

## Curricula Vitae

**Gregory G Kremer, Ph.D.**

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### Education

<i>Ph.D. in Mechanical Engineering.</i>	University of Cincinnati	1998
<i>M.S. in Mechanical Engineering</i>	University of Cincinnati	1995
<i>B.S. in Mechanical Engineering</i>	Rose-Hulman Institute of Technology	1989

### Professional and Academic Experience

<i>Department Chair, Ohio University Mechanical Engineering</i>	2006-present
<i>Associate Professor, Ohio University Mechanical Engineering</i> <i>(Promoted from Assistant Professor in 2004)</i>	1998-present
<i>Mechanical Design Engineer, General Electric Aircraft Engines, Cincinnati, Ohio.</i>	1989-1993

### Research Interests

Energy and the environment, including alternative methods of power production and clean coal technologies; Advanced automotive technologies, including alternative fuels, fuel cell vehicles and hybrid-electric vehicles; Design of mechanical systems, including total life-cycle design, design creativity and decision methods; Scholarship of Teaching and Learning, including outcomes assessment and effective methods for development and demonstration of professional skills.

### Recent Research Projects (\* denotes PI)

- \* Community Staple Seed Crop Project, funded for \$58,000 by the Sugar Bush Foundation. August 2009.
- \* Third Frontier: Advanced Commercial Stirling Cooler Development for Integration into Diverse Market Applications, funded for \$33,199.00. July 2009.
- Ohio Distributed Hydrogen Program - Using Coal to Bridge to the Hydrogen Economy, Funded for \$1.3 million through a federal appropriations bill (with Dave Bayless, PI) and \$20,000 by the 2005 OU Stocker Endowment Fund.
- Biodiesel production and analysis laboratory, \$50,000 awarded 2/23/06 by OU Vice President for Research (with Dr. Stuart, Dr. Bayless, and Dr. Vis)
- Biodiesel Production from Algal Biomass Feedstocks, funded for \$26281 as part of the 1804 Endowment; Faculty Research and Graduate Studies, June 2006 - June 2008 (with Ben Stuart, Guy Riefler, Morgan Vis, and David Bayless)
- OU Ammonia Fuel Engine Car, Funded for \$36000 as part of the Faculty Research and Graduate Studies Pool of the 1804 Endowment, 2005-2007.
- Facilities for Freedom Car: OU Ammonia Power Engine Car, funded for \$12,364 as a Stocker Endowment Proposal for 2006, (with Gerri Botte and Jim Zhu)
- Development of Sulfur Tolerant Anodes for Deployment of Coal Syngas with Planar Solid Oxide Fuel Cells for Stationary Power Generation, Ohio Air Quality Development Authority - Ohio Coal Research Consortium 2006, \$1.13 Million (with Dave Bayless and Ohio Coal Research Center)
- Hot Gas Cleanup using Electrostatic Separation, \$140,963 from the OCDO Ohio Coal Research Consortium-IV, 09/01/2004 - 09/30/2006 (with Dave Bayless).
- The Aeromobile Project - A Pilot Program for Development of Interdisciplinary Research and an Aeronautical Graduate Education Program, 1804 Fund Award, \$30,000, 8/1/04 - 6/30/06. (with Jim Zhu (EECS)).
- \* Fuel Cell Adaptation to Coal-Derived Syngas, Stocker Research Endowment Fund, 2002-2003, \$20,000. (with Dave Bayless).

Adapting Planar Solid Oxide Fuel Cells for use with Solid Fuel Sources in the Production of Distributed Power, United States Department of Energy, DE-FG36-03GO13059, \$1.93 million, 9/1/03 through 9/30/07 (with D. Bayless PI, B. Stuart and G. Botte)

Integration of Planar Solid-Oxide Fuel Cells with Coal-Derived Syngas to Promote Environmentally Sound Energy Production, funded through the Ohio University 1804 Fund, \$43,107, 9/1/2002 through 8/30/2004 (with D. Bayless PI and M. Prudich)

Regenerative Supercirculation Wing for Vertical Takeoff: Experimental Concept Validation, 1804 Fund Award, \$34500, 7/02 – 6/30/04. (with Jim Zhu (EECS) PI)

Adaptive Full Spectrum Solar Energy Systems, United States Department of Energy DE-PS36-00GO10500, \$150,000 for OU to study the use of separated light to grow photosynthetic organisms in a bioreactor for CO<sub>2</sub> mitigation., 6/1/01-5/31/04 (with D. Bayless PI, B. Stuart and M. Vis, and University of Nevada Reno as the lead institution )

Greenhouse Gas and Nitrogen Emissions Bioremediation using Applications of translating Slug Flow, funded through the Ohio University 1804 Fund, \$32,000, 9/1/2001 through 8/30/2003 (with B Stuart PI, D. Bayless, M. Vis and M. Prudich)

Enhanced Practical Photosynthetic CO<sub>2</sub> Mitigation, United States Department of Energy DE-FC26-00NT40932, \$1.075 million, 9/1/2000 through 8/30/2003 and continued on a no-cost extension through 2006 (with D. Bayless PI, M. Vis, and B. Stuart)

Post-Doctoral Researcher for the Ohio Coal Research Center, Ohio University, \$29,513, 8/1/2000 through 7/31/2002 (with D. Bayless PI and M. Prudich)

\* Research in Propulsion Systems For Future Vehicles, Ohio Board of Regents – Hayes Investment Funds, \$50,000 for Ohio University, 2000-2002. I am the PI from OU for this project which was submitted as a collaborative proposal with the Ohio FutureCar Consortium (PI Giorgio Rizzoni of OSU).

\* Dynamometer System for Automotive Research, Stocker Endowment, \$10000, FY 2001-2002.

### **Recent Journal Publications**

Burnette, D.D., Kremer, G.G., and Bayless, D.J., "The Use of Hydrogen-depleted Coal Syngas in Solid Oxide Fuel Cells," *Journal of Power Sources* (182) pp. 329-333, 2008.

Shi, L., Bayless, D., Kremer, G., and Stuart, B., "Numerical Investigations of the Flow Pattern in an Electrically Enhanced Cyclone," *Journal of the Air and Waste Management Association*, (57), pp. 489–496, 2007.

Bayless, D.J., Kremer, G., Vis, M., Stuart, B., Shi, L., Cuello, J., Ono, E., "Photosynthetic CO<sub>2</sub> Mitigation using a Novel Membrane-based Photobioreactor," *Journal of Environmental Engineering and Management*, Vol. 16, No. 4, pp. 209-215, April 2006.

Shi, L., Bayless, D.J., Kremer, G., and Stuart, B., "CFD Simulation of the Influence of Temperature and Pressure on the Flow Pattern in Cyclones," *Industrial & Engineering Chemistry Research*, V45, 2006.

Bayless, D.B, Shi, L., Kremer, G., et al., *Membrane-Based Wet Electrostatic Precipitation*, *Journal of the Air & Waste Management Association*, V55, June 2005.

Madireddy, M. and Kremer, G. "A Study of the "Optimum" Hybridization Ratio for SUVs and Heavy Trucks", IMECE2003-41777 in the *Proceedings of the IMECE 03: 2003 ASME International Mechanical Engineering Congress & Exposition*, November 2003.

Kremer, G.G., "Enhanced Robust Stability Analysis of Large Hydraulic Control Systems via a Bifurcation Based Procedure," *Journal of the Franklin Institute*, Vol. 338, No. 7, November 2001, pg. 781-809.

Thompson, D.F. and Kremer, G.G., "Parametric Model Development and Quantitative Feedback Design for Automotive Torque Converter Bypass Clutch Control," *Proceedings of the Institute of Mechanical Engineers*, (Vol 213 Part I), 1999, pp.249-266.

Kremer, G.G. and Thompson, D.F., "A Bifurcation Based Procedure for Designing and Analyzing Robustly Stable Nonlinear Hydraulic Servo Systems," *Proceedings of the Institute of Mechanical Engineers*, (Vol 212 Part I), 1998, pp. 383-394.

Thompson, D.F. and Kremer, G.G., "Quantitative Feedback Design for a Variable Displacement Hydraulic Vane Pump," *Optimal Control: Applications & Methods*, (19), 1998, pp. 63-92.

### **Recent Conference Publications and Presentations**

Kremer, G.G., Ryan, T. and Switzer, S., "A Risk Assessment Method and Safety Plan for a University Research Lab," *Proceedings of International Mechanical Engineering Congress and Exposition 2008*, IMECE2008-67286, November 2008.

Wallace, S. J. and Kremer, G.G., "Diesel Engine Energy Balance Study Operating On Diesel And Biodiesel Fuels," *Proceedings of International Mechanical Engineering Congress and Exposition 2008*, IMECE2008-67712, November 2008.

Cyders, T.J. and Kremer, G.G., "Engineering Around the World: Driving Local Economics in Africa With Human Power," *Proceedings of International Mechanical Engineering Congress and Exposition 2008*, IMECE2008-67696, November 2008.

Kremer, G. and Burnette, D., "Using Performance Reviews In Capstone Design Courses For Development And Assessment Of Professional Skills", *Proceedings of the 2008 American Society for Engineering Education Annual Conference & Exposition*, Paper 1041, Session 3525, June 2008.

Kremer, G. "Risk Assessment of a Mechanical Engineering Department", *Proceedings of the 2008 American Society for Engineering Education Annual Conference & Exposition*, Paper 1040, Session 3266, June 2008.

Kremer, G., "Lessons Learned from Developing, Implementing and Evaluating an Integrated Departmental Assessment and Continuous Improvement Process" (a 3-hour ABET Assessment Workshop), *ABET Best Assessment Processes IX Symposium*, April 2007.

Kremer, G., *An Academic Integrity Case Study: Let's Talk About It*. The 26th Annual Lilly Conference on College Teaching. #157, November 16-19, 2006.

Fisher, M. and Kremer, G., *Value-ing the Professions: Integrating Values in the Education of Science and Engineering Professionals*. The 26th Annual Lilly Conference on College Teaching, #162. November 16-19, 2006.

Leal, W. Kremer G et al, *Design and Verification of a Safety Monitoring and Control System for a Fuel Cell Laboratory*, Clearwater Coal Conference, 2006.

Shi, L., Bayless, D, Kremer, G., *Numerical Investigation of the flow profiles in the electrically enhanced cyclone*. The 99th Annual Conference & Exhibition of Air and Waste Management Association, New Orleans, LA, June 20-23, 2006.

Bayless, D., Shi, L., Kremer, G., Stuart, B., "Membrane-Based Wet Electrostatic Precipitation – Results from Pilot Testing Experience," Conference on Air Quality V, Washington D.C., Sept. 2005.

Shi, L., Kremer, G., Bayless, D., "Hot Gas Cleanup using Electrostatic Separation." *Proceedings of the 22nd Annual International Pittsburgh Coal Conference*, paper 33-2, Pittsburgh, PA, 2005.

Li, K., Shi, L., Kremer, G., Bayless, D., "Acid Aerosol and Other Fine Particulate Control with Wet Laminar Electrostatic Precipitation." *Proceedings of the 22nd Annual International Pittsburgh Coal Conference*, paper 23-3, Pittsburgh, PA, 2005.

Kremer, G.G., Lessons Learned from Ohio University's Fall 2004 ABET Review, ABET Best Assessment Processes VII Symposium, April 2005.

Bayless, D.J., Kremer, G.G., Vis, M. Stuart, B.J., Prudich, M.E., Cooksey, J.E., and Muhs, J.S., "Enhanced Practical Photosynthetic CO<sub>2</sub> Mitigation," Third Annual Conference on Carbon Sequestration, Alexandria, VA, May 3, 2004.

- Stuart, B., Kremer, G., Shi, L., Caine, J., Kish, P., Reynolds, J., Ray, I., Doonan, P. and Bayless, D.. "Pilot Testing Results of Membrane-Based Wet Electrostatic Precipitation for Multipollutant Control," Proceedings of the 29th International Technical Conference on Coal Utilization & Fuel Systems, 2004.
- Tremblay, J., Marquez, A., Stuart, B., Botte, G., Kremer, G., and Bayless, D., "Adapting Planar Solid Oxide Fuel Cells for use with Solid Fuel Sources in the Production of Distributed Power," Proceedings of the 29th International Technical Conference on Coal Utilization & Fuel Systems, 2004.
- Bayless, D.J., Kremer, G.G., Vis, M. Stuart, B.J., Prudich, M.E., Cooksey, J.E., and Muhs, J.S., "Enhanced Practical Photosynthetic CO<sub>2</sub> Mitigation," First Annual Hybrid lighting Summit, Oak Ridge TN, Oct. 7, 2003.
- Kremer, G. "Standardizing Outcomes Assessment Allows Faculty to Focus on Student Learning", *Proceedings of the 2003 American Society for Engineering Education Annual Conference & Exposition*, Educational Research and Methods Session 3230, June 2003.
- Kremer, G., "The Review Cycle: A Procedure for Efficiently Reviewing Your Overall Assessment and Continuous Improvement Process", *Best Assessment Processes V Symposium* Session 54, Rose-Hulman Institute of Technology, April 2003.
- Kremer, G., "Using Course Design and Assessment Forms to Drive the Outcomes Assessment and Continuous Improvement Process", *Best Assessment Processes V Symposium* Session 7, Rose-Hulman Institute of Technology, April 2003.
- Kremer, G., "The Engineering Students' Curriculum: Stressing Professionalism & Professional Registration", Presentation and panel discussion at the Ohio Society of Professional Engineers 124th Annual Meeting, 5/17/02.
- Kremer, G., "Teaching a Rigorous Problem-Solving Framework in Entry-Level Mechanical Engineering Courses - Theory and Practice," *Proceedings of the 2001 American Society for Engineering Education Annual Conference & Exposition*, Session 1566, Paper 1503, 2001.
- Kremer, G., "Interactive Problem Solving for Mechanical Engineering on the World-Wide-Web," *Proceedings of the 2001 American Society for Engineering Education Annual Conference & Exposition*, Session 1520, Paper 1508, 2001.
- Halliday, K., Kremer, G., and Urieli, I., "Putting the Engine back into Engineering Education – A Capstone Design Project," *Proceedings of the 2001 American Society for Engineering Education Annual Conference & Exposition*, Session 2525, 2001.
- Bayless, D.J., Kremer, G.G., et al., "Practical Photosynthetic CO<sub>2</sub> Mitigation," 26<sup>th</sup> International Conference on Coal Utilization and Fuel Systems, March 2001.
- Bayless, D.J., Kremer, G.G., et al., "Practical Photosynthetic CO<sub>2</sub> Mitigation," First National Conference on Carbon Sequestration, May 2001. This paper was selected as a platform presentation.
- Bayless, D.J., Kremer, G.G, et al, "Enhanced Practical Photosynthetic CO<sub>2</sub> Mitigation", *Proceedings of the Eighteenth Annual International Pittsburgh Coal Conference*, paper 35-05, 2001.
- Murray, A., Kremer G. et al, "Early Lessons in Executing Distributed Collaborative Student Design Projects," *Proceedings of the Design Engineering Technical Conference*, September 2001.
- Kremer, G., Pasic, H., and Mehta, B., "A Web-based Interactive Problem Solver for Enhancing Learning in Engineering Mechanics," *Proceedings of the 2000 American Society for Engineering Education Annual Conference & Exposition*, Session 1368, 2000.
- Mehta, B.M., Kremer, G.G., Wang, M. and Zhang, L., "Web-based Mechanics: Statics and Dynamics," *EDA 2000 Conference*, Orlando FL.
- Mehta, B. and Kremer, G., "Dynamics of Design and Development of Web-based Entry Level Engineering Courses: Mechanics (Statics and Dynamics), *WebNet 2000*, 10/30/2000-11/4/2000, San Antonio, Texas.

Murray, A., Smari, W.W., and Kremer, G.G., "Using Experiential Learning to Prepare Students for Geographically Disperse Collaborative Engineering Environments", *Workshop on Collaborative Technologies for Creative Integrated Systems*, November 10-11, 1999, Rochester MI.

Kremer, G.G., "Robust Stability Analysis of Large-Scale Hydraulic Control Systems," *Proceedings of the American Control Conference*, San Diego, California, June 1999.

Kremer, G.G., "Robust Stability of Nonlinear Hydraulic Servo Systems Using Closest Hopf Bifurcation Techniques," *Proceedings of the American Control Conference*, Philadelphia, Pennsylvania, June 1998.

Other publications of note:

- ME Department ABET Self Study report for Fall 2004 review.
- My research was included in a textbook review of closest bifurcation methods entitled "Bifurcation control, theory and application" by Dr. Ian Dobson, University of Wisconsin Madison.

#### **Patents During the Past Five Years**

"Enhanced Practical Photosynthetic CO<sub>2</sub> Mitigation," No. 6,667,171 (with D. Bayless, M. Vis) December 23, 2003.

"Apparatus and Method for Growing Biological Organisms for Fuel and Other Uses", 60/799,440 (with M. Vis, D. Bayless and B. Stuart), May 10, 2006.

"Flow Controlling Header for Delivering Fluid," 60/938,517 (with S. Switzer, M. Vis, D. Bayless and B. Stuart), May 17, 2007.

#### **Graduate Students:**

**MSME Graduated: 10; Currently advising: 5**

**PhD Currently Advising: 2**

#### **Undergraduate Courses:**

ME 224 Dynamics  
 ME 350 Intro to CAD  
 ME 398 Junior Lab  
 ME 403 Machine Design I  
 ME 450 Finite Elements  
 ME 470/471/472 ME Design I/II/III

#### **Graduate Courses:**

ME 576 Automotive Engineering  
 ME 577 Vehicle Systems Design (Starting 2006)

#### **Other activities for Student Engagement and Learning**

1. Faculty advisor for the **Society of Automotive Engineers** OU Collegiate Chapter and the **SAE micro-Baja Design team**.
2. Co-advisor for the Engineers Without Borders student group that is designing improvements to teacher housing and preparing for an implementation trip to Ghana in

3. Faculty team leader for the **Electric Bobcat Racing Team**.
4. Co-advisor for the Aeromobile student team that participated in a national **NASA student design competition**. (2002 - 2005)

#### **Honors and Awards (partial)**

**NISH 2009 National Scholar Award.** Advised a student design team that won first place in the 2009 National Institute for the Severely Handicapped Design Competition.

**Carnegie Scholar** for 2005-2006, a nationally competitive award that funds a Scholarship of Teaching and Learning Project on integrative learning. I am doing my research on improving the integration of professional skills in the Senior Design Capstone Experience (ME470, ME471, ME472) and the overall ME curriculum.

2001, 2005	Mechanical Engineering White Teaching Award, Ohio University
2000	The Outstanding Student Organization Advisor Award, presented by the Ohio University Leadership Development Program in recognition of exceptional personal commitment to the Electric Bobcat Team and the Ohio University Society of Automotive Engineers
2000	1999-2000 Mechanical Engineering Department Advisor of the Year, awarded by PI TAU SIGMA
1993	GE Engineering Achievement Award: for design and analysis of a new compressor rotor spool-shaft for a major field retrofit program.
1992	GE Managerial Award: for development and substantiation of an electron-beam weld repair to salvage scrapped compressor rotor shafts.
1990 – 1993	GE Special Recognition Letters: for exceptional support of manufacturing cost reduction efforts, continuous improvement, and concurrent engineering.