

REN-JYE YANG
Ph.D., P.E., ASME Fellow

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AREAS OF INTEREST

**Design Optimization, CAE, Safety, Topology Optimization, Robust/Reliability
Based Design, Model Validation and Verification, Statistical/Probabilistic Methods**

PROFESSIONAL EXPERIENCE

Senior Technical Leader: 2006 – present, Ford Research & Advanced Engineering, Dearborn, Michigan.

Technical Leader: 2003 – 2006, Ford Research & Advanced Engineering, Dearborn, Michigan.

Senior Staff Technical Specialist: October 1998 – 2003, Ford Research Laboratory, Dearborn, Michigan.

Responsible for advanced safety research on new CAE methods, safety optimization and robustness, high performance computing, V&V Methods, Robust/Reliability Design Methods.

Staff Technical Specialist: September 1993 - September 1998, CAE, Ford Research Laboratory, Dearborn, Michigan.

Lead 6 Senior Research Engineers on Structural Sensitivity Analysis and Shape/Topology Optimization projects.

Project Leader: May 1992 - September 1993, CAE, Ford Research Laboratory, Dearborn, Michigan.

Lead 5 Senior Research Engineers on Structural Sensitivity Analysis and Optimization projects. This project develops a new design process, which provides engineers a systematic means for vehicle weight reduction.

Adjunct Associate Professor: September 1, 1992 - May 31, 1993, University of Texas at Arlington, Arlington, Texas

Principal Research Engineer Associate: August 1988 - May 1992, CAE, Ford Research Laboratory, Dearborn, Michigan.

Shape Optimal Design for Solid Components, FEM, BEM, CAD Systems, Adaptive Analysis, Automatic Mesh Generation, Body Structure and Frame Optimization, Electronic Packaging Design, Seatbelt Location Design, Topology Optimization.

Staff Research Engineer: July 1988 - August 1988, Engineering Mechanics Department, GM Research Laboratory, Warren, Michigan.

Structural Analysis, Design, and Optimization for 3-D Automotive Components

Senior Research Engineer: Jan. 1984 - June 1988, Engineering Mechanics Department, GM Research Laboratory, Warren, Michigan.

Shape/Sizing Optimization for Automotive Components, Automatic Mesh Generation, Design Sensitivity Analysis, FEM, BEM, MSC/NASTRAN, Structural Optimization Considering Manufacturing Effects

Research Assistant: Jan. 1980 - Jan. 1984, Center for Computer Aided Design, The U. of Iowa, Iowa City, Iowa.

Design Sensitivity Analysis, Material Derivative Concept, FEM, Nonlinear Finite Element Analysis of Plates, Endochronic Theory of Viscoplasticity, Mechanical System Analysis and Design.

Instructor: Aug. 1979 - Jan. 1980, Department of Construction Engineering and Technology, National Taiwan Institute of Technology, Taipei, Taiwan.

Research Assistant: Aug. 1977 - Aug. 1979, Soil and Rock Mechanics Laboratory, National Taiwan U., Taipei, Taiwan.

EDUCATION

PhD. 1984 Materials Engineering, The U. of Iowa, Iowa City, Iowa
Thesis: Finite Element Computation of Structural Design Sensitivity Analysis

M.S. 1979 Civil Engineering, National Taiwan University, Taiwan
Thesis: Dynamic Behavior of Soils, Major: Engineering Mechanics

B.S. 1975 Civil Engineering, National Taiwan University, Taiwan
Major: Structural Engineering

AWARDS

2008 Henry Ford Technology Award

2007 2007 ASME Service Award

2006 Ford PD Diversity Recognition Award

2005 ASME Design Automation Award

2005 Henry Ford Technology Award

2005 Ford R&A Technical Achievement Award

2005 Ford R&A Publication Award

2005 TMM Body Engineering Excellence Award

2005 EPSS Recognition Award for Professional Recognition

2003 DRIVE for Leaders at All Levels Award

2003 EPSS Recognition Award for Professional Recognition

2003 Finalist for Computerworld Honors Program

2001 VCS Recognition Award

2001 Ford Research Laboratory Publication Award

1997 ASME Fellow

1997 ASME Black and Decker Best Paper Award on "Optimal Fastener Pattern Design Considering Bearing Loads"

1997 Ford Research Laboratory Publication Award

1995 **Ford Research Laboratory Technical Achievement Award**

1995 **Henry Ford Technology Award**

1994 **Ford Truck Significant Achievement Award**

PROFESSIONAL AFFILIATIONS

Industry Advisor	ASME Design Automation Executive Committee, 2004-2006
Senior Advisor	Structural and Multidisciplinary Optimization Journal
Editorial Board	International Journal of Reliability and Safety, Structural and Multidisciplinary Optimization Journal, Design Optimization: International Journal for Product and Process Improvement

University/Industry Advisory Board	University of Iowa, CCAD, (2002-2004); UCLA Civil and Environmental Engineering Department, (2002-); VPI Multidisciplinary Analysis & Design (MAD) Center (1996-1998)
Professional Engineer Professional Society Committee	Structural Engineering ASME fellow, member of ISSMO, SAE, USACM ASME PTC 60 Committee on Verification and Validation in Computational Solid Mechanics, SAE G11, Meshfree Methods Workshop, ASME Design Automation, SAE Technical Review Committee, International Scientific Committee member of 2007 7th World Congress of Structural and Multidisciplinary Optimization
Papers and Books	50 publications in technical journals and books, 72 conference papers; Co-guest editor of one technical book, two special issues of International Journal of Vehicle Design, one special issue of Structural and Multidisciplinary Optimization Journal
Paper Reviewer	AIAA Journal, Journal of Applied Mechanics, International Journal of Solids and Structures, Journal of Engineering Mechanics (ASCE), Journal of Mechanics of Structures and Machines, and SAE Transactions, Shock and Vibration Journal, Finite Elements in Analysis and Design, Structural and Multidisciplinary Optimization Journal, Mathematical and Computer Modeling Journal, Reliability Engineering and System Safety Journal
Project Reviewer Conference Chair	National Sciences and Engineering Research Council of Canada UM Statistics in Industry and Technology, DYNA, AIAA/ASME/ASCE/AHS/ASC SDM, AIAA/ISSMO MAO, ASME DTEC, Ford CAE Technical Exchange Conference
Symposium Organizer	ASME DTEC, ASME McNU97 Summer Meeting, 2001 USNCCM, SAE Congress

PUBLICATIONS

Books/Special Issues

1. "Design Optimization with Applications in Industry," co-editor for Proceedings of 1997 Joint ASME/ASCE/SES Summer Meeting, AMD-Vol 227, 1997.
2. "Design Optimization Applications in Industry," guest co-editor for special issue of International Journal of Vehicle Design, Volume 25, No.1/2, 2001.
3. "Advanced Vehicle Safety Technology," guest co-editor for special issue of International Journal of Vehicle Design, Volume 26, No. 4, 2001.
4. "Design Optimization Applications," guest editor for special issue for Structural Optimization Journal, 2004.
5. "Special Issue on Design Optimization – Industrial Applications," guest editor for special issue for **Structural and Multidisciplinary Optimization Journal**, Volume 35, Number 6, June 2008.

Journal Papers

1. H. C. Wu and R. J. Yang, "Application Of The Improved Endochronic Theory Of Plasticity To Loading With Multi-Axial Strain Path," **International Journal of Non-Linear Mechanics**, 18(5): 395-408, 1983.
2. R. J. Yang, K. K. Choi, R. D. Crownshield, and R. A. Brand, "Design Sensitivity Analysis: A New Method For Implant Design And A Comparison With Parametric Finite Element Analysis," **Journal of Biomechanics**, 17(11): 849-854, 1984.
3. R. J. Yang and K. K. Choi, "Accuracy of Finite Element Based Shape Design Sensitivity Analysis," **Mechanics of Structures and Machines**, 13(2): 223-239, 1985.
4. R. J. Yang and K. K. Choi, "Optimal Design Of An Engine Connecting Rod," **The Chinese Journal of Mechanics**, 3(1): 19-29, 1985.

5. R. J. Yang, K. K. Choi, and E. J. Haug, "Numerical Considerations in Component Shape Optimization," *Journal of Mechanisms, Transmissions, and Automation in Design*, 107(3): 334-339, 1985.
6. R. J. Yang and M. A. Bhatti, "Nonlinear Static And Dynamic Analyses Of Plates," *Journal of Engineering Mechanics*, 111(2): 175-187, 1985.
7. R. J. Yang and M. E. Botkin, "Comparison Between The Variational And Implicit Differentiation Approaches To Shape Design Sensitivities," *AIAA Journal*, 24(6): 1027-1032, 1986.
8. R. J. Yang and M. E. Botkin, "The Relationship Between The Variational And The Implicit Differentiation Approach To Shape Design Sensitivities," In J. A. Bennett and M. E. Botkin, editors, *The Optimum Shape: Automated Structural Design*, pages 61-77, Plenum Press, New York, 1986.
9. M. E. Botkin, R. J. Yang, and J. A. Bennett, "Shape Optimization Of Three-Dimensional Stamped And Solid Automotive Components," In J. A. Bennett and M. E. Botkin, editors, *The Optimum Shape: Automated Structural Design*, pages 235-262, Plenum Press, New York, 1986.
10. R. J. Yang and M. E. Botkin, "A Modular Approach For Three-Dimensional Shape Optimization," *AIAA Journal*, 25(3): 492-497, 1987.
11. R. J. Yang and M. E. Botkin, "Accuracy Of The Domain Material Derivative Approach To Shape Design Sensitivities," *AIAA Journal*, 25(12): 1606-1610, 1987.
12. M. R. Barone and R. J. Yang, "Boundary Integral Equations For Recovery Of Design Sensitivities In Shape Optimization," *AIAA Journal*, 26(5): 589-594, 1988.
13. M. R. Barone and R. J. Yang, "A Boundary Element Approach for Recovery of Shape Sensitivities in Three-Dimensional Elastic Solids," *Computer Methods in Applied Mechanics and Engineering*, 74(1): 69-82, 1989.
14. R. J. Yang, "A Three-Dimensional Shape Optimization System - SHOP3D," *Computers and Structures*, 31(6): 881-890, 1989.
15. R. J. Yang, "Shape Design Sensitivity Analysis with Frequency Response," *Computers and Structures*, 33(4): 1089-1093, 1989.
16. R. J. Yang, "Design Modeling Considerations In Shape Optimization Of Solids," *Computers and Structures*, 34(5): 727-734, 1990.
17. R. J. Yang, "Component Shape Optimization Using BEM," *Computers and Structures*, 37(4): 561-568, 1990.
18. M. E. Botkin and R. J. Yang, "Three-Dimensional Shape Optimization With Substructuring," *AIAA Journal*, 29(3): 486-488, 1991.
19. R. J. Yang, "Shape Sensitivity Analysis and Optimization Using MSC/NASTRAN," *Mechanics of Structures and Machines*, 19(3): 281-300, 1991.
20. R. J. Yang, D. L. Dewhirst, J. E. Allison, and A. Lee, "Shape Optimization Of Connecting Rod Pin End Using A Generic Model," *Finite Elements in Analysis and Design*, 11, 257-264, 1992.
21. G. Somajajula and R. J. Yang, "Effective Component Design Synthesis Using Structural And Shape Optimization Methods," *Finite Elements in Analysis and Design*, 11, 179-190, 1992.
22. R. J. Yang, A. Lee, and D. McGeen, "Application of Basis Function Concept To Practical Structural Optimization Problems," *Structural Optimization Journal*, 5(1-2), 55-63, 1992.
23. R. J. Yang, "Shape Design Sensitivity Analysis of Thermoelasticity Problems," *Computer Methods in Applied Mechanics and Engineering*, 102, 41-60, 1993.
24. R. J. Yang and S. Poe, "Shape Optimal Design of an Engine Exhaust Manifold," *Structural Optimization Journal*, 5(4), 233-239, 1993.
25. J. Huang, T. Walsh, L. Mancini, M. Wlotkowski, R. J. Yang, and C. H. Chuang, "A New Approach For Weight Reduction In Truck Frame Design," SAE 1993 Transactions, *Journal of Commercial Vehicles*, 959-967, 1993.
26. T. Y. Torng and R. J. Yang, "Robust Structural System Design Using A System Reliability-Based Design Optimization Method," In P. D. Spanos and Y. T. Wu, editors, *Probabilistic Structural Mechanics: Advances in Structural Reliability Methods*, pages 534-549, Springer-Verlag, New York, 1993.
27. R. J. Yang and C. H. Chuang, "Optimal Topology Design Using Linear Programming," *Computers and Structures*, 52-2, 265-275, 1994.
28. R. J. Yang and A. I. Chahande, "Automotive Application of Topology Optimization," *Structural Optimization Journal*, No. 9, 245-249, 1995.

29. G. Hou, V. Maroju, and R. J. Yang, "Component Mode Synthesis-Based Design Optimization Method For Local Structural Modification," **Structural Optimization Journal**, No. 10, 128-136, 1995.
30. R. J. Yang and C. M. Lu, "Topology Optimization with Superelements," **AIAA Journal**, 34(7), pp. 1533-1535, 1996.
31. R. J. Yang and C. J. Chen, "Stress-Based Topology Optimization," **Structural Optimization Journal**, No. 12, 98-105, 1996.
32. R. J. Yang, C. J. Chen, and C. H. Lee, "Bead Pattern Optimization," **Structural Optimization Journal**, No. 12, 217-221, 1996
33. R. J. Yang, "Multidiscipline Topology Optimization," **Computers and Structures**, Vol. 63, No. 6, 1205-1212, 1997.
34. R. J. Yang and D. E. Smith (co-editors), **Design Optimization with Applications in Industry**, Proceedings of 1997 Joint ASME/ASCE/SES Summer Meeting, AMD-Vol. 227.
35. Soto, C.A. and Yang, R.J., 1999, "Optimum Layout of Embossed Ribs to Maximize Natural Frequencies in Plates," **Design Optimization Journal**, Vol. 1, 1999.
36. H. Chickermane, H. C. Gea, R. J. Yang, and C. H. Chuang, "Optimal Fastener Pattern Design Considering Bearing Loads," **Structural Optimization Journal**, Vol. 17, pp. 140-146, 1999.
37. R. J. Yang, Ching-Hung Chuang, Xiangdong Che, and Ciro Soto, "New Applications of Topology Optimization in Automotive Industry," **International Journal of Vehicle Design**, Vol. 23, Nos. 1/2, 1-15, 2000.
38. H. S. Tzou and R. J. Yang, "Nonlinear Piezo-Thermoelastic Shell Theory Applied To Control of Variable-Geometry Shells," **Journal of Theoretical and Applied Mechanics**, No. 3, Vol. 38, pp. 623-644, 2000.
39. R. J. Yang, A. Akkerman, D. Anderson, O. Faruque, and L. Gu, "Robustness Optimization for Vehicle Structural Crash Simulation," **IEEE Computational Science and Engineering Journal**, Vol. 2, No. 6, 8-13, 2000.
40. L. Gu, R. J. Yang, H. Tho, M. Makowski, O. Faruque, and Y. Li, "Optimization and Robustness for Crashworthiness of Side Impact," **International Journal of Vehicle Design**, Vol. 26, No.4, 348-360, 2001.
41. J. Sobieski, S. Kodiyalam, and R.J. Yang, "Optimization of Car Body under Constraints of Noise, Vibration, and Harshness (NVH), and Crash," **Structural and Multidisciplinary Optimization Journal**, Vol. 22, No. 4, 295-306, 2001.
42. B. D. Youn, K. K. Choi, R. J. Yang, and L. Gu "Reliability-Based Design Optimization For Crashworthiness Of Vehicle Side Impact," **Structural and Multidisciplinary Optimization Journal**, Vol. 26, No. 3-4, 272-283, 2004.
43. R. J. Yang and L. Gu, "Experience with Approximate Reliability-Based Optimization Methods," **Structural and Multidisciplinary Optimization Journal**, Vol. 26, No. 1-2, 152-159, 2004.
44. P. N. Koch, R. J. Yang, and L. Gu, "Design For Six Sigma Through Robust Optimization," **Structural and Multidisciplinary Optimization Journal**, Vol. 26, No. 3-4, 235-248, 2004.
45. S. Kodiyalam, R. J. Yang, L. Gu, and C-H Tho, "Multidisciplinary Design Optimization of a Vehicle System in a Scalable, High Performance Computing Environment," **Structural and Multidisciplinary Optimization Journal**, Vol. 26, No. 3-4, 235-248, 2004.
46. Y. Fu, R. J. Yang, and I. Yeh, "A Genetic Algorithm for Optimal Design of an Inflatable Knee Bolster," **Structural and Multidisciplinary Optimization Journal**, Vol. 26, No. 3-4, 264-271, 2004.
47. T. W. Simpson, A. J. Booker, D. Ghosh, A. A. Giunta, P. N. Koch, and R. J. Yang, "Approximation Methods in Multidisciplinary Analysis and Optimization: A Panel Discussion," **Structural and Multidisciplinary Optimization Journal**, Vol. 27, No. 5, 2004, pp. 302-313, 2004.
48. R.J. Yang, C. Chuang, L. Gu, and G. Li, "Experience with Approximate Reliability-Based Optimization Methods II: An Exhaust System Problem," **Structural and Multidisciplinary Optimization Journal**, Vol. 29, No. 6, 488-497, 2005.
49. R. J. Yang, N. Wang, C.H. Tho, and J. P. Bobineau, B. Wang, "Metamodeling Development for Vehicle Frontal Impact Simulation," **Journal of Mechanical Design**, 1014-1020, 2005.
50. L. Gu, and R. J. Yang, "On Reliability-Based Optimization Methods for Automotive Structures", **Int. J. Materials and Product Technology**, Vol. 25, Nos. 1/2/3, pp.3-26, 2006.

51. C. H. Chuang, R. J. Yang, G. Li, K. Mallela and P. Pothuraju, "Multidisciplinary Design Optimization on Vehicle Tailor Rolled Blank," *Structural and Multidisciplinary Optimization Journal*, Vol. 35, No. 6, 551-560, 2008.

Conference Papers

1. R. J. Yang, K. K. Choi, and E. J. Haug. Numerical considerations in component shape optimization. In Proceedings of 1984 ASME Design Automation Conference, Boston, MA, 1984.
2. R. J. Yang and M. E. Botkin. The relationship between the variational approach and the implicit differentiation approach to shape design sensitivities. In Proceedings of 26th AIAA SDM Conference, Orlando, Florida, 1985.
3. R. J. Yang and M. E. Botkin. The relationship between the variational approach and the implicit differentiation approach to shape design sensitivities. In Proceedings of GMR Symposium on Automated Structural Design, Warren, Michigan, 1985.
4. M. E. Botkin, R. J. Yang, and J. A. Bennett. Shape optimization of three-dimensional stamped and solid automotive components. In Proceedings of GMR Symposium on Automated Structural Design, Warren, Michigan, 1985.
5. R. J. Yang and M. E. Botkin. A modular approach for three-dimensional shape optimization of structures. In Proceedings of 27th AIAA SDM Conference, San Antonio, Texas, 1986.
6. R. J. Yang and M. E. Botkin. Accuracy of the domain method for the material derivative approach to shape design sensitivities. In Sensitivity Analysis in Engineering, NASA C P 2457, pages 347-356, 1987.
7. M. E. Botkin, R. V. Lust, R. B. Katnik, J. O. Song, and R. J. Yang. Structural sizing optimization using an external finite element program. In Proceedings of 28th AIAA SDM Conference, Monterey, California, 1987.
8. R. J. Yang and M. J. Fiedler. Design modeling for large-scale three-dimensional shape optimization problems. In R. Raphavan and T. J. Cokonis, editors, Computers in Engineering, pages 177-182, ASME, New York, 1987.
9. C. M. Ni, J. R. Zuzelski, and R. J. Yang. A concurrent engineering approach to integrate forming effects into structural design and analysis of stamped parts. In Proceedings of VII International Vehicle Structural Mechanics Conference, Detroit, Michigan, 1988.
10. R. J. Yang. A hybrid approach for shape optimization. In V. A. Tipnis and E. M. Patton, editors, Computers in Engineering, pages 107-112, ASME, New York, 1988.
11. M. E. Botkin and R. J. Yang. Three-dimensional shape optimization with substructuring. In Proceedings of 30th AIAA SDM Conference, Mobile, Alabama, 1989.
12. R. J. Yang. Shape sensitivity analysis and optimization using MSC/NASTRAN. In Proceedings of MSC 1990 World Users Conference, Los Angeles, California, 1990.
13. Tsung-Yu Pan, R. J. Yang, and A. Lee. Flip-chip bump layout optimization feasibility study. Optimal Design of Flip-Chip Bumps. Presented in ASME winter meeting, Dallas, Texas, 1990.
14. G. Somajajula and R. J. Yang. Effective component design synthesis using structural and shape optimization methods. In Proceedings of MSC 1990 World Users Conference, Los Angeles, California, 1991.
15. R. J. Yang and C. H. Chuang. Optimal topology design using linear programming. In Proceedings of 34th AIAA SDM Conference, LaJolla, California, 1993.
16. T. Y. Torng and R. J. Yang. An advanced reliability based optimization method for robust structural system design. In Proceedings of 34th AIAA SDM Conference, LaJolla, California, 1993.
17. J. Huang, T. Walsh, L. Mancini, M. Wlotkowski, R. J. Yang, and C. H. Chuang. A new approach for weight reduction in truck frame design, SAE-933037, 1993.
18. R. J. Yang, L. Tseng, L. Nagy, and J. Cheng, "Feasibility study of crash optimization", ASME, DE-Vol. 69-2, 1994.
19. R. J. Yang, T. J. Walsh, and P. A. Schilke, "A general formulation for topology optimization", SAE-942256, 1994.
20. T. Y. Torng and R. J. Yang, "A reliability-based design optimization procedure for minimize variations", AIAA-94-1415-CP, In Proceedings of 35th AIAA SDM Conference, Hilton Head, SC, 1994.
21. B. P. Wang, C. M. Lu, and R. J. Yang, "Topology optimization using MSC/NASTRAN", Proceedings of 1994 MSC World Users' Conference, Florida, 1994.

22. B. P. Wang and R. J. Yang, "Sensitivity Analysis and Optimization for Structures With Inertia Relief," Proceedings of 36th AIAA SDM Conference, New Orleans, LA, 1995.
23. R. J. Yang, "Topology Optimization with Multiple Constraints," Proceedings of ASME Design Automation Conference, Boston, September 1995.
24. B. P. Wang, C. M. Lu, and R. J. Yang, "Optimal Topology for Maximum Eigenvalue Using Density-Dependent Material Model," AIAA 96-1627, 1996.
25. R. J. Yang, Y. Rui, A. Mohammed, G. Singh, "Spot weld/adhesive pattern optimization", Proceedings of ASME Design Engineering Technical Conferences, Irvine, August, 1996.
26. Y. Rui, R. J. Yang, C. J. Chen, H. Agrawal, "Fatigue Optimization of Spot Welds," Proceedings of **IBEC'96**, Detroit, 1996.
27. C. A. Soto, R. J. Yang, R. DeVries, "Structural topology optimization for forced frequency vibrations", Proceedings of ASME Design Engineering Technical Conferences, Irvine, August 1996.
28. R. J. Yang, C. J. Chen, and C. H. Lee, "Bead Pattern Optimization", Proceedings of 6th AIAA/USAF/NASA/ISSMO Symposium on Multidisciplinary Analysis and Optimization, Bellevue, WA, AIAA-96-3988-CP, 1996.
29. H. Chickermane, H. C. Gea, R. J. Yang, and C. H. Chuang, "Optimal Fastener Pattern Design Considering Bearing Loads," Proceedings of ASME Design Engineering Technical Conferences, Sacramento, September, 1997.
30. R. J. Yang and D. E. Smith (co-editors), Design Optimization with Applications in Industry, Proceedings of 1997 Joint ASME/ASCE/SES Summer Meeting, AMD-Vol. 227.
31. R. J. Yang, "Topology Optimization of Vehicle Structures", Proceedings of Optimization In Industry Conference, Florida, March 23-27, 1997.
32. Soto, C.A. and Yang, R.J., 1998, "Optimum Topology of Embossed Ribs in Stamped Plates", Proceedings of ASME Design Engineering Technical Conferences, September, Atlanta, 1998.
33. Yang, R. J., C. H. Chuang, and X. Che, "Recent Application of Topology Optimization," Proceedings of 7th Multidisciplinary Analysis and Optimization Conference, St. Louis, MO, August 1998.
34. B. P. Wang and R. J. Yang, "Sensitivity Analysis of Wavelet transform," Proceedings of 3rd World Congress of Structural and Multidisciplinary Optimization, May, Buffalo, 1999.
35. R.J. Yang, C.H. Tho, C. Wu, D. Johnson, and J. Cheng, "A Numerical Study of Crash Optimization," Proceedings of ASME Design Engineering Technical Conferences, September, Las Vegas, 1999.
36. B. P. Wang and R. J. Yang, "Optimum Design for Impact Response of Mechanical System Using Wavelet Transform," Proceedings of the Asia-Pacific Vibration Conference'99, Vol. 2, Singapore, 1999.
37. R. J. Yang, L. Gu, L. Liaw, C. Gearhart, C.H. Tho, X. Liu, and B. P. Wang, "Approximations For Safety Optimization Of Large Systems," DETC2000/DAC-14245, Proceedings of ASME Design Engineering Technical Conferences, September, Baltimore, Maryland, 2000.
38. B. P. Wang and R. J. Yang, "A New Response Surface Method for Design Optimization," Proceedings of 8th AIAA/NASA/USAF/ISSMO Symposium on MAO, Long Beach, California, 2000.
39. J. Luo, H. S. Gea, and R. J. Yang, "Topology Optimization for Crush Design," Proceedings of 8th AIAA/NASA/USAF/ISSMO Symposium on MAO, Long Beach, California, 2000.
40. J. Sobieszczanski-Sobieski, S. Kodiyalam, and R. J. Yang, "Optimization of Car Body under Constraints of Noise, Vibration, and Harshness (NVH), and Crash," AIAA 2000-1521, In Proceedings of 41st AIAA SDM Conference, Atlanta, Georgia, 2000.
41. H.-S. Kim, T. Wierzbicki, C.H. Tho, and R.J. Yang, "Crash Optimization Of An Aluminum Foam-Filled Front Side Rail," Proceedings of ASME Winter Meeting, November, Orlando, 2000.
42. R. J. Yang, C. H. Tho, C. C. Gearhart, and Y. Fu, "An Alternative Design Approach For Vehicle Crash Safety Using Crash Pulse Optimization," Proceedings of ASME Winter Meeting, November, Orlando, 2000.
43. R. J. Yang, L. Gu, C.H. Tho, J. Sobieszczanski-Sobieski, "Multidisciplinary Design Optimization Of A Full Vehicle With High Performance Computing," AIAA 2001-1273, In Proceedings of 42nd AIAA SDM Conference, Seattle, Washington, 2001.
44. S. Kodiyalam, R. J. Yang, L. Gu, and C.H. Tho, "Large-Scale, Multidisciplinary Optimization of a Vehicle System in a Scalable, High Performance Computing Environment," DETC2001/DAC-21082, Proceedings of ASME Design Engineering Technical Conferences, Pittsburgh, Pennsylvania, September 2001.

45. R. J. Yang, N. Wang, C.H. Tho, and J. P. Bobineau, "Metamodeling Development for Vehicle Frontal Impact Simulation," DETC2001/DAC-21012, In Proceedings of ASME Design Engineering Technical Conferences, Pittsburgh, Pennsylvania, September 2001.
46. K. K. Choi, B. D. Youn, and R. J. Yang, "Moving Least Square Method for Reliability-Based Design Optimization," in Proceedings of 4th World Congress of Structural and Multidisciplinary Optimization, Dalian, China. June 4-8, 2001.
47. K. K. Choi, B. D. Youn, and R. J. Yang, "Reliability-Based Design Optimization Using Moving Least Square Method," ARC Conference, Ann Arbor, MI, 2001.
48. R. J. Yang, L. Gu, C. Tho, K. Choi, B. Youn, "A New Reliability-Based Design Optimization Method," 2001 Ford Analytical Robust Engineering And Optimization Conference, Dearborn.
49. Yan Fu, R. J. Yang, Isheng Yeh, "Optimal Design Of An Inflatable Knee Bolster Using Genetic Algorithms," 2001 Ford Analytical Robust Engineering And Optimization Conference, Dearborn.
50. Lei Gu, C. Tho, R. J. Yang, Y. Li, O. Faruque, Y. Qiu, Dan Anderson, "Safety optimization and robustness analysis," 2001 Ford Analytical Robust Engineering And Optimization Conference, Dearborn.
51. Y. Fu, I. Yeh, and R. J. Yang, "Global Optimal Design of Inflatable Knee Bolster Using Generic Algorithm", ASME International Mechanical Engineering Congress and Exposition, New York, NY, November 11-16, 2001.
52. R. J. Yang, L. Gu, C. H. Tho, K. Choi and B. D. Youn, "Reliability-Based Multidisciplinary Design Optimization of a Full Vehicle System," AIAA-2002-1758, In Proceedings of 43rd AIAA SDM Conference, Denver, Colorado, 2002.
53. S. Kodiyalam, R. J. Yang, L. Gu, "Application of Descriptive Sampling and Metamodeling Methods for Optimal Design and Robustness of Vehicle Structures," AIAA-2002-1321, In Proceedings of 43rd AIAA SDM Conference, Denver, Colorado, 2002.
54. R. J. Yang, C. H. Tho, and L. Gu, "Recent Development in Multidisciplinary Design Optimization of Vehicle Structures," AIAA-2002-5606, Proceedings of 9th AIAA/ISSMO Symposium on MAO, Atlanta, Georgia, 2002.
55. **R. J. Yang, L. Gu, C. H. Tho, K. K. Choi and B. D. Youn, "Reliability-Based Multidisciplinary Design Optimization of Vehicle Structures," IMechE Statistics and Analytical Methods in Automotive Engineering, London, UK, 2002.**
56. T. W. Simpson, A. J. Booker, D. Ghosh, A. A. Giunta, P. N. Koch, and R. J. Yang, "Approximation Methods in Multidisciplinary Analysis and Optimization: A Panel Discussion," 3rd ISSMO/AIAA Internet Conference on Approximations in Optimization, 2002.
57. L. Gu, and R. J. Yang, "Large-Scale Reliability Based Optimization for Vehicle Crash Safety," Proceedings of the American Statistical Association, Statistical Computing Section [CD-ROM], Alexandria, VA: American Statistical Association, 2002.
58. L. Gu and R. J. Yang, "Recent Applications on Reliability-Based Optimization of Automotive Structures," 2003-01-0152, SAE World Congress and Exhibition, 2003.
59. R. J. Yang and L. Gu, "Experience with Approximate Reliability-Based Optimization Methods," AIAA-2003-1781, In Proceedings of 44th AIAA SDM Conference, Norfolk, Virginia, 2003.
60. S. Kodiyalam, R. J. Yang, and L. Gu, "High Performance Computing and Rapid Visualization for Design Steering In MDO," AIAA-2003-1528, In Proceedings of 44th AIAA SDM Conference, Norfolk, Virginia, 2003.
61. R. J. Yang, Lei Gu, Yan Fu, and C. H. Tho, "Experience with Sequential Stochastic Design Improvement Methods," Second M.I.T. Conference on Computational Fluid and Solid Mechanics, Cambridge, Massachusetts, 2003.
62. L. Gu and R. J. Yang, "Computer Model Validation In Vehicle Crash Safety Design," In Proceedings of ASME Design Engineering Technical Conferences, Chicago, Illinois, 2003.
63. B.D. Youn, K.K. Choi, and R. J. Yang, "Efficient Evaluation Approaches for Probabilistic Constraints in Reliability-Based Design Optimization," Fifth World Congress on Structural and Multidisciplinary Optimization, Venice, Italy, 2003.
64. L. Gu, G. Li and R. J. Yang, "An Excel Based Robust Design Tool for Vehicle Structural Optimization", 2004-01-1124, SAE World Congress and Exhibition, 2004.
65. L. Gu and R. J. Yang, "CAE Model Validation in Vehicle Safety Design", 2004-01-0455, SAE World Congress and Exhibition, 2004.

66. Y. Fu, C-H Chuang, G. Li, and R. J. Yang, "Reliability-Based Design Optimization of a Vehicle Exhaust System," 2004-01-1128, SAE World Congress and Exhibition, 2004.
67. R. J. Yang, C. Chuang, L. Gu, and G. Li, "Numerical Experiments of Reliability-Based Optimization Methods," AIAA 2004-2032, In Proceedings of 45th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics & Materials Conference, Palm Springs, California, 2004.
68. D. Jung, H.C. Gea, and R. J. Yang, "Design of Negative Poisson's Ratio Materials Using Topology Optimization," AIAA 2004-1969, In Proceedings of 45th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics & Materials Conference, Palm Springs, California, 2004.
69. L. Gu, T. Tyan, G. Li, and R. J. Yang, "Vehicle Structure Optimization for Crash Pulse," Proceedings of ASME Design Engineering Technical Conferences, DETC2004-57479, Salt Lake City, Utah, 2004.
70. R. J. Yang, L. Gu, C. Soto, G. Li, and T. Tyan, "Developments and Applications of Structural Optimization and Robustness Methods in Vehicle Impacts," Proceedings of ASME International Mechanical Engineering Congress, IMECE2004-61977, California, 2004.
71. R. J. Yang, G. Li and L. Gu, S. Kodiyalam, "Application of High Performance Computing and Visualization with Crashworthiness Design Optimization," 10th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, AIAA-2004-4455, 2004.
72. L. Gu, R. J. Yang, G. Li, and T. Tyan, "Structural Optimization for Crash Pulse", 2005-01-0748, SAE World Congress and Exhibition, Detroit, 2005.
73. Y. Fu, B. Xiao, W. Chen, G. Li, and R. J. Yang, "System Integration and Design Optimization of Passenger Airbag Shapes", IMECE2005-81544, 2005 ASME International Mechanical Engineering Congress, Nov. 5-11, Orlando, FL, 2005.
74. R. J. Yang, Y. Fu, and G. Li, "Application of Tailor Rolled Blank in Vehicle Front End for Frontal Impact," 2007-01-0675, SAE World Congress and Exhibition, 2007.
75. Y. Fu, G. Li, R. J. Yang, M. Y. Wu, M. Makowski, "A Multi-objective Optimization and Robustness Assessment Framework for Passenger Airbag Shape Design," 2007-01-1505, SAE World Congress and Exhibition, 2007.
76. C. H. Chuang, G. Li, and R. J. Yang, "An Optimization and Trade-Off Process for Crashworthiness with Multiple Responses," 2007-01-1543, SAE World Congress and Exhibition, 2007.
77. R. J. Yang, G. Li and Y. Fu., "Development of Validation Metrics for Vehicle Frontal Impact Simulation", DETC2007-34124.
78. H. Sarin, M. Kokkolaras, G. Hulbert, P. Papalambros, S. Barbat, R. J. Yang, "A comprehensive metric for comparing time histories in validation of simulation models with emphasis on vehicle safety applications," Proceedings of ASME Design Engineering Technical Conferences, DETC2008/DAC-49669, New York, 2008.
79. Y. Fu, X. Jiang, and R. J. Yang, "Auto-Correlation of Occupant Restraint System Model Using Bayesian Model Validation Metrics" SAE World Congress and Exhibition, 2009.
80. C. H. Chuang, S. Zhou, W. Ang, R. J. Yang, and M. Lee, "Upfront Body Structural Optimization using Parametric Concept Modeling", SAE World Congress and Exhibition, 2009.
81. X. Jiang, R. J. Yang, and S. Barbat, and P. Weerappuli, "Bayesian Probabilistic PCA Approach for Model Validation of Dynamic Systems," SAE World Congress and Exhibition, 2009.

Keynote Speeches

1. "Design Optimization Applications in Auto Industry," CAO Frontier'99: Optimization Technology and Collaborative Engineering, Japan, November 30, 1999.
2. "Multidisciplinary Design Optimization of a Full Vehicle with High Performance Computing," SGI Manufacturing Industry Solutions, Paris, France, April 5, 2001.
3. "Multidisciplinary Design Optimization of a Full Vehicle with High Performance Computing," 15th Annual International Symposium on High Performance Computing Systems And Applications, Windsor, Ontario, Canada, June 18-20, 2001.
4. "Multidisciplinary Design Optimization of a Full Vehicle with High Performance Computing," The 2002 SGI Automotive Summit, Michigan, March 27, 2002.
5. "Recent Developments and Applications of Safety Optimization and Robustness Methods," LS-DYNA&JMAG Users Conference, Tokyo, Japan, September 21-22, 2004.
6. "Optimization in Auto Industry," Computer-Aided Optimization Frontier Conference, Seoul, Korea, November 15, 2005.

7. "Optimization in Auto Industry," 2005 SIGHTNA Technologies Conference, Beijing, China, November 11, 2005.
8. "Design Optimization Applications in Automotive Industry", Fourth China-Japan-Korea Joint Symposium on Optimization of Structural and Mechanical Systems (CJKOSM4 2006), Kunming, China, November 6–9, 2006.
9. "Applications of Multi-Disciplinary Optimization in Auto Industry", 2007 CDAJ CAE Solution Conference, Yokohama, Japan, 2007.

Invited Speeches

1. "Applications of Structural Optimization in Auto Industry", Rutgers University, Piscataway, New Jersey, April 19, 1995.
2. "Automotive Applications of Topology Optimization," National Chung-Cheng University, Taiwan, May 9, 1996.
3. "Topology Optimization of Vehicle Structures", Optimization in Industry Conference, Palm Coast, Florida, March 23-27, 1997.
4. "Automotive Applications of Design Optimization," University of Iowa, Iowa City, March 26, 1998.
5. "A Numerical Study of Crash Optimization," 1999 iSIGHT Users Conference, Raleigh, NC, 1999.
6. "Vehicle Safety CAE: An Overview," University of Florida, Gainesville, Florida, 1999.
7. "Safety Optimization and Robustness", Mazda Motor Company, Japan, December 3, 1999.
8. "Design optimization Applications in Automotive Industry", Ford Lio Ho Engineering Workshop, Taipei, Taiwan, October 27-28, 2000.
9. "Multidisciplinary Design Optimization of a Full Vehicle with High Performance Computing," SGI Manufacturing Industry Solutions, Southfield, Michigan, March 13, 2001.
10. "Multidisciplinary Design Optimization with High Performance Computing," The University of Iowa, Iowa City, IA, March 1, 2001.
11. "Multidisciplinary Optimization: Advances & Challenges," daratechiDPS2001 – Intelligent Digital Prototyping Strategies Conference, Novi, Michigan, October 29-30, 2001.
12. "Multidisciplinary Design Optimization with High Performance Computing," SC2001, Denver, Colorado, November 10-16, 2001.
13. "A New Reliability-Based Design Optimization Method and Its Applications," Forum on Computational Mechanics, Taiwan, December 17-19, 2001.
14. "Multidisciplinary Design Optimization with High Performance Computing," Forum on Computational Mechanics, Taiwan, December 17-19, 2001.
15. "Overview of Verification and Validation and ASME Standards Committee On V&V in Computational Solid Mechanics," Forum on Computational Mechanics, Taiwan, December 17-19, 2001.
16. "Design Optimization Applications in Auto Industry," The University of Michigan, Ann Arbor, MI, April 10, 2002.
17. "Multidisciplinary Optimization: Advances & Challenges," daratechiDPS2002 – Intelligent Digital Prototyping Strategies Conference, Novi, Michigan, June 20-21, 2002.
18. "Optimization in Reverse Engineering: Applications in Automotive Industry," National Taiwan University, Taipei, October 9, 2002.
19. "Design Optimization in Auto Industry," invited lecture in Engineering Optimization course, Northwestern University, June, 2004.
20. "Recent Developments and Applications of Design Optimization and Robustness Methods in Vehicle Safety," SAE IBES Conference, Troy, MI, 2004.
21. "Recent Developments and Applications of Safety Optimization and Robustness Methods," Wayne State University, October 26, 2004.
22. "Challenges in Technology Transfer: from Development to Implementation", Ann Arbor, Michigan, 11th Annual ARC Conference, May 25, 2005.
23. "Optimization in Auto Industry", Shanghai Jiao Tong University, June 28, 2005.
24. "Optimization in Auto Industry", Hohai University, July 1, 2005.
25. "Safety CAE and Design Optimization", Tsinghua University, July 5, 2005.
26. "Optimization in Auto Industry", National Tsinghua University, Taiwan, November 22, 2005.
27. "Optimization in Automotive Industry", University of Missouri-Rolla, Missouri, January 26, 2006.
28. "Optimization in Automotive Industry", University of Arizona, Tucson, Arizona, March 2, 2006.

29. "Multi-Disciplinary Optimization and Applications", European-U.S. Multi-Disciplinary Optimization Colloquium, Göttingen, Germany, May 16-19, 2006.
30. "Safety CAE, Optimization, and Model Validation", Vehicle Technology Conference, Taipei, Taiwan, July, 3-7, 2006.
31. "Restraint System Optimization," Wayne State University, November 26, 2007.

Moderator/Invited Panelists

1. ASME Design Engineering Technical Conferences, Irvine, August 1996.
2. OPTICON'99 conference, Newport Beach, October 1999.
3. "Computational Mechanics Education," Sixth U.S. National Congress On Computational Mechanics, Dearborn, Michigan, August 2001.
4. "Approximation Methods," Multidisciplinary Analysis and Optimization Symposium, Atlanta, September 2002.
5. "Design Automation, Accomplishments and Directions," 30th ASME Design Automation Conference, Salt Lake City, 2004.
6. "Large-Scale and High-Performance Optimization," 10th AIAA/ISSMO Multidisciplinary Analysis and Optimization Conference, New York, 2004.
7. "Transition of Reliability Methods from Research to Engineering Design," SAE Congress, Detroit, 2005.
8. "Offshore Engineering: Where are the future jobs for mechanical engineers," ASME Design Automation Conference, Moderator and Panelist, Long Beach, CA, 2005.
9. "Design Automation's Accomplishments, Status, and Future Needs: From Industry's Perspective", ASME Design Automation Conference, Moderator, Philadelphia, PA, 2006.

University/Industry Advisory Board Member

1. VPI Multidisciplinary Analysis & Design (MAD) Center (1996-1998).
2. Civil and Environmental Engineering Department, UCLA, 2002-present.
3. University of Iowa CCAD, 2002- 2004.
4. ASME Design Automation Executive Committee Industry Advisor, 2004-2006
5. Industry Representative for project team of Automotive Research Center, University of Michigan

PhD Thesis Committee Member

1. Chi-Ming Lu, "Topology Optimization in Structural Design," University of Texas at Arlington, Arlington, TX, 1994.
2. Hemant Chickermane, "Design of Multi-Component Structural Systems for Optimal Component Layout Topology and Location of Joints and Connections," Rutgers University, Piscataway, NJ, 1997.
3. Byeng-Dong Youn, "Design of Multi-Component Structural Systems for Optimal Component Layout Topology and Location of Joints and Connections," University of Iowa, Iowa City, IA, 2001.
4. Krish Aekbote, Wayne State University, MI, 2008.

Others

1. Adjunct Associate Professor, Mechanical Engineering Department, the University of Texas at Arlington, 1992-1993.
2. Member of Editorial Board and Senior Advisor of Structural and Multidisciplinary Optimization Journal.
3. Member of Editorial Board of International Journal of Reliability and Safety
4. Member of Editorial Board of Design Optimization: International Journal for Product and Process Improvement
5. 1 patent, 7278679, "Automotive Vehicle with Structural Panel Having Selectively Deployable Shape Memory Alloy Elements" - Ren-Jye Yang, J. Le, C. Chou, H.S. Tzou, -10/09/2007
6. Defense Publication Award, "Application of Tailor Rolled Blank (TRB) in Vehicle Front Frame Design for Vehicle Frontal Crash Safety", 6/21/2007
7. Defense Publication Award, "Multivariate Model Validation Method and Process for Vehicle Safety Systems", 2009

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