Ellen Siem

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Summary

I received my Ph.D. from MIT in 2005 and completed a postdoctoral fellowship at a French research lab in Marseille in 2006. I have since served as a Senior Instructor II and Physics Program Coordinator at Southern Oregon University. In this capacity, I have taught a variety of upper and lower division courses, led a number of senior research projects, advised students, contributed to several university committees and working groups, and engaged faithfully in university and outreach activities.

Experience (*Current*)

Senior Instructor I,II of Physics and Physics Program Coordinator,
Southern Oregon University—2006-present

Physics Courses Taught (**= favorite):

- Capstone Project (PH 499)
- Nanophysics (PH 475, PH 175)
- Solid State Physics (PH 461)
- Analytical Mechanics I (PH 424),
- Quantum Physics I (PH 416)
- Computer Methods (PH 380)
- **Mathematical Methods in the Physical Sciences (PH 371)
- Thermal Physics (PH 354)
- Lasers (PH 339)
- Optics and Waves (PH 333)
- Methods of Research in Physics I & II (PH 331-332)
- Energy Alternatives (PH 309)
- Energy & the Environment (PH 308)
- General Physics Labs (PH 224-226)
- Calculus-Based General Physics (PH 221-223)
- Algebra-Based General Physics (PH 201-203)
- Astronomy & Astronomy Workshops (PH 112-115)
- Conceptual Physics & Lab (PH 100, 104)

Other Courses Taught:

- Math Honors Research Project (MTH 401)
- Energy & Climate Change (ES 327)
- Science, Sustainability, & Nature (HON 319)
- Concepts in Science: Energy (SC 110/110L)
- Concepts in Science: Light & Sound (SC 120/120L)
- Green House University Explorations: Science (HSE 303)
- Green House University Explorations: Science (HSE 203)
- Green House University Foundations (HSE 101-103)
- Honors Foundations (HON 101-103)
- Introduction to Expository Writing (USEM 185)
- University Seminar (USEM 101-103)

Professional Work: 9 grant proposals (2 funded), 1 invited talk (4 others), AAAS council member, new course creations and implementations

Service: Faculty Senate (8 yrs), Inter-Institutional Faculty Senate (2 yrs), Academic Program Review Working Group (1 yr), University Budget Committee, and regular positions in several University committees and working groups.

Outreach: I have been involved in several outreach activities each year aimed to increase participation in STEM fields, notably among underrepresented groups.

Experience (*Other*)

Owner (Remote), Private Physics Tutor —2020-2021

Provided online physics tutoring and professional development services that included workshops giving background knowledge for a course/industry, publication preparation, presentation preparation and coaching (excellent for non-native English speakers), and resume development.

Board Member (Remote), Science Works Museum —2020-2021

Helped develop a more engaging online presence and deployable activities in response to the COVID-19 pandemic.

Board Member, Geos Institute —2018-2019

Successfully helped create and launch a risk-based climate resiliency subscription service, which communities worldwide have used to help plan and mitigate the impacts of climate change predicted for their area.

Problem Writer and Editor (Remote), The Expert TA—2012-2018

Created a wide variety of new physics problems and animations for teaching videos. Provided upper administration editing services.

Postdoctoral Fellow, CINaM-CNRS, Marseille, France – 2005-2006

As a postdoctoral researcher sponsored by a Chateaubriand Fellowship, developed several computational models of the wetting of interfaces and triple junctions within materials by anisotropic particles working closely with chemists and physicists in a French national laboratory. Continued remote collaborations with scientists at Berkeley (CA), France, Denmark, Germany, and Israel.

Graduate Student Teaching Assistant, MIT, Cambridge, MA—2003–2005

Teaching assistant to two primary courses: thermodynamics of materials, kinetics of materials.

Visiting Researcher, National Center for Electron Microscopy, LBNL—summer 2003

Performed TEM and SEM on Pb particles in Al, resulting in 1 publication and 1 poster presentation in Nyborg, Denmark.

Visiting Researcher, CINaM-CNRS, Marseille, France—summer 2002

Collaborated with experts in wetting phenomena to develop better models of wetting within anisotropic materials.

Graduate Student Fellow, MIT, Cambridge, MA—2000-2003

The first 3 years of my graduate studies were supported by a fellowship from the Department of Defense. Developed computational models that incorporated the calculus

of variations and anisotropic surface free energies to model the wetting of solid particles and voids attached to grain boundaries.

Research Experience for Undergraduates, Northwestern University, Evanston, IL—1999
Undergraduate Research Assistant, Northwestern University, Evanston, IL—1998-1999
Both involved the same work: studied interfacial segregation to platelet particles in specific steels, resulting in 1 publication and 1 journal photo cover.

Education

Massachusetts Institute of Technology; Cambridge, MA—2000-2005
Ph.D., Materials Science & Engineering
Thesis: *Thermodynamic stability and implications of anisotropic boundary particles*
Advisors: S.M. Allen and W.C. Carter

Supported By: MIT Elsevier Scholarship, DoD Fellowship

Northwestern University; Evanston, IL—1997-2000
B.S., Materials Science & Engineering
Thesis 1: *Solute Segregation to Molybdenum Nitride Precipitate Interfaces in Steel using Atom Probe Field-Ion Microscopy*. Advisor: D. Seidman
Thesis 2: *Electrical Characterization of MgO Thin Films*. Advisor: B. Wessels

Skills

OS/Programming: Working knowledge of Linux, Mac, Mathematica, Matlab, C++, Java, Perl, Python, and other software as needed

Scientific Equipment: electron microscopy, AFM and STM, XRD, atom probe

Peer-Reviewed Publications

The melting behavior of faceted particles embedded in the solid state: A family of Wulff shapes, E.J. Siem and E. Johnson, *J. Mater. Sci.,* **41**(9) (2006) 2703-2710.

Orientation-dependent surface tension functions for surface energy minimizing calculations, E.J. Siem and W.C. Carter, Proceedings of Eleventh International Conference on Intergranular and Interphase Boundaries, *J. Mater. Sci.*, 40(12) (2005) 3107-3113.

Melting of embedded anisotropic particles: PbIn in Al, E.J. Siem and E. Johnson, *Philos. Mag.*, 85(12) (2005) 1273-1290.

The equilibrium shape of anisotropic interfacial particles, E.J. Siem, W.C. Carter, and D. Chatain, *Philos. Mag.*, **84**(10) (2004) 991-1010.

The stability of several periodic surfaces, E.J. Siem and W.C. Carter, *Interface Sci.*, **10**(4) (2001) 287-296.

Wetting in multiphase systems with complex geometries, D. Chatain, P. Wynblatt, S. Hagege, E.J. Siem, and W.C. Carter, *Interface Sci.*, **9**(3/4) (2001) 191-197.

Nanometer scale solute segregation at heterophase interfaces and microstructural evolution of molybdenum nitride precipitates, D. Isheim, E.J. Siem, and D.N. Seidman, *Ultramicroscopy*, **89**(1) (2001) 195-202.

Cover photo of Interface Sci.: The crystallographic alignment of molybdenum nitride precipitates in an Fe-Mo-Sn alloy, as seen in an atom-probe field-ion microscope, *Interface Sci.*, **9**(1/2) (2001).

Figure 15.10, Simulation of isotropic and uniform grain growth in two-dimensions; Figure 16.8, Simulation of isotropic coarsening in three-dimensions. R.W. Balluffi, S.M. Allen, and W.C. Carter, Kinetics of Materials, textbook, (Wiley-Interscience, Hoboken, NJ, 2005).

Awards

2006, National Research Council (NRC) Postdoctoral Fellowship Ceramics Division, NIST
(Gaithersburg, MD) – declined for SOU employment

2005, Chateaubriand Postdoctoral Fellowship Office for Science & Technology of the Embassy of France, CRMCN-CNRS, (Marseille, France)

2000, National Defense Science & Engineering Graduate Fellowship, Department of Defense

2000, Elsevier Award (Academic Scholarship), Massachusetts Institute of Technology

1999, LeaderShape Conference Scholarship, American Society of Metals

Professional Societies

American Association for the Advancement of Science
Physics Section Chair of the Pacific Division, 2015-2020
American Physical Society
Society of Actuaries (Affiliate Member)
International Association of Mathematical Physics
Materials Research Society
Sigma Xi
Southern Oregon Chapter President, 2009-2010
American Association of Physics Teachers
PNACP
Secretary, 2008-2009