

JENNIFER L. DOCKTOR – CURRICULUM VITAE

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Education

University of Minnesota – Twin Cities (UMn)

2009 (expected), Ph.D. in Physics, subfield: Physics Education

Dissertation: “Robust Assessment Instrument for Student Problem Solving”

Adviser: Dr. Kenneth Heller

2006, M.S. in Physics, subfield: High Energy Physics

Project: “Development of a Fiber Continuity and Light Calibration Device for NOvA”

Adviser: Dr. Dan Cronin-Hennessy

North Dakota State University (NDSU)

2004, B.S. in Physics and Physics Education, minors in Math and Math Education

North Dakota Teaching Certification: Physics

Research Experience

University of Minnesota-Twin Cities

2004-present: Member of the Physics Education Research and Development Group under the guidance of Ken Heller. Specific projects have included:

2005-present: Assessment instrument for student problem solving: developed a scoring tool or “rubric” to assess students’ written solutions to physics problems; created instructional materials for training personnel to apply the rubric; analyzed written and videotaped data of students’ problem solving to determine the reliability and validity of the instrument (in progress).

Summer 2005: Measuring change in qualitative problem solving in an introductory physics laboratory: assisted another graduate student in the group with categorizing student responses to pre/post quizzes given during two-hour laboratory sessions; collectively designed a coding instrument to describe students’ understanding of forces.

Summer 2004: Relationships among gender, high school physics experience, and FCI scores: analyzed introductory physics students’ pre/post scores on the Force Concept Inventory diagnostic test; used SPSS to determine the statistical significance of gender and high school physics experience on test performance.

Spring 2006: Experimental High Energy Physics research in a laboratory under the guidance of Dr. Dan Cronin-Hennessy; designed and tested a device to assess light transmission quality of wavelength-shifting scintillator fibers for a particle detector in the proposed electron neutrino appearance experiment NOvA.

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Research Experience cont'd:

North Dakota State University

Spring 2003: Theoretical High Energy Physics research under the guidance of Dr. Sidi Benzahra; mathematical derivation of the quark transition rate for the collision of a high energy gluon with a meson in terms of the number density of gluons produced in heavy ion collisions.

Stanford Linear Accelerator Center, Menlo Park, California

Summer 2003: Department of Energy Science Undergraduate Laboratory Internship; co-wrote a software tool CRAnE (Cosmic Ray Analysis Environment) in Java to plot incoming cosmic ray rates as they are detected by a compact Cosmic Ray Telescope; assembled and tested the telescopes with teachers in the QuarkNet program.

Fermi National Accelerator Laboratory, Batavia, Illinois

Summer 2002: Department of Energy Pre-Service Teacher Program; co-developed a web-based education module on systems analysis to satisfy the Real Time Embedded Systems (RTES) outreach component of the proposed high energy experiment BTeV; attended the QuarkNet program leadership training workshop for high school teachers.

Teaching Experience and Curriculum Development

University of Minnesota-Twin Cities

2005-2007: Mentor Teaching Assistant: Co-led a weekly seminar for new physics teaching assistants throughout the academic year which highlighted both theoretical and practical issues of teaching physics; observed TAs to provide them with individual feedback on their teaching performances; acted as a liaison between TAs and faculty.

Fall 2005, 2006: Co-Instructor, incoming physics teaching assistant orientation: prepared materials for and helped conduct the 2-week long orientation for new physics teaching assistants; familiarized new TAs with the theoretical background for pedagogical practices of the physics department (Cognitive Apprenticeship Theory of model, coach, and fade) and provided opportunities for practice teaching laboratories and problem-solving discussions sessions with Cooperative Group Problem Solving methods.

2004-2005: Teaching Assistant, Physics for Pre-medicine & Biology Students I & II; instructor for laboratory and discussion sessions using cooperative group problem solving methods; also graded written work including exams and laboratory reports.

Summer 2006: Laboratory manual development coordinator: supervised seven graduate students in the revision of introductory physics laboratory manuals and instructor guides; facilitated meetings and edited and proofed documents prior to publishing.

Teaching Experience and Curriculum Development cont'd:

North Dakota State University

Spring 2004: Student Teaching with Steve Kennedy at Fargo South High School: two honors physics and three advanced placement physics classes each day.

2001-2003: Undergraduate Fellow in the NSF GK-12 program GraSUS (Graduate-Student-University-School); wrote curriculum for a unit on graph theory in a pre-calculus class at Moorhead High School; set up Personal Response Systems (PRS) and LON-CAPA online homework in classrooms at Fargo South High School and wrote a conceptual physics question bank for use with PRS clickers.

2003-2004: Undergraduate Teaching Assistant, College Physics I & II (algebra-based); laboratory instructor and grader of homework and exams.

2000-2001: Problem Based Learning course peer instructor with Dr. Douglas Kurtze in University Physics I (calc-based course for scientists & engineers); coached student groups on PBL projects during class time.

Presentations, Posters, and Workshops

Abstracts and electronic copies of most items listed below can be obtained online at:
<http://groups.physics.umn.edu/physed/People/Docktor/index.html>

“Cognitive Research and the Practical Classroom: Bridging the Gap,” J. Docktor and L. Hsu, workshop, Minnesota Area Association of Physics Teachers Fall Meeting, St. Cloud, Minnesota, October, 2007.

“New TA Orientation: Resources, Policies, and Classroom Climate,” J. Docktor and B. Beers, workshop, University of Minnesota Center for Teaching and Learning Orientation for New Teaching Assistants, Minneapolis, Minnesota, August, 2007.

“Robust Assessment Instrument for Student Problem Solving,” J. Docktor, poster, Canada-America-Mexico (CAM) physics graduate student conference, Montreal, Quebec, Canada, August, 2007.

“Robust Assessment Instrument for Student Problem Solving,” J. Docktor, poster and presentation, American Association of Physics Teachers Summer Meeting, Greensboro, NC, July, 2007.

“Flexible Software for Computer-Based Problem Solving Labs,” J. Docktor and B. Neller-moe, invited talk, American Association of Physics Teachers Summer Meeting, Greensboro, NC, July, 2007.

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Presentations, Posters, and Workshops cont'd:

“A report on the conference ‘Why the Difference? A Teachers Conference on Best Practices to Engage Girls and Students of Color in Science, Technology, Engineering, and Math’,” J. Docktor, presentation at the monthly luncheon of the Institute of Technology Program for Women, University of Minnesota, September, 2006.

“Professional Development for Teaching Assistants,” J. Docktor & P. Knutson, Problems of Physics Teaching and Higher Education Seminar, School of Physics and Astronomy, University of Minnesota, February 16, 2006.

“Introductory Physics Labs – Initial Steps in Measuring Students’ Skills in Problem Solving,” P. Knutson and J. Docktor, Problems of Physics Teaching and Higher Education Seminar, School of Physics and Astronomy, University of Minnesota, February 9, 2006.

“Subatomic Billiards: Quark Transitions Due to Hard Gluon Collisions,” A. Wald & J. Docktor, Colloquium, Department of Physics, North Dakota State University, May, 2003.

Professional Service

2005-present: Website Administrator, Physics Education Research and Development Group, University of Minnesota.

2007-present: Officer for the GradPhi graduate student organization; assisted the President in coordination of events for graduate students in the School of Physics & Astronomy at the University of Minnesota.

2006-2007: President of the University of Minnesota Women in Physics & Astronomy student organization and physics representative for the Institute of Technology Program for Women; coordinated events for women graduate students and secured grant funding.

Summer 2006, 2007: Assistant Coordinator for the University of Minnesota Physics Research Experiences for Undergraduates (REU) program; co-organized and assisted with group seminars and field trips.

Honors and Awards

2005 Outstanding Physics Teaching Assistant Award, University of Minnesota
1999-2003 Distinguished Presidential Scholar, North Dakota State University

Professional Organizations

American Association of Physics Teachers (AAPT)
Minnesota Area Association of Physics Teachers (MAAPT)

References

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Dr. Yuichi Kubota

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