

Dr. CORNEL SULTAN

EDUCATION

Purdue University, Ph.D. Aerospace Engineering (1999)

- Thesis: *Modeling, Design, and Control of Tensegrity Structures with Applications*

Purdue University, M.S. Applied Mathematics (1999)

- Major: Numerical Methods

Polytechnic University, Romania, M.S. Aerospace Engineering (1992)

- Thesis: *Bifurcation Theory Applied to Aircraft Dynamics*

EXPERIENCE

2007 - Assist./Assoc./Full Prof., Aerospace and Ocean Engr., Virginia Tech, Blacksburg

2020 - Affiliate Prof., Mechanical Engr., Virginia Tech, Blacksburg

- Teaching and research faculty in Dynamics, Control, and Structures
 - Interests: dynamics, control, structures theory with applications to membranes, tensegrity, rotorcraft, high speed aircraft, energy harvesting systems, etc.
 - Major funding sources: NSF, ONR, AFRL, NAVAIR, ICTAS, UTRC, NASA

2004 - 2007 Staff Engineer, United Technologies Research Center, E. Hartford, CT

- Senior technical position involving initiating, executing, leading projects; selected:
 - PI helicopter projects (heavy lift, swashplateless, formation flying helicopters, etc.)
 - Task leader propulsion systems projects (JSF control, mission adaptive propulsion)

2001 - 2004 Senior Research Engineer, Scientific Systems Company, Woburn, MA

- Technical leadership position in dynamics and control; selected:
 - PI spacecraft formation flying projects (supervisory control, path planning)
 - Task leader system identification (flight simulation, nonlinear system identification)

2001 - 2003 Research Fellow, Harvard University Medical School, Boston, MA

- Research position focused on mathematical modeling of biological systems
 - Cytoskeleton dynamics modeling and analysis using the tensegrity paradigm

1999 - 2001 Research Engineer, Tensegra Inc. (start-up), Boston, MA

- Technical contributor in structural design and optimization
 - Task leader “Artificial Spinal Disc Design” project, including testing and IP
 - Task leader “Non-orthogonal Structures for Aircraft Wings” project

1994 - 1999 Teaching/Research Assist., Aeronautics and Astronautics, Purdue University

- Typical Ph.D. student position and responsibilities
 - Teaching (for five courses) and research assistant (topic: tensegrity structures)

1992 - 1994 Research Engineer, Simulation Systems, Bucharest, Romania

- Research position involving modeling and software engineering
 - Developed mathematical models and software for IAR-99 and RO-BAE aircraft

AWARDS

- 2020, 2014: Excellent Reviewer for AIAA Journal of Guidance, Control, and Dynamics
- 2016: Virginia Tech’s College of Engineering Fellow
- 2012: Virginia Tech’s Scholar of the Week
- 2011: Virginia Tech’s Outstanding New Assistant Professor
- 2010: NSF CAREER

- 2009: Virginia Space Grant Consortium New Faculty Investigator
- 2009: ICTAS Junior Faculty
- 2006, 2007: UTRC Publication Reward
- 1997: Puskas Memorial Fellowship
- 1992, 1991, 1990: Outstanding Student Fellowship (Romania)
- 1989: Special Prize at the Technology of Materials Contest, National Phase (Romania)
- 1988: Academy of Science Prize at the Mathematics Olympiad, National Phase (Romania)

PUBLICATIONS

- Student/postdoc underlined, Google Scholar data: citations around 3000, h-index: 26

Book Chapters

1. **Sultan, C., Tensegrity: Sixty Years of Art, Science and Engineering. In *Advances in Applied Mechanics*, 43, 69-145, 2009**
2. Huang, S., **Sultan, C.**, Ingber, D.E., Tensegrity, Dynamic Networks, and Complex Systems Biology: Emergence in Structural and Information Networks within Living Cells. In *Complex Systems Science in Bio-Medicine, New York: Springer Verlag, 283-310, 2006*

Journals

1. Ngo, T., **Sultan, C.**, Van Zwieten, J.H., Xiros, N.I., Constrained Control of Moored Ocean Current Turbines with Cyclic Blade Pitch Variations, *IEEE Journal of Ocean Engineering*, Vol. 46(2), 594-610, 2021
2. Greer W.B., **Sultan, C.**, Infinite Horizon Model Predictive Control Tracking Application to Helicopters, *Aerospace Science and Technology*, Vol. 98, 105675-105691, 2020
3. Greer W.B., **Sultan, C.**, Shrinking Horizon Model Predictive Control Method for Helicopter–Ship Touchdown, *Journal of Guidance, Control, and Dynamics*, Vol. 43(5), 884-900, 2020
4. Gonzalez-Rocha, J., Woolsey, C.A., **Sultan, C.**, De Wekker, S.F.J., Sensing Wind from Quadrotor Motion, *Journal of Guidance, Control, and Dynamics*, Vol. 42(4), 836-852, 2019
5. Yang, S., **Sultan, C.**, Deployment of Foldable Tensegrity-Membrane Systems via Transition Between Tensegrity Configurations and Tensegrity-Membrane Configurations, *International Journal of Solids and Structures*, Vol. 160, 103-119, 2019
6. **Sultan, C.**, Close Tracking of Equilibrium Paths, *International Journal of Robust and Nonlinear Control*, Vol. 28(6), 2209-2230, 2018
7. Sudalagunta, P.R., **Sultan, C.**, Kapania, R.K., Watson, L.T., Raj, P., Aeroelastic Control-Oriented Modeling of an Airbreathing Hypersonic Vehicle, *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 41(5), 1136-114, 2018
8. Pyakurel, P., Van Zwieten, J.H., **Sultan, C.**, Dhanak, M., Xiros, N.I., Numerical Simulation and Dynamical Response of a Moored Hydrokinetic Turbine Operating in the Wake of an Upstream Turbine for Control Design, *Renewable Energy*, Vol. 114, 1134-1145, 2017
9. Yang, S., **Sultan, C.**, LPV Control of a Tensegrity-Membrane System, *Mechanical Systems and Signal Processing*, Vol. 95, 397-424, 2017

10. Morris, C.C., **Sultan, C.**, Schetz, J.A., Kapania, R.K., State Variance Based Approach to Flight Dynamic Constraints in Multidisciplinary Design Optimization, *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 40(5), 1206-1220, 2017
11. Yang, S., **Sultan, C.**, A Comparative Study on the Dynamics of Tensegrity-membrane Systems Based on Multiple Models, *International Journal of Solids and Structures*, Vol. 113, 47-69, 2017
12. Yang, S., **Sultan, C.**, Control Oriented Modeling and Deployment of Tensegrity Membrane Systems, *International Journal of Robust and Nonlinear Control*, Vol. 27(16), 2722–2748, 2017
13. Tzelepis, V., Xiros, N.I., Van Zwieten, J.H., **Sultan, C.**, System Modeling and Simulation of In-Stream Hydrokinetic Turbines for Power Management and Control, *ASME Journal of Dynamic Systems, Measurement, and Control*, Vol. 139(5), 051005-1-0510005-15, 2017
14. Sudalagunta, P.R., **Sultan, C.**, Kapania, R.K., Watson, L.T., Raj, P., Accurate Computing of Higher Vibration Modes of Thin Flexible Structures, *AIAA Journal*, Vol. 54(5), 1704-1718, 2016
15. Ngo, T., **Sultan, C.**, Model Predictive Control for Helicopter Shipboard Operations in the Ship Airwakes, *Journal of Guidance, Control, and Dynamics*, Vol. 39(3), 574-589, 2016
16. Van Zwieten, J.H., Pyakurel, P., Ngo, T., **Sultan, C.**, Xiros, N.I., An Assessment of Using Variable Blade Pitch for Moored Ocean Current Turbine Flight Control, *International Journal of Marine Energy*, Vol. 13, 16-26, 2016
17. Yang, S., **Sultan, C.**, Modeling of Tensegrity Membrane Systems, *International Journal of Solids and Structures*, Vol. 82, 125-143, 2016
18. Oktay, T., **Sultan, C.**, Comfortable Helicopter Flight Via Passive/Active Morphing, *IEEE Transactions on Aerospace and Electronic Systems*, Vol. 51(4), 2776-2786, 2015
19. Ferhat, I., **Sultan, C.**, System Analysis and Control Design for a Membrane with Bimorph Actuators, *AIAA Journal*, Vol. 53(8), 2110-2120, 2015
20. Oktay, T., **Sultan, C.**, Flight Control Energy Saving via Helicopter Rotor Active Morphing, *AIAA Journal of Aircraft*, Vol. 51(6), 1784-1804, 2014
21. Morris, C.C., Allison, D.L., Schetz, J.A., Kapania, R.K., **Sultan, C.**, Parametric Geometry Model for Design Studies of Tailless Supersonic Aircraft, *AIAA Journal of Aircraft*, Vol. 51(5), 1455-1466, 2014
22. **Sultan, C.**, Tensegrity Deployment Using Infinitesimal Mechanisms, *International Journal of Solids and Structures*, Vol. 51(21), 3653-3668, 2014
23. Sunny, M., **Sultan, C.**, Kapania, R.K., Optimal Energy Harvesting from a Membrane Attached to a Tensegrity Structure, *AIAA Journal*, Vol. 52(2), 307-319, 2014
24. Oktay, T., **Sultan, C.**, Variance Constrained Control of Maneuvering Helicopters with Sensor Failure, *Journal of Aerospace Engineering, Proceedings of the Institution of Mechanical Engineers Part G*, Vol. 227, 1845-1858, 2013
25. Oktay, T., **Sultan, C.**, Modeling and Control of a Helicopter Slung-Load System, *Aerospace Science and Technology*, Vol. 29, 206-222, 2013
26. **Sultan, C.**, Stiffness Formulations and Necessary and Sufficient Conditions for Exponential Stability of Prestressable Structures, *International Journal of Solids and Structures*, Vol. 50(14-15), 2180-2195, 2013
27. Oktay, T., **Sultan, C.**, Simultaneous Helicopter and Control System Design, *AIAA Journal of Aircraft*, Vol. 50(3), 911-925, 2013

28. **Sultan, C.**, Decoupling Approximation Design Using the Peak to Peak Gain, *Mechanical Systems and Signal Processing*, Vol. 36(2), 582–603, 2013
29. **Oktay, T., Sultan, C.**, Constrained Predictive Control of Helicopters, *Aircraft Engineering and Aerospace Technology*, Vol. 85(1), 32-47, 2013
30. **Sunny, M., Kapania, R.K., Sultan, C.**, Solution of Nonlinear Vibration Problem of a Prestressed Membrane by Adomian Decomposition, *AIAA Journal*, Vol. 50(8), 1786-1800, 2012
31. **Sultan, C.**, Proportional Damping Approximation Using the Energy Gain and Simultaneous Perturbation Stochastic Approximation, *Mechanical Systems and Signal Processing*, Vol. 24(7), 2210-2224, 2010
32. **Sultan, C.**, Designing Structures for Dynamic Properties via Natural Frequencies Separation; Application to Tensegrity Structures Design, *Mechanical Systems and Signal Processing*, Vol. 23(4), 1112-1122, 2009
33. **Sultan, C., Seereeram, S., Mehra, R.K.**, Deep Space Formation Flying Spacecraft Path Planning, *International Journal of Robotics Research*, Vol. 20(4), 405-430, 2007
34. **Sultan, C., Seereeram, S., Mehra, R.K.**, Energy Sub-Optimal Collision-Free Path Planning for Spacecraft Formation Flying, *AIAA Journal of Guidance, Control, and Dynamics*, Vol. 29(1), 190-192, 2006
35. **Sultan, C., Skelton, R.E.**, A Force and Torque Tensegrity Sensor, *Sensors and Actuators: A. Physical*, Vol. 112(2-3), 220-231, 2004
36. **Sultan, C., Stamenovic, D., Ingber, D.E.**, A Computational Tensegrity Model Explains Dynamic Rheological Behaviors of Living Cells, *Annals of Biomedical Engineering*, Vol. 32(4), 520-530, 2004
37. **Sultan, C., Skelton, R.E.**, Deployment of Tensegrity Structures, *International Journal of Solids and Structures*, Vol. 40(18), 4637-4657, 2003
38. **Sultan, C., Skelton, R.E.**, Tensegrity Structures Prestressability Investigation, *International Journal of Space Structures*, Vol. 18(1), 15-30, 2003
39. **Sultan, C., Corless, M., Skelton, R.E.**, Linear Dynamics of Tensegrity Structures (Invited), *Engineering Structures*, Vol. 26(6), 671-685, 2002
40. **Sultan, C., Corless, M., Skelton, R.E.**, Symmetrical Reconfiguration of Tensegrity Structures, *International Journal of Solids and Structures*, Vol. 39(8), 2215-2234, 2002
41. **Sultan, C., Corless, M., Skelton, R.E.**, The Prestressability Problem of Tensegrity Structures. Some Analytical Solutions, *International Journal of Solids and Structures*, Vol. 38(30-31), 5223-5252, 2001
42. **Sultan, C., Corless, M., Skelton, R.E.**, Tensegrity Flight Simulator, *Journal of Guidance, Control, and Dynamics*, Vol. 23(6), 1055-1064, 2000
43. **Sultan, C.**, Stability and Control of Aircraft at High Angles of Attack. Bifurcation Phenomena, *Revue Roumaine des Sciences Techniques – Mecanique Appliquee*, Vol. 39(6), 693-706, 1994
44. **Sultan, C.**, The Bifurcation of the Set of Symmetric Motions of Aircraft. Persistence Under Perturbations. The Dynamical Case. Hopf Bifurcations, *Revue Roumaine des Sciences Techniques – Mecanique Appliquee*, Vol. 39(3), 255-262, 1994
45. **Sultan, C.**, The Bifurcation of the Set of Symmetric Motions of Aircraft. The Stationary Case, *Revue Roumaine des Sciences Techniques – Mecanique Appliquee*, Vol. 39(2), 165-171, 1994

Conference Proceedings (Selected)

Only papers which did not evolve into journal publications but have/had potential are listed

1. Y. Tang, J. VanZwieten, B. Dunlap, D.A. Wilson, **C. Sultan**, N.I. Xiros, In-Stream Hydrokinetic Turbine Fault Detection and Fault Tolerant Control-A Benchmark Model, *American Control Conference (ACC), Philadelphia, PA, USA, 2019*
2. Greer, W., **Sultan, C.**, Helicopter Ship Landing Envelope for Model Predictive Control, *American Helicopter Society Forum (AHS), Philadelphia, PA, USA, May 13-16, 2019*
3. Ngo, T., **Sultan, C.**, Towards Automation of Helicopter Landings On Ship Decks Using Integer Programming and Model Predictive Control, *AHS, Phoenix, AZ, USA, 2018*
4. Ngo, T., **Sultan, C.**, Van Zwieten, J.H., Xiros, N.I., Model Predictive Control for Moored Ocean Current Turbines, *ACC, Seattle, WA, USA, 2017*
5. **Sultan, C.**, Decoupling Transformations for Linear Systems in the Configuration Space, *ASME Dynamic Systems and Control Conference (DSCC), Columbus, OH, USA, 2015*
6. **Sultan C.**, On the Nonlinear Stability of Prestressable Structures, *ASME International Design and Engineering Technical Conferences (IDETC), Boston, MA, USA, 2015*
7. Rye, M., **Sultan, C.**, Methods for Modeling Tensegrity Dynamics in LEO, *AIAA Science and Technology Forum and Exposition, Orlando, FL, USA, 2015*
8. Ferhat, I., **Sultan, C.**, LQG Control and Robustness Study for a Prestressed Membrane with Bimorph Actuators, *ASME IDETC, Buffalo, NY, USA, 2014*
9. Rye, M., **Sultan, C.**, Modeling and Control of Tensegrity Systems under LEO Gravitational Effects, *AIAA GNC, Boston, MA, USA, 2013*
10. Oktay, T., **Sultan, C.**, Robustness of Variance Constrained Controllers for Complex, Control Oriented Helicopter Models, *ACC, Washington, DC, USA, 2013*
11. **Sultan, C.**, Simple Conditions for Arbitrarily Close Deployment and Equilibrium Paths and Quasistationary Deployment, *IEEE CDC, Cancun, Mexico, 2008*
12. **Sultan, C.**, Seereeram, S., Mehra, R.K., Matrix Inequalities and Energy Optimal Reconfiguration for Deep Space Formation Flying, *AIAA, GNC, Providence, RI, 2004*
13. **Sultan, C.**, Corless, M., Skelton, R.E., Peak to Peak Control of an Adaptive Tensegrity Space Telescope, *SPIE Symposium Smart Structures, Newport Beach, CA, USA, 1999*
14. **Sultan, C.**, Skelton, R.E., Integrated Design of Controllable Tensegrity Structures, *ASME International Mechanical Engineering Congress and Exposition, Dallas, TX, USA, 1997*
15. Weidman, P.D., **Sultan, C.**, Georgescu, A., Numerical Solutions of the Stability of Rigidly Rotating Immiscible Fluids, *Romanian Conf. Applied Industrial Math., Romania, 1993*

Patents

1. Manasas, M., Oslakovic, K., **Sultan, C.**, Hamilton, J., Ingber, D.E., Sammarco, C., Kummilil, J., Skinner, D., Orthopedic Implant and Method of Making Metal Articles, *US Patent 6520996, February 18, 2003*

MAJOR INVITED LECTURES

1. Energy Harvesting from Ocean Currents, **University of Virginia, Electrical and Computer Engineering Department, Charlottesville, VA, USA, November 1, 2019**
2. Model Predictive Control Design for Helicopter Ship Landing in Realistic Environments, George Washington University, **Mechanical and Aerospace Engineering Department, Washington, D.C., USA, November 16, 2018**

3. **Model Predictive Control Design for Helicopter Ship Landing in Realistic Environments, Rensselaer Polytechnic Institute, Mechanical Aerospace and Nuclear Engineering Department, Troy, NY, USA, November 29, 2017**
4. **Decoupling Approximation Design using Operator Norms, University of Pittsburgh, Applied Mathematics Seminar, Mathematics Department, Pittsburgh, PA, USA, September 29, 2017**
5. **Model Predictive Control for Helicopter Ship Landing Operations in Realistic Environments, University of Washington, Aerospace Engineering Department, Seattle, WA, USA, May 23, 2017**
6. **Decoupling Approximation Design, Villanova University, Mechanical Engineering Department, Villanova, PA, USA, March 18, 2016**
7. **Enabling System Analysis and Control by Design, Mechanical and Aerospace Engineering Department, Ohio State University, Columbus, OH, USA, March 4, 2016**
8. **Decoupling Approximation Design, Cornell University, Ithaca, NY, USA, Mathematics Department, February 29, 2016**
9. **Energy Harvesting from Vibrating Structures and Ocean Currents, West Virginia University, Mechanical and Aerospace Engineering Department, Morgantown, WV, USA, February 19, 2016**
10. **System Decoupling By Design; Application to Tensegrity Structures, University of Connecticut, Mechanical Engineering Department, Storrs, CT, USA, March 6, 2015**
11. **Modeling and Design for Control: Tensegrity and Helicopters, Duke University, Mechanical Engineering and Material Science Department, Durham, NC, USA, February 25, 2015**
12. **Bio-inspired Tensegrity Structures, Wake Forest University, Physics Department, Winston-Salem, NC, USA, February 11, 2015**
13. **System Decoupling By Design; Application to Tensegrity Structures, University of Texas at Austin, Aerospace and Engineering Mechanics Department, Austin, TX, USA, November 10, 2014**
14. **System Decoupling By Design; Application to Tensegrity Structures, University of North Carolina at Charlotte, Mechanical Engineering Department, Charlotte, NC, USA, October 16, 2014**
15. **Integrating Modeling Control and Design; Application to Blade Morphing Helicopter Design, Army Research Laboratory, Aberdeen, MD, USA, September 3, 2014**
16. **New Results in Blade Morphing Helicopter Design and MPC for Ship Landing Operations, United Technologies Research Center, Hartford, CT, USA, April 11, 2014**
17. **Modeling, Control, and Integrated Design: Application to Blade Morphing Helicopters, North Carolina State University, Mechanical and Aerospace Engineering Department, Raleigh, NC, USA, December 6, 2013**
18. **Guaranteeing Accurate Decoupled Approximations Via Structural Design, Michigan Technological University, Mechanical Engineering Department, Houghton, MI, USA, October 31, 2013**
19. **Bio-inspired Tensegrity Structures, Boston College, Physics Department, Boston, MA, USA, September 25, 2013**
20. **Decoupling by Design: Application to Tensegrity Structures, State University of New York, Mechanical and Aerospace Engineering Department, Buffalo, NY, USA, September 5, 2013**

21. Decoupling Systems by Design, **Mitsubishi Electric Research Laboratory, Cambridge, MA, USA, August 23, 2013**
22. Decoupling of Structural Models and Integrated Control and Helicopter Design, **National Institute of Aerospace, Hampton, VA, USA, July 12, 2013**
23. Design and Control for Tensegrity and Blade Morphing Helicopters, **University of Colorado, Aerospace Engineering Department, Boulder, CO, USA, April 26, 2013**
24. Design for Control: Tensegrity and Helicopters, **Boston University, Mechanical Engineering Department, Boston, MA, USA, April 12, 2013**
25. Harvesting Energy From Vibrating Tensegrity Membranes, **University of New Mexico, Mechanical Engineering Department, Albuquerque, NM, USA, January 18, 2013**
26. Dynamic Design of Tensegrity Structures, **University of New Orleans, Naval and Mechanical Engineering Department, New Orleans, LA, USA, November 16, 2012**
27. Modeling and Designing for Control: Tensegrity and Helicopters, **University of Texas at Arlington, Mechanical and Aerospace Engineering Department, Arlington, TX, USA, May 4, 2012**
28. Tensegrity and Membranes for Control and Energy Harvesting, **Carnegie Mellon University, Civil and Mechanical Engineering Departments, Pittsburgh, PA, USA, February 23, 2012**
29. Tensegrity Structures Deployment and Design for Energy Harvesting and Control, **Michigan State University, Mechanical and Electrical Engineering Departments, Lansing, MI, USA, November 8, 2011**
30. Tensegrity Structures Design for Control, Energy Harvesting, and Deployment, **Pennsylvania State University, Aerospace Engineering Department, State College, PA, USA, October 21, 2011**
31. Mathematics in Tensegrity and Control Design, **University of Pittsburgh, Mathematics Department, Johnstown, PA, USA, September 29, 2011**
32. Fast Algorithms for Formation Trajectory Generation, **Supelec, Automatic Control Department, Paris, France, September 5, 2011**
33. Dynamic Design of Tensegrity Structures and Membranes for Control and Energy Harvesting, **Iowa State University, Electrical and Computer Engineering Department, Ames, IA, USA, March 28, 2011**
34. Coordinated Vehicles, Rotorcraft and Energy Harvesting Research, **Naval Surface Warfare Center, Dahlgren, VA, USA, May 20, 2009**
35. Helicopter Model Complexity Reduction for Modern Control Design, **Boeing Rotorcraft, Philadelphia, PA, USA, January 8, 2009**
36. Tensegrity Structures: 60 Years of Art, Science and Engineering, **University of New Mexico, Electrical and Computer Engineering Department, Albuquerque, NM, USA, September 2, 2008**
37. Tensegrity in Deployable Structures and Motion Simulation, **Universitat Politècnica de Catalunya, Robotics Institute, Barcelona, Spain, June 3, 2008**
38. Minimization and Equalization of Energy for Formations Flying in Deep Space, **University of Zaragoza, Spain, May 30, 2008**
39. Tensegrity Structures, Between Art and Engineering, **University of Beira Interior, Covilha, Portugal, May 21, 2008**
40. Tensegrity Structures in Engineering, **Virginia Tech, Aerospace and Ocean Engineering Department, Blacksburg, VA, USA, April 2, 2007**

41. Tensegrity in Art and Engineering, **University of Connecticut, Mechanical Engineering Department, Storrs, CT, USA, February 16, 2007**
42. Tensegrity: History and Perspectives, **Texas A&M University, Aerospace Engineering Department, College Station, Texas, USA, March 7, 2006**
43. Energy Minimization and Equalization for Formation Flying Spacecraft, **Texas A&M University, Aerospace Engineering Department, College Station, Texas, USA, March 7, 2006**
44. Dynamic Networks Analysis and Robust Uncertainty Management, **Army Research Laboratory Advanced Microsystems Workshop, Research Triangle Park, NC, USA, January 31, 2006**
45. Aim High: Building Successful Careers in Aerospace Engineering, **University "Politehnica", Aerospace Engineering Department, Bucharest, Romania, December 19, 2005**
46. Swarms Research: Bridging the Gap Between Academia and Industry, **Invited Industry Speaker at the Swarms Workshop, Napa, CA, USA, August 3, 2005**
47. Tensegrity Structures: Theory and Applications, **United Technologies Research Center, East Hartford, CT, USA, June 14, 2004**
48. Tensegrity Structures, **NASA Jet Propulsion Laboratory, Caltech, Pasadena, CA, USA, June 15, 2003**
49. Mathematical Modeling of Cell's Dynamics, **University of Virginia, Mechanical and Aerospace Engineering Department, Charlottesville, VA, USA, October 3, 2002**
50. Form Finding and Deployment of Tensegrity Structures, **University of Rome "Tor Vergata", Rome, Italy, September 6, 2002**
51. Tensegrity Structures and Cell Dynamics, **University of California at San Diego, Mechanical and Aerospace Engineering Department, La Jolla, USA, July 12, 2002**
52. Cable Controlled Structures in Flight Simulation, **Scientific Systems Company Inc., Woburn, MA, USA, November 2, 2001**
53. Deployment and Geometry Control of Tensegrity Structures, **University of Montpellier, Laboratoire de Mechanique et Genie Civil, Montpellier, France, March 20, 2001**
54. Analytical Solutions and Deployment Strategies for Tensegrity Structures, **Cornell University, Mathematics Department, Ithaca, USA, October 15, 2000**
55. Deployable Tensegrity Structures in Flight Simulation Technology, **Carnegie Mellon University, Robotics Institute, Pittsburgh, USA, September 29, 2000**
56. Research in Tensegrity Structures, **Molecular Geodesics Inc., Boston, MA, USA, March 23, 1999**
57. Tendon Controlled Tensegrity Structures with Industrial Applications, **University of British Columbia, Electrical and Computer Engineering Department, Vancouver, Canada, February 19, 1999**
58. Analytical Solutions of the Prestressability Problem and Deployment Strategies for Tensegrity Structures, **University of East Anglia, Mathematics Department, Norwich, UK, January 18, 1999**
59. Analytical Solutions for Deployable Tensegrity Structures, **University of Cambridge, Engineering Department, Cambridge, UK, January 15, 1999**

WORKSHOPS/TUTORIALS

1. “Controllable Tensegrity Structures and Membranes”, ASME DSCC 2020 (sole presenter)
2. “Energy Harvesting Systems”, ASME IDETC, 2019 (sole presenter)
3. “Autonomous Control for Rotorcraft Operation”, ASME DSCC 2018 (sole presenter)
4. “Advanced Rotorcraft Control”, ASME DSCC, 2017 (sole presenter)
5. “Bio-inspired Controllable Structural Networks”, ASME IDETC, 2016 (sole presenter)
6. “Biological Collections as a Resource for Technical Innovations”, Smithsonian’s National Museum of Natural History, Washington, DC, May 10, 2016 (NSF sponsored)
7. “Energy Harvesting”, ASME DSCC, 2015 (with Lei Zuo)
8. “Future Career Path Selection and Development”, ASME DSCC, 2014 (many presenters)

SERVICE (Selected)

- Technical chair for AIAA GNC on Aerospace Robotics and Unmanned/Autonomous Systems (2016), AIAA GNC on Control Theory, Analysis, Design (2015)
- AIAA Guidance, Navigation, and Control Technical Committee member, 2013-2020
- Program Committee/Assoc. Editor: ASME DSCC (2015-2018), IASTED Conf. Control & Applications (2010-2013), IEEE Conf. Control Applications (2008, 2010-2012), etc.
- Organizer invited conf. sessions on Energy Harvesting, Rotorcraft Modeling and Control, Control, Communication, and Sensing Algorithms in Heterogeneous Vehicle Formations
- Associate Fellow AIAA (2017-), Senior member IEEE (2007-2014), member ASEE (2007-2012), AHS (2007, 2012, 2014-), SIAM (2010-2012), ASME (2014-)
- Virginia Tech service: Chair of AOE seminar speaker committee, Chair of AOE Webpage design committee, Faculty Search Committee Member (numerous), Faculty Senate Member, Library Committee Member, etc.

REVIEWS (Books, Papers, Proposals)

- Books: 4: McGraw-Hill, Elsevier (2), AIAA
- Journals: over 200 papers, most frequently for International Journal of Solids and Structures, ASME Journal of Dynamic Systems, Measurement, and Control, AIAA Journal, AIAA Journal of Guidance, Control, and Dynamics, Mechanical Systems and Signal Processing, ASCE Journal of Structural Engineering, Engineering Structures
- Conferences: ACC, IEEE CDC, AIAA GNC, ASME DSCC, ASME IDETC, etc.
- Funding agencies: NSF (CMMI, ECCS, CBET, IIS, IIP Divisions), NASA, ONR, Army, Swiss Science Foundation, Japan Society for the Promotion of Science, etc.

MENTORING & ADVISING (GRADUATE STUDENTS)

- Post-doc
 - Sunny Mohammed (with Dr. R. K. Kapania), Tensegrity Membranes for Energy Harvesting, 2009-2011
- Ph.D. Theses
 - Co-Chair (with Dr. C. Woolsey): Javier Gonzales-Rocha, Sensing Atmospheric Winds from Quadrotor Motion, **May 2020**
 - Chair: William Greer, Advanced Linear Model Predictive Control For Helicopter Shipboard Maneuvers, **Dec. 2019**
 - Chair: Maria Rye, Tensegrity Dynamics in LEO, **May 2017**

- Co-chair (with Dr. P. Raj): Praneeth Reddy Sudalagunta, Control-oriented Modeling of an Air-breathing Hypersonic Vehicle, **July 2016**
- Chair: Shu Yang: Modeling and Control of Tensegrity Membrane Systems, **May 2016**
- Chair: Tri D. Ngo, Constrained Control for Helicopter Shipboard Operations and Moored Ocean Current Turbine Flight Control, **May 2016**
- Chair: Ipar Ferhat, Development and Application of Modern Optimal Controllers for a Membrane Structure Using Vector Second Order Form, **May 2015**
- Co-chair (with Dr. J. A. Schetz): Craig Morris, Flight Dynamic Constraints in Conceptual Aircraft Multidisciplinary Analysis and Design Optimization, **Dec. 2013**
- Chair: Tugrul Oktay, Constrained Control of Complex Helicopter Models, **May 2012**
- M.S. Theses
 - Co-chair (with Dr. R.K. Kapania): Raymond Singh: Modeling Energy Harvesting From Membrane Vibrations using Multi-physics Modeling, **May 2012**
 - Chair: Brandon Stiltner, Macro Fiber Composite Actuated Control Surfaces with Applications Toward Ducted Fan Vehicles, **July 2011**
 - Co-chair (with Dr. M. Patil): Johannes Schwarz: Ordering Scheme and Reduced Complexity Modeling for a Multi-Rigid-Body Helicopter Dynamic Model, **July 2008**
- M.S. non thesis (M.S. project)
 - Chair: William Greer (**Dec. 2016**), Brandon Fleming (**May 2015**), Khaled Kaiser (**August 2012**), Kimberly Polk (**Dec. 2009**), John Josza (**Dec. 2009**)

COURSES TAUGHT

- AOE 5204 Vehicle Dynamics and Control (Fall 2007-2016), online (Fall 2008-2016)
- AOE 3134 Stability and Control (Spring 2008-2012)
- AOE 6204 Advanced Vehicle Dynamics and Control (Fall 2009-)
- AOE 4140/3144 Spacecraft Stability and Control (Spring 2014-2020)
- AOE/ME/ECE 5744 Nonlinear Systems (Fall 2017-)
- AOE 4894 Selected Topics in Guidance and Navigation (Spring 2021-)