MARLANN PATTERSON

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Education

2005	PhD	Materials Science, University of Wisconsin - Madison "Control and Measurement of Ion Bombardment Energies Using Tailored substrate Voltage Waveforms"
2000	MS	Materials Science, University of Wisconsin - Madison "Antenna Configurations for Large Area of Inductive Plasma Sources"
1996	BS	Honors Physics Major, Women's Studies Minor, University of Florida - Gainesville

Appointments

2013 -	University of Wisconsin - Stout	Associate Professor
2008 - 2013	"	Assistant Professor
2004 - 2008	University of Wisconsin - Platteville	Assistant Professor
2004	Madison Area Technical College	Adjunct Faculty
2001	Sandia National Laboratories	Visiting Researcher
1997 - 2003	University of Wisconsin - Madison	Research Assistant
1996 - 1997	Bell Labs, Lucent Technologies	Member of the Technical Staff Level 1
1993 - 1996	AT&T Microelectronics	Intern

Grants, Honors & Awards

2014 - 2015	Teaching Champion	Nakatani Teaching and Learning Center, UW-Stout
2006 - 2008; 2014 - 2015	Faculty/Student Pair Summer Research Fellowship	Nebraska Center for Materials & Nanoscience, University of Nebraska at Lincoln
2009	Physics Reviewer	NSF TUES Grant Proposals
2007	Co-PI	NSF CCLI Grant
2007 - 2009	Elected Councilor	CUR
2002 - 2003	Graduate Engineering Research Scholar (GERS)	UW Madison
1997	Advanced Opportunity Fellow	AT&T Microelectronics
1993	Opportunity Awards Fellow	AT&T Microelectronics

Publications & Talks

Archival, Peer-Reviewed Journal Articles

- M. A. Koten, S.A. Voeller, M. M. Patterson, J. E. Shield, J. Appl. Phys. **119**, 114306 (2016).
  doi: http://dx.doi.org/10.1063/1.4943630
- E. Folcke, R. Lard, J. M. Le Breton, M. Gruber, F. Vurpillot, J. E. Shield, X. Rui, M. M. Patterson, Journal of Alloys and Compounds, **515**, 40 (2012).
  doi: http://dx.doi.org/10.1016/j.jallcom.2011.11.134
- M. M. Patterson, A. Cochran, J. Ferina, X. Rui, T. A. Zimmerman, Z. Sun, M. J. Kramer, D. J. Sellmyer, J. E. Shield, J. Vac. Sci. Tech. B, **28**, 273 (2010).
  doi: http://dx.doi.org/10.1116/1.3298888
- M. M. Patterson, H. Y. Chu, A. E. Wendt, Plasma Sources Science and Technology, **16**, 2 (2007).
  doi: https://doi.org/10.1088/0963-0252/16/2/007

Academic Articles and Publications

- M. M. Patterson, Control and measurement of ion bombardment energies at substrates biased with tailored voltage waveforms, PhD thesis, University of Wisconsin, 2005.
- M. M. Patterson, Spatial variation of the rf electromagnetic induction fields from simple antenna configurations, MS thesis, University of Wisconsin, 2000.
- M. M. Patterson, E. D. Marshall, C. G. Wade, J. A. Nucci, D. J. Dunham (eds), *Materials Education* (Cambridge University Press, 2010).
- M. M. Patterson, X. Rui, X. Z Li, J. E. Shield, D. J. Sellmyer, Materials Research Society Symposium Proceedings, 1087E (V08), 2008. doi: https://doi.org/10.1557/PROC-1087-V08-08

Conference Presentations

- M.M. Patterson, A. Cochran, J. Ferina, V. J. Litwinowicz, X. Rui, T. A. Zimmerman, Z. Sun, M. J. Kramer, D. J. Sellmyer, J.E. Shield, "In situ formation of L10 FePt nanoclusters via plasma ion heating during inert gas condensation", Magnetism and Magnetic Materials Conference, 2008.
- M. M. Patterson, "Where Materials Meet Plasmas: The making of nanoclusters", Materials Science UW System Symposium, Eau Claire, WI 2007.
- M. M. Patterson, H. Y. Chu, A. E. Wendt "Creating arbitrary substrate voltage wave forms for manipulating energy distribution of bombarding ions during plasma processing", Gaseous Electronics Conference 2006.

Poster Presentations

- M. M. Patterson, X. Rui, J. E. Shield, D. J. Sellmyer, "Method to Create Cubic FePt Clusters During *in situ'* Gas-Phase Aggregation", Materials Research Society Spring Meeting, San Francisco, CA 2008.

- M. M. Patterson, X. Rui, J. E. Shield, D. J. Sellmyer, "Method to Create Cubic FePt Clusters During *in situ* Gas-Phase Aggregation", Midwest Solid State Conference, Lincoln, NE 2007.
- M. M. Patterson, T. Lho, A. E. Wendt, N. Hershkowitz, "Antenna Configurations for Large-Area rf Inductive Plasma Sources", 47th Symposium of the American Vacuum Society, Boston 2000.
- M. M. Patterson, A. E. Wendt, "Antennas for Large-Area Inductively Coupled Plasmas", 46th Symposium of the American Vacuum Society, Seattle 1999.

Local Presentations and Posters

- MM Patterson, "Plasma Probe and AFM Characterization of Fe Nanomagnets", 2008 UW-Platteville Research Poster Day.
- C Hineline, L Johnson, M Lowery, M Sala, J Smith, MM Patterson, "Deposition of Nano-Magnets via Aggregate Sputtering", 2007 UW-Platteville Research Poster Day.
- MM Patterson, "Plasma-Aided Nanomagnet Control and Characterization", Center for Plasma-Aided Manufacturing talk, 2007, Madison, WI
- J Smith, X Rui, P Rasmussen, MM Patterson, JE Shield, "Magnetic property characterization of MnAu nanoclusters in an Fe matrix", UW-Platteville Research Presentation, December 2006.
- MM Patterson, D Foust, T Baker, H Evensen and JP Hamilton, "Observation of Self Assembly of Nickel Nanowires", 2006 UWP Research Poster Session.
- MM Patterson, "Control and Measurement of Ion Bombardment Energies at Substrates Biased with Tailored Voltage Waveforms", 2002 Plasma-Aided Manufacturing Seminar, UW-Madison
- MM Patterson, "Antenna Configurations for Large-Area rf Inductive Plasma Sources", 2000 Plasma-Aided Manufacturing Seminar, UW-Madison
- MM Patterson, "Making Diamond-Like Carbon", 1999 Materials Science Program Seminar, UW-Madison.

Teaching, Advising & Mentoring

- Associate Professor at UW-Stout
  - Introductory Electricity and Magnetism, Solid State Physics and Nanotechnology
  - Ethics, student projects
  - Developed new top-down, applications-focused College Physics II curriculum.
- Assistant Professor at UW-Stout
  - Revised solid state physics as Condenses Mater Physics for F09.
  - Submitted two course proposals for University Physics I: Learning Community Proposal and Honors Course Proposal.

- Assistant Professor at UW-Platteville
  - Enriched and rewrote engineering physics lab curriculum.
  - Taught studio-style (combined lecture and lab), calculus-based Physics course (summer 2006).
  - Coordinated Nanotechnology Introduction course (spring 2006).
  - Updated Astronomy Observation labs.
  - Redeveloped Physical Science course and lab in interactive (studio) style.
  - Coordinated Introductory Nano/MEMS course offering.
  - Supervised 8 undergraduate research projects and a 5-person senior design project.
  - Developed and taught a 4-week Nanomagnetism course module.
  - Physics Education Research (PER):
    * Administered assessments (CCLI award project).
    * Led studio physics transition of Intro Physics Sequence for Engineers.
    * Worked with J.D. Patterson, retired professor of Physics, FIT, Effect of Current-Topic Commercials on Introductory Physics Learning.
    * Monitored pre and post-concept test results.
    * Enjoyed the energizing experience of imparting knowledge to diverse students; and learning in the process.
- Adjunct Physics Instructor
  - Developed technical science course curriculum.
  - Created new laboratory exercises.
  - Taught Physics and Intermediate Algebra courses.

Research, Scholarly Activities & Professional Development

- Assistant Professor at UW-Stout
  - Teaching science ethics
    * Science writing for large audiences
    * Reclamation of waste stream materials
  - Nanomaterials
    * Submitted Faculty Research Initiative proposal; and NSF CAREER proposal (unfunded).
    * Attended and presented at Magnetism and Magnetic Materials conference (10/08).
    * Submitted a Journal of Applied Physics article for conference proceedings.
    * Hired 2 research students to jointly conduct research and assist in the lab.
    * Served as active member of Stouts CORE Research Committee.
    * Acted as CUR Physics and Astronomy Division Councilor.
    * Created cyrstallographically ordered FePt nanoclusters in situ (new result).
    * Measured plasma parameters during FePt fabrication.
    * Established some theoretical limits on FePt nanoparticle phase transition in argon sputtering plasma.

    * Co-supervised undergraduate research project on MnAu nanoparticle characterization.

- Assistant Professor at UW-Platteville
  - Steered University of Wisconsin-Platteville SOTL Project: Iterative Grading of Mastering Physics Homework: A Comparative Study.
  - Established a working, unfunded lab/research program with 7 undergraduates.
  - Conducted research collaboration and testing of energy analyzers for plasma applications.
  - Manufactured and tested over one hundred micron-scale ion energy analyzers.
  - Studied blended program core of Materials Science, Physics, Thermodynamics and Chemical Engineering.
- Research Assistant at University of Wisconsin - Ph.D. Research
  - Developed voltage waveform construction methodology.
  - Created in-situ predictive software for plasma diagnostic.
  - Assembled probe for plasma diagnostic.
  - Designed and manufactured in-house ion energy analyzer.
  - Designed and assembled plasma diagnostic housings.
  - Developed software for ion energy analyzer data acquisition.
  - Planned and constructed a dedicated vacuum chamber for above research.
- Research Assistant at University of Wisconsin - M.S. Research
  - Completed antenna model for inductive plasma generation.
  - Designed and manufactured large area, rectangular induction antennas; developed their shielding designs.
  - Collaborated with researchers based outside the United States.
  - Rehabilitated unused vacuum chamber.
  - Designed servo for plasma etch system (Lucent Microelectronics, Madrid, Spain, 95).
  - Assisted plasma etch engineers Lucent Technologies, 94).
  - Tested metallization manufacturing processes (AT&T, 93).
  - Assisted nanomateirals and superconductors / electron microscopy research
  - engaged in service opportunities, and completed Honors Program three years.
  - Assisted in fabrication of superconducting nanowires. Also operated SEM for electron beam lithography of above nanowires.

Leadership, Community Outreach & Professional Service

- Associate Professor at UW-Stout
  - Advised Materials and Nanoscience students
  - Physics Department representative on Faculty Senate
  - Senate representative on Personnel Policies Committee

  - Department Representative on Faculty Senate
  - Materials and Nanoscience program promotion and growth.
  - Academic Communities: Played key role in building successful university collaboration.
  - Forged relationship with Chippewa Valley Technical College and Eau Claire community.

- Assistant Professor at UW-Stout
  - Revised mission statement.
  - Formed Curriculum Reform Committee for physics faculty to revise and update course offerings.
  - Served as Physics web-mistress.
  - Served as Champion for the Materials Science Concentration in Applied Science
  - Formed and chaired the Materials Science, Engineering and Technology (MSET) faculty committee; and have completed first draft revision on the Materials Minor
  - Gave Applied Science Seminar (11/09) on Nanomagnetism and the Storage Revolution.
  - Co-chaired Materials Research Society Symposium on Materials Education and Outreach.

- Assistant Professor at UW-Platteville
  - Served as Faculty Co-Advisor to UW-Platteville Society of Physics Students honor society, providing academic / career mentorship and encouragement., spoke at organizations honorary dinner.
  - Maintained two bulletin boards (EP research opportunities, EP description board).
  - Presented Career Camp activities for Women in Engineering.
  - Search and Screen Chem/EP for Faculty
  - Search and Screen Chem/EP for Chemistry Lecturer
  - UWP Nanotechnology Program Planning Committee
  - UWP EMS Minority Education Committee
  - MS in Engineering Committee
  - Chair, Search and Screen for Physics Lecturer

- Research Assistant at University of Wisconsin - Madison
  - Served as an officer in the Materials Science Graduate Student organization on campus.
  - Served on Materials Science Student Advisory and College of Engineering Welcoming Committees.

- Member of Technical Staff - Level I
  - Chaired cross-departmental team identifying and correcting problems with pattern dependent plasma processing.
  - Served as President of Women in Leadership at Lucent.