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, Interdisciplinary Manufacturing Engineering Program
Missouri University of Science and Technology (MS&T, formerly University of Missouri-Rolla)

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EDUCATION:

Ph.D., M.E.	University of Minnesota, July 1987. Dissertation: "*Dynamic Analysis of High-Speed Mechanisms with Elastic Members*" Advisor: Professor Arthur G. Erdman
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), Novel AM process development and process planning, Rapid prototyping, Multiscale multiphysics AM process modeling, Remanufacturing automation, AM process monitoring and control, Digital materials processing

WORK EXPERIENCE:
- Michael and Joyce Bytnar Product Innovation and Creativity Professor, Mechanical Engineering, 2011-present, MS&T
- Interim Director, Intelligent Systems Center (ISC), MS&T, Feb-June 2019
- 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.
- Faculty Research Investigator, Energy Research and Development Center (ERDC), 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:

- Fellow, Society of Manufacturing Engineers (FSME), 2021.
- 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, 2010, River View Hotel, Singapore).
- Rapid Prototyping Journal Best Paper Award (poster presentation), 21st Solid Freeform Fabrication Symposium, (with Shyam Barua and T. Sparks) Austin, Texas, 2010.
- Top 10 Most Downloaded Articles -- April 2010, ASME Digital Library: Journal of Manufacturing Science and Engineering (with Lan Ren, Todd Sparks, and Jianzhong Ruan).
- 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

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.

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

Articles in Refereed Journals and Chapters in Books:

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, and O. 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.

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28. 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.
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32. 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.
33. 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.
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35. 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.
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38. 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).
39. 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.

40. 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.
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44. 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.
45. 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.
46. 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.
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53. 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, 13 pages.

54. Shenoy, Amogh and Frank Liou, "Microwire Feeder for Laser Applications," Biomedical Engineering Research (BER), DOI:10.5963/BER0202006, pp.96-107, 2013.
55. 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.
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59. Newkirk, Joseph W, and Frank Liou "High Performance Materials by Laser Deposition," Materials Science Forum Vols. 783-786 (2014) pp 2365-2369.
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64. 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.
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