

Gregory D. Buckner

Professor, Department of Mechanical and Aerospace Engineering
North Carolina State University
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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, Faculty Core Lead (Dynamic Systems, Vibration and Control) Mechanical and Aerospace Engineering, NC State University
2024-present	Consultant, Impact Forensics, Cary NC
2016-2024	Consultant, Accident Research Specialists, Cary NC
2004-present	Affiliate Professor, Biomedical Engineering, UNC-Chapel Hill and NC State University
2018-present	Affiliate Professor, Electrical and Computer Engineering, 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

Electromechanical systems (modeling, design, fabrication and control), control systems, mechatronics, applications to automotive systems, industrial processes and medical devices

D. Scientific and Professional Societies

Pi Tau Sigma: Mechanical Engineering Honor Society (Faculty Advisor, NCSU Chapter, 2007-2013), 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), National Fire Protection Association (NFPA), American Society for Engineering Education (ASEE)

E. Appointments and Honors

Associate Editor, ASME Journal of Dynamic Systems, Measurement and Control: 2023-present

Board of Governors Award for Excellence in Teaching, North Carolina State University, College of Engineering Recipient, University Finalist: 2023, 2017, 2013.

Carnot Award for Teaching Excellence, North Carolina State University chapter of the American Society of Mechanical Engineers: 2012, 2011, 2010, 2008, 2004, 2000 (award discontinued in 2013)

Faculty Impact Award, North Carolina State University chapter of the American Society of Mechanical Engineers: 2012, 2005 (award discontinued in 2013)

Distinguished Undergraduate Professor Award, N. C. State University Alumni Association, 2007

Ralph R. Teetor Educational Award, 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)

Institute of Electrical and Electronics Engineers (IEEE)

American Society for Engineering Education (ASEE)

National Fire Protection Association (NFPA)

G. Recent Consulting Activities

Intellectual Property: Jackson Walker LLP, Houston TX (2025)

Intellectual Property: GLP Intellectual Property, Milan Italy (2024)

Intellectual Property: DeWitt LLP, Madison WI (2023-2024)

- Trial Testimony 10/22/24 - Fiskars Finland OY AB v. Woodland Tools Inc., Case No. 3:22-CV-540-JDP, Docket No. 435 (on behalf of the Defendant)
- Deposition 8/12/24 – Fiskars Finland OY AB v. Woodland Tools Inc., Case No. 3:22-CV-540-JDP, 2024 WL 3936444 (on behalf of the Defendant)

Pressurized Cylinder Injury: Impact Forensics, Cary NC (2024)

Electrical Fire: Accident Research Specialists, Cary NC (2023-2024)

Intellectual Property: Leydig Voit & Mayer, LTD, Chicago IL (2023)

Medical Device: Stockman O'Connor Connors, PLLC, Shelton CT (2021-2023)

Electrical Fire: Accident Research Specialists, Cary NC (2022)

- Deposition 9/30/22 - J. Medina, W. Diaz v. Samsung Electronics America Inc., Case Number 20-CVS-3755, North Carolina General Court of Justice, Superior Court Division, Johnson County (on behalf of the Plaintiff)

Intellectual Property: Latham and Watkins PLLC, Washington DC (2019-2020)

Electrical Fire: Accident Research Specialists, Cary NC (2018-2019)

- Deposition 5/3/18 - Erie Insurance Exchange v. Harley-Davidson of Greensboro, Inc., Case Number 18-CVS-6075, North Carolina General Court of Justice, Superior Court Division, Guilford County (on behalf of the Defendant)

Recent Trial and Deposition Testimony

- Trial Testimony 10/22/24 - Fiskars Finland OY AB v. Woodland Tools Inc., Case No. 3:22-CV-540-JDP, Docket No. 435 (on behalf of the Defendant)
- Deposition 8/12/24 – Fiskars Finland OY AB v. Woodland Tools Inc., Case No. 3:22-CV-540-JDP, 2024 WL 3936444 (on behalf of the Defendant)
- Deposition 9/30/22 – J. Medina, W. Diaz v. Samsung Electronics America Inc., Case Number 20-CVS-3755, North Carolina General Court of Justice, Superior Court Division, Johnson County (on behalf of the Plaintiff)
- Deposition 8/7/19 – Kevin J. Null v. Norfolk-Southern Railway Company, Case Number 18-CVS-1203, North Carolina General Court of Justice, Superior Court Division, Rowan County (on behalf of the Defendant)
- Deposition 5/3/18 - Erie Insurance Exchange v. Harley-Davidson of Greensboro, Inc., Case Number 18-CVS-6075, North Carolina General Court of Justice, Superior Court Division, Guilford County (on behalf of the Defendant)

Research Collaborations

Dr. Gil Bolotin (Cardiac Surgery, Academic Hospital of Maastricht, Netherlands), Dr. Matthew Bryant (Mechanical & Aerospace Engineering, NCSU), 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. Channing Der (Lineberger Comprehensive Cancer Center, UNC-CH), Dr. Tiegang Fang (Mechanical & Aerospace Engineering, NCSU), Dr. Angus Kingon (Materials Science & Engineering, NCSU), Dr. Bryan Laffitte (Industrial Design, NCSU), Dr. Rob Richardson (Crop Sciences, NCSU), Dr. Andor Van Den Hoven (Radiology and Nuclear Medicine, University Medical Center Utrecht, the Netherlands), Dr. Daniel Von Allmen (Pediatric Surgery, UNC)

H. Thesis Advisorships (47) and Postgraduate-Scholar Sponsorships (9)

Victor Zaccardo (PhD, MAE, 2022), Samuel Miller (PhD, MAE, 2021), Stefan Atay (PhD, MAE, 2020), Daniel Kakaley (PhD, MAE, 2018), Christopher Elliott (PhD, MAE, 2017), Bongani Malinga (PhD, MAE, 2016), Jeff Allred (PhD, MAE, 2015), 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), Madison McCullough (MS, MAE, 2023), Ellis Stevens (MS, MAE, 2020), Sameer Upahdye (MS, MAE, 2020), Jay Amit Shah (MS, MAE, 2020), Satyanarayana Konala (MS, MAE, 2019), Maharshi Patel (MS, MAE, 2019), Victor Zaccardo (MS, MAE, 2016), Daniel Kakaley (MS, MAE, 2015), 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), 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), Hiba Alrukh (Visiting Scholar, MAE, 2015),

Chunqi Wang (Visiting Scholar, MAE, 2013), Bo Ning (Visiting Scholar, MAE, 2012), Shiquan Wang (Visiting Scholar, MAE, 2011), Katarzyna Cieślak (Visiting Scholar, MAE, 2010).

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 and Systems Engineering) 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, 2012-2014

Chief Science Officer, Physcient Inc., Durham NC, 2007-2014

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

K. Patents, Licensing Agreements

M.S. Islam, I. Husain, R. Chattopadhyay, G.D. Buckner, “Three-Dimensional Airgap Electric Machines Employing Winding Embedded Liquid Cooling”, U.S. Patent Number 12,184,123.

G.D. Buckner, T. Fang, “Fuel injection device for an internal combustion engine, and associated method”, U.S. Patent Number 9,316,189.

G.D. Buckner, A.S. Veeramani, S.B. Owen, S.R. Jernigan, “Active Catheter Device and Associated System and Method”, U.S. Patent Number 9,308,350.

G. Bolotin, G.D. Buckner, “Force-Determining Retraction Device and Associated Method”, U.S. Patent Number 8,579,806.

J.L. Wordsworth, J. Barnes, G.D. Buckner, “Intelligent Power Management System”, U.S. Patent Number 8,295,950.

G. Bolotin and G.D. Buckner, “Force-Determining Retraction Device and Associated Method”, U.S. Patent Number 7,775,974.

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

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

L. Peer-Reviewed Journal Publications (student co-authors underlined)

(a) Articles Published (student co-authors underlined)

- (76) J.J. McCall, D. Kamper, G.D. Buckner, “Soft pneumatic actuators for pushing fingers into extension”, *Journal of NeuroEngineering and Rehabilitation*, (2024) 21:146, <https://doi.org/10.1186/s12984-024-01444-4>.

- (75) S.R. Miller, S.R. Jernigan, R.J. Abraham, G.D. Buckner, "Comparing deposition characteristics of various embolic particles using an in vitro prostate microvasculature model", *J Vasc Interv Radiol.* 2024 Jul; DOI:<https://doi.org/10.1016/j.jvir.2024.06.028/>.
- (74) M.D. McCullough, M. Muller, T.M. Egan, G.D. Buckner, "Design Optimization and Tradeoff Analysis of an Actuated Continuum Probe for Pulmonary Nodule Localization and Resection", *Bioengineering* 2024, 11, 417. <https://doi.org/10.3390/bioengineering11050417>.
- (73) V.M. Zaccardo, G.D. Buckner, "Saturation and Duty Cycle Tolerant Self-Sensing for Active Magnetic Dampers", *Journal of Mechanical Systems and Signal Processing*, Vol 200, 2023, <https://doi.org/10.1016/j.ymssp.2023.110567>.
- (72) S.R. Miller, R.J. Abraham, S.R. Jernigan, G.D. Buckner, "Comparison of Bolus Versus Dual-Syringe Administration Systems on Glass Yttrium-90 Microsphere Deposition in an In Vitro Microvascular Hepatic Tumor Model", *J Vasc Interv Radiol.* 2023 Jan; 34(1):11-20. doi: 10.1016/j.jvir.2022.07.032.
- (71) J.A. Shah, S.R. Miller, S.R. Jernigan, G.D. Buckner, A Permanent Magnet Synchronous Spherical Motor for High-Mobility Servo-Actuation. *Machines* 2022, 10, 612. <https://doi.org/10.3390/machines10080612>.
- (70) Perrin, J.E.; Jernigan, S.R.; Thayer, J.D.; Howell, A.W.; Leary, J.K.; Buckner, G.D. Sensor Fusion with Deep Learning for Autonomous Classification and Management of Aquatic Invasive Plant Species. *Robotics* 2022, 11, 68. <https://doi.org/10.3390/robotics11040068>.
- (69) Jenkins, T., Atay, S., Buckner, G., and Bryant, M. (June 3, 2021). "Genetic Algorithm-Based Optimal Design of a Rolling-Flying Vehicle." *ASME. J. Mechanisms Robotics.* October 2021; 13(5): 050907. <https://doi.org/10.1115/1.4050811>.
- (68) Atay, S., Bryant, M., and Buckner, G. (May 17, 2021). "The Spherical Rolling-Flying Vehicle: Dynamic Modeling and Control System Design." *ASME. J. Mechanisms Robotics.* October 2021; 13(5): 050901. <https://doi.org/10.1115/1.4050831>.
- (67) Atay, S., Bryant, M., and Buckner, G. (May 17, 2021). "Control and Control Allocation for Bimodal, Rotary Wing, Rolling-Flying Vehicles." *ASME. J. Mechanisms Robotics.* October 2021; 13(5): 050904. <https://doi.org/10.1115/1.4050998>.
- (66) V.M. Zaccardo, G.D. Buckner, "Active magnetic dampers for controlling lateral rotor vibration in high-speed rotating shafts", *Mechanical Systems and Signal Processing*, 152, 2021, <https://doi.org/10.1016/j.ymssp.2020.107445>.
- (65) C.M. Elliott, S. Ferguson, G.D. Buckner, "The Cost-Sorted Distance Method for Identifying Minima within Firefly Optimization Results: Application to Engineering Design", *Journal of Computing and Information Science in Engineering*, 21, 2021.
- (64) S. Atay, G.D. Buckner, M. Bryant, "Dynamic Modeling for Bi-Modal, Rotary Wing, Rolling-Flying Vehicles", *Journal of Dynamic Systems, Measurement and Control*, 2020. doi: <https://doi.org/10.1115/1.4047693>.
- (63) S.R. Jernigan, J.A. Osborne, G.D. Buckner, "Gastric artery embolization: studying the effects of catheter type and injection rate on microsphere distributions within a benchtop arterial model", *BioMedical Engineering OnLine*, 19(54), 2020.

- (62) W. Weisler, S. Miller, S. Jernigan, G. Buckner, M. Bryant, “Design and testing of a centrifugal fluidic device for populating microarrays of spheroid cancer cell cultures”, *Journal of Biological Engineering*, 14(7), 2020.
- (61) V.M. Zaccardo, S.R. Miller, G.D. Buckner, “A large air gap magnetic levitator for intra-arterial positioning of a clinical microcatheter: design, fabrication, and preliminary experimental evaluation”, *International Journal of Intelligent Robotics and Applications*, 4:122-131, 2020.
- (60) S. Atay, T. Jenkins, G.D. Buckner, M. Bryant, “Energetic analysis and optimization of a bi-modal rolling-flying vehicle”, *International Journal of Intelligent Robotics and Applications*, 4:3-20, 2020.
- (59) D.E. Kakaley, R.E. Altieri, G.D. Buckner, “Non-contacting measurement of torque and axial translation in high-speed rotating shafts”, *Mechanical Systems and Signal Processing*, 138, 2020.
- (58) M. Patel, S. Jernigan, R. Richardson, S. Ferguson, G. Buckner, “Autonomous Robotics for Identification and Management of Invasive Aquatic Plant Species”, *Applied Sciences*, 9(12), 2019.
- (57) G. Chanoit, C.A. Pell, G. Bolotin, G.D. Buckner, J.P. Williams, H.C. Crenshaw, “Retraction Mechanics of Finochietto-Style Self-Retaining Thoracic Retractors”, *BioMedical Engineering OnLine*, 18(45), 2019.
- (56) C.D. Haigh, J.H. Crews, S. Wang, G.D. Buckner, "Multi-Objective Design Optimization of a Shape Memory Alloy Flexural Actuator", *Actuators*, 8(13), 1-16, 2019.
- (55) S.R. Miller, V.M. Zaccardo, G.D. Buckner, “A large air gap magnetic levitator for precise positioning of a clinical microcatheter: nonlinear modelling and control”, *International Journal of Intelligent Robotics and Applications*, 4:122-131, 2018.
- (54) C.M. Elliott, G.D. Buckner, “Design optimization of a novel elastomeric baffle magnetorheological fluid device,” *Journal of Intelligent Material Systems and Structures*, 29(19):3774–3791, 2018.
- (53) D.E. Kakaley, M.R. Jolly, and G.D. Buckner, “An offset hub active vibration control system for mitigating helicopter vibrations during power loss: Simulation and experimental demonstration,” *Aerospace Science and Technology*, 77:610–625, 2018.
- (52) C.J. Allred, D. Churchill, and G.D. Buckner, “Real-time estimation of helicopter rotor blade kinematics through measurement of rotation induced acceleration,” *Mechanical Systems and Signal Processing*, 91:183–197, 2017.
- (51) B. Malinga, G.D. Buckner, “Design Optimization of a Prescribed Vibration System Using Conjoint Value Analysis”, *Engineering Optimization*, 48(12):2090-2113, 2016.
- (50) Z. Xu, S.R. Jernigan, C. Kleinstreuer, G.D. Buckner, “Solid Tumor Embolotherapy in Hepatic Arteries with an Anti-reflux Catheter System”, *Annals of Biomedical Engineering*, 2015 (PMID: 26265458).
- (49) A.F. van den Hoven, M. Lam, S.R. Jernigan, M. van den Bosch, G.D. Buckner, “Innovation in catheter design for intra-arterial liver cancer treatments results in favorable particle-fluid dynamics”, *Journal of Experimental and Clinical Cancer Research*, 34:74, 2015 (PMID 26231929).
- (48) B. Malinga, G.D. Buckner, “ \mathcal{L}_1 adaptive control of a shape memory alloy actuated flexible beam”, *Systems Science & Control Engineering*, 3:1, 460-471, 2015.

- (47) J.H. Wiest, G.D. Buckner, "Path Optimization and Control of a Shape Memory Alloy Actuated Catheter for Endocardial Radiofrequency Ablation", *Robotics and Autonomous Systems*, 65, 88-97, 2015.
- (46) C.J. Allred, M.A. Jolly, G.D. Buckner, "Real-time estimation of helicopter blade kinematics using integrated linear displacement sensors", *Aerospace Science & Technology*, 42, 274-286, 2015.
- (45) S.R. Jernigan, J.A. Osborne, C.J. Mirek, G.D. Buckner, "Selective Internal Radiation Therapy: Quantifying Distal Penetration and Distribution of Resin and Glass Microspheres in a Surrogate Arterial Model", *Journal of Vascular and Interventional Radiology*, 26(6):897-904, 2015 (PMID: 25891507). Recipient: JVIR 2015 Distinguished Laboratory Investigation.
- (44) J.R. Archer, T.G. Fang, S.M. Ferguson, G.D. Buckner, "Multi-objective Design Optimization of a Variable Geometry Spray Fuel Injector", *Journal of Mechanical Design*, 136(4), 2014.
- (43) J.C. Hannen, G.D. Buckner, "Indirect Intelligent Sliding Mode Control of Antagonistic Shape Memory Alloy Actuators Using Hysteretic Recurrent Neural Networks", *IEEE Transactions on Control Systems Technology*, PP(99), 1-9, 2013.
- (42) J.H. Crews, R.C. Smith, K.M. Pender, J.C. Hannen, G.D. Buckner, "Data-driven techniques to estimate parameters in the homogenized energy model for shape memory alloys", *Journal of Intelligent Material Systems and Structures*, 23(17), 1897-1920, 2012.
- (41) J.C. Hannen, J.H. Crews, G.D. Buckner, "Indirect intelligent sliding mode control of a shape memory alloy actuated flexible beam using hysteretic recurrent neural networks", *Smart Materials & Structures*, 21(8), 2012.
- (40) A.L. Richards, M.D. Dickey, G.D. Buckner, "Design and demonstration of a novel micro-Coulter counter utilizing liquid metal electrodes", *Journal of Micromechanics and Microengineering*, 22(11), 1-8, 2012.
- (39) J.H. Crews, G.D. Buckner, "Design optimization of a shape memory alloy-actuated robotic catheter", *Journal of Intelligent Material Systems & Structures*, 23(5), 545-562, 2012.
- (38) A.L. Richards, C. Kleinstreuer C, A.S. Kennedy, E. Childress, G.D. Buckner, "Experimental microsphere targeting in a representative hepatic artery system", *IEEE Trans Biomed Eng.* 59(1):198-204, 2012 (PMID: 21965193).
- (37) J.H. Crews, M.G. Mattson, G.D. Buckner, "Multi-objective Control Optimization for Semi-active Vehicle Suspensions", *Journal of Sound and Vibration*, ISSN 0022-460X, DOI: 10.1016/j.jsv.2011.05.036.
- (36) J.P. Lien, T. Fang, and G.D. Buckner, "Hysteretic neural network modeling of spring-coupled piezoelectric actuators", *Smart Materials and Structures*, 20(6): 065007:1-9, 2011.
- (35) J.P. Lien, A. York, T. Fang, G.D. Buckner, "Modeling piezoelectric actuators with Hysteretic Recurrent Neural Networks", *Sensors and Actuators A: Physical*, 163(2):516-525, 2010.
- (34) S.R. Jernigan, G.P. Chanoit, A.S. Veeramani, S.B. Owen, M.S. Hilliard, D.R. Cormier, B.W. Laffitte, G.D. Buckner, "A Laparoscopic Knot-Tying Device for Minimally Invasive Cardiac Surgery", *European Journal of Cardio-Thoracic Surgery*, 37:626-630, 2010 (PMID: 19854658).

- (33) B.M. Chung, Y.K. Lim, G.D. Buckner, "A tuning method for PID gains using Jacobian signs in multivariable control systems", *International Journal of Control, Automation, and Systems*, 7(5): 737-744, 2009.
- (32) M.F. Purser, A.L. Richards, R.C. Cook MD, J.A. Osborne, D.R. Cormier, G.D. Buckner, "Evaluation of a Shape Memory Alloy Reinforced Annuloplasty Band for Robot-Assisted Mitral Valve Repair", *Annals of Thoracic Surgery*: 88(4):1312-1316, 2009 (PMID: 19766827).
- (31) A.S. Veeramani, J.H. Crews, and G.D. Buckner, "Hysteretic Recurrent Neural Networks: A Modeling Tool for Hysteretic Materials and Systems", *Smart Materials and Structures*, 18:075004, 2009.
- (30) A.L. Richards, R.C. Cook, G. Bolotin, G.D. Buckner, "A dynamic heart system to facilitate the development of mitral valve repair techniques", *Annals of Biomedical Engineering*: 37(4):651-660, 2009 (PMID: 19224369).
- (29) S.R. Jernigan, Y. Fahmy, G.D. Buckner, "Implementing a Remote Laboratory Experience into a Joint Engineering Degree Program: Aerodynamic Levitation of a Beach Ball", *IEEE Transactions on Education*: 52(2): 205-213, 2009.
- (28) E. Bean, G. Chanoit, S. Jernigan, G. Bolotin, J. Osborne, G. Buckner, "Evaluation of a novel atrial retractor for exposure of the mitral valve in a porcine model", *Journal of Thoracic and Cardiovascular Surgery*, 136:1492-1495, 2008 (PMID: 19114196).
- (27) O. Zohni, G. Buckner, T. Kim, A. Kingon, R. Siergiej, "Effects of adhesion layers on the ferroelectric properties of PZT thin films deposited on silicon nitride substrates", *Thin Solid Films*, 516(18):6052-6057, 2008.
- (26) B. Lu, H. Choi, G. Buckner, K. Tammi "Linear Parameter-Varying Techniques for Control of A Magnetic Bearing System", *Control Engineering Practice*, 16(10):1161-1172, 2008.
- (25) A.S. Veeramani, G.D. Buckner, S.B. Owen, R.C. Cook, G. Bolotin, "Modeling the dynamic behavior of a shape memory alloy actuated catheter", *Smart Materials and Structures*, 17(1):1-14, 2008.
- (24) S.R. Jernigan, G.D. Buckner, J.W. Eischen, and D.R. Cormier, "Finite element modeling of the left atrium to facilitate the design of an endoscopic atrial retractor", *ASME Journal of Biomechanical Engineering*, 129(6):825-37, 2007 (PMID: 18067386).
- (23) G. Bolotin, G.D. Buckner, N.B. Campbell, M. Kocherginsky, J. Raman, V. Jeevanandam, J.G. Maessen, "Tissue-disruptive forces during median sternotomy", *Heart Surgery Forum*, 10(6):487-92, 2007 (PMID: 18187385)
- (22) S.A. Saadat, G.D. Buckner, and M.N. Noori, "Structural System Identification and Damage Detection using the Intelligent Parameter Varying Technique: An Experimental Study", *Structural Health Monitoring*, 6(3):231-243, 2007.
- (21) P. Pandurangan and G.D. Buckner, "Defect identification in GRID-LOCK® joints", *NDT & E International*, 40(5):347-356, 2007.
- (20) G. Bolotin, G.D. Buckner, N.J. Jardine, A.J. Kiefer, N.B. Campbell, M. Kocherginsky, J. Raman, and V. Jeevanandam, "A novel instrumented retractor to monitor tissue-disruptive forces during lateral thoracotomy", *Journal of Thoracic and Cardiovascular Surgery*, 133(4):949-54, 2007 (PMID: 17382632).

- (19) P. Pandurangan and G.D. Buckner, "Assessment of damage detection methods in GRID-LOCK® structures", *Mechanical Systems and Signal Processing*, 21(5):2185-2197, 2007
- (18) O. Zohni, G. Buckner, T. Kim, A. Kingon, J. Maranchi and R. Siergiej, "Investigating thin film stresses in stacked silicon dioxide/silicon nitride structures and quantifying their effects on frequency response", *Journal of Micromechanics and Microengineering*, 17(5):1042-1051, 2007.
- (17) B.M. Lawrence, G.D. Buckner, G.A. Mirka, "An adaptive system identification model of the biomechanical response of the human trunk during sudden loading", *Journal of Biomechanics*, 128(2):235-241, 2006 (PMID: 16524336).
- (16) G.D. Buckner, H. Choi, and N.S. Gibson, "Estimating Model Uncertainty using Confidence Interval Networks: Applications to Robust Control", *ASME Journal of Dynamic Systems, Measurement, and Control*, 128(3):626-635, 2006.
- (15) P.S. Pandurangan and G.D. Buckner, "Vibration analysis for damage detection in metal-to-metal adhesive joints", *Experimental Mechanics*, 46(5):601-607, 2006.
- (14) B.M. Lawrence, G.A. Mirka and G.D. Buckner, "Adaptive system identification applied to the biomechanical response of the human trunk during sudden loading", *Journal of Biomechanics*, 38(12): 2472-2479, 2005 (PMID: 16524336).
- (13) J.M. Stevens and G.D. Buckner, "Actuation and Control Strategies for Miniature Robotic Surgical Systems", *ASME Journal of Dynamic Systems, Measurement, and Control*, 127(4):537-549, 2005.
- (12) J. Kuniholm, G. Buckner, W. Nifong, and M. Orrico, "Automated Knot Tying for Fixation in Minimally Invasive, Robot Assisted Cardiac Surgery", *ASME Journal of Biomechanical Engineering*, 127(6):1001-1008, 2005 (PMID: 16438240).
- (11) R.K. Dixit and G.D. Buckner, "Sliding Mode Control and Observation for Semiactive Vehicle Suspensions", *Vehicle System Dynamics*, 43(2):83-105, 2005
- (10) S.A. Saadat, M.N. Noori, G.D. Buckner, T. Furukawa and Y. Suzuki, "Structural health monitoring and damage detection using an intelligent parameter varying (IPV) technique", *International Journal of Non-Linear Mechanics*, 39(10):1687-1697, 2004.
- (9) S.A. Saadat, G.D. Buckner, T. Furukawa, and M.N. Noori, "An Intelligent Parameter Varying (IPV) Approach for Non-linear System Identification of Base Excited Structures", *International Journal of Non-Linear Mechanics*, 39(6):993-1004, 2004.
- (8) G.D. Buckner, "Intelligent bounding of modeling uncertainties: applications to robust control", *IEEE Transactions on Systems, Man, and Cybernetics - Part C: Applications and Reviews*, 32(2): 113-124, 2002.
- (7) G.D. Buckner, B. Fernandez, and G. Masada, "Intelligent sliding mode control of cutting force during single-point turning operations", *Journal of Manufacturing Science and Engineering*, 123(2): 206-213, 2001.
- (6) G.D. Buckner, K.T. Schuetze and J.H. Beno, "Intelligent feedback linearization for active vehicle suspension control", *Journal of Dynamic Systems, Measurement, and Control*, 123(4): 727-733, 2001.

- (5) M.A. Pichot, J.P. Kajs, B.R. Murphy, A. Ouroua, B.M. Rech, J.H. Beno, G.D. Buckner and B. Palazzolo, "Active magnetic bearings for energy storage systems for combat vehicles", IEEE Transactions on Magnetics, 37(1):318-323, 2001.
- (4) G.D. Buckner and K.T. Schuetze, "Intelligent estimation of system parameters for active vehicle suspension control", SAE Transactions, 1999(1):729-738, 1999.
- (3) G.D. Buckner and M.L. Marziale, "Westvaco Uses Leak Detection System as Preventive Boiler Maintenance Tool", Pulp and Paper Journal, 66(10):81-84, 1992.
- (2) G.D. Buckner and M.L. Marziale, "Early Steam Leak Detection Can Help Limit Boiler Damage, Avert Explosion", Pulp and Paper Journal, 66(9):167-170, 1992.
- (1) G.D. Buckner and S.J. Paradis, "Design and implementation of a commercial acoustic leak detection system for black liquor recovery boilers", TAPPI Journal, 73(7):121-127, 1990.

(b) Articles In Press

- (1) N.T. Kantu, W. Gao, N. Srinivasan, G.D. Buckner, H. Su, "Portable and Versatile Catheter Robot for Image-Guided Cardiovascular Interventions", IEEE/ASME Transactions on Mechatronics.

(c) Articles in Review

- (1) M. Haghani, W. Place, G.D. Buckner, "Daylighting Performance of Innovative Sun-Tracking Prismatic Vertical Louvers (PVL) System: A Comparative Study", Building and Environment Journal.

M. Peer-Reviewed Conference Publications

(a) Articles Published (student co-authors underlined)

- (47) M. McCullough, M. Muller, T. Egan, G. Buckner, "Design Optimization of an Actuated Probe for Pulmonary Nodule Localization and Resection" at 3rd International Conference on Biomedical Engineering Instrumentation (BEI-2023) November 15-17, 2023 Boston, MA, USA, 2023.
- (46) S. Upadhye, C. Shah, M. Liu, G. Buckner, H. Huang, "A Powered Prosthetic Ankle Designed for Task Variability - a Concept Validation", 2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Prague, CZ, 2021.
- (45) S. Atay, M. Bryant, G.D. Buckner "Real-Time Power Optimization of a Bi-Modal Rolling-Flying Vehicle via Extremum Seeking Control", 2020 American Control Conference (ACC), Denver, CO, USA, 2020.
- (44) S. Miller and G.D. Buckner, "Finite element-based modeling and nonlinear control of a large air gap magnetic levitator", Proceedings of the ASME 2018 Dynamic Systems and Control Conference (DSCC2018), Atlanta, GA, USA, 2018.
- (43) B. Malinga, S. Ferguson, G.D. Buckner, "Design Optimization and Analysis of a Prescribed Vibration System", 2016 ASME IDETC/CIE Design Automation Conference, Charlotte, NC, USA 2016.
- (42) C. Haigh, J.H. Crews, G.D. Buckner, "Modeling and Experimental Validation of Shape Memory Alloy Bending Actuators", 2012 Smart Materials, Adaptive Structures, and Intelligent Systems (SMASIS) Conference, Stone Mountain, GA, USA, 2012.
- (41) J. Hannen, J.H. Crews, G.D. Buckner, "Indirect Intelligent Sliding Mode Control using Hysteretic Recurrent Neural Networks with Application to a Shape Memory Alloy Actuated Beam", 2012 Smart

Materials, Adaptive Structures, and Intelligent Systems (SMASIS) Conference, Stone Mountain, GA, USA, 2012.

- (40) J.R. Archer, J.P. Lien, T. Fang and G.D. Buckner, "Closed Loop Control of Continuously Variable Geometry Sprays", 24th Annual Conference of the Institute for Liquid Atomization and Spray Systems (ILASS-Americas 2012), San Antonio, TX, USA, 2012.
- (39) J.H. Crews, G.D. Buckner, "Multi-objective Design Optimization of a Shape Memory Alloy Actuated Robotic Catheter", proceedings of the 2011 Smart Materials, Adaptive Structures, and Intelligent Systems (SMASIS) Conference, Scottsdale, AZ, USA, 2011.
- (38) J.P. Lien, J. Zhang, T. Fang, G. D. Buckner, "Preliminary Testing of Sprays with Continuously Variable Spray Geometry", Proceedings of the ILASS-Americas 23rd Annual Conference on Liquid Atomization and Spray Systems, Ventura, CA, USA, 2011.
- (37) J.H. Crews and G.D. Buckner, "Multi-objective design optimization of a shape memory alloy actuated robotic catheter", Proceedings of the ASME 2011 Conference on Smart Materials, Adaptive Structures, and Intelligent Systems, Phoenix, AZ, USA, 2011.
- (36) S.R. Jernigan, B. Fortney, Y. Fahmy and G.D. Buckner, "Implementing Effective Low-cost Laboratory Experiments into a Distance Engineering Program", Proceedings of the ASME 2010 International Mechanical Engineering Congress & Exposition (IMECE2010), Vancouver, British Columbia, Canada, 2010.
- (35) A.S. Veeramani, J.H. Crews, and G.D. Buckner, "Modeling Smart Materials Using Hysteretic Recurrent Neural Networks", ASME 2009 Conference on Smart Materials, Adaptive Structures and Intelligent Systems (SMASIS 2009), Oxnard, CA, USA, 2009.
- (34) N.K. Noel, K. Tammi, G.D. Buckner, N.S. Gibson, "Intelligent Kalman Filtering for Fault Detection on an Active Magnetic Bearing System", Proceedings of the ASME Dynamic Systems and Control Conference (DSCC 2008), Ann Arbor, Michigan, USA, 2008.
- (33) A. Veeramani, J. Crews, G.D. Buckner, S.B. Owen, R. Cook, G. Bolotin, "Design and Control of a Shape Memory Alloy Actuated Robotic Catheter", Proceedings of the ASME Dynamic Systems and Control Conference (DSCC 2008), Ann Arbor, Michigan, USA, 2008.
- (32) K. Tammi, G. Buckner, J. Kortelainen, "Magneto-Rheological Squeeze-Film Damper for Semi-Active Control of Rotor Vibration", proceedings of the 9th International Conference on Motion and Vibration Control, Munich, Germany, 2008.
- (31) A. Veeramani, J.H. Crews, G.D. Buckner, S.B. Owen, R.C. Cook, G. Bolotin, "Development of a Shape Memory Alloy Actuated Catheter for Cardiovascular Procedures", Proceedings of the 3rd Annual Frontiers in Biomedical Devices Conference, Irvine, CA, USA, 2008.
- (30) M. Purser, D. Cormier, G. Buckner, R. Cook, and G. Bolotin, "Annuloplasty Band with Shape Memory Alloy Stiffener", Proceedings of the Materials & Processes for Medical Devices Conference and Exposition (MPMD 2007), Palm Desert, CA, USA, 2007.
- (29) B. Lu, H. Choi, G. D. Buckner "LPV Control Design and Experimental Implementation for a Magnetic Bearing System", Proceedings of the 2006 American Controls Conference, Minneapolis, MN, USA, 2006.

- (28) H. Choi, G. D. Buckner, and N.S. Gibson “Neural Robust Control of a High-Speed Flexible Rotor Supported on Active Magnetic Bearings”, Proceedings of the 2006 American Controls Conference, Minneapolis, MN, USA, 2006.
- (27) P.S. Pandurangan and G.D. Buckner, “Non-destructive evaluation of metal-to-metal adhesive joints using vibration analysis: experimental results”, Proceedings of the SPIE, San Diego, CA, USA, 6176:103-111, 2006.
- (26) O. Zohni, G. Buckner, T. Kim, A. Kingon, J. Maranchi, and R. Siergiej, “Adhesion layer effects on the fabrication of MEMS-based PZT devices deposited on silicon nitride coated substrates”, Proceedings of the Second International Symposium on Adhesion Aspects of Thin Films, Savannah GA, 2005.
- (25) B. Lu, H. Choi, G.D. Buckner, “LPV control design and experimental implementation for a magnetic bearing system”, Proceedings of the 31st Annual Conference of IEEE, IECON 2005, Raleigh, NC, USA, 1:6-10, 2005.
- (24) N.S. Gibson, G.D. Buckner, H. Choi, and F. Wu, “Confidence Interval Networks for Bounding Model Uncertainty: Experimental Evaluations on an Active Magnetic Bearing System”, Proceedings of the 2005 IEEE Mid-Summer Workshop on Soft Computing in Industrial Applications (SMCia/05), Helsinki, Finland, 1:160-165, 2005.
- (23) S. Saadat, G.D. Buckner, M.N. Noori, and T. Furukawa, “Structural Health Monitoring and Damage Detection Using the Intelligent Parameter Varying (IPV) Technique”, Proceedings of the 5th Korea-Japan Seminar/Workshop on System Identification and Structural Health Monitoring, Dongguk University, Seoul, Korea, 1:199-207, 2004.
- (22) T. Furukawa, S. Saadat, M. Ishibashi, G.D. Buckner, and M.N. Noori, “Structural Identification of Partially Nonlinear System Subjected to Seismic Excitation Using Intelligent Parameter Varying (IPV) Approach”, Proceedings of the Third International Conference on Earthquake Engineering New Frontier and Research Transformation, Nanjing, China, 1:868-872, 2004.
- (21) B.M. Lawrence, G.A. Mirka, and G.D. Buckner, “System Identification Applied to the Biomechanical Response of Sudden Loading”, Proceedings of the 2004 Industrial Engineering Research Conference (IERC), Houston, TX, USA, 2004.
- (20) D. Esterling, F.D. Caulfield, A.J. Kiefer, G.D. Buckner, and P. Jaju, “Non-contact Device for Measuring Frequency Response Functions of CNC Machine Tools”, Proceedings of the International Mechanical Engineering Congress (IMECE2003), Washington, DC, USA, 2003.
- (19) D.W. Hood, G.D. Buckner, and T.A. Dow, “Force Feedback Control of Tool Deflection in Minature Ball End Milling”, Proceedings of the American Society of Precision Engineering 18th Annual Meeting, Portland, OR, USA, 2003.
- (18) N.S. Gibson, H. Choi, and G.D. Buckner, “ H_{∞} Control of Active Magnetic Bearings Using Artificial Neural Network Identification of Uncertainty”, Proceedings of the 2003 IEEE International Conference on Systems, Man and Cybernetics, Washington, DC, USA, 2:1449-1456, 2003.
- (17) S.A. Saadat, G.D. Buckner, and M.N. Noori, “An Intelligent Parameter Varying Approach For Structural Health Monitoring and Damage Detection”, Proceedings of the Ninth International Conference on Applications of Statistics and Probability in Civil Engineering (ICASP9), San Francisco, CA, USA, 2003.

- (16) J.M. Stevens and G.D. Buckner, "Intelligent control of a micro-manipulator actuated with shape memory alloy tendons", SPIE's 10th Annual International Symposium on Smart Structures and Materials, San Diego, CA, USA, March 2003.
- (15) S. Saadat, G.D. Buckner, T. Furukawa, and M.N. Noori, "An Intelligent Parameter Varying (IPV) Approach for Non-linear System Identification of Base Excited Structures", SPIE's 10th Annual International Symposium on Smart Structures and Materials, San Diego, CA, USA, 2003.
- (14) M.J. Craft and G.D. Buckner, "Fuzzy logic control algorithms for Magneshock semi-active vehicle shock absorbers: design and experimental evaluations", SPIE's 10th Annual International Symposium on Smart Structures and Materials, San Diego, CA, USA, 2003.
- (13) D. Hood, S. Clayton, G.D. Buckner, T.A. Dow, K. Garrard, "Closed loop control of milling tool deflection", Proceedings of the American Society of Precision Engineering 17th Annual Meeting, St. Louis, MO, USA, 2002.
- (12) B.M. Lawrence, G.D. Buckner, and G.A. Mirka, "Nonlinear system identification applied to the biomechanical response of the human trunk during sudden loading", Proceedings of the Human Factors and Ergonomics Society's 46th Annual Meeting, Baltimore, MD, USA, 46:1076-1080, 2002.
- (11) S. Saadat, F.G. Yuan, M.N. Noori, and G.D. Buckner, "Estimation of Wind Loads on Structures", Proceedings of the 15th ASCE Engineering Mechanics Conference, New York, NY, USA, 557, 2002.
- (10) N. Gibson and G.D. Buckner, "Real-time adaptive control of active magnetic bearings using linear parameter varying models", Proceedings of IEEE SoutheastCon 2002, Columbia, SC, USA, 1(1):268-272, 2002.
- (9) V. Jayanth, H. Choi, G.D. Buckner, "Identification and control of flexible structures supported on active magnetic bearings", Proceedings of IEEE SoutheastCon 2002, Columbia, SC, USA, 1(1):273-278, 2002.
- (8) G.D. Buckner, "Intelligent bounds on modeling uncertainties: applications to sliding mode control of a magnetic levitation system", Proceedings of the 2001 IEEE International Conference on Systems, Man and Cybernetics, Tucson, AZ, USA, 1:81-86, 2001.
- (7) M.T. Caprio, G.D. Buckner, and W.F. Weldon, "Controlling the torque-speed characteristics of a polyphase induction motor using a switched rotor ballast network", Proceedings of the 2001 American Control Conference, Arlington, VA, USA, 1:143-148, 2001.
- (6) G.D. Buckner, K.T. Schuetze and J. Beno, "Active vehicle suspension control using intelligent feedback linearization", Proceedings of the 2000 American Controls Conference, Chicago, IL, USA, 6:4014-18, 2000.
- (5) G.D. Buckner, "Intelligent sliding mode control of turning operations", Proceedings of the ISCA 9th International Conference on Intelligent Systems, Louisville, KY, USA, 1:70-75, 2000.
- (4) J. Kajs, B. Murphy, H. Ouroua, B. Rech, R. Hayes, J. Beno, G. Buckner, and A. Palazzolo, "Active Magnetic Bearings for Energy Storage Systems for Combat Vehicles", 10th Electromagnetic Launch Technology Symposium (10th EML), San Francisco, CA, USA, 2000.
- (3) G.D. Buckner, A. Palazzolo, J. Kajs, B. Murphy J. Beno, "Control system for inside-out configuration active magnetic bearings", Proceedings of the 5th International Symposium on Magnetic Suspension Technology, Santa Barbara, CA, USA, 1999.

- (2) B.R. Fernández and G.D. Buckner, "Statistica: artificial neural networks for statistical bounding of data", Proceedings of the 4th IEEE Conference on Control Applications, Albany, NY, USA, 1:554-559, 1995.
- (1) G.D. Buckner and M.L. Marziale, "Acoustic leak detection: a viable system for recovery boiler maintenance", proceedings of the Pulp and Paper Maintenance Conference 1990, New Orleans, LA, USA, 1990.

N. DOCTORAL AND MASTER'S THESES DIRECTED

(a) Completed doctoral dissertations

- (19) Victor M. Zaccardo (PhD/MAE): "Novel Sensing and Actuation for Tip Clearance Reduction in High Speed Turbomachines: Enabling Technologies for Enhanced Performance and Efficiency", funded by Lord Corporation Doctoral Fellowship, defended 12/16/2022.
- (18) Samuel R. Miller (PhD/MAE): "Microparticle Manipulation Technologies: Advancing Cancer Research and Clinical Treatment through Novel Device Design", funded by Lord Corporation Doctoral Fellowship, defended 10/23/2020.
- (17) Stefan Atay (PhD/MAE, co-supervised with Dr. Matthew Bryant): "Energetics, Dynamics and Control of Multicopter, Rolling-Flying, Mobile Robots", funded by the US Army Research Office, defended 6/2/2020.
- (16) Daniel Kakaley (PhD/MAE): "Real-Time Monitoring of Shaft Torque, Axial Translation and Whirl: Applications to High-Speed Aerospace Drivetrains", funded by Lord Corporation, defended 12/18/18.
- (15) Christopher Elliott (PhD/MAE), "Methods for Streamlined Firefly Optimization and Interpretation: Applications to Electromechanical Systems Design", funded by Caterpillar Corporation, defended 03/30/17.
- (14) Bongani Malinga (PhD/MAE), "Design Optimization Methods for Complex Electromechanical Systems: Addressing User Preferences and Uncertainties", funded by Lord Corporation, defended 03/28/16.
- (13) C. Jeff Allred (PhD/MAE), "Methods for Expanding Rotary Wing Aircraft Health and Usage Monitoring Systems to the Rotating Frame through Real-time Rotor Blade Motion Estimation", funded by Lord Corporation, defended 08/12/15.
- (12) 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.
- (11) 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.
- (10) 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.
- (9) 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.

- (8) Arun Veeramani (PhD/MAE), "Design, Modeling and Control of Shape Memory Alloy Actuated Robotic Catheter", funded by the NIH (NHLBI), defended 03/26/09.
- (7) 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.
- (6) 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.
- (5) Pradeep Pandurangan (PhD/MAE), "Real-Time Structural Health Monitoring for Aerospace Structures", funded by Goodrich, defended 12/08/06.
- (4) 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.
- (3) 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.
- (2) 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.
- (1) 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.

(b) Completed master's theses supervised

- (27) Madison McCullough (MST/MAE), "Design Optimization and Tradeoff Analysis of an Actuated Probe for Pulmonary Nodule Localization and Resection", defended 08/17/23.
- (26) Ellis Stevens (MST/MAE), "A Digital Sensorless Motor Control Algorithm Utilizing Line-to-Line Voltages for Aerospace Applications", defended 11/20/20.
- (25) Sameer Upahdye (MST/MAE), "Design, Fabrication, and Experimental Demonstration of a Permanent Magnet Synchronous Spherical Motor (PMSSM) for High-Mobility Servomechanisms", defended 03/26/20.
- (24) Jay Amit Shah (MST/MAE), "Design, Fabrication, and Experimental Demonstration of a Permanent Magnet Synchronous Spherical Motor (PMSSM) for High-Mobility Servomechanisms", defended 03/26/20.
- (23) Satyanarayana Konala (MST/MAE), "The influence of particle size distribution, oxygen content, and temperature on the spreadability of copper and its application to additive manufacturing", funded by CAMAL, defended 08/16/19.
- (22) Maharshi Patel (MST/MAE), "Autonomous Robotics for Invasive Aquatic Plant Management", funded via NC Collaboratory grant, defended 03/29/19.

- (21) Victor Zaccardo (MST/MAE), "Active Magnetic Bearings For Intra-Arterial Positioning of a Clinical Microcatheter", funded via MAE TA, defended 05/10/16.
- (20) Daniel Kakaley (MST/MAE), "An Offset Hub Active Vibration Control System for Mitigating Helicopter Vibrations during Power Loss: Simulation and Experimental Demonstration", funded by Lord Corporation, defended 06/22/15.
- (19) Casey Haigh (MST/MAE), "Modeling, Optimization and Experimental Validation of Shape Memory Alloy Bending Actuators", funded by the NIH (NHLBI), defended 06/17/13.
- (18) John R. Archer (MST/MAE), "Multi-objective Design Optimization of a Variable Geometry Spray Fuel Injector", funded by the NSF (CBET), defended 01/23/13.
- (17) Michael Mattson (MST/MAE), "Multi-objective Optimization of Semi-active Vehicle Suspension Control", funded by Lord Corporation, defended 06/30/10.
- (16) Nana Noel (MST/MAE), "GE-F110 Agile Combat Support – Intelligent Event Detection", funded by GE Aviation, defended 04/25/08.
- (15) 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.
- (14) Jay Robb (MST/MAE), "Design and Simulation of an Active Load Balancing System for High-Speed, Magnetically Supported Rotors", employed by Ingersoll-Rand, defended 02/15/08.
- (13) Paul Bachmeyer (MST/MAE), "Simulation-Based Design Strategies for Component Optimization in Steer-by-Wire Applications", employed by Lord Corporation, defended 01/04/08.
- (12) Sean Dugan (MST/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.
- (11) Neil Milani (MST/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 (MST/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.
- (9) Aaron Kiefer (MST/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.
- (8) Jonathan Kuniholm (MST/MAE), "Automated Knot Tying for Fixation in Minimally Invasive, Robot Assisted Cardiac Surgery", defended 6/23/03.
- (7) Mike Blue (MST/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.
- (6) David Hood (MST/MAE), "Force Feedback Control of Tool Deflection in Miniature Ball End Milling", funded by the NSF (ENG/DMII), defended 5/15/03.

- (5) Michael Craft (MST/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.
- (4) Jason Stevens (MST/MAE), "Actuation and Control Strategies for Miniature Surgical Robotic Systems", funded by Johnson & Johnson (Ethicon), defended 7/08/02.
- (3) F. Donald Caulfield (MST/MAE), "Electromechanical Actuator Development for Integrated Chatter Prediction on High-Speed Machining Centers", funded by VulcanCraft, defended 3/29/02.
- (2) Ravindra Dixit (MST/MAE), "Sliding Mode Observation and Control for Semi-Active Vehicle Suspensions", defended 11/05/01.
- (1) Vignesh Jayanth (MST/MAE), "System identification and control of a magnetically-levitated flexible structure", defended 9/19/01.

O. University and Professional Service

(a) Department, college, and university committees

- **MAE Teaching Core (Controls, Vibrations, Dynamics and Robotics):** 2020-2021, 2021-2022, 2022-2023, 2023-2024, 2024-2025
- **MAE Junior Faculty Mentoring Committee:** 2018-2019 (Chair), 2019-2020 (Chair), 2020-2021 (Chair), 2021-2022 (Chair), 2022-2023 (Chair), 2023-2024 (Chair)
- **MAE Reappointment, Promotion and Tenure Committee: 2023-2024, 2024-2025**
- **Faculty Mentoring @ NC State - Invited Mentor:** 2023-2024
- **MAE Post-Tenure Review Committee:** 2012-2013, 2013-2014 (Chair), 2014-2015, 2016-2017 (Chair), 2021-2022, 2022-2023, 2024-2025 (Chair)
- **MAE Faculty Search Committee:** 2012-2013 (Chair), 2017-2018 (Chair), 2022-2023, 2024-2025
- **UNC-Asheville Mechatronics Curriculum/ABET Committee:** 2009-2010, 2010-2011, 2018-2019, 2019-2020, 2020-2021, 2021-2022, 2022-2023, 2023-2024, 2024-2025
- **Havelock Systems Engineering Curriculum/ABET Committee:** 2009-2010, 2010-2011, 2018-2019, 2019-2020, 2020-2021, 2021-2022, 2022-2023, 2023-2024, 2024-2025
- **MAE Laboratory Committee:** 2000-2001, 2001-2002, 2004-2005 (Chair), 2005-2006 (Chair), 2006-2007 (Chair), 2007-2008 (Chair), 2008-2009 (Chair), 2009-2010 (Chair), 2010-2011 (Chair), 2011-2012 (Chair), 2012-2013 (Chair), 2013-2014 (Chair), 2014-2015 (Chair), 2015-2016 (Chair), 2016-2017 (Chair), 2017-2018 (Chair), 2018-2019 (Chair), 2019-2020 (Chair)
- **MAE Peer Review of Teaching Committee:** 2004-2005, 2005-2006, 2006-2007, 2007-2008, 2008-2009, 2010-2011 (Chair), 2011-2012 (Chair), 2012-2013 (Chair), 2013-2014 (Chair), 2014-2015 (Chair), 2015-2016 (Chair), 2016-2017 (Chair), 2017-2018 (Chair), 2018-2019 (Chair)
- UNCA Faculty Search Committee: 2020-2021 (Chair)
- MAE Lab Director Search Committee: 2018-2019
- BME Post-Tenure Review Committee: 2017-2018
- MAE Department Head Nominating Committee: 2016-2017
- UNCA Director of Engineering Programs Search Committee: 2013-2014, 2016-2017
- NCSU Park Scholarship Advisory Committee: 2010-2011, 2011-2012, 2012-2013
- NCSU Master of Engineering Advisory Committee: 2011-2012, 2012-2013, 2013-2014
- BME Rehabilitation Faculty Search Committee: 2012-2013
- Panelist, N.C.S.U. New Faculty Orientation: August 2004, August 2007, August 2010
- College of Engineering Department Head Review Survey Committee: 2003-2004, 2011-2012
- MAE 304 Curriculum Committee: 2003-2004
- MAE Joint MAE-ECE Mechatronics Committee: 2001-2002, 2002-2003

- MAE Undergraduate Curriculum Committee: 2000-2001, 2002-2003
- MAE Seminar Series Committee: 1999-2000, 2001-2002
- Judge, N.C.S.U. Undergraduate Research Symposium: April 10, 2003.
- Fundamentals of Engineering Exam Review (E 490) : “Engineering Mechanics: Statics and Dynamics”, Spring 2010, Fall 2010, Spring 2011, Fall 2011, Spring 2012, Fall 2012, Spring 2013, Fall 2013, Spring 2014.

(b) Professional service

- 2008-Present: Member, NIH Center for Scientific Review Special Emphasis Panels: “Computational Modeling and Sciences for Biomedical and Clinical Applications”, “Cardiovascular and Surgical Devices”, etc. Reviewed NIH R01, R21, R41/42 (STTR), R43/44 (SBIR), RC-2, S10 and GO proposals: July 2008, March 2009, July 2009, November 2009, February 2010, November 2010, February 2011, June 2011, February 2012 (Acting Chair), October 2012, February 2013, November 2013, February 2014, June 2014, June 2015, February 2016, June 2016, February 2017, October 2017, June 2018, October 2018, June 2019, February 2020, November 2020, December 2020, June 2021 (Chair), June 2023
- 2007-Present: Member, ASME Mechatronics Technical Committee
- 2007-Present: Member, ASME Model Identification and Intelligent Systems Technical Committee
- Associate Editor, ASME Journal of Dynamic Systems, Measurement and Control: 2023-2024
- Journal Reviews: ASME Journal of Dynamic Systems, Measurement, and Control, ASME Journal of Computational and Nonlinear Dynamics, ASME Journal of Manufacturing Science and Engineering, ASME Journal of Vibration and Acoustics, IEEE Transactions on Control Systems Technology, IEEE Transactions on Industrial Electronics, IEEE Transactions on Systems, Man, and Cybernetics - Part C: Applications and Reviews, The Royal Society Proceedings A: Mathematical, Physical, and Engineering Sciences, International Journal of Vehicle Design; Annals of Biomedical Engineering; International Journal of Modelling and Simulation; Journal of Robotics
- Proposal Reviews: NIH Proposal Review Panel (July 2008, March 2009, July 2009, November 2009, February 2010, November 2010, February 2011, June 2011, February 2012, October 2012, February 2013; June 2014, June 2015, February 2016, June 2016, February 2017, October 2017, June 2018, October 2018, June 2019, February 2020, November 2020, December 2020, June 2021 (Chair), June 2023); DOE EPSCoR Louisiana Proposal Review Panel (June 2011); South Carolina Research Initiative Grants
- Textbook Reviews: Dynamics text proposal, Oxford Press
- External Reappointment, Promotion and Tenure reviews: Dr. Sa'ed Alajlouni, Assistant Professor of Electrical Engineering in the Department of Mechatronics Engineering, The Hashemite University, Zarka, Jordan, August 2023; Dr. Krishnanand Kaipa, Assistant Professor of Mechanical and Aerospace Engineering, Old Dominion University, September 2021; Dr. Themistoklis Charalambous, School of Electrical Engineering, Aalto University, Espoo, Finland, January 2020; Dr. Mario Perhinschi, Associate Professor of Mechanical and Aerospace Engineering, West Virginia University, December 2015; Dr. Hans DeSmidt, Assistant Professor of Mechanical, Aerospace, & Biomedical Engineering, The University of Tennessee, Knoxville, October 2010.
- Member, Pi Tau Sigma - Mechanical Engineering Honor Society (Faculty Advisor, NCSU Chapter, 2007-2013)
- Member, Tau Beta Pi - Engineering Honor Society
- Member, Phi Kappa Phi - Academic Honor Society
- Member, Sigma Xi – Scientific Research Honor Society
- Member, American Society of Mechanical Engineers (ASME)
- Member, Institute of Electrical and Electronics Engineers (IEEE)
- Member, American Society for Engineering Education (ASEE)