**CURRICULUM VITAE**

NAME: Fuewen Frank Liou, Ph.D., ASME Fellow, SME Fellow

**PRESENT POSITION:**

### Michael and Joyce Bytnar Product Innovation and Creativity Professor, Mechanical Engineering,

### Director, Intelligent Systems Center

### Director, Manufacturing Engineering Program

Missouri University of Science and Technology (MS&T, formerly University of Missouri-Rolla)

## OFFICE ADDRESS

 Mechanical Engineering Department

 292B Toomey Hall, 400 West 13th Street

 Missouri University of Science and Technology

 Rolla, Missouri 65409-0050

 (573) 341-4603

 E-mail: liou@mst.edu

**EDUCATION:**

 Ph.D., M.E. University of Minnesota, July 1987.

 M.S., M.E. North Carolina State University at Raleigh, May 1984.

 B.S., N.A.& M.E. National Cheng-Kung University, Taiwan, June, 1980.

**RESEARCH INTERESTS:**

Metal additive manufacturing (AM), Rapid prototyping, Multiscale multiphysics AM process modeling, Remanufacturing automation, Digital materials processing, Digital Twin, Digital Factory

**WORK EXPERIENCE:**

* Director, Intelligent Systems Center (ISC), MS&T, 2021-present
* Michael and Joyce Bytnar Product Innovation and Creativity Professor, Mechanical Engineering, 2011-present, MS&T
* Director, Manufacturing Engineering Program, 2000-present, MS&T
* Senior Research Investigator, Intelligent Systems Center(ISC), 2005- present, MS&T
* Faculty Research Investigator, Graduate Center for Materials Research (MRC), 2010-present.
* Professor, Mechanical Engineering, 1999-present, MS&T
* Co-founder, Product Innovation and Engineering (PINE), LLC, 2002-present
* Interim Program Coordinator, Manufacturing Engineering Program, 1998-2000, University of Missouri-Rolla
* Associate Professor, Mechanical Engineering, 1993-1999, University of Missouri-Rolla
* Boeing - A.D. Welliver Faculty Summer Fellow, Wichita and Seattle, Summer 1997
* Research Investigator, Intelligent Systems Center, 1993-2005, University of Missouri-Rolla
* Research Associate, Intelligent Systems Center, 1991-1993, University of Missouri-Rolla
* Assistant Professor, Mechanical Engineering, 1987-1993, University of Missouri-Rolla

**HONORS AND AWARDS:**

* Listed in Highly Ranked Scholars (top 0.5% of all scholars worldwide) by ScholarGPS, 2024-present.
* Outstanding Alumnus, Systems and Naval Mechatronics, National Cheng-Kung University, Taiwan, 2021.
* Fellow, Society of Manufacturing Engineers (FSME), 2021.
* Listed in World Top 2% cited scientists in their fields for career and yearly impact by Stanford University, 2020-present
* Tier One Faculty External Recognition Award at S&T, 2021
* SME Frederick W. Taylor Research Medal, 2020
* Distinguished Investigator Award, Intelligent Systems Center, Missouri S&T, 2019.
* Best Conference Paper Award, “A Framework for Process Inspection of Metal Additive Manufacturing,” 2018 IEEE International Conference on Applied System Innovation, Chiba, Tokyo, Japan, April 13-17, 2018, by Y Cheng; F. Liou; C. Cheng; and S. Shen.
* Keynote speech on “Metal Additive Manufacturing: Promises and Challenges” in the 2017 International Symposium on Optomechatronic Technology, Tainan, Taiwan, Nov 5-9, 2017.
* Distinguished Investigator Award, Intelligent Systems Center, Missouri S&T, 2015.
* “New materials, in 3-D” research is selected as 15 important innovations at Missouri S&T in 2015
* Best Paper award, the 2015 Solid Freeform Fabrication Symposium, Austin, Texas, 2015 (with Yan, L., X. Chen, W. Li, and J. Newkirk).
* “Manufacturing in 3-D” research is listed as one of the “13 Important Research Stories of 2013”, Missouri University of Science and Technology, 2013.
* Outstanding Faculty Research Award, Missouri S&T, 2011.
* Outstanding Scholar Award, Midwest Chinese–American Science and Technology Association (MCASTA), 2010.
* Keynote speech on “Rapid Manufacturing and Its Emerging Applications” in the 3rd International Forum on Systems and Mechatronics” (IFSM-2010, Singapore).
* Rapid Prototyping Journal Best Paper Award (poster presentation), 21st Solid Freeform Fabrication Symposium, (with Shyam Barua and T. Sparks) Austin, Texas, 2010.
* Society of Manufacturing Engineers (SME) Dick Aubin Distinguished Paper Award (with Mary Kinsella), 2009 (The selected paper must have a significant impact on rapid prototyping or additive manufacturing and must have practical value beyond pure research).
* Fellow, American Society of Mechanical Engineers (ASME), 2008.
* Highly Commended Paper Award for Rapid Prototyping Journal, selected by Emerald Literati Network Awards for Excellence 2008.
* ASEE Manufacturing Division Leadership Award, 2007, Honolulu, HI.
* Outstanding Teacher Award, University of Missouri-Rolla, 2005-06.
* Excellence in Teaching, School of Engineering, UMR, 2006.
* SFF Best Poster Paper Award, Solid Freeform Fabrication Symposium, (with K. Eiamsa-ard, H. Nair, L. Ren, J. Ruan, and T. Sparks) Austin, Texas, 2005.
* Faculty Performance Shares, University of Missouri-Rolla, September 2001.
* Academy of Mechanical Engineers Faculty Excellence Service Award, University of Missouri-Rolla, October 2000.
* ASME Best Paper Award, Applicon Best Paper Award for CAD/CAM Theory and Applications, ASME Design Automation Conference, (with K. Srikanth and S. N. Balakrishnan), Sept 16, 1997.
* Boeing - A.D. Welliver Faculty Fellow, 1997
* McDonnell Douglas Faculty Excellence Award, University of Missouri-Rolla, 1995-96
* McDonnell Douglas Faculty Excellence Award, University of Missouri-Rolla, 1994-95
* McDonnell Douglas Faculty Excellence Award, University of Missouri-Rolla, 1993-94
* Outstanding Faculty Advisor Award, Society of Automotive Engineering, 1994
* Outstanding Teacher Award, University of Missouri-Rolla, 1992-93
* Ralph R. Teetor Educational Award, Society of Automotive Engineering, 1990
* Certified Professional Engineer, Taiwan, 1980
* Listed in the Who’s Who Among Asian Americans
* Listed in the Who’s Who in Science and Engineering
* Listed in the International Who’s Who of Professionals
* Listed in the America’s Most Admired Men and Women
* Listed in the Who's Who in America

**Recent Advisee/Student Honors and Awards:**

* Mohammad Masud Parvez, Musarrat Farzana Rahman, Shaikat Galib and Frank Liou, “A Convolutional Neural Network (CNN) for Defect Detection of Additively Manufactured Parts,” ASME International Mechanical Engineering Congress and Exposition (IMECE) Conference, Machines Advanced Manufacturing, Best student paper award, Nov. 2021.
* Xinchang Zhang (PhDME), CEC Dean’s Ph.D. Scholar Award, Missouri S&T, 2019.
* Wenyuan Cui (PhDME), First place in Intelligent Systems Center’s (ISC) Research Symposium presentation (out of about 40 presentations), 2019.
* Tan Pan (MSME), Third place in Intelligent Systems Center’s (ISC) Research Poster presentation, 2019.
* Aaron Flood (PhDME), CEC Dean’s Graduator Educator Award, Missouri S&T, 2018.
* Wei Li (PhDME), CEC Dean’s Ph.D. Scholar Award, Missouri S&T, 2018.
* Freddy Wu, (MSSMAME), Best Student Presentation Award, 2017 International Symposium on Optomechatronic Technology, Tainan, Taiwan, Nov 5-9, 2017.
* Wei Li (PhDME), Third place in Intelligent Systems Center’s (ISC) Research Poster presentation (out of over 40 posters), 2016 and 2017.

**Professional Editorial Activities:**

* Associate Editor (2001-2008), SME Journal of Manufacturing Systems
* Associate Editor (2000-2007), Mechanism and Machine Theory, the journal of IFToMM - The International Federation for the Theory of Machines and Mechanisms

**PROFESSIONAL AFFILIATIONS:**

* Fellow, Society of Manufacturing Engineers (SME)
* Fellow, American Society of Mechanical Engineers (ASME)

**BOOK:**

* Liou, Fuewen Frank, Rapid Prototyping and Engineering Applications: A Toolbox for Prototype Development (Second Edition). CRC Press, 2019, ISBN-10: 1498798926, ISBN-13: 978-1498798921. [https://doi.org/10.1201/9780429029721](https://doi.org/10.1201/9780429029721%22%20%5Ct%20%22_blank)

**REFEREED PUBLICATIONS: ORCID:** <https://orcid.org/0000-0001-9505-0841>

Articles in Book Chapters:

1. Huang, C.P., S. Agarwal, F. W. Liou, “Validation of the Dynamics of a Parts Feeding System Using Augmented Reality Technology,” Book chapter (Chapter 14) in *Virtual Reality and Augmented Reality Applications in Manufacturing*, edited by Ong, Soh K., Nee, A.Y.C., July 2004, Published by Springer, ISBN: 1-85233-796-62004.
2. Zhang, Jingwei, Lei Yan, Wei Li, , Frank Liou, “A Two-Dimensional Simulation of Grain Structure Growth Within Substrate and Fusion Zone During Direct Metal Deposition,” book chapter of Additive Manufacturing of High-performance Metals and Alloys - Modeling and Optimization, ISBN#978-1-78923-389-6, Comptes Rendus Mecanique, Académie des Sciences, 2018, DOI.org/10.5772/intechopen.73107.
3. Isanaka, Sriram Praneeth and Frank Liou, “Current Capabilities and Research Trends in Rapid and Virtual Prototyping,” Advances in Manufacturing and Processing of Materials and Structures, Chapter 4 in the book: ISBN 9781138035959, 2018, DOI.org/10.1201/b22020-4.
4. Flood, Aaron and Frank Liou, “Chapter 5: Modeling and Simulation of Metal AM,” 3D Printing, 978-1-78923-966-9, Dragan Cvetković, IntechOpen, 2018. DOI.org/ 10.5772/intechopen.78144. Available from: <https://www.intechopen.com/books/3d-printing/modeling-and-simulation-of-metal-am>.
5. Liu, Renwei, Zhiyuan Wang, and Frank Liou, “Additive Processes”, Chapter 7 of Handbook of Manufacturing, <https://doi.org/10.1142/9789813271029_0007>, September 2019.
6. Zhang, Xinchang, Frank Liou,“Chapter 1: Introduction to Additive Manufacturing,” Editor(s): Juan Pou, Antonio Riveiro, J. Paulo Davim, In Handbooks in Advanced Manufacturing, Additive Manufacturing, Elsevier, 2021, Pages 1-31, ISBN 9780128184110,

<https://doi.org/10.1016/B978-0-12-818411-0.00009-4>.

1. Boillat, Rachel; Sriram Praneeth Isanaka; Frank Liou, “Chapter 1: Introduction to Materials and Processes for Additive Manufacturing/Alloy Design and Materials Selection,” ASM International Handbook, Volume 24A, Additive Manufacturing Design and Applications, ISBN electronic: 978-1-62708-439-0, DOI: <https://doi.org/10.31399/asm.hb.v24A.a0006973>, 2023.
2. Muhammad Arif Mahmood, Sung-Heng Wu, Frank Liou, Kashif Ishfaq,”Chapter 2: Machine learning for design in additive manufacturing,” *Machine Learning for Powder-Based Metal Additive Manufacturing*, Elsevier, 978-0-443-22145-3, B978-0-443-22145-3.00002-5, <https://www.sciencedirect.com/science/article/abs/pii/B9780443221453000025>, 2025.

Articles in Refereed Journals:

1. Liou, F. W. and A. G. Erdman, "Analysis of A High-Speed Flexible Four-bar Linkage, Part I: Formulation and Solution" *ASME Journal of Vibration, Acoustics, Stress, and Reliability in Design*, vol. 111, pp.35-41, 1989.
2. Liou, F. W. and A. G. Erdman, "Analysis of A High-Speed Flexible Four-bar Linkage, Part II: Analytical and Experimental Results on the Apollo", *ASME Journal of Vibration, Acoustics, Stress, and Reliability in Design*, vol. 111, pp.42-47, 1989.
3. Liou, F. W. and A. G. Erdman, "Experimental Motion Analysis of a High-Speed Mechanism and Drive System by Using High-Speed Camera and Digital Imaging Technique," *Mechanism and Machine Theory Journal*, vol. 24, No. 4, pp. 257-266, 1989.
4. Liou, F.W., A.G. Erdman and C.S. Lin, "Dynamic Analysis of A Motor-Gear- Mechanism System," *Mechanism and Machine Theory*, vol. 26, No. 3, pp. 239-252, 1991.
5. Liou, F.W. and K.C. Peng, "Experimental Vibration Analysis of Mechanisms," *Shock and Vibration Digest*, vol. 24, No. 2, pp. 3-10, 1992.
6. Liou, F.W. and D.J. Suen, "The Development of a Feature-Based Fixture Planning System for Flexible Assembly," *Journal of Manufacturing Systems*, No. 2, vol. 11, pp. 102-113, 1992.
7. Liou, F.W. and K. C. Peng, "Experimental Frequency Response Analysis of Flexible Four-Bar Mechanisms," *Mechanisms and Machine Theory*, vol. 28, No. 1, pp. 73-81, 1992.
8. Liou, F.W. and J.D. Liu, "Optimal Design of Flexible Mechanisms Using Parametric Approach," *Computers and Structures*, vol. 45, No. 5-6, pp. 965-972, 1992.
9. Liou, F. W. and C. J. Lou, "An Efficient Design Algorithm for High-Speed Mechanisms under Multiple Constraints," *Computers and Structures*, vol. 44, No. 5, pp. 965-972, 1992.
10. Liou, F. W. and Abani Patra, "Development of An Advisory Expert System for Elastic Mechanism Design," *Computers and Structures*, vol. 46, No. 1, pp. 125-132, 1993.
11. Shao, J.W., F.W. Liou, and A. Patra, "A Contact Phase Model for the Analysis of Flexible Mechanisms Under Impact Loading," *Computers and Structures*, vol. 49, No. 4, pp. 617-624, 1993.
12. Liou, F.W. and E. Baghu, "Experimental Research in Elastic Mechanisms," *Modern Kinematics - Developments in the Last Forty Years*, John Wiley & Sons, Inc., pp. 383-387 and pp. 434-437, 1993.
13. Liou, F. W. and J. D. Liu, "A Parametric Study on the Design of Multi-Body Systems with Elastic Members," *Mechanisms and Machine Theory*, vol. 29, No. 8, pp. 1219-1231, 1994.
14. Liou, F. W. and Abani Patra, "An Advisory System for the Analysis and Design of Deformable Beam-Type Multi-Body Systems," *Mechanisms and Machine Theory*, vol. 29, No. 8, pp. 1205-1218, 1994.
15. Fang, Yong and F.W. Liou, "Dynamic Analysis of Three Dimensional Multi-Body Systems with Elastic Components," *Computers and Structures*, vol. 57, No. 2, pp. 309-316, 1995.
16. Meyer, R.T. and F.W. Liou, “Fixture Analysis Under Dynamic Machining,” *International Journal of Production Research*, vol. 35, No. 5, 1471-1489, 1997.
17. Fang, Yong and F.W. Liou, “Virtual Prototyping of Mechanical Assemblies With Deformable Components,” *Journal of Manufacturing Systems*, vol. 16, No. 3, pp. 211-219, 1997.
18. Fang, Yong and F.W. Liou, "Interactive Geometric Modeling and Simulation of Manufacturing Systems," *Concurrent Design of Products, Manufacturing Processes and Systems*, Chapman & Hall, Chapter 14, pp. 337-364, 1998.
19. Yeh, J. H. and F.W. Liou, "Contact Condition Modeling for Machining Fixture Setup Processes," *International Journal of Machine Tools and Manufacture,* vol. 39, pp. 787-803, 1999.
20. Albuquerque, V. A., F. W. Liou, andO. R. Mitchell, “Inspection Point Placement and Path Planning Algorithms for Automatic CMM Inspection,” I*nternational Journal of Computer-Integrated Manufacturing*, vol. 13, No. 2, pp. 107-120, 2000.
21. Laeng, J., J. G. Stewart and F. W. Liou, “Laser Metal Forming Processes For Rapid Prototyping – A Review” *International Journal of Production Research,* vol. 38, No. 16, 3973-3996, 2000.
22. Yeh, J. H. and F.W. Liou, "Clamping Fault Detection in A Fixturing System," *SME* *Journal of Manufacturing Processes,* vol. 2, No. 3, 194-202, 2000.
23. Srikanth, K., F.W. Liou and S.N. Balakrishnan, "An Integrated Approach for Assembly Tolerance Analysis," *International Journal of Production Research,* vol. 39, No. 7, 1517-1535, 2001.
24. Huang, C.P., S. Agarwal, F. W. Liou, “Calibration, Registration, and Preparation of An Augmented Reality Environment For Virtual Prototyping Of Dynamic Systems,” *Journal of Advanced Manufacturing Systems*. vol. 1 No. 1, pp. 19-36, 2002.
25. Zhang, Jun and F.W. Liou, “Adaptive Slicing for A Multi-axis Laser Aided Manufacturing Process,” *ASME Journal of Mechanical Design,* vol. 126, pp. 254-261, March 2004.
26. Han, L.J. and F. W. Liou, “Numerical Investigation of the Influence of Laser Beam Mode on Melt Pool” *International Journal of Heat and Mass Transfer*, 47, pp. 4385-4402, 2004.
27. Kadekar, Vinay, Weiya Fang and Frank Liou, “Deposition Technologies For Micro-Manufacturing -A Review,” *ASME Journal of Manufacturing Science and Engineering*, November 2004, Volume 126, Issue 4, pp. 787-795.
28. Han, L., F.W. Liou, and K.M. Phatak, “Modeling of Laser Cladding with Powder Injection,” *Metallurgical and Materials Transactions B*, 2005, volume 35B, December 2004, pp. 1139-1150.
29. Han, Lijun, Kaushik M. Phatak and F. W. Liou, “Modeling of Laser Deposition and Repair Process,” *Journal of Laser Applications*, May 2005, Volume 17, Issue 2, pp. 89-99.
30. Pan, Heng and Frank Liou, “Numerical Simulation of Metallic Powder Flow in a Coaxial Nozzle for the Laser Aided Deposition Process,” *Journal of Materials Processing Tech*., Volume 168, Issue 2, 30 September 2005, Pages 230-244.
31. Ruan, J., K. Eiamsa-ard, and F. Liou, “Automatic Process Planning and Toolpath Generation of a Multi-Axis Hybrid Manufacturing System,” *SME Journal of Manufacturing Processes*, vol. 7, No. 1, pp. 57-68, 2005.
32. Han, Lijun, Frank W. Liou and Srinnivas Musti, “Thermal Behavior and Geometry Model of Melt Pool in Laser Material Process,” *Transactions of the ASME: Journal of Heat Transfer*, vol. 127, No. 9, pp. 1005-1014, September 2005.
33. Pan, Heng, Robert G. Landers, and Frank Liou, “Dynamic Modeling of Powder Delivery Systems in Gravity-Fed Powder Feeders,” *ASME Journal of Manufacturing Science and Engineering,* vol. 128, Feb 2006, pp. 337-345.
34. Pan, Heng, Todd Sparks, Yogesh D. Thakar, and Frank Liou, “The Investigation of Gravity-Driven Metal Powder Flow in Coaxial Nozzle for Laser Aided Direct Metal Deposition Process,” *ASME Journal of Manufacturing Science and Engineering*, May 2006, Volume 128, Issue 2, pp. 541-553.
35. Landers, R.G., Ruan, J–Z., and Liou, F.W., 2006, “Reconfigurable Manufacturing Equipment,” in *Reconfigurable Manufacturing Systems and Transformable Factories*, A. Dashchenko (ed.), Springer–Verlag, Part 2, Chapter 6.
36. Ruan, Jianzhong, Todd E. Sparks, Ajay Panackal, Kunnayut Eiamsa-ard, F. W. Liou, Kevin Slattery, Hsin-Nan Chou, Mary Kinsella, “Automated Slicing For A Multi-Axis Metal Deposition System,” *ASME Journal of Manufacturing Science and Engineering*, vol. 129, pp. 303-310, Apr 2007.
37. Liou, Frank, Kevin Slattery, Mary Kinsella, Joseph Newkirk, Hsin-Nan Chou, Robert Landers, “Applications of a Hybrid Manufacturing Process for Fabrication and Repair of Metallic Structures,” *Rapid Prototyping Journal*, 2007, ISSN: 1355-2546, 2007 Volume: 13 Issue: 4 Page: 236 – 244 (Won Highly Commended Paper Award, selected by Emerald Literati Network Awards for Excellence in 2008).
38. Tang, Lie, Jianzhong Ruan, Robert G. Landers, and Frank Liou, “Variable Powder Flow Rate Control in Laser Metal Deposition Processes, “*ASME Journal of Manufacturing Science and Engineering*, August 2008, vol. 130, 041016-1 to 11, 2008.
39. Ren, Lan, Todd Sparks, Jianzhong Ruan, and Frank Liou, “Process Planning Strategies for Solid Freeform Fabrication of Metal Parts,” *SME* *Journal of Manufacturing Processes,* Vol. 27, No. 4, 158-165, 2008.
40. Bao, Yaxin, Joseph Newkirk, Jianzhong Ruan, Todd E. Sparks, Frank Liou, “Effect of Mechanical Surface Treatments on Ti-6AL-4V Direct Metal Deposition Parts,” *SME Journal of Manufacturing Processes, Volume 10, Issue 2, 2008, Pages 56-60.*
41. Ren, Lan, Todd Sparks, Jianzhong Ruan, and Frank Liou, “Integrated Process Planning Framework for a Multi-axis Hybrid Manufacturing System,” *ASME Journal of Manufacturing Science and Engineering*, April 2010, vol. 132 / 021006-1 to 021006-7 (Top 10 Most Downloaded Articles -- April 2010).
42. Nagel, Jacquelyn K. S. and Frank W. Liou, “Designing a Modular Rapid Manufacturing Process,” *ASME Journal of Manufacturing Science and Engineering*, Volume 132, Issue 6, 061006-1 to 061006-1, 2010.
43. Ruan, Jianzhong, Lie Tang, Todd E. Sparks, Frank Liou, and Robert G. Landers , “Direct Three Dimensional Layer Metal Deposition,” *ASME Journal of Manufacturing Science and Engineering*, vol.132, Iss.6, pp. 064502-1 to 064502-6, 2010.
44. Chen, Xueyong, Todd Sparks, Jianzhong Ruan, Frank Liou, “Study of Ti64 Vibration Laser Metal Deposition Process,” *Journal of Advanced Materials Research*, Vols. 189-193, pp 512-517, 2011.
45. Barua, Shyam, Todd Sparks, and Frank Liou “Development of Low Cost Imaging System for Laser Metal Deposition Processes,” Rapid Prototyping Journal, Vol. 17 Issue: 3, pp.203 – 210, 2011.
46. Dietrich, David M, Michael W Hayes, and Frank Liou, “Additive Manufacturing Mechanical Property Assessment and Part Candidate Screening,” *International Journal of Rapid Manufacturing (IJRapidM)*: Special Issue on: "Rapid Manufacturing in Medical Applications", 2011, Vol.2 No.1/2 pp.28 - 55.
47. Kulkarnia, Nikhil, F. W. Liou, and J. W. Newkirk, “Comparison of Direct Deposition Process and Electro-Write Process for Proton Exchange Membrane Fuel Cell MEA Manufacturing,” *Journal of Sustainable Manufacturing and Renewable Energy, Article 2, Volume 1, Issue 1-2, 2011*.
48. Fan, Zhiqiang and Frank Liou, “Numerical Modeling of the Additive Manufacturing (AM) Processes of Titanium Alloy,” *Titanium Alloys - Towards Achieving Enhanced Properties for Diversified Applications*, ISBN 978-953-51-0354-7, Chapter 1, pp. 1-28, Editor: A.K.M. Nurul Amin, InTech, March, 2012.
49. Nagel, Jacquelyn K. S. and Frank W. Liou, “Hybrid Manufacturing System Design and Development,” *Manufacturing System*, ISBN 978-953-51-0530-5, Chapter 11, pp. 223-244 Editor: Faieza Abdul Azi, InTech, May, 2012.
50. Adivarekar, Mihir and Frank Liou, “Developing a General Postprocessor for Multi-Axis CNC Milling Centers,” *Computer-Aided Design and Applications* (ISSN 1686-4360), PACE Volume 2, pp-57-68,10.3722/cadaps, 2012.
51. Zhang, Jun, Jianzhong Ruan, Frank Liou, “A Process Planning Strategy for Multi-Axis Hybrid Manufacturing Process,” Int. J. Rapid Manufacturing, Vol. 3, Nos. 2/3, 2013, pp.130-153.
52. Kumar, Vishwa V., Salik R. Yadav, F. W. Liou, and S. N. Balakrishnan, “A Digital Interface for the Part Designers and the Fixture Designers for a Reconfigurable Assembly System,” Mathematical Problems in Engineering, Volume 2013 (2013), Article ID 943702, DOI: 10.1155/2013/943702.
53. Shenoy, Amogh and Frank Liou, “Microwire Feeder for Laser Applications,” Biomedical Engineering Research (BER), DOI:10.5963/BER0202006, pp.96-107, 2013.
54. Sreedharan, Shirish and Frank Liou, "Achieving Flow in a Rapid Prototyping Laboratory,” Lean Systems: Applications and Case Studies in Manufacturing, Service, and Healthcare, edited by Elizabeth Anne Cudney, CRC Press, 2013.
55. Zhang, Jun, Frank Liou, “Multi-Axis Planning of a Hybrid Material Deposition and Removal Combined Process,” Journal of Machinery Manufacturing and Automation, Sep. 2013, Vol. 2 Iss. 3, PP. 46-57.
56. Kumar, Vishwa V., F. W. Liou, S. N. Balakrishnan, Vikas Kumar, "Economical Impact of RFID Implementation in Remanufacturing: A Chaos-based Interactive Artificial Bee Colony Approach," Journal of Intelligent Manufacturing, DOI 10.1007/s10845-013-0836-9, October 2013.
57. Barua, Shyam, Frank Liou, Joseph Newkirk, and Todd Sparks, “Vision Based Defect Detection in Laser Metal Deposition Process,” Rapid Prototyping Journal, Rapid Prototyping Journal, Vol. 20, Iss: 1, pp.77 – 85, 2014.
58. Newkirk, Joseph W, and Frank Liou “High Performance Materials by Laser Deposition,” Materials Science Forum Vols. 783-786 (2014) pp 2365-2369.
59. Francis, Jomy, Todd E. Sparks, Jianzhong Ruan and Frank Liou, “Multi-Axis Tool Path Generation for Surface Finish Machining of a Rapid Manufacturing Process,” International Journal of Rapid Manufacturing, Vol.4, No.1, pp.66 – 80, 2014.
60. Amine, Tarak, Joseph W. Newkirk, Hussam El-Din F. El-Sheikh, Frank Liou, "Microstructural and Hardness Investigation of Tool Steel D2 Processed by Laser Surface Melting and Alloying," International Journal of Advanced Manufacturing Technology, JAMT-D-13-01839R1, May 2014.
61. Amine, Tarak, Joseph Newkirk, and Frank Liou," Numerical simulation of the thermal history multiple laser deposited layers,” The International Journal of Advanced Manufacturing Technology, DOI 10.1007/s00170-014-5961-x, May 2014.
62. Amine, Tarak, Joseph Newkirk, and Frank Liou, “An investigation of the effect of laser deposition parameters on characteristics of multilayered 316 L deposits,” Int J Adv Manuf Technology, DOI 10.1007/s00170-014-5951-z, May 2014.
63. Amine, Tarak, Joseph Newkirk, and Frank Liou, “An Investigation of the Effect of Direct Metal Deposition Parameters on the Characteristics of the Deposited Layers," Case Studies in Thermal Engineering, Volume 3, July 2014, Pages 21–34.
64. Amine, Tarak, Joseph Newkirk, and Frank Liou, “Investigation of effect of process parameters on multilayer builds by direct metal deposition," Applied Thermal Engineering, (2014), doi: 10.1016/j.applthermaleng.2014.08.005.
65. Wang, Zhiyuan, Renwei Liu, Todd Sparks, Heng Liu, Frank Liou, “Stereo Vision Based Hybrid Manufacturing Process For Precision Metal Parts,” Precision Engineering, doi:10.1016/j.precisioneng.2014.11.012, December 2014.
66. Sistla, Harihar Rakshit, Joseph. W. Newkirk, F. Frank Liou, “Effect of Al/Ni ratio, heat treatment on phase transformations and microstructure of AlxFeCoCrNi2−x (x = 0.3, 1) high entropy alloys,” Materials & Design, Volume 81, 15, 2015, Pages 113–121.
67. Brian Davis, Frank Liou, and Yong Huang, “Study of grain size variation and saw-tooth spacing during machining of additively manufactured titanium alloy, “ MRS Communications, June 2015.
68. Amine, Tarak, Joseph Newkirk, and Frank Liou, “Methodology for Studying Effect of Cooling Rate During Laser Deposition on Microstructure,” Journal of Materials Engineering and Performance,” 10.1007/s11665-015-1572-4, June 2015.
69. Isanaka, Sriram P., Todd E. Sparks, Frank F. Liou, and Joseph W. Newkirk, “Design strategy for reducing manufacturing and assembly complexity of air-breathing Proton Exchange Membrane Fuel Cells,” Journal of Manufacturing Systems, Volume 38, January 2016, Pages 165–171.
70. Wang, Zhiyuan, Renwei Liu, Todd Sparks and Frank Liou, “Realization of Robot Ink Deposition on a Curved Surface,” International Journal of Applications in Technology, International Journal of Computer Applications in Technology, Vol.53, No.2, pp.183 – 188, 2016. DOI: 10.1504/IJCAT.2016.074457
71. Isanaka, Sriram Praneeth, Sreekar Karnati, Frank Liou, “Blown powder deposition of 4047 aluminum on 2024 aluminum substrates,” Manufacturing Letters 7 (2016) 11–14.
72. Francis, Romy, Joseph W Newkirk, Frank Liou, “Investigation of Forged-Like Microstructure Produced by A Hybrid Manufacturing Process,” Rapid Prototyping Journal, Vol. 22, Iss: 4, 2016.
73. Gaja, H. and Liou, F., "Depth of Cut Monitoring for Hybrid Manufacturing Using Acoustic Emission Sensor," The International Journal of Advanced Manufacturing Technology, pp. 1 - 13, June 2016.
74. Zhang, Jingwei, Frank Liou, William Seufzer, Karen Taminger, “A Coupled Finite Element Cellular Automaton Model to Predict Thermal History and Grain Morphology of Ti-6Al-4V during Direct Metal Deposition (DMD),” Additive Manufacturing, Volume 11, 2016, Pages 32–39.
75. Gaja, H. and F. Liou, “Automatic detection of depth of cut during end milling operation using acoustic emission sensor,” The International Journal of Advanced Manufacturing Technology, October 2016, Volume 86, Issue 9, pp 2913–2925.
76. Yan, L., X. Chen, W. Li, F. Liou, J. Newkirk, “Direct Laser Deposition of Ti-6Al-4V from Elemental Powder Blends,” Rapid Prototyping Journal, Volume: 22 Issue 5, 2016.
77. Isanaka, Sriram Praneeth, Frank Liou, and Joseph Newkirk, “Nonprismatic Air-Breathing Fuel Cells—Concept, Theory, Design, and Manufacturing,” ASME Journal of Electrochemical Energy Conversion and Storage MAY 2016, Vol. 13 / 021006-1.
78. Liu, Renwei, Zhiyuan Wang, Todd Sparks, Frank Liou, Joseph Newkirk, “Aerospace Applications of Laser Additive Manufacturing,” Laser Additive Manufacturing, Materials, Design, Technologies, and Applications, Chapter 13, pp-351-371, Woodhead Publishing, 2016.
79. Gaja, H. and F. Liou, “Defects monitoring of laser metal deposition using acoustic emission sensor,” The International Journal of Advanced Manufacturing Technology, September 2016, doi:10.1007/s00170-016-9366-x.
80. Yan, Lei, Wei Li, Xueyang Chen, Yunlu Zhang, Joe Newkirk, Frank Liou, David Dietrich, “Simulation of Cooling Rate Effects on Ti-48Al-2Cr-2Nb Crack Formation in Direct Laser Deposition,” JOM (2016), <https://doi.org/10.1007/s11837-016-2211-8>.
81. Wang, Zhiyuan, Renwei Liu, Xueyang Chen, Todd Sparks and Frank Liou, “Industrial Robot Trajectory Stiffness Mapping for Hybrid Manufacturing Process,” International Journal of Robotics and Automation Technology, 2016, No. 3, pp. 28-39, doi:10.15377/2409-9694.2016.03.01.4.
82. Li, Wei, Lei Yan, Sreekar Karnati, Frank Liou, Joseph Newkirk, Karen Taminger; William Seufzer, “Ti-Fe Intermetallics Analysis and Control in Joining Titanium Alloy and Stainless Steel by Laser Metal Deposition,” Volume 242, April 2017, Pages 39–48, Journal of Materials Processing Technology.
83. Liu, Renwei, Zhiyuan Wang, Todd Sparks, and Frank Liou, “Stereo Vision-Based Repair of Metallic Components” Rapid Prototyping Journal, Vol. 23, Iss: 1, 2017.
84. Chen, Xueyang, Lei Yan, Sreekar Karnati, Yunlu Zhang, and Frank Liou, “Fabrication and characterization of AlxCoFeNiCu1-x high entropy alloys by laser metal deposition,” Coatings, 2017, 7(4), 47; <https://doi.org/10.3390/coatings7040047>.
85. Li, Wei, Sreekar Karnati, Frank Liou, Caitlin Kriewall, Joseph Newkirk, Karen Taminger; William Seufzer, “Fabrication and Characterization of the Functionally Graded Material from Ti-6Al-4V to SS316 by Laser Metal Deposition,” Additive Manufacturing, 14 (2017) 95–104.
86. Li, Wei, Frank Liou, Joseph Newkirk, Karen M. Brown Taminger, and William J. Seufzer,” Ti6Al4V/SS316 Multi-metallic Structure Fabricated by Laser 3D Printing and Thermodynamic Modeling Prediction,” International Journal of Advanced Manufacturing Technology, May 2017, DOI 10.1007/s00170-017-0543-3.
87. Zhang, Yunlu, Lei Yan, Frank Liou, “Improved Initial Guess with Semi-subpixel Level Accuracy in Digital Image Correlation by Feature-based Method,” Optics and Lasers in Engineering, May 2017, <https://doi.org/10.1016/j.optlaseng.2017.05.014>.
88. Chen, Xueyang, Lei Yan, Wei Li, Frank Liou, and Joseph Newkirk, ”Effect of Powder Particle Size on the Fabrication of Ti-6Al-4V Using Laser Metal Deposition from Elemental Powder Mixture,” Journal of Mechanics Engineering and Automation (JMEA), DOI: 10.17265/2159-5275/2016.07.005, July 2017.
89. Li, Wei, Jingwei Zhang, Xinchang Zhang, Frank Liou, “Effect of Optimizing Particle Size on Directed Energy Deposition of Functionally Graded Material with Blown Pre-mixed Multi-powder,” Manufacturing Letters, 15 July 2017, <https://doi.org/10.1016/j.mfglet.2017.07.001>
90. Li, Wei, Frank Liou, Joseph. Newkirk, Karen M. Brown Taminger, and William J. Seufzer, “Investigation on Ti6Al4V-V-Cr-Fe-SS316 Multi-layers Metallic Structure Fabricated by Laser 3D Printing,” Nature: Scientific Reports, 7, Article number: 7977, August 2017, <https://doi.org/10.1038/s41598-017-08580-z>.
91. Gaja, H. and F. Liou, “Defect classification of laser metal deposition using logistic regression and artificial neural networks for pattern recognition,” The International Journal of Advanced Manufacturing Technology, August 2017, DOI 10.1007/s00170-017-0878-9.
92. Li, Wei, Xueyang Chen, Lei Yan, Jingwei Zhang, Xinchang Zhang, Frank Liou, “Additive manufacturing of a new Fe-Cr-Ni alloy with gradually changing compositions with elemental powder mixes and thermodynamic calculation,” International Journal of Advanced Manufacturing, <https://doi.org/10.1007/s00170-017-1302-1>, Nov 2017
93. Zhang, Xinchang, Wei Li, Frank Liou, “"Damage detection and reconstruction algorithm in repairing compressor blade by direct metal deposition," International Journal of Advanced Manufacturing, <https://doi.org/10.1007/s00170-017-1413-8>, Nov 2017.
94. Li, Wei, Sreekar Karnati, Yunlu Zhang, Frank Liou, “Investigating and eliminating powder separation in pre-mixed powder supply for laser metal deposition process,” Journal of Materials Processing Tech., 254, 2018, pp. 294-301, <https://doi.org/10.1016/j.jmatprotec.2017.11.045> (IF: 3.147, http://www.scijournal.org/impact-factor-of-J-MATER-PROCESS-TECH.shtml)
95. Liu, Renwei, Zhiyuan Wang, and Frank Liou, “Multi-feature-fitting and Shape Adaption Algorithm for Components Repair,” ASME Journal of Manufacturing Science and Engineering, 140(2), 021003 (Dec 18, 2017), Paper No: MANU-17-1105; https://doi: 10.1115/1.4037107.
96. Li, Jie, Xinhua Liang, Frank Liou, and Jonghyun Park, “Macro-/Micro-Controlled 3D Lithium-Ion Batteries via Additive Manufacturing and Electric Field Processing,” Nature: Scientific Reportsvolume 8, Article number: 1846 (2018), <https://doi.org/10.1038/s41598-018-20329-w>.
97. Wang, Zhiyuan, Renwei Liu, Todd Sparks, Xueyang Chen and Frank Liou, “Industrial Robot Trajectory Accuracy Evaluation Maps for Hybrid Manufacturing Process Based on Joint Angle Error Analysis,” Advances in Robotics & Automation, 2018, 7:1.

<https://doi.org/10.4172/2168-9695.1000183>.

1. Zhang, Xinchang, Wei Li, Kate Adkison, Frank Liou, “Damage Reconstruction from Tri-dexel Data for Laser-aided Repairing of Metallic Components,” The International Journal of Advanced Manufacturing Technology, March 2018, <https://doi.org/10.1007/s00170-018-1830-3>.
2. Yan, Lei, Yunlu Zhang, Joseph W Newkirk, Frank Liou, Eric Thomas, Andrew Baker,” Investigation of Machining Coolant Residue Cleaning Methods for Ti6Al4V Part Fabrication through Hybrid Manufacturing Process,” Manufacturing Letters, MFGLET 145, 2018, doi: <https://doi.org/10.1016/j.mfglet.2018.02.016>.
3. Wei Li, Xinchang Zhang, and Frank Liou, “Modeling analysis of argon gas flow rate’s effect on pre-mixed powder separation in laser metal deposition process and experimental validation,” International Journal of Advanced Manufacturing Technology 96(23), March 2018. DOI.org/10.1007/s00170-018-1909-x.
4. Yan, Lei, Yunlu Zhang, Frank Liou, “A Conceptual Design of Residual Stress Reduction with Multiple Shape Laser Beams in Direct Laser Deposition,” Finite Elements in Analysis and Design, Volume 144, May 2018, Pages 30-37, <https://doi.org/10.1016/j.finel.2018.02.004>.
5. Zhang, Jingwei, Yunlu Zhang, Wei Li, Sreekar Karnati, Frank Liou, and Joseph W Newkirk, “Microstructure and properties of functionally graded materials Ti6Al4V/TiC fabricated by direct laser deposition,” Rapid Prototyping Journal, Vol. 24, issue 4, 2018, pp-677-687, <https://doi.org/10.1108/RPJ-12-2016-0215>.
6. Flood, Aaron and Frank Liou, “Review of Metal AM Simulation Validation Techniques,” Journal of Mechanics Engineering and Automation 8 (2018) 43-52, doi.org/10.17265/2159-5275/2018.02.001.
7. Zhang, Jingwei, Lei Yan, and Frank Liou, "An optimized Cellular Automata Finite Element (CAFE) model to simulate melt pool size and grain morphology of Ti-6Al-4V during direct metal deposition (DMD)," Three-dimensional Printing and Additive Manufacturing of High-performance Metals and Alloys, 2018, https://api.semanticscholar.org/CorpusID:235508951.
8. Li, Wei, Lei Yan, Xueyang Chen, Jingwei Zhang, Xinchang Zhang, Frank Liou, “Directed energy depositing a new Fe-Cr-Ni alloy with gradually changing composition with elemental powder mixes and particle size’ effect in fabrication process,” Journal of Materials Processing Technology, Volume 255, May 2018, Pages 96-104. <https://doi.org/10.1016/j.jmatprotec.2017.12.010>
9. Zhang, Xinchang, Wei Li, Xueyang Chen, Wenyuan Cui, Frank Liou, ” Evaluation of component repair using direct metal deposition from scanned data,” The International Journal of Advanced Manufacturing Technology (2018) 95:3335–3348. <https://doi.org/10.1007/s00170-017-1455-y>
10. Lei Yan, Wenyuan Cui, Joseph W. Newkirk, and Frank Liou, “Build Strategy Investigation of Ti-6Al-4V Produced Via a Hybrid Manufacturing Process,” JOM: the journal of the Minerals, Metals & Materials Society, Volume 70, Issue 9, pp 1706–1713, <https://doi.org/10.1007/s11837-018-3009-7>, July 2018.
11. Zhang, Xinchang, Wenyuan Cui, Wei Li, and Frank Liou, “Effects of tool path in remanufacturing cylindrical components by laser metal deposition,” International Journal of Advanced Manufacturing Technology, Volume 100, Issue 5–8, pp 1607–1617, <https://doi.org/10.1007/s00170-018-2786-z>, October 2018.
12. Zhang, Xinchang, Tan Pan, Wei Li, Frank Liou, “Experimental Characterization of a Direct Metal Deposited Cobalt-Based Alloy on Tool Steel for Component Repair,” JOM: the journal of the Minerals, Metals & Materials Society, arch 2019, Volume 71, Issue 3, pp 946–955, <https://doi.org/10.1007/s11837-018-3221-5>, November 2018.
13. Cui, Wenyuan, Sreekar Karnati, Xinchang Zhang, Elizabeth Burns, Frank Liou, “Fabrication of AlCoCrFeNi and 304 stainless steel dissimilar joint via Fe-Ni-Co intermediate layers through laser metal deposition,” Entropy 2019, 21(1), 2; <https://doi.org/10.3390/e21010002>.
14. Sreekar Karnati, Yunlu Zhang, Frank Liou, Joseph Newkirk, “On the feasibility of tailoring copper-nickel functionally graded materials fabricated through laser metal deposition,” Metals, Special Issue on Functionally Graded Materials, Metals 2019, 9(3), 287; <https://doi.org/10.3390/met9030287>.
15. Cheng, Yi-Chien, Frank Liou, Chih-Kun Cheng, and Sheng-Chih Shen, “A Framework for Process Inspection of Metal Additive Manufacturing,” Sensors and Materials, Vol. 31, No. 2 (2019) 411–420, <https://doi.org/10.18494/SAM.2019.2106>, 2019.
16. Karnati, Sreekar, Frank Liou, Joseph Newkirk, “Characterization of copper-nickel alloys fabricated using laser metal deposition and blended powder feedstocks,” The International Journal of Advanced Manufacturing Technology, 103, 239–250, 2019. <https://doi.org/10.1007/s00170-019-03553-0>.
17. Karnati, Sreekar, Atiyah Kouchakzad Khiabani, Aaron Flood, Frank Liou, and Joseph Newkirk, “Anisotropy in impact toughness of powder bed fused AISI 304L stainless steel,” Material Design and Processing Communication, doi.org/10.1002/mdp2.59, 2019.
18. Zhang, Xinchang, Yitao Chen, and Frank Liou, “Fabrication of SS316L-IN625 functionally graded materials by powder-fed directed energy deposition,” Science and Technology of Welding and Joining, Vol. 24, Issue: 5, 504-516, 2019, DOI.org/10.1080/13621718.2019.1589086
19. Zhang, Yunlu, Lei Yan, Sreekar Karnati, and Frank Liou, ” Bisection searching based reference frame update strategy for digital image correlation,” SN Applied Sciences (2019) 1:588 | <https://doi.org/10.1007/s42452-019-0625-y>.
20. Zhang, Xinchang, Wenyuan Cui, Wei Li, Frank Liou, “A Hybrid Process Integrating Reverse Engineering, Pre-Repair Processing, Additive Manufacturing and Material Testing for Component Remanufacturing,” MDPI, Materials, 12(12), 1961; <https://doi.org/10.3390/ma12121961>, 2019.
21. Parvez, Mohammad Masud, Yitao Chen, Sreekar Karnati, Connor Coward, Joseph Newkirk, Frank Liou, “A Displacement Controlled Fatigue Test Method for Additively Manufactured Materials,” MDPI Appl. Sci. **2019**, 9(16), 3226; <https://doi.org/10.3390/app9163226>.
22. Karnati, Sreekar and Frank F. Liou, “Detection and Tracking of Melt Pool in Blown Powder Deposition Through Image Processing of Infrared Camera Data,” In: Sergiyenko O., Flores-Fuentes W., Mercorelli P. (eds) Machine Vision and Navigation. Springer, Cham, pp 711-732, 2019, <https://doi.org/10.1007/978-3-030-22587-2_22>.
23. Yan, Lei, Yitao Chen, and Frank Liou, “Additive Manufacturing of Functionally Graded Metallic Materials Using Laser Metal Deposition,” (Invited Review Article) Additive Manufacturing, Volume 31, January 2020, 100901, [https://doi.org/10.1016/j.addma.2019.100901](https://doi.org/10.1016/j.addma.2019.100901%22%20%5Ct%20%22_blank%22%20%5Co%20%22Persistent%20link%20using%20digital%20object%20identifier).
24. Liu, Heng and Frank Liou, "Residual Stress Modelling and Deformation Measurement in Laser Metal Deposition Process," Chapter contribution in New Challenges in Residual Stress Measurements and Evaluation, ISBN 978-1-78984-952-3, edited by Dr. Caterina Casavola, 2019. Doi.org/10.5772/intechopen.90539.
25. Cui, Wenyuan, Yunlu Zhang, Xinchang Zhang, Lan Li, Frank Liou, “Metal Additive Manufacturing Parts Inspection using Convolutional Neural Network,” Appl. Sci. 2020, 10, 545; doi.org/10.3390/app10020545.
26. Zhang, Yunlu, Karnati, Sreekar, Pan, Tan, Liou, Frank. (2020). Determination of constitutive relation from miniature tensile test with digital image correlation. The Journal of Strain Analysis for Engineering Design. Volume: 55 issue: 3-4, page(s): 99-108. <https://doi.org/10.1177/0309324719892732>.
27. Parvez, Mohammad Masud, Tan Pan, Yitao Chen, Sreekar Karnati, Joseph W. Newkirk, and Frank Liou, “High Cycle Fatigue Performance of LPBF 304L Stainless Steel at Nominal and Optimized Parameters,” Special Issue Additively Manufactured Metallic Materials, Materials 2020, 13, 1591, <https://doi.org/10.3390/ma13071591>.
28. Li, L., Zhang, X., Cui, W., F Liou, W Deng, and Wei Li., “Temperature and residual stress distribution of FGM parts by DED process: modeling and experimental validation,” The International Journal of Advanced Manufacturing Technology, 109, pages 451–462 (2020). <https://doi.org/10.1007/s00170-020-05673-4>.
29. Zhang, Xinchang, Cheng Sun, Tan Pan, Aaron Flood, Yunlu Zhang, Lan Li, Frank Liou, “Additive Manufacturing of Copper – H13 Tool Steel Bi-metallic Structures via Ni-based Multi-interlayer,” Additive Manufacturing, Volume 36, 2020, <https://doi.org/10.1016/j.addma.2020.101474>.
30. Pan, Tan, Xinchang Zhang, Tomoya Yamazaki, Austin Sutton, Wenyuan Cui, Lan Li, and Frank Liou, “Characteristics of Inconel 625 - Copper Bimetallic Structure Fabricated by Directed Energy Deposition,” International Journal of Advanced Manufacturing Technology, 109, pages 1261–1274, 2020, <https://doi.org/10.1007/s00170-020-05713-z>
31. Cui, Wenyuan, Wei Li, Wei-Ting Chen, Frank Liou, “Laser Metal Deposition of an AlCoCrFeNiTi0.5 High-Entropy Alloy Coating on a Ti6Al4V Substrate: Microstructure and Oxidation Behavior,” Crystals, 2020, 10(8), 638; <https://doi.org/10.3390/cryst10080638>.
32. Tan Pan, Sreekar Karnati, Yunlu Zhang, Xinchang Zhang, Lan Li, Frank Liou, "Experiment Characterization and Formulation Estimation of Tensile Properties for Selective Laser Melting Manufactured 304L Stainless Steel" Materials Science & Engineering A, Volume 798, 140086, 2020, <https://doi.org/10.1016/j.msea.2020.140086>.
33. Chen, Yitao, Xinchang Zhang, Mohammad Masud Parvez and Frank Liou, “A Review on Metallic Alloys Fabrication Using Elemental Powder Blends by Laser Powder Directed Energy Deposition Process,” Materials (Basel). 2020 Aug; 13(16): 3562, doi: 10.3390/ma13163562.
34. Sun, Cheng, Yun Wang, Michael D. McMurtrey, Nathan D. Jerred, Frank Liou, Ju Li, “Additive Manufacturing for Energy Applications: A Review,” Applied Energy, 282 (2021) 116041.
35. Lauren Bryce Tomanek,Daniel Steven Stutts,Tan Pan,Frank Liou,"Influence of Porosity on the Thermal,Electrical,and Mechanical Performance of Selective Laser Melted Stainless Steel," Additive Manufacturing,Volume 39,March, 2021,101886. <https://doi.org/10.1016/j.addma.2021.101886>.
36. Li, Lan,Xinchang Zhang,Frank Liou,“Experimental and Numerical Investigation in Directed Energy Deposition for Component Repair,” Materials 2021,14,1409. <https://doi.org/10.3390/ma14061409>.
37. Zhang, Xinchang, Tan Pan, Aaron Flood, Yitao Chen, Yunlu Zhang, and Frank Liou, “Investigation of copper/stainless steel multimetallic materials fabricated by laser metal deposition,” Materials Science and Engineering: A, Volume 811, 15, 2021, 141071. <https://doi.org/10.1016/j.msea.2021.141071>.
38. Zhang, Xinchang, Wenyuan Cui, and Frank Liou, "Voxel-based Geometry Reconstruction for Repairing and Remanufacturing of Metallic Components via Additive Manufacturing," International Journal of Precision Engineering and Manufacturing-Green Technology, 2021, <https://doi.org/10.1007/s40684-020-00291-7>.
39. Boillat, R.; Isanaka, S.P.; Liou, F. “The Effect of Nanostructures in Aluminum Alloys Processed Using Additive Manufacturing on Microstructural Evolution and Mechanical Performance Behavior,” Crystals 2021, 11, 524. <https://doi.org/10.3390/cryst11050524>.
40. Yitao Chen, Xinchang Zhang, Mohammad Masud Parvez, Joseph W., “Fabricating TiNiCu ternary shape memory alloy by directed energy deposition via elemental metal powders,” Appl. Sci. 2021, 11, 4863, <https://doi.org/10.3390/app11114863>, 2021.
41. Xinchang Zhang, Tan Pan, Yitao Chen, Lan Li, et al.. "Additive Manufacturing of Copper-Stainless Steel Hybrid Components using Laser-Aided Directed Energy Deposition" Journal of Materials Science and Technology Vol. 80 (2021) p. 100 - 116 ISSN: 1005-0302 Available at: <https://www.sciencedirect.com/science/article/abs/pii/S100503022031032X>.
42. Li, L.; Liou, F. Numerical Investigation of Thermo-Mechanical Field during Selective Laser Melting Process with Experimental Validation,” Metals 2021, 11, 1003. <https://doi.org/10.3390/met11071003>.
43. Li, Lan, Tan Pan, Xinchang Zhang, Yitao Chen, Wenyuan Cui, Lei Yan, Frank Liou." Deformations and Stresses Prediction of Cantilever Structures Fabricated by Selective Laser Melting Process," Rapid Prototyping Journal, Vol. 27 No. 3, pp. 453-464. <https://doi.org/10.1108/RPJ-10-2019-0273>, 2021.
44. Xinchang Zhang, Lan Li, and Frank Liou, “Additive manufacturing of stainless steel copper functionally graded materials via Inconel 718 interlayer,” Journal of Materials Research and Technology, Volume 15, November–December 2021, Pages 2045-2058, [https://doi.org/10.1016/j.jmrt.2021.09.027](https://doi.org/10.1016/j.jmrt.2021.09.027%22%20%5Ct%20%22_blank%22%20%5Co%20%22Persistent%20link%20using%20digital%20object%20identifier).
45. Parvez, M.M.; Patel, S.; Isanaka, S.P.; Liou, F., “A Novel Laser-Aided Machining and

Polishing Process for Additive Manufacturing Materials with Multiple Endmill Emulating Scan Patterns,” Appl. Sci. 2021, 11, 9428. <https://doi.org/10.3390/app11209428>.

1. Ghimire, Ritesh and Frank Liou, “Coupled Flexural‐Electrical Evaluation of Additively

Manufactured Multifunctional Composites at Ambient Temperature,” Appl. Sci. 2021,

11, 9638. <https://doi.org/10.3390/app11209638>.

1. Ghimire, Ritesh and Frank Liou, “Experimental Investigation of Additive Manufacturing of Continuous Carbon Fiber Composites with Multifunctional Electro-Tensile Properties,” Materials 2021, 14(21), 6574; <https://doi.org/10.3390/ma14216574>.
2. Li, L., Zhang, X., Pan, T. et al., “Component repair using additive manufacturing: experiments and thermal modeling,” International Journal of Advanced Manufacturing Technology (2021). <https://doi.org/10.1007/s00170-021-08265-y>.
3. Tan Pan, Lan Li, Xinchang Zhang, Aaron Flood, Sreekar Karnati, Wenyuan Cui, Yunlu Zhang, Wei Li, Frank Liou, “Investigation of significant factors on deformation with powder bed fusion system,” Proceedings of the Institution of Mechanical Engineers, Part B: Journal of Engineering Manufacture, Volume: 235 issue: 5, page(s): 902-911, 2021, <https://doi.org/10.1177/0954405420970088>
4. Xinchang Zhang, Wei Li, Frank Liou, “Additive manufacturing of cobalt-based alloy on tool steel by directed energy deposition,” Optics & Laser Technology, Volume 148, 2022, 107738, ISSN 0030-3992, <https://doi.org/10.1016/j.optlastec.2021.107738>.
5. Ghimire, Ritesh and Frank Liou, “Quasi-Static Multifunctional Characterization of 3D Printed Carbon Fiber Composites for Compressive-Electro Properties,” Polymers, 2022, 14, 328. <https://doi.org/10.3390/polym14020328>.
6. Pan, Tan, Frank Liou, “Effect of processing parameters and build orientation on microstructure and performance of AISI stainless steel 304L made with selective laser melting under different strain rates,” Materials Science & Engineering A, 142686, 2022, <https://doi.org/10.1016/j.msea.2022.142686>.
7. John G Michopoulos, Athanasios P Iliopoulos, John C Steuben, Madan Kittur, Nam Phan, Ayman A Salem, Daniel P Satko, Sreekar Karnati, Sriram P. Isanaka, Frank Liou,

Multiscale Data Driven Methodology for Accelerating Qualification and Certification of Additively Manufactured Parts, Editor(s): Francisca G. Caballero, Encyclopedia of Materials: Metals and Alloys, Elsevier, 2022, Pages 223-244, ISBN 9780128197332, <https://doi.org/10.1016/B978-0-12-819726-4.00104-6>.

1. Yitao Chen, Cesar Ortiz Rios, Braden McLain, Joseph Newkirk, and Frank Liou, “TiNi-based bi-metallic shape memory alloy by laser directed energy deposition,” Materials 2022, 15, 3945. <https://doi.org/10.3390/ma15113945>.
2. Karnati, Sreekar; Sriram Isanaka, Yunlu Zhang, Frank Liou, Jason L. Schulthess, “A comparative study on representativeness and stochastic efficacy of miniature tensile specimen testing,” Materials Performance and Characterization, Volume 11, 2022; [https://doi.org/10.1520/mpc20210136 2022](https://doi.org/10.1520/mpc20210136%202022).
3. Saeid Alipour, Atieh Moridi, Frank Liou, Arezoo Emdadi, “The Trajectory of Additively Manufactured Titanium Alloys with Superior Mechanical Properties and Engineered Microstructures,” Additive Manufacturing, Article number 103245, 2022, <https://doi.org/10.1016/j.addma.2022.103245>.
4. Wu, Chenglin, Jiaoli Li, , Aditya Thakur, Yuxiang Gan, Yanxiao Li, Mianqing Yang, Stefan Linke, Frank Liou, Enrico Stoll. (2023). Phase Formation and Mechanical Prosperities of Graphene Reinforced Regolith Composites. SSRN Electronic Journal. <https://doi.org/10.2139/ssrn.4369365>.
5. Yitao Chen, Joseph W. Newkirk and Frank Liou, “Synthesizing Ti–Ni Alloy Composite Coating on Ti–6Al–4V Surface from Laser Surface Modification,” Metals 2023, 13, 243. <https://doi.org/10.3390/met13020243>.
6. Jiaoli Li, Aditya Thakur, Yanxiao Li, Mianqing Yang, Gan Yuxiang, Stefan Linke, Frank Liou, Enrico Stoll, Chenglin Wu, “Phase formation and mechanical properties of graphene reinforced regolith composites,” Materials Today Communications, Volume 35, Pages 106112, 2023, <https://doi.org/10.1016/j.mtcomm.2023.106112>.
7. Yitao Chen and Frank Liou, “Effect of Aging Time on Mechanical and Functional Properties of Graded Ti-Ni Alloy Joined by Laser Additive Manufacturing,” Manufacturing Letters, 2023’ <https://doi.org/10.1016/j.mfglet.2023.05.003>.
8. Jalan, V., Crawford, S., Wu, SH., Frank Liou, and Haiming Wen, “Microstructure, Mechanical Properties and Oxidation Behavior of Refractory Multi-principal Element Alloys by Laser Remelting and Conventional Manufacturing,” JOM (2023). <https://doi.org/10.1007/s11837-023-06135-4>
9. Maalavan Arivu, Andrew Hoffman, Jiaqi Duan, Jonathan Poplawsky, Xinchang Zhang, Frank Liou, Rinat Islamgaliev, Ruslan Valiev, Haiming Wen, “Comparison of the Thermal Stability in Equal-Channel-Angular-Pressed and High-Pressure-Torsion-Processed Fe–21Cr–5Al Alloy,” Advanced Engineering Materials, 2023, <https://doi.org/10.1002/adem.202300756>
10. Zhang, X., Wang, L., Liou, F. et al. Microstructure and Residual Stress in Functionally Graded 316L Stainless Steel/Inconel 625 Alloys Fabricated by Direct Energy Deposition. JOM (2023). <https://doi.org/10.1007/s11837-023-06201-x>.
11. Tariq, U., Joy, R., Wu, S.-H., Mahmood, M.A., Malik, A.W. and Liou, F. (2023), "A state-of-the-art digital factory integrating digital twin for laser additive and subtractive manufacturing processes", Rapid Prototyping Journal, Vol. 29 No. 10, pp. 2061-2097. <https://doi.org/10.1108/RPJ-03-2023-0113>
12. Flood, A.; Boillat, R.; Isanaka, S.P.; Liou, F. “Searching for Unknown Material Properties for AM Simulations,” Metals 2023, 13, 1798. <https://doi.org/10.3390/met1311179>8.
13. Flood, A. and Liou, F. “Sensitivity Analysis of Directed Energy Deposition Simulation Results to Aluminum Material Properties,” 3D Printing and Additive Manufacturing, 2023, <https://doi.org/10.1089/3dp.2023.0054>.
14. Rangapuram, M., Babalola, S., Newkirk, J.W. L. N. Bartlett, F. W. Liou, K. Chandrashekhara & Stephen R. Cluff, “Multiphysics modeling and experimental validation of high-strength steel in laser powder bed fusion process,” Progress in Additive Manufacturing (2023). <https://doi.org/10.1007/s40964-023-00532-6>
15. Remy Mathenia, Aaron Flood, Braden McLain, Todd Sparks, Frank Liou, “Effects of Laser Defocusing on Bead Geometry in Coaxial Titanium Wire-Based Laser Metal Deposition,” Materials 2024, 17, 889. <https://doi.org/10.3390/ma17040889>.
16. Rachel Boillat-Newport, Sriram Praneeth Isanaka, Jonathan Kelley, Frank Liou, “Heat Treatments for Minimization of Residual Stresses and Maximization of Tensile Strengths of Scalmalloy,” Materials 2024, 17, 1333. <https://doi.org/10.3390/ma17061333>
17. Wu, S.-H.; Tariq, U.; Joy, R.; Sparks, T.; Flood, A.; Liou, F., “Experimental, Computational, and Machine Learning Methods for Prediction of Residual Stresses in Laser Additive Manufacturing: A Critical Review. Materials 2024, 17, 1498. <https://doi.org/10.3390/ma17071498>.
18. Wu, Sung-Heng, U Tariq, R Joy, MA Mahmood, AW Malik, and F Liou, ”A Robust Recurrent Neural Networks-Based Surrogate Model for Thermal History and Melt Pool Characteristics in Directed Energy Deposition” Materials 17.17 (2024): 4363. <https://doi.org/10.3390/ma17174363>
19. Mahmood, M.A.; Ur Rehman, A.; Khan, T.; Seers, T.D.; Liou, F.; Khraisheh, M. Defects quantification of additively manufactured AISI 316L stainless steel parts via non-destructive analyses: Experiments and semi-FEM-analytical-based modeling. Opt. Laser Technol. 2024, 174, 110684. <https://doi.org/10.1016/j.optlastec.2024.110684>.
20. Mahmood, Muhammad Arif; Kashif Ishfaq; Muhammad Sana; Saqib Anwar; Frank Liou, "3D Fractal Model with Experimental Analysis for Assessing Surface Topography in EDM," Surface Topography: Metrology and Properties, 2024, <https://DOI.org/10.1088/2051-672X/ad3e94>.
21. Tariq, Usman, Sung-Heng Wu, Muhammad Arif Mahmood, Michael M Woodworth, and Frank Liou, “Effect of Pre-heating on Residual Stresses and Deformation in Laser-based Directed Energy Deposition Repair: A Comparative Analysis,” Materials, 2024, 17, 2179.

<https://doi.org/10.3390/ma17102179>.

1. Saberi, Leila; Liou, Frank; Amiri, Mehdi, “Effects of Process-Induced Defects on the Corrosion of Additively Manufactured Stainless Steel 304L,” Journal of The Electrochemical Society, Volume 171, Number 5, 2024, <https://DOI.org/10.1149/1945-7111/ad4c0f>.
2. Mahmood, Muhammad Arif, Asad Malik, Frank Liou, “A Novel Framework for Identification of Cyber-physical Attacks in Additive Manufacturing,” Additive Manufacturing, July 2024, [Progress in Additive Manufacturing](https://www.researchgate.net/journal/Progress-in-Additive-Manufacturing-2363-9520?_sg=wnFXvwN6Xi3pYNuEnxowNS4VXCEg18HEzUdpPsCMxVKc1b9e_QrpLaOpDcbECPN81lhgUdi_PTweYImWlNXIABdAGBHgaQ.2MszPicE1z_-ltRoz1wzM-tjFV5eY3OsqIEYW95SOR1LNqzgzOWSP-6ODsfQRljoWwPKv-xDH62n6YWcrhV26Q), DOI: [10.1007/s40964-024-00726-6](http://dx.doi.org/10.1007/s40964-024-00726-6)
3. Rachel Boillat-Newport, Sriram Praneeth Isanaka, Frank Liou, “Heat Treatment Post-Processing for Improved Mechanical Properties of Scalmalloy® Processed via Directed Energy Deposition,” Crystals 2024, 14, 688. <https://doi.org/10.3390/cryst14080688>.
4. Mahmood, Muhammad Arif, Khraisheh, Marwan; Popescu, Andrei C.; Liou, Frank, “Processing Windows for Al-357 by LPBF Process: A Novel Framework integrating FEM simulation and Machine Learning with Empirical Testin,” Rapid Prototyping Journal, 2024, <https://doi.org/10.1108/RPJ-01-2024-0057>.
5. Ahmmed, M.S.; Isanaka, S.P.; Liou, F., “Promoting Synergies to Improve Manufacturing Efficiency in Industrial Material Processing: A Systematic Review of Industry 4.0 and AI,” Machines 2024, 12, 681. <https://doi.org/10.3390/machines12100681>.
6. Mahmood, Muhammad Arif, Usman Tariq, Mihai Oane & Frank Liou, “Analytical and FEM Models for Thermal Analysis and Residual Stresses Using Wire Arc-based Welding and Additive Manufacturing of SUS304,” The International Journal of Advanced Manufacturing Technology, Volume 133, pages 2363–2380, 2024, <https://doi.org/10.1007/s00170-024-13797-0>.
7. Mahmood, Muhammad Arif, Kashif Ishfaq, Mihai Oane, Marwan Khraisheh, Frank Liou, “Integrated Approach for AlSi10Mg Rapid Part Qualification: FEM, Machine Learning, and Experimental Verification in LPBF-based Additive Manufacturing Process,” Additive Manufacturing, <https://doi.org/10.1007/s40964-024-00683-0>.
8. Malik, Asad Waqar, Mahmood, Muhammad Arif, Liou, Frank, “Digital Twin-Driven Optimization of Laser Powder Bed Fusion Processes: A Focus on Lack-of-fusion Defects,” Rapid Prototyping Journal, August 2024, DOI: [10.1108/RPJ-02-2024-0091](http://dx.doi.org/10.1108/RPJ-02-2024-0091).
9. Remy Mathenia, Braden McLain, Todd Sparks, Frank Liou, “A Study of Directionality Effects in Three-Beam Coaxial Titanium Wire-Based Laser Metal Deposition,” Materials, 2024, 2024, 17, 3201. <https://doi.org/10.3390/ma17133201>.
10. Kelley, J.; Newkirk, J.W.; Bartlett, L.N.; Isanaka, S.P.; Sparks, T.; Alipour, S.; Liou, F. Development of Robust Steel Alloys for Laser-Directed Energy Deposition via Analysis of Mechanical Property Sensitivities. Micromachines 2024, 15, 1180. <https://doi.org/10.3390/mi15101180>.
11. McLain, B.; Mathenia, R.; Sparks, T.; Liou, F., “Machine Vision to Provide Quantitative Analysis of Meltpool Stability for a Coaxial Wire Directed Energy Deposition Process. Materials 2024, 17, 5311. <https://doi.org/10.3390/ma17215311>.
12. Brown, B, Lough C, Wilson D, Newkirk J, Liou F., “Atmosphere Effects in Laser Powder Bed Fusion: A Review,” Materials, 2024; 17(22):5549. <https://doi.org/10.3390/ma17225549>
13. Khan, L.; Isanaka, S.P.; Liou, F., “FPGA-Based Sensors for Distributed Digital Manufacturing Systems: A State-of-the-Art Review,” Sensors 2024, 24, 7709. <https://doi.org/10.3390/s24237709>.
14. Saeid Alipour, Sung-Heng Wu, Frank Liou, Arezoo Emdadi, “Implementation of Miniature Tensile Specimens in Mechanical Properties Assessment of Directed Energy Deposited Ti-6Al-4V: As-built and Heat Treated,” Materials Science and Engineering A., 2024. <https://doi.org/10.1016/j.msea.2024.147593>.
15. MD Ali; Malik, Asad; Nursultan Jyeniskhan; Mahmood, Muhammad Arif; Liou, “Development of Digital Twin for FDM Printer with Integrated Preventive Cyber-Attack and Model Predictive Control Algorithms,” IEEE Access, 2169-3536, 2024. <https://doi.org/10.1109/ACCESS.2024.3516827>.
16. Anilas Karimpilakkal, Joseph W Newkirk, Jason L Schulthess, Frank Liou, Visharad Jalan, Haiming Wen, “High-temperature stability and thermal expansion behavior of equi-atomic refractory multi-principal element alloys based on MoNbTi system for Gen IV reactor applications,” International Journal of Refractory Metals and Hard Materials, 2025. <https://doi.org/10.1016/j.ijrmhm.2025.107064>
17. Muhammad Arif Mahmood, Kashif Ishfaq, Mihai Oane, Marwan Khraisheh, Frank Liou, “Integrated approach for AlSi10Mg rapid part qualification: FEM, machine learning, and experimental verification in LPBF-based additive manufacturing process,” Progress in Additive Manufacturing, Prog Addit Manuf 10, 861–874 (2025). <https://doi.org/10.1007/s40964-024-00683-0>.
18. Rahman, Atiqur, Sriram Praneeth Isanaka, and Frank Liou. 2025. "A Comprehensive Study of Cooling Rate Effects on Diffusion, Microstructural Evolution, and Characterization of Aluminum Alloys" Machines 13, no. 2: 160. <https://doi.org/10.3390/machines13020160>.
19. Ragampeta, B.; Ragampeta, P.; Sparks, T.; Liou, F. Oxidation–Reduction of Ti-6Al-4V in Direct Energy Deposition Subject to Minimum Argon Consumption. Appl.Sci. 2025, 15, 2247. [**https://doi.org/10.3390/app15042247**](https://doi.org/10.3390/app15042247).
20. Boillat-Newport, R.; Isanaka, S.P.; Liou, F., “Impact of Delayed Artificial Aging on Tensile Properties and Microstructural Evolution of Directed Energy Deposited Scalmalloy®,” Appl. Sci. 2025, 15, 3674. <https://doi.org/10.3390/app15073674>.

Articles in Refereed Proceedings:

1. Liou, F. W. and A. G. Erdman, "Analytical Form of a Kinematic Mobility Equation For 3-D Mechanisms Including Over-constrained Linkages," *Proceedings of ASME Paper 86-DET-154,* presented at ASME Design Engineering Technical Conference, Columbus, Ohio, Oct. 6-8, 1986.
2. Liou, F. W., A. G. Erdman, and K. Stelson, "General Design Rules for High-Speed Flexible Mechanisms," *Proceedings of 1988 ASME Mechanisms Conference*, DE-Vol. 15.2, pp.423-439.
3. Krishnamurthy, K., F. W. Liou, M. Mehta, J.H. Chien, and H.T. Liang, "Design of An Unmanned Flexible Assembly Cell," *Proceedings of the Third ORSA/TIMS Special Interest Conference on Flexible Manufacturing Systems*, pp. 299-304, MIT, Cambridge, MA, Aug. 14-16, 1989.
4. Liou, F. W. and J. D. Liu, "Optimal Design Rules Applied to the Design of High-Speed Mechanisms under Deflection and Stress Constraints," *Proceedings of the ASME Design Automation Conference*, pp. 127-133, vol. 2, Montreal, Canada, September 17-20, 1989.
5. Liou, F. W., K. Krishnamurthy, M. Mehta, J.H. Chien, and H.T. Liang, "Development of A Flexible Fixture for Assembly," *Proceedings of the 1st ASME Conference in Flexible Assembly*, pp. 85-91, Montreal, Canada, September 17-20, 1989.
6. Peng, K. C. and F. W. Liou, "A Survey of Experimental Investigation of High-Speed Mechanisms," *Proceedings of the 1990 ASME Mechanisms Conference*, Chicago, September 17-19, 1990, DE-VOL-24, pp. 161-168.
7. Patra, Abani and F. W. Liou, "An Advisory Expert System for the Design of High-Speed Mechanisms," *Proceedings of the 1990 ASME Mechanisms Conference*, Chicago, September 17-19, 1990, DE-VOL-24, pp. 153-160.
8. Pfeiffer, Glen and F.W. Liou, "Investigation Resulting in Guidelines to Optimize Fluidized Bed Fixture Performance," *Proceedings of the 2nd ASME Flexible Assembly Conference*, Chicago, September 17-19, 1990, DE-VOL-28, pp. 37-44.
9. Schollmeyer, M., J. Lin, K. Krishnamurthy, A. Bahrami, C. Dagli, G. Leininger, and F. Liou, "Hybrid Expert System and Operations Research for Solving Nesting Problems," *Proceedings of the 1st World Congress on Expert Systems*, vol. 2, pp. 1223-1231, Orlando, FL, Dec., 1991.
10. Straus, R.J. and F.W. Liou, "Automated Welding Process Fixture Planning Using Features," *ASME* *Flexible Assembly Systems,* DE-vol. 48, pp. 11-18, September, 1992.
11. Yu, Jin, F.W. Liou, Zhongfang Tong, and Yueming Sun, "A Knowledge Base System for Intelligent Process Planning," *Advances in Design Automation,* DE-vol. 44-1, pp. 155-160, September, 1992.
12. Fang, Yong and F.W. Liou, "Computer Simulation of Three-Dimensional Mechanical Assemblies, Part I. General Formulation," *Proceedings of the 1993 ASME Computers in Engineering Conference*, Vol. 1, pp. 579-587.
13. Chou, T.C. and F.W. Liou, "Computer Simulation of Three-Dimensional Mechanical Assemblies, Part II. Computer Simulation," *Proceedings of the 1993 ASME Computers in Engineering Conference*, Vol. 1, pp. 589-596.
14. Fang, Yong and F. W. Liou, "Geometric Modeling and Simulation of Mechanical Assemblies with Elastic Components," *Proceedings of the ASME Design Technical Conferences*, DE-Vol. 69-1, pp. 45-53, September 11-14, 1994.
15. Huang, J.P., F. Liou, J. Malyamakkil, and W. Lu, "An Advisory System for the Conceptual Design of Mechanical Components," *Proceedings of the ASME Design Technical Conferences*, DE-Vol. 71, pp. 391-399, September 11-14, 1994.
16. Yeh, J. H. and F.W. Liou, "The Preliminary Design of Mechanical Drive and Transmission Components," *Proceedings of the 1995 ASME Design Technical Conference*, Vol. 1, DE-Vol. 82, pp. 553-560, 1995.
17. Pai, U. and F.W. Liou, "Computer Prototyping of Moving Mechanical Parts," *Proceedings of the 1995 ASME Computers in Engineering Conference*, pp. 979-986, 1995.
18. Cheng, F.Y., P. Tian, V. Rao, K. Martin, F. Liou, and J.H. Yeh, “Theoretical and Experimental Studies on Hybrid Control of Seismic Structures,” *Proceedings of the 12th ASCE Analysis and Computation Conference*, Chicago, IL, pp. 322-338, April 1996.
19. Liou, F.W., “Enabling Technologies For Virtual Parts Handling Environment - An Overview,” the *5th ASME Flexible Assembly Conference paper 96-DETC/FAS-1608*, pp. 1-8, (in CD ROM format) August 1996.
20. Ramachandran, R., B. K. Vilvaray, and F. Liou, "3D CAD Model Simplification for Simulation," *Symposium on Virtual Reality in Manufacturing Research and Education*, pp. 163-172, Chicago, IL, 1996.
21. Srikanth, K., F.W. Liou and S.N. Balakrishnan, "Fuzzy Tolerance Analysis of 3-D Mechanical Assemblies," *ASME Design Automation Conference paper DETC97/DAC-3769*, pp. 1-10, Sept 16, 1997. (Won ASME Design Automation Applicon Best Paper Award for CAD/CAM Theory and Applications).
22. Chou, T.C., F.W. Liou, L. Reeves, B. McMillin, and P. Suess, "Effective Octree Generation of Parts for Virtual Prototyping," *Proceedings of the 3rd ASME Design for Manufacturing Conference, Paper No. DETC98/DFM-5716*, pp. 1-6, September 13-16, 1998 in Atlanta, GA.
23. Srikanth, K., F.W. Liou and S.N. Balakrishnan, "Automatic Tolerance Assignment Using Fuzzy Logic," *Proceedings of the ASME Design Automation Conference, Paper No. DETC98/DAC-5585,* pp. 1-10, September 13-16, 1998 in Atlanta, GA.
24. Agarwal, S. and O.R. Mitchell, J. Zhang, V. Albuquerque, and F.W. Liou, “Application of Machine Vision Technology to Quick Turnaround Cell," presented in *SME AutoFact '98 Conference, Sec. 205B,* September 28 -October 1, 1998 in Detroit, MI.
25. Albuquerque, V.A., F. Liou, S. Agarwal, and O. R. Mitchell, “Automatic Coordinate Measuring Machine Inspection,” *Proc. of 1999 ASME Design Engineering Technical Conference,* Sept. 12-15, 1999, Las Vegas, Nevada.
26. Liou, F. W., (1999), “A Multi-Axis Rapid Prototyping System,” *SME Rapid Prototyping and Manufacturing '99 Conference*, Volume 3, 565-579, April 22, 1999.
27. Agarwal, S., J.P. Huang, F.W. Liou, and O.R. Mitchell, “A Framework for Augmented Reality Based Collaborative Product Development," *Industrial Virtual Reality Symposium*, MH-Vol. 9, pp. 117-125, 1999.
28. F. W. Liou, “Virtual Environment For Materials Handling,” *Proceedings of the 11th National Conference on Automation Technologies,* pp. 945- 950, July 9-11, 1999, Taiwan.
29. Huang, C.P., S. Agarwal, F. W. Liou, “The Development of Augmented Reality Environment: A Case Study On The Parts Feeding Systems,” *Proceedings of the ASME 20th Computers and Information in Engineering Conference, Paper no. DETC/CIE-14583*, Sep., 2000.
30. Yeh, J. H. and F. W. Liou, “Detection Of Machine And Structure Assemblies With Bolt Looseness,” *Proceedings of the ASME 20th Computers and Information in Engineering Conference, Paper no. DETC2000/RSAFP-14466*.
31. Liou, F.W., J. Zhang, S. Agarwal, J. Laeng, and J. Stewart, “Development of a Precision Rapid Metal Forming Process,” *Proceedings of the Eleventh Annual Solid Freeform Fabrication Symposium*, Austin, TX, August 7-9, 2000, 362-368.
32. Zhang, J., J. Ruan, and F. W. Liou, “Process Planning for a Five-Axis Hybrid Rapid Manufacturing Process,” *Proceedings of the Eleventh Annual Solid Freeform Fabrication Symposium*, Austin, TX, August 7-9, 2000, pp. 243-250.
33. Munjuluri, N., S. Agarwal, and F.W. Liou, “Process Modeling, Monitoring and Control of Laser Metal Forming,” *Proceedings of the Eleventh Annual Solid Freeform Fabrication Symposium*, Austin, TX, August 7-9, 2000, pp. 235-242.
34. Leu, Ming C., Frank Liou, Daniel A. McAdams, Venkat Allada, Bahador Ghahramani, Sanjeev Agarwal, Richard H. Hall, “Planning of a Multi-Disciplinary Rapid Product Realization Program,” *Proceedings of the International Conference on Engineering Education Conference (ICEE2000)*, August 14-16, 2000, Taipei, Taiwan.
35. Laeng, J., J. G. Stewart and F. W. Liou, “Laser Metal Forming Processes and The Application In Rapid Prototyping of Metallic Parts,” Proceedings of the 2nd International Conference on Advanced Manufacturing Technology, August 16-17, 2000, Johor Bahru, Malaysia, pp. 305-320.
36. Stewart, J. G., F. W. Liou, and J. Laeng, “Material Delivery System For A Rapid Metal Forming Machine,” *Proceedings of the 2nd International Conference on Advanced Manufacturing Technology*, August 16-17, 2000, Johor Bahru, Malaysia, pp 571-581.
37. Zhang, Jun and F.W. Liou, “Precision Solid Freeform Fabrication using Laser Aided Manufacturing Processes (LAMP),” *Proceedings of the 2001 NSF Design and Manufacturing Grantees Conference*, MPM-56, pp. 1-8, 2001.
38. Zhang, Jun and F.W. Liou, “Adaptive Slicing for a Five-Axis Laser Aided Manufacturing Process,” Proceedings of the *2001 ASME Design Automation Conference,* Pittsburgh, Pennsylvania*,* September 9-12, 2001, Paper No*.* DAC-21157.
39. Ruan, J.Z., Jun Zhang, and F.W. Liou, “Support Structures Extraction for Hybrid Layered Manufacturing,” Proceedings of the *2001 ASME Design Automation Conference,* Pittsburgh, Pennsylvania*,* September 9-12, 2001, Paper No.DAC-21098.
40. Eiamsa-ard, Kunnayut, Jun Zhang, F.W. Liou*, “*Skeleton-Based Geometry Decomposition for Adaptive Slicing in a Five-Axis Laser Aided Manufacturing Process System,” *Proceedings of the Twelfth Annual Solid Freeform Fabrication Symposium*, Austin, TX, August 6-8, 2001.
41. Boddu, Mallikharjuna R., Srinivas Musti, Robert G. Landers, Sanjeev Agarwal, Frank Liou, “Empirical Modeling and Vision Based Control for the Laser Aided Metal Deposition Process,” *Proceedings of the Twelfth Annual Solid Freeform Fabrication Symposium*, Austin, TX, August 6-8, 2001, pp. 452-459.
42. Laeng, James aka Jamaluddin Abdullah, F.W. Liou*, “*Design and Integration of a Laser Metal Forming System,” *Proceedings of the Twelfth Annual Solid Freeform Fabrication Symposium*, Austin, TX, August 6-8, 2001.
43. Liou, Frank, Robert Landers, J. Choi, Sanjeev Agarwal, Vijayakumar Janardhan, S.N. Balakrishnan, “Research and Development of a Hybrid Rapid Manufacturing Process,” *Proceedings of the Twelfth Annual Solid Freeform Fabrication Symposium*, Austin, TX, August 6-8, 2001, pp. 138-145
44. Boddu, Mallikharjuna R., Robert G. Landers, Frank Liou*, “*Control of Laser Cladding Process for Rapid Prototyping - A Review,” *Proceedings of the Twelfth Annual Solid Freeform Fabrication Symposium*, Austin, TX, August 6-8, 2001, pp. 460-467.
45. Liou, Frank and Jianzhong Ruan, “A Hybrid Metal Deposition and Removal System for Rapid Manufacturing,” *Proceedings of the 2002 International Conference On Metal Powder Deposition for Rapid Manufacturing***,** April 8-10, 2002 -San Antonio, TX.
46. Wang, Jinglei, Sashikanth Prakash, Yashodhan Joshi, and Frank Liou *“*Laser Aided Part Repair - a Review,” *Proceedings of the Thirteenth Annual Solid Freeform Fabrication Symposium*, Austin, TX, August 5-7, 2002.
47. Landers, Robert G., Michael Hilgers, Frank W. Liou, Bruce M. McMillin, “Object-Oriented Modeling and Fault Detection of a Powder Feeder for a Laser Metal Deposition System,” *Proceedings of the Thirteenth Annual Solid Freeform Fabrication Symposium*, Austin, TX, August 5-7, 2002.
48. Boddu, Mallikharjuna R., Robert G. Landers, Srinivas Musti, Sanjeev Agarwal, Jianzhong Ruan, Frank W. Liou, “System Integration and Real-Time Control Architecture of a Laser Aided Manufacturing Process,” *Proceedings of the Thirteenth Annual Solid Freeform Fabrication Symposium*, Austin, TX, August 5-7, 2002.
49. Ruan, Jianzhong, Kunnayut Eiamsa-ard*,* , Jun Zhang, and F.W. Liou, “Automatic Process Planning of A Multi-Axis Hybrid Manufacturing System,” *Proceedings of the* *2002 ASME Design Automation Conference,* Montreal, Canada*,* September 29-Oct. 2, 2002, Paper No*.* DAC-34138.
50. Liou, Frank, Venkat Allada, Ming Leu, Rajiv Mishra, Tony Okafor, and Ashok Agrawal, “A Product Focused Manufacturing Curriculum, *2002 ASEE Annual Conference & Exposition*, Montréal, Quebec, Canada, June 16-19, 2002.
51. Liou, Frank, Venkat Allada, Ming Leu, Rajiv Mishra, Tony Okafor, and Ashok Agrawal, “Product Development Curriculum With Integrated Manufacturing Processes,” *Proceedings of the 36th ASEE Midwest Section Conference*, September 2002.
52. Liou, F.W. and Jianzhong Ruan, “Integrated Process Planning for A Multi-Axis Hybrid Manufacturing Process,” *Proceedings of the 2003 NSF Design and Manufacturing Grantees Conference*, MPM, pp. 1-7, 2003.
53. Liou, Frank, Venkat Allada, Ming Leu, Rajiv Mishra, Tony Okafor, and Ashok Agrawal, “An Integrated And Distributed Environment For A Manufacturing Capstone Course,” *Proceedings of The 2003 ASEE Annual Conference & Exposition*, Nashville, TN, June 22-26, 2003.
54. Eiamsa-ard, Kunnayut, F.W. Liou, Robert G. Landers, and Howie Choset, “Toward Automatic Process Planning of A Multi-Axis Hybrid Laser Aided Manufacturing System: Skeleton-Based Offset Edge Generation,” *Proceedings of* the *2003 ASME Design Automation Conference,* Chicago, Illinois*,* September 2-6, 2003, Paper No*.* DAC-48726.
55. Ruan, Jianzhong and F.W. Liou “Automatic Toolpath Generation For Multi-Axis Surface Machining In A Hybrid Manufacturing System,” *Proceedings of the* *2003 ASME Design Automation Conference,* Chicago, Illinois*,* September 2-6, 2003, Paper No*.* DAC-48780.
56. Joshi, Yashodhan Vinay; Boddu, Mallikharjuna Rao; Liou, Frank; Landers, Robert G., “Parametric Evaluations of Process Variables in the Laser Aided Manufacturing Process (LAMP)" Proceedings of the Fourteenth Annual Solid Freeform Fabrication Symposium, Austin, TX, August 4-6, 2003.
57. Prakash, Sashikanth; Boddu, Mallikharjuna Rao; Liou, Frank “Application of a Diagnostic Tool in Laser Aided Manufacturing Processes" *Proceedings of the Fourteenth Annual Solid Freeform Fabrication Symposium*, Austin, TX, August 4-6, 2003.
58. Han, L. and F. W. Liou, “Numerical Modeling of Laser Repair Process and Stress Analysis,” ICALEO 2003, Jacksonville, FL, Paper number 1608, October 2003.
59. Liou, F.W. and Jianzhong Ruan, “A Multi-Axis Hybrid Manufacturing Process,” *Proceedings of the 2004 NSF Design and Manufacturing Grantees Conference*, MPM, pp. 1-11, 2004.
60. Nair, Hari Janardanan, Frank Liou “Integrating Micro-Nano Level Interdisciplinary Manufacturing Engineering Education For MEMS,” *Proceedings of the 2004 ASEE Annual Conference & Exposition*, Salt Lake City, UT, June 20-23, 2004.
61. Sparks, Todd, Vinay Kadekar, Yogesh Thakar, Frank Liou, and Ashok K Agarwal, “Educating High School Students And Teachers In Rapid Prototyping And Manufacturing Technologies,” *Proceedings of the 2004 ASEE Annual Conference & Exposition, Salt Lake City*, UT, June 20-23, 2004.
62. Thakar, Yogesh, Heng Pan, and Frank Liou, “Numerical And Experimental Analysis Of The Powder Flow Streams In The Laser Aided Material Deposition Process,” *Proceedings of the Fifteenth Annual Solid Freeform Fabrication Symposium*, Austin, TX, August 2-4, 2004.
63. Sparks, Todd and F.W. Liou, "Characterization of Laser Deposition Experimental Results via Image Processing," *Proceedings of the Fifteenth Annual Solid Freeform Fabrication Symposium*, Austin, TX, August 2-4, 2004.
64. Kadekar, Vinay, Sashi Prakash, and F.W. Liou, "Experimental Investigation of Laser Metal Deposition of Functionally Graded Copper and Steel," *Proceedings of the Fifteenth Annual Solid Freeform Fabrication Symposium*, Austin, TX, August 2-4, 2004.
65. Pan, Heng and Frank Liou, “Modeling of the Metal Powder Flow With Carrier Gas In Coaxial Nozzle For Direct Laser Deposition Process,” *Proceedings of the Fifteenth Annual Solid Freeform Fabrication Symposium*, Austin, TX, August 2-4, 2004.
66. Pan, Heng, Yogesh D. Thakar and Frank Liou, “Numerical And Experimental Study Of Shielding Gas Orientation Effects On Particle Stream Concentration Mode In Coaxial Laser Aided Material Deposition Process,” *Proceedings of* the *2004 ASME Design Automation Conference,* Salt Lake City, Utah*,* September 28-October 2, 2004, Paper No*.* DAC2004-57049.
67. Phatak, K., L. Han and F. W. Liou, “Experimental And Simulation Based Study of Laser Aided Deposition Process Using Image And Temperature Sensor,” *2004 International Congress on Applications of Lasers and Electro-Optics (ICALEO®)*, San Francisco, CA, Oct. 4-7, 2004.
68. Thakar, Yogesh, Heng Pan and Frank Liou, “Analysis Of The Powder Flow Characteristics For The Direct Laser Deposition Process,” *2004 International Congress on Applications of Lasers and Electro-Optics (ICALEO®)*, San Francisco, CA, Oct. 4-7, 2004.
69. Joshi, Yashodhan, Frank Liou, and Vinay Kadekar “Application of Laser Aided Manufacturing Process for Functionally Graded Thermal Barrier Coatings,” *2004 International Congress on Applications of Lasers and Electro-Optics (ICALEO®)*, San Francisco, CA, Oct. 4-7, 2004.
70. Sparks, Todd, Vinay Kadekar, Gail Richards, Frank Liou, Venkat Allada, Ming Leu, Faisal Anam, and Siddharth Shinde, “An Advanced Manufacturing Workshop for High-School Teachers and Students,” *Proceedings of the 2005 ASEE Annual Conference & Exposition*, Portland, Oregon, June 12-15, 2005.
71. Ruan, Jianzhong, Kunnayut Eiamsa-ard, and F.W.Liou, “Automatic Multi-axis Slicing Based on Centroidal Axis Computation,” *Proceedings of the 2005 ASME International Design Engineering Technical Conferences & Computers and Information In Engineering Conference*, Long Beach, California from September 24-28, 2005.
72. Eiamsa-ard, Kunnayut, Jianzhong Ruan, Lan Ren, and F.W. Liou, “Building Sequence Of Boundary Model In Layered Manufacturing,” *Proceedings of the 2005 ASME International Design Engineering Technical Conferences & Computers and Information In Engineering Conference*, Long Beach, California from September 24-28, 2005.
73. Fan, Zhiqiang, Kaushik Phatak, and Frank Liou, “Sensitivity Analysis of Process Parameters in Laser Deposition,” *Proceedings of the Sixteenth Annual Solid Freeform Fabrication Symposium*, Austin, Texas, August 1-3, 2005.
74. Eiamsa-ard, Kunnayut, Hari Janardanan Nair, Lan Ren, Jianzhong Ruan, Todd Sparks, Frank Liou, ”Part Repair Using a Hybrid Manufacturing System,” *Proceedings of the Sixteenth Annual Solid Freeform Fabrication Symposium*, Austin, Texas, August 1-3, 2005 (Won Solid Freeform Fabrication Symposium Best Poster Paper Award).
75. Sparks, Todd, Heng Pan, Frank Liou, "Determination of Dynamic Powder Modeling Parameters via Optical Methods,” *Proceedings of the Sixteenth Annual Solid Freeform Fabrication Symposium*, Austin, Texas, August 1-3, 2005.
76. Padathu, Panackal, Ajay, Todd Sparks, Frank Liou, “Workpiece Alignment for Hybrid Laser Aided Part Repair Process,” *Proceedings of the Sixteenth Annual Solid Freeform Fabrication Symposium*, Austin, Texas, August 1-3, 2005.
77. Newkirk, Joseph W., Yaxin Bao, Todd Sparks, Jianzhong Ruan and Frank Liou, “Performance Benchmarking for Laser Weld Repair of Die Components,” *Proceedings of the International Surface Engineering Congress*, May 15-17, 2006, Seattle, WA.
78. Newkirk, Joseph W., Frank Liou and Andrew Jesgar, “Issues with Feeding Blended Powders for Laser Deposition,” *Proceedings of the International Surface Engineering Congress 2006*, May 15-17, 2006 Seattle, WA.
79. Liou, F.W., “Curriculum Development for an Interdisciplinary Manufacturing Engineering Program,” *Proceedings of the 2006 ASEE Annual Conference & Exposition*, Chicago, Illinois, June 18-21, 2006.
80. Liou, Frank, Kevin Slattery, Mary Kinsella, Joseph Newkirk, Hsin-Nan Chou, Robert Landers, “Applications of a Hybrid Manufacturing Process for Fabrication and Repair of Metallic Structures,” *Proceedings of the Seventeenth Solid Freeform Fabrication Symposium*, Austin, Texas, August 14-16, 2006, pp. 1-11.
81. Ren, Lan, Ajay Panachal Padathu, Jianzhong Ruan, Todd Sparks, Frank W. Liou, “Three Dimensional Die Repair Using a Hybrid Manufacturing System,” *Proceedings of the Seventeenth Solid Freeform Fabrication Symposium,* Austin, Texas, August 14-16, 2006, pp. 51-59.
82. Stroble, Jacquelyn Kay, Robert Landers, Frank Liou, Omoghene Obahor, " Automation of Hybrid Manufacturing System Through Tight Integration of Software and Sensor Feedback,” *Proceedings of the Seventeenth Solid Freeform Fabrication Symposium,* Austin, Texas, August 14-16, 2006, pp.586-597.
83. Padathu, Ajay Panackal, Todd Sparks, Frank Liou, “Determination of Transformation Matrix in a Hybrid Multi-Axis Laser-Aided Manufacturing System and its Practical Implementation,” *Proceedings of the Seventeenth Solid Freeform Fabrication Symposium,* Austin, Texas, August 14-16, 2006.
84. Yang, Yu, Omoghene Osaze Obahor, Yaxin Bao, Todd E. Sparks, Jianzhong Ruan, Jacquelyn Kay Stroble, Robert Landers, Frank Liou, “Comparison of Thermal Properties of Laser Deposition and Traditional Welding Process via Thermal Diffusivity Measurement, “ *Proceedings of the Seventeenth Solid Freeform Fabrication Symposium, Austin, Texas, August 14-16, 2006*.
85. Fan, Zhiqiang, Jianzhong Ruan, Todd E. Sparks, Yu Yang, Yaxin Bao, Frank Liou, “Numerical Simulation and Prediction of Dilution Depth and Lack of Fusion During Laser Deposition,“ *Proceedings of the Seventeenth Solid Freeform Fabrication Symposium,* Austin, Texas, August 14-16, 2006.
86. Ruan, Jianzhong, Todd Sparks, Zhiqiang Fan, Jacquelyn Kay Stroble, Ajay Panachal Padathu, and Frank W. Liou, “A Review of Layer Based Manufacturing Processes for Metals,” *Proceedings of the Seventeenth Solid Freeform Fabrication Symposium,* Austin, Texas, August 14-16, 2006, pp. 233-245.
87. Sparks, Todd, Jianzhong Ruan, Zhiqiang Fan, Yaxin Bao, and Frank W. Liou, “Effect of Structured Laser Pulses on Grain Growth in H13 Tool steel,“ *Proceedings of the Seventeenth Solid Freeform Fabrication Symposium,* Austin, Texas, August 14-16, 2006, pp. 261-267.
88. Bao, Yaxin, Jianzhong Ruan, Todd Sparks, J. Anand, Joe Newkirk, and Frank W. Liou, “Evaluation of Mechanical Properties and Microstructure for Laser Deposition Process and Welding Process,” *Proceedings of the Seventeenth Solid Freeform Fabrication Symposium,* Austin, Texas, August 14-16, 2006, pp. 280-289.
89. Ruan, Jianzhong, Lan Ren, Todd E. Sparks, and Frank Liou, “2-D Deposition Pattern And Strategy Study On Rapid Manufacturing,” *Proceedings of the 2006 ASME International Design Engineering Technical Conferences & Computers and Information In Engineering Conference*, Philadelphia, PA from September 11-13, 2006.
90. Eiamsa-ard, Kunnayut, F.W. Liou, Lan Ren, and H. Choset, “Spiral-like Path Planning Without Gap For Material Deposition Processes,” *Proceedings of the 2006 ASME International Design Engineering Technical Conferences & Computers and Information In Engineering Conference*, Philadelphia, PA from September 11-13, 2006.
91. Liou, F., “Computer Integrated Engineering and Mechatronics for Rapid Manufacturing,” *International Forum on Systems and Mechatronics*, December 6-8, 2006, Tainan, Taiwan.
92. Sreedharan, Shirish and Frank Liou, “Can Lean Manufacturing Be Applied to University Laboratories?” *Proceedings of the 2007 ASEE Annual Conference & Exposition*, Honolulu, HI, June 25-27, 2007.
93. Tang, Lie, Jianzhong Ruan, Robert G. Landers, Frank Liou, “Variable Powder Flow Rate Control in Laser Metal Deposition Processes, “Proceedings of the *Eighteenth Solid Freeform Fabrication Symposium,* Austin, Texas, August 6-8, 2007.
94. Liou, Frank, Zhiqiang Fan, Heng Pan, Kevin Slattery, Mary Kinsella, Joseph Newkirk, Hsin-Nan Chou, “Modeling and Simulation of a Laser Deposition Process,” *Proceedings of the Eighteenth Solid Freeform Fabrication Symposium,* Austin, Texas, August 6-8, 2007.
95. Chanasseri, Rana Gunaratnam, Todd Eugene Sparks, Frank Liou, “Thermocouple Embedding for the Production of a Substrate,” *Proceedings of the Eighteenth Solid Freeform Fabrication Symposium,* Austin, Texas, August 6-8, 2007.
96. Philip, Ravi, Todd Eugene Sparks, Frank Liou, “Design of Embedded Resistance Heating Element Using Rapid Manufacturing Process,” Proceedings of the *Eighteenth Solid Freeform Fabrication Symposium,* Austin, Texas, August 6-8, 2007.
97. Yang, Yu, Todd Sparks, Jianzhong Ruan, Frank Liou, “Laser Deposition Cladding 3-D Shape On-Line Control Based on 3-D Scanner,” *Proceedings of the Eighteenth Solid Freeform Fabrication Symposium,* Austin, Texas, August 6-8, 2007.
98. Fan, Zhiqiang, Anand Jambunathan, Todd E. Sparks, Yaxin Bao, Jianzhong Ruan, Joseph W. Newkirk, Frank Liou, “Numerical Simulation of the Evolution of Solidification Microstructure in Laser Deposition,” *Proceedings of the Eighteenth Solid Freeform Fabrication Symposium,* Austin, Texas, August 6-8, 2007.
99. Ren, Lan, Jianzhong Ruan, Kunnayut Eiamsa-ard, and Frank Liou, “Adaptive Deposition Coverage Toolpath Planning For Metal Deposition Process,” *ASME 2007 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference IDETC/CIE 2007*, September 4-7, 2007, Las Vegas, Nevada, DETC2007-34445.
100. Fan, Zhiqiang, Jacquelyn K. Stroble, Jianzhong Ruan, Todd E. Sparks, and Frank Liou, “Numerical and Analytical Modeling of Laser Deposition with Preheating,” *Proceedings of the 2007 International Manufacturing Science And Engineering Conference,* October 15-17, 2007, Atlanta, Georgia, MSEC2007-31089.
101. Ren, Lan, Kunnayut Eiamsa-ard, Jianzhong Ruan, and Frank Liou, “Part Repairing Using A Hybrid Manufacturing System,” *Proceedings of the 2007 International Manufacturing Science And Engineering Conference*, October 15-17, 2007, Atlanta, Georgia, MSEC2007- 31003.
102. Liou, Frank and Jianzhong Ruan, “Rapid Manufacturing Research and Development for High Performance Materials,” *2007 International Conference on Advanced Manufacture*, November 26 –30, 2007, Tainan, Taiwan.
103. Sparks, Todd and Frank Liou, “Considerations for Robust Laser Additive Manufacturing Processes,” *2007 International Conference on Advanced Manufacture*, November 26 –30, 2007, Tainan, Taiwan, Paper A8-92.
104. Fan, Zhiqiang, Jacquelyn K. Stroble, Todd E. Sparks, and Frank Liou, “Increasing Computational Efficiency of Simulation of Laser Deposition by A Joint Numerical and Analytical Approach,” *2007 International Conference on Advanced Manufacture*, November 26 –30, 2007, Tainan, Taiwan, Paper A8-1021.
105. Ruan, Jianzhong and Frank Liou, “Automated Position Planning of a Multi-Axis Manufacturing System,” *2007 International Forum on Systems and Mechatronics,* December 3 –6, 2007, Tainan, Taiwan, Paper B03.
106. Liou, Frank and Hari Janardanan Nair, “Building an Engineering Curriculum for the MICRO/NANO World,” *2007 International Conference on Advanced Manufacture*, December 3 –6, 2007, Tainan, Taiwan, Paper E03.
107. Liou, Frank and Ming Leu, “Product Focused Freeform Fabrication Education,” *Proceedings of the Nineteenth Solid Freeform Fabrication Symposium,* Austin, Texas, August 4-6, 2008.
108. Sparks, Todd and Frank Liou, “Direct-to-Part Machining Waste Recycling using Laser Metal Deposition,” *Proceedings of the Nineteenth Solid Freeform Fabrication Symposium,* Austin, Texas, August 4-6, 2008.
109. Ruan, Jianzhong, Lie Tang, Todd E. Sparks, Robert G. Landers, Frank Liou, “Direct 3-D Layer Metal Deposition,” *Proceedings of the Nineteenth Solid Freeform Fabrication Symposium,* Austin, Texas, August 4-6, 2008.
110. Fu, Tian, Zhiqiang Fan, Todd E. Sparks, Jianzhong Ruan, Frank Liou, Joseph W. Newkirk, “Microstructure Characterization of Diode Laser DepositedTi-6Al-4V,” *Proceedings of the Nineteenth Solid Freeform Fabrication Symposium,* Austin, Texas, August 4-6, 2008.
111. Fan, Zhiqiang, Todd E. Sparks, Tian Fu, Frank Liou, “Numerical Modeling of Thermal Stresses in Laser Deposition,” *Proceedings of the Nineteenth Solid Freeform Fabrication Symposium,* Austin, Texas, August 4-6, 2008.
112. Tang, Lie, Jianzhong Ruan, Todd E. Sparks, Robert G. Landers, Frank Liou, “Layer-to-Layer Height Control for Laser Metal Deposition Processes,” *Proceedings of the Nineteenth Solid Freeform Fabrication Symposium,* Austin, Texas, August 4-6, 2008.
113. Ruan, Jianzhong, Lie Tang, Todd E. Sparks, Robert G. Landers, and Frank Liou, “Direct 3d Layer Metal Deposition And Toolpath Generation,” *Proceedings of the ASME 2008 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference*, IDETC/CIE 2008, August 3-6, 2008, Brooklyn, New York.
114. Liou, Frank and Mary Kinsella, “A Rapid Manufacturing Process for High Performance Precision Metal Parts,” *Proceedings of the SME RAPID 2009 Conference & Exposition*, Schaumburg IL, May 12-14, 2009. (Won 2009 RTAM/SME Dick Aubin Distinguished Paper Award).
115. Kulkarni, Nikhil P., Gargi Tandra, Frank Liou, Todd Eugene Sparks, Jianzhong Ruan, “Fuel Cell Development using Additive Manufacturing Technologies - A Review,” *Proceedings of the Twentieth Solid Freeform Fabrication Symposium,* Austin, Texas, August 3-5, 2009.
116. Joshi, Sourabh S, Frank Liou, and Todd Eugene Sparks, “A Framework of Cost Estimation Model for Metal Deposition Process (Laser Aided Manufacturing Process - LAMP,” *Proceedings of the Twentieth Solid Freeform Fabrication Symposium,* Austin, Texas, August 3-5, 2009.
117. Fu, Tien, Todd Eugene Sparks, and Frank Liou, “Evaluation of Diode Laser Deposited High Nitrogen Stainless Steel on 4340 Steel Substrate for Aircraft Landing Gear Application,” Proceedings of the *Twentieth Solid Freeform Fabrication Symposium,* Austin, Texas, August 3-5, 2009.
118. Pulugurtha, Syamala R, Joseph Newkirk, Frank Liou, and Hsin-Nan Chou “Functionally Graded Materials by Laser Metal Deposition,” *Proceedings of the Twentieth Solid Freeform Fabrication Symposium,* Austin, Texas, August 3-5, 2009.
119. Sparks, Todd Eugene, Lie Tang, and Frank Liou, “Development of a Melt Pool Tracking Vision System for Laser Deposition,” *Proceedings of the Twentieth Solid Freeform Fabrication Symposium,* Austin, Texas, August 3-5, 2009.
120. Ruan, Jianzhong, Andrew Hayes, Todd Sparks, and Frank Liou, “The Effect of Toolpath Intersection Angle in Metal Deposition,” *Proceedings of the ASME 2009 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2009*, August 30-September 2, 2009, San Diego, CA.
121. Ruan, Jianzhong, Jun Zhang, and Frank Liou, “Selection of Part Orientation For Multi-Axis Hybrid Manufacturing Process,” *Proceedings of the ASME 2009 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2009,* August 30-September 2, 2009, San Diego, CA.
122. Stroble, Jacquelyn K. and Frank W. Liou, “Designing A Modular Rapid Manufacturing Process,” *Proceedings of the ASME 2009 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2009*, August 30-September 2, 2009, San Diego, CA.
123. Isanaka, Sriram Praneeth, Frank Liou, Joseph Newkirk, Amar Bala Sridhar, “Computer Aided Contour Profiling of High Strength Deposits,” *Proceedings of the 21st Solid Freeform Fabrication Symposium,* Austin, Texas, August 9-11, 2010.
124. Liou, Frank, Jianzhong Ruan, Todd Sparks, “A Multi Axis Planning System (MAPS) for Hybrid Laser Deposition Processes,” *Proceedings of the 21st Solid Freeform Fabrication Symposium*, Austin, Texas, August 9-11, 2010.
125. Barua, Shyam, Todd Sparks, Frank Liou, “Development of a Low Cost Imaging System for a Laser Metal Deposition Process,” *Proceedings of the 21st Solid Freeform Fabrication Symposium,* Austin, Texas, August 9-11, 2010 (Won Solid Freeform Fabrication Symposium Best Poster Paper Award).
126. Tandra, Gargi, Todd Eugene Sparks, Shyam Barua, Nikhil P. Kulkarni, Frank Liou, “Laser Based Rapid Manufacturing of Metallic Gas Diffusion Layers for PEM Fuel cells,” *Proceedings of the 21st Solid Freeform Fabrication Symposium*, Austin, Texas, August 9-11, 2010.
127. Francis, Jomy, Todd Sparks, Frank Liou, “Uncertainty Analysis in Laser Deposition Finish Machining Operations,” *Proceedings of the 21st Solid Freeform Fabrication Symposium*, Austin, Texas, August 9-11, 2010.
128. Kulkarni, Nikhil P., Todd Eugene Sparks, Gargi Tandra, Frank Liou, “The Impact of Deposition Patterns of a Catalyst on an MEA on the Fuel Cell Performance and Its Cost Reduction,” *Proceedings of the 21st Solid Freeform Fabrication Symposium*, Austin, Texas, August 9-11, 2010.
129. Shenoy, Amogh, Shyam Barua, and Frank Liou, “Research and Development of Microwire Handling Devices,” *Proceedings of the ASME 2010 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2010,* August 15-18, 2010, Montréal, Quebec, Canada Paper number DETC2010-28571.
130. Routhu, Swathi, Divya Kanakanala, Jianzhong Ruan, Xiaoqing Liu, Frank Liou, “2-D Path Planning for Direct Laser Deposition Process,” *Proceedings of the ASME 2010 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2010,* August 15-18, 2010, Montréal, Quebec, Canada Paper number DETC2010- 28440.
131. Kanakanala, Divya, Swathi Routhu, Jianzhong Ruan, Xiaoqing Liu, Frank Liou “A Multi-Axis Slicing Method for Direct Laser Deposition Process,” *Proceedings of the ASME 2010 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2010*, August 15-18, 2010, Montréal, Quebec, Canada Paper number DETC2010- 28442.
132. Dhaveji, Sweta, Todd E. Sparks, Jianzhong Ruan, and Frank Liou, “Octree Approach for Simulation of Additive Manufacturing Toolpath,” Proceedings of the 22nd Solid Freeform Fabrication Symposium, Austin, Texas, August 8-10, 2011.
133. Amine, Tarak A., Todd E. Sparks and Frank Liou, “Strategy for Fabricating Complex Internals Structures via a Hybrid Manufacturing Process,” Proceedings of the 22nd Solid Freeform Fabrication Symposium, Austin, Texas, August 8-10, 2011.
134. Dhaveji, Sweta, Todd E. Sparks, Jianzhong Ruan, and Frank Liou,“Generic Visual Simulation of Manufacturing Equipment,” Proceedings of the 2011 ASME Design Automation Conference (Aug 28-Aug 31, 2011) in Washington DC, Paper # DETC2011-47908.
135. Chen, Xueyong, Todd Sparks, Jianzhong Ruan, and Frank Liou, “Study of Ultrasonic Vibration Laser Metal Deposition Process,” Proceedings of the ASME 2012 International Symposium on Flexible Automation (ISFA2012), June 18-20, 2012, St. Louis, MO, Paper ISFA2012-7124.
136. Jacquelyn K.S. Nagel and Frank Liou, “Process Modelling and Computation of a Hybrid Metal Deposition System,” 2012 International Forum on Systems and Mechatronics, August 6-9, 2012, Virginia Beach, VA.
137. Jacquelyn K.S. Nagel and Frank Liou, “Hybrid Manufacturing System Modeling and Development,” 2012 ASME Design Automation Conference (Aug 12-Aug 15, 2012) in Chicago, IL, Paper # DETC2012-70247.
138. Frank Liou, Ming Leu, Robert Landers, “Interactions of an Additive Manufacturing Program with Society,” Proceedings of the 23rd Solid Freeform Fabrication Symposium, Austin, Texas, August 6-8, 2012.
139. Sriram Praneeth Isanaka, and Frank Liou, “The Applications of Additive Manufacturing Technologies in Cyber-Enabled Manufacturing Systems,” Proceedings of the 23rd Solid Freeform Fabrication Symposium, Austin, Texas, August 6-8, 2012.
140. Chen, Xueyang, and Frank Liou, and J. W. Newkirk, “Numerical Simulation of Dilution in Laser Metal Deposition by Powder Injection,” 41st Annual North American Manufacturing Research Conference (NAMRC 41), June 10-14, 2013, Madison, WI, paper number NAMRC41-1623.
141. Wang, Z.Y., R.W. Liu, T. Sparks, F.W. Liou, “Realization of Robot Ink Deposition on Curved Surfaces,” Proceedings of the International Forum on Systems and Mechatronics (IFSM), Gui-lin, China, July 22-25, 2013.
142. Liu, Heng, Todd E. Sparks, Frank Liou, David M. Dietrich, “Numerical Analysis of Thermal Stress and Deflection in Multi-Layer Laser Metal Deposition Processes,” Proceedings of the 24th Solid Freeform Fabrication Symposium, Austin, Texas, August 12-14, 2013.
143. Zhang, Jingwei, Frank Liou, William Seufzer, Joseph Newkirk, Zhiqiang Fan, Todd E. Sparks, Heng Liu, “Probabilistic Simulation of Solidification Microstructure Evolution During Laser-Based Meal Deposition,” Proceedings of the 24th Solid Freeform Fabrication Symposium, Austin, Texas, August 12-14, 2013.
144. Karnati, Sreekar, Todd E. Sparks, Frank Liou, Niroop Matta, “Vision-based Process Monitoring for Laser Metal Deposition Processes,” Proceedings of the 24th Solid Freeform Fabrication Symposium, Austin, Texas, August 12-14, 2013.
145. Dey, Nanda Kumar, Frank Liou, Cedo Nedic, “Additive Manufacturing Laser Deposition of Ti-6Al-4V for Aerospace Repair Applications,” Proceedings of the 24th Solid Freeform Fabrication Symposium, Austin, Texas, August 12-14, 2013.
146. Francis, Romy, Joseph W Newkirk, Frank Liou, “A Hybrid Manufacturing Process for Producing or Repairing Parts with Forged-Like Microstructure,” Proceedings of the 25th Solid Freeform Fabrication Symposium, Austin, Texas, August 4-6, 2014.
147. Dongare, Sujitkumar, Todd E. Sparks, Joseph Newkirk and Frank Liou, “A Mechanical Testing Methodology for Additive Manufacturing Processes,” Proceedings of the 25th Solid Freeform Fabrication Symposium, Austin, Texas, August 4-6, 2014.
148. Price, Matthew, Todd Sparks, Sreekar Karnati, Frank Liou, “Snake Robot Design and Prototype Development Using Additive Manufacturing Technology,” Proceedings of the 25th Solid Freeform Fabrication Symposium, Austin, Texas, August 4-6, 2014.
149. Liu, Renwei, Zhiyuan Wang, Todd Sparks, Frank Liou, “Stereo Vision Based Laser Deposition of Ti-6Al-4V in Component Repair Process,” Proceedings of the 25th Solid Freeform Fabrication Symposium, Austin, Texas, August 4-6, 2014.
150. Karnati, Sreekar, Todd E Sparks, Frank Liou, “Thermo-graphic investigation of laser metal deposition,” Proceedings of the 25th Solid Freeform Fabrication Symposium, Austin, Texas, August 4-6, 2014.
151. Karnati, Sreekar, Sai Palepu, Todd Sparks, Frank Liou, and Cedo Nedic, “Contrast of Repair Capabilities Between Laser Metal Deposition and Tig Welding on TI-6AL-4V,” Proceedings of the ASME 2014 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference IDETC/CIE 2014, August 17-20, 2014, Buffalo, New York. ASME DETC2014-35524
152. Liou, Frank, “On Robotic 3-D Printing,” International Forum on Systems and Mechatronics, Tainan, Taiwan, Oct. 12-15, 2014.
153. Newkirk, Joseph W., Tarak Amine, and Frank Liou, “Component Level Tensile Testing of Press & Sinter Steels,” POWDERMET 2015, San Diego, CA, May 17-20, 2015.
154. Heng Liu, Todd Sparks, Frank Liou, “Residual Stress and Deformation Modelling for Metal Additive Manufacturing Processes,” Proceedings of the 4th International Conference on Mechanics and Industrial Engineering, Barcelona, Spain – July 20-21, 2015, Paper No. 245.
155. Isanaka, Sriram Praneeth, Frank Liou, and Joseph Newkirk, “Non-Prismatic Air-Breathing Fuel Cells - Concept, Design And Manufacturing,” Proceedings of the ASME 2015 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference IDETC/CIE 2015, August 2-5, 2015, Boston, MA, ASME DETC2015-46493.
156. Wang, Z., R. Liu, T. Sparks, F. Liou, “A Framework for Large Scale Fused Pellet Modeling (FPM) by an Industry Robot,” Proceedings of the 26th Solid Freeform Fabrication Symposium, Austin, Texas, August 10-12, 2015.
157. Gaja, H. and F. Liou, “Depth of Cut Monitoring for Hybrid Manufacturing using Acoustic Emission Sensor,” Proceedings of the 26th Solid Freeform Fabrication Symposium, Austin, Texas, August 10-12, 2015.
158. Bitragunta, V.S., T. Sparks, and F. Liou, “Performance Metric for Powder Feeder Systems in Additive Manufacturing,” Proceedings of the 26th Solid Freeform Fabrication Symposium, Austin, Texas, August 10-12, 2015.
159. Zhang, J., Y. Zhang, F. Liou, J.W. Newkirk, K.M.B. Taminger, W.J. Seufzer, “A Microstructure and Hardness Study of Functionally Graded Materials Ti6Al4V/TiC by Laser Metal Deposition,” Proceedings of the 26th Solid Freeform Fabrication Symposium, Austin, Texas, August 10-12, 2015.
160. Zhang, Y., J. Zhang, F. Liou, J. Newkirk, “Microstructure and Property of TiB-Reinforced Ti Alloy Composites by Laser Metal Deposition,” Proceedings of the 26th Solid Freeform Fabrication Symposium, Austin, Texas, August 10-12, 2015.
161. Yan, L., X. Chen, W. Li, F. Liou, J. Newkirk, “Direct Laser Deposition of Ti-6Al-4V from Elemental Powder Blends,” Proceedings of the 26th Solid Freeform Fabrication Symposium, Austin, Texas, August 10-12, 2015. (Won a best paper award in the conference)
162. Karnati, S., T.E. Sparks, F.Liou, J.W. Newkirk, K.M.B. Taminger, W.J. Seufzer, “Laser Metal Deposition of Functionally Gradient Materials from Elemental Copper and Nickel Powders,” Proceedings of the 26th Solid Freeform Fabrication Symposium, Austin, Texas, August 10-12, 2015.
163. Flood, A. and F. Liou, “Modeling of Powder Bed Processing – A Review,” Proceedings of the 26th Solid Freeform Fabrication Symposium, Austin, Texas, August 10-12, 2015.
164. Kumar, K.S., T.E. Sparks, F. Liou, “Parameter Determination and Experimental Validation of a Wire Feed Additive Manufacturing Model,” Proceedings of the 26th Solid Freeform Fabrication Symposium, Austin, Texas, August 10-12, 2015.
165. Gegesky, Megan, Frank Liou, and Joseph Newkirk, ”Proposed Hybrid Processes for Part Building Using Fusion Welding and Friction Stir Processing,” Proceedings of the 27th Solid Freeform Fabrication Symposium, Austin, Texas, August 7-10, 2016.
166. Karnati, Sreekar and Frank Liou, ” Investigation of Tensile Properties of Bulk and SLM Fabricated 304L Stainless Steel Using Various Gage Length Specimens,” Proceedings of the 27th Solid Freeform Fabrication Symposium, Austin, Texas, August 7-10, 2016.
167. Li, Wei, Jingwei Zhang, Sreekar Karnati, Yunlu Zhang, Frank Liou, Joseph Newkirk, Karen Taminger, and William Seufzer, “Modeling and Experimental Investigation of Pre-mixed Multi-powder Flow in Fabricating Functional Gradient Material by Laser Metal Deposition Process,” Proceedings of the 27th Solid Freeform Fabrication Symposium, Austin, Texas, August 7-10, 2016.
168. Yan, Lei, Wei Li, Xueyang Chen, and Frank Liou, “Simulation of Cooling Rate Effects on Ti-6Al-4V Microstructure Tailoring in Direct Laser Deposition,” Proceedings of the 27th Solid Freeform Fabrication Symposium, Austin, Texas, August 7-10, 2016.
169. Liu, Renwei, Zhiyuan Wang, Yunlu Zhang, Todd Sparks, Frank Liou, “A Smooth Toolpath Generation Method for Laser Metal Deposition,” Proceedings of the 27th Solid Freeform Fabrication Symposium, Austin, Texas, August 7-10, 2016.
170. Wang, Fangquan, Frank Liou, and Todd Sparks, “Integration of Voxel Based and Source Based Representation for Computer Aided Design of Functional Gradient Materials,” Proceedings of the 27th Solid Freeform Fabrication Symposium, Austin, Texas, August 7-10, 2016.
171. Chen, Xueyang, Lei Yan, Wei Li, Frank Liou, and Joseph Newkirk, ”Effect of Powder Particle Size on the Fabrication of Ti-6Al-4V Using Laser Metal Deposition from Elemental Powder Mixture,” Proceedings of the 27th Solid Freeform Fabrication Symposium, Austin, Texas, August 7-10, 2016.
172. Flood, Aaron, and Frank Liou, ” Review of AM simulation validation techniques,” Proceedings of the 28th Solid Freeform Fabrication Symposium, Austin, Texas, August 6-9, 2017.
173. Karnati, Sreekar, Jack Hoerchler, Frank Liou, and Joseph Newkirk, “Impact of specimen dimensions on miniature tensile characterization of powder bed fabricated 304L stainless steel,” Proceedings of the 28th Solid Freeform Fabrication Symposium, Austin, Texas, August 6-9, 2017.
174. Hill, Leon, Todd Sparks, Frank Liou, “Development of A Hybrid Manufacturing Process for Precision Metal Parts,” Proceedings of the 28th Solid Freeform Fabrication Symposium, Austin, Texas, August 6-9, 2017.
175. Zhang, Jingwei, Wei Li, Frank Liou, Joseph Newkirk, “A two-dimensional simulation of grain structure growth within substrate and fusion zone during direct metal deposition,” Proceedings of the 28th Solid Freeform Fabrication Symposium, Austin, Texas, August 6-9, 2017.
176. Li, Wei, Jingwei Zhang, Xinchang Zhang, Sreekar Karnati, Frank Liou, “Effect of Optimizing Particle Size in Laser Metal Deposition with Blown Pre-mixed Powders,” Proceedings of the 28th Solid Freeform Fabrication Symposium, Austin, Texas, August 6-9, 2017.
177. Gaja, Haythem, Frank Liou, “Defects Detection of Laser Metal Deposition Using Acoustic Emission Sensor,” Proceedings of the 28th Solid Freeform Fabrication Symposium, Austin, Texas, August 6-9, 2017.
178. Yan, Lei, Leon Hill, Joseph Newkirk, Frank Liou, “Investigation of Build Strategies for A Hybrid Manufacturing Process Progress on Ti-6Al-4V,” Proceedings of the 28th Solid Freeform Fabrication Symposium, Austin, Texas, August 6-9, 2017.
179. Cui, Wenyuan, Xinchang Zhang, Frank Liou, “Additive Manufacturing of High Entropy Alloys – A Review,” Proceedings of the 28th Solid Freeform Fabrication Symposium, Austin, Texas, August 6-9, 2017.
180. Zhang, Xinchang, Wenyuan Cui, Wei Li, Frank Liou, “Metallic components repair strategies using the hybrid manufacturing process,” Proceedings of the 28th Solid Freeform Fabrication Symposium, Austin, Texas, August 6-9, 2017.
181. Yan, Lei, Wenyuan Cui, Joseph Newkirk, Frank Liou; Eric Thomas; Andrew Baker; James Castle, “Mechanical Properties Evaluation of Ti-6Al-4V Thin-wall Structure Produced by a Hybrid Manufacturing Process,” Proceedings of the 29th Solid Freeform Fabrication Symposium, Austin, Texas, August 13-15, 2018.
182. Zhang, Xinchang, Wenyuan Cui, Leon Hill, Wei Li, Frank Liou, “Development of Pre-machining Strategies for Laser-aided Metallic Component Remanufacturing,” Proceedings of the 29th Solid Freeform Fabrication Symposium, Austin, Texas, August 13-15, 2018.
183. Karnati, Sreekar, Atoosa Khiabani, Aaron Flood, Frank Liou, Joseph Newkirk, “Characterization of Impact Toughness of 304L Stainless Steel Fabricated through Laser Powder Bed Fusion Process,” Proceedings of the 29th Solid Freeform Fabrication Symposium, Austin, Texas, August 13-15, 2018.
184. Flood, Aaron, Frank Liou, “Effect of Environmental Variables on Ti-64 AM Simulation Results,” Proceedings of the 29th Solid Freeform Fabrication Symposium, Austin, Texas, August 13-15, 2018.
185. Zhang, Xinchang, Tan Pan, Wei Li, Frank Liou, “Experimental Characterization of Direct Metal Deposited Cobalt based Alloy on Tool Steel for Component Repair,” Proceedings of the 29th Solid Freeform Fabrication Symposium, Austin, Texas, August 13-15, 2018.
186. Karnati, Sreekar, Jack Hoerchler, Aaron Flood, Frank Liou, “Incorporation of Automated Ball Indentation Methodology for Studying Powder Bed Fabricated 304L Stainless Steel,” Proceedings of the 29th Solid Freeform Fabrication Symposium, Austin, Texas, August 13-15, 2018.
187. Chen, Yitao, Frank Liou, “Additive Manufacturing of Metal Functionally Graded Materials: A Review,” Proceedings of the 29th Solid Freeform Fabrication Symposium, Austin, Texas, August 13-15, 2018.
188. Yan, Lei, Tan Pan, Joseph Newkirk, Frank Liou, Eric Thomas, Andrew Baker, James Castle, “Fast Prediction of Thermal History in Large-scale Part Fabricated via a Laser Metal Deposition Process,” Proceedings of the 29th Solid Freeform Fabrication Symposium, Austin, Texas, August 13-15, 2018.
189. Pan, Tan, Sreekar Karnati, Frank Liou, “General Rules for the Powder Bed Build Setup - A Review,” Proceedings of the 29th Solid Freeform Fabrication Symposium, Austin, Texas, August 13-15, 2018.
190. Mohammad Masud Parvez, Yitao Chen, Frank Liou, Joseph Newkirk, “Comparison of Fatigue Performance Between Additively Manufactured and Wrought 304L Stainless Steel Using a Novel Fatigue Test Setup,” Proceedings of the 30th Solid Freeform Fabrication Symposium, Austin, Texas, August 12-14, 2019.
191. Bharadwaja Ragampeta, Aravind Murugan, Yitao Chen, Frank Liou, “Application of Schlieren Technique in Additive Manufacturing : A Review,” Proceedings of the 30th Solid Freeform Fabrication Symposium, Austin, Texas, August 12-14, 2019.
192. Mugdha Joshi, Aaron Flood, Todd Sparks, FueWen Liou, “Applications of Supervised Machine Learning Algorithms in Additive Manufacturing: A Review,” Proceedings of the 30th Solid Freeform Fabrication Symposium, Austin, Texas, August 12-14, 2019.
193. Xinchang Zhang, Frank Liou, “Part Remanufacturing Using Hybrid Manufacturing Processes,” Proceedings of the 30th Solid Freeform Fabrication Symposium, Austin, Texas, August 12-14, 2019.
194. Aaron Flood and Frank Liou, “Simulated Effect of Laser Beam Quality on the Robustness of Laser-based AM System,” Proceedings of the 30th Solid Freeform Fabrication Symposium, Austin, Texas, August 12-14, 2019.
195. Xinchang Zhang, Yitao Chen, Tan Pan, Wenyuan Cui, Lan Li, Frank Liou, “Joining of Copper and Stainless Steel 304L Using Direct Metal Deposition,” Proceedings of the 30th Solid Freeform Fabrication Symposium, Austin, Texas, August 12-14, 2019.
196. T. Pan, S. Karnati, A. T. Sutton, M. Bennish, and F. F. Liou, “The Impact of Porosity on the Mechanical Properties of 304L Stainless Steel Fabricated by Selective Laser Melting,” Proceedings of the 30th Solid Freeform Fabrication Symposium, Austin, Texas, August 12-14, 2019.
197. Wenyuan Cui, , Xinchang Zhang, Lan Li, Yitao Chen, Tan Pan, Frank Liou, “Fabrication and characterization of AlxCrCuFeNi2 high-entropy alloys coatings by laser metal deposition,” 25th International Conference on Production Research Manufacturing Innovation, August 9-14, 2019, Chicago, Illinois.
198. Lan Li, Lei Yan, Aaron Flood, Frank Liou,” Predictive Model for Thermal and Stress Field in Laser Powder Bed Fusion Additive Manufacturing Process –I,” 25th International Conference on Production Research Manufacturing Innovation, August 9-14, 2019, Chicago, Illinois.
199. Lan Li, Lei Yan, Aaron Flood, Frank Liou,” Predictive Model for Thermal and Stress Field in Laser Powder Bed Fusion Additive Manufacturing Process – II,” 25th International Conference on Production Research Manufacturing Innovation, August 9-14, 2019, Chicago, Illinois.
200. Vishwa Vijay Kumar and Frank Liou, “Cyber-enabled Product Life cycle Management - A Multi-agent Framework,” 25th International Conference on Production Research Manufacturing Innovation, August 9-14, 2019, Chicago, Illinois.
201. Arivu, Maalavan, Matthew Luebbe, Wenyuan Cui, Frank Liou, Haiming Wen, “Direct laser deposition of cobalt-free high- entropy alloys,” Materials Science & Technology 2019.
202. Xinchang Zhang, Tan Pan, Yitao Chen, Frank Liou, “Additive Manufacturing of Cu on 316L Stainless Steel via Inconel 718 Intermediate Layers,” Proceedings of the 2021 Solid Freeform Fabrication Symposium, August 2021.
203. Mohammad Masud Parvez, Musarrat Farzana Rahman, Shaikat Galib and Frank Liou, “A Convolutional Neural Network (CNN) for Defect Detection of Additively Manufactured Parts,” ASME IMECE conference, Machines Advanced Manufacturing, Best student paper award, 2021, <https://doi.org/10.1115/IMECE2021-70500>.
204. Manoj Kumar Reddy Rangapuram1, Mianqing Yang; Saheed Babalola; Joseph Newkirk; Laura Nicole Bartlett; Frank Liou; and K. Chandrashekhara, “A Multiphysics Modeling Approach to Assess the Powder Bed Characteristics of High Strength Steel in Selective Laser Melting,” Proceedings of the 2022 Solid Freeform Fabrication Symposium, July 2022, [doi.org/10.26153/tsw/44577](http://dx.doi.org/10.26153/tsw/44577).
205. Mianqing Yang; Mohammad Parvez; Todd Sparks; Saheed Babolola; Joseph Newkrik; Frank Liou; K Chandrashekhara, “Directed Energy Deposition Processing-Performance Relationship of AF9628,” Proceedings of the 2022 Solid Freeform Fabrication Symposium, July 2022, [doi.org/10.26153/tsw/44565](http://dx.doi.org/10.26153/tsw/44565).
206. Anilas Karimpilakkal, Joseph Newkirk, Jason L Schulthess, Frank Liou, “Design and development of equi-atomic high entropy alloys for use in irradiation environments,” INL/CON-23-75852-Rev000, Idaho National Laboratory (INL), Idaho Falls, ID, 2023.
207. Liou, Frank and Wei Li, “ A Framework for Digital Manufacturing with a Directed Energy Deposition Process,” Flexible Automation and Intelligent Manufacturing International Conference, FAIM 2023 Proceedings, Lecture Notes in Mechanical Engineering (LNME), 978-3-031-38241-3, June 18-22, 2023.
208. Wu, Sung-Heng; Usman Tariq; Ranjit Joy; Muhammad Arif Mahmood; Frank Liou, “Role of In-situ Monitoring Technique for Digital Twin Development using Direct Energy Deposition: Melt Pool Dynamics and Thermal Distribution,” Proceedings of the 2023 Solid Freeform Fabrication Symposium, August 2023.
209. Ranjit Joy, Sung-Heng Wu, Usman Tariq, Muhammad Arif Mahmood, Frank Liou, “Effect Of Inter-Layer Dwell Time on Residual Stresses in Directed Energy Deposition of High Strength Steel Alloy,” Proceedings of the 2023 Solid Freeform Fabrication Symposium, August 2023.
210. Ranjit Roy, Sung-Heng Wu, Usman Tariq, Sriram Praneeth Isanaka, Asad Malik, Muhammad Arif Mahmood, Frank Liou, “State-of-the-art Cyber-enabled Physical and Digital Systems Deployed in Distributed Digital Factory Using Additive and Subtractive Manufacturing Systems: Open, Scalable, and Secure Framework,” Proceedings of the 2023 Solid Freeform Fabrication Symposium, August 2023.
211. Usman Tariq, Ranjit Joy, Sung-Heng Wu, Muhammad Arif Mahmood, Michael M Woodworth, Frank Liou, “Optimization of Computational Time for Digital Twin in Directed Energy Deposition for Residual Stresses,” Proceedings of the 2023 Solid Freeform Fabrication Symposium, August 2023.
212. Kelley, J. P., J. W. Newkirk, L. N. Bartlett, T. Sparks, S. P. Isanaka, S. Alipour, and F. Liou, “Influence of Steel Alloy Composition on The Process Robustness of As-Built Hardness in Laser-Directed Energy Deposition,” Proceedings of the 2023 Solid Freeform Fabrication Symposium, August 2023.
213. Usman Tariq; Sung-Heng Wu; Muhammad Arif Mahmood; Frank Liou, “Exploring the Impact of Pre- and Post-heating on Residual Stresses in Laser-directed Energy Deposition: A Numerical Investigation,” Proceedings of the 2024 Solid Freeform Fabrication Symposium, August 2024.
214. Md Sazol Ahmmed; Asad Waqar Malik; Muhammad Arif Mahmood; Sriram Praneeth Isanaka; Frank Liou, “Feasibility Analyses of Distributed Digital Factories Integrating Additive and Subtractive Manufacturing: A Case Study,“ Proceedings of the 2024 Solid Freeform Fabrication Symposium, August 2024.
215. Sung-Heng Wu; Usman Tariq; Ranjit Joy; Muhammad Arif Mahmood; Frank Liou, “Predicting Melt Pool Thermal Distribution in Ti-6Al-4V Directed Energy Deposition Using Machine Learning,” Proceedings of the 2024 Solid Freeform Fabrication Symposium, August 2024.

**OTHER PUBLICATIONS**

Articles in National Conference Proceedings:

1. F. W. Liou and J.D. Liu, "Optimal Design of Flexible Mechanisms Using General Design Rules," *Proceedings of the First International Applied Mechanical Systems Design Conference*, p77.1-p77.7, June 11-14, 1989, Nashville, Tennessee.
2. J. H. Chien and F. W. Liou, "System Modelling and Vibration Reduction of A Flexible Beam Under Rotary Motion," *Proceedings of the First International Applied Mechanical Systems Design Conference*, p71.1-p71.6, June 11-14, 1989, Nashville, Tennessee.
3. K. Krishnamurthy, F. W. Liou, M. Mehta, J.H. Chien, and H.T. Liang, "Flexible Assembly," *Proceedings of the First International Applied Mechanical Systems Design Conference*, p46.1-p46.7, June 11-14, 1989, Nashville, Tennessee.
4. F. W. Liou and C. J. Lou, "A Heuristic Approach for the Design of Beam-Type Flexible Mechanisms," *Proceedings of the 1st National Conference on Applied Mechanisms and Robotics*, vol.1, 89AMR-4C-1, pp. 1-6, Cincinnati, Ohio, November 5-8, 1989.
5. F. W. Liou and H. T. Liang, "Microprocessor Based CAD/CAM Integration System Implemented with Five Bar Mechanism," *Proceedings of the 1st National Conference on Applied Mechanisms and Robotics*, vol. 1, 89AMR-6C-2, pp. 1-5, Cincinnati, Ohio, November 5-8, 1989.
6. F.W. Liou, "Experimental Research in Elastic Mechanisms," *Proceedings of the First Forty Years of Modern Kinematics Conference*, pp. 9.10-9.13, Brainerd, MN, July 20-23, 1991.
7. J.W. Shao, F.W. Liou, and A. Patra, "A Contact Phase Model for the Analysis of Flexible Mechanisms Under Impact Loading," *Proceedings of the 2nd National Applied Mechanisms and Robotics Conference*, VIIB, 1-1 to 1-7, Cincinnati, Ohio, November 3-6, 1991.
8. F.W. Liou, and K.C. Peng, "Experimental Investigation On Some Critical Design Parameters of Elastic Mechanisms," *Proceedings of the 2nd National Applied Mechanisms and Robotics Conference*, XB. 4-1, to 4-6, Cincinnati, Ohio, November 3-6, 1991.
9. Yong Fang and F.W. Liou, "Feature-Based Dynamic Analysis of Mechanisms," *Proceedings of the 1993 Applied Mechanisms & Robotics Conference*, IXB 1-1 to 1-7, 1993.
10. F.W. Liou and T.C. Chou, "An Advanced Motion Simulation System for Mechanical Assemblies," *Proceedings of the 1994 NSF Design and Manufacturing Grantees Conference*, pp. 177-178, 1994.
11. Yong Fang and F.W. Liou, "An Interactive Design Tool for Part-Feeding Systems," *Proceedings of the 1995 NSF Design and Manufacturing Grantees Conference*, pp. 99-100, 1995.
12. F.W. Liou and F.S. Lin, "Dynamic Analysis Of Mechanical Components Using Parallel Computing," *Proceedings of the 1996 NSF Design and Manufacturing Grantees Conference*, pp. 143-144, January 1996.
13. F. W. Liou, J. Zhang, W. F. Lu, H. L. Tsai, K. Krishnamurthy**,** S. Agarwal, O. R. Mitchell, K. Peaslee, V. Allada, **“**A Five-Axis Rapid Metal Forming System,” *Proceedings of the 1999 NSF Design and Manufacturing Grantees Conference*, IE-22-1 to 11, January 1999.

Conference Presentations (Abstracts only):

* F. W. Liou and A. G. Erdman, "An Experimental and Analytical Study of the Dynamic Response of the High-Speed Elastic Mechanism System, " *Proceedings of Army Workshop on Kinematics, Dynamics and Control of Mechanisms and Manipulators*, Rensselaer Polytechnic Institute, Troy, New York, June 25-27, 1986.
* F. W. Liou and A. G. Erdman, "Modelling and Experimental Verification of the Dynamic Effect of Flexible Links and DC Motor of a Mechanism System," *Proceedings of Nonlinear Vibrations, Stability, and Dynamics of Structures and Mechanisms workshop*, Air Force Office of Science Research/Army Research Office, VPI, Blacksburg, Virginia, March 23-25, 1987.
* F. W. Liou "Computer-Aided Design of Mechanisms-An Update," *Proceedings of Midwest American Chinese Science and Technology Conference*, St. Louis, Missouri, June 3-5, 1988.
* F.W. Liou and K.C. Peng, "Experimental Study on the Frequency Response of Flexible Mechanisms," *Proceedings of the Twenty-Second Midwestern Mechanics Conference*, Rolla, Missouri, pp. 477-478, October 6-9, 1991.
* Liou, F.W., “Rapid Forming of Parts with Functionally Gradient Materials,” *Proceedings of the Midwest Chinese American Science And Technology Conference, Modern Engineering Session****,*** June, 2000.
* Liou, F.W., “Process Implementation of Parts with Functionally Gradient Materials,” *presented in the Midwest Chinese American Science And Technology Conference, Modern Engineering Session****,*** June, 2001.
* Liou, F.W., “Process Planning of Multi-Axis Hybrid Manufacturing System,” *presented in the Midwest Chinese American Science And Technology Conference, Modern Engineering Session****,*** June, 2002.
* Liou, F.W., “Process Planning For Laser Micro-Machining,” *presented in the Midwest Chinese American Science And Technology Conference, Modern Engineering Session****,*** October 25, 2003.
* Frank Liou, Kevin Slattery, Joohyun Choi, Hsin-Nan Chou, Mary Kinsella, Joseph Newkirk, and Keith Young, “Research on A Hybrid Manufacturing Process for Aerospace Structures,” *Presented at the 2005 AeroMat Conference*, Orlando, FL, June 6-9, 2005.
* Frank Liou, Kevin Slattery, Joohyun Choi, Hsin-Nan Chou, Mary Kinsella, Joseph Newkirk, and Keith Young, “Research and Development of a Hybrid Manufacturing Process for Fabrication and Repair of Metallic Structures,” *Presented at the 2005 Defense Manufacturing Conference (DMC 2005)*, Orlando, FL, 28 November - 1 December 2005.
* Kevin Slattery, Hsin-Nan Chou, Mary Kinsella, Frank Liou, “Destructive Test of LAM Ti 5553 Specimens” *presented in the 17th Annual Aeromat Conference*, May 2006.
* Zhiqiang Fan, Frank Liou, J. W. Newkirk, “Multiscale Modeling of Transport Phenomena and Microstructure Evolution during Laser Deposition,” *Presented at the 2007 ASM AeroMat Conference & Expo*, June 26-27, 2007, Baltimore, MD.
* Zhiqiang Fan, Frank Liou, Kevin Slattery, Mary Kinsella, Joseph Newkirk, Hsin-Nan Chou, and Blake Slaughter, “Process Modeling and Prediction for Laser Metal Deposition,” *Presented at SAE 2007 AeroTech Congress & Exhibition*, September 17 – 20, 2007, Los Angeles, California.
* Hsin-Nan Chou, Zhiqiang Fan, Frank Liou, Kevin Slattery, Mary Kinsella, Joseph Newkirk, “Modeling of Transport Phenomena and Numerical Simulation of Lack of Fusion during Laser Deposition,” *AeroMat 2008 Conference and Exposition*, Jun 23-26, 2008.
* Frank Liou, Zhiqiang Fan, Hsin-Nan Chou, Kevin Slattery, James Sears, Mary Kinsella, and Joseph Newkirk, “Laser-Material Interaction Research in a Metal Deposition Process,” *Presented in the 2009 TMS Annual Meeting & Exhibition*, February 15-19, 2009, San Francisco, CA.
* Liou, F. “Modeling of A Hybrid Manufacturing System,” 2010 Midwest Chinese-American Science and Technology (MCASTA) Symposium, St. Louis, MO, Sep. 10, 2011.
* Liou, F, “What are the key measurement science barriers that prevent innovation in metal-based AM?,” Workshop on Measurement and Standards for Metals-based Additive Manufacturing December 4-5, 2012 at National Institute of Standards and Technology, Gaithersburg Campus, Gaithersburg, MD.
* Joseph Newkirk; Frank Liou; Karen Taminger; William Seufzer; Zhiqiang Fan; Harihar Sistla; Sreekar Karnati, “Modeling and Experimental Study of Advanced Materials for Aerospace,” Materials Science & Technology 2013, October 27-31, 2013: Montreal, QC.

**INVITED SEMINARS:**

1. "Flexible Assembly," Intelligent System Center Project Review Conference, University of Missouri-Rolla, with K. Krishnamurthy, March 17, 1988.
2. "Development of Flexible Fixtures for Automotive Manufacturing," invited seminar at General Motors Company, Detroit, August 2, 1988.
3. "Intelligent Blank Cutting and Scheduling," Westinghouse ABB, Jefferson City, Missouri, with G. Leininger, K. Krishnamurthy, and C. Dagli, June 6, 1989.
4. "Design of A Flexible Robotic Welding Cell," First Annual Intelligent Systems Center Industrial Liaison Program's Member Conference, St. Louis, Missouri, June 9, 1989.
5. "Automated Design of High-Speed Machinery," invited seminar at the Department of Mechanical Engineering, National Taiwan University, Taipei, Taiwan, July, 18, 1989.
6. "Computer-Aided Design and Manufacturing Research," Intelligent Systems Center Industrial Liaison Program Conference, Rolla, Missouri, June 27, 1991.
7. "Computer-Aided Fixture Design and Development," Intelligent Systems Center Industrial Liaison Program Conference, St. Louis, Missouri, April 7, 1992.
8. "Intelligent CAD/CAM Systems," a series of lectures at the Jianghan Petroleum Institute, Jiangling, Hubei, China, May 20-23, and May 27-29, 1992.
9. "Applications of AI Technology in Process Planning," invited seminar at the Zhejing University, Hangzhou, Zhejing, China, June 2, 1992.
10. "Automation of Packaging Machinery," invited seminar at the Benison & Co. LTD, Taipei, Taiwan, June 13, 1992.
11. "Computer-Aided Prototyping of Packaging Machinery," invited seminar at the Benison & Co. LTD, Taipei, Taiwan, June 2, 1993.
12. “Current Research Opportunities in the Manufacturing Area,” Ramada, Rolla (ISC Retreat), January 1995.
13. “Product Design and Development - Boeing Experience” Boeing, Wichita KS (July 28 ) and Seattle, WA (August 4), 1997.
14. “Future Engineering Education” Boeing, Seattle WA, Aug. 7 1997.
15. "Product Design and Development - Boeing Experience," MAEM Seminar, UMR October 8, 1997.
16. "Undergraduate Program Enhancement: Product Design and Development," UMR MAEM Industrial Advisory Board, October 30, 1997.
17. "Product Realization Process," Engineering Management 320, Guest Lecturer, UMR, November 20, 1997.
18. "Aircraft Design and Manufacturing," Civil Engineering Seminar, UMR, October 8, 1998.
19. "Rapid Product Realization," Watlow Electric Manufacturing Company, November 5, 1998.
20. "Augmented Reality and Rapid Manufacturing Research," General Motors, June 1999.
21. Liou, F.W., “Rapid Forming of Parts with Functionally Gradient Materials,” *Midwest Chinese American Science And Technology Conference, Modern Engineering Session****,*** June, 2000.
22. Liou, F.W., “Process Implementation of Parts with Functionally Gradient Materials,” *presented in the Midwest Chinese American Science And Technology Conference, Modern Engineering Session****,*** June, 2001.
23. Jianzhong Ruan, Jun Zhang and Frank Liou, “Process planning for laser micro-machining,” *presented in the Midwest Chinese American Science And Technology Conference, Modern Engineering Session****,*** October 2003.
24. F. Liou, “Laser Aided Manufacturing Processes (LAMP) Research” *Midwest Chinese American Science And Technology Conference, Modern Engineering Session****,*** August 2004.
25. F. Liou, “Feature Presentation: Manufacturing Engineering Research and Education Program at the Missouri University of Science and Technology”, 2008 Manufacturing Summit, Southwest Area Manufacturers Association (SAMA), Springfield, Missouri, April 23, 2008.
26. F. Liou, “Rapid Manufacturing and Some Emerging Applications,” Invited seminar, Chemical Engineering, Missouri University of Science and Technology, April 28, 2009.
27. F. Liou, “Rapid Manufacturing and Its Opportunities in Energy Area,” Invited seminar, Naval Architecture and Systems Engineering, National Cheng-Kung University, Tainan, Taiwan, June 24, 2009.
28. F. Liou, “Rapid Manufacturing and the Future of Product Development,” Invited seminar, Global Research lecture series, Missouri University of Science and Technology, Nov 5, 2009.
29. F. Liou “Rapid Manufacturing and Its Emerging Applications,” Keynote speech in the 3rd International Forum on Systems and Mechatronics” (IFSM-2010, September 6-9, 2010, River View Hotel, Singapore).
30. F. Liou “Rapid Manufacturing,” Invited Award Speech in the Midwest Chinese–American Science and Technology Association (MCASTA), September, 18, 2010.
31. Liou, F., “Laser Metal Deposition and Its Emerging Applications,” invited seminar by Industrial Technology Research Institute (ITRI), Tainan, Taiwan, March 30, 2011.
32. Liou, F., “Multiscale and Multiphysics Modeling of Additive Manufacturing of Advanced Materials -1,” NASA Langley Research Center, VA, July 7, 2011.
33. Liou, F. “Is modeling really useful and practical in product development?” National Cheng-Kung University on Dec. 23, 2011.
34. Liou, F. “Metal Additive Manufacturing and Its Industrial Applications” invited lecture at the 2012 Mechanics and System Engineering Research Forum, National Cheng-Kung University, Tainan, Taiwan on July 20, 2012.
35. Liou, F. “Industrial Research Collaborations in the USA” invited presentation at the 2012 Mechanics and System Engineering Research Forum, National Cheng-Kung University, Tainan, Taiwan on July 20, 2012.
36. Liou, F., "Advanced Additive Materials Modeling and Simulation - Multiscale and Multiphysics Modeling of Metal Deposition Processes," Additive Aerospace Summit 2013, Los Angeles, CA, October 16 - 18, 2013.
37. Liou, F., Fan, Z., Newkirk, J., Seufzer, W. and Taminger, K., "Modeling and its Applications to Metal Additive Manufacturing Processes," AeroMat 2013, Bellevue, WA, April 1 - 4, 2013.
38. Liou, Frank, Todd Sparks, and Heng Liu, “A Hybrid Manufacturing Process for Precision Metal Parts,” ASPE Dimensional Accuracy and Surface Finish in Additive Manufacturing in Berkeley, CA on April 13-16, 2014.
39. Liou, Frank, Joseph Newkirk, William Seufzer and Karen Taminger, “Multi‐scale Modeling and Simulation of Directed Energy Deposition Processes, “AeroMat 2014 in Orlando, FL on June 16-19, 2014.
40. Liou, F., "Process Modeling and Qualification of Metal Additive Manufacturing," Additive Aerospace Summit 2014, Los Angeles, CA, November 3-6, 2014.
41. Liou, F. “On Robotic 3-D Printing,” International Forum on Systems and Mechatronics, Tainan, Taiwan, Oct. 13, 2014.
42. Liou, F. “Precision Metal Parts with Hybrid Additive Manufacturing and Machining,” invited lecture at the Metal Additive Tutorial Workshop (June 23-24, 2015) in Austin, Texas.
43. Liou, F., “Multi-Physics, Multi-Scale Modeling of Directed Energy Deposition Processes,” invited lecture at Navy’s Structural Mechanics TIM meeting at Falls Church, VA, June 24-26, 2015.
44. Liou, F., “Hybrid Additive Manufacturing for Precision Metal Parts,” invited Penn State IE Colloquium Series, Pennsylvania State University at State College, PA, Oct. 1, 2015.
45. Liou, F., “Laser Deposition Technology for Additive Manufacturing and Repair,” invited lecture at the Additive Adoption for Aerospace Summit/Metal Additive Tutorial 2015 in Los Angeles, CA on Oct 26-Oct 28, 2015.
46. Liou, F. W., "Model-Based Qualification for Directed Energy Deposition Processes," 145th TMS Annual Meeting & Exhibition, Nashville, TN, February 16 - 18, 2016.
47. Liou, F., "Metal Additive Manufacturing," School of Engineering, National Cheng-Kung University, Tainan, Taiwan, June 16, 2016.
48. Liou, F., "Multiscale and Multiphysics Modeling of Metallic Additive Manufacturing," Joint Army-Navy-NASA-Air Force (JANNAF) Liquid Propulsion Subcommittee (LPS) Advanced Materials Panel meeting 2016, Jackson Center, Huntsville, AL, August 23 - 25, 2016.
49. Liou, F., "Hybrid Manufacturing Processes for Precision Metal Parts," Joint Army-Navy-NASA-Air Force (JANNAF) Liquid Propulsion Subcommittee (LPS) Advanced Materials Panel meeting 2016, Jackson Center, Huntsville, AL, August 23 - 25, 2016.
50. F Liou (with John Ziegert), “Inspection, Qualification, and Certification,” workshop on Advanced Hybrid Manufacturing–Integrating Technologies, CAM-IT meeting in Jackson Center, El Paso, TX, March 12-14, 2017.
51. F Liou, “Inspection Process for Additive Manufacturing,” Invited presentation, National Cheng Kung University, Tainan, Taiwan, June 8, 2017.
52. F Liou, “Discovery of Novel Materials Using Additive Manufacturing,” Invited presentation, Discover DSO Day (D3, DARPA’s Defense Sciences Office (DSO)), Arlington, Virginia, June 15, 2017.
53. F Liou, “Metal Additive Manufacturing, Monitoring and Control,” Invited presentation by USPTO (United States Patent and Trademark Office), Patent Examiners Technical Training Program, Alexandria, VA, June 27, 2017.
54. Hill, Leon, Todd Sparks, Frank Liou, “Development of A Hybrid Manufacturing Process for Precision Metal Parts,” 28th Solid Freeform Fabrication Symposium, Austin, Texas, August 6-9, 2017.
55. Zhang, Xinchang, Wenyuan Cui, Wei Li, Frank Liou, “Metallic components repair strategies using the hybrid manufacturing process,” 28th Solid Freeform Fabrication Symposium, Austin, Texas, August 6-9, 2017.
56. Liou, F., "Metal Additive Manufacturing Research – Laser Applications," Navair’s Additive Manufacturing Planning Meeting, Falls Church, VA, October 13, 2017.
57. Newkirk, J, and F Liou, “Investigation of Fabrication of Ti64 Components Using Hybrid Additive Manufacturing, TMS 2018, Phoenix, Arizona, March 11-15, 2018.
58. Sparks, T., A. Flood, and Liou, F., “Optimized Build Plate Design Tool for Metal Laser Powder Bed Additive,” presentation at Navair, Patuxent River, MD, March 19, 2018.
59. Liou, F. and J. Newkirk, “Development of Metal Additive Manufacturing Processes and Materials,” Idaho National Laboratory, Idaho Falls, ID, June 28, 2018.
60. Liou, F., "Laser Beam Manipulation and AM Processing for Fabrication and Repair of Metallic Structures," Navair Additive Manufacturing workshop, Falls Church, VA, Aug 8, 2018.
61. Frank Liou, “Additive Manufacturing of Aluminum Bellcrank,” invited presentation at Auburn University for 2018 Army/Navy Additive Manufacturing Workshop, Auburn, Alabama, Oct. 18, 2018.
62. Praneeth Isanaka and Frank Liou, “Innovative Processing Techniques for Additive Manufacture of 7000 Series Aluminum Alloy Components,” invited presentation at Navair, Patuxent River, MD, Nov. 19, 2018.
63. Liou, F., Invited talk on “Laser Beam Manipulation and Processing for Fabrication and Repair for Metallic Structures,” US-Australia Additive Manufacturing Technical Exchange at RMIT University Melbourne, Australia, on Dec. 4, 2018.
64. Liou, F., Invited talk on “Directed Energy Depositing a New Fe-Cr-Ni Alloy,” US-Australia Additive Manufacturing Technical Exchange at RMIT University Melbourne, Australia, on Dec. 4, 2018.
65. Liou, F., Invited talk on “Research Toward Precision Repair Automation,” US-Australia Additive Manufacturing Technical Exchange at RUAG Australia, Australia, on Dec. 5, 2018.
66. Liou, F., Invited talk on “Toward Qualification of Metal Additive Manufacturing Processes,” US-Australia Additive Manufacturing Technical Exchange at Defence Science and Technology, Australia, on Dec. 6, 2018.
67. Liou, F., Invited talk on “The Challenges and Applications of Metal Additive Manufacturing,” Mechanical Engineering, National Cheng Kung University, Tainan, Taiwan, Dec. 13, 2018.
68. Liou, F., Invited seminar on “Overview of Metal Additive Manufacturing,” Systems and Naval Mechatronic Engineering, National Cheng Kung University, Tainan, Taiwan, Dec. 14, 2018.
69. Liou, F., Invited presentation on “Additive Manufacturing for Future Product Design and Manufacturing,” Intelligent Manufacturing and Product Innovation Workshop, National Cheng Kung University, Tainan, Taiwan, June 26, 2019.
70. Liou, F., Invited presentation on “Fabrication of Ti-6Al-4V to SS316 Functionally Graded Material,” Navair Additive Manufacturing Workshop, Seattle, WA, July 16, 2019.
71. Liou, F., Invited presentation on “Multi-beam AM project,” Navair Additive Manufacturing Workshop, Seattle, WA, July 17, 2019.
72. Liou, F. “Metal Additive Manufacturing Research: Modeling, Planning, Processing, & Testing,” Idaho National Laboratory, Idaho Falls, ID, January 29-31, 2020.
73. F Liou, “Metal Additive Manufacturing: Digital Material Fabrication,” Invited presentation by USPTO Tech Fair (United States Patent and Trademark Office), Patent Examiners Technical Training Program, June 24, 2020.
74. F Liou, “Vision Statement: Integrative Manufacturing and Remanufacturing Technologies (iMart) to Spur Rural Development,” Research Symposium on Towards A Vision for an Engineering Research Center on Integrative Manufacturing and Remanufacturing Technologies to Spur Rural Development, Missouri S&T, Sep 3, 2020.
75. Liou, F., Invited (online) seminar on “Digital-material Fabrication Using Additive Manufacturing,” Systems and Naval Mechatronic Engineering, National Cheng Kung University, Tainan, Taiwan, Dec. 18, 2020.
76. F Liou, “The Future Repair Technologies with Additive Manufacturing Solutions,” Invited (online) presentation by USPTO Tech Fair (United States Patent and Trademark Office), Patent Examiners Technical Training Program, June 22, 2021
77. Liou, F., Invited seminar on “Digital-Material Manufacturing and Remanufacturing” Mechanical Engineering, University of Texas- Dallas, April 1, 2022.
78. Liou, F., presentation on “Digital-Material Fabrication Using Additive Manufacturing,” RAPID 2022, May 17, 2022.
79. Liou, F. and Wei Li, presentation on “A Framework for Digital Materials Fabrication Using Directed Energy Deposition Process,” Solid Freeform Fabrication Symposium, Austin, Texas, July 26, 2022.
80. F Liou, “The Future Repair Technologies with Additive Manufacturing Solutions,” Invited presentation by USPTO Tech Fair (United States Patent and Trademark Office), Patent Examiners Technical Training Program, June 22, 2022.
81. F Liou, “A Decentralized Digital Factory for Future Manufacturing,” Invited presentation by USPTO Tech Fair (United States Patent and Trademark Office), Patent Examiners Technical Training Program, June 14, 2023.
82. Frank Liou and Wei Li, “ A Framework for Digital Manufacturing with a Directed Energy Deposition Process,” Flexible Automation and Intelligent Manufacturing International Conference, FAIM 2023 Proceedings, June 18-22, 2023.
83. Frank Liou, “High-Performance Material Development Using Additive Manufacturing Process,” 2023 DoD Steels Summit in Niceville, FL, Nov 13-15, 2023.
84. Liou, F., Invited seminar on “Research and Development of A Decentralized Digital Factory for Future Manufacturing,” School of Engineering, National United University, Miaoli, Taiwan, Dec. 20, 2023.
85. Liou, F., Invited seminar on “Research and Development of A Decentralized Digital Factory for Future Manufacturing,” Systems and Naval Mechatronic Engineering, National Cheng Kung University, Tainan, Taiwan, Dec. 22, 2023.
86. F Liou, “A Digital Twin Development Strategy for Metal Additive Manufacturing,” Invited presentation by USPTO Tech Fair (United States Patent and Trademark Office), Patent Examiners Technical Training Program, September 5, 2024.

**GRANTS**:

**Research Grants/Contracts:**

1. "Development of A Flexible Robotic Welding Cell - Feasibility Study," $16,008, Westinghouse Electric Corporation, Missouri, 12/15/88-1/15/89, Role: Co-PI, (with Drs. K. Krishnamurthy and G. Leininger)
2. "Intelligent Blank Cutting and Scheduling Advisory System - Feasibility Study," $20,000, Westinghouse Electric Corporation, Missouri, 3/15/89-5/31/89, Role: Co-PI, (with Drs. K. Krishnamurthy, G. Leininger, and C. Dagli)
3. "Development of A Flexible Robotic Welding Cell - System Implementation," $77,814, Westinghouse Electric Corporation, Missouri, 6/1/89-1/31/90, Role: Co-PI, (with Drs. K. Krishnamurthy and G. Leininger)
4. "Analysis and Synthesis of the Slider-Crank Mechanism in a Diesel Engine," $32,355, Weldon Spring Endowment Fund, Missouri, 6/1/89-5/31/90, ROLE: PI, (with Dr. S. Haddad)
5. "Intelligent Blank Cutting and Scheduling Advisory System-Heuristic Optimization," $70,187, Westinghouse Electric Corporation, Missouri, 12/1/89-5/31/90, Role: Co-PI, (with Drs. K. Krishnamurthy, G. Leininger, A. Bahrami, and C. Dagli)
6. "FEA Advisory System I - Elastic Modeling," $60,000, Anheuser Busch/Metal Container Co., Missouri, 1/1/90-7/31/90, Role: Co-PI, (with Drs. Y.W. Kown, W. Lu, and G. Leininger)
7. "FEA Advisory System II - Elasto-Plastic Modeling," $ 115,510, Anheuser Busch/Metal Container Co., Missouri/MRTC, 8/1/90-1/31/91, Role: Co-PI, (with Drs. K. Chandra, W. Lu, and G. Leininger)
8. "Assistance Related to Robotic Spin/Bake Hot Plate System - High Precision Robotic Gripper Design and Implementation," $16,011, Brewer Science Inc., Missouri/ MRTC, 3/18/91-8/18/91, Role: Co-PI, (with Drs. K. Krishnamurthy, A. Bahrami, and C. Dagli)
9. "FEA Advisory System III - Geometric Nonlinearity Modeling," $81,655, Anheuser Busch/Metal Container Co., Missouri/MRTC, 1/1/91-12/31/91, Role: Co-PI, (with Drs. K. Chandra, W. Lu, and G. Leininger)
10. "FEA Advisory System IV - Dynamics Modeling," $81,655, Anheuser Busch/Metal Container Co., Missouri/MRTC, 1/1/92-12/31/92, Role: Co-PI (with Drs. K. Chandra and W. Lu)
11. "Automation of An Engine Sub-Assembly Workcell," $85,240, Ford Motor Co.,/MRTC, 6/1/92-6/30/93, role: PI.
12. "Dynamic Analysis of Mechanical Assemblies," $110,000, National Science Foundation/MRTC, 9/1/92-2/1/96, role: PI.
13. "U.S.-Korea Joint Research on Hybrid system for Seismic Structures with Resonant Dampers and Robust Mutiobjective Controllers," $305,760, National Science Foundation/MRTC, 8/15/93-2/14/96, Role: Co-PI, (with Drs. F. Cheng and V. Rao)
14. "Graduate Research Traineeships in Machine Tool Research," $695,000, National Science Foundation, 10/1/93-3/31/99, Role: Co-PI, (with Drs. B. Armaly, A. Okafor, K. Krishnamurthy, and W. Lu)
15. "Real Time Dynamic Simulation and Display of Mechanical Assemblies," $70,000, Software Systems Specialist Inc./MRTC (DoD STTR Program), 10/1/94-9/30/95, role: PI (with Dr. Bruce McMillin).
16. "An Interdisciplinary Design Course that Utilizes Concurrent Engineering Principles Along with Unigraphs," $132,311, McDonnell Douglas Corporation, 6/96-6/98, Role: Co-PI (with B. Selberg, A, Okafor, and H. Wiebe).
17. "Metrology Equipment to Enhance Agile Manufacturing and Automatic Inspection Research and Education at UMR", Brown and Sharpe/UMR, $62,000, 8/96-7/97, role: PI (with Allada, V., Krishnamurthy, K., Lu, W., Mitchell, O. R., Moss, R., Rao, V.)
18. "Automation Of Wiring Harness Assembly Process", NIST/Mid-Am. Mfg. Tech. Ctr. (MAYTAG Inc./ MRTC/UMR), $43,698, 1/97-8/97, role: PI.
19. "Contact Analysis Between Mechanical Components", UM Research Board, $29,646, 7/97-8/98, role: PI.
20. "Development of a Five-Axis Rapid Metal Forming System," NSF/MRTC/UMR, $670,846, 9/98-8/03, DDM 9871185, role: PI (with Allada, V., Krishnamurthy, K., Lu, W., Mitchell, R. Peaslee, K. and Tsai, H.L.)
21. "Development of An Advanced Rapid Prototyping System," UM Research Board, $100,000, 10/98-9/99, role: PI (with Allada, V., Krishnamurthy, K., Lu, W., Mitchell, R. Peaslee, K. and Tsai, H.L.)
22. “Development of a Virtual and Augmented Reality System for Research in Intelligent Design and Manufacturing,” NSF, 9/1/2000-8/31/2003, $431,401, role: Co-PI (with Agarwal, S., Allada, Fu, Y., Hall, R., V., Kellogg, R., Krishnamurthy, Leu, M., Liu, F., Midha, A., Mitchell, R., and Wunsch, D.
23. “Precision Rapid Metal Forming,” NSF, $10,000, role: PI, July 1, 2000-June 30, 2001.
24. “Doctoral Research and Training in Virtual and Rapid Prototyping,” Leu, M. C., Choi, J., Liou (Co-PI), F., Landers, R., McAdams, D., Midha, A., Tsai, H. L., Okafor, A., U.S. Department of Education, $346,284, July 1, 2001 – June 30, 2004.
25. "Development of a Product Focused Manufacturing Program," awarded by the Society of Manufacturing Engineers Education Foundation, $182,000, 2001-2003, role: PI, (Co-PI: A. Agarwal, V. Allada, M.C. Leu, R. S. Mishra, A. C. Okafor).
26. “Design And Development Of Refractive Devices For Directing Laser Beams,” Leu, M. C., Liou, F. (Co-PI), McAdams, MetaStable Instruments Inc., $30,000, 2001-2002.
27. "Development of a Five-Axis Rapid Metal Forming System," NSF, $12,000, 7/01-6/02, role: PI (with Allada, V., Krishnamurthy, K., Lu, W., Mitchell, R. Peaslee, K. and Tsai, H.L.)
28. ”FORD – UMR Partnership for Lean Thinking in Manufacturing” role: PI (with Venkat Allada and Can Saygin), $355,745, Aug 2001-July 2006.
29. “Gateway to Manufacturing Excellence Project,” NSF, $672,880, 7/2002-7/2005, Ashok Agrawal, Tarrence Freeman, Dale Gerstenecker, Ming Leu, Frank Liou (Co-PI), Venkata Allada, John Clendenin, William Frizelle, Andrew Taylor, and Barton Weihl.
30. “Laser-Based Manufacturing and Materials Processing” U.S. Army, $900,000, 4/2003-9/2004. J. Choi, G. Hilmas, F. Liou (Co-PI), H. Tsai, D. Van Aken.
31. “Development of A Parallel Machine Tool For Research And Education In Advanced Manufacturing,” NSF/RB/UMR, $271,058, 8/2003-8/2005, Landers, Robert G.; Acar, Levent; Balakrishnan, S. N.; Hilgers, Michael Gene; McMillin, Bruce M.; Liou, Frank (role: Co-PI) ; Leu, Ming C.; Saygin, Can.
32. “Die Repair Using Direct Metal Deposition Process,” Spartan Light Metal Products Inc./UMR, $59,981, 2/2004-2/2005, role: PI.
33. “Hybrid Deposition and Removal of Metals for Aerospace Systems,” Air Force Research Laboratory (Contract# FA8650-04-C-5704), role: PI, with Joohyun Choi and Joseph Newkirk, $802,644, 4/2004-4/2007.
34. “CAMT Task 11.1 Program Integration and Oversight,” Leu, Landers, Summers, Liou (role: Co-PI), Tsai, Mishra, O'Keefe, Zoughi, Chandrashekhara, Pommerenke, $380,000, AFRL, 4/2004-4/2006.
35. “Die Repair Using Direct Metal Deposition Process Phase II,” Spartan Light Metal Products Inc./UMR, $34,000, 5/2005-10/2006, role: PI.
36. “2006 NSF Design, Service and Manufacturing Grantees and Research Conference,” $304,258, NSF, role: Co-PI, 01/01/05-12/31/06.
37. “Laser Applications in Fuel Cell Manufacturing,” Department of Transportation, role: PI, $ 29,603, 9/2006-9/2007.
38. “Hybrid Deposition and Removal Process for Aerospace Parts with Complex Geometry,” Air Force Research Laboratory, role: PI, with Joseph Newkirk, $170,000, 4/2006-4/2008.
39. “Recrystallization and Microstructure Control of Laser Deposition Using Hybrid Process,” Air Force Research Laboratory, role: PI, with Joseph Newkirk, $95,000, 4/2006-4/2008.
40. “STTR Phase I: A Multi-Axis Planning System (MAPS) for Direct Fabrication Processes,” National Science Foundation/Product Innovation and Engineering LLC, role: PI, $50,000 (IIP-0637796), 1/2007-12/2007.
41. “Direct Metal Deposition of Graded Alloys for A Space Heat Exchanger,” Air Force Research Laboratory/Boeing, $160,000, role: PI,11/2007-4/2010.
42. “Multi-Axis Planning System for Direct Fabrication and Repair of Metals,” Air Force Research Laboratory/Product Innovation and Engineering LLC. $250,000, role: PI, 8/2007-8/2011.
43. “Die Repair Using LAMP Hybrid Process,” Air Force Research Laboratory/Spartan Light Metal Products, Inc., $150,000, role: PI, 11/2008-10/2010.
44. “Laser Cladding of Green Landing Materials,” Air Force Research Laboratory/Boeing, $80,000, role: PI, 5/2008-5/2010.
45. “STTR Phase II: A Multi-Axis Planning System (MAPS) for Direct Fabrication Processes,” National Science Foundation (IIP-0822739)/Product Innovation and Engineering LLC role: PI, $100,000, 7/2008-7/2012.
46. “Advanced Military Installations That Integrate Renewable Energy And Advanced Energy Storage Technologies,” Air Force Research Laboratory, Contract No. FA4819-09-C-0018, $3,450,000, role: Co-PI with Mariesa Crow (PI), Fatih Dogan, and K.B. Lee, K. Chandrashekhara, K., Robert Landers, Ming Leu, Joe Newkirk, etc., 7/2009-7/2012.
47. “Modeling of Novel Laser Cladding of High Temperature Alloys,” Titanova Inc., role: PI, $50,000, 01/18/10-1/17/11.
48. “REU Site: Additive Manufacturing,” National Science Foundation, role: Co-PI, with Robert Landers (PI), Douglas Bristow, Gregory Hilmas, Ming Leu, Joseph Newkirk, and Hong Sheng, NSF EEC 1004839, $400,000, July 15, 2010 – July 14, 2013.
49. “Surface Finishing of Additive Metal Processes,” Boeing, $25,000, role: PI, with Joe Newkirk, Sep 2010-Sep 2011.
50. “SBIR Phase I: A Multi-Axis Repair System (MARS),” National Science Foundation IIP-1046492, role: PI, $50,000, January 1, 2011 – June 30, 2011.
51. “SBIR Phase IB: A Multi-Axis Repair System (MARS),” National Science Foundation, role: PI, $20,000, July 1, 2011 – Dec 31, 2011.
52. “Multiscale and Multiphysics Modeling of Additive Manufacturing of Advanced Materials,” National Aeronautics and Space Administration, Grant Number NNX11AI73A, $659,984, role: PI, with Joe Newkirk, June 2011-June 2014.
53. “Human-Assisted-Manufacturing Model Library,” Boeing (DARPA iFAB), $310,543, role: PI, with Cihan Dagli and Ming Leu, May 2011 to May 2012.
54. “Laser Deposition for Metal Defect Rework,” GKN-Aerospace, $25,000, role: PI, 11/2011-11/2012.
55. “Prediction and Validation of Material Behavior Fabricated from Additive Metal,” Boeing, $40,000, role: PI, with Newkirk, 11/2011-11/2012.
56. “Doctoral Research and Training in Direct Digital Manufacturing,” US Dept. of Education, $408,315, role: Co-PI, (with Landers, Leu, Bristow, Chandrashekhara, Rahaman, and Newkirk), 08-16-2012-8-15-2015.
57. "Technology Development Support for the C2M2L-1 Program - Area 3," $300,000, role: PI, with M. Leu, Boeing Company, January 19 - November 21, 2012.
58. “Comparison of Laser Deposition and Welding for Metal Defect Rework,” GKN-Aerospace, $20,000, role: PI, 11/2012-11/2013.
59. “Direct Metal Deposition of Functionally Gradient Materials,” Boeing, $40,000, role: PI, with Newkirk, 11/2012-11/2013.
60. “Direct Metal Deposition of Functionally Gradient Materials,” Rolls Royce, $40,000, role: PI, with Newkirk, 11/2012-11/2013.
61. “Iterative Process Control for Laser Metal Deposition,” role: Co-PI (with Douglas Bristow (PI) and Robert Landers), NSF CMMI-1301414, $272,875, 6/1/2013 through 5/31/2016.
62. “Fabrication of Advanced Materials for Space Applications,” role: Science PI, with David Riggins and Joe Newkirk (role: Co-PI), NASA Grant NNX13AM99A NSR 475489, $750,000, 9/1/2013 through 8/31/2016.
63. “Doctoral Research and Training in Direct Digital Manufacturing,” US Dept. of Education, $399,798, August 16, 2012 – August 15, 2015 (additional $133,266 in cost sharing from Missouri S&T), role: Co-PI, (with Landers, Leu, Bristow, Chandrashekhara, Rahaman, and Newkirk), 08-16-2012-8-15-2015.
64. “Direct Metal Deposition of IN625 and Ti64 Functionally Gradient Materials,” Boeing, $20,000, role: PI, with Newkirk, 11/2013-11/2014.
65. “Automated Repair of Metal Defect Rework,” GKN-Aerospace, $25,000, role: PI, 11/2013-11/2014.
66. “SBIR Phase I: Practical On-Machine Inspection Equipment (PROMISE) for Metal Deposition Processes,” National Science Foundation IIP-1345240, role: PI, $50,000, January 1, 2014 – Dec. 31, 2014.
67. “SBIR Phase IB: Practical On-Machine Inspection Equipment (PROMISE) for Metal Deposition Processes,” GE Aviation/National Science Foundation IIP-1345240, role: PI, $30,000, July 1, 2014 – Dec. 31, 2014.
68. “Direct Metal Deposition of SS316 and Ti64 Functionally Gradient Materials with Elemental Powders,” Boeing, $40,000, role: PI, with Newkirk, 1/2015-12/2015.
69. “Robotic Repair with Additive and Subtractive Processes,” GKN-Aerospace, $25,000, role: PI, 1/2015-12/2015.
70. “REU Site: Additive Manufacturing,” National Science Foundation, role: Co-PI, with Robert Landers (PI), Douglas Bristow, Gregory Hilmas, Ming Leu, Joseph Newkirk, and Hong Sheng, NSF EEC 1004839, $415,000, April 1, 2015 – March 31, 2018.
71. “Metal Additive Manufacturing Analysis for Missouri S&T,” Honeywell, role: Co-PI, with Ming Leu (PI), Joseph Newkirk, Robert Landers, Douglas Bristow, Ronald OMalley, $ 1,161,804, 07/2015 to 09/2016.
72. “Cybermanufacturing: Cyber-Enabled Additive Manufacturing of Advanced Materials,” National Science Foundation CMMI-1547042, role: PI, with Jagannathan Sarangapani, $ 159,758, 09/2015-12/2017.
73. “Fabrication of Ti – γ-TiAl Functionally Gradient Materials,” Boeing, $40,000, role: PI, with Newkirk, 1/2016-12/2016.
74. “Simulation of a laser wire deposition process for Ti6Al4V components,” GKN-Aerospace, $40,000, role: PI, 1/2016-12/2016.
75. “Evaluation of Die Repair Using Metal Deposition Process,” Toyota, $40,000, role: PI, 1/2016-12/2016.
76. "To Demonstrate Part Height Control During The Laser Metal Deposition (LMD) Process Using A Height Control Sensor," $30,714, EWI/America Makes, role: PI, January 1 - August 31, 2016.
77. “Additive Manufacturing Simulator (AMS),” $50,000, Product Innovation and Engineering /Department of Energy SBIR Phase I (Grant # DE-SC0015207), role: PI, 2/2016-11/2016.
78. "MRI: Development of an Advanced Materials Additive Manufacturing (AM2) System for Research and Education," National Science Foundation CMMI 1625736/ Missouri S&T, $1,258,600, role: PI, (with J. Newkirk, and J. Sarangapani), September 1, 2016 - August 31, 2019.
79. “Onsite Structural Restoration Methods for Aircraft Components,” Navair SBIR Phase I, Contract # N68335-17-C-0009, $79,999, Product Innovation and Engineering, role: PI, 10/2016-4/2017.
80. “Investigation of build strategies for a hybrid manufacturing process,” Boeing, DMG/MORI, GKN, Spirit, $72,000, role: PI, with J. Newkirk,1/2017-12/2017.
81. “Simulation and validation of a laser wire deposition process for Ti6Al4V components,” GKN, $40,000, role: PI, 1/2017-12/2017.
82. “Investigation of automated die repair strategies,” Toyota and Product Innovation and Engineering, $55,000, role: PI, 1/2017-12/2017.
83. “Feasibility Fuel Systems Applications for AM ,” Cummins, $12,000, role: PI, 1/2017-12/2017.
84. “Metal Additive Manufacturing Analysis for Missouri S&T,” Honeywell, role: Co-PI, with Ming Leu (PI), Lianyi Chen, Joseph Newkirk, Robert Landers, Douglas Bristow, Ronald OMalley, $834,845, 10/2016 to 09/2017.
85. “Additive Manufacturing Simulator (AMS),” $200,000, Product Innovation and Engineering /Department of Energy SBIR Phase II (Contract # DE-SC0015207), role: PI, 8/2017-3/2020.
86. “Onsite Structural Restoration Methods for Aircraft Components,” Product Innovation and Engineering /Navair SBIR Phase I Option, $15,000, role: PI, 8/2017-2/2018.
87. “Optimized Build Plate Design Tool for Metal Laser Powder Bed Additive,” Product Innovation and Engineering /Navair STTR Phase I, Contract # N68335-18-C-0460, $50,000, role: PI, 9/2017-3/2019.
88. “Metal Additive Manufacturing Analysis for Missouri S&T,” Honeywell, role: Co-PI, with Ming Leu (PI), Lianyi Chen, Joseph Newkirk, Robert Landers, Douglas Bristow, Ronald OMalley, $813,809, 1/2018 to 08/2018.
89. “Investigation of Build Strategies for a Hybrid Manufacturing Process,” CAMT/Boeing/DMG/MORI, $52,000, role: PI, (with J. Newkirk), 1/18-12/18.
90. “Development of an Automated Die Repair Process,” CAMT/Toyota, $40,000, role: PI, 1/2018-12/2018.
91. “Modeling and Experimental Validation of A Wire Feed Ti64 Deposition Process,” CAMT/GKN, $40,000, role: PI, 1/2018-12/2018.
92. “Precision Machining of Composite Structures,” Product Innovation and Engineering /Navair SBIR Phase I, Contract # N68335-18-C-0460, $25,000, K. Chandrashekhara (PI), Frank Liou (Co-PI), 6/2018-12/2018.
93. “Innovative Processing Techniques for Additive Manufacture of 7000 Series Aluminum Alloy Components,” Product Innovation and Engineering /Navair STTR Phase I, Contract # N68335-18-C-0425, $225,000, role: PI, 6/2018-8/2019.
94. “Optimized Build Plate Design Tool for Metal Laser Powder Bed Additive,” Product Innovation and Engineering /Navair STTR Phase I Option, $50,000, role: PI, 9/2018-3/2019.
95. “Advanced Mechanical Testing (AMT) System for Highly Irradiated Materials,” Product Innovation and Engineering /Department of Energy STTR Phase I, $50,000, role: PI, with Joe Newkirk, 7/2018-4/2019.
96. “AM Residual Stress for Missouri University of Science and Technology for Boeing Research & Technology,” $45,372, PI: Joe Newkirk, Frank Liou (Co-PI), Boeing Research & Technology, 7-25-2018-12-31-2018.
97. “Onsite Structural Restoration Methods for Aircraft Components,” Product Innovation and Engineering /Navair SBIR Phase II, Contract # N6833518C0603, $100,000, role: PI, 8/2018-8/2020.
98. “Metal Additive Manufacturing Analysis for Missouri S&T,” Honeywell, role: Co-PI, with Ming Leu (PI), Lianyi Chen, Joseph Newkirk, Robert Landers, Douglas Bristow, Ronald OMalley, $804,220, 9/2018 to 08/2019.
99. “Investigation of oxidation reduction of Ti64 in hybrid manufacturing processing,” CAMT/Boeing, $40,000, role: PI, 1/2019-12/2019.
100. “Research on DED processing of Cu-Ni FGM structures,” CAMT/Toyota, $40,000, role: PI, 1/2019-12/2019.
101. “Additive Manufacturing Modeling and Experimental Validation,” CAMT/PINE, $40,000, role: PI, 1/2019-12/2019.
102. “Development of a Robotic Wire-Feed Deposition Cell,” CAMT/GKN, $40,000, role: PI, 1/2019-12/2019.
103. “Phase II: Optimized Build Plate Design Tool for Metal Laser Powder Bed Additive,” Product Innovation and Engineering /Navair STTR Phase II (Contract #N6833519C0319), $90,000, role: PI, 4/2019-4/2020.
104. “Doctoral Research and Training in Advanced Manufacturing,” $774,222, DOEdu GAANN Grant number: P200A180061, R. Landers (PI), Frank Liou (Co-PI), K. Chandrashekhara, Lianyi Chen, Xiangyang Dong, Edward Kinzel, Ming Leu, Heng Pan, and Jonghyun Park, Jan. 2019-September 30, 2020.
105. “Phase II: Advanced Mechanical Testing (AMT) System for Highly Irradiated Materials,” Product Innovation and Engineering /Department of Energy STTR Phase II (Contract #DE-SC0018879), $300,000, role: PI, with Joe Newkirk, 8/2019-8/2022.
106. “Fatigue Prediction for Additive Manufactured (AM) Metallic Components,” Product Innovation and Engineering /Navair STTR Phase I, N68936-20-C-0013, $34,394, role: PI, 10/2019-4/2020.
107. “Additive Manufacturing of Inorganic Transparent Materials for Advanced Optics,” Product Innovation and Engineering /Navair STTR Phase I, Contract # N68936-20-C-0015, $24,505, role: PI, 10/2019-2/2021.
108. “NSF ERC Planning Grant: Engineering Research Center for Integrative Manufacturing and Remanufacturing Technologies (iMart) to Spur Rural Development,” Liou, F. (role: PI), Angela Lueking, Ming Leu, Jagannathan Sarangapani, Suzanna Long, Sajal Das, Jonathan Kimball, Joseph Newkirk, Fatih Dogan, Sahra Sedighsarvestani, Heng Pan, NSF EEC 1937128, $100,000, 9/1/2019 to 8/31/2022.
109. “Phase II: Precision Machining of Composite Structures,” Product Innovation and Engineering /Navair SBIR Phase II (Contract # N6833520C0128), $100,000, K. Chandrashekhara (PI), Frank Liou (Co-PI), 12/2019-12/2021.
110. “Phase II: Innovative Processing Techniques for Additive Manufacture of 7000 Series Aluminum Alloy Components,” Product Innovation and Engineering /Navair STTR Phase II, Contract # N6833520C0029, $225,000, role: PI, 1/2020-9/15/2023.
111. “Development of a Robotic Wire-Feed Deposition Cell II,” CAMT/GKN, $52,000, role: PI, 1/2020-12/2020.
112. “Investigation of oxidation reduction of Ti64 in hybrid manufacturing processing II” CAMT/Boeing, $55,000, Frank Liou (role: PI) and Joe Newkirk (co-PI), 1/2020-12/2020.
113. “Development of High Throughput Mechanical Properties Testing,” Frank Liou (role: PI) and J. Newkirk, Funded by Battelle Energy Alliance, LLC/INL/DOE, Contract # 234370, 3/20-9/23, $ 287,876.
114. “MRI: Acquisition of High-Resolution X-Ray Computed Tomography System for Real-Time, In Situ Studies of Various Effects on Microstructure of Materials,” NSF, 0063035 $1,311,996, Role: Co-PI, October 1, 2020 to September 30, 2021.
115. “Rapid Development of Next Generation Ultrahigh Strength and Lightweight Steels for Army Modernization,” Contract # W911NF2020251, Laura Bartlett (PI), Ronald O’Malley, Joseph Newkirk, Frank Liou (Co-PI), Yijia Gu, Jeffrey Smith, Mario Buchely, Julia Medvedeva, K. Chandrashekhara, Army Research Laboratory, $4,629,288, 9/11/2020 to 9/10/2021.
116. “Development of a Robotic Wire-Feed Deposition Cell III,” CAMT/GKN, $40,000, Frank Liou (role: PI), 1/2021-12/2021.
117. “Investigation of oxidation reduction of Ti64 in hybrid manufacturing processing III” CAMT/Boeing, $40,000, Frank Liou (role: PI) and Joe Newkirk (co-PI), 1/2021-12/2021.
118. “Additive Manufacturing of Inorganic Transparent Materials for Advanced Optics,” Product Innovation and Engineering /Navair STTR Phase II (Contract #N6893621C0048), $150,000, role: PI, 8/2021-8/2024.
119. “Doctoral Research and Training in Advanced Manufacturing,” $816,000, DOEdu GAANN Grant number: P200A210100, with Doug Bristow (PI), Frank Liou (co-PI), K. Chandrashekhara, Xiangyang Dong, Ming Leu, and Jonghyun Park, Oct. 2021-September 2024.
120. “Next Generation Titanium for AM,” $111,112, KCNSC (Honeywell), Joe Newkirk (PI) and Frank Liou (Co-PI), 2-8-2022 to 11-30-2022.
121. “Digital Twin R&D for A Wire-Feed Deposition Process,” CAMT/GKN, $40,000, role: PI, 1/2022-12/2022.
122. “Model Validation of Hybrid Directed Energy Deposition” CAMT/Boeing, $40,000, role: PI, 1/2022-12/2022.
123. “Modeling and Process Planning Tool for Hybrid Metal Additive/Subtractive Manufacturing to Control Residual Stress and Reduce Distortion,” Product Innovation and Engineering /Navair STTR Phase II (Contract #N6833524C0215), $150,000, role: PI, 8/2024-8/2026.
124. “Phase IIA: Advanced Mechanical Testing (AMT) System for Highly Irradiated Materials,” Product Innovation and Engineering /Department of Energy STTR Phase IIA (Contract #DE-SC0018879), $400,000, role: PI, with Joe Newkirk, 8/2022-8/2024.
125. “Next Generation Titanium for AM II,” $ 146,856, KCNSC (Honeywell), Joe Newkirk (PI) and Frank Liou (Co-PI), 2-27-2023 to 8-31-2023.
126. “Investigation of U-Mo Monolithic Fuel Interfacial Bond Strengths,” $ 342,160, BATTELLE Energy Alliance LLC, Joe Newkirk (PI) and Frank Liou (Co-PI), 3-22-2023 to 9-15-2023.
127. “Digital Twin R&D for A Wire-Feed Deposition Process II,” CAMT/GKN, $40,000, role: PI, 1/2023-12/2023.
128. “Model Validation of Hybrid Directed Energy Deposition II” CAMT/Boeing, $60,000, role: PI, 1/2023-12/2023.
129. “Weld Assembly of Large Castings,” GE Renewable Energy, $125,000, role: PI, 4/1/2023-6/30/2024.
130. “Rapid Development of Next Generation Ultrahigh Strength and Lightweight Steels for Army Modernization,” Army Research Laboratory, $450,650, Laura Bartlett (PI), Yijia Gu, Ronald O’Malley, Jeffrey Smith, Mario Buchely, Julia Medvedeva, Joseph Newkirk, K. Chandrashekhara, and Frank Liou (Co-PI), 9/2023-9/2024.
131. “Digital Twin R&D for A Wire-Feed Deposition Process III,” CAMT/GKN, $40,000, role: PI, 1/2024-12/2024.
132. “Demonstration of Part Repair on DMG-Mori LASERTEC 4300” CAMT/Boeing, $60,000, role: PI, 1/2024-12/2024.
133. “Advanced Additive Manufacturing of Titanium,” $ 104,096, KCNSC (Honeywell), Joe Newkirk (PI), Praneeth Isanaka, and Frank Liou (Co-PI), 3-15-2024 to 8-31-2024.
134. “Investigation of Hot Isostatic Press Diffusion Bonded Aluminum and U-Mo Monolithic Fuel Interfacial Bond Strengths,” $625,477, Idaho National Lab, Joe Newkirk (PI), Frank Liou (Co-PI), Arezoo Emdadi, and Praneeth Isanaka, 11/07/2024 to 11/30/2026.
135. “Secured Digital Twin for Additive Manufacturing,” PINE/Navy, $77,102, role: PI, 10/2024 to 4/2025.

In Negotiation:

1. “Design, Fabrication, and Repair of Multi-Material Gears for Improved Performance and Reliability of Wind Turbine Systems,” GE-Vernova/DOE, $500,000, role: PI, 10/2024 to 9/2026.
2. “Durable Coating for Wind Turbine Pitch Bearing Produced via Hybrid Manufacturing,” DOE, $2,000,000, role: PI, with Haiming Wen (Co-PI), and Praneeth Isanaka (Co-PI), 2/2025-1/2028.

Development Grants:

* "Analysis and Synthesis of High-Speed Machinery," $19,650, Faculty Development Fund, UMR, 9/1/87-8/31/88.
* "Flexible Assembly," $27,530, Intelligent System Center, UMR, 1/1/88-12/31/88, Role: Co-PI, with K. Krishnamurthy).
* "Ozark County Times Plant Layout Analysis," $500, Small Business Institute, UMR, 6/1/88-8/1/88.
* "Optimal Design of Mechanical Systems," $500, GM Foundation, 6/1/88-8/1/88.
* "Development of an Advisory Expert System for the Design of High-Speed Mechanisms," $940, Faculty Research Grant S&W, UMR, 5/15/89-6/30/89.
* "Experimental Study of Dynamic Systems Using High-Speed Camera and Digital Imaging Techniques," $35,000, Engineering Equipment Fund, Missouri, 1990.
* "Feature-Based Design Research," $912, Faculty Research Grant E&E, UMR, 5/15/90-8/31/90.
* "Feature-Based Design of Modular Fixturing," $5,000, School of Engineering, UMR, 5/15/90-8/31/90.
* "Development of Guidelines for Flexible Robotic Welding Cell," $980, Faculty Research Grant S&W, UMR, 5/15/90-8/31/90.
* "Computer Simulations of Mechanical Assemblies," $4,130, Graduate School, UMR, 5/15/91-6/30/91.
* "Computer-Aided Manufacturing Research," $3,065, Intelligent Systems Center, UMR, 5/15/91-6/30/91.
* "Development of Advanced Packaging Machinery," taper evident band packaging machine valued at $23,000, Benison & Co., LTD, Taiwan, 1992.
* "Course and Curriculum Development Innovation: Enhancing the Design Process Through Interactive Visualization," $5,198, with Bruce McMillin and Sally Prakash, Internal Awareness Committee of the Curriculum Task Force, UMR, 1994.
* “Fixture Design and Simulation for Automatic Sodering Process,” $500, Modine Heat Transfer, MO, 1995.
* “Equipment For A Low Cost Rapid Prototyping System,” $6,900, UMR, 1995.
* “Human-in the Loop: Fuzzy Logic Simulation Algorithm,” $500, John Deere, 1996.
* “Equipment To Setup A Virtual Prototyping System,” $9,800, UMR, with Wen Lu, 1997.
* “Development of A Virtual Manufacturing and Assembly Laboratory,” $34,000, General Motors/UMR, with Wen Lu, 1997.
* “Laser Applications in Fuel Cell Manufacturing,” $ 21,873, UTC Graduate Fellowship Grant, Missouri S&T, 9/2006-08/2007.
* “Fuel Cells Bi-Polar Plate Design and Manufacturing,” $23,448, UTC Graduate Fellowship Grant, Missouri S&T, 12/2010-1/2010.
* Newkirk, J. and Liou, F. “Recrystallization of Titanium Alloys using Laser Deposition,” Technology Acceleration Program (TAP), Office of Technology Transfer and Economic Development, S&T, $18,353, May 1, 2011 – April 30, 2012.

**PATENTS AND INVENTION DISCLOSURE**:

* Wei Li and Frank W. Liou. "Joining Metallurgically Incompatible Metals" U.S. Patents (2018), US20180161931A1, Available at: <http://works.bepress.com/frank-liou/272/>
* Joe Newkirk, Frank Liou, and Romy Francis, “Systems and methods for fabricating a direct metal deposition structure having fully forged structural qualities,” US 8617661 B2 (<http://www.google.com/patents/US8617661>), Dec. 31, 2013.
* Invention disclosure titled, "A Cost-Effective System for Micro and Nanofabrication" November, 2004.
* Provisional patent titled, "Direct Deposit Device and Method For Nanofabrication," (60/725,737) filed by the OTSP on Oct 12, 2005.

**PROFESSIONAL ACTIVITIES:**

* Advisory Committee, Solid Freeform Fabrication Symposium, 2005-present.
* Site review panelist, Served as a site review panelist for an AM engineering research center, funded by Science Foundation of Ireland, Ireland, March 9-11, 2020.
* Delegation member, US-Australia Additive Manufacturing Technical Exchange, Melbourne, Australia, December 3 - 6, 2018.
* Executive Committee, Consortium for Advanced Hybrid Manufacturing Integrating Technologies (CAM-IT), 2017.
* Executive Advisory Committee, ASME Advanced Design & Manufacturing Impact Forum, AM3D, Boston, MA, August 2 - 5, 2015.
* Member, International Advisory Committee, International Forum on Systems and Mechatronics Conference*,* 2013-2015.
* Member, Executive Advisory Committee (EAC), ASME Advanced Design & Manufacturing Impact Forum, 2013-2014.
* Chair*,* International Advisory Committee, 3rd International Forum on Systems and Mechatronics Conference*,* September 6-9, 2010, Singapore.
* Past Chair, ASME Design Automation Conference, 2009-2010.
* Chair, Honors and Awards Technical Subcommittee, ASME Design Automation Conference, 2009.
* Committee Chair, ASME Design Automation Conference, 2008-2009.
* Member, Honors and Awards Technical Subcommittee, ASME Design Automation Conference, 2008.
* Conference Chair, ASME Design Automation Conference, 2007-2008.
* International Advisory Committee Chair, International Forum on Systems and Mechatronics, 2007, December 3-6, 2007, NCKU, Tainan, Taiwan.
* Division Chair, Manufacturing Division, American Society for Engineering Education Conference, 2006-2007.
* Program Chair, ASME Design Automation Conference, 2006-2007.
* Member of Advisory Committee, Solid Freeform Fabrication Symposium, Austin, Texas, 2005-present.
* Special Sessions Chair, ASME Design Automation Conference, 2005-2006.
* Member of Executive Committee, ASME Design Automation Conference, 2005-2010.
* Program Chair, Manufacturing Division, American Society for Engineering Education Conference, 2005-2006.
* President, Midwest Chinese American Science and Technology Association (MCASTA), 2005-2007.
* Associate Program Chair, Manufacturing Division, American Society for Engineering Education Conference, 2004-2005.
* External Examiner to the University Science Malaysia for School of Mechanical Engineering, 2003-2004.
* Program co-Chair, Midwest Chinese American Science and Technology Conference, 2004.
* Assistant Program Chair, Manufacturing Division, American Society for Engineering Education Conference, 2003-2004.
* Section Coordinator, ASME Design Automation Conference, special session, “Rapid Prototyping and Manufacturing, ” 2002, 2003.
* Session Coordinator, Modern Engineering, Midwest Chinese-American Science and Technology Conference, 2002, 2003.
* Membership Chair, Manufacturing Division of the American Society for Engineering Education, 2002-2003.
* Honors and Awards Committee, ASME, Computers in Engineering Conference, 2000-01, and 2001-02.
* International Program Committee, Industrial Virtual Reality Symposium, November 1-2, 1999, University of Illinois at Chicago, Chicago, IL 1999.
* ASME 23rd Mechanisms Conference Arrangement Committee, 1994.
* Member of the Governing Board SAE St. Louis Chapter, 1989-1994.

Session Chaired/Co-Chaired:

* F. Liou, Chair a session on “Applications: Residual Stress,” at the 35th Solid Freeform Fabrication Symposium, Austin, Texas, August 11-14, 2024.
* F. Liou, Chair a session on “Process Development: Powder Bed Fusion II,” at the 35th Solid Freeform Fabrication Symposium, Austin, Texas, August 11-14, 2024.
* F. Liou, Chair a session on “Process Development: Directed Energy Deposition and Cold Spray,” at the 34th Solid Freeform Fabrication Symposium, Austin, Texas, August 13-16, 2023.
* F. Liou, Chair a session on “Materials: Metals - Copper and Other
* Metals,” at the 33th Solid Freeform Fabrication Symposium, Austin, Texas, July 25-27, 2022.
* F. Liou, Chair a session on “Materials -- Metals I - High Entropy Materials,” at the 32nd Solid Freeform Fabrication Symposium, Austin, Texas, Auguast 2-4, 2021.
* F. Liou, Chair a session on “Hybrid AM Processes,” at the 31st Solid Freeform Fabrication Symposium, Austin, Texas, Auguast 2-4, 2020.
* F. Liou, Chair a session on “Hybrid AM Processes,” at the 30th Solid Freeform Fabrication Symposium, Austin, Texas, August 12-14, 2019.
* F. Liou, Chair a session on “Hybrid AM Processes 2,” at the 29th Solid Freeform Fabrication Symposium, Austin, Texas, August 13-15, 2018.
* F. Liou, Chair a session on “Hybrid Processes II,” at the 28th Solid Freeform Fabrication Symposium, Austin, Texas, August 6-9, 2017.
* F. Liou, Chair a session on “Materials III: Ti-6Al-4V,” at the 27th Solid Freeform Fabrication Symposium, Austin, Texas, August 8-10, 2016.
* F. Liou, Chair a session on “Materials VII: Copper, Silicon, Nickel,” at the 26th Solid Freeform Fabrication Symposium, Austin, Texas, August 10-12, 2015.
* Chair a session on “Materials I – Lightweight Materials,” at the 25th Solid Freeform Fabrication Symposium, Austin, Texas, August 4, 2014.
* Chair a session on “Aerospace Special Track 1 – Validation Process of Additive Manufactured Parts,” at the ASME Advanced Design and Manufacturing Impact Forum, August 19, 2014, Buffalo, New York.
* Chair a session on “Aerospace Special Track 2 – Applications, Advancements & Reliability Developments,” at the ASME Advanced Design and Manufacturing Impact Forum, August 19, 2014, Buffalo, New York.
* Chaired a Session on “Materials II,” at the 24th Solid Freeform Fabrication Symposium, Austin, Texas, August 12-14, 2013.
* Chaired a panel session on (Panelists: Khershed Cooper, Al Salour, Robert B. Tilove, and A. Galip Ulsoy) on “Cyber-Enabled Manufacturing” at the ASME 2012 International Symposium on Flexible Automation (ISFA2012), June 18-20, 2012, St. Louis, MO, Paper ISFA2012-7124.
* Chaired a Special Session on “Design and Manufacturing Integration, Design for Layered Manufacturing**”** at the ASME 2010 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2010, August 15-18, 2010.
* Chaired a Special Session on “Direct Digital Manufacturing**”** at the ASME 2010 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2010, August 15-18, 2010.
* Chaired a Session on “Process Development**”** at the 21st Solid Freeform Fabrication Symposium, Austin, Texas, August 9-11, 2010.
* Chaired a Special Session on “Direct Digital Manufacturing**”** at the ASME 2009 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2009, August 30-September 2, 2009, San Diego, CA.
* Chaired a Session on “Process Development**”** at the *Twentieth Solid Freeform Fabrication Symposium,* Austin, Texas, August 3-5, 2009.
* Chaired a Special Session on “Direct Digital Manufacturing**”** at the *ASME 2008 International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, IDETC/CIE 2008,* August 3-6, 2008, Brooklyn, New York.
* Chaired a Session on “Process Development**”** at the *Eighteenth Solid Freeform Fabrication Symposium,* Austin, Texas, August 6-8, 2007.
* Chaired a Keynote Speech Session on “Sensing Rich Approaches to the Design and Operation of Mechatronic Systems (by Professor Masayoshi Tomizuka)**”** at the *International Forum on Systems and Mechatronics,* December 3-6, 2007*,* Tainan, Taiwan*.*
* Chaired a Session on “Mechatronics in Manufacturing” at the *International Forum on Systems and Mechatronics,* December 3-6, 2007*,* Tainan, Taiwan*.*
* Chaired a Session on “Technologies and material for rapid prototype machine,” at International Conference on Advanced Manufacturing Technology, November 26-30, 2007, Tainan, Taiwan.
* Chaired a Panel Session (Panelists: Mary E. Kinsella, Kevin Slattery, and Brent Stucker) on “Rapid Manufacturing Using Metal Additive Technologies: Applications, Challenges, and Directions**”** at the *2007 International Manufacturing Science And Engineering Conference,* October 15-17, 2007, Atlanta, Georgia.
* Chaired a Special Session on “Direct Digital Manufacturing**”** at the *ASME 2007 International Design Engineering Technical Conferences& Computers and Information in Engineering Conference IDETC/CIE 2007,* September 4-7, 2007, Las Vegas, Nevada*.*
* Chaired a Plenary Session on “Design**”** at the *2007 Seventeenth Solid Freeform Fabrication Symposium,* Austin, Texas, August 6-8, 2007.
* Chaired a Special Session on “Rapid Prototyping/Rapid Manufacturing**”** at the *2006 ASME Design Automation Conference,* Philadelphia, PA from September 11-13, 2006.
* Chaired a Session on “Process Development**”** at the *2006 Seventeenth Solid Freeform Fabrication Symposium,* Austin, Texas, August 14-16, 2006.
* Chaired a Session on “Virtual Reality and Rapid Prototyping**”** at the *2005 ASME Design Automation Conference,* Long Beach, CA, September 25-28, 2005.
* Chaired a Special Session on “Rapid Prototyping/Rapid Manufacturing**”** at the *2004 ASME Design Automation Conference,* Salt Lake City, Utah, September 28-October 2, 2004.
* Chaired a Special Session on “Rapid Prototyping/Rapid Manufacturing**”** at the *2003 ASME Design Automation Conference,* Chicago, Illinois, September 2-6, 2003.
* Chaired a Session on “Modern Engineering**”** at the *2003 the Midwest Chinese American Science and Technology Conference,* October 25, 2003.
* Chaired a Special Session on “Rapid Prototyping/Rapid Manufacturing**”** at the *2002 ASME Design Automation Conference,* Montreal, Canada*,* September 29-Oct. 2, 2002.
* Chaired a session “Design III” *at the ASEE Mid-west Session Conference*, Norman, OK, September 11-13, 2002.
* Co-Chaired a technical session “Modeling II” *at the Thirteenth Annual Solid Freeform Fabrication Symposium*, Austin, TX, August 5-7, 2002.
* Co-Chaired a technical session “CAD/CAM Extension II” *at Industrial Virtual Reality Symposium,* Chicago, IL, November 1999.
* Co-Chaired a technical session “Tolerance Analysis” *at the ASME Design Technical Conference,* Sacramento, CA, September 1997.
* Co-Chaired a technical session at the ASME Mechanisms Conference, Irvine, CA, August 21, 1996.
* Co-Chaired a technical session: "Elasto-Dynamics of Mechanisms," *at the ASME Mechanisms Conference*, Minneapolis, MN, September 12, 1994.
* Co-Chaired technical session "Computer Simulation", *at the ASME Computers in Engineering Conference*, San Diego, California, on August 8-12, 1993.
* Chaired technical session "Expert Systems for Manufacturing / Modeling", *at the Twenty-Second Midwestern Mechanics Conference*, Rolla, Missouri, October 6-9, 1991.
* Chaired technical session "Mechanical Systems/Mechanics", *at the Twenty-Second Midwestern Mechanics Conference*, Rolla, Missouri, October 6-9, 1991.
* Co-Chaired technical session "Dynamics of Flexible Mechanisms," *at 1990 ASME Mechanisms Conference*, Chicago, Illinois, September 16-19, 1990.
* Co-Chaired technical session "Expert Systems," *at First National Applied Mechanisms and Robotics Conference*, November 5-8, 1989, Cincinnati, Ohio.
* Chaired technical session "Dynamics and Control of Flexible Robot Arms," *at First International Applied Mechanical Systems Design Conference*, June 11-14, 1989, Nashville, Tennessee.

Reviewer for Technical Papers and Proposals

* Additive Manufacturing
* Solid Freeform Fabrication Symposium
* International Journal of Production Research
* SME Journal of Manufacturing Systems
* Journal of Vibration, Acoustics, Stress, and Reliability in Design
* Mechanisms and Machine Theory
* Journal of Sound and Vibration
* ASME Journal of Mechanical Design
* ASME Mechanisms Conference
* ASME Design for Manufacturing Conference
* ASME Computer in Engineering Conference
* ASME Design Automation Conference
* Artificial Neural Networks in Engineering
* Research Board, University of Missouri
* National Science Foundation
* Army Research Office
* Department of Energy
* National Nuclear Security Administration
* Flanders Innovation & Entrepreneurship
* Canada Foundation for Innovation
* European Research Council
* Mitacs, Canada
* Etc.

**THESES/DISSERTATION SUPERVISION**: (Major Advisor)

Ph.D. students supervised: 56 (10 in progress)

MS students (thesis) supervised: 63 (1 in progress)

Undergraduate students sponsored: Over 200

**COURSES TAUGHT:**

* Missouri University of Science and Technology: (1987-present)

 Undergraduate Level:

* + Machine Design I
	+ Automatic Control of Mechanical Systems
	+ Linear Systems in Mechanical Engineering
	+ Machine Dynamics
	+ Analysis and Synthesis in Engineering Design

 Graduate Level:

* + Synthesis of Mechanisms
	+ Concurrent Engineering I
	+ Concurrent Engineering II
	+ Rapid Product Design and Optimization
	+ Integrated Product Development
	+ Manufacturing Automation
	+ Advanced Topics in Design and Manufacturing

**COURSES DEVELOPED:**

* ME 5708 Rapid Product Design and Optimization
* ME 5758 Integrated Product Development
* ME 6659 Advanced Topics in Design and Manufacturing

**LABORATORY DEVELOPMENT:**

* Agile Manufacturing and Automatic Inspection Laboratory (AMAIL Lab.), Intelligent Systems Center.
* Laser Aided Manufacturing Processes (LAMP) Laboratory.

**UNIVERSITY SERVICES:**

* Director, Manufacturing Engineering program, Missouri S&T, 1998-present.
* Coordinator, Intelligent Manufacturing Processes, Equipment, and Systems (IMPES) Research Area, Intelligent Systems, 1998-2021.
* Tenure and Promotion Committee, Mechanical and Aerospace Engineering, Missouri S&T, 1999-present.
* Personnel Standing Committee, Faculty Senate, Missouri S&T, 2011-present.
* Tenure and Promotion Committee, Engineering Management and Systems Engineering, Missouri S&T, 2010.
* Tenure and Promotion Committee, Interdisciplinary Engineering, UMR, 2007.
* Tenure and Promotion Committee, Business Administration, UMR, 2007.
* Tenure and Promotion Committee, Mechanical and Aerospace Engineering, UMR, 2007.
* UMR Vice Provost for Academic Affair Search Committee, 2007.
* Chair, Tenure and Promotion Committee, ME, AE, and EM Department, UMR, 2001-2005.
* Chair, Space Allocation Committee, Mechanical and Aerospace Engineering, UMR, 2001-present.
* Graduate Council, S&T, 2001-present.
* Chair, Search Committee, Virtual Manufacturing and Rapid Product Realization Faculty Position, UMR, 1998-99.
* Chair, Executive Committee, Manufacturing Education Program, S&T, 1998-present.
* North Central Association Accreditation Committee, UMR Campus Committee, 1998- 99.
* Manufacturing Processes Emphasis Area Committee, MAE Department, S&T, 1996-Present.
* Chair, Mechanics and Systems Design Technical Committee, ME, AE, and EM Department, 1996-98.
* Curricula, Admissions & Acad. Standards Committee, School of Engineering, UMR, 1997.
* Curriculum Committee, ME, AE, and EM Department, UMR, 1996-98.
* Advisory Committee, ME, AE, and EM Department, 1996-97.
* Co-Coordinator, ISC Open House, UMR, 1996, 1998.
* Coordinator, Intelligent Manufacturing Systems Research Group, Intelligent Systems Center, University of Missouri-Rolla, 1993-present.
* Coordinator, Agile Manufacturing and Automated Inspection Laboratory, Intelligent Systems Center, University of Missouri-Rolla, 1993-2000.
* Laboratory Committee, ME, AE, and EM Department, University of Missouri-Rolla, 1993-1994.
* Manufacturing Education Task Force Committee, University of Missouri-Rolla, 1993.
* Vibration Laboratory Coordinator, ME, AE, & EM Department, University of Missouri-Rolla, taking charge of major equipment such as high-speed camera and digitizing system, HP modal testing set, etc., 1990-1994.
* Faculty Advisor to SAE Formula Car Project, University of Missouri-Rolla, 1989-1991, won the 3rd place out of 52 teams overall in 1990.
* Faculty Advisor to Society of Automotive Engineers, University of Missouri-Rolla, 1989-1994.
* Member of the Governing Board SAE St. Louis Chapter, 1989-1991.
* Faculty Recruitment Committee, ME, AE, and EM Department, University of Missouri-Rolla, 1988-1991.
* Graduate Faculty Member, 1987-present, Missouri S&T
* Design and Manufacturing Committee (Department, 1987-present), Missouri S&T