

Katherine T. Schwarz

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OBJECTIVE

Scientific programming, simulation or data analysis.

EDUCATION

PhD in Physics, expected December 2008

Advisor: Tad Patzek

University of California, Berkeley

Thesis: Created original algorithm to detect instrument failures in records from a field site, using Extreme Value Theory to define outliers when the distribution of valid data was unknown. Wrote Matlab and C code to process raw data from sonic anemometer. Also compared simulation and analytical model of CO₂ dispersion in air from underground sequestration. GPA 3.92/4.0.

BS in Physics, 1987

Massachusetts Institute of Technology

Thesis: Photoluminescence Study of Annealing and Lattice Defects in CdTe; supervisor: Professor Mildred Dresselhaus. GPA 4.9/5.0. Completed core classes in EE, including Signals and Systems.

SKILLS—PHYSICS

Atmospheric turbulence	Thesis work on transport in the atmospheric surface layer: gradient model of turbulent diffusion and measurement of carbon flux by eddy covariance.
Linear and nonlinear filters	In thesis work, compared filters for despiking and used Matlab's Signal Processing Toolbox for spectral estimation. Coded an efficient median filter in C integrated with Matlab. Graduate classes in Random Processes.
Electromagnetic waves	Graduate student instructor for Electromagnetism and Optics for two years; covered refraction, reflection and transmission, polarization, diffraction, Fourier optics. Graduate classes in Electromagnetism, Nonlinear Optics, Quantum Optics.
Differential equations	Graduate classes on finite difference methods for numerical solution of partial differential equations, including parabolic, hyperbolic and elliptic types; programming assignments in Matlab.

SKILLS—SOFTWARE

C++	Wrote object-oriented code for Monte Carlo Markov chain simulation of protein folding; found phase transition in a lattice model protein by simulated annealing. Also used C++ to construct a suffix tree and find repeats in text in linear time.
C	Ranked first in class on algorithms for genome sequence alignment, motif finding, and phylogenetic tree construction. Project on codon substitution scores; improved efficiency of BLOSUM program to run on a much larger data set than it was originally designed for.
GIS	Won contest for best map in introductory class, using ArcGIS. Covered spatial queries, spatial overlay operations, projections, elevation models.
Other languages and systems	Java: introductory class. Unix: C, C++ projects above developed in Unix. Fortran: maintained data analysis package for crystallography lab.

WORK EXPERIENCE

Reader, University of California, Berkeley 2002-2003, 2007-2008

Classes: Statistical Physics; Introduction to Matlab; Groundwater Hydrology.

- Head Reader; developed grading schemes and assisted with writing of programming labs.

Graduate Student Instructor, University of California, Berkeley 1988-2001

Classes include graduate quantum mechanics and introductory physics.

- Head TA for four semesters, supervising about 10 other teaching assistants and administering classes of over 500 students. **Outstanding GSI Award, 1994.**

Word Processor, URS Corporation, Oakland, CA 2001-2003

Worked 5-20 hours per week in word processing, usually on environmental impact reports, using Microsoft Word and Excel.

Programmer, Harvard University Biochemistry and Molecular Biology 1988-89

Maintained Fortran package for X-ray crystallography, including the CCP4 suite and locally written programs. Modified code to users' requests and wrote scripts in VAX/VMS environment. Assisted team of biologists who solved the structure of SV40 virus.