Gregory D. Buckner
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A. Professional Preparation

University of Texas at Austin	Mechanical Engineering	Ph.D.	1996
Virginia Polytechnic Institute	Mechanical Engineering	M.S.	1987
Louisiana State University	Mechanical Engineering	B.S.	1986

B. Appointments

2010-present	Professor, Mechanical & Aerospace Engineering, NC State University
2004-present	Affiliate Faculty, Biomedical Engineering, UNC-Chapel Hill and NC State University
2004-2010	Associate Professor, Mechanical & Aerospace Engineering, NC State University
1999-2004	Assistant Professor, Mechanical & Aerospace Engineering, NC State University
1997-1999	Research Engineer, University of Texas at Austin Center for Electromechanics
1996-1997	Process Controls Consultant, Austin TX
1991-1996	Graduate Research Assistant, University of Texas at Austin
1988-1991	Senior Engineer, Westvaco's Covington Research Center

C. Research and Teaching Interests

Modeling, fabrication and control of dynamic systems, electromechanical systems, intelligent control systems, mechatronics, surgical robotics

D. Scientific and Professional Societies

Pi Tau Sigma: Mechanical Engineering Honor Society (Faculty Advisor, NCSU Chapter), Tau Beta Pi: Engineering Honor Society, Phi Kappa Phi: Academic Honor Society, Sigma Xi: Scientific Research Honor Society, American Society of Mechanical Engineers (ASME), Institute of Electrical and Electronics Engineers (IEEE), American Society for Engineering Education (ASEE)

E. Scholarly and Professional Honors

Board of Governors Award for Excellence in Teaching, North Carolina State University College of Engineering Recipient, 2013.

Carnot Award for Teaching Excellence, North Carolina State University chapter of the American Society of Mechanical Engineers: 2012, 2011, 2010, 2008, 2004, 2000

Faculty Impact Award, North Carolina State University chapter of the American Society of Mechanical Engineers: 2012, 2005

Distinguished Undergraduate Professor Award, North Carolina State University Alumni Association, 2007

Ralph R. Teetor Educational Award, The Society of Automotive Engineers (SAE International), 2006

New Faculty Research Award, American Society of Engineering Education, Southeast Region, 2002

Outstanding Teacher Award, induction into the Academy of Outstanding Teachers, North Carolina State University, May 2002

NSF CAREER Award - "Intelligent Control Systems for Active Magnetic Bearings: An Enabling Technology for Flywheel Energy Storage Systems", January 2001

F. Professional Society Memberships

Pi Tau Sigma - Mechanical Engineering Honor Society

Tau Beta Pi - Engineering Honor Society

Phi Kappa Phi - Academic Honor Society

American Society of Mechanical Engineers (ASME)

American Society for Engineering Education (ASEE)

G. Consulting Activities

2007-Present: Physcient, Inc. (Raleigh, NC) - Technical advising to startup company developing instrumented retractors for cardiothoracic surgery

1996-2008: Mead-Westvaco Corporation, (Charleston, SC, Luke, MD, Covington, VA, Wickliffe, KY and Santa Caterina, Brazil) - Evaluating, tuning, and upgrading Acoustic Leak Detection Systems (ALDS) to detect hazardous steam leaks in black liquor recovery boilers

1999-2002: University of Texas Center for Electromechanics (UT-CEM), Austin, TX - Developed and implemented intelligent system identification and control algorithms for UT-CEM's active vehicle suspension program, real-time tests conducted on a military HMMWV at the U.S. Army's Yuma Proving Grounds, Yuma, NM

1994-2000: Co-Founder, Partner: Compu-Crane, Inc., Raleigh NC - developed a Windows software application, Crane Selection and Planning Software (CSPS), to select cranes for critical lifts and graphically simulate project; distributed with every new Grove and Manitowoc crane; named Lifting & Transportation's most requested product of 1995

H. Collaborators and Advisorships

Dr. Gil Bolotin (Cardiac Surgery, Academic Hospital of Maastricht, Netherlands), Dr. Guillaume Chanoit (Veterinary Medicine, NCSU), Dr. Randolph Chitwood (Cardiac Surgery, Brody School of Medicine, ECU), Dr. Richard Cook (Cardiac Surgery, University of British Columbia, Canada), Dr. Denis Cormier (Industrial & Systems Engineering, NCSU), Dr. Angus Kingon (Materials Science & Engineering, NCSU), Dr. Bryan Laffitte (Industrial Design, NCSU), Dr. Tiegang Fang (Mechanical & Aerospace Engineering, NCSU), Dr. Andor Van Den Hoven (Radiology and Nuclear Medicine, University Medical Center Utrecht, the Netherlands), Dr. Daniel Von Allmen (Pediatric Surgery, UNC)

Thesis Advisorships (39) and Postgraduate-Scholar Sponsorships (4)

Dr. Kari Tammi (Post-Doc, MAE, 2008), Dr. Bei Lu (Post-Doc, MAE, 2005), Dr. Soheil Saadat (Post-Doc, MAE, 2004), Prof. Byeong-Mook Chung (Visiting Scholar, MAE, 2006), Jeff Allred (PhD, MAE, current), Eric Boros (PhD, MAE, current), Chris Elliott (PhD, MAE, current), Brent Kitchen (PhD, MAE, current), Bongani

Malinga (PhD, MAE, current), Andrew Richards (PhD, MAE, 2013), Jennifer Hannen Wiest (PhD, MAE, 2013), John Crews (PhD, MAE, 2011), J.P. Lien (PhD, MAE, 2011), Arun Veeramani (PhD, MAE, 2009), Molly Purser (PhD, ISE, 2009), Omar Zohni (PhD, MAE, 2008), Pradeep Pandurangan (PhD, MAE, 2007), Heeju Choi (PhD, MAE, 2005), Nathan Gibson (PhD, MAE, 2004), Soheil Saadat (PhD, MAE, 2003), Brad Lawrence (PhD, IE, 2002), John Archer (MS, MAE, 2013), Casey Haigh (MS, MAE, 2013), Michael Mattson (MS, MAE, 2010), Nana Noel (MS, MAE, 2008), Jay Robb (MS, MAE, 2008), Andrew Richards (MS, BME, 2008), Paul Bachmeyer (MS, MAE, 2008), Sean Dugan (MS, MAE, 2007), Neil Milani (MS, MAE, 2006), Shaphan Jernigan (MS, MAE, 2006), Aaron Kiefer (MS, MAE, 2004), Jonathan Kuniholm (MS, MAE, 2003), Mike Blue (MS, MAE, 2003), David Hood (MS, MAE, 2003), Michael Craft (MS, MAE, 2003), Jason Stevens (MS, MAE, 2002), F. Donald Caulfield (MS, MAE, 2002), Ravindra Dixit (MS, MAE, 2001), Vignesh Jayanth (MS, MAE, 2001)

I. Synergistic Activities

Innovative Tools and Techniques for Robot Assisted Cardiac Surgery (NIH, 2004-2007) – PI of large scale, multi-university concurrent design project to develop endoscopic tools for minimally-invasive cardiac surgery; with professors Cormier (Industrial & Systems Engr.) and Laffitte (College of Design) at NCSU, surgeons Chitwood and Nifong of ECU, surgeon Bolotin of Academic Hospital Maastricht, surgeon Cook of Univ. of British Columbia

Faculty Affiliate, Institute for Maintenance Science and Technology (NCSU, 2008-2010) – DOD and affiliate-funded research with faculty and graduate students from Materials Science and Engineering, Industrial and Systems Engineering, MAE and other departments

J. Entrepreneurial Activities

Founder and CEO, emTECH LLC, Raleigh NC, 2012-Present

Chief Science Officer, Physcient Inc., Durham NC, 2007-Present

Co-founder, Compu-Crane Inc., Graham NC, 1994-2003

K. Patents and Licensing Agreements

1. Gregory D. Buckner, Gil Bolotin: Force-determining retraction device and associated method. North Carolina State University, August 2010: US 07775974.

2. Jerry Lee Wordsworth, Jerry Barnes, Gregory D. Buckner: Intelligent power management system. October 2012: US 08295950.

3. Gregory D. Buckner, Tiegang Fang: Fuel injection device for an internal combustion engine, and associated method. North Carolina State University, January 2011: US 20110005499-A1.

4. Gregory D. Buckner, Arun Shankar Veeramani, Stephen B. Owen, Shaphan R. Jernigan: Active Catheter Device and Associated System and Method. North Carolina State University, October 2012: WO/2012/135339.

5. Acutus Medical: exclusive license agreement for Active Catheter Device and Associated System and Method, via NCSU's Office of Technology Transfer, 2012.

6. PhyScient, Inc.: exclusive license agreement for Force-determining retraction device and associated method, 2007.

L. Doctoral Advising

1. Andrew L. Richards (PhD/MAE), "Experimental Investigations into the Targeted Delivery of Microspheres in Radioembolization Therapy", funded by Sirtex Medical, Inc., defended 08/30/13.

2. Jennifer H. Wiest (PhD/MAE), "Nonlinear Control Strategies for a Teleoperated Cardiac Ablation Catheter Actuated by Shape Memory Alloy Tendons: System Modeling, Controller Synthesis, and Experimental Validation", funded by the NIH (NHLBI), defended 03/28/13.

3. John P. Lien (PhD/MAE), "Design, Modeling, and Control of a Variable Geometry Spray Fuel Injector", funded by the NSF (CBET), defended 08/10/11.

4. John Crews (PhD/MAE), "Development of a Shape Memory Alloy Actuated Robotic Catheter for Endocardial Ablation: Modeling, Design Optimization, and Control", funded by the NIH (NHLBI), defended 01/14/11.

5. Arun Veeramani (PhD/MAE), "Design, Modeling and Control of Shape Memory Alloy Actuated Robotic Catheter", funded by the NIH (NHLBI), defended 03/26/09.

6. Molly Purser (PhD/ISE, co-supervised with Denis R. Cormier), "Development and Surgical Evaluation of a Novel Annuloplasty Ring with a Shape Memory Alloy Core", funded by the NIH (NHLBI), defended 03/23/09.

7. Omar Zohni (PhD/MAE), "Design, Fabrication and Experimental Characterization of PZT Membranes for Passive Low Frequency Vibration Sensing", funded by the DOE (NNP Fellowship), defended 12/04/08.

8. Pradeep Pandurangan (PhD/MAE), "Real-Time Structural Health Monitoring for Aerospace Structures", funded by Goodrich, defended 12/08/06.

9. Heeju Choi (PhD/MAE), "Intelligent Control using Confidence Interval Networks: Applications to Robust Control of Active Magnetic Bearings", funded by the NSF (ENG/ECCS), defended 3/28/05.

10. Nathan Gibson (PhD/MAE), "H∞ Control of Active Magnetic Bearings: An Intelligent Uncertainty Modeling Approach", funded by the NSF (ENG/ECCS), defended 9/10/04.

11. Soheil Saadat (PhD/MAE, co-directed with Dr. Mohammad Noori), "Structural Health Monitoring and Detection of Progressive and Existing Damage using Artificial Neural Networks-Based System Identification", funded by the NIA, defended 2/25/03.

12. Brad Lawrence (PhD/ISE, co-directed with Dr. Gary Mirka), "Intelligent System Identification Applied to the Biomechanical Response of the Human Trunk during Sudden Loading", defended 10/29/02.

M. Masters (Thesis Option) Advising

1. Casey Haigh (MS/MAE), "Modeling, Optimization and Experimental Validation of Shape Memory Alloy Bending Actuators", funded by the NIH (NHLBI), defended 06/17/13.

2. John R. Archer (MS/MAE), “Multi-objective Design Optimization of a Variable Geometry Spray Fuel Injector”, funded by the NSF (CBET), defended 01/23/13.

3. Michael Mattson (MS/MAE), “Multi-objective Optimization of Semi-active Vehicle Suspension Control”, funded by Lord Corporation, defended 06/30/10.

4. Nana Noel (MS/MAE), “GE-F110 Agile Combat Support – Intelligent Event Detection”, funded by GE Aviation, defended 04/25/08.

5. Andrew Richards (MST/BME), “A dynamically pressurized heart model to facilitate the development of surgical tools and techniques for mitral valve repair”, funded by the NIH (NHLBI), defended 02/15/08.

6. Jay Robb (MS/MAE), “Design and Simulation of an Active Load Balancing System for High-Speed, Magnetically Supported Rotors”, employed by Ingersoll-Rand, defended 02/15/08.

7. Paul Bachmeyer (MS/MAE), “Simulation-Based Design Strategies for Component Optimization in Steer-by-Wire Applications”, employed by Lord Corporation, defended 01/04/08.

8. Sean Dugan (MS/MAE), “On the Design, Modeling, and Control of an Electromechanical Pump System for Ex Vivo Testing of Surgically Repaired Mitral Valves”, defended 09/12/07.

9. Neil Milani (MS/MAE), “Performance Design of a Wind-Turbine Diesel Microgrid Hybrid Power System” (co-advised with Dr. Jim Leach), defended 06/20/06.

10. Shaphan Jernigan (MS/MAE), “Finite Element Modeling of the Left Atrium to Facilitate the Design of an Endoscopic Atrial Retractor”, funded by the NIH (NHLBI), defended 02/01/06.

11. Aaron Kiefer (MS/MAE), “Integrating Electromechanical Actuator Hardware with Receptance Coupling Substructure Analysis for Chatter Prediction on High Speed Machining Centers”, funded by VulcanCraft, defended 3/25/04.

12. Jonathan Kuniholm (MS/MAE), “Automated Knot Tying for Fixation in Minimally Invasive, Robot Assisted Cardiac Surgery”, defended 6/23/03.

13. Mike Blue (MS/MAE), “Development of a Non-Contacting Capacitive Displacement Sensor for Integrated Chatter Prediction on High Speed Milling Centers”, funded by VulcanCraft, defended 5/20/03.

14. (n) David Hood (MS/MAE), “Force Feedback Control of Tool Deflection in Miniature Ball End Milling”, funded by the NSF (ENG/DMII), defended 5/15/03.

15. Michael Craft (MS/MAE), “Design Optimization of MagneShock™ MR Dampers and Development of Fuzzy Logic Control for Semi-Active Vehicle Suspensions”, funded by Carrera, defended 3/25/03.

16. Jason Stevens (MS/MAE), “Actuation and Control Strategies for Miniature Surgical Robotic Systems”, funded by Johnson & Johnson (Ethicon), defended 7/08/02.

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