Joshua E. Vaughan

Group Leader – Manufacturing Robotics and Controls
Secure and Digital Manufacturing Section
Manufacturing Sciences Division
Oak Ridge National Laboratory
vaughanje@ornl.gov

Research Interests

Large-scale and multi-agent manufacturing, smart manufacturing, industrial automation, mobile robotics, reinforcement learning, federated learning, human–machine–control system interaction, autonomous maritime systems, rescue and inspection robotics

Education

Ph.D., Mechanical Engineering, August 2008
Georgia Institute of Technology
Atlanta, Georgia
> Dissertation: *Dynamics and Control of Mobile Cranes*
> Advisor: Dr. William Singhose
> Committee: Drs. Kok-Meng Lee, Rhett Mayor, John-Paul Clarke, Patricio Vela

M.S., Mechanical Engineering, May 2004
Georgia Institute of Technology
Atlanta, Georgia
> Thesis: *Active and Semi-Active Control to Counter Vehicle Payload Variation*
> Advisors: Dr. Nader Sadegh and Dr. William Singhose

B.S., Physics with Honors, May 2002
B.S., Applied Mathematics, May 2002
Hampden-Sydney College
Hampden-Sydney, Virginia
> Honors Thesis: *Trace Detection of Gaseous CS_2 with an Optoacoustic Technique*
> Graduated *Magna Cum Laude*

Research Experience

10/2020 – Present	Group Leader, Senior R&D Staff Member Manufacturing Robotics and Controls Group Secure and Digital Manufacturing Section Oak Ridge National Laboratory – Manufacturing Demonstration Facility

> 6/2024 – present   Lead for the Advanced Manufacturing Convergent Research Initiative for The University of Tennessee-Oak Ridge Innovation Institute (UT-ORII)
> 10/2023 – present   PI on the Automation and Controls thrust area of the Manufacturing Demonstration Facility (MDF) Annual Operating Plan ($1M/year)
> 1/2021 – 9/2024   PI on the Large-scale Metal Additive/DED thrust area of the Manufacturing Demonstration Facility (MDF) Annual Operating Plan ($\approx$$4M/year)

5/2021 – Present	Graduate Faculty, Full Member Department of Mechanical Engineering – University of Louisiana at Lafayette
8/2019 – 10/2020	R&D Staff Member Oak Ridge National Laboratory – Manufacturing Demonstration Facility
8/2018 – 5/2021	Associate Professor Department of Mechanical Engineering – University of Louisiana at Lafayette
8/2012 – 8/2018	Assistant Professor Department of Mechanical Engineering – University of Louisiana at Lafayette
4/2010 – 8/2012	Postdoctoral Research Engineer Boeing Aerospace Research Center – Georgia Institute of Technology

Developed methods for compensating for nonzero initial conditions in real-time command shaping

Investigated control and coordination of multiple material handling systems

Investigated interaction between human operators, control systems, and user interfaces

3/2009 – 3/2010   Japan Society for the Promotion of Science (JSPS) Postdoctoral Fellow
Tokyo Institute of Technology – Hirose-Fukushima Laboratory
    Developed controllers for a mobile, semi-autonomous demining robot
    Reduced endpoint vibration of a long-reach, robotic scanning arm
    Investigated methods for landmine discrimination

9/2008 – 3/2009   Siemens Energy and Automation Postdoctoral Fellow
Georgia Institute of Technology
    Led development of a mobile boom crane experimental platform
    Developed input shapers to improve crane payload positioning accuracy
    Designed Graphical User Interfaces to improve crane operator performance
    Installed input shaping crane controller at Boeing Phantom Works in St. Louis

5/2006 – 8/2008   Siemens Energy and Automation Fellow
Georgia Institute of Technology
    Developed advanced dynamic models of mobile cranes
    Developed multi-input shaping techniques for vibration suppression
    Investigated human operator performance in tele-operated systems
    Thoroughly evaluated robust input-shaping methods and design compromises
    Advised up to four Undergraduate Researchers per semester

11/2006 – 2/2007   NSF Doctoral Dissertation Enhancement Project (DDEP) Sponsored Researcher
Tokyo Institute of Technology – Hirose-Fukushima Laboratory
    Designed and constructed a mobile base for a portable tower crane
    Experimentally evaluated mobile tower crane dynamics and control methods

9/2002 – 5/2006   Graduate Researcher
Georgia Institute of Technology
    Investigated changes in vehicle dynamics due to varying payloads
    Developed active suspension techniques to counter the effects of vehicle payloads
    Investigated active seating systems to enhance passenger safety and comfort

9/2001 – 5/2002   Undergraduate Researcher
Hampden-Sydney College

Teaching Experience

1/2015 – 05/2019   *MCHE 201: Introduction to Mechanical Design*
University of Louisiana at Lafayette
    Completed all course planning and management
    Taught high-level design process (*e.g.* House of Quality, Concept evaluation)
    Taught technical communication
    Integrated robotics projects into course
    Secured ≈$15,000 of grants and $10,000 of donations in support of class

1/2019 – 5/2019   *MCHE 485: Mechanical Vibrations*
1/2018 – 5/2018   University of Louisiana at Lafayette
1/2016 – 5/2016   Completed all course planning and management
8/2014 – 5/2015   Taught single and multi-degree-of-freedom vibration analysis
1/2014 – 5/2014   Developed interactive instruction modules, including Jupyter Notebooks
8/2012 – 5/2013   Developed video presentations of core course topics

8/2018 – 12/2018
8/2016 – 12/2016
8/2015 – 12/2015
	MCHE 513: Intermediate Dynamics
	University of Louisiana at Lafayette
	    Completed all course planning and management
	    Taught graduate-level kinematics and dynamics
	    Integrated computing projects into course

1/2018	*Modern Approaches to System Dynamics and Control*
	Visiting Lecturer
	Kumoh National Institute of Technology, Gumi, Korea
	    Taught advanced controls to Korean undergraduate and graduate students
	    Developed Jupyter Notebooks in support of course

8/2017 – 12/2017	*MCHE 474: Control Systems*
	University of Louisiana at Lafayette
	    Completed all course planning and management
	    Taught system dynamics and control
	    Integrated hands-on controls projects and modern tools into course

2/2016 – 3/2016	*MCDDT: Mechatronics Creative Decision and Design Tools* Visiting Lecturer Huazhong University of Science and Technology (HUST), Wuhan, China Taught mechanical design process and technical communication to Chinese under-graduate students
8/2016 – 5/2021 8/2013 – 5/2015 1/2013 – 5/2013	*MCHE 484: Engineering Projects* Project Advisor University of Louisiana at Lafayette Advised teams of up to five senior students during their capstone design project

8/2013 – 12/2013	*MCHE 470: Special Topics – Robotics*
	University of Louisiana at Lafayette
	    Created new course at UL Lafayette
	    Taught broad range of robotics topics, including design, control, and sensing

8/2011 – 8/2012
1/2011 – 5/2011
8/2010 – 12/2010
	ME2110: Creative Decisions and Design
	Studio Section Instructor
	Georgia Institute of Technology
	    Led design studio exercises for sections of twenty students
	    Assisted with course final project planning

2/2012	*APPH8803: Special Topics - Assistive Technology Design* Guest Lecturer Georgia Institute of Technology Presented two lectures on biomechanical modeling and structural stability

11/2011
10/2008
11/2007
	ME6404: Advanced Control Design and Implementation
	Guest Lecturer
	Georgia Institute of Technology
	    Presented two-lecture series on tele-operation control techniques
	    Presented a lecture on Repetitive Learning Control

1/2011 – 5/2011	*APPH8803: Special Topics - Assistive Technology Design*
	Co-Lecturer
	Georgia Institute of Technology
	    Presented lectures on biomechanical modeling and structural stability
	    Led laboratory and design prototyping activities

2/2011	*ME8843: Advanced Mechatronics* Guest Lecturer Georgia Institute of Technology

Presented lecture on motion control and command generation
Provided test question on guest lecture material

8/2010 – 12/2010	*ME6404: Advanced Control Design and Implementation*
	Co-Lecturer
	Georgia Institute of Technology
	    Taught graduate-level advanced controls design methods including optimal control, model reference control, learning control, and command shaping
	    Developed laboratories and tests supporting course lecture material

10/2010	*2.998: Command Shaping, Theory and Applications*
	Guest Lecturer
	Massachusetts Institute of Technology
	    Presented lecture on commands and interfaces to improve crane operator performance
	    Developed test items from course material

8/2010 – 12/2010
1/2009 – 5/2009
	ME4182: Capstone Design
	Project Advisor
	Georgia Institute of Technology
	    Advised team of four senior students during their capstone design project
	    Assisted in procuring industry funding for Georgia Tech senior design projects

2/2009, 10/2010	*ME2110: Creative Decisions and Design*
	Guest Lecturer
	Georgia Institute of Technology
	    Presented lecture on management and planning tools
	    Presented design-study lecture on the GRYPHON demining robot

8/2006 – 5/2007	*ME6404: Advanced Control Design and Implementation*
	Teaching Associate
	Georgia Institute of Technology
	    Co-taught graduate level course
	    Developed and presented advanced controls lectures
	    Developed and graded exams

8/2005 – 8/2006
1/2004 – 5/2004
	ME2110: Creative Decisions and Design
	Head Graduate Teaching Assistant
	Georgia Institute of Technology
	    Wrote course Mechatronics manual (still in use)
	    Assisted in procuring industry funding to support the course
	    Assisted with course organization and instruction
	    Led team of six to eight graduate teaching assistants
	    Graded homework, design reports, and project presentations

5/2005 – 8/2005
9/2002 – 12/2003
	ME2110: Creative Decisions and Design
	Graduate Teaching Assistant
	Georgia Institute of Technology
	    Assisted students with implementation of design tools and techniques
	    Graded homework, design reports, and project presentations

5/2004 – 5/2005	Cedar Grove High School & Georgia Institute of Technology
	NSF STEP Fellow
	    Assisted with teaching of a high school Accelerated Physics class
	    Planned, introduced, conducted, and evaluated classroom lab activities
	    Advised student Robotics Club at Cedar Grove High School

Publications

Book Chapters

Joshua Vaughan and William Singhose. *Advances in Delays and Dynamics: Delay Systems*, "The Influence of Time Delay on Crane Operator Performance", pages 329–342. Springer, 2014.

Journal Articles

[1] Yousub Lee, Peeyush Nandwana, Brian Gibson, Paritosh Mhatre, Julio Ortega Rojas, Bhagyashree Prabhune, Aaron Thornton, Joshua Vaughan, and Srdjan Simunovic. Integrated Top-Down Process and Voxel-Based Microstructure Modeling for Ti-6Al-4V in Laser Wire Direct Energy Deposition Process. *Materials & Design*, 2025.

[2] Alex Arbogast, Andrzej Nycz, Mark W. Noakes, Peter Wang, Christopher Masuo, Joshua Vaughan, Lonnie Love, Randall Lind, William Carter, Luke Meyer, Derek Vaughan, Alex Walters, Steven Patrick, Jonathan Paul, and Jason Flamm. Strategies for a scalable multi-robot large scale wire arc additive manufacturing system. *Additive Manufacturing Letters*, 8:100183, 2024.

[3] Yousub Lee, Andrzej Nycz, Srdjan Simunovic, Luke Meyer, Derek Vaughan, William Carter, Sudarsanam S. Babu, Joshua Vaughan, and Lonnie Love. Prediction and understanding of non-linear distortion on large curved wall manufactured by wire-arc direct energy deposition. *Additive Manufacturing Letters*, 7:100173, 2023.

[4] A. Plotkowski, K. Saleeby, C. M. Fancher, J. Haley, G. Madireddy, K. An, R. Kannan, T. Feldhausen, Y. Lee, D. Yu, C. Leach, J. Vaughan, and S. S. Babu. Operando neutron diffraction reveals mechanisms for controlled strain evolution in 3d printing. *Nature Communications*, 14(1):4950, 2023.

[5] Brian T. Gibson, Paritosh Mhatre, Michael C. Borish, Celeste E. Atkins, John T. Potter, Joshua E. Vaughan, and Lonnie J. Love. Controls and process planning strategies for 5-axis laser directed energy deposition of ti-6al-4v using an 8-axis industrial robot and rotary motion. *Additive Manufacturing*, 58:103048, 2022.

[6] Celeste Atkins, Diana Hun, Piljae Im, Brian Post, Bob Slattery, Emishaw Iffa, Borui Cui, Jin Dong, Abigail Barnes, Joshua Vaughan, Alex Roschli, Mikael Salonvaara, Som Shrestha, Sungkyun Jung, Phillip Chesser, Jesse Heineman, Peter L. Wang, Amiee Jackson, and Melissa Voss Lapsa. Empower wall: Active insulation system leveraging additive manufacturing and model predictive control. *Energy Conversion and Management*, 266:115823, 2022.

[7] Phillip Chesser, Peter Wang, Joshua Vaughan, Randall Lind, and Brian Post. Kinematics of a Cable-Driven Robotic Platform for Large-Scale Additive Manufacturing. *Journal of Mechanisms and Robotics*, pages 1–17, 08 2021.

[8] Joshua Vaughan, William Singhose, and Dooroo Kim. Analysis of unrestrained crawler-crane counterweights during tip-over accidents. *Mechanics Based Design of Structures and Machines*, 0(0):1–26, 2020.

[9] Daniel Newman, Seong-Wook Hong, and Joshua E. Vaughan. The design of input shapers which eliminate nonzero initial conditions. *Journal of Dynamic Systems, Measurement, and Control*, 140(10):101005–101005–9, 05 2018.

[10] Gerardo Peláez, Joshua Vaughan, Pablo Izquierdo, Higinio Rubio, and Juan Carlos García-Prada. Dynamics and embedded internet of things input shaping control for overhead cranes transporting multibody payloads. *Sensors*, 18(6), 2018.

[11] Abhishek Dhanda, Joshua Vaughan, and William Singhose. Time-optimal and near time-optimal vibration reduction control for non-zero initial conditions. *Journal Dynamic Systems, Measurement, and Control*, 138(4):041006–041006, 02 2016.

[12] J. Yoon, S. Nation, W. Singhose, and J.E. Vaughan. Control of crane payloads that bounce during hoisting. *Control Systems Technology, IEEE Transactions on*, 22(3):1233–1238, May 2014.

[13] Joshua Vaughan, Paul Jurek, and William Singhose. Reducing overshoot in human-operated flexible systems. *Journal of Dynamic Systems, Measurement, and Control*, 133(1):011010, 2011.

[14] William Singhose, Joshua Vaughan, Kelvin Chen Chih Peng, Brice Pridgen, Urs Glauser, Juan de Juanes Marquez, and Seong-Wook Hong. Use of cranes in education and international collaborations. *J. of Robotics and Mechatronics*, 23(5):881–892, 2011.

[15] William Singhose and Joshua Vaughan. Reducing vibration by digital filtering and input shaping. *Control Systems Technology, IEEE Transactions on*, 19(6):1410 –1420, nov. 2011.

[16] Joshua Vaughan, Dooroo Kim, and William Singhose. Control of tower cranes with double-pendulum payload dynamics. *Control Systems Technology, IEEE Transactions on*, 18(6):1345 – 1358, 2010.

[17] Joshua Vaughan, Anderson Smith, S. J. Kang, and William Singhose. Predictive graphical user interface elements to improve crane operator performance. *Systems, Man and Cybernetics, Part A: Systems and Humans, IEEE Transactions on*, PP(99):1 –8, October 2010.

[18] Joshua Vaughan, Aika Yano, and William Singhose. Robust negative input shapers for vibration suppression. *Journal of Dynamic Systems, Measurement, and Control*, 131(3):031014, 2009.

[19] Joshua Vaughan, Aika Yano, and William Singhose. Comparison of robust input shapers. *Journal of Sound and Vibration*, 315(4-5):797 – 815, 2008.

[20] Joshua Vaughan, Joel Fortgang, William Singhose, Jeffrey Donnell, and Thomas Kurfess. Using mechatronics to teach mechanical design and technical communication. *Mechatronics*, 18(4):179–186, May 2008.

[21] Stanley Cheyne, Walter McDermott, Matt Rannals, and Joshua Vaughan. Concentration determination of binary mixture of air and carbon disulfide gas using optoacoustics. *Acoustic Research Letters Online*, 5(2):7–12, April 2004.

Conference Papers

[1] Gerald Eaglin, Thomas Poche, and Joshua Vaughan. Controlling a double-pendulum crane by combining reinforcement learning and conventional control. In *2023 American Control Conference (ACC)*, pages 788–793, 2023.

[2] Derek Vaughan, Luke Meyer, Chris Masuo, Andrzej Nycz, Mark Noakes, Joshua Vaughan, Alex Walters, William Carter, and Riley Wallace. Geometric Challenges in Designing Parts for Machining using Wire-fed DED. In *2022 International Solid Freeform Fabrication Symposium (SFF)*, Austin, TX, July 25-27 2022.

[3] Andrew Albright and Joshua Vaughan. Learning energy efficient jumping strategies for flexible-legged systems. In *Modeling, Estimation and Control Conference (MECC) 2021*, volume 54, pages 443–448, 2021.

[4] Gerald Eaglin and Joshua Vaughan. Leveraging conventional control to improve performance of systems using reinforcement learning. In *ASME 2020 Dynamic Systems and Control Conference*, Pittsburgh, PA, USA, Oct. 4–7 2020.

[5] Benjamin Armentor, Joseph Stevens, Nathan Madsen, Andrew Durand, and Joshua Vaughan. Effect of short-term weather predictions on model predictive trajectory tracking performance of unmanned surface vessels. In *ASME 2020 Dynamic Systems and Control Conference*, Pittsburgh, PA, USA, Oct. 4–7 2020.

[6] Celeste Atkins, Emma Betters, Alex Boulger, Phillip Chesser, Jesse Heineman, Diana Hun, Melissa Lapsa, Amy Loy, Alex Roschli, Joshua Vaughan, Peter Wang, , and Brian Post. Construction-scale concrete additive manufacturing and its application in infrastructure energy storage. In *ASME International Mechanical Engineering Congress and Exposition*, Portland, OR, Nov. 15–19 2020.

[7] Gerald Eaglin and Joshua Vaughan. Using rrts to plan low-vibration trajectories for flexible mobile robots. In *American Control Conference (ACC)*, Philadelphia, PA, July 10–12 2019.

[8] Gerald Eaglin and Joshua Vaughan. Model reference control with command shaping for a micro-electromagnetic actuator with input constraints. In *Dynamic Systems and Control Conference*, Park City, Utah, October 8–11 2019.

[9] Daniel Newman and Joshua Vaughan. Concurrent design of linear control with input shaping for a two-link flexible manipulator arm. In *14th IFAC Workshop on Time Delay Systems*, Budapest, Hungary, June 28–30 2018.

[10] Daniel Newman, Seong-Wook Hong, and Joshua Vaughan. Eliminating nonzero initial states in flexible systems through specified insensitivity input shaping. In *American Control Conference (ACC)*, 2018.

[11] Minh Vu and Joshua Vaughan. Designing input shapers using reinforcement learning. In *American Control Conference (ACC)*, 2018.

[12] Daniel Newman, Seong-Wook Hong, and Joshua Vaughan. Eliminating initial oscillation in flexible systems by the pole-zero cancellation input shaping technique. In *The 7th International Conference of Asian Society for Precision Engineering and Nanotechnology (ASPEN 2017)*, Seoul, Korea, November 11–17 2017.

[13] Forrest Montgomery and Joshua Vaughan. Suppression of cable suspended parallel manipulator vibration utilizing input shaping. In *IEEE Conference on Control Technology and Applications*, Kohala Coast, Hawai'i, August 27-30 2017.

[14] Daniel Newman and Joshua Vaughan. Command shaping of a boom crane subject to nonzero initial conditions. In *IEEE Conference on Control Technology and Applications*, Kohala Coast, Hawai'i, August 27-30 2017.

[15] Gerald Eaglin and Joshua Vaughan. Reducing trajectory tracking error of flexible mobile robots using command shaping with error-limiting constraints. In *ASME 2017 Dynamic Systems and Control Conference*, Tysons Corner, VA, October 11-13 2017.

[16] Daniel Newman and Joshua Vaughan. Reduction of transient payload swing in a harmonically excited boom crane by shaping luff commands. In *ASME 2017 Dynamic Systems and Control Conference*, Tysons Corner, VA, October 11-13 2017.

[17] Youmin Hu, Dongmin Han, Ling Ling, Thomas Kurfess, William Singhose, and Joshua Vaughan. Case study: Comparison of project-based, creative engineering courses at georgia tech and huazhong university of science and technology. In *International Conference on Engineering Education & Research*, Sydney, Australia, 21 – 24 November 2016.

[18] Robert Schmidt, Matthew Begneaud, and Joshua Vaughan. Tracking of a target payload via a combination of input shaping, zero phase error tracking control, and fuzzy logic. In *Dynamic Systems and Control Conference*, volume 2, page V002T27A005, Minneapolis, Minnesota, USA, October 12–14 2016.

[19] Forrest Montgomery and Joshua Vaughan. Modeling and control of a cable-driven robot for inspection of wide-area horizontal workspaces. In *Dynamic Systems and Control Conference*, volume 2, page V002T22A002, Minneapolis, Minnesota, USA, October 12–14 2016.

[20] Nicole Barry, Erin Fisher, and Joshua Vaughan. Modeling and control of a cable-suspended robot for inspection of vertical structures. In *International Conference on Motion and Vibration Control (MOVIC)*, Southampton, UK, July 3–6 2016.

[21] Beau Domingue and Joshua Vaughan. Crane workspace mapping via a scanning laser rangefinder. In *ASME 2015 International Mechanical Engineering Congress & Exposition (IMECE 2015)*, Houston, TX USA, November 13–19 2015. ASME.

[22] Dare Olaonipekun and Joshua Vaughan. Complete coverage path planning for flexible parent-child unit robots. In *ASME 2015 Dynamic Systems and Control Conference*, volume 3, page V003T40A004, Columbus, Ohio, USA, October 28–30 2015. ASME.

[23] M. Sazzad Rahman and Joshua Vaughan. Crane workspace mapping using qr codes. In *ASME 2015 Dynamic Systems and Control Conference*, volume 2, page V002T30A004, Columbus, Ohio, USA, October 28–30 2015. ASME.

[24] Ali Baheri and Joshua Vaughan. Concurrent design of unity-magnitude input shapers and proportional-derivative feedback controllers. In *American Control Conference (ACC)*, Chicago, IL, July 1–3 2015.

[25] Robert Schmidt, Nicole Barry, and Joshua Vaughan. Tracking of a target payload via a combination of input shaping and feedback control. In *12th IFAC Workshop on Time Delay Systems*, Ann Arbor, Michigan, June 28–30 2015.

[26] Joshua Vaughan. An initial comparison of energy use between crane control methods. In *ASME 2014 Dynamic Systems and Control Conference*, volume 3, San Antonio, Texas, October 22–24 2014.

[27] M. Sazzad Rahman and Joshua Vaughan. Simple near-realtime crane workspace mapping using machine vision. In *ASME 2014 Dynamic Systems and Control Conference*, volume 3, page V003T28A005, San Antonio, Texas, October 22–24 2014.

[28] Ali Baheri and Joshua Vaughan. Robust concurrent design of inputs and proportional-derivative feedback controllers. In *International Symposium on Flexible Automation*, Awaji-Island, Hyogo, Japan, July 14-16 2014.

[29] Joshua Vaughan, Michele Guarnieri, and Paulo Debenest. Limiting rocking oscillation of cable-riding robots subject to wind disturbances. In *International Conference on Motion and Vibration Control (MOVIC)*, Sapporo, Hokaido, Japan, August 3-7 2014.

[30] Ali Baheri and Joshua Vaughan. Concurrent command and mechanical system design to limit transient and residual vibration. In *International Conference on Motion and Vibration Control (MOVIC)*, Sapporo, Hokaido, Japan, August 3-7 2014.

[31] William Singhose, Dooroo Kim, and Joshua Vaughan. Post-ejection failure mode of post-driving machines. In *VIII International Conference "Heavy Machinery-HM 2014"*, Zlatibor, Serbia, June 25-28 2014.

[32] Joshua Vaughan. Jumping commands for flexible-legged robots. In *International Symposium on Robotics*, Seoul, Korea, Oct. 24-26 2013.

[33] Joshua Vaughan, Jieun Yoo, Nathan Knight, and William Singhose. Multi-input shaping control for multi-hoist cranes. In *2013 American Controls Conference (ACC)*, pages 3455–3460, Washington, D.C., June 17-19 2013.

[34] Joshua Vaughan. Modeling and control of rocking in cable-riding systems. In *2013 Asian Control Conference (ASCC)*, Istanbul, Turkey, June 23-26 2013.

[35] Youmin Hu, Bo Wu, Joshua Vaughan, and William Singhose. Oscillation suppression for an energy efficient bridge crane using input shaping. In *2013 Asian Control Conference (ASCC)*, Istanbul, Turkey, June 23-26 2013.

[36] Ehsan Maleki, William Singhose, Jeffrey Hawke, and Joshua Vaughan. Dynamic response of a dual-hoist bridge crane. In *ASME Dynamic Systems and Control Conference*, Palo Alto, CA, Oct. 21-23 2013.

[37] Joshua Vaughan, Kelvin Chen Chih Peng, William Singhose, and Warren Seering. Influence of remote-operation time delay on crane operator performance. In *10th IFAC Workshop on Time Delay Systems*, Boston, USA, June 22-24 2012.

[38] Joshua Vaughan, Jieun Yoo, Nathan Knight, and William Singhose. Dynamics and control of multiple cranes with a connected payload. In *19th International Congress on Sound and Vibration (ICSV19)*, Vilnius, Lithuania, July 8-12 2012.

[39] Joshua Vaughan, Jieun Yoo, and W. Singhose. Using approximate multi-crane frequencies for input shaper design. In *Control, Automation and Systems (ICCAS), 2012 12th International Conference on*, pages 639–644, Jeju Island, Korea, Oct. 17-21 2012.

[40] J. Vaughan, A. Karajgikar, and W. Singhose. A study of crane operator performance comparing pd-control and input shaping. In *American Control Conference (ACC), 2011*, pages 545 –550, 29 2011-july 1 2011.

[41] Ajeya Karajgikar, Joshua Vaughan, and William Singhose. Double-pendulum crane operator performance comparing pd-feedback control and input shaping. In *Multibody Dynamics 2011*, Brussels, Belgium, July 4-7 2011.

[42] Joshua Vaughan and William Singhose. Reducing multiple modes of vibration by digital filtering and input shaping. In *ASME Dynamic Systems and Control Conference*, Cambridge, MA, September 13-15 2010.

[43] Joshua Vaughan, Ehsan Maleki, and William Singhose. Advantages of using command shaping over feedback for crane control. In *American Control Conference*, Baltimore, MD, June 30 - July 2 2010.

[44] William Singhose, Juan de Juanes Marquez, Brice Pridgen, and Joshua Vaughan. Use of telerobotic cranes in international collaborative education. In *The 15th IASTED International Conference on Robotics and Applications*, Cambridge, MA, November 1-3 2010.

[45] Joshua Vaughan, Anderson Smith, and William Singhose. Using a predictive graphical user interface to improve tower crane performance. In *The 14th IASTED International Conference on Robotics and Applications*, Cambridge, MA, November 2-4 2009.

[46] Joshua Vaughan and William Singhose. Input shapers for reducing overshoot in human-operated flexible systems. In *Proceedings of 2009 American Control Conference*, St. Louis, MO, June 10-12 2009.

[47] Joshua Vaughan and William Singhose. Reducing vibration and providing robustness with multi-input shapers. In *Proceedings of 2009 American Control Conference*, St. Louis, MO, June 10-12 2009.

[48] William Singhose, Joshua Vaughan, and Rhett Mayor. Use of design competitions in mechatronics education. In *Proceedings of 2009 International Conference on Mechatronics*, Malaga, Spain, April 14-17 2009.

[49] Ehsan Maleki, William Singhose, and Joshua Vaughan. Initial experiments with a small-scale mobile boom crane. In *The 14th IASTED International Conference on Robotics and Applications*, Cambridge, MA, November 2-4 2009.

[50] Jisup Yoon, William Singhose, Joshua Vaughan, Gabriel Ramirez, Michael Kim, and Sujay Tawde. Dynamics and control of crane payloads that bounce and pitch during hoisting. In *ASME International Design Engineering Technical Conferences*, San Diego, CA, August 30 - September 2 2009.

[51] Abhishek Dhanda, Joshua Vaughan, and William Singhose. Optimal input shaping filters for non-zero initial states. In *Proceedings of 2009 American Control Conference*, St. Louis, MO, June 10-12 2009.

[52] Joshua Vaughan, Aayush Daftari, and William Singhose. The influence of input shaper duration on bridge crane operator performance. In *The 9th International Conference on Motion and Vibration Control*, Munich, Germany, September 15-18 2008.

[53] Joshua Vaughan and William Singhose. Comparison of command filterting methods for vibration reduction in automated manufacturing. In *International Symposium on Flexible Automation*, June 23–26 2008.

[54] Joshua Vaughan, Aika Yano, and William Singhose. Performance comparison of robust negative input shapers. In *2008 American Controls Conference*, pages 3257 – 62, Seattle, Washington, June 2008.

[55] William Singhose, Joshua Vaughan, Jon Danielson, and Jason Lawrence. Use of cranes in system dynamics and controls education. In *Proceedings of the 17th IFAC World Congress*, Seoul, Korea, July 6-11 2008.

[56] Urs Glauser, Lukas Wilder, Rolf Weiss, Joshua Vaughan, and William Singhose. Conducting international research projects using undergraduate thesis projects. In *International Symposium on Flexible Automation*, June 23–26 2008.

[57] Mingxiao Dong and Joshua Vaughan. Approximate extra insensitive methods to restrain residual vibrations of flexible manufacturing machines. In *International Symposium on Flexible Automation*, Atlanta, GA, June 23–26 2008.

[58] Jon Danielson, Joshua Vaughan, William Singhose, Lukas Wilder, and Urs Glauser. Design of a mobile boom crane for research and educational applications. In *The 9th International Conference on Motion and Vibration Control*, Munich, Germany, September 15-18 2008.

[59] Joshua Vaughan, William Singhose, Paulo Debenest, Edwardo Fukushima, and Shigeo Hirose. Initial experiments on the control of a mobile tower crane. In *ASME International Mechanical Engineering Congress and Exposition*, Seattle, Washington, 2007.

[60] Joshua Vaughan, Aika Yano, and William Singhose. Performance comparison of robust input shapers. In *The Sixth International Conference on Control and Automation*, Guangzhou, China, 2007.

[61] William Singhose, Joshua Vaughan, Jon Danielson, and Jason Lawrence. The use of tele-operated cranes for advanced controls education. In *ASME International Mechanical Engineering Congress and Exposition*, Seattle, Washington, 2007.

[62] Joshua Vaughan and William Singhose. Modeling and control of a mobile crane system. In *The Third International Conference for Advances in Mechanical Engineering and Mechanics*, Hammamet, Tunisia, 2006.

[63] Joshua Vaughan and William Singhose. ARLISS: A multidisciplinary extracurricular design project for undergraduates. In *ASEE Annual Conference and Exposition*. Chicago, Illinois, 2006.

[64] Michael Robertson, Joshua Vaughan, William Singhose, Michael Pastirik, Marion Usselman, and Donna Llewellyn. Involving high school students in a university-level mechanical engineering design competition. In *ASEE Annual Conference and Exposition*, pages 9039–9049, Portland, Oregon, June 12–15 2005.

[65] Joshua Vaughan, Nader Sadegh, and William Singhose. Examination of variable damping for payload compensation in heavy machinery. In *The Seventh International Conference on Motion and Vibration Control*, August 2004.

[66] Joshua Vaughan, William Singhose, and Nader Sadegh. A multiple model approach to payload compensation via active suspension control. In *IFAC Symposium on Advances in Automotive Control*, pages 590–595, Salerno, Italy, 2004.

[67] Samuel Klooster, Kris Kozak, Joshua Vaughan, Peter Sanders, and William Singhose. Fluid power control of a hyper-active seat for low-frequency vibration suppression. In *IFAC Symposium on Advances in Automotive Control*, Salerno, Italy, 2004.

[68] Joshua Vaughan, William Singhose, and Nader Sadegh. Use of active suspension control to counter the effects of vehicle payloads. In *IEEE Conference on Control Applications*, pages 285–289, Istanbul, Turkey, 2003.

Patents & Intellectual Property

10/22/19	"Automated Evacuation of Pharmaceutical Tubes." U.S. Patent 10,450,108.
11/14/17	"Methods for Near-realtime Workspace Mapping." U.S. Patent 9,818,198.
3/10/15	"Methods and Systems for Improving Positioning Accuracy." U.S. Patent 8,975,853.

Oak Ridge National Laboratory Funding – Approx. $12M Cash + $11.3M In-kind

9/2022 – present *Large-scale Robotic Metal Additive Manufacturing* – Cooperative Research and Development Agreement (CRADA) Extension with Lincoln Electric – $12M Cash + $11.3M In-kind

Academic Funding – Approx. $968,751 Cash + $402,389 In-kind Contributions

1/2020 – 5/2020 *Continued Expansion of the Core Robotics Kit in the Mechanical Engineering Curriculum* – UL Lafayette STEP Grant – $2,390

1/2019 – 5/2019 *Controls Research in Support of an Undergraduate Student Exchange* – Kumoh National Institute of Technology – ≈$2,146 (2,400,000 KRW)

6/2018 – 6/2021 *Improving Autonomous Surface Vehicle Performance through Machine-Learning Enhanced Modeling and Control* – Louisiana Board of Regents ITRS (with ASV Global) – $181,466 + $162,000 in-kind

1/2018 – 12/2021 *A Progression of Robotics Projects and Competitions for GEAR UP* – Lafayette Public School Systems – $64,970

1/2018 – 5/2018 *Input Shaping Control Research in Support of an Undergraduate Student Exchange* – Kumoh National Institute of Technology – ≈$2,650 (3,000,000 KRW)

1/2018 – 12/2020 *Automated Peeling of Louisiana Crawfish* – Louisiana Crawfish Promotion and Research Board – $201,563

11/2017 – 10/2018 *Promoting Aerospace Research and Education through ARLISS at UL Lafayette* Louisiana Space Grant Consortium (LaSPACE) – $3,948

7/2017 – 6/2018 *Improving the Core Robotics Kit in the Mechanical Engineering Curriculum* – UL Lafayette STEP Grant – $4,903

1/2017 – 12/2017 *Supporting Hands-on Robotics Projects in the Mechanical Engineering Curriculum* – UL Lafayette STEP Grant – $6,662

5/2016 – 12/2016 *Maritime RobotX at UL Lafayette* – Donation from Mr. Donald Mosing – $130,000

1/2016 – 12/2016 *Vibration-free Control of Cable-suspended Robots* – HiBot, Corp – $9,172

6/2015 – 6/2018 *Cable-Driven Robots for Inspection, Maintenance, and Rescue* – Louisiana Board of Regents ITRS (with HiBot, Corp) – $162,249 + $75,000 in-kind

6/2014 – 6/2017 *Reducing Oscillation of Ship-Mounted Cranes Used for ASV Retrieval* – Louisiana Board of Regents ITRS (with C&C Technologies, then ASV, Ltd) – $136,140 + $145,011 in-kind

6/2014 – 1/2015 *Using Robotics to Improve Efficiency of Operations at Professional Arts Pharmacy* – Professional Arts Pharmacy – $47,881

1/2014 – 1/2015 *Establishing ARLISS at the University of Louisiana at Lafayette* – Louisiana Space Grant Consortium (LaSPACE) – $12,822

10/2013 – 4/2014 *Using Hands-On Robotics Projects to Teach Mechanical Design and Technical Communication* – UL Lafayette Educational Grant – $2,157

8/2013 – 8/2014 *Making the Anaconda Autonomous – Year 1* – Swiftships Shipbuilders – $127,632 + $20,378 equipment (50% Co-PI with Dr. Arun Lakhotia)

Invited Presentations

4/2019   *Input Shaping for X*
Oak Ridge National Laboratory, Manufacturing Demonstration Facility, Knoxville, TN

10/2018   *An Introduction to Input Shaping Control*
Northeast Forestry University, Harbin, China

10/2018   *An Introduction to the University of Louisiana at Lafayette*
Northeast Forestry University, Harbin, China

10/2018   *Machine Learning for Object Detection and Control*
Northeast Forestry University, Harbin, China

3/2016   *An Overview of Input Shaping Control*
Wuxi Institute of Huazhong University of Science and Technology, Wuxi, China

3/2016   *An Overview of Input Shaping Control*
Huazhong University of Science and Technology, Wuxi, China

3/2016   *An Introduction to the C.R.A.W.LAB*
Huazhong University of Science and Technology, Wuhan, China

3/2016   *A Brief Introduction to the University of Louisiana at Lafayette*
Huazhong University of Science and Technology, Wuhan, China

11/2014   *Command Generation Strategies to Improve Flexible System Performance*
Louisiana Engineering Society, Lafayette Chapter, Lafayette, LA

7/2014   *Dynamics and Control of Autonomous Surface Vehicles*
Tokyo Institute of Technology, Tokyo Japan

6/2014   *Using Input Shaping to Improve Crane Performance and Safety*
ISA (International Society of Automation), Lafayette Section, Lafayette, LA

10/2013   *Establishing the C.R.A.W.LAB*
Shandong Jianzhu University, Jinan, Shandong Province, China

4/2013   *What Can You Do with a Physics Degree?*
Hampden-Sydney College Physics and Astronomy Department, Hampden-Sydney, VA

10/2012   *Using Approximate Multi-Crane Frequencies for Input Shaper Design*
12th International Conference on Control, Automation and Systems, Jeju, Korea

5/2011   *Intelligent Command Generation*
Tokyo Institute of Technology, Tokyo, Japan

10/2010   *Intelligent Command Generation to Reduce Machine Vibration*
Italian Institute of Technology, Genoa, Italy

6/2010   *Why Mechanical Engineering?*
Georgia Engineering Foundation – Exploring Engineer Academy
Georgia Institute of Technology, Atlanta, GA

10/2009   *Use of Advanced Mechatronics for Landmine Detection*
Chosun University, Gwangju, Korea

10/2009   *Challenges of Humanitarian Demining*
Kumoh National Institute of Technology, Gumi, Korea

5/2008   *Limiting Input Shaper Induced Overshoot in Operator Commands*
Kumoh National Institute of Technology, Gumi, Korea

1/2007   *Dynamics and Control of Mobile Cranes*
Kumoh National Institute of Technology, Gumi, Korea

Conference Sessions Organized

6/2015	*Input Shaping and Vibration Control Design* (Co-organized) IFAC Workshop on Time Delay Systems, University of Michigan, Ann Arbor, USA
5/2013	*Command Generation and Filtering for Control of Flexible Systems* Asian Controls Conference, Istanbul, Turkey.
10/2012	*Command Generation for Flexible System Control* International Conference on Control, Automation, and Systems, Jeju, Korea
5/2012	*Input Shaping and Vibration Suppression* (Co-organized) IFAC Workshop on Time Delay Systems, Northeastern University, Boston, USA

Conference Sessions Chaired or Co-chaired

10/2017	Dynamic Systems and Control Conference (DSCC), Tysons Corner, VA, USA
08/2017	Conference on Control Technology and Applications (CCTA), Kohala Coast, Hawaii, USA
10/2016	Dynamic Systems and Control Conference (DSCC), Minneapolis, Minnesota, USA
10/2015	Dynamic Systems and Control Conference (DSCC), Columbus, Ohio, USA
6/2015	IFAC Workshop on Time Delay Systems, University of Michigan, Ann Arbor, USA
8/2014	International Conference on Motion and Vibration Control (MoViC), Sapporo, Japan
5/2013	Asian Controls Conference, Istanbul, Turkey
10/2012	International Conference on Control, Automation, and Systems, Jeju, Korea
5/2012	IFAC Workshop on Time Delay Systems, Northeastern University, Boston, USA
5/2006	ASEE Annual Conference and Exposition. Chicago, Illinois, USA

Advising Experience

8/2016 – 12/2023	Gerald Eaglin, Ph.D. Student – Graduated M.S. 8/18, Ph.D. 12/23 Leveraging conventional controls domain knowledge for interpretable Reinforcement Learning Developed path-planning and tracking for cable-driven parallel manipulators 2017 NSF EAPSI Researcher at Tokyo Institute of Technology in Japan 2018 Louisiana Board of Regents Support Fund Fellow
1/2021 – 5/2022	Adam Smith, M.S. Student – Graduated 5/22 Developed models and control algorithms for Autonomous Surface Vehicles Used Model Predictive Control for decoupling thrust allocation for Autonomous Surface Vehicles
8/2020 – 5/2022	Andrew Albright, M.S. Student – Graduated 5/22 Developed reinforcement-learning-based concurrent design algorithms for robot locomotion Developed system for automated peeling of crawfish
8/2020 – 12/2020	Evan Rosson, M.S. Student Developed concurrent design methodologies for compliant robot structures
8/2020 – 12/2020	Kyle Leleux, M.S. Student Developed models for Autonomous Surface Vehicles
8/2018 – 8/2020	Benjamin Armentor, M.S. Student – Graduated 8/20 Developed models and control algorithms for Autonomous Surface Vehicles

8/2018 – 1/2022   Dallas Mitchell, M.S. Student
> Developed system for automated peeling of crawfish
> Used domain randomization methods for sim-to-real transfer of reinforcement learning agents

8/2017 – 1/2018   Mounirat Oyindamola Mahmoud, M.S. Student
> Developed system for automated peeling of crawfish

8/2017 – 12/2017   Joseph Fuentes, M.S. Student
> Developed models and control algorithms cable-suspended robots

1/2017 – 12/2017   Daniel Ashkebousi, M.S. Student – Graduated 12/17
> Experimentally verified tracking algorithms for crane controllers

8/2016 – 5/2018   Daniel Newman, M.S. Student – Graduated 5/18
> Developed tracking algorithms for crane controllers
> 2017 NSF EAPSI Researcher at Kumoh National Institute of Technology in Korea

8/2015 – 8/2017   Forrest Montgomery, M.S. Student – Graduated 8/17
> Developed models and control algorithms for nearly-horizontal cable-driven robots
> Experimentally verified key results
> Visiting Scholar at HiBot, Corp in Japan during summer 2016

8/2015 – 5/2017   Nicole Barry, M.S. Student – Graduated 5/17
> Developed models and control algorithms for vertical cable-driven robot
> Experimentally verified key results

4/2016 – 12/2016   Josh Hebert, M.S. Student – Graduated 12/16
> Developed vibratory models for deep-well drill strings
> Analysis of ship-induced drill-string vibration and loading
> Compared models to data from live drilling operations

5/2015 – 7/2015   Atsushi Horigome, Visiting Ph.D. Student
> Quantified improved jumping performance from compliant robot legs
> Designed and experimentally tested flexible legs for an insectoid hexapedal robot

8/2014 – 8/2016   Yasmeen Qudsi, M.S. Student – Graduated 8/16
> Quantified improved walking performance from compliant robot legs
> Designed and experimentally tested flexible legs for an insectoid quadrupedal robot
> Investigated changes in material properties after nanoparticle coating
> Developed control of spray-based nanoparticle application

8/2014 – 8/2016   Robert Schmidt, M.S. Student – Graduated 8/16
> Developed model and control algorithm for ship-mounted cranes
> Designed modifications to an existing small-scale crane

1/2014 – 5/2015   Seema Mallavalli, Ph.D. Student
> Developed models of flexible-legged robots
> Design and control of a tube-squeezing robot

8/2013 – 5/2015   Dare Olaonipekun, M.S. Student – Graduated 5/15
> Modeled and simulated a flexible parent-child robot
> Designed a complete coverage algorithm for flexible robots

8/2013 – 5/2015   Mohammad Sazzad Rahman, M.S. Student – Graduated 5/15
> Used machine vision to map crane workspaces
> Designed obstacle avoidance algorithms for cranes

8/2013 – 12/2014   Nicholas Bergeron, M.S. Student – Graduated 12/14
> Modeled and simulated an autonomous patrol boat

<div style="text-align: right;">Implemented autonomous controller on Anaconda, an existing Swiftships boat</div>

8/2012 – 8/2014   Ali Khayat Baheri Irani, M.S. Student – Graduated 8/14
    Investigated concurrent design of commands and feedback controllers

12/2013 – 5/2014   Brett Marks, M.S. Student – Graduated 5/14
    Modeled and simulated an mobile robot
    Implemented Kalman-filter-based navigation algorithm

8/2012 – 12/2013   Ninad Dhundur, M.S. Student – Graduated 12/13
    Modeled dynamics of cable-riding robots
    Designed commands to limit oscillation on cable-riding robots

5/2024 – 8/2024   Yehoon (Mark) Jang, REU Intern at ORNL
5/2023 – 8/2023   Mark Caleca, EERE Robotics Intern at ORNL
5/2023 – 8/2023   Dylan MacAllaster, EERE Robotics Intern at ORNL
5/2021 – 8/2021   Garrett Mesmer, SULI Intern at ORNL
1/2021 – 5/2022   Eve Dang, Undergraduate Researcher
8/2020 – 12/2020   Jacob Landreneau, Undergraduate Researcher
8/2020 – 12/2020   Austin Diodene, Undergraduate Researcher
1/2020 – 5/2021   Bradley Este, Undergraduate Researcher
8/2019 – 5/2020   Tahj Delasbour, Undergraduate Researcher
8/2019 – 12/2020   Andrew Durand, Undergraduate Researcher
8/2019 – 12/2020   Ryan Strong, Undergraduate Researcher
8/2019 – 12/2021   Logan Sullivan, Undergraduate Researcher
8/2019 – 05/2020   Matthew Templet, Undergraduate Researcher
8/2019 – 12/2019   Melody Townsend, Undergraduate Researcher
5/2019 – 5/2021   Joseph Stevens, Undergraduate Researcher
5/2019 – 7/2019   Nicholas Warren, Undergraduate Researcher
1/2019 – 12/2020   Darcy Lafont, Undergraduate Researcher
1/2019 – 5/2021   Brennan Moeller, Undergraduate Researcher
1/2019 – 2/2019   Jungh-wan Choi, Seun-guk Jang, and Sang-won Lee
    Visiting Korean Undergraduate Researchers
8/2018 – 5/2019   Grant Baudoin, Undergraduate Researcher
8/2018 – 5/2019   Rebecca Cline, Undergraduate Researcher
8/2018 – 3/2019   Matthew Fanguy, Undergraduate Researcher
8/2018 – 12/2018   Joseph Ferniany, Undergraduate Researcher
8/2018 – 12/2019   Kyle Leleux, Undergraduate Researcher
8/2018 – 5/2022   Thomas Poche, Undergraduate Researcher
1/2017 – 2/2017   Kyung-koo Kim, Hyo-jeong Kwak, and Dong-jun Lim
    Visiting Korean Undergraduate Researchers
12/2017 – 5/2018   Joshua Keller, Undergraduate Researcher
12/2017 – 3/2018   Jacob Irwin, Undergraduate Researcher
8/2017 – 5/2018   Andrew Conlin, Undergraduate Researcher
8/2017 – 5/2018   Jacob Deshotels, Undergraduate Researcher
8/2017 – 12/2017   Luke Huval, Undergraduate Researcher
8/2017 – 3/2019   Michael Tonore, Undergraduate Researcher
8/2017 – 8/2018   Diana Tran, Undergraduate Researcher
5/2017 – 12/2018   Jacob Randall, Undergraduate Researcher
5/2017 – 12/2017   Kaleb Geautreaux, Undergraduate Researcher
5/2017 – 5/2018   Lane Elder, Undergraduate Researcher
5/2017 – 8/2017   Samuel Holmes, Undergraduate Researcher
1/2017 – 5/2018   Juan Casas, Undergraduate Researcher
1/2017 – 5/2017   Benjamin Dantin, Undergraduate Researcher
1/2017 – 5/2017   Savannah Neill, Undergraduate Researcher
1/2017 – 5/2017   Thelen Pumford, Undergraduate Researcher
1/2017 – 5/2017   Blake Talbot, Undergraduate Researcher
8/2016 – 5/2021   Jacob LaBerteaux, Undergraduate Researcher
8/2016 – 5/2021   Nathan Madsen, Undergraduate Researcher
8/2016 – 12/2016   Kalin Nero, Undergraduate Researcher
8/2016 – 5/2017   Jessica Tetnowski, Undergraduate Researcher

5/2016 – 5/2017	Haley Habetz, Undergraduate Researcher
3/2016 – 5/2017	Minh Vu, Undergraduate Researcher
1/2016 – 5/2017	Angelle Bercegeay, Undergraduate Researcher
8/2015 – 5/2016	Erin Fisher, Undergraduate Researcher
8/2015 – 5/2018	Kabir Qureshi, Undergraduate Researcher
8/2015 – 5/2016	Matthew Begneaud, Undergraduate Researcher
8/2015 – 8/2016	Andre Clay, Undergraduate Researcher
8/2015 – 4/2016	Bryce Teekel, Undergraduate Researcher
1/2015 – 5/2016	Gerald Eaglin, Undergraduate Researcher
5/2015 – 7/2015	Paulo Ferreira, Mauricio Murakami, and Leopoldo Silva
	Visiting Brazilian Undergraduate Researchers
5/2015 – 12/2015	Jarmarquis Torrence, Undergraduate Researcher
1/2015 – 5/2015	Jasmin Honneger, Undergraduate Researcher
10/2014 – 5/2015	Forrest Montgomery, Undergraduate Researcher
10/2014 – 5/2015	John Daigle, Undergraduate Researcher
8/2014 – 5/2015	Nicole Barry, Undergraduate Researcher
5/2014 – 5/2015	Beau Domingue, Undergraduate Researcher
5/2014 – 1/2015	Jordan Simon, Undergraduate Researcher
1/2014 – 11/2014	Brian Shipley, Undergraduate Researcher
8/2014 – 5/2014	Elijah Manuel, Undergraduate Researcher
8/2012 – 12/2013	Nolan Edwards, Undergraduate Researcher
8/2012 – 12/2013	James Whipple, Undergraduate Researcher
4/2013 – 6/2013	Steven Adhumeau, Undergraduate Researcher
8/2011 – 8/2012	Nathan Knight, Undergraduate Researcher
8/2011 – 6/2012	Jieun Yoo, Undergraduate Researcher
1/2012 – 5/2012	Sridatta Kompella, Undergraduate Researcher
8/2011 – 10/2011	Hyun Ju Bae, Won Kuk Han, Gu Young Jung, Gud Sem Kim, Hyun Ho Kim, Ji Ha Kim, and Jin Seon Seo
	Visiting Korean Undergraduate Researchers
1/2011 – 3/2011	Yoonhan Baek, Sehee Jung, Eungsoo Kim, Jongheon Kim, and Hokyun Park
	Visiting Korean Undergraduate Researchers
7/2010 – 9/2010	Hyoung Min Park, Yong Seok Lee, and Sun Jo Kim
	Visiting Korean Undergraduate Researchers
5/2010 – 8/2010	Ajeya Karajgikar, Undergraduate Researcher
1/2009 – 5/2009	Se Joong Kang, Undergraduate Researcher
8/2008 – 5/2009	Paul Jurek, Undergraduate Researcher
5/2008 – 8/2008	Anderson Smith, Undergraduate Researcher
1/2008 – 5/2008	Jason Kulpe, Undergraduate Researcher
8/2007 – 5/2008	Adrit Lath, Undergraduate Researcher
5/2007 – 5/2008	Aayush Daftari, Undergraduate Researcher
8/2006 – 12/2007	Aika Yano, Undergraduate Researcher
5/2005 – 8/2005	Nicholas Sabogal, Undergraduate Researcher
5/2004 – 5/2005	Varun Sharma, Undergraduate Researcher

Thesis Committees

August 2025	Alex Arbogast, Georgia Institute of Technology
	Ph.D. Dissertation: *Planning and Control for Multi-Robot Manufacturing Processes*
August 2020	Daniel Newman, Georgia Institute of Technology
	Ph.D. Dissertation: *Bayesian Edge Analytics of Manufacturing Process and Health Status in an IoT Framework*
August 2019	Jacob King, University of Louisiana at Lafayette
	Ph.D. Dissertation: *Novel Strategies for Cardiovascular Medical Device and Procedure Assessment, Evaluated In Silico and Designed for Implementation within a Mock Circulatory System for In Vitro Investigations*

December 2018	Srikrishna Raman, University of Louisiana at Lafayette M.S. Thesis: *Electrostatic Levitation Control System Development Via Image Processing Supported by Finite Element Simulation*
May 2017	Arto Kivila, Georgia Institute of Technology Ph.D. Dissertation: *Estimation and Control of Flexible Serial Robot Arms*
May 2016	Daichi Fujioka, Georgia Institute of Technology Ph.D. Dissertation: *Input-Shaped Model Reference Control for Flexible Systems*
May 2014	Shou Wan, University of Louisiana at Lafayette M.S. Thesis: *Development of an Automated Nanoparticles Spray System for Selectively Reinforcing Polymer Composites*
October 2012	Eileen Hernandez, Georgia Institute of Technology M.S. Thesis: *Dynamic Characterization and Analysis of Aerial Lifts*

Consulting Experience

Summer 2020	Control Design for HiBot Float Arm Developed and implemented kinematics and inverse kinematics algorithms for a high-degree-of-freedom robot arm Developed and implemented path-planning and control algorithms for a high-degree-of-freedom robot arm
Fall 2016	Crane Tipover Accident Analysis Analysis of crane accident Simulation of accident conditions
Fall 2015	Garbage Truck Accident Analysis Analysis of truck accident Simulation of door opening conditions and forces
Fall 2015	Personal Transporter Accident Analysis Analysis of accident Personal Transporter design analysis
Spring 2013	Survey of Mechanical Restraint Methods Searched and categorized methods of mechanical restraint Summarized findings for support of expert witness testimony
Spring 2012	Post Driver Analysis Video analysis of post driver post ejection Analyzed the velocity of post in various modes of ejection
Fall 2011	Aerial-Lift (Cherrypicker) Stability Analysis Modeled telescoping aerial-lift Analyzed the stability of the lift within its workspace
Summer 2011	Aerial-Lift (Cherrypicker) Accident Analysis Video analysis of cherrypicker tip-over accident Extracted system states from video of accident
Summer 2010	Personal Transporter Market Analysis Personal transporter market review Compilation of existing personal transporter specifications Evaluation of personal transporter designs currently in market
Spring 2008	Segway Accident Analysis Processed video to determine states of Segway prior to accident

Tested battery life and battery failure modes of Segway
Analyzed audio levels of Segway warnings

Spring 2008	Aerial-Lift (Cherrypicker) Accident Analysis
	Developed physical and mathematical models of cherrypicker in tip-over accident
	Design analysis of cherrypicker in accident
	Analyzed dynamics and stability of cherrypickers in various configurations
Summer 2004	Segway Accident Analysis
	Reconstruction of the 1st Major Segway Accident
	Segway design and safety critique
	Analysis of contributing factors for accident

Honors & Awards

2024	R&D 100 winner for *MedUSA: Large-Scale Multiagent Wire-Arc Additive Manufacturing* as part of a team at Oak Ridge National Laboratory (ORNL)
2024	Runner up for SME Aubin AM Case Study Award for *Breaking the 100 lb/h Barrier via Multi-agent Wire Arc Additive Manufacturing* as part of a team at Oak Ridge National Laboratory (ORNL)
2023	R&D 100 winner for *Precise, Continuous, & High-Speed Manufacturing of Thermoplastic Composites Using Additive Manufacturing-Compression Molding (AM-CM)* as part of a team at Oak Ridge National Laboratory (ORNL)
2023	R&D 100 winner for *OpeN-AM: A Platform for Operando Neutron Diffraction Measurements of Additive Manufacturing* as part of a team at Oak Ridge National Laboratory (ORNL)
2021	University of Louisiana at Lafayette Outstanding Master's Mentor Award
2021	Runner up for SME Aubin AM Case Study Award for *A New Way of 3D Printing: Site-Specific Process-Parameter Modifications via Closed-Loop Control for Enabling Dynamic Bead Geometries and the Embossing Effect* as part of a team at Oak Ridge National Laboratory (ORNL)
2020	2020 Federal Energy and Water Management (FEMP) Director's Award Winner as part of a team at Oak Ridge National Laboratory (ORNL)
2019 – 2020	University of Louisiana at Lafayette Achievement in Innovation
2017 – 2018	University of Louisiana at Lafayette College Outstanding Undergraduate Research Mentor Award Winner
2016 – 2017	University of Louisiana at Lafayette Innovator Award Winner
2014 – 2016	University of Louisiana at Lafayette Rising Star Award Winner
2014 – 2016	University of Louisiana at Lafayette Innovator Award Winner
2015	College of Engineering Young Researcher of the Year at the University of Louisiana at Lafayette
2013 – 2014	University of Louisiana at Lafayette Rising Star Award Winner
2012	ADVANCE at Northeastern Univ. Future Faculty Workshop Invited Participant
2009 – 2010	Trans. on Control Systems Technology Outstanding Paper Award Nominee
2009 – 2010	Japan Society for the Promotion of Science (JSPS) Postdoctoral Fellow
2008 – 2009	Siemens Energy and Automation Postdoctoral Fellow
2006 – 2008	Siemens Energy and Automation Fellow

2006 – 2007	ASME Graduate Teaching Fellow
2006 – 2007	NSF Doctoral Dissertation Enhancement Project winner
2004 – 2005	NSF STEP Fellow
	Madison Scholar at Hampden-Sydney College
	Phi Beta Kappa at Hampden-Sydney College (national honor fraternity)
	Omicron Delta Kappa at Hampden-Sydney College (national leadership fraternity)
	Pi Mu Epsilon (national mathematics honor fraternity)
	Hardy Cross Award for Excellence in Physics
	Two-year co-captain of baseball at Hampden-Sydney College

Professional Contributions

Int. Conf. on Ubiquitous Robots and Ambient Intelligence, Int. Program Committee
Control Engineering Practice, reviewer
IEEE Transactions on Control Systems Technology, reviewer
Transactions on Systems, Man, and Cybernetics–Part A: Systems and Humans, reviewer
International Journal of Control, Automation, and Systems, reviewer
Journal of Systems and Control Engineering, reviewer
Journal of Sound and Vibration, reviewer
Automation in Construction, reviewer
American Controls Conference, reviewer
ASME Dynamic Systems and Control Conference, reviewer
ASME IMECE, reviewer
International Conference on Intelligent Robots and Systems, reviewer

Memberships Society of Manufacturing Engineers (SME) Member

American Society of Mechanical Engineers (ASME) Member

Japan Society for the Promotion of Science (JSPS) US Alumni Association