Donghyun **Kim**

Assistant Professor · Update: Aug 2025

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Employment History

University of Massachusetts Amherst — *Amherst, MA, US*

Assistant Professor — *Jan. 2021 - Present*

Massachusetts Institute of Technology — *Cambridge, MA, US*

Postdoctoral Associate — *Jan. 2019 - Dec.2020*

University of Texas at Austin — *Austin, TX, US*

Postdoctoral Scientist — *Jan. 2018 - Jan. 2019*

Education

University of Texas at Austin — *Austin, TX, US*

Ph.D in Mechanical Engineering, Advisor: Luis Sentis — *Sep. 2012 - Dec. 2017*

SNU (Seoul National University) — *Seoul, S.Korea*

M.S. in Mechanical Engineering, Advisor: Frank C. Park — *Mar. 2010 - Feb. 2012*

KAIST(Korea Advanced Institute of Science and Technology) — *Daejeon, S.Korea*

B.S. in Mechanical Engineering, Advisor: Sukyung Park — *Mar. 2003 - Aug. 2007*

External Grant

2025	**National Institutes of Health (NIH), PI**, Human-Centered Development of Guide-dog Robots	*$ 324k (Total: $ 624k)*
2025	**National Science Foundation (NSF), Co-PI**, MATH-DT: Functional Surrogate Modeling for Human Agile Locomotion with Wearable Technology	*$ 120k (Total: $ 490k)*
2025	**NVIDIA Academic Grant Program Award, PI**, Vision Language Model of Guide-Dog Robots for Blind and Low Vision Individuals	*RTX PRO 6000 GPU x4*
2025	**AlphaZ, PI**, Door Opening of a Humanoid Robot using a Non-holonomic Mobile Base	*$ 20k*
2024	**National Science Foundation (NSF), PI**, Rapid Perception-Based Terrain-Adaptive Agile Locomotion of a Humanoid Robot	*$ 520k (Total: $ 924k)*
2024	**Army Research Laboratory (ARL), Co-PI**, SPARC: Swift Preparation for Adversary-Resilient Contact through Contrastive Neurosymbolic Adaptation	*$ 610k (Total: $ 1.4M)*
2022	**National Robotics Initiative 3.0 (NSF-NRI), Co-PI**, A Novel Framework for the Hardware and Control Co-design of Dynamic Humanoid Robots with Electric Motors	*$ 350k (Total: $ 1.2M)*
2022	**Stanford University Restore Center Pilot Project Award, Co-PI**, Mobile Robot System to measure human kinematics in the real-world environments	*$ 15k (Total: $ 30k)*

Internal Grant

2024	**UMass Center for Personalized Health Monitoring, Co-PI**, A Novel Bio-Inspired Exfoliation Platform for Assistive Robots	*$ 7k (Total: $ 20k)*
2022	**UMass Mutual Mentoring Award, Co-PI**, A Novel Bio-Inspired Exfoliation Platform for Assistive Robots	*$ 1.5k (Total: $ 6k)*

Honors & Awards

2024 **Finalist - Best WBC Paper**, IEEE Whole-body control TC
2024 **Best Paper Award**, ACM Conference on Human Factors in Computing Systems (CHI)
2024 **Finalist - Best Paper Award**, International Conference on Ubiquitous Robots (UR)
2023 **Sloan Faculty Fellowship**, Sloan Foundation
2022 **Finalist - Outstanding Dynamics and Control Paper**, ICRA
2020 **Best Paper Award**, IEEE Transactions on Mechatronics
2016 **Finalist - Best WBC Paper**, IEEE Whole-body control TC
2016 **Finalist - Best WBC Video Award**, IEEE Whole-body control TC

Publications and Patent

Journals

1. Zhu, Shifan, Zixun Xiong, and **Donghyun Kim**. CEAR: Comprehensive Event Camera Dataset for Rapid Perception of Agile Quadruped Robots. IEEE Robotics and Automation Letters, 2024.
2. Jacoff, Adam, Jeongmin Jeon, Oliver Huke, Dimitrios Kanoulas, Sehoon Ha, **Donghyun Kim**, and Hyungpil Moon. Taking the First Step Toward Autonomous Quadruped Robots: The Quadruped Robot Challenge at ICRA 2023 in London [Competitions]. IEEE Robotics & Automation Magazine, 2023.
3. Zhongyang Zhang, Kaidong Chai, Haowen Yu, Ramzi Majaj, Francesca Walsh, Edward Wang, Upal Mahbub, Hava Siegelmann, **Donghyun Kim**, and Tauhidur Rahman. Neuromorphic High-Frequency 3D Dancing Pose Estimation in Dynamic Environment. Neurocomputing, 2023.
4. **Donghyun Kim**, Steven Jens Jorgensen, Jaemin Lee, Junhyeok Ahn, Jiawen Luo, and Luis Sentis. Dynamic Locomotion For Passive-Ankle Biped Robots And Humanoids Using Whole-Body Locomotion Control. International Journal of Robotics Research, 2020.
5. **Donghyun Kim**, Junhyeok Ahn, Orion Campbell, Nicholas Paine, and Luis Sentis. Investigations of a Robotic Testbed with Viscoelastic Liquid Cooled Actuators. IEEE Transactions on Mechatronics, 2018. **Best Paper Award**
6. **Donghyun Kim**, Ye Zhao, Gray Thomas, Benito Fernandez, and Luis Sentis. Stabilizing series-elastic point-foot bipeds using whole-body operational space control. IEEE Transactions on Robotics, 32(6):1362–1379, 2016. **Finalist of Best WBC Paper Award**
7. **Donghyun Kim**, Cheongjae Jang, and Frank C Park. Kinematic feedback control laws for generating natural arm movements. Bioinspiration & Biomimetics, 9(1):016002, 2014.
8. Jianwen Luo, Yao Su, Lecheng Ruan, Ye Zhao, **Donghyun Kim**, Luis Sentis, and Chenglong Fu. Robust Bipedal Locomotion Based on a Hierarchical Control Structure. Robotica, 2019.

Peer-reviewed conferences papers

1. Georges Chebly, Spencer Little, Nisal Perera, Aliya Abedeen, Ken Suzuki, and **Donghyun Kim**. Strong, Accurate, and Low-Cost Robot Manipulator, IEEE-RAS 24th International Conference on Humanoid Robots (Humanoids), 2025.
2. Daniel Marew, Nisal Perera, Shangqun Yu, Sarah Roelker, and **Donghyun Kim**. A Biomechanics-Inspired Approach to Soccer Kicking for Humanoid Robots, In 2024 IEEE-RAS 23rd International Conference on Humanoid Robots (Humanoids), 2024.
3. Shangqun Yu, Nisal Perera, Daniel Marew, and **Donghyun Kim**. Learning Generic and Dynamic Locomotion of Humanoids Across Discrete Terrains, In 2024 IEEE-RAS 23rd International Conference on Humanoid Robots (Humanoids), 2024.
4. Nisal Perera, Shangqun Yu, Daniel Marew, Mack Tang, Ken Suzuki, Aidan McCormack, Shifan Zhu, Yong-Jae Kim, and **Donghyun Kim**. StaccaToe: A Single-Leg Robot that Mimics the Human Leg and Toe. In IEEE-RAS International Conference on Intelligent Robots and System (IROS), 2024.
5. Hochul Hwang, Sunjae Kwon, Yekyung Kim, and **Donghyun Kim**. Is it safe to cross? Interpretable Risk Assessment with GPT-4V for Safety-Aware Street Crossing, In 2024 International Conference on Ubiquitous Robots (UR), 2024. **Best Paper Finalist**
6. Neil Guan, Shangqun Yu, Shifan Zhu, and **Donghyun Kim**. Impedance Matching: Enabling an RL-Based Running Jump in a Quadruped Robot, In International Conference on Ubiquitous Robots (UR). IEEE, 2024.
7. Hochul Hwang, Hee-Tae Jung, Nicholas A Giudice, Joydeep Biswas, Sunghoon Ivan Lee, and **Donghyun Kim**. Towards Robotic Companions: Understanding Handler-Guide Dog Interactions for Informed Guide Dog Robot Design, In ACM Conference on Human Factors in Computing Systems (CHI), 2024. **Best Paper Award**
8. Daniel Marew, Misha Lvovsky, Shangqun Yu, Shotaro Sessions, and **Donghyun Kim**. Integration of Riemannian Motion Policy with Whole-Body Control for Collision-Free Legged Locomotion, In 2023 IEEE-RAS 22nd International Conference on Humanoid Robots (Humanoids), 2023.
9. Shifan Zhu, Zhipeng Tang, Michael Yang, Erik Learned-Miller, and **Donghyun Kim**. Event Camera-based Visual Odometry for Dynamic Motion Tracking of a Legged Robot Using Adaptive Time Surface, In IEEE-RAS International Conference on Intelligent Robots and System (IROS), 2023.
10. Hochul Hwang, Tim Xia, Ibrahima Keita, Ken Suzuki, Joydeep Biswas, Sunghoon I. Lee, and **Donghyun Kim**. System configuration and navigation of a guide dog robot: Toward animal guide dog-level guiding work. In IEEE International Conference on Robotics and Automation (ICRA), 2023.
11. Se Hwan Jeon, Sangbae Kim, **Donghyun Kim**. Real-time Optimal Landing Control of the MIT Mini Cheetah, In IEEE-RAS International Conference on Robotics and Automation (ICRA), 2022. **Finalist of Outstanding Dynamics and Control Paper Award (ICRA), Finalist of Best WBC Paper Award (IEEE/WBC-TC)**
12. Zuoxin Tang, **Donghyun Kim**, Sehoon Ha. Learning Agile Motor Skills on Quadrupedal Robots using Curriculum Learning, In International Conference on Robot Intelligence Technology and Applications (RiTA), 2021.
13. Gabriel B Margolis, Tao Chen, Kartik Paigwar, Xiang Fu, **Donghyun Kim**, Sang bae Kim, Pulkit Agrawal. Learning to Jump from Pixels. In Conference on Robot Learning (CoRL), 2021.
14. Md Mahmudur Rahman, Tauhidur Rahman, **Donghyun Kim**, Mohammad Arif Ul Alam. Knowledge Transfer across Imaging Modalities Via Simultaneous Learning of Adaptive Autoencoders for High-Fidelity Mobile Robot Vision, In IEEE-RAS International Conference on Intelligent Robots and System (IROS), 2021.

15. M Chignoli, **Donghyun Kim**, E Stanger-Jones, and Sangbae Kim. The MIT Humanoid Robot: Design, Motion Planning, and Control For Acrobatic Behaviors. In IEEE-RAS International Conference on Humanoid Robots (Humanoid), 2021.
16. Lindsay Epstein, Andrew SaLoutos, **Donghyun Kim**, and Sangbae Kim. Bi-Modal Hemispherical Sensors for Dynamic Locomotion and Manipulation . In IEEE-RAS International Conference on Intelligent Robots and System (IROS), 2020.
17. Thomas Dudzik, Matthew Chignoli, Gerardo Bledt, Bryan Lim, Adam Miller, **Donghyun Kim**, and Sangbae Kim. Robust Autonomous Navigation of a Small-Scale Quadruped Robot in Real-World Environments. In IEEE-RAS International Conference on Intelligent Robots and System (IROS), 2020.
18. **Donghyun Kim**, Daniel Carballo, Jared Di Carlo, Benjamin Katz, Gerardo Bledt, Bryan Lim, and Sangbae Kim. Vision Aided Dynamic Exploration of Unstructured Terrain with a Small-Scale Quadruped Robot. In IEEE-RAS International Conference on Robotics and Automation (ICRA). IEEE, 2020.
19. Meng Yee Chuah, Lindsay Epstein, **Donghyun Kim**, Juan Romero, and Sangbae Kim. Bi-Modal Hemispherical Sensor: A Unifying Solution for Three Axis Force and Contact Angle Measurement. In IEEE-RAS International Conference on Intelligent Robots and System (IROS). IEEE, 2019.
20. Junhyeok Ahn, **Donghyun Kim**, Seunghyeon Bang, Nick Paine, Luis Sentis. Control of A High Performance Bipedal Robot using Viscoelastic Liquid Cooled Actuators. In IEEE-RAS 19th International Conference on Humanoid Robots (Humanoids). IEEE, 2019.
21. **Donghyun Kim**, Steven Jorgensen, Hochul Hwang, and Luis Sentis. Control Scheme and Uncertainty Considerations for Dynamic Balancing of Passive-Ankled Bipeds and Full Humanoids. In 2018 IEEE-RAS 18th International Conference on Humanoid Robots (Humanoids). IEEE, 2018.
22. **Donghyun Kim**, Jaemin Lee, Junhyeok Ahn, Orion Campbell, Hochul Hwang, and Luis Sentis. Computationally-Robust and Efficient Prioritized Whole-Body Controller with Contact Constraints. In IEEE-RAS International Conference on Intelligent Robots and System (IROS). IEEE, 2018.
23. Junhyeok Ahn, Orion Campbell, **Donghyun Kim**, and Luis Sentis. Fast Kinodynamic Bipedal Locomotion Planning with Moving Obstacles. In IEEE-RAS International Conference on Intelligent Robots and System (IROS). IEEE, 2018.
24. **Donghyun Kim**, Orion Campbell, Junhyeok Ahn, Nicholas Paine, and Luis Sentis. Investigations of Viscoelastic Liquid Cooled Actuators Applied for Dynamic Motion Control of Legged Systems. In 2017 IEEE-RAS 17th International Conference on Humanoid Robots (Humanoids). IEEE, 2017.
25. Jianwen Luo, Ye Zhao, **Donghyun Kim**, Oussama Khatib, Luis Sentis. Locomotion Control of Three Dimensional Passive-Foot Biped Robot Based on Whole Body Operational Space Framework. 2017 IEEE International Conference on Robotics and Biomimetics (ROBIO), IEEE, 2017.
26. **Donghyun Kim**, Steven Jens Jorgensen, Peter Stone, and Luis Sentis. Dynamic behaviors on the NAO robot with closed-loop whole body operational space control. In 2016 IEEE-RAS 16th International Conference on Humanoid Robots (Humanoids), pages 1121–1128. IEEE, 2016.
27. **Donghyun Kim**, Gray Thomas, and Luis Sentis. A method for dynamically balancing a point foot robot. In 2015 IEEE-RAS 15th International Conference on Humanoid Robots (Humanoids), pages 901–907. IEEE, 2015.
28. Ye Zhao, **Donghyun Kim**, Gray Thomas, and Luis Sentis. "Hybrid multi-contact dynamics for wedge jumping locomotion behaviors." In Proceedings of the 18th International Conference on Hybrid Systems: Computation and Control, pp. 293-294. ACM, 2015.
29. **Donghyun Kim**, Gray Thomas, and Luis Sentis. Continuous Cyclic Stepping on 3D Point-Foot Biped Robots Via Constant Time to Velocity Reversal. In The 13th International Conference on Control, Automation, Robotics and Vision, Singapore, December 2014.
30. **Donghyun Kim**, Ye Zhao, Gray Thomas, and Luis Sentis. Empirical Modifications to a Phase Space Planner Which Compensates for Low Stiffness Actuation in a Planar, Point-Foot, Biped Robot. In the ASME 2014 Dynamic Systems and Control Conference, page V001T11A001. ASME, 2014.
31. Y Zhao, **Donghyun Kim**, B Fernandez, and L Sentis. Phase space planning and robust control for data-driven locomotion behaviors. In 2013 13th IEEE-RAS International Conference on Humanoid Robots (Humanoids), pages 80–87. IEEE, 2013.

Patent

1. Sangbae Kim, Meng Yee Chuah, Lindsay Epstein, **Donghyun Kim**, and Juan Romero. Sensing system. U.S. Patent Application 16/409,537, filed September 24, 2020.

Workshop papers

1. Hochul Hwang, Ken Suzuki, Nicholas A Giudice, Joydeep Biswas, Sunghoon Ivan Lee, and **Donghyun Kim**. Lessons Learned from Developing a Human-Centered Guide Dog Robot for Mobility Assistance, ASSETS Workshop on the Future of Urban Accessibility, 2024.
2. Shifan Zhu, Nisal Perera, Shangqun Yu, Hochul Hwang, and **Donghyun Kim**. Dynamic Object Avoidance using Event-Data for a Quadruped Robot. IROS Workshop on Integrated Perception, Planning, and Control for Physically and Contextually-Aware Robot Autonomy, 2023.

Preprints

1. Shangqun Yu, Hochul Hwang, Trung M. Dang, Joydeep Biswas, Nicholas A. Giudice, Sunghoon Ivan Lee, and **Donghyun Kim**. Human-Centered Development of Guide Dog Robots: Quiet and Stable Locomotion Control. arXiv.org, May 2025.
2. **Donghyun Kim**, Jared Di Carlo, Benjamin Katz, Gerardo Bledt, and Sangbae Kim. Highly Dynamic Quadruped Locomotion via Whole-Body Impulse Control and Model Predictive Control. arXiv.org, September 2019.
3. **Donghyun Kim**, Jaemin Lee, and Luis Sentis. Robust Dynamic Locomotion via Reinforcement Learning and Novel Whole Body Controller. arXiv.org, August 2017.

4. Steven Jens Jorgensen, Orion Campbell, Travis Llado, **Donghyun Kim**, Junhyeok Ahn, and Luis Sentis. Exploring Model Predictive Control to Generate Optimal Control Policies for HRI Dynamical Systems. arXiv.org, January 2017.
5. **Donghyun Kim**, Ye Zhao, Gray Thomas, and Luis Sentis. Assessing Whole-Body Operational Space Control in a Point-Foot Series Elastic Biped: Balance on Split Terrain and Undirected Walking. arXiv.org, page 2855, January 2015.

Student Awards

2025 **Humanoids 2025 IEEE/RAS Travel Support**, Nisal Perera, Ph.D
2025 **Proposal Writing Fellowship (UMass Amherst, CICS)**, Daniel Marew, Ph.D
2025 **Robert and Deanna Hagerty Robotics Scholarship**, Anh Nguyen, Undergraduate
2025 **Robert and Deanna Hagerty Robotics Scholarship**, Shifan Zhu, Ph.D
2024 **1st Place at TAPIA Poster Competition**, Shiven Patel, Undergraduate
2024 **UMass Amherst Rising Researcher**, Shiven Patel, Undergraduates
2024 **Robert and Deanna Hagerty Robotics Scholarship**, Hochul Hwang, Ph.D
2022 **Edward Riseman and Allen Hanson Scholarship**, Shifan Zhu, Ph.D
2020 **Spaulding-Smith Fellowship**, Daniel Marew, Ph.D

Selected Media Coverage

2024	**A New Dog Learns Old Tricks**, [Magazine Online Link]	*Significant Bits Magazine*
2021	**MIT is Building a Dynamic, Acrobatic Humanoid Robot**, [Article Link]	*IEEE spectrum*
2019	**These dog-like robots do backflips and play soccer. Yes, they're adorable**, [Article Link]	*CNN Business*
2019	**Highly Dynamic Quadruped Locomotion**, [Page Link]	*IEEE spectrum*
2019	**Dynamic Locomotion of DRACO Bipedal Robot**, [Page Link]	*IEEE spectrum*
2018	**Biped Robot Balancing**, [Link]	*UT Austin News*
2018	**Aspiring engineers constructing robots for the present and future**, [Video Link]	*KVUE News*
2018	**Mercury robot experiment video**, [Link]	*IEEE spectrum*
2015	**Presentation in Dynamic Walking 2015**, [Page Link]	*IEEE spectrum*
2015	**Point-foot biped robot balancing**, [Page Link]	*IEEE spectrum*
2014	**2D point-foot biped robot walking**, [Page Link]	*IEEE spectrum*

Teaching

Advanced Robot Dynamics and Control — *University of Massachusetts Amherst*
Instructor — *Fall 2023, Fall 2024, Spring 2025*

Make: A Hands-on introduction to physical computing — *University of Massachusetts Amherst*
Instructor — *Spring 2022, Spring 2023*

Introduction to Robotics — *University of Massachusetts Amherst*
Instructor — *Fall 2021, 2022, Spring 2025*

Bio-inspired Robotics — *MIT*
Lecture Assistant — *Sep. - Dec. 2019/2020*