

Qing Peng

Dr. Qing Peng
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EDUCATION

University of Connecticut, Storrs, CT
PhD, Physics (Material Simulation), Oct 2005
Dissertation: "Localization of Plastic Shear Events in Glassy Materials"
Adviser: Dr. Marcel Utz [Defence]

University of Connecticut, Storrs, CT
MS, Physics (Material Simulation), Aug 2003
Adviser: Dr. Marcel Utz

State University of New York, Binghamton, NY
MS, Physics (Fluid Mechanics), Aug 2000
Thesis: "A Study of the Flow of Dense Suspension on Inhomogeneous Surfaces"
Adviser: Dr. Eric Cotts [Defence]

Beijing University, Beijing, China
BS, Physics (Nuclear Science and Technology), Jun 1998
Thesis: "Analytically Solve Dirac Equation with SU(3) Algebra"
Adviser: Dr. Hua Guo

RESEARCH EXPERIENCE

Postdoctoral Associate
Physics Department
Northridge, CA

California State University

Jan 2007 – present
Research in development and applications of a DFT-based quasicontinuum method (QCDFE) and development of accelerated dynamic simulations of QCDFE. It is very important for national interest because it involves development of novel materials that will be used in high-technology applications. As a result of the recent progress in manufacturing and utilization of nano- and micro-scale engineering structures which are potential candidates for high-temperature structural applications, there is an urgent need for physically-based approaches that are capable in predicting the strength, ductility and propensity to failure under a wide variety of mechanical and thermal loads. The objective of this research work is to develop and validate a novel multiscale computational approach to elucidate the origin in the electronic and atomic structure of the unusual and interesting mechanical properties of this class of nano-materials.

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Postdoctoral Associate
Geophysical Laboratory
Washington, DC

**Carnegie Institution of
Washington**

Jan 2006 – Dec 2006

Research in computer simulations of Ferroelectrics using first principle and molecular dynamics methods. The pyroelectric coefficients of LiNbO_3 are studied. The programs used are ABINIT for *ab initio* calculation and DLPOLY for MD simulations. Fitting the potential for MD simulations from the *ab initio* calculations. Coding the programs that fit the force field for MD simulation from the first principle calculations.

Object: Ferroelectrics (LiNbO_3)

Method: *ab initio* and MD simulations

Advisor: Dr. Ronald Cohen

Research Assistant
Physics and Material Science
Storrs, CT

University of Connecticut

Aug 2000 – Dec 2005

(1) Research in computer simulations of plastic deformation of polymer glasses. Investigation of new approach to study localization phenomenon based on 3D Delaunay Tessellation and FFT technique. Investigated athermal simulation of plastic deformation in amorphous solids at constant pressure. Coding programs for Molecular Dynamic and Monte Carlo simulations of polymers.

Object: polymer glasses

Method: MD and MC simulations (classical)

Advisor: Dr. Marcel Utz

(2) Conducted experimental and theoretical research on the near field diffraction of short pulse laser and quantum beat. Studied the dispersion of wavelength-division multiplexing (WDM) in fiber-optics communications.

(3) Facilitated experimental research on Laser Cooling and Trapping. Designed and built a constant-temperature diode laser system for experiments.

Research Assistant
Cotts Lab
Binghamton, NY

Sate University of New York

Aug 1998 – Aug 2000

Carried experimental research on the dense suspension flow on inhomogeneous surface for under-fill flip-chip electronics packing. Studied capillary flow of dense suspensions, in particular commercial underfill encapsulant on different surfaces, including measuring wetting angles and viscosities. Such flow on mixed surfaced was examined in terms of the Washburn model.

Object: dense suspension fluid (Dexter)

Method: Capillary flow

Advisor: Dr. Eric Cotts

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TEACHING EXPERIENCE *Teaching Assistant* **University of Connecticut**
Astronomy
Storrs, CT 2002 – 2005

(1) PHYS155: Introduction to Astronomy.
Instructed the laboratory work and observations for three semesters. Created and maintained course website, held weekly office hours and graded homework and quiz, mid-term exams and finals. Supervised by Dr. Cynthia Peterson.

(2) Conduct discussion sections for all fields all grades of undergraduate students in Physics Learning Resource Center. Supervised by Dr. Carolina Artacho-Guerra.

(3) Mentor of new teaching assistants to share teaching experiences in International Teaching Assistant Program (ITAP) of UCONN (summer, 2004). Supervised by Dr. Catherine Ross.

(4) Instruction Research Undergraduate (RU) students in research of material simulation (summer, 2003).

(5) Instruction Advanced High School students in research of Optics/Lasers in Photonics lab (summer, 2002).

ADMINISTRATOR EXPERIENCE *Systems Administration,* **University of Connecticut**
Computer Lab of Physics Department
Storrs, CT 2003 – 2005

Daily maintain of computers in the Computer Lab of the Physics Department, including hardware repairing/replacement, software installation/updating, daily virus and security checking and updates.
Providing solutions of all problems related to computers, emails, internet connection, printer connection, scanner using, printing etc. Supervised by Dr. Michael Rozman.

Systems Administration, **University of Connecticut**
Institute of Material Science

Maintaining a parallel computing 30 nodes Beowulf cluster which permits state-of-the-art computer simulation to analyze and predict the behavior of metal, polymer, ceramic and composite materials under diverse conditions. Supervisor: Dr. Marcel Utz.

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SKILLS

ab initio

CALCULATION
SKILLS

Total energies, Geometry optimization, space group, Band structure, Charge densities, Born effective Charge, Electric polarization, Phonon dispersion, Phonon densities of states, Vibrational properties, Elastic constants, Bulk moduli, Piezoelectric constants, Pyroelectric constants, Thermal expansion, Heat capacity

CLASSICAL
SIMULATION
SKILLS

Molecular Dynamics (MD) Simulation, Monte Carlo (MC) Simulation, Simulated Annealing, Plastic deformation simulation, 3D Delaunay Tessellation, Multiscale Analysis, Modeling and Computation

QUANTITATIVE
SKILLS

Matlab calculation and modeling, mathematical modeling, probability, statistics, numerical methods, finite difference method, finite element method, stochastic differential equations, PDE, Monte Carlo methods, signal/data processing, linear and nonlinear filtering, parameter estimation, time series analysis, principal component analysis

FINANCIAL
SKILLS

Forward, futures, options, swaps, derivatives pricing, Black-Scholes analysis, risk management (VaR), interest rate models, stochastic volatility models, implied volatility, numerical methods for derivatives pricing, martingales, Girsanov theory, Brownian motion, Ito's lemma, stochastic calculus

COMPUTER
SKILLS

- ∞ Expert knowledge of the programming languages: C++/C/F, Python, PHP, Matlab, Mathematica and HTML.
- ∞ Expert knowledge of the Linux operating system and related applications.
- ∞ Expert knowledge of the winxp/win2000/win98 operating system and related applications.
- ∞ Expert knowledge of the databased driven website design.

EXPERIMENT
SKILLS

- ♣ **Certified** Machine shop working skills by School of Engineering of Uconn.
- ♣ Expert at optics/laser experiment.
- ♣ Expert at capillary flow/rheology experiment.
- ♣ Advanced knowledge of the solid state NMR experiment.