

Curriculum Vitae for David L Alumbaugh

Employment History

- 2019 - Present Staff Scientist, Lawrence Berkeley National Laboratory, Berkeley, CA. Principal responsibilities include:
- investigating new methodologies and configurations of measuring electromagnetic fields for subsurface geophysical characterization;
 - the use of electromagnetic and other geophysical methods for monitoring subsurface fluid and gas injection processes;
 - guiding the development of, and using numerical modeling and analytics algorithms for geophysical data analysis and interpretation.
- 2018 - Present Consultant and Principal, BlueGreen Geophysics, Berkeley, CA. Services provided to clients include:
- basic electromagnetic data quality assessment analysis;
 - electromagnetic survey design and resolution analysis;
 - one, two and three-dimensional forward and inverse modeling of EM geophysical data, including marine and land MT and CSEM data, as well as various types of airborne EM data;
 - development and execution of novel workflows for inverting and interpreting electromagnetic geophysical data.
- 2013 - 2018 Principal Geoscientist and Electromagnetics Subject Matter Expert, NEOS GeoSolutions, Pleasanton, CA. Principal responsibilities included:
- developing and managing the future vision and path forward for multi-physics geophysical data interpretation solutions using both model driven physics-based techniques as well as data driven machine learning methodologies;
 - performing technical due diligence for possible technology acquisitions and partnerships;
 - managing survey design, data processing, imaging, and interpretation for all electromagnetic data acquisition projects, and developing the workflows for the interpretation of electromagnetic geophysical data;
 - scoping out software and data acquisition requirements for future projects.
- 2011 - 2013 Senior Geophysical Researcher, Geophysical Modeling and Inversion R&D Group, Earth Sciences Division, Chevron Energy Technology Company, San Ramon, CA. Principal responsibilities included:
- developing workflows for the interpretation of electromagnetic geophysical data as applied to resource exploration and reservoir management;
 - testing various 2D and 3D EM numerical modeling and inversion algorithms, and providing code modifications as required;
 - technical guidance for various Chevron 'think-tank' R&D projects;
 - simulating geophysical responses to transient physical property changes in realistic multi-phase flow reservoir models and simple hydrofrac simulations.

- 2004 - 2011 Discipline Manager of the Physics, Modeling and Inversion Group, Schlumberger EMI Technology Center, Berkeley, CA. Principal responsibilities included:
- managing the development and commercialization of the modeling, processing, and data interpretation console for Schlumberger's 'DeepLook-EM' cross-well electromagnetic imaging system;
 - managing research, modeling, and theoretical projects associated with the development of an intellectual property portfolio for Schlumberger's marine electromagnetic exploration business;
 - participating in various due-diligence research exercises for small business acquisitions or investments, and technology infringement lawsuits.
- 1999 - 2005 Assistant/Associate Professor, University of Wisconsin-Madison, Department of Civil and Environmental Engineering, Geological Engineering Program. Principal responsibilities included:
- teaching courses in applied geophysical methods and applications;
 - performing and managing research related to
 - oil field reservoir characterization;
 - methods to map contaminants and remediation in the subsurface;
 - hydrologic assessment;
 - non-destructive evaluation of engineered structures;
 - the possible existence and effects of power grid 'stray' electric current contamination on dairy cow health and milk production.
- 1993 – 1999 Post-Doc / Senior Member of the Technical Staff, Geophysical Technology Department, Sandia National Laboratories, NM. Principal responsibilities included:
- developed and testing 3D finite difference forward modeling and inverse algorithms for interpreting electromagnetic geophysical data using parallel computing platforms;
 - applied 3D electromagnetic forward modeling and inverse solutions to better understand the physics of EM geophysical methods, as well as designing novel acquisition technologies;
 - managing the development, implementation, and operation of an experimental hydrologic test site and the associated research projects aimed at better understanding flow and contaminant transport properties in the unsaturated zone.

Adjunct/Visiting Professorships

- 2018 – Present Adjunct Senior Research Scientist, Columbia University, Lamont-Doherty Earth Observatory.
- 2006 - 2014 Adjunct Associate Professor, University of California Berkeley, Department of Earth and Planetary Sciences and Berkeley Seismological Laboratory.
- 2003 - 2004 Visiting Associate Professor, Stanford University, Department of Geophysics.

1997 - 1999 Adjunct Professor, New Mexico Tech, Department of Earth and Environmental Science.

Formal Education

Ph.D., 1993, Materials Science and Mineral Engineering, emphasis in Geophysical Engineering, University of California at Berkeley.

M.S., 1989, Materials Science and Mineral Engineering, emphasis in Geophysical Engineering, University of California at Berkeley.

B.S., 1986, Geological Sciences, San Diego State University.

Significant Honors and Awards

Hart Energy E&P Magazine, Meritorious Award for New Engineering Innovation, 2010, Presented to Schlumberger for The DeepLook-EM Enhanced Crosswell Reservoir Monitoring System.

Recipient, The Gerald W. Hohmann Award for Excellence in Applied Electrical Geophysics, The Gerald W. Hohmann Memorial Trust, September, 1998.

Best Student Paper Award, Society of Exploration Geophysicists, 1992.

Outstanding Graduate, San Diego State University Geological Sciences Department, 1986.

Professional Memberships:

Society of Exploration Geophysicists (SEG)

European Association of Geoscientists and Engineers (EAGE)

American Geophysical Union (AGU)

Professional Service

Society and Committee Leadership

Member of the Incorporated Research Institutions for Seismology (IRIS) Electromagnetic Advisory Committee (EMAC) beginning in December of 2018.

Member of the QuakeFinder Research Advisory Council, November 2017 – present.

President, Bay Area Geophysical Society (BAGS), December 2014 to December 2016.

Member of the Non-Seismic Technical Committee for the SEG's 'SEAM' modeling project, 2008.

Member of the SEG Online Education Taskforce, 2007.

Member of SAFOD Downhole Measurements Technical Panel, 2004.

Member of the Electromagnetic Sounding of the Continents (EMSOC) Steering Committee, 2003-2005.

Co-chair, Environmental and Engineering Geophysical Society Research Committee, 1996-1998.

Conferences

Organization

Technical Program Chair, The Society of Exploration Geophysicists Exposition and 87th Annual Meeting, Anaheim, California, October 2018.

Symposium Organizer and Co-Chair, 3DEM-6, The Gerald W. Hohmann Memorial Trust, Berkeley, CA, March 2017.

Electromagnetic Methods sessions organizer for the 2016 Society of Exploration Geophysicists Annual Meeting, Dallas, TX.

Technical Program Co-organizer, 3DEM-5, The Gerald W. Hohmann Memorial Trust, Japan, May 2013.
Electromagnetic Methods sessions organizer for the 2013 Society of Exploration Geophysicists Annual Meeting, Houston, TX.
Electromagnetic Methods sessions organizer for the 2012 Society of Exploration Geophysicists Annual Meeting, Las Vegas, NV.
Co-chair, Technical Program for SAGEEP'99, March, 1999.
Co-organizer, four sessions and the Research and New Technologies Discussion Panel, SAGEEP'98, March, 1998
Co-organizer, the Research and New Technologies Sessions and Discussion Panel, SAGEEP'97, March, 1997.
Co-organizer, The Role of In-Mine Geophysics for Resource Evaluation Workshop , 66'th Annual Meeting of the SEG, November, 1996.
Co-chair, TEM and Other Applications, 79th Annual Meeting of the SEG, November, 2009.
Co-chair, EM modeling and Inversion , 78th Annual Meeting of the SEG, October, 2008.

Co-chair for various sessions at meetings

Co-chair, TEM and Other Applications, 79th Annual Meeting of the SEG, November, 2009
Co-chair, EM modeling and Inversion , 78th Annual Meeting of the SEG, October, 2008
Co-chair, CSEM Theory , 77th Annual Meeting of the SEG, September, 2007
Co-chair, EM and Electro-seismic Acquisition and Applications, 75th Annual Meeting of the SEG, October, 2005.
Co-chair, New developments in 3D EM Inversion Technical Session, 72nd Annual Meeting of the SEG, October, 2002.
Co-chair, Electromagnetics - 3D and Inversion Technical Session, 70'th Annual Meeting of the SEG, August, 2000.
Co-chair, Resistivity and Related Techniques Session, 64'th Annual Meeting of the SEG, November, 1994.
Co-chair, Modeling and Inversion Session, John S. Sumner Memorial International Workshop on Induced Polarization in Mining and the Environment, October 199

Editorships

Associate Editor, *Geophysics*, 1997-1999.
Special Editor, *Geophysics*, 1993-1997.

Books Edited

Volume editor, 'The Boundary Element Method in Geophysics' by Xu Shi-zhe, Society of Exploration Geophysicists, 2001.

Bibliography for David L Alumbaugh

Refereed Journal Articles

Velasco, M. S., Alumbaugh, D. L., and Schnetzler, E., 2018, Multiphysics data modeling and imaging for exploration in the southern Rocky Mountains; *Interpretation*, **6**, SG59-SG78.
Hoversten, G. M., Myer, D., Key, K., Alumbaugh, D., Hermann, O., and Hobber, R., 2015, Field test of sub-basalt hydrocarbon exploration with marine controlled source electromagnetic and magnetotelluric data; *Geophysical Prospecting*, **63**, DOI: 10.1111/1365-2478.12278.

- Ray, A, Alumbaugh, D. L., Hoversten, G. M., Key, K., 2013, Robust and accelerated Bayesian inversion of marine controlled-source electromagnetic data using parallel tempering; *Geophysics*, **78**, E271-E280.
- Um, E. S., Harris, J. M. and Alumbaugh, D. L., 2012, An iterative finite element time-domain method for simulating three-dimensional electromagnetic diffusion in earth; *Geophysical Journal International*, **190**,871-886.
- Um, E. S., Alumbaugh, D. L., Harris, J. M., and Chen, J., 2012, Numerical modeling analysis of short-offset electric-field measurements with a vertical electric dipole source in complex offshore environments; *Geophysics*, **76**, no 5, 329-341.
- Cuevas, N. H., and Alumbaugh, D., 2011, Near-source response of a resistive layer to a vertical or horizontal electric dipole excitation; *Geophysics*, **76**, 353-371.
- Tompkins, M. J., Fernandez-Martinez, Juan L, Alumbaugh, D. L, and Mukerji, T., 2011, Scalable uncertainty estimation for nonlinear inverse problems using parameter reduction, constraint mapping, and geometric sampling: Marine controlled-source electromagnetic examples; *Geophysics*, **76**, 263-281.
- Chen, J., and Alumbaugh, D. L., 2011, Three methods for mitigating air waves in shallow water marine controlled-source electromagnetic data; *Geophysics*, **76**, 89-99.
- Weitemeyer, K., Gao, G., Constable, S., and Alumbaugh, D., 2010, The practical application of 2D inversion to marine controlled source electromagnetic data; *Geophysics*, **75**, 199-211.
- Um, E., Harris, J, and Alumbaugh, D., 2010, 3D time-domain simulation of electromagnetic diffusion phenomena: a finite-element electric-field approach; *Geophysics*, **75**, 115-126.
- Abubakar, A., Habashy, T., Druskin, V.L., Knizhnerman, L., and , Alumbaugh, D., 2008, Two-and-half dimensional forward and inverse modeling for the interpretation of low-frequency electromagnetic measurements; *Geophysics*, **73**, F 165-177.
- Um, E., and Alumbaugh, D., 2007, On the physics of the marine controlled source electromagnetic method for subsurface hydrocarbon detection; *invited paper in Geophysics*, **72**, WA13-WA26.
- Chang P.-Y., Alumbaugh, D., Brainard, J., and Hall, L., 2006, Cross-borehole ground-penetrating radar for monitoring and imaging solute transport within the vadose zone, *Water Resour. Res.*, **42**, W10413, doi:10.1029/2004WR003871.
- Staab, D. A., Alumbaugh, D. L., and Edil, T. B., 2005, Defect detection in deep-mixed columns using geophysical methods: a computer modeling study; *Earthquake Engineering and Soil Dynamics*, Geotechnical Special Publication No. 133, Geo-Frontier 2005, American Society of Civil Engineers, 1-15.
- Pellerin, L., Alumbaugh, D., Reinmann, D., and Thompsan, P., 2004, Results of the University of Wisconsin stray voltage earth-current measurement experiment; *Applied Engineering in Agriculture*, **20**, 703-706.
- Staab, D. A., Edil, T. B. and Alumbaugh, D. L., 2004, Non-destructive evaluation of cement mixed soils; *Drilled Shafts, Micropiling, Deep Mixing, Remedial and Specialty Foundation Systems*, Geotechnical Special Publication No. 124, American Society of Civil Engineers, Geo-Support 2004, 838-848.
- Tompkins, M. J., and Alumbaugh, D. L., 2004, Detection of 1-D formation boundaries for the triaxial induction logging problem; *Petrophysics*, **45** (6).
- Chang, P. Y., Alumbaugh, D., Brainard, J., and Hall, L., 2004, The application of ground penetrating radar attenuation tomography in a vadose zone infiltration experiment; *Journal of Contaminant Hydrology*, **71**,67-87.

- Tompkins, M., Alumbaugh, D. L., Stanley, D., and Lu, X., 2004, Numerical analysis of near-borehole and anisotropic effects on the response of a new multi-component induction logging tool; *Geophysics*, **69**, 140-151.
- Wilt, M. J., and Alumbaugh, D. L., 2003, Oil field reservoir characterization and monitoring using electromagnetic geophysical techniques; *Journal of Petroleum Science and Engineering*, **39**, 85-97.
- Alumbaugh, D. L., Chang, P.Y., Paprocki, L., Brainard, J. R., Glass, R. J., and Rautmann, C., 2002, Estimating moisture contents using cross-borehole ground penetrating radar; a study of accuracy, repeatability and resolution in context of an infiltration experiment; *Water Resources Research*, **38**,1309.
- Yeh, T. C. J, Liu, S, Glass, R. J., Baker, K., Brainard, J, Alumbaugh, D. L., and Labrecque, D., 2002, A geostatistically-based inverse model for electrical resistivity surveys and its applications to vadose zone hydrology; *Water Resources Research*, **38**, 1278.
- Newman, G. A., and Alumbaugh, D. L., 2002, A finite difference solution for 3D induction logging problems: Part II; *Geophysics*, **67**, 484-491.
- Lu, X., Alumbaugh, D. L., and Weiss, C. J., 2002, On the electric fields and currents produced by induction logging instruments in anisotropic media; *Geophysics*, **67**, 478-483.
- Lu, X., and Alumbaugh, D. L., 2001, Three-dimensional sensitivity analysis of induction logging in anisotropic media; *Petrophysics*, **42**, 566-579.
- Weiss, C. J., Lu, X., and Alumbaugh, D. L., 2001, Electromagnetic induction by a tilted magnetic dipole in an electrically anisotropic formation; *Petrophysics*, **42**, 580-587.
- Alumbaugh, D. L., and Wilt, M.J., 2001, A numerical sensitivity study of three dimensional imaging from a single borehole; *Petrophysics*, **42**,19-31.
- Alumbaugh, D. A., 2000, Linearized and Nonlinear Parameter Variance Estimation for Two Dimensional Electromagnetic Inversion; *invited paper in Inverse Problems*, **16**, 1323-1342.
- Alumbaugh, D. L., and Newman, G.A., 2000, Image appraisal for 2D and 3D electromagnetic inversion; *Geophysics*, **65**, 1455-1467.
- Newman, G. A., and Alumbaugh, D. L., 2000, Three-dimensional magnetotelluric inversion using nonlinear conjugate gradients; *Geophysical Journal International*, **140**, 410-424.)
- Zhang, Z., Routh, P. S., Oldenburg, D. W., Alumbaugh, D. L., and Newman, G. A., 2000, Reconstruction of 1-D conductivity from coaxial, coplanar, vertical coplanar, and perpendicular EM data; *Geophysics*, **65**, 492-501.
- Pellerin, L., and Alumbaugh, D. L., 1997, Geophysical tools for the electromagnetic characterization of buried waste; *invited paper in Butsuri-Tansa*, **50**, 656-663.
- Newman, G.A., and Alumbaugh, D.L., 1997, 3-D massively parallel electromagnetic inversion; part a – theory; *Geophysical Journal International*, **128**, 345-354.
- Alumbaugh, D.L., and Newman, G.A., 1997, 3-D massively parallel electromagnetic inversion; part b - analysis of a cross well EM experiment; *Geophysical Journal International*, **128**, 355-363.
- Alumbaugh, D.L., Newman, G.A., Prevost, L., and Shadid, J.N., 1996, Three-dimensional wide band electromagnetic modeling on massively parallel computers; *Radio Science* , **31**, 1-23.
- Newman, G.A., and Alumbaugh, D.L., 1995, Frequency-domain modeling of airborne electromagnetic responses using staggered finite differences; *Geophysical Prospecting*, **43**, 1021-1042.

- Alumbaugh, D. L., and Morrison, H. F., 1995, Monitoring subsurface changes over time with cross well electromagnetic tomography; *Geophysical Prospecting*, **43**, 873-902.
- Alumbaugh, D. L., and Morrison, H. F., 1995, Theoretical and practical considerations for crosswell electromagnetic tomography using a cylindrical geometry; *Geophysics*, **60**, 846-870.
- Wilt, M.J., Alumbaugh, D.L., Morrison, H.F., Becker, A., Lee, K.H. and Deszcz-Pan, M., 1995, Crosshole electromagnetic tomography; system design considerations and field results: *Geophysics*, **60**, 871-885.
- Alumbaugh, D. L. and Morrison, H. F., 1993, Electromagnetic conductivity imaging with an iterative Born inversion; *IEEE Transactions on Geoscience and Remote Sensing*, **31**, 758-763.

Chapters in Books

- Alumbaugh, D. L., Simon, D. P. and Benson, C. R., 2005, Comparison of three geophysical techniques for characterizing air flow from an air sparging well; in Butler, D. W., ed., *Near Surface Geophysics, Volume II*; Society of Exploration Geophysicists, 573-583.
- Daniels, J. D., Allred, B., Binley, A., Labrecque, D., Alumbaugh, D., 2005, Hydrogeophysical case studies in the vadose zone; in Rubin, Y., and Hubbard, S., ed., *Hydrogeophysics*; Springer, 413-440.
- Newman, G. A., Hoversten, G. M., and Alumbaugh, D. L., 2002, 3D magnetotelluric modeling and inversion; in Zhdanov, M., and Wannamaker, P., ed., *Three-Dimensional Electromagnetics*; Elsevier.
- LaBrecque, D., Alumbaugh, D.L., Yang, X, and Paprocki, L., 2002, Three dimensional monitoring of vadose zone infiltration using electrical resistivity tomography and cross borehole ground penetrating radar; in Zhdanov, M., and Wannamaker, P., ed., *Three-Dimensional Electromagnetics*; Elsevier, 259-272.
- Newman, G.A., and Alumbaugh, D.A., 1999, 3-D electromagnetic modeling and inversion on massively parallel computers, in Oristaglio, M.N., and Spies, B.R., ed., *Three-Dimensional Electromagnetics*; Society of Exploration Geophysicists, 299-321
- Wilt, M. J., Schenkel, C., Spies, B. R., Torres-Verdin, C., and Alumbaugh, D., 1999, Measurement of surface and borehole electromagnetic fields in quasi two- and three-dimensional geology; in Oristaglio, M.N., and Spies, B.R., ed., *Three-Dimensional Electromagnetics*; Society of Exploration Geophysicists, 545-563.
- Goldstein, N. E., Benson, S.M., and Alumbaugh, D.L., 1990, Saline groundwater mapping with electromagnetics, in Ward, S.H. , ed., *Geotechnical and Environmental Geophysics - Volume II: Environmental and Groundwater*; Society of Exploration Geophysicists, 17-26.

Non-Refereed Journal Articles:

- Schnetzler, E., and Alumbaugh, D., 2017, The use of predictive analytics for hydrocarbon exploration in the Denver-Julesberg Basin; *The Leading Edge*, **36**, 227-233.
- Alumbaugh, D, Huang, H, Livermore, J., and Velasco, M. S., 2016, Resistivity imaging in a fold and thrust belt using ZTEM and sparse MT data; *First Break*, **34**, 65-72.

- Jiracek, G. R., Baldrige, W. S., Biehler, S., Braile, L. W., Ferguson, J. F., Gilpin, B. E., and Alumbaugh, D. L., 2000, SAGE: learning geophysics by immersion; *The Leading Edge*, **19**, 986-990.
- Wilt, M. J., and Alumbaugh, D. L., 1998, Electromagnetic methods for development and production: state of the art: *The Leading Edge*, **17**, 487-490.
- Pellerin, L., and Alumbaugh, D. L., 1997, Tools for electromagnetic investigation of the shallow subsurface: *The Leading Edge*, **16**, 1631-1638
- Wilt, M.J., Lee, K.H., Morrison, H.F., Becker, A., Torres-Verdin, C., Alumbaugh, D.L. and Tseng, H.W., 1995, Crosshole electromagnetic tomography - a new technology for oil field characterization: *The Leading Edge*, **14**, 173-177.

Invited Conference Papers and Presentations

- Alumbaugh, D., Soyer, W., and Mackie, R., 2018, Survey cost versus image resolution: augmenting ground MT stations with other EM data, Presented at *the Society of Exploration Geophysicists Annual Meeting Post Convention Workshop on 'Natural Field EM for Mineral Exploration'*, October, Anaheim, CA.
- Alumbaugh, D., Velasco, S., Poirier, J. and Schnetzler, E., 2016, Multi-physics data integration for exploration in the Raton Basin, Southern Colorado, Presented at the *Society of Exploration Geophysicists Annual Meeting Post Convention Workshop on 'Multi-physics - integration for exploration and formation evaluation and reservoir monitoring'*, October, Dallas, TX.
- Alumbaugh, D., and Schnetzler, E., 2016, Predictive analytics for productivity estimation, Presented at the *Society of Exploration Geophysicists Workshop on 'Multi-Physics Imaging for Integrated Exploration and Field Development'* October, Dubai, UAE.
- Alumbaugh, D. L., Cuevas, N., Chen, J., Gao, G., and Brady, J., 2010, Comparison of sensitivity and resolution with two marine CSEM exploration methods, Presented at the *Annual Meeting of the Society of Exploration Geophysicists*, October, Denver, CO.
- Tompkins, M. J., Fernandez-Martinez, Juan L, Mukerji, T., and Alumbaugh, D. L., 2010, Scalable nonlinear inverse uncertainty estimation using model reduction, constraint mapping, and sparse geometric sampling, Presented at the *Annual Meeting of the Society of Exploration Geophysicists*, October, Denver, CO.
- Alumbaugh, D., Donadille, J. M., Gao, G., Levesque, C., Nalonnil, A., Reynolds, L., Wilt, M., Zhang, P., 2008, Multi-scale data integration in crosswell EM imaging and interpretation, Presented at the *Annual Meeting of the Society of Exploration Geophysicists*, October, Las Vegas, NV.
- Alumbaugh, D. L., 2007, EM and Electrical Well Logging Research in Academia; Workshop on Recent Advances in Resistivity and EM Well Logging, Presented at the *Annual Meeting of the Society of Exploration Geophysicists*, September, San Antonio, Tx
- Alumbaugh, D. L., Abubakar, A., Habashy, T., Horne, S., Druskin, V., Hoversten, G. M., and Rosen, T., 2006, Two-dimensional inversion of marine electromagnetic data using seismic reflection data as apriori information; Presented at the *Fall Meeting of the American Geophysical Union*, December, San Francisco, CA.
- Alumbaugh, D. L., Urquhardt, S., and Carlson, N., 2006, Electrical and electromagnetic methods for groundwater applications: principles and applications; Presented at the *National Groundwater Association Expo*, December, Las Vegas, NV.
- Alumbaugh, D. L., Abubakar, A., Druskin, V., Habashy, T., Zerilli, A., Knizhnerman, L., and Hoversten, G. M., 2006, Fast two-dimensional forward and inversion algorithms for

- interpreting marine CSEM data; Presented at *The Offshore Technology Conference*, Houston, Tx, May 1-5.
- Alumbaugh, D. L., Chang, P. Y., LaBrecque, D., Stueben, M., Brainard, J., and Hall, L., 2003 Investigating vadose-zone flow and transport processes using cross borehole GPR and electrical resistivity; Presented at the *Annual Meeting of the Society of Exploration Geophysicists, Special Honorarium for H. Frank Morrison*, October, Dallas, TX.
- Alumbaugh, D. L., and Mallan, R., 2003, The effects of anisotropy on 3D single well imaging, Presented at the *Progress in Electromagnetics Research Symposium*, October, Honolulu, HI.
- Alumbaugh, D. L., and Wilt, M. J., 2000, Improved reservoir characterization and monitoring using electromagnetic geophysical techniques, *The International Symposium on Optical Science and Technology (SPIE Annual Meeting)*, July-August, 2000, San Diego, CA.
- Alumbaugh, D.L., and Newman, G.A., 1997, Electromagnetic inversion for environmental site characterization: data quality versus image resolution; *Proceedings of the European Environmental and Engineering Geophysical Society's Annual Meeting*, Aarhus, Denmark, 127-130.

Contributed Papers at Conferences, Symposia, and Workshops (Since 2005):

- Velasco, M., Schnetzler, E., and Alumbaugh, D., 2016, Multimeasurement exploration and interpretation in the southern Rocky Mountains; presented at the *Annual Meeting of the Society of Exploration Geophysicists*, October, Dallas, TX.
- Wilt, M., Chen, J., Alumbaugh, D., and Rahmani, A., 2013, Dipole magnetics: using low frequency controlled-source EM to map magnetic anomalies; presented at the *Annual Meeting of the Society of Exploration Geophysicists*, October, Houston, TX.
- Alumbaugh D., Hoversten M., Stefani J. and Thacher, C, 2013, A 3D model study to investigate EM imaging of sub-basalt structures in a deep water environment; presented at the *Annual Meeting of the Society of Exploration Geophysicists*, October, Houston, TX.
- Beer, R., Zhang, P., Alumbaugh, D., and Nalonnil, A. 2010, Anisotropy modeling and inversions of DeepLook-EM data from Brazil; presented at the *Annual meeting of the Society of Exploration Geophysicists*, October, Denver, CO.
- Um, E. S., Alumbaugh, D. L., and Harris, J., 2010, A Lorenz-gauged finite element solution for transient CSEM modeling; presented at the *2010 Annual Meeting of the Society of Exploration Geophysicists*, October, Denver, CO.
- Cuevas, N., Alumbaugh, D., and Chen, J., 2010, 1D layered resolution analysis of two marine EM exploration methods, presented at the *Annual Meeting of the European Association of Geophysical Engineers*, June, Barcelona, Spain.
- Cuevas, N., Alumbaugh, D., and Morrison, H. F., 2009, Analytical solutions to the thin resistor electromagnetic problem, presented at the *Annual Meeting of the European Association of Geophysical Engineers*, May, Amsterdam, the Netherlands.
- Chen, J., and Alumbaugh, D., 2009, Three methods for mitigating airwaves in shallow water marine CSEM data, presented at the *Annual Meeting of the Society of Exploration Geophysicists*, November, Houston, TX.
- Cuevas, N., and Alumbaugh, D., 2009, Near source response of a resistive layer to vertical electric dipole excitation, presented at the *Annual Meeting of the Society of Exploration Geophysicists*, November, Houston, TX.

- Um, E., Harris, J., and Alumbaugh, D., 2009, A finite element algorithm for 3-D transient electromagnetic modeling, presented at the *Annual Meeting of the Society of Exploration Geophysicists*, November, Houston, TX.
- Gao, G., Alumbaugh, D., Zhang, P., Zhang, H., Levesque, C., Rosthal, R., Liu, J., Abubakar, A., and Habashy, T., 2008, Practical implications of nonlinear inversion for cross-well electromagnetic data collected in cased-wells; presented at the *Annual Meeting of the Society of Exploration Geophysicists*, October, Las Vegas, NV.
- Liu, J., Abubakar, A., Habashy, T., Alumbaugh, D., Nichols, E., and Gao, G., 2008, Nonlinear inversion approaches for cross-well electromagnetic data collected in cased-wells; presented at the *Annual Meeting of the Society of Exploration Geophysicists*, October, Las Vegas, NV.
- Weitemeyer, K., Constable, S., and Alumbaugh, D., 2007, Electromagnetic studies of hydrates and accretionary structures at Hydrate Ridge, Oregon using 2.5D model studies; presented at the *Fall Meeting of the American Geophysical Union*, December, San Francisco, CA.
- Gao, G., Alumbaugh, D., Chen, J., and Eyl, K., 2007, Resolution and uncertainty analysis for marine CSEM and cross-well EM imaging; presented at the *Annual Meeting of the Society of Exploration Geophysicists*, September, San Antonio, Tx.
- Hoversten, G. M., Rosen, T., Hokstad, K., Alumbaugh, D. L., Horne, S., and Newman, G. A., 2006, Integration of multiple electromagnetic imaging and inversion techniques for prospect evaluation; presented at the *Annual Meeting of the Society of Exploration Geophysicists*, October, New Orleans, LA.
- Abubakar, A., Habashy, T., Druskin, V., Alumbaugh, D., Zerilli, A., and Knizhnerman, L., 2006, Two-and-half-dimensional forward and inverse modeling for marine CSEM problems; presented at the *Annual Meeting of the Society of Exploration Geophysicists*, October, New Orleans, LA.
- Alumbaugh, D. L., Wilt, M., Zhang, P., Chen, J., Denacalara, H., and Little, J., 2005, Crosswell electromagnetic imaging for subsurface fluid monitoring; presented at the *Fall Meeting of the American Geophysical Union*, December, San Francisco, CA.
- Wilt, M., Alumbaugh, D., and Tseng, H., 2005, Surface to borehole EM for shallow site investigations; presented at the *Fall Meeting of the American Geophysical Union*, December, San Francisco, CA.
- Staab, D. A., Edil, T. B., Alumbaugh, D. L., and Porbaha, A., 2005, Geophysical Evaluation of Cement-Mixed Columns; Deep Mixing 05, *Proceedings of the International Conference on Deep Mixing Best Practice and Recent Advances*, Stockholm, Sweden.
- Abubakar, A., Habashy, T., Druskin, V., Alumbaugh, D., Zhang, P., Wilt, M., Denacalara, H., Nichols, E., and Knizhnerman, L., 2005, A fast and rigorous 2.5D inversion algorithm for crosswell electromagnetic data; presented at the *Annual Meeting of the Society of Exploration Geophysicists*, November, Houston, Tx.
- Um, E., and Alumbaugh, D., 2005, On the physics of the marine-time-domain controlled source electromagnetic method for detecting hydrocarbon reservoirs; presented at the *Annual Meeting of the Society of Exploration Geophysicists*, November, Houston, Tx.

Granted Patents

- Patent Number US 9268052 B2, Method and system of using a data weighted electromagnetic source for time-lapse monitoring of a reservoir production or hydraulic fracturing; Inventors - Hoversten, G. M., Brow, V. C., and Alumbaugh, D. L., Granted February 23, 2016.
- Patent Number US 8614578 B2, Attenuation of electromagnetic signals passing through conductive material; Inventors - Gao, G., Morrison, H. F., Zhang, H., Rosthal, R. A., Alumbaugh, D., and Levesque, C., Granted December 24, 2013.
- Patent Number US 8332191 B2, Correction factors for electromagnetic measurements made through conductive material; Inventors - Rosthal, R. A., Zhang, H., Levesque, C., Gao, G., Morrison, H. F., and Alumbaugh, D. L., Granted December 11, 2012.
- Patent Number US 8115491 B2, Providing a tow cable having plural electromagnetic receivers and one or more electromagnetic sources; Inventors - Alumbaugh, D. L., Gao, G., Habashy, T. M., Morrison, H. F., Oristaglio, M., Safinya, K., and Zerilli, A., Granted February 14, 2012.
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