

Curriculum vitae of **Olivier A. BAUCHAU**

Professor of Aerospace Engineering
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1 Personal information

- Address: 4064 River Cliff Chase. Marietta GA 30067.
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- E-mail: olivier.bauchau@ae.gatech.edu
- Married, wife Yi-Ling, children: Florence and Philippe.

2 Interests

Teaching and conducting research in the fields of structural dynamics, multibody dynamics, experimental dynamics, and mechanics of advanced composite materials and structures.

3 Education

- Université de l'Etat à Liège (Belgium): Ingénieur Civil Physicien degree awarded in July 1977. Thesis under Prof. B. Fraeijs de Veubeke entitled: *"Influence of Warping on the Natural Frequencies of Vibration of Box-Beams"*.
- Massachusetts Institute of Technology (Cambridge, MA.): Master of Science in Aeronautics and Astronautics degree awarded in June 1978. Thesis under Prof. T.H.H. Pian entitled: *"Elastic-Plastic Analysis of Structures Using the Equilibrium Finite Element Method"*. Awardee of the Rotary Foundation of the ROTARY INTERNATIONAL 1977 – 78.
- Massachusetts Institute of Technology (Cambridge, MA.): Doctor of Philosophy degree in the field of Structural Dynamics awarded in July 1981. Thesis under Prof. J.W. Mar entitled: *"Design, Manufacturing, and Testing of High-Speed Rotating Graphite/Epoxy Shafts"*. Grade point average 5.0/5.0.

4 Experience

Position chronology

- Jul. 82 – Aug. 83: Research Engineer at St. Gobain Recherches in Paris, France. Assignments included modeling of industrial processes in the glass industry.
- Sep. 83 – 89: Assistant Professor, then
- Sep. 89 – Aug. 95: Associate Professor, Department of Mechanical Engineering, Aeronautical Engineering, and Mechanics at the Rensselaer Polytechnic Institute in Troy, NY.
- Sep. 95 – present: Professor, Daniel Guggenheim School of Aerospace Engineering, at the Georgia Institute of Technology in Atlanta, Georgia. Faculty responsibilities including teaching of graduate and undergraduate courses, and conducting research in the fields of structural dynamics, multibody dynamics, experimental dynamics, and mechanics of advanced composite materials and structures.

Consulting experience

- Engineering Consultant with United Technologies Research Center in Hartford, CT.; Sikorsky Aircraft in Stratford, CT.; Bell Helicopter in Fort Worth, TX.; NASA Ames Research Center in Moffet Field, CA; NASA Langley Research Center in Hampton, VA; Advanced Rotorcraft Technology Inc. in Mountain View, CA.; Materials Technologies Corporation in Monroe, CT.

Fields of expertise

- Teaching undergraduate and graduate courses in the areas of Theory of Structures, Strength of Materials, Advanced Structural Analysis, Design with Composite Materials, Aeroelasticity, Finite Element Methodologies, Engineering Mechanics, Structural Dynamics, Machine Dynamics, and Engineering Laboratories.
- Conducting research in the areas of Finite Element Methods for Structural and Multibody Dynamics, Experimental Mechanics and Dynamics, and the Design and Manufacturing of Composite Materials and Structures.

5 Publications in refereed journals

1. Bauchau O.A.: “Experimental Measurements of Elastic Shear Modulus of Graphite/Epoxy tubes.” *Journal of Composite Materials*, **15**, 1981, pp 151 – 156.
2. Bauchau O.A.: “Optimal Design of High Speed Rotating Graphite/Epoxy Shafts.” *Journal of Composite Materials*, **17**, 1983, pp 170 – 181.
3. Bauchau O.A.: “A Beam Theory for Anisotropic Materials.” *Journal of Applied Mechanics*, **52**, 1985, pp 416 – 422.

4. Bauchau O.A., Coffenberry B.S. and Rehfield L.W.: “Composite Box Beam Analysis: Theory and Experiments.” *Journal of reinforced Plastics and Composites*, **6**, No. 1, 1987, pp 25 – 35.
5. Bauchau O.A.: “A Solution of the Eigenproblem for Undamped Gyroscopic Systems with the Lanczos Algorithm.” *International Journal of Numerical Methods in Engineering*, **23**, 1986, pp 1705 – 1713.
6. Bauchau O.A. and Hong C.H.: “Finite Element Approach to Rotor Blade Modeling.” *Journal of the American Helicopter Society*, **32**, No 1, 1987, pp 60 – 67.
7. Bauchau O.A. and Hong C.H.: “Large Displacement Analysis of Naturally Curved and Twisted Beams.” *AIAA Journal*, **25**, No 11, 1987, pp 1469 – 1475.
8. Bauchau O.A. and Hong C.H.: “Nonlinear Composite Beam Theory.” *Journal of Applied Mechanics*, **55**, No 1, 1988, pp 156 – 163.
9. Bauchau O.A., Krafchak T.R. and Hayes J.F.: “Torsional Buckling Analysis and Damage Tolerance of Graphite/Epoxy Shafts.” *Journal of Composite Materials*, **22**, 1988, pp 142 – 158.
10. Bauchau O.A. and Hong C.H.: “Nonlinear Response and Stability Analysis of Beams Using Finite Elements in Time.” *AIAA Journal*, **26**, No. 9, 1988, pp 1135 – 1142.
11. Bauchau O.A. and Liu S.P.: “Finite Element Based Modal Analysis of Helicopter Rotor blade.” *Vertica*, **13**, No 2, 1989, pp 197 – 206.
12. Srinivasan, A.V., Cutts, D.G., Shu, H.T., Sharpe, D.L. and Bauchau O.A.: “Structural Dynamics of a Helicopter Rotor Blade System.” *Journal of The American Helicopter Society*, **35**, No 1, January 1990, pp 75 – 85.
13. Bauchau O.A. and Chiang W.Y.: “Dynamic Analysis of Rotor Flex-beams Based on Nonlinear Anisotropic Shell Models.” *Journal of The American Helicopter Society*, **38**, No 1, January 1993, pp 55 – 61.
14. Bauchau O.A. and Kang N.K.: “A Multibody Formulation for Helicopter Structural Dynamic Analysis.” *Journal of The American Helicopter Society*, **38**, No 2, April 1993, pp 3 – 14.
15. Bauchau O.A. and Guernsey D.: “On The Choice of Appropriate Bases for Nonlinear Dynamic Modal Analysis.” *Journal of the American Helicopter Society*, **38**, No 4, 1993, pp 28 – 36.
16. Bauchau O.A. and Bottasso C.: “Space-Time Perturbation Modes for Nonlinear Dynamic Analysis.” *Nonlinear Dynamics*, **6**, June 1994, pp 21 – 35.
17. Bauchau O.A. and Chiang W.Y.: “Dynamic Analysis of Bearingless Tail-rotor Blades Based on Nonlinear Shell Models.” *Journal of Aircraft*, **31**, No 6, 1994, pp 1402 – 1410.

18. Laulusa A., Bauchau O.A. and Theron N.J.: “Theoretical and Experimental Investigation of the Nonlinear Behavior of Composite Beams.” *La Recherche Aérospatiale*, **4**, 1995, pp 223 – 240.
19. Bauchau O.A., Damilano G. and Theron N.J.: “Numerical Integration of Nonlinear Elastic Multibody Systems.” *International Journal of Numerical Methods in Engineering*, **38**, 1995, pp 2727 – 2751.
20. Bauchau O.A. and Theron N.J.: “Energy Decaying Schemes for Nonlinear Beam Models.” *Computer Methods in Applied Mechanics and Engineering*, **134**, pp 37 – 56, 1996.
21. Bauchau O.A. and Theron N.J.: “Energy Decaying Schemes for Nonlinear Elastic Multibody Systems.” *Computers and Structures*, **59**, No. 2, pp 317 – 331, 1996.
22. Yun S.H. and Bauchau O.A.: “Improving Modal Parameter Predictions for Jointed Airframe Panels. Part I: Experiments.” *Journal of the American Helicopter Society*, **43**, No. 2, pp 156 – 163, 1998.
23. Yun S.H. and Bauchau O.A.: “Improving Modal Parameter Predictions for Jointed Airframe Panels. Part II: Improved Numerical Model.” *Journal of the American Helicopter Society*, **43**, No. 2, pp 164 – 171, 1998.
24. Bauchau O.A.: “Computational Schemes for Flexible, Nonlinear Multibody Systems.” *Multibody System Dynamics*, **2**, pp 169 – 225, 1998.
25. Bauchau O.A. and Hodges D.H.: “Analysis of Nonlinear Multibody Systems with Elastic Couplings.” *Multibody System Dynamics*, **3**, pp 163 – 188, 1999.
26. Bauchau O.A. and Joo T.: “Computational Schemes for Nonlinear Elasto-Dynamics.” *International Journal for Numerical Methods in Engineering*, **45**, pp 693 – 719, 1999.
27. Bauchau O.A. and Bottasso C.L.: “On the Design of Energy Preserving Schemes for Flexible, Nonlinear Multibody Systems.” *Computer Methods in Applied Mechanics and Engineering*, **169**, pp 61 – 79, 1999.
28. Bauchau O.A.: “On the Modeling of Friction and Rolling in Flexible Multibody Systems.” *Multibody System Dynamics*, **3**, pp 209 – 239, 1999.
29. Bauchau O.A.: “On the Modeling of Prismatic Joints in Flexible Multibody Systems.” *Computer Methods in Applied Mechanics and Engineering*, **181**, pp 87 – 105, 2000.
30. Bauchau O.A.: “Analysis of Flexible Multibody Systems with Intermittent Contacts.” *Multibody System Dynamics*, **4**, pp 23 – 54, 2000.
31. Bauchau O.A. and Bottasso C.L.: “Contact Conditions for Cylindrical, Prismatic, and Screw Joints in Flexible Multibody Systems.” *Multibody System Dynamics*, **5**, pp 251 – 278, 2001.

32. Bauchau O.A. and Nikishkov Y.G.: “An Implicit Transition Matrix Approach to Stability Analysis of Flexible Multibody Systems.” *Multibody System Dynamics*, **5**, pp 279 – 301, 2001.
33. Bauchau O.A., Bottasso C.L. and Nikishkov Y.G.: “Modeling Rotorcraft Dynamics with Finite Element Multibody Procedures.” *Mathematical and Computer Modeling*, **33**, pp 1113 – 1137, 2001.
34. Bauchau O.A. and Nikishkov Y.G.: “An Implicit Floquet Analysis for Rotorcraft Stability Evaluation.” *Journal of the American Helicopter Society*, **46**, pp 200 – 209, 2001.
35. Bauchau O.A., Rodriguez J. and Bottasso C.L.: “Modeling of Unilateral Contact Conditions with Application to Aerospace Systems Involving Backlash, Freeplay and Friction.” *Mechanics Research Communications*, **28**, pp 571 – 599, 2001.
36. Bottasso C.L. and Bauchau O.A.: “Multibody Modeling of Engage and Disengage Operations of Helicopter Rotors.” *Journal of the American Helicopter Society*, **46**, pp 290 – 300, 2001.
37. Bauchau O.A. and Rodriguez J.: “Modeling of Joints with Clearance in Flexible Multibody Systems.” *International Journal of Solids and Structures*, **39**, pp 41 – 63, 2002.
38. Bauchau O.A., Choi J.Y. and Bottasso C.L.: “Time Integrators for Shells in Multibody Dynamics.” *Computers and Structures*, **80**, pp 971 – 889, 2002.
39. Bauchau O.A. and Rodriguez J.: “Simulation of Wheels in Nonlinear, Flexible Multibody Systems.” *Multibody System Dynamics*, **7**, pp 407 – 438, 2002.
40. Bottasso C.L., Bauchau O.A. and Choi J.Y.: “An Energy Decaying Scheme for Nonlinear Dynamics of Shells.” *Computer Methods in Applied Mechanics and Engineering*, **191**, pp 3099 – 3121, 2002.
41. Yang Zhong, Sankar L.N., Smith M.J., and Bauchau O.A.: “Recent Improvements to a Hybrid Method for Rotors in Forward Flight.” *Journal of Aircraft*, **39**, pp 804 – 812, 2002.
42. Bauchau O.A., Choi J.Y. and Bottasso C.L.: “On the Modeling of Shells in Multibody Dynamics.” *Multibody Dynamics Systems*, **8**, pp 459 – 489, 2002.
43. Bauchau O.A., Bottasso C.L. and Trainelli L.: “Robust Integration Schemes for Flexible Multibody Systems.” *Computer Methods in Applied Mechanics and Engineering*, **192**, pp 395 – 420, 2003.
44. Bauchau O.A.: “A Self-Stabilized Algorithm for Enforcing Constraints in Multibody Systems.” *International Journal of Solids and Structures*, **40**, No 12 – 13, pp 3253 – 3271, 2003.

45. Bauchau O.A. and Trainelli L.: “The Vectorial Parameterization of Rotation.” *Nonlinear Dynamics*, **32**, No 1, pp 71 – 92, 2003.
46. Bauchau O.A. and Rodriguez J.: “Formulation of Modal Based Elements in Nonlinear, Flexible Multibody Dynamics.” *Journal of Multiscale Computational Engineering*, **1**, No 2 & 3 pp 161 – 180, 2003.
47. Bauchau O.A. and Choi J.Y.: “The Vectorial Parameterization of Motion.” *Nonlinear Dynamics*, **33**, No 1, pp 165 – 188, 2003.
48. Bauchau O.A., Rodriguez J., and Chen, S.Y.: “Modeling the Bifilar Pendulum Using Nonlinear, Flexible Multibody Dynamics.” *Journal of the American Helicopter Society*, **47**, No 1, pp 53 – 62, 2003.
49. Bauchau O.A. and Rodriguez J., and Chen, S.Y.: “Coupled Rotor-Fuselage Analysis with Finite Motions Using Component Mode Synthesis.” *Journal of the American Helicopter Society*, **49**, No 2, pp 201 – 211, 2004.
50. Choi, J.Y. and Ruzzene, M. and Bauchau O.A.: “Dynamic Analysis of Flexible Supercavitating Vehicles Using Modal-Based Elements.” *SIMULATION*, **80**, No 11, pp 619 – 633, 2004.
51. Bauchau, O.A. and Wang, Jielong: “Stability Analysis of Complex Multibody Systems.” *Journal of Computational and Nonlinear Dynamics*, **1**, No 1, pp 71 – 80, 2006.
52. Bauchau, O.A. and Liu, Haiying: “On the Modeling of Hydraulic Components in Rotorcraft Systems.” *Journal of the American Helicopter Society*, **51**, No 2, pp 175 – 184, 2006.
53. Bauchau, O.A. and Ju, Changkuan: “Modeling Friction Phenomena in Flexible Multibody Dynamics.” *Computer Methods in Applied Mechanics and Engineering*, **195**, No 50-51, pp 6909 – 6924, 2006.
54. Laulusa A., Bauchau O. A., Choi J-Y., Tan V. and Li L.: “Evaluation of some Shear Deformable Shell Elements.” *International Journal of Solids and Structures*, **43**, pp 5033 – 5054, 2006.
55. Bauchau, O.A. and Wang J.L.: “Stability Evaluation and System Identification of Flexible Multi-Body Systems.” *Multibody System Dynamics*, **18**, No 1, pp 95 – 106, 2007.
56. Bottasso, L., Bauchau, O.A. and Cardona, A.: “Time-Step-Size Independent Conditioning and Sensitivity to Perturbations in the Numerical Solution of Index-3 Differential Algebraic Equations.” *SIAM Journal on Scientific Computing*, **29**, No 1, pp 397 – 414, 2007.
57. Do, N.B., Ferri, A.A. and Bauchau, O.A.: “Efficient Simulation of a Dynamic System with LuGre Friction.” *Journal of Computational and Nonlinear Dynamics*, **2**, No 4, pp 281 – 289, October 2007.

58. Shabana, A.A., Bauchau, O.A. and Hulbert, G.M.: “Integration of Large Deformation Finite Element and Multibody System Algorithms.” *Journal of Computational and Nonlinear Dynamics*, **2**, No 4, pp 351 – 359, October 2007.
59. Bauchau, O.A. and Wang, Jielong: “Efficient and Robust Approaches to the Stability Analysis of Large Multibody Systems.” *Journal of Computational and Nonlinear Dynamics*, **3**, No 1, pp 011001-1 – 12, January 2008.
60. Laulusa A. and Bauchau, O.A.: “Review of Classical Approaches for Constraint Enforcement in Multibody Systems.” *Journal of Computational and Nonlinear Dynamics*, **3**, No 1, pp 011004-1– 8, January 2008.
61. Bauchau, O.A. and Laulusa A.: “Review of Contemporary Approaches for Constraint Enforcement in Multibody Systems.” *Journal of Computational and Nonlinear Dynamics*, **3**, No 1, pp 011005 1–8, January 2008.
62. Maqueda, L.G., Bauchau, O.A. and Shabana, A.A.: “Effect of the Centrifugal Forces on the Finite Element Eigenvalue Solution of a Rotating Blade: a Comparative Study.” *Multibody System Dynamics*, **19**, pp 281–302, 2008.
63. Bauchau, O.A. and Epple, A.: “Improved Computational Strategies for Rotor Blades Presenting High Gradients in Sectional Properties.” *Journal of the American Helicopter Society*, to appear, 2007.
64. Bauchau, O.A. and Wang, Jielong: “Efficient and Robust Approaches for Rotorcraft Stability Analysis.” Submitted to *Journal of the American Helicopter Society*, 2007.
65. Bauchau, O.A., Epple, A. and Heo, Seundo: “Interpolation of Finite Rotations in Flexible Multibody Dynamics Simulations.” Submitted to *Proceedings of the Institution of Mechanical Engineers, Part K, Journal of Multi-body Dynamics*, 2008.

6 Publications in non-refereed journals

1. Srinivasan A.V., Cutts D.G., Shu H.T., Sharpe D.L. and Bauchau O.A.: “Structural Dynamics of a Helicopter Rotor Blade System.” Proceedings of the 44th American Helicopter Society Forum, Washington DC, Jun. 16 – 18, 1988, pp 317 – 329.
2. Bauchau O.A., Bryan P.S. and Peck A.W.: “Torsional Buckling Analysis and Damage Tolerance of Graphite/Epoxy Helicopter Drive Shafts.” Proceedings of the 45th American Helicopter Society Forum, Boston MA, May 22 – 24, 1989, pp 1091 – 1095.
3. Bauchau O.A. and Chiang W.Y.: “Dynamic Analysis of Rotor Flex-beams Based on Nonlinear Anisotropic Shell Models.” Proceedings of the International Technical Specialists’ Meeting on Rotorcraft Basic Research, Georgia Institute of Technology, Atlanta GA, Mar. 25 – 27, pp 21 – 1 to 21 – 11, 1991.

4. Bauchau O.A. and Guernsey D.: "On the Choice of Appropriate Bases for Nonlinear Dynamic Modal Analysis." Proceedings of the International Technical Specialists' Meeting on Rotorcraft Basic Research, Georgia Institute of Technology, Atlanta GA, Mar. 25 – 27, pp 12 – 1 to 12 – 13, 1991.
5. Chen S.Y., Bauchau O.A. and Sopher R.: "Evaluation of an Advanced Finite Element Analysis for Rotor Blades." Proceedings of the 47th Annual Forum of the American Helicopter Society, Phoenix AZ, pp 1385 – 1397, May 6 – 8, 1991.
6. Peck A.W. and Bauchau O.A.: "On Design and Optimization of Curved Composite Beams." Proceedings of the 48th Annual Forum of The American Helicopter Society, Washington DC, Jun. 3 – 5, 1992.
7. Bauchau O.A. and Chiang W.Y.: "Dynamic Analysis of Bearingless Rotor Blades Based on Nonlinear Shell Models with drilling degrees of Freedom." In Recent Advances in the Structural Dynamic Modeling of Composite Rotor Blades and Thick Composites, edited by P.P. Friedmann and J.B. Kosmatka. A.S.M.E. AD-Vol. 30, Nov. 1992.
8. Bauchau O.A., Lee M.S. and Theron N.J.: "Energy Decaying Scheme with Adaptive Time Step Methodology for Nonlinear Beam Models." Proceedings of the 36th Structures, Structural Dynamics, and Materials Conference, New Orleans LA, Apr. 10 – 13, 1995, pp 277 – 287.
9. Bauchau O.A., Lee M.S. and Theron N.J.: "Dynamic Analysis of Nonlinear Elastic Multibody Systems Using Energy Decaying Schemes." Proceedings of the 36th Structures, Structural Dynamics, and Materials Conference, New Orleans LA, Apr. 10 – 13, 1995, pp 2591 – 2601.
10. Bauchau O.A. and Lee M.S.: "Multibody Formulation for Rotorcraft Dynamic Analysis." Proceedings of the American Helicopter Society 51st Annual Forum and Technology Display, Fort-Worth TX, May 9 – 11, 1995, pp 1788 – 1798.
11. Bauchau O.A., Bottasso C.L., Dindar M., Murty H.S., Ruzak Z. and Shephard M.: "Aeroelastic Stability of Rotor Blades Using a Parallel Adaptive Finite Element Solver." Proceedings of the American Helicopter Society Stratford Chapter Aeromechanics Technology and Product Design for the 21st Century Conference, Fairfield CT, Oct. 11 – 13, 1995.
12. Bauchau O.A. and Ahmad J.U.: "Advanced CFD and CSD Methods for Multidisciplinary Applications in Rotorcraft Problems." Proceedings of the AIAA/ NASA/USAF Multidisciplinary Analysis and Optimization Symposium, Bellevue WA, Sep. 4 – 6, 1996, pp 945 – 953.
13. Bauchau O.A., Zhang H.C., Loewy R.G. and Atluri S.N.: "Nonlinear Aeroelastic Effects in Damaged Composite Aerospace Structures." Proceedings of the 35th Aerospace Sciences Meeting and Exhibit, Reno NV, Jan. 6 – 9, 1997, pp 308 – 318.

14. Yun S.H., Lemnios A.Z. and Bauchau O.A.: “Improved Finite Element Modeling of Helicopter Airframe Connections.” Proceedings of the American Helicopter Society 53st Annual Forum and Technology Display, Virginia Beach VA, Apr. 29 – May 1, 1997, pp 1788 – 1798.
15. Murty H., Bottasso C., Dindar M., Shephard M. and Bauchau O.A.: “Aeroelastic Analysis of Rotor Blades Using Nonlinear Fluid/Structure Coupling.” Proceedings of the American Helicopter Society 53st Annual Forum and Technology Display, Virginia Beach VA, Apr. 29 – May 1, 1997, pp 2324 – 2334.
16. Bauchau O.A.: “Computational Schemes for Nonlinear Elastodynamics and Multibody Dynamics.” Proceedings of the 4th National Congress on Theoretical and Applied Mechanics, Brussels, May 22 – 23, 1997, pp 249 – 263.
17. Bauchau O.A. and Nikishkov Y.G.: “A Comparison of Various Methods for Stability Analysis.” Proceedings of the Seventh International Workshop on Dynamics and Aeroelasticity Stability Modeling, St. Louis MO, Oct. 14 – 16, 1997.
18. Bauchau O.A. and Nikishkov Y.G.: “An Implicit Floquet Theory for Rotorcraft Stability Analysis.” Proceedings of the American Helicopter Society 54th Annual Forum and Technology Display, Washington DC, May 20 – 22 1998, pp 1565 – 1575.
19. Bauchau O.A. and Nikishkov Y.G.: “An Implicit Floquet Theory for Rotorcraft Stability Analysis.” Proceedings of the American Helicopter Society 54th Annual Forum and Technology Display, Washington DC, May 20 – 22 1998, pp 1565 – 1575.
20. Bauchau O.A.: “Reduced Order Models for Aeroelastic Stability Analysis.” Proceedings of the 40th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, St Louis MO, Apr. 12 – 15, 1999.
21. Bauchau O.A.: “On the Modeling of Cylindrical and Prismatic Joints in Flexible Multibody Systems.” Proceedings of the EUROMECH Colloquium 404 of Advances in Computational Multibody Dynamics, J.A.C. Ambròsio and W. Schielen (Eds.), Sep. 20 – 23, 1999, pp 561 – 580.
22. Bauchau O.A.: “On the Modeling of Variable Diameter Tilt Rotor.” Proceedings of the Eighth Army Research Office Workshop on Aeroelasticity of Rotorcraft Systems, Penn State University, State College PA, Oct. 18 – 20, 1999.
23. Yang Z., Sankar L.N., Smith M. and Bauchau O.A.: “Recent Improvements to a Hybrid Method for Rotors in Forward Flight.” Proceedings of the 38th AIAA Aerospace Sciences Meeting, Reno NV, Jan. 2000.
24. Bauchau O.A.: “Computational Schemes for Nonlinear Elasto-Dynamics.” Proceedings of the 41th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Atlanta GA, Apr. 3 – 6, 2000.

25. Bauchau O.A. and Bottasso C.L.: “Contact Conditions for Cylindrical, Prismatic, and Screw Joints in Flexible Multibody Systems.” Proceedings of the 41th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Atlanta GA, Apr. 3 – 6, 2000.
26. Bauchau O.A.: “On the Modeling of Friction and Rolling in Flexible Multibody Systems.” Proceedings of the 41th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Atlanta GA, Apr. 3 – 6, 2000.
27. Mavris D., Volovoi V., Baker A. and Bauchau O.A.: “Multibody Dynamics Metamodels for System Level Studies of NewTilt-Rotor Technologies.” Proceedings of the 41th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Atlanta GA, Apr. 3 – 6, 2000.
28. Bauchau O.A. and Nikishkov Y.G.: “Stability Analysis of Comprehensive Rotorcraft Models.” Proceedings of the American Helicopter Society 56th Annual Forum and Technology Display, Virginia Beach VA, May 2 – 4, 2000.
29. Bauchau O.A., Bottasso C.L. and Trainelli L.: “Robust Integration Schemes for Flexible Multibody Systems.” Proceedings of the NATO Advanced Research Workshop on Computational Aspects of Nonlinear Structural Systems with Large Rigid Body Motions. Jorge Ambrósio and Michal Kleiber, editors. Pultusk, Poland, Jul. 2 – 7, 2000.
30. Bottasso C.L. and Bauchau O.A.: “Beyond Geometric Integration: Application to Shell Dynamics.” Proceedings of GIMC 2000, XIII Convegno Italiano di Meccanica Computazionale, Università degli Studi di Brescia, Brescia, Italy, Nov. 13 – 15, 2000.
31. Bottasso C.L. and Bauchau O.A.: “Multibody Modeling of Engage and Disengage Operations of Helicopter Rotors.” Proceedings of the AHS Rotorcraft Dynamics and Aeromechanics Specialists’ Meeting, Atlanta GA, Nov. 13 – 14, 2000.
32. Laurita M.J., Smith M.J., and Bauchau O.A.: “Aeroelastic Considerations for CSD-CFD Coupling.” Proceedings of the AHS Rotorcraft Dynamics and Aeromechanics Specialists’ Meeting, Atlanta GA, Nov. 13 – 14, 2000.
33. Yang Z., Smith M.J., Bauchau O.A., and Sankar L.N.: “A Hybrid Flow Analysis for Rotors in Forward Flight.” Proceedings of the AHS Rotorcraft Dynamics and Aeromechanics Specialists’ Meeting, Atlanta GA, Nov. 13 – 14, 2000.
34. Bauchau O.A. and Bottasso C.L.: “On the Modeling of Shells in Multibody Dynamics.” Proceeding of the First MIT Conference on Computational Fluid and Solid Mechanics, Cambridge, MA, June 12 – 15, 2001. Volume 1, pp 58 – 60. Editor: K.J. Bathe.
35. Bauchau O.A., Choi J.Y. and Bottasso C.L.: “An Energy Decaying Scheme for Non-linear Dynamics of Shells.” Proceeding of the Second European Conference on Computational Mechanics, Cracow, Poland, June 26 – 29, 2001. Volume 1, pp 44 – 45.

36. Bottasso C.L. and Bauchau O.A.: “Finite Element Multibody Modeling of Rotorcraft Systems.” Proceeding of the 27th European Rotorcraft Forum, Moscow, Russia, Sep. 11 – 14, 2001.
37. Bauchau O.A. and Bottasso C.L.: “A General Purpose Multibody Code Based on Conserving/Dissipative Algorithms.” Proceedings of the Sixth U.S. National Congress on Computational Mechanics, Dearborn, MI, Aug. 1 – 3, 2001. pp 707 – 708.
38. Bottasso C.L. and Bauchau O.A.: “Geometrically Exact Shell Dynamics by an Energy Decaying Scheme.” Proceedings of the Sixth U.S. National Congress on Computational Mechanics, Dearborn, MI, Aug. 1 – 3, 2001. pp 708 – 709.
39. Bauchau O.A. and Rodriguez J.: “Modeling of Joints with Clearance In Flexible Multibody Systems.” Proceedings of the 18th Biennial Conference on Mechanical Vibration and Noise, Pittsburgh PA, Sep. 9 – 12, 2001. Paper DETC2001/VIB-21329.
40. Bauchau O.A., Choi J.Y. and Bottasso C.L.: “On the Modeling of Shells in Multibody Dynamic.” Proceedings of the 18th Biennial Conference on Mechanical Vibration and Noise, Pittsburgh PA, Sep. 9 – 12, 2001. Paper DETC2001/VIB-21339.
41. Bauchau O.A.: “Eigenvalue Analysis.” Chapter in the *Encyclopedia of Vibration*, Academic Press. Editors: Simon G. Braun, David J. Ewins, Singiresu S. Rao. 2001. pp 461 – 467.
42. Bottasso C.L. and Bauchau O.A.: “Finite Element Multibody Modeling of Rotorcraft Systems.” Proceedings of the 27th European Rotorcraft Forum, Moscow, Russia, Sep. 11 – 14, 2001.
43. Bauchau O.A. and Rodriguez J.: “On the Modeling of the Bifilar Pendulum.” Proceedings of the 9th International Workshop on Aeroelasticity of Rotorcraft Systems, Ann Arbor, MI, Oct. 22 – 24, 2001.
44. Hodges D.H., Craig J.I., Bauchau O.A., Hong X., and Jeong J.: “Validation and Integration of VABS into a Rotorcraft Design Process.” Proceedings of the 9th International Workshop on Aeroelasticity of Rotorcraft Systems, Ann Arbor, MI, Oct. 22 – 24, 2001.
45. Bauchau O.A., Rodriguez J., and Chen, S.Y.: “Modeling the Bifilar Pendulum Using Nonlinear, Flexible Multibody Dynamics.” Proceedings of the American Helicopter Society 58th Forum and Technology Display, Montreal, Quebec, Canada, Jun. 11 – 13, 2002.
46. Bauchau O.A. and Rodriguez J.: “Modeling of a Vibration Absorber Using Nonlinear, Flexible Multibody Dynamics: The Bifilar Pendulum.” Proceedings of the Fifth World Congress on Computational Mechanics. Vienna, Austria, July 7 – 12, 2002. pp 1694 – 1702.

47. Bauchau O.A. and Choi J.Y.: “Dynamic Simulation of Cables and Membranes.” Proceedings of the Fifth World Congress on Computational Mechanics. Vienna, Austria, July 7 – 12, 2002. pp 262 – 270.
48. Bauchau O.A., Rodriguez J. and Chen, S.Y.: “Coupled Rotor-Fuselage Analysis with Finite Motions Using Component Mode Synthesis.” Proceedings of the American Helicopter Society 59th Forum and Technology Display, Phoenix AZ, May 6 – 8, 2003.
49. Bauchau O.A., Rodriguez J. and Bottasso C.L.: “Modeling of Unilateral Contact Conditions with Application to Aerospace Systems Involving Backlash, Freeplay and Friction.” Proceedings of the 7th US National Congress on Computational Mechanics, Albuquerque NM, July 28 – 30, 2003.
50. Bottasso C.L. and Bauchau O.A. : “Finite Element Procedures For Non-Linear Aeroelastic Problems.” Proceedings of the 7th US National Congress on Computational Mechanics, Albuquerque NM, July 28 – 30, 2003.
51. Bauchau O.A.: “A Self-Stabilized Algorithm for Enforcing Constraints in Multibody Systems.” Proceedings of the 19th Biennial Conference on Mechanical Vibration and Noise, Chicago IL, September 2 – 6, 2003. Paper DECT 2003 VIB-48332
52. Bauchau O.A.: “The Vectorial Parameterization of Motion.” Proceedings of the 19th Biennial Conference on Mechanical Vibration and Noise, Chicago IL, September 2 – 6, 2003. Paper DECT 2003 VIB-48304
53. Choi J.Y., Ruzzene M. and Bauchau O.A.: “Dynamic Analysis of Flexible Supercavitating Vehicles Using Modal Based Elements.” Proceedings of the International Mechanical Engineering Congress, Washington DC, November 15 – 21, 2003.
54. Bauchau O.A.: “Modeling of Unilateral Contact in Multibody Systems.” Proceedings of the XXII Southeastern Conference on Theoretical and Applied Mechanics, Tuskegee AL, August 15-17, 2004, pp 682 – 691.
55. Ozbay S., Bauchau O.A. and Dancila D.: “Stability Analysis of Extension-Twist Coupled Composite Rotor Blades.” Proceedings of the American Helicopter Society 61st Forum and Technology Display, Grapevine TX, June 1 – 3, 2005, pp 567-577.
56. Shen J., Singleton J., Piatak D.J. and Bauchau O.A.: “Multibody Dynamic Simulation and Experimental Investigation of a Model-Scale Tiltrotor.” Proceedings of the American Helicopter Society 61st Forum and Technology Display, Grapevine TX, June 1 – 3, 2005, pp 742-752.
57. Bauchau, O.A.: “Modeling Friction Phenomena in Flexible Multibody Dynamics.” Proceedings of the Sixth European Conference on Structural Dynamics, Paris, France, Sep. 4 – 7, 2005, pp 561-566.
58. Ferri, A., Do, Nguyen and Bauchau, O.A.: “Efficient Simulation of a Dynamic System with LuGre Friction.” Proceedings of the ASME International Design Engineering

- Technical Conferences and Computers and Information in Engineering Conference, Long Beach, CA, Sep. 24 – 28, 2005, DETC2005-85339
59. Bauchau, O.A.: “Stability Analysis of Complex Multibody Systems.” Proceedings of the ASME International Design Engineering Technical Conferences and Computers and Information in Engineering Conference, Long Beach, CA, Sep. 24 – 28, 2005, paper DETC 2005-84490.
 60. Bottasso, L. and Bauchau, O.A.: “Reduced Stability to Perturbations in the Numerical Solution of Multibody DAE’s.” Proceedings of the ASME International Design Engineering Technical Conferences and Computers and Information in Engineering Conference, Long Beach, CA, Sep. 24 – 28, 2005, paper DETC 2005-84567.
 61. Phanse, S., Sankar, L.N. and Bauchau, O.A.: “An Efficient Tightly Coupled Fluid-Solid Interaction Approach For Modeling Rotors in Forward Flight” Proceedings of the 2nd International Basic Research Conference on Rotorcraft Technology, Nanjing, China, Nov 7-9, 2005.
 62. Bauchau, O.A. and Liu, H.: “On the Modeling of Hydraulic Components in Rotorcraft Systems.” Proceedings of the American Helicopter Society 62nd Forum and Technology Display, Phoenix AZ, May 9 – 11, 2006.
 63. Bauchau, O.A. and Agrawal, S.: “The Semi-Active Coulomb Friction Damper Concept.” Proceedings of the American Helicopter Society 62nd Forum and Technology Display, Phoenix AZ, May 9 – 11, 2006.
 64. Abras, J., Smith, M.J. and Bauchau, O.A.: “Rotor Airloads Predictions Using Coupled Finite Element and Free Wake Methods.” Proceedings of the American Helicopter Society 62nd Forum and Technology Display, Phoenix AZ, May 9 – 11, 2006.
 65. Bauchau, O.A. and Wang, J.L.: “Stability Analysis of Complex Multibody Systems.” Proceedings of the 7th World congress on Computational Mechanics, Los Angeles CA, July 16-22, 2006.
 66. Bauchau, O.A. and Epple, A.: “Improved Computational Strategies for Rotor Blades Presenting High Gradients in Sectional Properties,” Proceedings of the American Helicopter Society 63rd Forum and Technology Display, Virginia Beach VA, May 1 – 3, 2007.
 67. Bauchau, O.A. and Wang, J.L.: “Efficient and Robust Approaches for Rotorcraft Stability Analysis.” Proceedings of the American Helicopter Society 63rd Forum and Technology Display, Virginia Beach VA, May 1 – 3, 2007.
 68. Bauchau, O.A. and Epple, A.: “Performance Evaluation of Numerical Integration Schemes for Flexible Multibody Systems.” Proceedings of MULTIBODY DYNAMICS 2007, ECCOMAS Thematic Conference, C.L. Bottasso, P. Masarati, L. Trainelli (eds.), Milano, Italy, 25–28 June 2007.

69. Bauchau, O.A. and Wang, J.L.: “Optimal Control Based on Subspace Identification Algorithms for Multibody Systems.” Proceedings of MULTIBODY DYNAMICS 2007, ECCOMAS Thematic Conference, C.L. Bottasso, P. Masarati, L. Trainelli (eds.), Milano, Italy, 25–28 June 2007.
70. Maqueda, L.G., Bauchau, O.A. and Shabana, A.A.: “Effect of the Centrifugal Forces on the Eigenvalue Solution of a Rotating Blade.” Proceedings of MULTIBODY DYNAMICS 2007, ECCOMAS Thematic Conference, C.L. Bottasso, P. Masarati, L. Trainelli (eds.), Milano, Italy, 25–28 June 2007.
71. Bauchau, O.A.: “Enforcing Constraints in Multibody Systems: A Review” Proceedings of the ASME International Design Engineering Technical Conferences and Computers and Information in Engineering Conference, Las Vegas, NV, Sep. 4 – 7, 2007, paper DETC 2007-35037.
72. Bauchau, O.A.: “Stability Evaluation and System Identification of Flexible Multibody Systems” Proceedings of the International Forum on Rotorcraft Multidisciplinary Technology for Dual Applications, Seoul, South-Korea, Oct 15–17, 2007.
73. Rajmohan, N., Sankar, L., Bauchau, O.A., Charles, B., Makinen, S. and Egolf, A.: “Application of Hybrid Methodology to Rotors in Steady and Maneuvering Flight.” Proceedings of the American Helicopter Society 64th Forum and Technology Display, Montréal, Québec, Canada, April 29 – May 1, 2008.
74. Bauchau, O.A., Riviello, L. and Bottasso, C.: “Effect of Modeling Approximations on the Stability of Autopilot Controllers.” Proceedings of the American Helicopter Society 64th Forum and Technology Display, Montréal, Québec, Canada, April 29 – May 1, 2008.

7 Reports

1. Bauchau O.A. and Hong C.H.: “Large Displacement Analysis of Naturally Curved and Twisted Beams.” Rensselaer Polytechnic Institute Rotorcraft Technology Center Report No D-86-1, Jul. 1986.
2. Bauchau O.A., Loewy R.G. and Bryan P.S.: “An Approach to Ideal Twist Distribution in Tilt Rotor VTOL Blade Designs.” Rensselaer Polytechnic Institute Rotorcraft Technology Center Report No D-86-2, Jul. 1986.
3. Bauchau O.A. and Liu S.P.: “DYMORE: A Finite Element Based Modal Analysis of Helicopter Rotors.” Contract Report to Sikorsky Aircraft, Mar. 1989.
4. Bauchau O.A. and Kang N.K.: “Nonlinear Dynamic Analysis of Flexible Multibody Systems.” NASA Contractor Report 187597, Jul. 1991.
5. Bauchau O.A., Choi J.Y. and Bottasso C.L.: “On the modeling of shells in multibody dynamics.” NASA/CR-2000-210556, ICASE Report No. 2000-42, November 2000.

6. Bottasso C.L., Bauchau O.A. and Choi J.Y.: “An energy decaying scheme for nonlinear dynamics of shells.” NASA/CR-2000-210557, ICASE Report No. 2000-43, November 2000.

8 Grants and Contracts

8.1 As Principal and Co-Principal Investigator

1. “Anisotropic Beam Theory.” Composite Materials and Structures Program; NASA/AFOSR. Leading investigator, 1983 – 1986, (\$210k).
2. “Finite Element Analysis of Helicopter Rotor Blades.” Center of Excellence in Rotorcraft Technology; ARO. Leading investigator, 1984 – 1987, (\$129k)
3. “Ballistic Damage Tolerance of Helicopter Drive Shafts.” Center of Excellence in Rotorcraft Technology; ARO. Leading investigator, 1984 – 1987, (\$92k)
4. “An Approach to Ideal Twist Distribution in Tilt Rotor VTOL Blade Design.” Boeing Helicopter Company. Co-principal investigator (with Dr. R.G. Loewy, 1985 – 1986, (\$20k)
5. “Rotorcraft Maneuver Loads.” Center of Excellence in Rotorcraft Technology; ARO. Leading investigator, 1987 – 1992, (\$180k)
6. “Rotorcraft Composite Fuselage Frames.” Center of Excellence in Rotorcraft Technology; ARO. Leading investigator, 1987 – 1992, (\$195k)
7. “Helicopter Composite Blade Dynamics.” United Technologies Sikorsky Aircraft. Principal investigator, 1988 – 1990, (\$25k)
8. “Design of Automotive Braided Drive Shafts.” Nippon Steel. Principal investigator, 1988 – 1990, (\$20k)
9. “Nonlinear Dynamic Analysis of Flexible Multibody Systems.” NASA. Principal investigator, 1989 – 1991, (\$60k)
10. “Rotorcraft Technology Center.” ARO and Rotorcraft industry consortium. Co-principal investigator (with Dr. R.G. Loewy), 1992 – 1995, (\$450k)
11. “Establishing a Rensselaer Rotorcraft Technology Center Automated Data Processing Facility.” ARO. Co-principal investigator (with Dr. R.G. Loewy), 1993, (\$427k)
12. “Augmentation of Rotorcraft Technology Center.” ARO and Rotorcraft Industry Consortium. Co-principal investigator (with Dr. A.Z. Lemnios), 1993 – 1994, (\$529k)
13. “Multibody Dynamic Analysis of Rotorcraft Systems.” United Technologies Sikorsky Aircraft. Principal investigator, 1992 – 1994, (\$30k)

14. "Efficient Solution Procedures for Rotorcraft Aeroelastic Analysis." National Rotorcraft Technology Center. Principal Investigator (with Drs. L.N. Sankar and M.J. Smith), 1996 – 2001, (\$500k).
15. "Novel Approaches to the Stability Analysis of Complex Rotorcraft Systems." National Rotorcraft Technology Center. Principal Investigator (with Dr. D.A. Peters), 1996 – 2001, (\$375k).
16. "Acoustic Emission Bearing Fault Diagnostics System." AI Signal Research, Huntsville AL. Principal investigator, 1998 – 1999, (\$75k)
17. "Comprehensive Aeromechanical Analysis Using Integrated Analysis Tools." Rotorcraft Industry Technology Association (with Drs. Hodges and Craig), 2000 – 2003, (\$300k)
18. "Multibody Approach to the Dynamic Analysis of Space Structures with Actuated Components." AFOSR. Co-Principal Investigator (with Dr. D.H. Hodges), 2001 – 2004, (\$308k).
19. "Elastically Tailored Smart Composite Rotor Blades." National Rotorcraft Technology Center. Co-Principal Investigator (with Drs. E.A. Armanios and D.S. Dancila), 2001 – 2005, (\$500k).
20. "Finite Element Based Multibody Dynamic Analysis Approach to Rotorcraft Modeling." Principal Investigator, Rotorcraft Industry Technology Association, 2001 – 2003, (\$300k).
21. "Analysis of Rotor Systems with Inter-Blade Dampers." Bell Helicopter. Principal Investigator, 2003, (\$44k).
22. "Hosting the Tenth International Workshop on Dynamics and Aeroelastic Stability Modeling of Rotorcraft Systems." Army Research Office. Principal Investigator, 2003, (\$8k).
23. "Modeling of Unilateral Contact Conditions in Aerospace Systems." AFOSR. Co-Principal Investigator (with Dr. A.A. Ferri), 2003 – 2006, (\$339k).
24. "Multibody Dynamic Analysis Approach to Comprehensive Rotorcraft Modeling." Rotorcraft Industry Technology Association. Principal Investigator, 2004 – 2007, (\$300k).
25. "Comprehensive Aeromechanical Analysis Using Integrated Analysis Tools." Rotorcraft Industry Technology Association (with Drs. Hodges and Craig), 2004 – 2006, (\$200k)
26. "Multibody Dynamics Approach to the Comprehensive Modeling of Rotorcraft Systems." Army Research Office. Principal Investigator, 2005, (\$30k)
27. "Unsteady Trim Procedures for the Simulation of Maneuvering Rotorcraft with Comprehensive Models." Army Research Office. Principal Investigator, (with Dr. Carlo L. Bottasso), 2005 – 2008, (\$227k)

28. "Validation of Comprehensive Multibody Code for the UH-60 Aircraft." Sikorsky Aircraft. Principal Investigator, 2005 – 2006, (\$96k)
29. "Multibody Dynamic Analysis Approach to Comprehensive Rotorcraft Modeling." Center for Rotorcraft Innovation. Principal Investigator, 2007 – 2010, (\$300k).
30. "Semi-active damper concepts for rotorcraft." Materials Technology Corporation. Principal Investigator, 2005 – 2006, (\$85k)

8.2 As Investigator

1. "Micro-cracking of Ceramic Matrix composites." High Temperature Structural Composites Program; DARPA/ONR. Leading investigator, 1986 – 1987, (\$35k)
2. "Revolutionary Physics-Based Design Tools for Quiet Helicopters." Defense Advanced Research Project Agency (with Drs. Sankar, Brentner, Long, Menon, Morris, Ruffin, Smith, Gandhi), 2005 – 2006, (\$2,400k)
3. "Combat Search and Rescue (CSAR) Vertical Takeoff and Landing Gyrodyne Demonstrator Aircraft "HELIPLANE" Phase 1." Defense Advanced Research Project Agency (with Drs. Schrage, Ahuja, Hodges, Komerath, Sankar), 2005 – 2006, (\$1,200k)
4. "Innovative Strategies for Rotary-Wing Coupled Aeroelastic Simulations." NASA. Co-Principal Investigator, (with Dr. Marilyn Smith), 2007 – 2010, (\$453k)

9 Presentations

1. "Finite Element Approach to Rotor Blade Modeling," and
2. "A Comparison of composite Rotor Blade Models." Presented at the Technical Workshop on Dynamics and Aeroelastic Stability Modeling of Rotor Systems held at the Georgia Institute of Technology, Atlanta GA, Dec. 4 – 5 1985.
3. "Box Beam Analysis: Theory and Experiments." Invited Seminar at the Virginia Polytechnic Institute, Blacksburg VA, May 7, 1986.
4. "Warping Deformations in Composite Helicopter Rotor Blades." Invited Seminar at the Chung Shan Institute, Long Tang, Taiwan, Jun. 12, 1986.
5. "Torsional Buckling and Damage Tolerance of Graphite/Epoxy Shafts." Presented at the Workshop on Composite Material and Structures held at the Rensselaer Polytechnic Institute, Troy NY, Sep. 10 – 11, 1986.
6. "Innovative Design with Composite Materials." Invited Presentation at the Winter Gordon Research Conference on Composites, Santa Barbara CA, Jan. 12 – 16 1987.
7. "Finite Elements Approach to Helicopter Blade Aeroelasticity." Invited Seminar at United Technologies Research Center, Hartford CT, May 19, 1987.

8. "Nonlinear Composite Beam Theory," and
9. "An Approach to Ideal Twist Distribution in Tilt Rotor VTOL Blade Design." Presented at the Workshop on Dynamics and Aeroelastic Stability Modeling of Rotor Systems held at the Florida Atlantic University, Boca Raton FL, Nov. 18 – 20 1987.
10. "Applications of Composite Materials to Helicopter Structures." Presented at the Center for Composite Materials and Structures Overview, held at the Rensselaer Polytechnic Institute, Troy NY, Mar. 2 – 3, 1988.
11. "Nonlinear Dynamic Analysis of Composite Helicopter Rotor Blade." Invited Seminar at Syracuse University, Syracuse NY, Mar. 4, 1988.
12. "Dynamic Analysis of a Model Rotor in a Vacuum." Presented at the Second Workshop on the Integrated Technology Rotor, NASA Ames Research Center, Moffet Field CA, Aug. 2 – 3, 1988.
13. "A Finite Element Based Modal Approach to Multibody Dynamics." Presented at the ARO Workshop on Multibody Dynamics, Research Triangle Park NC, Dec. 12, 1988.
14. "Nonlinear Dynamic Analysis of Composite Helicopter Rotor Blade." Invited Seminar at National Taiwan University, Taipei, Taiwan, Republic of China, Dec. 27, 1988.
15. "DYMORE: A Finite Element Based Modal Analysis for Rotorcraft Modeling." Presented at Sikorsky Aircraft, Stratford CT, May 10, 1989.
16. "Torsional Buckling Analysis and Damage Tolerance of Graphite/Epoxy Helicopter Drive Shafts." Presented at the 45th Annual Forum of the American Helicopter Society, Boston MA, May 22 – 24, 1989.
17. "Analysis and Design of Curved Composite Beams." Presented at the 2nd International Workshop on Composite Materials and Structures for Rotorcraft, Rensselaer Polytechnic Institute, Troy NY, Sep. 14 – 15, 1989.
18. "Nonlinear Dynamics of Flexible Multibody Systems with Rotating Components." Presented at the 5th DAMVIBS meeting, NASA Langley Research Center, Hampton VA, Sep. 10 – 11, 1990.
19. "Dynamic Analysis of Rotor Flex-Structures Based on Nonlinear Anisotropic Shell Models," and
20. "On The Choice of Appropriate Bases for Nonlinear Dynamic Modal Analysis." Presented at the International Technical Specialists' Meeting on Rotorcraft Basic Research, Georgia Institute of Technology, Atlanta GA, Mar. 25 – 27, 1991.
21. "Direct Integration of Helicopter Rotor Nonlinear Finite Element Dynamic Equations," and

22. "Multibody Formulation for Helicopter Nonlinear Dynamic Analysis." Presented at the Fourth Workshop on Dynamics and Aeroelastic Stability Modeling of Rotorcraft Systems. University of Maryland, College Park MD, Nov. 19 – 21, 1991.
23. "On Design and Optimization of Curved Composite Beams." Presented at the 48th Annual Forum of the American Helicopter Society, Washington DC, June 3 – 5, 1992.
24. "Multibody Formulation for Helicopter Nonlinear Dynamic Analysis." Presented at Bell Helicopter Textron, Inc. Fort Worth TX, Aug. 27, 1992.
25. "Energy Balance Methodologies for Helicopter Stability Analysis." Presented at Boeing Helicopter Corporation, Philadelphia PA, Jul. 8, 1992.
26. "Comprehensive Structural Dynamic Analysis Methodologies for Rotorcraft." Presented at United Technologies Sikorsky Aircraft, Stratford CT, Jul. 13, 1992.
27. "Structural Models for Comprehensive Rotorcraft Analysis." Presented at the Beamology Workshop, NASA Ames Research Center, Moffet Field CA, Oct. 13, 1992.
28. "Dynamic Analysis of a Helicopter Tail-rotor Based on Nonlinear Shell Models." Presented at the ASME Winter annual Meeting, Anaheim CA, Nov. 9 – 13, 1992.
29. "Multibody Formulation for Nonlinear Dynamic Analysis." Presented at the Rensselaer Polytechnic Institute Civil Engineering Department Seminar Series, Troy NY, Nov. 24, 1992.
30. "Secondary Stresses in Composite Sandwich Structures and Curved Frame Members." Presented at the Gordon Research Conference on Composites, Ventura CA, Jan. 11 – 15, 1993.
31. "Helicopter Blade Design for Vibration Minimization By Optimal Placement of Moving Masses." Presented at the AHS International Technical Specialists' Meeting on Multidisciplinary Design Optimization, Atlanta GA, Apr. 27 – 28, 1993.
32. "Eigendeformation Modes in Beams and Plates." Presented at the Second U.S. National Congress on Computational Mechanics, Washington DC, Aug. 16 – 18, 1993.
33. "Nonlinear Dynamic Analysis of Multibody Systems." Presented at Rensselaer Polytechnic Institute, Troy NY, Oct. 6, 1993.
34. "Nonlinear Damper Effect on Ground Resonance." Presented at the Fifth International Workshop on Dynamics and Aeroelastic Stability Modeling of Rotorcraft Systems, Rensselaer Polytechnic Institute, Troy NY, Oct. 18 – 20, 1993.
35. "Multibody Formulation for Tandem Rotor Helicopters." Presented at Boeing Helicopter Company, Philadelphia PA, Feb. 22, 1994.
36. "Multibody Formulations for Rotorcraft Aeroelasticity." Presented at United Technologies Sikorsky Aircraft Division, Stratford CT, May 5, 1994.

37. "A Multibody Formulation for Helicopter Structural Analysis." Presented at the Army Applied Aviation Technology Directorate, NASA Langley Research Center, Hampton VA, Nov. 18, 1993.
38. "Dynamics of Helicopter Rotors with Movable Masses." Presented at the Vehicle Structures Directorate, NASA Langley Research Center, Hampton VA, Jun. 14, 1994.
39. "Multibody Formulations for Rotorcraft Aeroelasticity," and
40. "Computation of the Sectional Properties of Beams." Presented at NASA Ames Research Center, Moffet Field CA, Jul. 20, 1994.
41. "Multibody Formulation for Rotorcraft Dynamic Analysis." Presented at School of Aerospace Engineering, Georgia Institute of Technology, Atlanta GA, Oct. 4, 1994.
42. "Multibody Formulation for Power Transmission Drive Systems." Presented at the KAMATICS Corporation, Bloomfield CT, Oct. 1, 1994.
43. "Energy Decaying Scheme with Adaptive Time Step Methodology for Nonlinear Beam Models," and
44. "Dynamic Analysis of Nonlinear Elastic Multibody Systems Using Energy Decaying Schemes." Presented at the 36th Structures, Structural Dynamics, and Materials Conference, New Orleans LA, Apr. 10 – 13, 1995.
45. "Multibody Formulation for Rotorcraft Dynamic Analysis." Presented at the American Helicopter Society 51st Annual Forum and Technology Display, Fort-Worth TX, May 9 – 11, 1995.
46. "Dynamic Analysis of Helicopter Airframe Components." Presented at the 6th International Workshop on Dynamics and Aeroelastic Stability Modeling of Rotorcraft Systems, University of California in Los-Angeles, Los-Angeles CA, Nov. 22 – 24, 1995.
47. "Nonlinear Aeroelastic Effects in Damage Composite Aerospace Structures." Presented at the AFOSR Structural Mechanics Workshop, Virginia Beach VA , Jun. 24 – 27, 1996.
48. "Energy Decaying Schemes for Nonlinear Elastic Multibody Systems." Presented at the pre-nominated session on multibody dynamics at the 19th International Congress of Theoretical and Applied Mechanics, Kyoto Japan, Aug. 24 – 30, 1996.
49. "Advanced CFD and CSD Methods for Multi-Disciplinary Applications in Rotorcraft Problems." Presented at the 6th AIAA/NASA/USAF Multi-Disciplinary Analysis and Optimization Symposium, Bellevue WA., Sep. 4 – 6, 1996.
50. "Computational Schemes for the Analysis of Nonlinear Elastic Multibody Systems." Presented at the Georgia Institute of Technology Mechanics Seminar Series, Atlanta GA, Dec. 5, 1996.

51. “Nonlinear Aeroelastic Effects in Damaged Composite Aerospace Structures.” Presented at the 35th Aerospace Sciences Meeting and Exhibit, Reno NV, Jan. 6 – 9, 1997.
52. “Improved Finite Element Modeling of Helicopter Airframe Connections.” Presented at the American Helicopter Society 53st Annual Forum and Technology Display, Virginia Beach VA, Apr. 29 – May 1, 1997.
53. “Computational Schemes for Nonlinear Elastodynamics and Multibody Dynamics.” Presented at the 4th National Congress on Theoretical and Applied Mechanics, Brussels, May 22 – 23, 1997. (Keynote lecture)
54. “Computational Schemes for Nonlinear Elastic Multibody Systems.” Presented at the 16th Biennial Conference on Mechanical Vibration and Noise, Sacramento CA, Sep. 14 – 17, 1997.
55. “A Comparison of Various Methods for Stability Analysis.” Presented at the Seventh International Workshop on Dynamics and Aeroelasticity Stability Modeling, St. Louis MO, Oct. 14 – 16, 1997.
56. “An Implicit Floquet Theory for Rotorcraft Stability Analysis.” Presented at the American Helicopter Society 54th Annual Forum and Technology Display, Washington DC, May 20 – 22, 1998.
57. “Analysis of Flexible Multibody Systems with Intermittent Contacts.” Presented at the Seventh Conference on Nonlinear Vibrations, Stability, and Dynamics of Structures, Blacksburg VA, Jul. 26 – 30, 1998.
58. “On the Modeling of Prismatic Joints in Flexible Multibody Systems,” and
59. “On the Modeling of Friction and Rolling in Flexible Multibody Systems.” Presented at the Sixth Pan-American Congress on Applied Mechanics, Rio de Janeiro, Brazil, Jan. 4 – 8, 1999.
60. “Reduced Order Models for Aeroelastic Stability Analysis.” Presented at the 40th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, St Louis MO, April 12 – 15, 1999.
61. “On the Modeling of Cylindrical and Prismatic Joints in Flexible Multibody Systems.” Presented at EUROMECH Colloquium 404 of Advances in Computational Multibody Dynamics, Lisbon, Portugal, Sep. 20 – 23, 1999.
62. “On the Modeling of Variable Diameter Tilt Rotor.” Presented at the Eighth Army Research Office Workshop on Aeroelasticity of Rotorcraft Systems, Penn State University, State College PA, Oct 18 – 20, 1999.
63. “Contact Conditions for Cylindrical, Prismatic, and Screw Joints in Flexible Multibody Systems.” Invited Seminar, ETH seminar series in Applied Mechanics, ETH Zürich, Jan. 13, 2000.

64. "Finite Element Based Multibody Dynamics Approach to Rotorcraft Modeling." Presented at United Technologies, Sikorsky Aircraft, Stratford CT, Mar. 16, 2000.
65. "Computational Schemes for Nonlinear Elasto-Dynamics," and
66. "Contact Conditions for Cylindrical, Prismatic, and Screw Joints in Flexible Multibody Systems," and
67. "On the Modeling of Friction and Rolling in Flexible Multibody Systems." Presented at the 41th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, Atlanta GA, Apr. 3 – 6, 2000.
68. "Stability Analysis of Comprehensive Rotorcraft Models." Presented at the American Helicopter Society 56th Annual Forum and Technology Display, Virginia Beach VA, May 2 – 4, 2000.
69. "Numerical and Physical Stability Analysis of Flexible Multibody Systems." Invited presentation at the NATO Advanced Research Workshop on Computational Aspects of Nonlinear Structural Systems with Large Rigid Body Motions. Pultusk, Poland, Jul. 2 – 7, 2000.
70. "An Implicit Transition Matrix Approach to Stability Analysis of Flexible Multibody Systems." Presented at the 20th International Congress of Theoretical and Applied Mechanics, Chicago IL, Aug. 27th – Sep. 2nd, 2000.
71. "A Multibody Dynamics Approach to the Modeling of Wind Turbines." Presented at the General Purpose Aeroelastic Code Evaluation Workshop, National Renewable Energy Laboratory, National Wind Turbine Center, Boulder CO, Oct. 23 – 24, 2000.
72. "Multibody Modeling of Engage and Disengage Operations of Helicopter Rotors." Presented at the AHS Rotorcraft Dynamics and Aeromechanics Specialists' Meeting, Atlanta GA, Nov. 13 – 14, 2000.
73. "A Finite Element Based Tool for the Comprehensive Analysis of Rotorcraft Systems." Presented at the Review of Integrated Helicopter Design Tools: Technology for Rotorcraft Integrated Analysis and Design, West Palm Beach FL, Nov. 29 – 30, 2000.
74. "A Finite Element Based Tool for the Analysis of Nonlinear Flexible Multibody Systems." Presented at the Air Force Research Laboratory, Space Vehicle Directorate, Kirtland AFB, NM, March 5th, 2001.
75. "On the Modeling of Shells in Multibody Dynamics." Presented at the First MIT Conference on Computational Fluid and Solid Mechanics, Cambridge, MA, June 12 – 15, 2001.
76. "An Energy Decaying Scheme for Nonlinear Dynamics of Shells." Keynote Lecture presented at the Second European Conference on Computational Mechanics, Cracow, Poland, June 26 – 9, 2001.

77. "A General Purpose Multibody Code Based on Conserving/Dissipative Algorithms." Presented at the Sixth U.S. National Congress on Computational Mechanics, Dearborn, MI, Aug. 1 – 3, 2001.
78. "Modeling of Joints with Clearance In Flexible Multibody Systems." Presented at the 18th Biennial Conference on Mechanical Vibration and Noise, Pittsburgh PA, Sep. 9 – 12, 2001.
79. "On the Modeling of Shells in Multibody Dynamic." Presented at the 18th Biennial Conference on Mechanical Vibration and Noise, Pittsburgh PA, Sep. 9 – 12, 2001.
80. "Comprehensive Aeromechanical Analysis Using Integrated Analysis Tools," and
81. "Finite Element Based Multibody Dynamic Analysis Approach to Rotorcraft Modeling." Presented at the Rotorcraft Industry Technology Association Year End Review in Arlington TX, Feb. 26 – 28, 2002.
82. "Multibody Approach to the Dynamic Analysis of Space Structures with Actuated Components." Presented at the AFOSR Computational Mathematics and Applied Mathematics Program Review, Shalimar FL, May 29 – 31, 2002.
83. "Modeling the Bifilar Pendulum Using Nonlinear, Flexible Multibody Dynamics." Presented at the American Helicopter Society 58th Forum and Technology Display, Montréal, Québec, Canada, Jun. 11 – 13, 2002.
84. "Modeling of a Vibration Absorber Using Nonlinear, Flexible Multibody Dynamics: The Bifilar Pendulum." Presented at the Fifth World Congress on Computational Mechanics. Vienna, Austria, July 7 – 12, 2002.
85. "Dynamic Simulation of Cables and Membranes." Invited presentation at the Fifth World Congress on Computational Mechanics. Vienna, Austria, July 7 – 12, 2002.
86. "Comprehensive Aeromechanical Analysis Using Integrated Analysis Tools," and
87. "Finite Element Based Multibody Dynamic Analysis Approach to Rotorcraft Modeling." Presented at the Rotorcraft Industry Technology Association Year End Review in Phoenix AZ, Feb. 25 – 28, 2003.
88. "Coupled Rotor-Fuselage Analysis with Finite Motions Using Component Mode Synthesis." Presented at the American Helicopter Society 59th Forum and Technology Display, Phoenix AZ, May 6 – 8, 2003.
89. "Modeling of Contact Conditions with Application to Aerospace Systems Involving Backlash, Free-play and Friction." Presented at the 7th US National Congress on Computational Mechanics, Albuquerque NM, July 28 – 30, 2003.
90. "A Self-Stabilized Algorithm for Enforcing Constraints in Multibody Systems." Presented at the 19th Biennial Conference on Mechanical Vibration and Noise, Chicago IL, September 2 – 6, 2003. Paper DECT 2003 VIB-48332.

91. "Validation of Sectional Analysis Tools for Blade Design Process," and
92. "Extension-Twist Coupling Optimization in Composite Rotor Blades." Presented at the Tenth International Workshop on Aeroelasticity of Rotorcraft Systems, Atlanta, Georgia, Nov. 3 - 4, 2003.
93. "Finite Element Based Multibody Dynamic Analysis Approach to Rotorcraft Modeling." Presented at the Rotorcraft Industry Technology Association Year End Review in Atlanta GA, Feb. 18 - 20, 2004.
94. "Modeling of Unilateral Contact in Multibody Systems." Presented at the XXII South-eastern Conference on Theoretical and Applied Mechanics, Tuskegee AL, August 15-17, 2004.
95. "Modeling of Unilateral Contact Conditions in Aerospace Systems." Presented at the Contractor's Meeting in Mechanics of Materials and Devices & Structural Mechanics Wintergreen Resort, Wintergreen, VA, August 18 - 21, 2004.
96. "Development and Validation of Accurate and Efficient Cross-sectional Analysis Tools," and
97. "Finite Element Based Multibody Dynamic Analysis Approach to Rotorcraft Modeling." Presented at the Rotorcraft Industry Technology Association Year End Review in Philadelphia PA, Feb. 15 - 17, 2005.
98. "DYMORE A Finite Element Based Tool for the Analysis of Nonlinear Flexible Multibody Systems." Invited seminar in the Morphing Lecture Series presented at the National Institute of Aerospace in Hampton VA, July 26, 2005.
99. "Modeling of Unilateral Contact Conditions in Aerospace Systems." Presented at the Contractor's Meeting in Mechanics of Materials and Devices & Structural Mechanics, Eldorado Hotel, Santa Fe, NM, Aug. 29 - Sep. 1, 2005.
100. "Modeling Friction Phenomena in Flexible Multibody Dynamics." Presented at the Sixth European Conference on Structural Dynamics, Paris, France, Sep. 4 - 7, 2005.
101. "Stability Analysis of Complex Multibody Systems." Presented at the ASME International Design Engineering Technical Conferences and Computers and Information in Engineering Conference, Long Beach, CA, Sep. 24 - 28, 2005.
102. "Aeromechanical Stability Augmentation Using Semi-active Friction Modulation of Lag Dampers," and
103. "On the Modeling of Hydraulic Components in Rotorcraft Systems," and
104. "Stability Analysis of Complex Rotorcraft Systems." Presented at the Eleventh International Workshop on Rotorcraft Dynamics and Aeroelasticity, Boca Raton, Florida, October 12-14, 2005.

105. "Finite Element Based Multibody Dynamic Analysis Approach to Rotorcraft Modeling." Presented at the Center for Rotorcraft Innovation Year End Review in Dallas TX, Feb. 21 – 23, 2006.
106. "Efficient and Robust Approaches to the Stability Analysis of Large Multibody Systems." Invited Seminar presented at the University of Illinois at Chicago, Mar. 28, 2006.
107. "On the Modeling of Hydraulic Components in Rotorcraft Systems," Best paper in the session award, and
108. "The Semi-Active Coulomb Friction Damper Concept." Presented at the American Helicopter Society 62nd Forum and Technology Display, Phoenix AZ, May 9 – 11, 2006. Best paper in the session award.
109. "DYMORE: A Finite Element Based Tool for Coupled CSD/CFD Aeroelastic Simulation of Rotorcraft." Invited seminar presented at the NASA Langley Research Center, Hampton VA, July 13, 2006.
110. "Stability Analysis of Complex Multibody Systems." Presented at the 7th World congress on Computational Mechanics, Los Angeles CA, July 16-22, 2006.
111. "Development and Validation of Accurate and Efficient Cross-sectional Analysis Tools," and
112. "Finite Element Based Multibody Dynamic Analysis Approach to Rotorcraft Modeling." Presented at the Center For Rotorcraft Innovation Year End Review in Philadelphia PA, Feb. 14 – 15, 2007.
113. "Improved Computational Strategies for Rotor Blades Presenting High Gradients in Sectional Properties," and
114. "Efficient and Robust Approaches for Rotorcraft Stability Analysis." Presented at the American Helicopter Society 63rd Forum and Technology Display, Virginia Beach VA, May 1 – 3, 2007.
115. "Stability Evaluation and System Identification for Rotorcraft Systems." Invited seminar presented at Konkuk University, Seoul, South Korea, June 15, 2007.
116. "Enforcing Constraints in Multibody Systems: A Review." Invited seminar presented at Seoul National University, Seoul, South Korea, June 17, 2007.
117. "Performance Evaluation of Numerical Integration Schemes for Flexible Multibody Systems," and
118. "Optimal Control Based on Subspace Identification Algorithms for Multibody Systems." Presented at the MULTIBODY DYNAMICS 2007, ECCOMAS Thematic Conference, Milano, Italy, 25–28 June 2007.

119. “DYMORE: A Finite Element Based Tool for coupled CSD/CFD Aeroelastic Simulations.” Invited seminar presented at Bell Helicopter, Dallas, Texas, July 19, 2007.
120. “Enforcing Constraints in Multibody Systems: A Review” Presented at the ASME International Design Engineering Technical Conferences and Computers and Information in Engineering Conference, Las Vegas, NV, Sep. 4 – 7, 2007. Keynote Lecture.
121. “Stability Evaluation and System Identification of Flexible Multibody Systems” Presented at the International Forum on Rotorcraft Multidisciplinary Technology for Dual Applications, Seoul, South-Korea, Oct 15–17, 2007.
122. “Enforcing Constraints in Multibody Systems: A Review” Invited seminar presented at Seoul National University, South-Korea, Oct. 17, 2007.
123. “Finite Element Based Multibody Dynamic Analysis Approach to Rotorcraft Modeling.” Presented at the Center for Rotorcraft Innovation Year End Review in Phoenix AZ, Feb. 19 – 20, 2008.
124. “Effect of Modeling Approximations on the Stability of Autopilot Controllers.” Presented at the American Helicopter Society 64th Forum and Technology Display, Montréal, Québec, Canada, April 29 – May 1, 2008.
125. “Flexible Multibody Dynamic Simulations.” Invited Seminar presented at the Charles Stark Draper Laboratory, Cambridge, Massachusetts, July 31st, 2008.

10 Graduate students

10.1 Past doctoral students

1. Hong, C.H.: “Finite Element Approach to the Dynamic Analysis of Composite Helicopter Blades.” Rensselaer Polytechnic Institute Doctoral Thesis, October 1987.
2. Chiang, W.Y.: “Structural Dynamic Analysis of Bearingless Rotor Blades.” Rensselaer Polytechnic Institute Doctoral Thesis, May 1992.
3. Peck, A.W.: “Design and Analysis of Curved Composite Components for Rotorcraft Fuselage Frames.” Rensselaer Polytechnic Institute Doctoral Thesis, Aug. 1992.
4. Kang, N.K.: “Nonlinear Multibody Formulation for Rotorcraft Analysis.” Rensselaer Polytechnic Institute Doctoral Thesis, May 1993.
5. Damilano, G.J.: “Finite Element Methods for Nonlinear Elastic Constrained Multibody Systems.” Rensselaer Polytechnic Institute Doctoral Thesis, Aug. 1993.
6. Lee, M.R.: “Minimization of Helicopter Rotor Blade Loads Using Formal Optimization and Adjustable Masses.” Rensselaer Polytechnic Institute Doctoral Thesis, Aug. 1993.
7. Theron, N.J.: “Multibody Dynamic Analysis of Helicopter Rotors.” Rensselaer Polytechnic Institute Doctoral Thesis, December 1994.

8. Lee, M.S.: “Nonlinear Finite Element Based Multibody Analysis for Rotor Dynamics.” Rensselaer Polytechnic Institute Doctoral Thesis, Sep. 1995.
9. Yun, S.H.: “Vibration Prediction Capabilities of Helicopter Airframe Connections.” Rensselaer Polytechnic Institute Doctoral Thesis, June 1996.
10. Nikishkov, Y.G.: “Computational Stability Analysis of Dynamical Systems.” Georgia Institute of Technology Doctoral Thesis, Aug. 2000.
11. Rodriguez, J.: “Modeling of Complex Systems using Nonlinear, Flexible Multibody Dynamics.” Georgia Institute of Technology Doctoral Thesis, Aug. 2002.
12. Choi, J.Y.: “Flexible Multibody Analysis of Thin Structures with Actuated Components.” Georgia Institute of Technology Doctoral Thesis, Dec. 2002.
13. Agarwal, S.: “Aeromechanical Stability Augmentation Using Semi-Active Friction Based Lead Lag Damper.” Georgia Institute of Technology Doctoral Thesis, Dec. 2005.
14. Wang, J.L.: “Efficient and Robust Approaches to the Stability Analysis and Optimal Control of Large-Scale Multibody Systems.” Georgia Institute of Technology Doctoral Thesis, Aug. 2007.
15. Liu, H.Y.: “Interfacing Comprehensive Rotorcraft Analysis with Advanced Aeromechanics and Vortex Wake Models.” Georgia Institute of Technology Doctoral Thesis, May 2008.
16. Chakravarty, U.: “SectionBuilder: An Innovative Finite Element Based Tool for Analysis and Design of Composite Beam Cross-Sections.” Georgia Institute of Technology Doctoral Thesis, May 2008.

10.2 Present doctoral students

1. Epple, A.: “Efficient Time Integration Schemes for Multibody Dynamics Simulations.” Passed qualifier exams. Expected graduation Dec. 2008.
2. Ju, C.K.: “Modeling Friction Phenomena in Flexible Multibody Dynamics.” Passed qualifier exams. Expected graduation Dec. 2009.
3. Van Weddingen, Y.: “Friction Based Lead-Lag Dampers for Rotorcraft.” Passed qualifier exams. Expected graduation May. 2010.
4. Zaki, A.: “Unsteady Aerodynamic models for Rotorcraft Applications.” Passed qualifier exams. Expected graduation May. 2010.
5. Heo, Seundo: “Efficient Time Integration Schemes for Multibody Dynamics Simulations.” Expected graduation May. 2012.

11 Short courses

Involved in teaching the following short courses:

1. “Composite Materials and Structures,” short course held at Sikorsky Aircraft in Stratford CT, Oct. 1985, Dec. 1985, and Feb. 1986.
2. “Rotorcraft Structural Dynamic, Vibrations, and Aeroelasticity,” short course held at the Naval Postgraduate School in Monterey CA, Jul. 1986, and 87; and at the Rensselaer Polytechnic Institute Jun. 1987, 88, 89, and 90.
3. “Advanced Composite Materials and Structures,” short course held at the Rensselaer Polytechnic Institute in Jul. 1986, 87, 88, 89, and 90.
4. “Composite Materials and Structures,” short course held at Eastman Kodak Company, Rochester NY, Feb. 1987.
5. “Finite Element Methodologies in Rotorcraft Dynamics,” short course held at Agusta, S.p.a., Gallarate, Italy, May 21 – 23, 1990.
6. “Contemporary Rotorcraft Structural Dynamics and Aeroelasticity,” short course held at Patuxent River Naval Air Station, Lexington Park MD, Aug. 23 – 27, 1993.
7. “Modeling Rotorcraft Systems Using Multibody Formulations,” short course held at The National Institute of Aerospace, June 14 to 18, 2004.
8. “Multibody Dynamics for Rotorcraft: Formulation and Numerical Applications,” short course held at Konkuk University, Seoul, South Korea, July 7-11, 2008 and at Seoul National University, Seoul, South Korea, July 14-18, 2008.

12 Service

12.1 Professional Contributions

1. American Institute of Aeronautics and Astronautics, Senior Member 1985 – present.
2. American Society of Mechanical Engineers, Associate Member 1984 – present.
3. American Helicopter Society, Member 1985 – present. Member: *Dynamics Committee*. (1996 – 1998, 2000 – 2002)
4. Associate Editor: *Journal of the American Helicopter Society*. (1993 – 2005)
5. Advisory Board: *Multibody System Dynamics*. Member 2002 – present.
6. Associate Editor: *Journal of Computational and Nonlinear Dynamics*. (2005 – 2008)
7. Guest Editor: *Computer Methods in Applied Mechanics and Engineering*. Special issue of the “Computational Multibody Dynamics,” January 2006.

12.2 Department and University Committees

1. AE Committee on Post Tenure Review, 2002, Chair.
2. AE Committee on Aeroelasticity and Dynamics, 1995-present; 2001-present, Chair.
3. AE Faculty Honors Committee, 2000-present.
4. AE Committee on Structural Mechanics & Material Behavior, 1995-present.

13 Honors and Awards

1. *Prix Auguste Sacré* awarded by the *Académie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique* for the period 1994 – 2000. In recognition of his work in Structural Dynamics, and Rotors and Rotor Blade Dynamics.
2. The National Aeronautics and Space Administration Group Achievement Award awarded to the NASA/Army UH-60A Airloads Program Team for enabling, for the first time, the characterization and understanding of a helicopter's complex, unsteady, aerodynamic operating environment. May 2007.