Peter Czoschke

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Education

Ph.D. Physics. University of Illinois at Urbana-Champaign, expected May 2005.
Subfield: Experimental Condensed Matter.

M.S. Physics. University of Illinois at Urbana-Champaign, 2002.

B.A. Physics. Carleton College, 1997.
Graduated magna cum laude with distinction in physics and honors in music performance.

Research Experience

Doctoral Research. University of Illinois at Urbana-Champaign, 2001 – present.
Thesis: "Quantum Electronic Effects in Metal on Semiconductor Ultrathin Films"
Advisor: Dr. Tai-Chang Chiang, Department of Physics.

- ◇ Designed, coordinated, and performed novel experiments to investigate self-developed research projects resulting in authored publications in top journals.
- ◇ Derived theoretical models to explain the basic physics of nanoscale metal on semiconductor films and coupled the theory with experimental results.
- ◇ Developed software packages in C++ and Igor for analysis of experimental data, including statistical models and methods.
- ◇ Collaborated with researchers from national labs, other universities, and industrial companies to execute experiments at a high-demand synchrotron facility.
- ◇ Trained new graduate students in experimental techniques.

Undergraduate Thesis. Carleton College, 1997.
"Architectural Acoustics," Advisor: Dr. Bruce Thomas, Department of Physics.

- ◇ Wrote a comprehensive report on the fluid dynamics of sound waves and the important factors in measuring the acoustic quality of enclosed spaces.
- ◇ Delivered a 70-minute public presentation on the research which earned the honor of "Distinction in Senior Integrative Exercise" from the College.

Research Assistant. Carleton College, 1996.
Dr. Richard Noer, Department of Physics.

- ◇ Designed and tested an experiment for the Contemporary Experimental Physics course that is still in use measuring the secondary electron coefficient of an ion-sputtered thin film.
- ◇ Installed a mass spectrometer in an ultrahigh vacuum chamber and wrote an application in LabVIEW to operate it using a homemade network interface.

Research Assistant. Carleton College, 1995 – 1996.
Dr. Paolo Dini, Department of Physics.

Worked with a team of two other undergraduate students to develop a software application in Objective C that visually represents the qualitative features of music using tools of physical analysis.

Work Experience

UNIX Architectural Engineer — Comdisco, Inc. Minnetonka, MN, 1999 – 2000.
Administered the core technical infrastructure for the Managed Network Services group as a lead member of the architecture team. Helped coordinate, build and move the entire datacenter from Minnetonka, MN to Woodridge, IL with only 6 hours of total downtime.

Database Administrator — UnitedHealth Group. Golden Valley, MN, 1998 – 1999.
Supported multiple clients with mission-critical SQL-based database applications and simultaneously spearheaded an effort that streamlined technical support activities and resulted in a 90% decline in downtime for the production team.

Analyst — ServiceNet, LLC. Minneapolis, MN, 1997 – 1998.
Developed distributed three-tier web-based applications for a technology startup company.

Technical Skills

- **Sample Analysis/Preparation.** RHEED (reflection high energy electron diffraction), AES (Auger electron spectroscopy), AFM (atomic force microscopy), nanoindentation, substrate polishing, wet chemical etching, electropolishing, crystal/surface orientation, laser alignment, ion sputtering, cryogenics (including LN_2 and LHe transfer), high magnetic fields, tube furnace operation, vacuum annealing.
- **Computer Languages/Programs.** C/C++, Igor, Mathcad, Mathematica, SQL, AutoCAD, Visual Basic, spec, UNIX scripting (Korn shell, sed, awk, etc.), Perl, LabVIEW, Matlab, LaTeX, UNIX administration (AIX, HP-UX and Linux), network administration (TCP/IP, Cisco), image processing.
- **Construction/Design.** CAD design, analog and digital electronics, machining (lathe, mill, drill press, etc.), soldering and brazing.
- **Thin/Ultrathin Film Deposition.** MBE (molecular beam epitaxy, both thermal and electron beam), PLD (pulsed laser deposition).
- **Ultrahigh Vacuum.** Operation, maintenance, design and construction.
- **X-Ray Diffraction.** Extensive experience with synchrotron and laboratory sources: surface, powder, single crystal, Laue diffraction and quasi-elastic diffuse scattering. Attended the 2002 National School on Neutron and X-ray scattering at Argonne National Laboratory.

Other Skills

- **Organizational/Team Management.** Managed multiple research projects simultaneously. Coordinated and collaborated with members from other national labs and universities. Planned and executed experiments under stringent time constraints.
- **Critical Thinking and Analysis.** Hypothesis testing and application of the scientific method to a diversified set of circumstances. Deconstructing problems to understand root causes.
- **Communication/Presentations.** Produced and delivered oral and written contributions at numerous meetings and conferences (7 total), including an invited talk at the 2003 Users Meeting of the Advanced Photon Source. Submitted regular proposals for experiments at the Advanced Photon Source (Argonne National Lab). Helped with a grant proposal to the National Science Foundation.
- **Teaching.** Trained and mentored new graduate students. Evaluated 80–100 students per semester as a graduate teaching assistant for discussion and laboratory sections of introductory physics classes. Tutored math and physics of all levels.
- **Languages.** Skilled in written and oral communication with French and Flemish (Dutch). Studied abroad in Belgium for 11 months and France for 4 months. Reading and oral comprehension of Spanish.

Publications

P. Czoschke, Hawoong Hong, L. Basile, and T.-C. Chiang. "Calculated and observed quantum size effects in the surface energy of Pb/Si(111) film nanostructures." (2005). (in preparation).

P. Czoschke, Hawoong Hong, L. Basile, and T.-C. Chiang. "An x-ray study and quantum well analysis of the growth and atomic layer structure of ultrathin Pb/Si(111) films." (2005). (submitted).

P. Czoschke, Hawoong Hong, L. Basile, and T.-C. Chiang. "Quantum Beating Patterns in the Energetics of Pb Film Nanostructures." *Physical Review Letters* **93**, 036103 (2004).

L. Basile, Hawoong Hong, P. Czoschke, and T.-C. Chiang. "X-ray studies of the growth of smooth Ag films on Ge(111)-c(2x8)." *Applied Physics Letters* **84**, 4995–4997 (2004).

P. Czoschke, Hawoong Hong, L. Basile, and T.-C. Chiang. "Quantum Oscillations in the Layer Structure of Thin Metal Films." *Physical Review Letters* **91**, 226801 (2003).

M. Holt, P. Czoschke, Hawoong Hong, P. Zschack, H. K. Birnbaum, and T.-C. Chiang. "Phonon dispersions in niobium determined by x-ray transmission scattering." *Physical Review B* **66**, 064303 (2002).

Honors/Awards

- Member of Phi Kappa Phi, an academic honors society, 2003 – present.
- Associate Member of Sigma Xi, The Scientific Research Society, 1997 – present.
- Excellence in Teaching Award, University of Illinois at Urbana-Champaign, 2000.
- Laurence McKinley Gould Prize in Natural Science, Carleton College, 1997.
- Distinction in senior comprehensive exercise in physics, Carleton College, 1997.