

Exponent®
Engineering & Scientific Consulting

Brun Hilbert, Jr., Ph.D., P.E.

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Professional Profile

Dr. Hilbert has been consulting at Exponent since 1996 in the fields of mechanical and petroleum engineering, with special applications to engineering mechanics and geomechanics. He has worked in the petroleum exploration and production industry for over 40 years. Dr. Hilbert has testifying experience in state and federal courts, intellectual property, and international arbitration, with particular focus on the oil and gas industry.

Dr. Hilbert has expertise in mechanical and petroleum engineering. In the area of petroleum engineering, he has expertise in oil and gas well design and integrity, hydraulic fracturing, well production and wellhead equipment, blowouts and well control, drilling mechanics and directional drilling, reservoir geomechanics, reservoir reserves estimation, fixed and floating offshore platforms. He also has experience with natural gas and liquid hydrocarbon storage in solution-mined salt caverns and depleted hydrocarbon formations.

In the area of geomechanics, Dr. Hilbert has expertise in evaluating the structural integrity of oil and gas wells in compacting or deforming reservoir rocks, in the stability of underground storage structures and nuclear waste repositories, and he assists clients in failure analysis involving soil-structure interaction, including pipelines.

Prior to joining Exponent, Dr. Hilbert was employed as an Engineering Specialist for Exxon Production Research Company, where he performed research and taught courses in Well Completions and Workovers in the Middle East, Southeast Asia, Australia, and North America.

Academic Credentials & Professional Honors

Ph.D., Materials Science and Mineral Engineering, University of California, Berkeley, 1995

M.S.E., Mechanical Engineering, University of New Orleans, 1981

B.S., Mathematics, University of New Orleans, 1979

National Academy of Engineering Committee on Connector Reliability for Offshore Oil and Natural Gas Operations, 2017-2018

Society of Petroleum Engineers Distinguished Lecturer, 2015-2016

Jane Lewis Fellowship in Geomechanics

Mathematical Association of America Membership Award

Outstanding Instructor, Exxon Production Research Company 1991

Outstanding Instructor, Exxon Company, U.S.A. 1990

Licenses and Certifications

Professional Engineer Mechanical, California, #31490

Professional Engineer, Idaho, #5681404

Professional Engineer Mechanical, New Mexico, #20939

Professional Engineer Mechanical, Pennsylvania, #PE099415

Professional Engineer Mechanical and Petroleum, Texas, #112060

Prior Experience

Lawrence Berkeley National Laboratory, 1996

University of California at Berkeley, 1992-1996

Exxon Production Research Company, 1981-1992

Professional Affiliations

American Water Works Association

American Society of Mechanical Engineers

Society of Petroleum Engineers

American Rock Mechanics Association

Publications

Papers and Articles

Hilbert LB and Hallai JF, From Brine to Batteries: A Summary of Direct Lithium Extraction (DLE). 76th Annual Energy Law Conference, The Center for American and International Law, Houston, Texas February 13-14, 2025.

Hilbert LB and Hallai JF. Natural Gas Production in Extreme Weather (Guest Commentary). Pipeline & Gas Journal. Vol. 248, No, 6, June 7, 2021.

Owens ZC, Smyth BJ, Ames NA, Pye JD, Hilbert LB, Brooks B. Development of a Casing-Integrated Well Control Tool. Offshore Technology Conference. doi:10.4043/28644-MS, April 30, 2018.

Owens ZC, Smyth BJ, Ames NA, Pye JD, Hilbert LB, Brooks B, Taber RM, Mendez H. Casing-integrated, surface-activated well control tool supplements BOP in uncontrolled blowout scenarios. Drilling Contractor 2017 July/Aug; 73(4).

Hilbert LB, Reilly E, Ames N. Underground storage operators must fully understand 2016 PIPES Act. Oil & Gas Journal, July 3, 2017.

Hilbert LB, Saraf VK, Birbiglia DKJ, Shumilak EE, Schutjens PMTM, Hindriks COH, Klever FJ. Modeling horizontal completion deformations in a deepwater unconsolidated sand reservoir. SPE Journal of Drilling & Completion 2011 Mar; (26)2:68-83.

Hilbert LB, Saraf VK. Salt mechanics and casing deformation in solution-mined gas storage operations. Paper ARMA 08-383, Presented at San Francisco 2008, the 42nd US Rock Mechanics Symposium and 2nd U.S.-Canada Rock Mechanics Symposium, San Francisco, CA, June 29-July 2, 2008.

Hilbert LB, Bergström JS. Evaluating pressure integrity of polymer ring seals for threaded connections in HP/HT wells and expandable casing. SPE Journal 2008; 13:1:123-132.

Bergström JS, Hilbert LB. A constitutive model for predicting the large deformation thermomechanical behavior of fluoropolymers. Mechanics of Materials 2005; 37:899-213.

Bergström JS, Brown SB, Hilbert LB. Large strain time- and temperature-dependent modeling of PTFE. Presented at 2nd MIT Conference on Computational Fluid and Solid Mechanics, June 2003.

Bessinger B, Suarez-Rivera R, Nihei K, Hilbert B, Myer L, Cook N. P-wave amplitude anisotropy in limestone. In: Advances in Anisotropy: Selected Theory, Modeling, and Case Studies. Hood JA (ed), Society of Exploration Geophysicists, pp. 322, Tulsa, OK, 2001.

Nihei KT, Hilbert LB Jr, Cook NGW, Nakagawa S, Myer LR. Frictional effects on the volumetric strain of sandstone. International Journal of Rock Mechanics and Mining Sciences 2000; 37(1-2):121-132.

Hilbert LB, Gwinn RL, Moroney TA, Deitrick GL. Field-scale and wellbore modeling of compaction-induced casing failures. SPE Journal of Drilling & Completion 1999; 14(2):92-101, June.

Guyer RA, McCall KR, Boitnott GN, Hilbert LB Jr, Plona TJ. Quantitative implementation of Preisach-Mayergoyz space to find static and dynamic elastic moduli of rock. Journal of Geophysical Research 1997; 102(B3):5281-5293, March.

Nihei KT, Hilbert Jr LB, Cook NGW, Myer LR. Frictional effects on the compressibility of sandstone. EOS, Transactions of the American Geophysical Union 1996; 77(46).

Kastenberg WE, Peterson PF, Ahn J, Burch J, Casher G, Chambre PL, Greenspan E, Olander DR, Vujic JL, Bessinger B, Cook NGW, Doyle FM, Hilbert LB Jr. Consideration of autocatalytic criticality of fissile materials in geologic repositories. Nuclear Technology 1996; 115:298-310, September.

McCall KR, Guyer RA, Zhu L, Boitnott GN, Hilbert LB Jr, Plona TJ. Experimental determination of the linear and nonlinear dynamic moduli of rock from quasistatic measurements. Proceedings, 2nd North American Rock Mechanics Symposium: NARMS'96, Aubertin M, Hassani F, Mitri H (eds), Quebec, Canada, 19-21, Balkema, Rotterdam, Netherlands, pp. 147-154, June 1996.

Hilbert LB, Fredrich, JT, Bruno MS, Dietrick GL, de Rouffignac EP. Two-dimensional nonlinear finite element analysis of well damage due to reservoir compaction, well-to-well interactions, and localization on weak layers. Proceedings, 2nd Annual North American Rock Mechanics Symposium, p. 19-21, Montreal, Canada, June 1996.

Bessinger BA, Yi W, Suarez-Rivera R, Nihei K, Hilbert LB, Myer LR. P-Wave amplitude anisotropy in limestones. Proceedings, 7th International Workshop in Seismic Anisotropy, Miami, FL, February 1996.

Hilbert LB, Bessinger BA, Cook NGW. Effects of bedding planes and discontinuities on the sorptivity and permeability of rock. Presented at Fall Meeting of AGU, December 11-15, 1995.

Zhu L, Guyer RA, McCall KR, Boitnott GN, Hilbert LB Jr, Plona TJ. Experimental determination of the linear and nonlinear dynamic moduli of rock from quasistatic measurements. Journal of the Acoustical

Society of America 1995 Nov; 98:2905-2905.

Hilbert L, Cook NGW, Myer L. Numerical modeling of highly jointed and fractured media using discontinuous deformation methods. Proceedings, 8th International Congress on Rock Mechanics, Vol. 3, pp. 1159-1165, Tokyo, Japan, September 1995.

Hilbert LB, Liu Z, Cook NGW. On the use of substructuring and domain decomposition techniques in discontinuum mechanics. Proceedings, 32nd Annual Technical Meeting Society of Engineering Science, New Orleans, LA, October 1995.

Hilbert LB Jr, Yi W, Cook NGW, Cai Y, Liang GP. A new discontinuous finite element method for interaction of many deformable bodies in geomechanics. Proceedings, 8th International Conference on Computational Method and Advances in Geomechancis, pp. 836-931, May 1994.

Hilbert LB, Hwong TK, Cook NGW, Nihei KT, Myer LR. Effects of strain amplitude on the static and dynamic nonlinear deformation of Berea sandstone. In: Rock Mechanics Models and Measurements Challenges from Industry, Nelson P and Laubach S (eds), Proceedings of 1st North American Rock Mechanics Symposium, pp. 497-504, June 1994.

Hilbert LB, Hwong T, Cook NGW, Nihei KT, Myer LR. Micromechanics of the static and dynamic nonlinear behavior of Berea sandstone. EOS, Transactions of the American Geophysical Union 1993; 74(43):236.

Hilbert LB, Kalil IA. Evaluation of premium threaded connections using finite element analysis and full-scale testing. Proceedings, IADC/SPE Drilling Conference, New Orleans, LA, February 1992.

Banon H, Johnson DV, Hilbert LB. Reliability considerations in design of steel and CRA production tubing strings. Proceedings of the 1st International SPE Conference on Health, Safety, and the Environment, SPE 23483, The Hague, The Netherlands, pp. 673-680, November 1991.

Kocian EM, Mefford RN, Hilbert LB, Kalil IA. Compressive loading casing design. Proceedings, 1990 IADC/SPE Drilling Conference, IADC/SPE 19923, Houston, TX, pp. 145-155, February 22-March 2, 1990.

Hilbert LB, Janna WS. The feasibility of electric power generation by the wind on the University of New Orleans Campus. Proceedings, ASME Energy Sources Technology Conference and Exhibition, 82-PET-1, New Orleans, LA, March 1982.

Book Chapters

Hilbert, LB et al., National Academies of Sciences, Engineering, and Medicine. High-Performance Bolting Technology for Offshore Oil and Natural Gas Operations. Washington, DC: The National Academies Press. June 2018. https://doi.org/10.17226/25032

Hilbert LB. Chapter 7. Reservoir Integrity. In: Underground Gas Storage Regulatory Considerations: A Guide for State and Federal Regulatory Agencies. Ground Water Protection Council and Interstate Oil and Gas Compact Commission. May, 2017.

Hilbert LB. Reservoir compaction, subsidence and well damage. In: Numerical Analysis and Modeling in Geomechanics, Chapter 11. John Bull (ed), Spon Press, May 2003.

Other Technical Publications

Saba T, Mohsen MFN, Hilbert LB, Garry MR. Methanol use in hydraulic fracturing fluids. White Paper, August, 29, 2011.

Presentations and Lectures

Hilbert LB, CJ Medere, and Davidson J. Legal Considerations in Brine-Based Lithium Extraction, Processing, Use. Panel presentation and discussions, 76th Annual Energy Law Conference, The Center for American and International Law, Houston, Texas February 14, 2025.

Hilbert LB, Saba T. Recent developments in hydraulic fracturing. Presented at: A Whole New Ballgame: Oil and Gas in the Trump Administration. A Seminar by Husch Blackwell, LLP. April Denver, CO, 27, 2017.

Hilbert LB. Society of Petroleum Engineers Distinguished Lecture Program: Well design and integrity: Importance, Risk and scientific certainty. Invited Lecture, 2015-2016.

Hilbert LB, Saba T, Murali A. Hydraulic fracturing: An overview of the current environmental and engineering issues. Exponent Webinar, October 14, 2015.

Hilbert LB, Schell JD, Meyer AA. Considerations of risk in hydraulic fracturing. Invited speaker. ASME Silicon Valley Section Technical Dinner Talk, February 27, 2014.

Hilbert LB, Mosher GE, Schell JD. Hydraulic fracturing: Myths and realities. Exponent Webinar, May 14, 2013.

Hilbert LB, Stewart SE. Hydraulic fracturing: The process. Invited Speaker. Seminar on Fracking Law: From Land Contract Negotiations to Environmental Disputes, National Business Institute Attorney Presentations. Grand Rapids, MI. February 19, 2013.

Hilbert LB (Moderator), et al. Hydraulic fracturing science update and frontiers. Invited Speaker. Seminar presentation: Key Legal Issues and Future Directions in the Environmental Impacts of Shale Development and Hydraulic Fracturing. Sponsored by ALI CLW American Law Institute, November 29, 2012.

Hilbert LB, Hardin WA. Understanding fracing, the potential risks and risk management concerns. Invited Speaker, Shale Gas Drilling Operations (Fracking) Conference, New York, NY, October 3, 2012.

Hilbert LB, Mathieson EL, Osteraas JD. Earthquakes 101: Natural and man-made sources and consequences. Exponent Webinar, January 26, 2012.

Hilbert LB, Saba T, Mohsen F. Hydraulic fracturing: What are the key engineering and environmental issues? Exponent Webinar, May 25, 2011.

Hilbert LB. Unconventional gas resources: Shale gas and hydraulic fracturing. Invited Speaker, Poland - Silicon Valley Technology Symposium, Palo Alto, CA, December 4-7, 2010.

Hilbert LB, Saraf VS. Buckling of multiple concentric casings. Presentation, 2007 West Regional ABAQUS User's Conference, Las Vegas, NV, October 2007.

Hilbert LB. The development and application of user material subroutines for large deformation thermomechanical modeling of Teflon. Presentation, 2006 West Regional ABAQUS User's Conference, Emeryville, CA, October 24-25, 2007.

Hilbert LB. Challenges in constitutive modeling of soft unconsolidated rocks. Presentation, Society of Petroleum Engineers Forum "Challenges in Unconsolidated Reservoirs: Reservoir Performance," Kananaskis, Canada, August 26-31, 2007.

Hilbert LB. Finite element methods in geomechcanics. Invited Lecture, Stanford University, March 2, 2007.

Hilbert LB, Bergström JS. Finite element modeling of a thermoplastic seal at high temperature and

pressure. Presentation, 2005 East Regional ABAQUS User's Conference, Westborough, MA, November, 2005.

Hilbert LB. Evaluating pressure integrity of polymer ring seals for threaded connections in HP/HT wells and expandable casing. Presentation, American Society of Mechanical Engineers, North West Houston Sub Section, Houston, TX, September 27, 2003.

Hilbert LB. Analysis of pressure integrity of polymer ring seals. Presentation, American Society of Mechanical Engineers, Silicon Valley Chapter, Mountain View, CA, September 18, 2003.

Hilbert LB. Failure analysis in the petroleum industry. Presentation, Society of Petroleum Engineers, Los Angeles Basin Section, Long Beach, CA, May 9, 2000.

Hilbert LB. Limitations and unfulfilled expectations of numerical methods in underground design and construction. Presentation, 3rd Geo-Institute Conference, Urbana, IL, June 1999.

Hilbert LB. Landslides! Presentation, Association of Defense Council, South Lake Tahoe, NV, June 1998.

Hilbert LB. Applications of forensics in geotechnical engineering. Presentation, Society of Civil Engineers of California Polytechnic State University, San Luis Obispo, CA, October 1998.

Hilbert LB. On the relationship between the pseudo rigid body and discontinuous deformation analysis. Presentation, Neville G.W. Cook Conference, Berkeley, CA, October 1998.

Hilbert LB. Failure analysis in petroleum engineering. Invited Lecture, Stanford University Petroleum Engineering Seminar, February 1998.

Hilbert LB. Geomechanical modeling of subsidence-induced well failures. Society of Petroleum Engineering, Golden Gate Section, San Francisco, CA, December 1997.

Hilbert LB. Discontinuum mechanics: The Manifold Method and the Finite Element Method. Presentation, Working Forum on the Manifold Method of Material Analysis, U.S. Army Corps of Engineers, Waterways Experiment Station, Timber Cove, CA, October 1995.

Hilbert LB. Computational geomechanics at Lawrence Berkeley National Laboratory. Kiso-Jiban Consultants Co., Tokyo, Japan, September 1995.

Hilbert LB. A finite element method for jointed, fractured and faulted geomaterials. Invited Lecture, Earth Sciences Division Seminar, Lawrence Berkeley National Laboratory, Berkeley, CA, July 1994.

Hilbert LB. Computational discontinuum analysis geoengineering seminar. Invited Lecture, University of California at Berkeley, October 1994.

Hilbert LB. Tubular string design. Invited Lecture, Subsurface Engineering School, Exxon Company U.S.A., Houston, TX, October 1991.

Hilbert LB. Casing and tubing course. Invited Lecture, Esso Production Malaysia Inc., Kerteh, Malaysia, October 1991.

Hilbert LB. Overview of production engineering school. Invited Lecture, Saudi Aramco, Dhahran, Saudi Arabia, August, 1991

Hilbert LB. Casing and tubing school. Invited Lecture, Exxon Production Research Company, Houston, Texas, April 1991.

Hilbert LB. Tubular design in Subsurface Engineering School. Invited Lecture, Exxon Company U.S.A.,

Houston, TX, June 1990.

Hilbert LB. The Walne 1-34: Exxon's deepest well. Invited Lecture, Exxon Production Research Company Production Seminar, Houston, TX, August 1989.

Hilbert LB. Evaluation methods for premium threaded connections. Invited Lecture, Exxon Production Research Company Production Seminar, Houston, TX, November 1988.

Hilbert LB. Premium tubing connections and analysis. Invited Lecture, Saudi Aramco Mid-Year Technical Review, Dhahran, Saudi Arabia, June 1988.

Hilbert LB. Tubular string design and stability analysis. Invited Lecture, Exxon Production Research Company Production Seminar, Houston, TX, December 1986.

Hilbert LB. Well completions and workovers school. Invited Lecture, Exxon Production Research Company, Houston, Texas; Kerteh, Malaysia; Ras Tanura and Dhahran, Saudi Arabia; Sale, Australia, 1983-1981.