

**Carmen Pacheco-Borden**  
Citizen of the United States of America  
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**EDUCATION:**

Columbia University  
School of Continuing Education

University of Arizona  
Masters of Science in Chemical Engineering  
Graduated June 2001, GPA 3.8/4.0

University of Arizona  
Bachelors of Science in Chemical Engineering  
Graduated May 1999, GPA 3.5/4.0

**INDUSTRIAL AND RESEARCH EXPERIENCE:**

**Associate Process Engineer, Valero Energy Corporation, Benicia CA 7/01 - 12/02**

In charge of the utility and oil movement process operations. Responsibilities included designing new processes, maintenance projects, making engineering calculations, maintaining awareness of safety, health and environmental issues, evaluating economic feasibility, and supplying technical data.

**Graduate Research Assistant, University of Arizona, Chemical and Environmental Engr., 8/99-6/01**

Researched bubble formation in gas-lift reactors. Developed a nonlinear mathematical model to describe the physical mechanisms governing single bubble formation on a submerged orifice plate under circulating flow. Developed a FORTRAN program to numerically solve the model.

**Summer Intern Researcher, University of Compiègne, France, 5/99 - 8/99**

Performed research on peptide purification using novel metal chelating adsorbents chemically linked to a polymer gel support structure.

**Undergraduate Research Assistant, University of Arizona, Tucson, Arizona, 8/98 - 5/99**

Chemical and Environmental Engineering Department, Center for Separation Science. Performed undergraduate research studies in biotechnology using immobilized metal affinity chromatography.

**Summer Intern, Exxon Company, U.S.A., Billings, Montana, 5/98 - 8/98**

Technical Department, Process Engineering Computing Section. Modified, converted, and developed automated tools to allow engineers to efficiently monitor key unit variables. Set up target exception reports and a raw data retriever that automatically segregated and listed critical parameters into reports.

**Research Assistant, Donnelly Corporation Advanced Technology Center, 6/97 - 8/97**

Researched glass-based electrochromic devices. Cut tungsten-coated glass, drilled holes, soldered and prepared electrolyte solutions for assembling electrochromic cells. Encapsulated the cells after

assembling with rubber. Tested the durability, charge and kinetics of cells with a UV spectrophotometer system.

**Research Assistant, University of Arizona /Pima Community College Research Program, 6/96 - 8/96**  
Synthesized fatty acids and phospholipids, purified products using chromatography techniques, and performed UV polymerization and characterization of liposomes.

**Chemistry Technician, Pima Community College West Campus, Chemistry Lab, 9/94 - 9/96**  
Prepared reagents for chemistry and biology experiments, conducted experiments to establish standards for the student laboratory experiments, conducted organizational projects, and trained new lab assistants.

### **TEACHING EXPERIENCE:**

**Adjunct Professor, University of Colorado, Boulder CO 08/10 - Current**

*Mechanical Engineering Measurements Lab:* addresses the fundamentals of measurements: resolution, frequency response, calibration, digital data acquisition. Emphasize uncertainty analysis for design stage, single and repeated measurements, including random vs. systematic, propagation, statistics and outlier rejection. Comparison of measurements with empirical, first and second order models. Guide senior level students to work in teams, highlight team leadership and accountability. Supervise experiments and data analysis. Students present their final work in written, oral and posters technical presentations.

*Mechanical Engineering Senior Lab:* this course is designed to give students skills to design experiments and analyze the resulting data, emphasize independent thinking, and further develop presentation skills. Assign students to work in teams of 3 or 4 students. Hands-on laboratory sessions and homeworks are used to recall the skills learned in the previous two lab courses to design and analyze engineering experiments. A final lab is designed, executed, and analyzed by each student team.

**Adjunct Professor, Columbia University, New York, NY 09/09 – 5/10**

*Chemical Engineering Transport Phenomena I:* addresses the quantitative description of non-equilibrium phenomena important in typical chemical engineering applications, including fluid flow, transport of heat and dispersion of chemical species. It is complementary to thermodynamics. Presented at the molecular, continuum and macroscopic scales, focusing primarily on systems containing simple fluids (gases and low-molecular-weight liquids).

*Chemical Engineering Laboratory:* experiment-based resolution of open-ended problems involving use, design and optimization of equipment, products or materials. The course develops analytical, communications and cooperative problem-solving skills.

**Adjunct Professor, Los Rios Community College District, Sacramento, CA 1/03- 12/06**

*Chemistry:* unit analysis, phases of matter, acids and bases, stoichiometry, molecular geometry, atomic theory and a brief introduction to organic and biochemistry.

**Adjunct Faculty, Pima Community College, Tucson, AZ 7/05- 8/06**

*Chemistry:* chemical kinetics, equilibrium, acids and bases, thermodynamics & electrochemistry.

*General Organic Chemistry Lab:* focused on alcohols, epoxides, aldehydes, ketones, acid, acid derivatives, aromatics, dienes, ethers and nitrogen containing compounds. Emphasized synthesis/separation techniques and employed instrumental and theoretical methods including NMR and IR for compound identification. Integrated laboratory safety with computer software.

*Engineering:* design principles, effective team participation and career preparation.

**Learning Consultant, University of Arizona, Tucson Arizona, 8/96 - 12/98**

Minority Student Services, Math and Science Learning Center.

Provided tutorial assistance in Math, Chemistry and Physics

***Courses Instructed***

CHM 2A/305 IN **Introduction to Chemistry**, American River College, Sacramento, CA

CHM 110/WLD 41C **Preparatory Chemistry**, Sacramento City College/Univ. of California, Davis, CA

CHM 152 **General Chemistry II**, Pima Community College, Tucson, AZ

CHM 236 LB **General Organic Chemistry Lab II**, Pima Community College, Tucson, AZ

ENGR 102 IN **Problem Solving and Engineering Design**, Pima Community College, Tucson, AZ

CHEN E3110 **Chemical Engineering Transport Phenomena I**, Columbia University, New York, NY

CHEN 3810 **Chemical Engineering Laboratory**, Columbia University, New York, NY

MCEN 4037 **Mechanical Engineering Measurements Lab** University of Colorado, Boulder, CO

MCEN 4047 **Mechanical Engineering Senior Lab** University of Colorado, Boulder, CO

***Teaching Assistant during graduate school***

ChEE 303 Chemical Engineering Mass Transfer I

ChEE 304 Chemical Engineering Operations Laboratory I

ChEE 413 Chemical Engineering Process Control and Simulation Laboratory I

**HONORS & AWARDS:**

- Summer Medical Educational Program, University of Arizona College of Medicine, 2004.
- Univ. of Arizona Computer Science, Engineering & Mathematics Scholarship, 2000.
- Univ. of Arizona Hispanic Alumni/Chaparales Board/Rotary Club Scholarship, 2000.
- Graduate Minority Scholarship, 1999.
- National Hispanic Scholarship Fund, 1997.
- Amazon Scholarship Fund, 1996.
- American Chemical Society Scholarship, 1996.
- Grant recipient from Texas Energy, 1996.
- Pima Community College Summer Bridge Program, 1993.
- Pima Community College Chancellor's Recognition Scholarship, 1993.

**ACTIVITIES:**

2011 – 2010 Volunteer, Whitter Elementary School, Boulder, CO









2007 – 2010 Volunteer, Ascension School, New York, NY

2003 – 2007 Volunteer, Davis Community Meals, Davis, CA  
2003 – 2007 Volunteer, Sutter-Davis Doula Program, Davis, CA  
2006 - 2006 Patient Volunteer, Carondelet Hospice and Palliative Care  
2006 – 2006 Volunteer, Pima Community College Science & Engineering Day, Tucson, AZ  
2005 – 2006 Volunteer, The Leukemia and Lymphoma Society, Tucson, AZ  
2004 – 2005 Volunteer, Yolo Hospice, Davis, CA  
2003 – 2004 Volunteer, UC Davis Children's Hospital Pediatric ER, Sacramento, CA  
2000 – 2001 Coordinator, PCC-UofA Future Bound Summer Bridge Program, Tucson, AZ  
2000 – 2000 Coordinator, Manzo Elementary School Chemistry Outreach Event, Tucson, AZ  
1995 – 1996 Tutor, Pima Community College Learning Center, Tucson, AZ  
1993 – 1993 Volunteer, Habitat for Humanity, Tucson, AZ









**SKILLS:**

- **Fluent in Spanish**
- CPR Certified
- Computer: Canvas, Fortran, Frontpage, Mathcad, Mathematica, Office, SimSci, Visio, Labview, Matlab.

**CHEN 3810 Chemical Engineering Laboratory**, Columbia University, New York, NY  
Spring 2010

Instructor: Organization and Preparation:		
3.88/5.00		77.6%
Instructor: Classroom Delivery:		
3.81/5.00		76.2%
Instructor: Approachability:		
3.94/5.00		78.8%
Instructor: Overall Quality:		
4.00/5.00		80.0%
Course: Amount Learned:		
3.94/5.00		78.8%
Course: Appropriateness of Workload:		
4.19/5.00		83.8%
Course: Fairness of Grading Process:		
4.12/5.00		82.4%
Course: Overall Quality:		
3.81/5.00		76.2%

**CHEN E3110 Chemical Engineering Transport Phenomena I**, Columbia University, New York, NY  
Fall 2009

Instructor: Organization and Preparation:		
3.83/5.00		76.6%
Instructor: Classroom Delivery:		
3.67/5.00		73.4%
Instructor: Approachability:		
3.92/5.00		78.4%
Instructor: Overall Quality:		
3.79/5.00		75.8%
Course: Amount Learned:		
4.17/5.00		83.4%
Course: Appropriateness of Workload:		
3.54/5.00		70.8%
Course: Fairness of Grading Process:		
3.71/5.00		74.2%
Course: Overall Quality:		
3.79/5.00		75.8%