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EDUCATION

PhD Mechanical Engineering, University of Wisconsin-Madison, 1988
MS Mechanical Engineering, University of Wisconsin-Madison, 1984
BE with honors Mechanical Engineering, Shanghai Jiao Tong University, China, 1982

ACADEMIC POSITIONS

1994-Current Professor (2001-Current), Department Chair (2005-2011), Associate
 Professor (1994-2001)
 Department of Mechanical Engineering, Columbia University
1989-1994 Senior Lecturer (1991-1994)
 Lecturer (1989-1991), Wollongong Campus
 School of Mechanical and Manufacturing Engineering
 University of New South Wales, Sydney, Australia
1983-1987 Graduate Research and Teaching Assistant
(1986-1987) (Teaching Fellow, various periods)
 Department of Mechanical Engineering, University of Wisconsin-Madison
2011-2012 Fulbright Scholar, Industrial Laser Research Center, University of Vigo,
 Spain
1991-1992 Visiting Research Fellow, Department of Mechanical Engineering and
 Applied Mechanics, University of Michigan, Ann Arbor

HONORS AND AWARDS

- Outstanding Paper Award, “Effect of Geometrical Modeling on Prediction of Laser-Induced Heat Transfer in Metal Foam,” co-authored with Bucher, T., Bolger, C., Zhang, M., Chen, C.J., 44th North American Manufacturing Research Conference, Blacksburg, VA, June 2016.
- Milton C. Shaw Manufacturing Research Medal, ASME, June 2015.
- Outstanding Paper Award, NAMRI/SME, “Effect of Deep Penetration of Interleaf on Delamination Resistance in GFRP,” co-authored with Bian, D., Bucher, T., and Tan, H., June 2015.
- NAMRI/SME Outstanding Lifetime Service Award, June 2015.

- Dedicated Service Award, American Society of Mechanical Engineers (ASME), Manufacturing Engineering Division, June 2014.
- Fulbright Scholar, Senior Researcher Award, Fall 2011.
- Faculty Excellence Award, School of Engineering and Applied Science, Columbia University, April 2010.
- Janette and Armen Avanesians Diversity Award, School of Engineering and Applied Science, Columbia University, May 2009.
- Elected Fellow, Society of Manufacturing Engineers (SME), 2008.
- 3rd Place Award, Student Paper Contest, "Pre-heated Substrate Effects on Melt-mediated Laser Crystallization on NiTi Thin Films" by Birnbaum, A., Chung, U.-J., Huang, X., Im, J.S., Ramirez A.G., Yao, Y.L., at 26th *Int. Congress on Applications of Lasers and Electro-Optics (ICALEO '08): Conf. on Laser Microprocessing*, Temecula, CA, Oct. 2008, pp. 332-341.
- Visiting Committee, Department of Scientific Research, Metropolitan Museum of Art, New York, NY, 2006 -
- Blackall Award, American Society of Mechanical Engineers (ASME), 2006.
- Elected Fellow, American Society of Mechanical Engineers, 2006.
- Elected Fellow, Laser Institute of America, 2004.
- 1st Place Award, Student Paper Contest, "Spatially Resolved Characterization of Residual Stress Induced by Micro Scale Laser Shock Peening," by Chen, H., Yao, Y. L., and Kysar, J., at 21st *Int. Congress on Applications of Lasers and Electro-Optics (ICALEO '03): Conf. on Laser Materials Processing*, Jacksonville, FL, Oct. 2003.
- Best Paper Award "Advances in Micro-scale Laser Shock Peening," *the 5th Int. Conf. on Frontiers in Design and Manufacturing*, Dalian, China, July 2002.
- Outstanding Paper Award "Convex laser forming with high certainty," *North American Manufacturing Research Conference*, Lexington, KY, May 2000.
- Sigma Xi Honor Society.

PROFESSIONAL MEMBERSHIP, SERVICE AND HONORS

- **American Society of Mechanical Engineers (ASME)**
 - Fellow
 - Editor, *Journal of Manufacturing Science and Engineering*
 - Past Chair, Manufacturing Engineering Division
- **Society of Manufacturing Engineers (SME)**
 - Fellow

- Past President, past Scientific Committee member, North American Manufacturing Research Institution (NAMRI/SME).
- Past Associate Editor, *Journal of Manufacturing Systems* and *Journal of Manufacturing Processes*.
- **Laser Institute of America (LIA)**
 - Fellow
 - Past Board of Directors
 - Past chair of Laser Materials Processing Conferences of ICALEO
- **Machines: Machinery and Automation**
 - Member, Editorial Advisory Board

RESEARCH INTEREST

- Manufacturing and design, nontraditional manufacturing, laser materials processing, laser assisted material removal, shaping, and surface modification, laser applications in industry and art restoration, robotics in industry and health care industry.

PATENTS

- Simulator and Optimizer for Laser Cutting Process, US patent #5,854,751, with Paul Di Pietro, 1998.
- Methods and systems for identifying and localizing objects based on features of the objects that are mapped to a vector. US patent #7,958,063, with Xi Long, and W Louis Cleveland, issued June 2011.
- Garty G., Brenner D.J., Randers-Pehrson G., Yao Y.L., Simaan N., Salerno A., Bhatla A., Zhang J., Lyulko O.V., Dutta A., Systems and Methods for High Throughput Radiation Biodosimetry. US Patent No. 7,822,249, issued October 26, 2010.
- Zhang J., Salerno A., Simaan N., Yao Y.L., Randers-Pehrson G., Garty G., Dutta A., Brenner D.J., Systems and Methods for Robotic Transport, US patent 7,787,681, issued August 31, 2010.

JOURNAL PUBLICATIONS

1. Yao, Y. L., and Wu, S. M., "Development of An Adaptive Position/Force Controller for Robot-Automated Composite Tape-layering," *ASME Trans. J. of Engineering for Industry*, Vol. 115, No. 3, 1993, pp. 352-358.
2. Yao, Y. L., and Wu, S. M., "Recursive Calibration of Industrial Manipulators by Adaptive Filtering," *ASME Trans. J. of Engineering for Industry*, Vol. 117, No. 3, 1995, pp. 406-411.
3. Yao, Y. L., Fang, X. D., and Arndt, G., "Comprehensive Tool Wear Estimation in Finish-Machining via Multivariate Time-Series Analysis of 3-D Cutting Forces," *Annals of CIRP (Int. Federation of Production Research)*, Vol. 39, No. 1, 1990, pp. 57-60.

4. Fang, X. D., Yao, Y. L., and Arndt, G., "Monitoring Groove Wear Development via Stochastic Modeling and Analysis of 3-D Vibration," *Wear*, Elsevier Scientific, Vol. 151, 1991, pp. 143-156.
5. Yao, Y. L., "Transient Lateral Motion of Robots in Cylindrical Part Mating," *Robotics and Computer-Integrated Manufacturing, Int. J.*, Pergamon, Vol. 8, No. 2, 1991, pp. 103-111.
6. Yao, Y. L., Fang, X. D., and Arndt, G., "On-line Estimation of Groove Wear in the Minor Cutting Edge for Finish-Machining" *Annals of CIRP (Int. Federation of Production Research)*, Vol. 40, No. 1, 1991, pp. 41-44.
7. Yao, Y. L., and Fang, X. D., "Modeling of Multivariate Time Series for Tool Wear Estimation in Finish-Machining," *Int. J. Machine Tools & Manufacture*, Pergamon, Vol. 32, No. 4, 1992, pp. 495-508.
8. Weston, K. C. and Yao, Y. L., "Integrating Robotics and Solid Modeling in a Sophomore Design Project," *ASEE Journal Computers in Education*, Vol. 9, No. 4, 1989, pp. 64-70.
9. Yao, Y. L., and Mohd Yusoff, M. R., "A CAD Based Error Mapping and Layout Facility for Precision Robotic Operations," *Robotics and Computer-Integrated Manufacturing, Int. J.*, Pergamon, Vol. 9, No. 6, 1992, pp. 505-511.
10. Yao, Y. L., and Fang, X. D., "Assessment of Chip Forming Patterns with Tool Wear Progression in Machining via Neural Networks," *Int. J. Machine Tools & Manufacture*, Pergamon, Vol. 33, No. 1, 1993, pp. 89-102.
11. Yao, Y. L., Korayem, M. H., and Basu, A., "Maximum Allowable Load of Flexible Manipulators for Given Dynamic Trajectory," *Robotics and Computer-Integrated Manufacturing, Int. J.*, Pergamon, Vol. 10, No. 4, 1993, pp. 301-309.
12. Di Pietro, P., and Yao, Y. L., "An Investigation into Characterizing and Optimizing Laser Cutting Quality - A Review," *Int. J. Machine Tools & Manufacture*, Pergamon, Vol. 34, No. 3, 1994, pp. 225-243.
13. Korayem, M. H., Yao, Y. L., and Basu, A., "Application of Symbolic Manipulation to Inverse Dynamics and Kinematics of Elastic Robots," *Int. J. Advanced Manufacturing Technology*, Springer-Verlag, Vol. 9, No. 5, 1994, pp. 343-350.
14. Di Pietro, P., and Yao, Y. L., "Effects of Workpiece Boundary and Motion on Laser Cutting Front Phenomena," *J. Materials Processing Technology*, Elsevier Scientific, Vol. 44, 1994, pp. 237-245.
15. Di Pietro, P., and Yao, Y. L., "A Numerical Investigation into Cutting Front Mobility in CO₂ laser Cutting," *Int. J. Machine Tools & Manufacture*, Pergamon, Vol. 35, No. 5, 1995, pp. 673-688.
16. Di Pietro, P., and Yao, Y. L., "A New Technique to Characterize and Predict Laser Cut Striations," *Int. J. Machine Tools & Manufacture*, Pergamon, Vol. 35, No. 7, 1995, pp. 993-1002.
17. Fang, X. D., and Yao, Y. L., "Appropriate Introduction of Computer Control to Mechanical Engineering Students," *Int. J. of Mechanical Engineering Education*, Vol. 23, No. 4, 1995, pp. 273-284.

18. Fang, X. D., and Yao, Y. L., "In-Process Evaluation of Overall Machining Performance via a Single Data Source," *ASME Trans. J. of Manufacturing Science and Engineering*, Vol. 119, No. 3, 1997, pp. 444-447.
19. Di Pietro, P., and Yao, Y. L., "Improving Laser Cutting Quality for Two-Dimensional Contoured Paths," *ASME Trans. J. of Manufacturing Science and Engineering*, Vol. 120, No. 3, 1998, pp. 590-599.
20. Soltz, M., Yao, Y. L., and Ish-Shalom, J., "Investigation of a 2-D Planar Motor Based Machine Tool Motion System," *Int. J. Machine Tools & Manufacture*, Pergamon, Vol. 39, 1999, pp. 1157-1169.
21. Huang, Z., and Yao, Y. L., "Extension of Usable Workspace of Rotational Axes in Robot Planning," *Robotica*, Cambridge Univ. Press, Vol. 17, 1999, pp. 293-301.
22. Huang, Z., and Yao, Y. L., "A New Closed-Form Kinematics of the Generalized 3-DOF Spherical Parallel Manipulator," *Robotica*, Cambridge Univ. Press, Vol. 17, 1999, pp. 475-485.
23. Chen, K., and Yao, Y. L., "Striation Formation and Melt Removal in Laser Cutting Process," *J. Manufacturing Processes*, Society of Manufacturing Engineers, Vol. 1, No. 1, 1999, pp. 43-53.
24. Yao, Y. L., and Cheng, W., "Model based Motion Planning of Robot Assembly of Non-Cylindrical Parts," *Int. J. Advanced Manufacturing Technology*, Springer-Verlag, Vol. 15, 1999, pp. 683-691.
25. Chen, K., Yao, Y. L., and Modi, V., "Numerical Simulation of Oxidation Effects in Laser Cutting Process," *Int. J. Advanced Manufacturing Technology*, Springer-Verlag, Vol. 15, 1999, pp. 835-842.
26. Di Pietro, P., Yao, Y. L., and Jeromin, A., "Quality Optimization for Laser Machining under Transient Conditions," *J. Materials Processing Technology*, Elsevier Scientific, Vol. 97, 2000, pp. 158-167.
27. Chen, K., and Yao, Y. L., "Process Optimization of Pulsed Laser Micromachining with Applications in Medical Device Manufacturing," *Int. J. Advanced Manufacturing Technology*, Springer-Verlag, Vol. 16, 2000, pp.243-249.
28. Chen, K., and Yao, Y. L., "Interactive Effects of Reactivity and Melt Flow in Laser Machining," *Int. J. High Temperature Material Processes, Special Issue on Laser Materials Processing*, edited by Yao, Y. L., invited paper, Vol. 4, No.2, 2000, pp.227-252.
29. Li, W., Bao, J., and Yao, Y. L., "Dimensional Characteristics and Mechanical Properties of Laser-Formed Parts," *Int. J. High Temperature Material Processes, Special Issue on Laser Materials Processing*, edited by Yao, Y. L., invited paper, Vol. 4, No.2, 2000, pp.253-290.
30. Chen, K., Yao, Y. L., and Modi, V., "Gas Jet - Workpiece Interactions in Laser Machining," *ASME Trans. J. of Manufacturing Science and Engineering*, Vol. 122, No. 3, 2000, pp. 429-438.
31. Li, W., and Yao, Y. L., "Numerical and Experimental Study of Strain Rate Effects in Laser Forming," *ASME Trans. J. of Manufacturing Science and Engineering*, Vol. 122, No. 3, 2000, pp. 445-451.

32. Abdul Majid, M. Z., Huang, Z., and Yao, Y. L., "Workspace Analysis of a Six-DOF, Three-PPSR Parallel Manipulator," *Int. J. Advanced Manufacturing Technology*, Pergamon, Vol. 16, 2000, pp. 441-449.
33. Li, W., and Yao, Y. L., "Laser Forming with Constant Line Energy," *Int. J. Advanced Manufacturing Technology*, Pergamon, Vol. 17, 2001, pp. 196-203.
34. Bao, J., and Yao, Y. L., "Analysis and Prediction of Edge Effects in Laser Bending," *ASME Trans. J. of Manufacturing Science and Engineering*, Vol. 123, No. 1, 2001, pp. 53-61.
35. Chen, K., Yao, Y. L., and Modi, V., "Gas Dynamic Effects on Laser Cutting Quality," *SME J. of Manufacturing Processes*, Vol. 3, No. 1, 2001, pp. 38-49.
36. Cheng, J., and Yao, Y. L., "Cooling Effects in Multiscan Laser Forming," *SME J. of Manufacturing Processes*, Vol.3, No.1, 2001, pp. 60-72.
37. Li, W., and Yao, Y. L., "Laser Bending of Tubes: Mechanism, Analysis, and Prediction," *ASME Trans. J. of Manufacturing Science and Engineering*, Vol. 123, No. 4, 2001, pp. 674-681.
38. Zhang, W., Yao, Y. L., and Chen, K., "Modeling and Analysis of UV Laser Micromachining of Copper," *Int. J. Advanced Manufacturing Technology*, Pergamon, Vol. 18, 2001, pp.323-331.
39. Lu, X., Yao, Y. L., and Chen, K., "A Low Diffraction Laser Beam as Applied to Polymer Ablation," *J. of Laser Applications*, Laser Institute of America, Vol. 13, No. 5, 2001, pp.209-217.
40. Li, W., and Yao, Y. L., "Numerical and Experimental Investigation of Convex Laser Forming Process," *SME J. of Manufacturing Processes*, Vol. 3, No.2, 2001, pp. 73-81.
41. Zhang, W., and Yao, Y. L., "Micro-scale Laser Shock Processing: Modeling, Testing, and Microstructure Characterization," *SME J. of Manufacturing Processes*, Vol. 3, No.2, 2001, pp. 128-143.
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44. Cheng, J., and Yao, Y. L., "Microstructure Integrated Modeling of Multiscan Laser Forming," *ASME Trans. J. of Manufacturing Science and Engineering*, Vol. 124, No. 2, May 2002, pp. 379-388.
45. Liu, C., and Yao, Y. L., "Optimal and Robust Design of Laser Forming Process," *SME J. of Manufacturing Processes*, Vol. 4, No.1, 2002, pp. 52-66.
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47. Zhang, W., Yao, Y. L., and I. C. Noyan, "Microscale Laser Shock Peening of Thin Films, Part I: Experiment, Modeling and Simulation," *ASME Trans. J. of Manufacturing Science and Engineering*, Vol. 126, No. 1, Feb 2004, pp. 10-17.
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49. Cheng, J., and Yao, Y. L., "Process Design of Laser Forming for Three Dimensional Thin Plates," *ASME Trans. J. of Manufacturing Science and Engineering*, Vol. 126, No. 2, May 2004, pp.217-225.
50. Chen, H., Yao, Y. L., and Kysar, J., "Spatially Resolved Characterization of Residual Stress Induced by Micro Scale Laser Shock Peening," *ASME Trans. J. of Manufacturing Science and Engineering*, Vol. 126, No. 2, May 2004, pp.226-236.
51. Cheng, J., and Yao, Y. L., "Process Synthesis of Laser Forming by Genetic Algorithms," *Int. J. of Machine Tools and Manufacture, UK*, Vol. 44, No.15, 2004, pp.1619-1628.
52. Chen, H. and Yao, Y. L., "Modeling Schemes, Transiency, and Strain Measurement for Microscale Laser Shock Processing," *SME J. of Manufacturing Processes*, Vol.6, No.2, 2004, pp.155-169.
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57. Chen, H., Yao, Y. L., Kysar, J. W., Noyan, I. C., and Wang, Y., "Fourier Analysis of X-ray Microdiffraction Profiles to Characterize Laser Shock Peened Metals," *Int. J. of Solids and Structures*, Vol. 42, 2005, pp.3471-3485.
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62. Fan, Y., Yang, Z., Cheng, P., Eglund, K., Yao, Y. L., "Effects of Phase Transformations on Laser Forming of Ti-6Al-4V Alloy," *J. Applied Physics*, Vol. 98, Issue 1, 013518, 1 July 2005, 10 pages.
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65. Long, X., Cleveland, W. L., and Yao, Y. L., "Effective Automatic Recognition of Cultured Cells in Bright Field Images Using Fisher's Linear Discriminant Preprocessing," *Image and Vision Computing*, Vol. 23, 2005, pp.1203-1213.
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