

PROFESSOR DANIEL D. JENSEN, Ph.D.
Dept. of Engineering Mechanics
U.S. Air Force Academy
U.S.A.F. Academy, CO, 80840-6240

Voice (719) 333-7946, Fax: (719) 333-2944, email: jensendd.dfem@usafa.af.mil

I. EDUCATION

Ph.D. in Aerospace Engineering, Univ. of Colorado, Boulder, 1992.

(Emphasis in computational structural analysis)

M.S. in Mechanics, Univ. of Colorado, Boulder, 1987.

(Emphasis in advanced solid mechanics)

B.S. in Mechanical Engineering, Univ. of Colorado, Boulder, 1984.

II. EXPERIENCE

Asst. / Assoc. / Full Professor of Engr. Mechanics, USAFA, CO **May 1997-present**
Teach in areas of design, solid mechanics, instrumentation and computational methods. Conduct research in pedagogical advances in engineering education & design methodology.

Multimedia Development Consultant - MSC Corp, Costa Mesa, CA **Sept 1999 - present**
Developed finite element based interactive multimedia for use in Engineering Mechanics courses.

Asst. Professor of Mech. Eng., Univ. of the Pacific, Stockton, CA **1993 - 1997**
Conducted research in pedagogical advances in eng. education & computational analysis techniques while teaching M.E. courses.

Eng. Consultant & Professor, Lawrence Berkeley Natl. Lab., Berkeley, CA **1995 - 1997**
Taught course on computer based analysis. Consulted in computer use for advanced analysis including finite element analysis and use of high performance Cray super computers.

NASA Post Doctoral Researcher, Center for Space Structures & Control, UCB, **1992 - 1993**
Research in static and dynamic computer based analysis techniques.

Research Assistant, Aero. Eng. Dept., Univ. of Colo, **1988 - 1992**
Research led to improvements in ability to predict acoustic structural responses as well as a new shell finite element formulation with increased stress accuracy. Work was funded by Naval Research Laboratories.

Research Consultant, Lockheed/Martin Palo Alto Labs, Palo Alto, CA **10/89 - 3/90**
Implemented and tested new versions of the 4 and 9 noded shell finite elements in software jointly used by Lockheed and the NASA Langley Research Center.

Design Engineer, Texas Instruments, Lubbock TX **Summer 1983**
Performed design and analysis of electronics packaging. Worked on suppression of radio frequency interference through grounding techniques.

III. PUBLICATIONS

III.1 Refereed Conference Papers

Park, K.C., Jensen, D.D., "A Systematic Determination of Lumped and Improved Consistent Mass Matrices for Vibration Analysis," *Proceeding of the AIAA Structures, Dynamics and Materials Conference*, Mobile, AL, April, 1989.

Jensen, D.D., Park, K.C., "Transverse Shear Augmented ANS Shell Elements," *Proceedings of the First U.S. National Congress on Computational Mechanics*, Chicago, IL, July, 1991.

Jensen, D.D., Park, K.C. , "ANS Shell Elements with Improved Transverse Shear Accuracy," *Proceedings of the AIAA Structures, Dynamics and Materials Conference*, Dallas, TX, April, 1992.

Jensen, D.D., "Using MSC/PATRAN for Pre- and Postprocessing for Specialized FEM Codes that Are Not in the Standard MSC/PATRAN Library," *Proceedings of the MSC World Conference*, Newport Beach, CA June, 1996.

Jensen, D.D., Murphy, M.D., Wood, K.L., "Evaluation and Refinement of a Restructured Introduction to Engineering Design Course Using Student Surveys and MBTI Data," *Proceedings of the ASEE Annual Conference*, Seattle WA, June, 1998.

Otto, K., Wood, K.L., Murphy, M.D., Jensen, D.D., "Building Better Mousetrap Builders: Courses to Incrementally and Systematically Teach Design," *Proceedings of the ASEE Annual Conference*, Seattle WA, June, 1998.

Borchert , R., Jensen, D., Yates, D. , "Hands-on and Visualization Modules for Enhancement of Learning in Mechanics: Development and Assessment in the Context of Myers Briggs Types and VARK Learning Styles," *Proceedings of ASEE Annual Conference*, Charlotte, NC, June, 1999.

Jensen, D., Bowe, M., "Hands-on Experiences to Enhance Learning of Design: Effectiveness in a Reverse Engineering / Redesign Context When Correlated with MBTI and VARK Types," *Proceedings of ASEE Annual Conference*, Charlotte, NC, June, 1999.

Murphy, M., Jensen, D., "Integrating CAD into an Already Packed Curriculum: Is Another Class Necessary?," *Proceedings of ASEE Annual Conference*, Charlotte, NC, June, 1999.

Jensen, D., Feland, J., Bowe, M., Self, B., "A 6-Hats Based Team Formation Strategy: Development and Comparison with an MBTI Based Approach," *Proceedings of the ASEE Annual Conference*, St. Louis, June 2000.

Bowe, M., Jensen, D., Feland, J., Self, B., "When Multimedia *Doesn't* Work: An Assessment of Visualization Modules for Learning Enhancement in Mechanics," *Proceedings of the ASEE Annual Conference*, St Louis, June 2000.

Jensen, D., Greer, M., Wood, K., Nowack, M., "Force Flow Analysis: Opportunities for Creative Component Combination," *Proceedings of the ASME Annual Conference*, Orlando, FL, Nov., 2000.

Rhymer, D., Jensen, D., "An Assessment of Visualization Modules for Learning Enhancement in Mechanics," *Proceedings of the ASEE Annual Conference*, Albuquerque NM, June 2001.

Dennis, S., Bowe, M., Ball, J., Jensen, D., "A Student-Developed Teaching Demo of an Automatic Transmission," *Proceedings of the ASEE Annual Conference*, Albuquerque NM, June 2001.

Jensen, D., Randell, C., Feland, J., Bowe, M., "A Study of Rapid Prototyping for Use in Undergraduate Design Education", *Proceedings of the ASEE Annual Conference*, June 2002.

Wood, J., Winebrener, D., Bartolomei, J., Jensen, D., Rhymer, D., "Creating a Visually Rich, Active Learning Environment for Teaching Mechanics of Materials," *Proceedings of the ASEE Annual Conference*, June 2002.

Greer, J., Wood, J., Jensen, D., Wood, K., "Guidelines For Product Evolution Using Effort Flow Analysis: Results Of An Empirical Study," *Proceedings of the ASME 2002 International Design Engineering Technical Conferences*, Montreal, Canada, Sept., 2002.

Dutson, A., Green, M., Wood, K., Jensen, D., "Active Learning Approaches in Engineering Design Courses," *Proceedings of the ASEE Annual Conference*, June 2003.

Jensen, D., Wood, K., Wood, J., "A Design Methodology for Hands-on Experiences to Optimize Learning through Correlation with Learning Styles and Pedagogical Theory", *Proceedings of the ASEE Annual Conference*, Salt Lakes City, UT, 2004.

Moe, R.E., Jensen, D.D., Wood, K.W., "Prototype Partitioning Based on Requirement Flexibility", *Proceedings of the ASME Design Education and Technology Conference*, Salt Lake City, UT, Sept, 2004.

III.2 Refereed Journal Papers

Jensen, D.D., Park, K.C., "Equilibrium Constrained Assumed Natural Coordinate Strain Plate Elements ," *International. Journal of Numerical. Methods in Engineering.*, Vol. 38, pp. 2951-2977, 1995.

Jensen, D.D., Pramono, E., "A Method for Teaching Finite Elements Which Combines the Advantages of Commercial Pre and Post -Processing with Student Written Software," *Computer Applications in Engineering Education*, Vol. 6, No. 2, pp. 105-114, June 1998.

Jensen, D., Borchert, R., "MSC/Patran Used to Improve Education by Providing Visualization of Stress Concepts," *MSC World*, Feb., 1999.

Shakerin, S., Jensen, D., "Enhancement of Mechanics Education by Means of Photoelasticity and the Finite Element Method," *International Jour. of Mechanical Engineering Education*, Vol 29, No. 4, pp. 307-320, Oct. 2001.

Wood, K., Jensen, D., Bezdek, J., Otto, K., "Reverse Engineering and Redesign: Courses to Incrementally and Systematically Teach Design," *Journal of Engineering Education*, pp. 363-374, July 2001.

Jensen, D., Self, B., Rhymer, D., Wood, J., Bowe, M., “A Rocky Journey toward Effective Assessment of Visualization Modules for Learning Enhancement in Engineering Mechanics ,” *Journal of Educational Technology & Society: Special issue on 'Evaluation of Learning Technologies in Higher Education'*, Vol . 5, No 3, July, 2002.

Jensen, D.D., J.J. Wood, and K.L. Wood, *Hands-on Activities, Interactive Multimedia and Improved Team Dynamics for Enhancing Mechanical Engineering Curricula*. International Journal of Engineering Education, **19** (No. 6): p. 874-884, 2003.

Greer, J., Jensen, D., Wood. K., “Effort Flow Analysis, a Methodology for Directed Product Evolution” *Journal of Design Studies*, [Volume 25, Issue 2](#) , , Pgs 193-214, March 2004.

Wood, J., Campbell, M., Wood, K., Jensen, D., “Enhancing Machine Design by Creating a Basic Hands-on Environment with Mechanical Breadboards,” Accepted to *International Journal of Mechanical Engineering Education.*, March, 2003.

Dennis, S., Jensen, D., “Planetary Gear Set and Automatic Transmission Simulation for Machine Design Courses”, *Computer Applications in Engineering Education*, Vol . 11, Issue3, pp 144-155, Jan, 2003.

III.3 Commercial Software, Commercial Tutorial, Thesis and Invited papers/presentations

Jensen, D.D., "Equilibrium Constrained Assumed Natural Coordinate Strain Finite Elements for Shell Analysis," Ph.D. Thesis, University of Colorado, Boulder, 1992.

Jensen, D. “Computer Aided Engineering: Recent Advances and Continuing Challenges,” Invited presentation to Staff Scientists at Lawrence Berkeley National Laboratories, June, 1995.

Jensen, D., “The Finite Element Method : An Indispensable Tool for Engineering Analysis,” Invited presentation to design and analysis team at Advanced Aerospace Structures Corp., Stockton, CA, May 1996.

Shakerin, S., Jensen, D., “Photoelasticity and its Synergism with the Finite Element Method: A report on NSF ILI Grant DUE 9751315,” Invited for publication in *Proceedings of ASEE Annual Conf.*, Charlotte, NC, June, 1999.

Talreja, R, Jensen, D., Bowe, M., “Information and Technology in Education”, Issues in Engineering Education (Session 52-ED-1),” Invited for the AIAA Annual Aerospace Sciences Conference, Reno NV, Jan 00.

Bowe, M., Jensen, D., Feland, J., Self, B., “When Multimedia *Doesn't* Work: An Assessment of Visualization Modules for Learning Enhancement in Mechanics,” Invited Technology Paper: *Institute for Information and Technology Applications*, U S Air Force Academy, CO, Aug., 2000.

Jensen, D., Wood, K., "Incorporating Learning Styles to Enhance Mechanical Engineering Curricula by Restructuring Courses, Increasing Hands-on Activities, & Improving Team Dynamics," Invited ASME Publication & Presentation for the Award for the Most Innovative Curriculum for the year 2000, Presented at the *ASME Annual Conference*, Orlando, FL, Nov, 2000.

Jensen, D.D. "Force Flow Analysis," Invited presentation on AFOSR Sponsored Research, USAF Academy, May 2001

Jensen, D. D., Wood, J.W., Dimas, D., **Mechanics: A Visual Approach**, Interactive Multimedia Courseware CD and Web site published by MSC Corporation, 2002.

Jensen, D. D., **Basic Finite Element Tutorials, 2nd ed.** published by MSC Corporation. Full hardcopy or CD available through MSCsoftware.com, 2002.

III.4. Industry Internal Reports and Non-refereed Papers

Jensen, D.D., "Grounding Methods for Reduction of Radio Frequency Interference from Printed Circuit Boards," *Texas Instruments Internal Report*, Mechanical Design Division, Lubbock, TX, 1983.

Stanley, G.M., Jensen, D.D., "The Computational Mechanics Testbed Element Theory Manual - Processor ES27," Lockheed Contract Report F333013, January, 1990.

Jensen, D.D., "Teaching Finite Elements Using the Software Package PATRAN, Advantages and Drawbacks," *Proceedings of the ASEE Pacific Southwest Annual Conf.*, Sacramento, CA, Oct., 1994.

Jensen, D., "Benchmarking Speeds on Cray Supercomputers for Static and Dynamic Structural Analysis Using ANSYS," *Lawrence Berkeley National Laboratories Consulting Report*, February, 1997.

Jensen, D., Borchert, R., "Myers Briggs Based Assessment of Hands-on and Visualization Usage in Mechanics Courses," *Proceedings of the Pikes Peak Educational Research Conference*, USAF Academy, CO, July, 1999.

Jensen, D., Feland, J., "A Simple Approach for Using Myers Briggs Type Indicator Data to Enhance Engineering Education," *Proceedings of the ASEE South West Regional Conference*, Golden, CO, March, 2000.

Self, B., Jensen, D., Bowe, M., Borchert, R. "Tech in Mech: Multimedia and Hands-on Projects for Learning Enhancement in Engineering Mechanics," Teaching with Technology Conference, Univ. of Colorado, July, 2000.

IV. GRANTS

(Note dollar amounts are either actual or in-kind values)

IV.1 Summary

- I have been awarded approximately \$400,000 worth of grant funds. Over 350,000 worth of these have been engineering educations enhancement.
- I have generated over \$150,000 of grants (new or continuing, actual or in-kind) while at USAFA. 78% of this has been external funding (outside of USAFA).
- Funding from outside USAFA: NSF (\$55,000), Lawrence Berkeley National Labs (\$10,000), MSC Software Corp. (\$53,000),
→ total outside funding while at USAFA = \$118,000.
- Funding internal to USAFA: AFOSR = (\$17,000), IITA (\$16,000), Dean's fund for Academic Excellence (\$4,000),
→ total internal funding while at USAFA = \$37,000.

IV.2 Grants

NASA Post Doctoral Position (\$35,000) 1992 - 1993

Worked in the area of computational mechanics. Sponsored by the Center for Space Structures & Controls, University of Colorado, Boulder, CO.

NSF Sponsored Undergraduate Supercomputer Grant (\$5000) 1994

Undergraduate use of the Cray 90 at San Diego Supercomputer facilities.

UOP School of Engineering Teaching Effectiveness Award (\$1,500) 1994

Worked to maximize the effective use of computational teaching tools throughout the mechanics and design curriculum.

Eberhardt Research Fellowship (\$3,500) 1995

Proposal title "Improved Computer Based Vibration Analysis". Pedagogical advancements in visualization of structural vibrations.

Microsoft Instructional Laboratory Award (\$68,000) 1996

Software grant for curriculum development projects.

AutoDesk Design Curriculum Development Grant (\$6,000) 1996

Educational grant from AutoCAD design systems.

Department of Energy Advanced Computational Resources Grant (\$74,000) 1996

P.I. for National Energy Research Super Computer (NERSC) grant for finite element use at Lawrence Berkeley National Laboratory.

National Science Foundation Div. of Undergraduate Edu. ILI (\$33,000) 1997

Integration of the data acquisition and control software LabVIEW into curriculum providing increased understanding through hand-on & visualization.

Lawrence Berkeley National Laboratories (\$10,000) 1997

Develop and teach new content for visually based finite element modeling.

National Science Foundation Div. of Undergraduate Edu. ILI (\$22,000) 1997

Use of visualization modules and photoelasticity to increase students learning in mechanics courses.

Air Force Office of Scientific Research (\$2,000) 1998

Develop visualization modules for stress concepts for mechanics courses.

Institute for Information and Technology Applications (\$3,000) 1999

Computer resources to use in development of learning modules for use in mechanics.

MSC Software Corp. (\$3,000) 1999

Software development grant for tools to aid in NSF work in the area of interactive educational multimedia.

MSC Software Corp. (\$20,000) 1999

Software development grant for development of interactive educational multimedia.

Air Force Office of Scientific Research (\$2000) 1999/2000

Funding for development and dissemination of assessment of multimedia and design team formulation strategies.

Air Force Office of Scientific Research (\$5,000) 2000

Materials and research travel funds for design of compliant mechanisms.

Institute for Information and Technology Applications (\$3000), 1999/2000

Research in Multimedia's Effect on Mechanics Education.

Air Force Office of Scientific Research (\$3000), 1999/2000.

Software funds for material selection and statistical analysis for design of compliant mechanisms which are used as hands-on devices in the classroom.

Institute for Information and Technology Applications (\$1200), 2000/2001

Research in Multimedia's Effect on Mechanics Education.

Air Force Office of Scientific Research (\$4000), 2000/2001.

For material selection and statistical analysis for design of compliant mechanisms which are used as hands-on devices in the classroom.

Dean of the Faculty Assessment Grant (\$1100) 2000/2001

For presentation of assessment of multimedia in education.

MSC Software Corp. (\$30,000) 1999-2001

Software development grant for refinement of interactive educational multimedia based on Finite Element Analysis.

Institute for Information and Technology Applications (\$6,500) 2001

Revisions and dissemination of Interactive Multimedia for Mechanics Education.

Dean of the Faculty Assessment Grant (\$3000) 2001/2002

For development of multimedia to enhance engineering mechanics.

Institute for Information and Technology Applications (\$3,000) 2001/2002

Present Interactive Multimedia results and initiate “PDA in Design” study.

Air Force Office of Scientific Research (CASTIE Research Center) (\$1,000) 2002

Materials and research travel funds for design of compliant mechanisms.

Dean of the Faculty Assessment Grant (\$5000) 2002/2003

For presentation of assessment of combined hands-on & multimedia in education.

Wiley Publishers Development Grant (\$3,000) 2002

For development of hands-on & multimedia for Mechanics of Materials. .

Institute for Information and Technology Applications (\$3,000) 2002/2003

Educuse educational technology for development of active learning strategies

Air Force Acquisitions Grant Program (With Major K. Bearden) (\$43,000) 2003

Rapid Prototyping Machine for use in Education and Design Research

Dean of the Faculty Assessment Grant (\$2500) 2003/2004

For development of multimedia in Machine Design

NSF Division of Undergraduate Education (\$500,000) 2004-2006 submitted

Development and assessment of active learning for Mechanics of Materials.

NSF Division of Engineering (\$350,000) 2004-2006 submitted

Development and assessment of a methodology for design flexibility .

V. AWARDS and HONORS

NASA Post Doctoral Position, 1992.

UOP School of Engineering Teaching Effectiveness Award in 1994.

Best paper award for Mechanical Engineering Session at ASEE Annual Conference, June 1998.
Paper titled “Evaluation and Refinement of a Restructured Introduction to Engineering Design Course Using Student Surveys and MBTI Data”.

Outstanding Academy Educator Award, US Air Force Academy, May 2000.

American Society of Mechanical Engineering (ASME) Award for “Most Innovative Curriculum”, 1999-2000.

US Air Force Academy’s Engineering Division nominee for the “Engineering The Ernest L. Boyer - International Award for Excellence in Teaching, Learning and Technology”, Nov 2000.

US Air Force Academy Department of Engineering Mechanics “Instructor of the Year – 300 Level Courses” for the year 2000 – 2001.

Multimedia Courseware Vis-MoM (by Jensen, Wood & Dimas) was selected as a finalist for the Premier Award in Engineering Courseware 2001. This award is given annually to recognize the best non-commercial engineering courseware developed during that year. This honor included the benefit of having our software distributed to over 2000 individuals for use in their classes.

Appointed as Adjunct Professor at University of Texas, Austin, Sept 2001.

Nominated for the ASEE Outstanding Teacher Award in the West/Central Region, 2002

VI. PROFESSIONAL SERVICE

Active member of American Society of Mechanical Engineers (ASME) and American Society of Engineering Education (ASEE).

Session Chair, ASEE Mechanics Division, ASEE Annual Conference, St. Louis, June 2000.

Associate staff with AF Chaplain’s Spire sponsored group Campus Crusade for Christ, 1997-present.

Elected, Member at Large, Executive Committee of the Mechanics Division of ASEE, June 2001.

On the thesis committee for John Wood, Candidate for the Ph.D. in Mechanical Engineering at the Colorado State University, Ft. Collins, CO, anticipated completion date May 2002.

On the thesis committee for Monty Greer, candidate for the Ph.D. in Mechanical Engineering at the University of Texas, Austin, anticipated completion date May 2002.

Reviewer for Journals/Conferences: Journal of Engineering Education, Proceeding of the ASME International Congress (Design for Manufacturing Section), Proceedings of the ASEE Annual Conference (Mechanics Division), Proceedings of the ASEE Annual Conference (Design Division), Proceedings of the ASME Design Theory and Methodology Conference.

Reviewer for Publishing Companies: Wiley Publishers (Mechanics of Materials textbook by Boresi), Wiley Publishers (Mechanics of Materials textbook by Sturges et. Al., Prentice Hall Publishers (Design textbook by Otto & Wood), McGraw-Hill Publishers (Finite Element book by Hutton).

Engineering Consultant: MSC Software Corp. 1) Development of Multimedia for Mechanics of Materials. 2) Development of Instructional Material for Finite Element Analysis.

Department of Engineering Mechanics “Faculty Development Officer”.

VII. COURSES TAUGHT (as of Jan. 2004)

Course	Location(s)	Year(s)	Total # of times taught
Finite Element Analysis	CU, UOP, LBNL, USAFA	89, 94-97, 01	11
Instrumentation	UOP	94-97	4
Statics	UOP	95	1
Mechanics of Materials	UOP, USAFA	95-96, 02	3
Intro. to Engineering Design	UOP, USAFA	94-96, 03, 04	6
Numerical Methods	UOP	94-97	4
Introduction to Mechanics	USAFA	97-98	2
Design Methodology	USAFA	97-00	5
Capstone Design	USAFA	99	1
Machine Design	USAFA	00-04	7
National Competition Capstone Design –	USAFA	99-02	8