Pascual H. Benito

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RESEARCH INTERESTS: Subsurface fluid flow and contaminant transport modeling, hydrogeologic site characterization & environmental remediation, ground water/surface water interactions, chaos & fractal geometry in Earth systems, data visualization, Web-based GIS, science & engineering curriculum development.

FIELDS OF TEACHING EXPERIENCE: Hydrogeology, Environmental Engineering, Computer Programming for Scientists & Engineers

DISSERTATION TOPIC

(I) 3-D regional groundwater flow and transport model for Northern San Joaquin River Basin for studying the impact of the food processing industry on salinity in the California Central Valley; (II) Pore-scale numerical investigations of 2-phase immiscible displacement fronts in presence of buoyancy forces (e.g. NAPL/water)

EDUCATION

Ph.D. Candidate (exp. Fall 2008), U.C. Berkeley, Department of Civil & Environmental Engineering
Major: Hydrogeology, Minors: Geophysics, River Restoration & Ecology
M.S., Hydrogeology, U.C. Berkeley, Dept. of Civil & Environmental Engineering, 2001.
B.A. *cum laude*. Geology. Amherst College, Amherst, MA. 1990-94.
Summer Course in Geologic Field Methods, Univ. of Pennsylvania-YBRA, 1993.

FELLOWSHIPS & ACADEMIC AWARDS

- U.C. Berkeley -NSF ADEPT (Applied Design Engineering Project Teams) Fellowship, 2005-2006
- Graduate Teaching Assistantship, U.C. Berkeley, Jan. 1999, 2000, 2001, 2002, Aug 2000, 2003, & 2004
- Jane Lewis Fellowship, U.C. Berkeley, Spring 1999, 2002-2003
- U.C. Graduate Opportunity Program Fellowship, 1996-96, 1997-98
- Richard M. Foose Scholarship Award, Amherst Dept. Geology, 1993
- American Geological Institute Minority Geoscience Scholarship, 1992-3, 1996-97
- National Hispanic Scholarship Fund Scholar, 1993
- Amherst Alumni Association David Winslow Award Recipient, 1993-94

TEACHING AWARDS

Outstanding Graduate Student Instructor Award (2003-2004) - In recognition of exceptional achievements as a teacher during the past year. Each year, fewer than ten percent of the GSI's serving on campus earn this distinguished award.

RESEARCH EXPERIENCE

- *Graduate Student Researcher (GSR),* U.C. Berkeley, Dept. Civil & Environmental Engineering
  7/2006-current: Developed 3-D regional groundwater flow and transport model for Northern San Joaquin River Basin as part of an investigation into the impact of the food processing industry on salinity in the Central Valley.
  7/2002 – current: Pore-network modeling of immiscible displacement fronts (e.g. NAPL/water, gas/water, *etc*...) using invasion percolation method. Lattice-Boltzmann numerical modeling to measure absolute and relative permeabilities of digitized rock samples
- *Graduate Student Researcher (GSR)*Earth Science Division, Lawrence Berkeley National Laboratory
  6/2002 - 10/2002: Analysis of production data from Chevron Lost Hills Diatomite oil reservoir, and development of cross-well tests that can be carried out during production operation. Developed analytic solutions for pressure transients arising from sinusoidal well testing for use in analysis of water flood production data.
  8/1997 - 10/1999: Analysis of cross-well air-injection tests in variably saturated, fractured basalt flows, Analysis included steady-state and transient injection test analysis and spatial data visualization of hydrogeologic data.

2/1997-5/1997 Yucca Mountain Project: Lab measurement of hydrogeologic rock properties from core samples: gravimetric water content, saturation, porosity, bulk density, grain density.

- *Research Technician*, Earth Science Division, Lawrence Berkeley National Laboratory, 9/1994 - 12/1996. Responsibilities included: monitoring hydrogeologic field experiments and data collection; geophysical gravity surveying, statistical analysis of fracture data, laboratory analysis of tracer test samples using ion-exchange chromatography, geologic mapping; and creation of publication quality figures and visual aids for presentations.
- *Student Research Assistant*, Lawrence Berkeley National Laboratory, 6/1993 to 7/1993 and 6/1994 to 9/1994. Worked as part of a research team investigating fluid flow in fractured bed-rock aquifers: analyzed geophysical well logs and developed sub-surface fracture database; monitoring hydrologic field experiments; water sample analyses using ICP spectrometer and fluorophotometer; petrographic analysis of rock samples; computer data entry and analysis; prepared graphs and figures for presentations and professional publications.

TEACHING EXPERIENCE

Graduate Student Instructor (GSI) – 7 semesters of teaching U.C. Berkeley, Dept. Civil & Environmental Engineering:

CE173 Groundwater and Seepage. Fall 2003 & 2004. GSI for upper division course on groundwater flow. Led weekly discussion sessions, lab demonstrations, office hours, review sessions, helped develop homework assignments & exams, managed grading issues, supervised course grader, and maintained website.

E77 Introduction to Computer Programming for Scientists and Engineers

- Head Graduate Student Instructor, Spring 2001. Supervised staff of six GSI's, and 3 undergraduate graders. Developed lab and homework assignments, solution sets, developed and maintained course website and newsgroup, managed all student grading issues.
- Graduate Student Instructor, Fall 2000, Spring, 2000,2002. Taught computer laboratory sessions and led discussion sessions, held office hours.

E11 Introduction to Environmental Engineering, Spring 1999. Responsible for leading discussion sessions, and lab demonstrations. Graded exams and weekly homework assignments, met with students one-on-one during office hours.

Guest Lectures

- CE173, Fall 2005, 2006 Groundwater aquifer flow model demonstrations and lab exercises)
- CE176 Spring 2006, Waste Containment Systems, "Intro to Groundwater Modeling"

U.C. ADEPT Fellow (June 2005- June '06). U.C. Berkeley & Berkeley Unified School Districts Applied Design Engineering Project Teams (ADEPT). Designed and deployed standards-based engineering curriculum for middle schools and high schools (grades 6-9) meant to integrate mathematics and science learning, inspire students, and strengthen the classroom experience of current and future faculty in math, science, and engineering. Also team-taught U.C. Berkeley Pre-Engineering Partnership summer academy for middle school students.

Teaching Assistant, Dept. Geology, Amherst College, 1/1992 to 5/1993. Prepared lab exercises and assisted students during labs, field trips, and final projects for Introductory Geology and course on dynamic geologic processes & theory of plate tectonics. Worked with other TA's in developing, administering and grading weekly quizzes and helping supervise field-trips.

PRIVATE & CONSULTING WORK:

- June, 2006-present: *Research & Development Engineer,* HGP Inc., hydrogeologic and environmental data collection, GIS mapping, numerical groundwater modeling (http://hgp-inc.net), co-developing and marketing for startup company that provides Web-based Environmental Information Management Systems and web-based GIS + data analysis tools (http://h2o2u.us)
- Additional work performing hydrogeologic characterization and aquifer test analysis in support of expert witness testimony in environmental litigation cases.
- MOD-FLOW (PMWIN-PRO) Software training sessions.

SKILLS

Numerical Modeling: MODFLOW (PMWIN PRO, GMS), river & stream modeling: HEC-RAS, pumping test analysis (Aquifer, AQTESOLV), Surfer, Excel, ArcGIS, expert in MATLAB programming, and computer graphics and data visualization, comfortable in Windows, Mac-OS, and Linux/Unix environments, experience with writing numerical modeling codes in MATLAB, Fortran, Python,. Field: geologic mapping, stream surveying,. Laboratory: porosity, density, and saturation measurements.

FOREIGN LANGUAGES

English & Spanish (native speaker), French (fluent), Italian (elementary level)

PROFESSIONAL ASSOCIATIONS

American Geophysical Union (AGU), Groundwater Resources Assoc. (GRA), Engineers for a Sustainable World (ESW), Society of Petroleum Engineers (SPE)

PUBLICATIONS & CONFERENCE PRESENTATIONS

Miller, G.R., Y. Rubin, K. Ulrich Mayer, and P. H. Benito, Modeling Vadose Zone Processes During Land Application of Food-processing Wastewater in California's Central Valley , Journal of Environmental Quality (In Press).

P. Benito, T. Patzek, (2007), Pore-Network Model Investigation of Stability & Scaling of Immiscible Displacement Fronts with Buoyancy Forces, *Eos Trans. AGU, 88(52)*, Fall Meet. Suppl., Abstract H44D-07

Rubin, Y, P. Benito, G. Miller,J. McLaughlin, Z.Hou, S. Hermanowicz, and U. Mayer, U, (2007), Modeling Land Application of Food-Processing Wastewater in the Central Valley, California, *Eos Trans. AGU, 88(52)*, Fall Meet. Suppl., Abstract H54D-01

Rubin, Y., P. Benito, G. Miller, J. McLaughlin, Z. Hou, S. Hermanowicz, U. Mayer, and D. Silin, Hilmar Supplemental Environmental Project, Submitted to the California Regional Water Quality Control Board Central Valley Region In Compliance with Order No. R5-2006-0025, November 16, 2007 (online at http://hgp-inc.net)

Bessinger, B., Cook, N.G.W., Benito, P., Myer, L., Nakagawa, S., Nihei, K. and Suarez-Rivera, R., 2002. The role of compressive stresses in jointing on Vancouver Island, British Columbia. Journal of Structural Geology, LBNL-51104.

Stoller, S., and P. Benito, Pilot project proposal for San Anselmo Creek floodplain re-establishment: hydraulic modeling report. (Term project for Landscape Architecture 227, Prof. G. Mathias Kondolf, University of California, Berkeley, Fall 2000. On file In UCB Water Resources Center Archive: MS 96/2 87)

Benito, P.H., P. Cook, B. Faybishenko, B. Freifeld, and C. Doughty, Crosswell air-injection packer tests for the assessment of pneumatic connectivity in fractured, unsaturated basalt, Rock Mechanics for Industry, Proceedings of the 37th U.S. Rock Mechanics Symposium, Vol. 2. Amadei, Kranz, Scott & Smeallie (Eds), A.A. Balkema, 1999.

Benito, P.H, P. Cook, B. Faybishenko, B. Freifeld, and C. Doughty, Analog Site for Fractured Rock Characterization: Box Canyon Pneumatic Connectivity Study Preliminary Data Analysis. Report LBNL-42359, Lawrence Berkeley National Laboratory, Berkeley, CA, 1998.

P. H. Benito, P. J. Cook, C. Doughty, B. Faybishenko, B. Freifeld, K. Karasaki, (1997), Cross-Borehole Air-Injection Interference Tests in Fractured Unsaturated Basalt, *Eos Trans. AGU,* Fall Meet. Suppl., Abstract H21B-03

Cohen, A.J.B., K. Karasaki, S. Benson, G. Bodvarsson, B. Freifeld, P.H. Benito, P.J. Cook, J. Clyde, K. Grossenbacher, J. Peterson, R. Solbau, B. Thapa, D.Vasco, and P. Zawislanski, Hydrogeologic characterization of fractured rock formations: a guide for groundwater remediators, Report LBL-38142/UC-800, E.O. Lawrence Berkeley National Laboratory, University of California, Berkeley, CA, 1995.

Benito, P.H., Surface measurement of hydrogeological fracture parameters as possible method for identifying high-yield fractures in a bedrock aquifer, Raymond, CA. Senior Honors Thesis, Amherst College Dept. Geology, Amherst MA, 1994.