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WORK ADDRESS

The Ohio State University
College of Engineering
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EDUCATION

North Carolina State University

Doctor of Philosophy (Aug. 1991 - Sept. 1994)

Mechanical Engineering GPA 4.0

Graduate Advisor: Larry Silverberg

Dissertation: *Modal Control of Reflector Surfaces for Far Field Power Maximization*

Master of Science (May 1989 - Aug. 1991)

Mechanical Engineering GPA 4.0

Graduate Advisor: Eric Klang

Thesis: *Modeling and Analysis of Doubly Curved Aerobrake Truss Structures*

Bachelor of Science (Aug. 1984 - May 1989)

Mechanical Engineering GPA 3.72

INTEREST

Mechatronic Systems, System Dynamics, Adaptive Structures, Structural Dynamics and Control, and Intelligent Control

PROFESSIONAL EXPERIENCE (Academic)

Ohio State University

Associate Dean of Research (July 2005 – Present) Duties include oversight and administration of all research programs at the college of engineering. Supervisory experience over the 13 Engineering Experiment Service Development and coordination of new research areas based on the strategic thrust of the College.

Ohio State University

Professor (October 2004 – Present) Duties include teaching courses in mechanical engineering, conducting funded research with graduate students, mentoring and advising students, and participating on university committees.

Associate Professor (October 2000 – September 2004) Duties include teaching courses in mechanical engineering, conducting funded research with graduate students, mentoring and advising students, and participating on university committees.

Assistant Professor (October 1995 – September 2000) Duties include teaching courses in mechanical engineering, conducting funded research with graduate students, mentoring and advising students, and participating on university committees.

Courses Taught:

System Dynamics, Principles of Automatic Control, Control System Design, Control Systems Design Laboratory, System Dynamics Laboratory, Introduction to Mechatronics, State Space Methods for Dynamic Systems Analysis

and Control, Optimization and Control of Hybrid Electric Vehicles, Introduction to Smart Structures. *Average course evaluation ranking of 4.7 out of 5.*

Undergraduate Students Advised (including undergraduate honors)

Student	Research Topic
Bruce Isler	<i>Vibration Modeling and Control with Polyvinylidene Fluoride Film</i>
Cullen Buie	<i>Modeling and development of Shape Memory Alloy Devices</i>
Edward Kiely	<i>Modeling of High Deflection Rainbow Piezoceramic Actuators</i>
Richard Granger	<i>Modeling of High Deflection Thunder Piezoceramic Actuators</i>
Quenetta Brooks	<i>Modeling of Polyvinylidene Fluoride Films</i>
Chad Taylor	<i>Development of Neural Network Systems</i>
Richard Duckett	<i>Design and Construction of Miniature Robots</i>
Chris Taylor	<i>Actuation Mechanisms for Direct Injection Diesel Engines</i>
Jeff Wacker	<i>Charge Generation with High Deflection Piezoceramic Actuators</i>
Brad Glenn	<i>Active Vibration Control with Piezoceramic Actuators</i>
Jamal Zite	<i>An MR Fluid Based Orthopedic Active Knee Brace</i>

Undergraduate Student Awards:

Denman Undergraduate Research Forum Winners

- Bruce Isler (Winner Senior/ 2nd Place overall category), 2000
- Cullen Buie (Best Sophomore Award), 2001
- Cullen Buie (Best Junior Award - 2nd runner up overall), 2002

ASME old guard winners (This is a competition for undergraduate students)

- Anthony Roy - OSU Winner
- Bruce Isler - OSU Winner, Regional Winner

Graduate Students Advised (MS)

Completed (MS):

Edward Keily, MS 1997	Bernd Baumann, MS 1997	Hwan-Sik Yoon, MS 1998
Peter Mayhan, MS 1998	Paul Mayhan, MS 1998	Richard Granger, MS 1999
Seung Keon Kwak, PhD 1999	Guhan Kumar, MS 2000	Brad Glenn, MS 2000
Matt Detrick, MS 2000	Mike Borgen, MS 2001	Marc Angelino, MS 2001
Bruce Isler, MS 2001	Amitesh Punhani, MS 2001	Chris Taylor, MS 2002
Manthram Sivasubramaniam, MS 2002	Arun Rajagopalan, MS 2002	Vijay Neelakantan, MS 2002
Amita Danak, MS 2003	Brian Bray, MS 2003	Anthony Roy, MS 2003
Jung Kyu Park, MS 2004	Leah Cayton, MS 2005	Leon Headings, MS 2005
Aaron Lambert, MS 2005		

Current (MS): N/A

Graduate Students Advised (Ph.D.)

Completed (Ph.D.):

Seung Keon Kwak, PhD 1999	Fukashi Andoh, PhD 2001	Hwan-Sik Yoon, PhD 2002
Peter Eyabi, PhD 2003	Brad Glenn, Ph.D. 2005	Vijay Neelakantan, Ph.D. 2005
Leann Faidley, Ph.D., 2006		

Current (Ph.D.) Anticipated Graduation Dates Shown:

Matt Detrick, PhD, 2008	Leon Headings, Ph.D.2008	Farzad Ahkmadlou, Ph.D., 2007
Byeongil Kim, Ph.D. 2008	Amitesh Punhani, Ph.D., 2008	Prashanth Ramesh, Ph.D. 2008

Graduate Student Awards:

Best Paper or Poster Awards

- Leann Faidley, 2003 SPIE Smart Structures and Materials Student Best Paper Award (2nd Place)
- Leann Faidley, 2004 SPIE Smart Structures and Materials Student Best Poster Award (1st Place)
- Leann Faidley, 2005 SPIE Smart Structures and Materials Student Best Paper Award (1st Place)
- Vijay Neelakantan, 2005 SPIE Smart Structures and Materials Student Best Paper Award (3rd Place)
- Error! Contact not defined.**, 2005 SPIE Smart Structures and Materials Student Best Paper Award (4th Place)

Other Graduate student awards

- Leann Faidley, 2004 Edward F. Hayes Graduate Research Forum - Engineering Sciences Division – (1st Place)

North Carolina State University

Research Assistant (Aug. 1991 - Sept. 1994) Research included multidisciplinary design study of an electrostatic antenna. Disciplines included Finite Element Analysis, Controls, Dynamics and Electromagnetics.

Courses Taught:

Statics

North Carolina State University

Research Assistant (May 1989 - May 1990) Research included introductory design study of aerobraking in both Lunar and Mars missions. Disciplines included Finite Element Analysis, and Composite Materials.

Teaching Initiatives

Course and Curriculum Development

- Developed a new course entitled “Smart Materials and Intelligent Systems”
- Introduced a undergraduate course entitled “Strategies for Academic Success” geared towards new engineering students
- Co-designed and co-developed an automotive engineering curriculum in Modeling, Simulation, Design and Control of Hybrid Electric Vehicle Drives. The curriculum included 4 new courses one of which (Hybrid Electric Vehicle Optimization and Control) was co-developed by G. Washington.
- Developed a student project design course (Mechanical Engineering Design) which led to an undergraduate student microgravity flight aboard NASA’s KC135-09 Aircraft.

Undergraduate Research

Sponsored 10 undergraduate students (3 honors) students on research projects (5 became masters students)

PROFESSIONAL EXPERIENCE (Industrial/Government)

National Aeronautics and Space Administration

Research assistant (May 1990 - Aug. 1990) Research included a preliminary design study of aerobraking in both Lunar and Mars missions.

Ford Motor Company

Research Scientist (May 1995 – September 1995) Analyzed and designed systems and processes to improve Noise, Vibrations and Harshness (NVH) issues related to the 1996 Ford Mustang

National Aeronautics and Space Administration

Summer Faculty Fellow (Successive Summers 1997 - 1999) Research included the design, modeling, development and testing of ultra-lightweight structurally active antennas and sensory systems that involve the use of “smart materials”.

Air Force Research Laboratory

Summer Faculty Program (Successive Summers 2001 - 2004) Research included the design, modeling, development and testing of ultra-lightweight structurally active antennas and sensory systems that involve the use of “smart materials”.

PROFESSIONAL SERVICE

National Research Council, Decadal Survey of Civil Aeronautics:

Structures and Materials Panel: Conducted a 7-month study of NASA’s aeronautics program and its relationship to civil transport. NRC final report is pending

Defense Science Study Group:

A precursor to the defense science board (DSB). The program features two years (2002-2003) of reviewing department of defense programs culminating in the writing of a white paper in a field of interest or concern.

Institute for Defense Analysis (IDA): Consultant

This non-profit organization conducts research and provides information to the United States Department of Defense on large weapon systems

Conference Technical Chair: (ASME- Adaptive Structures and Material Systems Symposium, 1998)

Conference General Chair: (ASME- Adaptive Structures and Material Systems Symposium, 1999)

Technical Reviewer: Journal of Sound and Vibration, 1996, 2002

Technical Reviewer: ASME Journal of Dynamic Systems Measurement and Control, 1996-1998

Technical Reviewer: AIAA Journal of Guidance, Control, and Dynamics, 1996-97, 2003-2004

Technical Reviewer: IEEE Transactions on Antennas and Propagation, 1998-2000

Technical Reviewer: IEEE Transactions on Control Systems Technology, 1999

Technical Reviewer: Journal of Intelligent Material Systems and Structures, 1999 - 2006

Technical Reviewer: Journal of Smart Materials and Structures, 1997-2003

Technical Review Panel: NSF Civil and Mechanical Systems Division, SBIR

Technical Review Panel: NSF Civil and Mechanical Systems Division, CAREER

Session Chair:

- ASME International Congress & Exposition, November 1996
- Smart Electronics and MEMS Conference, SPIE Symposium on Smart Structures and Materials, March, 1997
- ASME International Congress & Exposition, November 1997
- Smart Electronics and MEMS Conference, SPIE Symposium on Smart Structures and Materials, March, 1998
- ASME International Congress & Exposition, November 1998
- Progress in Electromagnetics Research Symposium, July 1998
- Smart Electronics and MEMS Conference, SPIE Symposium on Smart Structures and Materials, March, 1999
- ASME International Congress & Exposition, November 1999
- Smart Electronics and MEMS Conference, SPIE Symposium on Smart Structures and Materials, March, 2000
- ASME International Congress & Exposition, November 2000
- ASME International Congress & Exposition, November 2001
- ASME International Congress & Exposition, November 2002

Technical Committee Member: Adaptive Structures and Material Systems, Aerospace Division, ASME 1998 - present

Treasurer: *Adaptive Structures and Material Systems Technical Committee, Aerospace Division, ASME* 1998 - 2004

Advisor – National Society of Black Engineers (OSU Chapter), OSU FutureCar Team, OSU FutureTruck Team

HONORS AND AWARDS

Best Paper Awards

(2006) ASME Adaptive Structures and Material Systems Best Paper Award in Mechanics and Material Systems, “Reversible Strain in Ni-Mn-Ga with Collinear Field and Stress”, (w/ Faidley L., Dapino M., and Lograsso T.) *Proc. SPIE Int. Conference on Smart Structures and Materials*, 2005, Vol. 5761, No. 70, pp. 501–512.

(1998) R.P. King Best Paper Award for best Journal Article (in IEEE Transactions on Antennas and Propagation) by Author under 35 years old, “Aperture Antenna Shape Prediction by Feedforward Neural Networks”, *IEEE Transactions on Antennas and Propagation*, **45** (1997), pp. 683-688.

Other Awards

Lumley Research Award (2005), Harrison Faculty Award for Excellence in Engineering Education (2005), National Academy of Engineering – Frontiers in Engineering (Invitee) (2004), University Award for Distinguished Teaching (2002), OSU Teaching Academy (2002), Defense Sciences Study Group (2002 – 2003), Lumley Interdisciplinary Research Award (2002), Charles E. MacQuigg Award for Outstanding Teaching (2002), Lumley Research Award (1999-2000), Ralph R. Teetor Educational Award (SAE) (2000), Departmental Excellence in Teaching Award (1998-1999), College of Engineering Annual Research Accomplishment Award (1998), OSU Engineering Advisor of the Year (1998), National Science Foundation CAREER Award (1997), NASA Summer Faculty Fellow (1997-1999), Dupont Young Investigator Award (1998-2000), Ameritech Faculty Fellowship (1996), DuPont Aid to Education Grant (1995,1996), OSU Outstanding Faculty Nomination (1996), Wake County Black Achiever of the Year (1993), Phi Kappa Phi Honor Fraternity (1992), Featured in Ebony Magazine as one of the top ten African American students in the USA (Aug. 1990)

PUBLICATIONS

Books and Monographs

1. Washington, G.N. and Redmond J., (Editors), Adaptive Structures and Material Systems Symposium, 1998
2. Sirkis, J., and Washington, G.N., (Editors), Adaptive Structures and Material Systems Symposium, 1999

Refereed Journal

1. Ahmadkhanlou F., Wang Y., Bechtel S.E., and Washington G.N., “A Comparison of Kinetic Theory-Based Models to Other Multiscale 3-D Models for Magnetorheological Fluids”, *International Journal of Engineering Science* (in Review)
2. Glenn, B., D. Upadhyay, V.I. Utkin, G. N. Washington, “Estimation of Exhaust Manifold Pressure and Intake/Exhaust Air Mass Fraction in a VGT-EGR Diesel Engine”, *Control Engineering Practice*, (In Review)
3. Glenn, B., D. Upadhyay, G.N. Washington, “Control Design of Electrically Assisted Boosting Systems for Lean Burn Powertrain Applications”, *IEEE Transactions on Control Systems Technology*, (In Review)
4. Washington, G.N. and Park, J.K., “Prediction of Hysteretic Effects in PZT Stack Actuators using a Hybrid Modeling Strategy”, *Journal of Smart Structures and Systems*, (In Review)

5. Neelakantan V. and Washington G.N. "Model Predictive Control of a Two Stage Actuation System using Piezoelectric Actuators for Controllable Industrial and Automotive Brakes and Clutches", *Journal of Intelligent Material Systems and Structures*, (Accepted)
6. Neelakantan, V., and Washington, G.N., "Vibration Control of Structural Systems using MR dampers and a 'Modified' Sliding Mode Control Technique", *Journal of Intelligent Material Systems and Structures* (Accepted)
7. Eyabi, P., Washington, G.N., "Modeling and Sensorless Control of an Electromagnetic Valve Actuator", *Mechatronics*, Volume 16, 2006, Pages 159-175
8. Faidley, L., Dapino M.D., Washington G.N., Lagrasso T., "Modulus Shift with Magnetic Field in Ferromagnetic Shape Memory Ni-Mn-Ga", *Journal of Intelligent Material Systems and Structures*, 17, 2006: 123 - 131.
9. Joo J.J., Sanders B., and Washington, G.N., "Energy Based Efficiency of Adaptive Structure Systems", *Journal of Smart Materials and Structures*, 15, 2006, pp. 171-181
10. Yoon H.S., Washington G.N., Danak A., "Modeling and Design of Efficient Initially-Curved Piezoceramic Unimorphs for Energy Harvesting Applications", *Journal of Intelligent Material Systems and Structures*, Vol.16, October 2005, pp: 877-888
11. Neelakantan, V., and Washington, G.N., "Modeling and Reduction of Centrifuging in Magneto-Rheological (MR) Transmission Clutches for Automotive Applications", *Journal of Intelligent Material Systems and Structures*, Vol.16, No. 9, September 2005, pp: 703-711
12. Eyabi, P., Washington, G.N., "A Thermal Model for Electromagnetic Actuators", *SAE Transactions: Journal of Passenger Cars – Electronic and Electrical Systems*, 2005-01-2070
13. Yoon, H.S., Washington, G.N., "Generation of Multiple Beam Patterns using a Mechanically Reconfigurable Smart Reflector Antenna System", *AIAA Journal of Aerospace Computing, Information and Communication*, 2, No. 5., May 2005, pp. 252-266.
14. Andoh, F., Washington, G.N., and Utkin, V., "Efficient Shape Control of Distributed Reflectors with Discrete Piezoelectric Actuators", *Journal of Intelligent Material Systems and Structures*, 15, No. 1., January 2004, pp. 3-15.
15. Isler, B., Washington, G.N., "Spatial Aperture Shading Applied to Distributed Systems for Uniform Damping Control", *Journal of Smart Materials and Structures*, 12, No. 3., June 2003, pp. 384-392.
16. Borgen, M.G., Washington, G.N., and Kinzel, G.L., "Design and Evolution of a Piezoelectrically Actuated Swimming Vehicle", *IEEE/ASME Transactions on Mechatronics*, 8, No. 1., March 2003, pp. 66-76.
17. Detrick, M., Washington, G.N., and Subramaniam, V., "Control of Polishing of Diamond Films using Microactuation and an Atmospheric Pressure Plasma", *IEEE/ASME Transactions on Mechatronics*, 8, No. 1., March 2003, pp. 45-55.
18. Angelino, M., Washington, G.N., "Design and Construction of a Piezoelectric Point Actuated Aperture Antenna", *Journal of Intelligent Material Systems and Structures*, 13, No. 2-3, February – March, 2002, pp. 125–137.
19. Punhani, A., Washington, G.N., Theunissen, W.H., "Doubly Curved Aperture Antenna Shape Prediction using Network Based Predictors ", *Microwave and Optical Technology Letters*, 33, No. 3, May 2002, pp. 156-162
20. Washington, G.N., Angelino, M., Yoon, H.T., and Theunissen, W.H., "Design, Modeling, and Optimization of Mechanically Reconfigurable Aperture Antennas", *IEEE Transactions on Antennas and Propagation*, 50, No. 5, May 2002, pp. 628-637

21. Kwak, S.K., G. N. Washington, and R. K. Yedavalli, "Acceleration Based Control Using the Reciprocal State Space Framework and Smart Materials," *Journal of Sound and Vibration*, **251**, No.3, March 2002, pp. 543-557
22. Kwak, S. K., G. N. Washington, and R. K. Yedavalli, "Acceleration Feedback Based Active and Passive Vibration Control of Landing Gear Components," *ASCE Journal of Aerospace Engineering*, **15**, No. 1, (2002), pp. 1-9.
23. Bernhard, J., E. Kiely, and G. N. Washington, "A Smart Mechanically-Actuated Two-Layer Electromagnetically Coupled Microstrip Antenna that Provides Frequency Bandwidth and Antenna Gain Variability," *IEEE Transactions on Antennas and Propagation*, **49**, No. 4 (2001), pp. 579-601.
24. Theunissen, W. H., H. S. Yoon, G. N. Washington, and W. D. Burnside, "Reconfigurable Contour Beam Reflector Antenna Synthesis Using a Mechanical Finite Element Description of the Adjustable Surface," *IEEE Transactions on Antennas and Propagation*, **49**, No. 2, (2001), pp. 272-279
25. Song, J. K. and G. N. Washington, "Uniform Damping of Plates Using a Modified Nodal Control Method," *AIAA Journal of Guidance Control and Dynamics*, **24**, No. 5, (2001), pp. 1049 – 1053.
26. Mayhan, P., Srinivasan, K., Watechagit, S. Washington, G. "Dynamic Modeling and Controller Design for a Piezoelectric Actuation System used for Machine Tool Control," *J. Intelligent Material Systems and Structures*, **11**, No. 10, (2000), pp. 771 - 780
27. Glenn, B., Washington, G.N., and Rizzoni, G., "Operation and Control Strategies for Hybrid Electric Vehicles", *SAE Transactions – Journal of Engines*, Paper number 2000-01-1537, **109**, Section 3, pp. 1662-1667
28. Song, J. K. and G. N. Washington, "Neural Network Discrimination and Control in Intelligent Vibration Control," *J. Intelligent Material Systems and Structures*, **11**, No. 3 (2000), pp. 234-242.
29. Granger, R., G. N. Washington, and S. K. Kwak, "Modeling and Control of a Singly Curved, Mechanically Active, Aperture Antenna Using Thunder Piezoceramic Actuators," *J. Intelligent Material Systems and Structures*, **11**, No. 3 (2000), pp. 225-233.
30. Romanofsky, R., J. Bernhard, G. N. Washington, F. VanKeuls, F. Miranda, and C. Cannedy, "K-band Phased Array Antenna based on $Ba_{0.60}Sr_{0.40}TiO_3$ Thin Film Phase Shifters," *IEEE Transactions on Microwave Theory and Techniques*, **48**, No 12, (2000).
31. Baumann, B., G. N. Washington, and G. Rizzoni, "Mechatronic Design and Control of Hybrid Electric Vehicles," *IEEE/ASME Transactions on Mechatronics*, **5** (2000), pp. 49-57.
32. Silverberg, L. M. and G. N. Washington, "Exact Formulas for Local Control of Longitudinally Vibrating Systems," *Journal of the Society of Mechanical Engineers (Chinese Ed.) -Invited paper for special issue in honor of L. Meirovitch*, **21** (2000), pp. 97-105.
33. Washington, G. N. and J. K. Song, "Mechatronic Design and Control of Singly and Doubly Curved Composite Mesoscale Actuator Systems," *IEEE/ASME Transactions on Mechatronics*, **5** (2000), pp. 49-57.
34. Yoon, H. S. and G. N. Washington, "Analysis and Design of Doubly Curved Piezoelectric Strip Actuated Aperture Antennas," *IEEE Transactions on Antennas and Propagation*, **48** (2000), pp. 755 – 763.
35. Yoon, H. S. and G. N. Washington, "Modeling, Design and Zero Gravity Testing of a Doubly Curved Aperture Antenna," *J. Intelligent Material Systems and Structures*, **10** (1999), pp. 141-148.
36. Silverberg, L. M. and G. N. Washington, "Weighted-Residual Discretization for Uniform Damping and Stiffening of Structural Systems," *AIAA J. Guidance, Control, and Dynamics*, **22** (1999), pp. 614-618.

37. Theunissen, W. H., H. S. Yoon, G. N. Washington, and W. D. Burnside, "Reconfigurable Contour Beam Reflector Antenna Using an Adjustable Subreflector and an Adjustable Feed," *Microwave and Optical Technology Letters*, **21** (1999), pp. 436-446.
38. Kiely, E., G. N. Washington, and J. Bernhard, "Design, Actuation, and Control of Active Microstrip Patch Antennas," *J. Smart Materials and Structures*, **7** (1998), pp. 792-800.
39. Mayhan, P. and G. N. Washington, "Fuzzy Model Reference Learning Control: A New Control Paradigm for Smart Structures," *J. Smart Materials and Structures*, **7** (1998), pp. 874-884.
40. Yoon, H. S. and G. N. Washington, "Piezoceramic Actuated Aperture Antennas," *J. Smart Materials and Structures*, **7** (1998), pp. 537-542.
41. Washington, G. N., "Aperture Antenna Shape Prediction by Feedforward Neural Networks," *IEEE Transactions on Antennas and Propagation*, **45** (1997), pp. 683-688. **R.P. King Best Paper Award (IEEE).**
42. Washington, G. N. and L. M. Silverberg, "Uniform Damping and Stiffness Control of Distributed Systems," *ASME J. Dynamic Systems, Measurement, and Control*, **119** (1997), pp. 561-565.
43. Washington, G. N., "Smart Aperture Antennas," *J. Smart Materials and Structures*, **5** (1996).
44. Washington, G. N. and L. M. Silverberg, "Modal Control of a Corner Reflector to Maximize Far Field Power," *Microwave and Optical Technology Letters*, **8** (1995).
45. Silverberg, L. M. and G. N. Washington, "Modal Control of Reflector Surfaces Using Far Field Power Measurements," *Microwave and Optical Technology Letters*, **7** (1994).

Refereed Conference

1. Detrick M., Washington G.N., "Modeling and Design of a Morphing Wing for Micro Unmanned Aerial Vehicles via Active Twist", 48th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, 2007, AIAA 2007-1788
2. Headings L., Jaworski C., Heremans J., Guezennec Y., Rizzoni G., Washington, Marano V. "Opportunities for Thermoelectric Energy Conversion in Hybrid Vehicles", Proc. of IMECE 2006 ASME International Mechanical Engineering Congress and Exposition, IMECHE2006-15085.
3. Headings L.M., Washington G.N., "Stiffness Controlled Piezoelectric Stick-Slip Actuator for Rapid Positioning Applications", ASME International Mechanical Engineering Congress and Exposition, 2005, Paper#80916
4. Faidley L., Dapino M.J., Washington G.N., "Strain Model for Ni-Mn-Ga with Collinear Field and Stress", ASME International Mechanical Engineering Congress and Exposition, 2005, Paper#79092
5. Westervelt, E.R., Schmiedler J.P., Washington G.N., "Variable Transmission Compliance with an MR Damper", *ASME International Mechanical Engineering Congress and Exposition*, 2004, Paper #62046
6. Bechtel S., Washington G.N., Ahkmadkhanlou F., Wang Y., "Microstructural Analysis and Control of a Magnetorheological Fluid", *ASME International Mechanical Engineering Congress and Exposition*, 2004, Paper #61693
7. Yoon H.S., Washington G.N., "Active Vibration Confinement of Flexible Structures using Modal Observers", *International Conference on Adaptive Structure Technologies*, 2004, Paper #43185
8. Danak A. D., Yoon H.S., Washington G.N., "Optimization of Electrical Output in Response to Mechanical Input Piezoelectric Laminated Shells", *ASME International Mechanical Engineering Congress and Exposition*, 2003, Paper #43185

9. Roy A.M., Neelakantan V.A., Washington G.N., "Design and Development of Passive and Active Force Feedback Systems using Magnetorheological Fluids", *ASME International Mechanical Engineering Congress and Exposition*, 2003, Paper #43210
10. Faidley L.E., Dapino M.D., Washington G.N. "Dynamic Response in the Low-Khz Range and Delta-E Effect in Ferromagnetic Shape Memory Ni-MN-GA", *ASME International Mechanical Engineering Congress and Exposition*, 2003, Paper #43198
11. Rajagopalan R., Washington G., "Intelligent Control of Hybrid Electric Vehicles using GPS Information", *Society of Automotive Engineers – Future Car Congress*, 2002 Paper# 02FCC-35
12. Neelakantan, V.A. and Washington, G.N., "Effect of Centrifugal Force on Magneto-Rheological Fluid Clutches", *ASME International Mechanical Engineering Congress and Exposition*, 2002, Paper # ASMS #49
13. Sivasubramaniam M. and Washington, G.N., "Independent Modal Sliding Mode Shape and Vibration Control Using a Stereophotogrammetric Measurement System", *ASME Int. Congress and Exposition*, 2002, Paper # ASMS #48
14. Kwak, S.K. and Washington, G.N., "Energy Analysis for a Twisting and Bending Coupled Piezoelectric Actuator for Miniature Unmanned Aerial Vehicles", *ASME Int. Cong. and Exposition*, 2001 ,Paper # AD-23739
15. Borgen, M.G., and Washington, G.N., "Modeling and Testing of an Autonomous Swimming Vehicle Powered Via Smart Materials", *ASME Int. Cong. and Exposition*, 2001 ,Paper # AD-23751
16. Angelino, M. and G. Washington, "Design of a Piezoelectric Actuated Active Aperture Antenna," *Adaptive Structures and Material Systems Symposium, ASME Int. Cong. and Exposition*, 2000.
17. Borgen, M., G. N. Washington, and G. Kinzel, "Design of Swimming Vehicles Using Smart Material Actuation," *7th Mechatronics Forum Int. Conference*, 2000.
18. Borgen, M., G. N. Washington, and G. Kinzel, "Introducing the Carangithopter: A Small Piezoelectrically Actuated Swimming Vehicle," *Adaptive Structures and Material Systems Symposium, ASME International Congress and Exposition*, 2000.
19. Kwak, S. K. and G. N. Washington, "A New Twisting and Bending Coupled Piezoelectric Actuator Using Shaped Electrodes," *Adaptive Structures and Material Systems Symposium, ASME Int. Cong. and Exposition*, 2000.
20. Kwak, S. K., G. N. Washington, and R. Yedavalli, "Implementation of Full State Derivative Feedback Control Based on the Reciprocal State Space Framework Using Smart Materials," *Proc. SPIE 7th Int. Symposium on Smart Structures and Materials*, 2000.
21. Romanofsky, R., J. Bernhard, G. N. Washington, F. VanKeuls, F. Miranda, and C. Cannedy, "AK Band Phased Array Antenna Based on $Ba_{0.60} Sr_{0.40} TiO_3$ Thin Film Phase Shifters," *IEEE Conference on Microwave Theory and Techniques*, 2000.
22. Brahma A., B. Glenn, Y. Guezennec, T. Miller, G. Rizzoni, and G. N. Washington, "Modeling, Performance Analysis and Control Design of a Hybrid Sport-Utility Vehicle," *IEEE Int. Conference on Control Applications*, 1999.
23. Glenn, B., G. N. Washington, and G. Rizzoni, "Intelligent Control of Parallel Hybrid Electric Vehicles," *ASME Int. Cong. and Exposition*, 1999.
24. Kwak, S. K., G. Washington, and R. Yedavalli, "Active and Passive Vibration Control of Landing Gear Components," *ASME Int. Cong. and Exposition*, 1999.

25. Mayhan, P., K. Srinivasan, and G. N. Washington, "Dynamic Modeling of a Piezoelectric Actuation System for Machine Tool Position Control," *ASME Int. Cong. and Exposition*, 1999.
26. Theunissen, W. H., H. S. Yoon, G. N. Washington, and W. D. Burnside, "Mechanical Finite Element Diffraction Synthesis of Reconfigurable Contour Beams from Dual Offset Reflector Antennas," *IEEE Antennas and Propagation Society Int. Symposium*, 1999.
27. Washington, G. and J. Redmond, "Adaptive Structures and Material Systems," *ASME Int. Cong. and Exposition*, 1999.
28. Washington, G. N. and H. S. Yoon, "Zero G Validation of Smart Aperture Antennas," *ASME Int. Cong. and Exposition*, 1999.
29. Kiely, E., G. N. Washington, J. K. Song, "Analysis and Control of Mesoscale Actuator Systems," Adaptive Structures and Material Systems Symposium, *ASME Int. Cong. and Exposition*, 1998.
30. Yoon, H. S. and G. N. Washington, "Analysis of Doubly Curved Antenna Structures," Adaptive Structures and Material Systems Symposium, *ASME Int. Cong. and Exposition*, 1998.
31. G. Rizzoni, A. Keyhani, G. Washington, B. Chandrasekaran, G. Baumgartner, "Education in Mechatronic Systems at the Ohio State University", DSC-Vol.64 Proceedings of the ASME Dynamic Systems and Control Division, 1998 ASME International Mechanical Engineering Conference and Exhibition, Anaheim, CA, November 15-20
32. Washington, G. N., "Active Aperture Antennas," Adaptive Structures Forum, *ASME Int. Cong. and Exposition*, 1996.
33. Washington, G. N. and L. M. Silverberg, "Uniform Damping and Stiffness Control of Distributed Parameter Systems," Active Control of Vibration and Noise Conference, *ASME Int. Cong. and Exposition*, 1996.
34. Washington, G. N. and E. C. Klang, "Modeling and Analysis of Doubly Curved Aerobrake Truss Structures," Proc. 3rd Int. Conference on Engineering Construction and Operations in Space, 1992.
35. Klang, E. C. and G. N. Washington, "Aerobrake Construction Concepts for the Mars Mission," Proc. 2nd Int. Conference on Engineering Construction and Operations in Space, 1990.

Non-Refereed Conferences and Workshops

1. Ahmadkhanlou, F., Zite J.L., Washington G.N. "A Magnetorheological Fluid-Based Controllable Active Knee Brace," *Proc. SPIE Int. Conference on Smart Structures and Materials*, 2007, Vol. 6527, 65270-O
2. Faidley L.E., Dapino M.J., Washington G.N., "A Homogenized Strain Model for Ni-Mn-Ga Driven with Collinear Field and Stress" *Proc. SPIE Int. Conference on Smart Structures and Materials*, 2006, Vol. 6170, Paper 617019-1
3. Ahmadkhanlou F, Washington G.N., Bechtel S.E, Wang Y. "Magnetorheological Fluid Based Automotive steer-by-wire Systems", *Proc. SPIE Int. Conference on Smart Structures and Materials*, 2006, Vol. 6171, Paper 61710I-1
4. Punhani, A. Washington G.N., "Shape and Vibration Control of Active Laminated Plates for RF and Optical Applications", *Proc. SPIE Int. Conference on Smart Structures and Materials*, 2006, Vol. 6166, Paper 61661B-1
5. Zite J.L., Ahmadkhanlou F., Neelakantan V.A., Washington G.N. "A Magnetorheological Fluid Based Orthopedic Active Knee Brace" *Proc. SPIE Int. Conference on Smart Structures and Materials*, 2006, Vol. 6171, Paper 61710H-1

6. Eyabi, P. and Washington, G.N. "Modeling and Sensorless Estimation for Single Spring Solenoids", SAE paper # 2006-01-1678
7. Eyabi, P. and Washington, G.N. "Non-linear Modeling of an Electromagnetic Valve Actuator", SAE paper # 2006-01-0043
8. Yoon, H.S. and Washington, G.N. "Vibration Confinement of Flexible Structures using Piezoceramic Actuators", *Proc. SPIE Int. Conference on Smart Structures and Materials*, 2005, Vol. 5757, No. 44, pp. 441-450.
9. Massad, J.E., Washington G.N., and Sumali H., "Orthotropic Deflection Model for Corner Supported Plates with Segmented In-Plane Actuators", *Proc. SPIE Int. Conference on Smart Structures and Materials*, 2005, Vol. 5757, No. 50, pp. 503-514.
10. Ahmadkhanlou, F., Washington, G.N., Wang, Y., and Bechtel S.E., "The Development of Variably Compliant Haptic Systems using Magnetorheological Fluids", *Proc. SPIE Int. Conference on Smart Structures and Materials*, 2005, Vol. 5757, No. 49, pp. 491-502.
11. Neelakantan, V.A., Washington, G.N., Bucknor, N.K., "Two-Stage Actuation System using DC Motors and Piezoelectric Actuators for Controllable Industrial and Automotive Brakes and Clutches", *Proc. SPIE Int. Conference on Smart Structures and Materials*, 2005, Vol. 5762, No. 39, pp. 275-286.
12. Faidley L.E., Dapino, M.J., Washington, G.N., Lograsso, "Reversible Strain in Ni-Mn-Ga with Collinear Field and Stress", *Proc. SPIE Int. Conference on Smart Structures and Materials*, 2005, Vol. 5761, No. 70, pp. 501-512.
13. Faidley L.E., Dapino, M.J., Washington, G.N., Lograsso, "Dynamic behavior and Stiffness Tuning in Solenoid based Ni-MN-Ga Transducers", *Proc. SPIE Int. Conference on Smart Structures and Materials*, 2004,
14. Washington, G.N. and Park, J.K., "Prediction of Hysteretic Effects in PZT Stack Actuators using a Hybrid Modeling Strategy", *Proc. SPIE Int. Conference on Smart Structures and Materials*, 2004, Vol. 5383.
15. Joo, J., Sanders B., Washington, G.N. and Adams, J. "Energy based Efficiency of Mechanized Solid-State Actuators", *Proc. SPIE Int. Conference on Smart Structures and Materials*, 2003, Vol. 5056.
16. Bray, B.C. and Washington, G.N., "Positional Impact Sensing with Spatially Shaded Polyvinylidene Fluoride Film", *Proc. SPIE Int. Conference on Smart Structures and Materials*, 2003, Vol. 5050, pp. 249-258.
17. Faidley L.E., Dapino, M.J., Washington, G.N., Lograsso, T.A., Smith, R.E. "Analytical and Experimental Issues in NiMnGa Transducers", *Proc. SPIE Int. Conference on Smart Structures and Materials*, 2003, Vol. 5049, p. 1-12
18. Isler, B., and Washington, G.N., "Spatial Aperture Shading Applied to Distributed Systems for Uniform Damping Control", *Proc. SPIE Int. Conference on Smart Structures and Materials*, 2001, Vol. 4326, No. 61, pp. 548-558.
19. Kwak, S.K. and Washington, G.N., "A Broadband Vibration Control Using Passive Circuits in the Matrix Second Order Framework", *Proc. SPIE Int. Conference on Smart Structures and Materials*, 2001
20. Washington, G.N., Yoon H.S. and Theunissen W.H., "Simulation and Optimization of A Smart Reconfigurable Aperture Antenna", *Proc. SPIE Int. Conference on Smart Structures and Materials*, (Smart Electronics and MEMS Symposium), Vol. 4700, No. 31, 2002
21. Neelakantan, V.A., Washington G.N., and Wolfe R. "Force Feedback System using Magneto Rheological Fluids for Telerobotic Surgery", *Proc. SPIE Int. Conference on Smart Structures and Materials*, (Industrial and Commercial Applications of Smart Materials), Vol. 4698, No. 57, 2002

22. Taylor, C. and Washington G.N., "Comprehensive Piezoceramic Actuator Review", *Proc. SPIE Int. Conference on Smart Structures and Materials*, (Smart Structures and Integrated Systems), Vol. 4701, No. 47, 2002
23. Angelino, M., Washington, G.N., "Point Actuated Aperture Antenna Development" *Proc. SPIE Int. Conference on Smart Structures and Materials*, (Smart Electronics and MEMS Symposium), 2001
24. Andoh, F., Washington, G.N., V. Utkin "Shape Control of Distributed Parameter Reflectors Using Sliding Mode Control" *Proc. SPIE Int. Conference on Smart Structures and Materials*, 2001
25. Kwak, S. K., G. N. Washington, and R. Yedavalli, "Implementation of Full State Derivative Feedback Control Based on the Reciprocal State Space Framework Using Smart Materials," *Proc. SPIE Int. Conference on Smart Structures and Materials*, 2000.
26. Song, J. K. and G. N. Washington, "Plate Vibration Modes Identification by Using Piezoelectric Sensors," *Proc. SPIE Int. Conference on Smart Structures and Materials*, 2000.
27. Yoon, H. S., G. N. Washington, and W. Theunissen, "Reconfigurable Contour Beam Generation Using a Smart Subreflector Antenna System," *Proc. SPIE Int. Conference on Smart Structures and Materials*, 2000.
28. Song, J.K. and G. N. Washington, "Thunder Actuator Modeling and Control with Classical and Fuzzy Control Algorithm," *Proc. SPIE Int. Conference on Smart Structures and Materials*, 1999.
29. Baumann, B., G. Rizzoni, and G. N. Washington, "Intelligent Control of Hybrid Vehicles Using Neural Networks and Fuzzy Logic," SAE Technical Paper 981061, *SAE Int. Cong. and Exposition*, 1998.
30. Baumann, B., G. Rizzoni, and G. N. Washington, "Intelligent Control of the Ohio State University Hybrid-Electric Vehicle: Preprints of the Proceedings of the IFAC Workshop," *Advances in Automotive Control*, Mohican State Park, Loudonville, OH, 1998.
31. Kiely, E. and G. N. Washington, "Design, Actuation, and Control of Active Patch Antennas," *Proc. SPIE Int. Conference on Smart Structures and Materials*, 1998.
32. Mayhan, P. and G. N. Washington, "Robust Intelligent Control of Structures Using Piezoceramic Materials," *Proc. SPIE Int. Conference on Smart Structures and Materials*, 1998.
33. Song, J.K. and G. N. Washington, "Intelligent Beam Vibration Control Utilizing Smart Materials," *Proc. Artificial Neural Networks in Engineering Conference*, 1998.
34. Washington, G. N., "Smart Electromagnetic Structures (SEMS): A New Paradigm for Microwave Technology," *Progress in Electromagnetics Research Symposium*, France, 1998.
35. Yoon, H. S. and G. N. Washington, "Piezoceramic Actuated Aperture Antennas," *Proc. SPIE Int. Conference on Smart Structures and Materials*, 1998.
36. Washington, G. N., "Modeling and Design of an Active Polyvinylidene Fluoride Aperture Antenna," *Workshop on Smart Electromagnetic Antenna Structures*, NATO Headquarters, Brussels, 1996.
37. Washington, G. N., "Smart Aperture Antennas," *Proc. SPIE Conference on Smart Structures and Intelligent Systems*, 1996.

INVITED LECTURES

1. NATO Panel 3 Workshop on Smart Electromagnetic Antenna Structures, "Active Aperture Antennas", Brussels, Belgium, 11/15/1996
2. Vanderbilt University, "Smart Aperture Antennas", 10/14/1997
3. Progress in Electromagnetics Research Symposium (PIERS), "Smart Electromagnetic Structures: A New Paradigm for Microwave Technology", Nante, France, 7/16/1998

4. University of Illinois, "Design, Modeling and Control of Mechanically Active Antennas", 4/12/1999
5. Hughes Research Labs, "Design, Modeling and Control of Mechanically Active Antennas", 9/15/1999
6. Cornell University, "Design, Modeling and Control of Mechanically Active Antennas", 1/26/2000
7. NASA Glenn Research Center, "Smart Electromagnetic Systems", 7/2000
8. Duke University, "Intelligent Structures and Systems" 1/10/2001
9. Boeing Satellite Systems, "Design, Modeling and Control of Mechanically Active Antennas", 3/6/2001
10. National Science Teachers Association (National Convention: Shell Seminar Series Keynote) "Smart Materials and Structures Technology", 3/29/2002
11. Metropolitan Detroit Science Teachers Association (Annual Fall Conference: Keynote) "Smart Materials and Structures Technology", 10/26/2002
12. General Motors, "Smart Materials and Intelligent Systems for Next Generation Locomotion", 6/16/2002
13. University of Maryland, "Integrating Smart Materials in Advanced Electromagnetic Structures", 6/27/2003
14. Air Vehicles Directorate: Air Force Research Labs, "Design, Modeling and Control of Mechanically Active Apertures", 9/2003
15. International Materials Research Congress, "Integrating Smart Materials in Advanced Electromagnetic Structures", (Cancun, Mexico) 8/19/2003
16. URSI Meeting, "Mechanically Active Apertures", (Boulder, CO), 1/7/2004
17. Sandia National Laboratory, "Mechanically Active Apertures", (Albuquerque, NM), 5/13/2004
18. Space Vehicle Directorate: Air Force Research Labs, "Design, Modeling and Control of Mechanically Active Apertures for Electromagnetics and Optical Applications", (Albuquerque, New Mexico) 12/9/2004

GOVERNMENT AND INDUSTRIAL SUPPORT

1. DuPont Aid To Education Award - "Mylar Usage in Antenna," \$15,000 per year for three years, 1996-1998.
2. Ohio State University - "Uniform Damping and Stiffness Control of Structures", \$ 18,333, 1996.
3. Ameritech Faculty Fellowship - "Feasibility Study of Active Antennas," \$ 33,000, 1996, Current
4. NSF - "Feasibility Study Active Aperture Antennas," \$ 25,788, 1996 - 1997. Current
5. NSF CAREER - "Design, Modeling, and Development of Active Aperture Antennas", \$ 310,000 1997 - 2001,
6. Ohio Board of Regents - "Center for Advanced Plasma Engineering (CAPE)" \$ 710,000 1997, With V.V. Subramaniam, W. Rich, and P. Morrison
7. ARO (Army Research Office) - "Design, modeling and testing of smart electromagnetic structures," \$ 176,431 (total) 1998 - 2002
8. Dupont Young Investigator Award - "Novel Aperture Antennas," \$75,000 (total) 1998-2001
9. Ohio Aerospace Institute - "Intelligent Modeling and Control of Structural Systems", \$30,000 1998-1999
10. National Renewable Energy Laboratory - "Advanced Development, Control, and Testing of an Intelligent Simulator For Parallel Hybrid Electric Vehicles", \$240,000, with Giorgio Rizzoni 1998 – 2001
11. DOE (Department of Energy/Graduate Automotive Technology Center of Excellence) – "Modeling, Simulation, Design and Control of Hybrid Electric Vehicle Drives", (with Giorgio Rizzoni, (PI)), \$700,000, 1998 – 2000
12. DARPA, "Design, Modeling, and Development of Precision Apertures", \$618,990, summer 1999-2002
13. CAR Consortium - Control of Hybrid Electric Vehicles, (w/ Giorgio Rizzoni (PI)) (\$50,000)
14. NASA, "Smart Electromagnetic Structural Systems", \$18,000.00, Current
15. Outboard Marine Company, "Design and Development of Advanced Injectors Utilizing Piezoelectric Materials (A Proof of Concept)", \$15,000, 1999 Current.
16. NSF, "Modeling and Design of a Point Actuated Aperture Antenna", (7/2001 - 6/2004) - Electrical and Communications Systems, \$225,000.00
17. NSF, "Modeling and Development of Gradient Based Smart Polymer Sensors and Actuators" (7/2001 - 6/2004) – \$210,000.00
18. National Renewable Energy Laboratory (NREL), "Advanced Vehicle Systems Analysis", (7/2001-9/2001) - \$15,869
19. Hughes Research Lab (HRL), "Simulation and Design of Active Aperture Antenna", (7/2001-7/2002) - \$20,000
20. Ohio Board of Regents, "Advanced Vibration Analysis and Smart Materials for Future Vehicles", \$175,000 (with R. Parker (PI) and R. Singh)
21. AFOSR, "Energy Based design and Control of Innovative Air Vehicle Concepts", (11/2001 – 11/2002), \$50,000.00
22. General Motors, "Electromagnetic Valve Actuator Design", (12/2001 – 12/2002), \$100,000.00

23. General Motors, “Design of Magnetorheological Fluid based Clutch System”, (12/2002 – 12/2003), \$100,000.00
24. General Motors, “Design of a Hybrid Piezoelectric Braking Mechanism”, (12/2003 – 12/2004), \$100,000.00
25. NSF, “Industrial University Collaborative Research Center in Smart Vehicle Concepts”, Planning Grant, \$10,000.00
26. NSF, “Design, Modeling and Control of Force Feedback Systems using Magneto-Rheological Fluids”, (8/2005 - 7/2008) – Civil and Mechanical Systems, \$418,000.00
27. DOE, GATE Center for advanced automotive propulsion systems at The Ohio State University, (10/05-9/10), \$671,000.00
28. Eaton Corp, “Design and construction of a high deflection piezoelectric actuator with hydraulic level deformation mechanism”, (9/05-3/06), \$22,344
29. AFOSR, “GameChangers: Multifunctional Hybrid Composite Structures for Load Bearing Antennas”, w/ J. Volakis S. Ghosh, S.E Bechtel, (9/2007 – 8/2010), \$3,500,000.00
30. NSF, “Industrial University Collaborative Research Center in Smart Vehicle Concepts”, Planning Grant, \$350,000 (6/2007 – 5/2012)

RESEARCH STATEMENT

Gregory Washington holds the rank of Professor of Mechanical Engineering at The Ohio State University. Professor Washington has been involved in multidomain research for the last 15 years. His core area of interest lies in the area of dynamic systems: with an emphasis in modeling and control of smart material systems and devices. During this time he has been involved in the following applications: the design and control of mechanically actuated antennas, the design and control of advanced automotive systems incorporating smart materials, the design and control of Hybrid Electric Vehicles, and structural position and vibration control with smart materials. He is presently working on an ultra-lightweight structurally active antennas and sensory systems that involve the use of “smart materials”. His specific area of research lies in the modeling and control of novel systems and devices that incorporate smart materials. He is the author of more than 100 technical publications in journals, edited volumes, and conference proceedings.