Dr. Marlann Patterson

Materials and Nanoscience Concentration Coordinator, University of Wisconsin-Stout
Associate Professor of Physics, University of Wisconsin - Stout
Chemistry and Physics Department
College of Science, Technology, Engineering, Mathematics and Management

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Brief Biography

Experienced Physics Professor, Researcher & Student Advocate, Materials Scientist & Nanotechnologist

Teaching Interests: Entry-level undergraduate courses: physics, physical science, materials science, general engineering; advanced undergraduate courses: modern physics, quantum mechanics, thermodynamics, solid state physics, plasma processing, X-Ray diffraction, phase transformations, process engineering analysis; interactive learning methods and technologies (studio classrooms, clickers, think/pair/share, team based learning); cognitive evaluation (concept inventories, real time assessments, etc.)

Research Interests: Spintronic nanoclusters including synthesis, layering, characterization (SEM, TEM, AFM, SQUID, AGFM, etc.); plasma processing, including etching, deposition, sputter deposition, gas phase aggregation, ion energy control, plasma source design; plasma waste treatment.

Professional Interests: PUI Teaching, UG Research, Program Leadership, Student Advising, Academic Community Building

Languages

- Spanish (Beginner)
- Portuguese (Beginner)

Office Hours

Day	Time
Mo We Fr	2:30 - 3:25
We	8:00 - 11:00
Th	1:25 - 3:25

Education

- **Ph D Materials Science**
  University of Wisconsin
  Madison, WI, United States, 2005
- **MS Materials Science**
  University of Wisconsin
  Madison, WI, United States, 2000
- **BS Physics**
  University of Florida
  Gainesville, FL, United States, 1996

Work Experience

Academic - Post-Secondary

- **University of Wisconsin-Stout**, Applied Science Program
  Materials and Nanoscience Concentration Coordinator
  July 1, 2013 -
- **University of Wisconsin - Stout**, Chemistry and Physics Department
  Associate Professor of Physics
  June 16, 2013 -
- **University of Nebraska - Lincoln**, Materials Research Science and Engineering Center
  Summer Faculty Research Fellow
  June 1, 2014 - July 31, 2015
- **Univeristy of Wisconsin - Stout**, Physics
  Assistant Professor
  August 15, 2008 - June 15, 2013
- **Nebraska Center for Materials and Nanoscience**, MRSEC
  Visiting Summer Research Professor
  August 1, 2006 - August 15, 2008
- **Univeristy of Wisconsin - Platteville**, Chemistry and Engineering Physics, College of Engineering
  Assistant Professor of Physics
  August 15, 2004 - August 15, 2008
- **Univeristy of Wisconsin**
  Research Assistant
  August 15, 1997 - December 29, 2004
- **Madison Area Technical College**, Physics
  Adjunct Faculty
  August 15, 2003 - May 1, 2004
- **University of Florida**
  Honors Physics Student
  August 15, 1993 - August 15, 1996

Government

- **Sandia National Laboratories**
  Research Intern
  September 1, 2000 - November 15, 2000

Industry

- **Bell Labs, Lucent Technologies, Microelectronics Group**
  Member of Technical Staff - Level I
  July 15, 1996 - June 15, 1997

- **Bell Labs, Lucent Technologies, Microelectronics Group**
  Summer Student Intern
  June 15, 1993 - August 15, 1995

Intellectual Contributions

Journal Article

- Koten, M. A., Voeller, S., Patterson, M., & Shield, J. E. (2016). In-situ measurements of plasma properties during gas-condensation of Cu nanoparticles. *Journal of Applied Physics, 119*(114306), AIP Publishing, LLC.
- Patterson, M. (2012). Laser-assisted atom probe tomography investigation of magnetic FePt nanoclusters: First experiments',. *Journal of Alloys and Compounds*, 515,40.
- Patterson, M., Cochran, A., Ferina, J., Rui, X., Zimmerman, T. A., Sun, Z., Kramer, M. J., Sellmyer, D. J., & Shield, J. E. Early stages of direct L10 FePt nanocluster formation: The effects of plasma characteristics. *J. Vac. Sci. Technol. , 28*(2).
- Patterson, M. (2007). Arbitrary substrate voltage wave forms for manipulating energy distribution of bombarding ions during plasma processing. *Plasma Sources Science & Technology, 16*(2), 257.

Book

- Nucci, J. A. (2010). Materials Education. IN Patterson, M., Marshall, E. D., Wade, C. G., & Dunham, D. J. (Eds.), *Proceedings of the Materials Research Society, 1233*, 1233, Cambridge University Press.

Conference Proceeding

- Patterson, M. (2008). Plasma ion heating produces L10 FePt nanoclusters. *, 1087E*(8), Materials Research Society Symposium Proceedings.

Presentations

Seminar

- Patterson, M. (December, 2015). . , La Crosse, WI, United States.
- Patterson, M. (October 9, 2014). How to Be an Academic. GERS Seminars, Madison, WI, United States.

Paper

- Patterson, M. (September, 2008). In situ formation of L10 FePt nanoclusters via plasma ion heating during inert gas condensation. Magnetism and Magnetic Materials Conference,
- Patterson, M. (September, 2007). Where Materials Meet Plasmas: The making of nanoclusters. Materials Science UW System Symposium, Eau Claire, WI.
- Patterson, M. (September, 2006). Creating arbitrary substrate voltage wave forms for manipulating energy distribution of bombarding ions during plasma processing. Gaseous Electronics Conference,

Poster

- Patterson, M. (September, 2008). Plasma Probe and AFM Characterization of Fe Nanomagnets. UW-Platteville Research Poster Day,
- Patterson, M. (February, 2008). Method to Create Cubic FePt Clusters During in situ Gas-Phase Aggregation. Materials Research Society Spring Meeting, San Francisco, CA.
- Patterson, M. (September, 2007). Plasma-Aided Nanomagnet Control and Characterization. Center for Plasma-Aided Manufacturing talk, Madison, WI.
- Patterson, M. (September, 2007). Method to Create Cubic FePt Clusters During in situ Gas-Phase Aggregation. Midwest Solid State Conference, Lincoln, NE.
- Patterson, M. (September, 2007). Deposition of Nano-Magnets via Aggregate Sputtering. UW-Platteville Research Poster Day,

- Patterson, M. (September, 2006). Observation of Self Assembly of Nickel Nanowires. UWP Research Poster Session,
- Patterson, M. (January, 2006). Magnetic property characterization of MnAu nanoclusters in an Fe matrix. UW-Platteville Research Presentation,
- Patterson, M. (September, 2002). Control and Measurement of Ion Bombardment Energies at Substrates Biased with Tailored Voltage Waveforms. Plasma-Aided Manufacturing Seminar, Madison, WI.
- Patterson, M. (September, 2000). Antenna Configurations for Large-Area rf Inductive Plasma Sources. 47th Symposium of the American Vacuum Society, Boston, MA.
- Patterson, M. (September, 2000). Antenna Configurations for Large-Area rf Inductive Plasma Sources. Plasma-Aided Manufacturing Seminar, Madison, WI.
- Patterson, M. (September, 1999). Antennas for Large-Area Inductively Coupled Plasmas. 46th Symposium of the American Vacuum Society, Seattle, WA.
- Patterson, M. (September, 1999). Making Diamond-Like Carbon. Materials Science Program Seminar, Madison, WI.

Applied Research

Uncategorized

- **Plastics Manufacturer (Greater Minneapolis Area)**
  Consultant (July 2015 - March 2016)

Grants, Contracts, and Sponsored Research

Grant

- Kirk, J. S., Patterson, M., & Kramschuster, A. MRI-R2: Instrument Acquisition for Advanced Nanomaterials and Characterization. Sponsored by UW-System ARRA Grant Program, $19816 (Funded).
- Patterson, M. Course, Curriculum and Laboratory Improvement (CCLI). Sponsored by NSF (Funded).

Media Contributions

TV

- **PBS Nova: Making Stuff Education Collection** (February 22, 2012)
  On the production team of Making Stuff Education (http://www.pbslearningmedia.org/collection/nvms/)

Awards, Fellowships, Honors, and Scholarships

Fellowship

- Faculty/Student Pair Summer Research Fellowship, University of Nebraska - Lincoln (May 2015)
- Faculty/Student Pair Summer Research Fellowship, University of Nebraska - Lincoln (May 2014)
- Faculty/Student Pair Summer Research Fellowship,
- Faculty/Student Pair Summer Research Fellowship,
- Faculty/Student Pair Summer Research Fellowship,
- Advanced Opportunity Fellowship,
- Opportunity Awards Fellow (OAP),

Award

- Sabbatical, UW - Stout (September 2014)

Honor

- Teaching Champion, Nakatani Teaching and Learning Center (May 2014)
- Elected Councilor for Council on Undergraduate Research (CUR),
- High Merit rating on annual review,

Scholarship

- Graduate Engineering Research Scholarship,

Professional Memberships

- ASM International (ASM)
- Minnesota Chapter of the American Vacuum Society (MN-AVS)
- American Society of Engineering Educators (ASEE)
- Materials Research Society
- American Association of Physics Teachers (AAPT)
- American Physical Society (APS)
- Wisconsin Association of Physics Teachers
- Council on Undergraduate Research (CUR)
- Science and Technology of Materials, Interfaces and Processing (AVS)
- Sigma Pi Sigma
- Society of Physics Students (SPS)

Service

Department / School

- **Developer**, Department of Chemistry and Physics Web Page (August 20,2014 - Present)
- **Organizer**, Physics (Re)Assessments (August 20,2013 - May 10, 2015)
- **Organizer**, Physics Tutor Center (August 20,2013 - May 10, 2015)
- **Developer**, Physics Department Web Page (February 1,2009 - May 30, 2014)
- Faculty Senate (April 2011 - May 27, 2014)

College

- **Faculty Advisor**, UW-Stout Chapter of the Materials Research Society (January 2011 - Present)

University

UW Stout

- **Representative**, Faculty Senate (August 25,2010 - May 25, 2014)
- **Chairperson**, Personnel Policies Committee (PPC) (November 25,2013 - May 20, 2014)
- **Representative**, Personnel Policies Committee (PPC) (August 25,2011 - May 20, 2013)

Professional

- **Board of Directors**, Regional Materials and Manufacturing Network (RM2N) (July 1,2016 - Present)
- **Advisory Board Member**, CVTC Nano Engineering Technology Program (October 2014 - Present)
- **Advisory Board Member**, Normandale Vacuum Technology Program (December 2012 - Present)
- **Representative**, Regional Materials and Manufacturing Network (RM2N) (March 15,2013 - June 15, 2016)
- **Officer, Treasurer**, Minnesota Chapter of the American Vacuum Society (January 1,2012 - December 31, 2014)

- **Organizer**, Materials Research Society (November 1,2010 - May 1, 2012)
- **Organizer**, Materials Research Society (July 1,2008 - February 1, 2010)

Councilor, Council of Undergraduate Research (January 1,2005 - December 31, 2009)