Professor William Singhose, PhD

I. Earned Degrees 2
II. Employment History 2
III. Honors and Awards 4
IV. Research, Scholarship, and Creative Activities 5
A. Published Books, Book Chapters, and Edited Volumes 5
B. Refereed Publications and Submitted Articles 5
D. Presentations 37
E. Grants and Contracts 42
F. Other Scholarly and Creative Accomplishments 50
G. Other Professional 50
V. Education 51
B. Individual Student Guidance 51
C. Educational Innovations and Other Contributions 56
a) New Course Development 56
VI. Service 57
A. Professional Contributions 57
B. Public and Community Service 58
C. Institute Contributions 58

WILLIAM SINGHOSE
Professor
The George W. Woodruff School of Mechanical Engineering
Georgia Institute of Technology
813 Ferst Drive, N.W., Atlanta, GA 30332
Office: 404-385-0668 fax: 404-894-9342
Singhose@gatech.edu

I. Earned Degrees

1997, Ph.D. Mechanical Engineering, Massachusetts Institute of Technology
1992, M.S. Mechanical Engineering, Stanford University
1990, B.S. Mechanical Engineering, Massachusetts Institute of Technology

II. Employment History

Georgia Institute of Technology (8/98 – present) Atlanta, GA
Professor of Mechanical Engineering (2014-Present). Associate Professor (2004-2014). Assistant Professor (1998-2004). Director of Crane Safety Research Center (2023-Present). Head of Automation and Mechatronics Group (2006-2010). Develop curriculum and teach courses in mechanical design, dynamics, controls, and rehabilitation engineering. Develop research programs and proposals. Direct research of graduate students, undergraduate students, and postdoctoral researchers in the areas of dynamics, vibration suppression, robotics, spacecraft, crane control, flight control, active seating technology, and product design. Advise SME, ASME, and CanSat student groups. Held visiting appointments at MIT, Stanford, the Tokyo Institute of Technology, and Polytechnic University of Madrid.

InVekTek, Inc. (12/15 – present) Atlanta, GA
Co-Founder and CTO. Develop and commercialize control systems for robotic and industrial material-handling systems. The control systems are embedded in motor drives to reduce unwanted machine motion.

Google, Inc. (9/17 – 12/19) Mountain View, CA
Pennington Advisor mechanical engineer to Google's augmented reality (Daydream) and Advanced Technology and Projects (ATAP) facilities. Performed mechanical design and analysis of hand-held consumer electronic products and wearable devices. Performed failure and hazard analyses. Directed and performed research activities on human-motion measurement, human-machine interactions, actuation system design, and activity monitoring.

Stanford University (3/18 – 7/19) Stanford, CA
Visiting Professor in the Department of Mechanical Engineering. Delivered lectures on product design, safety analysis, and sensors. Advised student design teams.

CAMotion Cranes, Inc. (9/08 – 11/2013) Atlanta, GA
Co-Founder and Board Member. Developed and commercialized crane-control technology. Controllers improve crane safety, throughput, and ease of operation. Sold company to PaR Systems in Nov. 2013.

Champion - EX2079, Page 2 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

Massachusetts Institute of Technology (9/10 – 6/11) Cambridge, MA
Taught graduate-level controls course. Supervised research projects. Developed textbook on command-shaping control methods.

Polytechnic University of Madrid (5/10 – 8/10) Madrid, Spain
Taught course in manufacturing controls. Supervised construction of experimental equipment. Developed international collaborative research projects.

Tokyo Institute of Technology (10/05 – 4/06) Tokyo, Japan
Visiting Associate Professor in Center of Excellence in Robotics. Taught advanced control course. Conducted experiments with robotic crane. Developed research proposals with Japanese collaborators.

Massachusetts Institute of Technology (6/97 – 7/98) Cambridge, MA
Postdoctoral Fellow in the NSF Center for Innovation in Product Development. Directed the development of an internet-controlled machine. Conducted research in design process optimization. Taught senior-level design course.

Convolve, Inc. (4/92 - 8/94) Armonk, NY
Managed NSF sponsored project investigating techniques for inspecting manufactured parts using measurement robots. Developed computer simulations of manufacturing robots, coordinate measuring machines, car seats, and NASA weather balloons. Designed control systems for automated machines. Designed data acquisition system using a laser interferometer.

Apple Computers, Inc. (6/91 - 3/92) Santa Clara, CA
Designed and performance evaluation tests for the Audio-Visual 14" Monitor. Designed and constructed test equipment. Organized, interpreted and reported test results produced by product evaluation team. Made design recommendations based on test results and dynamic simulations.

Walt Disney World (5/90-8/90) Orlando, FL
Designed components for the Space Mountain rehabilitation project. Performed failure analysis and developed design changes for Star Tours and Body Wars simulators Performed stress analysis of the Star Jets base plate and specified welds. Designed IR sensor mount and cable management for the Norway Pavilion water ride. Formulated repair procedures for Pirates of the Caribbean roller bearings.

Artificial Intelligence Laboratory (12/87 - 6/90) Cambridge, MA
Developed computer simulations of flexible robots. Performed research on command-shaping methods to eliminate vibration in computer controlled machines. Performed robotic experiments to verify controller's robustness to modeling errors and changing configurations. Verified new control theory by performing simulations of the space shuttle's robotic arm. The control methods were tested on-orbit in Space Shuttle Endeavour.

Cable News Network (Summer '89) Atlanta, GA
AAAS Mass Media Science and Engineering Fellow. Wrote several stories for CNN Science and Technology. Field producer on stories covering the Starship 1 aircraft and

Champion - EX2079, Page 3 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

an international climate study. Produced a story reporting on a car seat that lowers impact forces during head-on collisions.

Riverside Cement Company (Summer '88) Riverside, CA
Cement lab technician. Designed and performed experiments to test mechanical properties of cement. Operated a wide range of equipment including forklifts, cement pumps, sand sifters, trucks, climatic test chambers, and compression testing machines.

Bill's Asphalt Repair (8/85-8/87) Springfield, OR
Developed bids and executed construction projects involving asphalt and concrete structures. Operated heavy machinery including: dump trucks, paving machines, steam rollers, and compactors.

III. Honors and Awards

Academic

2025 IDETC-CIE Best Paper Award: Nonlinear Dynamics
2025 IDETC-CIE Best Student Paper - 2nd Place
2015 Asian Control Conference, Best Application Paper Finalist
2013 Zeigler Woodruff School Outstanding Educator Award
2009 Georgia Tech SAIC Student Paper Contest Winner, Graduate Division
2006 Georgia Tech SAIC Student Paper Contest Winner, Undergraduate Division
2004 CETL Educational Partnership Award
2003 SME Jiri Tlusty Outstanding Young Manufacturing Engineer Award
2002 Georgia Tech SAIC Student Paper Contest Winner, Undergraduate Division
2002 CETL/BP Junior Faculty Teaching Excellence Award
2002 Japan Society for the Promotion of Science Invitation Fellowship
2001 Georgia Tech SAIC Student Paper Contest Winner, Undergraduate Division
1996 Massachusetts Space Grant Fellowship
1990 Office of Naval Research Fellowship
1990 Phi Beta Kappa
1989 AAAS Mass Media Science and Engineering Fellowship
1989 Tau Beta Pi
1989 Pi Tau Sigma

Academic and Athletic

1990 The GTE Academic All-American, Collegiate Division (only one award nationally each year)
1990 NCAA Postgraduate Scholarship
1990 NACDA/Walt Disney Scholar-Athlete Award

Athletic

1989 NCAA Division III National Decathlon Champion
1990 New England Division III Athlete of the Year
1990 All New England Field Athlete of the Year
1988-1990 NCAA Division III All-American (8-Times)

Champion - EX2079, Page 4 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

IV. Research, Scholarship, and Creative Activities

A. Published Books, Book Chapters, and Edited Volumes

[1] J. Vaughan and W. Singhose, "Advances in Delays and Dynamics at Springer," in *The Influence of Time Delay on Crane Operator Performance*. 2014

[2] W. Singhose, "Trajectory Planning for Flexible Robots," in *CRC Robotics and Automation Handbook*, T. Kurfess, Ed.: CRC Press, 2004.

[3] W. Singhose and W. Seering, "Control of Flexible Manipulators with Input Shaping Techniques," in *Flexible Robot Manipulators: Modelling, Simulation and Control*, M. O. Tokhi and A. K. M. Azad, Eds. Stevenage, UK: The Institution of Engineering and Technology, 2008, pp. 235-257.

[4] W. Singhose and J. Donnell, *Introductory Mechanical Design Tools*: www.lulu.com/content/3365814, 978-0-9842210-4-2, 2009.

[5] W. Singhose, J. Donnell, and D. Frakes, *Introductory Biomechanical Design Tools*: www.lulu.com/content/8235890, 978-0-9842210-5-9, 2010.

[6] W. Singhose and W. Seering, *Command Generation for Dynamic Systems*: www.lulu.com/content/621219, 978-0-9842210-0-4, 2010.

[7] M. A. Lau and W. E. Singhose, "Optimal Control of Dynamical Systems," in *Applications of Spreadsheets in Education The Amazing Power of a Simple Tool*, M. L. a. S. Sugden, Ed.: Bentham Science Publishers Ltd., 2011, pp. 41–63.

[8] W. Singhose, J. Donnell, and Y. Hu, *Introductory Mechanical Design Tools (in Chinese)*. Wuhan, China: Huazhong University of Science and Technology Press, 978-7-5609-7926-7, 2012.

B. Refereed Publications and Submitted Articles

Journal Articles

[1] W. Singhose, W. Seering, and N. Singer, "Residual Vibration Reduction Using Vector Diagrams to Generate Shaped Inputs," *ASME J. of Mechanical Design,* vol. 116, no. June, pp. 654-659, 1994.

[2] W. Singhose, K. Bohlke, and W. Seering, "Fuel-Efficient Pulse Command Profiles for Flexible Spacecraft," *AIAA J. of Guidance, Control, and Dynamics,* vol. 19, no. 4, pp. 954-960, 1996.

[3] W. Singhose, S. Derezinski, and N. Singer, "Extra-Insensitive Input Shapers for Controlling Flexible Spacecraft," *AIAA J. of Guidance, Control, and Dynamics,* vol. 19, no. 2, pp. 385-91, 1996.

[4] W. Singhose and N. Singer, "Effects of Input Shaping on Two-Dimensional Trajectory Following," *IEEE Trans. on Robotics and Automation,* vol. 12, no. 6, pp. 881-887, 1996.

[5] W. Singhose, N. Singer, and W. Seering, "Improving Repeatability of Coordinate Measuring Machines with Shaped Command Signals," *Precision Engineering,* vol. 18, no. April, pp. 138-146, 1996.

Champion - EX2079, Page 5 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[6] L. Y. Pao and W. E. Singhose, "Verifying Robust Time-Optimal Commands for Multi-Mode Flexible Spacecraft," *AIAA J. of Guidance, Control, and Dynamics,* vol. 20, no. 4, pp. 831-833, 1997.
[7] W. Singhose, A. Banerjee, and W. Seering, "Slewing Flexible Spacecraft with Deflection-Limiting Input Shaping," *AIAA J. of Guidance, Control, and Dynamics,* vol. 20, no. 2, pp. 291-298, 1997.
[8] W. Singhose and L. Pao, "A Comparison of Input Shaping and Time-Optimal Flexible-Body Control," *IFAC Control Engineering Practice,* vol. 5, no. 4, pp. 459-467, 1997.
[9] W. Singhose, L. J. Porter, T. D. Tuttle, and N. C. Singer, "Vibration Reduction Using Multi-Hump Input Shapers," *ASME J. Dynamic Systems, Measurement, and Control,* vol. 119, no. June, pp. 320-326, 1997.
[10] W. Singhose, N. Singer, and W. Seering, "Time-Optimal Negative Input Shapers," *ASME J. Dynamic Systems, Measurement, and Control,* vol. 119, no. June, pp. 198-205, 1997.
[11] W. E. Singhose, E. A. Crain, and W. P. Seering, "Convolved and Simultaneous Two-Mode Input Shapers," *IEE Control Theory and Applications,* vol. 144, no. Nov., pp. 515-520, 1997. [Online]. Available: http://dx.doi.org/10.1049/ip-cta:19971439.
[12] W. E. Singhose, L. Y. Pao, and W. P. Seering, "Slewing Multi-Mode Flexible Spacecraft Using Zero Derivative Robustness Constraints," *AIAA J. of Guidance, Control, and Dynamics,* vol. 20, no. 1, pp. 204-206, 1997.
[13] A. K. Banerjee and W. E. Singhose, "Command Shaping in Tracking Control of a Two-Link Flexible Robot," *AIAA J. of Guidance, Control, and Dynamics,* vol. 21, no. 6, pp. 1012-1015, 1998.
[14] L. Y. Pao and W. E. Singhose, "Robust Minimum Time Control of Flexible Structures," *Automatica,* vol. 34, no. 2, pp. 229-236, 1998.
[15] N. C. Singer, W. E. Singhose, and W. P. Seering, "Comparison of Filtering Methods for Reducing Residual Vibration," *European Journal of Control,* vol. 5, no. 2, pp. 208-219, 1999.
[16] W. Singhose, B. Mills, and W. Seering, "Closed-Form Methods for Generating On-Off Commands for Undamped Flexible Structures," *AIAA J. of Guidance, Control, and Dynamics,* vol. 22, no. 2, pp. 378-82, 1999.
[17] W. Singhose, T. Singh, and W. Seering, "On-Off Control with Specified Fuel Usage," *ASME J. Dynamic Systems, Measurement, and Control,* vol. 121, no. 2, pp. 206- 212, 1999.
[18] K. Grosser and W. Singhose, "Command Generation for Reducing Perceived Lag in Flexible Telerobotic Arms," *JSME International Journal,* vol. 43, no. 3, pp. 755-761, 2000.

Champion - EX2079, Page 6 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[19] R. A. Masterson, W. E. Singhose, and W. P. Seering, "Setpoint Generation for Constant-Velocity Motion of Space-Based Scanners," *AIAA J. of Guidance, Control, and Dynamics,* vol. 23, no. 5, pp. 892-895, 2000.
[20] W. Singhose, L. Porter, M. Kenison, and E. Kriikku, "Effects of Hoisting on the Input Shaping Control of Gantry Cranes," *IFAC Control Engineering Practice,* vol. 8, no. 10, pp. 1159-1165, 2000.
[21] A. Banerjee, N. Pedreiro, and W. Singhose, "Vibration Reduction for Flexible Spacecraft Following Momentum Dumping with/without Slewing," *AIAA J. of Guidance, Control, and Dynamics,* vol. 24, no. 3, pp. 417-428, 2001.
[22] M. Kenison and W. Singhose, "Concurrent Design of Input Shaping and Proportional Plus Derivative Feedback Control," *ASME J. of Dynamic Systems, Measurement, and Control,* vol. 124, no. 3, pp. 398-405, 2002.
[23] U. Andresen and W. Singhose, "A Simple Procedure for Modifying High-Speed Cam Profiles for Vibration Reduction," *ASME J. of Mechanical Design,* vol. 126, no. Nov., pp. 1105-1108, 2004.
[24] K. Kozak, I. Ebert-Uphoff, and W. Singhose, "Locally Linearized Dynamic Analysis of Parallel Manipulators and Application of Input Shaping to Reduce Vibrations," *ASME J. of Mechanical Design,* vol. 126, no. Jan., pp. 156-168, 2004.
[25] W. Singhose, E. Biediger, Y.-H. Chen, and B. Mills, "Reference Command Shaping Using Specified-Negative-Amplitude Input Shapers for Vibration Reduction," *ASME J. of Dynamic Systems, Measurement, and Controls,* vol. 126, no. March, pp. 210-214, 2004.
[26] J. Fortgang and W. Singhose, "Concurrent Design of Vibration Absorbers and Input Shapers," *ASME J. Dynamic Systems, Measurement, and Control,* vol. 127, no. September, pp. 329-335, 2005.
[27] J. Fortgang and W. Singhose, "Design Of Vibration Absorbers For Step Motions and Step Disturbances," *ASME J. of Mechanical Design,* vol. 127, no. March, pp. 160-163, 2005.
[28] J. Lawrence, W. Singhose, and K. Hekman, "Friction-Compensating Input Shaping for Vibration Reduction," *ASME J. of Vibration and Acoustics,* vol. 127, no. August, pp. 307-14, 2005.
[29] T. Watanabe, H. A. Fujii, H. Kojima, and W. Singhose, "Design of Electric Current Profile for Electrodynamic Tether System by Input Shaping Method (In Japanese)," *J. of the Japan Society for Aeronautical and Space Sciences,* vol. 53, no. 623, pp. 569-576, 2005.
[30] S.-W. Hong, V. Patrangenaru, W. Singhose, and S. Sprigle, "A Method for Identifying Human-Generated Forces During an Extensor Thrust," *Int. J. of Precision Engineering and Manufacturing,* vol. 7, no. 3, pp. 66-71, 2006.
[31] S.-W. Hong, V. Patrangenaru, W. Singhose, and S. Sprigle, "Identification of Human-Generated Forces on Wheelchairs During Total-Body Extensor Thrusts," *Clinical Biomechanics,* vol. 21, no. 8, pp. 790-798, 2006.

Champion - EX2079, Page 7 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[32] A. Khalid, J. Huey, W. Singhose, J. Lawrence, and D. Frakes, "Human Operator Performance Testing Using an Input-Shaped Bridge Crane," *ASME J. of Dynamic Systems, Measurement, and Control,* vol. 128, no. 4, pp. 835-841, 2006.
[33] K. Kozak, W. Singhose, and I. Ebert-Uphoff, "Performance Measures For Input Shaping and Command Generation," *ASME J. Dynamic Systems, Measurement, and Control,* vol. 128, no. 3, pp. 731-6, 2006.
[34] J. d. J. Márquez, J. Fortgang, W. Singhose, and J. M. Perez, "Optimización del Proceso de Microfresado Mediante La Reducción de Vibraciones Empleando Técnicas de Generación de Ordenes de Movimiento," *Revista Internacional de Información Tecnológica,* vol. 17, no. 6, pp. 3-6, 2006.
[35] M. Robertson, K. Kozak, and W. Singhose, "Computational Framework for Digital Input Shapers Using Linear Optimization," *IEE Control Theory and Applications,* vol. 153, no. 3, pp. 314-322, 2006.
[36] W. Singhose, E. Biediger, H. Okada, and S. Matunaga, "Experimental Verification of Real-Time Control for Flexible Systems with On-Off Actuators," *ASME J. of Dynamic Systems, Measurement, and Controls,* vol. 128, no. 2, pp. 287-96, 2006.
[37] W. Singhose, E. Biediger, H. Okada, and S. Matunaga, "Closed-Form Specified-Fuel Commands for On-Off Thrusters," *AIAA J. of Guidance, Control, and Dynamics,* vol. 29, no. 3, pp. 606-11, 2006.
[38] W. Singhose, J. Lawrence, K. Sorensen, and D. Kim, "Applications and Educational Uses of Crane Oscillation Control," *FME Transactions,* vol. 34, no. 4, pp. 175-183, 2006.
[39] K. A. Hekman and W. E. Singhose, "A Feedback Control System for Suppressing Crane Oscillation with On-Off Motors," *Int. Journal of Control, Automation, and Systems,* vol. 5, no. 3, pp. 223-233, 2007.
[40] H. Kojima and W. Singhose, "Adaptive Deflection Limiting Control for Slewing Flexible Space Structures," *AIAA J. of Guidance, Control, and Dynamics,* vol. 30, no. 1, pp. 61-67, 2007.
[41] S.-W. Park, S.-W. Hong, H.-S. Choi, and W. Singhose, "Discretization Effects of Real-Time Input Shaping in Residual Vibration Reduction for Precise XY Stage (in Korean)," *Trans. of the Korean Society of Machine Tool Engineers,* vol. 16, no. 4, pp. 71-78, 2007.
[42] M. J. Robertson and W. E. Singhose, "Specified-Deflection Command Shapers for Second-Order Position Input Systems," *ASME J. Dynamic Systems, Measurement, and Control,* vol. 129, no. 6, pp. 856-859, 2007.
[43] K. Sorensen, W. Singhose, and S. Dickerson, "A Controller Enabling Precise Positioning and Sway Reduction in Bridge and Gantry Cranes," *IFAC Control Engineering Practice,* vol. 15, no. 7, pp. 825-837, 2007.
[44] Y.-G. Sung and W. Singhose, "Closed-Form Specified-Fuel Commands for Two Flexible Modes," *AIAA J. of Guidance, Control, and Dynamics,* vol. 30, no. 6, pp. 1590-6, 2007.

Champion - EX2079, Page 8 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[45] T. Bradley, J. Danielson, J. Lawrence, and W. Singhose, "Command Shaping for Non-Symmetrical Acceleration and Braking Dynamics," *ASME J. of Vibration and Acoustics,* vol. 130, no. Oct., pp. 054503-1-5, 2008.
[46] J. Danielson, J. Lawrence, and W. Singhose, "Command Shaping for Flexible Systems Subject to Constant Acceleration Limits," *ASME J. Dynamic Systems, Measurement, and Control,* vol. 130, no. 5, pp. 0510111-0510118, 2008.
[47] S.-W. Hong, S.-W. Park, and W. Singhose, "Input Shaping for Vibration Control in Precise Positioning System (in Korean)," *Korean Society for Precision Engineering,* vol. 25, no. 4, pp. 26-31, 2008.
[48] J. R. Huey, K. L. Sorensen, and W. E. Singhose, "Useful Applications of Closed-Loop Signal Shaping Controllers," *IFAC Control Engineering Practice,* vol. 16, no. 7, pp. 836-846, 2008.
[49] W. Singhose, D. Kim, and M. Kenison, "Input Shaping Control of Double-Pendulum Bridge Crane Oscillations," *ASME J. Dynamic Systems, Measurement, and Control,* vol. 130, no. May, p. 034504, 2008.
[50] K. Sorensen, A. Daftari, W. Singhose, and K. Hekman, "Negative Input Shaping: Eliminating Overcurrenting and Maximizing the Command Space," *ASME J. of Dynamic Systems, Measurement, and Control,* vol. 130, no. 6, pp. 0610121-0610127, 2008.
[51] K. Sorensen and W. Singhose, "Command-Induced Vibration Analysis Using Input Shaping Principles," *Automatica,* vol. 44, no. 9, pp. 2392–2397, 2008.
[52] Y.-G. Sung and W. Singhose, "Deflection-Limiting Commands for Systems with Velocity Limits," *AIAA J. of Guidance, Control, and Dynamics,* vol. 31, no. 3, pp. 472-8, 2008.
[53] J. Vaughan, J. Fortgang, W. Singhose, J. Donnell, and T. Kurfess, "Using Mechatronics to Teach Mechanical Design and Technical Communication," *Mechatronics,* vol. 18, no. 4, pp. 179-186, 2008.
[54] J. Vaughan, A. Yano, and W. Singhose, "Comparison of Robust Input Shapers," *J. of Sound and Vibration,* vol. 315, no. 4-5, pp. 797–815, 2008.
[55] M. Robertson and W. Singhose, "Robust Discrete-Time Deflection-Limiting Commands for Flexible Systems," *IET Control Theory and Applications,* vol. 3, no. 4, pp. 473-480, 2009.
[56] W. Singhose, "Command Shaping for Flexible Systems: A Review of the First 50 Years," *Int. J. of Precision Engineering and Manufacturing,* vol. 10, no. 4, pp. 153-168, 2009.
[57] Y.-G. Sung and W. Singhose, "Robustness Analysis of Input Shaping Commands for Two-mode Flexible Systems," *IET Control Theory and Applications,* vol. 3, no. 6, pp. 722-30, 2009.
[58] Y.-G. Sung and W. E. Singhose, "Limited-State Commands for Systems with Two Flexible Modes," *Mechatronics,* vol. 19, no. August, pp. 780-87, 2009.

Champion - EX2079, Page 9 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[59] J. Vaughan, A. Yano, and W. Singhose, "Robust Negative Input Shapers for Vibration Suppression," *ASME J. Dynamic Systems, Measurement, and Control,* vol. 131, no. 3, pp. 031014-1-9, 2009.
[60] D. Blackburn, J. Lawrence, J. Danielson, W. Singhose, T. Kamoi, and A. Taura, "Radial-Motion Assisted Command Shapers for Nonlinear Tower Crane Rotational Slewing," *Control Engineering Practice,* vol. 18, no. May, pp. 523-531, 2010.
[61] D. Blackburn *et al.*, "Command Shaping for Nonlinear Crane Dynamics," *J. of Vibration and Control,* vol. 16, no. 4, pp. 477-501, 2010.
[62] J. Hong-Xia, L. Wan-Li, and W. Singhose, "Dynamic Modeling and Vibration Analysis of Cherry Pickers with Flexible Arms (in Chinese)," *Zhendong yu Chongji/Journal of Vibration and Shock,* vol. 29, no. 12, pp. 136-140, 2010.
[63] J. R. Huey and W. Singhose, "Trends in the Stability Properties of CLSS Controllers: A Root-Locus Analysis," *IEEE Trans. on Control Systems Technology,* vol. 18, no. 5, pp. 1044-56, 2010.
[64] D. Kim and W. Singhose, "Performance Studies of Human Operators Driving Double-Pendulum Bridge Cranes," *IFAC Control Engineering Practice,* vol. 18, no. June, pp. 567-576, 2010.
[65] J. Lawrence and W. Singhose, "Command Shaping Slewing Motions for Tower Cranes," *ASME J. of Vibration and Acoustics,* vol. 132, no. Feb., pp. 011002-1-11, 2010.
[66] R. Manning, J. Clement, D. Kim, and W. Singhose, "Dynamics and Control of Bridge Cranes Transporting Distributed-Mass Payloads," *ASME J. Dynamic Systems, Measurement, and Control,* vol. 132, no. Jan., pp. 014505-3, 2010.
[67] W. Singhose, R. Eloundou, and J. Lawrence, "Command Generation for Flexible Systems by Input Shaping and Command Smoothing," *AIAA J. of Guidance, Control, and Dynamics,* vol. 33, no. 6, pp. 1697-1707, 2010.
[68] K. Sorensen, K. Hekman, and W. Singhose, "Finite-State Input Shaping," *IEEE Trans. on Control Systems Technology,* vol. 18, no. 3, pp. 664-72, 2010.
[69] J. Vaughan, D. Kim, and W. Singhose, "Control of Tower Cranes with Double-Pendulum Dynamics," *IEEE Trans. on Control Systems Technology,* vol. 18, no. 6, pp. 1345 –1358, 2010.
[70] A. E. Vela, S. Solak, J.-P. Clarke, W. Singhose, E. Barnes, and E. Johnson, "Near Real-Time Fuel-Optimal En Route Conflict Resolution," *IEEE Trans. on Intelligent Transportation Systems,* vol. 11, no. 4, pp. 826-837, 2010.
[71] J. Fortgang, W. Singhose, J. d. J. Márquez, and J. Perez, "Command Shaping Control for Micro-milling Operations," *Int. Journal of Control, Automation, and Systems,* vol. 9, no. 6, 2011.
[72] E. Maleki and W. Singhose, "Dynamics and Control of a Small-Scale Boom Crane," *ASME J. of Computational and Nonlinear Dynamics,* vol. 6, no. 3, pp. 031015-1-8, 2011.

Champion - EX2079, Page 10 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[73] W. Singhose and J. Vaughan, "Reducing Vibration by Digital Filtering and Input Shaping," *IEEE Trans. on Control Systems Technology,* vol. 19, no. 6, pp. 1410-1420, 2011, doi: 10.1109/TCST.2010.2093135.
[74] W. Singhose *et al.*, "Use of Cranes in Education and International Collaborations," *J. of Robotics and Mechatronics,* vol. 23, no. 5, pp. 881-891, 2011.
[75] K. L. Sorensen, P. W. Cross, W. E. Singhose, and S. Prakash, "Vibration Analysis and Mitigation of Dead-Zone on Systems Using Two-Impulse Zero-Vibration Input Shaping," *ASME J. of Computational and Nonlinear Dynamics,* vol. 6, no. 1, p. 011011, 2011, doi: 10.1115/1.4001818.
[76] J. Vaughan, P. Jurek, and W. Singhose, "Reducing Overshoot in Human-Operated Flexible Systems," *ASME J. Dynamic Systems, Measurement, and Control,* vol. 133, pp. 011010-1-10, 2011, doi: 10.1115/1.4002074.
[77] J. Vaughan, A. Smith, S. J. Kang, and W. Singhose, "Predictive Graphical User Interface Elements to Improve Crane Operator Performance," *IEEE Trans. on Systems, Man, and Cybernetics--Part A: Systems and Humans,* vol. 41, no. 2, pp. 323-330, 2011.
[78] J. R. Huey and W. Singhose, "Design of Proportional Derivative Feedback and Input Shaping for Control of Inertia Plants," *IET Control Theory and Applications,* vol. 6, no. 3, pp. 357-364, 2012.
[79] E. Maleki, B. Pridgen, W. Singhose, U. Glauser, and W. Seering, "Educational Use of a Small-Scale Cherrypicker," *International Journal of Mechanical Engineering Education,* vol. 40, no. 2, pp. 104-120, 2012.
[80] E. Maleki and W. Singhose, "Swing Dynamics and Input-Shaping Control of Double-Pendulum Boom Cranes," *ASME J. Computational and Nonlinear Dynamics,* vol. 7, no. July, pp. 031006-1-10, 2012.
[81] K. C. C. Peng, W. Singhose, and P. Bhaumik, "Using Machine Vision and Hand-Motion Control to Improve Crane Operator Performance," *IEEE Trans. on Systems, Man, and Cybernetics - Part A: Systems and Humans,* vol. 42, no. 6, pp. 1496-1503, 2012.
[82] K. C. C. Peng, W. Singhose, and D. Frakes, "Hand-Motion Crane Control Using Radio Frequency Real-Time Location Systems," *IEEE/ASME Trans. on Mechatronics,* vol. 17, no. 3, pp. 464-471, 2012.
[83] B. Pridgen and W. Singhose, "Comparison of Polynomial Cam Profiles and Input Shaping for Driving Flexible Systems," *ASME J. of Mechanical Design,* vol. 134, no. 12, p. 124505 (7 pp.), 2012.
[84] A. Vela, K. Feigh, S. Solak, W. Singhose, and J.-P. Clarke, "Formulation of Reduced-Taskload Optimization Models for Conflict Resolution," *IEEE Trans. on Systems, Man, and Cybernetics,* vol. 42, no. 6, pp. 1552-61, 2012.
[85] D. Frakes, C. Zwart, and W. Singhose, "Extracting Motion Data from Video Using Optical Flow with Physically-Based Constraints," *Int. J. of Control, Automation, and Systems,* vol. 11, no. 1, p. 48:57, 2013.

Champion - EX2079, Page 11 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[86] S. S. Gürleyük, K. C. C. Peng, and W. Singhose, "Hand Motion Input Shaping Control of a Crane System: El Hareketini Takip Eden Vinç Sisteminin Giriş Şekillendirici Denetimi (in Turkish)," *Karaelmas Science and Engineering Journal,* vol. 3, no. 2, pp. 43-47, 2013.
[87] S.-W. Hong, Y.-K. Seo, and W. Singhose, "A New Command Shaper Design for Residual Vibration Reduction in Flexible Systems Using Artificial Mode Constraints," *IACSIT Int. Journal of Engineering and Technology,* vol. 5, no. 2, pp. 210-213, 2013.
[88] J. Huang, E. Maleki, and W. Singhose, "Dynamics and swing control of mobile boom cranes subject to wind disturbances," *IET Control Theory and Applications,* vol. 7, no. 9, pp. 1187-1195, 2013.
[89] J. J. Potter and W. E. Singhose, "Improving Manual Tracking of Systems with Oscillatory Dynamics," *IEEE Trans. on Human-Machine Systems,* vol. 43, no. 1, pp. 46-52, 2013.
[90] B. Pridgen, K. Bai, and W. Singhose, "Shaping Container Motion for Multi-Mode and Robust Slosh Suppression," *AIAA J. of Spacecraft and Rockets,* vol. 50, no. 2, pp. 440-448, 2013, doi: 10.2514/1.A32137.
[91] A. Rauch, W. Singhose, D. Fujioka, and T. Jones, "Tip-Over Stability Analysis of Mobile Boom Cranes with Swinging Payloads," *ASME J. of Dynamic Systems, Meas., and Control,* vol. 135, no. 3, pp. 031008-1-6, May 2013.
[92] H. Seong-Wook, S. Yong-Kyu, and W. Singhose, "A New Command Shaper Design for Residual Vibration Reduction in Flexible Systems Using Artificial Mode Constraints," *International Journal of Engineering and Technology,* vol. 5, no. 2, pp. 210-13, 04/ 2013, doi: 10.7763/IJET.2013.V5.544.
[93] B. Xiao, Q. Hu, W. Singhose, and X. Huo, "Reaction Wheel Fault Compensation and Disturbance Rejection for Spacecraft Attitude Tracking," *AIAA J. of Guidance, Control, and Dynamics,* vol. 36, no. 6, pp. 1565-1575, 2013, doi: 10.2514/1.59839.
[94] E. Maleki, W. Singhose, and S. S. Gürleyük, "Increasing Crane Payload Swing by Shaping Human-Operator Commands," *IEEE Transactions on Human-Machine Systems,* vol. 44, no. 1, pp. 106-114, 2014.
[95] J. J. Potter and W. Singhose, "Effects of Input Shaping on Manual Control of Flexible and Time-Delayed Systems," *Human Factors,* vol. 56, no. 7, pp. 1284-1295, 2014.
[96] J. Yoon, S. Nation, W. Singhose, and J. Vaughan, "Control of Crane Payloads that Bounce During Hoisting," *IEEE Trans. on Control Systems Technology,* vol. 22, no. 3, pp. 1233-1238, 2014.
[97] C. Adams, J. Potter, and W. Singhose, "Input-Shaping and Model-Following Control of a Helicopter Carrying a Suspended Load," *AIAA J. of Guidance, Control, and Dynamics,* vol. 38, no. 1, pp. 94-105, 2015, doi: 10.2514/1.G000326.

Champion - EX2079, Page 12 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[98] J. J. Potter and W. Singhose, "A Planar Experimental Remote-Controlled Helicopter with a Suspended Load," *IEEE/ASME Transactions on Mechatronics,* vol. 20, no. 5, pp. 2496-2503, 2015, doi: 10.1109/TMECH.2014.2386801.
[99] A. Dhanda, J. Vaughan, and W. Singhose, "Vibration Reduction Using Near Time-Optimal Commands for Systems With Nonzero Initial Conditions," *Journal of Dynamic Systems, Measurement, and Control,* vol. 138, no. 4, pp. 041006-041006, 2016, doi: 10.1115/1.4032064.
[100] S.-W. Hong, S.-W. Kwon, and W. Singhose, "Vibration suppression of axially-extending cantilever beams under gravity using command shaping," *Research J. of Applied Sciences, Engineering and Technology,* vol. 12, no. 12, pp. 1196-1203, 2016.
[101] J. J. Potter and W. Singhose, "Design and Human-in-the-Loop Testing of Reduced-Modification Input Shapers," *IEEE Trans. on Control System Technology,* vol. 24, no. 4, pp. 1513-1520, 2016.
[102] W. Singhose, C. Adams, and D. Kim, "A Dynamics-Based Hazard Analysis of Inverted-Pendulum Human Transporters Using Data-Mined Information," *ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part B: Mechanical Engineering,* vol. 2, no. Sept., pp. 031007-1-12, 2016, doi: 10.1115/1.4032459.
[103] W. Singhose, K. Peng, A. Garcia, and A. Ferri, "Modeling and Control of Crane Payload Lift-off and Lay-down Operations," *FME Transactions,* vol. 44, pp. 237-248, 2016.
[104] A. Garcia, W. Singhose, and A. Ferri, "Three-Dimensional Dynamic Modeling and Control of Off-Centered Bridge Crane Lifts," *ASME J. Dynamic Systems, Meas., and Control,* vol. 139, no. 4, p. 041005, 2017, doi: doi:10.1115/1.4035030.
[105] A. Kivila, W. Book, and W. Singhose, "Exact Modeling of n-link Spatial Serial Structures using Transfer Matrices," *ASME J. of Dynamic Systems, Measurement, and Control,* vol. 139, no. 11, pp. 114502-114506, 2017, doi: doi.org/10.1115/1.4036555.
[106] R. Mar, A. Goyal, V. Nguyen, T. Yang, and W. Singhose, "Combined Input Shaping and Feedback Control for Double-Pendulum Systems," *Mechanical Systems and Signal Processing,* vol. 85, pp. 267-277, 2017.
[107] F. Schlagenhauf, P. P. Sahoo, and W. Singhose, "A Comparison of Dual-Kinect and Vicon Tracking of Human Motion for Use in Robotic Motion Programming," *J. of Robotics and Automation Engineering,* vol. 1, no. 2, p. 555558, 2017.
[108] C. Adams and W. Singhose, "Robust Constant-Amplitude Input Shapers with Selectable Duration," *AIAA Journal of Guidance, Control, and Dynamics,* vol. 41, no. 12, pp. 2543-2553, 2018.
[109] D. Fujioka and W. Singhose, "Optimized Input-Shaped Model Reference Control on Double-Pendulum System," *Journal of Dynamic Systems, Measurement, and Control,* vol. 140, no. 10, 2018, doi: 10.1115/1.4039786.

Champion - EX2079, Page 13 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[110] S. Wang, A. Ferri, and W. Singhose, "Slipping Dynamics of Slender-Beam Payloads During Lay-Down Operations," *Journal of Dynamic Systems, Measurement, and Control,* vol. 140, no. 8, 2018, doi: 10.1115/1.4039154.
[111] J. Peng, J. Huang, and W. Singhose, "Payload twisting dynamics and oscillation suppression of tower cranes during slewing motions," *Nonlinear Dynamics,* vol. 98, no. 2, pp. 1041–1048, 2019, doi: doi.org/10.1007/s11071-019-05247-4.
[112] J. Vaughan, W. Singhose, and D. Kim, "Analysis of Unrestrained Crawler-Crane Counterweights During Tip-Over Accidents," *Mechanics Based Design of Structures and Machines,* no. May, 2020, doi: 10.1080/15397734.2020.1768113.
[113] A. Kivila, W. Book, and W. Singhose, "Modeling spatial multi-link flexible manipulator arms based on system modes," *International Journal of Intelligent Robotics and Applications,* vol. 5, no. 3, pp. 300-312, 2021/09/01 2021, doi: 10.1007/s41315-021-00201-3.
[114] A. E. Vela, W. Singhose, K. Feigh, J.-P. Clarke, and E. Feron, "Evaluation of conflict-resolution policies on controller taskload," *Chinese Journal of Aeronautics,* vol. 34, no. 5, pp. 315-330, 2021.
[115] T. Gao, J. Huang, and W. Singhose, "Eccentric-Load Dynamics and Oscillation Control of Industrial Cranes Transporting Heterogeneous Loads," *Mechanism and Machine Theory,* no. 172, p. 104800, 2022, doi: doi.org/10.1016/j.mechmachtheory.2022.104800.
[116] K. Sorensen *et al.*, "Electromagnetic Model of Linear Resonant Actuators," *ASME J. Dynamic Systems, Measurement, and Control,* vol. 145, no. 5, pp. 051003-1-051003-9, 2023, doi: Electromagnetic Model of Linear
Resonant Actuators.
[117] G. Li, J. Huang, W. Singhose, and C. Adams, "Cooperative-Transportation Dynamics of Two Helicopters Transporting a Rocket Booster Undergoing Planar Motions," *Aerospace Science and Technology,* vol. 145, p. 108873, 2024, doi: doi.org/10.1016/j.ast.2024.108873.
[118] W. Singhose, "Diminishing Safety Margins of Telescoping-Boom Aerial Lifts," *ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems Part B: Mechanical Engineering,* vol. 10, no. September, pp. 024502-1-7, 2024.
[119] W. Tian, J. Huang, and W. Singhose, "Control of Cooperative-Transportation Dynamics in Twin-Lift Cranes Suspending a Liquid Container," *IEEE Trans. on Industrial Electronics,* vol. 71, no. 4, pp. 4016-4025, 2024, doi: 10.1109/TIE.2023.3274868.
[120] C. Yang, J. Huang, and W. Singhose, "Dynamic Modeling and Oscillation Control of Industrial Cranes Transporting Upright Slender Flexible Payloads," *Mechanical Systems and Signal Processing,* vol. 220, no. Nov., p. 111676, 2024.

Refereed Conference Papers

Champion - EX2079, Page 14 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[121] W. E. Singhose, W. P. Seering, and N. C. Singer, "Shaping Inputs to Reduce Vibration: A Vector Diagram Approach," in *IEEE Int. Conference on Robotics and Automation*, Cincinnati, OH, 1990, vol. 2, pp. 922-927.
[122] W. Singhose, S. Derezinski, and N. Singer, "Input Shapers for Improving the Throughput of Torque-Limited Systems," in *IEEE Conf. on Control Applications*, Glasgow, Scotland, 1994.
[123] W. Singhose, S. Derezinski, and N. Singer, "Extra-Insensitive Shapers for Controlling Flexible Spacecraft," in *AIAA Guidance, Navigation, and Control Conf.*, Scottsdale, AZ, 1994.
[124] W. Singhose, N. Singer, and W. Seering, "Design and Implementation of Time-Optimal Negative Input Shapers," in *International Mechanical Engineering Congress and Exposition, DSC 55-1*, Chicago, IL, 1994: ASME, pp. 151-7.
[125] L. Y. Pao and W. E. Singhose, "A Comparison of Constant and Variable Amplitude Command Shaping Techniques for Vibration Reduction," in *IEEE Conference on Control Applications*, Albany, NY, 1995, pp. 875-81.
[126] L. Y. Pao and W. E. Singhose, "On the Equivalence of Minimum Time Input Shaping with Traditional Time-Optimal Control," in *IEEE Conference on Control Applications*, Albany, NY, 1995, pp. 1120-5.
[127] W. Singhose, K. Bohlke, and W. Seering, "Fuel-Efficient Shaped Command Profiles for Flexible Spacecraft," in *AIAA Guidance, Navigation, and Control Conf.*, Baltimore, MD, 1995.
[128] W. Singhose, L. Porter, and N. Singer, "Vibration Reduction Using Multi-Hump Extra-Insensitive Input Shapers," in *American Control Conference*, Seattle, WA, 1995, vol. 5, pp. 3830-34.
[129] E. A. Crain, W. E. Singhose, and W. P. Seering, "Evaluation of Input Shaping on Configuration Dependent Systems," in *Japan-USA Symp. on Flexible Automation*, Boston, MA, 1996.
[130] E. A. Crain, W. E. Singhose, and W. P. Seering, "Derivation and Properties of Convolved and Simultaneous Two-Mode Input Shapers," in *IFAC World Congress*, San Francisco, CA, 1996, pp. 441-6.
[131] L. Pao and W. Singhose, "Unity Magnitude Input Shapers and Their Relation to Time-Optimal Control," in *IFAC World Congress*, San Francisco, CA, 1996, pp. 385-390.
[132] W. Singhose and L. Pao, "Comparison of Input Shaping Techniques for Speed-Critical Multi-Mode Flexible Systems," in *IEEE Conf. on Control Applications*, Dearborn, MI, 1996.
[133] W. Singhose, W. Seering, and N. Singer, "Input Shaping for Vibration Reduction with Specified Insensitivity to Modeling Errors," in *Japan-USA Sym. on Flexible Automation*, Boston, MA, 1996, vol. 1: ASME, pp. 307-13.

Champion - EX2079, Page 15 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[134] W. E. Singhose, L. Y. Pao, and W. P. Seering, "Time-Optimal Rest-to-Rest Slewing of Multi-Mode Flexible Spacecraft Using ZVD Robustness Constraints," in *AIAA Guidance, Navigation, and Control Conf.*, San Diego, CA, 1996.
[135] W. E. Singhose, W. P. Seering, and A. K. Banerjee, "Limiting Deflection During the Slewing of Flexible Spacecraft Using Deflection Sampling," in *AIAA Guidance, Navigation, and Control Conf.*, San Diego, CA, 1996.
[136] W. Singhose and W. Seering, "Analytic Methods for Slewing Undamped Flexible Structures with On-Off Actuators," in *AIAA Guidance, Navigation, and Control Conf.*, New Orleans, LA, 1997.
[137] W. Singhose, T. Singh, and W. Seering, "On-Off Control of Flexible Spacecraft with Specified Fuel Usage," in *American Control Conf.*, Albuquerque, NM, 1997.
[138] W. E. Singhose, B. W. Mills, and W. P. Seering, "Closed-Form Methods for On-Off Control of Multi-Mode Flexible Structures," in *IEEE Conf. of Decision and Control*, San Diego, CA, 1997, vol. 2: IEEE, New York, NY, pp. 1381-6.
[139] W. E. Singhose, L. J. Porter, and W. P. Seering, "Input Shaped Control of a Planar Gantry Crane with Hoisting," in *American Control Conf.*, Albuquerque, NM, 1997.
[140] R. Masterson, W. Singhose, and W. Seering, "Input Shaping for Constant-Velocity Scanning with Flexible Sensors," in *IEEE Conf. on Control Applications*, Trieste, Italy, 1998.
[141] W. Singhose and S. Towell, "Double-Pendelum Gantry Crane Dynamics and Control," in *IEEE Conf. on Control Applications*, Trieste, Italy, 1998.
[142] M. Kenison and W. Singhose, "Input Shaper Design for Double-Pendulum Planar Gantry Cranes," in *IEEE Conference on Control Applications*, Kona, Hawaii, 1999, pp. 539-44.
[143] W. Singhose and K. Grosser, "Limiting Excitation of Unmodeled High Modes with Negative Input Shapers," in *IEEE Conference on Controls Applications*, Kohala, Hawaii, 1999.
[144] W. Singhose and B. Mills, "Vibration Reduction with Specified-Swing Input Shapers," in *Conference on Control Applications*, Kohala, Hawaii, 1999, vol. 1: IEEE, Piscataway, NJ, pp. 533-538.
[145] W. Singhose and B. Mills, "Command Generation Using Specified-Negative-Amplitude Input Shapers," in *American Control Conference*, San Diego, CA, 1999, vol. 1: IEEE, Piscataway, NJ, pp. 61-65.
[146] D. Frakes, K. Grosser, J. Fortgang, and W. Singhose, "Simulating Motion of an Operator-Controlled Gantry Crane in a Cluttered Work Environment," in *IMECE Conference*, Orlando, Fl, 2000.
[147] M. Kenison and W. Singhose, "A Parameter-Based Method for Designing Input Shapers for Flexible Robotic Systems," in *Seventh Mechatronics Forum International Conference*, Atlanta, GA, 2000.

Champion - EX2079, Page 16 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[148] C. Forest, D. Frakes, and W. Singhose, "Input-Shaped Control of Gantry Cranes: Simulation and Curriculum Development," in *ASME DETC 18th Biennial Conf. on Mechanical Vibration and Noise*, Pittsburgh, PA, 2001: DETC2001/VIB-21522.
[149] J. Fortgang and W. Singhose, "Design of Vibration Absorbers for Step Motions and Step Disturbances," in *ASME Int. DETC 18th Biennial Conf. on Mechanical Vibration and Noise*, Pittsburgh, PA, 2001.
[150] J. Fortgang and W. Singhose, "The Combined Use of Input Shaping and Nonlinear Vibration Absorbers," in *5th IFAC Symposium on Nonlinear Control Systems*, St. Petersburg, Russia, 2001.
[151] K. Hekman, J. Lawrence, and W. Singhose, "Use of Input Shaping to Decrease the Effects of Stiction," in *5th IFAC Symposium on Nonlinear Control Systems*, St. Petersburg, Russia, 2001.
[152] K. Kozak, I. Ebert-Uphoff, and W. Singhose, "Analysis of Varying Natural Frequencies and Damping Ratios of a Sample Parallel Manipulator Throughout its Workspace using Linearized Equations of Motion," in *ASME Design Engineering Technical Conferences*, Pittsburgh, PA, 2001.
[153] M. Robertson and W. Singhose, "Multi-level Optimization Techniques for Designing Digital Shapers," in *American Control Conference*, Pittsburgh, PA, 2001.
[154] U. Andresen and W. Singhose, "A Simple Cam Design Procedure for Automatic Screw Machines with Flexible Dynamics," in *Japan-USA Symp. on Flexible Automation*, Hiroshima, Japan, 2002.
[155] R. Eloundou and W. Singhose, "Justification for Using Step-Function Reference Commands: Comparison to S-Curves," in *2nd IFAC Conference on Mechatronic Systems*, Berkeley, CA, 2002: Elsevier Ltd., Oxford, UK
[156] R. Eloundou and W. Singhose, "Saturation Compensating Input Shapers for Reducing Vibration," in *6th Int. Conference on Motion and Vibration Control*, Saitama, Japan, 2002, vol. 2: Japan Soc. Mechanical Eng., Tokyo, Japan, pp. 625-30.
[157] R. Eloundou and W. Singhose, "Interpretation of S-Curve Reference Commands as Input-Shaped Functions," in *American Control Conference*, Anchorage, AK, 2002, vol. 6: IEEE, Piscataway, NJ, pp. 4948-4953.
[158] J. Fortgang and W. Singhose, "Concurrent Design of Input Shaping and Vibration Absorbers," in *American Control Conference*, Anchorage, AK, 2002.
[159] K. Hekman, J. Lawrence, and W. Singhose, "Input Shaping for a PD Position Controller Under Coulomb Friction," in *IFAC World Congress on Automatic Control*, Barcelona, Spain, 2002.
[160] J. Huey and W. Singhose, "The Application of Input Shaping to Wire-Driven Mechanisms," in *6th International Conference on Motion and Vibration Control*, Saitama, Japan, 2002.

Champion - EX2079, Page 17 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[161] K. Kozak and W. Singhose, "Rapid Computation of Digital Input Shaping Filters for Reconfigurable Machines," in *Japan-USA Symp. on Flexible Automation*, Hiroshima, Japan, 2002, doi: JUSFA02/U-057.
[162] T. Kurfess, W. Singhose, and J. Fortgang, "Genesis and Evolution of an Undergraduate Mechatronics Course," in *Second IFAC Conf. of Mechatronic Systems*, Berkeley, CA, 2002.
[163] J. Lawrence and W. Singhose, "Decreasing Effects of Coulomb Friction in Precision Positioning Using Input Shaping: Experimental Verifications," in *Japan-USA Symp. on Flexible Automation*, Hiroshima, Japan, 2002.
[164] J. Lawrence and W. Singhose, "An Analytical Solution for a Zero Vibration Input Shaper for Systems with Coulomb Friction," in *American Control Conference*, Anchorage, AK, 2002.
[165] G. Peláez and W. Singhose, "Implementation of Input Shaping on Flexible Machines with Integer Controllers," in *IFAC World Congress on Automatic Control*, Barcelona, Spain, 2002, doi: 10.3182/20020721-6-ES-1901.01474.
[166] G. Peláez, W. Singhose, and A. Vizan, "Shaping Tool Head Pneumatic Actuator Commands to Reduce Cut Car Letters Machine Vibration," in *WSEAS Int. Conf. on Signal Processing, Robotics and Automation*, 2002, pp. 54-59.
[167] T. Singh and W. Singhose, "Tutorial on Input Shaping/Time Delay Control of Maneuvering Flexible Structures," in *American Control Conference*, Anchorage, AK, 2002.
[168] J. Smith, K. Kozak, and W. Singhose, "Input Shaping for a Simple Non-Linear System," in *American Control Conference*, Anchorage, AK, 2002, vol. 1, pp. 821-6.
[169] R. Thomas, J. Fortgang, and W. Singhose, "Optimization of Lightly Damped Pick-and-Place Processes Using Optimal Dynamic Vibration Absorbers," in *6th International Conference on Motion and Vibration Control*, Saitama, Japan, 2002.
[170] E. Biediger, W. Singhose, H. Okada, and S. Matunaga, "Trajectory Planning for Coordinating Satellites using Command Generation," in *10th International Space Conference of Pacific-basin Societies*, Tokyo, Japan, 2003.
[171] J. Brogan, J. Fortgang, and W. Singhose, "Experimental Verification of Vibration Absorbers Combined with Input Shaping for Oscillatory Systems," in *American Control Conference*, Denver, CO, 2003.
[172] J. Huey and W. Singhose, "Effect of Vertical Acceleration on the Frequency of a Pendulum: Impact on Input Shaping," in *IEEE Conference on Control Applications*, Istanbul, Turkey, 2003.
[173] S. Klooster and W. Singhose, "A Study of Passenger Seat Parameters as a Basis for Active Seat Control," in *11th Mediterranean Conference on Control Automation*, Rhodes, Greece, 2003.
[174] K. Kozak, J. Huey, and W. Singhose, "Performance Measures for Input Shaping," in *IEEE Conf. on Control Applications*, Istanbul, Turkey, 2003.

Champion - EX2079, Page 18 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[175] W. Singhose, E. Biediger, H. Okada, and S. Matunaga, "Control of Flexible Satellites Using Analytic On-Off Thruster Commands," in *AIAA Guidance, Navigation, & Control Conf.*, Austin, TX, 2003: AIAA-2003-5333.
[176] W. Singhose, J. Huey, J. Lawrence, and D. Frakes, "Input Shaping Curriculum: Integrating Interactive Simulations And Experimental Setups," in *11th Mediterranean Conference on Control Automation*, Rhodes, Greece, 2003, pp. IV 11-05.
[177] J. Vaughan, W. Singhose, and N. Sadegh, "Use of Active Suspension Control to Counter the Effects of Vehicle Payloads," in *IEEE Conf. on Control Applications*, Istanbul, Turkey, 2003.
[178] J. Fortgang, J. d. J. Marquez, and W. Singhose, "Application of Command Shaping on Micro-Mills," in *Japan – USA Symposium on Flexible Automation*, Denver, Colorado, 2004.
[179] J. Fortgang and W. Singhose, "Improving Trajectory Following Through Input Shaping of Internal Deflections," in *Seventh International Conference on Motion and Vibration Control*, St. Louis, MO, 2004.
[180] K. Hekman, W. Singhose, and J. Lawrence, "Input Shaping with Coulomb Friction Compensation on a Solder Cell Machine," in *American Control Conference*, Boston, MA, 2004, vol. 1: IEEE, pp. 728-33.
[181] K. Hekman, W. Singhose, and J. Lawrence, "Using Input Shaping to Suppress Controller and Structural Oscillations," in *Mechatronics 2004 9th Mechatronics Forum*, Ankara, Turkey, 2004.
[182] J. Huey and W. Singhose, "Design of Flexible Systems for Use with Input Shaping," in *Seventh International Conference on Motion and Vibration Control*, St. Louis, MO, 2004.
[183] A. Khalid, W. Singhose, J. Huey, J. Lawrence, and D. Frakes, "Study of Operator Behavior and Performance Using an Input-Shaped Bridge Crane," in *IEEE Conference on Control Applications*, Taipei, Taiwan, 2004, vol. 1: IEEE, pp. 759-64.
[184] S. Klooster, K. Kozak, J. Vaughan, P. Sanders, and W. 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.
[185] H. Kojima, H. Fukudome, T. Watanabe, M. Robertson, and W. Singhose, "Adaptive Input Shaping Control for Slewing Flexible Space Structures," in *24th Int. Symp. on Space Technology and Science*, Miyazaki, Japan, 2004, pp. 474-479.
[186] J. Lawrence, M. Falkenberg, W. Singhose, and G. Peláez, "Input Shaping for a Flexible, Nonlinear, One-link Robotic Arm with Backlash," in *Japan–USA Symposium on Flexible Automation*, Denver, Colorado, 2004.
[187] J. Lawrence, W. Singhose, and K. Hekman, "Robust Friction-Compensating Input Shapers," in *8th Cairo Univ. Int. Conf. on Mechanical Design and Production*, Cairo, Egypt, 2004.

Champion - EX2079, Page 19 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[188] J. d. J. Márquez, J. Fortgang, W. Singhose, and J. M. Perez, "Optimizacion del proceso de microfresado mediante el empleo de tecnicas de reduccion activa de vibraciones," in *XVI National Conference of Mechanical Engineering (Spain)*, Leon, Spain, Dec. 15-17, 2004 2004, pp. 2709-2714.
[189] M. Robertson and W. Singhose, "Command Generation for Tether Retrieval," in *14th AAS/AIAA Space Flight Mechanics Conference*, Maui, Hawaii, 2004.
[190] J. Vaughan, W. Singhose, and N. Sadegh, "Examination of Variable Damping for Payload Compensation in Heavy Machinery," in *Seventh International Conference on Motion and Vibration Control*, St. Louis, MO, 2004.
[191] J. Vaughan, W. Singhose, and N. Sadegh, "A Multiple Model Approach to Payload Compensation via Active Suspension Control," in *IFAC Symposium on Advances in Automotive Control*, Salerno, Italy, 2004.
[192] E. Biediger, J. Lawrence, and W. Singhose, "Improving Trajectory Tracking for Systems with Unobservable Modes Using Command Generation," in *American Control Conference*, Portland, OR, 2005, vol. 1: IEEE, pp. 513-18.
[193] J. Fortgang and W. Singhose, "Input Shaping for Continuum Beams under Longitudinal Vibration," in *IEEE/ASME International Conference on Advanced Intelligent Mechatronics*, Monterey, CA, 2005.
[194] J. Fortgang, W. Singhose, and J. d. J. Márquez, "Command Shaping for Micro-Mills and CNC Controllers," in *American Control Conference*, Portland, OR, 2005.
[195] S.-W. Hong, V. Patrangenaru, W. Singhose, and S. Sprigle, "Motion Measurement and Force Determination During Unconstrained Extensor Thrust," in *Rehabilitation Engineering and Assistive Technology Society of North America Annual Meeting*, Atlanta, GA, 2005.
[196] S.-W. Hong, H. Seomoon, V. Patrangenaru, W. Singhose, and S. Sprigle, "An Efficient Method for Identification of Human-Generated Forces During Extensor Thrust," in *IASTED International Conference on Biomedical Engineering*, Innsbruck, Austria, 2005.
[197] J. Huey and W. Singhose, "Stability Analysis of Closed-Loop Input Shaping Control," in *IFAC World Congress*, Prague, Czech Republic, 2005.
[198] J. R. Huey and W. Singhose, "Experimental Verification of Stability Analysis of Closed-Loop Input Shaping Controllers," in *IEEE/ASME Int. Conf. on Advanced Intelligent Mechatronics*, Monterey, CA, 2005, pp. 1587-1592.
[199] H. Kojima and W. Singhose, "Adaptive Deflection Limiting Control for Slewing Flexible Space Structures," in *56th Int. Astronautical Congress*, Fukuoka, Japan, 2005, vol. IAC-05-C2.7.02.
[200] J. Lawrence and W. Singhose, "Design of Minicrane for Education and Research," in *6th Int. Conference on Research and Education in Mechatronics*, Annecy, France, 2005.

Champion - EX2079, Page 20 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[201] M. Robertson and W. Singhose, "Closed-Form Deflection-Limiting Commands," in *American Control Conference*, Portland, OR, 2005, vol. 3: IEEE, Piscataway, NJ, pp. 2104-9.
[202] M. Robertson and W. Singhose, "Evaluation of Analytic Deflection-Limiting Commands," in *IFAC World Congress*, Prague, Czech Republic, 2005.
[203] M. Robertson, A. Timm, and W. Singhose, "Evaluation of Command Generation Techniques for Tethered Satellite Retrieval," in *AAS/AIAA Space Flight Mechanics Conference*, Copper Mountain, CO, 2005.
[204] M. Robertson, J. Vaughan, W. Singhose, M. Pastirik, M. Usselman, and D. Llewellyn, "Involving High School Students in a University-Level Mechanical Engineering Design Competition " in *American Society for Engineering Education Annual Conference*, Portland, Oregon, 2005: American Society for Engineering Education, Chantilly, VA, pp. 9039-9049.
[205] K. Sorensen, W. Singhose, and S. Dickerson, "A Controller Enabling Precise Positioning and Sway Reduction in Cranes with On-Off Actuation," in *IFAC World Congress*, Prague, Czech Republic, 2005.
[206] D. Blackburn *et al.*, "Advanced Input Shaping Algorithm for Nonlinear Tower Crane Dynamics," in *Int. Conference on Motion and Vibration Control*, Daejeon, Korea, 2006.
[207] T. Bradley, T. Hall, Q. Xie, W. Singhose, and J. Lawrence, "Input Shaping for Nonlinear Drive Systems," in *ASME Int. Mechanical Engineering Congress & Exposition*, Chicago, IL, 2006.
[208] J. Fortgang, W. Singhose, and V. Patrangenaru, "Scheduling of Input Shaping and Transient Vibration Absorbers for High-Rise Elevators," in *American Control Conference*, Minneapolis, MN, 2006.
[209] K. Hekman and W. Singhose, "Suppression of Crane Payload Oscillation Using On-Off Commands," in *American Control Conference*, Minneapolis, MN, 2006.
[210] K. Hekman, C. Stäheli, K. Sorensen, and W. Singhose, "Measuring Crane Payload Swing Angle Through Computer Vision," in *Int. Symp. on Flexible Automation*, Osaka, Japan, 2006.
[211] J. Huey *et al.*, "Remote Manipulation of Cranes via the Internet," in *Int. Conference on Motion and Vibration Control*, Daejeon, Korea, 2006.
[212] D. Kim and W. Singhose, "Reduction of Double Pendulum Crane Oscillations," in *Int. Conf. on Motion and Vibration Control*, Daejeon, Korea, 2006.
[213] J. Lawrence, J. Danielson, and W. Singhose, "Design and Analysis of Input Shapers for Systems with a Braking Nonlinearity," in *Int. Symp. on Flexible Automation*, Osaka, Japan, 2006.
[214] J. Lawrence, W. Singhose, R. Weiss, A. Erb, and U. Glauser, "An Internet-Driven Tower Crane for Dynamics and Controls Education," in *IFAC Symp. on Control Education*, Madrid, Spain, 2006.

Champion - EX2079, Page 21 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[215] M. Robertson and W. Singhose, "Robust Analytic Deflection-Limiting Commands," in *American Control Conference*, Minneapolis, MN, 2006.
[216] W. Singhose, "Crane Oscillation Control: Applications and Educational Uses," in *XVIII International Conference on Material Handling, Constructions and Logistics*, Belgrade, Serbia, 2006.
[217] A. Timm, M. Robertson, W. Singhose, and K. Fujiwara, "Control of Elastic Tethers During Spin Up For Artificial Gravity," in *Third Asian Conference on Multibody Dynamics*, Tokyo, Japan, 2006.
[218] J. Vaughan and W. Singhose, "ARLISS: A Multidisciplinary Extracurricular Design Project for Undergraduates," in *American Society for Engineering Education Annual Conf.*, Chicago, IL, 2006.
[219] J. Vaughan and W. Singhose, "Modeling and Control of a Mobile Tower Crane," in *Int. Conf. on Advances in Mechanical Engineering and Mechanics*, Hammamet, Tunisia, 2006.
[220] J. Danielson, J. Lawrence, and W. Singhose, "Command Shaping for Flexible Systems with Constant Acceleration," in *IEEE Conference on Industrial Electronics and Applications*, Harbin, China, 2007.
[221] M. Freese, E. Fukushima, S. Hirose, and W. Singhose, "Endpoint Vibration Control of a Mobile Mine-Detecting Robotic Manipulator," in *American Control Conference*, New York, NY, 2007.
[222] D. Kim and W. Singhose, "Human Operator Learning On Double-Pendulum Bridge Cranes," in *ASME IMECE*, Seattle, WA, 2007.
[223] D. Kim and W. Singhose, "Studies of Human Operators Manipulating Double-Pendulum Cranes," in *European Control Conference*, Kos, Greece, 2007, p. WeC10.1.
[224] S. W. Park, S. W. Hong, H. S. Choi, and W. E. Singhose, "A Study on Dynamic Performance of Precise XY Stages Using Real-Time Input Shaping," in *Int. Symp. on Measurement Technology and Intelligent Instruments*, Sendai, Japan, 2007.
[225] W. Singhose and D. Kim, "Manipulation with Tower Cranes Exhibiting Double-Pendulum Oscillations," in *IEEE Int. Conf. on Robotics and Automation*, Rome, Italy, 2007.
[226] W. Singhose and K. Sorensen, "Manipulation of Flexible Space Structures: Effects of Command Shaping and Human Interfaces," in *2007 ICRA Workshop on Space Robotics*, Rome, Italy, 2007.
[227] W. Singhose, J. Vaughan, J. Danielson, and J. Lawrence, "The Use of Tele-operated Cranes for Advanced Controls Education," in *ASME IMECE*, Seattle, WA, 2007.
[228] K. L. Sorensen, P. W. Cross, W. E. Singhose, and S. Prakash, "Analysis and Mitigation of Dead-Zone Effects on Systems Using Two-Impulse ZV Input Shaping," in *ASME Int. Design Engineering Technical Conferences*, Las Vegas, NV, 2007.

Champion - EX2079, Page 22 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[229] K. L. Sorensen and W. E. Singhose, "Oscillatory Effects of Common Hard Nonlinearities on Systems Using Two-Impulse ZV Input Shaping," in *American Control Conference*, New York, NY, 2007.
[230] K. L. Sorensen, J. B. Spiers, and W. E. Singhose, "Operational Effects of Crane Interface Devices " in *IEEE Conference on Industrial Electronics and Applications*, Harbin, China, 2007.
[231] Y.-G. Sung and W. Singhose, "Two-State Actuator Commands for Moving Two-Mode Flexible Systems," in *IASTED Intelligent Systems and Control*, Boston, MA, 2007.
[232] Y.-G. Sung and W. Singhose, "Closed-Form Specified-Fuel Commands for Two-Mode Systems," in *IEEE International Conference on Control and Automation*, Guangzhou, China, 2007.
[233] J. Suter, D. Kim, W. Singhose, K. Sorensen, and U. Glauser, "Evaluation and Integration of a Wireless Touchscreen Into a Bridge Crane Control System," in *IEEE/ASME Int. Conf. on Advanced Intelligent Mechatronics*, Zürich, Switzerland, 2007, p. 4412586.
[234] J. Vaughan, W. Singhose, P. Debenest, E. Fukushima, and S. Hirose, "Initial Experiments on the Control of a Mobile Tower Crane," in *ASME IMECE*, Seattle, WA, 2007.
[235] J. Vaughan, A. Yano, and W. Singhose, "Performance Comparison of Robust Input Shapers," in *IEEE International Conference on Control and Automation*, Guangzhou, China, 2007.
[236] P. Andersch, K. Sorensen, and W. Singhose, "Effects of Rate Limiting on Common Input Shaping Filters," in *WSEAS Int. Conf. on Automatic Control, Modelling, and Simulation*, Istanbul, Turkey, 2008.
[237] J. Danielson, J. Vaughan, W. Singhose, L. Widler, and U. Glauser, "Design of a Mobile Boom Crane for Research and Educational Applications," in *International Conference on Motion and Vibration Control*, Munich, Germany, 2008.
[238] U. Glauser, L. Widler, R. Weiss, J. Vaughan, and W. Singhose, "Conducting International Research Projects Using Undergraduate Thesis Projects," in *International Symposium on Flexible Automation*, Atlanta, GA, 2008.
[239] S. W. Hong, S. W. Park, and W. E. Singhose, "A method of input shaper design for residual vibration reduction using virtual mode concept," in *International Congress on Sound and Vibration*, Daejon, Korea, 2008, pp. 1712-1718.
[240] R. Manning, D. Kim, and W. Singhose, "Reduction of Distributed Payload Bridge Crane Oscillations," in *WSEAS International Conference on Automatic Control, Modeling, and Simulation*, Istanbul, Turkey, 2008.
[241] A. Rauch and W. Singhose, "Stability Analysis of Mobile Boom Cranes," in *International Conference on Motion and Vibration Control*, Munich, Germany, 2008.

Champion - EX2079, Page 23 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[242] W. Singhose, J. Vaughan, J. Danielson, and J. Lawrence, "Use of Cranes in System Dynamics and Controls Education," in *IFAC World Congress*, Seoul, Korea, 2008.
[243] K. Sorensen and W. Singhose, "A Multi-Operational-Mode Anti-Sway & Positioning Control for an Industrial 30-Ton Bridge Crane," in *IFAC World Congress*, Seoul, Korea, 2008.
[244] K. L. Sorensen, J. Danielson, and W. E. Singhose, "Anti-Sway and Positioning Control For An Industrial Bridge Crane With Multi-Mode Dynamics," in *ASME International Symposium on Flexible Automation*, Atlanta, GA, 2008.
[245] Y.-G. Sung and W. Singhose, "Deflection-Limiting Commands to Slew Flexible Systems with Velocity Limits," in *International Conference on Control, Automation and Systems*, Seoul, Korea, 2008.
[246] J. Vaughan, A. Daftari, and W. Singhose, "The Influence of Input Shaper Duration on Bridge Crane Operator Performance," in *International Conference on Motion and Vibration Control*, Munich, Germany, 2008.
[247] J. Vaughan and W. Singhose, "Comparison of Command Filtering Methods for Vibration Reduction in Automated Manufacturing Machines," in *ASME Int. Symposium on Flexible Automation*, Atlanta, GA, 2008.
[248] J. Vaughan, A. Yano, and W. Singhose, "Performance Comparison of Robust Negative Input Shapers," in *American Control Conference*, Seattle, WA, 2008.
[249] A. Dhanda, J. Vaughan, and W. Singhose, "Optimal Input Shaping Filters for Non-Zero Initial States," in *American Control Conference*, St. Loius,MO, 2009.
[250] M. Freese, S. Singh, W. Singhose, E. Fukushima, and S. Hirose, "Terrain Modeling and Following Using a Compliant Manipulator for Humanitarian Demining Applications," in *Int. Conference on Field and Service Robots*, Cambridge, MA, 2009.
[251] D. Fujioka, A. Rauch, W. Singhose, and T. Jones, "Stability Analysis of Mobile Boom Cranes with Double-Pendulum Payloads," in *American Control Conference*, St. Louis, MO, 2009.
[252] E. Maleki and W. Singhose, "Initial Experiments with a Small-Scale Mobile Boom Crane," in *IASTED Int. Conference on Robotics and Applications*, Cambridge, MA, 2009.
[253] J. d. J. Márquez, D. Kim, and W. Singhose, "An Examination of the Trajectories Traveled by Two-Mode Flexible Systems," in *IASTED Int. Conference on Robotics and Applications*, Cambridge, MA, 2009.
[254] K. C. C. Peng and W. Singhose, "Crane Control Using Machine Vision and Wand Following," in *IEEE International Conference on Mechatronics*, Malaga, Spain, 2009.
[255] K. C. C. Peng, W. Singhose, and J. Fonseca, "Crane Operation using Hand Motion and Machine Vision," in *ASME Dynamic Systems and Control Conference*, Hollywood, CA, 2009.

Champion - EX2079, Page 24 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[256] K. C. C. Peng, W. Singhose, S. Gessesse, and D. Frakes, "Crane Operation Using Hand-Motion and Radio Frequency Identification Tags," in *IEEE Int. Conference on Control and Automation*, Christchurch, New Zealand, 2009.
[257] W. Singhose, J. Vaughan, and R. Mayor, "Use of Design Competitions in Mechatronics Education," in *IEEE International Conference on Mechatronics*, Malaga, Spain, 2009.
[258] W. Singhose, A. Vela, and D. Kim, "Comparison of Residual-Vibration and Energy-Minimizing Control Methods for Command Generation," in *IEEE Conference on Decision and Control*, Shanghai, China, 2009.
[259] J. Vaughan and W. Singhose, "Reducing Vibration and Providing Robustness with Multi-Input Shapers," in *American Control Conference*, St. Louis, MO, 2009.
[260] J. Vaughan and W. Singhose, "Input Shapers for Reducing Overshoot in Human-Operated Flexible Systems," in *American Control Conference*, St. Louis, MO, 2009.
[261] J. Vaughan, A. Smith, and W. Singhose, "Using a Predictive Graphical User Interface to Improve Tower Crane Performance," in *IASTED Int. Conference on Robotics and Applications*, Cambridge, MA, 2009.
[262] A. Vela, E. Salaun, S. Solak, E. Feron, W. Singhose, and J.-P. Clarke, "A Two-Stage Stochastic Optimization Model for Air Traffic Conflict Resolution under Wind Uncertainty," in *Digital Avionics Systems Conference*, Orlando, Florida, 2009.
[263] A. Vela, S. Solak, E. Feron, K. Feigh, W. Singhose, and J.-P. Clarke, "A Fuel Optimal and Reduced Controller Workload Optimization Model for Conflict Resolution," in *Digital Avionics Systems Conference*, Orlando, Florida, 2009.
[264] A. Vela, S. Solak, W. Singhose, and J.-P. Clarke, "A Mixed Integer Program for Flight-Level Assignment and Speed Control for Conflict Resolution," in *IEEE Conference on Decision and Control*, Shanghai, China, 2009.
[265] J. Yoon, W. Singhose, M. D. Kim, G. Ramirez, and S. K. Tawde, "Dynamics and Control of Bouncing and Tilting Crane Payloads," in *ASME IDETC*, San Diego, CA, 2009.
[266] E. Maleki, B. Pridgen, J. Q. Xiong, and W. Singhose, "Dynamic Analysis and Control of a Portable Cherrypicker," in *Dynamic Systems and Control Conference*, Cambridge, MA, 2010.
[267] E. Maleki and W. Singhose, "Operator Performance Studies on a Small-Scale Mobile Boom Crane," in *International Congress on Sound and Vibration*, Cairo, Egypt, 2010.
[268] E. Maleki and W. Singhose, "Dynamics and Zero Vibration Input Shaping Control of a Small-Scale Boom Crane," in *American Control Conference*, Baltimore, MD, 2010.

Champion - EX2079, Page 25 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[269] E. Maleki, W. Singhose, and S. Srinivasan, "Positioning and Control of Boom Crane Luffing with Double-Pendulum Payloads," in *IEEE Conference on Control Applications*, Yokohama, Japan, 2010.
[270] K. C. C. Peng and W. Singhose, "A Vision-Based Predictive Hook-Tracker for Industrial Cranes," in *International Congress on Sound and Vibration*, Cairo, Egypt, 2010.
[271] K. C. C. Peng, K. Sorensen, and W. Singhose, "Sway Control of a Relay-Driven Crane with Asymmetrical Acceleration and Deceleration," in *IASTED Conf. on Robotics and Applications*, Cambridge, MA, 2010.
[272] J. J. Potter, K. L. Sorensen, and W. E. Singhose, "Efficient Method for Generating Pick-and-Place Trajectory Over Obstacles," in *IASTED Int. Conference on Robotics and Applications*, Cambridge, MA, 2010.
[273] B. Pridgen, K. Bai, and W. Singhose, "Slosh Suppression by Robust Input Shaping," in *IEEE Conf. on Decision and Control*, Atlanta, GA, 2010.
[274] B. Pridgen and W. Singhose, "Comparison of Polynomial Cam Profiles and Input Shaping for Vibration Reduction," in *International Congress on Sound and Vibration*, Cairo, Egypt, 2010.
[275] W. Singhose, J. d. J. Márquez, J. Vaughan, and B. Pridgen, "Use of Tele-Robotic Cranes in International Collaborative Education," in *IASTED Int. Conference on Robotics and Applications*, Cambridge, MA, 2010.
[276] D. C. Ujueta, K. C. C. Peng, W. Singhose, and D. Frakes, "Determination of Control Parameters for a Radio-Frequency Based Crane Controller " in *IEEE Conf. on Decision and Control*, Atlanta, GA, 2010.
[277] J. Vaughan, E. Maleki, and W. Singhose, "Advantages of Using Command Shaping Over Feedback for Crane Control," in *American Control Conference*, Baltimore, MD, 2010.
[278] J. Vaughan and W. Singhose, "Reducing Multiple Modes of Vibration by Digital Filtering and Input Shaping," in *Dynamic Systems and Control Conference*, Cambridge, MA, 2010.
[279] A. Vela, E. Salaün, S. Solak, E. Feron, W. Singhose, and J.-P. Clarke, "Maximizing Throughput at an Intersection under Constrained Maneuvers," in *IEEE Conference on Decision and Control*, Atlanta, GA, 2010, pp. 1207-1214.
[280] A. E. Vela, E. Feron, W. Singhose, and J.-P. Clarke, "Control of Holding Patterns for Increased Throughput and Recovery of Operations," in *Digital Avionics Systems Conference*, Salt Lake City, UT, 2010.
[281] A. E. Vela, E. Salaun, P. Burgain, W. Singhose, J.-P. Clarke, and E. Feron, "Predicting Controller Communication Time for Capacity Estimation," in *Int. Conference on Research in Air Transportation*, Budapest, Hungary, 2010.
[282] A. E. Vela *et al.*, "Determining Bounds on Controller Workload Rates at an Intersection," in *American Control Conference*, Baltimore, MD, 2010.

Champion - EX2079, Page 26 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[283] D. Fujioka, E. Maleki, and W. Singhose, "Tip-Over Stability of a Portable Cherrypicker," in *Multibody Dynamics Conference*, Brussels, Belgium, 2011.
[284] J. Hongxia, L. Wanli, and W. Singhose, "Using Two-mode Input Shaping to Suppress the Residual Vibration of Cherry Pickers," in *Int. Conf. on Measuring Technology and Mechatronics Automation*, Shanghai, China, 2011.
[285] A. Karajgikar, J. Vaughan, and W. Singhose, "Double-Pendulum Crane Operator Performance Comparing PD-Feedback Control and Input Shaping," in *Multibody Dynamics Conference*, Brussels, Belgium, 2011.
[286] E. Maleki and W. Singhose, "Control of the Mobile Base of a Small-Scale Boom Crane," in *Multibody Dynamics Conference*, Brussels, Belgium, 2011.
[287] J. Pasternack *et al.*, "Experimental Analysis for Wind Induced Disturbance Rejection on Bridge Crane Structures," in *ASME Dynamic Systems and Control Conference*, Washington, DC, 2011.
[288] B. Post, A. Mariuzza, W. Book, and W. Singhose, "Faltness-Based Control of Flexible Motion Systems," in *ASME Dynamic Systems and Control Conference*, Washington, DC, 2011.
[289] J. Potter, W. Singhose, and M. Costello, "Reducing Swing of Model Helicopter Sling Load Using Input Shaping," in *IEEE International Conference on Control and Automation*, Santiago, Chile, 2011.
[290] B. Pridgen, E. Maleki, W. Singhose, W. Seering, U. Glauser, and L. Kaufmann, "A Small-Scale Cherrypicker for Experimental and Educational Use," in *American Control Conference*, San Francisco, CA, 2011.
[291] S. Ragunathan, D. Frakes, K. Peng, and W. Singhose, "Filtering Effects on Input-Shaped Command Signals for Effective Crane Control," in *IEEE International Conference on Control and Automation*, Santiago, Chile, 2011.
[292] S. Ragunathan, K. C. C. Peng, W. Singhose, and D. Frakes, "Improving Energy Efficiency of Cranes Driven by Noisy Control Signals," in *Multibody Dynamics Conference*, Brussels, Belgium, 2011.
[293] J. Vaughan, A. Karajgikar, and W. Singhose, "A Study of Crane Operator Performance Comparing PD-Control and Input Shaping," in *American Control Conference*, San Francisco, CA, 2011.
[294] A. Vela, J.-P. Clarke, N. Durand, E. Feron, and W. Singhose, "Determining the Value of Information for Minimizing Controller Taskload: A Graph-Based Approach," in *USA/Europe Seminar on Air Traffic Management Research and Development*, Berlin, Germany 2011.
[295] A. Vela, J. P. Clarke, E. Feron, and W. Singhose, "The relative value of trajectory prediction and conflict-resolution algorithms," in *2011 IEEE/AIAA 30th Digital Avionics Systems Conference* Seattle, WA, 2011: IEEE, in 2011 IEEE/AIAA 30th Digital Avionics Systems Conference (DASC), pp. 6-1.

Champion - EX2079, Page 27 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[296] A. E. Vela, E. Salaun, E. Feron, W. Singhose, and J.-P. Clarke, "Bounds on Controller Taskload Rates at an Intersection for Dense Traffic," in *2011 American Control Conference*, San Francisco, CA, 2011, pp. 2745-51.
[297] C. Adams, J. Potter, and W. Singhose, "Modeling and Input Shaping Control of a Micro Coaxial Radio-Controlled Helicopter Carrying a Suspended Load," in *Int. Conference on Control, Automation and Systems*, Jeju, Korea, 2012.
[298] A. Castro, W. Singhose, J. J. Potter, and C. Adams, "Modeling and Experimental Testing of a Two-Wheeled Inverted-Pendulum Transporter " in *ASME Dynamic Systems and Control Conference*, Ft. Lauderdale, FL, 2012.
[299] S.-W. Hong, Y.-K. Seo, and W. Singhose, "A New Command Shaper Design for Residual Vibration Reduction in Flexible Systems Using Artificial Mode Constraints," in *Int. Conf. on Mechanical, Industrial, and Manufacturing Technologies*, Shenzhen, China, 2012.
[300] S.-W. Hong and W. Singhose, "Command Shaper Design for Transverse Vibration Suppression of Axially-Extending Cantilever Beams Under Gravity," in *Int. Congress on Sound and Vibration*, Vilnius, Lithuania, 2012.
[301] E. Maleki, F. Bazerghi, W. Singhose, and S. Gürleyük, "Shaping Commands to Maximize Pendulum Swing," in *Int. Congress on Sound and Vibration*, Vilnius, Lithuania, 2012.
[302] G. Mann, P. Danilochkin, and W. Singhose, "Attenuation of Initial Oscillation in Bridge Cranes via Input-Shaping-Based Feedback Control Methods," in *ASME Dynamic Systems and Control Conference*, Ft. Lauderdale, FL, 2012.
[303] A. S. Murthy, A. Kivila, and W. Singhose, "Slosh Suppression of a Liquid in a Suspended Container Using Robust Input Shaping," in *Int. Congress on Sound and Vibration*, Vilnius, Lithuania, 2012.
[304] K. C.-C. Peng and W. Singhose, "Stability Analysis of a Hand-Motion Crane Controller Using Describing Functions: An Initial Investigation," in *Int. Congress on Sound and Vibration*, Vilnius, Lithuania, 2012.
[305] K. C. C. Peng, W. Singhose, and S. S. Gürleyük, "Initial Investigations of Hand-Motion Crane Control with Double-Pendulum Payloads," in *American Control Conference*, Montréal, Canada, 2012.
[306] J. Potter and W. Singhose, "Effects of Input Shaping on Manual Tracking with Flexible and Time-Delayed System Dynamics," in *IFAC Workshop on Time Delay Systems*, Boston, MA, 2012.
[307] J. J. Potter and W. Singhose, "Using Manual Tracking Performance to Tune a Specified-Negative-Amplitude Input Shaper," in *IEEE Conference on Systems, Man, and Cybernetics*, Seoul, Korea, 2012.
[308] J. J. Potter and W. Singhose, "Effects of Input Shaping on Manual Tracking with Oscillatory Controlled-Element Dynamics," in *American Control Conference*, Montréal, Canada, 2012.

Champion - EX2079, Page 28 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[309] S. Ragunathan, W. Singhose, K. C. C. Peng, L. Stokes, and D. Frakes, "Kalman Filtering for Improving Radio-Frequency Hand Motion Crane Control," in *ASME Dynamic Systems and Control Conference*, Ft. Lauderdale, FL, 2012.
[310] J. Vaughan, K. C. C. Peng, W. Singhose, and W. Seering, "Influence of Remote-Operation Time Delay on Crane Operator Performance," in *IFAC Workshop on Time Delay Systems*, Boston, MA, 2012.
[311] J. Vaughan, J. Yoo, N. Knight, and W. Singhose, "Dynamics and Control of Multiple Cranes with a Connected Payload," in *Int. Congress on Sound and Vibration*, Vilnius, Lithuania, 2012.
[312] J. Vaughan, J. Yoo, and W. Singhose, "Using Approximate Multi-crane Frequencies for Input Shaper Design," in *Int. Conference on Control, Automation and Systems*, Jeju, Korea, 2012.
[313] B. Xiao, Q. Hu, and W. Singhose, "Adaptive Compensation Control for Spacecraft Attitude Stabilization with Actuator Misalignment and Faults," in *AIAA Guidance, Navigation, and Control Conference*, Minneapolis, MN, 2012.
[314] C. Adams, W. Singhose, and D. Kim, "A System-Dynamics-Based Hazard Analysis of Inverted-Pendulum Human Transporters," in *ASME Dynamic Systems and Control Conference*, Stanford, CA, 2013.
[315] A. AlSaibie and W. Singhose, "Experimental Testing of Liquid Slosh Suppression in a Suspended Container with Compound Pendulum Dynamics," in *Asian Control Conference*, Istanbul, Turkey, 2013.
[316] A. Castro, C. Adams, and W. Singhose, "Dynamic Response Characteristics of a Two-Wheeled Inverted-Pendulum Transporter," in *IEEE Conf. on Decision and Control*, Florence, Italy, 2013.
[317] D. Frakes, C. Zwart, and W. Singhose, "Analyzing Accident Videos with Optical Flow and Physically-Based Constraints," in *ASME Summer Bioengineering Conference*, Sunriver, OR, 2013.
[318] Y. Hu, W. Singhose, B. Wu, L. Zhou, and L. He, "Practice Competence Training in Mechatronics Engineering Education under the Cooperation Project Between HUST and GATECH," in *Int. Conference on Engineering Education and Research*, Marrakesh, Morocco, 2013.
[319] Y. Hu, B. Wu, J. Vaughan, and W. Singhose, "Oscillation Suppression for an Energy Efficient Bridge Crane Using Input Shaping " in *Asian Control Conference*, Istanbul, Turkey, 2013.
[320] A. Kivila, C. Porter, and W. Singhose, "Human Operator Studies of Portable Touchscreen Crane Control Interfaces," in *IEEE Int. Conference on Industrial Technology* Cape Town, South Africa, 2013.
[321] A. Kivila and W. Singhose, "Touchscreen Crane Control Interfaces with Oscillation Suppression," in *IEEE Conf. on Decision and Control*, Florence, Italy, 2013.

Champion - EX2079, Page 29 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[322] E. Maleki and W. Singhose, "Maximizing the Swing of a Human-Operated Wrecking Ball," in *IEEE Int. Conference on Industrial Technology*, Cape Town, South Africa, 2013.
[323] E. Maleki, W. Singhose, J. Hawke, and J. Vaughan, "Dynamic Response of a Dual-Hoist Bridge Crane," in *ASME Dynamic Systems and Control Conference*, Stanford, CA, 2013.
[324] K. C.-C. Peng and W. Singhose, "Low-Oscillation Command Switch-Times for Relay-Driven Cranes with Asymmetrical Acceleration and Deceleration," in *Asian Control Conference*, Istanbul, Turkey, 2013.
[325] J. J. Potter, C. J. Adams, and W. Singhose, "An Experimental Remote-Controlled Helicopter with Suspended Load," in *2013 Int. Symp. on Mechatronics and its Applications*, Amman, Jordan, 2013.
[326] J. J. Potter, R. Simpson, and W. Singhose, "Dynamic Modeling and Simulation of a Remote-Controlled Helicopter with a Suspended Load," in *ASME Dynamic Systems and Control Conference*, Stanford, CA, 2013.
[327] W. Singhose, J. Donnell, and A. Kivila, "Development of an Interactive Textbook for Introductory Mechanical Design," in *Int. Symp. on Mechatronics and its Applications*, Amman, Jordan, 2013.
[328] J. Vaughan, J. Yoo, N. Knight, and W. Singhose, "Multi-Input Shaping Control for Multi-Hoist Cranes," in *American Control Conference*, Washington, DC, 2013.
[329] D. Fujioka and W. Singhose, "Control Effort Reduction Analysis of Zero-Vibration Model Reference Control for Controlling a Time-Varying Plant," in *American Control Conference*, Portland, OR, 2014.
[330] Y. Hu, L. Ling, T. Kurfess, W. Singhose, and B. Wu, "International Collaboration Teaching Method for Mechatronic Innovation Decision-making and Design Tools," in *International Conference on Engineering Education and Research*, Hamilton, Canada, 2014.
[331] Y. Hu, W. Singhose, T. Kurfess, B. Wu, J. R. Mayor, and J. A. Donnell, "Introductory Mechatronics Creative Decision and Design Tools—the Design and Realization of a Mechatronics Course," in *ICEE/ICIT Conference on Engineering Education and International Conference on Information Technology*, Riga, Latvia, 2014.
[332] H. Liu and W. Singhose, "Tip-over stability of crawler cranes with moveable counterweights," in *International Scientific Conference Heavy Machinery*, Zlatibor, Serbia, 2014.
[333] A. Miller, P. Sarvepalli, and W. Singhose, "Dynamics and Control of Dual-Hoist Cranes Moving Triangular Payloads," in *ASME Dynamic Systems and Control Conference*, San Antonio, TX, 2014.
[334] J. Potter, W. Singhose, A. AlSaibie, and A. Kivila, "Fostering Global Collaboration between Engineering Students through a Robotic Design Competition," in *Hawaii Education and STEM Conference*, Honolulu, HI, 2014.

Champion - EX2079, Page 30 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[335] J. J. Potter and W. Singhose, "Reduced-Modification Input Shapers for Manually Controlled Systems with Flexibility," in *American Control Conference*, Portland, OR, 2014.
[336] W. Singhose, J. Donnell, and A. Kivila, "An Interactive Textbook for Introductory Engineering Design," in *Int. Conference on Computer Supported Education*, Barcelona, Spain, 2014.
[337] W. Singhose, D. Kim, and J. Vaughan, "Post-Ejection Failure Mode of Post Driving Machines," in *International Scientific Conference Heavy Machinery*, Zlatibor, Serbia, 2014.
[338] W. Singhose, A. Kivila, and W. Seering, "Development of an Interactive Textbook for Command-Shaping Control Methods," in *Hawaii Education and STEM Conference*, Honolulu, HI, 2014.
[339] D. Fujioka, M. Shah, and W. Singhose, "Robustness Analysis of Input-Shaped Model Reference Control on a Double-Pendulum Crane," in *American Control Conference*, Chicago, IL, 2015.
[340] D. Fujioka and W. Singhose, "Performance Comparison of Input-Shaped Model Reference Control on an Uncertain Flexible System," in *IFAC Workshop on Time Delay Systems*, Ann Arbor, MI, 2015.
[341] D. Fujioka and W. Singhose, "Input-Shaped Model Reference Control of a Nonlinear Time-Varying Double-Pendulum Crane," in *Asian Control Conference*, Kota Kinabalu, Malaysia, 2015.
[342] A. Garcia, W. Singhose, and A. Ferri, "Three-Dimensional Modeling and Experimental Verification of Off-Centered Crane Lifts," in *Dynamic Systems and Control Conference*, Columbus, OH, 2015.
[343] A. Garcia, W. Singhose, and A. Ferri, "Dynamics and Control of Off-Centered Crane Lifts," in *Asian Control Conference*, Kota Kinabalu, Malaysia, 2015.
[344] J. Harber, C. Adams, A. Castro, and W. Singhose, "Dynamic Effects of Obstacles on Two-Wheeled Inverted-Pendulum Transporters," in *ASME International Design Engineering Technical Conferences*, Boston, MA, 2015.
[345] Y. Hu, T. Kurfess, W. Singhose, D. Frakes, and B. Wu, "Design of a Hands-on Mechatronic Project Integrated into an Introductory Course," in *19th Int. Conf. on Engineering Education*, Zagreb, Croatia, 2015.
[346] A. Kivila, J. Potter, and W. Singhose, "Manual Tracking Using Touchscreen Interfaces," in *Asian Control Conference*, Kota Kinabalu, Malaysia, 2015.
[347] R. Mar, A. Goyal, V. Nguyen, T. Yang, and W. Singhose, "Combined Input Shaping and Feedback Control of a Double-Pendulum System Subject to External Disturbances," in *Dynamic Systems and Control Conference*, Columbus, OH, 2015.
[348] K. Peng and W. Singhose, "Prediction and Measurement of Payload Swing from Off-Centered Crane Lifts," in *ASME IDETC, 11th International Conference on Multibody Systems, Nonlinear Dynamics, and Control*, Boston, MA, 2015.

Champion - EX2079, Page 31 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[349] C. Rhee, A. Miller, and W. Singhose, "Operator Testing on Dual-Hoist Cranes Moving Triangular Payloads," in *ASME Dynamic Systems and Control Conference*, Columbus, OH, 2015.
[350] S. Rishmawi and W. Singhose, "Static Tip-Over Stability of Crawler Cranes with Moveable Counterweights," in *International Conference on Material Handling, Constructions and Logistics*, Vienna, Austria, 2015.
[351] W. Singhose, K. Peng, A. Garcia, and A. Ferri, "Dynamics and Control of Crane Payload Lift-off and Lay-down Operations," in *International Conference on Material Handling, Constructions and Logistics*, Vienna, Austria, 2015.
[352] Y. Hu, D. Han, L. Ling, T. Kurfess, W. Singhose, and J. Vaughan, "Case Study: Comparison of Project-based, Creative Engineering Courses at Georgia Tech and Huazhong University of Science and Technology," in *Int. Conf. on Engineering Education and Research*, Sydney, Australia, Nov. 21-24 2016.
[353] R. Khodambashi, G. Weinberg, W. Singhose, S. Rishmawi, V. Murali, and E. Kim, "User oriented assessment of vibration suppression by command shaping in a supernumerary wearable robotic arm," in *IEEE-RAS International Conference on Humanoid Robots*, Cancun, Mexico, Nov 15-17 2016.
[354] A. S. Miller, W. Singhose, and U. Glauser, "Integrating PLC Theory and Programming into Advanced Controls Courses," in *American Control Conference*, Boston, MA, 2016.
[355] A. Castro, W. Singhose, X. Liu, K. Sorensen, and E. C. Kwak, "Modeling and Experimental Testing of Hoverboard Dynamic Behavior," in *ASME Dynamic Systems and Control Conference*, Tysons Corner, Virginia, 2017.
[356] S. Grazioso, G. D. Gironimo, W. Singhose, and B. Siciliano, "Input Predictive Shaping for Vibration Control in Flexible Systems," in *IEEE Conference on Control Technology and Applications*, Kohala Coast, Hawai'i, USA, 2017.
[357] A. Kivila, J. Burgin, W. Book, and W. Singhose, "Development and Verification of a 2-Link Flexible Serial Arm Testbed for 3D Spatial Movements," in *IEEE 11th Asian Control Conference*, Gold Coast, Australia, 2017: IEEE.
[358] S. Rishmawi and W. Singhose, "Control of Robotic Crawler Cranes in Tandem Lifting Operations," in *Future Technologies Conference*, Vancouver, Canada, 2017.
[359] F. Schlagenhauf, P. P. Sahoo, and W. Singhose, "Comparison of Single-Kinect and Dual-Kinect Motion Capture of Upper-Body Joint Tracking," in *Asian Control Conference*, Gold Coast, Australia, 2017.
[360] S. Ichikawa, A. Castro, N. Johnson, H. Kojima, and W. Singhose, "Dynamics and command shaping control of quadcopters carrying suspended loads," in *14th IFAC Workshop on Time Delay Systems TDS (IFAC-PapersOnLine)*, Budapest, Hungary, 2018, vol. 51, no. 14, pp. 84 - 88.

Champion - EX2079, Page 32 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[361] N. Johnson and W. Singhose, "Dynamics and Modeling of a Quadrotor with a Suspended Payload " in *AIAA Aviation Forum Applied Aerodynamics Conference*, Atlanta, GA, 2018.
[362] P. P. Sahoo and W. Singhose, "Effects of Input Shaping on Impact Loads During Collisions Involving Flexible Robots," in *IEEE Int. Conf. on Control and Automation*, Anchorage, Alaska, 2018.
[363] F. Schlagenhauf and W. Singhose, "Comparison of Sway Reduction Controllers for Construction Cranes," in *IEEE Int. Conf. on Control and Automation*, Anchorage, Alaska, 2018.
[364] F. Schlagenhauf, S. Sreeram, and W. Singhose, "Comparison of Kinect and Vicon Motion Capture of Upper-Body Joint Angle Tracking," in *IEEE Int. Conf. on Control and Automation*, Anchorage, Alaska, 2018.
[365] K. Sorensen and W. Singhose, "Wheeled Inverted Pendulum Control and Slip Dynamics," in *IEEE Int. Conf. on Control and Automation*, Anchorage, Alaska, 2018.
[366] S. Wang, A. Ferri, W. Singhose, and Y. Yang, "Control of Slender-Beam Payloads During Lift-Up Operations," in *ASME 2018 Dynamic Systems and Control Conference*, 2018, vol. Volume 3: Modeling and Validation; Multi-Agent and Networked Systems; Path Planning and Motion Control; Tracking Control Systems; Unmanned Aerial Vehicles (UAVs) and Application; Unmanned Ground and Aerial Vehicles; Vibration in Mechanical Systems; Vibrations and Control of Systems; Vibrations: Modeling, Analysis, and Control, V003T40A003, doi: 10.1115/dscc2018-8967. [Online]. Available: https://doi.org/10.1115/DSCC2018-8967
[367] F. Schlagenhauf, W. Singhose, K. Sorensen, and K. Dobson, "Command-shaping control of linear resonant actuators for haptic force generation," in *21st IFAC World Congress 2020, July 12, 2020 - July 17, 2020*, Berlin, Germany, 2020, vol. 53: Elsevier B.V., in IFAC-PapersOnLine, 2 ed., pp. 8675-8682, doi: 10.1016/j.ifacol.2020.12.303. [Online]. Available: http://dx.doi.org/10.1016/j.ifacol.2020.12.303
[368] W. Singhose, "Control Safety Margins for Telescoping-Boom Mechatronic Lifts," in *5th International Conference on Mechatronics and Electrical Systems*, Rome, Italy, 2020.
[369] W. S. W. S. D. Frakes, "Soli Radar Image-Based Target Localization," in *IEEE Int. Conf. on Image Processing*, Bordeaux, France, 2022.
[370] T. Rome, W. S. K. D. K. Sorensen, F. Schlagenhauf, and J.-W. Kang, "Impact of Input Shaper Discretization on Linear Resonant Actuators for Haptic Feedback," in *IEEE International Symposium on Industrial Electronics*, Anchorage, AK, 2022.
[371] C. Adams and W. Singhose, "Stability Margins of Heavy-Lifting Machines with a Telescoping Boom and Jib," in *IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM)*, Seattle, WA, 2023.

Champion - EX2079, Page 33 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[372] A. Jenkins, D. V. Delden, W. Singhose, F. Schlagenhauf, and K. Dobson, "Controlling Human Perception of Haptic Profiles Using Contextual Cues," in *IEEE World Haptics Conference*, Delft, Netherlands, 2023.
[373] M. W. Lui, D. Kotten, E. Dushaj, and W. Singhose, "Improving Human Positioning Control of Oscillatory Systems," in *IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM)*, Seattle, WA, 2023.
[374] T. Rome, C. Adams, and W. Singhose, "Experimental Comparison of Manual and Automated Crane Control Through Obstacle Fields," in *IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM)*, Seattle, WA, 2023.
[375] R. Schmidt, M. H. Guzman, F. Schlagenhauf, and W. Singhose, "Back-EMF Sensing of Linear Resonant Actuators for Detection of Tap-Induced Vibration," in *ASME International Design Engineering Technical Conferences*, Boston, MA, 2023.
[376] W. Singhose, C. Adams, A. Rana, D. Kim, and W. Li, "Use of Data-Mined Customer Reviews to Inform Design Evaluation and Testing of Bassinets," in *ASME International Design Engineering Technical Conferences*, Boston, MA, 2023.
[377] T. Rome, C. Adams, and W. Singhose, "Dynamic Model for Improved Controller Design in Tower Crane Disassembly," in *IEEE/ASME International Conference on Advanced Intelligent Mechatronics (AIM)*, Boston, MA, July 15-18 2024.
[378] W. Singhose, C. Adams, R. Martinez, A. Rana, D. Kim, and W. Li, "Semi-Automated Mining of Customer Reviews to Identify Design Problems of Cantilever-Style Bassinets," in *ASME Int. Design Engineering Technical Conferences and Computers and Information in Engineering Conference*, Washington, D.C., 2024.
[379] W. Barclay, T. Rome, C. Adams, and W. Singhose, "Twist Control of Payloads Suspended by Single Looping Cable," in *ASME Int. Design Engineering Technical Conferences and Computers and Information in Engineering Conference*, Anaheim, CA, 2025.
[380] E. Harkonen, A. Zonnenberg, D. Vail, T. Poage, C. Adams, and W. Singhose, "Robust Cable Angle Detection for Safe Crane Control," in *ASME Int. Design Engineering Technical Conferences and Computers and Information in Engineering Conference*, Anaheim, CA, 2025.
[381] M. Nagaraj *et al.*, "A Small-Scale Luffing Crane for Safe Tip-Over Experimentation and Education," in *ASME Int. Design Engineering Technical Conferences and Computers and Information in Engineering Conference*, Anaheim, CA, 2025.
[382] T. Rome, A. Ferri, C. Adams, and W. Singhose, "Rolling Resistance Model for Forced and Unforced Systems," in *ASME Int. Design Engineering Technical Conferences and Computers and Information in Engineering Conference*, Anaheim, CA, 2025.

Champion - EX2079, Page 34 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[383] E. Stone, M. Caulfield, C. Adams, and W. Singhose, "Analysis of Crane Tip-Over Online Videos and Reporting," in *ASME Int. Design Engineering Technical Conferences and Computers and Information in Engineering Conference*, Anaheim, CA, 2025.

Invited papers

[384] W. Singhose, "Shaping Inputs to Reduce Vibration: A Vector Diagram Approach," MIT Artificial Intelligence Lab Memo No. 1223, March 1990.
[385] W. Singhose and W. Seering, "Generating Vibration-Reducing Inputs with Vector Diagrams," in *IFToMM Eighth World Congress on the Theory of Machines and Mechanisms*, Prague, Czechoslovakia, 1991, vol. 1, pp. 315-318.
[386] A. K. Banerjee and W. E. Singhose, "Slewing and Vibration Control of a Nonlinearly Elastic Shuttle Antenna," in *AIAA/AAS Astrodynamics Specialists Conf.*, Scottsdale, AZ, 1994.
[387] W. Singhose and N. Singer, "Initial Investigations into the Effects of Input Shaping on Trajectory Following," in *American Control Conference*, Baltimore, MD, 1994, vol. 3, pp. 2526-32. [Online].
[388] W. E. Singhose and N. C. Singer, "Improving Coordinate Measuring Machine Repeatability with Input Shaping," in *NSF Design and Manufacturing Grantees Conf.*, Cambridge, MA, 1994, pp. 467-8.
[389] A. K. Banerjee and W. E. Singhose, "Minimum Time Fuel Efficient Maneuver of Flexible Spacecraft with Vibration Amplitude Constraint," in *AAS Astrodynamics Specialist Conf.*, Halifax, Nova Scotia, 1995, vol. AAS 95-318.
[390] W. Singhose and T. Chuang, "Reducing Deviations From Trajectory Components With Input Shaping," in *American Control Conference*, Seattle, WA, 1995, vol. 1, pp. 929-33.
[391] W. Singhose, W. Seering, and N. Singer, "The Effect of Input Shaping on Coordinate Measuring Machine Repeatability," in *IFToMM Ninth World Congress on the Theory of Machines and Mechanisms*, Milan, Italy, 1995, vol. 4, pp. 2930-2934.
[392] W. Singhose, N. Singer, and W. Seering, "Comparison of Command Shaping Methods For Reducing Residual Vibration," in *Third European Control Conf.*, Rome, Italy, 1995, vol. 2, pp. 1126-1131.
[393] N. Singer, L. Pao, W. Singhose, and W. Seering, "An Efficient Algorithm for the Generation of Multi-Mode Input Shaping Sequences," in *IEEE Int. Conf. on Control Applications*, Dearborn, MI, 1996.
[394] W. E. Singhose, W. P. Seering, and A. Banerjee, "An Evaluation of Fuel-Efficient On-Off Input Shaping with Deflection Limiting," in *AIAA/AAS Astrodynamics Specialist Conf.*, San Diego, CA, 1996.

Champion - EX2079, Page 35 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[395] A. K. Banerjee and W. E. Singhose, "Command Shaping in Tracking Control of a Two-Link Flexible Manipulator," in *AIAA Astrodynamics Conf.*, Sun Valley, ID, 1997, vol. AAS 97-721.
[396] H. J. S. Feder, W. E. Singhose, and W. P. Seering, "Input Shaping for Collision Avoidance with Robotic Manipulation of Suspended Payloads," in *11th Symposium on Structural Dynamics and Control*, Blacksburg, VA, 1997.
[397] N. Singer, W. Singhose, and E. Kriikku, "An Input Shaping Controller Enabling Cranes to Move Without Sway," in *ANS 7th Topical Meeting on Robotics and Remote Systems*, Augusta, GA, 1997, vol. 1, pp. 225-231.
[398] W. Singhose, I. Villanueva, and W. Seering, "Use of Neural Networks for Generation of On-Off Commands for Flexible Systems," in *12th IEEE Int. Symp. on Intelligent Control*, Istanbul, Turkey, 1997.
[399] W. E. Singhose, "Command Generation for Flexible Systems," Ph.D. Thesis, Mechanical Engineering, Massachusetts Institute of Technology, 1997.
[400] B. W. Mills, W. E. Singhose, and W. P. Seering, "Closed-Form Generation of Specified-Fuel Commands for Flexible Systems," in *American Control Conference*, Philadelphia, PA, 1998, vol. 5: IEEE, Piscataway, NJ, pp. 2632-6.
[401] A. Banerjee and W. Singhose, "Vibration Reduction for Flexible Spacecraft Following Momentum Dumping with/without Slewing," in *AAS/AIAA Astrodynamics Specialist Conference*, Girdwood, AK, 1999.
[402] L. French, W. Singhose, and W. Seering, "An Expert System for the Design of Input Shapers," in *IEEE Conference on Control Applications*, Kohala, Hawaii, 1999.
[403] K. Grosser and W. Singhose, "Command Generation for Flexible Telerobotic Arms," in *International Symposium on Motion and Vibration Control in Mechatronics*, Tokyo, Japan, 1999.
[404] E. Ooten and W. Singhose, "Time-Optimal Commands for Sequential Motions of Flexible Systems with Numerator Dynamics," in *International Symposium on Motion and Vibration Control in Mechatronics*, Tokyo, Japan, 1999.
[405] M. Robertson and W. Singhose, "Initial Guess Schemes for Generating Deflection-Limiting Commands," in *AAS/AIAA Astrodynamics Specialist Conference*, Girdwood, AK, 1999.
[406] K. Grosser, J. Fortgang, and W. Singhose, "Limiting High Mode Vibration and Rise Time in Flexible Telerobotic Arms," in *Conf. on Systemics, Cybernetics, and Informatics*, Orlando, FL, 2000.
[407] M. Kenison and W. Singhose, "Concurrent Design of Input Shaping and Feedback Control for Insensitivity to Parameter Variations," in *Sixth Int. Workshop on Advanced Motion Control*, Nagoya, Japan, 2000.
[408] E. Ooten and W. Singhose, "Command Generation with Sliding Mode Control for Flexible Systems," in *Sixth International Workshop on Advanced Motion Control*, Nagoya, Japan, 2000.

Champion - EX2079, Page 36 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

[409] D. Frakes and W. Singhose, "Geometrically Constrained Optical-flow Based Tracking for the Extraction of Kinematic Data from Video," in *Fifth Int. Symp. on Computer Methods in Biomechanics and Biomedical Engineering*, Rome, Italy, 2001.
[410] K. Kozak, I. Ebert-Uphoff, P. A. Voglewede, and W. Singhose, "Concept Paper: On the Significance of the Lowest Linearized Natural Frequency of a Parallel Manipulator as a Performance Measure for Concurrent Design," in *Workshop on Fundamental Issues and Future Research Directions for Parallel Mechanisms and Manipulators*, Quebec City, Quebec, Canada, 2002.
[411] E. Ooten-Biediger and W. Singhose, "Command Generation for Trajectory Planning of Coordinating Satellites," in *University Space Systems Symposium*, Honolulu, HI, 2002.
[412] M. Robertson and W. Singhose, "Deflection-Limiting Control of Flexible Spacecraft Using On-Off Thrusters," in *University Space Systems Symposium*, Honolulu, HI, 2002.
[413] E. Biediger and W. Singhose, "Formation Flying Satellite Control Utilizing Input Shaping," in *AIAA/AAS Astrodynamics Specialist Conf.*, Big Sky, Montana, 2003.
[414] E. Biediger, W. Singhose, D. Frakes, M. Kashiwa, and S. Matunaga, "An Investigation of Video Tracking on a Formation Flying Satellite Testbed," in *AIAA/AAS Astrodynamics Specialist Conf.*, Big Sky, Montana, 2003.
[415] W. Singhose, M. Robertson, T. Watanabe, H. Kojima, and A. Banerjee, "Tether-Based Actuators for Space Applications," in *2003 International Workshop on Advanced Sensors, Structural Health Monitoring, and Smart Structures*, Yokohama, Japan, 2003.
[416] T. Watanabe, T. Makida, H. A. Fujii, H. Kojima, and W. Singhose, "An Application of Input Shaping for Electrodynamic Tether System," in *AIAA/AAS Astrodynamics Specialist Conference*, Providence, Rhode Island, 2004.
[417] A. Banerjee, W. Singhose, and D. Blackburn, "Orbit Boosting of an Electrodynamic Tethered Satellite with Input-Shaped Current," in *AAS/AIAA Astrodynamics Specialist Conference*, Lake Tahoe, CA, 2005.
[418] W. Singhose and D. Kim, "Robustness of Command-Shaping Control on Flexible Systems," in *Spring Research Conference on Statistics in Industry and Technology*, Chicago, IL, 2011.

D. Presentations

Keynote and Plenary Lectures

6/8/23 “Hazard Analysis of Mobile Juvenile Products,” International Forum on Automotive and Mechanical Engineering (MECHFORUM2023)
9/23/15 “Dynamics and Control of Crane Payload Lift-off and Lay-Down Operations,” XXI Triennial Int. Conference on Material Handling, Constructions, and Logistics, Vienna, Austria

Champion - EX2079, Page 37 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

10/27/14 “Using Mechatronics to Improve Human Operation of Complex Dynamic Systems,” International Conference on Mechanics and Control Engineering, Asheville, NC
10/18/12 “Improving Human Operation of Oscillatory Dynamic Systems,” International Conference on Control, Automation and Systems, Jeju, South Korea
10/19/06 “Crane Oscillation Control: Applications and Educational Uses,” International Conference on Material Handling, Constructions, and Logistics, Belgrade, Serbia

Other Invited Lectures
3/2/20 “Legal Considerations of Sensor use in Emerging Technology,” Google, Mountain View, CA
4/24/19 “Ethical Considerations of Sensor Use,” Stanford University, Palo Alto, CA
11/29/18 “Killer Robots: Why You Will not be Owning a Self-Driving Car,” Stanford University, CA
10/12/18 “Georgia Tech ARLISS Team”, University of Oregon, Eugene, OR
2/26/18 “Command Generation for Flexible Systems,” University of California, Berkeley, Berkeley, CA
10/3/16 “Oscillation Control Using Input Shaping Technology,” Hankyong University, Anseong, South Korea
9/29/16 “Input Shaping Control Technologies”, Shanghai Jiao Tong University, Shanghai, China
4/21/16 “Improving Manufacturing Machines with Command Shaping,” Mercedes Manufacturing Facilities, Vance, AL
1/25/16 “Commercialization of University-Developed Technology,” University of Chicago Booth School of Business, Chicago, IL
9/25/15 “Applications of Input Shaping Control Methods,” Czech Technical University, Prague, Czech Republic
3/25/15 “Oscillation Control of Suspended Loads Using Command Shaping,” Boeing BR&T – Vertical Lift, Mesa, AZ
1/22/15 “Building a Culture of Active Learning in Mechatronics,” Kumoh National Institute of Technology, Gumi, South Korea
1/19-1/23/15 “Special Lectures on Mechatronics by Foreign Distinguished Professor,” Kumoh National Institute of Technology, Gumi, South Korea
9/26/14 “Building a Culture of Active Learning”, Georgia Tech Zeigler Lecture
8/4/14 “NI myRIO Design Real Systems, Fast: 2014 Student Project Success”, Panelist, NI Week, Austin, TX
3/19/14 “Input Shaping for Oscillation Reduction in the Digital World”, Auburn University
11/16/13 “Improving Machine Motion with Command Shaping”, Wuxi Zhong Ding Logistics, Wuxi, China

Champion - EX2079, Page 38 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

11/14/13 “Improving Manufacturing Machines with Command Shaping”, HUST-Wuxi Research Institute, Wuxi, China
11/13/13 “Analyzing Accident Videos of Inverted-Pendulum Human Transporters”, Huazhong University of Science and Technology, Wuhan, China
4/15/13 “Control of Large Flexible Spacecraft, Robots, and Cranes”, Budapest University of Technology and Economics, Budapest, Hungary
4/15/13 “Recue Robot: An International Student Design Collaboration”, University of Patras, Patras, Greece
10/17/12 “Active Learning Methods for Mechanical Engineering”, Yeungnam College, Daegu, South Korea
6/26/12 “Command-Shaping Control of Flexible Aerospace Systems”, Beijing Institute of Technology Beijing, China
6/18-21/12 “Introductory Creative Decision and Design Tools for Mechatronics”, Huazhong University of Science and Technology, Wuhan, China
11/8/11 “Advanced Crane Control to Improve Safety and Ergonomics”, Boeing Research and Technology Ergonomics Road Show, Everett, WA
5/6/11 “Creative Decisions and Design: An Innovative Design Course at Georgia Tech”, Aalto University, Helsinki, Finland
4/25/11 “Creative Decisions and Design: An Innovative Design Course at Georgia Tech”, Chosun University, Gwangju, Korea
4/21/11 “Controlling Large Flexible Structures with Command Shaping”, Konkuk Univertsity, Seoul, Korea
4/19/11 “Command Shaping Control of Large Flexible Structures”, Shanghai Maritime University, Shanghai, China
4/18/11 “Creative Decisions and Design: An Innovative Design Course at Georgia Tech”, Huazhong University of Science and Technology, Wuhan, China
4/18/11 “Controlling Large Flexible Structures with Command Shaping”, Huazhong University of Science and Technology, Wuhan, China
4/1/11 “Command Shaping Control of Large Flexible Systems”, University of Parma, Parma, Italy
7/12/10 “Command Shaping Control of Large Flexible Systems”, University Carlos III, Madrid, Spain
6/18/10 “Advanced Crane Control Lab at Georgia Tech”, KoneCranes, Hyvinkää, Finland
5/3/10 “Command Shaping Control of Flexible Systems”, University Castilla-La Mancha, Ciudad Real, Spain
12/16/09 “Control of Cranes and Spacecraft using Command Shaping”, University of Sydney, Sydney, Australia

11/25/09 “The ASU Experience: Interfacing with the Machines“, Arizona State University, Tempe, AZ

Champion - EX2079, Page 39 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

11/25/09 “Interfaces and Control Systems for Intuitive Crane Control”, Arizona State University, Tempe, AZ

10/6/09 “Using Competitions in Mechatronics Engineering Education at Georgia Tech”, Chosun University, Kwangju, Korea

4/20/09 “Advanced Command Shaping Control of Cranes, Robots, and Spacecraft”, Instituto Automatique de Industriales, Madrid, Spain

11/25/08 “Command Shaping Control of Cranes, Robots, and Spacecraft”, Kyung Hee University, Suwon, Korea.

11/24/08 “Command Shaping Control of Cranes, Robots, and Spacecraft”, Seoul National University, Seoul, Korea.

11/21/08 “Command Shaping Control of Cranes, Robots, and Spacecraft”, Korean Atomic Energy Research Institute, Deajon, Korea.

11/20/08 “Control of Tip-Over Instability”, Kumoh National Institute of Technology, Gumi, Korea.

8/10/08 “Engineering Teaching Methods at Georgia Tech”, Shandong Jianzhu University, Jinan, China.

8/10/08 “Using Command Shaping to Control Robots, Spacecraft, and Cranes”, Shandong Jianzhu University, Jinan, China.

8/8/08 “Control of Robots, Spacecraft, and Cranes Using Command Shaping”, Northeastern Forest University, Harbin, China.

8/7/08 “Engineering Teaching Methods at Georgia Tech”, Northeastern Forest University, Harbin, China.

8/4/08-8/8/08 “Command Shaping for Dynamic Systems”, Harbin Institute of Technology, Harbin, China.

5/28/07, “A Design Course at Georgia Tech: Creative Decisions & Design”, Center of Excellence in Robotics, Kumoh National Institute of Technology, Gumi, Korea.

5/24/07, “Making Robots and Cranes Move Very Fast with Command Shaping”, Northwest Forest University, Harbin, China.

5/23/07, “Making Robots and Cranes Move Very Fast with Command Shaping”, Harbin Institute of Technology, Harbin, China.

3/19/07, “Crane Dynamics and Control: Applications and Educational Uses”, Center of Excellence in Robotics, Tokyo Tech, Tokyo, Japan.

9/1/2006, “Crane Oscillation Control by Command Shaping”, Ishikawajima Harima Heavy Industries, Yokohama, Japan.

4/20/06, “High-Speed Motion Control Using Command Shaping”, Toshiba Corporate Research & Development Center, Tokyo, Japan.

Champion - EX2079, Page 40 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

1/25/2006, “”Command Shaping for Cranes and Other Flexible Systems”, University of Tokyo, Tokyo, Japan.
1/18/06, “Research Topics for Gantry Robots”, Kumoh National Institute of Technology, Gumi, South Korea.
12/13/05, “An Introduction to Command Shaping for Flexible Systems”, Center of Excellence in Robotics, Tokyo Tech, Tokyo, Japan.
8/12/05, “Advanced Command Shaping for Nonlinear Systems and On-Off Actuators”, Kumoh National Institute of Technology, Gumi, South Korea.
8/11/05, “An Introduction to Command Shaping for Flexible Systems”, Kumoh National Institute of Technology, Gumi, South Korea.
8/10/05, “An Introduction to Command Shaping for Flexible Systems”, Korea Institute of Machinery & Materials, Deajon, South Korea.
8/9/05, “Command Shaping for Flexible Systems”, Pusan National University, Busan, South Korea.
11/29/04, “Improving Machine Speed and Accuracy by Command Shaping”, Metz, France.
10/27/04 – “Improving the Speed of Cranes, Robots, and Micro Mills by Command Shaping”, Instituto Automatique de Industriales, Madrid, Spain
4/15/04 – “Undergraduate Research in Mechanical Engineering”, Meeting of Congressional Staffers, Georgia Tech Conference Center, Atlanta, GA.
3/10/04 – “Design of Physical Mechanisms to Reduce Unwanted Dynamics”, Nihon University, Tokyo, Japan.
1/29/04 – "Georgia Tech CanSat Team", Southeastern Space Grant Consortia Director’s Meeting, Atlanta, GA.
10/23/03 - "Control of Flexible Spacecraft Using Command Shaping ", Georgia Tech IEEE meeting Atlanta, GA.
8/7/02 - "Rapid Motion of Crane-Like Structures", Tsukuba University, Tsukuba, Japan.
10/15/02 - "Designing Commands to Reduce Vibration in Mechanical Systems", ETSII de Madrid, Madrid, Spain.
10/14/02 - "Designing Commands to Reduce Vibration in Mechanical Systems", University of Vigo, Vigo, Spain.
8/13/02 - "Command Shaping for Flexible Structures", Tokyo Metropolitan Institute of Technology, Tokyo, Japan.
7/29/02 - “Controlling Flexible Spacecraft through Command Shaping”, ISAS Astrodynamics Symposium Invited Speaker, Sagamihara, Japan.
7/13/02- "Using Input Shaping with On/Off Actuators", Laboratory for Space Systems, Tokyo Institute of Technology, Tokyo, Japan.
7/6/02- "Tutorial on Input Shaping for Moving Flexible Structures", Laboratory for Space Systems, Tokyo Institute of Technology, Tokyo, Japan.
3/18/02 - "Command Shaping Overview and Application to Hard Disk Drive Servo Control", Hitachi Corporation, Odawara, Japan.

Champion - EX2079, Page 41 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

3/15/02 - "Command Shaping for Vibration Reduction: Overview and Application to Hard Disk Drive Servo Control", IEE Committee Meeting for Mass Storage Servo, Nagoya, Japan.
10/27/00 - "Robotics Research at Georgia Tech." Waseda University, Tokyo, Japan.
10/24/00 - "Robotics Research at Georgia Tech." Tokyo Institute of Technology, Tokyo, Japan.
10/23/00 - "Robotics Research at Georgia Tech." Kyushu University, Fukuoka, Japan.
10/16/00 - "How to Properly Motivate Robots." MIT Club of Atlanta, Georgia Tech.
2/27/99 - "Making Machines Move Very Fast With Command Generation." American University in Cairo, Cairo, Egypt.

E. Grants and Contracts
A. As PI or Co-PI

Private Sources

"Crane Safety Research Center", Wang-Wong Foundation, December, 2023, $5,000,000.

Government Sources

"Input Shaping Mobile Crane Controllers", Georgia Research Alliance, October 2018, $49,965.

"I-Corps: Reducing Oscillation of Systems Driven by Stepper Motors and On-Off Actuators", National Science Foundation, April 2016, $50,000.

"Rocket Rescue Robot", Georgia Space Grant Consortium, August 2014, $6,000.

"Designing a Rocket-Launched Target-Seeking Rescue Robot", Georgia Space Grant Consortium, May 2013, $3,762.

"Hopping Rotochute Micro Satellite Design Project", Georgia Space Grant Consortium, July 2012, $2,275.

"International DDEP: Control of Complex Tower Crane Motion Using Low-Cost Cameras", National Science Foundation, September 2011-December 2012, $13,930.

"Input Shaping for Rotorcraft Sling Load Operation", National Rotorcraft Technology Center (NRTC), Jan. 2011 – May 2013, $120,000. **Co-PI (Singhose: $56,875)**

"Georgia Tech Student CanSat Team", Georgia Space Grant Consortium, Jan. 2006 - May 2010, $19,708.

"International DDEP: Development of Aircraft Conflict Resolution Algorithms", National Science Foundation, May 2008-September 2008, $9,950.

Champion - EX2079, Page 42 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

"Approaches to Traffic Flow Management in the Presence of Uncertainty", NASA, October 2006-September 2008, $706,366. **Co-PI (Singhose: $120,056)**

"International DDEP: Experimental Evaluation of a Mobile Tower Crane", National Science Foundation, November 2006-March 2007, $10,800.

"International DDEP: Experimental and Educational Research with Remotely Operated Cranes", National Science Foundation, December 2005-March 2006, $8,100.

"Planning Visit: Large Flexible Space Structures", National Science Foundation, December 2005, $12,412.

"Application of Command Generation Techniques to the Control of Space Tether Systems", NASA/Marshall Space Flight Center, July 2005-July 2006, $24,000.

"Ph.D. Dissertation Enhancement Project: Experimental Evaluation of Low-Contact-Force Machining", National Science Foundation, January 2004-May 2004, $9,700.

Support for International Workshop on Advanced Sensors, Structural Health Monitoring, and Smart Structures, Yokohama, Japan, National Science Foundation, November 2003, $1,334.

"Command Generation and Control of Momentum Exchange Electrodynamic Reboost Tethered Satellite", NASA/Marshall Space Flight Center, August 2003-July2005, $48,000.

"Georgia Tech CanSat Development", Georgia Space Grant Consortium, December 2002 - December 2005, $20,851.

"Experimental Evaluation of Coordinated Flexible Satellite Control", National Science Foundation, November 2002, $7,995.

"Trajectory Planning for Coordinating Satellites Using Command Generation", NASA/ Goddard Space Flight Center, August 2002-July 2005, $72,000.

Industry Sources

"Evolution of Novel Haptic Actuation, Implementation and Test Systems" Google Inc., Jan. 2022, $249,869.

"Steady Hoist Swing-Damping Control for Rotocraft Operations," Atlas Devices Inc., March, 2021, $100,000.

"Development of Advanced Haptic Actuation Structures and Control Methods," Google Inc., Jan. 2021, $246,042.

Champion - EX2079, Page 43 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

"Development of Novel Haptic Actuation," Google Inc., Jan. 2020, $258,488.

"Dynamic Model and Control System Design for Cable-Driven Crane," ConcertLab, Jan. 2020, $27,088.

"Steady Hoist for Rotocraft Operations," Atlas Devices, LLC, Dec. 2019, $10,000.

"Mobile Vision GT Singhose SOW 5", Google Inc., Nov, 2017, $105,650.

"Mobile Vision GT Singhose SOW 4", Google Inc., Jan, 2017, $95,922.

"Development Kits and myRIO Controllers for Undergraduate Controls", National Instruments, October 2016, $8,814.

"Mobile Vision GT Singhose SOW 3", Google Inc., August, 2016, $80,193.

"Mobile Vision GT Singhose SOW 2", Google, Inc. Jan, 2016, $112,309.

"Automated Large-Area Sanding", Boeing Research and Technology, Jan, 2016, $50,000.

"Mobile Vision - Design and Evaluation of a Mobile Vision-Based Device for Interactive Writing", Google Inc., June, 2015, $79,794.

"Automated Large-Area Painting", Boeing Research and Technology, May, 2015, $50,000.

"Hardware Integration for Large-Area Sensing", Boeing Research and Technology, July, 2014, $141,632.

"ME6404 Pneumatics project", National Fluid Power Association, November 2014, $4,520.

"PLC Programming Curriculum for Georgia Tech", Siemens, August 2014, $27,500.

"Use of Pneumatic Systems in Introductory Mechanical Design Projects", National Fluid Power Association, November 2013, $4,720.

"Development of Mechatronics and Robotics Educational Platforms Using Compact Control Units", National Instruments, May 2013, $117,000.

"Integration of Zurich University of Applied Sciences Bridge Crane into Georgia Tech Research and Educational Activities", Siemens, May 2013, $15,920.

"Manufacturing Technologies for the 21st Century", Boeing Research and Technology, Jan. 2013, $185,700.

"Multi-National Collaborative Design of Target-Seeking Robots", Boeing Research and Technology, Nov. 2012, $60,864.

"Multi-National Collaborative Design Tools", Boeing Research and Technology, Nov. 2012, $62,711.

Champion - EX2079, Page 44 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

"Input Shaping Analysis and Design Support", Space Systems Loral, August 2012, $47,086.

"Material Handling Dynamic Load Oscillation Suppression", Boeing Research and Technology, Jan. 2012, $100,000.

"Material Handling Dynamic Load Oscillation Suppression", Boeing Research and Technology, Jan. 2011, $100,000.

"A Balloon Hoist Experimental Setup to Evaluate National Instruments Products", National Instruments, March 2011, $38,665.

"Design & Development of a Pediatric Personal Transporter for Children with Disabilities", International Diversified Products, December 2010, $5,500. **Co-PI (Singhose: $2,750)**

"Siemens Automation – Cherrypicker Crane Project", Siemens Industry, August 2010, $44,732.

"Investigation of Commercial Personal Transporters", International Diversified Products, June 2010, $6,000. **Co-PI (Singhose: $3,000)**

"Material Handling Dynamic Load Oscillation Suppression", Boeing Research and Technology, Jan. 2010, $100,000.

"Sponsorship of Georgia Tech Curriculum Improvements", British Petroleum, Nov. 2009, $7,500.

"Development of a Cherrypicker Aerial Lift for Use in Local and Remote Laboratories", Siemens Energy and Automation, Sept. 2009, $38,000.

"**Pneumatic Powered Advertisement Dispenser",** Diastone Corporation, May 2009, $8,800.

"Material Handling Dynamic Load Oscillation Suppression", Boeing Research and Technology, Jan. 2009, $100,000.

"Integrating Pneumatics Into Introductory Mechanical Design", National Fluid Power Association, May 2008, $4,960.

"Material Handling Dynamic Load Oscillation Suppression", Boeing Research and Technology, Jan. 2008, $75,000.

"Expansion of Pneumatic Systems in ME2110: Creative Decisions and Design", National Fluid Power Association, March 2006, $4,000.

"Pneumatic Equipment and Supplies for ME2110: Creative Decisions and Design", Festo Corporation, March. 2005, $6,898.

"Introduction of Pneumatic Systems into ME2110: Creative Decisions and Design", National Fluid Power Association, Nov. 2004, $5,000.

Champion - EX2079, Page 45 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

“Feedback and Command Shaping Control of Bridge Cranes”, CAMotion, Inc. Jan. 2004 - August 2008, $98,168.

“Prototype Controller for Elastic Spacecraft”, Northrop Grumman, January 2004 – December 2004, $44,415.

Support for University Space System Symposium, Jet Propulsion Laboratory, November 2002-5, $5,528.

"Control of Sloshing Liquid Demonstration Unit", National Instruments, March 2001, $1,500.

International Sources

“International Design and Construction of Quadrotors”, Kumoh National Institute of Technology, December 2015, $6,000.

“International Cooperative Education in Engineering Design”, Chosun University, November 2013, $9,000.

“Development of Educational Tasks in an Introductory Design Course”, Chosun University, November 2011, $9,600.

“Development of a Mobile Mechatronic Device”, Chosun University, June 2011, $9,600.

“Development of Educational Tasks in an Introductory Design Course”, Chosun University, November 2010, $2,400.

“Research on Mobile Mechatronics Machine”, Chosun University, November 2010, $3,600.

“Mechanical Manipulators Control, Education and Research”, Ministerio de Ciencia e Innovacion de España, Dec. 2009, 18,000 Euro ($25,767).

“Environmentally-Friendly Automotive Parts - Human Resources Development Center”, Chosun University, Dec. 2009, $6,000.

“Versatile Command Shaping Controllers for Industrial Cranes”, Kumoh National Institute of Technology, June 2006, $50,829

"Development of Vibration Reduction Scheme for XY Stages Using Input Shaping", Top Engineering Co., Center for Nano and Precision Technology, Kumi, Korea, December 2005, $5,000.

"Command Generation for Flexible Systems", Kumoh National Institute of Technology and Pusan National University, August 2005, 3300000 Won ($3,210).

"Enhanced Trajectory Tracking of Flexible Systems Using Command Generation", Japan Ministry of Education, Culture, Sports, Science and Technology

Champion - EX2079, Page 46 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

(MEXT), and Tokyo Metropolitan Institute of Technology (TMIT), $11,500 **Co-PI (Singhose: $5,750)**.

"Generación De Órdenes De Movimiento Que No Inducen Vibración En Maquinas Con FaltaDe Rigidez", University of Vigo, October 2002, 900 Euros.

"Experimental Investigation of Deflection-Limiting Satellite Thruster Control for Multiple Flexible Satellites", Japan Society for the Promotion of Science, June 2002, $17,245.

Internal Sources

"An International Collaborative Student Space Robot Design Initiative", Denning Global Engagement Seed Fund, 2014, $15,000.

GTRC travel grant to Serbia, July, 2014, $1,458.

"Interactive Tablet Computers for Introductory Mechanical Design", Georgia Tech Technology Fee Grant, 2013, $22,896.

"Power Analyzer for Energy-Efficient Student Design Projects", Georgia Tech Technology Fee Grant, 2013, $17,104.

GTRC travel grant to Turkey, July, 2013, $1,500.

GTRC travel grant to Lithuania, July, 2012, $750.

"Siemens Cherrypicker and Conference Paper Support" Manufacturing Research Center**,** July 2010, $6,750.

GTRC travel grant to Egypt, July, 2010, $750.

"Siemens Conference Paper Support" Manufacturing Research Center**,** September 2009, $3,200.

GTRC travel grant to Spain, April, 2009, $1,500.

"The Influence of Input Shaper Duration on Bridge Crane Operator Performance " Aayush Daftari, President's Undergraduate Research Travel Award, August 2008, $1,000.

"Dynamics of Orbit Boosting of an Electrodynamic Tethered Satellite with Input-Shaped Current" Adrit Lath, President's Undergraduate Research Award, July 2008, $1,500.

"Robustness of Negative Input Shaping" Aika Yano, President's Undergraduate Research Travel Award, May 2008, $1,000.

"Generator for Mobile Boom Crane", Materials, Supplies, & Travel Grants for Undergraduate Research, April. 2008, $1,500.

Champion - EX2079, Page 47 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

GTRC travel grant to Turkey, April, 2008, $1,500.

"Comparison of Command Filtering Methods for Vibration Reduction in Mechanical Systems", Anderson Smith, President's Undergraduate Research Awards, March. 2008, $1,500.

"Development of Input Shapers for Mobile Cranes", Adrit Lath, President's Undergraduate Research Awards, Nov. 2007, $1,500.

"Effect of Input Shaper Duration on Crane Operator Performance", Aaayush Daftari, President's Undergraduate Research Awards, Nov. 2007, $1,500.

"Robust Input Shaper Evaluation", Aika Yano, President's Undergraduate Research Awards, May 2007, $1,500.

GTRC travel grant to China, May, 2007, $1,500.

"Conference Travel Funding: Reduction of Double Pendulum Crane Oscillations", Dooroo Kim, President's Undergraduate Research Awards, August 2006, $1,000.

GTRC travel grant to Serbia, October, 2006, $1,278.

"Reduction of Double Pendulum Crane Oscillations", Dooroo Kim, President's Undergraduate Research Awards, December 2005, $1,500.

"Development and Testing of a Command Shaping Compensator for Nonlinear Drives", Jon Danielson, President's Undergraduate Research Awards, December, 2005, $1,000.

"Space Tethered Satellite Control", Andrew Timm, President's Undergraduate Research Awards, May, 2005, $1,500.

GTRC travel grant to IFAC (Czech Republic) & REM (France), June, 2005, $1,500.

"Use of Fluid Power to Cancel Low Frequency Vibrations", Varun Sharma, President's Undergraduate Research Awards, Jan. 2005, $1,500.

"The Effects of Input Shaping on a Flexible Nonlinear Robotic Arm with Backlash", Matthew Falkenberg, President's Undergraduate Research Awards, Jan. 2005, $1,500.

"Study of Operator Behavior and Performance Using an Input-Shaped Bridge Crane", Attir Khalid, President's Undergraduate Research Awards, April 2004, $1,000.

"Fluid Power Control of a Hyper-Active Seat for Low-Frequency Vibration Suppression", Earl Lewis, President's Undergraduate Research Awards, December 2003, $960.

GTRC travel grant to IEEE CCA (Turkey) & IEEE MED (Greece), June, 2003,

Champion - EX2079, Page 48 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

$1,500.

"Vibration Reduction for High-Rise Elevators", **Vlad Patrangenaru,** President's Undergraduate Research Awards, April 2003, $800.

"Experimental Verification of Input Shaping Combined with Vibration Absorbers for Oscillatory Systems", President's Undergraduate Research Awards, April 2003, $900.

"Experimental Investigation of Input Shaping with Friction on a Solder Cell Machine", President's Undergraduate Research Awards, December 2002, $900.

"CanSat Project", President's Undergraduate Research Awards, December 2002, $500.

Georgia Tech Foundation Travel Grant to Spain, October 2002, $764.

GTRC travel grant to NCOLS 2001 (Russia), April 2001, $1,406.

"Experimental Apparatus for Input-Shaped Cam Profiles", President's Undergraduate Research Awards, July 2001, $1,250.

GTRC travel grant for Japan lecture tour, October 2000, $1,231.

GTRC travel grant to Advanced Motion Control 2000, February 2000, $1,250.

Other Sources

SURE & SHARP student support (Marie Cox, April Pritchard, Nathan Mauch, Adam Vela, Dwayne Bobb, **Timothy Melano**, **Rory Thomas**, **Kimberly Sheafe**) May 1999 – August 2004, $4,000.

B. As Investigator

RERC on Wheeled Mobility in Everyday Life. PI Dr. Stephen Sprigle. Funding for salary, graduate student support, materials and supplies. November 2003 - October 2008. $134,725. Total project budget $4,750,000.

In-Line Optical Measurement of MicroElectroMechanical Systems (MEMS) Devices During Production. PI Dr. Thomas Kurfess. Funding provided to train high school teacher for mechatronics curriculum transfer from Georgia Tech to Cedar Grove High School. June 2003-August 2003. $6,000.

MARC Siemens - Automation and Drives. PI Dr. Steven Danyluk. Funding provided for graduate and undergraduate student support, hardware development, installation of oscillation controller on the MARC crane and development of portable bridge and tower cranes. August 2002 – August 2012, $889,429.

Champion - EX2079, Page 49 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

HUSCO/Ramirez Laboratories for Fluid Power and Motion Control. PI Dr. Wayne Book. Funding for graduate student support, hardware development, and travel. August 2002-July 2004. $42,775.

F. Other Scholarly and Creative Accomplishments

Patents

[1] W. Singhose, N. Singer, W. Rappole, S. Derezinski, and K. Pasch, "Methods and Apparatus for Minimizing Unwanted Dynamics in a Physical System," US Patent US 5,638,267, June 10, 1997, 1997.

[2] R. Eloundou and W. Singhose, "Command Generation Combining Input Shaping and Smooth Baseline Commands," Patent US 6,920,378, July 19, 2005, 2005.

[3] K. L. Sorensen, W. Singhose, and S. Dickerson, "Combined feedback and command shaping controller for multistate control with application to improving positioning and reducing cable sway in cranes " Patent US 7,970,521, June 28, 2011, 2011.

[4] W. Singhose and D. Kim, "Methods and Systems for Double-Pendulum Crane Control," Patent US 8,235,229, August 7, 2012, 2012.

[5] W. Singhose and K. Peng, "Crane Control Systems and Method," US Patent US9,132,997 Patent Appl. 13/642,075, Sept. 15, 2015.

[6] W. Singhose and J. Vaughan, "Methods and Systems for Improving Positioning Accuracy," US Patent US 8,975,853 B2 Patent Appl. 2011/0298409 A1, 2015.

[7] K. L. Sorensen, W. Singhose, "Crane Motion Control," Patent US 9,776,838, October 3, 2017, 2017.

G. Other Professional

Conferences Organized

NSF Planning Visit: Large Flexible Space Structures, Tokyo Japan, 12/11-12/15/2005.
Siemens Automation and Drives Conference at Georgia Tech Lorraine, 11/29-11/30/04.

Conference Sessions Organized

"Command Shaping in Mechatronics." 7th Mechatronics Forum International Conference, 2000, Atlanta, GA.
"Tutorial: Input Shaping and Time Delay Control of Maneuvering Flexible Structures." 2002 American Controls Conference, Anchorage, AK.

Conference Sessions Chaired

2007 American Control Conference, New York, NY
2006 ICAMEM, Tunis, Tunisia
2004 Japan-USA Symposium on Flexible Automation, Denver, CO.
2004 American Control Conference, Boston, MA.

Champion - EX2079, Page 50 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

2003 American Control Conference, Denver, CO.
2002 2nd IFAC Conference on Mechatronic Systems, Berkeley, CA.
2002 6th International Conference on Motion and Vibration Control, Saitama, Japan
2002 Japan-USA Symposium on Flexible Automation, Hiroshima, Japan.
2002 American Control Conference, Anchorage, AK.
1999 IEEE Conference on Control Applications, Kona, HA.
1998 IEEE Conference on Control Applications, Trieste, Italy.
1995 IFToMM Ninth World Congress on the Theory of Machines and Mechanisms, Milan, Italy.

V. Education

B. Individual Student Guidance

B1. Ph.D. Students

B1.a. Graduated Ph.D. Students

1) Kris Kozak. Started Fall '99. Passed qualifier examination Fall '00. Ph.D. awarded May ’03, "Investigation of Input Shaping for Parallel Manipulators." Currently at Southwestern Research Institute. (coadvised with Dr. Ebert-Uphoff).
2) Erika Biediger-Ooten. Started Fall '98. M.S. Dec. '00. Passed qualifier examination Fall '01. Ph.D. awarded May ’05, “Vibration Reduction Using Command Generation in Formation Flying Satellites.” Currently Engineer at Exxon-Mobil.
3) Mike Robertson. Started Fall '98. M.S. May '01. Passed qualifier examination Spring '02. Ph.D. awarded May ’05, “Command Generation for Tethered Satellite Systems”. Currently Professor at the Naval Academy
4) Joel Fortgang. Started Fall '99. M.S. May '02. Passed qualifier examination Spring '02. Ph.D. awarded May ’06. “Combined Mechanical and Command Design for Micro-Milling Machines”.
5) John Huey. Started Fall ’01. M.S. August '03. Passed qualifier examination Fall '03. Ph.D. awarded August ’06. “Concurrent Design of Feedback and Command Shaping Control”. Currently Controls Engineer - GE Aviation.
6) Jason Lawrence. Started Fall '00. M.S. August '02. Passed qualifier examination Fall '03. Ph.D. awarded August ’06. “Control of Tower Cranes”, Currently Mechanical Engineer at Lexmark.
7) Joshua Vaughan. Started Fall ’02. M.S. May ’04, Ph.D. awarded August ’08” Dynamics and Control of Mobile Cranes”. Currently professor at University of Louisiana-Lafayette.
8) Khalid Sorensen. Started Fall ’03. M.S. May ’05, Ph.D. awarded August ’08. “Combined Feedback Control and Command Shaping of a Bridge Crane.”
9) Adan Vela. Started Fall ’06. Ph.D. awarded Dec. ’11. “Bounds on Controller Taskload Implementing Conflict-Resolution Algorithms in an Airspace.”

Champion - EX2079, Page 51 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

10) Kelvin Peng, Started Spring ’08, Ph.D. awarded Dec. ’13, “Methods for Improving Crane Performance and Ease of Use.”
11) Ehsan Maleki, Started Fall ’08, Ph.D. awarded Dec. ’13, “Control of Human-Operated Machinery with Flexible Dynamics.”
12) James Potter, Started Fall ’09, Ph.D. awarded Dec. ’13, “Input-Shaped Manual Control of Helicopters with Suspended Payloads.”
13) Arto Kivila, Started Fall ‘13, Ph.D. awarded Aug.’17, “Modeling, Estimation and Control for Serial Flexible Robot Arms.”
14) Daichi Fujioka, Started Fall ’10, Ph.D. awarded Aug.’17, “Input-Shaped Model Reference Control for Flexible Systems.”
15) Christopher Adams, Started Fall ’12, Ph.D. awarded Dec. ’18, “Modeling and Control of Backdrivable Flexible Systems”
16) Ali AlSaibie, Started Fall ‘12, Ph.D. awarded Dec. ’18, “Mechatronic Design of Micro Autonomous Underwater Vehicles for Confined Spaces”
17) Arnoldo Castro, Started Spring ’16, Ph.D. awarded Dec. ’19, “Dynamics and Control of Self-Balancing Transporters”

B1.b. In Process Ph.D. Students

1) Alison Jenkins, Started Spring ’20, Passed Quals Fall 2021
2) Tyler Rome, Started Spring ’21, Passed Quals Fall 2022

B2. M.S. Students (Indicate Thesis Option for Each Student)

B2.a. Graduated M.S. Students

1) Mike Kenison. Graduated Dec. '99 - "Command Generation in Control System Design for Systems with Parameter Variations." Currently Development Engineer, Schlumberger.
2) Karen Grosser. Graduated May '00 - "Input Shaping for Telerobotic Manipulators." Currently Development Engineer, Schlumberger.
3) Erika Ooten. Graduated Dec. '00 - "Command Generation for Flexible Systems Using Numerator Dynamics and Sliding Mode Control." Currently Engineer at Exxon-Mobil.
4) Kris Kozak. Graduated Aug. '01 - "Dynamic Analysis of Parallel Manipulators and Digital Input Shaper Computation Using Linear Optimization." Currently a Post-doc at Tsinghua University.
5) Mike Robertson. Graduated May '01. "Methods for Generating Deflection-Limiting Commands." Currently Post-doc at Air Force Research Lab.
6) Joel Fortgang. Graduated May '02 - "Concurrent Design of Input Shaping and Vibration Absorbers."
7) Jason Lawrence. Graduated August '02 - " Using Input Shaping to Optimize Point-to-Point Motions in PD Controlled Systems with Coulomb Friction."

Champion - EX2079, Page 52 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

8) Raynald Eloundou. Graduated August '02 - "Investigation of Various Reference Commands for Vibration Reduction." Currently Mechanical Engineer at Hitachi.
9) John Huey. Graduated August '03. “Dynamics and Vibration Control of Large Area Manipulators.”
10) Sam Klooster. Graduated Spring ’04. “Design of an Active Safety Seat.” Currently mechanical engineer at Lockheed Martin.
11) Joshua Vaughn. Graduated Spring ’04. “Active and Semi-Active Control to Counter Vehicle Payload Variation.” (coadvised with Dr. Nader Sadegh)
12) Khalid Sorensen. Graduated Spring ’05.”A Combined Feedback and Command Shaping Controller for Improving Positioning and Reducing Cable Sway in Cranes”
13) Vlad Patrangenaru. Graduated Spring ’06. “Design of Active Wheelchair Seats to Compensate for Extensor Tone in Children.”
14) Azeem Meruani, Spring ’06. “Tweel Technology Tires for Wheelchairs and Instrumentation for Measuring Everyday Wheeled Mobility”
15) David Blackburn. Graduated Summer ’06. “Control of Space Tethers.”
16) Jim Kitchen. Graduated Summer ’06. “Design of an Dynamic Wheelchair Seat.”
17) Ray Manning. Graduated Spring ’08 “Improving the Control of Two-Mode Flexible Systems with Input Shaping”
18) Jon Danielson. Graduated Summer ’08 “Mobile Boom Crane Dynamics and Control”
19) Andreas Rauch, Graduated Summer ’08 “Stability Analysis of Mobile Boom Cranes”
20) Daichi Fujioka, Graduated Summer ‘10, “Dynamic Stability of Mobile Boom Cranes”
21) Kelvin Peng, Graduated Fall ‘09, “Interfaces and Control Systems for Intuitive Crane Control”
22) Ehsan Maleki, Graduated Summer ’10, “Dynamics and Control of a Small-Scale Mobile Boom Crane”
23) Brice Pridgen, Graduated May ’11, “Comparison of Polynomial Profiles and Input Shaping for Industrial Applications”
24) Arnoldo Castro, Graduated Summer ’12, “Modeling and Dynamic Analysis of a Two-Wheeled Inverted-Pendulum”
25) Christopher Adams, Graduated Summer ’12, “Modeling and Control of Helicopters Carrying Suspended Loads”
26) Eileen Hernandez, Graduated Fall ’12, “Dynamic Characterization and Analysis of Aerial Lifts”
27) Arto Kivila, Graduated Aug. ’13, “Touchscreen Interfaces for Machine Control and Education”
28) Alex Miller, Graduated Dec. ’13, “Dynamics and Control of Dual-Hoist Cranes Moving Distributed Payloads”

Champion - EX2079, Page 53 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

29) Athony Garcia, Graduated Dec. ’14, “Improved Friction, Contact and Dynamic Simulation Model to Study the Behavior of Payloads During Off-Centered Crane Lifts”
30) John Harber, Graduated May ’16, “A Dual Hoist Robot Crane for Large Area Sensing”
31) Sima Rishmawi, Graduated May ’16, “Tip-Over Stability Analysis of Crawler Cranes in Heavy Lifting Applications”
32) Yujia Yang Graduated May ’17, “Automated Longitudinal Payload Lift-up Using Bridge Cranes”
33) Nickolas Johnson, Graduated May’17, “Control of a Folding Quadrotor with a Slung Load Using Input Shaping.”
34) Franziska Schlagenhauf, Graduated Aug. ’17, “A Kinematic Upper Body Model for Evaluating Clothing”
35) Xiaoshu Liu, Graduated Dec. ’17, “Numerical Investigation of Affordable 2D Lidar Sensors for Autonomous Driving Under a Specially-Structured Driving Environment”
36) Luk, Henry, Graduated May '20, Non-thesis Master's, Project: Dynamics of LRA Devices Within Wrist Bands
37) Lyman, Colin, Graduated August '21, Non-thesis Master's, Project: Development of Multi-LRA Devices
38) Ravishankar, Praveen, Graduated August '21, Non-thesis Master's, Project: Development of Haptic Signals for Multi-LRA Devices
39) Schmidt, Ryan, Graduated August '22, Non-thesis Master's, Project: Sensing of LRA Back EMF

B2.b. In Process M.S. Students

1) William Barclay
2) Eemil Harkonen
3) Saee Sholapurkar

B3. Undergraduate Students

Kanako Abe, Hafeez Alam, Ulf Andresen, Derek Bastien, Fernando Bazerghi, Esteban Benero (SURE), Dustin Bergman, Dwayne Bobb (SURE - Morehouse College), Carrie Boles, Justis Brogan, Jeff Clement, Maria Cox (SURE), Jon Danielson, Chuck Devane, Raynald Eloundou, Adrian Erb (Swiss), Matthew Falkenberg (PURA), Brian Fatkin, Jonathon Fonseca, Craig Forest, Damien Gaudry, Terry Hall, Samir Idnani, Walker Inman, Taft Jones (SURE), Paul Jurek, Attir Khalid, Dooroo Kim, Jae-Hyung Kim, Nathan Knight, Prerana Kumar, Bumsoo Lee, Caitlyn Leksana, Earl Lewis, Alan Martin, Timothy Melano (SURE – Berkeley), Ben Myers, Chad Nicholson, Noav Nossenson (SURE), Patrick Opdenbosch, Adnan Pandjou, Tejan Poage, Jessica Powell, April Pritchard

Champion - EX2079, Page 54 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

(SURE), Devshan Renganathan, Caroline Rhee, Nathan Ritz, Nick Sabogal, Prachi Sahoo, Dushyant Sharma, Varun Sharma (PURA), Kimberly Sheafe (SURE – Stanford), Anderson Smith (PURA), Jonathon Smith, Josh Spiers, Christoph Stäheli (Swiss), Lee Stokes, Ethan Stone (PURA), Art Terdpravat, Brandon Terrell, Rory Thomas (SURE – John Hopkins), Andrew Timm, Adam Vela (SURE), Rolf Weiss (Swiss), Amber Welsh, Kevin Yang, Aika Yano, Jieun Yoo.

B5. Mentorship of Postdoctoral Fellows or Visiting Scholars

B5.a. Postdoctoral Fellows

1) Dr. Kris Kozak. June 2003-Dec. 2003, "Development of a Hyperactive Seat."
2) Dr. Joshua Vaughan. Jan. 2010–August 2012, "Development of an Aerospace Manufacturing Center."
3) Dr. Christopher Adams. Jan. '19-present, "Input Shaping Mobile Crane Controllers"

B5.b. Visiting Scholars

1) Prof. Seong-Wook Hong, Kumoh National University, Kumi, Korea, Feb. 2004-Feb. 2005.
2) Prof. Juan de Juanes Marquez, Escuela Tecnica Superior de Ingenieros Industriales (ETSII), Madrid, Spain, June 2005-Dec. 2005.
3) Prof. Yoon-Gyeoung Sung, Chosun University, Gwangju, Korea, July 2006-August 2007.
4) Prof. Mingxiao Dong, Shandong Jianzhu University, China, Dec 2007-May 2008
5) Ji Sup Joon, Division Director, Advanced Fuel Cycle System Eng., Korea Atomic Energy Research Institute, Korea, September 2008-September 2009
6) Prof. Zhang Yizhuo, North East Forestry University, Harbin, China, Dec. 2009 – Dec. 2010
7) Prof. Youmin Hu, Huazhong University of Science & Technology, Wuhan, China, Jan. 2010-Jan 2011
8) Prof. Kyoungseok Park, Kumoh National Institute of Technology, Gumi, Korea, June 2010-June2011
9) Prof. Jie Huang, Beijing Institute of Technology, August 2014-July 2105
10) Prof. Dongjoo Kim, Kumoh National Institute of Technology, Gumi, Korea, Feb. 2016 - Feb. 2017
11) Stanislao Grazioso, Università degli Studi di Napoli "Federico II", Napoli, Italy, August 2016-Dec. 2016
12) Dr. Ali AlSaibie, Kuwait University, July-August 2023

Champion - EX2079, Page 55 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

C. Educational Innovations and Other Contributions

a) New Course Development

ME 6404 - Advanced Control System Design and Implementation. Course was completely overhauled, updated, and expanded for the Fall of 2001. The result was essentially a new course. A book, *Command Generation for Dynamic Systems*, was written to compliment the course curriculum. A portable robotic bridge crane was constructed so that this course could be taught at Georgia Tech Lorraine in the fall of 2004. Siemens sponsored the crane construction and also a two-day conference at GTL that centered on the crane and the associated curriculum development: http://singhose.marc.gatech.edu/SiemensGTL/. A portable tower crane was also constructed for the course. The tower crane was used at Tokyo Tech for 2 years. Students conducted remote operation tests via the internet. The course was also taught at MIT during the fall of 2010 in conjunction with Professor Warren Seering of MIT. The course was expanded in the fall of 2011 to include a distance learning curriculum that uses remote-operated labs.

ME 4863 – Emerging Technology Law. Course was designed to educate engineering students about legal constructs that effect engineering activities in the area of emerging technology. The course is cross listed as BME4853. The course has two main components: Product Liability and Intellectual Property. In addition to weekly lectures, the course includes weekly studio sessions and mock trials.

b) Laboratory Experiments Developed: The new version of Advanced Control System Design and Implementation has a major laboratory component. An entire sequence of laboratory projects were developed for the course using the large bridge crane in the MARC building and hardware in the Love Building hydraulics laboratory. The crane in the MARC building has been equipped with oscillation-reducing technology that is taught in ME6404. The crane was also used as a testbed in the senior-level experimental engineering course, ME4055. Several laboratory projects were developed for ME2110, Creative Decisions and Design. A paper describing these developments was presented at the 2nd IFAC Conference on Mechatronic Systems. A two-week curriculum on PLC programming was developed along with PLC workstations to conduct laboratory activities. Hands-on control experiments for ME4452 (Control Systems) were developed to utilize the NI MyRIO controller along with a flexible-beam experimental setup.

c) Interactive Instructional Materials Developed: Dr. Singhose has developed interactive textbooks for both introductory mechanical design (with an emphasis on mechatronics) and advanced control system implementation (with an emphasis on command-shaping control). Features of interactive textbooks include: embedded videos that can be viewed with the tap of a finger, picture slideshows, user-controlled simulations, and interactive charts that accept user input and provide immediate

Champion - EX2079, Page 56 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

feedback. Dr. Singhose has also developed a series of remote-operated experimental cranes and aerial lifts that have been used extensively in educational activities.

VI. Service

A. Professional Contributions

Journals

Int. Journal of Control, Automation, and Systems (IJCAS), Editorial Board Member, 2005-Present
Mechatronics, Associate Editor, 2008
Control Engineering Practice, Designated Editor, 2007-2010

Conferences

Asian Control Conference, Associate Editor of Contributed Papers, 2017
Int. Symposium on Flexible Automation, Program Chair, 2008
IEEE/ASME Int. Conference on Advanced Intelligent Mechatronics, Program Committee, 2007
Int. Symposium on Flexible Automation, Program Committee, 2006
Advanced Intelligent Mechatronics Program Committee, member, 2005
International Conference on Motion and Vibration Control Program Committee, member, 2004
American Control Conference Program Committee, member, 2004
Japan-USA Symposium on Flexible Automation Program Committee, member, 2004

Reviews

National Science Foundation, Division of Design Manufacturing and Industrial Innovation, proposal reviewer
National Science Foundation, Sensors and Sensor Systems, proposal reviewer
AIAA Journal of Guidance, Control, and Dynamics, reviewer
AIAA Journal of Spacecraft and Rockets, reviewer
AIAA Guidance, Navigation, and Control Conference, reviewer
American Control Conference, reviewer
ASME Journal of Dynamic Systems, Measurement, and Control, reviewer
ASME Design Engineering Technical Conferences, reviewer
ASME Journal of Vibration and Acoustics, reviewer
Automatica, reviewer
Control Engineering Practice, reviewer
Control Systems Technology, reviewer
IEEE/ASME Transactions on Mechatronics, reviewer
IEEE Transactions on Systems, Man, and Cybernetics, reviewer
IEEE Conference on Control Applications, reviewer
IEEE Int. Conference on Robotics and Automation, reviewer
Industrial & Engineering Chemistry Research, reviewer

Champion - EX2079, Page 57 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

Journal of the Franklin Institute, reviewer
Journal of Sound and Vibration, reviewer
Mechatronics, reviewer
Mechatronics 2000, Panel reviewer
Industrial Project Advising
Milliken Summer Faculty Challenge – 2000

B. Public and Community Service
Standards Committees
IEEE Virtual Reality and Augmented Reality Standards Working Group, 2018-2019
ASTM F15.18 - Cribs, Toddler Beds, Play Yards, Bassinets, Cradles and Changing Tables, 2018-2019
ASTM D13-Textiles, D13.66 – Sewn Product Automation subcommittee member, 2017-2019
ASTM F08.52, F08.67 - Pole Vault Pole Testing and Pole Vault Landing Pads subcommittee, member, 2000-2006
USA Track & Field Pole Vault Equipment Task Force, member.

Legislative Testimony
Washington State Legislature, Senate Labor & Commerce Committee, SB5900 – Construction Crane Safety, 1/11/24
Washington State Legislature, House Labor and Workplace Standards Meeting, HB2022 – Construction Crane Safety, 1/12/24

C. Institute Contributions
Organized and supervised Georgia Tech Rescue Robot Team, 2013-present
Organized and supervised Georgia Tech CanSat Team, 2002-2012
ASME Student Group, Faculty Advisor, 2007-2012
SME Student Group, Faculty Advisor, 2001-2007
Pole vault coach for Georgia Tech track and field team (1998-2000)
2009 Chair of Director of Design Search Committee
2015 Chair of Zeigler Woodruff School Outstanding Educator Award Committee

Woodruff School Committee member:
2023 Zeigler Outstanding Educator Award Committee
2022 Zeigler Outstanding Educator Award Committee
2021-23 RPT
2019-21 Graduate Student Development
2015-16 RPT
2016-17 PPR
2013-16 Undergraduate

Champion - EX2079, Page 58 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271

2012 Director of Design Search Committee
2008 HR Director Search Committee
2006-07 Undergraduate
2003-04 Faculty Awards
2001-03 Undergraduate
2000 Faculty Recruiting
1999 Graduate
1998 Undergraduate

Champion - EX2079, Page 59 of 59
Generac Power Systems, Inc. v. Champion Power Equip., Inc.
IPR2025-01271