

Curriculum Vitae

Ravi C. Penmetsa

EDUCATION

Institution	Field of Study	Degree/Date
Wright State University	Engineering	Ph.D., May, 2002
Andhra University	Mechanical Engineering	B.E., June, 1997

PROFESSIONAL EXPERIENCE

Position	Institution	Dates
Assistant Professor	Wright State University, Mech. & Mat. Eng.	01/03-Present
ASEE Summer Faculty Fellowship	WPAFB, Air Vehicles Directorate (AFRL/VASM)	06/07 – 08/07
ASEE Summer Faculty Fellowship	WPAFB, Air Vehicles Directorate (AFRL/VASM)	06/06 – 08/06
VA Summer Research Faculty	WPAFB, Air Vehicles Directorate (AFRL/VASM)	06/05 – 08/05
Senior Research Associate	Wright State University, Mech. & Mat. Eng.	05/02-12/02
Graduate Research Assistant	Wright State University, Mech. & Mat. Eng.	06/98-04/02

CURRENT RESEARCH

- Develop a risk quantified design process that would replace the traditional factor of safety based sizing of aircraft structural components.
- Develop an efficient algorithm for system reliability estimation for large scale systems
- Develop an algorithm for automated fault tree generation for aircraft structural systems

PROFESSIONAL MEMBERSHIPS

1. American Institute of Aeronautics and Astronautics (AIAA), 1998-Present
2. American Society of Mechanical Engineers (ASME), 2001-Present
3. AIAA – Nondeterministic Approaches Technical Committee (Secretary - 2007-2009)

ACADEMIC AWARDS

1. **President’s Award for Faculty Excellence: Early Career Achievement Award**, 2006
2. **ASEE Air Force Summer Faculty Fellowship**, 2006
3. **Citation for CECS Excellence in Teaching Committee**, 2004/2005
4. **Young Researcher Fellowship** for exemplary research in computational mechanics, awarded by First MIT Conference in Computational Fluid and Solid Mechanics, June 2001, Cambridge, MA
5. **Outstanding Graduate Student Award**, June 2000, Wright State University
6. **Dayton Area Graduate Studies Institute Scholarship**, June 1998

External Funding

1. Penmetsa, R. C. (Co. PI), “Reliability Based Multidisciplinary Design of Undersea Weapons,” Office of Naval Research, Grant # N00014-03-1-0057, 10/01/02 – 9/30/05, Total Funding: \$ 419,026, WSU Account #: 665320
2. Penmetsa, R. C. (Co. PI), “Multidisciplinary Design Optimization for High Reliability and Robustness,” DAGSI Cost Share, , 10/01/02 – 12/31/06, Total Funding: \$86,000, WSU Account #: 665402

3. Penmetsa, R. C., "Robust Uncertainty Modeling Techniques," AFRL Air Vehicles Directorate, 10/01/05 – 05/19/06, Total Funding: \$ 37,693, WSU Account #: 666354
4. Penmetsa, RC, "Efficient Reliability Estimations for Large-Scale Aircraft Structural System (ATROHS Wing Configuration)," AFRL Air Vehicles Directorate, 01/02/06 – 12/31/06, Total Funding: \$ 55,890, WSU Account #: 666456
5. Penmetsa, RC, "Risk Based Design of Air Vehicle Structures," AFRL Air Vehicles Directorate (through UIUC Structural Sciences Center), 02/16/07-02/15/10, Total Funding: \$ 346,750, WSU Account #: 666822
6. Penmetsa, RC, "Risk Based Design of Air Vehicle Structures," DAGSI Cost share for AFRL/VA grant, 01/01/07-12/31/09, Total Funding: \$126,000, WSU Account #: 666831

Total External Funding: \$ 1,071,359

Internal Funding

1. Penmetsa, RC, "Robust Design of Thermal Protection Systems for Spacecraft," \$25,000, Research Initiation Grant, WSU Account #: 665359
2. Penmetsa, RC, "Efficient Techniques for Robust System Reliability Estimation," \$15,500, Research Initiation/Augmentation Grant, WSU Account #: 665707
3. Penmetsa, RC, Research Travel Fund to attend "ASCE Joint Specialty Conference on Probabilistic Mechanics and Structural Reliability," in Albuquerque, New Mexico, \$700, WSU Account #: 241500

Total Internal Funding: \$41,200

Total Research Funding (Internal and External): \$ 1,112,559

Summer Contracts

1. Penmetsa, RC, AFRL/VA Summer Faculty Fellowship \$9,800, June 05 – August 05
2. Penmetsa, RC, ASEE Air Force Summer Faculty Fellowship, \$12,500, June 06 – August 06
3. Penmetsa, RC, ASEE Air Force Summer Faculty Fellowship, \$15,000, June 07 – August 07

Total Contracts: \$37,300

TEACHING

Courses Taught at WSU

Course	Number of Times Taught
1. ME 212 Statics	2
2. ME 213 Dynamics	4
3. ME 313 Strength of Materials	3
4. ME 408/608 Design Optimization	2
4. ME 460/660 Engineering Vibrations	3
5. ME 710 Computational Methods in Structural Dynamics	2
6. ME 720 Advanced Mechanics of Solids	3
7. ME 726 Structural Reliability	2
8. ME 408/608 Design Optimization	3
9. EGR 705 Design of Experiments	1

Graduate Students Supervised (Major Professor)

Student	Thesis Title	Support	Degree/Date
Adduri, P.	Robust Estimation of Reliability in the Presence of Multiple Failure Modes	Research Assistantship	Ph.D., Dec, 2006
Khambaswadkar, R.	Acoustic signature minimization for a light weight torpedo	Research Assistantship	M.S. June, 2005
Kondoju, S.	Analysis of a torpedo subjected to bending loads during handling	Research Assistantship	M.S. Dec., 2005
Dwire, H.	Reliability based design of a large-scale aircraft structures	Research Assistantship	M.S., Expected Dec 2007
Kable, B.	Automated Reliability Tree Generation Algorithm for Redundant Aircraft Structures	Research Assistantship	M.S., Expected June 2008
Shanmugham, V.	Optimal risk allocation for systems with correlated failure modes	Research Assistantship	Ph. D., Expected June 2010

Graduate Students Advised to Completion: 2 M.S., 1 Ph.D.

Graduate Students in Progress: 2 M.S., 1 Ph.D.

Other Thesis Committee Memberships

Student	Thesis Title	Chair	Degree/Date
Mohammed, T.	Optical pattern recognition of three dimensional images using composite binary phase only filters	Awwal, A.	M. S., June 2003
Byreddy, C.	Multidisciplinary optimization and sensitivity analysis of flutter of an aircraft wing with underwing store in transonic regime	Grandhi, R.	M. S., December 2003
Janardhan, S.	Multidisciplinary design optimization of an aircraft wing/tip store in the transonic regime	Grandhi, R.	M. S. December 2003
Hutton, T.	Innovative forced response analysis method applied to a transonic compressor	Wolff, M.	M. S., September 2003
Jeyasingh, V.	Experimental and Computational Study on the Thermal Performance of a Lamp/Ballast System in a CFL Recessed Downlight Fixture	Menart, J.	M. S., September 2004
Thiyagarajan, N.	Multi-Level Design Process for 3-D Preform Shape Optimization in Metal Forming using the Reduced Basis Technique	Grandhi, R.	M. S., December 2004
McClung, A.	Design for Structural Health for Location of Fastener Failure in Thermal Protection Systems	Grandhi, R.	M. S., June 2005
Kalavalapally, R.	Multidisciplinay Optimization Of a Lightweight Torpedo Structure Subjected To Underwater Explosion	Grandhi, R.	M. S., September 2005
Prithiviraj, M.	Topology Design of a Curved Thermal Protection System	Grandhi, R.	M. S., December 2005
Alyanak, E.	Efficient Reliability Based Design and Optimization of Structural Systems using Evidence Theory	Grandhi, R.	Ph.D., July 2006

Page, S.	Investigation into the Behavior of Bolted Joints	Slater, J	M.S., July 2006
Daily, J.	Plastic Energy Dissipation at a Bimaterial Crack Tip under Cyclic Loading	Klingbeil, N	Ph.D., June 2006
Amarchinta, H.	Multi-Attribute Objective Optimization Based on Conjoint Analysis	Grandhi, R	M. S., December 2006
Haney, M.	Topology Optimization of Engine Exhaust-Washed Structures	Grandhi, R.	Ph. D., December 2006
Ogunjobi, T.	Computational Study of Ring-Cusp Magnet Configurations that Provide Maximum Electron Confinement	Menart, J.	M. S., November 2006

Student Projects Supervised

Student(s)	Project	Project Dates
Sreenivasa C. Kondoju	ME 699 - CAD based shape optimization using IDEAS	Fall 03
Balaji Parthasarathy	ME 699 - Analysis of a Torpedo Joint using NASTRAN	Spring 04
Mirza Kazim Potineni C. Satish	ME 890 - Acoustic Analysis and Optimization using NASTRAN	Summer 04
Snelling F. Samuel	ME 699 - Probabilistic Analysis of Torpedo Joints	Fall 04
Snelling F. Samuel	ME 890 - Design of Labyrinth Seals	Fall 04
Snelling F. Samuel	ME 890 - Secondary Air Systems in High Pressure Gas Turbines	Winter, 05
Chalamalasetty R. K	ME 890 - Study of Deming Philosophy and Experiments	Spring 05
Kondoju S. Chary	ME 699 - Robust Design of a Torpedo	Spring 05
Johnson, M. and Gonyoun, K.	ME 490 - Redesign of Penn Ventilation Breezeway Panel Fan	Winter 05 and Spring 05
Potineni C. Satish	ME 890 - Reliability Analysis Toolbox	Fall 05
Grant D. Gregory	ME 499 - Design of Experiments for Mechanics Classes	Fall 05

SCHOLARSHIP

Archival Journal Publications

1. Penmetsa, R. C., and Grandhi, R. V., "Structural System Reliability Quantification using Multi-Point Approximations," AIAA Journal, Vol. 40, No. 12, pp. 2526-2531, December 2002
2. Penmetsa, R. C., and Grandhi, R. V., "Efficient Estimation of Structural Reliability for Problems with Uncertain Intervals," International Journal of Computers and Structures, Vol. 80, pp. 1103-1112, 2002
3. Penmetsa R. C., and Grandhi R. V., "Adaptation of Fast Fourier Transformations to Estimate Structural Failure Probability," Journal of Finite Elements in Analysis and Design, Vol.39, No. 5-6, pp. 473-486, 2003
4. Penmetsa, R. C. and Grandhi, R. V., "Uncertainty Propagation Using Possibility Theory and Function Approximations," Journal of Mechanics Based Design of Structures and Machines, Vol. 31, No. 2, pp. 257-279, 2003

5. Penmetsa, R. C., Grandhi, R. V., and Venkayya, V. B., "Modeling, Analysis, and Uncertainty Quantification of a Lightweight Torpedo Design," *Journal of Naval Engineers*, Vol. 116, No. 4, pp. 23-36, 2004
6. Choi, J., Penmetsa, R. C., and Grandhi, R. V., "Cavitator Shape Optimization for Minimum Drag," *Journal of Structural and Multidisciplinary Optimization*, Vol. 29, No. 2, February 2005, pp. 159-167
7. Alyanak, E., Venkayya, V. B., Grandhi, R. V., and Penmetsa, R. C., "Structural Response and Optimization of a Supercavitating Torpedo," *Journal of Finite Elements in Analysis and Design*, Vol. 41, No. 6, March 2005, pp. 563-582
8. Penmetsa, R. C. "Determining Probability of Mission Success when Using Deep Penetration Weapons," *International Journal of Mechanical Sciences*, Vol. 47, No. 9, September 2005, pp. 1442-1454
9. Alyanak, E., Grandhi, R.V., and Penmetsa, R.C., "Optimum Design of a Supercavitating Torpedo Considering Overall Size, Shape and Structural Configuration," *International Journal of Solids and Structures*, Vol. 43, No. 3-4, Feb 2006, pp. 642-657
10. Penmetsa, R. C., Grandhi, R. V., and Haney, M., "Topology Optimization for Evolutionary Design of Thermal Protection System," *AIAA Journal*, Vol. 44, No. 11, November 2006, pp. 2663-2671
11. Kalavalapally, R., Penmetsa, R.C., and Grandhi, R.V., "Multidisciplinary optimization of a Lightweight Torpedo Structure Subjected to an Underwater Explosion," *Journal of Finite Element Methods in Analysis and Design*, Vol. 43, 2006, pp. 103-111
12. Adduri, P., and Penmetsa, R., "Bounds on Structural System Reliability in the Presence of Uncertain Intervals," *International Journal of Computers and Structures*, Vol. 85, 2007, pp. 320-329
13. Adduri, P., and Penmetsa, R. C., "Estimation of Structural System Reliability Using Fast Fourier Transforms," *International Journal of Reliability and Safety*, Accepted for Publication, January 2007

Papers under review:

14. Alyanak, E., Venkayya, V. B., Grandhi, R. V., and Penmetsa, R. C., "Variable Shape Cavitator for Cavity Generation," *Journal of Ship Research*
15. Kalavalapally, R., Penmetsa, R.C., and Grandhi, R.V., "Configuration Design of a Lightweight Torpedo Subjected to Underwater Explosion," Submitted to the *International Journal of Impact Engineering*
16. Adduri, P., Penmetsa, R. C., and Grandhi, R. V., "Optimization of Lightweight Composite Torpedo Structure with System Reliability Constraint," *Journal of Structural and Multidisciplinary Optimization*
17. Adduri, P., and Penmetsa, R. C., "Confidence Bounds on Component Reliability in the Presence of Mixed Uncertain Variables," *International Journal of Mechanical Sciences*
18. Tuegel, E., and Penmetsa, R., "Development of Risk Based Design Plots of Aircraft Structural Sizing," *AIAA Journal of Aircraft*
19. Penmetsa, R., Khambaswadkar, R., and Slater, J., "Acoustic Optimization of an Underwater Vehicle Involving Fluid-Structure Interaction," *Journal of Sound and Vibration*
20. Adduri, P., and Penmetsa, R. C., "System Reliability Analysis for Mixed Uncertain Variables," *Journal of Computers and Structures*, May 2007

Papers Published in Conference Proceedings¹

1. Penmetsa, R. C., and Grandhi, R. V., "Structural Reliability Assessment in the Presence of Interval Parameters," *6th US National Congress on Computational Mechanics*, Dearborn, Michigan, July 31-Aug 3 2001. (R)
2. Penmetsa, R. C., and Grandhi, R. V., "Uncertainty Analysis of Large-Scale Structures using High Fidelity Models," *First MIT Conference on Computational Fluid and Solid Mechanics*, June 12-15, 2001. (R)
3. Penmetsa, R. C., and Grandhi, R. V., "Failure Probability Prediction Method for Variables with Uncertain Intervals and Distribution Function," *8th International Conference on Structural Safety and Reliability (ICOSSAR-01)*, Newport Beach, CA, June 17-21, 2001, Paper # 276. (R)
4. Penmetsa, R. C., and Grandhi, R. V., "Efficient Estimation of Structural Reliability for Problems with Uncertain Intervals," *42nd AIAA/ASME/ASC/AHS SDM Conference*, Seattle, Washington, April 2001, AIAA-2001-1648. (R)
5. Penmetsa, R. C., and Grandhi, R. V., "Structural Reliability Prediction for a Design Environment: Use of Multi-Point Approximation," *8th AIAA/NASA/USAF/ISSMO Symposium on Multidisciplinary Analysis and Optimization*, Long Beach, CA, September, 2000, AIAA-2000-4759. (R)
6. Penmetsa, R. C., Zhou, L., and Grandhi, R. V., "Fast Fourier Transform for Estimating the Structural Failure Probability," *International Conference on Computational Engineering Sciences*, Los Angeles, CA, August 2000, pp. 1586-1591. (R)
7. Zhou, L., Penmetsa, R. C., and Grandhi, R. V., "Application of Multi-Point Approximation in Predicting Probability of Failure for Multiple MPP Problems," *8th ASCE EMD/SEI/GI/AD Conference*, Notre Dame, IN, July 2000, PMC2000-082. (R)
8. Penmetsa, R. C., Zhou, L., and Grandhi, R. V., "Fast Fourier Transformation to Accurately Predict the Structural Failure Probability," *8th ASCE EMD/SEI/GI/AD Conference*, Notre Dame, IN, July 2000, PMC2000-083. (R)
9. Penmetsa, R. C., Zhou, L., and Grandhi, R. V., "Adaptation of Fast Fourier Transformations to Estimate the Structural Failure Probability," *41st AIAA/ASME/ASC/AHS SDM Conference*, Atlanta, GA, April 2000, AIAA-2000-1718. (R)
10. Choi, J., Penmetsa, R. C., and Grandhi, R. V., "Shape Optimization of Supercavitating Projectiles Underwater," *7th U. S. National Congress on Computational Mechanics*, Albuquerque, New Mexico, July 2003, paper # 2121. (R)
11. Choi, J., Alyanak, E., Khambaswadkar, R.B., Kalavalapally, R., Adduri, P., Singh, T., Grandhi, R.V., Penmetsa, R.C., and Venkayya, V. B., "Multidisciplinary Optimization and Reliability Analysis of Undersea Weapons" *AIAA/ICAS International Air and Space Symposium and Exposition*, Dayton, OH, July 14-17, 2003, 19 pages (N)
12. Alyanak, E., Grandhi, R., Penmetsa, R. C. and Venkayya, V., "Structural Response of a Supercavitating Torpedo Shell," *45th AIAA/ASME/ASC/AHS SDM Conference*, Palm Springs, CA, AIAA Paper 2004-1850. (R)

¹ "R" and "N" denote refereed and non-refereed, respectively

13. Alyanak, E., Penmetsa, R. C., and Grandhi, R. V., "Variable Shape Cavitator Design for a Supercavitating Torpedo," 10th AIAA/ISSMO Multidisciplinary Analysis and Optimization (MDO)Conference, Albany, New York, 30Aug – 1 Sep, 2004 AIAA 2004-4424. (R)
14. Adduri, P., Penmetsa, R. C., and Grandhi, R. V., "Estimation of Structural System Reliability Using Fast Fourier Transforms," 10th AIAA/ISSMO Multidisciplinary Analysis and Optimization (MDO)Conference, Albany, New York, 30Aug – 1 Sep, 2004, AIAA 2004-434. (R)
15. Adduri, P., Penmetsa, R. C., and Grandhi, R. V., "Solving the Multi Dimensional Convolution Integral for System Reliability," 9th ASCE EMD/SEI/GI/AD Joint Specialty Conference on Probabilistic Mechanics and Structural Reliability (PMC2004), Albuquerque, New Mexico, July 26-28, 2004. (R)
16. Adduri, P., Penmetsa, R. C., Grandhi, R. V., "Bounds on Structural System Reliability in the Presence of Interval Variables", Third MIT Conference on Computational Fluid and Solid Mechanics, June 14-17, 2005. No. 275-022.
17. Adduri, P., Penmetsa, R. C., Grandhi, R. V., "Membership Function of Reliability for Problems with Mixed Uncertain Variables", 46th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics & Materials Conference, Austin, TX, April 18-21, 2005. AIAA 2005-2072.
18. Tuegel, E., and Penmetsa, R.C., "Risk Based Design of Aircraft Structures: A Systems Engineering Approach," 47th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics & Materials Conference, Newport, RI, May 1-5, 2006. AIAA 2006-2147

Abstracts Published in Conference Proceedings

1. Penmetsa, R. C., Zhou, L., and Grandhi, R. V., "Structural Failure Probability Prediction using Fast Fourier Transformations for High Accuracy", *25th Annual Dayton-Cincinnati Aerospace Science Symposium*, Dayton, Ohio, 2000
2. Penmetsa, R. C., and Grandhi, R. V., "Uncertainty Analysis Techniques for Mixed Uncertain Variables," *26th Annual Dayton-Cincinnati Aerospace Science Symposium*, Dayton, Ohio, 2001
3. Penmetsa, R. C., and Grandhi, R. V., "Structural Reliability Assessment in the Presence of Interval Parameters," *6th US National Congress on Computational Mechanics*, Dearborn, Michigan, 2001
4. Penmetsa, R. C., and Grandhi, R. V., "Uncertainty Propagation using Possibility Theory and Function Approximations," *27th Annual Dayton-Cincinnati Aerospace Science Symposium*, Dayton, Ohio, 2002
5. Penmetsa, R. C., Grandhi, R. V. and Haney, M., "Optimization for Revolutionary Design of Thermal Protection System," *28th Annual Dayton-Cincinnati Aerospace Science Symposium*, Dayton, Ohio, 2003
6. Alyanak, E., Penmetsa, R. C., and Grandhi, R. V., "Variable Shape Cavitator Design for a Supercavitating Torpedo," *28th Annual Dayton-Cincinnati Aerospace Science Symposium*, Dayton, Ohio, 9 March, 2004
7. Kalavalaply, R., Penmetsa, R. C., and Grandhi, R. V., "Shock Response of a Light Weight Torpedo Subjected to an Underwater Explosion," *28th Annual Dayton-Cincinnati Aerospace Science Symposium*, Dayton, Ohio, 9 March, 2004

8. Adduri, P., Penmetsa, R. C., and Grandhi, R. V., "Structural System Reliability Using Fast Fourier Transforms," 28th Annual Dayton-Cincinnati Aerospace Science Symposium, Dayton, Ohio, 9 March, 2004
9. Khambaswadkar, R., Penmetsa, R. C., and Grandhi, R. V., "Minimization of Noise generated by Fluid-Structure Interaction in Underwater Acoustic Systems," 28th Annual Dayton-Cincinnati Aerospace Science Symposium, Dayton, Ohio, 9 March, 2004
10. Adduri, P., Penmetsa, R. C., Grandhi, R., "System Reliability Bounds in the Presence of Uncertain Intervals", 1st Dayton Engineering Sciences Symposium, October 31st 2005.

SERVICE

Committee Memberships

Department Committees:

1. Design Committee, Winter 03-Present
2. ABET Objectives Committee, Winter 04 – Present
3. Assistant Professor Search Committee, 05/06

College Committees:

1. Academic Computing Committee (Chair), Fall 03 – Spring 03
2. Academic Computing Committee, Fall 04 – Spring 05
3. Graduate Studies Committee, Fall 05 – Present
4. Ad-Hoc Web Design Committee, Fall 05 – Present

University Committees:

1. Parking Advisory & Appeals Committee, Fall 03 – Spring 03.
2. University Technology Committee, Fall 03 – Spring 03
3. UTC Sub-committee for Faculty Computer Initiative, Spring 2004
4. Graduate Council – Student Affairs, Fall 05 – Present

Reviewer for Professional Journals

1. ASME Journal of Mechanical Design
2. Journal of Finite Elements in Analysis and Design
3. Journal of Structural and Multidisciplinary Optimization
4. Journal of Sound and Vibration
5. Journal of Structural Safety
6. International Journal of Reliability and Safety

Other Professional Service

1. Associate Member of AIAA NDA working group.
2. Session Chair, 47th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics & Materials Conference, Newport, RI, Session: NDA-1, Title: Probabilistic Applications I, Co-Chair: R. Holzworth
3. Judge, SAE AeroDesign-East Competition, Dayton, Ohio, May 2003
4. Member, Trebuchet Advisory Board. Compiled a list of potential donors who would donate to a science and math related project. Participated as a qualifier during the tournament.
5. Develop and update online ABET alumni survey forms and tabulate mechanical and materials data. Also created various slides indicating the outcome of the survey. Prepared the ABET self study report for program objectives.
6. Maintain/update ME department webpage
7. Taught "Introduction to Mechanical Engineering" for EGR 191 students during winter 2003, spring 2003, winter 2004
8. Attended the Campus Visitation Day
9. Attended and presented research developments to the college external advisory board, Fall 2004

10. Organized a week long one hour MATLAB workshop every quarter for the Mechanical and Materials Engineering students. Prepared PowerPoint notes for distribution in class.

Teaching Workshops Attended

1. Effective Teaching: A Workshop, Wright State University, February 2003
2. Disruptive students in the classroom, CTL Fall 03
3. ASEE Summer National Effective Teaching Institute, Portland OR, June 8-11, 2005

Curriculum/Course Development

1. Development of course materials for the "Introduction to MATLAB" training session.
2. Development of in-class demonstrations for the Statics and Dynamics classes.