- 2007 Ruth L. Kirschstein National Research Service Award
- 2003 Contribution to Teaching Award, Department of Chemistry, University of California, Irvine
- 2000 Magna Cum Laude, Harvard University
- 1996–2000 Harvard College Scholarship
- 1996 National Merit Scholar

PROFESSIONAL AFFILIATIONS

American Chemical Society, Member, 2006–present
Philadelphia Organic Chemistry Club, Member, 2011–present

Biology Chemistry Interface Program at the University of Delaware, Faculty Trainer, 2009–present
Center for Catalytic Science and Technology at the University of Delaware, Member, 2014–present

PUBLICATIONS

Publications from Delaware

- 1) Srinivas, H. D.; Zhou, Q.; Watson, M. P. “Enantiospecific, Nickel-Catalyzed Cross-Couplings of Allylic Pivalates and Arylboroxines” *Org. Lett.* **2014**, *16*(13), 3596–3599.
- 2) Shacklady-McAtee, D. M.; Roberts, K. M.; Basch, C. H.; Song, Y.-G.; Watson, M. P. “A General, Simple Catalyst for Enantiospecific Cross Couplings of Benzylic Ammonium Triflates and Boronic Acids: No Phosphine Ligand Required” *Tetrahedron* **2014**, *70*(27–28), 4257–4263 (invited contribution).
- 3) Zhou, Q.; Srinivas, H. D.; Dasgupta, S.; Watson, M. P. “Nickel-Catalyzed Cross Couplings of Benzylic Pivalates with Arylboroxines: Stereospecific Formation of Diarylalkanes and Triarylmethanes” *J. Am. Chem. Soc.* **2013**, *135*(9), 3307–3310.
* Highlighted in *Synfacts* (*Synfacts* **2013**, *9*, 646) *
- 4) Maity, P.; Shacklady-McAtee, D. M.; Yap, G. P. A.; Sirianni, E. R.; Watson, M. P. “Nickel-Catalyzed Cross Couplings of Benzylic Ammonium Salts and Boronic Acids: Stereospecific Formation of Diarylethanes via C–N Bond Activation” *J. Am. Chem. Soc.* **2013**, *135*(1), 280–285.
- 5) Watson, M. P.; Maity, P. “Controlling Enantioselectivity in Additions to Cyclic Oxocarbenium Ions via Transition Metal Catalysis” *Synlett*, **2012**, *23*(12), 1705–1708 (invited submission).
- 6) Ehle, A. R.; Zhou, Q.; Watson, M. P. “Nickel(0)-Catalyzed Heck Cross Coupling via Activation of Aryl C–OPiv Bonds” *Org. Lett.* **2012**, *14*, 1202–1205.
* One of the top 10 most read articles in *Organic Letters* from Jan–Mar 2012 *
- 7) Maity, P.; Srinivas, H. D.; Watson, M. P. “Copper-Catalyzed Enantioselective Additions to Oxocarbenium Ions: Alkynylation of Isochroman Acetals” *J. Am. Chem. Soc.* **2011**, *133*, 17142–17145.
* Highlighted in *Synfacts* (*Synfacts* **2012**, *8*, 78) and as a *SynStory* (Dec 2011) *
- 8) Shacklady-McAtee, D. M.; Dasgupta, S.; Watson, M. P. “Nickel(0)-Catalyzed Cyclization of *N*-Benzoylaminals for Isoindolinone Synthesis” *Org. Lett.* **2011**, *13*, 3490–3493.

Publications from Supervised Career

- 9) Watson, M. P.; Jacobsen, E. N. “Asymmetric Intramolecular Arylcyanation of Unactivated Olefins via C–CN Bond Activation.” *J. Am. Chem. Soc.* **2008**, *130*(38), 12594–12595.
- 10) Watson, M. P.; Overman, L. E.; Bergman, R. G. “Kinetic and Computational Analysis of the Palladium(II)-Catalyzed Asymmetric Allylic Trichloroacetimidate Rearrangement: Development of a Model for Enantioselectivity.” *J. Am. Chem. Soc.* **2007**, *129*(16), 5031–5044.
- 11) Anderson, C. E.; Kirsch, S. F.; Overman, L. E.; Richards, C. J.; Watson, M. P. “Preparation of the COP Catalysts: [(*S*)-COP-OAc]₂, [(*S*)-COP-Cl]₂, and (*S*)-COP-hfacac.” *Org. Synth.* **2007**, *84*, 148–155.
- 12) Anderson, C. E.; Overman, L. E.; Richards, C. J.; Watson, M. P.; White, N. “Preparation of (η⁵-*S*)-2-(4-methylethyl)oxazolinylcyclopentadienyl-(η⁴-tetraphenylcyclobutadiene)cobalt.

- (cobalt, [1,1',1",1'''-(η^4 1,3-cyclobutadiene-1,2,3,4-tetra η l)tetrakis[benzene]][(1,2,3,4,5- η)-1-[(4S)-4,5-dihydro-4-(1-methylethyl)-2-oxazolyl]-2,4-cyclopentadien-1-yl]-).” *Org. Synth.* **2007**, *84*, 139–147.
- 13) Anderson, C. E.; Overman, L. E.; Watson, M. P. “Asymmetric Rearrangement of Allylic Trichloroacetimidates: Preparation of (S)-2,2,2-Trichloro-N-(1-propylallyl)acetamide.” *Org. Synth.* **2005**, *82*, 134–139.
- 14) Kirsch, S. F.; Overman, L. E.; Watson, M. P. “Monomeric Cobalt Oxazoline Palladacycles (COP). Useful Catalysts for Catalytic Asymmetric Rearrangement of Allylic Trichloroacetimidates.” *J. Org. Chem.* **2004**, *69*(23), 8101–8104.
- 15) Overman, L. E.; Owen, C. E.; Pavan, M. M.; Richards, C. J. “Catalytic Asymmetric Rearrangement of Allylic N-Aryl Trifluoroacetimidates. A Useful Method for Transforming Prochiral Allylic Alcohols to Chiral Allylic Amines.” *Org. Lett.* **2003**, *5*(11), 1809–1812. (Maiden name: Mary M. Pavan)

PRESENTATIONS

Invited Seminars

- 1) Wayne State University, Oct. 22, 2014.
- 2) University of Michigan, Oct. 21, 2014.
- 3) Pennsylvania State University, Oct. 6, 2014.
- 4) University of Maryland, Oct. 2, 2014.
- 5) Princeton University, Sept. 30, 2014.
- 6) University of Washington, Sept. 24, 2014.
- 7) Pacific Lutheran University, Sept. 23, 2014.
- 8) 22nd IUPAC International Conference on Physical Organic Chemistry, August 11, 2014.
- 9) Young Academic Investigators Award Symposium, 248th ACS National Meeting, San Francisco, CA, August 10, 2014.
- 10) Lehigh University, April 16, 2014.
- 11) Johns Hopkins University, April 8, 2014.
- 12) Olah Symposium in Honor of Prof. Robert G. Bergman, 247th ACS National Meeting, March 17, 2014.
- 13) Swarthmore College, Feb. 6, 2014.
- 14) Larry E. Overman 70th Birthday Symposium, Sept. 12, 2013.
- 15) Gordon Research Conference, Organic Reactions & Processes, July 18, 2013.
- 16) DuPont Crop Protection Seminar Series, Nov. 8, 2012.
- 17) Robert G. Bergman 70th Birthday Symposium, June 16, 2012.
- 18) ACS Mid-Atlantic Regional Meeting Younger Organic Chemists Symposium, June 1, 2012.
- 19) Salisbury University, March 15, 2012.
- 20) University of Vermont, March 1, 2012.
- 21) Tulane University, April 11, 2011.
- 22) East Tennessee State University, February 5, 2010.
- 23) Chemistry Biology Interface Program Seminar, University of Delaware, October 7, 2009.

Recruiting and Other Seminars

- 1) 244th ACS National Meeting, Philadelphia, PA, August 21, 2012.
- 2) 244th ACS National Meeting, Philadelphia, PA, August 19, 2012.
- 3) 243rd ACS National Meeting, San Diego, CA, March 25, 2012.
- 4) Middlebury College, March 2, 2012.

Poster Presentations

- 1) 243rd ACS National Meeting, San Diego, CA, March 27, 2012.

- 2) Gordon Research Conference: Natural Products, July 27, 2011.
- 3) Gordon Research Conference: Organic Reactions and Processes, July 20, 2011.
- 4) Gordon Research Conference: Organic Reactions and Processes, July 21, 2010.
- 5) Gordon Research Conference: Organic Reactions and Processes, July 2008.
- 6) Gordon Research Conference: Organic Reactions and Processes, July 2007.

FELLOWSHIPS AND GRANTS

Current Research Support

NIH COBRE P20GM104316 (Fox, Watson = Subproject Co-investigator) 09/01/2014 – 05/31/2019

Discovery of Chemical Probes and Therapeutic Leads

The goal of this Center of Biomedical Research Excellence is to discover new molecules to study human disease. Watson's role is to employ methods developed by her group to create diverse libraries of small molecules, which will be tested for a range of bioactivities by collaborators.

NIH R01 GM111820-01 (Watson) 08/15/2014 – 07/31/2019

Cross Couplings of Amine and Alcohol Derivatives to Give Enantioenriched Products

The major goal of this project is to develop enantiospecific and enantioselective, nickel-catalyzed cross couplings of amine- and alcohol-derived starting materials to provide efficient access to a range of highly enantioenriched products.

NSF CAREER CHE 1151364 (Watson) 02/15/2012 – 01/31/2017

CAREER: A Metal-Catalyzed Strategy for Enantioselective Additions to Oxocarbenium Ions

The goal of this project is to develop metal-catalyzed methods for the enantioselective addition of carbon nucleophiles, particularly terminal alkynes, to prochiral, cyclic oxocarbenium ions. These methods will enable efficient conversion of readily available, racemic acetal precursors to enantioenriched substituted oxygen heterocycles, which are found in a number of biologically active compounds.

University of Delaware Research Foundation – Strategic Initiatives (Watson) 12/1/2013 – 06/30/2015

Targeting Nuclear Receptors with Synthetic Diarylalkane Derivatives: Method Development, Synthesis, and Biological Assay

The goals of this project are to develop methodology for the synthesis of a broad range of diarylalkanes and assay the biological activity of the diarylalkane products against nuclear receptors.

Completed Research Support

NIH COBRE P20RR017716 (Beebe; Watson = Junior Faculty) 08/01/2012 – 07/31/2014

COBRE Junior Faculty Grant: Efficient Preparation of Glycopeptides via Glycosylation of Alkynyl Residues

The goal of this grant is to continue our efforts to develop metal-catalyzed alkynyations of sugars to enable formation of C-linked glycopeptides.

ACS PRF 50330-DNI1 (Watson) 09/01/2010 – 08/31/2012

Arylalkoxylation of Alkynes and Olefins via Transition Metal-Catalyzed C–O Activation

The major goals of this project were to develop new stereoselective methods to efficiently prepare ether products via nickel(0)-catalyzed insertion of alkynes and olefins into C–O bonds.

NIH COBRE P20RR017716 (Beebe; Watson = Seed Grant Investigator) 08/01/2011 – 07/31/2012

COBRE Seed Grant: Efficient Preparation of Glycopeptides via Glycosylation of Alkynyl Residues

The goal of this grant was to develop efficient methods for the metal-catalyzed alkylation of sugars to enable formation of C-linked glycopeptides.

University of Delaware Research Foundation (Watson) 06/01/2010 – 07/31/2012

Brønsted Acid-Catalyzed Reactions of Unactivated Olefins

The major goal of this project was to develop new chiral Brønsted acid catalysts for additions to olefin substrates.

NIH F32-GM078783 (Watson) 03/01/2007 – 06/31/2009

NIH Ruth L. Kirchstein National Research Service Postdoctoral Fellowship: Catalytic, Asymmetric Aziridination using (Salen)metal Catalysts

The major goal of this project was to develop new enantioselective, transition metal-catalyzed reactions to enable efficient synthesis of bioactive molecules.

TEACHING

CHEM 633 Physical Organic Chemistry (graduate level). 2009F, 2010F, 2011F, 2012F, 2013F

This graduate-level course focuses on physical organic chemistry, including organic reaction mechanisms and the tools available to study them. In addition to first-year graduate students in the organic division, the enrollment for this course typically includes graduate students from the inorganic and biochemical divisions, as well as several advanced undergraduates. The course is taught in a lecture format with regular discussion sections.

CHEM 634 Synthetic Organic Chemistry (graduate level). 2014F

This graduate-level course surveys modern methods for the synthesis of organic molecules, including both classical and modern reactions. In addition to learning reaction conditions and basic synthetic strategy, a strong emphasis is placed on reaction mechanisms. The course is taught in a lecture format mixed with problem-solving sessions.

CHEM 322 Organic Chemistry II. 2011S, 2014S

This undergraduate course focuses on second-semester organic chemistry, including reactions, mechanism, and NMR spectroscopy. The enrollment for this course largely consists of life sciences majors, and is taught in a lecture format with regular discussion and laboratory sections.

SERVICE

- Speaker at Science Coalition Champion of Science Award Ceremony for Senator Chris Coons, Oct. 8, 2014
- Discussion Leader, Reaction Mechanisms Conference, June 22-25, 2014, UC-Davis
- Moderator, Alfred Bader Symposium in honor of Prof. Laura Kiessling, 247th ACS National Meeting, March 19, 2014
- Faculty Advisor, Organic Student-Invited Colloquium, Department of Chemistry and Biochemistry, University of Delaware, Spring 2012 – present

- Organizing Committee, Heck Award and Lectureship, Department of Chemistry and Biochemistry, University of Delaware, Fall 2011 – present
- Proposal Reviewer for the National Science Foundation, 2010 – present
- Proposal Reviewer for the ACS Petroleum Research Fund, 2012 – present
- Regular Reviewer for The Journal of the American Chemical Society, The Journal of Organic Chemistry, Organic Letters, Chemical Communications, Tetrahedron, and Tetrahedron Letters, 2010 – present
- Liaison to Women Chemists' Committee for Delaware ACS Section, 2012
- UD Chemistry & Biochemistry Undergraduate Curriculum Committee (2009–2012)
- Early Career Reviewer for NIH Synthetic and Biological Chemistry (SBCB) Review Panel, Oct. 4–5, 2012
- Coordinator of Organic Seminar Series, Fall 2010, Fall 2011, Fall 2012, 2014/2015
- Organizer, graduate student recruiting for the Department of Chemistry and Biochemistry at the ACS Graduate School Recruiting Events at the 244th ACS National Meeting in Philadelphia, PA, August 19–20, 2012
- Session Chair, 244th ACS National Meeting in Philadelphia, PA, August 2012, and 243rd ACS National Meeting in San Diego, CA, April 2012
- Demonstrator, Bring Your Child to Work Day, University of Delaware, April 27, 2012
- STEM Role Model and CBC Departmental Organizer for American Association of University Women Award Luncheon for Excellence in Science and Mathematics, April 15, 2012
- Search Committee Member for Environmental Chemist, 2011–2012
- Seminar Presenter and Demonstrator for UD ACS Student Affiliates Meeting, Sept. 2011
- Session Chair at Gordon Research Conference: Natural Products, July 2011
- Session Chair at Gordon Research Conference: Organic Reactions and Processes, July 2011
- Science Advisor for Education Outreach Project about Nobel Laureate Richard Heck, *Discovery and Achievement, Richard Heck's Contribution to Science and the World*. See http://www.udel.edu/chem/mpwatson/mpwatson/Heck_Video.html
- Presenter on Richard F. Heck's Nobel Prize, College of Arts & Sciences Nobel Symposium, University of Delaware, Oct. 29, 2010
- Panelist, Careers in Chemistry Workshop at Rutgers University, Oct. 2010
- Presenter for New Student Orientation, Department of Chemistry and Biochemistry, University of Delaware, Aug. 30, 2010 and Aug. 31, 2009
- Session Moderator, 3rd Annual Frontiers at the Chemistry Biology Interface Symposium, Johns Hopkins University, May 1, 2010
- Panelist for UD ACS Student Affiliates Research Panel, Feb. 16, 2010
- Panelist for "What Is It Like to Be a Woman in Science?" part of UD's HHMI Undergraduate Science Education Summer Enrichment Program, July 7, 2009