VITA VALERIE K. OTERO

School of Education
University of Colorado
Boulder, CO 80309-0249

Phone: 303.492.7403
Fax: 303.492.7090
e-mail: Valerie.Otero@Colorado.edu

PROFESSIONAL PREPARATION

University of New Mexico	(Major: Physics)	B.A. 1991
University of California, San Diego	(Major: Geophysics)	M.A. 1995
University of California, San Diego & San Diego State University	(Mathematics & Science Education)	Ph.D. 2001

APPOINTMENTS

2005-Present	Director of the STEM Colorado Learning Assistant Program
2001-Present	Assistant Professor of Science Education, University of Colorado at Boulder
1996-2000	Adjunct Professor, Physics Department, San Diego State University
1995-2000	Research Assistant, Physics Department, San Diego State University

PUBLICATIONS

Refereed Journal Articles

Otero, V. & Gray, K. (accepted). Attitudinal gains across multiple universities using the Physics and Everyday Thinking curriculum. Accepted to Physics Review Special Topics, Physics Education Research, March, 2008.

Otero, V., & Nathan, M. (2008). Pre-service elementary teachers' conceptions of their students' prior knowledge. *Journal of Research in Science Teaching*, *45* (4), 497-523.

Otero, V. (2006). Moving beyond the "get it or don't" conception of formative assessment. *Journal of Teacher Education*, *57*(3), 247-255.

Otero, V., Finkelstein, N., McCray, R., & Pollock, S. (2006). Who is responsible for preparing science teachers? *Science, 313*(5786), 445-446.

Harlow, D., & Otero, V. (2005) Collaboration physics: Elementary teachers and university researchers join forces to help students construct understandings of friction—and discover something of the nature of science in the process. *Science and Children*, *42*(5), 31-35.

Otero, V., Peressini, D., Anderson, K., Ford, P., Garvin, T., Harlow, D., Mears, C., Reidel, M., & Waite, B. (2005). Integrating technology into teacher education: A critical framework for implementing reform. *Journal of Teacher Education, 56*(1), 8-23.

Otero, V., Johnson, A., & Goldberg, F. (1999). How does the computer facilitate the development of physics knowledge among prospective elementary teachers? *Journal of Education, 181*(2), 57-89.

Refereed Conference Proceedings

Otero, V., & Gray, K. (2007). Learning to think like scientists with the PET curriculum. In L. McCullough, J. Hsu & P. Heron, (Eds.), *2007 Physics Education Research Conference Proceedings.* Melville, NY: AIP Press,160-163.

Finkelstein, N., Turpen, C., Pollock, S., Dubson, M., Iona, S., Keller, C., & Otero, V. (2006). Evaluating a model of research-based practices for teacher preparation in a physics department: Colorado PhysTEC. In P. Heron, L. McCullough, & J. Marx (Eds.), *2005 Physics Education Research Conference Proceedings.* Melville NY: AIP Press, 3-6.

Harlow, D. & Otero, V. (2007). Beyond Concepts: Transfer from inquiry-based physics to elementary classrooms., In L. McCullough, L. Hsu, and P. Heron (Eds.), *2006 Physics Education Research Conference Proceedings.* Melville NY: AIP Press, 73-76.

Harlow, D., & Otero, V (2006). Talking to learn physics and learning to talk physics. In P. Heron, L. McCullough, & J. Marx (Eds.), *2005 Physics Education Research Conference Proceedings.* Melville NY: AIP Press, 53-56.

Harlow, D., & Otero, V. (2005). Learning physics by listening to children. In J. Marx, P. Heron, & S. Franklin (Eds.), *2004 Physics Education Research Conference Proceedings.* Melville, NY: AIP Press, 105-108.

Harlow, D., & Otero, V (2004). An examination of children's scientific argumentation. In J. Marx, S. Franklin, & K. Cummings (Eds.), *2003 Physics Education Research Conference Proceedings.* Melville, NY: AIP Press, 145-148.

Otero, V. & Nathan, M. (2004). "After I gave students their prior knowledge…" Pre-service teachers' conceptions of students' prior knowledge. In J. Marx, S. Franklin, & K. Cummings (Eds.), *2003 Physics Education Research Conference Proceedings.* Melville, NY: AIP Press, 141-144.

Otero, V., & Nathan, M. (2003). Elementary pre-service teachers' conceptions of students' prior knowledge. In K. Cummings, J. Marx, & S. Franklin (Eds.), *2002 Physics Education Research Conference Proceedings*. Melville, NY: AIP Press, 123-128.

Book Chapters

Otero, V. (2004). Cognitive processes and the learning of physics, Part I: The evolution of knowledge from a Vygotskian perspective. In E. F. Redish & M. Vicentini (Eds.), *Proceedings of the International School of Physics "Enrico Fermi" Course CLVI, Italian Physical Society* (pp. 409-445). Amsterdam: IOS Press.

Otero,V. (2004). Cognitive processes and the learning of physics. Part II: Mediated action. In E. F. Redish & M. Vicentini (Eds.), *Proceedings of the International School of Physics "Enrico Fermi" Course CLVI, Italian Physical Society* (pp. 446-471). Amsterdam: IOS Press.

Goldberg, F., & Otero, V. (2001). The roles of laboratory and computer simulator experiments in helping students develop a conceptual model of static electricity. In D. Psillos, P. Kariotoglou, V. Tselfes, G. Bisdikian, G. Fassoulopoulos, E. Hatzikraniotis, & M. Kallery (Eds.), *Proceedings of the Third International Conference on Science Education Research in the Knowledge-Based Society* (pp. 29-31). Thessaloniki: Art of Text.

Niedderer, H., Fischer, H., Goldberg, F., Jorde, D., Hucke, L., Otero, V., Sander, F., Slotta, J., Strømme, A., Tiberghien, A., & Vince, J. (2003). Research about the use of information technology in science education. In D. Psillos et al. (Eds.), *Science education research in the knowledge-based society* (pp. 309-322). Dordrecht: The Netherlands: Kluwer.

Popular Press

Finkelstein, N., Otero, V., & Pollock, S. (2006). Teaching to learn: The Colorado Learning Assistant program's impact on learning content. *American Physical Society Forum on Education Newsletter, Fall 2006/Spring 2007,* 11-13.

Otero, V. (2006). The Learning Assistant model for teacher preparation in science and technology. *American Physical Society Forum on Education Newsletter, Summer 2006,* 31-35.

Curriculum Materials

Goldberg, F., Heller, P., Morse, R., Minstrell, J., Hickman, P., Hickman, J., McKinley, A., Faletti, J., Otero, V., Johnson, A., & McCullough, L. (2000). *Constructing physics understanding in a computer-supported collaborative learning environment—CPU software and activities,* Armonk, NY: The Learning Team.

Goldberg, F., Otero, V., & Robinson, S. (2006). *Physics for elementary teachers: Curriculum, software, and video case studies*. Armonk, NY: It's About Time.

Goldberg, F., Robinson, S., Kruse, R., Thompson, N., & Otero, V. (2007). *Physical science and everyday thinking: Curriculum, software, and video case studies*. Armonk, NY: It's About Time.

GRANTS AND CONTRACTS

2008-2011 Principal Investigator V. Otero with Co-I M. Klymkowsky: National Mathematics and Science Initiative (Exxon/Mobile Funding). Project Title, "The CU-Teach Replication Program."

$2,397,133 Total Award (pending yearly reviews)

2008-2011 Principal Investigator F. Goldberg with Co-Is V. Otero, E. Price, S. Robinson, & R. Kruse: Division of Undergraduate Education-Course, Curriculum and Laboratory Improvement. Project Title, "Developing a Large-Enrollment Physical Science Curriculum."

$ 499,946 Total Award

2009-2011 Principal Investigator V. Otero with Co-Is D. Briggs, M. Klymkowsky, & S. Pollock: Division of Undergraduate Education, National Science Foundation. Project Title, "Learning Assistant Model for Teacher Education in Science and Technology (LA-TEST)."

$965,235 Pending progress 2006-2009

2006-2009 Principal Investigator V. Otero with Co-Is D. Briggs, M. Klymkowsky, & S. Pollock: Division of Undergraduate Education, National Science Foundation. Project Title, "Learning Assistant Model for Teacher Education in Science and Technology (LA-TEST)."

$1,527,914 Total Award

2005-2008 Principal Investigator V. Otero with Co-Is R. McCray, J. Curry, & W. Wood: Division of Undergraduate Education, National Science Foundation DUE-0434144. Project Title, "Colorado STEM/Noyce Fellowship Program."

$500,000 Total Award

2004-2007 Principal Investigator N. Finkelstein with Co-Is V. Otero & S. Pollock: American Physical Society #1540955. Project Title, "Colorado PhysTEC."

$300,222 Total Award

2003-2004 Principal Investigator V. Otero: University of Colorado at Boulder, Continuing Education Outreach Grant. Project Title, "Young Environmental Stewards Program Evaluation."

$4,946 Total Award

2003-2006 Principal Investigator R. McCray with Co-Is V. Otero, J. Curry, C. Wieman, & W. Wood: Education & Human Resources/Division of Undergraduate Education, National Science Foundation NSF-0203022, HER/DUE. Project Title, "Transforming Science & Mathematics Teacher Preparation."

$932,847 Total Award

2002-2003 Principal Investigator V. Otero: Catamount Institute, OCG4493B. Project Title, "Young Environmental Stewards Program Evaluation."

$17,995 Total Award

2001-2008 Principal Investigator F. Goldberg with Co-Is V.Otero & S. Robinson: National Science Foundation ESI-0096856, Project Title, "Professional Development Materials for Constructing Physics Understanding Among Prospective and Practicing Elementary Teachers."

$2,021,747 (including supplements)

2000-2003 Principal Investigator D. Peressini with Co-Is V. Otero & C. Salinas): Preparing Tomorrow's Teachers to Use Technology, U.S. Department of Education. Project Title, "Preparing Tomorrow's Teachers for Technology: A Joint Effort Between the University of Colorado and the University of Denver."

$1,170,000 Total Award

INVITED PRESENTATIONS

Otero, V. (2007, August). *The Road Less Traveled: The STEM Colorado Learning Assistant Program.* Presented at the bi-annual meeting for the American Association of Physics Teachers, Greensboro, N.C.

Otero, V., & STEM Colorado/PhysTEC Team. (2006, December). *Who is responsible for recruiting and preparing science teachers?* Paper presented at Texas State University, San Marcos.

Otero, V., & STEM Colorado/PhysTEC Team. (2006, November). *Who is responsible for recruiting and preparing science teachers?* Paper presented at the Northwest regional meeting of the American Association of Physics Teachers, Seattle, WA.

Otero, V. (2006, October). The Colorado Learning Assistant model: A multidisciplinary approach to teacher recruitment and preparation. Paper presented at the annual meeting of the National Academy of Education, Boulder, CO.

Otero, V., Jalovec, S., & Her Many Horses, Ian. (2006, July). *SWOSing and theoretical perspectives that can explain it.* Paper presented at the biannual meeting of the American Association of Physics Teachers, Syracuse, NY.

Otero, V., & STEM Colorado/PhysTEC Team (2006, March). *The Colorado Learning Assistant model: A multidisciplinary approach to teacher recruitment and preparation*. Paper presented at the annual meeting of the American Physical Society, Dallas, TX.

Otero, V. (2005, August). *Evolution of theoretical perspectives in PER and the types of research we can (or can't) do*. Paper presented at the First Foundations and Frontiers of Physics Education Conference, Bar Harbor, ME.

Otero, V. (2005, August). *Repositioning ourselves from "knowers" to "learners": Formative assessment, Vygotsky, and teacher development.* Paper presented at the annual Physics Education Research Conference, Salt Lake City, UT.

Otero, V., & STEM Colorado Team (2005, March). *Coupling teacher recruitment and preparation with undergraduate course transformation.* Paper presented at the annual meeting of the Physics Teaching Coalition, Muncie, IN.

Otero, V. (2005, February). *Recruiting talented math and science majors to careers in teaching: A collaborative effort for K-20 educational reform.* Paper presented at the annual meeting of the American Association for the Advancement of Science, Washington, DC.

Otero, V., Iona, S., & Pollock, S. (2004, August). *Shared responsibility for preparing teachers*. Paper presented at the biannual meeting of the American Association of Physics Teachers, Sacramento, CA.

Otero, V. (2004, January). *The role of education research in PER and teacher education*. Paper presented at the biannual meeting of the American Association of Physics Teachers, Miami, FL.

Otero, V. (2003, November). *Blurring the boundaries between physics departments and schools of education for teacher preparation.* Paper presented at the Joint Fall Meeting of the AAPT AOK & Nebraska AAPT Sections and Big 12 Physics Education Research Conference, Kansas State University, Manhattan.

Otero, V. (2003, July). *Qualitative research on student conceptual development: The need for a theoretical framework*. Paper presented at the Enrico Fermi Summer School in Physics Education Research, Varenna, Italy.

Otero, V., Cobanoglu, D., & Harlow, D. (2003, January). *The subtle role of tacit theory in physics educational research.* Paper presented at the biannual conference of The American Association of Physics Teachers, Austin, TX.

Otero, V. (2001, July). *Combining group behaviors with out-of-class interviews*. Paper presented at the annual meeting of the American Association of Physics Teachers, Rochester, NY.

Otero, V. (2001, April). *A cognitive system: Students' evolving conceptions of electrostatics and the evolving social and material environment*. Paper presented to the Department of Physics, Ohio State University, Columbus.

Otero, V. (2001, March). *The changing role of the computer simulator in students' construction of explanatory models*. Paper presented at the annual meeting of the National Association for Research in Science Teaching, St. Louis, MO.

Otero, V. (2001, February). *The process of learning about static electricity and the role of the computer simulator,* Paper presented at the annual meeting of the Denver Area Physics Teachers, Denver, CO.

REFEREED CONFERENCE PRESENTATIONS

Otero, V. (2006, April). *Recruiting talented mathematics and science majors to careers in teaching: A collaborative effort for K-16 educational reform*. Paper presented at the National Association for Research in Science Teaching, San Francisco, CA

Geil, K., Briggs, D., Harlow, D., & Otero, V. (2006, April). *Measuring sophistication of beliefs about teaching and learning*. Paper presented at the annual meeting of the American Education Research Association, San Francisco, CA.

Otero, V. (2005, April). *"After I gave students their prior knowledge..." Pre-service elementary teachers' conceptions of students' prior knowledge.* Paper presented at the annual meeting of the National Association of Research on Science Teaching, Dallas, TX.

Otero, V. (2005, April)**.** *When cognitive meets socio-cultural theory: Evolution of conceptual models leads to evolution of the learning environment and vice versa*. Paper presented at the annual meeting of the National Association for Research in Science Teaching, Dallas, TX.

Otero, V., & Harlow, D. (2005, April). *Classroom contexts and curricula for helping teachers develop identities as "science people."* Paper presented at the annual meeting of the National Association for Research in Science Teaching, Dallas, TX.

Otero, V., & Nathan, M. (2003, April). *Elementary pre-service teachers' initial and changing views about students' prior knowledge and collaborative learning*. Paper presented at the annual meeting of the American Educational Research Association, Chicago, IL.

Otero, V. (2001, March). *The role of computer simulators in students' construction of explanatory models of static electricity.* Paper presented at the annual meeting of the National Association for Research in Science Teaching, St. Louis, MO.

Monaghan, J. M., Otero, V., Goldberg, F., & Johnson, A. (2000, April). *An analysis of the Constructing Physics Understanding (CPU) science teaching methodology from multiple perspectives.* Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.

CONFERENCE PRESENTATIONS

Otero, V. (2005, August). Elementary *teachers developing identities as "science people."* Paper presented at the biannual meeting of the American Association of Physics Teachers, Salt Lake City, UT.

Harlow, D., & Otero, V. (2004, August). *Learning physics by listening to children*. Paper presented at the biannual meeting of the American Association of Physics Teachers, Sacramento, CA.

Harlow, D., & Otero, V. (2004, January). *Analyzing children's ideas: An authentic application of physics knowledge.* Paper presented at the biannual meeting of the American Association of Physics Teachers, Miami, FL.

Cobanoglu, D., & Otero, V. (2004, January). *The role of representations in facilitating the second- and third-grade student's understanding of motion*. Paper presented at the biannual meeting of the American Association of Physics Teachers, Miami, FL.

Otero, V. (2000, August). *The role of the CPU computer simulator in learning: Video classroom data: Results, methodology, and video analysis tools.* Paper presented at the annual meeting of the American Association of Physics Teachers, Guelph, Ontario, Canada.

Otero, V., & Goldberg, F. (1999, August). *The computer simulator and the process of scientific inquiry.* Paper presented at the biannual meeting of the American Association of Physics Teachers, San Antonio, TX.

Otero, V., & Goldberg, F. (1998, August). *Student learning about static electricity in a model-focused, computer-rich, collaborative learning environment*. Paper presented at the biannual meeting of the American Association of Physics Teachers, Lincoln, NE.

McCullough, L., Otero, V., & Goldberg, F. (1997, August). *Computer diagnostic testing about charge flow in circuits.* Paper presented at the biannual meeting of the American Association of Physics Teachers, Denver, CO.

Otero, V., Johnson, A., & Goldberg, F. (1997, January). *Using learning commentaries to help students become more aware of their own learning*. Paper presented at the biannual meeting of the American Association of Physics Teachers, Phoenix, AZ.

WORKSHOPS

Otero, V., Pollock, S., Iona, S., Finkelstein, N., & Klymkowsky, M. (2007, October). *Up close and personal with the University of Colorado Learning Assistant program*. Workshop conducted for the national Physics Teachers Education Coalition (PTEC) and funded by the American Physical Society, held at University of Colorado, Boulder.

Otero, V., Pollock, S., Finkelstein, N., & Klymkowsky, M. (2007, August). Workshop conducted for faculty new to using learning assistants, University of Colorado, Boulder.

Otero, V., Pollock, S., Iona, S., & Finkelstein, N. (2007, August). *The Learning Assistant model for recruiting talented math and science students to careers in teaching.* Workshop conducted for the University of North Carolina System, University of North Carolina, Chapel Hill.

Otero, V., Pollock, S., Iona, S., & Finkelstein, N. (2007, July). *The Learning Assistant model at your university*. Workshop conducted at the biannual meeting of the American Association of Physics Teachers, University of North Carolina, Greensboro.

Otero, V., & Iona, S. (2007, March). *Nuts and bolts of designing a pedagogy course for Learning Assistants*. Workshop conducted at the annual meeting of the Physics Teacher Education Coalition, Boulder, CO.

Otero, V., & Pollock, S. (2007, March). *The University of Colorado Learning Assistant model*. Workshop conducted at the annual meeting of the Physics Teacher Education Coalition, Boulder, CO.

Otero, V., & Iona, S. (2002-2007). *Physics and Everyday Thinking [PET] and Physical Science and Everyday Thinking [PSET]: A workshop for physics faculty.* Workshops conducted twice annually from 2002-2007, Boulder, CO.

Otero, V. (2003-2006, August). *STEM Colorado workshop for K-12 teachers, Noyce Fellows, and university faculty*. Workshops held annually at the University of Colorado, Boulder.

Otero, V., Stewart, G., & Vokos, S. (2006, March). *Undergraduate learning assistants: A powerful way to improve student learning and recruit future teachers.* Workshop conducted at the annual meeting of the Physics Teacher Education Coalition, Fayetteville, AR.

Otero, V., & Poel, R. (2005, March). *What is inquiry? How do we measure it?* Workshop conducted at the annual meeting of the Physics Teachers Education Coalition, Muncie, IN.

Otero, V., & Cobanoglu, D. (2002, July). *How do we know what students are thinking? Theory and methods in video data analysis*. Workshop presented at the summer meeting of the American Association of Physics Teachers, Boise, ID.

Otero, V., Hammer, D., & May, D. (2001, July). *How do we know what students are thinking? Theory and methods in video data analysis.* Workshop presented at the summer meeting of the American Association of Physics Teachers, Rochester, NY.

PROFESSIONAL ACTIVITIES

2007-2009	Editorial Board for an upcoming book on the preparation and professional development of teachers of physics and physical science, to be published by the Physics Teachers Education Coalition.
2007-2008	Physics Education Research Leadership Organizing Council-Acting President
2006-2007	Research In Physics Education Committee Member
2006-2007	Physics Education Research Leadership Organizing Council-Secretary
2006-2007	Advisory Board Member for NSF-funded grant for Graduate TA Training at the University of Maryland.
2006-present	Advisory Board for the Physics Teachers Education Coalition
2006-present	Reviewer, *Journal of the Learning Sciences*

2005-present Reviewer, *American Educational Research Journal*

2005-present Reviewer, *Journal of Teacher Education*

2005-present Reviewer, *Physics Review Special Topics*

2004-present Member, Chicano Faculty and Staff Association, University of Colorado at Boulder

2003-present Reviewer, *American Journal of Physics*

2002-present Reviewer, *Review of Educational Research*

2001-present Advisor, Denver Area Mathematics, Engineering, & Science Achievement Program

2001-present Reviewer, *Journal of Research in Science Teaching*

AWARDS AND RECOGNITION

2007 Featured in Inside CU: In the Spotlight - CU Boulder program working to draw more science majors into teaching (October, 9, 2007), http://www.colorado.edu/insidecu/editions/2007/10-09/story1.html

2007 Best Should Teach Award, awarded by the Graduate Teaching Program at CU Boulder.

2006 Emerging Pioneer Award, awarded by the Boulder Natural History Museum.

2006 Featured in the 2006 CU Boulder "Just the Facts." Office of News Services Publication.

2004 Featured in "Sponsored Research: Highlighting some of CU's Outstanding Women Scholars." Published by CU Boulder's Office of Contracts and Grants, http://www.colorado.edu/ocg/reports/2003-04/teacher.html

K-12 OUTREACH AND COLLABORATIONS

Mathematics, Engineering, and Science Achievement (MESA) (2007): Program Evaluation with graduate student Robert (Bud) Talbot.

Magnetism and Electricity for Elementary Teachers (2006): 15-week professional development workshop for third- and fourth-grade teachers, St. Vrain Valley School District, Longmont, CO.

Guest speaker at the Achievement Via Individual Determination (AVID) program (2004-2005). Casey Middle School, Boulder, CO.

Young Environmental Stewards Program Evaluation (2003-2004). Program Evaluation with graduate student Eric Snow, Catamount Institute, Colorado Springs, CO.

Mathematics, Engineering, and Science Achievement (MESA) (2002-2003): Constructing Physics Understanding for Second- and Third-Grade Females and Minorities, Columbine Elementary School, St. Vrain Valley School District, Longmont, CO.

Mathematics, Engineering, and Science Achievement (MESA) Program Advisor (2002-present): St. Vrain Valley School District, Longmont, CO.

Science Fair Judge (2002-present): Boulder Valley School District.

Constructing Physics Understanding for Elementary Teachers (2002). Physics for Elementary Teachers, on-site professional development. University of Colorado at Boulder, St. Vrain Valley School District, Longmont, CO.