

Kenneth C. Walsh

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Professional Preparation

Doctorate of Philosophy

Oregon State University Jan. 2010
Major: Physics
Research: Computational Condensed Matter Theory
Research Advisor: Dr. Henri Jansen

Bachelor of Science

Oregon State University Dec. 2003
Major: Physics

Bachelor of Science

Oregon State University Dec. 2003
Major: Engineering Physics (Mechanical Engineering Focus)

Teaching Experience

Introductory Algebra based Physics (PH201, PH202, PH203)

Oregon State University Fall 2012, 2013; Winter 2013, 2014; Spring 2013, 2014
Instructor – Active engagement lecture

Introduction to Computational Physics (PH265)

Oregon State University Winter 2013, 2014
Instructor – Active engagement instruction, integrated lecture/lab/recitation

Introduction to Modern Physics (PH314)

Oregon State University Spring 2013, 2014
Instructor – Active engagement lecture

Introductory Calculus based Physics (PH211, PH212, PH213)

Oregon State University Fall 2011, Winter 2012; Spring 2012, Summer 2011, 2013
Instructor – Active engagement lecture

Introductory Modern Physics (PH311, PH312, PH313)

Western Oregon University Fall 2010, Winter 2011, Spring 2011
Assistant Professor – Active engagement instruction, integrated lecture/lab/recitation

Introductory Calculus based Physics (PH211, PH212, PH213)

Western Oregon University Fall 2009, 2010; Winter 2010, 2011; Spring 2010, 2011
Assistant Professor – Active engagement instruction, integrated lecture/lab/recitation

Introductory Algebra based Physics (PH201, PH202, PH203)

Western Oregon University Fall 2008, 2009; Winter 2009, 2010; Spring 2009, 2010
Assistant Professor – Active engagement instruction, integrated lecture/lab/recitation

Introductory Algebra based Physics (PH201)

Oregon State University Summer 2009 - 2013
Instructor – Lecture hall (200+ students) instruction with PRS engagement

Introductory Calculus based Physics (PH211, PH212, PH213)

Linn Benton Community College Winter 2010, Spring 2010, Summer 2010
Instructor – Active engagement instruction, integrated lecture/lab/recitation

Introductory Honors Physics (PH201/211H, PH202/212H, PH203/213H)

Oregon State University Fall 2007, Winter 2008, Spring 2008
Teaching Assistant – Integrated lab/recitation/lecture

Scientific Computing II (PH 464/564)

Oregon State University Fall 2007
Laboratory Teaching Assistant – Aided students with advanced level computational projects

**Paradigms – Symmetries and Idealizations, Oscillations, Vector Fields, Waves,
Quantum Measurements and Spin, Central Forces (PH 320, 421, 422, 424, 425, 426)**

Oregon State University Fall 2006, Winter 2007
Teaching Assistant – Helped run classroom active engagement activities, graded

Light, Vision, Color; Sound, Hearing, Music (PH 332, 331)

Oregon State University Fall 2006, Winter 2007
Laboratory Teaching Assistant – Instructed labs on the physics of light/optics and sound

Modern Physics (PH 314)

Oregon State University Spring 2004, 2005, 2006; Fall 2004, 2005
Laboratory Teaching Assistant – Instructed labs on modern physics topics, graded

Introductory Calculus based Physics (PH 211)

Oregon State University Summer 2005; Spring 2007, 2008
Laboratory Teaching Assistant – Instructed introductory calculus based physics labs, graded
Recitation Teaching Assistant – Lectured, developed worksheets, led discussions, graded,
and instructed a wide variety of classroom activities

Introductory Algebra based Physics (PH 201, 202, 203)

Oregon State University

Summer 2005,2007; Winter 2008

Laboratory Teaching Assistant – Instructed introductory algebra based physics labs, graded
Recitation Teaching Assistant – Lectured, developed worksheets, led discussions, graded,
and instructed a wide variety of classroom activities

Perspectives in Physics (PH 106)

Oregon State University

Spring 2007

Laboratory Teaching Assistant – Instructed labs on introductory conceptual based physics

Course Development and Instructional Education

Teaching Practicum, Introductory Physics for Honors Students

Oregon State University

Oct. 2007-June 2008

Practicum Advisor and Course Professor: Dr. Kenneth Krane

Assisted in the introduction of a new course for honors students, created by Dr. Krane,
based on the methods used in the Paradigms in Physics Project

- Intermixed lectures, labs, and classroom activities
- Utilized active engagement methods through group worksheets, class presentations/discussions, hands-on laboratories with class comparisons/discussions of data and lectures with a discussion encouraging environment
- Shared daily instruction
- Occasionally taught entire topics, (i.e. the electric potential) over the course of many days, with Dr. Krane playing the role of the teaching assistant
- Created, with Dr. Krane's mentorship in physics education pedagogy, lesson plans that include all of the above active engagement methods

Modern Physics

Oregon State University

Winter, Spring 2004

Developed a wide range of improvements to the modern physics curriculum

- Involved in changing and adding material presented in the laboratory
- Created website with an extensive list of links to visualization aids (mostly Java applets) and associated conceptual questions
- Wrote an extensive Maple worksheet that solves the Schrödinger equation for potential steps, wells and barriers, creating time dependent plots of the wavefunction and probability that aid students in the behavior of waves on boundaries

Paradigms in Physics Project Teaching Assistant

Oregon State University

Oct. 2006 - Mar. 2007

Collaborative course development in the Paradigms in Physics Project (website:

<http://www.physics.oregonstate.edu/paradigms/>)

- Learned invaluable lessons in controlling an active engagement environment
- Worked with professors in directing lessons that enabled students to learn through inquiry, Socratic methods and hands-on activities

- Attended, "Quantum Mechanics in the Paradigms" Summer Faculty Workshop, July 06

Teaching Assistant Seminar

Oregon State University

Spring 2004

Weekly departmental seminar on teaching assistant skills and practices

Teaching Seminar

Oregon State University

Spring, Fall 2004, Spring 2005

Weekly departmental seminar focusing on improving teaching skills

- Discussed active engagement skills, Socratic methods and physics pedagogy with visiting speakers

Research

Graduate Thesis

Oregon State University

December 2010

Research Advisor: Dr. Henri Jansen

Abstract – Electronic structure calculations of free and immersed atoms are performed in the context of unrestricted Hartree-Fock Theory. Spherical symmetry is broken, lifting degeneracies in electronic configurations involving the magnetic quantum number m_l . Basis sets, produced from density functional theory, are then explored for completeness.

Comparison to spectroscopic data is done by a configurational interaction of the appropriate L and S symmetry. Finally, a perturbation technique by Löwdin is used to couple the bound atomic states to a neutral, uniform background electronic gas (jellium).

Undergraduate Senior Project

Oregon State University, Department of Mechanical Engineering

2003

Research Advisor: Dr. Deborah Pence

Abstract – Fluid flow through bifurcating micro-scale channels, like those found in nature (veins, trees, rivers), could have potential for cooling microprocessors. The pressure drop and heat transfer was calculated as a function of the length to width ratio of each successive bifurcation. Thermodynamic efficiencies were explored to find the optimal length to width ratio.

Talks and Seminars

Guest Science Lecturer

Western Oregon University

April 2009

Presented to a diverse group of students and faculty an introduction to quantum mechanics and modern computational methods for modeling atoms.

Northwest American Physical Society Annual Meeting

Lewis & Clark College

May 2008

Presented a method of calculating the total electronic energy of non-spherical atoms, dealing with instabilities in the solutions and extending the model to atoms immersed in an electron gas.

Student Advising

Shawn Decker

Western Oregon University

Winter, Spring 2010

Major advisor on senior project in chemistry

- Analyzed angular momentum coupling and compared theoretical energies of non-spherical atoms to spectroscopic experiments
- Explored instabilities in system convergence for closely lying triplet states

Laura Waight

Western Oregon University

Winter, Spring 2010

Independent study advisor on curriculum development

- Created lesson plans to bridge the gap between mathematics and physics for introductory students
 - Studied ways and created curriculum to teach about multiple representations in physics
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Accolades and Awards

New Faculty Highlight in WOU Student Paper

Western Oregon University

Jan. 2009

Teaching Assistant of the Year

Oregon State University, Department of Physics

June 2008

Tuition and Stipend Award

National Science Foundation

Winter, Spring 2004

- Funding provided under a grant for Dr. Kenneth Krane, "Materials for Active Engagement in the Modern Physics Course"

Teaching Assistantship

Oregon State University, Department of Physics

Fall 2004 - Spring 2008

Committees and Services

Graduate Teaching Assistant, Paradigms in Physics Committee

Oregon State University, Department of Physics

Oct. 2006 - Mar 2007

Graduate Student Committee for Promotion and Tenure

Oregon State University, Department of Physics

Sept. - Dec. 2005

Graduate Student Committee, Faculty Search

Oregon State University, Department of Physics

Jan. - June 2004

Outreach Activities

Pre-College Programs

Oregon State University

July 2006, 2007, 2008

Adventures in Learning – Developed and instructed middle school level courses on: Electricity and Magnetism, Physics Challenges, Quantum Mechanics, Building Bridges with Pasta, Physics of Everyday Things, Water Bottle Rocket
Outside the Box – Developed and instructed middle school level courses on: Electricity and Magnetism, Physics Challenges, Quantum Mechanics

Private Tutor for all levels of physics

Mar 05 - Present

Industry Experience

Idatech Research and Development Internship

Summer 2003

Paid internship with Idatech's R&D department performing experiments on hydrogen fuel reformers.

- Proposed design and completed an experiment to decrease the amount of catalyst required for optimal hydrogen fuel reforming
- Performed general lab maintenance, participated in group meetings with brainstorming sessions, and assisted with other experiments