

Gregory Washington
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WORK ADDRESS

University of California – Irvine
The Henry Samueli School of Engineering
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EDUCATION

North Carolina State University

Doctor of Philosophy (1991 - 1994)
Mechanical Engineering GPA 4.0
Graduate Advisor: Larry Silverberg
Dissertation: *Modal Control of Reflector Surfaces for Far Field Power Maximization*

Master of Science (1989 - 1991)

Mechanical Engineering GPA 4.0
Graduate Advisor: Eric Klang
Thesis: *Modeling and Analysis of Doubly Curved Aerobrake Truss Structures*

Bachelor of Science (1984 - 1989)

Mechanical Engineering GPA 3.72

INTEREST

His core area of interest lies in the area of dynamic systems with an emphasis in the modeling and control of smart material structures and systems. My research also focus in the following applications: the design and control of mechanically actuated antennas, advanced control of machine tools, the design and control of Hybrid Electric Vehicles and advanced powertrains.

PROFESSIONAL EXPERIENCE (Administrative)

University of California – Irvine (2011 – Present)

Dr. Washington was appointed Dean of the Henry Samueli School of Engineering on August 1, 2011. Duties include the provision of visionary leadership, oversight and management of the School of Engineering program (Ranked 40th USNWR, Top 25 Public). The Henry Samueli School of Engineering consist of 110 faculty and more than 3500 students.

Ohio State University

Interim Dean (2008 – 2011)

Dr. Washington was appointed Interim Dean of the College of Engineering by Executive Vice President and Provost Joseph Alutto and President E. Gordon Gee and assumed the position on October 1, 2008. Duties include the provision of visionary leadership, oversight and management of Ohio's largest and highest ranked college of engineering program (Ranked 25th USNWR, Top 15 Public). The OSU College of Engineering consist of 275 faculty and more than 8400 students Annual research expenditures of the college exceeded \$128M in the latest academic year. Dr. Washington provided leadership and oversight to the College of Engineering as it advanced the excellence and impact of the University through the implementation of the *University Academic Plan*. Selected activities and accomplishments of Dr. Washington and his leadership team in support of the College *Strategic Plan*,

which detailed the College's goals, strategies, actions and performance metrics, are summarized below under the *Plan's* overarching goals.

Forge One Ohio State University

- Collaborated with the College of Business in the establishment of a Chapter of the National Organization of Business Engineers. Led in the implementation of the Ohio Innovation Initiative (OII), which sends teams of CoE and CoB students into Ohio businesses and helped to identify more than \$5M in potential savings for these Ohio companies.
- Organized Moving Ahead 2010 Conference a multi-college (5 Colleges) conference aimed at sustainable transportation for the 21st Century. The Conference had 750 attendees from 25 states and three countries.
- Led in the planning and execution of the Engineering in Medicine Workshop with the College of Medicine (CoM). This workshop featured Senator John Glenn.
- Led in the development of two multi-college student projects to include the Solar Decathlon (4 colleges, 18 departments), EcoCAR (2 colleges), Mobile Application Development Lab (with the College of Arts and Sciences)
- Launching a Global Engineering Leadership Masters Program with the College of Business.

Students First

- Fully funded and expanded the Engineering Education Innovation Center (EEIC) to enrich the undergraduate student experience and to strengthen the academic credentials of our undergraduates, further advancing OSU towards national leadership in undergraduate engineering education excellence and innovation.
- Led the remodeling of Hitchcock Hall and two other engineering buildings establishing student centered collaborative workspaces.
- Initiated and expanded new programs in **multidisciplinary design** (Ohio Innovation Initiative, Engineering and Business students engaged 17 separate companies on projects aimed to reduce cost and develop new products. This is more than a 500% increase from the previous year), **social responsibility** (Tony Wells Social Innovation Initiative was officially launched in 2009 with 4 projects and a team of students won third place in the International Idea to Product (I2P) Competition from an initial field of more than 60 applicants.
- Led the development of joint programs with the College of Business (Ohio Innovation Initiative) and the College of Arts and Sciences (Mobile App Development Lab- for Smart phones)
- Established Internationalization Task Force, chaired by a senior Knowlton School of Architecture (KSA) faculty member, to assess College of Engineering international programs and activities, and in partnership with new University leadership, develop a strategic (or performance) plan for significantly advancing College internationalization programs.
 - This has led to the establishment of joint programs with Shanghai Jiao Tong University and Peking University. This past year we leveraged US Automobile Manufacturers to engage Shanghai Jiao Tong University in the development of a Department of Energy funded US-China Clean Energy Research Center on Clean Vehicles.
- Initiated comprehensive assessment of undergraduate student recruitment processes, benchmarked competition, developed strategies and best practices for significantly enhancing the number, quality and diversity of undergraduate engineering students. Implementation of best practices, which included greater personalized communications with prospective students (including by College leadership) and the more selective and strategic application of scholarships.

- This yielded an increase in freshman enrollments of over 35% in 2009 with simultaneous increases in ACT scores. This enrollment was maintained in 2010. This represents the largest increase in enrollment in history.
- Led in the establishment of two new undergraduate programs (City and Regional Planning Program and the Environmental Engineering Program).
- Initiated graduate student recruitment fair to attract top external students to OSU.
- Provided oversight to Associate Dean Morrow-Jones and then to her replacement Associate Dean Roberto Rojas in the establishment of a Global Engineering Leadership program to be provided jointly with the Fisher College of Business, Glenn School for Public Policy and the Moritz College of Law via innovative weekend and distance program to engineering professionals across Ohio and the United States.

Faculty and Staff Talent and Culture

- Hired the most diverse faculty cohort of in the history of the college. In 2009, eight of the eleven faculty members hired were women and underrepresented minorities. This included the first African-American in Computer Science, the first Hispanic in Computer Science, the first African-American in City and Regional Planning.
- Initiated a program to improve program rankings and to enhance faculty success. This has included an enhanced marketing program focused on benchmarking and implementation of best practices.
 - Streamlined and strengthened the process for monitoring and reporting data for ASEE and US News.
 - The college's US News & World Report graduate rankings has improved two additional positions to 25. For the first time in our history all of our departments are ranked.
 - Initiated programs to significantly increase all objective measurable metrics (i.e. research expenditures, average GRE scores of incoming graduate students).
- Strengthened rigor of College promotion and tenure process, raising the bar for promotion and tenure while more clearly defining performance expectations and enhancing mentoring and support to promote and enable career success.
- Expanded the annual Dean's Faculty Salary Equity Adjustment process so that in two years has awarded over 25 salary equity adjustments to the College's best and most at-risk faculty based on prioritized recommendations of department chairs and market equity analysis. Conducted eight counter offers (six successful) in the last two years. Expanded the process to compensate top-performing research and administrative staff. Result has been high retention of top College faculty and staff.

Simplify University Systems and Structures

- Eliminated a large multimillion dollar continuing funds deficit and developed a plan to eliminate all future debt commitments
- Built a diverse leadership team that included the appointment of two of the five associate deans, hired or renewed six department chairs, and the director of the Knowlton School of Architecture. Expanded Dean's Executive Committee to include OSU's first Associate Dean for Diversity and Outreach.
- Provided leadership and administrative oversight in the development, acceleration and modification of a comprehensive, faculty/staff-driven, stakeholder-engaged strategic/business planning process that defined a bold, two-fold vision, In 2008, organized and provided strategic oversight to the *Performance Plan Acceleration Task Force* comprised of faculty leaders called together to improve the quality of research and education for the college of engineering students by realigning, reorganizing, strategic positioning and reducing the number of departments.

- Developed a Business Operations Center to streamline and centralize business operations (procurement, travel, human resources) for interdisciplinary centers and smaller departments within the College.
- Implementation of *Performance Plan* and associated enhanced fiscal management, significantly increased student enrollments (more than 30% growth in 2009 maintained in 2010)
- Implemented a formal, comprehensive annual evaluation process for department chairs, associate deans and other Dean direct reports.
- Communicates regularly with leadership team, faculty, staff, students, parents, and other College stakeholders. Meets with faculty and staff yearly in department meetings to discuss college's progress, fiscal issues and other timely topics and issues.

Recast Our Research Agenda

- Established a program to increase funded programs in interdisciplinary research: These include hiring of faculty along programmatic thrusts (not just departmental lines), hiring proposal coordinators, starting external proposal pre-submission review, and novel cost-share policies.
- Started a program to establish new major interdisciplinary research centers. Faculty working groups established centers for each of the eight programmatic research areas.
 - Faculty in the college achieved another ARPA-E win and we are one of only three institutions with two ARPA-E proposal wins. This project was a joint project with Battelle.
 - The college participated and won three more Department of Defense Multidisciplinary University Research Initiative (MURI). We now lead the country in the number of active MURIs with eight (5 with OSU lead).
 - Formed two new NSF-Industry University Collaborative Research Centers (IUCRC). OSU now leads the country in the number of active IUCRCs (with seven IUCRCs)
 - Faculty collaborated with industry to win two third frontier projects: CoE faculty in collaboration with CAR Technologies, Vanner, STMicroelectronics, and AeroVironment received a Wright Project to establish a *Center of Excellence for Energy Storage Technology*. CoE faculty in collaboration with GE Aviation Electrical Power Systems and Wright-Patterson's Air Force Research Laboratory have received a Wright Project to establish *the Center for High Performance Power Electronics*
- Established the Industrial Liaison office in the college of engineering. This program links industry to academic research at OSU. Dan Kramer was hired to focus on College of Engineering Industrial Research.
- Total core research expenditures are up more than 8% to \$128M (2009). Total research awards up 9.7%, with the award dollars up 53% (2009). More importantly total number of submitted proposals up 13.2% (919 in 2009 up from 812 in 2008). Total Ohio awards up from \$2.8M in 2008 to a whopping \$17.4M in FY2009.

Outreach and Collaboration

- Established the largest two-year fundraising and development effort in the college's history. Yielded more than \$40 million in gifts, pledges and planned gifts in each of the last two years. Currently leading the fundraising efforts for two buildings: The Electrosiences Building and Koffolt lab (Combined Chemical Engineering and Chemistry building)
- In collaboration with our Private and Corporate Sponsors conducted the Moving Ahead 2010 Conference with a focus on sustainable mobility. The conference is the largest undertaking of its kind performed by the college with more than 750 participants and more than 100 speakers.
- Established and led the Ohio Nuclear Workforce Roundtable, which featured high level nuclear energy industry,

research and academic leaders with a goal to demonstrate a broadly united desire to improve the market, regulatory and academic environments necessary to make new, economically viable nuclear power a major component of the nation's future energy profile.

- Expanded the College Development Office, hiring a new Executive Director of College Advancement and two development officers. Developed position to oversee College development, communications and alumni affairs.
- Performed development-related cultivation/solicitation visits around the country with alumni and friends of the College, and key corporations (GE Aviation, Goodrich, Texas Instruments, Shell, Exxon, Boeing, Northrop-Grumman, Honda, Ford, Chrysler, Rolls Royce).
- Expanded the Dean's Advisory Board comprised of national leaders of business and industry, government, and academia. In 2008 and 2009 the board provided significant input to the updated draft *Performance Plan*.
- Represented College and University on numerous boards/councils. In Ohio these included SciTech, the Edison Welding Institute, the Ohio Aerospace Institute (incoming board chair), Univenture, the Transportation Research and the Center (Board Chair). On a national level, served as member of the Air Force Scientific Advisory Board, the NSF Engineering Advisory Board and American Society for Engineering Education Dean's Council.
- Frequently represented OSU via speaking engagements at national forums such as the Moving Ahead Conference 2010, the Big 10 Women's conference, Impact 2008, and the Ohio Transportation Engineering Conference.
- Presented more than 35 talks on engineering, technology, energy and environmental issues at local high schools.
- Active participation with both US Senators. Led the Ohio Nuclear Workforce Roundtable for Senator Voinovich and the currently leading (with Battelle and EWI) the National Institute for Industrial transformation for Senator Brown. Participated with Governor's Office and the Ohio Department of Development (ODOD) in Ohio development opportunities, including personally teaming with Governor Strickland and Lt. Governor/ODOD Director Lee Fisher, Chancellor Eric Fingerhut, Mayor Michael Coleman, on recruitment and/or retention of companies to Ohio including CODA Automotive and Venturi Automotive.
- Proactively and personally addressed many complex and publicly controversial issues associated with the OSU Don Scott Airport proposed expansion and ongoing environmental concerns.

Associate Dean of Research –College of Engineering (July 2005 – September 2008) Duties include oversight and administration of all research programs at the college of engineering. Development and coordination of new research areas based on the strategic thrust of the College.

Major Accomplishments

- Led the research program in the College of Engineering, creating an environment that effectively stimulated, supported, and facilitated the performance of nationally-recognized research and scholarship, and that promoted rapid growth of sponsored research from the government and industry. Assisted and enabled faculty, department chairs, and research staff in performing and growing research programs.
- Provided direct oversight to The Ohio State University Engineering Experiment Station (EES), an organization chartered by The State of Ohio to support the research, development and the technology transfer needs of Ohio business and industry.
- Led strategic planning for the research enterprise focused on interdisciplinary research. This plan focused faculty teams along eight programmatic thrust: 1) Advanced Materials; 2) Energy, Sustainability and the Environment; 3) Mobility and Transportation; 4) Computation and Information; 5) Power and Propulsion; 6) Bioengineering; 7) Manufacturing; 8) Integrated Design.
- Successfully led the college in a competition for University-level investment (\$18M) to enhance the college's competitiveness in externally sponsored research funding.
- Established novel cost-share program to help faculty increase success in large block grants.

- Restructured research infrastructure by expanding the Engineering Experiment Station research, providing faculty with greater proposal support along with pre-award and post-award services. OSU Won an MRSEC and established 6 interdisciplinary centers using this program.
- Established initiatives and programs with both US Senators. Solicited US Senators for congressional directed funding in multiple areas.

Director (Interim) – Ohio State University Institute for Energy and the Environment (July 2007 – September 2008)
Duties include the coordination of energy research for six different colleges on the Ohio State University Campus. Inherent in this institute is the development of new research directions and campus initiatives in energy and the environment.

Major Accomplishments

- Led a university wide strategic planning effort to focus the energy and environmental enterprise.
- Established energy initiatives and programs with both US Senators. Solicited US Senators for congressional directed funding in the energy and environmental area.
- Represented the university statewide and nationally on more than 25 speeches on energy and environment issues.
- Performed development-related cultivation/solicitation visits around the country with alumni and friends of the university who support energy and environmental issues.
- Established multi college teams focused on large block grant support. Led statewide Ohio Research Scholar Proposal effort that produced \$10M in funded support.

BOARD LEVEL APPOINTMENTS

Algaeventure Systems – Board of Directors (2010 – Present)

Newly established company with a with a mission to take the cost barriers out of growing and processing algae, and in the process discovered a technology that will revolutionize dewatering and other solid-liquid separations

Air Force Scientific Advisory Board (2007 - 2011)

Member of the Advisory Board focused on Structures, Antennas and Spectrum Issues. The main goal of the SAB is to provide a link between the Air Force and the nation's scientific community. The SAB promotes the exchange of the latest scientific and technical information that may enhance the accomplishment of the Air Force mission.

Transportation Research Center of Ohio – Board of Directors: Chair (2008 - 2011)

The Transportation Research Center provides comprehensive research, development and testing services, facilities to manufacturers, industry organizations, and government agencies worldwide. Chairman of the board supervises and directs the Center's administration in the operation and maintenance of activities of the Center.

EWI Board of Directors - (2008 - 2011)

EWI provides comprehensive research, development and testing services related to manufacturing and joining technologies. It's the largest organization of its kind in the US with more than 300 corporate members.

Dayton Area Graduate Studies Institute (DAGSI) – (2008 – 2011)

DAGSI is a consortium of graduate universities with a mission to develop and support world-class graduate engineering education and research programs, thereby contributing to Ohio's economic growth and development.

National Science Foundation Engineering Advisory Committee (2007 - 2010)

Member of the Advisory Committee of the Engineering Directorate. The committee evaluates and advises the directorate on mission, programming, initiatives, goals, administration and structure. **National Research Council,**

Decadal Survey of Civil Aeronautics: (2005 - 2006)

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

Defense Science Study Group: (2002 – 2003)

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 (2002 – current)

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

PROFESSIONAL EXPERIENCE (Academic)

Ohio State University

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

North Carolina State University

Research Assistant (1991 - 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 (1989 - 1990) Research included introductory design study of aerobraking in both Lunar and Mars missions. Disciplines included Finite Element Analysis, and Composite Materials.

MAJOR RESEARCH ACCOMPLISHMENTS

Smart Electromagnetic Systems

Developed first mechanical active antenna using Smart Materials. Produced large electromagnetic and optical systems actuated by Polyvinylidene Fluoride film. Pioneered in the development of the analytical relationships between electromagnetic radiation and time varying mechanically aperture shapes.

Smart Automotive Systems

First Reported Intelligent Control Methodology for Hybrid Electric Vehicles. Pioneered in the development of smart material actuators (MR Fluid Dampers, Piezoelectric Actuators) for a host of automotive applications to include (active seats, electromagnetic braking systems, electromagnetic valve actuators, vibrational and thermoelectric energy harvesting)

General

First reported development of Intelligent Control with Smart Materials. Developed linear model for curved piezoelectric actuators with mechanical advantage. Currently developing a new class of solid-state materials that can actuate, sense, process information and communicate.

Student Advising (Ohio State University)

Advised 26 MS, 10 Ph.D. and 11 Undergraduate researchers including (honors)

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>

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	Kyle Van Volkinburg, MS 2010	

Graduate Students Advised (Ph.D.)

Completed (Ph.D.):

1. Seung Keon Kwak, “*New Modeling and Control Design Techniques for Aircraft Structural Dynamics using Smart Materials*, (Co-Advised with Rama Yedavalli), 1999, Research Engineer, Pratt Whitney
2. Fukashi Andoh, “*Control of Distributed Parameter Systems using Piezoelectric Transducers*”, (Co-Adviser Vadim Utkin), 2001
3. Hwan-Sik Yoon, “*Design, Modeling and Optimization of a Mechanically Reconfigurable Smart Reflector Antenna System*”, 2002, Assistant Professor, University of Alabama (Tusculoosa)
4. Peter Eyabi, “*Modeling and Sensorless Control of Solenoidal Actuators*” 2003, Cymer, Manager
5. Bradley Glenn, “*Coordinated Control of the Turbo Electrically Assisted Variable Geometry Turbocharged Diesel Engine with Exhaust Gas Recirculation*”, 2005 (Senior Scientist, Battelle)
6. Vijay Neelakantan, “*Modeling, Design, Testing and Control of a Two-Stage Actuation Mechanism using Piezoelectric Actuators for Automotive Applications*”, 2005, (Lead R&D Engineer, General Motors)
7. Leann Faidley, “*Characterization and Modeling of Ferromagnetic Shape Memory Ni-Mn-Ga in a Collinear Stress-Field Configuration*”, (Co-Advised with Marcelo Dapino), 2006, (Assistant Professor, Warburg College)
8. Amitesh Punhani, “*Shape and Vibration Control of Smart Laminated Plates*”, 2008, (Program Manager, Bharti Airtel Limited).
9. Farzad Ahmadkhanlou, “*Design, Modeling and Control of Magnetorheological Fluid-Based Force Feedback Dampers for Telerobotic Systems*”, (Co-Adviser: Stephen Bechtel) 2008
10. Byeongil Kim, “*Design and Analysis of Model Based Nonlinear and Multi-Spectral Controllers with Focus on Motion Control of Continuous Smart Structures*, (Co-Adviser: Rajendra Singh) 2010, Senior Research Engineer, Hyundai Kia Motors.
11. Leon Headings, “*Modeling and Development of Thermoelectric Device Technologies for Novel Mechanical Systems*”, 2011, (Post Doctoral Researcher, Ohio State University)
12. Prashanth Ramesh, “*Smart Materials for Electromagnetic and Optical Applications*”, 2012, (Design Engineer, Triquint Semiconductor)
13. Jung Kyu Park, “*Advanced Development of a Smart Material Design, Modeling, and Selection Tool with emphasis on Liquid Crystal Elastomers*”, 2012, (Post Doctoral Researcher, Ohio State University)

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

Matt Detrick, 2012	Jung Kyu Park, 2012
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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 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)
Farzad Ahmadkhanlou, 2005 SPIE Smart Structures and Materials Student Best Paper Award (4th Place)
Farzad Ahmadkhanlou, 2007 Hayes Graduate Forum (2nd Place)
Leon Headings, 2009 SPIE Smart Structures and Materials Student Best Paper Award (3rd Place)
Prashanth Ramesh, 2010 SPIE Smart Structures and Materials Student Best Paper Award (3rd Place)
Leon Headings, 2011 ASME Smart Materials, Adaptive Structures and Intelligent Systems

Other Graduate student awards

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

TEACHING ACCOMPLISHMENTS

Courses Taught:

System Dynamics and Vibrations (MAE 481), Principles of Automatic Control (MAE 571), Control System Design (MAE 672), Introduction to Mechatronics (MAE 674), Control Systems Design Laboratory (MAE 772), Smart Materials and Intelligent Systems (MAE 774), Lumped Parameter System Analysis (MAE 780), Optimization and Control of Hybrid Electric Vehicles (MAE 785), State Space Methods for Dynamic Systems Analysis and Control (MAE 873), Introduction to Advanced and Sustainable Energy Systems (ENG 694).

Average course evaluation ranking of 4.7 out of 5.

TEACHING INITIATIVES

Course and Curriculum Development

- Developed a new graduate course entitled “Smart Materials and Intelligent Systems” (MAE 774). Launched the research and curriculum in the area.
- Developed new grad/undergrad course entitled “Introduction to Advanced and Sustainable Energy Systems” (ENG 694)
- Introduced a undergraduate course entitled “Strategies for Academic Success” (ENG 294) geared towards new underrepresented engineering students
- Co-designed and co-developed an automotive engineering curriculum at the graduate level 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) (MAE 775) 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.

PROFESSIONAL EXPERIENCE (Industrial/Government)

National Aeronautics and Space Administration

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

Ford Motor Company

Research Scientist (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”.

Sandia National Laboratory

Research Scientist (2004-2005) Research included the design, modeling, development and testing of ultra-lightweight structurally active antennas and sensory systems that involve the use of “smart materials”. Additional research includes the development of active vibration control of large space systems.

PROFESSIONAL SERVICE

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

Technical Reviewer: ASME Journal of Dynamic Systems Measurement and Control

Technical Reviewer: AIAA Journal of Guidance, Control, and Dynamics

Technical Reviewer: IEEE Transactions on Antennas and Propagation

Technical Reviewer: IEEE Transactions on Control Systems Technology

Technical Reviewer: Journal of Intelligent Material Systems and Structures

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
- ASME International Congress & Exposition, November 2007

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.

(2000) NASA Communications Technology Division, Best paper of the year award, “K-band phased array antennas based on Ba_{0.60}Sr_{0.40}TiO₃ thin-film phase shifters,” (w/ R. R. Romanofsky, J. T. Bernhard, F. W. Van Keuls, F.A. Miranda, and C. Canedy), *IEEE Transactions on Microwave Theory and Techniques*, vol. 48, no. 12, December 2000, pp. 2504-2510.

(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

Journal and Conference Papers

1. Byeongil Kim, Gregory N. Washington, and Hwan-Sik Yoon, “Control and hysteresis reduction in prestressed curved unimorph actuators using model predictive control”, *Journal of Intelligent Material Systems and Structures*, (Accepted)
2. Byeongil Kim, Gregory N. Washington, and Hwan-Sik Yoon, "Active vibration suppression of a 1D piezoelectric bimorph structure using model predictive sliding mode control", *Smart Structures and Systems*, (Accepted)
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124. 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.
125. Yoon, H. S. and G. N. Washington, "Piezoceramic Actuated Aperture Antennas," *J. Smart Materials and Structures*, **7** (1998), pp. 537-542.
126. 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.
127. 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.
128. 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

129. 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.
130. 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.
131. Kiely, E. and G. N. Washington, "Design, Actuation, and Control of Active Patch Antennas," *Proc. SPIE Int. Conference on Smart Structures and Materials*, 1998.
132. Mayhan, P. and G. N. Washington, "Robust Intelligent Control of Structures Using Piezoceramic Materials," *Proc. SPIE Int. Conference on Smart Structures and Materials*, 1998.
133. Song, J.K. and G. N. Washington, "Intelligent Beam Vibration Control Utilizing Smart Materials," *Proc. Artificial Neural Networks in Engineering Conference*, 1998.
134. Washington, G. N., "Smart Electromagnetic Structures (SEMS): A New Paradigm for Microwave Technology," *Progress in Electromagnetics Research Symposium*, France, 1998.
135. Yoon, H. S. and G. N. Washington, "Piezoceramic Actuated Aperture Antennas," *Proc. SPIE Int. Conference on Smart Structures and Materials*, 1998.
136. 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)**.
137. 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.
138. Washington, G. N., "Smart Aperture Antennas," *J. Smart Materials and Structures*, **5** (1996).
139. Washington, G. N., "Active Aperture Antennas," Adaptive Structures Forum, *ASME Int. Cong. and Exposition*, 1996.
140. 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.
141. Washington, G. N., "Modeling and Design of an Active Polyvinylidene Fluoride Aperture Antenna," *Workshop on Smart Electromagnetic Antenna Structures*, NATO Headquarters, Brussels, 1996.
142. Washington, G. N., "Smart Aperture Antennas," *Proc. SPIE Conference on Smart Structures and Intelligent Systems*, 1996.
143. 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).
144. Silverberg, L. M. and G. N. Washington, "Modal Control of Reflector Surfaces Using Far Field Power Measurements," *Microwave and Optical Technology Letters*, **7** (1994).
145. 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.
146. 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.

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
19. National Science Foundation, “Smart Materials Research at OSU”, 3/27/2006
20. Ohio State University Winter College, “Center for Clean and Sustainable Energy, A work in Progress”, 2/24/2007
21. Ohio State University, Energy Systems Modeling Symposium, “Is Time Running Out”, 12/03/2007
22. North Carolina State University, “Modeling and Control of Magnetorheological Fluid-Based Haptic Systems for Telerobotic Surgery”, 3/27/2008
23. North Carolina State University, Building Future Faculty Program, “Preparing to be the Faculty Member of the Future” 3/27/2008
24. Purdue University, Mechanical Engineering Department, “Distributed Intelligent Materials Systems”, 9/13/2012

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 - (9/04-8/05) – Co-PI
26. Eaton Corp, "Design and construction of a high deflection piezoelectric actuator with hydraulic level deformation mechanism", (9/05-3/06), \$22,344
27. NSF, "Design, Modeling and Control of Force Feedback Systems using Magneto-Rheological Fluids", (8/2005 - 7/2008) – Civil and Mechanical Systems, \$418,000.00
28. DOE, GATE Center for advanced automotive propulsion systems at The Ohio State University, (10/05-9/10), \$671,000.00 (Co-PI)
29. NSF, "Industrial University Collaborative Research Center in Smart Vehicle Concepts", \$350,000, (7/2007 – 6/2012) (Co-PI)
30. Ohio Board of Regents, "Ohio Research Scholars Program – Advanced Energy Systems via Green Industrialization" (7/2008 – 6/2011), \$10.2M
31. AFOSR, "Game Changers", Multifunctional Hybrid Composite Structures for Load Bearing Antennas (7/2007 – 6/2010), Co-PI, \$3.45M
32. Ohio Department of Transportation, "Development of Opportunity Zones Utilizing Transportation Assets", 9/2010 – 1/2012, PI, \$188,000.00

RESEARCH STATEMENT

Gregory Washington Professor of Mechanical and Aerospace Engineering and Dean at The University of California, Irvine. Professor Washington has been involved in multidomain research for the last 20 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 140 technical publications in journals, edited volumes, and conference proceedings.