

**Paul Ciszek**

2550 S. University Blvd., Apt. 305  
Denver, CO 80210-6125

(303) 988-1754  
pciszek@pobox.com

---

**Skills  
Summary**

- Applied and Engineering Physics, Surface analysis, and semiconductor materials processing and device fabrication
- Experimental design and procedure
- Electronics troubleshooting and circuit design
- Teaching undergraduate Physics
- Technical writing, data reduction and presentation; I have been complimented on my writing skills and ability to present data meaningfully.

**Experience**    **Feb. 2008- Present**                      **National Renewable Energy Laboratory**                      **Golden, CO**

**Engineer II–Cell and Module Measurement**

Responsible for performing, reviewing and evaluating photovoltaic cell performance measurements in the PV Cell and Module Performance Characterization Section in the Measurements and Characterization Group of the National Center for Photovoltaics.

- Supporting the PV industry by providing accurate traceable efficiency, peak watt, quantum efficiency and I-V measurements with respect to standard reporting conditions
- Making sure that all procedures and checklists are followed and tolerances are met for ISO 17025 certifications
- Reviewing and analyzing routine measurements performed by technicians for artifacts and errors; creating reports for industry clients
- Managing a high volume calibration measurement queue, by prioritizing requests and helping set measurement technicians' day-to-day priorities
- Performing specialized measurements on atypical state-of-the-art devices
- Following all laboratory policies and procedures, including Environmental, Safety, Health and Quality requirements to ensure and maintain a safe working environment

**Sept. 2005 – Oct. 2007**                      **The Programmable Matter Corporation / RavenBrick LLC**                      **Denver, CO**

**Physicist**

Team member for basic research and development, design reviews, literature search, etc. Responsible for designing, building, and conducting physical, electronic, optical, and thermal experiments for a pair of startup companies

**2004-2006**                      **Adjunct Faculty at various colleges**                      **Denver Area**

- **Colorado School of Mines, Fall 2004 to Spring 2006.** Taught recitation and laboratory sections for first and second year calculus-based physics courses. My duties have included the advance preparation and classroom presentation of example problems, visual aids, and quizzes; composing exam questions for online testing; and assisting students on an individual basis.
- **Community College of Denver, Fall 2005.** Taught a conceptual physics course to adult students in a continuing education environment.
- **ITT Technical Institute, Summer 2005.** Taught an algebra-based AC Electronics course with laboratory section.
- **Red Rocks Community College, Spring 2004.** Taught first and second semester undergraduate algebra-based physics courses, for which I was responsible for composing and scheduling lectures, tests, and lab activities.

**1998-2002**                      **Evergreen Solar, Inc.**                      **Marlboro, MA**

**Scientist**

Designed and conducted experiments to improve the manufacture of silicon ribbon solar cells, in the areas of diffusion, metallization, gettering, surface and bulk passivation, and chemical etching.

- P-N junction formation: Optimized the diffusion process, materials, and equipment to increase uniformity and solar cell performance.
- Manufacturing: Specified new equipment modifications to achieve higher throughput and performance as Evergreen Solar scaled up to its new full-scale production facility.
- Process simulation: Wrote an object-oriented simulator that modeled robotic handling in a high-cost piece of capital equipment under different manufacturing conditions. The results guided additional capital investments in this area.

**1997-1998                      National Renewable Energy Laboratory                      Golden, CO**  
**Scientist I**

- Conducted optical and accelerated lifetime testing of prototype electrochromic windows
- Evaluated optical coatings for the detection of hydrogen and other gasses via surface plasmon resonances
- Contributed to the design, prototype construction, and testing of a portable fiber-optic based device for detecting hydrogen

**1992-1996,                      Rocky Mountain Labs, Inc.                      Golden, CO**  
**1985-1989**

Responsible for surface analysis of diverse materials using Scanning Probe Microscopy, Auger Electron Spectroscopy, and Scanning Electron Microscopy to provide quality control, materials characterization, failure analysis, cleaning and wear studies, reverse engineering, and other services for both industrial and academic clients. Specific examples include:

- Imaging the sub-micron texture of optical surfaces
- Determining roughness and magnetic bit spacing of storage media, measuring surface flaws, and demonstrating differential wear of materials in heads for magnetic media
- Imaging the structure of self-assembled protein films
- Measuring the size and surface area of deposited colloids
- Using quantitative sputter depth profiling to determine the thickness of individual layers in multi-layer systems and to determine the thickness and composition of surface oxides
- Writing reports that explained the results of analyses to people outside of the surface analysis field
- Writing software aids for data analysis and report preparation

**1991-1992                      Ophir Corporation                      Littleton, CO**  
**Physicist**

- Wrote Digital Signal Processing software and simulated physical processes
- Assisted in the design and troubleshooting of new meteorological instruments including a compact, continuous-wave LIDAR system and a portable PC-based frequency-modulated Doppler weather radar
- Gave presentations to clients explaining the math and physics underlying my work

**Education      1990                      Cornell University                      Ithaca, NY**

**Master of Science in Applied Physics with Electrical Engineering minor**

Project involved the design and construction of a sample deposition and transfer system for UV Photoemission Spectroscopy studies of CoSi<sub>2</sub> on silicon at the National Synchrotron Light Source

**1987                      Colorado School of Mines                      Golden, CO**

## **Bachelor of Science in Engineering Physics with Electrical Instrumentation minor**

Conferred with high scholastic honors

- Publications and Awards**
- W. McCarthy, P. Cizek, B. Van Zeghbroeck, T. Borsa, R. Powers, "Dial-a-size: Precision Quantum Dot Nanopatterning using cheap, off-the-shelf copolymers," *Journal of Applied Polymer Science* 110 #6 (2008) pp. 3785-3794
  - D.K. Benson, C.E.Tracy, G.A. Hishmeh, P.E. Cizek, S.H. Lee, and D.P. Haberman, "Low-Cost Fiber-Optic Hydrogen Gas Detector Using Guided-Wave, Surface-Plasmon Resonance in Chemochromic Thin Films," in: *Advanced Sensors and Monitors for Process Industries and the Environment*, ed. W.A. De Groot, (SPIE Proceedings Vol. 3535, Bellingham, WA, 1999) pp. 185-202.
  - Powers; Richard M., McCarthy; Wil, and Cizek; Paul. "Electromagnetic sensor incorporating quantum confinement structures" US Patent 7,601,946, October 13, 2009; Co-inventor of one pending U.S. patent, title and application number proprietary until published by USPTO.
  - National Science Foundation Fellowship (Cornell)
- Technical Skills**
- Experience with Ultra High Vacuum equipment ranging from improvised lab apparatus to commercial systems such as the Phi 610 Scanning Auger Multiprobe; maintenance on the vacuum pumps, electron optics, and high-voltage electronics associated with these systems.
  - Electronic design, assembly, and repair
  - Programming in FORTRAN, Pascal, C, and Visual Basic. I have worked under MS-DOS, Windows, Linux, VMS, and Unix, used MS Word and Excel extensively, and done some work in MATLAB.
  - Machining and fabrication, apparatus design and construction