

**Barbara Luke, Ph.D., P.E.**

Civil and Environmental Engineering, University of Nevada Las Vegas  
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Barbara Luke is Professor of Civil and Environmental Engineering at University of Nevada Las Vegas. She holds Bachelor's, Master's, and Ph.D. degrees in civil engineering. At the graduate level, she studied geotechnical engineering; specifically, rock mechanics (for the M.S.) and soil dynamics (for the Ph.D.). Currently, her research interests are in soil dynamics and geotechnical earthquake engineering. She focuses upon seismic site characterization and application of the outcomes to solve engineering problems. She is a registered Professional Engineer in the state of Nevada. In the past, she worked at Sandia National Laboratories, planning and conducting in situ geomechanical tests for deep geological disposal of radioactive waste. She once served in the U.S. Army on active duty and then as a reservist (enlisted).

Dr. Luke teaches undergraduate and graduate courses, in geotechnical and general civil engineering. She also taught a cross-disciplinary course on sustainable development for UNLV's Honors College. She advises graduate students at M.S. and Ph.D. levels. She is the faculty advisor for UNLV's new student chapter of Engineers without Borders.

Dr. Luke directs UNLV's Applied Geophysics Center. The Center houses a broad base of geophysical test equipment, the centerpiece of which is a "minivib" trailer-mounted seismic vibrator source with 144-channel recording capacity.

She is currently leading a multi-investigator, multi-million dollar project funded by the U.S. Department of Energy to study earthquakes in southern Nevada: to characterize the earthquake hazard and its risks to citizens and structures, to inform the public of these risks, and to improve earthquake preparedness and safety. The geotechnical component of the project involves mapping shear wave velocities and conducting site response analyses to understand earthquake ground-shaking hazards. She is a past recipient of the National Science Foundation CAREER award. The award supported research into detection and delineation of stiff inclusions in layered sediment profiles using seismic surface waves. This research continues, with new developments in data processing and interpretation. The CAREER award also inspired development of an on-campus Engineering Geophysics Test Site, which is used for teaching, research and technology transfer.

Dr. Luke is active in professional and community service. She currently serves on the Technical Coordination Council of the American Society of Civil Engineers' Geo-Institute. She is former President of the Environmental and Engineering Geophysical Society (2005-2006). In her home community, Dr. Luke serves as Vice Chair of the Red Rock Citizens Advisory Council, which reports to the County Commission.

**Professional Preparation**

University of Texas at Austin: Civil (Geotechnical) Engineering – Ph.D. 1994  
University of California, Berkeley: (Geotechnical) Engineering – M.S. 1987  
University of Texas at Austin: Civil Engineering – B.S. 1985, with highest honors

**Certification:** Professional Engineer, State of Nevada

**Major Appointments**

1995 to present. Assistant, Associate, and then full Professor of Civil Engineering, University of Nevada, Las Vegas. Also currently directs the UNLV Applied Geophysics Center and serves as Adjunct Professor in Geoscience at UNLV.  
Academic year 2001-2002 (concurrent). Associate Dean for Undergraduate Programs and Assessment, UNLV Howard R. Hughes College of Engineering  
Spring, 1995. Lecturer and Research Associate, University of Texas at Austin  
1990-1994. Graduate Research Assistant and Teaching Assistant, University of Texas at Austin  
1985–1990. Member of Technical Staff, Sandia National Laboratories, Albuquerque, New Mexico. *In situ* geomechanical characterization of rock masses for deep geologic disposal of nuclear waste.

## **Selected Publications**

- Jin, X., Luke, B., and Calderón-Macías, C. 2009, in press. Role of forward model in surface-wave studies to delineate a buried high-velocity layer, *Journal of Environmental and Engineering Geophysics*.
- Luke, B., Taylor, W., Wagoner, J. and Murvosh, H. 2009, in press. Correlating seismic data with lithology to guide three-dimensional mapping, *Journal of Earth Systems*.
- Luke, B., Taylor, W., Calderón-Macías, C., Jin, X., Murvosh, H., and Wagoner, J., 2008. Characterizing anomalous ground for engineering applications using surface-based seismic methods, *The Leading Edge*, 27(11), pp. 1544-1549.
- Luke, B. and Liu, Y. 2008. Site response zones and short-period earthquake ground motion projections for the Las Vegas basin, *Journal of Earth System Science*, 117(S2), pp 757-772.
- Luke, B., Kreamer, D. K. and Tan, Y.-B. 2008. Mechanical model of monofill-type landfill cover subjected to subsidence, *International Journal of Geotechnical Engineering*, 1(2), pp 29-44.
- Luke, B. and Liu, Y. 2007. Effect of sediment column on weak-motion site response for a deep basin fill, *Journal of Geotechnical and Geoenvironmental Engineering*, 133(11), pp 1399-1413.
- Calderón-Macías, C. and Luke, B. 2007. Improved parameterization to invert Rayleigh-wave data for shallow profiles containing stiff inclusions. *Geophysics* 72(1), pp U1-U10.
- Luke, B. and Calderón-Macías, C. 2007. Inversion of seismic surface wave data to resolve complex profiles. *Journal of Geotechnical and Geoenvironmental Engineering*, 133(2), pp 155-165.
- Elton, D., Shannon, D., Luke, B., Townsend, F., and Roth, M. 2006. Adding excitement to soils: A geotechnical student design competition. *International Journal of Engineering Education* 22(6), pp 1325-1336.
- Scott, J.B., Rasmussen, T., Luke, B., Taylor, W.J., Wagoner, J.L., Smith, S.B., and Louie, J.N. 2006. Shallow shear velocity and seismic microzonation of the urban Las Vegas, Nevada, basin. *Bulletin of the Seismological Society of America*, 96(3), pp 1068-1077.

## **Awards and Honors**

Member of Phi Beta Kappa honor society (2006), honorary member of Golden Key International Honor Society (2002), member of Tau Beta Pi engineering honor society

Nominated for Distinguished Educator Award, U.S. Univ. Council on Geotechnical Education and Research, 2006

Outstanding Service Award, Nevada Earthquake Safety Council, 2002

Tau Beta Pi Nevada Beta Chapter Award for Excellence in Teaching in Civil Engineering, 2001

UNLV Faculty International Development Award, 2001

Best Paper nomination, 70th Shock and Vibration Conference, 1999

National Science Foundation CAREER award, 1998

U. S. Army Summer Faculty Research and Engineering Program Fellowship, 1996

Dean T. U. Taylor Endowed Fellowship in Geotechnical Engineering, University of Texas at Austin, 1993

Texas Mining and Mineral Resources Research Institute Fellowship, University of Texas at Austin, 1992

University Presidential Fellowship, University of Texas at Austin, 1991–1992

## **Professional Service**

**Professional Society Membership:** Current member of American Society of Civil Engineers (ASCE) and ASCE Geo-Institute (see below for more information); American Geophysical Union (AGU); Association of Environmental and Engineering Geologists (AEG); Engineers without Borders (EWB); Environmental and Engineering Geophysical Society (EEGS; past President); National Speleological Society (NSS); Society of Exploration Geophysicists (SEG).

## **Involvement with ASCE Geo-Institute**

- Technical Coordination Council: Member, 2003 – 2009; Chair, 2005 – 2008.
- Led a task force to develop the national student competition in geotechnical engineering, 2001 - 2004. Served on the organizing committee for the event through 2008.
- *Journal of Geotechnical and Geoenvironmental Engineering*: Editorial Board member, 1997-2004
- Member of the Engineering Geophysics technical committee.