

Yiliang “Leon” Liao

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PROFESSIONAL EXPERIENCE

Associate Professor: Department of Industrial and Manufacturing Systems Engineering, Iowa State University (ISU), Ames, IA, 2020-present

Assistant Professor: Department of Mechanical Engineering, University of Nevada, Reno (UNR), Reno, NV, 2014-2020

Research Engineer: Caterpillar Global R&D Center, Caterpillar Inc., Peoria, IL, 2013-2014

Mechanical Engineer (Internship): Caterpillar Inc., Lafayette Engine Center, IN, 05/2012-09/2012

RESEARCH INTEREST

- Laser-based advanced manufacturing, laser materials processing, modeling of laser-matter interactions
- Additive manufacturing (3D printing)
- Micro/nanoscale manufacturing
- Advanced materials processing towards applications in soft robotics, energy storage, biomedical engineering, etc.

EDUCATION

Ph. D. in Industrial Engineering, Purdue University, West Lafayette, IN, 2012

M. S. in Biomedical Engineering, South Dakota School of Mines and Technology, Rapid City, SD, 2008

B. S. in Materials Science and Engineering, University of Science and Technology of China, Hefei, China, 2006

TEACHING EXPERIENCE

Iowa State University (2020-present)

- IE248 Engineering System Design, Manufacturing Processes and Specifications
- IE444/544 Micro-/Nano-scale Additive Manufacturing
- IE645 Laser-Based Advanced Manufacturing

University of Nevada, Reno (2014-2020)

- ME354 Introduction to Manufacturing Processes
- ME454 Intermediate Topics in Manufacturing
- ME754 Advanced Manufacturing

PUBLICATIONS

Journal Publications (Corresponding author *; Students supervised by Dr. Liao #)

85. M. Haque[#], F. Delzendehrooy[#], X. Zhang[#], L. Yeh, B. Li, Y. Liao*, “Surface morphology of API 5L X65 pipeline steel processed by ultrasonic impact peening: An integrated experimental and computational study”, *Journal of Manufacturing Processes*, 120, 854-866 (2024).

84. A. Sivaraman, B. Balasubramaniam, F. Delzendehrooy[#], G. Kremer, Y. Liao, B. Li, “Corrosion Characterization of Engine Connecting Rods Using Fringe Projection Profilometry and Unsupervised Machine Learning”, *Measurement Science and Technology*, in press (2024).

83. D. Wang, Y. Dou, X. Zhang[#], K. Bi, I. R. Panneerselvam, H. Sun, X. Jiang, R. Dai, K. Song, H. Zhuang, Y. Lu, Y. Wang, Y. Liao, L. Ding, Q. Nian, "Manufacturing and Applications of Multi-functional Holey Two-dimensional Nanomaterials—A Review", *Nano Today*, 55, 102162 (2024).
82. C. Zhang, W. Hua, K. Mitchell, L. Raymond, F. Delzendehrooy[#], L. Wen, C. Do, J. Chen, Y. Yang, G. Linke, Z. Zhang, M. A. Krishnan, M. Kuss, R. Coulter, E. Bandala, Y. Liao*, B. Duan, D. Zhao, G. Chai, Y. Jin, "Multiscale Embedded Printing of Engineered Human Tissue and Organ Equivalents", *Proceedings of the National Academy of Sciences (PNAS)*, 121, 9, e2313464121 (2024).
81. F. Rubbi[#], X. Zhang[#], F. Delzendehrooy[#], B. Mao[#], Q. Nian, C. C. Doumanidis, Y. Liao*, "Chemical etching enhanced nanosecond pulsed laser micromachining: An experimental and numerical investigation", *Journal of Manufacturing Processes*, 108, 384-394 (2023).
80. D. Li, S. Fields, X. Zhang[#], R. Shi, Y. Liao, Y. Zheng, "Characterization of Quasi-continuous Reinforcement Network in the Selective Laser Melted Titanium Matrix Nanocomposite using Correlative FIB-SEM Tomography and STEM", *Microscopy and Microanalysis*, 29, 1432-1433 (2023).
79. Y. Liao*, N. Kostoglou, C. Rebholz, C. C. Doumanidis, "Uniform Droplet Spraying of Magnesium Alloys: Modeling of Apollonian Fractal Structures on Micrograph Sections", *Journal of Manufacturing and Materials Processing*, 7(4), 122 (2023).
78. H. Soyama, C. Kuji, Y. Liao, "Comparison of the effects of submerged laser peening, cavitation peening and shot peening on the improvement of the fatigue strength of magnesium alloy AZ31", *Journal of Magnesium and Alloys*, 11, 1159-1607 (2023).
77. W. Ye, X. Zhang[#], J. Hohl, Y. Liao, L. T. Mushongera, "Life Prediction for Directed Energy Deposition-Manufactured 316L Stainless Steel using a Coupled Crystal Plasticity–Machine Learning Framework", *Advanced Engineering Materials*, 25(10), 2201429 (2023).
76. M. Mozafarifard, Y. Liao, Q. Nian, Y. Wang, "Two-temperature Time-fractional Model for Electron-phonon Coupled Interfacial Thermal Transport", *International Journal of Heat and Mass Transfer*, 202, 123759 (2023).
75. S. Ghazanlou, S. Ghazanlou, S. Hosseinpour, Y. Liao, M. Javidani, "Improving the Properties of An Al Matrix Composite Fabricated by Laser Powder Bed Fusion Using Graphene–TiO₂ Nanohybrid", *Journal of Alloys and Compounds*, 938, 168596 (2023).
74. X. Zhang[#], W. Ye, L. Mushongera, Y. Liao*, "Unravelling heterogeneities in sub-grain cellular structure and micromechanical response of additive manufactured Ti-Nb alloys", *Additive Manufacturing*, 103146 (2022).
73. X. Zhang[#], D. Li, Y. Zheng, P. Shojaei, M. Trabia, B. O'Toole, D. Lin, L. Mushongera, Y. Liao*, "In-situ synthesis of Ti₅Si₃-reinforced titanium matrix nanocomposite by selective laser melting: Quasi-continuous reinforcement network and enhanced mechanical performance", *Journal of Materials Processing Technology*, 309, 117752 (2022).
72. X. Zhang[#], H. Sun, B. Mao[#], R. Dai, H. Zhuang, Y. Liao*, Q. Nian, "Nanosecond Laser Shock Detonation of Nanodiamonds: from Laser-Matter Interaction to Graphite-to-Diamond Phase Transition", *International Journal of Extreme Manufacturing*, 4, 015401 (2022).
71. H. Sun, X. Jiang, R. Dai, X. Zhang[#], H. Zhuang, Y. Liao*, Q. Nian, "Understanding the Mechanism of Shockwave Induced Graphite-to-Diamond Phase Transition", *Materialia*, 24, 101487 (2022).

70. K. Bi, D. Wang, R. Dai, L. Liu, Y. Wang, Y. Lu, Y. Liao, L. Ding, H. Zhuang, Q. Nian, "Scalable Nanomanufacturing of Holey Graphene via Chemical Etching: An Investigation on Process Mechanisms", *Nanoscale*, 14, 12 (2022).
69. S. Sharifi, A. M. Nasab, P. Chen, Y. Liao, Y. Jiao, W. Shan, "Robust Bicontinuous Elastomer–Metal Foam Composites with Highly Tunable Stiffness", *Advanced Engineering Materials*, 24(8), 2101533 (2022).
68. I. R. Panneerselvam, P. Chakraborty, Q. Nian, Y. Lu, Y. Liao*, Y. Wang "First-Principles Study of the Impact of Chemical Doping and Functional Groups on the Absorption Spectra of Graphene", *Semiconductor Science and Technology*, 37, 025013 (2022).
67. P. Shojaei, R. Scazzosi, M. Trabia, B. O'Toole, M. Giglio, X. Zhang[#], Y. Liao, A. Manes, "An Approach for Material Model Identification of a Composite Coating Using Micro-Indentation and Multi-Scale Simulations", *Coatings*, 12, 92 (2022).
66. R. Histed[#], J. Ngo, O. A. Hussain, C. K. Lapins, O. Fakharian, K. K. Leang, Y. Liao, M. Aureli, "Ionic Polymer Metal Composite Compression Sensors with 3D-Structured Interfaces", *Smart Materials and Structures*, 30 (12), 125027 (2021).
65. X. Zhang[#], D. Li, Y. Liao*, Y. Zheng, "Three-dimensional Characterization of Selective Laser Melted Graphene Oxide-Reinforced Ti-48Al-2Cr-2Nb Alloy", *JOM*, 73, 1795-1803 (2021).
64. X. Zhang[#], B. Mao[#], L. Mushongera, J. Kundin, Y. Liao*, "Laser Powder Bed Fusion of Titanium Aluminides: An Investigation on Site-Specific Microstructure Evolution Mechanism", *Materials & Design*, 201, 109501 (2021).
63. M. N. Bhuiyan, N. Jabir, Y. Liao, L. T. Mushongera, "Interaction of Grain Boundaries and Particles in Uncooperative Migration", *Advanced Engineering Materials*, 24 (3), 2100881 (2021).
62. D. Li, X. Zhang[#], W. Zhao, H. D. Merrill, N. T. Meyer, S. Antonov, Y. Liao*, Y. Zheng, "The Role of High-Index Twinning on Hierarchical a Microstructure in a Metastable β Ti-5Al-5Mo-5V-3Cr Alloy", *JOM*, 73, 2303-2311 (2021).
61. W. Ye, J. Hohl, M. Misra, Y. Liao, L. T. Mushongera, "Grain boundary relaxation in doped nano-grained aluminum", *Materials Today Communications*, 102808 (2021).
60. K. Bi, D. Lin, Y. Liao, C. H. Wu, P. Parandoush, "Additive Manufacturing Embraces Big Data", *Progress in Additive Manufacturing*, 6, 181-197 (2021).
59. D. Li, W. Zhao, X. Zhang[#], Y. Liao, Y. Zheng, "Three-dimensional Characterization of Selective Laser Melted Graphene Oxide-Reinforced Ti-48Al-2Cr-2Nb Alloy using FIB-SEM Tomography", *Microscopy and Microanalysis*, 27, 2938-2939 (2021).
58. Z. Hu, R. Dai, D. Wang, X. Wang, F. Chen, X. Fan, C. Chen, Y. Liao, Q. Nian, "Preparation of graphene/copper nanocomposites by ball milling followed by pressureless vacuum sintering", *New Carbon Materials*, 36 (2), 420-428 (2021).
57. H. Tetik, D. Feng, S. W. Oxandale, G. Yang, K. Zhao, K. Feist, N. Shah, Y. Liao, Z. C. Leseman, D. Lin, "Bioinspired Manufacturing of Aerogels with Precisely Manipulated Surface Microstructure through Controlled Local Temperature Gradients", *ACS Applied Materials & Interfaces*, 13, 924-931 (2021).
56. C. Liu, X. Wang, Z. Chen, Y. Zhou, J. M. Ruso, D. Hu, Z. Liu, Y. Liao*, "The immobilization of Penicillin G Acylase on Modified TiO₂ with Various Micro-Environments", *Colloids and Surfaces A*, 616, 126316 (2021).
55. S. Jaffar, N. Kostoglou, H. Fukuda, C. Rebholz, T. Ando, Y. Liao*, C. Dumanidis, "Additive Manufacturing of Magnesium Alloy Using Uniform Droplet Spraying: Modeling of Microstructure Evolution", *MRS Advances*, in press, (2021).

54. G. Yang, F. Li, J. Xiao, H. Tetik, N. SHah, X. Xiao, J. Li, Y. Liao, S. Lei, W. Tan, D. Lin, "In-Situ X-Ray Observations and Thermal Modeling of Unidirectional and Bidirectional Freeze Casting", *Ceramics International*, 47 (9), 12234-12243 (2021).
53. A. Siddaiah, B. Mao[#], A. K. Kasar, Y. Liao*, P. L. Menezes, "Influence of Laser Shock Peening on the Surface Energy and Tribocorrosion Properties of An AZ31B Mg Alloy", *Wear*, 462-463, 203490 (2020).
52. P. Shojaei, R. Scazzosi, M. Trabia, B. O'Toole, M. Giglio, X. Zhang[#], Y. Liao, A. Manes, "Material Model Characterization of a Ti/SiC Metal Matrix Nanocomposite Coating Subjected to Hypervelocity Impact", *Procedia Structural Integrity*, 28, 525-537 (2020).
51. Y. Gao, J. H. Ke, B. Mao[#], Y. Liao, Y. Zheng, L. K. Aagesen, "Twinning Path Determined by Broken Symmetry: A Revisit to Deformation Twinning in Hexagonal Close-Packed Titanium and Zirconium", *Physical Review Materials*, 4 (7), 070601 (2020).
50. P. Shojaei, M. Trabia, B. O'Toole, R. Jennings, X. Zhang[#], Y. Liao, "Enhancing Hypervelocity Impact Resistance of Titanium Substrate Using Ti/SiC Metal Matrix Nanocomposite Coating", *Composites Part B: Engineering*, 194, 108068 (2020).
49. B. Mao[#], A. Siddaiah, Y. Liao*, P. Menezes, "Laser Surface Texturing and Related Techniques for Enhancing Tribological Performance of Engineering Materials: A Review", *Journal of Manufacturing Processes*, 53, 153-173 (2020).
48. X. Zhang[#], B. Mao[#], Y. Liao*, Y. Zheng, "Selective Laser Melting of Graphene Oxide-Reinforced Ti-48Al-2Cr-2Nb: Improved Manufacturability and Mechanical Strength", *Journal of Materials Research*, 35, 15, 1998-2005 (2020).
47. P. Esmailzadeh, R. Abdi Behnagh, M. Pour, X. Zhang[#], Y. Liao*, "Phase-Field Modeling of Fracture and Crack Growth in Friction Stir Processed Pure Copper", *International Journal of Advanced Manufacturing Technology*, 109, 2377-2392 (2020).
46. D. Wang, R. Dai, X. Zhang[#], L. Liu, H. Zhuang, Y. Lu, Y. Wang, Y. Liao, Q. Nian, "Scalable and Controlled Creation of Nanoholes in Graphene by Microwave-Assisted Chemical Etching for Improved Electrochemical Properties", *Carbon*, 161, 880-891 (2020).
45. G. Dai, L. Zhang, Y. Liao, Y. Shi, J. Xie, F. Lei, L. Fan, "Multi-Scale Model for Describing the Effect of Pore Structure on Carbon-Based Electric Double Layer", *Journal of Physical Chemistry C*, 124, 3952-3961 (2020).
44. Y. Ioannou, H. Fukuda, C. Rebholz, Y Liao*, T. Ando, C. Doumanidis, "Constrained Crystal Growth during Solidification of Particles and Splats in Uniform Droplet Sprays", *International Journal of Advanced Manufacturing Technology*, 107, 1205-1221 (2020).
43. B. Rui, M. Yang, L. Zhang, Y. Jia, Y. Shi, R. Histed, Y. Liao, J. Xie, F. Lei, L. Fan, "Reduced Graphene Oxide-Modified Biochar Electrodes via Electrophoretic Deposition with High Rate Capability for Supercapacitors", *Journal of Applied Electrochemistry*, 50, 407-420, (2020).
42. M. Aureli, C. Doumanidis, A. Hussien, S. Jaffar, N. Kostoglou, Y. Liao, C. Rebholz, C. Doumanidis, "Multivariable Control of Ball-Milled Reactive Material Composition and Structure", *Journal of Manufacturing Processes*, 52, 238-249 (2020).
41. A. Siddaiah, B. Mao[#], Y. Liao*, P. Menezes, "Effect of Laser Shock Peening on the Wear-Corrosion Synergistic Behavior of an AZ31B Magnesium Alloy", *ASME Journal of Tribology*, 142, 4 (2020).

40. X. Zhang[#], B. Mao[#], A. Siddaiah, P. Menezes, Y. Liao*, "Direct Laser Shock Surface Patterning of an AZ31B Magnesium Alloy: Microstructure Evolution and Friction Performance", *Journal of Materials Processing Technology*, 116333 (2020)
39. R. Abdi Behnagh, F. Fathi, M. Yeganeh, M. Paydar, M. Mohammad, Y. Liao*, "Production of Seamless Tube from Aluminum Machining Chips via Double-Step Friction Stir Consolidation", *International Journal of Advanced Manufacturing Technology*, 104, 4769-4777 (2019).
38. B. Mao[#], X. Zhang[#], P. Menezes, Y. Liao*, "Anisotropic Microstructure Evolution of an AZ31B Magnesium Alloy Subjected to Dry Sliding and Its Effects on Friction and Wear Performance", *Materialia*, 8, 100444 (2019).
37. X. Zhang[#], C. J. Yocom[#], B. Mao[#], Y. Liao*, "Microstructure Evolution during Selective Laser Melting of Metallic materials: A Review", *Journal of Laser Applications*, 31, 031201 (2019).
36. B. Mao[#], B. Li, D. Lin, Y. Liao*, "Enhanced Room Temperature Stretch Formability of AZ31B Magnesium Alloy Sheet by Laser Shock Peening", *Materials Science & Engineering A*, 756, 219-225 (2019).
35. B. Mao[#], A. Siddaiah, X. Zhang[#], B. Li, P. Menezes, Y. Liao*, "The Influence of Surface Pre-Twinning on the Friction and Wear Performance of an AZ31B Mg Alloy", *Applied Surface Science*, 480, 998-1007 (2019).
34. B. Mao[#], Y. Liao*, B. Li, "Abnormal Twin-Twin Interaction in an Mg-3Al-1Zn Magnesium Alloy Processed by Laser Shock Peening", *Scripta Materialia*, 165, 89-93 (2019).
33. B. Mao[#], Y. Liao*, "Modeling of Luders Elongation and Work Hardening Behaviors of Ferrite-Pearlite Dual Phase Steels under Tension ", *Mechanics of Materials*, 129, 222-229 (2019).
32. M. Aureli, S. Alzaabi, A. Hussien, C. Doumanidis, S. Jaffar, I. Gunduz, C. Rebholz, N. Kostoglou, Y. Liao, C. Doumanidis, "Thermostructural Observation and Adaptive Control of Fractal Structure in Ball-Milled Materials", *Materials & Design*, 160, 772-782 (2018).
31. X. Zhang[#], Y. Liao*, "A Phase-Field Model for Solid-State Selective Laser Sintering of Metallic Materials", *Powder Technology*, 339,677-685 (2018).
30. A. Siddaiah, B. Mao[#], Y. Liao*, P. Menezes, "Surface Characterization and Tribological Performance of Laser Shock Peened Steel Surfaces", *Surface and Coating Technology*, 351, 188-197 (2018).
29. B. Mao[#], Y. Liao*, B. Li, "Gradient Twinning Microstructure Generated by Laser Shock Peening in an AZ31B Magnesium Alloy", *Applied Surface Science*, 457, 342-351 (2018).
28. C. J. Yocom[#], X. Zhang[#], Y. Liao*, "Research and Development Status of Laser Peen Forming: A Review", *Optics and Laser Technology*, 108, 32-45, (2018).
27. M. Aureli, C. C. Doumanidis, I. E. Gunduz, A. G. S. Hussien, Y. Liao, N. Kostoglou, C. Rebholz, C. C. Doumanidis, "Bimetallic Diffusion Modeling and Temperature Regulation During Ball Milling", *Materials & Design*, 155, 233-243 (2018).
26. B. Mao[#], A. Siddaiah, P. L. Menezes, Y. Liao*, "Surface Texturing by Indirect Laser Shock Surface Patterning for Manipulated Friction Coefficient", *Journal of Materials Processing Technology*, 257, 227-233 (2018).
25. Z. Zhang[#], Q. Nian, C. C. Doumanidis, Y. Liao*, "First-Principles Modeling of Laser-Matter Interaction and Plasma Dynamics in Nanosecond Pulsed Laser Shock Processing", *Journal of Applied Physics*, 123, 5 (2018).
24. M. Aureli*, C. C. Doumanidis, I. E. Gunduz, A. G. S. Hussien, Y. Liao*, C. Rebholz, C. C. Doumanidis, "Non-equilibrium Microscale Thermomechanical Modeling of Bimetallic Particulate Fractal Structures During Ball Milling Fabrication", *Journal of Applied Physics*, 122, 025118 (2017).

23. M. Aureli, C. C. Doumanidis, I. E. Gunduz, A. G. S. Hussien, Y. Liao, C. Rebholz, C. C. Doumanidis, "Mechanics and Energetics Modeling of Ball-Milled Metal Foil and Particle Structures", *Acta Materialia*, 123, 305-316 (2017).
22. Z. Zhang[#], Y. Liao*, "Multi-stage Modeling of Luders Elongation and Work Hardening Behaviors of Ferrite Steels Under Tension", *Metallurgical and Materials Transactions A*, 47, 1621-1628 (2016).
21. Y. Liao*, C. Ye, G. J. Cheng, "A Review: Warm Laser Shock Peening and Related Laser Processing Technique", *Optics and Laser Technology*, 78, 15-24, (2015).
20. C. Ye, S. Suslov, D. Lin, Y. Liao, G. J. Cheng, "Cryogenic Ultrahigh Strain Rate Deformation Induced Hybrid Nanotwinned Microstructure for High Strength and High Ductility", *Journal of Applied Physics*, 213519 (2014).
19. C. Ye, Y. Liao, S. Suslov, D. Lin, G. J. Cheng, "Ultrahigh Dense and Gradient Nano-precipitates by Warm Laser Shock Peening for Combination of high Strength and Ductility", *Materials Science & Engineering A*, 609(15), 195–203 (2014).
18. D. Lin, C. Ye, Y. Liao, S. Suslov, C. R. Liu, G. J. Cheng, "Mechanism of Fatigue Performance Enhancement in A Laser Sintered Superhard Nanoparticles Reinforced Nanocomposite Followed by Laser Shock Peening", *Journal of Applied Physics*, 113, 133509, (2013).
17. Y. Liao, G. J. Cheng, "Controlled Precipitation by Thermal Engineered Laser Shock Peening and Its Effects on Dislocation Pinning: Multiscale Dislocation Dynamic Simulation and Experiments", *Acta Materialia*, 61, 1957-1967, (2013).
16. Y. Liao, S. Suslov, C. Ye and G. J. Cheng, "The Mechanisms of Thermal Engineered Laser Shock Peening for Enhanced Fatigue Performance", *Acta Materialia*, 60, 4997-5009, (2012).
15. Y. Liao, S. Suslov, C. Ye, and G. J. Cheng, "Deformation Induced Martensite in NiTi and Its Shape Memory Effects Generated by Low Temperature Laser Shock Peening", *Journal of Applied Physics*, 112, 033515 (2012).
14. J. Li, Y. Liao, S. Suslov and G. J. Cheng, "Laser Shock Based Platform for Controllable Forming of Nanowires", *Nano Letters*, 12, p.3224-3230, (2012), also featured in *News and Views of Nature Photonics*, August, 2012, 6(8), "Laser nanofabrication: New regimes for nanoshaping", Noriaki Horiuchi, doi:10.1038/nphoton.2012.186.
13. Z. K. Liu, Y. F. Wang, Y. Liao, and G. J. Cheng, "Direction-tunable Nanotwins in Copper Nanowires by Laser Assisted Electrodeposition", *Nanotechnology*, 23, 125602 (2012).
12. Y. Liao, C. Ye, H. Gao, S. Suslov, B. J. Kim, E. A. Stach and G. J. Cheng, "Dislocation Pinning Effects Induced by Nano-precipitates during Warm Laser Shock Peening: Dislocation Dynamic Simulation and Experiments", *Journal of Applied Physics*, 110, 023518 (2011).
11. Y. Liao, Y. L. Yang and G. J. Cheng, "Enhanced Laser Shock by An Active Liquid Confinement", *ASME Journal of Manufacturing Science and Engineering*, 134(3), 034503 (2011).
10. C. Ye, S. Suslov, D. Lin, Y. Liao, X. Fei and G. J. Cheng, "Microstructure and Mechanical Properties of Copper Subjected to Cryogenic Laser Shock Peening", *Journal of Applied Physics*, 110, 083504 (2011).
9. D. Lin, S. Suslov, C. Ye, Y. Liao, R. C. Liu and G. J. Cheng, "Laser Assisted Embedding of Nanoparticles in Metallic Materials", *Applied Surface Science*, 258(7), p.2289–2296 (2011).
8. C. Ye, Y. Liao and G. J. Cheng, "Warm Laser Shock Peening Driven Nanostructures and Their Effects on Fatigue Performance in Aluminum Alloy 6061", *Advanced Engineering Materials*, 12(4), 291-297 (2010). (Selected Covering Page).
7. Y. Liao, C. Ye, B. J. Kim, S. Suslov, E. A. Stach and G. J. Cheng, "Nucleation of Highly Dense Nanoscale Precipitates Based on Warm Laser Shock Peening", *Journal of Applied Physics*, 108, 063518 (2010).

6. Z. T. Zhu, L. F. Zhang, J. Y. Howe, Y. Liao, J. T. Speidel, S. Smith and H. Fong, "Aligned Electrospun ZnO Nanofibers for Simple and Sensitive Ultraviolet Nanosensors", *Chemical Communications*, 18, 2568 (2009).
5. Y. Liao, L. F. Zhang, Y. Gao, Z. T. Zhu and H. Fong, "Preparation, Characterization, and Encapsulation/Release Studies of A Composite Nanofiber Mat Electrospun from An Emulsion Containing PLGA", *Polymer*, 49 (24), 5294 (2008).
4. M. Tian, Y. Gao, Y. Liu, Y. Liao, N. E. Hedin and H. Fong, "Fabrication and Evaluation of Bis-GMA/TEGDMA Dental Resins/Composites Containing Nano Fibrillar Silicate", *Dental Materials*, 24 (2), 235 (2008).
3. Y. Gao, S. Sagi, L. F. Zhang, Y. Liao, D. M. Cowles, Y. Y. Sun and H. Fong, "Electrospun Nano-scaled Glass Fiber Reinforcement of Bis-GMA/TEGDMA Dental Composites", *Journal of Applied Polymer Science*, 110 (4), 2063 (2008).
2. M. Tian, Y. Gao, Y. Liu, Y. Liao, R. W. Xu, N. E. Hedin and H. Fong, "Bis-GMA/TEGDMA Dental Composites Reinforced with Electrospun Nylon 6 Nanocomposite Nanofibers Containing Highly Aligned Fibrillar Silicate Single Crystals", *Polymer*, 48 (9), 2720 (2007).
1. J. F. Qu, Y. Q. Zhang, X. L. Lu, X. Q. Xiang, Y. Liao, G. Li and X. G. Li, "Ultrasonic Study on Magnetic-Field-Induced Stripe Order in La_{1.88}Sr_{0.12}-xBaCuO₄", *Applied Physics Letter*, 89, 162508 (2006).

Selected Conference Publications

16. M. Haque, L. Yeh, X. Zhang, B. Li, Y. Liao, "Surface Morphology of API 5L X65 Pipeline Steel Processed by Ultrasonic Impact Peening", *ASME MSEC-NAMRC 2023*, Rutgers University, NJ, 2023.
15. X. Zhang, D. Li, Y. Zheng, Y. Liao, "Selective Laser Melting of Crack-Free Ti-48Al-2Cr-2Nb Alloy: Improved Manufacturability by Powder Surface Modification Using Graphene Oxide", *ASME MSEC-NAMRC 2022*, Purdue University, IN, 2022.
14. X. Zhang, L. Mushongera, Y. Liao, "Investigating the Heterogeneity in Microstructure Evolution During Selective Laser Melting of Titanium Aluminides: An Integrated Experimental and Modeling Study", *ASME MSEC-NAMRC 2022*, Purdue University, IN, 2022.
13. W. Shen, X. Zhang, Y. Liao, B. Li, "Real-Time Structured Light Scanning Characterization of Surface Topography of Direct Energy Deposited 316L Stainless Steel", *ASME MSEC-NAMRC 2022*, Purdue University, IN, 2022.
12. R. Histed, J. Ngo, O. Hussain, C. Lapins, K. Leang, Y. Liao, M. Aureli, "Ionic Polymer Metal Composite Sensors With Engineered Interfaces (eIPMCs): Compression Sensing Modeling and Experiments", *Dynamic Systems and Control Conference*, 84287, 2020
11. H. Doumanidis, Y. Ioannou, H. Fukuda, T. Ando, C. Rebholz, Y. Liao, "Constrained Crystal Growth During Solidification of Particles and Splats in Uniform Droplet Sprays", *2019-Sustainable Industrial Processing Summit*, 11, 165-166, 2019
10. B. Mao, Y. Liao, "Understanding the Laser-matter Interaction and Plasma Dynamics in Nanosecond Pulsed Laser Shock Processing: A First Principle Study", *ASME MSEC-NAMRC 2019*, Erie, PA, 2019
9. B. Mao, A. Siddaiah, P. Menezes, Y. Liao, "A Novel Laser Shock Surface Patterning Process toward Tribological Applications", *ASME MSEC-NAMRC 2019*, Erie, PA, 2019
8. B. Mao, B. Li, Y. Liao, "Twinning Behavior in Magnesium Alloys Processed by Laser Shock Peening", *ASME MSEC-NAMRC 2019*, Erie, PA, 2019
7. X. Zhang, B. Mao, R. Histed, Q. Nian, Y. Liao, "Modeling for chemical-etching enhanced pulsed laser ablation", *ASME MSEC-NAMRC 2019*, Erie, PA, 2019

6. X. Zhang, Y. Liao, "Microstructure Evolution during Solid-State Selective Laser Sintering of Metallic Materials: A Phase-Field Simulation", *ASME MSEC-NAMRC 2019*, Erie, PA, 2019
5. Y. Liao and G. J. Cheng, "Enhanced Laser Shock by An Active Liquid Confinement", *ASME MSEC-NAMRC 2012*, Notre Dame, IN, 2012.
4. Z. K. Liu, Y. F. Wang, Y. Liao, and G. J. Cheng, "Nanotwins in Copper Nanowires Controlled by Laser Assisted Electrochemical Deposition", *ASME MSEC-NAMRC 2012*, Notre Dame, IN, 2012 (*Best Paper Award*).
3. C. Ye, D. Lin, Y. Liao, G. J. Cheng, "Effect of Warm Laser Shock Peening on The Tensile Strength and Ductility of Aluminum Alloys", *ASME MSEC-NAMRC 2012*, Notre Dame, IN, 2012.
2. J. Li, Y. Liao and G. J. Cheng, "Laser Shock Based Controlled Forming of Silver Nanowires", *ASME MSEC-NAMRC 2011*, Corvallis, OR, 2011.
1. Y. Liao, C. Ye, and G. J. Cheng, "Nucleation of Highly Dense Nanoscale Precipitates Based on An Innovative Process: Warm Laser Shock Peening", *ASME MSEC-NAMRC 2010*, Erie, PA, 2010.

SEMINARS & PRESENTATIONS

Invited Presentations:

1. "Laser-Assisted Advanced Manufacturing: from Fundamental Mechanisms to Engineering Applications", invited seminar talk, Mechanical Engineering Department, University of Iowa, April 2024.
2. "Laser-Assisted Advanced Manufacturing: from Fundamental Mechanisms to Engineering Applications", invited seminar talk, Materials Science and Engineering Department, University of North Texas, April 2024.
3. "Laser-Assisted Advanced Manufacturing: from Fundamental Mechanisms to Engineering Applications", guest speaker, Systems and Industrial Engineering Department, University of Arizona, January 2020.
4. "Laser-Assisted Advanced Manufacturing: from Fundamental Mechanisms to Engineering Applications", Industrial and Manufacturing Systems Engineering department, Iowa State University, December 2019.
5. "Laser-assisted Advanced Manufacturing and Materials Processing: From Fundamental Mechanisms to Engineering Applications", guest seminar, Mechanical Engineering department, Kansas State University, October 2018.
6. "Laser-assisted Advanced Manufacturing and Materials Processing", guest seminar, Mechanical Engineering Department, University of Nevada Las Vegas, February 2017.
7. "The mechanisms of thermal engineered laser shock peening for enhanced fatigue performance", 2016 Collaborative Conference on 3D and Materials Research (CC3DMR), Incheon, South Korea, June 2016.
8. "Thermal Engineered Laser Shock Peening Driven Nanostructures and Their Effects on Enhanced Fatigue Performance", Plasticity, Damage & Fracture 2016, Kona, Hawaii, January 2016.
9. "Mechanism of Thermal Engineered Laser Shock Peening", 5th International Conference on Laser Peening & Related Phenomena, Cincinnati, Ohio, May 2015.
10. "Thermal Engineered Laser Shock Peening Driving Nanostructure and Their Effects on Fatigue Performance", Department of Mechanical and Automation Engineering, Chinese University of Hong Kong, April 2014.
11. "The Mechanism and Applications of Thermal Engineered Laser Shock Peening", Chongqing Institute of Green and Intelligent Technology, Chinese Academy of Sciences, Chongqing, China, October 2012.

12. “Laser-assisted Micro/Nano Manufacturing and Nanomaterials Processing”, Ningbo Institute of Materials Technology & Engineering, Chinese Academy of Sciences, Ningbo, China, September 2012.

Contributed Presentations

13. D. Li, S. Fields, X. Zhang, R. Shi, Y. Liao, Y. Zheng, “Characterization of Quasi-continuous Reinforcement Network in the Selective Laser Melted Titanium Matrix Nanocomposite using Correlative FIB-SEM Tomography and STEM”, Microscopy and Microanalysis Conference, Minneapolis, MN, 2023.
14. M. Haque, L. Yeh, X. Zhang, B. Li, Y. Liao, “Surface Morphology of API 5L X65 Pipeline Steel Processed by Ultrasonic Impact Peening”, ASME Manufacturing Science & Engineering Conference 2023, Rutgers University, NJ, 2023.
15. X. Zhang, D. Li, Y. Zheng, Y. Liao, “Selective Laser Melting of Crack-Free Ti-48Al-2Cr-2Nb Alloy: Improved Manufacturability by Powder Surface Modification Using Graphene Oxide”, ASME Manufacturing Science & Engineering Conference 2022, Purdue University, IN, 2022.
16. X. Zhang, L. Mushongera, Y. Liao, “Investigating the Heterogeneity in Microstructure Evolution During Selective Laser Melting of Titanium Aluminides: An Integrated Experimental and Modeling Study”, ASME Manufacturing Science & Engineering Conference 2022, Purdue University, IN, 2022.
17. R. Histed, J. Ngo, O. Hussain, C. Lapins, K. Leang, Y. Liao, M. Aureli, “Ionic Polymer Metal Composite Sensors With Engineered Interfaces (eIPMCs): Compression Sensing Modeling and Experiments”, Dynamic Systems and Control Conference, Salt Lake City, UT, 2020.
18. H. Doumanidis, Y. Ioannou, H. Fukuda, T. Ando, C. Rebolz, Y. Liao, “Constrained Crystal Growth During Solidification of Particles and Splats in Uniform Droplet Sprays”, 2019-Sustainable Industrial Processing Summit, Cyprus, 2019.
19. B. Mao, Y. Liao, “Understanding the Laser-matter Interaction and Plasma Dynamics in Nanosecond Pulsed Laser Shock Processing: A First Principal Study”, 14th International Manufacturing Science & Engineering Conference. Erie, PA, USA. 2019
20. B. Mao, B. Li, Y. Liao, “Improving the room temperature-stretch formability of AZ31B Mg alloys by laser shock peening”, 14th International Manufacturing Science & Engineering Conference. Erie, PA, USA. 2019
21. B. Mao, A. Siddaiah, P. Menezes, Y. Liao, “A Novel Laser Shock Surface Patterning Process toward Tribological Applications”, 14th International Manufacturing Science & Engineering Conference. Erie, PA, USA. 2019
22. B. Mao, B. Li, Y. Liao, “Twinning Behavior in Magnesium Alloys Processed by Laser Shock Peening”, 14th International Manufacturing Science & Engineering Conference. Erie, PA, USA. 2019
23. X. Zhang, B. Mao, R. Histed, Q. Nian, Y. Liao, “Modeling for chemical-etching enhanced pulsed laser ablation”, 14th International Manufacturing Science & Engineering Conference. Erie, PA, USA. 2019
24. X. Zhang, Y. Liao, “Microstructure Evolution during Solid-State Selective Laser Sintering of Metallic Materials: A Phase-Field Simulation”, 14th International Manufacturing Science & Engineering Conference. Erie, PA, USA. 2019
25. Mao, Y. Liao, “A Novel Laser Shock Surface Patterning Process toward Tribological Applications”, AeroMat 2019 30th conference and exposition. Reno, NV, 2019

26. Mao, Y. Liao, "Modeling of Lüders Elongation and Work Hardening Behaviors of Ferrite-Pearlite Dual Phase Steels under tension", AeroMat 2019 30th conference and exposition. Reno, NV, 2019
27. B. Mao, Y. Liao, "Enhanced Room Temperature Stretch Formability of AZ31B Magnesium Alloy Sheet by Laser Shock Peening", AeroMat 2019 30th conference and exposition. Reno, NV, 2019
28. B. Mao, Y. Liao, "Twinning Behavior in Magnesium Alloys Processed by Laser Shock Peening", AeroMat 2019 30th conference and exposition. Reno, NV, 2019
29. B. Mao, Y. Liao "Laser Shock Processing of AZ31B Magnesium Alloy: The Generation of Gradient Twinning Microstructure", Materials Science and Technology Conference & Exhibition. Columbus, OH, 2018
30. B. Mao, Y. Liao, "A Novel Laser Shock Surface Patterning Process towards Tribology Applications", Materials Science and Technology Conference & Exhibition. Columbus, OH, 2018.
31. B. Mao, Y. Liao, "Modeling of the Flow behavior of Dual phase steels", IRD Annual conference. Reno, NV, 2018
32. Y. Liao, "Enhanced Durability of Metallic Materials through Thermal Engineered Laser Shock Peening", Materials Science & Technology 2016 (MS&T 16), Salt Lake City, UT, October 26, 2016.
33. Liao, Y., "Enhanced Tribological performance of Metallic Materials Through Laser Surface Processing", 2016 STLE Annual Meeting, Las Vegas, NV, May 19, 2016.
34. Y. Liao, G. J. Cheng, "Laser-assisted Advanced Manufacturing for Nanoscale Shaping and Surface Engineering", Seagate Technology R&D Center, San Francisco, CA, June, 2013.
35. Y. Liao, G. J. Cheng, "Thermal Engineered Laser Shock Peening Driven Nanostructures and Their Effects on Fatigue Performance", Caterpillar Global R&D Center, Peoria, IL, March 2013.
36. Y. Liao and G. J. Cheng, "Enhanced Laser Shock by An Active Liquid Confinement", MSEC 2012, p539-544, 2012.
37. Z. K. Liu, Y. F. Wang, Y. Liao, and G. J. Cheng, "Nanotwins in Copper Nanowires Controlled by Laser Assisted Electrochemical Deposition", MSEC 2012, p553-558, 2012 (Best Paper Award).
38. Ye, D. Lin, Y. Liao, G. J. Cheng, "Effect of Warm Laser Shock Peening on The Tensile Strength and Ductility of Aluminum Alloys", MSEC 2012, p533-538, 2012.
39. Lin, S. Sergey, C. Ye, Y. Liao, C. R. Liu, and G. J. Cheng, "Nanoparticles Embedding into Metallic Materials by Laser Direct Irradiation", MSEC 2012, p879-884, 2012.
40. J. Li, Y. Liao and G. J. Cheng, "Laser Shock Based Controlled Forming of Silver Nanowires", MSEC 2011, p463-470, 2011.
41. Y. Liao, C. Ye, and G. J. Cheng, "Nucleation of Highly Dense Nanoscale Precipitates Based on An Innovative Process: Warm Laser Shock Peening", MSEC 2010, p291-298, 2010.

PATENTS

1. G. J. Cheng, **Y. Liao**, Y. L. Yang, C. Ye, "Laser Shock Peening Apparatuses and Methods", 2013, non-provisional US patent filed, No. 617933.100010.

BOOK CHAPTER

1. D. M. Cowles, Y. Gao, S. Sagi, L. F. Zhang, **Y. Liao**, and H. Fong. In *Glass Materials Research Progress: Chapter 2: Electrospun Nano-Scaled Glass Fibers and Their Reinforced Dental Composites*, J. C. Wolf and L. Lange, Editors, Nova Science Publishers (ISBN: 978-1-60456-578-2), 2008, pp. 39-59.

AWARDS & HIGHLIGHTS

- Best Youth Editor Award, International Journal of Extreme Manufacturing (IJEM), 2023-2024.
- Omurtag Research Excellence Award, IMSE, ISU, 2023.
- Best Promotion Award, International Journal of Extreme Manufacturing (IJEM), 2022.
- Outstanding Contribution Award, International Journal of Extreme Manufacturing (IJEM), 2020.
- Oak Ridge Associated University(ORAU) Ralph E. Powe Junior Faculty Enhancement Award, 2016.
- Best Paper Award, ASME 2012 International Manufacturing Science and Engineering Conference, 2012.
- Ross Fellowship, Purdue University, 2008.