

**JOSEPH WILLIAM NEWKIRK, PhD, FAEM, FASM**  
Chair, Department of Nuclear Engineering & Radiation Science  
Research Associate, Center for Advanced Manufacturing Technology  
Research Associate, Graduate Center for Materials Research  
Faculty, Manufacturing Engineering Program  
*Missouri University of Science & Technology*

Research interests include additive manufacturing, advanced manufacturing technology, manufacturing systems, nuclear and aerospace materials, and materials processing. Also workforce development, systems design, societal impact of technology, and space exploration.

### **RELEVANT LEADERSHIP EXPERIENCE**

Served on Alpha Sigma Mu (Materials Honor Society) Board and became President, leading expansion of activities and new initiatives; Elected to APMI Board as only non-industrial member; elected to the prestigious ASM Nominating Committee, which is responsible for electing society leadership; elected to leadership of ASM Handbook committee, leading tripling of handbook content output and prioritization of replacement of outdated volumes; elected President of Graduate Faculty and Chair of the Graduate Faculty Council, revitalized function of Council and worked with VP for Graduate Studies on a number of initiatives, including distance PhD policies; Currently leading creation of Manufacturing Engineering BS degree and part of Chancellor's proposal team; proposed and currently lead the advanced manufacturing thrust area of the multimillion dollar Army Project; picked to represent manufacturing engineering to WUST (Poland) collaboration agreement. Lead creation of Blacksmithing Club which won Grand Prize at latest national Bladesmithing contest. Lead development of Manufacturing Engineering program and manufacturing research at S&T.

### **PROFESSIONAL EXPERIENCE**

2021-2022     Manufacturing Engineering Development Lead  
2016-2022     Professor, Department of Material Science & Engineering  
1993-2016     Associate Professor, Department of Material Science & Engineering  
Summer 1991   NORCUS Summer Fellow, Battelle Pacific Northwest Laboratory, Richland, WA.  
Summer 1989   UES Summer Fellow, Wright-Patterson Air Force Base, Dayton, OH.  
1987-1993     Assistant Professor, Department of Metallurgical Engineering, U. of Missouri-Rolla.  
1983-1986     Assistant Research Scientist, Major Analytical Instrumentation Center, U. of Florida.  
1981-1983     Assistant Research Engineer, Homer Research Laboratories, Bethlehem Steel Corp.  
Summer 1979   Engineering Intern, Maine Yankee Atomic Power Plant.

### **EDUCATIONAL HISTORY**

Ph.D.    (Materials Science), University of Virginia, 1983. PhD Advisor: Heinz Wilsdorf.  
M.S.    (Physics), Miami University, 1979.  
B.S.    (Physics), Miami University, 1977.  
Studied MBA, Webster University, 2003-2004

### **HONORS**

- Laufer Energy Symposium Organizing Committee, 2023, St. Louis, Mo
- 2022 Wadsworth-Sherby TMS Bladesmithing Grand Prize, Faculty Advisor to team
- COMPLAS 2021 Symposium Organizer, Barcelona, Spain
- 2020 Keynote Speaker, ICPDF Conference 2020, Riviera Maya, Mexico.
- 2019 Faculty Research Award
- International Organizing Committee for ICPDF '20, Riviera Maya, Mexico.
- 2019 Keynote Speaker, ICPDF Conference 2019, Panama City, Panama.

- International Organizing Committee for ICPDF '19, Panama City, Panama.
- 2018 Inaugural Alpha Sigma Mu Lecture, WPI, Worcester, MA.
- 2018 Keynote Speaker, Materials Research and Design Conference, Paris, France
- 2017 Alpha Sigma Mu Distinguished Lecturer, Pittsburgh, PA
- 2017 Honorary Membership awarded by Alpha Sigma Mu
- 2017 Faculty Research Award
- Elected President, Alpha Sigma Mu, 2016-2020
- 2016 Keynote Speaker, 2016 AWS Laser Conference, San Francisco, CA
- 2016 Faculty External Recognition Award
- 2015 ASM Fellow
- 2015 Graduate Faculty Presidential Service Award
- Best Paper Award (1 of 10) for the 2015 Solid Freeform Fabrication Symposium
- Invited Lecturer and Organizer, Summer University, Institute of Materials Science & Metallurgy, Ekaterinburg, Russia 2015
- Keramos, 2015
- 2014 Faculty Service Award
- Invited Lecturer, Institute of Materials Science and Metallurgy, Ural Federal Univ., Nov. 2014
- Keynote Speaker, Ural Welding Society, Ekaterinburg, RF 2014.
- 2013 Alpha Sigma Mu Fellow
- Keynote Talk “Advanced and Future Metals and Alloys,” Association of Women in the Metal Industries, St. Louis Chapter, 2012
- Keynote Talk, “Stainless Steel Technology,” International Society of Pharmaceutical Engineers, Midwest Chapter, 2012.
- Graduate Faculty President (2011-2016)
- Highly Commended Paper Award for Rapid Prototyping Journal, selected by Emerald Literati Network Awards for Excellence 2008. Based on the 2007 paper by F. Liou, K. Slattery, M. Kinsella, J. Newkirk, H. Chou, R. Landers.
- Certificate of Recognition and Appreciation for Outstanding Service, TMS 2000
- Keynote Speaker, 7th International Seminar on Heat Treatment and Surface Engineering of Light Alloys, Budapest, Hungary, 1999.
- Certificate of Recognition and Appreciation for Outstanding Service, TMS 1998
- Certificate of Recognition and Appreciation for Outstanding Service, TMS 1991
- Sigma Xi, 1988
- Alpha Sigma Mu, 1988
- Sigma Pi Sigma, 1978

## **ORGANIZATIONS AND PROFESSIONAL SERVICE**

*Journal of ASTM International* - Editorial Board

*International Journal of Powder Metallurgy* - Editorial Review Committee

*Encyclopedia of Aluminum and Its Alloys* – Editorial Advisory Board

American Nuclear Society – Member

International Conference “Materials Science Applications in Metallurgy, Machine Building, and Power Engineering, Organizing Committee, Ekaterinburg, Russia 2015

SME

Member (2021-present)

ASM International and the Heat Treating Society

ASM Content Committee, Member (2012-2015, 2018-2019)

Honorary Membership Selection Committee (2016-present)

Chair (2017-present)

Handbook committee member (2005-2019)  
Ex-Officio Member (2018-2019)  
Immediate Past Chairman (2014-2016)  
Chairman (2012-2014)  
Vol 7 Division Co-Editor  
Vice-Chair, Handbook Committee 2010-2012  
Handbook Editorial Board  
Non-Destructive Evaluation Liaison  
Heat Treating Liaison  
Aluminum Liaison  
Powder Metallurgy Liaison  
ASM Bradley Stoughton Selection Committee, 2014-present  
ASM Nominating Committee, 2014-2015  
New Products and Services Committee, Past member  
Cryogenics Sub-Committee, Past Co-Chairman.  
HTS Technical Programming committee, 2008, 2009, & 2010.  
Journal of Materials Engineering and Performance Committee, Past Member  
Journal of Materials Engineering and Performance, Past editor  
Organizing Committee of 1<sup>st</sup> Int. Non-Ferrous Processing and Technology Conference, St. Louis, 1997.

APMI International  
Board of Directors, 2012-2016  
Technical Program Committee for PM<sup>2</sup>TEC 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007 & 2008, 2010, 2011, 2012, 2013, 2014, & 2015 (membership by invitation only).  
Technical Program Committee for AMPM conference 2015  
Technical Program Committee, 2003 International Conference on Automotive Fatigue Design & Applications.  
Poster Committee for PM<sup>2</sup>TEC 2002 (invitation only).

Alpha Sigma Mu  
President 2016-2020  
Board of Directors, 2014-present  
Vice-President, 2016  
Awards Chair, 2015-2017

ASME  
International Organizing Committee for “Heat Treatment and Surface Engineering in Automotive Applications” 20-22 June 2005, Riva del Garda, Italy  
Missouri Industries of the Future Aluminum Team – Champion (2002)

MSA (formerly EMSA)  
Education Committee (1982-1990)  
Chairman (1988-1990)  
Vice-Chairman (1986-1988)

Central States Electron Microscopy Society  
Organizer & Chair of 1992 CSEMS Fall Meeting (1992)

The Metallurgical Society (TMS)  
Powder Metallurgy Committee (1996-2002)  
Vice-Chairman (1998-2001)  
Chairman (2001-2002)

Refractory Metals Committee (1996-2000)  
Non-Ferrous Committee (2000-2002)  
“New and Emerging Applications for Refractory Metals and Materials” Symposium. (1998),

Sole Organizer

“Light Weight Metal Powder Technology” Symposium (1999), Principal Organizer

“Wear-Resistant PM Alloys for Agricultural and Industrial Applications” Symposium. (2000),

Co-Organizer

“New and Emerging Applications for Refractory Metals and Materials” Symposium (1998),

Sole Organizer

“Light Weight Metal Powder Technology” Symposium (1999), Principal Organizer

“Wear-Resistant PM Alloys for Agricultural and Industrial Applications” Symposium (2000),

Co-Organizer

## **CURRENT UNIVERSITY SERVICE**

“Protoplex” Executive Committee

“Protoplex” Equipment Selection Committee

CEC Dean’s Scholar Selection Committee

Blacksmithing Club Faculty Advisor

Manufacturing Engineering Advisory Committee

Desloge-Watlow Scholarship Committee

## **PRIOR FUNDED RESEARCH AT Mo S&T**

1. Shared Research Equipment Grant, Funded by Oak Ridge Associated Univ., 6/87, \$410.
2. "Microstructural Analysis of Rapidly Solidified Titanium Aluminide Alloys," PI, Funded by the McDonnell Aircraft Corporation, 3/88-6/89, \$45,536.
3. "The Addition of Boron to Ti<sub>3</sub>Al for High Temperature Aerospace Applications," PI, Funded by the Weldon Spring Foundation, 4/87-3/89, \$14,967.
4. "Development of New Structural Materials for Hypersonic Flight," PI, Funded by the Missouri Research Assistance Act, 7/88-6/90, \$15,810.
5. "Evaluation of Fiber-Matrix Compatibility of High Temperature Metal Matrix Composites," PI, Funded by the MRAA and McDonnell Aircraft Company, 1/90-3/92, \$75,750.
6. "Nanostructural Study of Plasma-Deposited Fe<sub>x</sub>N<sub>y</sub> Films", Co-PI, Missouri Research Board, 1/94-12/94, \$47,600.
7. "Fabrication of Intermetallics Using Amorphous Precursors", PI, Missouri Research Board, 7/94-8/95, \$25,074.
8. “Higher Performance, Lower Cost Shape Memory Alloys by Reaction Chemistry Control,” PI, Funded by the Missouri Research Board, 7/96-6/97, \$34,458.
9. “Direct Reduction of Magnetite Powders to MIM Feedstock,” PI, Funded by the Pea Ridge Iron Ore Co., 2/97-7/97, \$10,000.
10. “Impurity Treatment in Bulk Nitrogen,” Co-PI, Funded by MG Industries, 8/98-1/99, \$16,763.
11. "Development of Sulfuric Acid Resistant Ni-Si Alloys," PI, Funded by Charles S. Lewis & Co. Inc., 11/92-12/99, \$370,816.
12. “Preliminary Investigation of Cryotempering of Tool Steels,” Co-PI, Funded by Materials Enhancement Inc., 5/99-12/99, \$10,000.
13. “Effect of Quench Rate on the Microstructure, Fracture, and Fatigue Properties of 7050 Aluminum,” PI, Funded by Century Aluminum Co., 9/97-9/00, \$162,044.
14. “Witness Plate Analysis”, PI, Funded by Science Applications International Corp., 5/01-6/01, \$9,000.
15. “Development of New Wear-Resistant Coatings Deposited by PTA,” PI, Funded by Good Earth Tools, Inc. and the Missouri Research and Training Center, 8/00-8/01, \$52,719.
16. “The Effect of Quench Rate on the Mechanical Properties of 7040 Aluminum,” PI, Funded by Pechiney Rolled Products, 9/00 to 12/01, \$73,537.
17. “The Development of Optimized Heat Treatments for Cast Aluminum Alloy B319 Used in

- Powertrain Components,” PI, Funded by General Motors, 2/00-5/02, \$235,057.
18. “Study of the Variability of Mechanical Properties of Sinter Hardened P/M Alloys,” PI, Funded by Hoeganaes Corp., 4/02-4/04, \$59,180.
  19. “Abrasive Waterjet System for Cutting Through the Casing of Munition Items Containing Energetic Material, Ranging in Size Between 40mm to 120mm,” Co-I (10%), Funded by US-ONR, 9/00-12/04, \$2,226,179 (\$222,618).
  20. “Proof of Concept: Improved Roller Contract Fatigue through FSP,” PI, funded by GKN Sinter Metals, 4/05-5/2005, \$2,004.
  21. “Advanced Abrasive Slurry Jet Nozzle Manufacture,” Co-I (35%), Funded by USAF, 8/04-5/06, \$232,090 (\$81,232).
  22. “Hybrid Deposition and Removal of Metals for Aerospace Systems,” Co-I (20%), Funded by USAF, 6/04-5/06, \$802,644 (\$160,529)
  23. “Corrosion Prevention of Friction Stir Welded Joints,” Co-PI (40%) Funded by USAF, 6/04-5/06, \$155,192 (\$62,397)
  24. “Proof of Concept: Titanium Alloy Surface composites,” PI, funded by Lockheed Martin Corporation, 10/05-12/05, \$3,000.
  25. “Hybrid Deposition and Removal Process for Aerospace Parts with Complex Geometry,” Co-I (15%), Funded by USAF, 4/06-4/08, \$170,000 (\$25,500)
  26. “Recrystallization and Microstructure Control of Laser Deposition Using Hybrid Process,” Co-PI (46%), Funded by USAF, 4/06-4/08, \$95,000 (\$43,700)
  27. “Ni-Si Alloys for the S-I Reactor-Hydrogen Production Process Interface,” PI (60%), Funded by DOE, 3/06-3/09, \$399,814 (\$239,888)
  28. “Direct Metal Deposition of Graded Alloys for A Space Heat Exchanger,” Co-PI (34%), Funded by USAF, 5/08-5/10, \$160,000 (\$54,400)
  29. “Laser Cladding of Green Landing Materials,” Co-I (30%), Funded by USAF, 5/08-5/10, \$80,000 (\$27,000)
  30. “Abrasive Waterjet System for Cutting Through the Casing of Munition Items Containing Energetic Material,” Co-I (10%), Funded by US-ONR, 4/07-5/10, \$518,906 (\$51,891).
  31. “Advanced Military Installations that Integrate Renewable Energy and Advanced Energy Storage Technologies,” Co-I (4%), Funded by USAF, 6/09-5/2012, \$7,850,005 (\$314,000).
  32. “Formulation of Iron Phosphate Glasses with Simulated Hanford LAW for Joule Heated and Cold Crucible Induction Melters,” Co-I (10%), Funded by DOE, 4/10-1/11, \$800,000 (\$80,000).
  33. “Surface Finishing of Additive Metal Processes,” Co-PI (50%), Funded by USAF, 9/10-8/11, \$25,000 (\$17,500)
  34. “Prediction and Validation of Material Behavior Fabricated from Additive Metal,” Co-PI (50%), Funded by Boeing Corp, 1/12-12/12, \$40,000 (\$20,000)
  35. “Direct Metal Deposition of Functionally Gradient Materials,” Co-PI (50%), Funded by Boeing and Rolls-Royce, 12/12-11/13, \$80,000 (\$40,000).
  36. “REU Site: Additive Manufacturing,” Co-I (5%), Funded by NSF, 7/10-3/19, \$1,074,986 (\$53,749).
  37. “Multiscale and Multiphysics Modeling of Additive Manufacturing of Advanced Materials,” Co-I (30%), Funded by NASA, 6/11-5/14, \$659,986 (\$197,995)
  38. “Direct Metal Deposition of IN625 and Ti64 Functionally Gradient Materials,” Co-PI, Funded by Boeing, 12/13-11/14, \$20,000 (\$10,000).
  39. “Metallurgical Examination of High Energy Formed Aluminum,” PI, Funded by Boeing Corp., 08/14-12/14, \$9882.
  40. “GANN: Doctoral Research and Training in Direct Digital Manufacturing,” Co-I (10%), Funded by Department of Education, 8/12-8/15, \$533,064 (\$53,306).
  41. “Metal Additive Manufacturing Materials Analysis for Missouri S&T,” Co-PI (20%), Funded by Honeywell Fed Mfg and Tech, 05/15-8/19, \$3,655,346 (\$731,069)
  42. “Direct Metal Deposition of SS316 and Ti64 Functionally Gradient Materials with Elemental Powders,” Co-PI (40%), Funded by Boeing, 12/14-11/15, \$40,000 (\$16,000).

43. "Fabrication of Advanced Materials," Co-I (25%), Funded by NASA, 9/14-8/16, \$750,000 (\$187,500)
44. "Fabrication of Ti -  $\gamma$ -TiAl Functionally Gradient Materials," Co-PI (50%), Funded by CAMT-Boeing, 1/16-12/16, \$40,000 (\$20,000).
45. "Investigation of Build Strategies for a Hybrid Manufacturing Process," Co-PI (50%), Funded by CAMT-Boeing, 1/17-12/17, \$72,000 (\$36,000).
46. "Additive Manufacturing of Lightweight Metal Structures: Unit Cell Modeling," Co-PI (45%), Funded by CAMT-Spirit, 1/17-12/18, \$80,000 (\$36,000).
47. "Incorporation of Surface Residual Stress Engineering into Aerospace Practice Project," PI, Boeing Corp. (Metals Affordability Initiative), 05/15-7/18, \$315,338.
48. "Magnetic Material Synthesis," PI (50%), Funded by Honeywell Fed Mfg and Tech, 8/18-8/18, \$24,902 (\$12,451).
49. "Investigation of Build Strategies for a Large Hybrid Manufacturing Process," Co-PI (50%), Funded by CAMT-Boeing, 1/18-12/18, \$52,000 (\$26,000).
50. "Development of New Resistance Heater Materials," PI, Watlow Corp., 11/16-12/18, \$142,941.
51. "AM Residual Stress for Missouri University of Science & Technology," PI, Funded by Boeing Research and Technology, 7/18-12/18, \$45,372.
52. "Material Characterization and Analysis for RR-12 and RR-13 Projects," PI, Boeing Corp. (Metals Affordability Initiative), 2/18-1/19, \$10,912.
53. "Advanced Mechanical Testing (AMT) System for Highly Irradiated Materials," Co-PI (50%), Funded by CAMT-PINE, 8/18-7/19, \$50,000 (\$25,000).
54. "Surface Residual Stress Resolution Study" PI, Funded by Boeing Corp., 1/19-1/20, \$11,934.
55. "Planning Grant: Engineering Research Center for Integrative Manufacturing and Remanufacturing Technologies (iMart) to Spur Rural Development," Co-PI (10%), Funded by NSF, 9/19-8/20, \$100,000 (\$10,000).
56. "Establishing Missouri S&T Testing and Characterization Services for Advanced Manufacturing Research and Development," PI, CAMT-Boeing, 1/19-12/20, \$95,000.
57. "Plasma Spheroidization of Copper Powders" PI (55%), Honeywell Fed Mfg and Tech, 2/21-8/21, \$41,894 (\$23,041).
58. "Additive Materials Evaluations FY21," Co-PI (45%), Honeywell Fed Mfg and Tech, 4/21-8/21, \$72,528 (\$36,637).
59. "Additively Manufactured Metal Cellular Structures," Co-PI (50%), Honeywell Fed Mfg and Tech, 11/18-8/21, \$542,300 (\$271,150).
60. "Development of Material Characterization Method for Formed Component," PI, CAMT-Spirit Aerosystems, 1/21-12/21, \$25,000.
61. "Investigation of Oxidation Reduction of Ti64 in Hybrid Manufacturing Processing," Co-PI (40%), CAMT-Boeing, 1/19-12/21, \$135,000 (\$54,000).
62. "Development of Material Characterization Method for Formed Component," PI, CAMT-Spirit Aerosystems, 1/21-12/21, \$25,000.
63. "STTR: Phase II: Advanced Mechanical Testing (AMT) System for Highly Irradiated Materials," Co-PI (25%), Product Innovation and Engr, LLC, 8/19-8/22, \$300,000 (\$75,000).
64. "Development of High Throughput Mechanical Properties Testing," Co-PI (50%), Battelle Energy Alliance, LLC, 3/20-9/22, \$287,876 (\$143,938).
65. "Residual Stress Measurements," PI, Boeing, 11/21-9/22, \$91,532.
66. "Hiperc Replacement," PI (55%), Honeywell Fed Mfg and Tech, 1/20-9/22, \$431,282 (\$237,205).
67. "Next Generation Titanium for AM," PI (55%), Honeywell Fed Mfg and Tech, 1/22-11/22, \$111,112 (\$61,112).
68. "Trace Powder Contaminant Detectability Using IntelliSEM," Co-PI (50%), CAMT-Boeing, 1/21-12/22, \$40,000 (\$20,000).
69. "MRI: Development of an Advanced Materials Additive Manufacturing (AM2) System for Research and Education," Co-PI (25% Shared Credit), NSF, 09/16-12/22, \$961,018 (\$240,254)

70. "Predicting Performance of Additively Manufactured Metal Structures for Aerospace Applications," Co-PI (50%), CAMT-Spirit Aerosystems & Stratasy Direct, 1/19-12/22, \$220,925 (\$110,463).
71. "Establishing Testing and Characterization Methods for AM Qualification," PI, CAMT-Boeing, 1/21-12/22, \$100,000.

### **CURRENT GRANTS**

1. "Hiperco Replacement," PI (55%), Honeywell Fed Mfg and Tech, 1/23-8/23, \$130,250 (\$71,638).
2. "Rapid Development of Next Generation Ultrahigh Strength and Lightweight Steels for Army Modernization," Co-PI (15%), Funded by Army Research Office, 9/20-9/25, \$19,759,483 (\$2,963,922).
3. "Chemistry Variability for Performance and Lifecycle Models," Co-PI (45%), Honeywell Fed Mfg and Tech, 2/21-8/23, \$287,746 (\$129,485).
4. "Advanced Additive Manufacturing of Titanium," PI, Honeywell Fed Mfg and Tech, 2/23-8/23, \$121,856.
5. "Simulated Service Testing, Materials Characterization, and Thermo-Mechanical Processing Development of Metallic Materials for Extreme Environments," PI (75%), Boeing, 5/21-6/23, \$118,753(89,065).
6. "Process Modeling of Additively Manufactured Metallic Structures," Co-PI (50%), CAMT-Spirit Aerosystems, 1/23-12/23, \$40,000 (\$20,000).
7. "Development of High Throughput Mechanical Properties Testing," Co-PI (50%), Battelle Energy Alliance, LLC, 3/20-9/23, \$287,876 (\$143,938).
8. "Investigation of U-Mo Monolithic Fuel Interfacial Bond Strengths," PI, Battelle, 3/23-9/23, \$309,388.

### **PATENTS AND DISCLOSURES**

- US Patent #6,342,181, 1/2902 "Corrosion Resistant Nickel-Based Alloy." Inventor with S. Zhang.
- US Patent #8,617,661, 12/31/13 "Systems and Methods for Fabricating a Direct Metal Deposition Structure Having Fully Forged Structural Qualities," Inventor with F. Liou and R. Francis.
- US Patent Application, "A Refractory Complex Concentrated Alloy for Improved Oxidation Resistance and Structural Stability," Inventor with A. Mann and A. Yousefiani, filed June 24, 2022.
- US Patent Application, #18/492,210, "Method for Predicting the Performance of Novel Intermetallics," Inventor with W. Everhart, filed October 23, 2023
- US Patent application to be submitted, "Method for Development of New Magnetic Materials."
- UM Disclosure No. 91UMR010, "Room Temperature Consolidation of Intermetallic Alloy Powders," Sole Inventor, October 1990.
- UM Disclosure No. 98UMR038, "Axial Deformation Device," with D. S. MacKenzie, March 1998.
- UM Disclosure No. 04UMR028, "Mechanical Method for Producing In-Situ Cylinder Liners in Cast Aluminum Engines," with R. Mishra
- US Patent Appl. #10/927,215 "Selective Reinforcement of Metallic Bodies," filed 8/26/04 with R. Mishra, subsequently withdrawn

### **PUBLICATIONS**

#### Books Edited

1. "Powder Metallurgy Alloys and Particulate Materials for Industrial Applications," D.E. Alman and J.W. Newkirk, Ed., TMS, 2000.
2. ASM Handbook: Vol. 7, Powder Metal Technologies and Applications, Co-Editor, October 2015.
3. "Advanced Methods and Technologies in Metallurgy," J.W. Newkirk, A.G. Illarionov, A.S. Zhilin, Editors, WIT Press, December 21<sup>st</sup>, 2015.
4. "Progress in Materials Sciences and Technologies," J.W. Newkirk, A.A. Popov, A.S. Zhilin, Editors, WIT Press, December 21<sup>st</sup>, 2015.

5. "Advanced Methods and Technologies in Metallurgy in Russia," S Syngellakis, JJ Connor, Editors, and J.W. Newkirk, A.G. Illarionov, A.S. Zhilin, Associate Editors, Springer Int., 2018.
6. "Progress in Materials Science and Engineering," C Brebbia, JJ Connor, Editors, and J.W. Newkirk, A.A. Popov, A.S. Zhilin, Associate Editors, Springer Int., 2018.

#### Book Chapters

1. "Aluminum Powder Metallurgy," by J.W. Newkirk, Chapter 29 of the Handbook of Aluminum, Volume 1, Physical Metallurgy and Processes, Marcel Dekker, 2003, pp. 1251-1282.
2. "Designing With P/M Alloys," by J.W. Newkirk and R.A. Kohser, Chapter 14 of the Handbook of Mechanical Design Based on Material Composition, Marcel Dekker, 2004, pp. 641-666.
3. "Heat Treatment of Powder Metallurgy Steel Components," by J.W. Newkirk, Steel Heat Treatment Handbook: Second Edition, Steel Heat Treatment: Metallurgy and Technologies, Taylor & Francis 2007, pp. 741-787.
4. "Heat Treatment of PM Steels," by J.W. Newkirk, ASM Handbook, Vol. 4D, Heat Treating of Irons and Steels, ASM International, October 2014, pp. 253-273.
5. "Powder Metallurgy Alloys: Designing With," by J.W. Newkirk and R.A. Kohser, Encyclopedia of Iron, Steel, and Their Alloys (EISA), CRC Press, pp. 2606-2622, 2016.
6. "Powder Metallurgy Steel Components: Heat Treatment," by J.W. Newkirk and S.N. Thakur, Encyclopedia of Iron, Steel, and Their Alloys (EISA), CRC Press, pp. 2623-2656, 2016.
7. "Aerospace Applications of Laser Additive Manufacturing," by **F. Liou** and J.W. Newkirk, Chapter 29 in Laser Additive Manufacturing: Materials, Processes, Design and Applications, Elsevier Limited, pp. 351-371, 2017
8. "Powder Metals and Processing," by J.W. Newkirk, Encyclopedia of Aluminum Its Alloys (EAIA), CRC Press, February 2018.

#### Refereed Archival Publications

1. J. W. Newkirk and D. J. Dixon, "The Interaction of Tantalum with Reinforcements in TiAl," *Journal of Materials Science and Engineering*, A153, pp. 662-667, 1992.
2. F. A. Garner, M. L. Hamilton, T. Shikama, D. J. Edwards and J. W. Newkirk, "Response of Solute and Precipitation Strengthened Copper Alloys at High Neutron Exposure", *Journal of Nuclear Materials*, 191-194, pp. 386-390, 1992.
3. D. J. Edwards, J. W. Newkirk, F. A. Garner, M. L. Hamilton, A. Nadkarny, and P. Samal, "The Response of Dispersion-Strengthened Copper Alloys to High Fluence Neutron Irradiation at 415C", *Journal of Nuclear Materials*, 191-194, p. 416, 1992.
4. N. Seikimura, F. A. Garner, and J. W. Newkirk, "Silicon's Role in Determining Swelling in Neutron-Irradiated Fe-Cr-Ni-Si Alloys", *J. of Nuclear Materials*, 191-194, pp. 1244-1247, 1992.
5. M. E. Schlesinger and J. W. Newkirk, "The Influence of Solution-Model Complexity on Phase Diagram Prediction," *Journal of Phase Equilibria*, Vol. 14(1), 1993.
6. F. A. Garner, K. Miyahara, J. W. Newkirk and H. Kinoshita, "Influence of Cold Work and Phosphorus Content on Neutron-Induced Swelling of Fe-Cr-Ni Alloys", *Journal of Nuclear Materials*, 199, pp. 132-142, 1993.
7. F. A. Garner, N. Sekimura, M. L. Grossbeck, M. Kiritani, J. W. Newkirk, and H. Watanabe, "Influence of Details of Reactor History on Microstructural Development During Neutron Irradiation," *Journal of Nuclear Materials*, 205, pp. 206-218, 1993.
8. D. J. Edwards, F. A. Garner, J. W. Newkirk, and A. Nadkarni, "Neutron-Induced Microstructural Alteration of GlidCop Alloys at ~415C and High Neutron Exposure," *Journal of Nuclear Materials*, 212-215, pp. 1313-1317, 1994.
9. H. Siriwardane, O.A. Pringle, J.W. Newkirk, and W.J. James, "Microstructure and Physical Properties of Iron Carbide Films Formed by Plasma Enhanced Chemical Vapor Deposition," *Thin Solid Films*, 287, pp. 8-15, 1996



10. H. Siriwardane, O.A. Pringle, J.W. Newkirk, and W.J. James, "Microstructure of Thin Iron Carbide Films Prepared in a Glow Discharge, *Thin Solid Films*, 279, p. 155, 1996.
11. Terry Cruse & J. W. Newkirk, "Evaluation of Methods to Produce Tough Cr<sub>3</sub>Si Based Composites," *Materials Science & Engineering*, A241, pp. 410-418, 1997.
12. J.W. Newkirk and D.S. MacKenzie, "The Jominy End Quench for Light-Weight Alloy Development," *Journal of Materials Eng. and Performance*, Vol. 9, No.4, pp. 408-415, 2000.
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132. M. Yang, M. Parvez, T. Sparks, S. Babolola, J. Newkirk, F. Liou, and K. Chandrashekhara, "Directed Energy Deposition Processing-Performance Relationship of AF9628," 2022 Solid Freeform Fabrication Symposium, pp. 450-465, 2022.

Non Refereed Journals

1. J. W. Newkirk, "Expanding Horizons for Mechanical Alloying," *Industrial Heating Magazine*, October 1997.
2. J.W. Newkirk and R.A. Kohser, "Cryogenic Treatment of Tool Steels: Questions Posed and Answers Sought," *Industrial Heating Magazine*, March 2000.
3. J.W. Newkirk, "PM manufacturing research boosted by continuous sintering furnace," *Powder Metallurgy*, 47(3), pp. 221-222, 2004.
4. J.W. Newkirk, "PM Manufacturing Gets Boost with Continuous Sintering Furnace," *Industrial Heating Magazine*, 2004.

Recent Presentations (last five years)

1. "Aerospace Materials; The Quest for Lighter, Stronger, Cheaper," Invited Lecturer, ASM Materials Camp, Rolla, Mo June 2017.
2. "Creating the Materials of Tomorrow," 2017 Alpha Sigma Mu Distinguished Lecture, Annual Alpha Sigma Mu Meeting, Pittsburgh, PA, October 2017.
3. "Evaluating Material Property Variations In Components With Difficult Geometries," 2017 ASME International Mechanical Engineering Congress and Exposition.
4. "Selective Laser Melting of Fe-Co Intermetallics and Resulting Grain Boundary Performance," Invited Speaker, International Conference on Plasticity, Damage, and Fracture, January 2018.
5. "Creating the Materials of Tomorrow," Keynote Address, Materials Research and Design Conference, Paris, France, February 2018
6. "Investigation of Fabrication of Ti64 Components Using Hybrid Additive Manufacturing," Invited Speaker, Advances in Additive Manufacturing of Titanium Symposium, TMS 2018, March 2018.
7. "Alpha Sigma Mu Student Chapter Presentation," Invited Lecturer, Colorado School of Mines, May 2018.
8. "Aerospace Materials; The Quest for Lighter, Stronger, Cheaper," Invited Lecturer, ASM Materials Camp, Rolla, Mo July 2018.
9. "Characterization and Development of Additive Manufacturing Materials," Idaho National Laboratories, June 2018.
10. "Materials Innovation Drives the Future," 2018 Alpha Sigma Mu Lecture, Worcester Polytechnic Institute, October 2018.
11. "Metal Additive Manufacturing, Issues to be solved, opportunities to be exploited," Invited Lecturer, Washington University, November 2018.
12. "Residual Stress Measurement and Property Testing in the Microscale," Invited Lecturer, PSMRC Industry Meeting, November 2018.
13. "Why is Plasticity in Intermetallic Compounds and Alloys Important," Keynote Address, International Crystal Plasticity, Damage, and Fracture Conf., Panama City, Panama, January 2019.
14. "Local Residual Stress Measurement of AM Materials at the Micron Scale," TMS 2019.
15. "Aerospace Materials; The Quest for Lighter, Stronger, Cheaper," Invited Lecturer, ASM Materials Camp, Rolla, Mo July 2019.
16. "Long Life Materials for Aggressive Sulfuric Acid Environments," Vexag 2019, November 2019.
17. "Additive Manufacturing of Polymer and Metal Cellular Structures," Naval Research Labs, December 2019
18. "Overview of Factors Controlling Ductility in Intermetallic Compounds and Alloys," Keynote Address, International Crystal Plasticity, Damage, and Fracture Conference, Rivera Maya, Mexico, January 2020.
19. "Mesoscale Open Structures for Lightweight Structures," Invited Speaker, MS&T2020 Virtual Meeting, November 2020.
20. "Multimaterial, Multifunctional Design of Metallic Components," Invited Speaker, MS&T2020 Virtual Meeting, November 2020.
21. "Creating the Materials of Tomorrow," Invited Lecturer, ASM Materials Camp, Rolla, Mo July 2022.

22. "Towards more rapid deployment of Nuclear Materials," Invited Speaker, Nuclear Engineering Seminar, Mo S&T, October 2022.
23. "Towards More Rapid Deployment of Alloys for Nuclear," Invited Speaker, Laufer Symposium on Energy Economics and Policy, April 2023.

### **THESES DIRECTED**

1. K. T. Slattery, "Effects of 0.5% Boron on Cobalt Aluminide," Master's Thesis, University of Missouri-Rolla, May 1988.
2. G. B. Feldewerth, "Microalloying of Boron in Ti<sub>3</sub>Al," Master's Thesis, University of Missouri-Rolla, December 1989.
3. D. J. Edwards, "Partitioning of Beta Stabilizing Elements in Rapidly Solidified Ti-14Al-20Nb-3.2V-2Mo," Master's Thesis, University of Missouri-Rolla, May 1990.
4. S. Dutta, "Effect of Plasma Treatment on the Oxidation Behavior of Nb Alloys," co-advised Master's Thesis, University of Missouri-Rolla, May 1991.
5. D. J. Dixon, "Interaction of Reinforcing Fibers with TiAl at High Temperatures, Master's Thesis, University of Missouri-Rolla, May 1992.
6. G. B. Feldewerth, "Electron Charge Density Measurements of Covalency in Intermetallic Compounds," Doctoral Dissertation, University of Missouri-Rolla, May 1992.
7. D. J. Edwards, "Embrittlement of Irradiated Copper Alloys," co-advised Doctoral Dissertation, University of Missouri-Rolla, May 1993.
8. S. Majumdar, "Extrusion of Mechanically Alloyed Intermetallic Compounds", Masters Thesis, University of Missouri-Rolla, December 1993.
9. J. E. Price, "The Effect of Dispersoids on the Ductile Phase Toughening of Cr-Cr<sub>3</sub>Si Alloys," Masters Thesis, University of Missouri-Rolla, May 1995.
10. S. MacKenzie, "The Refurbishment of a Small Generator and Integral Quench Furnace for Laboratory Applications," Masters Thesis, University of Missouri-Rolla, December 1995.
11. J. A. Sago, "Ductile Second Phase Toughening in Cr-Cr<sub>3</sub>Si Alloys," Master's Thesis, University of Missouri-Rolla, August 1996.
12. D. Reinhart, "Sub-size Specimens of Nuclear Pressure Vessel Steels," co-advised Masters Thesis in Nuclear Engineering, University of Missouri-Rolla, August 1996.
13. T. Cruse, "Powder Processing of Cr-Cr<sub>3</sub>Si Alloys," Doctoral Dissertation, University of Missouri-Rolla, May 1998.
14. K. Ganapati, "Mechanical Alloying of Refractory Composites," Masters Thesis, University of Missouri-Rolla, August 1998.
15. S. Zhang, "Development of a sulfuric Acid Resistant Cast Alloy Based on Ni<sub>3</sub>Si." Doctoral Dissertation, May 2000.
16. M. Perez, "Hard Materials Based on Refractory Metal Silicides," Masters Thesis, University of Missouri-Rolla, December 2000.
17. Sachin Mehta, "Quench Rate Studies of Cast B319," Masters Thesis, U. of Missouri-Rolla, May 2001.
18. D. S. MacKenzie, "Quench Rate and Aging Effects in Aluminum-Zinc-Magnesium-Copper Aluminum Alloys," Doctoral Dissertation, University of Missouri-Rolla, May 2001.
19. S. Wei, "Effect of Quench Rate on Fracture Toughness of 7xxx Series Aluminum Alloys," Masters Thesis, University of Missouri-Rolla, May 2002.
20. S. Thakur, "Variability of Sinter Hardened P/M Steels," Masters Thesis, U. of Missouri-Rolla, December 2003.
21. J. Thomas, "Wear Resistant Surfaces through Friction Stir Powder Processing," Masters Thesis, University of Missouri-Rolla, May 2004.
22. A. Mohammadi, "Study of Heat Treatment Effects on Properties and Structures of A356 and B319 Cast Aluminum Alloys," Masters Thesis, University of Missouri-Rolla, May 2004.

23. J. A. Sago, "MIM Powders through Mechanical Alloying," Doctoral Dissertation, University of Missouri-Rolla, August 2004.
24. J. Bao, "Improved Coatings for Wear Applications," Doctoral Dissertation, University of Missouri-Rolla, August 2004.
25. K. McNelis, "Corrosion and Wear Resistant Coatings for Ferrous Alloys," Masters Thesis, University of Missouri-Rolla, August 2004.
26. U. Ramadora, "Improving Corrosion Resistance of Friction Stir Welded Aluminum Alloys," Masters Thesis, University of Missouri-Rolla, May 2005.
27. A. Jambunathan, "FSP of Al P/M Composites," Masters Thesis, U. of Missouri-Rolla, August 2006.
28. V. Bao, "Mechanical Properties And Microstructure Study For Direct Metal Deposition Of Titanium Alloy And Tool Steel," Masters Thesis, Manufacturing Eng., Missouri University of Science & Tech., May 2008.
29. A. Jambunathan, Non-Thesis Masters, Missouri U. of Science & Tech., August 2008.
30. R. Francis, "Friction Stir Processing Of Laser Metal Deposited Ti-6Al-4V," Masters Thesis, Manufacturing Eng., Missouri University of Science & Tech., December 2008.
31. C. Larson, "The Development of Nickel-Silicon Intermetallic Alloys for the Sulfur-Iodine Thermochemical Cycle," Masters Thesis, Missouri U. of Science & Tech., December 2008.
32. V. Gandikota, "Quench Factor Analysis of Aluminum Alloys," Masters Thesis, Missouri University of Science & Tech., December 2008.
33. J. Hsu, "Development of Ni-Si Alloy for S-I Cycle Process," PhD Dissertation, Missouri University of Science & Technology, August 2010.
34. Sujit Dongare, "Localized mechanical properties of Laser Deposited Alloys," Master's Thesis, Missouri University of Science & Tech., December 2012.
35. R. Clayton, "Modeling and Simulation of Materials from Direct Digital Manufacturing," Master's Thesis, Missouri University of Science & Tech., May 2013.
36. S. Pulugurtha, "Study of Functionally Gradient Materials Through Laser Additive Manufacturing," PhD Dissertation, Missouri University of Science & Technology, December 2014.
37. H. Sistla, "Using Laser Deposition to Fabricate Parts from Advanced Materials, Master's Thesis, Missouri University of Science & Technology, May 2014.
38. H.H.A. Kadhum, "Theoretical and experimental study of Friction Stir Welding parameters for dissimilar alloys," co-advisor, PhD Dissertation, University of Baghdad, May 2014.
39. T.Amine, "Impact of Process Parameters and Build Scheme of Direct Digital Manufacturing by Laser on Mechanical Property Values and Robustness," PhD Dissertation, Missouri University of Science & Technology, May 2015.
40. S. Karnati, "Thermographic Investigation of Laser Metal Deposition," Master's Thesis, Missouri University of Science & Technology, May 2015.
41. S.P. Isanaka, "Novel Design and Manufacturing Strategies for Portable Air-Breathing Proton Exchange Membrane Fuel Cells," PhD Dissertation, Missouri University of Science & Technology, May 2016.
42. E.A. Burns, "Study of Residual Stress Creation, Measurement, and Performance in Aerospace Alloys," PhD Dissertation, Missouri University of Science & Technology, December 2018.
43. C. Kriewall, "Characterization of Powder Used for Additive Manufacturing and Plasma Spheroidization," MS Thesis, Missouri University of Science & Technology, December 2018.
44. M. Spratt, "Development of Lightweight Materials by Meso- and Microstructure Control," PhD Dissertation, Missouri University of Science & Technology, December 2020.
45. W. Everhart, "SLM of Advanced Magnetic Materials," PhD Dissertation, Missouri University of Science & Technology, Expected December 2023.
46. Austin Mann, "Multiprincipal Element Alloys for Hypersonics," PhD Dissertation, Missouri University of Science & Technology, May 2023.
47. C. Ortiz-Rios, "Residual Stresses in Additively Manufactured Materials," PhD Dissertation, Missouri University of Science & Technology, Expected May 2022.

48. Choji Daches, "Hipercoco Plasticity Improvement," PhD Dissertation, Missouri University of Science & Technology, Expected May 2023.
49. Anilas Karimpilakkal, "Radiation Resistant Multiprincipal Element Alloys," PhD Dissertation, Missouri University of Science & Technology, Expected May 2023.
50. Jason Schultess, "Fabrication Issues with U-Mo Fuel Components," PhD Dissertation, Missouri University of Science & Technology, Expected May 2025.