**MICHAEL K. McCARTER**

**ACADEMIC VITA (Current as of 2017)**

**Summary of Experience:**

* Ten years of experience in industry, primarily related to open pit mining
* Forty two years of experience in academia, 37 years in tenure-track position.
* Twenty-eight years of service in academic administration
* National reputation as an educator, awards received in 1999 and 2004
* Licensed Professional Engineer State of Utah

**Academic Rank**:

Professor of Mining Engineering, Department of Mining Engi­neering, College of Mines and

Earth Sciences, University of Utah, Salt Lake City, Utah.

**Education:**

B.S., Magna Cum Laude, Mining Engineering, University of Utah, Salt Lake City, Utah, June 1965;

Ph.D., Mining Engineering, University of Utah, Salt Lake City, Utah, June 1972.

**Academic Positions:**

University of Utah, Salt Lake City, Utah

 Visiting Assistant Professor 1973 – 1976

 Adjunct Associate Professor 1976 - 1978

Professor, September 1978 to present (tenured May 1981);

McKinnon Endowed Chair, July 2011 to present;

Chair, Mining Dept., July 1982 to July 2008;

Associate Dean, College of Mines and Earth Sciences, May 1990 to January 1992;

Interim Director Utah MMRRI, January 1988 to January 1989;

Associate/Acting Chair, Dept. of Mining and Fuels Engineering, May 1980 to July 1982;

**Industrial/Professional Positions:**

Kennecott Copper Corporation**,** Bingham Canyon and Salt Lake City, Utah

 Planning Engineer, March 1975 to September 1978;

Project Engineer, October 1974 to February 1975;

Geologist/Geotechnical Engineer­, January 1970 to September 1974;

Technical Aide, June 1968 to September 1968 and June 1967 to September 1967; Draftsman, June 1963 to September 1963;

Trackman, June 1962 to September 1962.

American Smelting and Refining Company, Salt Lake City, Utah

Analyst, June 1964 to September 1965 and June 1966 to September 1966.

**Research Interests:**

Mine Seismicity, Slope and Waste Embankment Stability, Explosive Compaction and Rock Blasting/Fragmentation, Mine Safety

**Honors and Awards:**

Jackling Scholarship: 1960, 1961 and 1964;

Kennecott Scholarship: 1962 and 1963

Browning Scholarship: 1965, 1966, 1967, and 1968;

Graduated Magna Cum Laude: 1965

Member, Phi Kappa Phi National Scholastic Honor Society: 1965;

President, Student AIME: 1967;

Outstanding Teaching Award (CMMI) 1979; (CMES) 2005

American Federation Distinguished Achievement Award in Earth Sciences: 1987;

Most Notable Research Publication, Minerals, Metals and Materials Society for Extraction and Processing Science, Coauthor, 1994;

Election to the Mining and Metallurgy Society of America: 1994;

International Society of Mine Safety Professionals, H. L. Boling Award: 1998;

The Old Timers Organization Annual Faculty Award (1999) for outstanding teaching skills, involvement with

students, and commitment to the development of mining engineers.

Society for Mining, Metallurgy, and Exploration, Distinguished Member Award, 2003

Rocky Mountain Coal Mining Institute, Honorary Member Status (Life Membership), for outstanding service in education 2004

Utah Mining Association, Distinguished Service Award for leadership and dedicated service to the mining industry 2008.

Team of Excellence Award for Mining Engineering (Mining Department) 2009

McKinnon Endowed Chair, 2011

SME Legion of Honor, 2014

**Consulting Activities (Present and Past):**

Rio Tinto, Barneys Canyon, geotechnical issues related to reclamation

Rio Tinto, Bingham Canyon Mine, Mine Technical Review Team (Manefay slide/on-going geotechnical issues)

Consultant to the mining industry in slope design and instrumentation, blast vibrations, safety

Rio Tinto; Slope Stability and Blasting

CONSOL, Review of Underground Mining Plans

Hanson Aggregates, Review of Safety Issues

Brush Resources, Pit Slope Stability and Blasting Analysis

FMC (Slope Stability); Northern Geophysical (Explosives Evaluation)

DYNO NOBEL (Structural Vibrations Due to Blasting)

Kennecott Corporation (Surface Mine Planning, Instrumentation and Geotechnical Evaluation)

Rocky Mountain Energy Co./Pincock, Allen and Holt (Borehole Mining Project)

Homestake Mining Co./Robertson-Pincock (Surface Mine Planning)

State of Utah, Division of Oil, Gas and Mining/Ecosystems (Review of Federal Surface Mining Regulations)

Seegmiller Associates (Review of Waste Disposal Facility for a New Mexico Uranium Mine; Design of Geotechnical Monitoring Program for Large Overseas Copper Mine)

Chair of the University Consortium Committee for review of MX impact.

 **PUBLICATIONS AND OTHER CREATIVE WORK**

**Patents:**

McCarter, M.K. and Green, D.J., "Telemetry Alarm System for Early Detec­tion of Slope Failures in Open-Pit

Mines," United States Patent No. 3,944,996, March 16, 1976.

Guruswamy, S., McCarter, M.K., and Loveless M. R., Magnetostrictive Composites and Process for

Manufacture by Explosive Compaction, United States Patent 6071357, June 6, 2000.

**Publications:**

McCarter, M.K. and K.C. Ko. 1972. "A Seismic Refraction Technique for Deline­ating Unstable Areas in Pit

Slopes," (AIME Trans.) Vol. 252, pp. 374-378.

McCarter, M.K. 1972. "A Correlation of Strength and Dynamic Properties of Some Clastic Sedimentary

Rocks," (Ph.D. Thesis, University of Utah).

McCarter, M.K. and J.E. Willson. 1973. "Correlation of Strength and Energy Dissipation in Sandstone," New

Horizons in Rock Mechanics, 14th Symposium on Rock Mechanics, ASCE, pp. 223-245.

Ko, K.C. and M.K. McCarter. 1975. "Dynamic Behavior of Pit Slopes in Response to Blasting and

Precipitation," (Application of Rock Mechanics), ASCE, pp. 363-383.

McCarter, M.K. 1975. "Open-Pit Operations Today," (Guide Book Bingham Mining District), Soc. of Econo. Geologists, pp. 17-20.

McCarter, M.K. 1976. "Monitoring Stability of High Waste Dumps," (1976 SME Fall Meeting, Denver,

Colorado).

Zavodni, Z.M. and M.K. McCarter. 1977. "Main Hill Slide Zone, Utah Copper Division," (17th Symp. for

Rock Mechanics) Monograph on Rock Mechanics Applications in Mining, AIME, pp. 84-92.

McCarter, M.K. 1977. "Application for Plane Table Photogrammetry in Open-Pit Mapping," (17th

Symp. for Rock Mechanics) Monograph on Rock Mechanics Applications in Mining, AIME, pp. 93-98.

Anderson, G.P., R.K. Davey, W.E. Hughes, M.K. McCarter, G.S. Moffat. 1977. "Timely Mine Production

Reporting and Mine Planning, Utah Copper Divi­sion's Bingham Mine" (1977 Fall Meeting, St. Louis, MO).

McCarter, M.K., and B.N. Kaliser. 1984. "Prototype Instrumentation and Monitoring Programs for

Measuring Surface Deformation Associated with Landslide Processes," Proceedings of the Specialty

Conference on Delineation of Landslide, Flash Flood and Debris Flow Hazards in Utah, Utah State

University, Logan, Utah, June 14-15, 1984, 21pp.

McCarter, M.K. 1985. "Monitoring Stability of Waste Rock Dumps," Design of Non-Impounding Mine Waste

Dumps, M.K. McCarter ed., American Institute of Mining, Metallurgical, and Petroleum Engineers, Inc.,

New York, N.Y., pp. 163-173.

McCarter, M.K., D.J. Green, and R.E. Cameron. 1985. "Real-Time Slope Monitoring using a Dedicated

Computer," AIME Annual Meeting, New York, N.Y., Preprint, 9pp.

Paul, B.C., H.M. Wells, and M.K. McCarter. 1989. "FDLC - A New Method for Underground Recovery of

Copper," International Symposium on Innovative Mining Methods, Louisville, Kentucky

Paul, B.C. and M.K. McCarter. 1989. "Source of Variability in Rock Hardness during Crater Blasting,"

Society of Explosive Engineers, New Orleans, Louisiana.

Paul, B.C., H.Y. Sohn, and M.K. McCarter.1989. "Model for Bacterial Leaching of Copper Ores Containing

a Variety of Sulfide Minerals," Metallurgical Processes for the Year 2000 and Beyond, AIME Annual

Meeting, Las Vegas, Nevada. Published 1992, Metal. Trans. B, vol. 23B, pp 537-555.

Paul, B.C., J.A. Procarione, and M.K. McCarter. 1989. "Prediction of Air Flows Through Broken Rock

Using Finite Difference Grids," Fourth U.S. Mine Ventilation Symposium, Berkeley, California.

McCarter, M.K. 1990. "Design and Operating Considerations for Mine Waste Dumps," Surface Mining, 2nd

Edition, Bruce A. Kennedy, ed., Society for Mining, Metallurgy, and Exploration, Inc., Littleton, CO,

pp 890-900.

Guruswamy, S., M.K. McCarter, and M.E. Wadsworth. 1991. "Explosive Compaction of Metal Deuterides

and Metal Matrix-Al2O3 Composites", Advances in Powder Metallurgy, Vol. 6., MPIF.

McCarter, M.K. et al, 1992, "Surface Mining: Mechanical Extraction" SME Mining Engineering Handbook,

Society for Mining, Metallurgy, and Exploration, Inc., Littleton, CO, pp 1365-1452.

Eaton, C., D. Kupfer., M.K. McCarter, and S. Swanson. 1992. "Biomechanics and Prevention of Ring Avulsion

Injury", presented at the American Society for Surgery of the Hand, 47th Annual Meeting, Nov. 1992.

Kim, D.S. and M.K. McCarter. 1993. "Assessment of Damage in Rock Subjected to Shock Loading",

International Society of Explosive Engineers, 9th Annual Research Symposium, San Diego CA,

pp 163-177.

McCarter, M.K. and D.S. Kim. 1993. "Effect of Shock Wave Induced Damage on Subsequent Comminution

of Rock Materials," 4th International Symposium for Fragmentation by Explosives, Technical University,

Vienna, pp 63-69.

McCarter, M.K. 1996. Effect of Blast Preconditioning on Comminution for Selected Rock Types, Proceedings

of the Twelfth Symposium on Explosives and Blasting Research, ISEE, Orlando, FA, pp 119-129.

Guruswamy, S., M. K. McCarter, J. Shield, and V. Panchanathan. 1996. Explosive Compaction of

Magnequench Nd-Fe-B Magnetic Powders, Journal of Applied Physics, Vol. 79, No. 8, April 1996 Issue, pp 4851-4853.

Kim, D.S. and M.K. McCarter. 1998. Quantitative Assessment of Extrinsic Damage in Rock Materials, Rock Mechanics and Rock Engineering, 31(1), pp 43-62.

Arabasz, W. J. and M. K. McCarter. 2000. Mine Seismicity and the Interface between Mining Engineers and

Seismologists, [abs.]: Seismological Research Letters 71 (2), 220.

Guruswamy, S., M. Loveless, N. Srisukhumbowornchai, M. McCarter and J. Teter. 2000. Processing of Terfenol-D Alloy Based Magnetostrictive Composits by Dynamic Compaction, IEEE Transactions on Magnetics, Vol. 36, No. 5, Sept. 2000, pp 3219-3222.

Arabasz, W.J, J. C. Pechmann, and M. K. McCarter. 2001. Mechanisms and Ground-Truth Observations for the

largest (ML = 3.0-4.2) Coal-Mining-Induced Seismic Events in Utah, 1978-2000 [abs.]: EOS, Trans. Am.

Geophys. Union 81 (48) Fall Meet. Suppl., S71C-10, F869.

Arabasz, W. J., J. Ake, M. K. McCarter, A. McGarr, S. J. Nava, and K. L. Pankow. 2002. Coal Mining Seismicity

in the Trail Mountain Area, Utah: Part I - Case Study for Assessing Ground-shaking Hazard [abs.]: EOS,

Trans. Am. Geophys. Union 83 (47), Fall Meet. Suppl., S12A-1170, F1051.

Arabasz, W. J., S. J. Nava, M. K. McCarter, and K. L. Pankow - With contributions from J. C. Pechmann, M. E.

Jensen, and J. D. McKenzie. 2002. Ground-Motion Recording and Analysis of Mining-Induced Seismicity in

the Trail Mountain Area, Emery County, Utah. [http://www.seis.utah.edu/Reports/sitla2002a/toc.shtml ]

Meng, X, W.A. Hustrulid,, and M.K. McCarter. 2005. Some New Insights on Borehole Wall Pressure when using Decoupled Charges, Proceedings, 31st Annual ISEE Conference on Explosives and Blasting Technique, Vol. 1, Orlando, Feb 6-9.

Arabasz, W. J., S.J. Nava, M.K. McCarter, K.L. Pankow, J.C. Pechmann, J. Ake, and A. McGarr. 2005. Coal-Mining Seismicity and Ground-Shaking Hazard: A Case Study in the Trail Mountain Area, Emery County, Utah; Bulletin of the Seismological Society of America, Vol 95, No. 2. pp. 18-30, Feb. 2005.

Corson, R. P., S. Guruswamy, and M. K. McCarter. 2005. Preparation of Magnetic Fe-Zn Alloys by Explosive Compaction, Sixth Global Symposium on Materials Processing and Manufacturing Innovation, TMS (The Minerals, Metals & Materials Society), Ed. Thomas R. Bieler and James W. Sears,

Guduru, R.K., R.O. Scattergood, C.C. Koch, K.L. Murty, S. Guruswamy and M.K. McCarter. 2006. Mechanical Properties of Nanocrystalline Fe-Pb and Fe-Al2O3. Scripta Materialia. Vol 54, Issue 11, pp. 1879-1883.

McCarter, M.K. 2007. Mining Faculty in the United States: current status and sustainability. Mining

 Engineering a Publication of SME. Vol. 59, No. 9. pp. 28-33.

Pechman, J. C., W.A. Arabasz, K.L. Pankow, R. Burlacu, M.K. McCarter. 2008. Seismological Report on the 6 August 2007 Crandall Canyon Mine Collapse, Seismological Research Letters, May 2, 2008.

Pankow, K.L., M.K. McCarter, W.A. Arabasz, and R. Burlacu. 2008. Coal-Mining-Induced Seismicity in Utah – Improving Spatial Resolution Using Double-difference Relocations. (27th Conference on Ground Control in Mining, Morgantown, WV, July 29, 2008)

Pariseau, W.G., M.K. McCarter and J.D. McKenzie. 2008. Inter-Panel Barrier Pillar Study in a Deep Utah Coal Mine. (42nd U.S. Rock Mechanics Symposium and 2nd U.S. Canada Rock Mechanics Symposium, San Francisco, CA)

Hanafy, S.M., W. Cao, M.K. McCarter and G.T. Schuster. 2008. Using Super-stacking and Super-resolution Properties of Time Reversal Mirrors to Locate Trapped Miners, Leading Edge Journal.

Sonley, E, K.L. Pankow and M.K. McCarter. 2009. Trail Mountain Mine: A Case Study for Improving Locations of Mining-Induced Seismicity with double Difference Relocation. 28th Conference on Ground Control in Mining, Morgantown, WV, July 28, 2009.

McCarter, M.K., 2010. Water Infusion for Bump Control – Laboratory Feasibility Tests on Utah Coal (ARMA Proceedings on CD).

Pankow, K.L. and M.K. McCarter. 2010, Improving Hypocentral Locations of Induced Seismicity in the Wasatch Plateau – Book Cliffs Coal Mining Region, Central Utah, USA

Warner, J.W., P.J. Phipps, M.K. McCarter and K.L. Pankow. 2010. Monitoring Post Collapse Seismicity – An Analysis of Crandall Canyon Events

Kubacki, Tex, M.K. McCarter, K.L. Pankow. 2012. Analysis of Mining-Induced Seismicity of the Crandall Canyon Mine Collapse Using Double Difference Relocations, **Proceedings 31st ICGCM,** p. 217 – 220.

Boltz, Megan, K.L. Pankow, M.K. McCarter. 2012. Reevaluation of Trail Mountain Seismicity (31st ICGMC).

Ramanathan, M, B. Saha, C. Ren, S. Guruswamy and M. McCarter. 2012. Influence of Magnetization on the Hydrogen Embrittlement Behavior in AISI 4340 Steel, Proceedings Energy Technology 2012, The Minerals, Metal and Materials Society.

Boltz, M.S., T.M. Kubacki, D. Chambers, K.M. Whidden, K.L. Pankow, K.D. Koper, M.K. McCarter. 2013. Analysis of Mining-Induced Seismicity at Central Utah Coal Mines, Seismological Society of America, Poster Session.

Boltz, M.S., K.L. Pankow, and M.K. McCarter. 2013. Fine Details of Mining-Induced Seismicity at the Trail Mountain Mine using modified hypocentral relocation techniques. **Bulletin Seismological Society of America**, 104(1). Accessed February 2014. Doi 10.1785/0120130011.

Kubacki, T.M., K.D. Koper, K.L. Pankow, M.K. McCarter. 2013. Cross-Correlation Detection of Seismic Events Related to the Crandall Canyon Collapse, **Proceedings 32nd ICGCM**, p 119 - 124

Pankow, K.L., J.R. Moore, J.M. Hale, K.D. Koper, T.K. Kubacki, K.M. Whidden, M.K. McCarter. 2014. Massive Landslide at Utah Copper Mine Generates Wealth of Geophysical Data, **GSA Today** Jan. 2014, Vol. 24, No. 1. P 4- 9.

Wempen, J., M. K. McCarter. 2014. Time Dependent Mining-Induced Subsidence Measured by Differential Interferometric Synthetic Aperture Radar, P**roceedings**  **33rd ICGCM,** p. 209 - 215

Kubacki, T., K.D. Koper, K.L. Pankow and M.K. McCarter, 2014. Changes in mining-induced seismicity before and after the 2007 Crandall Canyon Mine collapse. *Journal of Geophysical Research: Solid Earth*. 119,doi: 10.1002/2014JB011037.

Stein, J.R., K.L. Pankow, K.D. Koper, M.K. McCarter, 2014. Relocation and Clustering Analysis Used to Discriminate Between mining Induced and natural Tectonic Seismicity in the Wasatch Plateau Region of Central Utah, AGU abstract (poster).

Pankow, K.D., T. Kubacki, K.D. Koper, K. Whidden, J.R. Moore, and M.K. McCarter. 2014. Induced

 Earthquakes from the 2013 Bingham Canyon Landslides, GSA Abstracts Vol. 46, No. 6 (245025) and oral

 Presentation by Pankow, Vancouver, BC

Chambers, D.J.A., J.M. Wempen, M.K. McCarter, K.L. Pankow and K.D. Koper, 2015. Correlation of Newly Detected Mining Induced Seismicity with Subsidence in a Wyoming Mining District. SME Annual Meeting,. Denver, Colorado, presentation and pre-print.

Pariseau, W.G. and M.K. McCarter, 2015. Rock Mechanics of Tabular Deposits – A Computational Challenge, accepted for presentation and inclusion in proceedings, APCOM, Fairbanks, Alaska.

Chambers, D.J.A., M.K. McCarter, K.D. Koper, and K.L. Pankow. 2015. Application of Regional Subspace Detection to Identify Mining Related Seismicity. **Proceedings 34th ICGCM,** p. 293 – 298.

Chambers, D., K.D. Koper, K.L. Pankow, and M.K. McCarter. (2015). Detecting and characterizing coal mine related seismicity in the Western U.S. using subspace methods, Geophys. J. Intl., 203, p. 1388-1399.

Stein, J.R., K.L. Pankow, K.D. Koper, and M.K. McCarter. 2015. Discriminating Mining Induced Seismicity from Natural Tectonic Earthquakes in the Wasatch Plateau Region of Central Utah. Proceedings 34th ICGCM, p. 318 – 321.

Wempen, J.M., M.K. McCarter. 2016. Comparison of L-band and X-band SAR Interferometry for Subsidence Monitoring in Central Utah. Proceedings 35th ICGCM, p. 316 – 321.

Pariseau, W.G., M.K. McCarter. 2016. Whole-Mine Subsidence over Tabular Deposits and Related Seismicity, Proceedings 34th ICGCM, p. 322 – 331.

Tucker, S.A., M.K. McCarter, and R.K. Rajamani. 2017. Blast Design and Mill Performance – a Case History, Proceedings, 43rd Annual Conference on Explosives & Blasting Technique, Orlando, FL, Jan. 29-Feb 1, 2017, pp. 1-10.

Wempen, J.M. and M.K. McCarter, 2017. Effective Application of synthetic Aperture Radar Interferometry for Monitoring Mine Subsidence in the Mountain West United States, Preprint 17-049, SME Annual meeting Feb. 19-22, Denver, CO. pp. 1-4.

**EDITORSHIP**:

Open Pit Mine Planning and Design, 1979, Section 2A, "Development Drilling" and Section 2B, "Mineral

Block Models," American Institute of Mining, Metallurgy, and Petroleum Engineers, New York, N.Y.,

pp 23-80.

Design of Non-Impounding Mine Waste Dumps, 1985, American Institute of Mining, Metallurgy, and

Petroleum Engineers, New York, N.Y., 216pp.

Mining Engineering Handbook, 1992, Section 14, American Institute of Mining, Metallurgy and Petroleum Engineers, pp. 1365-1452 and pp. A35-40.

Proceedings, Twenty-Eighth Annual Institute on Mining Health, Safety and Research, Virginia Polytechnic Institute and State University, 1997, 189pp.

Proceedings, Thirtieth Annual Institute on Mining Health, Safety and Research, Virginia Polytechnic Institute and State University, 1999, 116pp.

Slope Stability in Surface Mines, Society for Mining, Metallurgy and Exploration, Inc., with William A.

 Hustrulid and Dirk J.A. VanZyl, 2001, 456 pp.

Proceedings, Thirty Second Annual Institute on Mining Health, Safety and Research, University of Utah, 2001, 193pp.

Proceedings, Thirty Third Annual Institute on Mining Health, Safety and Research, Virginia Polytechnic

 Institute and State University, 2002, 152 pp

**PROFESSIONAL AND PUBLIC SERVICE**

**Professional Affiliations:**

Member of AIME/SME, Society of Mining Metallurgy and Exploration Inc.

Member of ARMA, American Rock Mechanics Association

Member of RMCMI, Rocky Mountain Coal Mining Institute,

Member of ISEE, International Society of Explosives Engineers.

Member of UMA, Utah Mining Association

Member of MMSA, the Mining and Metallurgy Society of America

Member of SSA, Seismological Society of America

**Served as:**

Utah Section AIME Arrangements Chair 1979/80

Associate Student Section Advisor

Secretary of the Utah Section 1980/81, 1981/82

Member of SME-AIME Accreditation Committee, 1980, 1981

Vice Chair of SME-AIME Accreditation Committee 1982

Chair of SME-AIME Educational Issues Committee 1983

Member of SME-AIME Educational Issues Committee 1991/92

Member of SME-AIME Educational Planning Committee, 1982

Member of ISRM, Commission on Design of High Slopes in Mining, 1983

Vice Chair of SME-AIME Utah Section 1982/83, 1983/84

Chair of SME-AIME Utah Section 1984/85

Utah Section Executive Committee 1985/86,1986/87,1987/88

Member SME Student Affairs Committee 1988/89, 1989/90,1990/91

Vice Chair SME Student Affairs Committee 1990/91

Chair SME Student Affairs Committee 1991/92, 1992/93

Member SME Coal Division Scholarship Committee 1987/88 - 1990/91

Vice Chair of SME Council of Education 1990/91

Chair SME Council of Education 1991/92, 1992/93

Chair SME Department Heads Forum 1992/93, 2005

Chair Educator's Forum 1991/92, 1992/93

Appointed Member-at-Large SME Committee on Educational Quality 1992/93

Chairman M&E Division, Outstanding Young Professional Award Committee, 1995, 1996.

Member-at-Large, SME Accreditation and Curricular Issues Subcommittee, 1997

Chair, Salt Lake Section, Mining and Metallurgical Society of America, 1996,1997

Counselor, Salt Lake Section, Mining and Metallurgical Society of America, 1998 - present

Co-chair, Institute on Mining Health, Safety and Research,1998 - 2004.

Member MMSA Educational Advisory Committee, 1999 - 2008

Member AIME, Teaching Award Committee, 2001 - 2008

Member-at-Large, SME Research Committee, 2002 - 2005

Member SME Task Force on Mining Education 2004 - 2008

Continuing Education Chair/co-Chair for RMCMI 2005 – 2008

American Rock Mechanics Association (ARMA) Session co-chair 2013, 2015.

Organizing Committee, ICGCM (International Conference for Ground Control in Mining 2012 – present

Technical paper reviewer for ARMA 2013 - present

Technical paper reviewer for ICGCM 2012 - present

Technical paper reviewer for International Fragblast 2015 – present

Technical paper reviewer for Tectonophysics 2016

Research proposal reviewer for ICCI (Illinois Clean Coal Institute) 2011 -2015

**National Science Foundation/National Academies:**

Reviewer for National Research Council, Site Visit Spokane Research Laboratory, NIOSH, 2000

National Academies Review Committee for NIOSH Mining Program - 2006

**State of Utah**

Chair of Technical Advisory Committee Utah Mine Safety Commission – 2007

Voting member, Technical Advisory Committee, Utah Labor Commission – Office of Coal Mine Safety

 2009 – present

 **TEACHING RESPONSIBILITIES/ASSIGNMENTS**

**Undergraduate Courses Offered During Past Five Years:**

Course

MGEN 2200 Utah Mining History (guest lecturer, one lecture per semester)

MGEN 2400 Introductory Surveying - Surveying Labs (Multiple Sections)

MGEN 3010/3015 Introduction to Mining (Shared lecture responsibility and field trip supervisor)

MGEN 3400 Mine Surveying

MGEN 5020 Surface Mining Methods

MGEN 5120 Surface Mine Design

 MGEN 5550 Explosives and Rock Blasting

Mining Eng. 5980 Special Topics

Mining Eng. 5970 Intern Program

**Graduate Students Supervised:**

Jebner Zambrana, M.E., 1980, Forecasting Technique in the Minerals Industry

Lynn Partington, M.S., 1981, Strength Measurements in Rock Using Two Boreholes

Jeff Tygesen, M.S.,1982,Laser Monitoring System

Khosrow Bakhtar, Ph.D., 1985, Large Scale Behavior of Rock Joints

Bradley Paul, Ph.D, 1989, Flood, Drain, Leach Mining System

Wade Barnes, M.S., 1989, Comparison of Methods for Estimating Reserves

Geoffrey Bedell, M.S., 1990, Effect of Macrofractures on Fragmentation by Explosives

Dal Sun Kim, Ph.D., 1993, Effect of High-Strain-Rate Damage on Comminution of Rock

Kyle Free, M.S., 2000, Prediction of Energy Requirements for Comminution

 Erik Fetzer, M.S , 2001, Far-Field Air Overpressure Prediction

Amanda Smith, M.S., 2003, Modified Holmberg-Persson Approach to Predict Blast Damage

Ajay Kumar, M.E., 2006, Modeling Grade and Ore Types in Leachpads and Stockpiles

Jeffrey Johnson, Ph.D., 2010, The Hustrulid Bar – A Dynamic Strength Test and its Application to the

 Cautious Blasting of Rock

Changshou Sun, Ph.D., 2013, Damage Zone Prediction for Bock Blasting

Kirk Erickson, M.S., 2013, Investigating the Extent of Damage from a Single Blasthole

Tex Kubacki, M.S., 2014, Changes in Mining Induced Seismicity before and after the Crandall Canyon Mine

 Collapse

Meagan Bolts, M.S., 2014, Mining-induced Seismicity and FLAC3D Modeling at the Trail Mountain Mine.

Solomon Tucker, Ph.D., 2015, An Evaluation of the Effect of Blast-Generated Fragment Size Distribution on

 the Unit costs of a Mining Operation, Using Modeling and Simulation Techniques.

Derrick Chambers, M.S., 2015, Induced Seismicity Related to Coal and/or Trona Mining.

Jessica Wempen, Ph.D., DInSAR Subsidence Correlation with MIS, expected 2016

Fitra Ismaya, Ph.D., Coal Mine Subsidence using DInSAR, expected 2016

Brady Nielson, M.S. Blast Optimization, expected 2016.

**University, College and Department Service**

University Conflict of Interest Committee 2008- 2012

University Seed-Grant proposal reviewer 2010 – 2014

University Student Fee Scholarship Committee 2014 - 2015

College Council 2010-2011

College Faculty Relations Committee 2010-2017

College McGregor Library Committee 2010-2014

College Teaching Awards Committee 2010-2011

College Loan Committee 2011- 2013

College Strategic Recruitment Plan 2012-2013

Department RPT Committee member and Chair 2010 to present

Department Faculty Search Committee Chair 2014-2016

College of Mines and Earth Sciences Dean search 2015-2016

Department Faculty Search Committee Member 2016-present

FUNDED RESEARCH

Dates Funding Agency Title of Grant

2016 - 2021 NIOSH Spokane Research Lab MIS Analysis and DInSAR Measurements – Tools for

 Improving Mine Ground Control Safety with Jessica

 Wempen and Keith Koper

2011 - 2016 NIOSH Spokane Research Lab Analysis of Mine Seismicity and Geotechnical Modeling

For Improved Safety in Underground Coal Mines with Kristine Pankow and William Pariseau

2010 Brush Resources Preliminary Blasting Study

2008 – 2009 NIOSH Spokane Research Lab Recommendations for Deep Retreat Coal Mine

 Safety with W.A. Arabasz, K. L. Pankow,

 M.G. Nelson, M.C. Chapman

2007 – 2008 NIOSH Spokane Research Lab Effect of Water on Coal Strength

2005 – 2007 BLM Solid Minerals Branch Recovering Coal Resources from Deep Deposits

 – participation by W. G. Pariseau

2006 J. Fredrick Personal Emergency Stop – Review of MSHA

 Injury reports

2004 – 2006 NIOSH Spokane Research Lab Nondestructive Measurement of Rock Damage

1996 – 1997 Mineral Leasing Rate Effects in Uniaxial Compression of Coal

1995 – 1996 Dyno Nobel Far-Field, Real-Time Airblast Monitoring

1994 – 1995 Mineral Leasing Evaluation of Explosive Preconditioning Benefits

1993 – 1994 Comminution Center USBM Effect of Blast Damage on Comminution of

 Rock

1991 – 1993 Comminution Center USBM Effect of Blast-Induced Damage on Comminution

 of Rock Materials Using a Split Hopkinson Bar

1987 – 1991 IRECO Fragmentation Laboratory (Equipment)

1987 – 1989 Mineral Leasing Verification of Blast Initiation Sequencing

 (Equipment)

1986 – 1987 Mineral Leasing Expendable Convergence Meter

1985 – 1986 Research Support Committee High Speed Photographic System (Equipment)

1985 – 1986 Comminution Center USBM Evaluation of Field Parameters Controlling

 Explosive Fragmentation with W.G. Pariseau

 Co-investigator

1984 – 1986 State of Utah UGMS Landslide Instrumentation

1984 - 1985 Salt Lake County Development of Telemetry Equipment for

 Emigration Canyon Landslides

1983 – 1985 FEMA/Davis County Rudd Creek Monitoring System

1983 – 1984 SLC County Reynolds Gulch Monitoring System

1981 – 1982 Chevron Grant Scale Effects on Rock Deformability in

 Boreholes

1980 – 1981 Kennecott Corporation Ground Settlement Monitoring System

1980 – 1981 Mineral Leasing Design and Construction of Beam Detectors

 For Laser Monitoring System

1979 – 1981 Office of Surface Mining In situ Shear Strength of Rock in Open Pit

 Benches with W.A. Hustrulid Co-investigator

1979 – 1980 MMRRI Open Pit-Limit Simulation (Equipment)

1979 – 1980 MMRRI Settlement Monitoring System for Mine Waste

 Embankments (Equipment)