

STANLEY M. HOWARD

ADDRESS

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Department of Materials and Metallurgical Engineering
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EDUCATION and CERTIFICATIONS

- BS. Metallurgical Engineering, Colorado School of Mines, Golden, CO (1967)
- Ph.D. Metallurgical Engineering (Minor - Chemical Petroleum Refining Engineering), Colorado School of Mines, Golden, CO (1971)
- PE Registered Professional Engineer (SD #2219)

PROFESSIONAL EXPERIENCE

1971 - present	Department of Materials and Metallurgical Engineering Assistant Professor (1971 - 75), Associate Professor (1975 - 81) Professor (1981-2014), Chair (1994-2000) Emeritus and Senior Lecturer (2014- present) South Dakota School of Mines & Technology; Rapid City, SD
2004 - 2007	Yucca Mountain Project, Consultant/Auditor DOE Contractor (BSE/Longenecker) Summerlin, NV
2003 - 2004	Division of Metals and Ceramics - Consultant Oak Ridge National Laboratory Oak Ridge, TN
1992 - 2001	Caterpillar Corporation - Consultant Technical Center Peoria, IL
1988 - 1991	Electronic Manufacturing & Production Facility - Consultant U. S. Department of the Navy Ridgecrest, CA
1986 - 1987	Kerr-McGee Corporation - Consultant Oklahoma City, OK
1981 - 1988	Group V Metals, Inc. - President (81 - 84), Vice President (84 - 88) Rapid City, South Dakota
1977 - 1982	Mintech, Inc. - President (77 - 82) Rapid City, South Dakota
1976 - 1977	Stanford Research Center - NSF Visiting Scientist Menlo Park, CA
1967 - 1971	Department of Metallurgical Engineering - Research Fellow Colorado School of Mines Golden, CO
1967 sum.	Atomic Weapons Division - Engineer Dow Chemical Company Golden, CO
1966 sum.	Kennecott Research Center - Engineer Assistant Kennecott Copper Corporation Salt Lake City, UT
1960 - 1966	Surface Water Division - Hydrological Engineer Assistant U. S. Geological Survey Cheyenne, WY

ENGINEERING COMPANY AFFILIATIONS

- Mintech, Inc.
Rapid City, SD(1980) Corrosion Engineering Services
President (1980-84)
- Group V Metals, Inc.
Spearfish, SD Research, Development, and commercial licensing/production
of Nb and Ta metal and high purity (5n+) Nb and Ta oxides
President (1981-4)
Vice President (1985-8)

AREAS OF PROFESSIONAL ACTIVITY

- Computer Modeling
- High-Temperature Gas-Solid Reactors with Nucleation
- Three-Dimensional Unsteady-State Anisotropic Heat Transfer Models with Fusion
- High-Temperature Thermodynamics
 Activities and Enthalpies in Liquid Metallic Solutions
- Phase Equilibria in Metallurgical Systems
- Corrosion in Aqueous Media - Corrosion in Geothermal Waters, High-Purity Water Systems
- Gas-Solid Corrosion at High Temperatures
- Stress Corrosion Cracking of Nuclear Reactor Fuel Rods - Fission Products Effect on Zircaloy
- Chlorination Metallurgy
 Extraction of Refractory Metals
 Production of High-Purity Refractory Oxides and Chlorides
 Precious Metal Extraction
- Direct Laser Deposition
- Friction Stir Welding
- Kinetics of High-Temperature Reactions
 Gas-Solid Reactions, Vapor-Transport Mechanisms, Toxic Emissions Control by Homogeneous
 Gas-Phase Reaction
- Process Control - Carburization
- Alloy Development - High-strength, high-conductivity alloys
- Distance Learning - Internet-deliverable and tracked Instructional Modules

SHORT COURSES PRESENTED

- *Corrosion Control and Prevention*, South Dakota School of Mines & Technology, Rapid City (1976)
- *Recovery and Sampling of Secondary Precious Metals*, U. S. Department of Defense Sponsored, South Dakota School of Mines and Technology, Rapid City (1987)
- *Recovery and Sampling of Secondary Precious Metals*, U. S. Department of Defense Sponsored, South Dakota School of Mines and Technology, Rapid City (1988)
- *Personal Computer Applications in Materials and Metallurgical Engineering*, The Minerals, Metals, and Materials Society Annual Meeting, Anaheim (1990)
- *Personal Computer Applications for Metals and Materials Engineering*, The Minerals, Metals, and Materials Society Annual Meeting, New Orleans (1991)
- *Computer Software and Methods in Metallurgical and Materials Engineering*, The Minerals, Metals, and Materials Society Annual Meeting, San Francisco (1994)

COURSES TAUGHT

Graduate

- Advanced Chemical Metallurgy
- Advanced Simulation Techniques
- Thermodynamics of Solids
- Steelmaking

Undergraduate

- Freshman Engineering
- Properties of Materials & Physical Metallurgy I
- FORTRAN Programming
- Programming (BASIC, FORTRAN, VBA)
- Metallurgical Thermodynamics
- Extractive Metallurgy I, II
- Engineering Economics
- Applied Numerical Methods
- Introduction to Material Science
- Transport Phenomena in Metallurgical Eng
- Engineering Fundamentals I & II
- Process Control, Optimization, and Modeling
- Engineering Design

HONORS AND HONORARY SOCIETIES

- AIME Oral History Designee, 2019
- AIME Outstanding Educator Award, 2004
- Research Award: The Santa Fe Symposium on Jewelry Manufacturing Technology, May 1996
- Benard A. Ennenga Faculty Award: South Dakota School of Mines and Technology, 1993-4
- Presidential Award: South Dakota School of Mines & Technology; Rapid City, SD, 1994
- Alpha Sigma Mu Honorary Society, 1966
- The Society of Sigma Xi, 1970
- Honored Guest: Kroll Institute Dedication; Golden, CO, 1974

PROFESSIONAL SERVICE, ORGANIZATIONS

- TMS: The Metals Materials, and Minerals Society
 - Presidential Cycle: Vice President (2015), President (2016), Past President (2017)
 - Foundation Board of Trustees (2014-)
 - International Affairs Committee (2015-19), chair (2018)
 - Executive Committee (2009-2012, 2014-17)
 - Material Advantage Student Chapter Advisor – SDSM&T (1990-2018)
 - Board of Directors (2006-2012)
 - Financial Planning Officer (2009-2012)
 - Financial Planning Committee (2009-2012)
 - Audit Committee Chair (2009-2012)
 - Retirement Committee Executive Board (2009-2012)
 - Professional Registration Committee (PE Exam Writer) (1990 - 2018)
 - Founding Chair of Bladesmithing Committee (2015-18)
 - EPD Publications Representative (2007-2009)
 - TMS Nominating Committee – (2004 -2008)
 - EPD Publication Committee – Chairman (2004 -2008)
 - TMS Education Committee (2002 –2007)
 - Extractive Processing Division Council Member EPD-TMS (2002-2008)
 - EPD Scholarship Selection Committee (2001 – 2008)
 - Student Affairs Committee – EPD Liaison (2001 -2004)
 - Waste Minimization Committee, Secretary (1993 – 2009)
 - Physical Chemistry of Extractive Processes Committee (1971 – 1990)
 - Board of Review Metallurgical Transactions (1973 - 81)
 - Papers and Publications Committee - Extractive Metallurgy Division (1973 - 81)
 - Physical Chemistry Committee - Extractive Metallurgy Division (Vice Chairman 1983)
 - Physical Chemistry Committee - Extractive Metallurgy Division (Secretary 1982)
 - Physical Chemistry Committee - Extractive Metallurgy Division (Chairman 1984)
 - Process Fundamentals Committee - Extractive Metallurgy Division
 - Process Flow Diagrams Sub Committee, Chairman (1986-8)
 - Session Chairmanship at Annual Meeting
 - Diffusion in Liquid Metals, Dallas (1974)
 - Thermodynamics of Alloys I, Las Vegas (1976)
 - Gas/Solid and Gas/Liquid Reactions, Denver (1978)
 - Gases in Liquid Metals, New Orleans (1979)
 - Thermodynamics II: Modeling, Chicago (1981)
 - 6th International Conference on Trends in Welding Research, Pine Mtn, GA (2002)
 - Waste Treatment Minimization Conference, Lulea, Sweden (2002)
- ASM: The Materials Information Society (1990-2018)
- The American Ceramic Society (ACeRS) (1990-2018)
- Association for Iron & Steel Technology (AIST) (1990-2018)
- The Minerals, Metals, and Materials, Society (TMS) (1966 -current)
- Hoover Award Selection Committee, AIME Representative (2008 -2011)
- The National Association of Corrosion Engineers (NACE) (2007)
- Laser Institute of America (2004)
- Alpha Sigma Mu Honorary Society
 - Board of Directors(1980 - 84)
 - National Secretary (1980 - 84)
 - Student Chapter Advisor (1980-1995)
- ASTM: American Society for Testing Materials
 - Committee on Geothermal Resources and Energy; Secretary (1979 - 82)
- ABET Metallurgical Engineering Program Assessment Consultant (2006 -)
- SD Engineering Society
- ARPA-E METALS Reviewer; Washington DC August, 2013

SHORT COURSES ATTENDED

- "Third Biennial Conference and Workshop on Computer Software for Chemical and Extractive Metallurgy Calculations," University of Missouri - Rolla (1989)
- "Facility for the Analysis of Chemical Thermodynamics," McMaster University, Hamilton, Ontario (1989)

INSTRUCTIONAL TEXTBOOKS, AND MONOGRAPHS

- S. M. Howard, Engineering Fundamentals, South Dakota School of Mines & Technology, 1974
- S. M. Howard and K. N. Han, Recovery and Sampling of Secondary Precious Metals, South Dakota School of Mines & Technology, 1986
- S. M. Howard, Process Control, Optimization, and Modeling, South Dakota School of Mines & Technology, 1986
- S. M. Howard and K. N. Han, Recovery and Sampling of Secondary Precious Metals, Industrial Technology Research Institute, Energy & Mining Research/Service Organization, Taiwan, Chinese, 1989
- S. M. Howard, Computer Applications in Metallurgical Engineering and Material Science: 1990, The Minerals, Metals, and Materials Society, Pittsburgh, PA, 1990
- S. M. Howard, Computer Applications in Metallurgical Engineering and Material Science: 1991, The Minerals, Metals, and Materials Society, Pittsburgh, PA, 1990
- S. M. Howard, Computer Software and Methods in Metallurgical and Materials Engineering, The Minerals, Metals, and Materials Society, Pittsburgh, PA, 1990
- S. M. Howard, Applied Numerical Methods On-line textbook, SDSM&T, Rapid City, SD, 2008
- S. M. Howard, Thermodynamics and Thermochemistry for Metallurgical Engineers, On-line textbook, SDSM&T, Rapid City, SD, 2010-continuing

SUMMER POSITIONS AND CONSULTING POSITIONS

- Dow Chemical Company; Atomic Energy Division; Rocky Flats, CO
- Lien Metals; Rapid City, SD
- Kennecott Copper Research Center; Salt Lake City, UT
- Stanford Research Institute; Materials Research Group; Menlo Park, CA
- Kerr McGee Corporation; Technical Center; Oklahoma City, OK
- U. S. Department of Defense, Defense Logistics Agency; Battle Creek, MI
- U. S. Department of Defense, Department of the Navy; Ridgecrest, CA
- Caterpillar Incorporated; Technical Center, Peoria, IL
- Yucca Mountain Project, Outer Barrier Corrosion Audit, Summerlin, NV (2004-7)

PATENTS

- S. M. Howard and Stone, G; "High Strength and High Electrical Conductivity Copper Alloys." US Patent #6074499. June 13, 2000
- S. M. Howard and Stone, G; "High Strength and High Electrical Conductivity Copper Alloys." US Patent #6231700. May 15, 2001

INVITED LECTURES

- Stanley M. Howard: *Educational Student Engagement Strategies through Professional Society Resources*, International 2016 Materials Education Symposium, Cambridge University, Cambridge, UK, April 6-7, 2016.
- Stanley M. Howard: *Thermodynamic of the Cu-As-S-O Systems, 3D Kellogg Diagrams*, Central South University, Changsha, China, sponsored by Dr. Zhaoguang Yang, May 15, 2015.

PUBLICATIONS AND REPORTS

Areas

- Thermodynamics of Liquid Metallic Solutions
- Corrosion in Geothermal Fluids
- Corrosion in High-Purity Water Cooling Systems
- Stress Corrosion Cracking in Fuel Rods
- Thermodynamics of Adsorption
- Generalized Gas Flow Reactor Modeling
- Carburization Modeling
- Oxygen Probes used as Nitride Probes
- Direct Laser Deposition
- Friction Stir Welding and Processing
- Ultra-high Purity Ge for the Sanford Underground Research Facility (SURF)

Titles

- S. M. Howard and J. P. Hager, and J. H. Jones: *Thermodynamic Properties of the Cu-Sn and Cu-Au Systems by Mass Spectrometry*, Metall. Trans., 1970, vol. 1, pp. 415-21

- S. M. Howard and J. P. Hager, and J. H. Jones: *Thermodynamic Properties of the Ge-Cu and Ge-Au Systems by Mass Spectrometry*, Metall. Trans., 1973, vol. 4, pp. 2383-88
- S. M. Howard and J. P. Hager: *Thermodynamic Properties of the Liquid Sn-Ge and Sn-Au System by Mass Spectrometry*, Metall. Trans. Vol. 9B, 1978, pp. 51-59
- Daniel Cubicciotti, Robin L. Jones, S. M. Howard, et al.: *Crack Formation in Zircalloys Exposed to Iodine*, EPRI-NASA Cooperative Project on Stress Corrosion Cracking of Zircalloys, NP-717, Research Project #455-1, Final Report, SRI International Menlo Park, CA, March, 1978, pp. 4.1- 4.31
- Daniel Cubicciotti, Robin L. Jones, S. M. Howard, et al.: *The Formation of Iodine Induced Stress Corrosion Cracks in Zircalloys*, Journal of Nuclear Metals, 1978, vol. 78, pp. 2-16
- S. M. Howard: *Direct Utilization of Geothermal Energy in South Dakota State Capitol Buildings*, Division of Engineering, South Dakota School of Mines and Technology, 1979
- S. M. Howard: *Corrosion in Geothermal Waters of Western South Dakota*, Proceeding of the National Association of Corrosion Engineers Annual Meeting, Corrosion/80, paper 208, 1980
- S. M. Howard: *Corrosion in High Purity Water Circuit Cooling Systems*, Final Report, Control Data Corporation, #80S11, 1982
- S. M. Howard: *Direct Utilization of Geothermal Energy in Western in South Dakota*, Information Bridge: DOE Scientific and Technical Information, U. S. Department of Energy, DE84005320, OCLC #68562656, 96 pp, 1983
- S. M. Howard: *Modeling of the TiO₂ Reactor*, Final Report, Kerr McGee Corporation, 202 pp, 1986
- S. M. Howard and K. H. Han: The Recovery and Sampling of Secondary Precious Metals, Division of Engineering, South Dakota School of Mines and Technology, Rapid City, SD, 96 pp, 1987
- S.M. Howard, C.J. Paterson, J.J. Papike, and C.K. Shearer: *Evaluation of South Dakota mineral deposits for the development of laboratory-scale expertise in chlorination extraction technology*, Division of Engineering, South Dakota School of Mines and Technology, Governor's Office for Economic Development, State of South Dakota, Final Report, 38 pp, 1988
- S.M. Howard: *A Study on the Removal of Arsenic and Cadmium and Recovery of Gold from Whitewood Creek Tailings Part II: High-Temperature Chlorination*, Division of Engineering, South Dakota School of Mines and Technology, Governor's Office of Economic Development, State of South Dakota, Final Report, 1989
- S.M. Howard: *Direct Activity Measurements in the Liquid Ag-Cu System Using a Valved Knudsen Cell-Mass Spectrometer System*, Metall. Trans. B, 1989, vol. 20B, pp. 845-52
- S.M. Howard and Qiling Yu: *Direct Activity Measurements in the Liquid Ag-Au-Ge System and its Solution Model Development by Computational Techniques*, Materials Research Society Symposium Proceedings, 1993, vol. 291, pp. 425-30
- J. Lui, S.M. Howard, and K. H. Han: *Adsorption Behavior of Cadmium and Zinc Ions on Oxide/Water Interfaces*, Langmuir, 1993, vol. 9, No. 12, pp. 3635-9
- S.M. Howard, *Gas Kinetics in the Carburization Process*, Final Report, Caterpillar Corporation, 113 pp, 1993
- S.M. Howard and Ajit Menon: *Computer Simulation of The Investment Casting Process Using Rapidcast[®] Software*, Proceedings of the 9th Annual Santa Fe Symposium Proceedings, May 14- 18, 1995, editor Dave Schneller, pp. 229-46, Albuquerque, NM
- S.M. Howard: *Use of Oxygen Probes to Determine Nitriding Potentials*, Final Report, Caterpillar Corporation, 21 pp, 1998
- A. Morris, S.M. Howard, et al.: *Computer Modeling and Analysis of Processes for the Production and Use of DRI: Description of Macros and Logic Used in Excel Model of Iron Carbide*, Direct Reduced Iron: Technology and Economics of Production and Use, 1999, ed. J. Feinman and D.R. Mac Rae, ISS, Warrendale, PA, pp. 173-89,
- S. M. Howard: *Microsoft Excel tutorials for GE 115: Freshman Engineering*, Department of Engineering, South Dakota School of Mines, August, 2000
- S. M. Howard: *MathSoft and MATHCaD tutorials for GE 111, Freshman Engineering*, Department of Engineering, South Dakota School of Mines, August, 2000
- Jon J. Kellar, Wendell Hovey, Michael Langerman, Stan Howard, Larry Simonson, Lidvin Kjerengtroen, Larry Stetler, Heidi Heilhecker, Lois Arneson-Meyer, and Stuart D. Kellogg: *A Problem Based Learning Approach for Freshman Engineering*, Frontiers in Education Conference, Oct 18, 2000, Kansas City, MO, IEEE
- S.M. Howard: *Modeling Carbon Profiles of Carburized Parts*, Final Report, Caterpillar Corporation, 81 pp, 2001
- J. I. Lee, S.M. Howard, J. J. Kellar, W. Cross, and K. H. Han: *Electrochemical Interactions between Silver and Sulfur in Sodium Solutions*, Metall. Trans. B, 2001, vol. 32B, pp. 895-901
- S. M. Howard: *Extractive Metallurgy of Uranium and Plutonium*, Encyclopedia of Materials, Science and Technology, 2nd ed., Elsevier Science, Oxford, England, ISBN: 0-08-0431526, pp. 9458-9, 2002
- S. M. Howard: *Extractive Metallurgy of Thorium*, Encyclopedia of Materials, Science and Technology, 2nd ed., Elsevier Science, Oxford, England, ISBN: 0-08-0431526, p. 9348, 2002

- S. M. Howard: *Extractive Metallurgy of Radium*, Encyclopedia of Materials, Science and Technology, 2nd ed., Elsevier Science, Oxford, England, ISBN: 0-08-0431526, p. 7976, 2002
- S. M. Howard and Glen A. Stone: *High Strength and High-Electrical Conductivity Copper-Magnesium Tin Boron Casting Alloy*, TMS - Recycling and Waste Treatment in Mineral and Metal Processing: Technical and Economic Aspects, June 16-20, 2002, Conference Proceedings, Ed. Bo Bjorkman, Caisa Samuelsson, Jan-Olov Wiksstrom, Lulea, Sweden, The Minerals, Metals & Materials Society (TMS), Warrendale, PA
- Stanley M. Howard, Glen A. Stone, William Arbegast, Glen Grant, Richard Wellnitz, Anand Kaligotla: *Surface Modification of Titanium by Adding SiC, WC, and BN₂ to the Surface of Ti 6-4*, Aluminum 2004, Automotive Alloys 2004 Proceedings, TMS 2004 Annual Meeting, March 14-18, 2004, Charlotte, NC, The Minerals, Metals & Materials Society (TMS), Warrendale, PA
- Stanley M. Howard, Anthony Barajas, Richard Wellnitz, Anand Kaligotla: *Abnormal Grain Growth in Friction Stir Welded and Post Thermal-Mechanical Treated Al-2195*, Aluminum 2004: Automotive Alloys 2004 Proceedings, TMS 2004 Annual Meeting, March 14-18, 2004, Charlotte, NC, The Minerals, Metals & Materials Society (TMS), Warrendale, PA
- Stanley M. Howard, Bharat K. Jasthi, W. J. Arbegast, Glenn J. Grant, Santosh Koduri, Darrell R. Herling: *Friction Stir Welding of MA 957 Oxide Dispersion Strengthened Ferritic Steel*, Friction Stir Welding and Processing III, 2005, ed. K. V. Jata, M. W. Mahoney, R. S. Mishra, and T. J. Lienhart, The Minerals, Metals & Materials Society (TMS), Warrendale, PA, pp.75-9
- Stanley M. Howard; Bharat K. Jasthi ;William J. Arbegast; Glenn J. Grant; Santosh Koduri; Darrell R. Herling: *Friction Surface Reaction Processing in Aluminum Substrates*, Friction Stir Welding and Processing III, 2005, ed. K. V. Jata, M. W. Mahoney, R. S. Mishra, and T. J. Lienhart, The Minerals, Metals & Materials Society (TMS), Warrendale, PA, pp. 139-146
- Sudip Bhattacharya, Stanley M. Howard, Jerrod Roalstad and James W. Sears: *Development of Functionally Graded Materials for Manufacturing Tools and Dies and Industrial Processing Equipment*, International Conference on Powder Metallurgy & Particulate Materials, Novel Materials II, vol. II: part 9, Montréal, Québec, Canada, June 19-23, 2005, Metal Powder Industries Federation (MPIF), Princeton, NJ
- S. M. Howard and K. H. Han: Chinese translation The Recovery and Sampling of Secondary Precious Metals, Division of Engineering, South Dakota School of Mines and Technology, Rapid City, SD, 96 pp, 2005
- Sudip Bhattacharya, Jerrod Roalstad, Stanley M. Howard, James W. Sears and Aaron Costello: *Material Solution for the Improvement of High Temperature Wear Characteristics of Industrial Tools and Dies by Laser Powder Deposition*, Proceedings of the Advanced Laser Application Conference & Exposition, September 18-21, 2006, ALAC2006, Novi, Michigan
- Rakesh Suravarapu, Katharine Flores, William Arbegast, Stanley Howard: *Friction Stir Welding of Bulk Metallic Glasses – Vitreloy 106A*, Friction Stir Welding and Processing IV, ed. Rajiv Mishra, Murray Mahoney, Thomas Lienert, Kumar Jata, 2007 TMS Annual Meeting & Exhibition, Feb 25-Mar 1, 2007, Orlando, FL, The Minerals, Metals & Materials Society (TMS), Warrendale, PA, pp. 233-42
- Bharat K. Jasthi, Stanley M. Howard, Casey D. Allen, William J. Arbegast: *Effects Of Friction Stir Welding On The Coefficient Of Thermal Expansion Of Invar 36*, Friction Stir Welding and Processing IV, ed., Rajiv S. Mishra, Murray W. Mahoney, Thomas J. Lienhart, and Kumar V. Jata., 2007 TMS Annual Meeting & Exhibition, February 25-March 1, 2007, Orlando, FL, The Minerals, Metals & Materials Society (TMS), Warrendale, PA, pp. 303-309
- Bharat K. Jasthi, Aaron C. Costello, William J. Arbegast, Stanley M. Howard: *Investigation of Laser Deposition of High Temperature Refractory Pin Tools for Friction Stir Welding*, Friction Stir Welding and Processing IV, ed., Rajiv S. Mishra, Murray W. Mahoney, Thomas J. Lienhart, and Kumar V. Jata., 2007 TMS Annual Meeting & Exhibition, February 25-March 1, 2007, Orlando, FL, The Minerals, Metals & Materials Society (TMS), Warrendale, PA, pp. 389-394
- Stanley M. Howard editor: 2008 EPD Congress, The Minerals, Metals, and Materials Society (TMS), Warrendale, PA, pp. 437, 2008
- Stanley M. Howard editor: 2009 EPD Congress, The Minerals, Metals, and Materials Society (TMS), Warrendale, PA, pp. 1020, 2009
- Bharat Jasthi, William Arbegast, Stanley M. Howard: *Thermal Expansion Coefficient and Mechanical Properties of Friction Stir Welded Invar (Fe-36%Ni)*, Journal of Materials Engineering and Performance, 2009, vol. 18(7), pp. 925-34
- Barbara Szczerbinska, Stan Howard, et al.: *Center for Ultra-Low Background Experiments at DUSEL*, Acta Physica Polonica B, 2010, vol. 41, no. 6, pp.1709-18
- Christina Keller, Stan Howard, et al.: *CUBED: South Dakota 2010 Research Center For DUSEL Experiments*, Nuclear Physics A, 2010, 834, pp. 816c–818c
- Bharat Jasthi, Edward Chen, William Arbegast, Matthew Heringer, Douglas Bice, Stanley Howard: *Friction Stir Welding of Alloy 22*, Proceedings Friction Stir Welding and Processing VI, ed. R. S. Mishra, M W. Mahoney, Y. Sato, Y Hovanski, and R. Verma, Friction Stir Welding and Processing VI, 2011 TMS Annual Meeting & Exhibition, Feb 28, 2011, San Diego, CA, The Materials, Metals, and Materials Society (TMS), Warrendale, PA, pp. 11-18

- B.K. Jasthi, E.Y. Chen, W.J. Arbegast, B. Kaligotla, M. West, C.A. Widener, and S. M. Howard: *Microstructure and Mechanical Properties of Friction Stir Processed Cast Alloy 718*, 9th International Symposium on Friction Stir Welding Proceedings, May 15-17, 2012, Huntsville, TWI Ltd, Granta Park, Great Abington, Cambridge, CB21 6AL, UK.
- Bharat K. Jasthi, Glenn J. Grant, and Stanley M. Howard: *In-situ Reaction Processing Using Friction Stir Processing*, Trends in Welding Research 2012, Proceedings of the 9th International Conference, June 4-6, 2012, Editors S. Babu, H.K. Bhadeshia, C.E. Cross, S.A. David, T. DebRoy, J. DuPont, T. Koseki, S. Liu, Chicago, IL, ASM International, Materials Park, OH, pp. 978-82
- Brahmanandam Kaligotla, Srikanth Labhala, Bharat K. Jasthi, William J. Arbegast, and Stanley M. Howard: *Determining Optimum Friction Stir Weld Variables to Inhibit Abnormal Grain Growth in Al-2195*, Trends in Welding Research 2012, Proceedings of the 9th International Conference, June 4-6, 2012, Editors S. Babu, H.K. Bhadeshia, C.E. Cross, S.A. David, T. DebRoy, J. DuPont, T. Koseki, S. Liu, Chicago, IL, ASM International, Materials Park, OH, pp. 558-62
- Brahmanandam Kaligotla, Bharat K. Jasthi, Christian A. Widener, and Stanley M. Howard: *Ultrasonic Spot Welding of 301 Stainless Steel to Aluminum 6061-T6*, Trends in Welding Research Proceedings of the 9th International Conference, June 4-8, 2012, ed. S. Babu, H.K. Bhadeshia, C.E. Cross, S.A. David, T. DebRoy, J. DuPont, T. Koseki, S. Liu, Chicago, IL, ASM International, Materials Park, OH, pp 631-4
- B.K. Jasthi, W. J. Arbegast, and S. M. Howard: *Effect of Thermal Aging on the Corrosion and Microstructure of Friction Stir Welded Alloy 22*, *Metall. Trans. A*, 2012, vol. 43A, pp. 3192-201
- William M. Cross, Jon J. Kellar, Grant A. Crawford, Stanley M. Howard, Dana J. Medlin and Michael K. West: *Development of an Integrated Research, Curricular, Historically-Informed and Extracurricular Learning Environment*. MRS Proceedings, 2012, 1472, mrss12-1472-zz04-08 doi:10.1557/opl.2012.1210
- Aguayo, - - , E., et al. "Characteristics of signals originating near the lithium-diffused N+ contact of high purity germanium p-type point contact detectors." *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment* 701 (2013): 176-185.
- G.K. Giovanetti, -- , S. Howard; F. Avignone & W. Haxton, editors, *A Dark Matter Search with MALBEK*, Proceedings of the 13th International Conference on Topics in Astroparticle and Underground Physics, Physics Procedia, Elsevier, TAUP 2013.N. Abgrall, S. Howard, et al., *The MAJORANA DEMONSTRATOR Neutrinoless Double-Beta Decay Experiment*, *Advances in High Energy Physics*, vol. 2014, Article ID 365432, 18 pages. doi:10.1155/2014/365432.
- Xiaoqian Ma, Stanley M. Howard and Bharat K. Jasthi: *Friction Stir Welding of Bulk Metallic Glass Vitreloy 106a*, *Journal of Manufacturing Science and Engineering*, 2014, vol. 136, issue 5, 7 pages. doi: 10.1115/1.4027941
- Xu, W., et al., *Testing the Ge Detectors for the MAJORANA DEMONSTRATOR*. *Physics Procedia*, 2015. **61**: p. 807-815.
- Suriano, A. M., Howard, S. M., Christofferson, C. D., Arnquist, I. J., and Hoppe, E. W. "Developing radiopure copper alloys for high strength low background applications", *AIP Conference Proceedings* **1921**, 080001 doi.org/10.1063/1.5019009 2018.
- M. Sadegh Safarzadeh & Stanley M. Howard, *Revisiting the Kellogg diagrams: roaster diagrams and their usefulness in pyrometallurgy*, *Mineral Processing and Extractive Metallurgy Review*, DOI: 10.1080/08827508.2017.1401538, 2017.
- M. Sadegh Safarzadeh and Stanley M. Howard, "Thermal removal of arsenic from copper concentrates: Three-dimensional isothermal predominance diagrams for the Cu-As-S-O system", *Journal of Hazardous Materials*, Vol. 347, pp 371-377, 5 April 2018.
- S. M. Howard. "Three-Dimensional Predominance Volume Diagrams: The Ni-As-S-O System." *Metallurgical Transactions B*, DOI: 10.1007/s11663-018-1321-9, 2018.
- M.S. Safarzadeh, S.M. Howard, and J.D. Miller, *Analysis and visualization of enargite and tennantite roasting using Cu-As-S-O system predominance volume diagrams*, *Vacuum* doi.org/10.1016/j.vacuum.2018.06.067, 2018.
- M.S. Safarzadeh and S.M. Howard, Solid state phase transformations during the oxidation of copper sulfides: *Solid State Sciences*, vol. 83, pp. 65–69, 2018.
- M.S. Safarzadeh and S.M. Howard, *Predominance Area Diagrams Bounding the Cu-As-S-O System's 3D Predominance Diagram at 900 K (627 °C)*, (accepted for publication - *Mining, Metallurgy & Exploration MMEX-S-18-00235*), 2019.
- Stanley M. Howard, *Bounding As_xS_yO_z Phases in Three-Dimensional Ni-As-S-O Predominance Volume Diagrams*, In review, *Met Trans B*, July, 2020.

PRESENTATIONS AT TECHNICAL MEETINGS

- Stanley M. Howard and J. P. Hager: *Thermodynamic Properties of the Liquid Ge-Cu and Ge-Au Systems by Mass Spectrometry*, Annual Meeting of AIME, Denver, CO, 1970
- Stanley M. Howard and J. P. Hager: *Thermodynamic Properties of the Liquid Pb-Pd System by Galvanic Cell and Mass Spectrometry*, Annual Meeting of AIME, Denver, CO, 1970

- Stanley M. Howard, John Jones, and J. P. Hager: *Thermodynamic Properties of the Liquid Sn-Au and Sn-Ge Systems by Mass Spectrometry*, Annual Meeting of AIME, New York, 1971
- Stanley M. Howard and J. P. Hager: *Additional Methods of Measuring Activities by Mass Spectrometry*, Annual Meeting of AIME, San Francisco, CA, 1972
- Stanley M. Howard and J. P. Hager: *Binary Gibbs-Duhem Integration Using an Implicitly Defined Integration Function*, Annual Meeting of AIME, Dallas, TX 1974
- Stanley M. Howard and Dan Carda: *Corrosion in Geothermal Waters of the Madison Aquifer*, Symposium on Materials in Geothermal Energy Systems, Geothermal Energy Division, U. S. Department of Energy, Austin, TX, 1978
- Stanley M. Howard and Dan Carda: *Direct Utilization of Geothermal Energy in Western South Dakota*, Review Meeting, Geothermal Energy Division, U. S. Department of Energy, Pocatello, ID, 1978
- Stanley M. Howard and Dan Carda: *Geothermal Direct Heat Applications*, Geothermal Resources Council 1979 Annual Meeting, Geothermal Energy Division - Direct Heat, U. S. Department of Energy, Reno, NV, 1979
- Stanley M. Howard and Dan Carda: *Geothermal Potential of the Dakotas*, Great Sioux Nation, Wamblee, SD, 1979
- Stanley M. Howard and Dan Carda: *Geothermal Direct Heat Applications*, Semi-annual Review Meeting, Geothermal Energy Division, U. S. Department of Energy, Las Vegas, NV, 1980
- Stanley M. Howard and Dan Carda: *Geothermal Direct Heat Applications*, Semi-annual Review Meeting, Geothermal Energy Division, U. S. Department of Energy, El Centro, CA, 1980
- Stanley M. Howard and Dan Carda: *Corrosivity of Geothermal Waters of Western South Dakota*, Corrosion/80, National Association of Corrosion Engineers, Chicago, IL, 1980
- Stanley M. Howard and Dan Carda: *Geothermal Direct Heat Applications*, Semi-annual Review Meeting, Geothermal Energy Division, U. S. Department of Energy, Boise, ID, 1981
- Stanley M. Howard: *A New Method of Directly Measuring Activities By the Mass Spectrometric Analysis of Knudsen Cell Effusates From a Valved Knudsen Cell*, Annual Meeting of AIME, Chicago, IL, 1981
- Stanley M. Howard and Dan Carda: *Direct Geothermal Heat Applications at the Diamond Ring Ranch*, Program Review Meeting, Geothermal Energy Division, U. S. Department of Energy, Las Vegas, NV, 1982
- Stanley M. Howard: *Computer Applications in Metallurgical Engineering and Materials Science*, Annual Meeting of AIME, Anaheim, CA, 1990
- Stanley M. Howard: *Computer Applications in Metallurgical Engineering and Materials Science*, Annual Meeting of AIME, New Orleans, LA, 1991
- Stanley M. Howard: *Direct Activity Measurements in the Liquid Ag-Au-Ge System and its Solution Model Development by Computational Techniques*, Materials Research Institute Annual Meeting, Detroit, MI, 1993
- Stanley M. Howard: *Computer Applications in Metallurgical Engineering and Materials Science*, Annual Meeting of AIME, San Francisco, CA, 1994
- Stanley M. Howard: *Opportunities and Problems in Metal Recycling*, Technical Assistance Program Annual Conference, Rapid City, SD, 1995
- Stanley M. Howard: *Computer Simulation of The Investment Casting Process Using Rapidcast[®] Software*, 9th Annual Santa Fe Symposium, Albuquerque, NM, 1995
- Arthur A. Morris, Stanley M. Howard, et al.: *Computer Modeling and Analysis of Processes for the Production and Use of DRI*, ISS St. Petersburg Conference, St. Petersburg, FL, 1999
- Stanley M. Howard: *Thermodynamics-On-Line*, Technology in Education, Regents Forum on Technology in Higher Education, Pierre, SD, Feb, 1999
- Stanley M. Howard: *Thermodynamics-On-Line*, Technology in Education, LOFTI Steering Committee Rapid City, SD, , April 6, 1999
- K. N. Han, S. M. Howard, J. I. Lee, J. K. Kellar: *Corrosion Mechanism of Silver in Sodium Sulfide Solution*, 2nd Biennial Joint EPSCoR Conference, Fargo, ND, Sept 10, 1999
- Stanley M. Howard: Christopher Johnson, Spreadsheet Modeling of Well Drawdown, Black Hills Hydrology Conference, Rapid City, SD, Sept 14, 1999
- S. M. Howard, Jon J. Kellar, Wendell Hovey, Michael Langerman, Larry Simonson, Lidvin Kjerengtroen, Larry Stetler, Heidi Heilhecker, Lois Arneson-Meyer and Stuart D. Kellogg: *A Problem Based Learning Approach for Freshman Engineering*, Frontiers in Education Conference, Kansas City, KS, Oct 21, 2000
- S. M. Howard: *Modeling Carbon Profiles of Carburized Parts*, Final Report, Caterpillar Corporation, 81 pp, 2001
- S. M. Howard, Glen A. Stone: *High Strength and High-Electrical Conductivity Copper-Magnesium Tin Boron Casting Alloy*, TMS - Recycling and Waste Treatment in Mineral and Metal Processing: Technical and Economic Aspects, Lulea, Sweden, June 18, 2002
- Glen A. Stone, William J. Arbegast, Glenn J. Grant, Stanley M. Howard: *Surface Modification of Titanium by Adding SiC, WC and BN₂ to the Surface of Ti 6-4 Alloy*, TMS 2004 Annual Meeting, Charlotte SC, March 15-19, 2004

- Stanley M. Howard; Anthony Barajas; Richard Wellnitz; Anand Kaligotla, *Abnormal Grain Growth in Friction Stir Welded and Post Thermal-Mechanical Treated Al-2195*, TMS 2004 Annual Meeting, Charlotte SC, Mar 15-19, 2004
- Stanley M. Howard, Bharat K. Jasthi, William J. Arbegast, Glenn J. Grant, Santosh Koduri, Darrell R. Herling: *Friction Stir Welding of MA 957 Oxide Dispersion Strengthened Ferritic Steel*, Friction Stir Welding and Processing III, TMS 2005 Annual Meeting, San Francisco, CA, Feb 13-17, 2005
- Anand B. Kaligotla; Glen A. Stone; Stanley M. Howard; William J. Arbegast: *TEM Analysis of Annealed and Thermo-Mechanically Processed Friction Stir Welds in Al-2195*, Friction Stir Welding and Processing III, TMS 2005 Annual Meeting, San Francisco, CA, Feb 13-17, 2005
- Alok Vats, Stanley M. Howard, William J. Arbegast, and Glenn J. Grant: *Friction Stir Technology For Superplastic Preforms: Sky5083 Alloy*, Friction Stir Welding and Processing III, TMS 2005 Annual Meeting, San Francisco, CA, Feb 13-17, 2005
- Stanley M. Howard, Bharat K. Jasthi, William J. Arbegast, Glenn J. Grant, Santosh Koduri, Darrell R. Herling: *Friction Surface Reaction Processing in Aluminum Substrates*; Friction Stir Welding and Processing III, TMS 2005 Annual Meeting, San Francisco, CA, Feb 13-17, 2005
- Srikanth Labhala, William J. Arbegast and Stanley. M. Howard: *Determining Optimum Friction Stir Weld Variables to Inhibit Abnormal Grain Growth in Al-2195*; Friction Stir Welding and Processing III, TMS 2005 Annual Meeting, San Francisco, CA, 2005, Feb 13-17, 2005
- Glen A. Stone, Anand B. Kaligotla, Stanley M. Howard, William J. Arbegast: *TEM Analysis of Annealed and Thermo-Mechanically Processed, Friction Stir Welds in Al-2195*, Friction Stir Welding and Processing III: Microstructure and Texture, TMS 2005 Annual Meeting, San Francisco, CA, 2005, Feb 13-17, 2005
- Sudip Bhattacharya, Stanley M. Howard, Jerrod Roalstad and James W. Sears: *Development of Functionally Graded Materials for Manufacturing Tools and Dies and Industrial Processing Equipment*, Superalloys and Coatings for High Temperature Applications: Superalloys – III, TMS 2005 Annual Meeting, San Francisco, CA, 2005, Feb 13-17, 2005
- Sudip Bhattacharya, Stanley M. Howard, Jerrod Roalstad and James W. Sears: *Development of Functionally Graded Materials for Manufacturing Tools and Dies and Industrial Processing Equipment*, International Conference on Powder Metallurgy & Particulate Materials, Novel Materials II, Montréal, Québec, Canada, June 19-23, 2005
- Sudip Bhattacharya, Jerrod Roalstad, Stanley M. Howard, Aaron Costello and James W. Sears: *ICALEO 2005, Laser Powder Deposition of Functionally Graded Materials To Improve The Wear Characteristics of Industrial Tools, Dies, and Processing Equipment*, Miami, Florida, October 31-Nov 3, 2005
- Briana Bichler, Shelly Peterson, Deborah Carlson, Jerrod Roalstad, Wayne Douglas, Stanley M. Howard: *Economics of Recycling in Rapid City, SD*, 2005 Spring Recycling and Landfill Conference, Solid Waste Management Association, Aberdeen, SD, Apr 13-14, 2005
- Sudip Bhattacharya; Jerrod Roalstad, Stanley M. Howard; Aaron Costello, James W. Sears: *Investigating Functionally Graded Materials to Improve the High Temperature Operating Characteristics of Industrial Tools and Dies and Processing Equipment*, General Abstracts: Materials Processing and Manufacturing Division: Surface Modification and Properties, San Antonio, TX, Mar 12-16, 2006
- Sudip Bhattacharya; Jerrod Roalstad, Stanley M. Howard; Aaron Costello, James W. Sears: *Thermal Stability of Various Alloys Clad on H-13 Tool Steel by Laser Powder Deposition*, General Abstracts: Materials Processing and Manufacturing Division, Surface Modification and Properties, General Abstracts: Materials Processing and Manufacturing Division: Surface Modification and Properties, San Antonio, TX, Mar 12-16, 2006
- Sudip Bhattacharya, Jerrod Roalstad, Stanley M. Howard, James W. Sears, and Aaron Costello:, *Improving the High Temperature Wear Characteristics of Industrial Tools, Dies and Processing Equipment using Functionally Graded Material*, Powder Met 2006, MPIF International Conference on Powder Metallurgy and Particulate Materials, Manchester Grand Hyatt, San Diego, CA, Jun 18–21, 2006
- Sudip Bhattacharya, Jerrod Roalstad, Stanley M. Howard, James W. Sears, and Aaron Costello: *Material Solution for the Improvement of High Temperature Wear Characteristics of Industrial Tools and Dies by Laser Powder Deposition*, ALAC2006, Advanced Laser Application Conference, Novi, MI, Sept 18-21, 2006
- J. W. Sears, A. Costello, J. Roalstad, S. Bhattacharya, and S. Howard: *Improving Metal Forming Tools and Dies through Additive Manufacturing*, the Material Science & Technology 2006 Conference and Exhibition (MS&T '06) Cincinnati, OH, October 15-19, 2006
- J. W. Sears, A. Costello, J. Roalstad, S. Bhattacharya, and S. Howard: *Hard, Wear Resistant Metal Surfaces for Industrial Applications through Laser Powder Deposition*, 2006 International Conference on Applications in Lasers and Electro-Optics (ICALEO), Scottsdale, AZ, October 30 – November 2, 2006

- Rakesh Suravarapu, Katharine Flores, William Arbegast, Stanley Howard: Friction Stir Welding Of Bulk Metallic Glasses – Vitreloy106a Friction Stir Welding And Processing - IV Symposium, TMS Annual Meeting & Exhibition, Orlando, FL,2007
- Bharat Jasthi, Stanley Howard, Casey Allen, William Arbegast: Effects Of Friction Stir Welding On The Coefficient Of Thermal Expansion Of Invar 36, Friction Stir Welding And Processing – IV Symposium. TMS Annual Meeting & Exhibition, Orlando, FL,2007
- Bharat Jasthi, Aaron Costello, William Arbegast, Stanley Howard: Investigation Of Laser Deposition Of High Temperature Refractory Pin Tools For Friction Stir Welding, Friction Stir Welding And Processing - IV Symposium, TMS Annual Meeting & Exhibition, Orlando, FL,2007
- James Sears, Jerrod Roalstad, Sudip Bhattacharya, Aaron Costello, Stanley Howard: *Characterization Of A Cobalt-Based Powder Alloy Laser Deposited on H-13 Hot Die Forging Tools*, Properties And Performance of High Temperature Alloys And Coatings Symposium, TMS Annual Meeting & Exhibition, Orlando, FL,2007
- J. Kellar, S. Howard, M. West, W. Cross, D. Medlin, and S. Kellogg: *The Samurai Sword Project and Opportunities for Metallurgical Programs*, Materials Science & Technology Conference and Exhibition, Pittsburgh, PA, Oct 25-9, 2009
- S. M. Howard, W. Arbegast, Bharat K Jasthi: Friction Stir Welding of Alloy 22, Symposium on Friction Stir Welding and Processing VI, Session on High Temperature Materials I, 2010 Meeting, 2011 TMS Annual Meeting & Exhibition, Seattle, WA, Feb 14-18, 2010
- S. M. Howard, W. Arbegast, Bharat K Jasthi: *Friction Stir Processing of Cast Inconel 718*, Symposium on Friction Stir Welding and Processing VI, Session on High Temperature Materials I, 2010 Meeting, 2011 TMS Annual Meeting & Exhibition, Seattle, WA, Feb 14-18-Mar 3, 2010
- Bharat Jasthi, Edward Chen, William Arbegast, Matthew Heringer, Douglas Bice, Stanley Howard: *Friction Stir Processing of Cast Inconel 718*, Friction Stir Welding and Processing VI Symposium, 2011 TMS Annual Meeting & Exhibition, San Diego, CA, Feb 28-Mar 3, 2011
- Bharat Jasthi, Edward Chen, William Arbegast, Matthew Heringer, Douglas Bice, Stanley Howard: *Friction Stir Welding of Alloy 22*, Friction Stir Welding and Processing VI Symposium, 2011 TMS Annual Meeting & Exhibition, San Diego, CA, Feb 28-Mar 3, 2011
- Bharat Jasthi, Douglas Bice, William Arbegast, Matthew Heringer, Stanley Howard: *Friction Stir Processing of Cast Superalloys*, General Abstracts: Structural Materials Division: Processing, 2011 TMS Annual Meeting & Exhibition, San Diego, CA, Feb 28-Mar 3, 2011
- B.K. Jasthi, E.Y. Chen, W.J. Arbegast, B. Kaligotla, M. West, C.A. Widener, and S. M. Howard: *Microstructure and Mechanical Properties of Friction Stir Processed Cast Alloy 718*, 9th International Friction Stir Welding Symposium, Huntsville, AL, USA, TWI Ltd, Granta Park, Great Abington, Cambridge, CB21 6AL, UK, May 16, 2012.
- Srikanth Labhala, Anand Kaligotla, Glen A. Stone, Stanley M. Howard, Bharat K. Jasthi, and William J. Arbegast: *Determining Optimum Friction Stir Weld Variables to Inhibit Abnormal Grain Growth in Al-2195*, Trends in Welding Research, 9th International Conference Chicago, IL, June 4-8, 2012
- Brahmanandam Kaligotla, Bharat K. Jasthi, William J. Arbegast, and Stanley M. Howard: *Effect of Thermomechanical Processing on Abnormal Grain Growth in Al-2195 Friction Stir Welds*, Trends in Welding Research, 9th International Conference, IL, June 4-8, 2012
- Bharat K. Jasthi, Glenn J. Grant, and Stanley M. Howard: *In-situ Reaction Processing Using Friction Stir Processing*, Trends in Welding Research, 9th International Conference, IL, June 4-8, 2012
- Brahmanandam Kaligotla, Bharat K. Jasthi, Christian A. Widener, and Stanley M. Howard: *Ultrasonic Spot Welding of 301 Stainless Steel to Aluminum 6061-T6*, Trends in Welding Research, 9th International Conference, IL, June 4-8, 2012
- William M. Cross, Jon J. Kellar, Grant .A Crawford, Stanley M. Howard, Michael K. West, and Dana J. Medlin: *Development of an Integrated Research, Curricular, Historically-Informed and Extracurricular Learning Environment*, 2012 MRS Spring Meeting, San Francisco, CA, April 9-13, 2012
- Anne-Marie Suriano and S. M. Howard, *Influence of Cell Parameters on Electrodeposition Rate*, MAJORANA DEMONSTRATOR Collaboration, TMS Annual Meeting & Exhibition, Orlando, FL, 2015
- Stanley M. Howard and Sadegh Safarzadeh, *Three-dimensional Isothermal Predominance Diagrams for the Cu-As-S-O System*, TMS Annual Meeting & Exhibition, Nashville, TN, 2016
- Stanley M. Howard and Sadegh Safarzadeh, *Predominance and Roaster Diagrams for the Cu-As-S-O System*, Extraction 2018, Part B-1: 7th International Symposium on Advances in Sulfide Smelting, Topic 7 Arsenic, Ottawa, CA, 08/28/2018.
- Stanley M. Howard and Sadegh Safarzadeh, *Theoretical Considerations in the Separation of Co and Ni from their Arsenic-bearing Sulfosalts: Ni-As-S-O and Co-As-S-O Systems*, Extraction 2018, Symposium: Part B-1: 7th International Symposium on Advances in Sulfide Smelting, Topic 9 Metal Recovery, Ottawa, CA, 08/28/2018

SPONSORED RESEARCHFunding Sources

- National Science Foundation
- U. S. Environmental Protection Agency
- NSF-EPSCoR
- U. S. Department of Energy
- Control Data Corporation
- U. S. Department of Defense
- U. S. Bureau of Mines
- U. S. Energy, Research, and Development Agency
- State of SD Office of Energy Policy
- State of SD Office of Economic Development
- SIPI Metals, Chicago, Ill
- Army Research Laboratory
- Edison Welding Institute
- Pacific Northwest Nat'l Laboratory

Titles

- "Simulation of the Nickel Segregation Process," Faculty Research Grant, Principal Investigator. \$1,300 (1972-73)
- "Vapor Refining in Extractive Metallurgy," Faculty Research Grant, Principal Investigator. \$2,950 (1973-74)
- "Simultaneous Removal of Hg and SO₂ from Smelter Flue Gases," Environmental Protection Agency, Principal Investigator, \$20,000 (1973 - 74)
- "A Mass Spectrometer Laboratory for Extractive Metallurgical Research," National Science Foundation, Principal Investigator, \$12,000 (1975 - 76)
- "A Mass Spectrometer Laboratory For Extractive Metallurgical Research," State of South Dakota, Principal Investigator, \$19,000 (1975 - 76)
- "Geothermal Application in the Madison Limestone Aquifer System in South Dakota," U. S. Energy Research and Development Administration, Investigator, \$123,425 (1976 - 77)
- "Direct Utilization of Geothermal Energy in Western in South Dakota," U. S. Energy Research and Development Administration, Principal Investigator, # ET-78-F-07-1729, \$403,098 (1978 - 81)
- "Direct Utilization of Geothermal Energy in South Dakota State Capitol Buildings," South Dakota Office of Energy Policy, Principal Investigator, # 9-2-7-802-031, \$20,000 (1979 - 80)
- "Direct Utilization of Geothermal Energy for Philip School Buildings and District Heating System," U. S. Department of Energy, Investigator, \$1,067,189 (1978 - 81)
- "Geothermal Direct Heat Application: St. Mary's Hospital," U. S. Department of Energy, Investigator, \$718,000 (1978 - 81)
- "Western South Dakota Usage of Geothermal Energy from the Madison Formation," U. S. Energy Research and Development Administration, Investigator, # ET-78-F-07-1707, \$235,038 (1978 - 81)
- "Direct Utilization of Geothermal Energy at Ellsworth Air Force Base Schools," U. S. Energy Research and Development Administration, Investigator, # ET-78-F-07-1727, \$482,356 (1978 - 81)
- "Corrosion in High Purity Water Circuit Cooling Systems," Control Data Corporation, Principal Investigator, #80S11, \$60,000 (1981 - 82)
- "Non personnel Services to Develop and Present a Training Class in Secondary Precious Metal Recovery and Sampling," U.S. Department of Defense, Co-Principal Investigator, \$112,784 (1987 - 89)
- "Production of Ta and Nb", Licensing and associated Fees, Group V Metals, \$1.2M (1981-88)
- "Production of Ta and Nb", Production and operation Funds, for Group V Metals licensed technology, \$4.5M (1981-88)
- "Evaluation of South Dakota Mineral Deposits and the Development of Expertise in Chlorination Extractive Metallurgy," South Dakota Economic Development, Principal Investigator, \$71,838 (1987 - 88)
- "Defect Structures in Lithium Niobate Crystals," South Dakota Economic Development, Co-Principal Investigator, \$31,134 (1988)
- "A Study on the Removal of Arsenic and Cadmium and Recovery of Gold from Whitewood Creek Tailings", South Dakota Economic Development, Co-Principal Investigator, \$10,738 (1988 - 89)
- "The Thermodynamic Properties of High-Temperature Multicomponent Systems", U. S. Bureau of Mines, MMRRI, Principal Investigator, \$5,000 (1989)
- "Reprocessing Of Complex Gold Scrap," South Dakota Office of Economic Development, Principal Investigator, \$31,675, grant #4-78600, (1989 - 90)
- "The Thermodynamic Properties of High-Temperature Multicomponent Systems", U. S. Bureau of Mines, MMRRI, Principal Investigator, \$5,000 (1990)

- "The Development of Advanced Technology in the Manufacture of Black Hills Gold," South Dakota Office of Economic Development, Principal Investigator, \$33,534 (1989 - 90)
- "The Thermodynamic Properties of High-Temperature Multicomponent Systems", U. S. Bureau of Mines, MMRI, Principal Investigator, \$5,500 (1991)
- "The Thermodynamic Properties of the Liquid Ag-Au-Cu-Ge System", U. S. Bureau of Mines, MMRI, Principal Investigator, \$5,500 (1992)
- "The Thermodynamic Properties of High-Temperature Multicomponent Systems", National Science Foundation, EPSCoR, #4-90723, Principal Investigator, \$15,000 (1990 - 91)
- "Entrapment Mechanisms in the Filtration of Oxide Particulates from Liquid Metals Using Oxide Ceramics", U. S. Bureau of Mines, MMRI, Principal Investigator, \$5,500 (1993)
- "Optimization of Investment and Shot Casting Processes through RAPID CAST® Simulation," South Dakota Economic Development, Principal Investigator, \$36,692 (1993 - 94)
- "Improving the Mineral Industries and Mechanical Engineering at SDSM&T", Kennecott Copper, Salt Lake City, UT. Co-Author Tim Votero, \$50,000 foundation grant (1998)
- "Thermodynamics-On-Line", Technology in Education, Office of the Governor, \$30,000 (1998).
- "New Copper Alloys to Replace Copper-Beryllium Alloys," Sipi Metals, Chicago, Ill, Co-Principal Investigator, \$80,000 (1997 - 98)
- "New Copper Alloys to Replace Copper-Beryllium Alloys," Sipi Metals, Chicago, Ill, Co-Principal Investigator, \$18,000 (1998 - 99)
- "Improvements in the Department of Materials and Metallurgical Engineering at SDSM&T", Cargill, MN. \$30,000 foundation grant (Other co-authors obtained additional funds) (2000)
- "Applied Numerical Methods-On-Line", Technology in Education, Office of the Governor, \$30,000 (2001).
- "Control of Abnormal Grain Growth in Friction Stir Welded Al-2195", Advanced Materials Processing Center: SDSM&T, \$18,000 (2003).
- Surface Modification of Brake Rotors, Pacific Northwest Laboratory, with Glen Stone, \$50,000 (2004-5).
- Friction Stir Joining and Processing of Advanced Materials including AL-MMCs, Pacific Northwest National Laboratories, Richland, WA, 2003, \$50,000 #4-12750 (2004-5)
- Faculty Associate - Controlling Growth in Friction Stir Welded Al-2195, ~\$30,000, W Arbegast-PI, AMP Center-related Funding, ARL and EWI (2004-5)
- "Development of Functionally Grade Materials for Manufacturing Tools and Dies and Industrial Processing Equipment", Faculty Associate, Carpenter Powder Products via DOE \$200,000, J. Sears-PI, #4-22530 (2004-5)
- "Investigation of Laser Deposition of High Temperature Refractory Pin Tools for Friction Stir Welding, Friction Stir Welding and Processing", Howard and Arbegast, Major Professor/Research Advisor, Bharat K. Jasthi - PhD Topic, AMP Center (2004-6)
- "Effects of Friction Stir Welding on The Coefficient Of Thermal Expansion of Invar 36", Friction Stir Welding and Processing, Howard and Arbegast, Major Professor/Research Advisor, Bharat K. Jasthi - PhD Topic, AMP Center (2005-6)
- "Ultrasonic Spot Welding of High Strength Ultrasonic Spot Welding of High Strength Aluminum Alloys", Howard and Arbegast, Major Professor/Research Advisor, Anand Kaligotla - PhD Topic, AMP Center (2005-6)
- "Friction Stir Welding of Bulk Metallic Glasses – Vitreloy 106A", Howard and Arbegast, Major Professor/Research Advisor, EWI and University of Ohio ~\$35,000, Rakesh - MS Topic, AMP Center, (2005-6)
- "Friction Stir Processing of Cast Superalloys" \$30,000, NASA SBIR Phase-I with T45 Technologies, Research Advisor, PI- William Arbegast (2006)
- "Dimensionless Analysis of Friction Stir Welding"- NSF Center for Friction Stir Processing (CFSP)- IUCRC #0934383, Major Professor/Research Advisor, Xiaoqian Ma PhD Topic (2009-13)
- Numerous continuing projects funded by Army Research Laboratory, Edison Welding Institute, and industrial partners, (2002 - 2010)
- "Recycling of Enriched Ge⁷⁶ from the Detector Production Circuit", Howard, Stanley, FY09 BOR SUSEL, SDSM&T (MP0800165 Howard SDBOR SUSEL Mini Grant (2008)
- "Back to the Future: Metallurgy", associate, REU Site proposal (DMR-0852057), Michael West, Office of Special Programs (OSP) in the Division of Materials Research (DMR). \$344,000, (2009)
- "Center for Detecting Rare Physics Processes with Ultra-Low Background Experiments at Sanford Lab/DUSEL", Dongming Mei, Stanley M Howard, et al., \$2,800,000 (Howard: Ge Processing), 5 years, State of South Dakota. (2009-14)
- "Center for Detecting Rare Physics Processes with Ultra-Low Background Experiments at Sanford Lab/DUSEL", Howard, et al. SDSM&T/Dongming Mei USD, subcontract "Development of a Ge Crystal Growth Lab at SDSM&T", Austin Nelson MS Topic, \$180,000, State of South Dakota. (Year 1) (2009-10)

- SDSM&T Team Leader and SDSM&T PI on DOE EPSCoR funded Project; Crystal Growth and Detector Development at Homestake for SURF Experiments, \$2.5 million, prime USD, subcontract to SDSM&T \$137,000, (2010-3)
- “Center for Detecting Rare Physics Processes with Ultra-Low Background Experiments at Sanford Lab/DUSEL”, Howard et al. SDSM&T/Dongming Mei USD, subcontract “Development of a Ge Crystal Growth Lab at SDSM&T”, Austin Nelson MS Topic , \$168,000, State of South Dakota. (Year 2) (2010-11)
- “Center for Detecting Rare Physics Processes with Ultra-Low Background Experiments at Sanford Lab/DUSEL”, Howard et al. SDSM&T/Dongming Mei USD, subcontract “Development of a Ge Crystal Growth Lab at SDSM&T”, Austin Nelson MS Topic , \$168,000, State of South Dakota. (Year 3) (2011-12)
- “Center for Detecting Rare Physics Processes with Ultra-Low Background Experiments at Sanford Lab/DUSEL”, Howard et al. SDSM&T/Dongming Mei USD, subcontract “Development of a Ge Crystal Growth Lab at SDSM&T”, Austin Nelson MS Topic , \$96,000, State of South Dakota. (Year 4) (2012-13)
- SDSM&T Team Leader and SDSM&T PI on DOE EPSCoR funded Project; Crystal Growth and Detector Development at Homestake for SURF Experiments, \$2.5 million, prime USD, subcontract to SDSM&T \$180,086, (2013-6)

MAJOR COMPUTER MODELS DEVELOPED FOR INDUSTRY & GOVERNMENT

- Generalized Model for a Gas Flow Reactor with Particulate Nucleation and Growth
- Three-Dimensional Thermal Gradients in Multilayered Circuit Boards during Solder Reflow
- Gas Kinetics in the Carburization Process
- Use of Oxygen Probes to Determine Nitriding Potentials in Steel Heat Treating
- Modeling of Carburization Profiles

SOFTWARE/WEB DEVELOPMENT

- Roster Builder, 2003 - .
- Outlook Calendar Populator by Merge Mail VBA Macro, 2003
- ThermoXP, 2002-2016.
- CalendarMaker, 2005
- GradeAutoMailer, 2006-
- Xcuser[®] 2006/Extracurricular Activity Info[®] 2019
- Multi-university Cooperative Continuous Curriculum Improvement System for ABET Accreditation in BS Metallurgical Engineering.
- Applied Numerical Methods - online Textbook
- Metallurgical Thermochemistry - online Textbook
- *GradesToGo*[®] - Grade Emailing Utility
- ABET and Continuous Improvement System: <http://www.ABETMetEng.org/SD> (1998 - 2016)
- Ellingham Diagram Maker App[®] (VBA[®] & MATLAB) (2007 -)
- 3-D Predominance Volume Diagram Maker App[®] (VBA[®] & MATLAB) (2018 -)

CAMPUS COMMITTEES

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| <ul style="list-style-type: none"> • Presidential Search • Faculty Senate - Chair • Research – Chair • Computation – Chair • Library – Chair • Faculty Club – Chair • Science Fair/ Tech Days - Chair • Honors Convocation • Undergraduate Transfer • Materials Engineering and Science • Engineering Accreditation • Graduate Research Chair | <ul style="list-style-type: none"> • Director of Research Search • Academic Appeals • EPSCoR Proposal Committee • Enrollment Task Force Committee • Outstanding Recent Graduate • Hardrocker Flying Club • Freshman Curriculum • Undergraduate Advisor • Aviation Committee • Safety Committee • SWEAT – Team for Accreditation Review • ABET Accreditation |
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CAMPUS SERVICE

- Past Chair of the SDSM&T Faculty and Faculty Senate (2013 -)
- President Search Committee (2013)
- Physical Metallurgy Professor Search Committee (2013)
- Extractive Metallurgy Professor Search Committee (2013)
- Academic Appeals Committee (1998-)
- United Way community Representative (2012)
- United Way "Over the Top" Organizer (2012-)
- Chair of the SDSM&T Faculty (2010-12)
- Chair of the SDSM&T Faculty Senate (2010-12)
- Associate Vice President for Research-Economic Development Search Committee (2012)
- Physical Metallurgy Professor Search Committee (2004)
- Material Advantage Student Chapter Advisor (2000-)
- TMS/ASM Chapter Faculty Advisor (1987-1999)
- Alpha Sigma Mu Chapter Faculty Advisor (1980-92)
- Visiting Scientist Lecturer (1991-2)
- Chair, Department of Materials and Metallurgical Engineering (1994-2000).
- Metallurgical Engineering ABET and Continuous Improvement Director (1988-)
- Tech Day (1974 - 75) - Organized, and Chaired
- Football Ticket Sales (1972-8) - Supervised personnel at Tech football games
- Tech Day (1976-7) - Chairman
- High School Recruiting Engineering Representative

OTHER SKILLS AND ACHIEVEMENTS

- Land Surveying
- Certified Scuba Diver
- French Language
- Aircraft Pilot

COMPUTER EXPERTISE

MATLAB	Visual Basic	LINGO	FrontPage
MathCad	Microsoft Excel	ThermoCalc	Authorware
Dreamweaver	LabView	Dictra	Visual Studio.NET
MSPal	Microsoft Word	PageMaker	Computer Languages
RapidCast	Mathematica	Publisher	APL
Flash	Power Point	AllWebMenus	C+
PageMaker	Solid Works	ProCast®	BASIC
Met Sim	Pathware®	FireWorks	FORTRAN
F*A*C*T	JavaScript	Director	MATLAB

COMMUNITY SERVICE

- United Way Community 2012 -14
- SDSM&T United Way 2012 -18
- Rapid City Waste Tire Task Force 1994
- Highway Cleanup Program Material Advantage Chapter (Sheridan Lake Road) (2000 -)
- Wellspring Children's Home Material Advantage Chapter Day Hosting of Children(2000 - 2012)
- Visiting Scientist Program ~1,400 students addressed (1991-2)
- Parent Teachers Association Board Member; Pinedale School; Rapid City, SD
- Consultation (gratis) Corrosion advice to numerous non-profit organizations
- Tutor High School Student Math
- After School Programs WPC West Middle School after-school programs

- Church of Christ Director of 1972 Flood Relief and Assistance Program
1529 West Blvd Board of Trustees, Chairman
Rapid City, SD Director of Education; Finance Committee
(1971-76) Director of Benevolence; Search Committee, Chairman
Teacher: Adult, Junior, Senior; VBS Director

- Black Hills Church of Christ Board of Trustees, Chairman; Director of Education
Rapid City, SD Director of Benevolence; Finance Committee, Lay Minister
(1976-83)

- Westminster Presbyterian Church Elder and Session Member; Lay Minister
Rapid City, SD Finance Committee, Chair Personnel Committee
(1984-) Regular and Special Choirs, United Campus Ministry Liaison

PHOTO

