

## Curriculum Vitae

Christian D. Poweleit  
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Department of Physics  
Arizona State University  
Tempe, Arizona 85287-1504

### EDUCATION

- B.S. Thomas More College, Physics-Associates Mathematics (cum laude), May 1987
- M.S. Purdue University, Physics, May 1989
- Ph.D. University of Cincinnati, Physics, March 1995

### INVITED TALKS

- 1) "Spectroscopy Improvements Using a Solid Immersion Lens", University of Arizona, August 2004 Tucson, Arizona
- 2) "The Atomic Age", Faculty Ambassador Program Tempe Public Library 2003
- 3) "Optical Spectroscopy: A Journey into Raman Nano-resolution Using a Solid Immersion Lens", Miami University, March 2000 Oxford, Ohio
- 4) "Increased Spatial Resolution with Solid Immersion Lens Spectroscopy" Lund University, May 2000 Lund, Sweden.
- 5) "High Spatial Resolution Optical Spectroscopy Using a Solid Immersion Lens", Federation of Analytical Chemistry and Spectroscopy Society (FACSS) October Meeting, 1999, Vancouver, BC.
- 6) "High Spatial Resolution Raman Imaging Using a Solid Immersion Lens", American Physical Society (APS) Centennial Meeting, March 1999, Atlanta, Georgia.

### PUBLICATIONS

- 1) "Quantification of Degradation in Nonceramic Insulator Housing Materials by Laser Ablation", B.N. Pinnangudi, R.S. Gorur, C.D. Poweleit, IEEE Trans. on Dielect. And Elec. Insulation v13, p423, (2006).
- 2) "Characterization of field-aged nonceramic insulators", B.N. Pinnangudi, R.S. Gorur, C.D. Poweleit, Electrical Insulation and Dielectric Phenomena, 2005 Annual Report p22- 25.
- 3) "Observations of large electron drift velocities in InN by ultrafast Raman spectroscopy", K.T. Tsen, C. Poweleit, D.K. Ferry, Hai Lu, and William J. Schaff, Appl. Phys. Lett. v 86, 222103, (2005).
- 4) "Transient picosecond Raman studies of electron and hole velocity overshoots in a GaAs based p-i-n semiconductor nanostructure", W. Liang, K.T. Tsen, C. Poweleit, J.M. Barker, D.K. Ferry, H. Morkoc, J. Phys. Cond. Matt., v 17, 1679-1686, (2005).
- 5) "Detection of non-equilibrium longitudinal optical phonons in InN and its consequences", W.Liang, K.T. Tsen, C. Poweleit, Shaw-Wei. D. Tsen, D.K. Ferry, Hai Lu, and William J. Schaff, Phys. stat. Sol. (C), v 2, p2324-2327, (2005).
- 6) "Non-equilibrium carrier transport in a high quality InN film grown on GaN", W.Liang, K.T. Tsen, C. Poweleit, Shaw-Wei. D. Tsen, D.K. Ferry, Hai Lu, and William J. Schaff, Phys. stat. Sol. (C), v 2, p2297-2300, (2005).
- 7) "Effect of N isotropic mass on the photoluminescence and cathodoluminescence spectra of gallium nitride", F.J. Manjou, M.A. Hernandez-Fenollosa, B. Mari, S.F. Li, C.D. Poweleit, A. Bell, J. Menendez, and M. Cardona, Eur. Phys. J. B, v 40, 453-458, (2004).
- 8) "Near-field Solid Immersion Lens (SIL) microscope with advanced compact mechanical design", Toa Chen, David Felix, Sang-Ki Park, Paul Hauser, Brendan P. McCarthy, Dror Sarid, Christian D. Poweleit, Jose Menendez, and Tom D. Milster, Proc. SPIE, v 5380, 634-641, (2004).

- 9) "Picosecond Raman studies of electron and hole velocity overshoots in a GaAs based p-i-n semiconductor nanostructure", W.Liang, K.T. Tsen, C. Poweleit, J. Parker, D.K. Ferry, and H. Morkok, accepted Proc. 27th International Conf. on the Physics of Semiconductors, Flagstaff AZ, (2004).
- 10) "Epitaxial growth of the pseudo-binary wide band gap semiconductor SiCAlN", R. Roucka; J. Tolle, A.V.G. Chizmeshya, P.A. Crozier, C.D. Poweleit, D.J. Smith, J. Kouvetakis; I.S. Tsong, Appl. Surf. Sci., 8 (15) 212 (2003).
- 11) "Optical characterization of bulk GaN grown by a Na-Ga melt technique", B.J. Skromme, K. Palle, C.D. Poweleit, H. Yamane; M. Aoki, F.J. DiSalvo, J. Crys.-Growth.; 246 (3-4): 299 (2002).
- 12) "Morphological and optical properties of Si nanostructures imbedded in SiO<sub>2</sub>/ and Si<sub>3</sub>N<sub>4</sub>/ films grown by single source chemical vapor deposition", L. Torrison, J. Tolle, D.J. Smith, C.D. Poweleit, J. Menéndez, M.M. Mitani, T. L. Alford, J. Kouvetakis, J. Appl. Phys., 92 (12): 7475 (2002).
- 13) "Optical spectroscopy of bulk GaN crystals grown from a Na-Ga melt", B.J. Skromme, K.C. Palle, C.D. Poweleit, H. Yamane, M. Aoki, F. J. DiSalvo, Appl. Phys. Lett., 81 (20) 3765 (2002).
- 14) "Oxidation-induced crystallographic transformation in heavily N-doped 4H-SiC wafers", B.J. Skromme, K.C. Palle, L.R. Bryant, C.D. Poweleit, W. M. Vetter, M. Dudley, K. Moore, T. Gehoski, Mat. Sci. Forum, 389-393 pt. 1: 455-8 (2002).
- 15) "Anomalous LO phonon lifetime in AlAs", M. Canonico, C.D. Poweleit, J. Menendez, A. Debernardi, S.R. Johnson, Y.H. Zhang, Phys. Rev. Lett. 88 (1-4) 215502 (2002).
- 16) "Low-temperature epitaxial growth of the quaternary wide band gap semiconductor SiCAlN", R. Roucka, J. Tolle, A.V.G. Chizmeshya, P.A. Crozier, C.D. Poweleit, D.J. Smith, I.S.T. Tsong, J. Kouvetakis, Phys. Rev. Lett., 88 (1-4) 206102 (2002).
- 17) "Characterization of carbon nanotubes using Raman excitation profiles", M. Canonico, G.B. Adams, C.D. Poweleit, J. Menendez, J.B. Page, G. Harris, H.P. van-der Meulen, J.M. Calleja, J. Rubio, Phys. Rev. B, 65 (1-4) 201402 (2002).
- 18) "Anisotropic diffusion and drift of photogenerated carriers near coreless dislocations in InGa<sub>N</sub> quantum well" L. Shi, C.D. Poweleit, F. A. Ponce, J. Menendez, W. W. Chow. Applied Physics Letters, 79, 75 (2001).
- 19) "Exciton spin thermalization in strained and relaxed Zn<sub>1-x</sub>Mn<sub>x</sub>Se epilayers", C.D. Poweleit, A.R. Hodges, T.B. Sun, L.M. Smith, and B.T. Jonker, Physical Review B, 59, 7610 (1999).
- 20) "Raman imaging of patterned silicon using a solid immersion lens", C.D. Poweleit, José Menéndez, A. Gunther, and S. Goodnick, Applied Physics Letters, 73, 2275 (1998).
- 21) "Thermal relaxation of excitons in ZnSe and Zn<sub>1-x</sub>Mn<sub>x</sub>Se Diluted Magnetic Semiconductors", C.D. Poweleit, L.M. Smith, and B.T. Jonker, Physical Review B, 55, 5062 (1997).
- 22) "Near-Field Scanning Optical Microscopy (NSOM) measurements of optical intensity distributions in semiconductor channel waveguides", C.D. Poweleit, S.M. Lindsay, D.H. Naghaski, J.T. Boyd, and H. E. Jackson, Applied Physics Letters, 69, 3471 (1996).
- 23) "Spin-Transport of Exciton Magnetic Polarons in Zn<sub>1-x</sub>Mn<sub>x</sub>Se/ZnSe Multiple Quantum Wells," G.A. Balchin, C.D. Poweleit, L.M. Smith & B.T. Jonker, Proc. 23rd International Conf. on the Physics of Semiconductors, Berlin, 2055 (1996).
- 24) "Near field optical microscopy of semiconductor channel waveguide optical intensity distributions", Naghaski, D.-H.; Lindsay, S.-M.; Poweleit, C.-D.; Boyd, J.-T.; Jackson, H.-E.
- 25) "Spin-Thermalization of Excitons in Zn(Cd,Mn,Fe)Se-Based Magnetic Quantum Wells," A.R. Hodges, C.D. Poweleit, L.M. Smith & B.T. Jonker, Proc. 23<sup>rd</sup> International Conf. on the Physics of Semiconductors, Berlin, 2035 (1996).
- 26) "Near Field Measurements of Optical Channel Waveguide Structures", H.E. Jackson, S.M. Lindsay, C.D. Poweleit, D.H. Naghaski, G.N. DeBrabender, and J. T. Boyd, Ultramicroscopy, 61, 295 (1996).

- 27) "Spin dependent carrier localization in Fe-based semimagnetic semiconductor heterostructures, B.T. Jonker, H. Abad, W.Y. Yu, S. Stoltz, A. Petrou, J. Warnock, C.D. Poweleit, L.M. Smith and T. Schmiedel, Journal of Crystal Growth 159, 947 (1996).
- 28) "Time-resolved Spin Dynamics in Strained  $\text{Zn}_{1-x}\text{Mn}_x\text{Se}/\text{ZnSe}$  Spin Superlattices", C. D. Poweleit, L. M. Smith, and B.T. Jonker, Superlattices and Microstructures, 20, 221 (1996).
- 29) "Use of near field scanning optical microscopy (NSOM) to characterize optical channel waveguide structures", Naghski,-D.-H.; Lindsay,-S.-M.; Poweleit,-C.-D.; De-Brabander,-G.-N.; Subramaniam,-V.; Jackson,-H.-E.; Boyd,-J.-T., Proc. SPIE., 2686: 64-72 (1996).
- 30) "Near field measurements of optical channel waveguide structures", Jackson,-H.-E.; Lindsay,-S.-M.; Poweleit,-C.-D.; Naghski,-D.-H.; De-Brabander,-G.-N.; Boyd,-J.-T., Ultramicro., 61 (1-4): 295 (1995).
- 31) "Exciton Energy and Spin-relaxation in Strained and Relaxed  $\text{Zn}_{1-x}\text{Mn}_x\text{Se}/\text{ZnSe}$ ", C.D. Poweleit, L.M. Smith, and B.T. Jonker, Proceedings of the 22<sup>nd</sup> International Conference of the Physics of Semiconductors, vol. 3, 2561 (1994).
- 32) "Observation of Long-lived Exciton-Magnetic-Polarons in  $\text{Zn}_{1-x}\text{Mn}_x\text{Se}/\text{ZnSe}$  Multiple Quantum Wells", C.D. Poweleit, L.M. Smith, and B.T. Jonker, Physical Review B, 50, 18662 (1994).

## CONFERENCES

- "Raman Linewidth measurements of InP", C.D. Poweleit and José Menéndez, APS March Meeting, March 2002, Indianapolis IN.
- "Minority Carrier Lifetime and 2-D Imaging of Diffusion Length in InP/InGaP Quantum Dot Wetting Layer for High and Low Dot Densities", C.D. Poweleit, José Menéndez, V. Zwiller, M. Pistol, and W. Seifert. APS March Meeting, March 2001, Seattle WA.
- "Raman Imaging of Semiconductor Nanostructures Using Solid Immersion Lenses", C.D. Poweleit, L. Shi, José Menéndez, V. Zwiller, M. Pistol, and W. Seifert. MRS Spring Meeting, April 1999, San, Francisco CA.
- "High Spatial Resolution Raman Imaging Using a Solid Immersion Lens", C.D. Poweleit, José Menéndez, A. Gunther, and S. Goodnick, APS March Meeting, March 1998, Los Angeles CA.
- "Near-Field Microscopy of Modal Variations in Semiconductor Waveguides", C.D. Poweleit, S.M. Lindsay, D.H. Naghski, J.T. Boyd, H.E. Jackson, APS March Meeting, March 1996, St. Louis MO.
- "Time-resolved Magneto-Photoluminescence of Exciton Magnetic Polarons in  $\text{Zn}_{1-x}\text{Mn}_x\text{Se}/\text{ZnSe}$  Multiple Quantum Wells", C.D. Poweleit, G.A. Balchin, L.M. Smith, and B.T. Jonker, APS March Meeting, March 1996, St. Louis MO.
- "Exciton Spin Dynamics in Strained  $\text{Zn}_{1-x}\text{Mn}_x\text{Se}/\text{ZnSe}$  and  $\text{Zn}_{1-x}\text{Mn}_x\text{Se}/\text{Zn}_{1-x}\text{Fe}_x\text{Se}$  Quantum Wells", C.D. Poweleit, L.M. Smith, and B.T. Jonker, APS March Meeting, March 1995, San Jose CA.
- "Exciton Energy and Spin-relaxation in Strained and Relaxed  $\text{Zn}_{1-x}\text{Mn}_x\text{Se}/\text{ZnSe}$ ", C.D. Poweleit, L.M. Smith, and B.T. Jonker, Proceedings of the 22<sup>nd</sup> International Conference of the Physics of Semiconductors, Vancouver British Columbia Canada (1994).
- "Exciton Spin Relaxation in Strained and Relaxed  $\text{Zn}_{1-x}\text{Mn}_x\text{Se}$  Epilayers", C.D. Poweleit, L.M. Smith, and B.T. Jonker, APS March Meeting. March 1994 Pittsburgh PA.
- "Exciton Energy Relaxation in  $\text{Zn}_{1-x}\text{Mn}_x\text{Se}/\text{ZnSe}$  Epilayers", C.D. Poweleit, L.M. Smith, and B.T. Jonker, APS March Meeting. March 1994. Pittsburgh PA.
- "Time-Resolved Magneto-Photoluminescence of Spin-Split Hole States in ZnSe Based Quantum Wells and Epilayers", C.D. Poweleit, L.M. Smith, and B.T. Jonker, APS March Meeting, March 1993, Seattle WA.

- “Time-Resolved Magneto-Photoluminescence of Bound Excitons in ZnMnSe/ZnSe Quantum Wells”, C.D. Poweleit, L.M. Smith, and B.T. Jonker, APS March Meeting, March 1993, Seattle WA.
- “Recombination Dynamics of Photoexcited Carriers at the Band-Edge of ZnSe Based Dilute Magnetic Semiconductors”, C.D. Poweleit, L.M. Smith, S.L. Cooper and B.T. Jonker, APS March Meeting, March 1992, Indianapolis IN.

## GRANT PROPOSALS

Co-PI “Acquisition of UV laser for Materials Research, Education, and Student Training Proposal # 0415012” National Science Foundation, Jose Menendez lead PI, Jan. 2005.

Co-PI “Acquisition of Interferometric Lithography for Materials Research, Education, and Student Training” National Science Foundation, Jeff Drucker lead PI, Jan. 2005.

Co-PI “Acquisition of Interferometric Lithography for Materials Research, Education, and Student Training Proposal # 0415012” National Science Foundation, Jeff Drucker lead PI, Jan. 2004. Favorably reviewed, not funded.

Co-PI “Photoreflectance Station at the ASU Laser Facility” Proposition 301 Funds-Picaraux, José Menéndez and Christian Poweleit Principal Investigators, June. 2002. **Funded**.

Co-PI “Novel Development of a Solid Immersion Lens Microscope for Optical Spectroscopy” National Science Foundation, José Menéndez and Christian Poweleit Principal Investigators, Jan. 2002. **Funded** NSF# 0216601.

Co-PI “Novel Application of Raman Spectroscopy in Semiconductor Physics” National Science Foundation, José Menéndez and Christian Poweleit Principal Investigators, Nov. 2000. Favorably reviewed, not funded.

Co-PI “Development of Instrumentation for Spectroscopic Imaging Materials” National Science Foundation, José Menéndez, Christian Poweleit, and Fernando Ponce Principal Investigators, Jan. 2000. Favorably reviewed, not funded.

Co-PI “Optical Spectroscopy of Semiconductors using Solid Immersion Lenses for Sub-Wavelength Spatial Resolution” Grant Opportunities for Academic Liaison with Industry (GOALI) - National Science Foundation (NSF 98-142), José Menéndez and Christian Poweleit Principal Investigators. Favorably reviewed, not funded.

Co-PI “Acquisition of instrumentation for ultraviolet spectroscopic imaging of semiconductors” Major Research Instrumentation Program- NSF José Menéndez, Christian Poweleit, B. Skromme, and S. Mahajan Principal Investigators, Feb. 1999. Favorably reviewed, not selected for funding.

Support letter for Lead Investigator Professor B. L. Ramakrishna regarding Research Experience for Undergraduates (REU) Summer Microscopy class.

## CONSULTING

Eastman Kodak Company: Rochester, New York. Design and implement solid immersion lens spectroscopic technique for Molecular Spectroscopy Unit. March-June 2000. Additionally this collaboration has led to Kodak contributing \$ 35K to our continued research efforts.

## ACADEMIC HONORS

*University of Cincinnati* (1989-1995)

University Research Council Summer Fellowship (1993)

University Research Council Summer Fellowship (1994)

*Thomas More College* (1980-1983)

Cincinnati Milacron Scholarship (1981)

Leonard Neineibor Award (1982)

Sigma Pi Sigma (1982)

## PROFESSIONAL EMPLOYMENT

2002 to Present: *Associate Academic Professional*: Arizona State University. Job performance consists of managing the laser facility designing upgrades to equipment for new research projects, maintaining equipment performance, and instructing users. Research involving Raman imaging and spectroscopy using a solid immersion lens (SIL) and grant proposals. Service to the University through Academic Professional Peer Review Committee, Department Laser Safety Officer.

1/96 to 2002: *Assistant Academic Professional*: Arizona State University. Job performance consists of managing the laser facility designing upgrades to equipment for new research projects, maintaining equipment performance, and training new users. Research involving Raman imaging and spectroscopy using a solid immersion lens (SIL) and grant proposals. Service to the University through Academic Professional Peer Review Committee, Department Laser Safety Officer. Additional Service through lab tours and instructions on lasers for Home Schooled students, Guest lecturer at the Arizona Science Center on lasers and Raman spectroscopy.

2/95 to 12/95: *Post Doctoral Research Assistant*: project subjects of Near-field Optical Scanning Microscopy (NSOM) and Raman Scattering, University of Cincinnati. Supervisor: Professor H. E. Jackson.

9/94 to 2/95: *Graduate Research Assistant* in the Laboratory of Ultra-fast Solid-State Optical Dynamics, University of Cincinnati. Supervisor: Professor Leigh M. Smith.

9/93 to 9/94: *Summer URC fellow and graduate research assistant* in the Laboratory of Ultra-fast Solid-State Optical Dynamics, University of Cincinnati. **Teaching Assistant**, Department of Physics, University of Cincinnati. Duties involved grading and working with undergraduate physics majors in a analog and digital electronics laboratory the third quarter is a computer numerical methods course involving Mathematica programming.

9/92 to 9/93: *Summer URC fellow and graduate research assistant* in the Laboratory of Ultra-fast Solid-State Optical Dynamics, University of Cincinnati. **Teaching Assistant**, Department of Physics, University of Cincinnati. Duties involved leading introductory College and University physics recitations using **cooperative learning techniques**. Grading and working with undergraduate physics majors in a analog and digital electronics laboratory the third quarter is a computer numerical methods course with C++ programming.

9/91 to 9/92: **Teaching Assistant**, Department of Physics, University of Cincinnati. Duties involved leading introductory College physics recitations sessions. Grading and working with undergraduate physics majors in a analog and digital electronics laboratory the third quarter is a computer numerical methods course with C++ programming, and grading for non-science major physics course.

6/90 to 6/91: **Teaching Assistant**, Department of Physics, University of Cincinnati. Duties involved grading and leading introductory physics recitations sessions in a head start program for incoming freshman minority engineering students using cooperative learning format and leading and grading laboratory sessions for introductory University physics courses.

9/89 to 6/90: **Teaching Assistant**, Department of Physics, University of Cincinnati. Duties involved leading and grading laboratory sessions for introductory University physics courses.

5/87 to 5/89: **Teaching Assistant**, Department of Physics, Purdue University. Duties involved leading and grading laboratory sessions for technology science students and University physics, and recitation instructor for introductory University physics courses.

8/86 to 5/87: **Tutor for Physics**, Thomas More College, Duties involved aiding fellow undergraduates in first year physics courses with problem solving and test preparation. Supervisor: Professor Jack Wells.

## **TEACHING**

Ph.D. Committee member to Balasubramanian Pinnangudi, EE graduate student of Professor Ravi Gorur 2003-. Examine optical techniques to simulate transformer dielectric deterioration and characterization for field testing to replace vulnerable dielectrics.

Faculty Mentor for Professor T. W. Lee's MAE 504 course to Jung-Dae Cho: surface enhanced Raman analysis on protein structures.

Faculty Mentor for the Physics 590 course: Raman Spectroscopy. This was a special topics class where students selected three experimental techniques and studied and performed the technique under the guidance and tutelage of the mentor. The last semester has been spent viewing and discussing with Professor Menéndez his results and experiences teaching general physics using class talk. This is an interactive learning technique where the class answers questions and the lecturer can obtain a tally of the class answers for feedback on conceptual understanding. Additionally, my graduate career consisted of many hours in teaching both in lab and recitation sections. I participated as a Teaching Assistant at two major universities that allowed me to observe many teaching styles and curricula. I spent two summers teaching in a bridge program using co-operative learning techniques to assist incoming minority engineering students in bridging the gap between high school and college.

*Undergraduate Research*: Research Experience for Undergraduates (REU) Program. Research Mentor for the REU students involving projects in near-field microscopy. Additional undergraduate research project involved a REU student who returned to perform lateral surface strain measurements on GaN. I set this up as a special project so the student could graduate in Physics with distinction at Southeast Missouri State. I honored the request of the student to write recommendation letters for graduate school admission based on my interaction with the two research projects and summer microscopy class. Additionally, I have worked with undergraduate geology students imaging kalinite surface structures before and after reaction with strontium.