

John Lewis Bignell

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Education

UNIVERSITY OF ILLINOIS, Urbana-Champaign, M.S. and Ph.D., **Civil Engineering**, 2001 and 2006
Completed with Computational Science and Engineering Option

UNIVERSITY OF UTAH, Salt Lake City, B.S., **Civil Engineering**, 2000
Graduated with Honors

Employment History

SANDIA NATIONAL LABORATORIES, Albuquerque, NM
Mechanical/Structural Engineer, July 2010 to Present

JET PROPULSION LABORATORY, Pasadena, CA
Mechanical/Structural Engineer, July 2006 to July 2010

Professional Experience

Dr. Bignell is a Principal Member of the Technical Staff at Sandia National Laboratories (SNL), Albuquerque, New Mexico, USA and is currently in the Structural and Thermal Analysis Department within the Nuclear Energy and Fuel Cycle Programs Center. He holds a BS in Civil and Environmental Engineering from the University of Utah (2000), and an MS and PhD in Civil and Environmental Engineering, with a certificate in Computational Science and Engineering, from the University of Illinois at Urban-Champaign, USA (2001 and 2006, respectively). As a research assistant at the University of Illinois Dr. Bignell developed analytical structural fragility curves for wall pier supported highway bridges typical of those found in southern Illinois for use in seismic risk assessment analyses. Upon his graduation, Dr. Bignell joined the Spacecraft Structures and Dynamics Group at NASA's Jet Propulsion Laboratory (JPL) in Pasadena, California, USA where he was the lead structural engineer for the rover mobility system on the 2.5 billion dollar Mars Science Laboratory (MSL) mission which recently successfully landed on the planet Mars. His responsibilities at JPL included the design, structural analysis, and test verification of components of the rover chassis and mobility systems. In 2010 Dr. Bignell joined SNL, where he specializes in the application of numerical and analytical methods in the design and assessment of structures subject to extreme load events. While Dr. Bignell has been involved in a number of projects, his primary role since joining SNL has been lead for the Radioisotope Power System Launch Safety (RPSLS) program's Blast and Impact (B&I) team which is responsible for characterizing the response of various radioisotope power systems to blast and impact events resulting from possible launch accident scenarios.

Publications and Reports

JOURNAL ARTICLES

1. Bignell J.L., and LaFave J.M., (2010). "Analytical Fragility Analysis of Southern Illinois Wall Pier Supported Highway Bridges," *Earthquake Engineering and Structural Dynamics*, 39:709-729.
2. Bignell J.L., LaFave J.M., and Hawkins N.M., (2005). "Seismic Vulnerability Assessment of Wall Pier Supported Highway Bridges Using Nonlinear Pushover Analyses," *Engineering Structures*, 27(14):2044-2063.
3. Decker R., Bignell J., Lambertsen C., and Porter K., (2001). "Measuring Efficiency of Winter Maintenance Practices," *Transportation Research Record*, 1741:167-175.

CONFERENCE PAPERS

1. Bignell J.L., and LaFave J.M., (2006). "Seismic Fragility Analysis of Wall Pier Supported Bridges on Southern Illinois Priority Emergency Routes," Paper No. 279, *Proceedings of the 8th U.S. National Conference on Earthquake Engineering*, April 18-22, San Francisco, CA.
2. Bignell J.L., LaFave J.M., Wilkey J.P., and Hawkins N.M., (2004). "Seismic Evaluation of Vulnerable Highway Bridges with Wall Piers on Emergency Routes in Southern Illinois," *Proceeding of the 13th World Conference on Earthquake Engineering*, Vancouver, B.C., Canada.

TECHNICAL REPORTS

1. Rath, Jonathan S. and Bignell, John L., (2012). "IRIS 2012 Numerical Simulation Report: United States Nuclear Regulatory Commission and Sandia National Laboratories," Technical Report, OECD, Paris, France.
2. Clayton, Daniel J., Akin, Lili A., Bartel, Timothy J., Bignell, John L., Bixler, Nathan E., Clutz, Christopher J.R., Farnum, Cathy O., Gelbard, Fred, Jones, Christopher A., Le, San, Lipinski, Ronald J., Lucas, Greg, Potter, Donald L., Smith, Jeffrey A., and Young, Larry W., (2012). "Draft Nuclear Risk Assessment for the Titan Mare Explorer Mission Environmental Impact Statement," Technical Report, SAND2012-4896, Sandia National Laboratories, Albuquerque, NM.
3. Clayton, Daniel J., Akin, Lili A., Bartel, Timothy J., Bignell, John L., Bixler, Nathan E., Clutz, Christopher J.R., Farnum, Cathy O., Gelbard, Fred, Jones, Christopher A., Le, San, Lipinski, Ronald J., Lucas, Greg, Potter, Donald L., Smith, Jeffrey A., and Young, Larry W., (2012). "Draft Nuclear Risk Assessment for the Titan Mare Explorer Mission Environmental Impact Statement Technical Support Document." Technical Report, SAND2012-4895, Sandia National Laboratories, Albuquerque, NM.
4. Clayton, Daniel J., Akin, Lili A., Bartel, Timothy J., Bignell, John L., Bixler, Nathan E., Clutz, Christopher J.R., Farnum, Cathy O., Gelbard, Fred, Jones, Christopher A., Le, San, Lipinski, Ronald J., Lucas, Greg, Potter, Donald L., Smith, Jeffrey A., and Young, Larry W., (2012). "Draft Nuclear Risk Assessment for the Comet Hopper Mission Environmental Impact Statement," Technical Report, SAND2012-4898, Sandia National Laboratories, Albuquerque, NM.

5. Clayton, Daniel J., Akin, Lili A., Bartel, Timothy J., Bignell, John L., Bixler, Nathan E., Clutz, Christopher J.R., Farnum, Cathy O., Gelbard, Fred, Jones, Christopher A., Le, San, Lipinski, Ronald J., Lucas, Greg, Potter, Donald L., Smith, Jeffrey A., and Young, Larry W., (2012). "Draft Nuclear Risk Assessment for the Comet Hopper Mission Environmental Impact Statement Technical Support Document," Technical Report, SAND2012-4897, Sandia National Laboratories, Albuquerque, NM.
6. Bignell, John L., Akin, Lili A., Petti, Jason P., Villa, Daniel L., and Smith, Jeffrey A., (2011). "Advanced Stirling Radioisotope Generator Preliminary Ground Impact Analysis," Technical Report SAND2011-3916, Sandia National Laboratories, Albuquerque, NM.
7. Bignell J.L., LaFave J.M., and Hawkins N.M., (2006). "Assessment of the Seismic Vulnerability of Wall Pier Supported Highway Bridges on Priority Emergency Routes in Southern Illinois," Final Report FHWA-ICT-07-004, Illinois Center for Transportation, Springfield, IL.
8. Parsons I.D., White S., Therriault D., and Bignell J.L., (2002). "Manufacture and Testing of a Filament Wound Composite Bridge Superstructure," Final Report for Highway IDEA Project 63, NCHRP063, Transportation Research Board of the National Academies, Washington, DC.