

Laurel M. Mayhew, Ph.D.

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TEACHING AND RELATED EXPERIENCE

- 9/2007 – Present **University of Colorado**, Boulder, CO, JILA. Director of Educational Community Partnerships for the NSF Physics Frontier Center. Develop community partnerships with K12 schools, after school programs, and housing project centers. Recruit university educators (undergraduate, graduate students, post docs, and faculty) to participate in informal science education activities. Adapt curricula. Provide materials, transportation, and training workshops.
- 9/2007 – Present **University of Colorado**, Boulder, CO, Department of Physics. Postdoctoral Research Associate for the Physics Education Research (PER@C) group. Conduct research on changes to university educators and K12 students after participating in informal science education activities using technologies such as PhET (physics simulations), stop action movie software, and Lego robotics.
- 9/2006 – 9/2007 **University of Colorado**, Boulder, CO, Departments of Mathematics, Applied Mathematics, and Physics. Lecturer for undergraduate science and math courses. Received Faculty Appreciation Award (Fall 2006) from the CU-LEAD Alliance, an organization promoting leadership, excellence, achievement, and diversity on the CU-Boulder campus.
- 1/2000 – 8/2000 **Worcester Polytechnic Institute**, Worcester, MA. Adjunct Professor and Post-Doctoral Candidate. Worked on laser tweezer experiment for the purpose of inserting bacteria into cells. Instructor for calculus based mechanics and electromagnetism physics courses (3 sections of 35 students). Received 94% student approval rating in first semester, unprecedented for new instructors at WPI.
- 9/1989 – 5/1997 **University of Massachusetts**, Amherst, MA. Teaching Assistant. Taught undergraduate lecture, laboratory, and discussion sections of physics and math such as calculus and non-calculus based mechanics (35-65 students), calculus and non-calculus based electromagnetism (35 students), calculus (25 students), physics writing (15 students).
- 9/1992 – 5/1995 **University of Massachusetts**, Amherst, MA. Minority Engineering Program Tutor. Tutored small groups of Minority Engineering Program students in physics and calculus.

- 9/1994 – **University of Massachusetts**, Amherst. Center for Teaching Classroom Diversity Fellowship Participant. Year-long paid program to promote diversity in the classroom. Select graduate student and faculty pair from 6 departments participated in workshops, brainstorming sessions, and departmental programs.
- 5/1995
- 9/1995 – **Princeton Review**, Amherst, MA. MCAT Instructor. Taught physics and chemistry part of MCAT prep course (5-20 students). Taught other instructors how to teach MCAT prep format (one on one).
- 5/1998

TEACHING AWARDS

Faculty Appreciation Award, CU-LEAD Alliance, University of Colorado, Boulder, Fall 2006. The CU-LEAD Alliance is a “set of multidisciplinary academic neighborhoods whose students, faculty, and staff are united to promote Leadership, Excellence, Achievement, and Diversity on the CU-Boulder campus.”

University Distinguished Teaching Award, University of Massachusetts, Amherst, 1995. This award is given to three outstanding graduate student Teaching Assistants each year. The award is very competitive and only given to instructors that show exceptional teaching across a variety of environments and courses. I was a member of the committee to select the next year’s award winner. I was also nominated in 1994.

First Annual Arthur Quinton Teaching Award, Physics Department, University of Massachusetts, Amherst, 1994. This award was created to recognize my teaching achievements when I was nominated (and did not win) the University Distinguished Teaching Award in 1994. Professor Quinton was an amazing physics instructor who was retiring that year. I was honored to receive an award named for him.

Classroom Diversity Fellowship, Center for Teaching, University of Massachusetts, Amherst, 1994. See description above.

OTHER EXPERIENCE

- 9/2003 – **Science Applications International Corp. (SAIC)**. Longmont, CO. Staff Scientist
9/2006 for satellite image analysis algorithm development group. Primary responsibilities included developing algorithms (C++, Matlab, ENVI/IDL); conducting algorithm validation tests (ENVI/IDL, Matlab); writing validation reports; and reviewing validation reports. Research and development of laser beam propagation systems in the presence of turbulence. General responsibilities included modeling, simulation, data collection, analysis, and documentation in structured modeling environment. Configured existing SAIC program (Fortran, Matlab) to run simulations for diverse adaptive optics scenarios. Data produced from these simulations (which included specific sensor and instrumentation models) was analyzed to develop more complex and effective adaptive optics systems. Developed availability statistical database for laser propagation through the atmosphere including beam attenuation from scattering and absorption based on NOAA visibility data for cities around the world

(C++). Ran MODTRAN and FASCOD simulations for various atmospheric conditions. Conducted other program level tasks such as writing customer reports, researching new business, and reading technical literature to evaluate new ideas or applications. Some laboratory work.

- 5/2003 – **Ball Aerospace Corp.**, Boulder, CO. Systems position to experimentally evaluate and develop software model for scanning Fabry-Perot interferometer used for measuring trace gases in the atmosphere on space-borne platforms. Wrote 100-page report detailing the results of laboratory experiments and models, and made recommendations about improvements to the mounts, control systems, etc.
- 9/2003
- 11/2000- **LightPointe Communications, Inc.**, Louisville, CO. Senior Research Scientist for telecommunications company that propagated laser beams between buildings instead of running fiber optic cable. Developed atmospheric transmission model to determine availability probabilities all over the world. Developed model to determine line of sight for laser communication between buildings in various cities using Vexcel Corporation DEM's. Developed model to describe relationship between scintillation and bit error rate for LightPointe systems. Worked on particle density fog models to predict better transmission wavelengths. Used MODTRAN to predict transmission under various atmospheric conditions.
- 12/2002

EDUCATION

Ph. D. in Physics, University of Massachusetts, Amherst, MA (1999). Worked on strained-layer semiconductor laser theory and experiments.

M. S. in Aerospace Engineering Sciences, University of Colorado, Boulder (2006). Emphasis in remote sensing including radar cross section calculations, SAR, electro-optical detection, 6 degree-of-freedom trajectory estimation in the presence of noise, Landsat image radiometry and registration, GIS information from digital imaging systems, land surface modeling, image processing techniques and tools, and hyperspectral image processing and analysis on urban landscapes.

Graduate Level Remote Sensing Certificate, University of Colorado, Boulder (2004).

M. S. E. C. E., University of Massachusetts, Amherst, MA (1992). Emphasis in control systems and semiconductor electro-optics.

M. S. in Physics, University of Massachusetts, Amherst, MA (1992). Emphasis in high energy physics and solid state physics.

B. S. in Physics, Minor in Electrical Engineering, University of New Hampshire, Durham, NH (1986). First undergraduate thesis in physics department.

COMPUTER PROFICIENCY

Platforms: Windows, NT, Unix/Linux, csh, VAX, mainframes and workstations.

Languages: C, C++, Matlab, FORTRAN, Assembly, Perl, BASIC.

Applications: LabVIEW, EDX, GIS, AutoCAD, CODEV, IDL, ENVI, MS Office, LaTeX.

AFFILIATIONS

IEEE Laser and Electro-Optical Society (LEOS), President (Boulder Section) 2004, Treasurer/
Secretary (Boulder Section) 2003, Member.

American Meteorological Society (AMS), Secretary (Boulder Section) 2003.

PUBLICATIONS

Laurel M. Mayhew, Deborah Lehr Trivedi, and Neal G. Anderson, "Modeling photoreflectance of quantum well heterostructures: A comprehensive approach," J. Appl. Phys. **101**, 033121 (2007).

Olga V. Kalashnikova, Heinz A. Willebrand, and Laurel M. Mayhew "Wavelength and altitude dependence of laser beam propagation in dense fog" Proc. SPIE, Vol 4635, p. 279-288, 2002.

L. Mayhew, H. Willebrand, and E. Kube, "Scintillation bit error rate reduction for free space optical communication systems," Proc. SPIE 4441, 2001.

L. Mayhew, N. G. Anderson, D. Lehr, and A. Baliga, "First-principles calculation of photoreflectance spectrum from a strained In_{0.18}Ga_{0.82}As/GaAs single quantum well," presented at the American Physical Society March Meeting, March 1999, Atlanta, Georgia, session ZC13.8.

L. Mayhew and N. G. Anderson, "Theoretical studies of modulated reflectance spectra for quantum well device structures," presented at the American Physical Society March Meeting, March 1997, Kansas City, Missouri, session F12.14.