Curriculum Vita

# William J. Endres, Ph.D.

**University Contact:**
1400 Townsend Drive
Houghton, MI 49931
(906) 487-2567
wjendres@mtu.edu

**Businesses Contact:**
509 W. Douglass Ave.
Houghton, MI 49931
(906) 370-1442
wjendres@endresmachining.com

## Citizenship

U.S. Citizen

## Education

- Ph.D. Mechanical Engineering, University of Illinois at Urbana-Champaign, Oct. 1992.
  Attended Jan. 1990 – Sep. 1992
  Thesis: "A Dual-Mechanism Approach to the Prediction of Machining Forces for Metal-Cutting Processes"
  Co-Directors of Dissertation Research: Professors Richard E. DeVor and Shiv G. Kapoor
- M.S. Mechanical Engineering, University of Illinois at Urbana-Champaign, Jan. 1990.
  Attended Aug. 1988 – Dec. 1989
  Thesis: "A Dynamic Model of the Cutting Force System in the Turning Process"
  Advisors: Professors Richard E. DeVor, Shiv G. Kapoor, and John W. Sutherland
- B.S. Mechanical Engineering, University of Illinois at Urbana-Champaign, May 1988.
  Attended Aug. 1984 – May 1988

## Employment History

### Endres Machining Innovations, LLC, Houghton, MI

- Founder and President: Dec. 2004 – Date.

  My Role: In this role I lead an outstanding team of employees toward realizing my vision for EMI — a company recognized by the global market-share leaders in the cutting-tool industry as a highly creative, innovative, and agile source of new technologies and products. Our team works to address pressing market needs by developing technologies that lead to some of the world's most advanced, fastest, and longest-lasting cutting tools. As our first products are commercialized based upon these technologies, we are growing into production by expanding our manufacturing capabilities and capacity while further building our commercialization teams that currently include some of the global market-share leaders in the cutting-tool industry as well as equipment OEMs.

  About the Company: EMI was founded in 2005 to develop and commercialize game-changing new technologies in the cutting-tool industry. Complementing EMI's industry-leading R&D is an offering of engineering services, including knowledge-transfer, application development, and machinability testing, all of which support a customer's efforts to reduce cost, improve quality, and reduce time to market. Through its R&D programs and commercialization partnerships, EMI's is developing and delivering, under its Revocut® brand, innovative tooling products that are providing substantial productivity improvements to manufacturers the world over. These technologies stand out in high-value processes like finishing and fine-finishing, and in difficult-to-machine materials like titanium, nickel alloys, stainless steels, compacted-graphite iron (CGI) and hardened steel. EMI's office and 3,600sf Prototype and Testing Lab are located in Houghton, Michigan near the campus of Michigan Technological University.


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**Dept. of Mechanical Engg. – Engg. Mechanics, Michigan Technological University, Houghton, MI**

- Richard and Elizabeth Henes Endowed Professorship: Jul. 2021 – Date.
- Director, Capstone Design Program (CDP): May 2009 – Date.

  My Role: In this role I lead a team of twelve dedicated faculty, professional staff, and shop personnel toward realizing my vision for our Capstone Design Program — a capstone design program that consistently delivers such high value to its customers that they are inspired to continuously search for projects to work on with us. Our team works to secure nearly 35–40 year-long projects each year and then provide direction and support about 200 students as they work in teams toward completing their project and satisfying our customers. I have a variety of responsibilities (fiduciary, administrative, and academic) related to the long-term direction and day-to-day operations of the program as well as the management of its $500,000 externally funded annual budget. The CDP is run as a business to the extent possible within an academic setting and with adherence to and consideration of the academic/educational purposes of the program.

  About the Program: The CDP in Mechanical Engineering builds on our practice/lab-based "hands-on" curriculum to provide students "their first job, not their last class," while helping our customers — companies and entrepreneurs — address their aggressive goals and tight budgets while providing a fresh perspective. Our teams are formed by considering student backgrounds and interests. Student teams are advised by a nine-person technical Advising Team, the members of which are specially selected for their technical expertise — to cover the array of typical technical needs associated with projects — and furthermore for their proven ability to guide students in solving real, applied, open-ended problems. Our projects span two semesters beginning with developing an understanding of and defining the problem, where end-user and customer needs, engineering requirements, and metrics for success are defined. Proceeding through function-level and system-level concept generation, assessment, and selection, then through detail-level design, each team ultimately produces a working prototype that is tested and refined toward satisfying the engineering requirements. Along the way teams need to sell themselves and their solution through program-level stage gates and design review meetings. Projects commence in late August and early January.
- Associate Professor: May 2001 – Date.

  Research: Funded research in cutting mechanics for metals and ceramics, analytical and computational machining dynamics in single and parallel-process machining, machine-tool joint dynamics, and mechanistic process modeling techniques.

  Teaching: Course development and instruction in machining dynamics and mechanics, machining process modeling, mechanical design and manufacturing, and dynamic systems. Advising undergraduate independent study projects and mentoring Doctoral and Masters students.

**Research and New Product Development, Lamb Technicon Machining Systems, Warren, MI**

- Visiting Researcher: May 2001 – Aug. 2001.

  Applied past research results to their new flexible line boring machine (the BOA – Boring with Optimal Accuracy) and its laser-guided, piezo-actuated smart tool for (1) better understanding of its stability (2) development of a pitch error compensation algorithm and calibration tool.

**Dept. of Mechanical Engineering, University of Michigan, Ann Arbor, MI**

- Assistant Professor: Sep. 1994 – May 2001.

  Research: Same as above.

  Teaching: Same as above.
- Visiting Assistant Professor: Feb. 1994 – Aug. 1994.

  Research: Funded research in sheet metal stamping and un-funded research in cutting mechanics and mechanistic process modeling techniques.

  Teaching: Development of a hands-on course in mechanical design and manufacturing.

**Dept. of Mech. and Ind. Engineering, University of Illinois at Urbana-Champaign, Urbana, IL**

- Visiting Assistant Professor: Sep. 1992 – Jan. 1994.
  Research: Research in cutting mechanics and mechanistic process modeling techniques.
  Teaching: Course development and instruction in dynamic systems, manufacturing processes and mechanical design. Advising Masters students in the Manufacturing Systems Research Group.
- Graduate Research Assistant: Aug. 1988 – Sep. 1992.
  Research: Research in cutting mechanics, computational machining dynamics, and mechanistic process modeling techniques.
  Teaching: Primary lecture instructor for one term, via a distinguished Departmental Teaching Fellowship, for a course in "Modeling and Analysis of Dynamic Systems," and for one-half of a term for a graduate course in "Accuracy, Dynamics, and Control of Machining Systems."
- Undergraduate Teaching Assistant: Aug. 1987 – May 1988.
  Instructor for laboratory sessions, maintaining equipment, and assembling new laboratory equipment for a course in "Microcomputer Control of Mechanical Engineering Systems."

**Process Design and Control, Inc., Champaign, IL**

- Independent Contractor to Process Design and Control, Inc.: Feb. 1989 – May 1992.
  Engineering consulting in the areas of manufacturing process planning/design; development of machining process models and computer simulation software.

**ABB - Impell Corporation, Lincolnshire, IL**

- Engineering Intern: Summer 1988, Dec. 1988 – Jan. 1989.
  Piping support analyses for nuclear plants; custom FEA front-end software maintenance.

**S & C Electric Company, Chicago, IL**

- Summer Employee: Summers 1984 – 1987
  1984 - 1986: Cleaning machines, stocking inventory, and kitting materials for jobs in the Tool Shop.
  1987: Assembly of pad mounted switchgear units.

## Board of Directors Membership

**Winsert, Inc., Marinette, WI, May 2006 – Feb. 2009**

Founded in 1977, Winsert, Inc. is a leading supplier of cast valve seat inserts (VSIs) for the world's engine market. Winsert utilizes proprietary alloys to create affordable wear solutions for its OEM customers. Since 1992, Winsert has maintained the industry's most sophisticated alloy development and wear-testing capability for the VSI sector. This R&D resource gives Winsert customers a matrix of design and performance options for warranty-critical VSI components. Winsert's patented new high performance, cost-saving alloys allow engine OEMs to meet stricter emission standards and minimize reliance on price-volatile raw materials. The combination of commitment to ISO/TS 16949 and ISO 14001 quality standards and use of advanced alloys allow Winsert to provide zero-defect performance and ready-to-install parts to its global customer base.

## Honors and Awards

- Richard and Elizabeth Henes Endowed Professorship, Dept. of Mechanical Engineering – Engineering Mechanics, Michigan Technological Univ., 2021.
- Milton C. Shaw Outstanding Young Manufacturing Engineer Award, Society of Manufacturing Engineers, 1999.


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- Recognized as an Outstanding Reviewer for the *ASME Journal of Manufacturing Science and Engineering*, 1998.
- National Science Foundation CAREER Award, 1998.
- ASME Blackall Machine Tool and Gage Award, with advisors R. E. DeVor and S. G. Kapoor (based on Ph.D. research), for "the best paper or papers clearly concerned with or related to the design or application of machine tools, gages or dimensional instruments" published in the *ASME Journal of Manufacturing Science and Engineering* (formerly *ASME Journal of Engineering for Industry*), 1997.
- Amoco Foundation Teaching Fellowship (UIUC), 1991.
- University of Illinois at Urbana-Champaign University Fellowship, 1988 – 1990.

## Invention Disclosures and Patents

### Invention Disclosures

1. Endres, W. J., "Elemental Cavity-based Tooling," MTU 0413.00, Mar. 2004.
2. Endres, W. J., "Internal Micro-Duct Cooled Cutting Tool," MTU 0412.00, Mar. 2004.
3. Endres, W. J., "Pinpoint Thermal Control Element for Elemental Molds and Casting Dies," MTU 0421.00, Apr. 2004.

### Patents

***Patents Issued – 10***

1. Endres, W. J., "High-Pressure, Fluid Storage Tank," US 7,479,314 B2; Assignee: Endres Machining Innovations, LLC (Houghton, MI); Filed: Jul. 25, 2006 (term extended/adjusted by 234 days); Issued: Jan. 20, 2009.
2. Endres, W. J., "System for Improving the Wearability of a Surface and Related Method," US 7,651,758 B2; Assignee: EIP Holdings, LLC (Houghton, MI); Filed: Oct. 18, 2005 (term extended/adjusted by 316 days); Issued: Jan. 26, 2010.
3. Endres, W. J., "Cutting Tool Insert Having Internal Microduct for Coolant," US 7,802,947 B2; Assignee: Michigan Technological University (Houghton, MI); Filed: May 09, 2007; Issued: Sep. 28, 2010.
4. Endres, W. J., "Cutting Tool Insert Having Internal Microduct for Coolant," US 8,047,748 B2; Assignee: Michigan Technological University (Houghton, MI); Filed: Sep. 17, 2010; Issued: Nov. 01, 2011.
5. Woodruff, D. J., Pennala, G. W., and Endres, W. J., "Micro-jet Cooling of Cutting Tools," US 8,439,609 B2; Assignee: Michigan Technological University (Houghton, MI) and Endres Machining Innovations, LLC (Houghton, MI); Filed: Oct. 03, 2011; Issued: May 14, 2013.
6. Woodruff, D. J., Pennala, G. W., and Endres, W. J., "Stabilization of Boring Tools," US 8,511,946 B2; Assignee: Rotary Technologies Corp. (Rancho Dominguez, CA); Filed: Aug. 25, 2011; Issued: Aug. 30, 2013.
7. Woodruff, D. J., Pennala, G. W., and Endres, W. J., "Round Wiper Tooth and Face Mill Incorporating the Same," US 9,550,240 B2; Assignee: Rotary Technologies Corp. (Rancho Dominguez, CA); Issued: Jan. 24, 2017.
8. Endres, W. J., Woodruff, D. J., Loosemore, J. W., and Kumbera, T. G., "Rotary Metal-Cutting Insert and Mounting Cartridge Therefor," EU 2,231,354; Assignee: Rotary

Technologies Corp. (Rancho Dominguez, CA); Filed Jan. 07, 2009; Issued: Aug. 01, 2018.

9. Endres, W. J., and Woodruff, D. J., "Rotary Cutting Insert and Support Device," US 10,549,361 B2; Assignee: EIP Holdings, LLC (Houghton, MI); Filed Jun. 01, 2017; Issued: Feb. 04, 2020.
10. Woodruff, D. J., Pennala, G. W., and Endres, W. J., "Stabilization of Boring Tools," EU 2,608,914; Assignee: Rotary Technologies Corp. (Rancho Dominguez, CA); Filed Aug. 21, 2011; Issued: May 27, 2020.

***Patent Applications Pending – 10***

1. Endres, W. J., Woodruff, D. J., Loosemore, J. W., and Kumbera, T. G., "Rotary Metal-Cutting Insert and Mounting Cartridge Therefor," US Applic. No. 61/010,279; Assignee: Rotary Technologies Corp. (Rancho Dominguez, CA); Filed: Jan. 07, 2009; pending.
2. Endres, W. J., Woodruff, D. J., Loosemore, J. W., and Kumbera, T. G., "Rotary Metal-Cutting Insert and Mounting Cartridge Therefor," Israel Applic. No. 206638 via PCT/US2009/030360; Assignee: Rotary Technologies Corp. (Rancho Dominguez, CA); Filed: Jan. 07, 2009; pending.
3. Endres, W. J., Woodruff, D. J., and Kroll, R. R., "Round Tooth Cutters and Method of Design and Use," European Applic. No. 15/847,168.0 via PCT/US2015/053130; Assignee: EIP Holdings, LLC (Houghton, MI); Filed: Sep. 30, 2015; pending.
4. Endres, W. J., "Quick-Adjustment Finishing Tool and Method of Use," US Applic. No. 16/849,907; Assignee: EIP Holdings, LLC (Houghton, MI); Filed: Apr. 15, 2020.
5. Endres, W. J., and Woodruff, D. J., "Compact Rotary Seal," US Applic. No. 16/780,896; Assignee: EIP Holdings, LLC (Houghton, MI); Filed: Feb. 2, 2020; pending.
6. Endres, W. J., and Endres, C. M., "Inertia Measurement Device," US Provisional Applic. No. 63/215,945; Assignee: WECE Innovations, LLC (Houghton, MI); Filed: Jun. 28, 2021; pending.

***Patent Applications not as Joint Inventor — informally serving company inventor(s) (assistance in authorship, USPTO filing, and prosecution) – 1***

1. Woodruff, D. J., "Twin Spherical Locking Ball Joint," US Provisional Applic. No. 63/176,328; Assignee: EIP Holdings, LLC (Houghton, MI); Filed: Apr. 18, 2021.

***Patent Applications Strategically Abandoned – 7***

1. Endres, W. J., and Woodruff, D. J., "Finishing Face Mill with Reduced Chip Load Variation and Method of Obtaining the Same," US Applic. No. 14/597,125; Assignee: EIP Holdings, LLC (Houghton, MI); Filed: Jan. 14, 2015.
2. Endres, W. J., and Woodruff, D. J., "Finishing Face Mill with Reduced Chip Load Variation and Method of Obtaining the Same," PCT Applic. No. PCT/US2015/11462; Assignee: EIP Holdings, LLC (Houghton, MI); Filed: Jan. 14, 2015.
3. Woodruff, D. J., Endres, W. J. and Helminen, N. H., "Adjustable Face Mill and Method of Manufacture," US Applic. No. 15/186,120; Assignee: EIP Holdings, LLC (Houghton, MI); Filed: Jun. 19, 2015.

4. Endres, W. J., and Woodruff, D. J., "Rotary Cutting Insert and Support Device," European Applic. No. 18/807,464.7 via PCT/US2017/035400; Assignee: EIP Holdings, LLC (Houghton, MI); Filed: Dec. 17, 2018; pending.
5. Endres, W. J., Woodruff, D. J., and Kroll, R. R., "Round Tooth Cutters," US Applic. No. 16/266,883; Assignee: EIP Holdings, LLC (Houghton, MI); Filed: Feb. 4, 2019; pending.
6. Endres, W. J., "Quick-Adjustment Finishing Tool and Method of Use," PCT Applic. No. PCT/US20/28369; Assignee: EIP Holdings, LLC (Houghton, MI); Filed: Apr. 15, 2020.
7. Endres, W. J. "Tool and Method for Very High Feed Machining," PCT Applic. No. PCT/US20/55448; Assignee: EIP Holdings, LLC (Houghton, MI); Filed: Oct. 14, 2020.

## Books

- Endres, W. J., *Machining Processes: Model-based Planning and Diagnostics*, 1993 – 2016; published by Endres Machining Innovations, LLC, Houghton, MI.

**Full-length professional development companion books on commercialization engineering**

- Endres, W. J., *A Game Against Reality: Engineering Practice and Professionalism in a Physical World Inhabited by Humans*, 98% complete and targeting publication in 2023 by Divivid Publishing, Houghton, MI, USA,
  content overview: failing/learning, communicating, teaming, situational (problem + people) understanding, problem defining, planning, and surviving critical decisions
- Endres, W. J., *Math to Mettle: Supporting, Selling, Struggling, and Surviving in the Practice of Engineering Design*, 98% complete and targeting publication in 2023 by Divivid Publishing, Houghton, MI, USA,
  content overview: general-to-specific ideation, function-level design, system-level design, phased decision-supportive engineering, decision-critical stage gates, protecting/IP, detailing, demonstrating, selling, and leading

**The first installments of an envisioned seven-book short-read series (the *with Others for Others* series) on leadership practice**

- Endres, W. J., *Leading with Others for Others: Part 1 — Start a Lifelong Journey… Your World Needs It*, 100% complete, in editing, and targeting publication in 2023 by Divivid Publishing, Houghton, MI, USA,
  content overview: centered on what I call MIDACKS leadership (meaningful, intentional, dedicated, authentic, caring, knowledgeable, and skilled)… the importance of leadership (of knowledge; to teaming; of being beneath); processes and people (leading vs. managing; processes; people + processes → product)
- Endres, W. J., *Leading with Others for Others: Part 2 — Some of The Doing*, 90% complete and targeting publication in 2023 by Divivid Publishing, Houghton, MI, USA,
  content overview: what a leader does (craft vision; cast vision; watch, listen, then build; serve; replace themselves)

Endres, W. J., *Leading with Others for Others: Part 3 — Some of The Being*, 30% complete and targeting publication in 2024 by Divivid Publishing, Houghton, MI, USA,
content overview: what a leader is (ambitious; disciplined; honorable; teachable; inclusive)

## Publications Student names underlined

### Peer Reviewed Journal/Transactions Publications

1. Radulescu, R., Kapoor, S. G., Endres, W. J., and DeVor, R. E., 1993, "An Investigation of the Vibration of the Face Milling Process During High-Speed Machining," *Trans. of NAMRI/SME,* **21**, 237-246; also presented at NAMRC 21, 1993.
2. Endres, W. J., and Waldorf, D. J., 1994, "The Importance of Size Effect Variation Along the Cutting Edge in Predicting the Effective Lead Angle in Turning," *Trans. of NAMRI/SME,* **22**, 65-72; also presented at NAMRC 22, 1994.
3. Endres, W. J., DeVor, R. E., and Kapoor, S. G., 1995, "A Dual-Mechanism Approach to the Prediction of Machining Forces: Part 1 – Model Development," *ASME J. of Engg. for Ind.* (now *ASME J. Mfg. Sci. and Engg.*), **117**, 526-533; also presented at the ASME WAM and in *Proc., Symp. on Modeling, Monitoring and Control Issues in Mach. Processes*, **PED-64**, 563-576, 1993. *Journal version awarded, with Part 2, the 1997 ASME Blackall Machine Tool and Gage Award.*
4. Endres, W. J., DeVor, R. E., and Kapoor, S. G., 1995, "A Dual-Mechanism Approach to the Prediction of Machining Forces: Part 2 – Calibration and Validation," *ASME J. of Engg. for Ind.* (now *ASME J. Mfg. Sci. and Engg.*), **117**, 534-541; also presented at the ASME WAM and in *Proc., Symp. on Modeling, Monitoring and Control Issues in Mach. Processes*, **PED-64**, 577-593, 1993. *Journal version awarded, with Part 1, the 1997 ASME Blackall Machine Tool and Gage Award.*
5. Endres, W. J., 1996, "A Quantitative Energy-Based Method for Predicting Stability Limit as a Direct Function of Spindle Speed for High-Speed Machining," *Trans. of NAMRI/SME,* **24**, 27-32; also presented at NAMRC 24, May 1996.
6. Melkote, S. N., and Endres, W. J., 1998, "The Importance of Considering Size Effect when Modeling Slot End Milling," *ASME J. Mfg. Sci. and Engg.*, **120**, 68-75; also presented at and in *Proc., First S. M. Wu Symp. on Mfg. Sci.*, 399-406, 1994.
7. Chiu, W.-C., Thouless, M. D., and Endres, W. J., 1998, "An Analysis of Chipping in Brittle Materials," *J. of Fracture,* **90**, 287-298.
8. Manjunathaiah, J., and Endres, W. J., 2000, "A Study of Apparent Negative Rake Angle and its Effects on Shear Angle During Orthogonal Cutting with Edge-Radiused Tools," *Trans. of NAMRI/SME,* **28**, 197-202; also presented at NAMRC 28, May 2000.
9. Schimmel, R. J., Manjunathaiah, J., and Endres, W. J., 2000, "Edge Radius Variability and Force Measurement Considerations," *ASME J. Mfg. Sci. Engg.*, **122**, 590-593; also presented at the ASME IMECE and in *Proc., Symp. on Advances in Cutting Tools and Workholding Technology for Machine Tools*, **MED-6-2**, 261-267, 1997.
10. Manjunathaiah, J., and Endres, W. J., 2000, "A New Model and Analysis of Orthogonal Machining with an Edge-Radiused Tool," *ASME J. Mfg. Sci. and Engg.*, **122**, 384-390; also presented at the ASME IMECE and in *Proc., Symp. on Adv. Matls. Processing*, **MED-8**, 259-268, 1998.
11. Schimmel, R. J., Endres, W. J., and Stevenson, R., 2000, "The Application of an Internally Consistent Material Model to Determine the Effect of Zero Clearance in Orthogonal Machining," *J. Mach. Sci. and Tech.*, **4**, 101-125.


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12. Chiu, W.-C., Endres, W. J., and Thouless, M. D., 2000, "An Experimental Study of Chip Formation and Surface Formation during Orthogonal Machining of Homogeneous Brittle Materials," *J. Mach. Sci. and Tech.*, **4**, 253-275.
13. Ozdoganlar, O. B., and Endres, W. J., 2000, "An Analytical Representation of Chip Area for Corner-Radiused Tools Under Depth-of-Cut and Feed Variations," *ASME J. Mfg. Sci and Engg.*, **122**, 660-665; also presented at the ASME IMECE and in *Proc., Symp. on Adv. Matls. Processing*, **MED-8**, 251-258, 1998.
14. Manjunathaiah, J., Beecherl, P. M., Szuba, P. S., and Endres, W. J., 2001, "Model-Based Design of Rotating Insert Tools for Metal Cutting Applications," *Trans. of NAMRI/SME*, **29**, 351-358; also presented at NAMRC 29, May 2001.
15. Chiu, W.-C., Endres, W. J., and Thouless, M. D., 2001, "An Analysis of Surface Cracking during Orthogonal Machining of Glass," *J. Mach. Sci. and Tech.*, **5** 195-215.
16. Schimmel, R. J., Endres, W. J., and Stevenson, R., 2002, "The Application of an Internally Consistent Material Model to Determine the Effect of Tool Edge Geometry in Orthogonal Machining," *ASME J. Mfg. Sci. and Engg.*, **124**, 536-543; also presented at the ASME IMECE and in *Proc., Symp. on Mach. Sci. and Tech.*, **MED-10**, 327-335, 1999.
17. Endres, W. J., and Ozdoganlar, O. B., 2002, "Existence and Effects of Overlap Factors Greater than Unity and Less than Zero," *J. Manuf. Proc.*, **4**, 67-76; also in *Trans. of NAMRI/SME*, **29**, 159-166 and presented at NAMRC 29, May 2001.
18. Endres, W. J., and Kountanya, R. K., 2003, "The Effects of Corner Radius and Edge Radius on Tool Flank Wear," *J. Manuf. Proc.*, **4**, 89-96; also in *Trans. of NAMRI/SME*, **30**, 401-407 and presented at NAMRC 30, May 2002.
19. Li, C.-J., Ulsoy, A. G., and Endres, W. J., 2003, "The Effect of Flexible-Tool Rotation on Regenerative Chatter in Machining," *ASME J. Mfg. Sci. and Engg.*, **125**, 39-47.
20. Corpus, W. T., and Endres, W. J., 2004, "Added Stability Lobes for Machining Processes that Exhibit Periodic Time Variation – Part 1: An Analytical Solution," *ASME J. Mfg. Sci. and Engg.*, **126**, 467-474; also presented under different title at the ASME IMECE and in *Proc., Symp. on Machining Processes*, **MED-11**, 871-878, 2000.
21. Corpus, W. T., and Endres, W. J., 2004, "Added Stability Lobes for Machining Processes that Exhibit Periodic Time Variation – Part 2: Experimental Validation," *ASME J. Mfg. Sci. and Engg.*, **126**, 475-480.
22. Kountanya, R. K., and Endres, W. J., 2004, "Flank Wear of Edge-Radiused Cutting Tools under Ideal Straight-Edged Orthogonal Conditions," *ASME J. Mfg. Sci. and Engg.*, 496-505; also presented at the ASME IMECE and in *Proc., Symp. on Advances to Further the Automation of Metal Removal Processes*, **CD#3**, Paper # IMECE2002-MED-34100, 2002.

**Conference Symposia Publications** not including journal papers cited above that were also presented at conferences, as was noted above.

1. Endres, W. J., Sutherland, J. W., DeVor, R. E., and Kapoor, S. G., 1990, "A Dynamic Model of the Cutting Force System in the Turning Process," *Proc., Symp. on Monitoring and Cont. for Mfg. Processes*, ASME WAM, **PED-44**, 193-212.


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2. Endres, W. J., Sutherland, J. W., and DeVor, R. E., 1990, "Process Improvement Using a Computer-Based Dynamic Force Model for the Turning Process," *Proc., Sixth Int. Conf. on Computer-Aided Production Engg.*, 29-42.
3. Endres, W. J., 1995, "Approximations for Efficient Analytical Computation of Effective Lead Angle in Mechanistic Turning, Boring, and Face Milling Models," *Tech. Papers. of NAMRI/SME*, **23**, 147-152.
4. Endres, W. J., 1996, "The Effect of Cutting Process Models, Process Gain Selection and Process Nonlinearity on Machining Stability Analysis," *Proc., Symp. on Physics of Mach. Processes – III*, ASME IMECE, 115-127.
5. Manjunathaiah, J., and Endres, W. J., 1996, "Effects of a Honed Cutting Edge in Machining," *Proc., Second S. M. Wu Symp. on Mfg. Sci.*, 25-30.
6. Chiu, W.-C., Endres, W. J., and Thouless, M. D., 1997, "Surface Formation During Rough Machining of Brittle Materials with a Geometrically Defined Tool," *Symp. on Engg. Mechanics in Mfg. Proc. and Matls. Processing*, Joint ASME, ASCE, SES Summer Meeting, Evanston, IL.
7. Endres, W. J., 1997, "An Energy-Based Approach towards Obtaining an Analytical Solution for Chatter Vibration Level," *Tech. Papers of NAMRI/SME*, **25**, 27-32.
8. Ozdoganlar, O. B., and Endres, W. J., 1997, "A Structured Fully-Analytical Approach to Multi-Degree-of-Freedom Time-Invariant Stability Analysis for Machining," *Proc., Symp. on Predictable Modeling in Metal Cutting as Means of Bridging Gap Between Theory and Practice*, ASME IMECE, **MED-6-2**, 153-160.
9. Ozdoganlar, O. B., and Endres, W. J., 1998, "An Analytical Stability Solution for the Turning Process with Depth-Direction Dynamics and Corner-Radiused Tooling," *Proc., Symp. on Advances in Modeling, Monitoring, and Control of Machining Systems*, ASME IMECE, **DSC-64**, 511-518.
10. Li, C.-J., Ulsoy, A. G., and Endres, W. J., 1999, "The Effect of Tool Rotation on Regenerative Chatter in Line Boring," *Proc., Symp. on Dynamics, Acoustics, and Simulations*, ASME IMECE, **DE-98**, 235-243.
11. Ozdoganlar, O. B., and Endres, W. J., 1999, "Parallel-Process (Simultaneous) Machining and its Stability," *Proc., Symp. on Mach. Sci. and Tech.*, ASME IMECE, **MED-10**, 361-368,1999.
12. Kountanya, R. K., and Endres, W. J., 2001, "A High-Magnification Experimental Study of Orthogonal Cutting with Edge-Radiused Tools," *Proc., Symp. on Fundamental Issues in Machining*, ASME IMECE, **CD#3**, Paper # IMECE2001/MED-23317.
13. Endres, W. J., and Loo, M., 2002, "Modeling Cutting Process Nonlinearity for Stability Analysis — Application to Tooling Selection for Valve-Seat Machining," *5th CIRP Int'l Workshop on Modeling of Machining – Application of Machining Models*, May 2002, 71-82.
14. Corpus, W. T., and Endres, W. J., 2003, "An Analytical Model to Predict Chatter in Multi-Dimensional Periodically Time-Varying Machining Processes," *Proc., Symp. on Accuracy and Stability in Machining*, ASME IMECE, **CD#3**, Paper # IMECE2003-42488.
15. Li, C.-J., Ulsoy, A. G., and Endres, W. J., 2005, "The Effect of Spindle Speed Variation on Chatter Suppression in Rotating-Tool Machining," *Progress on Advanced*


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*Manufacture for Micro/Nano Technology 2005*, *Materials Science Forum*, Proc., 2005 Intl. Conf. on Adv. Manuf., Taipei, Taiwan, **505-507** 859-864.

## Funded Research

***External Awards to Academic Institution (Approx. $970,390 share of $1,189,781 total)***

- "Research and Curriculum Development in Machining Process Analysis," SME Education Foundation Grant Program (Research Initiation Grant), Jul. 1996 – Jun. 1997, $10,000, W. J. Endres (PI).
- "Mechanics-Based Analysis of the Cutting Process and Surface Generation in Hard-Tool Machining," NSF Unsolicited, Sep. 1995 – Jul. 1999, $229,431, W. J. Endres (PI, ~$150,000), M. Thouless, J. Pan and K. Ludema.
- "Mechanics-Based Analysis of the Cutting Process and Surface Generation in Hard-Tool Machining — REU Supplement," NSF Unsolicited, Sep. 1995 – Aug. 1996, $10,000, W. J. Endres (PI).
- "Analysis Tools for Parallel-Process Machining — Turning and Boring," Michigan ERC for Reconfigurable Machining Systems, Sep. 1996 – Apr. 2000, $165,000, W. J. Endres (PI).
- "Mechanics-Based Analysis of the Cutting Process and Surface Generation in Hard-Tool Machining — REU Supplement," NSF Unsolicited, Sep. 1996 – Aug. 1997, $10,000, W. J. Endres (PI).
- "Merging Dynamics and Mechanics for Integrated Machine-Tool, Tooling and Process Analysis," NSF CAREER Program, Apr. 1998 – Mar. 2003, $200,000, W. J. Endres (PI).
- "Merging Dynamics and Mechanics for Integrated Machine-Tool, Tooling and Process Analysis," NSF CAREER Program Industry and Equipment Match, Apr. 1999 – Mar. 2004, $110,000, W. J. Endres (PI).
- "Modeling of Machine-Tool Joint Dynamics," Michigan ERC for Reconfigurable Machining Systems, Jan. 1999 – Dec. 2001, Approx. $120,000, W. J. Endres (PI).
- "Variable Hone Performance on Corner-Radiused Gun Drills," High-Throughput Hole Making Consortium, National Center for Manufacturing Sciences, Oct. 2000 – Aug. 2001, $35,000, W. J. Endres (PI).
- "GOALI: Process Modeling and Analysis for "Smart Tool" Redevelopment in Flexible Line Boring," NSF GOALI Program / Lamb Technicon Machining Systems, May. 2001 – Sep. 2003, $50,000 / $16,750, W. J. Endres (PI).
- "Mechanics-Based Design of Metal-Cutting Circular Saws," Industrial Sponsor (identity confidential), Aug. 2004 – Sep. 2005, $83,640, W. J. Endres (PI).
- "Acquisition of High Speed Digital Imagining System for Multidisciplinary Research at MTU," NSF Major Research Instrumentation Program, Aug. 2003 – Aug 2004, $149,960, S. L. Post (PI), J. Drelich, W. J. Endres (~$10,000), I. Miskioglu, E. Nadgorny.

***Internal Institutional Awards (Approx. $68,433 share of $88,133 total)***

- "Cooling of Cutting Tools for Increased Productivity via the Application of Internal and External Micro-Geometric Features — Proof of Concept," MTU Research Excellence Fund — Research Seed, Mar. 2003 – Jun. 2004, $38,433, W. J. Endres (PI).


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- "Nationally Visible Infrastructure: Industry-Directed Planning of Centers," MTU Research Excellence Fund — Infrastructure Enhancement, Jun. 2003 – May 2004, $15,000, W. W. Predebon (PI), W. J. Endres (~$5,000), J. K. Gershenson, J. W. Sutherland.
- "Nationally Visible Infrastructure: The MTU Machining Education and Research Laboratories (MERL)," MTU Research Excellence Fund — Infrastructure Enhancement, Jun. 2004 – May 2005, $34,700, W. W. Predebon (PI), W. W. Predebon (PI), R. M. D'Souza, W. J. Endres (~$25,000), C. R. Friedrich, M. A. Lacourt, M. H. Miller, D. J. Michalek, J. W. Sutherland.

***Government & Related Awards to Endres Machining Innovations, LLC ($2,215,755 total)***

- "SBIR Phase I: Micro-quantity Internal Cooling (MQuIC) of Cutting Tools for Increased Productivity via Micro-ducts," NSF, Jul. 2005 – Dec. 2005, $99,875, W. J. Endres (PI).
- "Micro-quantity Internal Cooling (MQuIC) of Cutting Tools for Increased Productivity via Micro-ducts — SBIR Match," Michigan Economic Development Corp., Jul. 2005 – Dec. 2005, $14,981, W. J. Endres (PI).
- "SBIR Phase I: Reduced-Friction Cutting Tools for Increased Productivity via Micro-Fluidic Lubrication (MFL)," NSF, Jul. 2005 – Dec. 2005, $99,795, W. J. Endres (PI).
- "SBIR Phase I: Reduced-Friction Cutting Tools for Increased Productivity via Micro-Fluidic Lubrication (MFL) — SBIR Match," Michigan Economic Development Corp., Jul. 2005 – Dec. 2005, $14,969, W. J. Endres (PI).
- "SBIR Phase II: Micro-quantity Internal Cooling (MQuIC) of Cutting Tools for Increased Productivity via Micro-ducts," NSF, Mar. 2007 – Feb. 2009, $499,951, W. J. Endres (PI).
- "SBIR Phase II – Research Experiences for Undergraduates (REU) Supplement: Micro-quantity Internal Cooling (MQuIC) of Cutting Tools for Increased Productivity via Micro-ducts," NSF, Mar. 2007 – Feb. 2009, $12,000, W. J. Endres (PI).
- "SBIR Phase I: Cost- and Energy-Efficient Conversion of Cellulosic Biomass to Bio-Fuel Feedstock of Consistent and Preferred Geometry," NSF, Jan. 2009 – Jun. 2009, $100,000, W. J. Endres (PI).
- "Cost- and Energy-Efficient Conversion of Cellulosic Biomass to Bio-Fuel Feedstock of Consistent and Preferred Geometry — SBIR Match," Michigan Economic Development Corp. Emerging Technologies Fund, Jan. 2009 – Dec. 2009, $25,000, W. J. Endres (PI).
- "SBIR Phase I/IB: Effectively-Thick Coating of High-Wear Surfaces with Application to Cutting Tools," NSF, Jan. 2010 – Jun. 2010, $150,000, W. J. Endres (PI).
- "SBIR Phase IB: Effectively-Thick Coating of High-Wear Surfaces with Application to Cutting Tools," NSF, Jan. 2010 – Jun. 2010, $20,000, W. J. Endres (PI).
- "Effectively-Thick Coating of High-Wear Surfaces with Application to Cutting Tools — SBIR Match," Michigan Economic Development Corp. Emerging Technologies Fund, Jan. 2010 – Dec. 2010, $25,000, W. J. Endres (PI).
- "SBIR Phase II: Cost- and Energy-Efficient Conversion of Cellulosic Biomass to Bio-Fuel Feedstock of Consistent and Preferred Geometry," NSF, Sep. 2010 – Feb. 2014 (with 18 months of TECP Supplement and no-cost extensions), $484,965, W. J. Endres (PI).
- "Cost- and Energy-Efficient Conversion of Cellulosic Biomass to Bio-Fuel Feedstock of Consistent and Preferred Geometry — SBIR Match," Michigan Economic Development Corp. Emerging Technologies Fund, Sep. 2010 – Aug. 2012, $121,241, W. J. Endres (PI).

- "SBIR Phase II – Research Experiences for Undergraduates (REU) Supplement: Cost- and Energy-Efficient Conversion of Cellulosic Biomass to Bio-Fuel Feedstock of Consistent and Preferred Geometry," NSF, Sep. 2010 – Aug. 2012, $7,988, W. J. Endres (PI).
- "SBIR Phase II –Research Assistantship for High School Students (RAHSS) Supplement: Cost- and Energy-Efficient Conversion of Cellulosic Biomass to Bio-Fuel Feedstock of Consistent and Preferred Geometry," NSF, Sep. 2010 – Aug. 2012, $7,380, W. J. Endres (PI).
- "SBIR Phase IIB: Cost- and Energy-Efficient Conversion of Cellulosic Biomass to Bio-Fuel Feedstock of Consistent and Preferred Geometry," Independent Third-Party Investment, Oct. 2011, $250,000, W. J. Endres (PI).
- "SBIR Phase II – Technology Enhancement for Commercial Partnerships (TECP) Supplement: Cost- and Energy-Efficient Conversion of Cellulosic Biomass to Bio-Fuel Feedstock of Consistent and Preferred Geometry," NSF, Sep. 2012 – Feb. 2013, $96,992, W. J. Endres (PI).
- "SBIR Phase IIB Supplement: Cost- and Energy-Efficient Conversion of Cellulosic Biomass to Bio-Fuel Feedstock of Consistent and Preferred Geometry," NSF, May 2013 – Feb. 2015, $185,618, W. J. Endres (PI).

## Other Funding

- "Research and Curriculum Development in Machining Process Analysis," SME Education Foundation Grant Program (software gift), Jul. 1995 – Jun. 1996, $10,400, W. J. Endres (PD) and D. Dutta.
- "NIST Summer Research Fellows (SURF) Program," NIST Summer Undergraduate Research Fellows Program, May 2003 – Aug. 2003, $6,060, W. J. Endres (PD), J. W. Gillespie (Undergrad recipient).

## Graduate Students

### Doctoral

- Current (0)
- Graduated (7 at UM, 4 at MTU):

  Jairam Manjunathaiah – Jun. 1998, UM, "Analysis and a New Model for the Orthogonal Machining Process in the Presence of Edge-Radiused (Non-Sharp) Tools;" last known/updated position is Vice President, General Manager, Infimatic, LLC.

  Wei-Chong Chiu – May 1999, UM, "Orthogonal Machining of Homogeneous Brittle Materials," co-chair with Prof. M. D. Thouless; last known/updated position is with a manufacturing company in Taiwan.

  Roy J. Schimmel – May 1999, UM, "Analyzing and Modeling the Effects of Tool Edge Geometry in Machining;" last known/updated position is with General Motors Corp.

  Chen-Jung Li – Jun. 1999, UM, "Tool-Tip Displacement Measurement, Process Modeling, and Chatter Avoidance in Agile Precision Line Boring," co-chair with Prof. A. G. Ulsoy; last known/updated position is a Post-doctoral Research Associate with National Tsing-Hua University.

  O. Burak Ozdoganlar – Oct. 1999, UM, "Analytical Stability Solutions for Single- and Parallel-Process Turning with Corner-Radiused Tools;" last known/updated position is Associate Professor, Dept. of Mechanical Engineering, Carnegie Mellon University.

  William T. Corpus – Feb. 2000, UM, "An Added Stability Phenomenon in Machining Processes with Periodic Time Variation;" last known/updated position is with Delphi Corp.


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Raja K. Kountanya – Aug. 2002, UM, "Process Mechanics of Metal Cutting with Edge Radiused and Worn Tools," last known/updated position is Machining Applications Engineer, Diamond Innovations, A Sandvik Company.

Jiang Zheng –Dec. 2006, MTU, "A Dynamic Model of Joints under Multi-Dimensional Time-Varying Loads," last known/updated position is R&D Engineer, Caterpillar.

Samved Bhatnagar – Dec. 2006, MTU, "Feasibility of Micro-Quantity Internal Cooling of Cutting Tools for Enhanced Productivity and Tool Life," last known/updated position is with Sandvik Coromant.

Zhen Zhang – Mar. 2008, MTU, "A Model of Residual Stresses while Machining with Worn Edge-Radiused Tools."

Thimmaiah G. Kumbera – May 2011, MTU, "Feasibility of a Universal Chip Breaking System," last known/updated position is R&D Engineer, Caterpillar.

### Master of Science

- Current (0)
- Graduated (4 at UM, 4 at MTU):

Raúl Alvarez – May 1996, UM, "Finite Element Modeling for Cutting with an Edge-Honed Tool," independent study project – non-thesis option.

Gustavo Delfino – Dec. 1997, UM, "Meta-modeling of Equivalent Lead Angle for Corner-Radiused Tools," independent study project – non-thesis option.

Scott G. Taylor – Jun. 2000, UM, "Machining Stability with Multi-Dimensional Dynamics and Multi-Tooth, Corner-Radiused Tooling."

Hussein M. Kalaoui – Dec. 2000, UM, "Modeling Dynamic Characteristics of Machine-Tool Joints under Simultaneous Normal and Tangential Loading Conditions."

Mayur P. Shetty – Aug. 2004, MTU, "Experimental Study of Edge-Radius and Wear-Land Effects on Small-Scale Surface Finish."

Rahul N. Gami –Dec. 2004, MTU, "Model-Based Comparative Selection of Optimal Tooling based on Dimensional Accuracy and Wear Rate."

Lenanrt J. Walqui – Dec. 2005, MTU, "Effects of Chip Splitting Grooves in Metal Cutting Circular Sawing."

Karthik Krishna – Apr. 2006, MTU, "Effects of Tooth Geometry and Materials on Performance of Metal-Cutting Circular Saws."

## Industry Project Advising

### Summer Projects of the Tauber Manufacturing Institute, University of Michigan

- Sealed Power Div. of SPX Corp., Muskegon, MI — *Cost Reduction and Capital Expenditure Recommendations for Aftermarket Cylinder Liner Business*, 1995; voted best project.
- Ford Motor Co., Advanced Manufacturing Technology Development, Dearborn, MI — *Automated Wet Sanding*, 1996.
- United Defense LP – FMC/BMY, Armament Systems Division (ASD), Minneapolis, MN — *Evaluation of Plating and Heat-Treating Facilities*, 1997.
- Delphi Automotive Systems, Interior and Lighting Systems Div. (Delphi-I), Troy, MI — *Door Latch Commonization*, 1998.
- Ford Motor Co., Dearborn, MI — *Agile Engine Assembly*, 1999.
- Caterpillar China Limited / Caterpillar Xuzhou Limited, Xuzhou, China — *First Operations Supplier Development in China*, 1999.
- A. T. Kearny / Huntsman Packaging Corp., Dalton, GA — *Product Consolidation*, 2000.


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**Senior Capstone Design Program, Michigan Technological University** In addition to the projects I have directly advised (below), as Program Director since 2009 I have overseen, more generally, more than 400 projects of this sort and more than 2,000 students working on them.

1. Ford Motor Co., Dearborn, MI — *Intake Manifold Dynamic Flowbench*, Sep. 2001 – May 2002.
2. International Paper Co., WI — *Winder Bering Head Failure and Re-design*, Sep. 2001 – May 2002.
3. Boise Paper, MN — *Rollslabbing Tool*, Sep. 2003 – May 2004.
4. C. G. Bretting Co., MN — *Log Saw Trim Removal*, Sep. 2003 – May 2004.
5. Federal Mogul Corp., MI — *Torsion Vibration Tester*, Sep. 2003 – May 2004.
6. Hydro Aluminum, MI — *Universal Machining Fixture*, Sep. 2003 – May 2004.
7. Anchor Coupling, MI — *Coupling Capper*, Sep. 2004 – May 2005.
8. International Paper Co., MI — *Core Cutter and Air Assist*, Sep. 2004 – May 2005.
9. Tyco-Ansul, WI — *CV-98 Valve Actuator Redesign*, Sep. 2004 – May 2005.
10. General Motors Corp. / Magna, MI — *Frame Integrated Rear Suspension*, Sep. 2005 – May 2006.
11. GHSP, MI — *Driver Interface Control*, Sep. 2005 – May 2006.
12. GHSP, MI — *Non-contact Sensor*, Sep. 2005 – May 2006.
13. General Motors Corp., MI — *Lift-gate/Swing-gate Hinge*, Sep. 2006 – May 2007.
14. GHSP, MI — *Product Innovation Process*, Sep. 2006 – May 2007.
15. Winsert, Inc., WI — *Material Handling System – Loading and Transport*, Sep. 2006 – May 2007.
16. Winsert, Inc., WI — *Material Handling System – Unloading and Transport*, Sep. 2006 – May 2007.
17. Tyco-Ansul, WI — *Valve Manufacturing Cost Reduction*, Jan. 2007 – Dec. 2007.
18. Anchor Coupling, IL — *Hose Assembly Machine*, Sep. 2007 – May 2008.
19. HGS Aerospace, MI — *Two-Axis Drill and Fill Head*, Sep. 2007 – May 2008.
20. HGS Aerospace, MI — *Multi-Axis Head*, Jan. 2008 – Dec. 2008.
21. Caterpillar, Inc., IL — *Oil Leak Detection and Quantification*, Sep. 2008 – May 2009.
22. GHSP / KDS Controls, MI — *Automated Vision Maintenance System*, Sep. 2008 – May 2009.
23. Continental Teves, Inc., MI — *Rear Backup Collision Avoidance System*, Jan. 2009 – Dec. 2009.
24. MB Companies, Inc., WI — *Alternative Snow Removal Brush*, Sep. 2009 – May 2010.
25. Chrysler Corp., MI — *Deployable Front Air Deflection System*, Jan. 2010 – Dec. 2010.
26. SuperShooter2, MN — *Hockey Shot Analysis System*, Jan. 2010 – Dec. 2010.
27. Woychowski Family Foundation, MI — *Human-Powered Grain Processor*, Sep. 2010 – May 2011.
28. Revcor, IL — *Material Handling Process*, Jan. 2011 – Dec 2011.
29. Whirlpool Corp., MI — *Top Rack Coating and Global Shipping Solution*, Jan. 2011 – Dec 2011.

30. Air Force Research Lab, OH — *Assault Climbing Device*, Sep. 2011 – May 2012.
31. GLS Innovations, LLC, MI — *Accessible Light Fixture Accessory*, Sep. 2011 – May 2012.
32. GHSP, MI — *Motor Controller Reclamation System*, Jan. 2012 – Dec 2012.
33. TI Automotive, MI — *Brake Line Flare Inspection System*, Jan. 2012 – Dec 2012.
34. Whirlpool Corp., MI — *Modular Top Rack Design*, Jan. 2012 – Dec 2012.
35. Air Force Research Lab, OH — *Traverse System*, [2 integrated sub-teams] Sep. 2012 – May 2013.
36. Jershon, Inc., MI — *Ladder Leveler System Integration*, Sep. 2012 – May 2013.
37. PACE, MI — *Portable Assisted Mobility Device*, Jan. 2013 – Dec 2013.
38. Air Force Research Lab, OH — *Emergency Heavy Lift Device*, [2 integrated sub-teams] Sep. 2013 – May 2014.
39. Chrysler LLC, MI — *Roadside Repair Module*, Sep. 2013 – May 2014.
40. Chrysler LLC, MI — *Lightweight Pop-rivet Gun*, Sep. 2013 – May 2014.
41. TI Automotive, MI — *Modular Tube Bender*, Jan. 2014 – Dec 2014.
42. Air Force Research Lab, OH — *Personal Heat Stress Prevention Kit*, [2 integrated sub-teams] Sep. 2014 – May 2015.
43. MacLean-Fogg Component Solutions – Metform LLC, IL — *Precision Machining Process Design*, Sep. 2014 – May 2015.
44. MacLean-Fogg Component Solutions – Saegertown, PA — *Mine Tool Bit Manufacturing System*, Sep. 2014 – May 2015.
45. American Axle and Manufacturing, MI — *Bearing Adjuster Sleeve Lock Design*, Jan. 2015 – Dec 2015.
46. Ariens Company, WI — *Snowblower Quick-Adjustable Skid Shoes*, Jan. 2015 – Dec 2015.
47. Donaldson Company, MN — *Solving Cold Temperature Diesel Fuel Filter Plugging*, Jan. 2015 – Dec 2015.
48. MTU Dept. of Mechanical Engineering (Prof. A. Narain), MI — *Boiler-Condenser Flow Loop and Test Section*, Jan. 2015 – Dec 2015.
49. Air Force Research Lab, OH — *Descent System*, [2 integrated sub-teams] Sep. 2015 – May 2016.
50. Stryker Instruments, MI — *Piezo-Actuator Design*, Sep. 2015 – May 2016.
51. Stryker Instruments, MI — *Irrigation/Suction/Torque Tool Attachment*, Sep. 2015 – May 2016.
52. Stryker Instruments, MI — *High-Speed Drill Collet*, Sep. 2015 – May 2016.
53. MacLean-Fogg Component Solutions – Engineered Plastics Company, IL — *Insert Molding Load System*, Jan. 2016 – Dec. 2016.
54. MacLean-Fogg Component Solutions – Maynard, MI — *Internal Drive Sort System*, Jan. 2016 – Dec. 2016.
55. Covestro, MI — *Stick-Slip Phenomena Measurement Process*, Jan. 2016 – Dec. 2016.
56. Woodward, MI — *Universal Laser Tack Weld Fixture*, Jan. 2016 – Dec. 2016.


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57. Air Force Research Lab, OH — *Gear Transport System*, [2 integrated sub-teams] Sep. 2016 – May 2017.
58. Stryker Instruments, MI — *Drill Attachment Coupling Mechanism*, Sep. 2016 – May 2017.
59. MacLean-Fogg Component Solutions – Metform LLC, IL — *Undersized Forging Detection System*, Sep. 2016 – May 2017.
60. MacLean-Fogg Component Solutions – Mundelein, IL — *Improved Inline Component Cleaning System*, Sep. 2016 – May 2017.
61. United States Steel Corporation, MI — *Versatile Bending Under Tension Test Die Design*, Jan. 2017 – Dec. 2017.
62. MacLean Power Systems – York, SC — *Fused Cutout Test System*, Jan. 2017 – Dec. 2017.
63. Air Force Research Lab, OH — *Space Debris Mitigation System*, [2 integrated sub-teams] Sep. 2017 – May 2018.
64. MacLean-Fogg Component Solutions — Metform, IL — *Prevailing Torque Nut Process Variation Minimization*, Sep. 2017 – May 2018.
65. U.S. Veterans Administration / Mark Zambon, CA — *Motorcycle Landing Gear*, Sep. 2017 – May 2018.
66. Adient, PLC, MI — *Power Seat Efficiency Improvement*, Sep. 2017 – May 2018.
67. Michigan Tech. Univ – Dr. Andrew Barnard, MI — *Carbon Nanotube Active Noise Control Muffler Element*, Sep. 2017 – May 2018.
68. American Axle and Manufacturing, MI — *Shell Core Dip Oven*, Jan. 2018 – Dec. 2018.
69. Cooper Standard – Gaylord, MI — *Window Trim Foam Application Process Improvement*, Jan. 2018 – Dec. 2018.
70. MacLean-Fogg Component Solutions – Chesterfield, MI — *Elevated Temperature Bolt Tension Test Apparatus*, Jan. 2018 – Dec. 2018.
71. Milwaukee Tool, WI — *Auto Reciprocating Blade Test Rig Improvement*, Jan. 2018 – Dec. 2018.
72. Air Force Research Lab, OH — *Mobile Active Threat Emergency System (MATES)*, [2 integrated sub-teams] Sep. 2018 – May 2019.
73. Fapco, MI — *Automatic Case Erector and Taper*, Sep. 2018 – May 2019.
74. MacLean-Fogg Component Solutions – Metform LLC, IL — *Assembly Cell Part Handling Changeover Improvement*, Sep. 2018 – May 2019.
75. MacLean-Fogg Component Solutions – Metform LLC, IL — *Eddy Current Inspection In-Line Integration*, Sep. 2018 – May 2019.
76. Caterpillar, IL — *Cylinder Head Handling Fixture*, Jan. 2019 – Dec. 2019.
77. Mercury Marine, WI — *Tensile Test Bar Fabrication Process*, Jan. 2019 – Dec. 2019.
78. Milwaukee Tool, WI — *Auto Reciprocating Blade Test Rig Improvement 2*, Jan. 2019 – Dec. 2019.
79. MacLean-Fogg Component Solutions – Chesterfield, MI — *Enhanced Elevated Temperature Bolt Tension Test Apparatus*, Jan. 2019 – Dec. 2019.

80. Air Force Research Lab, OH — *Waterborne Survival and Recovery Device*, [3 integrated sub-teams] Sep. 2019 – May 2020.
81. Air Force Research Lab, OH — *Situational Sensor Automated Insertion Suite*, [3 integrated sub-teams] Sep. 2020 – May 2021.
82. Nexteer Automotive, MI — *Steering System NX Model Generation*, Jan. 2021 – Dec. 2021.
83. Thompson Surgical Instruments, MI — *LaserMark Fixturing for Retractor Blade Sets*, Jan. 2021 – Dec. 2021.
84. Great Lakes Research Center, MI — *Lightweight Aerial-Based Data Acquisition for Surface Ice*, Jan. 2021 – Dec. 2021.
85. Voxel Science LLC, MI — *Interactive Gantry Crane Simulation*, Sep. 2021 – May 2022.
86. MTU ME-EM Department – Dr. Cameron Hadden, MI — *Stand-up Paddleboard Fishing Rod Holder*, Sep. 2021 – May 2022.
87. CR International LLC, TX — *Dense Loading Machine Improvement*, Sep. 2021 – May 2022.
88. MacLean-Fogg Component Solutions / DET Energy E-Challenge 5, MI — *Smart Switching System*, [4 integrated sub-teams] Sep. 2021 – May 2022.
89. NASA/ASU, AZ — *Landing through Returning Samples from Asteroid Psyche*, [4 integrated sub-teams] Sep. 2021 – May 2022.
90. GHSP, MI — *Electric Pump Performance Model Design Tool*, Jan. 2022 – Dec 2022.
91. GHSP, MI — *Park Lock Actuator*, Jan. 2022 – Dec 2022.
92. Milwaukee Tool, WI — *Masonry Impact Testing Fixture*, Jan. 2022 – Dec 2022.
93. CR International LLC, TX — *Dense Loading Machine Bed Contour Sensing*, Jan. 2022 – Dec 2022.
94. Alloy Research Central, MI — *Powdered Metal Feedstock Production*, Jan. 2022 – Dec 2022.
95. BISSELL Homecare, Inc., MI — *Floor Cleaner Lab Test Fixture*, Sep. 2022 – May 2023.
96. BISSELL Homecare, Inc., MI — *Corrugated Hose Alternative*, Sep. 2022 – May 2023.
97. CWC-Textron, MI — *Improved Camshaft Processing*, Sep. 2022 – May 2023.
98. MTU ME-EM Department – MEP 2 Lab, MI — *Module and Hardware for Teaching Motor Control and System Design*, Sep. 2022 – May 2023.

## Invited Talks and Seminars

***Exploring Future Directions of Machining Process Modeling and its Application***

- General Motors Technical Center, Warren, MI, May 1995.
- Ford Scientific Research Laboratories, Dearborn, MI, Mar. 1996.

***Finite Element Analysis of Machining with an Edge-Honed Tool***

General Motors Technical Center, Warren, MI, Feb. 1996.

***Practice-Motivated Research in High-Speed Machining Dynamics***

PIM-I/UCRC Joint Manufacturing Seminar Series, University of Michigan, College of Engineering, Ann Arbor, MI, Feb. 1996.


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***The Mechanics of Cutting Brittle Materials***

- Dept. of Mechanical Engineering, University of Kentucky, Lexington, KY, May 2000.
- Dept. of Mechanical Engineering – Engineering Mechanics, Michigan Technological University, Houghton, MI, May 2000.

***The Mechanics of Cutting: Brittle versus Ductile Materials***

- Dept. of Mechanical Engineering, University of Wisconsin, Madison, WI, Sep. 2000.

***The Effects of Edge Hone and other Tool Geometry***

- National Center for Manufacturing Sciences (NCMS), Dearborn, MI, Fall Workshop Series, Oct. 2000.

***Chatter in Machining — High Speeds and Real Tooling***

- United Technologies Research Center, East Hartford, CT, Oct. 2000.
- Dept. of Mechanical Engineering – Engineering Mechanics, Michigan Technological University, Houghton, MI, Graduate Seminar Series, Sep. 2001.

***Invited Panelist***

- *Impact of Analysis and Understanding of Machining at a Fundamental Level* – with S. Chandrasekar (Purdue U.), I. S. Jawahir (U. Kentucky), T. Marusich (Third Wave Systems, Inc.), and D. Stephenson (General Motors), organized by R. Stevenson (General Motors) and V. Madhavan (Wichita State U.), ASME IMECE, 2001.
- *Dynamic Performance of Machine-Tool Systems* – with Y. Altintas (U. British Columbia), J. E. Halley (Boeing), K. S. Smith (UNC-Charlotte), organized by J. T. Roth (Penn. State U. – Erie) and B. Jokiel (Sandia NL), ASME IMECE, 2002.

## Courses Developed and/or Taught

Developed courses are those where substantial original materials have been developed in lieu of a textbook or far beyond the textbook based on an original new syllabus.

**Undergraduate, Core and Elective**

- ME 313 (UIUC) Microcomputer Control of Mechanical Engineering Systems – Undergraduate TA
- ME 240 (UIUC) Modeling and Analysis of Dynamic Systems – Amoco Foundation Teaching Fellowship (4 credits)
- ME 270 (UIUC) Analysis and Design of Machines (6 credits)
  - Part 1: Material Behavior and Mechanics (45 hours of lecture)
  - Part 2: Machine Component Design (45 hours of lecture)
- ME 285 (UIUC) Manufacturing Processes (3 credits)
- ME 250 (UM) Design and Manufacturing I – 2 of 14 weeks (4 credits), developed
- ME 350 (UM) Design and Manufacturing II (4 credits), developed
- ME 360 (UM) Modeling, Analysis and Control of Dynamic Systems (4 credits)
- ME 482 (UM) Machining Process Modeling (4 credits), developed
- ME 46/5610 (MTU) Advanced Machining Processes (3 credits), similar to ME 482 (UM)
- ME 3501 (MTU) Product Realization I (3 credits), one-half similar to ME 350 (UM)
- ME 4901 (MTU) Senior Capstone Design I (2 credits)
- ME 4911 (MTU) Senior Capstone Design II (2 credits)


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- ME 2901 (MTU) Mechanical Engineering Practice I (2 credits)

**Graduate**

- IE 455 (UIUC) Accuracy, Dynamics, and Control of Machining Systems – 7 of 15 weeks (3 credits), developed
- ME 585 (UM) Machining Dynamics and Mechanics (3 credits), developed
- ME 5990 (MTU) Machining Dynamics, similar to ME 585 (UM)

**Short Courses**

- *Cutting Tools — Design and Performance Evaluation* – The M. K. Morse Co., Canton, OH, 2 days, Nov. 2004.
- *Static and Dynamic Process Modeling for Machining Performance Analysis* – Northern Research and Engineering Corp., Worcester, MA, 1 day, Apr. 1999.
- *From Cutting Mechanics to New Tooling Concepts* – Vermont American Corp., Louisville, KY, 1 day, Jun. 1995.
- *Machining Process Models for Simultaneous Engineering* – Caterpillar Inc., Mossville, IL, 1 day, Jan. 1993.

## Professional Affiliations

- Member, American Society of Mechanical Engineers (ASME) International
- Member, North American Manufacturing Research Institution of the Society of Manufacturing Engineers (NAMRI/SME) and Senior Member, SME
- Member, Tau Beta Pi Engineering Honor Society
- Member, Pi Tau Sigma Mechanical Engineering Honor Society
- Member, Golden Key National Honor Society

## Other Professional Activities and Committee Memberships

**Institutional Service**

- Michigan Technological University

  M/I Area Director/Dept. Executive Committee, Dept. of Mech. Engg. – Engg. Mechanics, Sep. 2006 – Aug. 2008; Jan. 2014 – Aug. 2015; Jan 2017 – Date.

  Assessment Committee, Dept. of Mech. Engg. – Engg. Mechanics, (Member) Sep. 2022 – Date.

  Chair Search Committee, Dept. of Mech. Engg. – Engg. Mechanics, (Member) Aug. 2021 – Apr. 2022.

  Chair Evaluation and Reappointment Committee, Dept. of Mech. Engg. – Engg. Mechanics, (Member) Nov. 2017 – Apr. 2018.

  Curriculum Revision Committee, Dept. of Mech. Engg. – Engg. Mechanics, Sep. 2011 – May 2012.

  STEP Diversity Committee, Dept. of Mech. Engg. – Engg. Mechanics, Jun. 2008 – Dec. 2009.

  Chair Evaluation Committee, Dept. of Mech. Engg. – Engg. Mechanics, (Chair) Feb. 2005 – Oct. 2006.

  Faculty Development (Promotion & Tenure) Committee, Dept. of Mech. Engg. – Engg. Mechanics, Sep. 2004 – Apr. 2007; Sep. 2021 – Apr. 2022.

  Senior Capstone Design Committee, Dept. of Mech. Engg. – Engg. Mechanics, Sep. 2002 – Date; (Co-chair, Sep. 2006 – May 2009; Program Director (first to be appointed to this new position) May 2009 – Date).

  Research Scholars Committee, College of Engineering, Jul. 2002 – Dec. 2006.

  Workload Committee, Dept. of Mech. Engg. – Engg. Mechanics, Mar. 2002 – Dec. 2003.

  M/I Area Faculty Search, Dept. of Mech. Engg. – Engg. Mechanics, Nov. 2001 – Aug. 2002; (Chair) Aug. 2002 – May 2004.


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Graduate Seminar Series Committee, Dept. of Mech. Engg. – Engg. Mechanics, Sep. 2001 – Aug. 2002; (Chair) Sep. 2002 – Aug. 2006.

- University of Michigan

Committee on Scholastic Standing, College of Engineering, Jul. 1999 – Jun. 2000.

Honors and Awards Committee, Dept. of Mechanical Engineering and Applied Mechanics, Apr. 1998 – May 2000.

Undergraduate Program Committee, Dept. of Mechanical Engineering and Applied Mechanics, Apr. 1998 – May 2000.

ME Program Advisor, Joint Degree in Mechanical Engineering and Industrial Design, May 1998 – Jun 2000.

Industrial Design Faculty Search Committee, School of Art and Design, Dec. 1998 – May 1999.

Mechanical Engineering and Applied Mechanics Departmental Review Committee, College of Engineering, Jan. 1998 – Jun. 1998.

## External Service

- Editorships and Regular Reviewing

Associate Editor, *ASME J. Manufacturing Science and Engineering*, 2004 – 2008.

Associate Editor, *J. Machining Science and Technology*, 2002 – 2005.

Member, Scientific Committee, North American Manufacturing Research Institution of SME (NAMRI/SME), 1998 – 2007.

Reviewer for the *Int. J. of Machine Tools and Manufacture*.

Reviewer for *ASME J. of Mfg. Sci. Engg.* (previously *J. of Engineering for Industry*).

Reviewer for the *SME J. of Manufacturing Processes*.

Reviewer for the *J. of Machining Science and Technology*.

Reviewer for ASME IMECE conference symposia.

- American Society of Mechanical Engineers (ASME International)

Co-organizer (with V. Chandrasekharan, Caterpillar Inc.), ASME Symp. on "Quality of Traditionally Machined Surfaces — Modeling, Analysis and Measurement," ASME IMECE, 1997.

Co-organizer (with G. Subhash, Michigan Technological University), two sessions on Metal Cutting Processes in the Symp. on "Engineering Mechanics in Manufacturing Processes and Materials Processing" Joint ASME, ASCE, SES Summer Meeting, 1997.

Co-organizer (with S. Chatterjee, Lucent Technologies), ASME Symp. on "Reconfigurable Products, Services and Manufacturing," ASME IMECE, 1998.

Congress Group Representative (Manufacturing Technical Group), ASME IMECE, 1998 – 2002.

Organizer, congress-wide highlight session on "Improved Productivity through Reconfigurable Manufacturing Systems," ASME IMECE, 1999.

Program Chair (2003); Co-Chair (2002), Manufacturing Engineering Div., ASME Intl. Mechanical Engineering Congress and Exposition (IMECE), 2001 – 2003.

Organizer, "Fostering Collaboration between Academia and Industry," a casual, organized time to get to know each other and exchange problems and ideas for their solution, IMECE 2002.

Session Chair/Co-Chair, ASME IMECE, 1995 – Date.

Occasional reviewer for *ASME J. of Dynamic Systems, Measurement and Control*.

- North American Manufacturing Research Institution of the Society of Manufacturing Engineers (NAMRI/SME)

Member, Organizing Committee, Twenty-Fourth North American Manufacturing Research Conference (NAMRC), May 1996, Ann Arbor, MI.

Session Chair/Co-Chair (occasional), NAMRC, 1994 – 2005.

- Society of Manufacturing Engineers (SME)

Faculty Advisor for U. of Michigan student Chapter 001 of SME, 1995 – 1998.

- National Science Foundation


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Unsolicited proposal review panel, Nov. 2006.
Major Research Instrumentation Program & Unsolicited proposal review panel, Apr. 2005.
Unsolicited proposal review panel, Apr. 2001.
SBIR/STTR Phase-I proposal review panel, Sep. 2000.
Unsolicited proposal review panel, May 1997.

**Miscellaneous**

- Prior to establishing Endres Machining Innovations, LLC, I had provided short-term (typically 10-30 hours each) consultation services to the following companies:
  Autodie International, Grand Rapids, MI
  Ford Motor Company, AMTD, Detroit, MI
  Caterpillar Inc., Mossville, IL
  Exxon Chemical Corp., Polymers Applications, Lake Zurich, IL
  Lamb Technicon Machining Systems, Warren, MI
  Vermont American Corp., Louisville, KY
- Expert Witness Engagements
  U.S. Department of Labor / OSHA, Boston Regional Office, 2017
  Paul Katz / Manafort Brothers, Inc., Plainville, CT, 2016
  Liblang and Associates, Birmingham, MI, 2005 – 2006
  Barnes, Richardson and Colburn, Chicago, IL, 1998

## Computer Background

- Fluent in Google Script.
- Fluent in Microsoft Visual Basic for Applications.
- Fluent (but rusty) in ANSI Standard C++ and object model development.
- Proficient with Windows® operating systems.
- Proficient with Pro/ENGINEER® Creo Parametric Feature-Based Solid Modeler.
- Past Experience with Borland C++Builder Rapid Application Development tool for Windows® 95/98/NT/2000/XP.
- Past experience with UNIX and the following UNIX workstation-based software packages:
  I-DEAS™ Object-Based Solids Modeler and Finite Element Modeler/Solver by Structural Dynamics Research Corporation (SDRC).
  ABAQUS® Finite Element Modeler and Solver.


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