Curriculum Vitae
Andrés Guerra, Ph.D., P.E.

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EDUCATION

Doctor of Philosophy, Engineering Systems, Colorado School of Mines, Golden, CO, 2008
Master of Science, Engineering Systems, Colorado School of Mines, Golden, CO, 2004
Bachelor of Science, Engineering, Colorado School of Mines, Golden, CO, 2002

ACADEMIC EXPERIENCE

Teaching Associate Professor, Colorado School of Mines, Fall 2014 -Present

- Course coordinator for CEEN 241: Statics
- CEEN 415 Foundations (Fall 2014)

Faculty Advisor, Society of Hispanic Professional Engineers, Colorado School of Mines, 2012 to Present

Instructor, Summer Academic Focused Education at Colorado School of Mines, June 2014
Taught a Four-day, hands-on, course for middle school students to get them excited about civil engineering using land surveying equipment, soil sampling methods, and structural engineering labs. This course is funded by the CSM foundation and is coordinated by the Office of Admissions.

Adjunct Faculty, Colorado School of Mines, Fall 2009 - Spring 2014

- Course coordinator for CEEN 241: Statics (Spring 2014)
- CEEN 415 Foundations (Fall 2011 and Spring 2014)
- EGGN 234 Civil Engineering Field Session (Summer 2009 through 2013)
- EBGN 325 Applications for Operations Research (Fall 2009, Fall 2010)

Faculty, Center for Academic Student Advising (CASA), Colorado School of Mines, Fall 2013

- Held 8 office hours a week in the CASA space to foster better student-professor relationships in Statics.
- Provided a student-centered study-hall approach to help students on homework and general advising.

Instructor, STRIVE@MINES, July 2013
Taught a one-day, hands-on, course for middle school students to get them excited about engineering using land surveying equipment. This course is funded by the CSM foundation and is coordinated by the Office of Admissions.

Postdoctoral Fellow, Mining Engineering, Colorado School of Mines June 2012 to May 2013
Performed fundamental and applied research in explosive engineering, energetic materials, and rock fracturing with explosives in a team of researchers from Colorado School of Mines and Los Alamos National Laboratory.

Adjunct Faculty, **University of Colorado at Boulder, Fall 2011**
Taught CVEN 5728 Advanced Foundation Design

Additional Teaching Expertise
Mechanics of Materials, Structural Theory, Design of Reinforced Concrete, Finite Element Methods, Computer Aided Engineering, Structural Dynamics, Advanced Surveying, and others related to engineering mechanics.

SERVICE AND AFFILIATIONS

- Faculty Advisor for Society of Hispanic Professional Engineering Colorado School of Mines Chapter (2012-2014)
- Client Representative for Colorado School of Mines Senior Design Survey Shelter Project (2011-2012)
- Technical Advisor for Colorado School of Mines Senior Design ConstrucKs(R) Team (2013-2014)
- Judge for Student Land Surveying Competition at the ASCE Rocky Mountain Regional Conference (2008)
- Judge for Student Steel Bridge Competition at the ASCE Rocky Mountain Regional Conference (2007)

PROFESSIONAL ENGINEERING EXPERIENCE

Consultant to McKinsey and Company, December 2010
Applied operations research for engineering problems to perform a market analysis and evaluate the effectiveness for implementing an online transportation management system to minimize costs for just-in-time shipping operations in a US automotive supply company.

Structural Analyst, Bureau of Reclamation, Technical Service Center, Denver, CO May 2005-October 2009
Assignments:

- Performed finite element modeling and analysis to evaluate seismic performance of concrete dams and risk assessment of associated dam failures
- Designed mass concrete and reinforced concrete for hydraulic structures
- Served on diversity recruiting committee to increase employment of students and engineers from diverse social and cultural backgrounds
- Organized in-house training to expand finite element analysis capabilities

Research projects:

- Finite element modeling to determine the strength of shear keys in concrete dams. This study gives engineers a more defensible basis when evaluating probabilities for shear failure.
- Soil structure interaction for concrete spillway walls in embankment dams. These numerical studies were used to determine if lateral earth pressures against spillway walls are large enough to cause structural wall failure during a seismic event.

Engineering Projects:

- Principal engineer for a team of geologists, civil, mechanical, and electrical engineers for a new 650 feet tall concrete dam and hydropower plant on the Upper San Joaquin River, California
- Developed Monte-Carlo simulations using @Risk in Excel to determine probabilities of failure for varying levels of concrete deterioration at Lake Tahoe Dam
- Principal engineer performing structural analysis and risk assessment for Shasta Dam raise feasibility study, Folsom Dam auxiliary spillway feasibility study, and Bradbury Dam, Loco Dam, Lucchetti Dam, and Altus Dam issue evaluations

Structural Engineer at Structural Consultants Incorporated, Denver, CO, June 2003-August 2003
Designed bolted and welded steel connections with a team of structural engineers and CAD technicians for the Denver Art Museum addition.

Engineer Intern at High Country Engineering Incorporated, Englewood, CO May 2001 to August 2001
Developed plan and profile drawings for land development projects using AUTOCAD.

Machine Shop Assistant in Division of Engineering at Colorado School of Mines, Golden, CO August 2000 to May 2002
Machining, welding, and material acquisition related to research projects in the Division of Engineering for undergraduate and graduate student projects.

PUBLICATIONS

Guerra, A., A. Newman, and S. Leyffer (2011). "Concrete Structure Design Using Mixed-Integer Nonlinear Programming with Complementarity Constraints." *SIAM Journal on Optimization*, 21(3): 833-863.

Guerra, A., Kiousis, P.D. (2006) "Design Optimization of Reinforced Concrete Structures," *Computers and Concrete*. 3, 5. 313.

Guerra, A., Nuss, L., and Mills-Bria, B. (2006) "Shear Keys in Concrete Arch Dams," United States Society on Dams Newsletter, Issue 140.

SEMINARS AND PRESENTATIONS

- Guerra, K., Redhorse, R., Guerra, A. "Engineering Sustainable Solutions to Increase Freshwater Resources in Rural and Tribal Communities," American Indian Science and Engineering Society Annual Conference, November 2013. Denver, CO
- Guerra, A. Petr, V., and Griffiths, D.V. (2013). "Radial Fractures in Rock Under the Action of Explosives," 6th International Conference on Discrete Element Methods, August 5-6, Golden, Colorado.
- "Review of Consolidation Characteristics of Gulf Coast Clays," Society of Hispanic Professional Engineers National Conference. Graduate Student Technical Paper Competition, November 2012. Fort Worth TX (Served as Graduate Student Mentor)
- "MINLPBB Algorithm Performance for Convex Reformulations in a MINLP with Complementarity Constraints," INFORMS Annual Conference, November 2010. Austin TX
- "Using Mixed Integer Nonlinear Programming for Engineering Systems," December 2008. Colorado School of Mines, Golden, CO (Invited)
- "Design of Reinforced Concrete Using Mixed Integer Nonlinear Programming," May 2008. American Society of Civil Engineers, University of Minnesota, Minneapolis, MN
- "Explicit Solution Methods for Engineering Systems," Mining Engineering Department Seminar, November 2007, Santiago de Chile, Chile (Invited)
- "Design of Reinforced Concrete Using Mixed Integer Nonlinear Programming," INFORMS Annual Conference, November 2007, Seattle, WA

HONORS, RECOGNITION, AND ACHIEVEMENTS

- Outstanding Faculty Award, Society of Hispanic Professional Engineers, Minority Engineering Program (2012 and 2013)
- Colorado School of Mines Women's Volleyball Professor Appreciation (2010, 2012)
- Bureau of Reclamation Star Award for superior performance rating (2005, 2006, and 2007)
- National Science Foundation Graduate Research Fellowship honorable mention (2004)
- United States Air Force Academy Water Polo Academic All-American (1999)

SOFTWARE APPLICATIONS

AUTOCAD Civil 3D, RISA3D, SAP2000,TrueGrid, LS-DYNA, @RISK, MATLAB, Mathematica, ANSYS AUTODYN Linux/Unix, AMPL, LATEX, FORTRAN

HOBBIES AND INTERESTS

Vertical integration home design, urban agriculture, fly-fishing and fly-tying, hiking, camping.