

**Jon Wren, Ph.D., P.E.**  
**Practice Director and Principal Engineer**

**Professional Profile**

Dr. Jon Wren is a Principal Engineer and Exponent's Civil Engineering Practice Director. Dr. Wren has over 18 years of experience in geotechnical and earthquake engineering. His expertise includes analysis, design, and performance of retaining structures, foundations, embankments, natural and manmade slopes, dams, levees, and pipelines. Dr. Wren has experience with urban and infrastructure construction including site characterization, deep foundations such as drilled shafts and piles, and excavation analysis and design. His expertise includes deep foundation testing, excavation monitoring, groundwater monitoring and withdrawal effects, and the effects of deep excavations on nearby structures. He provides peer review services for design of complex structures and activities such as nuclear power plant structures, deep excavations, and dewatering programs. Dr. Wren has experience with evaluating the geotechnical properties of fly ash and analyzing the performance of fly ash amended structures such as embankments and levees.

Dr. Wren has investigated retaining wall and foundation performance and failures including retaining structures such as crib retaining walls, soil mix retaining walls, soil nail walls, and conventional gravity and cantilever retaining structures. Dr. Wren also has experience in the investigation and analysis of pipeline system performance and failure, including sanitary sewer pipelines, water supply pipelines, storm drain pipelines, and irrigation pipeline systems and is knowledgeable about the documentation methods for operational pipeline systems. Dr. Wren has expertise in dynamic soil properties and testing, analysis of the behavior of retaining structures, slopes, foundations, and pipelines during earthquakes and has evaluated sites and structures following natural disasters, such as earthquakes and floods, including the Loma Prieta, Northridge, San Simeon, and Hawaii earthquakes.

Dr. Wren has also investigated and analyzed landslides on natural and manmade slopes and provided repair recommendations for slope failures. He has investigated and analyzed the factors contributing to the causes of landslides in varied geologic settings across the United States. Dr. Wren has expertise in the behavior of expansive and collapsible soils and their effects on foundations, retaining walls, and slopes. His expertise includes investigation of structures affected by ground settlement, conducting subsurface investigations of these sites, and performing analyses of the causes of the settlement and appropriate remedial measures. He has experience with geotechnical laboratory testing including static and dynamic testing of soil and soil improvement technologies such as soil mixing, jet grouting, and compaction grouting.

Dr. Wren has served as a Lecturer and Teaching Assistant in the Civil and Environmental Engineering Department at Stanford University, a part-time faculty member in the Department of Civil Engineering and Applied Mechanics at San Jose State University, and as an instructor for the U.S. Army Corps of Engineers. He currently serves on the Industrial Advisory Board for the University of California Los Angeles (UCLA).

## **Academic Credentials and Professional Honors**

Ph.D., Geotechnical Engineering (minor: Mechanical Engineering), Stanford University, 1994

M.S., Structural Engineering, Stanford University, 1989

B.S., Civil Engineering, University of Notre Dame (with High Honors), 1988

Taylor Award Recipient (Top Civil Engineering Student, University of Notre Dame), 1988

Tau Beta Pi, National Honorary Engineering Society

## **Licenses and Certifications**

Registered Professional Civil Engineer, California, #C56284

Registered Professional Civil Engineer, Hawaii, #11982

Registered Professional Civil Engineer, Massachusetts, #46593

Registered Professional Civil Engineer, Florida, #72838

Registered Professional Civil Engineer, Colorado, #45269

Post-Disaster Safety Assessment Program, Damage Assessment Volunteer, California Office of Emergency Services, SAPV10422 (Certified Program Evaluator)

## **Publications**

Wren JR. The Great Chicago Flood, analysis of Chicago's 2<sup>nd</sup> great disaster. Structure Magazine, Copper Creek, Reedsburg, WI, August 2007.

Wren JR. Recent developments in post-earthquake investigations: A geotechnical perspective. Structure Magazine, Copper Creek, Reedsburg, WI, December 2006.

Stewart JP, Wren JR. Engineering guidelines for the assessment and repair of earthquake damage in residential wood frame buildings: Chapter 4, Permanent Ground Deformation During Earthquakes. CUREE Publication No. EDA-06, Version 2005-4.

Emami NK, Moncarz PD, Wren JR. Micro-biological attack on deep foundation concrete. Proceedings, 9<sup>th</sup> International Conference on Piling and Deep Foundations, Nice, France, June 2002.

Emami NK, Nichol森 A, Moncarz PD, Wren JR. Micro-biological attack on concrete—A threat to concrete infra-structure. International Conference on Forensic Engineering, A Professional Approach to Investigation, Institution of Civil Engineers, London, UK, September 28–29, 1998, Thomas Telford Publications.

Borja RI, Regueiro RA, Wren JR. Micromechanical basis of continuum models for granular media. In: Localization and Bifurcation Theory for Soils and Rocks. Adachi, T, Oka F, and Yashima A (eds), A.A. Balkema, Rotterdam, pp. 295–304, 1998.

Wren JR, Borja RI. Micromechanics of granular media Part II: Overall tangential moduli and localization model for periodic assemblies of circular disks. *Computer Methods in Applied Mechanics and Engineering* 1997; 141:221–246.

Borja RI, Wren JR. Micromechanics of granular media Part I: Generation of overall constitutive equation for assemblies of circular disks. *Computer Methods in Applied Mechanics and Engineering* 1995; 127:13–36.

Borja RI, Wren JR. Micromechanics of continuum models for granular materials. *Proceedings, 10<sup>th</sup> Conference on Engineering Mechanics*, Vol. 1, pp. 497–500, Boulder, CO, 1995.

Wren JR. Micromechanical macromechanical model of dense granular materials. Ph.D. Dissertation, Stanford University, 1994.

Wren JR, Borja RI. Macro- and micro-mechanical model of granular materials. *Proceedings, 8th International Conference on Computer Methods and Advances in Geomechanics*, pp. 731–736, Morgantown, WV, May 1994.

Borja RI, Wren JR. Discrete micromechanics of elastoplastic crystals. *International Journal for Numerical Methods in Engineering* 1993; 36(22):3815–3840, November.

Borja RI, Wren JR. On the bifurcation of elasto-plastic crystals during multiple slip. *American Society of Civil Engineers Ninth Engineering Mechanics Conference*, Texas A&M University, 1992.

### **Invited Presentations**

Wren JR, McCann D. Epic failures. William A. and Joyce R. Bell Excellence Fund for Civil Engineering Lecture, Western Kentucky University, October 5, 2010.

Wren JR, Sykora D. Seismic Stability of Earth Dams, PROSPECT Course #247 – week-long training course for the U.S. Army Corps of Engineers, Huntsville, AL, August 31–September 4, 2009.

Wren JR, Shaller P. 2005 Landslides: Trends and observations from the trenches. *California Club*, Los Angeles, CA, May 11, 2005.

Wren JR, Gupta A. Seminar for the evaluation of earthquake damage, engineering issues for post-earthquake damage assessment. Presented at California Association of Independent Insurance Adjusters Seminar on The New Fair Claims Regulations & Earthquake Standards, Pleasanton, CA, February 28, 2004; Pomona, CA, March 2, 2004; and Fresno, CA, March 4, 2005.

Wren JR. Designing, constructing, and operating a failure: Observations from post-failure investigations. Presented at Graduate Seminar, Department of Civil and Environmental Engineering, University of Houston, November 17, 2004.

Wren JR, Chaudhuri D. San Simeon Earthquake: Damage patterns and trends. Presented at the American Society of Civil Engineering Forensic Engineering Technical Group, Los Angeles Section, September 14, 2004.

Wren JR, Suterwala S. What lies beneath: Understanding potential seismic hazards using GIS. 2003 Annual Meeting, Engineering Geology with an Altitude, Association of Engineering Geologists Conference, 46<sup>th</sup> Annual Meeting, Vail, CO, September 15–21, 2003.

Wren JR, Shekerlian S, Chaudhuri D, Shusto L. Post-disaster safety assessment program training. Co-instructor, Disaster Emergency Services Committee of Structural Engineers Association of Southern California, June 28, July 19, November 22, 2003.

Wren JR. New approaches to geotechnical issues in litigation cases. Presented at the American Society of Civil Engineering Forensic Engineering Technical Group, Los Angeles Section, 2002 Seminar, Recurring Cases and Issues in Forensic Engineering Practice, May 10, 2002.

Wren JR, Garrett J. The art and science of forensic engineering. Symposium in the Department of Engineering, Western Kentucky University, April 20, 2001.

Wren JR. Investigating engineering mishaps and disasters. Presented at Graduate Student Seminar Series in Selective Topics in Structures and Mechanics, Department of Civil and Environmental Engineering, University of California Los Angeles, CA, March 6, 2001.

Wren JR. Condition of America's infrastructure. Presented to the Annual Meeting of the Inland Marine Underwriters Association (IMUA), Seattle, WA, June 1998.

Wren JR. Geotechnical failures. Presented to the Geotechnical Group, Department of Civil and Environmental Engineering, University of Massachusetts, Amherst, March 7, 1997.

Wren JR. Geotechnical failures. Presented at the Structures and Geomechanics Seminar Series, Department of Civil Engineering, Stanford University, February 12, 1997.

Wren JR. Macro- and micro-mechanical model of granular materials. 8th International Conference on Computer Methods and Advances in Geomechanics, Morgantown, WV, May 1994.

### **Prior Experience**

Civil Engineer, New Hampshire Department of Transportation, 1988  
Engineering Technician, New Hampshire Department of Transportation, 1986 and 1987

### **Professional Affiliations**

- American Society of Civil Engineers (member)
- Stanford University Alumni Association Club of Palos Verdes/South Bay (past-President, past-Vice President)