

Warren J. Ostergren Curriculum Vitae

Emeritus Vice President of Academic Affairs and Professor of Mechanical Engineering

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EDUCATION

- PhD – Mechanics - Rensselaer Polytechnic Institute, Troy, NY, 1976
- MS – Engineering - Brown University, Providence, RI, 1969
- BS – Mechanical Engineering - University of Rochester, Rochester, NY, 1967

EMPLOYMENT HISTORY

- Vice President, Academic Affairs, New Mexico Tech, 2014-2016
- Chair, Mechanical Engineering Department, New Mexico Tech, 2009-2014
- Associate Professor, Mechanical Engineering Department, New Mexico Tech, 2004-2009
- Adjunct Professor, Management Department, New Mexico Tech, 2003-2004
- Adjunct Professor, York County Technical College, Wells, ME, 2001-2002
- Vice President of Engineering, WASTECH Inc., Portsmouth, NH, 2001-2002
- F414 Engine Program Manager, GE Aircraft Engines, Lynn, MA, 1999-2001
- F404 Engine Program Manager, GE Aircraft Engines, Lynn, MA, 1995-1998
- Manager JTAGG Engineering, GE Aircraft Engines, Lynn, MA, 1993-1994
- Manager Component Technology Programs, GE Aircraft Engines, Lynn, MA, 1991-1992
- Manager Structures, Stress and Vibration, GE Aircraft Engines, Lynn, MA, 1985-1990
- Manager Mechanical Development, GE Medium Steam Turbines, Lynn, MA, 1982-1984
- Manager Mechanics of Materials, GE Gas Turbines, Schenectady, NY, 1974-1982
- Engineer Mechanics of Materials, GE Gas Turbines, Schenectady NY, 1972-1974
- Engineer Generator Design, GE Generator Department, Schenectady NY, 1968-1972

ACADEMIC EXPERIENCE

New Mexico Tech - Socorro, NM

Vice President – Academic Affairs (2014-2016) – Responsible for the academic curriculum of the institution. Oversees faculty and academic staff recruitment and development activities. Provides advisory recommendations to the president on academic appointments, tenure and promotion matters. Oversees curriculum and periodic program reviews and works with department chairs in the development of curriculum and in the improvement of instruction. Prepares and updates accreditation reports and oversees accreditation visits. Coordinates faculty tenure and merit reviews. Manages the budget for the academic division. Chairs Council of Chairs. Reviews student appeals of

curricular and classroom matters. Provides link to the Faculty Senate and conveys Senate's recommendations to the President. Develops partnerships with industry and secondary institutions. Writes grants to procure external funding and supervises grant-funded projects. Represents the institute at local, state, regional meetings.

Chair – Mechanical Engineering (2009-2014) – Responsible for leading the department in supporting the institute and department missions, facilitating department decisions and managing department resources.

Key accomplishments of the team include:

- Successfully led rapid growth of undergraduate and graduate enrollment during a period of severe financial constraint within the state funded system.
- Completed successful ABET accreditation.
- Selected for FAA Center of Excellence for Commercial Space Transportation.
- Secured research grants from a variety of organizations; including, Sandia National Labs, Department of Homeland Security, NASA, ONR, DOE and Air Force Research Labs.
- Recruited new outstanding tenure track faculty members.
- Developed a robust program of graduate courses offered live on campus and via distance education.
- Participated in delegation to Yangtze University in China, which successfully created joint educational program.
- Continued development of minor programs in aerospace, explosives and biomedical engineering.
- Created five new research laboratories for the department in robotics and haptics, particle image velocimetry (PIV), gas dynamics and shock measurement, shock physics and hypervelocity material effects.
- Enhanced existing lab space to support aerospace related design clinic projects such as model airplane and experimental sounding rocket teams.
- Initiated undergraduate and graduate student representative positions to foster good communication and to act as ombudspersons for any student issues within the department.
- Created unique technical writing and graduate communication courses for the department which are integrated into other mechanical engineering courses.

Associate Professor (2004-2009) – Responsible for teaching undergraduate and graduate mechanical engineering courses, developing research programs, advising students and participating in service activities in the profession and for the university.

Key accomplishments include:

- Established a unique junior/senior design clinic program in which students perform design work on actual industrial/research projects that span multiple years, depending on complexity.
- Initiated design conferences, where student teams have the opportunity to present their design and research activity to external sponsors and the NMT community. Students provide presentations and posters on their projects to the broad technical community.

- Member of patent team for “Heliostat with Actively Controlled Liquid Ballast System” - US 8,231,222 B2, based on undergraduate and graduate research supported by the EPA and Sandia National Labs.
- Taught highly rated courses in advanced strength of materials, advanced mechanics of materials, design clinics, managing technology and engineering statistics.
- Launched successful continuous improvement program as department’s ABET representative to achieve accreditation and improve department.

INDUSTRIAL EXPERIENCE

GE Aircraft Engines – Lynn, MA

F414 Program Manager (1999-2001) - Responsible for engineering management of F414 engines on F/A-18 Navy Super Hornet Aircraft. Responsibilities include technical management and customer interface with \$40M annual budget for new component developments, production and field problems.

Key accomplishments include:

- Successfully led teams to solve unique design problems on F414 engine program, including afterburner cracking, combustor flameout and engine performance.

F404 Program Manager (1995-1998) – Responsible for engineering management of F404 engines on F/A-18 Navy Hornet Aircraft. Responsibilities include technical management and customer interface.

Key accomplishments include:

- Developed new process for component design and integration using Integrated Project Teams.
- Provided outstanding technical integration with US Navy, achieving unprecedented engine availability.

Manager JTAGG Engineering (1993-1994) – Responsible for engineering leadership of advanced turboshaft engine program supported by Army, Navy and Air Force with objective of doubling turbine engine performance.

Specific accomplishments include:

- Led team that exceeded performance goals on advanced turboshaft engine program, demonstrating 20% reduction in fuel consumption and 40% improvement in power to weight.

Manager Component Technology Programs (1991-1992) – Responsible for engineering technical management of programs funded by US Government to develop critical technology needs for advanced aircraft engine components, including blade film cooling, combustors, seals, turbines and metal matrix composites.

- Achieved technical objectives on advanced technology projects and achieved unprecedented customer satisfaction.

Manager Structures, Stress and Vibration (1985-1990) – Responsible for managing technical work of 30 engineers conducting dynamic analysis of aircraft engine systems and structures.

Specific accomplishments include:

- Introduced new structural buckling methodology for aircraft engine hot section components and 3D dynamics analysis for aircraft engine rotor systems, including non-linear blade loss events, successfully predicting field experience.

GE Medium Steam Turbine, Lynn, MA

Manager Mechanical Development (1982-1984) – Responsible for design and development of static components applied in utility, industrial and ship propulsion turbines.

Specific accomplishments include:

- Provided design and analysis of mounting systems to minimize structureborne vibration from new propulsion components in submarines and destroyers.

GE Gas Turbines, Schenectady, NY

Manager Mechanics of Materials (1974-1982) – Responsible for developing gas turbine materials behavior predictive methods in creep, fatigue and fracture; directing laboratory test programs and providing materials design criteria.

Specific accomplishments include:

- Identified the impact of manufacturing and material processes on the mechanical behavior of gas turbine materials and secured external agency funding for mechanics of materials programs in thermal fatigue and turbine cooling technology.
- Developed design methods for predicting the low cycle fatigue, thermal fatigue and creep life capability of gas turbine engines. Published numerous technical articles on low cycle fatigue and creep damage accumulation at elevated temperatures, including ASME special publications.

Engineer Mechanics of Materials (1972-1974) - Responsible for developing gas turbine materials behavior predictive methods in creep, fatigue and fracture; directing laboratory test programs and providing materials design criteria.

Specific accomplishments include:

- Developed a damage function low cycle fatigue methodology which was widely cited for explaining the unique hold time behavior of high temperature superalloy materials.

GE Generator Department, Schenectady, NY

Engineer, Generator Design (1968-1972) - Responsible for design of large rotating generator equipment, analysis of rotating parts and development of analysis techniques.

Specific accomplishments include:

- Established use of fracture mechanics for determining acceptability of large rotating components in power generation equipment.

GRADUATE STUDENT PROJECTS AND THESES ADVISED OR COMMITTEE MEMBER

- Kyle Feliciano Chavez – “Development and Application of an Optical Method for Efficiently Canting In-Field Heliostat Mirror Facets” – MS in Mechanical
- Evan G. Sproul – “An Optical Method for Focusing and Characterizing Heliostat Mirror Facets” – MS in Mechanical
- Jake Scarbrough - Evaluation of the Current Product Development Process and Project Management Methods Used by the LANL Weapons Division – MEM
- Stephenie Ann Sterbling Drauschak - “ A Review of the Development of Select Furazan-Based Molecules” MS in Mechanical
- Susan R. Murphy - "A Blueprint for Manufacturing Process Transfers in Industrial Corporations" – MEM
- Tony Gardner - "Best Practices for Implementing the Lean Manufacturing Approach to Maintenance at Intel” – MEM
- Matthew J. Majors – “Statistical Distribution and Simulation used in Conjunction with “Aladon – RCM2 Decision Diagram” to Select Maintenance Tasks-MEM Associated with Equipment Failure Modes at Barrick Cortez JV
- Michael Lucero – “Improved Management Practices for the COPY EXACTLY! Manufacturing Process” - MEM
- Benjamin Nicholas Davis – “Detonation Performance of the Insensitive High Explosive 1,3,5- Triamino-2,4,6-trinitrobenzene (TATB) – MS in Mechanical
- Rodrigo Azevedo Lopes – “Simulating High Frequency Trading During Normal and Abnormal Days” - MEM
- Tyson Gobble – “Development of an Improved Program Management Process for Department of Energy (DOE) Projects” – MEM
- Emre Yetistirici – “Cost Optimization for EVLA Antennas Cryogenic Cooling Systems” - MEM
- Brett Allen Carey - “An Investigation of Geometric Explosive Charge Effects in an Urban Environment for C4 and ANFO” – MS in Mechanical.
- Arthur H Weber – “A Review of Satellite Attitude Determination Without Gyroscope” – MS in Mechanical.
- Marcus Alexander Chávez – “Implications of Explosively Accelerating Thin Flyer Plates in the Transient Regimes of Explosive Systems” - MS in Mechanical.
- Mahsa Karamy – “Improved Practices for Increasing Productivity and Customer (External & Internal) Satisfaction in a Service Organization” – MEM.
- David Josiah Vaughn – “Alternative Methods for Economic Analysis in Potash” – MEM.
- John Samuel Thurman – “Application of Analytic Hierarchy Process to Air Force Research Lab Source Selection” – MEM.
- Donald Fresquez - Reduced Intel Opportunity Cost Through Increased Technical Knowledge of Internal Fab11X Lithography Resources – MEM

- Jason Rogers – “DDT Testing of Granular Double-Base Small Arms Propellant” - MS in Mechanical.
- Joseph Trujillo – “Comparative Analysis of Explosive Qualification Driver and Generator Driver Design and Performance” - MS in Mechanical.
- Winston Wilches - Evaluation of Plastic Microspheres as Sensitizers for Emulsion Explosives in Colombia – MS in Mechanical
- Matthew Johnston – “An Analytical Approximation of the Critical Jet or No Jet Angle of a Shaped Charge Liner.” – MS in Mechanical.
- Steven Padilla – “The Commercial Development of an Engineering Services Firm’s Custom Software Product, Practical Considerations, Decision Analysis and Application” – MEM.
- Victor Apodaca – “Decision Cost Model for Contractor Selection” – MEM.
- Ephraim Ford – “Best Practices for Resourcing and Planning a High Technology Production Program” – MEM
- Salah Habachi – “Methods Used to Estimate Formation Pore Pressure” - MS
- Yi Svec – “Decision on Implementation of New Technology in a Mature Oil Field” – MEM
- Delilah Walsh – “Socorro County Technology Asset Management Plan” – MEM
- Doug Jones - Revenue Modeling of Remote Monitoring Equipment on Gas Wells for Product Pricing and Feasibility – MEM
- Michael Lucero - Improved Management Practices for the COPY EXACTLY! Manufacturing Process – MEM
- Nathan Rimkus - Development of Motivational Practices and Guidelines for Industrial Corporations and Research Centers
- Elmira Israilova – “Best Practices for the Rate Calculation Method of Rental Fleets at U.S. Universities” - MEM
- Jose Ramirez – “Improved Risk Management Process for Department of Defense Projects” - MEM
- Luis Mendoza – “Production Process for Advanced Space Satellite System Cables/Interconnects at Sandia National Laboratories” – MEM
- Darrell Eidson – “Project Scoping and Cost Estimating: Opportunities for Improvement” -MEM
- Gokcen Aykac – “A Total Quality Management Blueprint For Small Technology Companies” - MEM
- Joyce Utoh – “Small Chain Stores in the Wal-Mart World - Can They Survive?” - MEM
- Dan Kostelnick - "The Perfect Tool Install Design For Intel in Rio Rancho, N.M." – MEM
- Myles Fitzgerald - "Weingarten Realty Investors - A Capital Projects Study" - MEM
- Jason Mathews – “Shock and Vibration Characteristics of a Bio-Inspired Structure Under Blast Loading” – ME
- Camden Mullen – “Model and Simulation of Path-Goal Leadership Theory” – MEM

- Matthew Risenmay – “Requirements Driven Shaped Charge Design for Large Diameter Penetrations into Geologic Materials” - ME
- Kimberly Coleman – “Modeling Bridge Maintenance Decisions” - MEM
- Raghava Vudata – “Risk Analysis and Task Assignments of Self Organizing Networks” - MEM
- Chad Monthan – “Compressing the Cycle of Success Through Proper Planning Resource Management” - MEM
- Robert Smetana – “Contract Design For Sub-Tier Agents in Specialized Industries: Avoiding the Hold-Up Problem” - MEM
- Theresa Montoya – “Direct Metal Oxidation Furnace: A Thermal and Structural Analysis” - ME

AWARDS

- 2012 New Mexico Tech Distinguished Faculty Award
- 2007 New Mexico Tech Distinguished Teaching Award
- 2001 GE Aircraft Engine Engineering Department Award
- 1999 Collier Award (as a team) for F414 Development
- 1996 GE Aircraft Engine Achievement Award

PROFESSIONAL PUBLICATIONS

- Zagrai, A, Ostergren, WJ, Borden, LT, Zeman, S, “Focused Learning Strategy and Advanced Technologies Facilitating Competitiveness of Science, Technology and Engineering Professionals with Disabilities” Presentation at breakout session of 2010 Southwest Conference on Disability, 6-8 October 2010, Albuquerque Convention Center, Albuquerque, New Mexico.
- Jarvis, MS, Ostergren, WJ, and Smith, B., "The Applicability of Electrically Driven Accessories for Turboshaft Engines", ASME Journal of Engineering for Gas Turbines and Power, April 1995, p. 221.
- Peterson, LG; Hrencecin, DE; Schilling, WF and Ostergren, WJ, “Development of Hybrid Gas Turbine Technology”, Gas Turbine Division ASME, 1982.
- Wood, JH; Farrell, TR; Beltran, AM; Schilling, WF and Ostergren, WJ, “Development of Diffusion Bonded Claddings for Large Gas Turbine Applications”, EPRI Conference, 1981.
- Ostergren, WJ and Embley, GT, “Mechanical Property Requirements for Hot Section Components in Gas Turbines”, EPRI Conference, 1981.
- Chambers, WL; Ostergren, WJ and Wood, JH, “Creep Failure Criteria for High Temperature Alloys”, Journal of Engineering Materials and Technology, Vol.101, Oct. 1979, p. 374.
- Ostergren, WJ and Krempl, E, “A Uniaxial Damage Accumulation Law for Time-Varying Loading Including Creep-Fatigue Interaction”, Journal of Pressure Vessel Technology, Vol.101, May 1979, p. 118.
- Ostergren, WJ and Krempl, E, “A Linear Uniaxial Damage Accumulation Law for Creep-Fatigue Interaction”, Joint ASME/CSME Pressure Vessel & Piping Conference, Montreal, Canada, Mar. 1978.

- Ostergren, WJ, “Correlation of Hold Time Effects in Elevated Temperature Low-Cycle Fatigue Using a Frequency Modified Damage Function”, ASME-MPC Symposium on Creep-Fatigue Interaction, Dec. 1976, p. 179.
- Ostergren, WJ, “A Damage Function and Associated Failure Equations for Predicting Hold-Time and Frequency Effects in Elevated Temperature, Low-Cycle Fatigue”, Journal of Testing and Evaluation, Vol.4, Sept. 1976, p. 327.
- Levy, N; Marcal, PV; Ostergren, WJ and Rice, JR, “Small Scale Yielding Near a Crack in Plane Strain: A Finite Element Analysis”, International Journal of Fracture Mechanics, Vol.7, June 1971, p. 143.

BOOK PUBLICATIONS

- Ostergren, WJ and Whitehead, JR, Editors, “Methods for Predicting Material Life in Fatigue”, ASME Special Technical Publication, Dec. 1979.

RESEARCH INTERESTS

- Mechanics of materials
- Structural analysis
- Machine design
- Propulsion and power systems
- Program management
- Product development
- Total quality management

INSTITUTIONAL ACTIVITIES

- ASME Academic Advisor.
- Advisory Board Member for Center for Innovative Teaching and Learning (2011).
- Member of Space Utilization Committee selected by Faculty Senate (2007-2010).
- Member of Distance Education Committee selected by Faculty Senate (2007-2009).
- Member of Masters in Teaching Committee selected by Faculty Senate
- Member of Distinguished Teaching Award selection committee (2008-2009).
- Co-op advisor for students at GE and Intel.
- Invited speaker at inaugural Graduate Student Association Workshop, "Successfully Transitioning From School to the Workplace".
- Participant in Exploration Day and Research at Tech Day presentations and tours.
- Search committee member for open positions in Mechanical Engineering, Management and Humanities.

COURSES TAUGHT

- **MENG304 - Advanced Strength of Materials.** The course focuses on advanced strength of materials principles and techniques for use in mechanical engineering design and problem solving. Mechanical engineering designs are increasingly complex and require a range of mechanics skills including, predicting material

failure under steady and cyclic loading, determining the stresses and deflections due to unsymmetrical loading, understanding nonlinear structural deflections and resulting residual stresses, computing shear stresses in thin-walled structures, analyzing for stresses in axisymmetric thin-walled shells, and analyzing thick cylinders. All of these important mechanics skills must be utilized by a mechanical engineer to make informed design decisions and to solve many engineering problems.

- **ES302 - Mechanics of Materials.** The course focuses on the relationships between the applied external forces acting on deformable bodies and the internal stresses and strains produced. In addition to analyzing equilibrium of the deformable bodies, this requires consideration of the material properties and geometry of deformation. Material characteristics, tension, compression, torsion, shear, bending, Mohr's circle, combined loading, and buckling of columns will be investigated. Analysis and design of structural members will be considered. The computer program MD Solids, provided with the text, will be used to help develop problem solving skills. These mechanics of materials skills are typically utilized by mechanical engineers to solve engineering problems and to make informed design decisions.
- **MENG381/382 - Junior Design Clinic.** The course enables students to utilize the engineering design and verification process on assigned mechanical design projects. Students will be advised by faculty members and external company sponsors/mentors. Weekly workshops will be conducted in specialized topics pertinent to the design process. Topics include conceptual design; design specifications; program planning using Gantt charts; costing of a project; detailed product design; as well as other specialized topics. Formal reports, fabrication drawings, and cost estimates will be prepared and submitted to faculty and outside industrial sponsors/mentors. Formal oral presentations will be given to a reviewing group of advisers and students. Formal written proposals, interim reports and final reports will be completed by the assigned student teams.
- **MENG481/482 - Senior Design Clinic.** The course will enable students to utilize the engineering design and verification process on assigned mechanical design projects. Students will be advised by faculty members and external company sponsors/mentors. Weekly workshops will be conducted in specialized topics pertinent to the design process. Topics include conceptual design; design specifications; program planning using Gantt charts; costing of a project; detailed product design; as well as other specialized topics. Formal reports, fabrication drawings, and cost estimates will be prepared and submitted to faculty and outside industrial sponsors/mentors. Formal oral presentations will be given to a reviewing group of advisers and students. Formal written proposals, interim reports and final reports will be completed by the assigned student teams.
- **MENG485 – Advanced Design Clinic.** The will enable students to enhance their understanding of the engineering design and verification process for mechanical design projects. Weekly seminars will be conducted in specialized topics pertinent to the design process. Topics will include creating a high performing team, dealing with project setbacks, common design problems to avoid, communicating within the team, dealing with project sponsors and customers, and

developing a set of best practices for completing mechanical design projects. Students will also be participants of ongoing design project teams, contributing in the role of senior technical member and/or adviser. Students will contribute to the formal reports and oral presentations of these teams.

- **EMGT506 - Managing Technology Resources.** This course covers the vital role provided by modern engineering managers and encompasses a variety of critical skills, including managing people and projects, providing team leadership, making decisions, resolving conflicts, interfacing with customers, and making technical proposals. All of these important capabilities must be utilized by the technical manager in today's dynamic engineering environment where products and processes are continuously improving.
- **EMGT572 - Engineering Statistics.** The course focuses on statistical decision making in today's dynamic engineering environment where products and processes are continuously improving. Decisions by modern engineering managers are increasingly data driven and require a range of statistical skills including, gathering and describing data, designing samples and experiments, drawing statistical inferences and conclusions, evaluating the confidence of conclusions, developing regression models for anticipating future behavior and use of statistical quality control and six sigma to drive process improvement. All of these important capabilities must be utilized by a technical manager to make informed decisions.
- **MENG504 - Advanced Mechanics of Materials.** The course focuses on advanced strength of materials principles and techniques for use in mechanical engineering design and problem solving. Mechanical engineering designs are increasingly complex and require a range of mechanics skills including, predicting material failure under steady and cyclic loading, determining the stresses and deflections due to unsymmetrical loading, understanding nonlinear structural deflections and resulting residual stresses, computing shear stresses in thin-walled structures, analyzing for stresses in axisymmetric thin-walled shells and thick cylinders and predicting the stability of elastic beams and shells. All of these important mechanics skills must be utilized by a mechanical engineer to make informed design decisions and to solve many engineering problems.