Aaron M. Johnson

Curriculum Vitae

Contact

Carnegie Mellon University
Mechanical Engineering
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Robomechanics Lab: http://robomechanics.net

Education

Ph.D., Electrical & Systems Engineering, May 2014
University of Pennsylvania, Philadelphia, PA
Thesis: *Self-Manipulation and Dynamic Transitions for a Legged Robot*
Advisor: Daniel E. Koditschek

B.S., Electrical & Computer Engineering, May 2008
Carnegie Mellon University, Pittsburgh, PA
Minors: *Robotics* and *Philosphy*
Advisors: Howie Choset, Tsuhan Chen

Work Experience

Academia

2022– **Associate Professor**
2016–2022 **Assistant Professor**
Mechanical Engineering Department, Carnegie Mellon University, Pittsburgh, PA
Robotics Institute (Courtesy Appointment)
Electrical & Computer Engineering (Courtesy Appointment)

Jan. 2015– **Postdoctoral Fellow, Personal Robotics Lab**
July 2016 Robotics Institute, Carnegie Mellon University, Pittsburgh, PA

May–Dec. 2014 **Postdoctoral Fellow, Kod*Lab**
Electrical & Systems Engineering, University of Pennsylvania, Philadelphia, PA

2008–2014 **Graduate Student Researcher, Kod*Lab**
Electrical & Systems Engineering, University of Pennsylvania, Philadelphia, PA

2005–2008 **Undergraduate Student Researcher, Biorobotics Lab**
Robotics Institute, Carnegie Mellon University, Pittsburgh, PA

Teaching

Spring 2022– **Dynamics** *(Redesigned Course)*

Fall 2018– **Robot Dynamics & Analysis** *(New Course)*

Spring 2018–2020 **Robot Design & Experimentation** *(New Course)*

Fall 2015–2016 **Engineering Optimization**

2006–2007 **Fun with Robots** *(Student College)*

Industry

2023–	**Technical Consultant** Apeiro Motion, Israel
2018–2021	**Senior Scientific Advisor** Ghost Robotics, Philadelphia, PA
2019–2020	**Technical Consultant** Postmates X, San Francisco, CA
2010–2012	**Visiting Graduate Student Researcher** Boston Dynamics, Waltham, MA
Summer 2007	**Electrical Engineering Intern** iRobot Corporation, Burlington, MA

Awards/Honors

Best Paper Finalist, IEEE-RAS Technical Committee on Whole-Body Control, 2023

Best Poster Award, IEEE Intl. Symposium on Multi-Robot and Multi-Agent Systems, 2023

Dean's Early Career Fellow, Carnegie Mellon University, College of Engineering, 2022-2025

Best Workshop Paper, ICRA Workshop on Legged Robots, May 2022

Outstanding Locomotion Paper Finalist, ICRA Conference, May 2022

Outstanding Learning Paper Finalist, ICRA Conference, May 2022

George Tallman Ladd Research Award, Carnegie Mellon University, College of Engineering, 2021

CAREER Award, National Science Foundation, March 2020

Best Paper Finalist, IEEE-RAS Technical Committee on Model-Based Optimization for Robotics, 2019

Young Investigator Award, Army Research Office, December 2018

Best Student Paper Finalist, ICRA Conference, May 2013

Best Student Paper Finalist, CLAWAR Conference, July 2012

David Tuma Laboratory Project Award, Carnegie Mellon University, ECE Dept, May, 2008

Computing Research Association's Outstanding Undergraduate, Honorable Mention, 2008

Tau Beta Pi and **Eta Kappa Nu** Honors societies, 2006-2008

Undergraduate project awards: **IBM Innovation that Matters Award**, **'Thought' Prize for Excellence in Research**, and **Lockheed Martin Undergraduate Project Judges Choice Awards**, Carnegie Mellon University, Meeting of the Minds, May 2005–2008

Publications

Journal Papers

J. Joe Payne, Daniel A. Hagen, Denis Garagić, and Aaron M. Johnson, "Multi-momentum observer contact estimation for bipedal robots," *arXiv Preprint*, 2024

Hongzhe Yu, Diana Frias Franco, Aaron M. Johnson, and Yongxin Chen, "Path integral control for hybrid dynamical systems," *arXiv Preprint*, 2024

Hongzhe Yu, Diana Frias Franco, Aaron M. Johnson, and Yongxin Chen, "Optimal covariance steering of linear stochastic systems with hybrid transitions," *arXiv Preprint*, 2024

J. Joe Payne, James Zhu, Nathan J. Kong, and Aaron M. Johnson, "Hybrid iterative linear quadratic estimation: Optimal estimation for hybrid systems," *IEEE Robotics and Automation Letters*, vol. 10, pp. 3070–3077, 4 2025

Nathan J. Kong, J. Joe Payne, James Zhu, and Aaron M. Johnson, "Saltation matrices: The essential tool for linearizing hybrid dynamical systems," *Proceedings of the IEEE*, vol. 112, pp. 585–608, 6 2024

Joseph Norby, Ardalan Tajbakhsh, Yanhao Yang, and Aaron M. Johnson, "Adaptive complexity model predictive control," *IEEE Transactions on Robotics*, vol. 40, pp. 4615–4634, 2024

Qishun Yu, Catherine Pavlov, Wooshik Kim, and Aaron M. Johnson, "Modeling wheeled locomotion in granular media using 3D-RFT and sand deformation," *Journal of Terramechanics*, vol. 115, p. 100 987, 2024

Sukjun Kim, Aaron M. Johnson, and Sarah Bergbreiter, "Picotaur: A 15 mg hexapedal robot with electrostatically driven, 3D-printed legs," *Advanced Intelligent Systems*, vol. 6, no. 10, p. 2 400 196, 2024

Joe Norby, Sean Wang, Hairong Wang, Shane Deng, *et al.*, "Path to autonomous soil sampling and analysis by ground-based robots," *Journal of Environmental Management*, vol. 360, 2024

Catherine Pavlov and Aaron M. Johnson, "A terramechanics model for high slip angle and skid with prediction of wheel-soil interaction geometry," *Journal of Terramechanics*, vol. 111, pp. 9–19, 2024

Ankit Bhatia, Matthew T. Mason, and Aaron M. Johnson, "Reacting to contact: Transparency and collision reflex in actuation," *arXiv:2212.03469 [cs.RO]*, 2022, Under review

Nathan Kong, Chuanzheng Li, George Council, and Aaron M. Johnson, "Hybrid iLQR model predictive control for contact implicit stabilization on legged robots," *IEEE Transactions on Robotics*, vol. 39, no. 6, pp. 4712–4727, 2023
Best Paper Award Finalist, IEEE-RAS Technical Committee on Whole-Body Control

Valeria Nava, Natasha Sihota, Thomas P. Hoelen, Aaron M. Johnson, and Gregory Lowry, "Portable X-ray fluorescence for autonomous in-situ characterization of chloride in oil and gas waste," *Environmental Pollution*, vol. 316, p. 120 558, 2023

Larry Matthies, Aaron M. Johnson, Monroe Kennedy, Cynthia Matuszek, and Dilip G. Patel, "Editorial: Special issue on Robotics Collaborative Technology Alliance (RCTA) program," *Field Robotics*, vol. 2, pp. 1943–1946, 2022

Stacey Leigh Shield, Aaron M. Johnson, and Amir Patel, "Contact-implicit direct collocation with a discontinuous velocity state," *IEEE Robotics and Automation Letters*, vol. 7, no. 2, pp. 5779–5786, 2022

Nathan J. Kong, J. Joe Payne, George Council, and Aaron M. Johnson, "The Salted Kalman Filter: Kalman filtering on hybrid dynamical systems," *Automatica*, vol. 131, p. 109 752, 2021

Joseph C. Norby, Jun Yang Li, Cameron C. Selby, Amir Patel, and Aaron M. Johnson, "Enabling dynamic behaviors with aerodynamic drag in lightweight tails," *IEEE Transactions on Robotics*, vol. 37, no. 4, pp. 1144–1153, 2021

B. Deniz Ilhan, Aaron M. Johnson, and D. E. Koditschek, "Autonomous stairwell ascent," *Robotica*, vol. 38, no. 1, pp. 159–170, 2020

Amir Patel, Stacey Shield, Saif Kazi, Aaron M. Johnson, and Lorenz T. Biegler, "Contact-implicit trajectory optimization using orthogonal collocation," *IEEE Robotics and Automation Letters*, vol. 4, no. 2, pp. 2242–2249, 2019
Best Paper Award Finalist, IEEE-RAS Technical Committee on Model-Based Optimization for Robotics

B. Deniz Ilhan, Aaron M. Johnson, and D. E. Koditschek, "Autonomous legged hill ascent," *Journal of Field Robotics*, vol. 35, no. 5, pp. 802–832, 2018

Jiaji Zhou, Robert Paolini, Aaron M. Johnson, James Bagnell, and Matthew T. Mason, "A probabilistic planning framework for planar grasping under uncertainty," *IEEE Robotics and Automation Letters*, vol. 2, no. 4, pp. 2111–2118, 2017

Aaron M. Johnson, Jennifer E. King, and Siddhartha Srinivasa, "Convergent planning," *IEEE Robotics and Automation Letters*, vol. 1, no. 2, pp. 1044–1051, 2016

Thomas Libby, Aaron M. Johnson, Evan Chang-Siu, Robert J. Full, and D. E. Koditschek, "Comparative design, scaling, and control of appendages for inertial reorientation," *IEEE Transactions on Robotics*, vol. 32, no. 6, pp. 1380–1398, 2016

Aaron M. Johnson, Samuel E. Burden, and D. E. Koditschek, "A hybrid systems model for simple manipulation and self-manipulation systems," *International Journal of Robotics Research*, vol. 35, no. 11, pp. 1354–1392, 2016

Aaron M. Johnson and Sidney Axinn, "The morality of autonomous robots," *Journal of Military Ethics*, vol. 12, no. 2, pp. 129–141, 2013

Aaron M. Johnson and D. E. Koditschek, "Legged self-manipulation," *IEEE Access*, vol. 1, pp. 310–334, 2013

Conference Papers

Steven Man, Soma Narita, Josef Macera, Naomi Oke, Aaron M. Johnson, and Sarah Bergbreiter, "Zippy: The smallest power-autonomous bipedal robot," in *IEEE Intl. Conference on Robotics and Automation*, To appear, 2025

Shibo Zhao, Honghao Zhu, Yuanjun Gao, Beomsoo Kim, *et al.*, "SuperLoc: The key to robust LiDAR-inertial localization lies in predicting alignment risks," in *IEEE Intl. Conference on Robotics and Automation*, To appear, 2025

Abdel Zaro, Ardalan Tajbakhsh, and Aaron M. Johnson, "Quad-tree based collision detection for scalable multi-robot motion planning," in *Workshop on the Algorithmic Foundations of Robotics*, 2024

Sean J. Wang, Honghao Zhu, and Aaron M. Johnson, "Pay attention to how you drive: Safe and adaptive model-based reinforcement learning for off-road driving," in *IEEE Intl. Conference on Robotics and Automation*, 2024, pp. 16 954–16 960

James Zhu, J. Joe Payne, and Aaron M. Johnson, "Convergent iLQR for safe trajectory planning and control of legged robots," in *IEEE Intl. Conference on Robotics and Automation*, 2024, pp. 8051–8057

Ardalan Tajbakhsh, Lorenz T Biegler, and Aaron M. Johnson, "Conflict-based model predictive control for scalable multi-robot motion planning," in *IEEE Intl. Conference on Robotics and Automation*, 2024, pp. 14 562–14 568

Paul Nadan, Spencer Backus, and Aaron M. Johnson, "LORIS: A lightweight free-climbing robot for extreme terrain exploration," in *IEEE Intl. Conference on Robotics and Automation*, 2024, pp. 18 480–18 486

James Kyle, Justin K. Yim, Kendall Hart, Sarah Bergbreiter, and Aaron M. Johnson, "The simplest walking robot: A bipedal robot with one actuator and two rigid bodies," in *IEEE-RAS International Conference on Humanoid Robots*, 2023

Justin K. Yim, Jiming Ren, David Ologan, Selvin Garcia Gonzalez, and Aaron M. Johnson, "Proprioception and reaction for walking among entanglements," in *IEEE/RSJ International Conference on Intelligent Robots and Systems*, 2023, pp. 2760–2767

Yanhao Yang, Joseph Norby, Justin K. Yim, and Aaron M. Johnson, "Proprioception and tail control enable extreme terrain traversal by quadruped robots," in *IEEE/RSJ International Conference on Intelligent Robots and Systems*, 2023, pp. 735–742

Michael R. Turski, Joseph Norby, and Aaron M. Johnson, "Staged contact optimization: Combining contact-implicit and multi-phase hybrid trajectory optimization," in *IEEE/RSJ International Conference on Intelligent Robots and Systems*, 2023, pp. 2376–2383

James Zhu, Anoushka Shrivastava, and Aaron M. Johnson, "Grounding robot navigation in self-defense law," in *IEEE International Conference on Robot and Human Interactive Communication*, 2023, pp. 2470–2477

J. Joe Payne, Nathan J. Kong, and Aaron M. Johnson, "The uncertainty aware Salted Kalman Filter: State estimation for hybrid systems with uncertain guards," in *IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, 2022, pp. 8821–8828

Paul Nadan, Dinesh Patel, Catherine Pavlov, Spencer Backus, and Aaron M. Johnson, "Microspine design for additive manufacturing," in *IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, 2022, pp. 5640–5647

James Zhu, Nathan J. Kong, George Council, and Aaron M. Johnson, "Hybrid event shaping to stabilize periodic hybrid orbits," in *IEEE Intl. Conference on Robotics and Automation*, Philadelphia, PA, 2022, pp. 6600–6606

Sharfin Islam, Kamal Carter, Justin Yim, James Kyle, Sarah Bergbreiter, and Aaron M. Johnson, "Scalable minimally actuated leg extension bipedal walker based on 3D passive dynamics," in *IEEE Intl. Conference on Robotics and Automation*, Philadelphia, PA, 2022, pp. 207–213
Outstanding Locomotion Paper Finalist

Hans Kumar, J. Joe Payne, Matthew Travers, Aaron M. Johnson, and Howie Choset, "Periodic SLAM: Using cyclic constraints to improve the performance of visual-inertial SLAM on legged robots," in *IEEE Intl. Conference on Robotics and Automation*, Philadelphia, PA, 2022, pp. 9477–9483

Samuel Triest, Matthew Sivaprakasam, Sean J. Wang, Wenshan Wang, Aaron M. Johnson, and Sebastian Scherer, "TartanDrive: A large-scale dataset for learning off-road dynamics models," in *IEEE Intl. Conference on Robotics and Automation*, Philadelphia, PA, 2022, pp. 2546–2552
Outstanding Learning Paper Finalist

Nathan J. Kong, George Council, and Aaron M. Johnson, "iLQR for piecewise-smooth hybrid dynamical systems," in *IEEE Conference on Decision and Control*, 2021, pp. 5374–5381

Sean J. Wang, Samuel Triest, Wenshan Wang, Sebastian Scherer, and Aaron M. Johnson, "Rough terrain navigation using divergence constrained model-based reinforcement learning," in *Conference on Robot Learning*, ser. Proceedings of Machine Learning Research, vol. 164, 2021, pp. 224–233

Sean J. Wang and Aaron M. Johnson, "Domain adaptation using system invariant dynamics models," in *Learning for Dynamics and Control Conference*, ser. Proceedings of Machine Learning Research, vol. 144, 2021, pp. 1130–1141

Joseph Norby and Aaron M. Johnson, "Fast global motion planning for dynamic legged robots," in *IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, Las Vegas, NV, 2020, pp. 3829–3836

Sean J. Wang, Ankit Bhatia, Matthew T. Mason, and Aaron M. Johnson, "Contact localization using velocity constraints," in *IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, Las Vegas, NV, 2020, pp. 7351–7358

Nathan Kong and Aaron M. Johnson, "Optimally convergent trajectories for navigation," in *International Symposium on Robotics Research*, 2019

Ankit Bhatia, Aaron M. Johnson, and Matthew T. Mason, "Direct drive hands: Force-motion transparency in gripper design," in *Robotics: Science and Systems*, Messe Freiburg, Germany, 2019

Catherine Pavlov and Aaron M. Johnson, "Soil displacement terramechanics for wheel-based trenching

with a planetary rover," in *IEEE Intl. Conference on Robotics and Automation*, Montreal, Canada, 2019, pp. 4760–4766

Yifan Hou, Zhenzhong Jia, Aaron M. Johnson, and Matthew Mason, "Robust planar dynamic pivoting by regulating inertial and gripping forces," in *Workshop on the Algorithmic Foundations of Robotics*, San Francisco, CA, 2016, pp. 464–479

Siddhartha S. Srinivasa, Aaron M. Johnson, Gilwoo Lee, Michael C. Koval, *et al.*, "A system for multi-step mobile manipulation: Architecture, algorithms, and experiments," in *International Symposium on Experimental Robotics*, Dana Kulić, Yoshihiko Nakamura, Oussama Khatib, and Gentiane Venture, Eds., vol. 1, Tokyo, Japan: Springer Proceedings in Advanced Robotics, 2016, pp. 254–265

Anna L. Brill, Avik De, Aaron M. Johnson, and D. E. Koditschek, "Tail-assisted rigid and compliant legged leaping," in *IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, Hamburg, Germany, 2015, pp. 6304–6311

Garrett J. Wenger, Aaron M. Johnson, Camillo J. Taylor, and Daniel E. Koditschek, "Semi-autonomous exploration of multi-floor buildings with a legged robot," in *Unmanned Systems Technology XVII*, vol. 9468, Baltimore, MD: SPIE, 2015, 94680B–8

Aaron M. Johnson and Sidney Axinn, "Acting vs. being moral: The limits of technological moral actors," in *IEEE Intl. Symposium on Ethics in Engineering, Science, and Technology*, Chicago, IL, 2014

Aaron M. Johnson and D. E. Koditschek, "Toward a vocabulary of legged leaping," in *IEEE Intl. Conference on Robotics and Automation*, Karlsruhe, Germany, 2013, pp. 2553–2560
Best Student Paper Finalist

Camilo Ordonez, Jacob Shill, Aaron M. Johnson, Jonathan Clark, and Emmanuel Collins, "Terrain identification for RHex-type robots," in *Unmanned Systems Technology XV*, vol. 8741, Baltimore, MD: SPIE, 2013, 87410Q

Aaron M. Johnson, G. Clark Haynes, and D. E. Koditschek, "Standing self-manipulation for a legged robot," in *IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, Algarve, Portugal, 2012, pp. 272–279

Aaron M. Johnson, Thomas Libby, Evan Chang-Siu, Masayoshi Tomizuka, Robert J. Full, and D. E. Koditschek, "Tail assisted dynamic self righting," in *Intl. Conference on Climbing and Walking Robots*, Baltimore, MD, 2012, pp. 611–620
Best Student Paper Finalist

Camilo Ordonez, N. Gupta, E. G. Collins, J. Clark, and Aaron M. Johnson, "Power modeling of the XRL hexapedal robot and its application to energy efficient motion planning," in *Intl. Conference on Climbing and Walking Robots*, Baltimore, MD, 2012, pp. 689–696

G. Clark Haynes, Jason Pusey, Ryan Knopf, Aaron M. Johnson, and D. E. Koditschek, "Laboratory on legs: An architecture for adjustable morphology with legged robots," in *Unmanned Systems Technology XIV*, vol. 8387, Baltimore, MD: SPIE, 2012, 83870W

Aaron M. Johnson, Matthew T. Hale, G. C. Haynes, and D. E. Koditschek, "Autonomous legged hill and stairwell ascent," in *IEEE Intl. Workshop on Safety, Security, & Rescue Robotics*, Kyoto, Japan, 2011, pp. 134–142

Avik De, Goran Lynch, Aaron M. Johnson, and D. E. Koditschek, "Motor sizing for legged robots using dynamic task specification," in *IEEE Intl. Conference on Technologies for Practical Robot Applications*, Boston, MA, 2011, pp. 64–69

Aaron M. Johnson, G. Clark Haynes, and D. E. Koditschek, "Disturbance detection, identification, and recovery by gait transition in legged robots," in *IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, Taipei, Taiwan, 2010, pp. 5347–5353

Cornell G. Wright, Aaron M. Johnson, Aaron Peck, Zachary McCord, *et al.*, "Design of a modular snake robot," in *IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, San Diego, CA, 2007, pp. 2609–2614

Chris Atwood, Felix Duvallet, Aaron M. Johnson, Richard Juchniewicz, *et al.*, "Relative localization in colony robots," in *Natl. Conference on Undergraduate Research*, Lexington, VA, 2005

Thesis and Technical Reports

Justin K. Yim, Paul Nadan, James Zhu, Alexandra Stutt, *et al.*, "Double-anonymous review for robotics," arXiv, Tech. Rep. arXiv:2406.10059 [cs.RO], 2024

Hannah He, Joe Norby, Sean Wang, Natasha Sihota, *et al.*, "Environmental sampling with the boustrophedon decomposition algorithm," arXiv, Tech. Rep. arXiv:2207.06209 [cs.RO], 2022

Mars Ice Core Working Group, "First ice cores from Mars," NASA Whitepaper. co-chairs: M.R. Albert and M. Koutnik, Tech. Rep., 2021

Gargi Sadalgekar, Sean Wang, and Aaron M. Johnson, "Path optimization for autonomous rough terrain traversal," CMU Robotics Institute Summer Scholars Working Papers Journal, Tech. Rep., 2020, pp. 195–199

Matt Martone, Catherine Pavlov, Adam Zeloof, Vivaan Bahl, and Aaron M Johnson, "Enhancing the vertical mobility of a robot hexapod using microspines," arXiv, Tech. Rep. arXiv:1906.04811 [cs.RO], 2019

Shuo Yang, Zhaoyuan Gu, Ruohai Ge, Aaron M Johnson, Matthew Travers, and Howie Choset, "Design and implementation of a three-link brachiation robot with optimal control based trajectory tracking controller," arXiv, Tech. Rep. arXiv:1911.05168 [eess.SY], 2019

Wooshik Kim, Catherine Pavlov, and Aaron M. Johnson, "Developing a simple model for sand-tool interaction and autonomously shaping sand," arXiv, Tech. Rep. arXiv:1908.02745 [cs.RO], 2019

Letong Wang, Sean Wang, and Aaron M. Johnson, "Traversability analysis for highly maneuverable wheeled robots," CMU Robotics Institute Summer Scholars Working Papers Journal, Tech. Rep., 2019, pp. 188–193

Zhiyi Ren and Aaron Johnson, "Toward robust stair climbing of the quadruped using proprioceptive sensing," CMU Robotics Institute Summer Scholars Working Papers Journal, Tech. Rep., 2018, pp. 112–118

Gilwoo Lee, Zita Marinho, Aaron M. Johnson, Geoffrey J. Gordon, Siddhartha S. Srinivasa, and Matthew T. Mason, "Unsupervised learning for nonlinear piecewise smooth hybrid systems," arXiv, Tech. Rep. arXiv:1710.00440 [cs.RO], 2017

Marshal Childers, Craig Lennon, Barry Bodt, Jason Pusey, *et al.*, "US Army Research Laboratory (ARL) robotics collaborative technology alliance 2014 capstone experiment," US Army Research Laboratory, Tech. Rep. ARL-TR-7729, 2016

Sonia Roberts, Jeff Duperret, Aaron M. Johnson, Scott van Pelt, *et al.*, "Desert RHex technical report: Jornada and White Sands trip," University of Pennsylvania, Philadelphia, PA, Tech. Rep., 2014

Aaron M. Johnson, "Self-manipulation and dynamic transitions for a legged robot," Ph.D. dissertation, Electrical & Systems Engineering, University of Pennsylvania, Philadelphia, PA, 2014

Aaron M. Johnson and D. E. Koditschek, "Parametric jumping dataset on the RHex robot," University of Pennsylvania, Philadelphia, PA, Tech. Rep., 2012

Aaron M. Johnson, Cornell Wright III, Matthew Tesch, Kevin Lipkin, and Howie Choset, "A novel architecture for modular snake robots," Robotics Institute, Pittsburgh, PA, Tech. Rep. CMU-RI-TR-11-29, 2011

Kevin C. Galloway, G. C. Haynes, B. Deniz Ilhan, Aaron M. Johnson, *et al.*, "X-RHex: A highly mobile hexapedal robot for sensorimotor tasks," University of Pennsylvania, Philadelphia, PA, Tech. Rep., 2010

Posters and Abstracts

Aaron M. Johnson, "Modeling robot/terrain interaction," in *Robodynamics in Soft Terrains, von Karman Conference*, 2024

Aja Carter and Aaron M. Johnson, "Dynamic gaits in extinct taxa and bio-inspired robots," in *Dynamic Walking*, 2024

Aaron M. Johnson, Aja Carter, Sidney Nimako-Boateng, Sasha Kroman, *et al.*, "Where are our robot spines?" In *Dynamic Walking*, 2024

Selvin Garcia Gonzalez, James Zhu, Ardalan Tajbakhsh, and Aaron M. Johnson, "The effect of gait parameters on safe quadrupedal locomotion: Walking over beams," in *Dynamic Walking*, 2024

Steven Man, Sarah Bergbreiter, and Aaron M. Johnson, "Towards simple and capable bipedal walking robots," in *Dynamic Walking*, 2024

Stacy A. Ashlyn, Yuting Lin, Aaron M. Johnson, Sharon E. Warner, John R. Hutchinson, and Joo H. Kim, "Stability found on slippery ground: Penguin gait study design and results," in *Dynamic Walking*, 2024

Sean J. Wang, Si Heng Teng, and Aaron M. Johnson, "Robust and adaptive rough terrain navigation through training in varied simulated dynamics," in *ICRA Workshop on Resilient Off-road Autonomy*, 2024

James Zhu, Selvin Garcia Gonzalez, Ardalan Tajbakhsh, and Aaron M. Johnson, "Designing safe quadrupedal gaits," in *ICRA Workshop on Advancements in Trajectory Optimization and Model Predictive Control for Legged Systems*, 2024

Ardalan Tajbakhsh, Lorenz T Biegler, and Aaron M. Johnson, "Conflict-based model predictive control for scalable multi-robot motion planning," in *IEEE International Symposium on Multi-Robot and Multi-Agent Systems*, 2023
Best Poster Award

David Ologan, Ardalan Tajbakhsh, Justin K. Yim, Yanhao Yang, *et al.*, "Quad-SDK update: Estimation, underbrush, and other improvements," in *IROS Late Breaking Results*, 2023

Justin K. Yim, James Kyle, Kendall Hart, Sarah Bergbreiter, and Aaron M. Johnson, "Small, stable, steerable bipedal walkers with one and two actuators," in *IROS Demonstration Session*, 2023

J. Joe Payne and Aaron M. Johnson, "Multiple model state estimation for hybrid dynamical systems," in *Dynamic Walking*, 2023

Justin K. Yim, Jiming Ren, David Ologan, Selvin Garcia Gonzalez, and Aaron M. Johnson, "Locomotion through vegetation with legged robots," in *Dynamic Walking*, 2023

Gregory V. Lowry, Aaron M. Johnson, Hairong Wang, Sean Wang, *et al.*, "Autonomous characterization of chloride and total petroleum hydrocarbons in contaminated soils using ground-based robotic platforms," in *Battelle International Symposium on Bioremediation and Sustainable Environmental Technologies*, 2023

J. Joe Payne, Nathan J. Kong, and Aaron M. Johnson, "State estimation for hybrid systems: Saltation based methods," in *IROS Workshop on Agile Robotics*, 2022

James Zhu, Nathan J. Kong, George Council, and Aaron M. Johnson, "Hybrid Event Shaping to stabilize periodic hybrid orbits," in *RSS Workshop on the Science of Bumping Into Things*, 2022

James Zhu and Aaron M. Johnson, "Convergent iLQR for underactuated hybrid dynamical systems," in *RSS Workshop on Risk Aware Decision Making*, 2022

Justin Yim, James Kyle, and Aaron M. Johnson, "Walking and turning with few actuators," in *Dynamic Walking*, 2022

J. Joe Payne, Nathan J. Kong, and Aaron M. Johnson, "Kalman filtering for hybrid systems," in *Dynamic Walking*, 2022

James Zhu and Aaron M. Johnson, "Unifying swing leg retraction, Raibert heuristic, and paddle juggling with hybrid event shaping," in *Dynamic Walking*, 2022

Joseph Norby, Yanhao Yang, Ardalan Tajbakhsh, Jiming Ren, *et al.*, "Quad-SDK: Full stack software framework for agile quadrupedal locomotion," in *ICRA Workshop on Legged Robots*, 2022
Best Workshop Paper

Yanhao Yang, Joseph Norby, Justin K. Yim, and Aaron M. Johnson, "Proprioception and tail control enable extreme terrain traversal by quadruped robots," in *ICRA Workshop on Legged Robots*, 2022

James Zhu and Aaron M. Johnson, "By air or by land: How locomotion methods dictate drone ethics," in *ICRA Workshop on Addressing Ethical and Technical Challenges in the Development, Use and Governance of Lethal Autonomous Weapons Systems*, 2022

Aaron M. Johnson, "Wandering through the desert: How kod*lab launched my career," in *Kod*fest: A Festschrift in Honor of Professor Daniel E. Koditschek*, 2022

Catherine A. Pavlov, Arno Rogg, and Aaron M. Johnson, "Assessing impact of joint actuator failure on lunar rover mobility," in *Lunar Surface Innovation Consortium Spring Meeting*, 2022

Hans Kumar, J. Joe Payne, Matthew Travers, Aaron M. Johnson, and Howie Choset, "Periodic SLAM: Using cyclic constraints to improve the performance of visual-inertial SLAM on legged robots," in *ICRA Workshop on Visual-Inertial Navigation Systems*, 2021

Yanhao Yang, Joseph Norby, Justin K. Yim, and Aaron M. Johnson, "Improving tail compatibility through sequential distributed model predictive control," in *RSS Workshop on Software Tools for Real-Time Optimal Control*, 2021

Justin K. Yim, Kamal Carter, Sharfin Islam, Sarah Bergbreiter, and Aaron M. Johnson, "3D passive dynamics-inspired walking actuated by open loop leg extension," in *Dynamic Walking*, 2021

Joseph C. Norby, Jun Yang Li, Cameron C. Selby, Amir Patel, and Aaron M. Johnson, "Leveraging aerodynamic drag for tails in legged robot locomotion," in *American Physical Society (APS) March Meeting*, 2021

Sean J. Wang, Valeria Nava, Nicholas Jones, Gregory Lowry, and Aaron M. Johnson, "Ground-based robots for soil collection and analysis," in *American Geophysical Union (AGU) Fall Meeting*, 2020

Catherine Pavlov and Aaron M. Johnson, "Field experiments in nonprehensile terrain manipulation with planetary exploration rovers," in *International Symposium on Artificial Intelligence, Robotics and Automation in Space (i-SAIRAS)*, 2020

Nathan Estansi, Ankit Bhatia, and Aaron M. Johnson, "Stator temperature estimation in permanent magnet synchronous motors for low speed direct-drive systems," in *Robotics: Science and Systems Workshop on "Reacting to Contact"*, 2020

Ardalan Tajbakhsh, Nikolai Flowers, and Aaron M. Johnson, "State estimation for legged robots in unstructured terrains," in *Dynamic Walking*, 2020

Kamal Carter, Sharfin Islam, Ryan St. Pierre, Sarah Bergbreiter, and Aaron M. Johnson, "Design and control of a mesoscale hip actuated powered walker," in *Dynamic Walking*, 2020

Sharfin Islam, Kamal Carter, Ryan St. Pierre, Sarah Bergbreiter, and Aaron M. Johnson, "Integrating passive dynamic wobbling with leg extension to produce stable gaits in a two-actuator bipedal robot," in *Dynamic Walking*, 2020

Renee Jessica Wallace, Catherine Pavlov, and Aaron Johnson, "Design of microspine-enhanced spring legs for robotic running and climbing," in *Dynamic Walking*, 2020

Sean J. Wang, Ankit Bhatia, Matt T. Mason, and Aaron M. Johnson, "Contact localization for transparent robots using velocity constraints," in *Dynamic Walking*, 2020

Michael R. Turski, Joseph Norby, and Aaron M. Johnson, "Contact-implicit vs. hybrid trajectory optimization: Performance comparison," in *Dynamic Walking*, 2020

Edward Lu, Nathan J. Kong, J. Joseph Payne, and Aaron M. Johnson, "Generating a dynamic controller for a flamingo inspired robot using deep reinforcement learning," in *Dynamic Walking*, 2020

Joseph Norby and Aaron M. Johnson, "Tail actuation improves quadrupedal robot acceleration," in *Dynamic Walking*, Canmore, Canada, 2019

John Joseph Payne, Nathan J. Kong, and Aaron M. Johnson, "Flamingobot: A flamingo inspired minimal energy standing biped robot," in *Dynamic Walking*, Canmore, Canada, 2019

Cameron Selby, Amir Patel, Peter Li, and Aaron M. Johnson, "Bio-inspired high aerodynamic tail for robot reorientation and stabilization," in *ASME International Mechanical Engineering Congress and Exposition*, Pittsburgh, PA, 2018, IMECE2018–89 710

Wooshik Kim and Aaron M. Johnson, "Simple model for tool interaction on a continuously deformable environment," in *ASME International Mechanical Engineering Congress and Exposition*, Pittsburgh, PA, 2018, IMECE2018–89 452

Catherine Pavlov and Aaron M. Johnson, "Wheel-based trenching: Terramechanics of nonprehensile manipulation for planetary rovers," in *Robotics: Science and Systems Workshop on "Autonomous Space Robotics"*, Pittsburgh, PA, 2018

Joseph Norby and Aaron M. Johnson, "Towards energy optimal design and control of tailed legged robot locomotion," in *Robotics: Science and Systems Workshop on "Unusual Appendages"*, Pittsburgh, PA, 2018

Amir Patel, Philipp Suhrcke, Adam Zeloof, Peter Li, Cameron Selby, and Aaron Johnson, "Tail aerodynamics in cheetahs and robots," in *Robotics: Science and Systems Workshop on "Unusual Appendages"*, Pittsburgh, PA, 2018

Monica Barragan, Nikolai Flowers, and Aaron M. Johnson, "MiniRHex: A small, open-source, fully programmable walking hexapod," in *Robotics: Science and Systems Workshop on "Design and Control of Small Legged Robots"*, Pittsburgh, PA, 2018

Catherine Pavlov and Aaron M. Johnson, "Wheel-based trenching: Terramechanics of nonprehensile manipulation on planetary rovers," in *Robotics: Science and Systems Workshop on "Women In Robotics"*, Pittsburgh, PA, 2018

Aaron M. Johnson, Natha Singhasaneh, and Praxis Bays, "Bioinspired hoof design," in *Dynamic Walking*, Pensacola, FL, 2018

Joseph Norby and Aaron M. Johnson, "Towards energy optimal design and control for inertial reorientation device," in *Dynamic Walking*, Pensacola, FL, 2018

Amir Patel and Aaron M. Johnson, "Wheels versus ankles: Rapid acceleration of a hybrid wheeled-biped robot," in *Dynamic Walking*, Pensacola, FL, 2018

Nikolai Flowers, Monica Barragan, and Aaron M. Johnson, "MiniRHex: An open-source walking hexapod," in *Dynamic Walking*, Pensacola, FL, 2018

Aaron M. Johnson, "Three uses for springs in extension in legged locomotion," in *Dynamic Walking*, Mariehamn, Finland, 2017

Aaron M. Johnson and Thomas Libby, "Morphological reduction on the slip template," in *Dynamic Walking*, Holly, MI, 2016

Thomas Libby, Aaron M. Johnson, Robert J. Full, and D. E. Koditschek, "Design and comparative morphology for inertial reorientation," in *Robotics: Science and Systems Workshop on "Robotic Uses for Tails"*, Rome, Italy, 2015

Thomas Libby, Aaron M. Johnson, Robert J. Full, and D. E. Koditschek, "Comparative morphology of inertial reorientation," in *IEEE International Conference on Robotics and Automation Workshop on "Robotics-Inspired Biology"*, Seattle, WA, 2015

Thomas Libby, Aaron M. Johnson, and Robert J. Full, "Scaling of effectiveness for inertial reorientation," in *Society for Integrative and Comparative Biology Annual Meeting*, West Palm Beach, FL, 2015

Aaron M. Johnson and D. E. Koditschek, "Cellular decomposition and classification of a hybrid system," in *Northeast Robotics Colloquium*, Providence, RI, 2014

Aaron M. Johnson, "Gait design using self-manipulation," in *Robotics: Science and Systems Workshop on "Dynamic Locomotion"*, Berkeley, CA, 2014

Avik De, Aaron M. Johnson, and D. E. Koditschek, "Planar hopping with a leg and a tail," in *Dynamic Walking*, Zurich, Switzerland, 2014

Aaron M. Johnson and D. E. Koditschek, "Robot parkour: The ground reaction complex & dynamic transitions," in *Dynamic Walking*, Pittsburgh, PA, 2013

Aaron M. Johnson and Sidney Axinn, "The morality of autonomous robots," in *Florida Philosophy Association Annual Meeting*, Ft. Lauderdale, FL, 2011

Kevin Woo, Eugene Marinelli, James Kong, Aaron M. Johnson, *et al.*, "Investigating power management in a robot colony," in *Meeting of the Minds*, Carnegie Mellon University, Pittsburgh, PA, 2008
IBM Innovation that Matters Awards and **'Thought' Prize for Excellence in Research**

Aaron M. Johnson and Tsuhan Chen, "Vision-based relative slam," in *Meeting of the Minds*, Carnegie Mellon University, Pittsburgh, PA, 2008

Felix Duvallet, Kevin Woo, James Kong, Aaron M. Johnson, *et al.*, "Control of a robot colony," in *Meeting of the Minds*, Carnegie Mellon University, Pittsburgh, PA, 2007
Lockheed Martin Undergraduate Project Judges Choice Award

Aaron M. Johnson, "A friendly voip box," in *Meeting of the Minds*, Carnegie Mellon University, Pittsburgh, PA, 2007

Felix Duvallet, Aaron M. Johnson, Ryan Kellogg, James Kong, *et al.*, "A robotic platform for exploring emergent behavior," in *Meeting of the Minds*, Carnegie Mellon University, Pittsburgh, PA, 2006

Allison Naaktgeboren, Jessica Kang, Steven Shamlian, Aaron M. Johnson, *et al.*, "Relative localization in colony robots," in *Meeting of the Minds*, Carnegie Mellon University, Pittsburgh, PA, 2005
Lockheed Martin Undergraduate Project Judges Choice Award

Doctoral Students Advised

Ankit Bhatia, *Direct-drive Hands: Making Robot Hands Transparent and Reactive to Contacts*, Coadvised with Matthew T. Mason, 2016–2022

Joseph Norby, *Enabling Autonomous Legged Robot Agility*, 2016–2022

Catherine Pavlov, *Off-Nominal Rover Driving: Terrain Manipulation and Degraded Mobility Compensation*, 2016–2023

Nathan Kong, *Increasing Reliability of Legged Robots in the Presence of Uncertainty*, 2018–2022

Sean Wang, *A Practical Approach to Learning Dynamics for Rough Terrain Navigation*, 2018–2024

J. Joe Payne, *State Estimation Techniques for Hybrid Dynamical Systems*, 2018–2024

James Zhu, *Navigating a Complex World: Improving Robot Outcomes Through Social, Regulatory, and Control Theoretic Approaches*, 2020–2024

Paul Nadan, *Robotic Climbing for Extreme Terrain Exploration*, 2020–

Ardalan Tajbakhsh, Coadvised with Lorenz T. Biegler, 2022–

Diana Frias Franco, 2023–

Steven Man, Coadvised with Sarah Bergbreiter, 2023–

Naomi Oke, 2024–

David Ologan, 2024–

Wensen Liu, 2024–

Invited Talks

2/21/2025 **West Virginia University**, Morgantown, WV

2/7/2025 **Carnegie Mellon University**, Robotics Institute Seminar, Pittsburgh, PA

2/5/2025 **Johns Hopkins University**, Baltimore, MD

10/18/2024 **Stanford University**, Palo Alto, CA

10/17/2024 **University of California San Diego**, San Diego, CA

10/3/2024 **University of Michigan**, Ann Arbor, MI

6/11/2024 **Amazon Robotics**, RoboTalks, Reading, MA

6/10/2024 **The AI Institute**, Cambridge, MA

5/13/2024 **Agile Robotics: From Perception to Dynamic Action**, ICRA Workshop, Yokohama, Japan

2/16/2024 **Carnegie Mellon University**, Mechanical Engineering Seminar, Pittsburgh, PA

9/6/2023 **Georgia Institute of Technology**, Atlanta, GA

7/14/2023 **California Institute of Technology**, Pasadena, CA

7/13/2023 **NASA Jet Propulsion Lab**, Pasadena, CA

3/29/2023 **Ohio State University**, Robotics, Automation, and Autonomy Seminar, Columbus, OH

2/28/2023 **University of Notre Dame**, AME Department Seminar, South Bend, IN

2/23/2023 **Sarcos Technology and Robotics Corporation**, Salt Lake City, UT

5/22/2022 **Kod*fest: What is Robotics?**, Koditschek Festschrift, Philadelphia, PA

4/4/2022 **University of Southern California**, CPS Seminar, Online

10/1/2021 **Perceptive Locomotion**, IROS Workshop, Online

10/1/2021 **Impact-Aware Robotics**, IROS Workshop, Online

7/2/2021 **Software Tools for Real-Time Optimal Control**, RSS Workshop, Online

5/24/2021 **Fielding Legged Robotics off the Beaten Path**, ACC Workshop, Online

5/14/2021 **University of Washington**, Robotics Colloquium, Online

4/23/2021 **Carnegie Mellon University**, Department of Mechanical Engineering Seminar, Online

12/4/2020 **University of Pennsylvania**, GRASP Laboratory Seminar, Online

7/9/2019 **Challenges and Solutions for Legged Robotics**, ACC Workshop, Philadelphia, PA

6/4/2019 **Dynamic Walking**, Canmore, Canada

5/24/2019 **Learning Legged Locomotion**, ICRA Workshop, Montreal, Canada

5/24/2019 **Toward Online Optimal Control of Dynamic Robots**, ICRA Workshop, Montreal, Canada

9/29/2017 **Frontiers in Contact-rich Robotic Interaction**, IROS Workshop, Vancouver, Canada

9/24/2017 **Planning Legged and Aerial Locomotion**, IROS Workshop, Vancouver, Canada

3/10/2016 **Massachusetts Institute of Technology**, Mechanical Engineering Department, Cambridge, MA

2/29/2016 **Brown University**, Computer Science Department, Providence, RI

2/24/2016 **University of North Carolina**, Computer Science Department, Chapel Hill, NC

2/9/2016 **Northwestern University**, Masters in Robotics Seminar, Evanston, IL

1/26/2016 **Carnegie Mellon University**, Department of Mechanical Engineering Seminar, Pittsburgh, PA

12/18/2015 **Carnegie Mellon University**, Bipedal Locomotion Seminar, Pittsburgh, PA

4/8/2015 **Toyota Motor Engineering & Manufacturing North America**, San Jose, CA

4/2/2015 **Locomotion and Manipulation: Why the great divide?** NSF Workshop, Arlington, VA

3/12/2015 **University of Maryland**, Department of Mechanical Engineering Seminar, College Park, NJ

2/4/2015 **Princeton University**, Princeton, NJ

11/21/2014 **University of Pennsylvania**, Law School, The Ethics of Autonomous Weapons Systems Workshop Panelist, Philadelphia, PA

6/26/2014 **Carnegie Mellon University**, Center for Foundations of Robotics Seminar, Pittsburgh, PA

3/4/2014 **Massachusetts Institute of Technology**, CSAIL Center for Robotics Seminar, Cambridge, MA

5/1/2013 **George Washington University**, Department of Computer Science Talk, Washington, DC

11/9/2012 **Stanford University**, Stanford, CA

11/8/2012 **University of California**, Berkeley, CA

11/2/2012 **Northwestern University**, Evanston, IL

4/27/2012 **Royal Veterinary College**, London, UK

2/3/2011 **Boston University**, Neuromorphics Laboratory, Boston, MA

Selected Media Appearances

7/29/2024 **Pittsburgh Post-Gazette**: *Pittsburgh's dino diaspora draws paleontologists from around the world, spurs new tech research* – Article

5/30/2024 **MSN News**: *This little robot could one day explore the furthest reaches of other planets* – Article

5/27/2024 **Interesting Engineering**: *Lizard-like robot climbs walls with insect-inspired passive grippers* – Article

5/24/2024 **New Atlas**: *Rock-climbing robot scales rough walls with bio-inspired grippers* – Article

3/25/2024 **ASME Mechanical Engineering**: *From Minifig to Walking Mini-Robot* – Article

12/19/2023 **Interesting Engineering**: *Meet Mugatu: A steerable bipedal robot with a single motor* – Article

12/18/2023 **Carnegie Mellon University**: *Carnegie Mellon Holds Groundbreaking for Robotics Innovation Center* – Press Release

12/11/2023 **Carnegie Mellon University**: *Big picture, small robot* – Press Release

10/6/2023 **Popular Science**: *Watch robot dogs train on obstacle courses to avoid tripping* – Article

9/1/2023 **Tech Xplore**: *A bipedal robot that can walk using just one actuator* – Article

8/29/2023 **Discover Magazine**: *Introducing The Simplest Walking Robot* – Article

4/7/2023 **Tech Xplore**: *A new design that equips robots with proprioception and a tail* – Article

1/24/2023 **Carnegie Mellon University**: *Gwen's Girls Partnership Fosters Children's Interest in Robomechanics* – Press Release

9/20/2022 **Reuters**: *Elon Musk faces skeptics as Tesla gets ready to unveil 'Optimus' robot* and *Tesla's robot waves but can't walk, yet. Musk plans to make millions of them* – Articles

7/26/2022 **Carnegie Mellon University**: *Open-source software gives a leg up to robot research* – Press Release

5/31/2022 **IEEE Spectrum – Automation**: *A First Small Step Toward a Lego-Size Humanoid Robot* – Article

5/25/2022 **Carnegie Mellon University**: *Roboticists Go Off Road To Compile Data That Could Train Self-Driving ATVs* – Press release

10/31/2021 **ASME Dynamic Systems and Control Division**: *ASME DSCD Podcast Series: Guest Prof. Aaron Johnson* – Podcast interview

5/25/2021 **IEEE Spectrum – Automation**: *The Cheetah's Fluffy Tail Points The Way for Robots With High-Speed Agility* – Article

4/29/2021 **TechCrunch**: *Head, tail, knees and trees (knees and trees)* – Article

9/10/2020 **IEEE Spectrum – Automation**: *Supporting Black Scholars in Robotics* – Article written with Prof. Henny Admoni and Prof. Carlotta Berry

8/13/2020 **Venture Beat**: *How the Pandemic is Influencing Robotics Research* – Article

6/22/2020 **IEEE Spectrum – Automation**: *How Roboticists (and Robots) Have Been Working from Home* – Article

2/21/2020 **Carnegie Mellon University**: *Making tracks in the desert* – Press Release

11/26/2019 **Carnegie Mellon University**: *Pushing Robotics Uphill* – Press Release

8/7/2019 **Future Tech Podcast**: *Designing Robots That Meet the Challenges of the Real World* – Podcast interview

6/12/2019 **IEEE Spectrum – Automation**: *T-RHex Is a Hexapod Robot With Microspines on Its Feet* – Article

3/20/2019 **Carnegie Mellon University**: *Johnson wins ARO Young Investigator Award* – Press release

12/12/2018 **IEEE Spectrum – Automation**: *MiniRHex Makes Wiggly-Legged Unstoppability Tiny and Affordable* – Article

12/6/2017 **Pittsburgh Tribune-Review**: *CMU team finalist for NASA's Mars Ice Challenge to drill for water on Mars* – Article

7/1/2017 **ASME Mechanical Engineering**: *A Leg Up on Robomechanics* – Article

5/28/2017 **Recode**: *Robots copy their coolest moves from animals* – Article

10/5/2016 **The Washington Post**: *Robots could eventually replace soldiers in warfare. Is that a good thing?* – Article written with Vivek Wadhwa

8/23/2016 **Carnegie Mellon University**: *Robomechanics: Aaron Johnson's robotic zoo* – Press release

8/15/2013 **CNN.com What's Next**: *Met RHex – the curvy-legged, leaping robot* – Article

8/13/2013 **Wall Street Journal News Hub**: *All-terrain robot, or overexcited puppy?* – Live video interview

8/13/2013 **The Associated Press**: *Penn researchers strive for a more athletic robot* – Syndicated article and video

7/26/2013 **Fast Company – Co.EXIST Blog**: *This versatile robot can climb just about anywhere* – Article

7/25/2013 **Slate**: *"Parkour robot" jumps around, other robots roll eyes* – Article

7/24/2013 **The Atlantic**: *Hardcore parkour (with robots)* – Article

7/23/2013 **IEEE Spectrum – Automation**: *RHex does parkour all over UPenn* – Article

5/9/2013 **Gizmodo**: *Does This Acrobatic Robot Have Olympic Aspirations?* – Article

5/8/2013 **IEEE Spectrum – Automaton**: *This robot's acrobatic leaps are the coolest thing you'll see today* – Article

8/5/2012 **The Naked Scientist**: *[RHex] the robot gets a tail* – Radio interview

7/31/2012 **Wired**: *Robot uses its tail to land on its feet, just like a cat* – Article

7/30/2012 **Engadget**: *X-RHex Lite robot grows a tail, always lands on its feet* – Article

7/30/2012 **IEEE Spectrum – Automaton**: *XRL hexapod robot gets a tail, learns to use it* – Article

Conference, Workshop, and Seminar Organization

Seminar Series Organizer, "CMU Locomotion Seminar," 2017–2025
http://www.andrew.cmu.edu/user/amj1/locomotion_seminar.html

Workshop Organizer, "2nd Unconventional Robots: Rethinking Robotic Systems Beyond Convention," IEEE ICRA, 2025,
https://sites.google.com/andrew.cmu.edu/2nd-unconventional-robots/home

Workshop Organizer, "Unconventional Robots: Universal Lessons for Designing Unique Systems," IEEE ICRA, 2024,
https://sites.google.com/andrew.cmu.edu/unconventionalrobots/home

Session Organizer, "An Engineering Perspective on Legislation Challenges for Autonomous Delivery Robots," SOLVING FOR X: Toward a Computer Science and Mathematically Informed Law, 2024

Workshop Organizer, "The Science of Bumping Into Things: Towards Robots That Aren't Afraid of Contact," Robotics: Science and Systems Conf., 2022,
https://aaronjoh.github.io/bumping_into_things/

Festchrift Organizer, "Kod*fest: What Is Robotics? The Koditschek Festschrift," 2022
https://kodlab.seas.upenn.edu/kodfest/

Program Organizer, "Inclusion@RSS," 2021
https://sites.google.com/andrew.cmu.edu/inclusion-2021/

Conference Organizer, "Dynamic Walking," 2020

Workshop Organizer, "Reacting to Contact: Enabling Transparent Interactions through Intelligent Sensing and Actuation," Robotics: Science and Systems Conf., 2020, http://ankitbhatia.github.io/reacting_contact_workshop

Workshop Organizer, "Unusual Appendages: Novel, multi-modal, or multi-functional uses for limbs, tails, and other body parts," Robotics: Science and Systems Conf., 2018, https://www.cmu.edu/me/robomechanicslab/ws/rss2018.html

Symposium Organizer, "RSS Area Chair Research Symposium", 2017

Workshop Organizer, "AAAI-RSS Celebrating the 50th Anniversary of Shakey: The Role of AI to Harmonize Robots and Humans," Robotics: Science and Systems Conf., 2015, http://rll.berkeley.edu/RSS2015-BlueSky-Shakey

Workshop Organizer, "Robotic Uses for Tails," Robotics: Science and Systems Conf., 2015, https://www.cmu.edu/me/robomechanicslab/ws/RSS2015.html

Special Session Organizer, "Throwing Your Weight Around: Using Appendage Inertia," CLAWAR Conf., 2012, https://www.cmu.edu/me/robomechanicslab/ws/CLAWAR2012.html

Professional and Editorial

Associate Editor, International Journal of Robotics Research, 2024–

Guest Editor, Journal of Field Robotics Special Issue, 2020–2022

Associate Editor, IEEE International Conference on Robotics and Automation, 2017–2023

NASA Mars Ice Core Working Group, 2020–2021

Program Committee, Robotics: Science and Systems, 2016–2018

International Program Committee, Climbing and Walking Robots Conference (CLAWAR), 2013–2015

Grant review activity: NSF Panelist (2015, 2018, 2023), PITA (2023,2024), MFI (2023), Army Research Office (2018,2022), NASA NSTGRO (2019,2022), ISF (2019), DoD NDSEG (2020), NASA (2020)

Reviewer for numerous journals and conferences including: ASME Journal of Dynamic Systems, Measurement, and Control, Bioinspiration & Biomimetics, Biology Letters, IEEE/ASME Transactions on Mechatronics, IEEE Transactions on Robotics, International Journal of Robotics Research, Robotics and Autonomous Systems, Science Robotics, and SIAM Journal on Applied Dynamical Systems

Professional memberships: *Senior Member*: The Institute of Electrical and Electronics Engineers (IEEE), *Member*: The American Society of Mechanical Engineers (ASME) and The National Society of Black Engineers (NSBE)

Mentoring and Community

Black in Robotics, Reading List and Allies Committee, 2020–

DEI Co-Chair, IEEE/RSJ IROS, 2026

Inclusion Chair, Robotics: Science and Systems, 2021

"From Imagination to Reality: Computer-Aided Design" and other after school/summer programs run in collaboration with Gwen's Girls and Black in Robotics, multiple sessions, 2021–

Faculty Advisor, CMU Tartan Ice Drilling Team, student organization participating in the NASA RASC-AL Mars Ice Challenge, 2017–2019

Robot inspector, website evaluator, and mentor for FIRST Robotics Competition, 2003–2012

Director and instructor for “Career Exploration and Mentoring Program,” an afterschool robotics program for students at nine elementary and middle schools throughout Maryland, 2000–2004