

Justin Yim

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July 2024

EDUCATION

University of California - Berkeley PhD, Electrical Engineering	2015-2020
University of Pennsylvania MSE Robotics BSE Double Major Mechanical Engineering and Electrical Engineering	2010-2015

RESEARCH AND WORK EXPERIENCE

Assistant Professor <i>University of Illinois Urbana-Champaign</i> Mechanical Science and Engineering Department	Jan 2023–current
Postdoctoral Researcher <i>Robomechanics Lab - Carnegie Mellon University</i> Legged robotics research supported by the 2020 Computing Innovation Fellowship.	2020-2022
Postdoctoral Researcher <i>Biomimetic Millisystems Lab - University of California Berkeley</i>	Summer 2020
Graduate Student Researcher <i>Biomimetic Millisystems Lab - University of California, Berkeley</i> Hopping Control and Estimation for a High-performance Monopedal Robot, Salto-1P [2-4], [6-8], [10].	2015–2020
Undergraduate Research Assistant <i>Collective Dynamics and Controls Lab - University of Maryland</i> Pursuit control with autonomous hovercraft [1], [5].	Summer 2014
Instrumentation Intern <i>SpaceX</i>	Summer 2013
Intern <i>KMel Robotics</i>	Summer 2012
Undergraduate Research Assistant <i>Dr. Daniel Lee's lab - University of Pennsylvania</i> Autonomous quadrotor landing and charging using monocular visual servoing.	2011-2012

GRANTS

Army Research Office Grant <i>Legged Locomotion on Compliant Terrain</i> Helped write successful grant proposal.	2017-2020
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TEACHING

ME370: Design I Fall 2024

Instructor

Project-based design course for mechanical engineering juniors covering prototyping, linkages, cams, and related mechanisms.

ME446/SE422/ECE489: Robot Dynamics and Control Spring 2023, 24

Instructor

Hands-on robotics course with an associated lab class taught by co-instructor.

EE192: Mechatronics Design Lab Spring 2019

GSI Teaching Assistant

Lectured lab sections and built demos for semester-long line racing car project.

EE16B: Designing Information Devices and Systems II Spring 2017

GSI Teaching Assistant

Led discussion section and developed homeworks and discussion worksheets.

Mentoring

Mentored 15 undergraduates and two master's students

HONORS AND AWARDS

UIUC CITL List of Teachers Ranked as Excellent by Their Students

Semesters: S2023, F2024, S2024

CMU Mechanical Engineering Outreach Stars Silver level 2021-2022

ICRA 2022 6th Workshop on Legged Robots Best Paper 2022

“Quad-SDK: Full Stack Software Framework for Agile Quadrupedal Locomotion.”

ICRA 2022 Outstanding Locomotion Paper Finalist 2022

“Scalable Minimally Actuated Leg Extension Bipedal Walker Based on 3D Passive Dynamics.” [12]

Robotics: Science and Systems (RSS) Pioneer 2021

ICRA 2021 Outstanding Reviewer Award 2021

Computing Innovation Fellow 2020

Two year postdoctoral fellowship by the Computing Research Association (CRA) and Computing Community Consortium (CCC).

Demetri Angelakos Memorial Achievement Award 2020

Awarded to a UCB EECS PhD student who takes the time to help colleagues beyond the normal cooperation existing between fellow students.

ICRA 2019 Best Student Paper Award 2019

“Drift-free Roll and Pitch Estimation for High-acceleration Hopping.” [8] ICRA is the IEEE RAS flagship conference with 2916 papers submitted and 1389 accepted.

IROS 2017 Best Paper Award 2017

“Repetitive Extreme-acceleration (14-g) Hopping with Salto-1P.” [6] IROS is the second largest robotics conference with 2164 papers submitted and 970 accepted.

NSF Graduate Research Fellowship Program Honorable Mention 2016

Ralph Teetor Award	2014
Awarded to one UPenn ME senior for ingenuity, creativity, scholarship, & service.	
Norman Gross Senior Design Project Award	2014
University of Pennsylvania ESE Department senior design top award.	
All-SEAS Senior Design Second Place	2014
University of Pennsylvania School of Engineering and Applied Sciences	
Rachleff Scholars Best Presentation and Poster	2012
University of Pennsylvania School of Engineering and Applied Sciences	

INVITED TALKS AND GUEST LECTURES

ICRA 2024 Workshop: Impulsive Motion in Soft Robotic and Microrobotic Systems	
Invited Talk	May 2024
“Series-elastic hopping and jumping”	
Northwestern University Invited Talk	October 2024
“Small robots traversing the world at large”	
University of Iowa Invited Talk	September 2023
“Small robots traversing the world at large”	
UIUC Guest lecture: Whole-body Musculoskeletal Biomechanics	March 2023
“Salto-1P: Saltatorial Locomotion on Terrain Obstacles”	
CMU Locomotion Seminar	December 2022
“Proprioception and reaction for walking in underbrush”	
University of Illinois Urbana Champaign Invited Talk	March 2022
“Unconventional Locomotion: Hopping, Leaping, and Disentangling”	
George Mason University Invited Talk	March 2022
“Unconventional Locomotion: Hopping, Leaping, and Disentangling”	
Columbia University Invited Talk	February 2022
“Unconventional Locomotion: Hopping, Leaping, and Disentangling”	
UC Santa Barbara Invited Talk	February 2022
“Unconventional Locomotion: Hopping, Leaping, and Disentangling”	
University of Michigan Invited Talk	January 2022
“Unconventional Locomotion: Hopping, Leaping, and Disentangling”	
Purdue University Invited Talk	January 2022
“Unconventional Locomotion: Hopping, Leaping, and Disentangling”	
CMU Guest Lecture: Robot Design and Experimentation	February 2021
“Locomotion and Gaits”	
CMU Joint Guest Lecture: Linear Control Systems	December 2020
“Legged robot control and estimation: hopping”	
University College London RPL Lab Robotics Seminar	November 2020

“Saltatorial Locomotion on Terrain Obstacles”	
University of Pennsylvania MEAM/GRASP Seminar	November 2020
“Saltatorial Locomotion on Terrain Obstacles”	
CMU Locomotion Seminar	September 2020
“Saltatorial Locomotion on Terrain Obstacles”	
Massachusetts Institute of Technology Invited Talk	February 2020
“Saltatorial Locomotion on Terrain Obstacles”	
UCB Guest Lecture: Introduction to Robotics	November 2019
“Salto-1P: Control and Estimation Experiments”	
UCB Guest Lecture: Feedback Control of Legged Robots	Nov 2018 & 2019
“Salto-1P: Saltatorial Locomotion on Terrain Obstacles”	
Italian Institute of Technology Invited Talk	November 2018
“Salto-1P: Saltatorial Locomotion on Terrain Obstacles”	
Master Class: “Building Small Robots”	

SERVICE AND LEADERSHIP

IEEE ICRA 2024 Workshop: Unconventional Robots	2024
<i>Co-organizer</i>	
Robomechanics Lab CAD outreach	2021-2022
Co-led development of a remote CAD lesson for middle school girls in the Pittsburgh area in partnership with the nonprofit Gwen’s Girls.	
CMU MechE DEI Mentorship Subcommittee	2020-2021
<i>Subcommittee member</i>	
Launched a peer mentoring program and professional development series to support undergraduate students, graduate students, and staff in the MechE department.	
Robotics: Science and Systems Conference 2021 Inclusion@RSS	2021
<i>Co-organizer</i>	
Coordinated workshop programming and conference attendance support for 44 fellows from groups traditionally underrepresented in robotics.	
Electrical Engineering Outreach	2017-2020
<i>Graduate Student Association Officer and Steering Committee Representative</i>	
Coordinated over 100 in-classroom elementary school science lessons by graduate students with the nonprofit Community Resources for Science (CRS).	
Penn Electric Racing	2011-2012
<i>Mechanical Team Co-captain</i>	
Science and Technology Wing Residential Program	2011-2012
<i>Workroom Manager</i>	

PUBLICATIONS

- [16] K. Murphy, J. C. V. Soares, **J. K. Yim**, D. Nottage, A. Soylemezoglu, J. Ramos, “Cooperative Modular Manipulation with Numerous Cable-Driven Robots for Assistive Construction and

- Gap Crossing,” *IEEE/RSJ Int. Conf. Intell. Robots Syst. (IROS)*, 2024.
- [15] J. Kyle, **J. K. Yim**, K. Hart, S. Bergbreiter, A. M. Johnson, “The Simplest Walking Robot: A bipedal robot with one actuator and two rigid bodies,” *IEEE Int. Conf. Humanoid Robots (Humanoids)*, 2023.
- [14] Y. Yang, J. Norby, **J. K. Yim**, A. M. Johnson, “Proprioception and tail control enable extreme terrain traversal by quadruped robots,” *IEEE/RSJ Int. Conf. Intell. Robots Syst. (IROS)*, 2023.
- [13] **J. K. Yim**, J. Ren, D. Ologan, S. Garcia Gonzalez, A. M. Johnson, “Proprioception and reaction for walking among entanglements,” *IEEE/RSJ Int. Conf. Intell. Robots Syst. (IROS)*, 2023.
- [12] S. Islam*, K. Carter*, **J. K. Yim***, J. Kyle, S. Bergbreiter, and A. M. Johnson, “Scalable Minimally Actuated Leg Extension Bipedal Walker Based on 3D Passive Dynamics,” *IEEE Int. Conf. Robot. Automation (ICRA)*, 2022. (**Outstanding Locomotion Paper Finalist**)
- [11] J. Liang, Y. Wu, **J. K. Yim**, H. Chen, M. Zicong, H. Liu, Y. Liu, Y. Liu, D. Wang, W. Qui, Z. Shao, M. Zhang, X. Wang, J. Zhong, and L. Lin, “Electrostatic footpads enable agile insect-scale soft robots with trajectory control,” *Science Robotics*, 2021.
- [10] **J. K. Yim**, B. R. P. Singh, E. K. Wang, R. Featherstone, R. S. Fearing, “Precision Robotic Leaping and Landing Using Stance-phase Balance,” *Robotics and Automation Letters*, 2020.
- [9] Y. Wu, **J. K. Yim**, J. Liang, Z. Shao, M. Qi, J. Zhong, Z. Luo, X. Yan, M. Zhang, X. Wang, R. S. Fearing, R. J. Full, L. Lin, “Insect-scale fast moving and ultrarobust soft robot,” *Science Robotics*, 2019.
- [8] **J. K. Yim**, E. K. Wang, R. S. Fearing, “Drift-free Roll and Pitch Estimation for High-acceleration Hopping,” *IEEE Int. Conf. Robot. Automation (ICRA)*, 2019. (**Best Student Paper**)
- [7] **J. K. Yim**, R. S. Fearing, “Precision Jumping Limits from Flight-phase Control in Salto-1P,” *IEEE/RSJ Int. Conf. Intell. Robots Syst. (IROS)*, 2018.
- [6] D. W. Haldane*, **J. K. Yim***, R. S. Fearing, “Repetitive Extreme-acceleration (14g) Spatial Jumping with Salto-1P,” *IEEE/RSJ Int. Conf. Intell. Robots Syst. (IROS)*, 2017. (**Best Paper**)
- [5] D. Shishika, **J. K. Yim**, D. A. Paley, “Robust Lyapunov Control Design for Bioinspired Pursuit With Autonomous Hovercraft,” *IEEE Trans. Contr. Syst. Tech.*, vol. 25, iss. 2, pp. 509-520, 2017.
- [4] M. M. Plecnik, D. W. Haldane, **J. K. Yim**, R. S. Fearing, “Design Exploration and Kinematic Tuning of a Power Modulating Jumping Monopod,” *J. of Mechanisms and Robotics*, vol. 9, iss. 1, 2016.
- [3] D. W. Haldane, M. M. Plecnik, **J. K. Yim**, R. S. Fearing, “Robotic Vertical Jumping Agility via Series-elastic Power-modulation,” *Science Robotics*, vol. 1, iss. 1, 2016.
- [2] D. W. Haldane, M. M. Plecnik, **J. K. Yim**, R. S. Fearing, “A Power Modulating Leg Mechanism for Monopodal Hopping,” *IEEE/RSJ Int. Conf. Intell. Robot. Syst. (IROS)*, pp. 4757-4764, 2016.
- [1] D. Shishika, **J. K. Yim**, D. A. Paley, “Bio-inspired pursuit with autonomous hovercraft using

*denotes equal contribution

Lyapunov-based control,” *American Control Conf. (ACC)*, 2015.

WORKSHOPS

J. Norby, Y. Yang, A. Tajbakhsh, J. Ren, **J. K. Yim**, A. Stutt, Q. Yu, N. Flowers, A. Johnson, “Quad-SDK: Full Stack Software Framework for Agile Quadrupedal Locomotion,” *ICRA Workshop: 6th Workshop on Legged Robots*, 2022. (**Best Paper**)

J. K. Yim, “Limb mechanisms for performance,” *RSS Pioneers*, 2021.

J. K. Yim, K. R. Carter, S. Islam, S. Bergbreiter, A. Johnson, “3D Passive Dynamics-inspired Walking Actuated by Open Loop Leg Extension,” *Dynamic Walking*, 2021.

J. K. Yim, E. K. Wang, R. S. Fearing, “Unsupported Monopedal Hopping Outdoors,” *ICRA Workshop: Towards Real-World Deployment of Legged Robots*, 2019. (**Best Poster Finalist**)

J. K. Yim, R. S. Fearing, “Precision Jumping with a SLIP-like Robot,” *IROS Workshop: Modeling and Control of Dynamic Legged Locomotion*, 2018.

REVIEW ACTIVITY

2018 IEEE International Conference on Robotics and Automation (ICRA)

2018 Soft Robotics

2019 IEEE International Conference on Humanoid Robots (Humanoids)

2019 IEEE International Conference on Robotics and Automation (ICRA)

2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)

2020 IEEE Robotics and Automation Letters

2020 AAAS Science Robotics

2020 IEEE Transactions on Robotics

2020 Soft Robotics

2021 IEEE International Conference on Robotics and Automation (ICRA) (**outstanding reviewer award**)

2021 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)

2021 IEEE Transactions on Robotics

2022 IEEE Robotics and Automation Letters (RA-L)

2023 IEEE International Conference on Humanoid Robots (Humanoids)

2023 International Journal of Robotics Research

2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)

2023 IEEE Robotics and Automation Letters

2023 IEEE Transactions on Robotics

2024 IEEE International Conference on Robotics and Automation (ICRA)

2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)

2024 Robotics and Autonomous Systems

2024 IEEE Transactions on Robotics