

ANDREW A. PIACSEK

curriculum vitae

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EDUCATION

Ph.D. Acoustics Pennsylvania State University (1995)
M.S. Acoustics Pennsylvania State University (1991)
B.A. Physics Johns Hopkins University (1986)

PROFESSIONAL APPOINTMENTS

2004-present Director, Science Honors Research Program, Central Washington University
1997-present Assistant Professor / Lecturer, Department of Physics, Central Washington University
2003-2005 Interim Director, Office of Undergraduate Research, Central Washington University
2003-2005 Director, STEP Summer Science Institute, Central Washington University
1995-1996 Postdoctoral Researcher, Lawrence Livermore National Laboratory (Livermore, CA)
1990-1993 Graduate Teaching Assistant, Pennsylvania State University (State College, PA)
1986-1987 Research Associate, Planning Systems, Inc. (McLean, VA)

TEACHING EXPERIENCE

- Physics courses taught (number of terms) at Central Washington University:
 - Physics of Musical Sound and Physics of Musical Sound Laboratory (13)
 - Introductory Astronomy of Stars and Galaxies (3), Introductory Astronomy Lab (3)
 - [algebra-based] Introductory Physics sequence (2), Introductory Physics Lab (4)
 - [calculus-based] General Physics sequence (11), General Physics Lab (16)
 - Analytical Mechanics (4), Computational Physics (3)
 - Thermodynamics (1), Quantum Mechanics (1), Fundamentals of Acoustics (1)
- Completely revised existing Physics of Musical Sound course, incorporating computer-based sound visualization and analysis into lectures and labs, developing a novel curriculum that will be the basis of a new textbook, and facilitating student-led class projects.
- Completely revised existing Computational Physics course, emphasizing familiarity with modern computational packages, such as Mathematica and MATLAB, as well as basic algorithms, such as root-finding, integration, and finite-differencing, using the FORTRAN and C languages.
- Developed and co-taught two seminar courses for the Science Honors Program:
 - SHP301 prepares students for their summer-long research experience through discussion of such topics as strategies and pitfalls of designing experiments, interpreting results, and performing statistical analysis. The history of science, public perception of science, and science's role in society are also discussed.
 - SHP401 prepares students for writing their honors thesis. Proper formats and effective writing techniques are modeled and discussed.
- Co-taught, and collaborated in the development of, two seminar courses in the STEP program.
- Taught freshman fall-quarter colloquium in the William O. Douglas Honors College (2003-2004).
- Taught UNIV101, a basic advising course for freshmen (2001).

RESEARCH EXPERIENCE

Central Washington University

- Enhanced previously developed computational models of focusing weak shocks to simulate the propagation of sonic booms through a turbulent atmosphere.
- Adapted computer models of outdoor sound propagation near the ground to predict sound levels in the vicinity of a wind farm for different wind conditions.
- Supervised several undergraduate research projects in the areas of acoustics, vibration, and computational physics (listed below).

Lawrence Livermore Laboratory

- Developed and refined nonlinear acoustic propagation codes to study the behavior of shock waves in shallow ocean environments.
- Collaborated with researchers developing novel methods for monitoring nuclear tests.

Penn State University

- Performed theoretical and computational investigations of focusing shock waves (Ph.D.)
- Conducted experimental and theoretical study of noise created by condensing flow (M.S.)

Mentored Undergraduate Research Projects

Travis Petersen: *Predicted Environmental Noise Impact of the Proposed Kittitas Wind Power Project*. STEP Sophomore research project. Student presented work at SOURCE 2006.

Anthony Smith: *Elastic properties of a regular tensegrity structure*. Thesis submitted to the Science Honors Research Program (2006). Student presented work at SOURCE 2006 (awarded best presentation in category) and at 151st meeting of the Acoustical Society of America (June, 2006).

Greg Wagner: *A study of the environmental noise due to a proposed windmill farm in Kittitas County*. Student presented work at SOURCE 2004 and was co-author of presentation at 147th meeting of the Acoustical Society of America (May, 2004).

Apollo Good: *Computational model of the chaotic behavior of a driven double pendulum* (2003).

Jared Grogan: *Resonance properties of a wood plate subject to vibrational stimulus*. Student presented work at SOURCE 2003 and at 145th meeting of the Acoustical Society of America (June, 2003). Awarded 2nd prize for best student paper in Musical Acoustics.

Karen Roberts: *Experimental study of the effect of glass shape on resonance frequency*. Student presented work at SOURCE 2001 and was co-author of paper given at the 17th International Congress on Acoustics in Rome (August, 2001).

Dennis Hamilton: *Investigation of wine-glass resonance & Development of an apparatus for the demonstration of glass-breaking via resonance*. Student presented work at SOURCE 2000 and was co-author of presentation given at 140th meeting of the Acoustical Society (November, 2000). Also received mention in the New York Times (12/17/2000).

Tim Faix: *Quantitative analysis of the "piano tone controversy."* Student presented work at SOURCE 1998 and at regional meeting of the Society of Physics Students.

REFEREED PUBLICATIONS

Piacsek, A.A., "Atmospheric turbulence conditions leading to focused and folded sonic boom wavefronts," *J. Acoust. Soc. Am.*, **111**, 520-529 (2002).

Piacsek, A. A., "A 2D numerical solution for the evolution of shock profiles subject to wavefront focusing and diffraction." *Environmental Acoustics: International Conference on Theoretical and Computational Acoustics, vol. 2*, D. Lee and M. Schultz, eds., World Scientific (1994).

PRESENTATIONS AT PROFESSIONAL MEETINGS

(underline indicates student presenter)

Smith, A., and Piacsek, A., “Elastic and vibrational properties of a regular tensegrity structure,” *J. Acoust. Soc. Am.*, **119**, 3390 (2006).

Piacsek, A., and Wagner, G., “Environmental impact of modern wind farms,” *J. Acoust. Soc. Am.*, **115**, 2414 (2004).

Piacsek, A., “Using acoustics to lure high school students into a career in science,” *J. Acoust. Soc. Am.*, **114**, 2311 (2003).

Grogan, J., Braunstein, M., and Piacsek, A., “An experimental study of changes in the impulse response of a wood plate that is subject to vibrational stimulus,” *J. Acoust. Soc. Am.*, **113**, 2315 (2003).

Piacsek, A., “Using computers to overcome math-phobia in an introductory course in musical acoustics,” *J. Acoust. Soc. Am.*, **112**, 2344 (2002).

Piacsek, A., and Roberts, K., “Influence of wall curvature on the resonance behavior of glass bowls” *17th International Congress on Acoustics*, Rome, September 2-7, 2001.

Piacsek, A., and Hamilton, D., “Measurements of wineglass resonance using a fiber-optic probe,” *J. Acoust. Soc. Am.*, **108**, 2623 (2000).

Piacsek, A., “Atmospheric turbulence conditions leading to focused and folded sonic boom wavefronts,” (invited presentation). *J. Acoust. Soc. Am.*, **104**, 1830 (1998).

Handa, T., Piacsek, A., Yu, R. “Vibrations of a film with arrays of point masses,” *J. Acoust. Soc. Am.*, **103**, 2971 (A) (1998).

Piacsek, A. A., “Nonlinearity vs. diffraction within a focusing weak shock,” *J. Acoust. Soc. Am.*, **99**, 2539 (A) (1996).

Clarke, D., Piacsek, A., White, J., “Propagation of signals from strong explosions above and below the ocean,” *J. Acoust. Soc. Am.*, **99**, 2525 (A) (1996).

Piacsek, A., “A multi-dimensional algorithm to simulate the propagation of a shock wave through caustics,” *J. Acoust. Soc. Am.*, **94**, 1874 (A) (1993).

Piacsek, A., “Effects of air-injection upon cavitation noise in condensing two-phase flow,” *J. Acoust. Soc. Am.*, **87**, S80 (1990).

INVITED TALKS

CWU Darwin Week Seminar, “The Age of the Cosmos” (February 15, 2006).

Highline Community College, Des Moines, WA, “The Science of Musical Sound” (May, 2005).

CWU Science Seminar Series, with Dr. Jay Bachrach, “Two Theories of Time” (March 5, 2004).

CWU Philosophy Colloquium, with Dr. Chenyang Li, “Scientific Anti-Realism: Do Electrons Really Exist?” (January 28, 2003).

St. Edwards University College of the Sciences, Austin, TX, “The Science of Musical Sound” (November 8, 2002).

CWU Science Seminar Series, “Waves that stand and forces that restore: the physics of musical sound” (December 1, 2000).

Inland Northwest Chapter of the Acoustical Society of America, Moscow, ID, “Sonic Boom Propagation in a Turbulent Atmosphere” (April 9, 1999).

CWU Science Seminar Series, “Science as a Way of Knowing” (May 9, 1997).

ADMINISTRATIVE EXPERIENCE

CWU Science Honors Research Program (2004-present)

- Work with advisory committee and university administration to develop and implement policies.
- Develop curriculum; recruit faculty to co-teach seminars.
- Recruit students and faculty mentors; oversee application process.
- Organize and lead summer seminars and activities; monitor student progress; review final theses.
- Co-wrote successful proposal to secure base funding for the program.
- Lead planning efforts to integrate science honors with Douglas Honors College.

CWU Office of Undergraduate Research (2003-2005)

- Organized annual Symposium on Undergraduate Research and Creative Expression (SOURCE).
- Administered internal research and travel grants to CWU undergraduate students.

CWU STEP Summer Science Institute (2003-2005)

- Finalized Institute structure; planned the two-week schedule; recruited faculty participants.
- Coordinated campus events, guest lectures, field trips, transportation, and student lodging.
- Interviewed and hired student chaperones.
- Recruited students, participated in the admissions process, and assigned students to projects.
- Participated in program assessment.

GRANT WRITING

- Co-PI NSF STEM grant (2002): pilot program to improve recruitment and retention of STEM majors at CWU. Funded at \$250,000 for three years.
- Co-PI NSF STEM grant (2006): expand and institutionize efforts to recruit and retain STEM majors at CWU. Requested \$1,000,000 over five years. Pending.
- CWU Spheres of Distinction grant (co-author). \$82,237 annual base funding for the Science Honors Research Program (2006).
- CWU equipment grant (co-author). \$9,666 to purchase Mathematica software for the Physics and Math departments (2004).
- CWU equipment grant. Awarded \$2,665 to purchase sound analysis software for the Musical Sound computing lab in the Physics Department (2002).

COMPUTER AND WEB EXPERIENCE

- Employ basic HTML programming to develop course web pages and maintain Physics department and Science Honors web sites
- Assembled and maintained computer lab for PHYS103 Physics of Musical Sound
- Experience with scientific programming, including computational fluid dynamics, using FORTRAN, C, Mathematica, and MATLAB on UNIX, Macintosh, and Windows platforms.

SERVICE

Central Washington University

- Co-chair, William O. Douglas Honors College faculty advisory committee (2006 – present)
- Physics department representative to the Faculty Senate (2006 – present)
- Department liaison to university library (2000 – present)
- Member, Faculty Senate Ad Hoc Evaluation of Instruction Committee (2002 – 2004)
- Faculty advisor for Society of Physics Students (1998 – 2000, 2003)
- Coordinator, physics department seminar series (1998 – 2002)

Professional Societies

- Member, American Institute of Physics Science Writing Award Committee (2006)
- Member, Education Committee of the Acoustical Society of America (2000-present)
- Member, Public Relations Committee of the Acoustical Society of America (2000-present)

Community

- Present lecture-demonstrations on the subject of musical acoustics at regional high schools and community colleges
- Present hands-on demonstrations of physics of waves at regional elementary and middle-schools
- Scientific consultant to local community regarding outdoor noise issues

PROFESSIONAL MEMBERSHIPS

Acoustical Society of America (since 1986)

American Geophysical Union (since 1995)

American Association of Physics Teachers (since 1995)

American Association for the Advancement of Science (since 1999)