

Gail S. Welsh

Curriculum Vitae

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Department of Physics
Salisbury University
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Education

1994	PhD	Penn State University	Physics (theoretical/computational condensed matter)
1991	MS	Penn State University	Physics (experimental biophysics)
1988	AB	Oberlin College	Physics

Professional Experience

2019-present Professor of Physics, Salisbury University
2001-2019 Associate Professor of Physics, Salisbury University
2019 Associate Chair of the Physics Department, Salisbury University
2002-2008 Chair of the Physics Department, Salisbury University
1994-2001 Assistant Professor of Physics, Salisbury State University
Courses taught at Salisbury University (1994-present):
Physical Science for elementary education majors
1st and 2nd semester Introductory Physics (algebra-based).
1st, 2nd, and 3rd semester Introductory Physics (calculus-based), Modern Physics.
Upper-level courses: Computational Physics, Electricity and Magnetism,
Semiconductor Physics, Thermodynamics & Statistical Mechanics, Quantum
Mechanics, Mathematical Physics, Digital Electronics, Analog Electronics, Senior
Laboratory, and Senior Seminar.
Introductory Physics and Integrated Science for non-science majors, Physics for Middle
School Teachers, Concepts in Physics course for 1st semester physics and
engineering majors.
1994 Lecturer, Physics Department, Penn State University:
3rd semester introductory physics for engineers.
1988-1994 Laboratory curriculum development, Penn State University:
Development and teaching of new lab sequence for 1st semester introductory
physics for engineers.
Recitation teaching assistant, Penn State University:
1st, 3rd, and 4th semester introductory physics for engineers.
Laboratory teaching assistant, Penn State University:
1st semester introductory physics for biologists, 2nd semester introductory physics
for engineers, Experimental physics for junior and senior physics majors.
Research assistant, Penn State University:
Thesis research in condensed matter theory, advisor Dr. Annett.

Professional Organization Memberships

American Association of Physics Teachers
National Science Teachers Association
American Physical Society
Sigma Xi Scientific Research Society

Grant Awards and Grant Participation

2019-present Co-PI on Salisbury University Robert Noyce Teacher Scholarship Program Track 1 Grant (five year grant for \$1,199,846)
2014 – 2017 Co-PI on Physics Teacher Education Coalition (PhysTEC) Recruiting Grant (three year grant for \$29,889)
2010-2011 Curriculum coordination for an NSF STEP grant
2005-2007 Co-principal investigator with Joseph Howard, Student Balloon and Engineering Flight Payloads project sponsored through Wallops Island. (first year \$7000, second year \$8000)
Spring 2000 MHEC Math/Science/Technology Grant, collaboration between the Education Department, Professional Development Schools, and Physics and Math departments. With Norman Frances (East Salisbury School science teacher), developed inquiry-based integrated physical science lesson and presented it to the student teachers' seminar class.
2003-2004 MHEC Science ADEPT grant. Curriculum development: Physics course for In-Service Middle School science teachers focused on using toys to teach physics. Taught course in Spring 2005.

Publications

Randall E. Groth, Jennifer A. Bergner, Starlin D. Weaver, and Gail S. Welsh, *Using Japanese Lesson Study to Merge Inservice Professional Development and Preservice Clinical Experiences*, The Clearing House: A Journal of Educational Strategies, Issues and Ideas, (2020).

Gail S. Welsh, *Recruiting Physics Teachers*, Re:Search Graduate Studies & Research at Salisbury University, (2017 Edition).

Gail S. Welsh, Starlin D. Weaver, and Matthew A. Bailey, *Salisbury University PhysTEC Recruiting Grant Project*, American Physical Society Forum on Education Newsletter, (Fall 2015).

Gail S. Welsh, *Magnetic Therapy in Physics?*, The Physics Teacher **38**, 181 (2000).

Gail S. Welsh and James F. Annett, *Conjugate-gradient Calculations of Adatom Interactions*, Physical Review B **49**, 13921 (1994).

Neil D. Shrimpton, Gail S. Welsh, and Jinsuk Song, *The Uniaxial Phase of Alkali Metals on the FCC(100) Metal Surfaces*, Physical Review B **45**, 1403 (1992).

Student Publication

Louise D. Coltharp, *Effect of Starting Location on Clusters Formed by Diffusion-Limited Aggregation*, NCUR 2016 Proceedings (2016).

Selected Presentations

Katherine R. Miller (presenter) and Gail S. Welsh, *Reflection Exercises for Learning and Assessment*, poster and invited presentation, American Society for Biochemistry and Molecular Biology Transforming Education in the Molecular Sciences, San Antonio, TX (July 2019).

Katherine R. Miller and Gail S. Welsh, *Time Capsules and Portfolios as Tools for Learning and Assessment*, Teaching and Learning Conference, Salisbury, MD (February 2018).

Gail S. Welsh, *Writing Time Capsules for Student Self-Assessment*, American Association of Physics Teachers Summer Meeting, Cincinnati, OH (July 2017);

Gail S. Welsh, *Diffusion-Limited Aggregation*, invited presentation for the Henson Physical Science Seminar Series, Salisbury, MD (April 2017).

Starlin Weaver and Gail Welsh, *PhysTEC Recruiting Grant at Salisbury University*, invited poster presentation, PhysTEC Conference, Atlanta, GA (February 2017).

Starlin Weaver and Gail Welsh, *PhysTEC Recruiting Grant at Salisbury University*, invited targeted poster presentation, PhysTEC Conference, Baltimore, MD (March 2016).

Gail Welsh, invited speaker on panel at “Spotlight on Women in STEM” sponsored by the Salisbury University Scientista Foundation Chapter (May 2015).

David Rieck and Gail Welsh, *Process-Oriented Guided-Inquiry Learning in Physical Science*, joint presentation at the Teaching and Learning Conference (TLC), Salisbury University (January 2011).

Seth Friese, Anita Brown, and Gail Welsh, *Using Performance-Based Contract Grading to Increase Student Success*, joint presentation at the TLC, Salisbury University (January 2011).

Gail Welsh and David Rieck, *Lecture Activities for Engaging Elementary Education Majors in Physical Science*, paper presented by Gail Welsh at the American Association of Physics Teachers Summer Meeting, Salt Lake City, UT (August 2005).

Gail Welsh, invited speaker on panel at the 3rd annual “Pioneering Women of the Eastern Shore” at Wallops Island sponsored by the Women of Wallops Federal Women’s Program (October 2005).

Gail Welsh and Joseph Howard, *Integrated Inquiry-Based Lecture and Laboratory*, paper presented at the American Association of Physics Teachers Summer Meeting, Rochester, NY (July 2001).

Gail Welsh, *Writing to Learn Physics*, workshop presented to Washington High School faculty, Princess Anne, MD (June 2000).

Linda Bush and Gail Welsh, *Guiding Undergraduates Toward Better Communication in Science*, workshop presented at the Communicating Science Conference, Hamilton College (October 1998).

Gail S. Welsh and Charles R. McKenzie, *A Non-Traditional Approach Keeps Students Excited About Physics*, paper presented at the American Association of Physics Teachers Summer Meeting, University of Nebraska-Lincoln (August 1998).

Gail S. Welsh, *Teaching Techniques*, workshop presented for new faculty members at Salisbury State University (August 1997 and 1998).

Gail S. Welsh and C. Richard McKenzie, *Collaborative Learning Through Collaborative Teaching*, paper presented at Rethinking Key Issues in College Learning, Elon College (September 1997).

Gail S. Welsh, *Transforming Preconceptions into Physics: A Writing-to-Learn Activity*, workshop presented at the Writing Across the Curriculum Conference, Salisbury State University (September 1997).

C. Richard McKenzie and Gail S. Welsh, *Major Concepts in Physics: A Non-Traditional Approach*, paper presented at the Faculty Seminar Series, Henson School of Science, Salisbury State University (April 1997).

Gail S. Welsh, *Understanding Surface Defect Interactions*, paper presented at the Faculty Seminar Series, Henson School of Science, Salisbury State University (November 1994).

Other Professional and Service Activities

2018-present	Salisbury University (SU) Undergraduate Curriculum Committee, Chair.
2018-present	Physics Department Assessment Committee, Chair.
2018-present	Physics Department Laboratory Committee, member.
2018-present	FIRST LEGO League Judge.
2019	Presenter for STEM Saturday program for elementary school children.
2018	Co-presenter for STEM Saturday program for middle school children.
2014-2020	SU University Academic Assessment Committee, member.
2008-present	Henson School of Science Curriculum Committee, member; Chair 2009-2010 and 2014-2015 and 2017-2018.
2014-2016	SU Scientista Chapter, student organization advisor.
2012-2013	SU Assessment of General Education Science Learning Goals.
2011-2013	SU Promotions Committee, member.
2011-2013	SU Continuing Accreditation Team for the Professional Education Unit, member.
2008-2011	SU Faculty Senate, member.
2006-2007	Search Committee for Dean of Henson School, Salisbury University, Chair
2001-2008	SU Commencement Committee, Co-Head Faculty Marshal.

2002-2012 SU Secondary Education/ K-12 Committee and Teacher Education Council, member.
2003-2006 Continuing Accreditation Team for the SU Professional Education Unit, member.
2001-2004 Secondary Education Associate of Arts in Teaching (Maryland Partnership for Teaching and Learning K-16), Faculty Disciplinary (Physics) Committee, member and Co-Chair.
2001-2002 Developed Physics Secondary Education Track, Salisbury University.
1998-1999 Reviewed major Physics textbook.
1997-2000 General Education Task Force, Salisbury State University, member.
1999-2002 University Curriculum Committee, Salisbury State University, member.
1996-1998 Honors Program Committee, Salisbury State University, member.
1995-2002 Henson School of Science Curriculum Committee, member and Chair.
1995-1998 Salisbury State University-University of Maryland Eastern Shore Collaborative New Faculty Initiative, Co-coordinator.

Selected Workshops and Tutorials Attended

February 2017 Physics Teacher Education Coalition Conference & PI meeting, Atlanta, GA.
March 2016 Physics Teacher Education Coalition Conference & PI meeting, Baltimore, MD.
March 2015 Physics Teacher Education Coalition Conference & PI meeting, Seattle, WA.
May 2011 Physics Teacher Education Coalition Conference, Austin, TX.
August 2009 *Critical Thinking & the Art of Instruction*, one-day workshop, Salisbury University
August 2005 *Research-based Alternatives to Problem Solving*, American Association of Physics Teachers (AAPT) Summer Meeting, Salt Lake City, UT.
April 2005 *Professional Skills Development Workshop*, American Physical Society and the Committee for the Status of Women Physicists, Tampa, FL.
May 2003 *Increasing the Retention of Under-Represented Groups – And the Learning of All Groups – In Science, Mathematics, Engineering and Technology Courses*, NSF National Chautauqua Workshop Program, University of Dayton, Dayton, OH.
June 2003 Chair's Conference, ACE, Alexandria, VA.
Spring 2002 *Classroom Assessment*, EDUC 532 course, Dr. Starlin Weaver, Salisbury University.
January 2002 *Courage to Teach*, week-long retreat, College Park, MD.
January 2001 *Problem-Based Learning*, one-day workshop, WorWic Community College.
June 2000 *Process Workshops – A New Model for the Science Classroom*, NSF National Chautauqua Workshop Program, SUNY Stony Brook, Stony Brook, NY.
Spring 2000 *Writing in the Disciplines Faculty Seminar*, Salisbury State University.
August 1998 *Group Problem Solving with Interdisciplinary Emphasis*, American Association of Physics Teachers (AAPT) Summer Meeting, Lincoln, NE.
May 1998 *Changing Science Courses to Promote Critical Thinking*, NSF National Chautauqua Workshop Program, Temple University, Philadelphia, PA.
1996-1997 *Writing Across the Curriculum Faculty Seminar*, Salisbury State University.
January 1995 *A New Approach to Introductory Electricity and Magnetism* and *The CASTLE Project: Electricity for the Right Side of the Brain*, AAPT Winter Meeting, Orlando, FL.

Selected Senior and Summer Student Research Projects

- 2018-2019 *Computational Diffusion Limited Aggregation* (one student, Summer 2019 Guerrieri Undergraduate Research Program; independent study Spring 2018-Fall 2019)
- Spring 2018 *How Modifying Electrode Shapes Impacts the Fractals Formed During Electrochemical Deposition* (two students senior research and honors thesis for one student)
- 2014-2016 *Computer Simulation of Diffusion-Limited Aggregation* (one student, Summer 2014 in the Summer Bridges for SUCCESS program, co-mentor Jeffrey Emmert; Fall 2014 – Fall 2015 independent study; Spring 2016 senior research project)
- 2012 *Computer Modeling of Adsorbate Configurations* (two students, Guerrieri Undergraduate Summer Research and Fall 2012 senior research project, co-mentor Jeffrey Emmert)
- Spring 2006 *Silicon Adsorbates* (one student, senior research project)
- Spring 2003 *Alkali Metal Adsorption* (three students, senior research project)

Sabbatical Projects

- Spring 2016 Diffusion-Limited Aggregation: modeling and electrodeposition experiments.
- Spring 2002 Portfolio and other assessment techniques applied to Modern Physics course.