

## Curriculum Vitae

MING C. LEU

### 1. PRESENT POSITION AND CONTACT INFORMATION

Keith and Pat Bailey Distinguished Professor  
Director, Intelligent Systems Center  
320 Engineering Research Laboratory  
Missouri University of Science and Technology  
Rolla, MO 65409-0050  
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### 2. EDUCATION

Ph.D. in Mechanical Engineering, 1981, University of California, Berkeley, CA.  
M.S. in Mechanical Engineering, 1977, Pennsylvania State University, University  
Park, PA.  
B.S. in Mechanical Engineering, 1972, National Taiwan University, Taipei,  
Taiwan.

### 3. RESEARCH INTEREST

Additive Manufacturing, Rapid Prototyping, CAD/CAM, Robotics, Machine  
dynamics and Control, Modeling and Simulation, Design and Manufacturing  
Automation, Virtual and Augmented Reality.

### 4. EXPERIENCE

#### 4a. Employment

10/03-present **Director, Intelligent Systems Center (ISC)**

Missouri University of Science and Technology. Directing the  
research activities of this state-funded center so as to integrate the  
knowledge and expertise of faculty investigators from different  
academic departments to build cross-disciplinary research teams,  
with the objectives to attract more external research funding and to  
generate greater research impacts. Developed five research thrust  
areas and identifying critical and emerging research topics for these  
areas: Intelligent Manufacturing Processes, Equipment and Systems;  
Intelligent Cyber Physical Systems; Advanced Simulation, Sensing,

Control and Communication; Computational Intelligence and Embedded Systems; and Cyber Security and Trustworthiness. Creating a stimulating academic environment for nurturing of junior faculty and training of graduate students.

- 8/99-present **Keith and Pat Bailey Distinguished Professor**  
Department of Mechanical and Aerospace Engineering, Missouri University of Science and Technology. Teaching and research in the area of integrated product development with emphasis on additive manufacturing, rapid prototyping, CAD/CAM, virtual reality, and mechatronics. Developing laboratory facilities and project activities for research and education. Mentoring students, post-docs, and junior faculty.
- 5/04-5/2016 **Director, Center for Aerospace Manufacturing Technologies (CAMT)**  
Missouri University of Science and Technology. Founded CAMT in 2004 with Boeing as the main industrial partner and initial funding from U.S. Air Force Research Laboratory. Directing and managing this center's research activities. Developing industry and government partnerships, technology transition paths, and future research directions. Established CAMT Industrial Consortium in 2007 aimed at research, development and transitioning of advanced manufacturing technologies to the aerospace manufacturing supply chain.
- 9/96-8/99 **Program Director, Manufacturing Machines and Equipment**  
National Science Foundation. Directing and managing fundamental research activities for support of academic researchers leading to the development of novel manufacturing processes and next-generation machines and equipment. Reviewing proposals for funding and monitoring progress of funded projects. Identifying critical and emerging research topics for future program activities. Coordinating with other federal agencies. Promoting NSF funded research and university-industry collaboration.
- 7/87-8/99 **New Jersey State Chair Professor in Manufacturing Productivity**  
Department of Mechanical Engineering, New Jersey Institute of Technology. Establishing a program of excellence in robotics, rapid prototyping, and intelligent manufacturing. Teaching and research on CAD/CAM, robotics, rapid prototyping, intelligent manufacturing, and control systems. Developing teaching and research laboratories and project activities. Mentoring students, post-docs, and junior faculty.

- 8/81-6/87      **Assistant Professor**  
Sibley School of Mechanical and Aerospace Engineering, Cornell University. Teaching robotics, manufacturing processes, system dynamics, and microprocessor applications. Research in robotics, CAD/CAM, optimal design, automatic control, and electromechanical systems.
- 1/78-8/81      **Research Assistant**  
Dynamic Stability Laboratory, Department of Mechanical Engineering, University of California, Berkeley. Research on mechanisms of vibration and noise generation in rotating cutters.
- 9/77-12/77     **Teaching Assistant**  
Department of Mechanical Engineering, University of California, Berkeley. Assistance in teaching mechanical design.
- 4/77-8/77      **Research Assistant**  
Applied Research Laboratory, Pennsylvania State University. Research on reduction of plate vibration and force transmission by use of stiffening ribs and damping layers.
- 9/75-3/77      **Research Assistant**  
Pennsylvania Transportation Institute, Pennsylvania State University. Research on effects of pavement texture on tire skid friction.
- 9/74-8/75      **Teaching Assistant**  
Department of Mechanical Engineering, National Taiwan University. Assistance in teaching machine design and strength of materials.

#### **4b. Other Experiences**

Visiting Professor, Nanyang Technological University, Singapore, 7/16-8/16.  
 Visiting Professor, Xi'an Jiaotong University, Xi'an, China, 6/10-7/10.  
 Visiting Professor, National Taiwan University, Taipei, Taiwan, 9/93-8/94.  
 Visiting Professor, University of Natal, Durban, South Africa, 7/93-8/93.  
 Consulting Experience: MoSci Corp., O'Fallon Casting, MetaStable Instruments, Siemens, Moog, Ford Motor, AT&T, Universal Instruments, Teltech, MARCO (Canada), and MIRL/ITRI (Taiwan).

### **5. HONORS AND AWARDS**

University of Missouri President's Award for Leadership, 2017, for having provided exemplary leadership to the University of Missouri System.

ASME Blackall Machine Tool and Gage Award, 2014, for the most outstanding paper published in the ASME's Journal of Manufacturing Science and Engineering during the preceding two years.

ISFA (International Symposium on Flexible Automation) Hideo Hanafusa Outstanding Investigator Award, 2008, for significant contributions to the field of flexible automation.

MCASTA Outstanding Scholar Award, 2006, for outstanding scholarly accomplishments among Chinese Americans in the Mid-West America.

ASME Dedicated Service Award, 2004, for unusual dedicated voluntary service to the American Society of Mechanical Engineers.

AMAE Research Excellence Award, 2001 & 2004, for outstanding research among the faculty of Missouri S&T's Department of Mechanical and Aerospace Engineering.

Missouri S&T Keith and Pat Bailey Distinguished Professorship, 1999-present, endowed professorship for leading Missouri S&T's research and education efforts in integrated product development and manufacturing.

NJIT New Jersey Chair Professorship, 1987-1999, NJ state-funded professorship for leading NJIT's manufacturing research programs.

CASA/SME University Lead Award, 1994, in recognition of the leadership and excellence of a university team in the application and development of integrated manufacturing.

AT&T Industrial Ecology Faculty Fellowship, 1994, for study of industrial ecology as a driving force for research, curriculum, and public policy change.

NJIT Harlan J. Perlis Research Award, 1993, for the most outstanding research performance among the university's faculty.

NSF Presidential Young Investigator Award, 1985, in recognition of ability and potential for contributing to the scientific and engineering effort of the United States.

SAE Ralph R. Teetor Education Award, 1985, in recognition of contributions to research, teaching, and student development.

FPRS Wood Award, 1981, for the second best paper in the field of wood science and technology.

Earle C. Anthony Scholarship, 1977-80, for excellent academic standing at the University of California-Berkeley.

South Sea Textile Inc. Fellowship, 1970-72, for the highest academic standing among all applicants from the National Taiwan University.

Fellow of CIRP (The International Academy of Production Engineering), elected 2008.

Fellow of ASME, elected 1993.

Member of Sigma Xi, Tau Beta Pi, and Phi Kappa Phi honor societies.

Listing in Who's Who in the World, Who's Who in America, Who's Who in the East, Who's Who in Science and Engineering, Who's Who in Technology Today, Who's Who in American Education, Who's Who of Emerging Leaders in America, Who's Who Among Executives and Professionals, etc.

## 6. PROFESSIONAL SERVICE ACTIVITIES

### 6a. Society Services

Editorial Board Member, Journal of Virtual and Physical Prototyping, 2005-present.

Editorial Board Member, CIRP Journal of Manufacturing Science and Technology, 2009-present.

Editorial Board Member, International Journal of Manufacturing Engineering, 2012-present.

Editorial Board Member, Journal of Systems Integration, 1990-2000.

Advisory Committee Member, Solid Freeform Fabrication Symposium, 2009-present.

Co-Organizer and Co-Chair, NSF CAREER Proposal Writing Workshop, 2016.

Advisory Committee Co-Chair, ASME/ISCIE International Symposium on Flexible Automation, 2014.

Co-Organizer and Co-Chair, NSF Workshop on Frontiers of Additive Manufacturing Research and Education, 2013.

Member of Scientific Committee, International Symposium on Electromachining (ISEM), 2013.

Member of Scientific Committee, CIRP Conference on Manufacturing Systems, 2013.

Conference Chair, ASME/ISCIE International Symposium on Flexible Automation, 2012.

Conference Co-Chair, ASME/ISCIE International Symposium on Flexible Automation, 2010.

Co-Organizer and Co-Chair, NSF Workshop on Roadmap for Additive Manufacturing: Identifying the Future of Freeform Processing, 2009.

Organizer and Chair, 2<sup>nd</sup> Aerospace Manufacturing Technologies Conference, 2009.

Organizer and Chair, 1<sup>st</sup> Aerospace Manufacturing Technologies Conference, 2008.

Member of Organizing/Program/Advisory Committee, ASME/ISCIE International Symposium on Flexible Automation, 1988, 1990, 1996, 1998, 2000, 2002, and 2008.

Organizer and Chair, 2006 NSF Design, Service and Manufacturing Research and Grantees Conference.

General Chair, ASME International Mechanical Engineering Conference, 2006.

Advisory Committee Co-Chair, ASME/ISCIE International Symposium on Flexible Automation, 2006.

Technical Program Chair, ASME International Mechanical Engineering Conference, 2005.

Advisory Committee Chair, ASME/ISCIE International Symposium on Flexible Automation, 2004.

Vice President-Manufacturing, ASME, 1999-2002.

Representative of ASME Manufacturing Technical Group to the ASME Engineering and Global Technologies Committee, 1995-1998.

Organizer, Chair, and Proceedings Editor, Symposium on University-Industry-Government Cooperative Research, National Taiwan University, 1994.

Conference Co-Chair, ASME/ISCIE International Symposium on Flexible Automation, 1994.

Co-organizer, Co-Chair, and Proceedings Co-editor, Symposium on Computer-Controlled Machines for Manufacturing, ASME Winter Annual Meeting, 1993.

Program Chair, ASME/ISCIE International Symposium on Flexible Automation, 1992.

Chair, ASME Manufacturing Engineering Division, 1989-1990.

Executive Committee Member, ASME Manufacturing Engineering Division, 1986-1990.

Organizer, Chair, and Proceedings Editor, Symposium on Advanced Manufacturing, New Jersey Institute of Technology, 1990.

Vice Chair, IEEE International Conference on Systems Integration, 1990.

Co-organizer, Co-Chair, and Proceedings Co-editor, Symposium on High Energy Beam Manufacturing, ASME Winter Annual Meeting, 1989.

Organizer, Chair, and Proceedings Editor, Symposium on High-Tech Manufacturing: Meeting the Needs of Industries, New Jersey Institute of Technology, 1989.

Organizer, Chair, and Proceedings Editor, Symposium on Robotics and Manufacturing Automation, ASME Winter Annual Meeting, 1985.

Organizer, Chair, and Proceedings Editor, Symposium on Computer-Integrated Manufacturing and Robotics, ASME Winter Annual Meeting, 1984.

Co-organizer, Co-Chair, and Proceedings Co-editor, Symposium on Computer-Integrated Manufacturing, ASME Winter Annual Meeting, 1983.

Referee of proposals for the National Science Foundation (General Research Grants, Research Initiation Grants, Research Equipment Grants, CAREER Grants, Engineering Research Center Grants, etc.), Indiana 21st Century Science and Technology Fund, University of Missouri Research Board, Science Foundation Ireland, Agency for Science, Technology and Research of Singapore, Research Grants Council of Hong Kong, etc.

Referee of papers for (among others):

- ASME Journal of Manufacturing Science and Engineering
- ASME Journal of Dynamic Systems, Measurement and Control
- ASME Journal of Mechanical Design
- IEEE Transactions on Robotics and Automation
- IEEE Transactions of Automation Science and Engineering
- International Journal of Advanced Manufacturing Technology
- International Journal of Robotics Research
- International Journal of Hydrogen Energy
- Journal of Virtual and Physical Prototyping
- Journal of Manufacturing Systems
- Journal of Materials and Design
- Journal of Materials Processing Technology
- Journal of Power Sources

Journal of Robotic Systems  
Journal of Systems Integration  
Journal of Sound and Vibration  
Rapid Prototyping Journal  
Computer-Aided Design Journal  
ASME International Mechanical Engineering Conference  
IEEE Robotics and Automation Conference  
American Control Conference  
Solid Freeform Fabrication Symposium  
International Symposium on Flexible Automation  
International Symposium on Electromachining  
Reviewer of books for:  
Addison Wesley, Prentice Hall, and Applied Mechanics Review.

## **6b. University Services**

Chair, Advanced Manufacturing Signature Area (Missouri S&T), 2014-present.  
Member, MAE Department Promotion and Tenure Committee (Missouri S&T), 2001-present.  
Chair, MAE Department Manufacturing Faculty Search Committee (Missouri S&T), 1999-2000, 2012-2013, 2015-2016.  
Chair, Advanced Manufacturing Signature Area Faculty Search Committee (Missouri S&T), 2014-2015.  
Chair, MAE Department Design and Manufacturing Technical Committee (Missouri S&T), 2013-2015.  
Member, Campus Promotion and Tenure Committee (Missouri S&T), 2012-2014.  
Chair, People Subcommittee, Research Capacity Task Force Committee (Missouri S&T), 2011-2012.  
Chair, MAE Department Chair Search Committee (Missouri S&T), 2009-2010.  
Member, University Manufacturing Education Executive Committee (Missouri S&T), 1999-present.  
Member, MAE Department Manufacturing Committee (Missouri S&T), 2004-2013.  
Member, MAE Department Mechanics and Systems Design Committee (Missouri S&T), 1999-2013.  
Chair, Faculty Workload Committee (Missouri S&T), 2006-2007.  
Member, Provost Search Committee (Missouri S&T), 2006.  
Member, Vice Provost-Research Search Committee (Missouri S&T), 2006.  
Member, F. Kenneth Iverson Chair Search Committee (Missouri S&T), 2006.  
Chair, MAE Department Promotion and Tenure Committee (Missouri S&T), 2000-2001.  
Chair, MAE Department Graduate Seminar Committee (Missouri S&T), 2000-2004.  
Chair, MAE Department Manufacturing Committee (Missouri S&T), 2000-2004.  
Member, MAE Department Academic Curriculum Committee (Missouri S&T), 1999-2004.

Member, MAE Department Graduate Affairs Committee (Missouri S&T), 1999-2004.

Member, Engineering College Committee on Curriculum Planning and Development (NJIT), 1994-1996.

Member, Institute Committee on Long Range Planning (NJIT), 1988-1996.

Member, Institute Committee on Graduate Studies and Research (NJIT), 1988-1993.

Member, Search Committee for Chairperson of Dept. of Industrial and Manufacturing Engineering (NJIT), 1995.

Member, Institute Committee on Promotion and Tenure (NJIT), 1989-1991.

Chairman, Institute Committee on CIM Laboratories Planning & Development (NJIT), 1988-1990.

Organizer, Mechanical Engineering Colloquium (NJIT), 1987-1990.

Member, Mechanical Engineering Promotion and Tenure Committee (NJIT), 1987-1989, 1991-1996.

Member, Mechanical Engineering Graduate Studies and Research Committee (NJIT), 1987-1996.

Co-organizer, Sibley School Colloquium (Cornell), 1986-1987.

Member, College Committee on Academic Standards, Petitions and Credit (Cornell), 1985-86.

Secretary, Sibley School Faculty (Cornell), 1984-85.

## 7. PUBLICATIONS

### 7a. Theses

1. M.S. Thesis, *Relationship Between Skidding Resistance and Pavement Texture*, Dept. of Mechanical Engineering, Pennsylvania State University, University Park, PA, August 1977.
2. Ph.D. Dissertation, *Source of Noise and Vibration in Idling Circular Saws and Its Control by Tooth Design*, Dept. of Mechanical Engineering, University of California, Berkeley, CA, August 1981.

### 7b. Book and Book Chapters

1. "Deformed Swept Volume Analysis of NC Machining Simulation with Cutter Deflection," M. C. Leu, D. Blackmore and B. Maitech, *Machining Impossible Shape*, Kluwer, 1999, pp. 158-166.
2. "Interactive Solid Modeling in a Virtual Environment with Haptic Interface," X. Peng and M. C. Leu, *AR/VR Applications in Manufacturing*, Springer-Verlag, 2004.
3. "Engineering Applications of Virtual Reality," X. Peng and M. C. Leu, *Mechanical Engineers' Handbook on Materials and Mechanical Design*, 3<sup>rd</sup> Edition, John Wiley and Sons, 2005, pp. 732-761.



4. "A Web-Based Intelligent Collaborative System for Engineering Design," X. Liu, S. Raorane, and M. C. Leu, *Collaborative Product Design & Manufacturing Methodologies and Applications*, Editors: W. D. Li, Chris McMahon, S. K. Ong and Andrew Y. C. Nee, Springer, 2007, pp. 37-58.
5. "Virtual Bone Surgery," M. C. Leu, Q. Niu and X. Chi, *Virtual Prototyping & Bio Manufacturing in Medical Applications*, Editors: Bopaya Bidanda and Paulo Bartolo, Springer, 2008.
6. "Chapter 8: Digital Design and Fabrication of Dental Restorations," M. C. Leu and P. Delli, *Bio-Materials and Prototyping Applications in Medicine*, Editors: Bopaya Bidanda & Paolo Bartolo, Springer, 2008, pp. 125-155.
7. "An Intelligent Computational Argumentation System for Supporting Collaborative Software Development Decision Making," X. Liu, E. Khudkhudia, L. Wen, V. Sajja, and M. C. Leu, *Artificial Intelligence Applications for Improved Software Engineering Development: New Prospects*, Editors: Farid Meziane and Sunil Vadera, IGI Global Publisher, 2009.
8. *Roadmap for Additive Manufacturing: Identifying the Future of Freeform Processing*, Editors: D. L. Bourell, M. C. Leu, D. W. Rosen, Laboratory for Freeform Fabrication, University of Texas, 92 pages, 2009.
9. *Unigraphics for Engineering Design*, S. Shinde and M. C. Leu, Department of Mechanical and Aerospace Engineering, Missouri University of Science and Technology, 2004.
10. *NX3 for Engineering Design*, P. Delli and M. C. Leu, Department of Mechanical and Aerospace Engineering, Missouri University of Science and Technology, 2005.
11. *NX5 for Engineering Design*, M. C. Leu and A. Joshi, Department of Mechanical and Aerospace Engineering, Missouri University of Science and Technology, 2008.
12. *NX7 for Engineering Design*, M. C. Leu, A. Joshi and K. Kolan, Department of Mechanical and Aerospace Engineering, Missouri University of Science and Technology, 2011.
13. "Sensor (Assembly)," M. C. Leu, in *Encyclopedia of Production Engineering*, Springer, March 2014.
14. *NX9 for Engineering Design*, M. C. Leu, A. Thomas, and K. Kolan, Department of Mechanical and Aerospace Engineering, Missouri University of Science and Technology, 2014.
15. *NX10 for Engineering Design*, M. C. Leu, A. Ghazanfari, and K. Kolan, Department of Mechanical and Aerospace Engineering, Missouri University of Science and Technology, 2015.

#### **7c. Edited Volumes of Conference Proceedings**

1. *Proceedings of Symposium on Computer-Integrated Manufacturing*, edited by M. R. Martinez and M. C. Leu, ASME Winter Annual Meeting, PED-Vol. 8, 1983.

2. *Proceedings of Symposium on Computer-Integrated Manufacturing and Robotics*, edited by M. C. Leu and M. R. Martinez, ASME Winter Annual Meeting, PED-Vol. 13, 1984.
3. *Proceedings of Symposium on Robotics and Manufacturing Automation*, edited by M. C. Leu and M. Donath, ASME Winter Annual Meeting, PED-Vol. 15, 1985.
4. *Proceedings of Symposium on High-Tech Manufacturing: Meeting the Needs of Industry*, edited by M. C. Leu, New Jersey Institute of Technology, May 1989.
5. *Proceedings of Symposium on High Energy Beam Manufacturing Technologies*, edited by E. S. Geskin and M. C. Leu, ASME Winter Annual Meeting, PED-Vol. 46, 1989.
6. *Proceedings of Symposium on Advanced Manufacturing*, edited by M. C. Leu and R. J. Caudill, New Jersey Institute of Technology, June 1990.
7. *Proceedings of 1992 Japan-USA Symposium on Flexible Automation*, edited by M. C. Leu, ASME Publication, July 1992.
8. *Proceedings of Symposium on University-Industry-Government Cooperative Research*, edited by M. C. Leu and K. C. Fan, National Taiwan University, July 1994.

#### **7d. Journal Papers**

1. "Prediction of Skid Resistance as a Function of Speed from Pavement Texture Measurements," M. C. Leu and J. J. Henry, **Transportation Research Board**, TRR 666, 1978, pp. 7-13.
2. "Whistling Instability in Circular Saws," C. D. Mote, Jr. and M. C. Leu, **ASME Journal of Dynamic Systems, Measurement and Control**, Vol. 102, No. 2, June 1980, pp. 114-122.
3. "Pressure Fluctuations on the Surface of a Parallelogram Prism Protruding from a Rotating Circular Disk," M. C. Leu and C. D. Mote, Jr., **Journal of Acoustic Society of America**, Vol. 72, No. 5, Nov. 1982, pp. 1583-1585.
4. "Simulation of Robot Kinematics Using Interactive Computer Graphics," M. C. Leu and R. Mahajan, **ASEE Journal of Computers in Education**, Vol. 4, No. 1, 1984, pp. 11-19.
5. "Origin of Idling Noise in Circular Saws and Its Suppression," M. C. Leu and C. D. Mote, Jr., **Journal of Wood Science and Technology**, Vol. 18, 1984, pp. 33-49. (This paper won an FPRS Wood Award.)
6. "Vortex Shedding: The Source of Noise and Vibration in Idling Circular Saws," M. C. Leu and C. D. Mote, Jr., **ASME Journal of Vibration, Acoustics, Stress and Reliability in Design**, Vol. 106, No. 3, July 1984, pp. 434-441.
7. "Modeling and Analysis of Flow-Induced Vibration in Circular Saws," M. C. Leu and J. Jiropongphan, **ASME Journal of Vibration, Acoustics, Stress and Reliability in Design**, Vol. 107, No. 2, April 1985, pp. 196-202.

8. "Robotics Software Systems," M. C. Leu, **International Journal of Robotics and Computer-Integrated Manufacturing**, Vol. 2, No. 1, 1985, pp. 1-12.
9. "Geometric Representation of Translational Swept Volumes and Its Applications," M. C. Leu, S. H. Park, and K. K. Wang, **ASME Journal of Engineering for Industry**, Vol. 108, No. 2, May 1986, pp. 113-119.
10. "Automated Symbolic Derivation of Dynamic Equations of Motion for Robotic Manipulators," M. C. Leu and N. Hemati, **ASME Journal of Dynamic Systems, Measurement, and Control**, Vol. 108, No. 3, Sept. 1986, pp. 172-179.
11. "Computer Generation of Robot Dynamic Equations and Related Issues," J. Koplík and M. C. Leu, **Journal of Robotic Systems**, Vol. 3, No. 3, 1986, pp. 301-319.
12. "A First Robotics Course for Senior/Graduate Engineering Students," M. C. Leu, **ASEE Journal of Computers in Education**, Vol. 6, No. 4, 1986, pp. 1-8.
13. "Optimal Trajectory Generation for Robotic Manipulators Using Dynamic Programming," S. Singh and M. C. Leu, **ASME Journal of Dynamic Systems, Measurement and Control**, Vol. 109, No. 2, June 1987, pp.88-96.
14. "Effect of Mechanical Compliance on Deflection of Robot Manipulators," M. C. Leu, V. Dukovski, and K. K. Wang, **CIRP Annals**, Vol. 36, No. 1, 1987, pp.305-309.
15. "A Case Study of Robotic Assembly for a Printer Compensation Device," M. C. Leu and M. S. Weinstein, **Journal of Manufacturing Systems**, Vol. 7, No. 2, 1988, pp. 163-170.
16. "Robot Motion Simulation and Planning Based on Solid Modeling," M. C. Leu, **CIRP Annals**, Vol. 37, No. 1, 1988, pp. 141-144.
17. "Characteristics and Optimal Design of Variable Air Gap Linear Force Motors," M. C. Leu, E. V. Scorza, and D. L. Bartel, **IEE Electrical Power Applications**, Vol. 135, No. 6, Nov. 1988, pp. 341-345.
18. "PDF Subvariable Control and Its Applications to Robot Motion Control," M. C. Leu and D. I. Freed, **ASME Journal of Dynamic Systems, Measurement and Control**, Vol. 111, Sept. 1989, pp. 452-461.
19. "A Vision System for Three-Dimensional Positional Measurement Based on Stereo Disparity," M. C. Leu and R. M. Pherwani, **Optics and Laser Technology**, Vol. 21, No. 5, 1989, pp.319-324.
20. "On the Design of Optical Triangulation Devices," Z. Ji and M. C. Leu, **Optics and Laser Technology**, Vol. 21, No.5, 1989, pp. 335-338.
21. "A Robot Vision System for 3-D Metrology," T.-Q. Kim, M. C. Leu, Z. Ji and F. Y. Shih, **Transactions of NAMRI/SME**, 1990, pp. 290-297.
22. "Macintosh II<sub>x</sub> and IBM PC Based Automatic Control Laboratory," Y. Park M. C. Leu, and G. Y. Zhou, **ASEE Journal of Computers in Education**, Sept. 1990, pp. 42-46.

23. "Control and Simulation of Servo Motor Systems Using Macintosh II<sub>x</sub>," Y. Park and M. C. Leu, **International Journal of Mechanical Engineering Education**, Vol. 18, No. 4, 1990, pp. 281-293.
24. "Geometric Representation of Swept Volumes with Application to Polyhedral Objects," J. D. Weld and M. C. Leu, **International Journal of Robotics Research**, Vol. 9, No. 5, Oct. 1990, pp. 105-117.
25. "Inverse Kinematics of Calibrated Industrial Robots," Z. Ji and M. C. Leu, **Journal of Robotic Systems**, Vol. 7, No. 5, Oct. 1990, pp. 675-687.
26. "Robust Nonlinear Control of Brushless DC Motors for Direct Drive Applications," N. Hemati, J. S. Thorp and M. C. Leu, **IEEE Transactions on Industrial Electronics**, Vol. 37, No. 6, Dec. 1990, pp. 460-468.
27. "Manipulator Motion Planning in the Presence of Obstacles and Dynamic Constraints," S. K. Singh and M. C. Leu, **International Journal of Robotics Research**, Vol. 10, No. 2, April 1991, pp.171-187.
28. "Feasible and Optimal Designs of Variable Air Gap Torque Motors," M. C. Leu and R. A. Aubrecht, **ASME Journal of Engineering for Industry**, Vol. 113, No.2, May 1991, pp. 241-245.
29. "Uncertainty and Compliance of Robot Manipulators," D. K. Pai and M. C. Leu, **International Journal of Robotics Research**, Vol. 10, No. 3, June 1991, pp. 200-213.
30. "Studying Manipulator Kinematics and Dynamics with Aid of MATHEMATICA," M. C. Leu, Z. Ji and Y. S. Wang, **International Journal of Mechanical Engineering Education**, Vol. 19, No. 3, 1991, pp. 213-228.
31. "Modeling and Performance Analysis of a Flexible PCB Assembly Station Using Petri Nets," M. Zhou and M. C. Leu, **ASME Journal of Electronic Packaging**, Vol. 113, Dec. 1991, pp. 410-416.
32. "A Complete Model Characterization of Brushless DC Motors," N. Hemati and M. C. Leu, **IEEE Transactions on Industry Applications**, IA-28, No. 1, Jan./Feb. 1992, pp. 172-180.
33. "Vision Based Tool Calibration and Accuracy Improvement for Assembly Robots," Z. Ji, M. C. Leu and P. F. Lilienthal, **Journal of Precision Engineering**, Vol. 14, No. 3, July 1992, pp. 168-175.
34. "Applications of Flows and Envelopes to NC Machining," D. Blackmore, M. C. Leu and K. K. Wang, **CIRP Annals**, Vol. 42, No. 1, 1992, pp. 493-496.
35. "Genericity and Singularities of Robot Manipulators," D. K. Pai and M. C. Leu, **IEEE Transactions on Robotics and Automation**, Vol. 8, No. 5, Oct. 1992, pp. 545-559.
36. "Application of Linear Assignment Model for Planning of Robotic Printed Circuit Board Assembly," Z. Ji, M. C. Leu, and H. Wong, **ASME Journal of Electronic Packaging**, Vol. 114, Dec. 1992, pp. 455-460.
37. "Analysis of Swept Volume via Lie Groups and Differential Equations," D. Blackmore and M.C. Leu, **International Journal of Robotics Research**, Vol. 11, No. 6, Dec. 1992, pp. 516-537.

38. "Mapping of Kinematic and Dynamic Parameters for Coupled Manipulators," Z. Ji and M. C. Leu, **ASME Journal of Mechanical Design**, Vol. 115, June 1993, pp. 283-288.
39. "Adaptive Genetic Algorithm for Optimal Printed Circuit Board Assembly Planning," H. Wong and M. C. Leu, **CIRP Annals**, Vol. 43, No. 1, 1993, pp. 17-20.
40. "Fractal Geometry Model for Wear Prediction," G. Y. Zhou, M. C. Leu, and D. Blackmore, **Wear**, Vol. 170, Nov. 1993, pp. 1-14.
41. "Anti-Windup Control of Second-Order Plants with Saturation Nonlinearity," M. C. Leu, S. Yang and A. Mayer, **ASME Journal of Dynamic Systems, Measurement and Control**, Vol. 115, Dec. 1993, pp. 715-720.
42. "Planning of Component Placement/Insertion Sequence and Feeder Setup in PCB Assembly Using Genetic Algorithm," M. C. Leu, H. Wong, and Z. Ji, **ASME Journal of Electronic Packaging**, Vol. 115, Dec. 1993, pp. 424-432.
43. "Analysis and Modeling of Deformed Swept Volumes," D. Blackmore, M. C. Leu, and F. Shih, **Journal of Computer Aided Design**, Vol. 26, April 1994, pp. 315-326.
44. "Vibration Assisted Engagement for Parts Mating," M. C. Leu and Z. Katz, **CIRP Annals**, Vol. 43/1, 1994, pp. 27-30.
45. "Fractal Geometry with Applications in Surface Characteristics and Wear Prediction," G. Zhou, M. C. Leu and D. Blackmore, **International Journal of Machine Tools and Manufacture**, Vol. 35, No. 2, 1995, pp. 203-209.
46. "Mating of Rigid Parts by Compliant Manipulators," M. C. Leu and Y. Jia, **ASME Journal of Engineering for Industry**, May 1995, pp. 240-247.
47. "Characteristics of Abrasive Waterjet Generated Surfaces and Effects of Cutting Parameters and Structure Vibration," J. Chao, G. Zhou, M. C. Leu, and E. Geskin, **ASME Journal of Engineering for Industry**, Nov. 1995, pp. 516-525.
48. "Swept Volume: Retrospective and Prospective View," D. Blackmore, M. C. Leu, L. Wang, and H. Jiang, **Journal of Neural, Parallel & Scientific Computation**, Vol. 5., No. 1&2, pp.81-102, 1996.
49. "Waterjet In-Situ Reactor Cleaning," Meng, P., Geskin, E. S., Leu, M. C. and Tismenetskiy, L., **Journal of Jetting Technology**, 1996, pp. 347-358.
50. "A Verification System for 5-Axis NC Machining with General APT Tools," M. C. Leu, L. Wang, and D. Blackmore, **Annals of the CIRP**, Vol. 46, No. 1, 1997, pp. 419-424.
51. "The Sweep-Envelope Differential Equation Algorithm and Its Application to NC Machining Verification," D. Blackmore, M. C. Leu, and L. Wang, **Journal of Computer Aided Design**, Vol. 29, No. 9, 1997, pp. 629-637.
52. "Error Analysis for Four-Axis Side Milling of Undevelopable Ruled Surface," B. Yang, M. C. Leu and J. Zhou, **Journal of Control Engineering Practice**, Vol. 6, No. 4, April 1998, pp. 481-487.
53. "Analysis of Impact in Robotic Peg-in-Hole Assembly," H. Liao and M. C. Leu, **Robotica Journal**, Vol. 16, No. 3, May-June 1998, pp. 347-356.

54. "Mathematical Modeling and Experimental Verification of Stationary Waterjet Cleaning Process," M. C. Leu, P. Meng, E. S. Geskin, and L. Tismenestskiy, **ASME Journal of Manufacturing Science and Engineering**, August 1998, pp. 571-579.
55. "An Analytical and Experimental Study of Cleaning with Moving Waterjets," P. Meng, E. S. Geskin, M. C. Leu, and L. Tismenestskiy, **ASME Journal of Manufacturing Science and Engineering**, August 1998, pp. 580-589.
56. "Simulation of NC Machining with Cutter Deflection by Modeling Deformed Swept Volumes," M. C. Leu, F. Lu, and D. Blackmore, **Annals of the CIRP**, Vol. 47, No. 1, 1998, pp. 441-446.
57. "Progress in Additive Manufacturing and Rapid Prototyping," J.-P. Kruth, M. C. Leu, and T. Nakagawa, **Annals of the CIRP** (STC "A" Keynote Paper), Vol. 47, No. 2, 1998, pp. 525-540.
58. "Intelligent Planning of CAD-Directed Inspection for Coordinate Measuring Machines," K-C. Fan and M. C. Leu, **Journal of Computer Integrated Manufacturing Systems**, Vol. 11, No. 1-2, 1998, pp. 43-51.
59. "Analysis of Shell Cracking in Investment Casting with Laser Stereolithography Patterns," W. L. Yao and M. C. Leu, **Rapid Prototyping Journal**, Vol. 5, No. 1, 1999, pp. 12-20.
60. "Trimming Swept Volumes," D. Blackmore, R. Samulyak, and M. C. Leu, **Journal of Computer Aided Design**, Vol. 31, No.3, March 1999, pp. 215-23.
61. "Rapid Freezing Prototyping with Water," W. Zhang, M. C. Leu, Z. Ji, and Y. Yan, **Journal of Materials and Design**, Vol. 20, June 1999, pp. 139-145.
62. "Integration of Rapid Prototyping and Electroforming for Tooling Application," B. Yang and M. C. Leu, **Annals of the CIRP**, Vol. 48, No. 1, 1999, pp. 119-122.
63. "Parts Mating Aided by Constant-Amplitude Sinusoidal Motions" M. C. Leu and H. Liao, **ASME Journal of Manufacturing Science and Engineering**, Vol. 121, No. 4, Nov. 1999, pp. 802-810.
64. "Analysis and Design of Internal Web Structure of Laser Stereolithography Patterns for Investment Casting," W. L. Yao and M. C. Leu, **Journal of Materials and Design**, Vol. 21, No. 2, 2000, pp. 101-109.
65. "Swept-Volume Computation for Machining Simulation and Virtual Reality Application," B. Y. Maiteh, D. Blackmore, L. Abdel-Malek, and M. C. Leu, **Journal of Materials Processing and Manufacturing Science**, Vol. 7, 2000, pp. 380-390.
66. "An Experimental and Analytical Study of Ice Part Fabrication with Rapid Freeze Prototyping," M. C. Leu, W. Zhang, and G. Sui, **Annals of the CIRP**, Vol. 49, No. 1, 2000, pp. 147-150.
67. "Determining Optimal Parameters for Stereolithography Processes via Genetic Algorithms," H. S. Cho, W. S. Park, B. W. Choi, and M. C. Leu, **Journal of Manufacturing Systems**, Vol. 19, No.1, 2000, pp. 18-27.

68. "EDM Tooling by Electrodeposition of Rapid Prototyping Masters," B. Yang and M. C. Leu, **International Journal of Agile Manufacturing**, Vol. 3, 2000, pp. 5-18.
69. "A Singularity Theory Approach to Swept Volumes," D. Blackmore, R. Samulyak, and M. C. Leu, **International Journal of Shape Modeling**, Vol. 6, No. 1, 2000, pp. 105-129.
70. "Rapid Freeze Prototyping," M. C. Leu, **Materials World Journal**, pp. 9-11, December 2000.
71. "Creation of Freeform Solid Models in Virtual Reality," M. C. Leu, B. Y. Maiteh, D. Blackmore and L. Fu, **Annals of the CIRP**, Vol. 50, No. 1, 2001, pp. 73-76.
72. "Electroforming Process and Application to Micro/Macro Manufacturing," J. A. McGeough, M. C. Leu, K. P. Rajurkar, A. K. M. De Silva, and Q. Liu, **Annals of the CIRP (STC "E" Keynote Paper)**, Vol. 50, No. 2, 2001, pp. 499-514.
73. "A Neural Network Approach to the Modeling and Analysis of Stereolithography Processes," S. H. Lee, W. S. Park, H. S. Cho, W. Zhang, and M. C. Leu, **Proceedings of Institute of Mechanical Engineers**, Vol. 215, Part B, 2001, pp. 1719-1733.
74. "Experimental Study on the Ice Pattern Fabrication for the Investment Casting by Rapid Freeze Prototyping," Q. Liu, G. Sui and M. C. Leu, **Journal of Computers in Industry**, Vol. 48, No. 3, August 2002, pp. 181-197.
75. "A Study on Effects of Process Parameters in Rapid Freeze Prototyping," F. D. Bryant, G. Sui, and M. C. Leu, **Rapid Prototyping Journal**, Vol. 9, No. 1, 2003, pp. 19-23.
76. "Study of Part Geometric Features and Support Materials in Rapid Freeze Prototyping," M. C. Leu, Q. Liu and F. D. Bryant, **Annals of the CIRP**, Vol. 52, No. 1, 2003, pp. 185-188
77. "Investigation of Layer Thickness and Surface Roughness in Rapid Freeze Prototyping," G. Sui and M. C. Leu, **ASME Journal of Manufacturing Science and Engineering**, Vol. 125, No. 3, August 2003, pp. 556-563.
78. "Thermal Analysis of Ice Wall Built by Rapid Freeze Prototyping," G. Sui and M. C. Leu, **ASME Journal of Manufacturing Science and Engineering**, Vol. 125, No. 4, November 2003, pp. 824-834.
79. "Dimensional Accuracy and Surface Roughness of Rapid Freeze Prototyping Ice Patterns and Investment Casting Metal Parts," Q. Liu, M. C. Leu, V. Richards and S. Schmitt, **International Journal of Advanced Manufacturing Technology**, October 2004, Vol. 24, No. 7-8, pp. 485-495.
80. "Surface Reconstruction for Interactive Modeling of Freeform Solids by Virtual Sculpting," M. C. Leu, X. Peng and W. Zhang, **Annals of the CIRP**, Vol. 54, No. 1, 2005, pp. 131-134.
81. "Computational Topology and Swept Volumes," D. Blackmore, Y. Mileyko, M.C. Leu, W. C. Regli, and W. Sun, **DIMACS Series in Discrete Mathematics and Theoretical Computer Science**, Vol. 67, 2005, pp. 53-77.

82. "Use of a Virtual Reality Driving Simulator as an Alcohol Abuse Prevention Approach with College Students," F. H. Montgomery, M. C. Leu, R. L. Montgomery, M. D. Nelson, and M. Sirdeshmukh, **Journal of Alcohol and Drug Education**, September 2005.
83. "Investigation of Interface Agent for Investment Casting with Ice Patterns," Q. Liu and M. C. Leu, **ASME Journal of Manufacturing Science and Engineering**, Vol. 128, No. 2, May 2006, pp. 554-562.
84. "Rapid Prototyping in Dentistry: Technology and Application," Q. Niu, M. C. Leu, and S. Schmitt, **Journal of Advanced Manufacturing Technology**, June 2006, Vol. 29, No. 3-4, pp. 317-335.
85. "Curing Kinetics of Ceramic Slurries Used in Investment Casting with Ice Patterns," Q. Liu, V. L. Richards, K. P. Daut, and M. C. Leu, **Journal of Cast Metals Research**, Vol. 19, No. 3, June 2006, pp. 195-200.
86. "Freeze-form Extrusion Fabrication of Ceramic Parts," T. Huang, M. S. Mason, G. E. Hilmas, and M. C. Leu, **International Journal of Virtual and Physical Prototyping**, Vol. 1, No. 2, June 2006, pp. 93-100.
87. "Performance Evaluation of an Auction-Based Job Allocation Model for Small and Medium-sized Enterprises," G. Bajaj, S. E. Grasman, C. Saygin, and M. C. Leu, **International Journal of Networking and Virtual Organizations**, Vol. 3, No. 2, 2006, pp. 202-219.
88. "Impact of Information Sharing in an Auction-Based Job Allocation Model for Small and Medium-sized Enterprises," K. Sampath, C. Saygin, S. E. Grasman, and M. C. Leu, **International Journal of Production Research**, Vol. 44, No. 9, 2006, pp. 1777-1798.
89. "American Sign Language Recognition Using Multi-dimensional Hidden Markov Models," H. Wang, M. C. Leu and C. Oz, **International Journal of Information Science and Engineering**, Vol. 22, No. 5, September 2006, pp. 1109-1123.
90. "Freeform Modeling Using Sweep Differential Equation with Haptic Interface," X. Peng, W. Zhang, and M. C. Leu, **Journal of Virtual and Physical Prototyping**, Vol. 1, No. 3, September 2006, pp. 183-196.
91. "Ice Patterns for Investment Casting: Do They Hold Promise for Industrial Use?" H. Jose, V. L. Richards, Q. Liu, M. C. Leu, R. Laurent, and T. Hill, **INCAST: International Journal of the Investment Casting Institute**, Vol. 19, No. 12, December 2006.
92. "Fracture Toughness of Ceramic Molds for Investment Casting with Ice Patterns," Q. Liu, M. C. Leu, and V. L. Richards, **International Journal of Cast Metals Research**, Vol. 20, No. 1, Jan. 2007, pp. 14-24.
93. "Finite Element Analysis of Solidification in Rapid Freeze Prototyping," Q. Liu, M. C. Leu, **ASME Journal of Manufacturing Science and Engineering**, Vol. 129, No. 4, August 2007, pp. 810-820.
94. "A Novel Contour Generation Algorithm for Surface Reconstruction from Dixel Data," W. Zhang, M. C. Leu, X. Peng and W. Zhang, **ASME Journal of Computing and Information Science in Engineering**, Vol. 7, Sept. 2007, pp. 203-210.



95. "Dispersion of Zirconium Diboride in an Aqueous High-Solids Paste," T. Huang, G. E. Hilmas, W. G. Fahrenholtz, and M. C. Leu, **Journal of Applied Ceramic Technology**, Vol. 4, No. 5, 2007, pp. 470-479.
96. "Linguistic Properties Based on American Sign Language Word Recognition with Artificial Neural Network Using a Sensory Glove and Motion Tracker," C. Oz and M. C. Leu, **Journal of Neurocomputing**, Vol. 70, October 2007, pp. 2891-2901.
97. "Image Processing, Geometric Modeling and Data Management for Development of a Virtual Bone Surgery System," X. Niu, X. Chi, M. C. Leu, and J. Ochoa, **Journal of Computer Aided Surgery**, Vol. 13, No. 1, January 2008, pp. 30-40.
98. "Virtual Sculpting with Surface Smoothing Based on Level Set Method," M. C. Leu and W. Zhang, **Journal of Manufacturing Technology – CIRP Annals**, Vol. 57, No. 1, 2008, pp. 167-170.
99. "Modeling of the Hand-Arm System for Impact Loading in Shear Fastener Installation," A. Joshi, R. Guttenberg, M. C. Leu, S. L. Murray, **International Journal of Industrial Ergonomics**, Vol. 38, No. 9-10, 2008, pp. 715-725.
100. "Surface Reconstruction Using Dixel Data from Three Sets of Orthogonal Rays," W. Zhang and M. C. Leu, **ASME Journal of Computing and Information Science in Engineering**, Vol. 9, No. 1, March 2009.
101. "Aqueous-Based Extrusion of High Solids Loading Ceramic Pastes: Process Modeling and Control," M. S. Mason, T. Huang, R. G. Landers, M. C. Leu, and G. E. Hilmas, **Journal of Materials Processing Technology**, Vol. 209, No. 6, March 2009, pp. 2946-2957.
102. "Aqueous Based Freeze-form Extrusion Fabrication of Alumina Components," T. Huang, M. S. Mason, G. E. Hilmas, and M. C. Leu, **Rapid Prototyping Journal**, Vol. 15, No. 2, 2009, pp. 88-95.
103. "Axiomatic Functional and Object-Oriented Design Framework," M. C. Leu, J. C. Wu and X. F. Liu, **Journal of Manufacturing Technology – CIRP Annals**, Vol. 58, No. 1, 2009, pp. 147-152.
104. "Modeling and Experimental Results of Concentration with Support Material in Rapid Freeze Prototyping," F. D. Bryant and M. C. Leu, **Rapid Prototyping Journal**, Vol. 15, No. 5, 2009, pp. 317-324.
105. "A Hierarchical Object-oriented Functional Modeling Framework for Co-design of Mechatronic Products," J. C. Wu, M. C. Leu, and X. F. Liu, **Journal of Concurrent Engineering: Research and Applications**, Vol. 17, No. 4, 2009, pp. 245-256.
106. "Liquid Phase Migration in Extrusion of Aqueous Alumina Paste for Freeze-Form Extrusion Fabrication," H-J. Liu and M. C. Leu, **International Journal of Modern Physics B**, Vol. 23, Nos. 6 &7, 2009, pp. 1861-1866.
107. "Predictive Modeling and Experimental Verification of Temperature and Concentration in Rapid Freeze Prototyping with Support Material," F. Bryant and M. C. Leu, **ASME Journal of Manufacturing Science and Engineering**, Vol. 131, No. 4, 2009.

108. "A Spatial Warping Method for Freeform Modeling Based on Level-Set Method," W. Zhang and M. C. Leu, **Journal of Computer-Aided Design**, Vol. 41, No. 11, 2009, pp. 765-771.
109. "Research on Extrusion Velocity in Freeform Extrusion Fabrication of Aqueous Alumina Paste," H-J. Liu and M. C. Leu, **Key Engineering Materials**, Vol. 419-420, 2010, pp. 125-128.
110. "Younger Driver's Evaluation of Vehicle Mounted Attenuator Markings in Work Zones using a Driving Simulator," G. H. Bham, D. R. Mathur, M. C. Leu, and M. Vallati, **Transportation Letters: The International Journal of Transportation Research**, Volume 2, Issue 3, July 2010, pp. 187-198.
111. "Adaptive Force Control of Freeze-Form Extrusion Fabrication Processes," X. Zhao, R. G. Landers, and M. C. Leu, **ASME Journal of Manufacturing Science and Engineering**, Vol. 132, No. 6, 2010, pp. 064504:1-9, <http://dx.doi.org/10.1115/1.4003009>.
112. "Freeze Extrusion Fabrication of 13-93 Bioactive Glass Scaffolds for Bone Repair," N. D. Doiphode, T. Huang, M. C. Leu, M. N. Rahaman, and D. E. Day, **Journal of Material Science: Materials in Medicine**, Vol. 22, No. 3, March 2011, pp. 932-950.
113. "American Sign Language Word Recognition with a Sensory Glove Using Artificial Neural Networks," C. Oz and M. C. Leu, **Journal of Engineering Applications of Artificial Intelligence**, Vol. 24, No. 7, October 2011, pp. 1204-1213.
114. "Graphite-Based Indirect Laser Sintered Fuel Cell Bipolar Plates Containing Graphite Fiber Additions," D. L. Bourell, M. C. Leu, K. Chakravarthy, N. Guo, and K. Alayavalli, **Journal of Manufacturing Technology – CIRP Annals**, Vol. 60, No. 1, 2011, pp. 275-278.
115. "Real-Time Automated Simulation Generation Based on CAD Modeling and Motion Capture," W. Zhu, A. Chadda, M. C. Leu and X. F. Liu, *Journal of Computer Aided Design and Applications*, **PACE** (1), 2011, pp. 103-121.
116. "Porous and Strong Bioactive Glass (13-93) Scaffolds Fabricated by Freeze Extrusion Technique," T. Huang, N. D. Doiphode, M. N. Rahaman, M. C. Leu, B. S. Bal, D. E. Day, and X. Liu, **Journal of Material Science and Engineering: C**, Vol. 31, No. 7, October 2011, pp. 1482-1489.
117. "Fabrication of 13-93 Bioactive Glass Scaffolds for Bone Tissue Engineering Using Indirect Selective Laser Sintering," K. C. R. Kolan, M. C. Leu, G. E. Hilmas, R. F. Brown and M. Velez, **Journal of Biofabrication**, Vol. 3, No. 2, June 2011, ID: 025004.download
118. "Fastening Ergonomics Study Based on State-Space Modeling of Hand-Arm System," A. Joshi, M. C. Leu, S. L. Murray, **International Journal of Human Factors Modeling and Simulation**, Vol. 2, No. 1/2, 2011, pp. 26-46.
119. "Effect of Different Graphite Materials on the Electrical Conductivity and Flexural Strength of Bipolar Plates Fabricated using Selective Laser Sintering," N. Guo and M. C. Leu, **International Journal of Hydrogen Energy**, Vol. 37, No. 4, February 2012, pp. 3358-3566.

120. "Integrated Function Structure and Object-Oriented Design Framework," J. C. Wu, K. Poppa, M.C. Leu, and X.F. Liu, **Journal of Computers in Industry**, Vol. 63, No. 5, June 2012, pp. 458-470.
121. "Investigation of Laser Sintering for Freeform Fabrication of Zirconium Diboride Parts," M. C. Leu, S. Pattnaik, and G. E. Hilmas, **Journal of Virtual and Physical Prototyping**, Vol. 7, No. 1, pp. 25-36, 2012.
122. "Freeze-Form Extrusion Fabrication of Functionally Graded Materials," M. C. Leu, B. K. Deuser, L. Tang, R. G. Landers, G. E. Hilmas, and J. L. Watts, **Journal of Manufacturing Technology – CIRP Annals**, Vol. 61, No. 1, 2012, pp. 223-226.
123. "Biomedical Production of Implants by Additive Electro-Chemical and Physical Processes," P. Bartolo, J-P. Kruth, J. Silva, G. Levy, A. Malshe, K. Rajurkar, M. Mitsuishi, J. Ciurana, and M. Leu, **Journal of Manufacturing Technology – CIRP Annals (STC "E" Keynote Paper)**, Vol. 61, No. 2, 2012, pp. 635-655.
124. "Effect of Material, Process Parameters and Simulated Body Fluids on Mechanical Properties of Porous Constructs Made by Selective Laser Sintering," K. C. R. Kolan, M. C. Leu, G. E. Hilmas, and M. Velez, **Journal of Mechanical Behavior of Biomedical Materials**, Vol. 13, September 2012, pp. 14-24.
125. "Ergonomic Analysis of Fastening Vibration Based on ISO Standard," A. Joshi, M. C. Leu, and S. L. Murray, **Applied Ergonomics**, Vol. 43, 2012, pp. 1051-1057.
126. "Wii Remote Based Low-Cost Motion Capture for Automated Assembly Simulation," W. Zhu, A. M. Vader, A. Chadda, M. C. Leu, X. F. Liu, and J. B. Vance, **International Journal of Virtual Reality**, Vol. 17, No. 2, June 2013, pp. 125-136, doi:// 10.1007/s10055-011-0204-z.
127. "Additive Manufacturing: Technology, Applications and Research Needs," N. Guo and M. C. Leu, **Journal of Frontiers of Mechanical Engineering**, Vol. 8, No. 3, 2013, pp. 215-243.
128. "Network Based Optimization Model for Pin-Type Flow Field of Polymer Electrolyte Membrane Fuel Cell," N. Guo, M. C. Leu, and U. O. Koylu, **International Journal of Hydrogen Energy**, Vol. 38, Issue 16, May 2013, pp. 6750–6761.
129. "Hybrid Extrusion Force-Velocity Control Using Freeze-form Extrusion Fabrication for Functionally Graded Material Parts," B. K. Deuser, L. Tang, R. G. Landers, M. C. Leu, and G. E. Hilmas, **ASME Journal of Manufacturing Science and Engineering**, Vol. 135, No. 4, July 2013.
130. "CAD Model Based Virtual Assembly Simulation, Planning and Training," M. C. Leu, H. A. ElMaraghy, A. Y. C. Nee, S. K. Ong, M. Lanzetta, M. Putz, W. Zhu, and A. Bernard, **Journal of Manufacturing Technology – CIRP Annals (STC "A" Keynote Paper)**, Vol. 62, No. 2, 2013, pp. 799-822.
131. "Extrusion Process Modeling for Aqueous-based Ceramic Pastes, Part 1: Constitutive Model," M. Li, L. Tang, R. G. Landers, and M. C. Leu, **ASME**

- Journal of Manufacturing Science and Engineering**, Vol. 135, No. 5, October 2013.
132. "Extrusion Process Modeling for Aqueous-based Ceramic Pastes, Part 2: Experimental Verification," M. Li, L. Tang, R. G. Landers, and M. C. Leu, **ASME Journal of Manufacturing Science and Engineering**, Vol. 135, No. 5, October 2013.
133. "Performance Investigation of PEM Fuel Cells Using Graphite Composite Plates Fabricated by Selective Laser Sintering," N. Guo and M. C. Leu, **ASME Journal of Fuel Cell Science and Technology**, Vol. 11, No. 1, February 2014.
134. "The Roadmap for Additive Manufacturing and Its Impact," D. L. Bourell, D. W. Rosen, and M. C. Leu, **3D Printing and Additive Manufacturing Journal**, Vol. 1, No. 1, March 2014, pp. 6-9.
135. "Driving Simulator Validation of Driver Behavior with Limited Safe Vantage Points for Data Collection in Work Zones," G. H. Bham, M. C. Leu, M. Vallati, and D. R. Mathur, **Journal of Safety Research**, Vol. 49, June 2014, pp. 53-60.
136. "The Effects of 3D Bioactive Glass Scaffolds and BMP-2 on Bone Formation in Rat Femoral Critical Size Defects and Adjacent Bones," W. C. Liu, I. Robu, R. Patel, M. C. Leu, M. Velez, T-M. Chu, **Journal of Biofabrication**, Vol. 9, July 2014 (11 pages).
137. "Effective Design Patterns for Vehicle Mounted Attenuators," G. H. Bham, M. C. Leu, M. Vallati, and D. R. Mathur, **Accident Reconstruction Journal**, Vol. 25, No. 4, July-August 2014, pp. 43-50.
138. "Optimization of Parallel and Serpentine Configurations for Polymer Electrolyte Membrane Fuel Cells," N. Guo, M. C. Leu, and U. O. Koylu, **Journal of Fuel Cells**, Published Online Oct. 8, 2014, DOI: 10.1002/fuce.201400127.
139. "Bio-inspired Flow Field Designs for Polymer Electrolyte Membrane Fuel Cells," N. Guo, M. C. Leu, and U. O. Koylu, **International Journal of Hydrogen Energy**, Vol. 39, 2014, pp. 21185-21195.
140. "Effective Design Patterns for Vehicle Mounted Attenuators," G. H. Bham, M. C. Leu, M. Vallati, and D. R. Mathur, V. A. Sam, **Accident Reconstruction Journal**, Vol. 25, No. 4, 2014, pp. 43-50.
141. "Modeling, Analysis and Simulation of Paste Freezing in Freeze-form Extrusion Fabrication of Thin-Wall Parts," M. Li, R. G. Landers, M. C. Leu, **ASME Journal of Manufacturing Science and Engineering**, Vol. 136, No. 6, December 2014.
142. "Development of Freeze-Form Extrusion Fabrication with Use of Sacrificial Material," M. C. Leu and D. A. Garcia, **ASME Journal of Manufacturing Science and Engineering**, Vol. 136, No. 6, December 2014.
143. "Additive Manufacturing: Current State, Future Potential, Gaps and Needs, and Recommendations," Y. Huang, M. C. Leu, J. Mazumder, and A. Donmez, **ASME Journal of Manufacturing Science and Engineering**, Vol. 137, No. 1, February 2015, 014001 (10 pages).

144. “*In Vitro* Assessment of Laser Sintered Bioactive Glass Scaffolds with Different Pore Geometries,” K. C. R. Kolan, M. C. Leu, A. Thomas, and G. E. Hilmas, **Rapid Prototyping Journal**, Vol. 21, No. 2, 2015, pp. 152–158.
145. “Computer Automated Ergonomic Analysis Based on Motion Capture and Assembly Simulation,” S. C. Puthenveetil, C. P. Daphalapurkar, W. Zhu, M. C. Leu, X. F. Liu, J. K. Gilpin-Mcminn, and S. D. Snodgrass, **International Journal of Virtual Reality**, Vol. 19, 2015, pp. 119-128.
146. “Design and Implementation of a Broker for Cloud Additive Manufacturing Services,” V. P. Modekurthy, K. K. Fletcher, X. F. Liu, and M. C. Leu, **ASME Journal of Manufacturing Science and Engineering**, Vol. 137, No. 4, August 2015, Paper # 040904 (10 pages).
147. “Modeling and Characterization of Fused Deposition Modeling Tooling for Vacuum Assisted Resin Transfer Molding Process,” H. Li, G. Taylor, V. Bheemreddy, O. Iyibilgin, M. Leu and K. Chandrashekhara, **Additive Manufacturing Journal**, Vol. 7, 2015, pp. 64-72.
148. “Adaptive Rastering Algorithm for Freeform Extrusion Fabrication Processes,” A. Ghazanfari, W. Li, and M. C. Leu, **Journal of Virtual and Physical Prototyping**, Vol. 10, No. 3, 2015, pp. 163-172.
149. “Experimental and Computational Evaluation of Water Management and Performance Characteristics of a Bio-inspired PEM Fuel Cell,” B. P. Saripella, M. C. Leu, and U. O. Koylu, **ASME Journal of Fuel Cell Science and Technology**, Vol. 12, December 2015, pp. 061007-1 – 061007-9.
150. “Modeling and Analysis of Paste Freezing in Freeze-Form Extrusion Fabrication of Thin-Wall Parts via a Lumped Method,” M. Li, A. Ghazanfari, W. Li, R. G. Landers, and M. C. Leu, **Journal of Materials Processing Technology**, Vol. 237, November 2016, pp. 163-180.
151. “Advanced Ceramic Components with Embedded Sapphire Optical Fiber Sensors for High Temperature Applications,” A. Ghazanfari, W. Li, M. C. Leu, Y. Zhuang, and J. Huang, **Materials and Design**, Vol. 112, December 2016, pp. 197-206.
152. “Powder Characterization Techniques and Effects of Powder Characteristics on Part Properties in Powder-Bed Based Additive Manufacturing: A Review,” A. T. Sutton, C. S. Kriewall, M. C. Leu and J. W. Newkirk, **Journal of Virtual and Physical Prototyping**, Vol. 12, No. 1, 2017, pp. 3-29.
153. “3D Bioprinting of Stem Cells and Polymer/Bioactive Glass Composite Scaffolds for Tissue Engineering,” C. Murphy, K. Kolan, W. Li, J. Semon, D. Day and M. C. Leu, **International Journal of Bioprinting**, Vol. 3, No. 1, 2017, pp. 1-11.
154. “Extrusion-On-Demand Methods for High Solids Loading Ceramic Paste in Freeform Extrusion Fabrication,” W. Li, A. Ghazanfari, M. C. Leu, and R. G. Landers, **Journal of Virtual and Physical Prototyping**, Vol. 12, No. 2, 2017, pp. 1-13.
155. “Freeform Extrusion Fabrication of Titanium Fiber Reinforced 13-93 Bioactive Glass Scaffolds,” A. Thomas, K. C. R. Kolan, M. C. Leu and G.

- E. Hilmas, **Journal of Mechanical Behavior of Biomedical Materials**, Vol. 69, 2017, pp. 153-162.
156. "A Novel Freeform Extrusion Fabrication Process for Producing Solid Ceramic Components with Uniform Layered Radiation Drying," A. Ghazanfari, W. Li, M. C. Leu, and Gregory E. Hilmas, **Additive Manufacturing Journal**, Vol. 15, 2017, pp. 102–112.
157. "A Hybrid Three-Dimensionally Structured Electrode for Lithium-ion Batteries via 3D Printing," J. Li, M. C. Leu, R. Panat, and J. Park, **Materials and Design**, Vol. 119, 2017, pp. 417-424.
158. "Experimental Investigation of Effects of Build Parameters on Flexural Properties in Fused Deposition Modeling Parts," K. P. Motaparti, G. Taylor, M. C. Leu, K. Chandrashekhara, J. Castle and M. Matlack, **Journal of Virtual and Physical Prototyping**, Published Online: April 12, 2017, Pages 1-14.
159. "Mechanical Characterization of Parts Produced by Ceramic On-Demand Extrusion Process," A. Ghazanfari, W. Li, M. C. Leu, J. L. Watts, and G. E. Hilmas, **International Journal of Applied Ceramic Technology**, Vol. 14, No. 3, May/June 2017, pp. 486-494.
160. "Additive Manufacturing and Mechanical Characterization of High-Density, Fully Stabilized Zirconia," A. Ghazanfari, W. Li, D. McMillen, M. C. Leu, G. E. Hilmas, and J. Watts, **Ceramics International**, Vol. 43, No. 8, June 2017, pp. 6082-6088.
161. "Cyber-Physical Manufacturing Cloud: Architecture, Virtualization, Communication, and Testbed," X. F. Liu, M. R. Shahriar, S. M. Sunny, M. C. Leu, L. Hu, **Journal of Manufacturing Systems** (in press).
162. "Fabricating Ceramic Components with Water Dissolvable Support Structures by the Ceramic On-Demand Extrusion Process," W. Li, A. Ghazanfari, D. McMillen, M. C. Leu, and G. E. Hilmas, **Journal of Manufacturing Technology – CIRP Annals**, Vol. 66, No. 1, 2017 (in press).
163. "Materials for Additive Manufacturing," D. Bourell, J-P. Kruth, M. C. Leu, G. Levy, D. Rosen, A. M. Beese, and A. Clare, **Journal of Manufacturing Technology – CIRP Annals (STC "E" Keynote Paper)**, Vol. 66, No. 2, 2017 (in press).

#### 7e. Conference Papers

1. "Noise Generation by Circular Saws," M. C. Leu and D. C. Mote, Jr., **Proceedings of 6th Wood Machining Seminar**, University of California Forest Products Laboratory, Richmond, CA, Oct. 15-17, 1979, pp. 169-188.
2. "Identification of Sources of Noise in Circular Saws," N. Alvarado, M. C. Leu and C. D. Mote, Jr. **Proceedings of 7th Wood Machining Seminar**, University of California Forest Products Laboratory, Richmond, CA, Oct. 18-20, 1982, pp. 103-113.
3. "Use of Computer Graphics for Robotics Instruction," M. C. Leu and S. H. Park, **Proceedings of ASEE Frontiers in Education Conference**,

- Worcester Polytechnic Institute, Worcester, MA, Oct. 17-19, 1983, pp. 173-178.
4. "Computer Graphic Simulation of Robot Kinematics and Dynamics," M. C. Leu and R. Mahajan, **Proceedings of ROBOTS 8 Conference**, Detroit, Michigan, June 4-7, 1984, pp. 4.80-4.101.
  5. "Application of PADL-2 Solid Modeler to Robot Simulation," M. C. Leu and S. H. Park, **Proceedings of 3rd Canadian CAD/CAM and Robotics Conference**, Ontario, Canada, June 19-21, 1984, pp. 10.13-10.19.
  6. "Solid Geometric Modeling Towards Robot Intelligence," **Proceedings of NSF Study on Supercomputers in Mechanical Systems Research**, Lawrence Livermore National Laboratory, Livermore, California, Sept. 12-14, 1984; **Cornell Theory Center Forefronts**, Vol. 1, No. 4, August 1985.
  7. "Elements of Computer Graphic Robot Simulation," M. C. Leu, **Proceedings of Computers in Engineering Conference**, American Society of Mechanical Engineers, Boston, MA, August 4-8, 1985, Vol. 1, pp. 65-72.
  8. "Application of Optimization Theory to Design of Torque Motors," M. C. Leu, D. L. Bartel, E. Tokuda, and R. A. Aubrecht, ASME Paper No. 85-DET-98, **Proceedings of 11th Design Automation Conference**, Cincinnati, OH, Sept. 10-13, 1985.
  9. "An Experimental Graphic Simulation Program for Off-Line Robot Program Verification," J. D. Weld and M. C. Leu, **Proceedings of 4th Canadian CAD/CAM and Robotics Conference**, Ontario, Canada, June 1985, pp. 5.1-5.4.
  10. "Effect of Manipulator Flexibility on Static Deflection," V. Dukovski and M. C. Leu, **Proceedings of 4th Canadian CAD/CAM and Robotics Conference**, Ontario, Canada, June 1985, pp. 14.15-14.17.
  11. "An Analytical and Experimental Study of the Stiffness of Robot Manipulators with Parallel Mechanism," M. C. Leu, V. Dukovski, and K. K. Wang, **Proceedings of Symposium on Robotics and Manufacturing Automation**, ASME Winter Annual Meeting, 1985, pp. 137-143.
  12. "Design and Analysis of Robotic Assembly for a Printer Compensation Arm," M. S. Weinstein, M. C. Leu, and F. A. Infelise, **Proceedings of Symposium on Robotics and Manufacturing Automation**, ASME Winter Annual Meeting, 1985, pp. 137-143.
  13. "INEFFABELLE - An Environment for Interactive Computer Graphic Simulation of Robotic Applications," D. K. Pai and M. C. Leu, **Proceedings of IEEE International Conference on Robotics and Automation**, San Francisco, CA, April 7-10, 1986, pp. 897-903.
  14. "Computer Graphics Based Simulation for NC Part Program Verification," J. D. Weld and M. C. Leu, **Proceedings of 5th Canadian CAD/CAM and Robotics Conference**, Ontario, Canada, June 1986, pp. 5.1-5.4.
  15. "The Design and Development of a General Purpose Gripper," E. R. Snow and M. C. Leu, **Proceedings of ROBOTS 11 and 17th ISIR Conference**, Chicago, IL, April 26-30, 1987, pp. 8.23-8.34.

16. "Robot Accuracy and Its Improvement – an Experimental Investigation," M. C. Leu and V. Dukovski, **Proceedings of NAMRC XV Conference**, Lehigh University, Bethlehem, PA, May 27-29, 1987, pp. 676-681.
17. "Real-Time Motion Control and NC Code Verification," M. C. Leu, **Proceedings of IBM ACIS University Conference**, Boston, MA, June 27-30, 1987, pp. 284-298.
18. "Feasible Tasks for Manipulators with Uncertainty and Compliance," D. K. Pai and M. C. Leu, **Proceedings of IEEE International Conference on Systems, Man and Cybernetics**, Alexandria, VA, Oct. 20-23, 1987, pp.6-13.
19. "Optimal Planning of Trajectories for Robots," M. C. Leu and S. K. Singh, in *CAD Based Programming for Sensory Robots*, **NATO ASI Series on Computer and System Sciences**, Vol. 50, 1988, pp. 467-477.
20. "Identification of Parameters for Manipulator Dynamics," S. K. Singh and M. C. Leu, **Proceedings of Japan-USA Symposium on Flexible Automation**, Minneapolis, MN, July 1988, pp. 51-58.
21. "Optimal Polynomial Trajectories for Robot Manipulators," S. K. Singh and M. C. Leu, **Proceedings of Japan-USA Symposium on Flexible Automation**, Minneapolis, MN, July 1988, pp. 265-270.
22. "A LISP-Based Environment for Simulation of Robot Applications," M. C. Leu and D. K. Pai, **3rd International Conference on CAD/CAM Robotics & Factories of the Future**, Southfield, MI, August 1988.
23. "Stereo Disparity Vision for Determining Object Contour Position," M. C. Leu and R. M. Pherwani, **Proceedings of Symposium on Manufacturing Metrology, ASME Winter Annual Meeting**, Chicago, IL, Nov. 27-Dec. 2, 1988, pp. 33-47.
24. "Generic Singularities of Robot Manipulators," D. K. Pai and M. C. Leu, **Proceedings of IEEE International Conference on Robotics and Automation**, Scottsdale, AZ, May 1989, pp. 738-744.
25. "Compliance and Jamming in Robotic Assembly," M. C. Leu, **Proceedings of Symposium on High-Tech Manufacturing: Meeting the Needs of Industry**, New Jersey Institute of Technology, Newark, NJ, May 17, 1989, pp. 9-12.
26. "Accurate Modeling of Brushless DC Motors for High Performance Applications, Part I: Linear Magnetic Structure," N. Hemati and M. C. Leu, **Proceedings of Symposium on Incremental Motion Control Systems and Devices**, Champaign, IL, June 20-22, 1989, pp. 79-88.
27. "Accurate Modeling of Brushless DC Motors for High Performance Applications, Part II: Presence of Magnetic Saturation," N. Hemati and M. C. Leu, **Proceedings of Symposium on Incremental Motion Control Systems and Devices**, Champaign, IL, June 20-22, 1989, pp. 89-96.
28. "Stability and Performance of a Control System with an Intelligent Limiter," S. Yang and M. C. Leu, **Proceedings of American Control Conference**, Pittsburgh, PA, June 21-23, 1989, pp. 1699-1705.
29. "Optimal Trajectory Planning of Robotic Manipulators Based on Global State Space Analysis," W. H. Zhu and M. C. Leu, in *Robotics Research-*



- 1989, DSC-Vol.14, **ASME Winter Annual Meeting**, San Francisco, CA, Dec. 10-15, 1989, pp.233-239.
30. "Modeling, Analysis and Simulation of Brushless DC Drive Systems," M. C. Leu, S. Liu and H. Zhang, Paper No. 89-WA/DSC-1, **ASME Winter Annual Meeting**, San Francisco, CA, Dec. 10-15, 1989.
  31. "Nonlinear Tracking Control of Brushless DC Motors for High Performance Application," N. Hemati and M. C. Leu, **Proceedings of 28th IEEE Conference on Decision and Control**, Tampa, FL, Dec. 13-15, 1989.
  32. "A Differential Equations Approach to Swept Volumes," D. Blackmore and M. C. Leu, **Proceedings of International Conference on Computer-Integrated Manufacturing**, Troy, NY, May 21-23, 1990, pp.143-149.
  33. "Planning Optimal Robot Trajectories by Cell Mapping," W. H. Zhu and M. C. Leu, **Proceedings of IEEE International Conference on Robotics and Automation**, Cincinnati, OH, May 13-15, 1990, pp.1730-1735.
  34. "A Cell Space Refinement Technique for Optimal Trajectories of Manipulators," W. H. Zhu and M. C. Leu, **Proceedings of Japan-USA Symposium on Flexible Automation**, Kyoto, JAPAN, July 9-13, 1990, pp. 441-446.
  35. "Optimal Manipulator Motion Planning in Constrained Work Space," S. K. Singh and M. C. Leu, **Proceedings of Japan-USA Symposium on Flexible Automation**, Kyoto, JAPAN, July 9-13, 1990, pp. 425-432.
  36. "Effect of Robot Manipulator's Uncertainty and Compliance on Task Feasibility," D. K. Pai and M. C. Leu, **Proceedings of Japan-USA Symposium on Flexible Automation**, Kyoto, JAPAN, July 9-13, 1990, pp. 979-984.
  37. "Macintosh II<sub>x</sub> and IBM PC Based Automatic Control Laboratory," Y. Park M. C. Leu, and G. Y. Zhou, **Proceedings of ASME Computers in Engineering Conference**, Boston, MA, Aug. 5-9, 1990.
  38. "Robust Nonlinear Control of a Direct-Drive Robotic Arm Actuated by a Brushless DC Motor," N. Hemati, J. S. Thorp and M. C. Leu, **Proceedings of IEEE Conference on Systems Engineering**, Pittsburgh, PA, Aug. 9-11, 1990.
  39. "Mapping of Kinematic and Dynamic Parameters for Coupled Manipulators," Z. Ji and M. C. Leu, **Proceedings of ASME Mechanisms Conference**, Chicago, IL, Sept. 16-19, 1990.
  40. "Measurement and Assessment of Topography for Machined Surfaces," G. Y. Zhou, M. C. Leu, and S. X. Dong, **Proceedings of Symposium on Microstructural Evolution in Metal Processing**, PED-Vol. 46, ASME Winter Annual Meeting, Dallas, TX, Nov. 25-30, 1990, pp. 89-100.
  41. "Petri Net Modeling of a Flexible Assembly Station for Printed Circuit Boards," M. Zhou and M. C. Leu, **Proceedings of IEEE Robotics & Automation Conference**, Sacramento, CA, April 9-11, 1991, pp. 2530-2535.
  42. "Knowledge-Based System for Designing PCB with High-Speed and High-Frequency Circuit," W. X. Huang, Q. Xi and M. C. Leu, **Proceedings of**

- NEPCON West Conference, Anaheim, CA., Feb. 24-28, 1991, pp. 1478-1487.
43. "Computer-Aided Process Planning for Printed Circuit Board Assembly," M. C. Leu and Z. Ji, **Proceedings of NEPCON East Conference**, Boston, MA, June 10-13, 1991, pp. 289-297.
  44. "Manufacturing Program Activities Supported by AT&T," M. C. Leu and K. O'Brien, **Proceedings of AT&T Manufacturing Technology Special Grants Program Symposium**, Merrimack, MA, June 12-13, 1991.
  45. "Modeling and Analysis of Parts Mating in Vibration Assisted Compliant Assembly," M. C. Leu and Y. Liu, **Proceedings of ASME Conference on Flexible Assembly Systems**, Miami Beach, FL, Sept. 22-25, 1991, pp. 9-20.
  46. "Design Considerations for Vibration Assisted Compliant Assembly," Y. Liu and M. C. Leu, **Proceedings of ASME Conference on Flexible Assembly Systems**, Miami Beach, FL, Sept. 22-25, 1991, pp. 21-29.
  47. "Application of Linear Assignment Model for Planning of Robotic Assembly of Printed Circuit Boards," Z. Ji, M. C. Leu, and H. Wong, **Proceedings of Symposium on Manufacturing Processes and Materials Challenges in Microelectronic Packaging, ASME Winter Annual Meeting**, Atlanta, GA, Dec. 1-6, 1991, pp. 35-41.
  48. "Representation of Sweeps and Swept Volumes via Differential Equations," M. C. Leu and D. Blackmore, **Proceedings of 1992 NSF Design and Manufacturing Systems Conference**, Atlanta, GA, Jan. 8-10, 1992, pp. 731-735.
  49. "Classification and Analysis of Robot Swept Volumes," D. Blackmore, M. C. Leu and W. Wang, **Proceedings of Japan-USA Symposium on Flexible Automation**, San Francisco, CA, July 13-15, 1992, pp. 69-76.
  50. "Nonlinear Vibration of a Robot Manipulator with Compliant Joints," M. C. Leu and W. H. Zhu, **Proceedings of Japan-USA Symposium on Flexible Automation**, San Francisco, CA, July 13-15, 1992, pp. 693-700.
  51. "Genetic Algorithm for Solving Printed Circuit Board Assembly Planning Problems," M. C. Leu, H. Wong and Z. Ji, **Proceedings of Japan-USA Symposium on Flexible Automation**, San Francisco, CA, July 13-15, 1992, pp. 1579-1586.
  52. "Investigation of Topography of Waterjet Generated Surfaces," G. Zhou, M. C. Leu, E. Geskin, Y. Chung, and J. Chao, **Proceedings of Symposium on Engineering Surfaces, ASME Winter Annual Meeting**, Anaheim, CA, Nov. 8-13, 1992, pp. 191-202.
  53. "Optimal and Robust Controllers for High-Performance and Reliable Motion Control in Automation," M. C. Leu, **Proceedings of Modern Engineering and Technology Seminar**, Taipei, TAIWAN, Dec. 6-15, 1992, pp. 39-59.
  54. "Application and Implementation of the Sweep Differential Equation Method," M. C. Leu and D. Blackmore, **Proceedings of 1993 NSF Design and Manufacturing Systems Conference**, Charlotte, NC, Jan. 6-8, 1993, pp. 1411-1418.

55. "Adaptation of Operator Rates for an Order Based Genetic Algorithm," H. Wong and M. C. Leu, **IEEE Regional Conference on Control Systems**, New Jersey Institute of Technology, Newark, NJ, Aug. 13-14, 1993, pp. 66-69.
56. "Applying Modular Manufacturing Language (M<sup>2</sup>L) to CIM Control Software Development," M. Zhou, M. C. Leu, P. R. Mitta, and P. F. Lilienthal, II, **Proceedings of the 9th International Conference on CAD/CAM, Robotics and Factories of the Future**, Newark, NJ, Aug. 18-20, 1993, pp. 87-92.
57. "The Effects of Robotic Traverse System Dynamics on the Surface Generated by Abrasive Waterjet," J. Chao, E. Geskin, and M. C. Leu, **Proceedings of the 9th International Conference on CAD/CAM, Robotics and Factories of the Future**, Newark, NJ, Aug. 18-20, 1993.
58. "The Flow Approach to CAD/CAM Modeling of Swept Volume," H. Jiang, D. Blackmore, and M. C. Leu, **Proceedings of the 9th International Conference on CAD/CAM, Robotics and Factories of the Future**, Newark, NJ, Aug. 18-20, 1993, pp. 341-346.
59. "Development and Implementation of Linear Assignment Algorithm for Assembly of PCB Components," Z. Ji, M. C. Leu, and H. Wong, **Proceedings of ASME International Electronics Packaging Conference**, Binghamton, NY, Sept. 29-Oct. 2, 1993, pp. 365-371.
60. "Application of Sweep Differential Equation Method to Multiaxis NC Machining," M. C. Leu and D. Blackmore, **Proceedings of Sino-German Joint Symposium on Precision and High-Speed Manufacturing Technology**, Taipei, TAIWAN, Oct. 4-5, 1993.
61. "Further Developments of the Sweep Differential Equation Approach," M. C. Leu and D. Blackmore, **Proceedings of 1994 NSF Grantees Conference on Design, Manufacturing and Industrial Innovation**, Jan. 5-7, 1994, pp. 63-64.
62. "Impact Model for Robotic Peg-in-Hole Assembly," H-T. Liao and M. C. Leu, **Proceedings of Third International Conference on Automation Technology**, Taipei, TAIWAN, July 6-9, 1994, pp. 259-266.
63. "Application of Genetic Algorithm for Optimization of Printed Circuit Board Assembly Systems," H. Wong and M. C. Leu, **Proceedings of Third International Conference on Automation Technology**, Taipei, TAIWAN, July 6-9, 1994.
64. "Application of Sweep Differential Equation Approach to 5-Axis Machining," Z. Deng, M. C. Leu, and D. Blackmore, **Proceedings of Third International Conference on Automation Technology**, Taipei, TAIWAN, July 6-9, 1994, pp. 135-141, pp. 327-334.
65. "Improved Flow Approach for Swept Volumes," D. Qin, D. Blackmore, and M. C. Leu, **Proceedings of 1994 Japan-USA Symposium on Flexible Automation**, Kobe, JAPAN, July 11-13, 1994, pp. 1191-1198.
66. "Application of Sweep Differential Equation Approach to Nonholonomic Motion Planning," Z. Deng, M. C. Leu, and D. Blackmore, **Proceedings of**

- 1994 Japan-USA Symposium on Flexible Automation**, Kobe, JAPAN, July 11-13, 1994, pp. 1025-1032.
67. "Implementation of SDE Method to Represent Cutter Swept Volumes in 5-Axis NC Milling," M. C. Leu, D. Blackmore, L. Wang, and K. G. Pak, **Proceedings of the International Conference on Intelligent Manufacturing**, Wuhan, P.R.C., June 10-13, 1995.
  68. "Improvement of the Waterjet Based Precision Cleaning Technology," P. Meng, E.S. Geskin, L. Timenestskiy, and M.C. Leu, **Proceedings of 8th American Waterjet Conference**, Houston, TX, Aug. 26-29, 1995.
  69. "An Algorithm for Computing Swept Volumes," D. Blackmore, M.C. Leu, D. Qin, and L. Wang, **Fourth SIAM Conference on Geometric Design**, Nashville, Tennessee, Nov. 6-9, 1995.
  70. "Robot Motion Planning by Rules and Strategies Based on Reinforcement Learning Scheme," K. Naruse, M. C. Leu, and Y. Kakazu, **Proceedings of Artificial Neural Networks in Engineering Conference**, Nov. 12-15, 1995, St. Louis, MO, pp. 891-896.
  71. "Multi-Lifecycle Design Strategies: Applications in Plastics for Durable Goods," D. H. Sebastian, M. Xanthos, E. Ehrenkrantz, and M.C. Leu, **Proceedings of International Conference on Lifecycle Modeling for Innovative Products and Processes**, Berlin, Germany, Nov. 29-Dec. 1, 1995, pp. 891-896.
  72. "Applications of SDE to Automated Motion Verification and Planning," M.C. Leu and D. Blackmore, **Proceedings of 1996 NSF Design and Manufacturing Grantees Conference**, Albuquerque, NM, Jan. 2-5, 1996.
  73. "Analysis of Thermal Stresses in Investment Casting with Epoxy Patterns," W. Yao, H. Wong, and M. C. Leu, **Proceedings of North America Stereolithography User Group Conference**, San Diego, CA, March 10-14, 1996.
  74. "Waterjet Based Precision Cleaning Technology," E. S. Geskin, P. Meng, M. C. Leu, L. Timenetskiy, **Proceedings of Precision Cleaning '96 Conference**, Anaheim, CA, May 14-16, 1996, pp. 315-334.
  75. "An Algorithm for Vibration Assisted Parts Mating," M. C. Leu and H. Liao, **Proceedings of 28th CIRP International Seminar on Manufacturing Systems**, Johannesburg, South Africa, May 15-17, 1996.
  76. "Nonholonomic Vehicle Motion Planning by Generating a Mapping from Configuration to Control Output with Reinforcement Learning," K. Naruse and M. C. Leu, **Japan-USA Symposium on Flexible Automation**, Boston, MA, July 7-10, 1996, pp. 609-614.
  77. "Effect of Link Length, Population Size, and Mutation Rate on the Convergence of an Order-Based Genetic Algorithm," H. Wong and M. C. Leu, **Proceedings of Japan-USA Symposium on Flexible Automation**, Boston, MA, July 7-10, 1996, pp. 1533-1537.
  78. "Cleaning with High-Pressure Directed Waterjets," P. Meng, M. C. Leu, E.S. Geskin, and L. Timenetskiy, **Proceedings of Japan-USA Symposium on Flexible Automation**, Boston, MA, July 7-10, 1996, pp. 1131-1138.

79. "CAD-Directed Inspection Planning for Coordinate Measurement Machines," K-C. Fan and M. C. Leu, **Proceedings of Automation '96**, Hsinchu, TAIWAN, July 8-11, 1996.
80. "Nonholonomic Vehicle Motion Planning by Reinforcement Learning with World Model Construction," K. Naruse and M. C. Leu, **Proceedings of Adaptive Distributed Parallel Computing Symposium**, Dayton, OH, August 8-9, 1996, pp. 103-111.
81. "Waterjet In-Situ Reactor Cleaning," P. Meng, E. S. Geskin, M. C. Leu and L. Timenetskiy, **Proceedings of 13th International Conference on Jetting Technology**, Sardinia, Italy, October 29-31, 1996.
82. "Determination of Flat-End Cutter Orientation in 5-Axis Machining," Z. Deng, M. C. Leu, D. Blackmore, and L. Wang, **Proceedings of Symposium on Rapid Response Manufacturing, ASME International Mechanical Engineering Conference**, Atlanta, GA, Nov. 17-22, MED-Vol.4, 1996, pp.73-80.
83. "An Analytical Study of Investment Casting with Webbed Epoxy Patterns," W. L. Yao, H. Wong, M. C. Leu, and D. H. Sebastian, **Proceedings of Symposium on Rapid Response Manufacturing, ASME International Mechanical Engineering Conference**, Atlanta, GA, Nov. 17-22, MED-Vol. 4, 1996, pp. 11-15.
84. "Swept Volume Approach as an Integral Part of CAD/CAM System for 5-Axis NC Machining," L. Wang, M. C. Leu, and D. Blackmore, **Proceedings of International Conference on Manufacturing Automation**, Hong Kong, April 28-30, 1997, pp. 1161-1166.
85. "Kinematics Analysis of 5-Axis NC Milling Machines and Its Application to NC Verification," L. Wang, M. C. Leu, and D. Blackmore, **Proceedings of International Conference on Manufacturing Automation**, Hong Kong, April 28-30, 1997, pp. 1167-1172.
86. "Autonomous Vehicle Navigation by Layered Learning and Planning", K. Naruse, and M. C. Leu, **29th CIRP International Seminar on Manufacturing Systems**, Osaka, Japan, May 11-13, 1997, pp. 87-92.
87. "Generating Swept Solids for General 7-Parameter APT Tools Using SEDE Method," L. Wang, M. C. Leu, and D. Blackmore, **Proceedings of 4th ACM Symposium on Solid Modeling and Applications**, Atlanta, GA, May 14-16, 1997, pp. 364-375.
88. "Mathematical Modeling of Waterjet Cleaning," P. Meng, E. Geskin, M. C. Leu, S. M. DeCaro, and Z. G. Huang, **Proceedings of 9th American Waterjet Conference**, Dearborn, Michigan, August 23-29, 1997, pp. 509-523.
89. "Rapid tooling of Dies and Molds Through Rapid Fabrication of EDM Electrodes," M. C. Leu and B. Yang, **North America Stereolithography Users Group Meeting**, San Antonio, TX, March 1998.
90. "Machine Tool Research at United States Universities," B. M. Kramer and M. C. Leu, **Proceedings of AMT Machine Tool Technology Forum**, Orlando, FL, April 2-3, 1998.

91. "A Feasibility Study of EDM Tooling Using Metal Plated Stereolithography Models," M. C. Leu, B. Yang and W. L. Yao, **Proceedings of North America Manufacturing Research Conference XXVI**, Atlanta, GA, May 19-22, 1998.
92. "Cell Mapping Based Fuzzy Control of Car Parking," M.C. Leu and T-Q. Kim, **Proceedings of IEEE International Conference on Robotics and Automation**, Leuven, BELGIUM, May 16-20, 1998, pp. 2494-2499.
93. "Artificial Neural Networks in Manufacturing Processes: Monitoring and Control," H.S. Cho and M.C. Leu, **Proceeding of IFAC Symposium on Information and Control in Manufacturing**, France, June 22-25, 1998.
94. "Motion Planning for Autonomous Vehicles by Reinforcement Learning," K. Naruse and M. C. Leu, **Proceedings of Japan-USA Symposium on Flexible Automation**, Ohtsu, Shiga, JAPAN, July 12-15, 1998.
95. "Research and Development in Rapid Prototyping and Tooling in the United States", M. C. Leu and W. Zhang, **Proceedings of the International Conference on Rapid Prototyping and Manufacturing**, Tsinghua University, Beijing, China, July 21-23, 1998.
96. "An Exposure Based Method for Analyzing the Influence of SLA Parameters on Part Curl Distortion", W. Zhang, L. A. Hanesian, M. C. Leu, and H. S. Cho, **Proceedings of the International Conference on Rapid Prototyping and Manufacturing**, Tsinghua University, Beijing, China, July 21-23, 1998.
97. "Analysis of Shell Cracking in Investment Casting with Laser Stereolithography Patterns," W. L. Yao and M. C. Leu, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 10-12, 1998, pp. 427-434.
98. "Rapid Freezing Prototyping with Water," W. Zhang, M. C. Leu, Z. Ji, and Y. Yan, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 10-12, 1998, pp. 185-192.
99. "Deformed Swept Volume Analysis to NC Machining Simulation with Cutter Deflection," M. C. Leu, D. Blackmore, and B. Maiteh, **Proceedings of Sculptured Surface Machining Conference**, Auburn Hills, MI, Nov. 9-11, 1998.
100. "Thermal Stresses Generated by Burnout of Laser Stereolithography Patterns in Investment Casting," W. L. Yao and M. C. Leu, **Proceedings of Rapid Prototyping and Manufacturing Conference**, Rosemont, IL, April 20-22, 1999.
101. "An Experimental and Analytical Study of Ice Part Fabrication with Rapid Freeze Prototyping," W. Zhang, M. C. Leu, G. H. Sui, and Z. Ji, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 1999.
102. "Assessment of Environmental Performance of Rapid Prototyping and Rapid Tooling Processes," Y. Luo, M. C. Leu, and Z. Ji, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 1999.

103. "Rapid Tooling by Integrating Electroforming and Solid Freeform Fabrication," B. Yang and M. C. Leu, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 1999.
104. "Swept-Volume Computation for Virtual Reality Applications of Machining Simulation," B. Maith, M. C. Leu, D. Blackmore, G. Liu, and L. Abdel-Malek, **Proceedings of Industrial Virtual Reality Symposium**, Chicago, IL, Nov. 1-2, 1999, pp. 3-10.
105. "Environmental Performance Analysis of Solid Freedom Fabrication Processes," Y. Luo, Z. Ji, R. Caudill, and M. C. Leu, **Proceedings of IEEE International Symposium on Electronics and the Environment**, Danvers, MA, May 11-13, 1999.
106. "An Experimental and Analytical Study of Ice Part Fabrication with Rapid Freeze Prototyping," M. C. Leu, W. Zhang, and G. H. Sui, **Proceedings of SME Rapid Prototyping and Manufacturing Conference**, Rosemont, IL, April 11-13, 2000.
107. "Rapid Electroforming Tooling," B. Yang, and M. C. Leu, **Proceedings of Materials Research Society Spring Meeting**, San Francisco, CA, April 24-28, 2000.
108. "Investment Casting with Ice Patterns Made by Rapid Freeze Prototyping," W. Zhang, C. Feng, R. Ren, R. Zhang, Q. Lu, Y. Yan, and M. C. Leu, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 7-9, 2000.
109. "Determination and Improvement of Building Speed in Rapid Freeze Prototyping," W. Zhang, G. H. Sui, and M. C. Leu, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 7-9, 2000.
110. "Study on Water Deposition in Rapid Freeze Prototyping," G. H. Sui, W. Zhang, and M. C. Leu, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 7-9, 2000.
111. "Planning of a Multi-Disciplinary Rapid Product Realization Program," M. C. Leu, F. Liou, D. A. McAdams, V. Allada, B. Ghahramani, S. Agarwal, and R. H. Hall, **Proceedings of International Conference on Engineering Education**, Taipei, TAIWAN, August 14-16, 2000.
112. "The Surface Roughness of Ice Parts Built by Rapid Freeze Prototyping", M. C. Leu and G. Sui, **Proceedings of SME Rapid Prototyping and Manufacturing Conference**, Cincinnati, OH, May 2001.
113. "A Product focused Manufacturing Curriculum," F. Liou, V. Allada, M. C. Leu, R. Mishra, A. Okafor, and A. Agarwal, **Proceedings of ASEE Annual Conference**, Montreal, CANADA, June 16-19, 2002.
114. "Image Processing and Graphics Rendering for Augmented Reality," M. C. Leu, S. Agarwal, K. Shah, and A. Aggarwal, **Proceedings of Japan-USA Symposium on Flexible Automation**, Hiroshima, JAPAN, July 14-16, 2002, pp. 295-302.
115. "A Study on Effects of Process Parameters in Rapid Freeze Prototyping," F. D. Bryant, G. Sui, and M. C. Leu, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 5-7, 2002.

116. "Investigation of Part Accuracy and Surface Roughness in Rapid Freeze Prototyping Based Investment Casting," Q. Liu and M. C. Leu, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 5-7, 2002.
117. "Product Development Curriculum with Integrated Manufacturing Processes," F. Liou, V. Allada, M. C. Leu, R. Mishra, A. Okafor, and A. Agarwal, **Proceedings of ASEE Midwest Section Meeting**, Norman, OK, September, 2002.
118. "Creating Freeform Model by Carving Virtual Workpiece with Haptic Interface," M. C. Leu, X. Peng, and A. Velivelli, **Proceedings of ASME International Mechanical Engineering Conference**, New Orleans, LO, November 17-22, 2002.
119. "Virtual Sculpting with Haptic Interface," M. C. Leu and X. Peng, **Proceedings of NSF Design, Service and Manufacturing Grantees and Research Conference**, Birmingham, Alabama, January 6-9, 2003..
120. "Investigation of Investment Casting with Rapid Freeze Prototyping Generated Ice Patterns," M. C. Leu and Q. Liu, **Proceedings of NSF Design, Service and Manufacturing Grantees and Research Conference**, Birmingham, Alabama, January 6-9, 2003..
121. "An Integrated And Distributed Environment For A Manufacturing Capstone Course," F. Liou, V. Allada, M. C. Leu, R. Mishra, A. Okafor, and A. Agrawal, **Proceedings of the 2003 ASEE Annual Conference & Exposition**, Nashville, TN, June 22-26, 2003.
122. "Bone Surgery Simulation with Virtual Reality," X. Peng, X. Chi, J. Ochoa, and M. C. Leu, **Proceedings of ASME Design Engineering Computers and Information in Engineering Conferences**, Chicago, IL, September 2-6, 2003.
123. "Fabrication of Dental Crowns by Investment Casting with Rapid Freeze Prototyping Generated Ice Patterns," Q. Liu and M. C. Leu, **Proceedings of ASM Materials & Process for Medical Devices Conference**, Anaheim, CA, September 8-10, 2003, pp. 438-443.
124. "Small Business Technology Transfer on Solid Freeform Fabrication Based Dental Reconstruction," M. C. Leu and S. M. Schmitt, **Proceedings of ASEE Midwest Section Meeting**, September 10-12, 2003, Rolla, Missouri.
125. "Training in Virtual Environments for First Responders," M. C. Leu, M. G. Hilgers, S. Agarwal, R. H. Hall, T. Lambert, R. Albright, and K. Nebel, **Proceedings of ASEE Midwest Section Meeting**, September 10-12, 2003, Rolla, Missouri.
126. "Working with Industry Through a Manufacturing Capstone Course," F. Liou, V. Allada, M. C. Leu, R. Mishra, A. Okafor, and A. Agrawal, **Proceedings of ASEE Midwest Section Meeting**, September 10-12, 2003, Rolla, Missouri
127. "Rapid Freeze Prototyping for Investment Casting," V. L. Richards, M. C. Leu and Q. Liu, **Proceedings of the 51st Investment Casting Institute Annual Technical Conference**, Cleveland, OH, November 2-5, 2003.



128. "Investment Casting with Ice Patterns from Rapid Freeze Prototyping," M. C. Leu, Q. Liu and V. L. Richards, **Proceedings of NSF Design, Service and Manufacturing Grantees and Research Conference**, Dallas, Texas, January 5-8, 2004.
129. "Rapid Freeze Prototyping of Ice patterns for Casting Dental Restorations," M. C. Leu, V. Richards, and S. M. Schmitt, **Proceedings of NSF Design, Service and Manufacturing Grantees and Research Conference**, Dallas, Texas, January 5-8, 2004.
130. "Interactive Freeform Modeling with Force Feedback," M. C. Leu, X. Peng, and X. Chi, **Proceedings of NSF Design, Service and Manufacturing Grantees and Research Conference**, Dallas, Texas, January 5-8, 2004.
131. "Recognition of American Sign Language Gestures with a Sensory Glove," H. G. Wang, N. N. Sarawate, and M. C. Leu, **Proceedings of Japan-USA Symposium on Flexible Automation**, Denver, Colorado, July 19-21, 2004.
132. "Interactive Virtual Sculpting with Force Feedback," X. Peng and M. C. Leu, **Proceedings of Japan-USA Symposium on Flexible Automation**, Denver, Colorado, July 19-21, 2004.
133. "Study on Incorporating Support Material in Rapid Freeze Prototyping," F. D. Bryant and M. C. Leu, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 2-4, 2004.
134. "Study of Ceramic Slurries for Investment Casting with Ice Patterns," Q. Liu, M. C. Leu, H. Jose, and V. L. Richards, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 2-4, 2004.
135. "Training in Affectively Intense Virtual Environments," L. M. Wilfred, R. H. Hall, M. G. Hilgers, M. C. Leu, J. M. Hortenstine, C. P. Walker and M. Reddy, **Proceedings of E-Learn: World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education**, November 2004, pp. 2233-2240. (This paper received an Outstanding Paper Award.)
136. "American Sign Language Word Recognition with a Sensory Glove Using Artificial Neural Networks," C. Oz, N. Sarawate, and M. C. Leu, **Proceedings of ANNIE Conference**, St. Louis, MO, November 7-10, 2004.
137. "Surface Reconstruction from Dixel Data for Virtual Sculpting," X. Peng, W. Zhang, S. Asam and M. C. Leu, **Proceedings of ASME International Mechanical Engineering Conference**, Anaheim, CA, November 14-19, 2004.
138. "Modeling of Haptic Rendering for Virtual Bone Surgery," X. Chi, M. C. Leu, and J. A. Ochoa, **Proceedings of ASME International Mechanical Engineering Conference**, Anaheim, CA, November 14-19, 2004.
139. "Finite Element Analysis of Water Droplet Solidification in Rapid Freeze Prototyping," Q. Liu and M. C. Leu, **Proceedings of ASME International Mechanical Engineering Conference**, Anaheim, CA, November 14-19, 2004.
140. "Center for Aerospace Manufacturing Technologies - A University/DoD/Industry Collaboration," R. L. Martin, M. C. Leu, J. Tiley and J. Morgan, **Proceedings of the 2004 Defense Manufacturing Conference**, Nov. 29- Dec. 2, 2004, Las Vegas, NE.

141. "Virtual Environments for Training First Responders -- FiRSTe," M. G. Hilgers, M. C. Leu, R. H. Hall, S. Agarwal, T. Lambert, R. Albright, and K. Nebel, **Proceedings of The Interservice/Industry Training, Simulation and Education Conference (I/ITSEC)**, December 6-9, 2004, Orlando, FL.
142. "Strength of Ceramic Molds Used in Investment Casting with Ice Patterns," Q. Liu and M. C. Leu, **Proceedings of 2005 NSF Design, Service and Manufacturing Grantees and Research Conference**, Scottsdale, AZ, January 4-7, 2005.
143. "Dental Restorations Cast From Rapid Freeze Prototyped Ice Patterns," S. Schmitt, M. C. Leu and F. Bryant, **Proceedings of 2005 NSF Design, Service and Manufacturing Grantees and Research Conference**, Scottsdale, AZ, January 4-7, 2005.
144. "A Reward-Based Job Shop Scheduling Heuristic," S. E., Grasman, C. Saygin, M. C. Leu, and E. Akcora, **Proceedings of 2005 NSF Design, Service and Manufacturing Grantees and Research Conference**, Scottsdale, AZ, January 4-7, 2005.
145. "Diagnosis and Treatment in the Digital Age," S. M. Schmitt and M. C. Leu, **Proceedings of 2005 SME Rapid Prototyping & Manufacturing Conference**, Dearborn, MI, May 10 - 12, 2005.
146. "Human-Computer Interaction System with Artificial Neural Network Using Motion Tracker and Data Glove," C. Oz and M. C. Leu, **Proceedings of First International Conference on Pattern Recognition and Machine Intelligence (PReMI'05)**, Kolkata, INDIA, December 18-22, 2005.
147. "Recognition of Finger Spelling of American Sign Language with ANN Using Position/Orientation Sensors and Data Glove," C. Oz and M. C. Leu, **Proceedings of 2nd International Symposium on Neural Networks**, Chongqing, CHINA, May 30 - June 1, 2005.
148. "Linguistic Properties Based on American Sign Language Recognition with Artificial Neural Network Using a Sensory Glove and Motion Tracker," C. Oz and M. C. Leu, **Proceedings of IWANN 2005**, Barcelona, Spain, June 8-10, 2005, pp. 1197-1205.
149. "A Computer Vision and HCI System for Robotic Arm Control," C. Oz, F. Ercal and M. C. Leu, **Proceedings of 35th International computer and Industrial Engineering Conference**, Istanbul, Turkey, June 2005, pp. 1457-1462.
150. "Freeze-form Extrusion Fabrication of Ceramics," T. Huang, M. S. Mason, G. E. Hilmas, and M. C. Leu, **Proceedings of 2005 Solid Freeform Fabrication Symposium**, Austin, TX, August 1-3, 2005.
151. "Engineering Applications of Virtual Reality," M. C. Leu and X. Peng, **Proceedings of 2nd International Conference on Advanced Research in Virtual and Rapid Prototyping**, Leiria, PORTUGAL, September 28-October 1, 2005.
152. "Large Medical Data Manipulation for Bone Surgery Simulation," X. Niu, X. Chi, and M. C. Leu, **Proceedings of ASME International Mechanical Engineering Conference**, Orlando, FL, November 5-11, 2005.

153. "Development of a Bone Drilling Simulation System with Force Feedback," X. Chi, X. Niu, V. S. Thakkar, and M. C. Leu, **Proceedings of ASME International Mechanical Engineering Conference**, Orlando, FL, November 5-11, 2005.
154. "Accuracy and Computational Complexity Analysis of Design Models Created by Virtual Sculpting," W. Zhang, X. Peng, M. C. Leu, and D. Blackmore, **Proceedings of ASME International Mechanical Engineering Conference**, Orlando, FL, November 5-11, 2005.
155. "An Internet Based Intelligent Argumentation System for Collaborative Engineering Design," X. Liu, S. Raorane, M. Zheng, and M. C. Leu, **Proceedings of 2006 International Symposium on Collaborative Technologies and Systems (CTS 2006)**, Las Vegas, NV, May 14-17, 2006.
156. "Development of A Low-cost Driving Simulation System for Safety Study and Training," Y. Wang, E. Zhang, W. Zhang, M. C. Leu, and H. Zeng, **Proceedings of the Driving Simulation Conference-Asia/Pacific 2006**, Tsukuba, JAPAN, May 31-June 2, 2006.
157. "Modeling of Hand-Arm Vibration," A. Joshi, R. Guttenberg, M. C. Leu, and S. L. Murray, **Proceedings of 1<sup>st</sup> American Conference on Human Vibrations**, Morgantown, WV, June 5-7, 2006.
158. "Freeform Extrusion of High Solids Loading Ceramic Slurries, Part I: Extrusion Process Modeling," M. S. Mason, T. Huang, R. G. Landers, M. C. Leu, and G. E. Hilmas, **Proceedings of 2006 Solid Freeform Fabrication Symposium**, Austin, TX, August 17-19, 2006.
159. "Freeform Extrusion of High Solids Loading Ceramic Slurries, Part II: Extrusion Process Control," M.S. Mason, T. Huang, R. G. Landers, M. C. Leu, and G. E. Hilmas, **Proceedings of 2006 Solid Freeform Fabrication Symposium**, Austin, TX, August 17-19, 2006.
160. "Shell Mold Investment Casting Process Using Ice Patterns," H. Jose, V. L. Richards, Q. Liu, M. C. Leu, R. Laurent and T. Hill, **Proceedings of Investment Casting Institute 54th Annual Technical Conference**, Milwaukee, WI, October 22 – 25, 2006.
161. "Interactive Soft Tissue Deformation Simulation Using Physics-Based Modeling," X. Chi, and M. C. Leu, **Proceedings of ASME International Mechanical Engineering Conference**, Chicago, IL, November 5-10, 2006.
162. "Modeling and Rendering for a Virtual Bone Surgery System," Q. Niu and M. C. Leu, **Proceedings of Medical Meets Virtual Reality Conference**, Long Beach, CA, February 6-9, 2007.
163. "Investment Casting with Ice Patterns and Comparison with Other Types of Rapid Prototyping Patterns," C. Huang, M. C. Leu, and V. L. Richards, **Proceedings of 2<sup>nd</sup> International Symposium on Shape Casting**, Orlando, FL, February 25-March 1, 2007.
164. "Management of an Intelligent Argumentation Network for a Web-Based Collaborative Engineering Design Environment," X. Liu, M. Zhang, G. K. Venayagamoorthy, and M. C. Leu, **Proceedings of 2007 International Symposium on Collaborative Technologies and Systems (CTS'07)**, Orlando, FL, May 21-25, 2007.

165. "Integration of Collaborative Engineering Design Using Teamcenter Community in Mechanical Engineering Curricula," X. Peng, M. C. Leu, Q. Niu, S. B. Lin, M. R. Bryant, **Proceedings of International Conference on Comprehensive Product Realization**, Beijing, CHINA, June 18-20, 2007.
166. "Selective Laser Sintering of High-Density Alumina Ceramic Parts," Z. H. Liu, J. J. Nolte, J. I. Packard, G. Hilmas, F. Dogan and M. C. Leu, **Proceedings of 35<sup>th</sup> International MATADOR Conference, Taipei, Taiwan**, July 18-20, 2007, pp. 351-354.
167. "Collaborative Engineering Design Using Teamcenter Community," X. Peng, M. C. Leu, and Q. Niu, **Proceedings of PACE Global Annual Forum**, Darmstadt, Germany, July 23-28, 2007.
168. "Integration of Collaborative Engineering Design Using Teamcenter Community in Mechanical Engineering Curricula," X. Peng, M. C. Leu, Q. Niu, S. B. Lin, M. R. Bryant, **Proceedings of International Conference on Comprehensive Product Realization**, June 18-20, 2007, Beijing, China.
169. "Aqueous Based Extrusion Fabrication of Ceramics on Demand," M.S. Mason, T. Huang, M. C. Leu, R. G. Landers, G. E. Hilmas and M. W. Hayes, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 6-8, 2007, pp. 124-134.
170. "Experimental Investigation of Effect of Environment Temperature on Freeze-form Extrusion Fabrication," X. Zhao, M.S. Mason, T. Huang, M. C. Leu, R. G. Landers, G. E. Hilmas, S. J. Easley and M. W. Hayes, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 6-8, 2007, pp. 135-146.
171. "Modeling and Validation of Temperature and Concentration for Rapid Freeze Prototyping," F. D. Bryant and M. C. Leu, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 6-8, 2007, pp. 234-245.
172. "Surface Reconstruction from Triple Dixel Model for Virtual Sculpting," W. Zhang and M. C. Leu, **Proceedings of ASME International Design Engineering Technical Conferences**, Las Vegas, NV, September 4-7, 2007.
173. "Interactive Sketch Based Digital Prototyping by Using the Level-Set Method," W. Zhang and M. C. Leu, **Proceedings of ASME International Mechanical Engineering Conference**, Seattle, WA, November 11-15, 2007.
174. "Rapid Freeze Prototyping of Investment Cast Thin-Wall Metal Matrix Composites: Pattern Build and Molding," V. L. Richards, E. A. Druschitz, S. P. Isanaka, M. C. Leu, M. Cavins, and T. Hill, **Proceedings of TMS 2008 Annual Meeting**, New Orleans, LA, March 9-13, 2008.
175. "Incorporation of Evidences into an Intelligent Computational Argumentation," X. F. Liu, K. Khudkhudia, and M. C. Leu, **Proceedings of 2008 International Symposium on Collaborative Technologies and Systems (CTS'08)**, Irvine, CA, May 19-23, 2008.

176. “NC Machining Simulation Based on Triple-Dexel Representation,” W. Zhang and M. C. Leu, **Proceedings of 2008 International Symposium on Flexible Automation**, Atlanta, GA, June 23-26, 2008.
177. “Aqueous Based Extrusion of High Solids Loading Ceramic Pastes: Process Modeling and Control,” M. S. Mason, T. Huang, R. G. Landers, M. C. Leu, and G. E. Hilmas, **Proceedings of 2008 International Symposium on Flexible Automation**, Atlanta, GA, June 23-26, 2008.
178. “Digital Manufacturing of Implant Based Dental Restorations,” M. C. Leu and P. Delli, **Proceedings of 9<sup>th</sup> Biennial ASME Conference on Engineering Systems Design and Analysis**, Haifa, Israel, July 7-9, 2008.
179. “Computer Aided Design of Implant Based Dental Restorations,” M. C. Leu and A. Gawate, **Proceedings of 9<sup>th</sup> Biennial ASME Conference on Engineering Systems Design and Analysis**, Haifa, Israel, July 7-9, 2008.
180. “A New Contour Reconstruction Approach from Dixel Data in Virtual Sculpting,” K. Yuksek, W. Zhang, B. I. Ridzalski, and M. C. Leu, **Proceedings of 3<sup>rd</sup> International Conference on Geometric Modeling and Imaging**, London, U.K., July 9-11, 2008.
181. “Modeling and Experimental Results of Concentration with Support Material in Rapid Freeze Prototyping,” F. D. Bryant and M. C. Leu, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 4-6, 2008.
182. “Freeform Fabrication of Zirconium Diboride Parts Using Selective Laser Sintering,” M. C. Leu, E. B. Adamek, T. Huang, G. E. Hilmas, and F. Dogan, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 4-6, 2008.
183. “Product Focused Freeform Fabrication Education,” F. Liou and M. C. Leu, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 4-6, 2008.
184. “Ergonomic Impact of Fastening Operation,” A. Joshi, M. C. Leu, and S. Murray, **Proceedings of 2<sup>nd</sup> CIRP Conference on Assembly Technologies and Systems (CATS 2008)**, Toronto, Ontario, CANADA, September 21-23, 2008.
185. “Automation of CAD Based Assembly Simulations Using Motion Capture from a Physical Environment,” M. C. Leu, X. F. Liu, J. Young, L. Wen, B. Dods, and C. Riegel, **Proceedings of 2<sup>nd</sup> CIRP Conference on Assembly Technologies and Systems (CATS 2008)**, Toronto, Ontario, CANADA, September 21-23, 2008.
186. “Adaptive Control of Freeze-form Extrusion Fabrication Process,” X. Zhao, R. G. Landers, and M. C. Leu, **Proceedings of 2008 ASME Dynamic Systems and Control Conference**, Ann Arbor, MI, October 20-22, 2008.
187. “Evaluation of Vehicle Mounted Attenuator (VMA) Markings Using a Driving Simulator for Mobile Work Zones,” G. H. Bham, M. C. Leu, D. R. Mathur, and B. S. Javvadi, **Proceedings of 88<sup>th</sup> Transportation Research Board Annual Meeting**, Washington, DC, January 11–15, 2009.
188. “Effect of Liquid Phase Migration on Extrusion Pressure in Freeze-form Extrusion Fabrication,” H. Liu, M. C. Leu, R. G. Landers, and G. E. Hilmas,

- Proceedings of 2009 TMS Annual Meeting**, San Francisco, CA, February 15-19, 2009.
189. "Improving Build Speed in Rapid Freeze Prototyping through Increase of Heat Transfer," M. C. Leu, S. P. Isanaka, and V. L. Richards, **Proceedings of 2009 TMS Annual Meeting**, San Francisco, CA, February 15-19, 2009.
  190. "Contribution Based Priority Assessment in an Intelligent Argumentation Network for a Web-based Collaborative Development System," X. F. Liu, M. Satyavolu, and M. C. Leu, **2009 International Symposium on Collaborative Technologies and Systems (CTS'09)**, Baltimore, Maryland, May 18-22, 2009.
  191. "Investigation of Selective Laser Sintering of Zirconium Diboride Parts," M. C. Leu, S. Pattnaik, G. E. Hilmas, and F. Dogan, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 3-5, 2009.
  192. "Increase of Heat Transfer to Reduce Build Time in Rapid Freeze Prototyping," M. C. Leu, S. P. Isanaka, and V. L. Richards, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 3-5, 2009.
  193. "Development of Extrusion-on-Demand for Ceramic Freeze-form Extrusion Fabrication," T. Oakes, P. Kulkarni, R. G. Landers, and M. C. Leu, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 3-5, 2009.
  194. "An Integrated Calibration Technique for Multi-Camera Vision Systems," A. M. Vader, A. Chadda, W. Zhu, M. C. Leu, X. F. Liu, and J. B. Vance, **Proceedings of ASME World Conference on Innovative Virtual Reality**, Ames, Iowa, May 12-14, 2010.
  195. "Low-Cost Versatile Motion Tracking for Assembly Simulation," W. Zhu, A. Chadda, A. M. Vader, M. C. Leu, X. F. Liu, and J. B. Vance, **Proceedings of International Symposium on Flexible Automation**, Tokyo, Japan July 12-14, 2010.
  196. "Freeze Extrusion Fabrication on Demand," M. C. Leu, R. G. Landers, P. Kulkarni, T. Oakes, **Proceedings of International Symposium on Flexible Automation**, Tokyo, Japan July 12-14, 2010.
  197. "Optimization of Selective Laser Sintering Process for Fabrication of Zirconium Diboride Parts," M. C. Leu, S. Pattnaik, and G. E. Hilmas, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 9-11, 2010.
  198. "Effect of Different Graphite Materials on the Properties of Bipolar Plates Fabricated by Selective Laser Sintering," N. Guo and M. C. Leu, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 9-11, 2010.
  199. "Selective Laser Sintering of 13-93 Bioactive Glass Bone Scaffolds," K. C. R. Kolan, M. C. Leu, G. E. Hilmas, and M. Velez, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 9-11, 2010.
  200. "Freeze Extrusion Fabrication of 13-93 Bioactive Glass Scaffolds," T. Huang, N. D. Doiphode, M. N. Rahaman, M. C. Leu, B.S. Bal, and D. E. Day, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 9-11, 2010.

201. "Selective Laser Sintering and Freeze Extrusion Fabrication of Bone Scaffolds: A Comparison," K. C. R. Kolan, N. D. Doiphode, and M. C. Leu, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 9-11, 2010.
202. "Fabrication of 13-93 Bioactive Glass Bone Scaffolds by Selective Laser Sintering," K. C. R. Kolan, M. C. Leu, G. E. Hilmas, and M. Velez, **Proceedings of Materials Science & Technology Conference**, Houston, TX, October 17-21, 2010.
203. "Utilizing Artificial Neural Networks to Model Mine Detector Sound Generation for Virtual Landmine Training," H. He, M. C. Leu, X. F. Liu, W. Zhu, and B. Cheng, **Proceedings of ANNIE Conference**, November 1-3, 2010, St. Louis, MO.
204. "Freeze-form Extrusion Fabrication of Composite Structures using Ultra-High Temperature Ceramics and Refractory Metals," M. C. Leu, G. E. Hilmas, R. G. Landers, C. Roman, S. Zhang, and L. Tang, **Proceedings of 2011 NSF CMMI Research and Innovation Conference**, January 4-7, 2011, Atlanta, GA.
205. "Low-Cost, High-Fidelity Virtual Landmine Detection Training System," W. Zhu, M. C. Leu, X. F. Liu, R. Kotikalapudi, H. He, S. Surisetty, J. D. Plunkett, G. Pierson, **Proceedings of 2011 International Conference on Computer Graphics and Virtual Reality (CGVR'11)**, July 18-21, 2011, Las Vegas, NV.
206. "Bio-Inspired Design of Bipolar Plate Flow Fields for Polymer Electrolyte Membrane Fuel Cells," N. Guo, M. C. Leu and M. Wu, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 8-10, 2011.
207. "Process Planning and Control for Functionally Graded Material Fabrication Using Freeze-Form Extrusion Fabrication," B. Deuser, L. Tang, J. Geldmeier, R. G. Landers and M. C. Leu, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 8-10, 2011.
208. "Freeze-Form Extrusion Fabrication of Composite Structures," M. C. Leu, L. Tang, B. Deuser, R. G. Landers, G. E. Hilmas, S. Zhang, and J. Watts, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 8-10, 2011.
209. "Effect of Particle Size, Binder Content and Heat Treatment on Mechanical Properties of 13-93 Bioactive Glass Scaffolds," N K. C. R. Kolan, M. C. Leu, G. E. Hilmas and M. Velez, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 8-10, 2011.
210. "Design, Implementation, and Evaluation of Optical Low-Cost Motion Capture System," A. Chadda, W. Zhu, M. C. Leu and X. F. Liu, **Proceedings of ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference, (IDETC/CIE)**, August 29-31, 2011, Washington, DC.
211. "*In Vivo* Evaluation of 13-93 Bioactive Glass Scaffolds Made by Selective Laser Sintering," M. Velez, S. Jung, K. C. R. Kolan, M. C. Leu, D.E. Day, T-M.G. Chu, **Proceedings of ACerS 113th Annual Meeting**, October 16-20, 2011, Columbus, OH.

212. "A Driving Simulator Study of Vehicle Mounted Attenuator Markings in Work Zones for Different Age Groups During Different Times of the Day," G. H. Bham, M. C. Leu, D. R. Mathur, V. A. Samaranayake, and M. Vallati, **Proceedings of the 91st Annual Meeting of the Transportation Research Board**, January 22-26, 2012, Washington, DC.
213. "Motion Capture of Fastening Operation using Wiimotes for Ergonomic Analysis," W. Zhu, C. P. Daphalapurkar, S. C. Puthenveetil, M. C. Leu, X. F. Liu, A. M. Chang, J. K. Gilpin-Mcminn, P. H., Wu, and S. D. Snodgrass, **Proceedings of International Symposium on Flexible Automation**, St. Louis, USA, June 18-20, 2012.
214. "Simulation and Testing of Polymer Electrolyte Membrane Fuel Cell Bipolar Plates Fabricated by Selective Laser Sintering," M. Wu, M. C. Leu, and N. Guo, **Proceedings of International Symposium on Flexible Automation**, St. Louis, USA, June 18-20, 2012.
215. "Freeze-Form Extrusion Fabrication of Functionally Graded Material Composites Using Zirconium Carbide and Tungsten," A. Li, A. S. Thornton, B. Deuser, J. L. Watts, M. C. Leu, G. E. Hilmas, and R. G. Landers, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 6-8, 2012.
216. "Modeling, Analysis and Simulation of Paste Freezing in Freeze-form Extrusion Fabrication," M. Li, R. G. Landers, and M. C. Leu, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 6-8, 2012.
217. "Experimental Study of Polymer Electrolyte Membrane Fuel Cells Using Graphite Composite Bipolar Plates Fabricated by Selective Laser Sintering," N. Guo and M. C. Leu, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 6-8, 2012.
218. "Comparison of Compression Molding and Selective Laser Sintering Manufacturing Processes in Development of Composite Bipolar Plates for PEM Fuel Cells," E. Taghipour, M. C. Leu, and N. Guo, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 6-8, 2012.
219. "Interactions of an Additive Manufacturing Program with Society," F. W. Liou, M. C. Leu, and R. G. Landers, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 6-8, 2012.
220. "Comparison of Marker-Based and Marker-Less Systems for Low-Cost Human Motion Capture," S. C. Puthenveetil, C. P. Daphalapurkar, W. Zhu, M. C. Leu, X. F. Liu, A. M. Chang, J. K. Gilpin-Mcminn, P. H. Wu, and S. D. Snodgrass, **Proceedings of the 2013 ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC/CIE 2013)**, August 4-7, 2013 Portland, OR.
221. "Motion Capture for Human-Centered Simulation Using Kinects," C. P. Daphalapurkar, W. Zhu, M. C. Leu, X. F. Liu, A. M. Chang, J. K. Gilpin-Mcminn, P. H. Wu, and S. D. Snodgrass, **Proceedings of the 2013 ASME International Design Engineering Technical Conferences & Computers**



- and Information in Engineering Conference (IDETC/CIE 2013)**, August 4-7, 2013 Portland, OR.
222. "Effect of Architecture and Porosity on Mechanical Properties of Borate Glass Scaffolds Made by Selective Laser Sintering," K. C. R. Kolan, M. C. Leu, G. E. Hilmas, and T. Comte, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 12-14, 2013.
  223. "Development of Freeze-Form Extrusion Fabrication with Use of Sacrificial Material," M. C. Leu and D. A. Garcia, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 12-14, 2013.
  224. "Experimental Investigation of Different Cellular Lattice Structures Manufactured by Fused Deposition Modeling," O. Iyibilgin, C. Yigit, and M. C. Leu, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 12-14, 2013.
  225. "Driving Simulator Validation of Driver Behavior in Work Zones," G. H. Bham, M. C. Leu, M. Vallati, and D. R. Mathur, **Proceedings of 2013 Road Safety and Simulation International Conference (RSS2013)**, Rome, ITALY, October 22-25, 2013.
  226. "Modeling and Characterization of Fused Deposition Modeling Tooling for Vacuum Assisted Resin Transfer Molding Process," H. Li, G. Taylor, V. Bheemreddy, O. Iyibilgin, M. Leu and K. Chandrashekhara, Paper Number 4082, pp. 1-14, **Proceedings of SAMPE Technical Conference**, Seattle, WA, June 2-5, 2014.
  227. "Composition Optimization for Three-Dimensional Parts with Functionally Gradient Materials," A. Ghazanfari and M. C. Leu, **Proceedings of the ASME 2014 Manufacturing Science and Engineering Conference (MSEC 2014)**, Detroit, MI, June 9-13, 2014.
  228. "Effect of Paste Properties on Extrudate Freezing Time in Freeze-Form Extrusion Fabrication Processes," M. Li, R. G. Landers, and M. C. Leu, **Proceedings of the ASME 2014 Manufacturing Science and Engineering Conference (MSEC 2014)**, Detroit, MI, June 9-13, 2014.
  229. "Optimal Design, Numerical Simulation, and Experimental Testing of Bipolar Plates with Pin-Type Flow Fields for Polymer Electrolyte Membrane (PEM) Fuel Cells," M. C. Leu and N. Guo, **Proceedings of 2014 International Symposium on Flexible Automation (ISFA2014)**, Awaji-Island, Hyogo, JAPAN, 14 - 16 July, 2014.
  230. "A Framework and Prototype System for Cloud-Based Additive Manufacturing," I. H. Selvi, T. Over, K. Fletcher, O. Iyibilgin, M. C. Leu, and F. X. Liu, **Proceedings of 2014 International Symposium on Flexible Automation (ISFA2014)**, Awaji-Island, Hyogo, JAPAN, 14 - 16 July, 2014.
  231. "*In Vitro* Assessment of Pore Geometry of Borate Bioactive Glass Scaffolds Made by Laser Sintering," K. C. R. Kolan, M. C. Leu, A. Thomas, and G. E. Hilmas, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 4-6, 2014.
  232. "Investigation of Sparse-Build Rapid Tooling by Fused Deposition Modeling," O. Iyibilgin, M. C. Leu, G. Taylor, H. Li, and K.

- Chandrashekhara, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 4-6, 2014.
233. “Use of Driving Simulators to Compare Work Zone Sign Configurations,” S. Moradpour, S. Wu, S. Long, M. C. Leu, B. Smith, D. Konur, **Industrial & Systems Engineering Research Conference (ISERC)**, Nashville, TN, May 30 – June 2, 2015.
234. “American Sign Language Alphabet Recognition Using Microsoft KINECT,” C. Dong, M. C. Leu, and Z. Yin, **Proceedings of IEEE Computer Society Workshop on Observing and Understanding Hands in Action (HANDS 2015)**, Boston, MA, June 12, 2015; this paper received the best paper award at the HANDS 2015 workshop.
235. “Design and Optimization of Flow Fields to Improve PEM Fuel Cell Performance,” Q. Wang, M. C. Leu, and U. O. Koylu, Poster Paper, **ASME Manufacturing Science and Engineering Conference (MSEC 2015)**, June 8-12, 2015, Charlotte, NC.
236. “Personal Preference and Trade-off based Additive Manufacturing Web Service Selection,” V. P. Modekurthy, K. K. Fletcher, X. F. Liu, and M. C. Leu, **Proceedings of the 22nd IEEE International Conference on Web Services**, New York, NY, June 27 - July 2, 2015.
237. “Comparisons of Performances and Liquid Water Distributions within Bio-Inspired And Single Serpentine Pen Fuel Cell Channels,” B. P. Saripella, M. C. Leu, and U. O. Koylu, **Proceedings of ASME Fuel Cell Science, Engineering, and Technology Conference**, June 28-July 2, 2015, San Diego, CA.
238. “Freeform Extrusion Fabrication of Titanium Fiber Reinforced Bioactive Glass Scaffolds,” A. Thomas, K. C.R. Kolan, M. C. Leu and G. E. Hilmas, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 10-12, 2015.
239. “Methods of Extrusion on Demand for High Solids Loading Alumina Paste in Freeze-form Extrusion Fabrication,” W. Li, A. Ghazanfari, M. C. Leu, and R. G. Landers, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 10-12, 2015.
240. “Planning Freeform Extrusion Fabrication Processes with Consideration of Horizontal Staircase Effect,” A. Ghazanfari, W. Li, M. C. Leu, and R. G. Landers, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 10-12, 2015.
241. “Optimal Rastering Orientation in Freeform Extrusion Fabrication Processes,” A. Ghazanfari, W. Li, M. C. Leu, and R. G. Landers, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 10-12, 2015.
242. “Effects of Temperature on Aqueous Freeform Extrusion Fabrication,” J. Li, M. C. Leu, and G. E. Hilmas, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 10-12, 2015.
243. “A Driving Simulator Study to Evaluate the Impact of Portable Changeable Message Signs on Drivers' Speed Characteristics,” G. H. Bham, M. C. Leu

- and B. Venkat, **Proceedings of Road Safety & Simulation International Conference**, Orlando, FL, October 6-8, 2015.
244. “Modeling and Characterization of Fused Deposition Modeling Tooling for Autoclave Process,” G. Taylor, X. Wang, K. P. Motaparti, S. Meng, M. C. Leu and K. Chandrashekhara, **Proceedings of Composites and Advanced Materials Expo (CAMX 2015)**, Dallas, TX, October 26-29, 2015.
245. “Nature-Inspired Flow Field with a Snowflake Design to Improve PEM Fuel Cell Performance,” Q. Wang, M. C. Leu, and U. O. Koylu, **ASME International Mechanical Engineering Congress & Exposition (IMECE 2015)**, Houston, TX, November 13-19, 2015.
246. “Examining the Impacts of Portable Changeable Message Signs on Drivers' Speed Characteristics: A Driving Simulator Study,” G. H. Bham, M. C. Leu, and B. Venkat, **Proceedings of the 95<sup>th</sup> Annual Conference of the Transportation Research Board**, Washington, DC, Jan. 10-14, 2016.
247. “Design of Lattice Structure for Additive Manufacturing,” W. Tao and M. C. Leu, **Proceedings of International Symposium on Flexible Automation**, Cleveland, OH, August 1-3, 2016.
248. “Designed Extrudate for Additive Manufacturing of Zirconium Diboride by Ceramic On-Demand Extrusion,” D. McMillen, W. Li, M. C. Leu, G. E. Hilmas, and J. Watts, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 8-10, 2016.
249. “Properties of Partially Stabilized Zirconia Components Fabricated by the Ceramic On-Demand Extrusion Process,” W. Li, A. Ghazanfari, D. McMillen, M. C. Leu, G. E. Hilmas, and J. Watts, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 8-10, 2016.
250. “3D Printing of a Polymer Bioactive Glass Composite for Bone Repair,” C. Murphy, K.C.R. Kolan, M. Long, W. Li, M.C. Leu, J.A. Semon, and D.E. Day, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 8-10, 2016.
251. “Effects of build parameters on compression properties for ULTEM 9085 parts by fused deposition modeling,” K. P. Motaparti, G. Taylor, M. C. Leu, K. Chandrashekhara, J. Castle and M. Matlack, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 8-10, 2016.
252. “Effect of Sparse-Build Internal Structure on Performance of Fused Deposition Modeling Tools Under Pressure,” S. Meng, L. Mason, G. Taylor, X. Wang, M. C. Leu, K. Chandrashekhara, M. Matlack and J. Castle, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 8-10, 2016.
253. “Novel Extrusion-Based Additive Manufacturing Process for Ceramic Parts,” A. Ghazanfari, W. Li, M. C. Leu, and G. E. Hilmas, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 8-10, 2016.
254. “Investigation of Heat-Affected 304L SS Powder and Its Effect on Built Parts in Selective Laser Melting,” C. S. Kriewall, A. T. Sutton, M. C. Leu, J. W. Newkirk, B. Brown, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 8-10, 2016.

255. “Powders for Additive Manufacturing Processes: Characterization Techniques and Effects on Part Properties,” A. T. Sutton, C. S. Kriewall, M. C. Leu, J. W. Newkirk, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 8-10, 2016.
256. “Design and Implementation of Cyber-Physical Manufacturing Cloud Using MTconnect,” X. F. Liu, M. R. Shahriar, S. M. Sunny, M. C. Leu, M. Chen, and L. Hu, **Proceedings of IDETC/CIE17**, August 21-24, 2016, Charlotte, NC.
257. “Implementation of MTConnect for Open Source 3D Printers in Cyber Physical Manufacturing Cloud,” X. F. Liu, S. M. Sunny, M. R. Shahriar, M. C. Leu, M. Chen, and L. Hu, **Proceedings of IDETC/CIE17**, August 21-24, 2016, Charlotte, NC.
258. “Investigation of Ultem 1010 FDM Sparse-Build Parts Using Design of Experiments and Numerical Simulation,” G. Taylor, X. Wang, L. Mason, M. C. Leu, K. Chandrashekhara, J. Castle, and M. Matlack, **Proceedings of Composites and Advanced Materials Expo (CAMX 2016)**, Anaheim, CA, September 26-29, 2016.
259. “Freeform Extrusion Fabrication of Advanced Ceramic Components With Embedded Sapphire Optical Fiber Sensors,” A. Ghazanfari, W. Li, M. C. Leu, J. Watts, Y. Zhuang, and J. Huang, **Proceedings of the ASME 2016 Conference on Smart Materials, Adaptive Structures and Intelligent Systems (SMASIS2016)**, September 28-30, 2016, Stowe, VT.
260. “Solvent Based 3D Printing of Biopolymer/Bioactive Glass Composite and Hydrogel for Tissue Engineering Applications,” K. Kolan, Y. Liu, J. Balkdrige, C. Murphy, J. Semon, D. Day, and M.C. Leu, **Proceedings of the 3rd CIRP Conference on BioManufacturing**, Chicago, IL. July 11-14, 2017.
261. “Fabricating Zirconia Components with Organic Support Material by the Ceramic On-Demand Extrusion Process,” W. Li, A. Ghazanfari, D. McMillen, M. C. Leu, and G. E. Hilmas, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 7-9, 2017 (abstract accepted).
262. “Bonding of 304L Stainless Steel to Cast Iron by Selective Laser Melting,” B. Thomas, A. Sutton, M. C. Leu, and N. Doiphode,” **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 7-9, 2017 (abstract accepted).
263. “Characterization of Heat-Affected Powder Generated during Selective Laser Melting of 304L Stainless Steel Powder,” A. Sutton, C. Kriewall, M. C. Leu, and J. Newkirk N., **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 7-9, 2017 (abstract accepted).
264. “Effects of Area Fraction and Part Spacing on Degradation of 304L Stainless Steel Powder in Selective Laser Melting,” C. Kriewall, A. Sutton, S. Karnati, M. C. Leu, and J. Newkirk N., **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 7-9, 2017 (abstract accepted).

265. "Building Zr-based Metallic Glass Part on Ti Alloy by Laser-Foil-Printing Additive Manufacturing," Y. Li, Y. Shen, M. C. Leu, and H. L. Tsai, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 7-9, 2017 (abstract accepted).
266. "Mechanical Properties of 304L Parts Made by Laser-Foil-Printing Technology," C. H. Hung, Y. Shen, M. C. Leu, and H. L. Tsai, **Proceedings of Solid Freeform Fabrication Symposium**, Austin, TX, August 7-9, 2017 (abstract accepted).
267. "Investigation of Ultem 1010 FDM Sparse-Build Parts Using Design of Experiments and Numerical Simulation," G. Taylor, X. Wang, L. Mason, M. C. Leu, K. Chandrashekhara, M. Matlack, J. Castle, and T. Schniepp, **Proceedings of Composites and Advanced Materials Expo (CAMX 2017)**, Orlando, FL, September 11-14, 2017 (abstract accepted).

## 8. PATENTS AND INVENTION DISCLOSURES

1. "Nonlinear Displacement Sensor Based on Optical Triangulation Principle," M. C. Leu and Z. Ji, U.S. Patent No. 5,113,080, granted May 12, 1992. (This patent was licensed to WYKO Corporation in Arizona.)
2. "Method and Apparatus for Rapid Freezing Prototyping," W. Zhang, M. C. Leu, Z. Ji, and Y. Yan, U.S. Patent No. 6,253,116, granted June 26, 2001.
3. "Rapid Production of Engineering Tools and Hollow Bodies by Integration of Electroforming and Solid Freeform Fabrication," B. Yang and M. C. Leu, U.S. Patent No. 6,409,902, granted June 25, 2002.
4. "Computer Aided Dental Bar Design," M. C. Leu and A. Gawate, U.S. Patent No. 7,747,418, granted June 29, 2010.
5. "Method and Apparatus for Freeze-Form Extrusion Fabrication of Functionally Gradient Composite Parts," M. C. Leu, G. E. Hilmas, and C. Roman, U.S. Patent Application No. 13/729,691 (pending).
6. "Method and Apparatus for Fabricating Ceramic and Metal Components via Additive Manufacturing with Uniform Layered Radiation Drying," M. C. Leu, A. Ghazanfari, W. Li, G. E. Hilmas, and R. G. Landers, U.S. Patent Application No. 15/130,261, filed 4/15/2016 (pending).

## 9. TEACHING AND ADVISING ACTIVITIES

### 9a. Courses Taught

Advanced Digital Design and Manufacturing\*  
 Advanced Topics in Robotics\*  
 Automatic Control  
 Automation in Manufacturing  
 Computer Aided Manufacturing

Computer Applications in Mechanical Engineering Design  
Fundamentals of Manufacturing Processes\*  
Introduction to Manufacturing Engineering  
Introduction to Mechanical Engineering  
Introduction to Robotics\*  
Linear Systems in Mechanical Engineering  
Materials and Manufacturing Processes  
Microprocessor Applications  
Multi-axis Motion Planning and Control\*  
Principles and Practice of Computer Aided Design\*  
Systems Dynamics

\* New courses developed by M. C. Leu

**9b. Teaching Laboratories Developed or Significantly Improved**

Automatic Control Laboratory  
Intelligent Manufacturing & Robotics Laboratory  
Manufacturing Processes Laboratory  
Microprocessor Applications Laboratory  
PACE (Partnership for Advanced Collaborative Engineering Education)  
Laboratory  
Systems Dynamics Laboratory

**9c. Graduate Students and Post-Docs Mentored**

Missouri S&T (1999-present): Main advisor of 13 Ph.D. and ~90 M.S. students who have graduated) and ~20 post-docs and visiting scholars.

NJIT (1987-1999): Main advisor of 9 Ph.D. and 23 Master students and 8 post-docs.

Cornell (1981-87): Main advisor of 4 Ph.D. and 21 Master students and 1 post-doc.

**9d. Names, Graduation Years, and Current Affiliations of Ph.D. Advisees**

1. J. Weld, 1987, Alcatel-Lucent Technologies, Inc.
2. N. Hemati, 1988, Western Digital Technologies, Inc.
3. D. Pai, 1989, University of British Columbia (Canada).
4. S. Singh, 1989, GlobalLogic Inc.
5. G. Zhou, 1993, Drexel University.
6. H. Wong, 1995, Total Tel Communications, Inc.
7. H. Liao, 1995, Ming-Hsin Institute of Technology (Taiwan).
8. T. Kim, 1996, Samsung Corporation (Korea).
9. P. Meng, 1996, Alcatel-Lucent Technologies, Inc.
10. L. Wang, 1997, Kane University.

11. W. L. Yao, 1998, National Kaoshiung First University of Science and Technology (Taiwan).
12. B. Yang, 2000, Pitney Bowes, Inc.
13. B. Maitech, 2000, Delphi Automotive Systems.
14. G. Sui, 2002, Vaxdesign, Inc.
15. Q. Liu, 2005, Sentry Pumping International, Inc.
16. X. Peng, 2005, Prairie View A&M University.
17. X. Chi, 2006, Environmental Systems Research Institute.
18. T. Huang, 2007, Missouri University of Science and Technology.
19. Q. Niu, 2008, General Motors Corporation.
20. W. Zhang, 2008, Glidewell Laboratories.
21. F. Bryant, 2008, Missouri University of Science and Technology.
22. J. Wu, 2009, MiTAC Technology Corporation (Taiwan).
23. A. Joshi, 2010, Bharat Forge America Inc.
24. N. Guo, 2013, Microsoft Corp.
25. K. Kolan, 2015, Missouri University of Science and Technology.
26. M. Li, 2016, Nanyang Technological University (Singapore).
27. A. Ghazanfari, 2017 (exp.)
28. W. Li, 2018 (exp.)
29. W. Tao, 2018 (exp.)
30. A. Sutton, 2019 (exp.)
31. L. Mason, 2019 (exp.)
32. Y. Li, 2019 (exp.)
33. H. Hung, 2020 (exp.)

## 10. GRANTS

1. "Automation and Optimization of Torque Motor Design," awarded by Moog Inc., \$36,380, 1982-1984 (PI: M.C. Leu, Co-PI: D. Bartel).
2. "Modeling and Analysis of Flow-Induced Vibration in Circular Saws," awarded by the Engineering Foundation, \$16,000, 1982-1983 (PI: M.C. Leu).
3. "Dynamic Simulation of Robot Motion Using Interactive Computer Graphics," awarded by Cornell Computer-Aided Design Instruction Facility, \$20,000, 1982-1983 (PI: M.C. Leu).
4. "Research Initiation and Curriculum Development in Robotics," awarded by the Manufacturing Engineering Education Foundation of SME, \$5,250, 1983-1984 (PI: M.C. Leu).
5. "Robust Control of Mechanical Manipulator Motion," awarded by the National Science Foundation, \$50,689, 1983-1985 (PI: M.C. Leu).
6. "Robotics Research in Mechanical Engineering," awarded by Cornell Manufacturing Engineering and Productivity Program, \$23,200, 1984-1985 (PI: M.C. Leu).
7. "Optimal Design of Linear Force Motors," awarded by Moog Inc., \$29,445, 1984-1985 (PI: M.C. Leu, Co-PI: D. Bartel).

8. "Modeling, Analysis and Control of Brushless DC Motors," awarded by Moog Inc., \$100,890, 1985-1988 (PI: M.C. Leu).
9. "Microprocessor Applications and Computer Numerical Control," awarded by IBM's Project Ezra at Cornell University, six IBM PC/AT computers with interface boards and printers worth approx. \$40,000, 1986 (PI: M.C. Leu).
10. "Presidential Young Investigator Award: Robot Dynamics and Control," awarded by the National Science Foundation, \$320,314, 1985-1990 (PI: M.C. Leu).
11. "Industrial Matching Funds for Presidential Young Investigator Award," awarded by Ford Motor Co., \$17,500; General Electric, \$53,340; AT&T Information Systems, \$27,150; Convergent Technologies, \$30,000; Deneb Robotics, \$4,500, 1985-90 (PI: M.C. Leu).
12. "Program of Sponsored Chair in Manufacturing Productivity," NJIT Chair Professorship Research Funds, approx. \$150,000 per year, 1987-1996.
13. "Computer Based Control and Instrumentation for Mechanical Engineering Laboratory Courses," awarded by New Jersey's Department of Higher Education, \$87,833, 1988-89 (PI: M.C. Leu, Co-PI's: B. Koplik, A. Harnoy, H. Pawel).
14. "Engineering Research Equipment Grant: Vibration Excitation and Measurement System," awarded by the National Science Foundation, \$40,811, 1989-1990 (PI: M.C. Leu, Co-PI's: A. Rosato, C. Wilson).
15. "Engineering Research Equipment Grant: High-Speed Motion Analysis System," awarded by the National Science Foundation, \$59,000, 1990-1991 (PI: I. Fischer, Co-PI's: M.C. Leu, A. Rosato, R. Dave).
16. "Optimal Planning for Placement of Printed Circuit Board Components," awarded by Universal Instruments Corp., \$41,451, 1991 (PI: M.C. Leu).
17. "AT&T Manufacturing Technology Special Grant," awarded by AT&T Foundation, \$225,000, 1989-1992 (PI: K. O'Brien, Co-PI's: M.C. Leu, R. Sodhi, K. McDermott, N. Levy).
18. "Flexible Automated Machining, Assembly and Packaging," awarded by AT&T Bell Laboratories and AT&T Manufacturing Affiliates Grants Program, \$106,000, plus donation of equipment worth approx. \$500,000, and co-awarded by the New Jersey Advanced Technology Center for Manufacturing Systems, \$81,200, 1989-1994 (PI: M.C. Leu).
19. "Studying Sweeps and Swept Volumes via Differential Equation Approach," awarded by the National Science Foundation, \$135,000, 1991-1993 (PI: M.C. Leu, Co-PI: D. Blackmore).
20. "Representation and Analysis of Swept Volumes with Tolerances and Deformations," awarded by the Office of Naval Research, \$613,231, and co-awarded by the New Jersey Advanced Technology Center for Manufacturing Systems, \$121,625, 1992-1995 (PI: M.C. Leu, Co-PI's: D. Blackmore, F. Shih).
21. "Waterjet In-Situ Cleaning," awarded by the NSF Emission Reduction Research Center, \$253,597, 1993-1996 (PI: E. Geskin, Co-PI: M.C. Leu).



22. "Japan-USA Symposium on Flexible Automation (Travel Fund)," awarded by the National Science Foundation, \$55,000, 1994-1995 (PI: M.C. Leu).
23. "Symposium on University-Industry-Government Cooperative Research," awarded by the National Science Foundation and Department of Education in Taiwan, NT\$1,200,000, 1994 (PI: M.C. Leu, Co-PI: K.C. Fan).
24. "Industrial Ecology as a Force for Research, Curriculum and Public Policy Change," awarded by AT&T Industrial Ecology Faculty Fellowship Program, \$100,000, 1994-1996 (PI: D. Watts, Co-PI's: M.C. Leu, R. Caudill, H. Shaw, D. Hawk, M. Dekadt).
25. "Manufacturing Practice in Engineering Education," awarded by the NSF/DARPA Technology Reinvestment Project, \$1,550,000, 1994-1997 (PI: W. Swart, Co-PI's: M.C. Leu, N. Elliot).
26. "Application of Sweep differential Equations to Automated Manufacturing," awarded by the National Science Foundation, \$140,000, 1995-1998 (PI: D. Blackmore, Co-PI: M.C. Leu).
27. "Intergovernmental Personnel Act Agreement for Program Director Assignment," awarded by the National Science Foundation, \$615,415, 1996-1999 (PI: M.C. Leu).
28. "Multi-lifecycle Engineering and Rapid Prototyping for the 21st Century," awarded by New Jersey Commission on Science and Technology, approx. \$5,000,000, 1996-2000 (PI's: R. Caudill, D. Sebastian, S. Danforth, Co-PI's: M.C. Leu, S. Das, M. Xanthos, E. Ehrenkrantz and others).
29. "Rapid Freeform Fabrication of Ice Parts," awarded by the University of Missouri System Research Board, \$25,367, 2000-2001 (PI: M.C. Leu, Co-PI: W. Zhang).
30. "Development of a Virtual and Augmented Reality System for Research in Intelligent Design and Manufacturing," awarded by the National Science Foundation, \$461,401, 2000-2003 (PI: M. C. Leu, Co-PIs: S. Agarwal, V. Allada, Y. Fu, R. H. Hall, R. T. Kellogg, K. Krishnamurthy, F. W. Liou, X. Liu, A. Midha, O. R. Mitchell, D. Wunsch).
31. "Matching Support for NSF Project: Development of a Virtual and Augmented Reality System for Research in Intelligent Design and Manufacturing," awarded by Missouri S&T's Manufacturing Research and Training Center and Missouri Department of Economic Development, \$388,082, 2000-2003 (PI: M. C. Leu, Co-PIs: S. Agarwal, V. Allada, Y. Fu, R. H. Hall, R. T. Kellogg, K. Krishnamurthy, F. W. Liou, X. Liu, A. Midha, O. R. Mitchell, D. Wunsch).
32. "Partners for the Advancement of Collaborative Engineering (PACE) Education," awarded by the PACE Consortium, 46 Sun Ultra workstations valued at \$161,000 and 250 NX licenses and other software plus support and training, 2000-2003 (PI: M. C. Leu, Co-PIs: O. R. Mitchell, A. Midha, D. McAdams).
33. "Development of a Virtual Reality Laboratory and Related Activities," awarded by Ford Motor Company, \$250,000, 2000-2005 (PI: M. C. Leu, Co-PI's: O. R. Mitchell, A. Midha, M. Bird).

34. "Development of a Product Focused Manufacturing Program," awarded by the Society of Manufacturing Engineers Education Foundation, \$182,000, 2001-2003 (PI: F. Liou, Co-PIs: A. Agarwal, V. Allada, M.C. Leu, R. S. Mishra, A. C. Okafor).
35. "Acquisition of a High-Power CO<sub>2</sub> Laser for Research and Education in Manufacturing and Materials Processing," awarded by the National Science Foundation, \$200,000, 2001-2003 (PI: H. Tsai, Co-PIs: J. Choi, R. Landers, M. C. Leu, A. Midha, M. N. Rahaman, J. G. Story, D. C. Van Aken).
36. "Design and Development of Refractive Devices for Directing Laser Beams," awarded by MetaStable Instruments Inc., \$30,000, 6/1/01-5/31/02 (PI: M.C. Leu, Co-PIs: F. Liou, D. McAdams).
37. "GAANN: Doctoral Research and Training in Virtual and Rapid Prototyping," awarded by the Department of Education, \$362,280, 08/15/01-08/14/05 (PI: M. C. Leu, Co-PIs: J. Choi, F. Liou, R. G. Landers, D. A. McAdams, A. C. Okafor, H. Tsai, A. Midha).
38. "STTR: Solid Freeform Fabrication Based Dental Reconstruction: Phase I & Phase II," awarded by the National Science Foundation (with a Subaward from Tel Med Technologies to Missouri S&T), \$622,000, 1/1/02-12/31/06 (PI: S. Schmitt, co-PI: M.C. Leu).
39. "Gateway to Manufacturing Excellence Project," awarded by the National Science Foundation (with a Subaward from St. Louis Community College at Florissant Valley to Missouri S&T), \$672,880, 05/15/02-04/30/06 (PI: A. Agrawal, co-PIs: M.C. Leu, F. Liou, F. Terrence, D. Gerstenecker).
40. "Rapid Freeze Prototyping and Investment Casting Application," awarded by the National Science Foundation, \$92,000, 06/15/02-05/31/04 (PI: M. C. Leu, co-PI: V. Richards).
41. "Advanced Virtual Environment for First Responders," awarded by the Army Tank-automotive and Armaments Command, \$1,050,000, 08/21/02-1/31/05 (PI: M C. Leu, Co-PIs: M. Hilgers, S. Agarwal, R. Hall).
42. "Development of a Parallel Machine Tool for Research and Education in Advanced Manufacturing," awarded by the National Science Foundation, \$166,058, and matched by the Missouri Research Board, \$15,000, 05/01/03-04/30/05 (PI: R. Landers, Co-PIs: M. C. Leu, L. Acar, S. N. Balakrishnan, M. G. Hilgers, B. M. McMillin, F. Liou, A. C. Okafor, C. Saygin).
43. "Development of a Virtual Reality System for Simulated Bone Drilling with Haptics Interface," awarded by DePuy Orthopaedics, Inc., \$138,630, 5/1/03-4/30/05 (PI: M.C. Leu).
44. "An Architecture for Productive Collaboration Among Small and Medium-Sized Enterprises," awarded by the National Science Foundation, \$106,000, 8/1/03-7/31/05 (PI: C. Saygin, Co-PIs: S. Grasman, M. C. Leu).
45. "Accuracy and Stability of Computational Representations of Swept Volume Operations," awarded by the National Science Foundation (with a Subaward from NJIT to Missouri S&T), \$468,000, 9/1/03-8/31/07 (PI: D. Blackmore, co-PIs: M.C. Leu, W. Regli, W. Sun).

46. "Dynamic Fastening Simulation," awarded by the Air Force Research Laboratory via Missouri S&T's Center for Aerospace Manufacturing Technologies \$521,363, 5/1/04-7/31/07 (PI: S. L. Murray, co-PI: M C. Leu).
47. "Fabrication of Near Net-Shaped Ceramic Parts by Rapid Freeze Prototyping and Freeze Drying," awarded by the Air Force Research Laboratory via Missouri S&T's Center for Aerospace Manufacturing Technologies, \$625,316, 5/1/04-7/31/06 (PI: M C. Leu, Co-PIs: F. Dogan, G. Hilmas).
48. "CAMT Program Integration and Management," awarded by the Air Force Research Laboratory via Missouri S&T's Center for Aerospace Manufacturing Technologies \$2,042,875, 5/1/04-4/30/10 (PI: M C. Leu, co-PIs: R. Landers, D. Summers, F. Liou, H. Tsai, R. Mishra, M. O'Keefe, R. Zoughi, K. Chandrashekhara, D. Pommerenke).
49. "2006 NSF Design, Service and Manufacturing Grantees and Research Conference," awarded by the National Science Foundation, \$304,258, 3/1/05-2/28/08 (PI: M. C. Leu).
50. "Matching Support for 2006 NSF Design, Service and Manufacturing Grantees and Research Conference," awarded by Boeing, Emerson, the Research Alliance of Missouri, and the Auto/Steel Partnership, \$40,000, 3/1/05-2/28/08 (PI: M. C. Leu).
51. "Planning Grant: Proposal for Industry/University Cooperative Research Center Site on Intelligent Maintenance Systems," awarded by the National Science Foundation, \$10,000, 7/15/05-6/30/06 (PI: J. Sarangapani, Co-PIs: M. C. Leu, C. Saygin).
52. "Rapid Prototyping of Complex Ceramic Components and Graded Composites for Hot Structures," awarded by the Air Force Research Laboratory via Missouri S&T's Center for Aerospace Manufacturing Technologies, \$295,000, 8/1/05-7/31/07 (PI: M C. Leu, Co-PIs: F. Dogan, G. Hilmas).
53. "Selective Laser Sintering of Ultra High Temperature Ceramics," awarded by the Air Force Research Laboratory via Missouri S&T's Center for Aerospace Manufacturing Technologies, \$267,180, 8/1/05-7/31/07 (PI: M C. Leu, Co-PIs: F. Dogan and G. Hilmas).
54. "Development of System-Level Maintenance System for Compressors," awarded by the NSF I/UCRC on Intelligent Maintenance Systems at Missouri S&T, \$40,000, 7/1/06-6/30/07 (PI: M. C. Leu).
55. "Two (2) DTM2000 Sinter Stations for Selective Laser Sintering Research," donated by Boeing company, valued at \$97,140, 1/1/06-12/31/06 (PI: M. C. Leu, Co-PIs: F. Dogan, G. Hilmas).
56. "Development of Collaborative Engineering Design Education Projects," awarded by General Motors Corporation via the PACE Consortium, \$21,000 in cash plus two computer stations, 7/1/06-6/30/08 (PI: M. C. Leu).
57. "STTR: Rapid Freeze Prototyping of Investment Cast Thin Wall Metal Matrix Composites: Phase I," awarded by the National Science Foundation (with a Subaward from O'Fallon Casting Company to Missouri S&T), \$149,990, 1/1/07-12/31/07 (PI: T. Hill, Co-PIs: V. Richards, M.C. Leu).

58. "Synthesis and Evaluation of Markings for Truck Mounted Attenuators," awarded by Iowa Department of Transportation and Missouri S&T's University Transportation Center, \$60,000, 9/1/07-6/30/09 (PI: G. Bham, Co-PI: M.C. Leu).
59. "A Simulator for Fastening Operation and Dynamic Ergonomics Analysis," awarded by the Air Force Research Laboratory via Missouri S&T's Center for Aerospace Manufacturing Technologies with matching support from CAMT Industrial Consortium, \$64,000 (plus \$86,000 industry software in-kind matching), 10/1/07-9/30/09 (PI: M C. Leu, Co-PI: S. L. Murray).
60. "Automated CAD Model Based Simulation of Manufacturing Operations," awarded by the Air Force Research Laboratory via Missouri S&T's Center for Aerospace Manufacturing Technologies, \$122,788, 10/1/07-9/30/09 (PI: M C. Leu, Co-PI: X. F. Liu).
61. "Direct Digital Manufacture of Near Net-Shape Parts with Ultra-High Temperature Ceramics," awarded by the Air Force Research Laboratory via Missouri S&T's Center for Aerospace Manufacturing Technologies, \$187,212, 10/1/07-9/30/09 (PI: M C. Leu, Co-PIs: F. Dogan, G. Hilmas, R. Landers).
62. "2008 CAMT Industrial Consortium Program Support and Development," awarded by Missouri S&T's CAMT Industrial Consortium, \$50,000, 1/1/08-12/31/08 (PI: M. C. Leu).
63. "CAD Model Based Simulation of Manufacturing Operations Using Dynamic Data Configuration and Real-time Motion Capture," awarded by Missouri S&T's CAMT Industrial Consortium, \$80,000, 7/1/08-6/30/10 (PI: M. C. Leu, Co-PI: X. F. Liu).
64. "Roadmap for Additive Manufacturing (RAM) Workshop: Identifying the Future of Freeform Processing," awarded by the National Science Foundation and the Office of Naval Research, \$66,992, 1/1/09-12/31/09 (PI: D. L. Bourell, Co-PIs: M. C. Leu, D. W. Rosen).
65. "Freeze Extrusion Fabrication of Bone Scaffolds with Bioactive Glass," awarded by Missouri S&T's Consortium for Bone and Tissue Repair and Regeneration (CBTRR), \$19,850, 1/1/09-12/31/09 (PI: M. C. Leu).
66. "2009 CAMT Industrial Consortium Program Support and Development," awarded by Missouri S&T's CAMT Industrial Consortium, \$50,000, 1/1/09-12/31/09 (PI: M. C. Leu).
67. "SBIR: Selective Laser Sintering of Bioglass Scaffolds for Bone Tissue Engineering: Phase I," awarded by the National Science Foundation (with a Subaward from MoSci Corporation to Missouri S&T), \$100,000, 7/1/09-12/31/09 (PI: M. Velez, Co-PIs: M.C. Leu, R. F. Brown, G. E. Hilmas).
68. "Advanced Military Installations Integrating Renewable Energy and Advanced Energy Storage Technologies: Task 2," awarded by the Air Force Research Laboratory, \$862,500, 7/10/09-9/9/12 (PI: F. Liou, Co-PIs: C. Chandrashekhara, R. G. Landers, M. C. Leu, J. Newkirk).
69. "GOALI: Freeze-form Extrusion Fabrication of Composite Structures Using Ultra High Temperature Ceramics and Refractory Metals," awarded by the

- National Science Foundation, \$312,000, 8/1/09-7/31/12 (PI: M.C. Leu,, Co-PI: G. E. Hilmas, R. G. Landers, M. W. Hayes, S. Lawton).
70. “Matching Support for NSF GOALI Project: Freeze-form Extrusion Fabrication of Composite Structures Using Ultra High Temperature Ceramics and Refractory Metals,” awarded by Boeing Company, \$60,000, 8/1/09-7/31/12 (PI: M.C. Leu, Co-PI: G. E. Hilmas, R. G. Landers, M. W. Hayes, S. Lawton).
  71. “A Low-Cost Motion Tracking System for Virtual Reality Applications,” awarded by Missouri S&T’s CAMT Industrial Consortium, \$50,000plus \$43,000 industry software in-kind matching), 10/1/09-9/30/10 (PI: M. C. Leu, Co-PI: X. F. Liu).
  72. “Landmine Detection Simulator,” awarded by Leonard Wood Institute (with a Subaward from Advanced Military Equipment Corporation to Missouri S&T), \$544,950, 9/1/09-12/31/10 (PI: J. Plunkett, Co-PIs: M. C. Leu, K. Wedge, B. M. Davis).
  73. “Advanced Electric Drive Vehicles,” awarded by the National Energy Technology Laboratory, \$5,000,000, 1/1/10-12/31/12 (PI: M. Ferdowsi, Co-PIs: K. T. Erickson, J. W. Kimball, J. W. Sheffield, S. Long, R. H. Hall, S. E. Grassman, M. C. Leu, R. G. Landers, S. Corns, K. Corzine, F. Dogan, M. L. Crow).
  74. “2010 CAMT Industrial Consortium Program Support and Development,” awarded by Missouri S&T’s CAMT Industrial Consortium, \$50,000, 1/1/10-12/31/10 (PI: M. C. Leu).
  75. “Conference: 2010 International Symposium on Flexible Automation; Tokyo; Japan; July 12 - 14, 2010,” awarded by the National Science Foundation, \$25,000, 3/15/10-6/30/11 (PI: J. Cao, Co-PIs: M. Tomizuka, M. C. Leu).
  76. “REU Site: Additive Manufacturing,” awarded by the National Science Foundation, \$400,000, 7/15/10-7/14/13 (PI: R. Landers, Co-PIs: M. C. Leu, G. Hilmas, F. Liou, H. Sheng).
  77. “Additive Manufacturing of Functionally Gradient Ultra-High Temperature Materials,” awarded by the Air Force Research Laboratory, \$197,320, 8/1/10-7/31/12 (PI: M. C. Leu, Co-PI: G. Hilmas).
  78. “Ergonomic Analysis Based on Assembly Simulation with Motion Capture,” awarded by Missouri S&T’s CAMT Industrial Consortium, \$20,000 (plus \$43,000 industry software in-kind matching), 11/1/10-10/31/11 (PI: M. C. Leu, Co-PI: X. F. Liu).
  79. “2011 CAMT Industrial Consortium Program Support and Development,” awarded by Missouri S&T’s CAMT Industrial Consortium, \$50,000, 1/1/11-12/31/11 (PI: M. C. Leu).
  80. “SBIR: Biodegradable and Biocompatible Tissue Matrices for Bone Repair: Phase I,” awarded by the Office of Naval Research (with a Subaward from MoSci Corporation to Missouri S&T), \$70,000, 1/15/11-7/14/11 (PI: M. Velez, Co-PIs: M. C. Leu, T. G. Chu).

81. "Human-Assisted Manufacturing Model Library," A subaward from Boeing Company of an award by the Defense Advanced Research Project Agency, \$310,543, 6/20/11-5/31/12 (PI: F. Liou, Co-PIs: M.C. Leu, C. Dagli).
82. "Influencing Work Zone Traffic Flow through Variable Messaging Technologies," awarded by Iowa Department of Transportation and matched by Missouri S&T Center for Infrastructure Engineering Studies, \$100,000, 7/1/11-12/31/13 (PI: G. Bham, Co-PI: M.C. Leu).
83. "Bio-inspired Design, Fabrication and Testing of Bipolar Plates for PEM Fuel Cells," awarded by the National Science Foundation, \$357,061, 8/15/11-7/31/15 (PI: M.C. Leu, Co-PI: U. Koylu).
84. "Development of a Portable Turn-Key Motion Capture System for Shop-Floor Use," awarded by Missouri S&T's CAMT Industrial Consortium, \$40,000 (plus \$43,000 industry software in-kind matching), 1/1/12-12/31/12 (PI: M. C. Leu, Co-PI: X. F. Liu).
85. "Temporary Fastener for Aerospace Automation: Design and Analysis," awarded by Missouri S&T's CAMT Industrial Consortium, \$30,000, 1/1/12-12/31/12 (PI: M. C. Leu).
86. "2012 CAMT Industrial Consortium Program Support and Development," awarded by Missouri S&T's CAMT Industrial Consortium, \$50,000, 1/1/12-12/31/12 (PI: M. C. Leu).
87. "Technology Development Support for the Boeing DARPA-C2M2L Program Area 3," a subaward from Boeing Company of an award by the Defense Advanced Research Project Agency, \$300,000, 1/19/12-11/21/12 (PI: F. Liou, Co-PI: M.C. Leu).
88. "Alternative Materials to Beryllium for Future Additive Manufacturing Application," awarded by Lockheed Martin Company, \$70,000, 7/10/12-13/31/13 (PI: M. C. Leu. Co-PI: G. E. Hilmas).
89. "GAANN: Doctoral Research and Training in Direct Digital Manufacturing," awarded by Department of Education, \$399,798 (plus \$133,266 from Missouri S&T matching), 8/16/12-8/15/15 (PI: R. G. Landers, Co-PI's: M. C. Leu, D. A. Bristow, K. Chandrashekhara, and M. Rahaman).
90. "MRI: Development of an Open-Source Dual-Probe Atomic Force Microscope," awarded by National Science Foundation, \$316,044 (plus \$135,447 from Missouri S&T matching), 9/15/12-8/31/15 (PI: D. A. Bristow, Co-PIs: M. C. Leu, J. A. Switzer, R. J. Stanley, J. Sarangapani).
91. "Temporary Fastener for Aerospace Automation: Prototyping and Testing," awarded by Missouri S&T's CAMT Industrial Consortium, \$20,000, 1/1/13-12/31/13 (PI: M. C. Leu).
92. "Sparse-Build Tooling by Fused Deposition Modeling for Composites Manufacturing," awarded by Missouri S&T's CAMT Industrial Consortium, \$40,000 (plus \$50,000 industry material & equipment matching), 1/1/13-12/31/13 (PI: M. C. Leu).
93. "2013 CAMT Industrial Consortium Program Support and Development," awarded by Missouri S&T's CAMT Industrial Consortium, \$50,000, 1/1/13-12/31/13 (PI: M. C. Leu).

94. “NSF Workshop on Frontiers of Additive Manufacturing Research and Education,” awarded by the National Science Foundation, \$49,465, 3/15/13-3/14/14 (PI: Y. Huang, Co-PI: M. C. Leu).
95. “Sparse-Build Rapid Tooling by Fused Depositing Modeling (FDM) for Composite Manufacturing and Hydroforming,” awarded by America Makes – National Additive Manufacturing Innovation Institute, \$191,523, plus \$145,000 industry matching and \$100,000 Missouri S&T matching, 4/1/13-4/30/14 (PI: M. C. Leu, Co-PI: K. Chandrashekhara).
96. “Student Travel Support for 2014 International Symposium on Flexible Automation; Kobe, Japan; 14-16 July 2014,” awarded by the National Science Foundation, \$25,000, 9/1/13-12/31/14 (PI: R. G. Landers, Co-PIs: M. C. Leu, R. X. Gao).
97. “Additive Manufacturing of Smart Parts with Embedded Sensors for In-Situ Monitoring in Advanced Power Generation Systems,” awarded by the Department of Energy, \$1,499,978, plus \$379,449 university matching, 10/1/13-9/30/16 (PI: H. Tsai, Co-PIs: H. Xiao, M. C. Leu, J. Dong).
98. “Sparse-Build FDM Tooling for Autoclave Processing,” awarded by Missouri S&T’s CAMT Industrial Consortium, \$55,000 (plus \$50,000 industry material & equipment matching), 1/1/14-12/31/14 (PI: M. C. Leu, Co-PI: K. Chandrashekhara).
99. “2014 CAMT Industrial Consortium Program Support and Development,” awarded by Missouri S&T’s CAMT Industrial Consortium, \$50,000, 1/1/14-12/31/14 (PI: M. C. Leu).
100. “Healing Chronic Bone Infection Using Bioactive Glass,” awarded by the University of Missouri System, \$145,000, 8/1/14-7/31/15 (PI: B. S. Bal, Co-PIs: M. Rahaman, M. C. Leu, K. Katti, C. Phillips, G. Thiagarajan, Y. Wang).
101. “Work Zone Simulator Analysis: Driver Performance and Acceptance of Alternate Merge Sign Configuration,” awarded by Missouri Department of Transportation, \$120,037, 10/1/14-9/30/15 (PI: S. Long, Co-PIs: M. C. Leu, B. K. Smith, D. Konur).
102. “2015 CAMT Industrial Consortium Program Support and Development,” awarded by Missouri S&T’s CAMT Industrial Consortium, \$50,000, 1/1/15-12/31/15 (PI: M. C. Leu, co-PI: D. Bristow).
103. “REU Site: Additive Manufacturing,” awarded by the National Science Foundation, \$415,000, 4/1/15-3/31/18 (PI: R. Landers, Co-PIs: D. Bristow, G. Hilmas, J. Newkirk, E. Kinzel).
104. “Metal Additive Manufacturing Materials Analysis,” awarded by the National Security Campus of the Department of Energy (operated by Honeywell Federal Manufacturing & Technology), \$344,423, 5/1/15-9/30/15 (PI: M. C. Leu, Co-PIs: F. Liou, J. Newkirk, E. Kinzel, R. Landers, D. Bristow, and D. O’Malley).
105. “3D Printing of Bone Using Bioactive Glass and Mesenchymal Stem Cells,” awarded by the Missouri S&T CASB Best-In-Class Pilot Study Program, \$19,000, 6/1/15-5/31/16 (PI: J. A. Semon, Co-PIs: M. C. Leu, D. E. Day).

106. "EAGER: Cybermanufacturing: Architecture and Protocols for Scalable Cyber-Physical Manufacturing Systems," awarded by the National Science Foundation, \$300,000, 9/1/15-8/31/17 (PI: X. F. Liu, Co-PIs: M. C. Leu, M. X. Cheng).
107. "GAANN: Doctoral Research and Training in Mechatronics," awarded by the Department of Education, \$885,834, 9/1/15-8/31/18 (PI: D. A. Bristow, co-PIs: J. L. Rovey, R. G. Landers, H. Pernicka, L. Duan, E. C. Kinzel, M. C. Leu, J. Park, H. Peng, K. J. DeMars).
108. "Metal Additive Manufacturing Materials Analysis," awarded by the National Security Campus of the Department of Energy (operated by Honeywell Federal Manufacturing & Technology), \$817,381, 10/1/15-9/30/16 (PI: M. C. Leu, Co-PIs: F. Liou, J. Newkirk, E. Kinzel, R. Landers, D. Bristow, L. Chen, and D. O'Malley).
109. "NX-10 for Engineering Design e-book," awarded by Siemens Corp., \$31,000, 10/1/15-9/30/16 (PI: M.C. Leu).
110. "Low-Cost Rapid FDM Tooling with ULTEM 1010," awarded by Missouri S&T's CAMT Industrial Consortium, \$65,000 (plus \$50,000 industry material & equipment matching), 1/1/16-12/31/16 (PI: M. C. Leu, Co-PI: K. Chandrashekhara).
111. "2016 CAMT Industrial Consortium Program Support and Development," awarded by Missouri S&T's CAMT Industrial Consortium, \$90,000, 1/1/16-12/31/16 (PI: M. C. Leu, co-PI: D. Bristow).
112. "2016 NSF CAREER Proposal Writing Workshop; St. Louis, Missouri; March 21-22, 2016," awarded by the National Science Foundation, \$38,000, 2/1/16-1/31/18 (PI: B. A. Kramer, Co-PI: M. C. Leu).
113. "Integrated Manufacturing Variation Management," awarded by the Digital Manufacturing and Design Innovation Institute, \$276,287. 2/5/16-11/30/17 (PI: D. Bristow, co-PIs: M. C. Leu, R. Landers).
114. "Work Zone Simulator Analysis: Driver Performance and Acceptance of Missouri Alternate Lane Shift Configurations," awarded by Missouri Department of Transportation, \$75,009, 5/1/16-12/31/16 (PI: S. Long, Co-PIs: M. C. Leu, R. Qin, D. Konur).
115. "An Exploratory Study of Selective Laser Melting for Bonding of 304L Stainless Steel to Cast Iron" \$12,000, awarded by Missouri S&T's CAMT Industrial Consortium, 7/1/16-12/31/16 (PI: M. C. Leu).
116. "CPS: Synergy: Collaborative Research: Cyber-Physical Sensing, Modeling, and Control with Augmented Reality for Smart Manufacturing Workforce Training and Operations Management," awarded by the National Science Foundation, \$505,287, 2/1/17-1/31/20 (PI: Z. Yin, Co-PIs: M. C. Leu, R. Qin).
117. "Metal Additive Manufacturing Materials Analysis," awarded by the National Security Campus of the Department of Energy (operated by Honeywell Federal Manufacturing & Technology), \$862,295, 10/1/16-9/30/17 (PI: M. C. Leu, Co-PIs: F. Liou, J. Newkirk, E. Kinzel, R. Landers, D. Bristow, L. Chen, and D. O'Malley).



118. “Additive Manufacturing of Ceramic and Ceramic Composites,” awarded by the National Security Campus of the Department of Energy (operated by Honeywell Federal Manufacturing & Technology), \$150,578, 10/1/16-9/30/17 (PI: G. E. Hilmas, Co-PI: M. C. Leu).
119. “Modeling and Simulation of Residual Stresses and Part Deformation in Autoclave Processing with ULTEM 9085 and ULTEM 1010 Tools, \$52,000 (plus \$50,000 industry material & equipment matching), 1/1/17-12/31/17 (PI: M. C. Leu, Co-PI: K. Chandrashekhara).