

HAOSEN (RUSSELL) XING

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Research Interests

Legged Robots, Dynamic Locomotion, Biomechanics,
Optimal Control and Real-time Optimization of Human Assistive Devices
Reinforcement Learning / Deep Learning for Locomotion

Education

- M.S. Mechanical Engineering, Carnegie Mellon University May 2019
- Advisor: Prof. Howie Choset
- B.S. Mechanical Engineering, University of California, Irvine Jun 2017
- Graduated with *Cum Laude* honor

Proficient Skills

Knowledge: Biomechanics, Locomotion, Control Theory,
Mathematical Modeling, Engineering Optimization, Robot Dynamic Analysis,
(Deep) Reinforcement Learning, Machine Learning, Finite Element Analysis

Design: SolidWorks, Rhino

Programming: Arduino, C++, MATLAB, Python (PyTorch),

Tools: LaTeX, Mathematica

Research Experience

- Research Intern, Carnegie Mellon University, PA Nov 2019 – Current
(Advisors: [Prof. Hartmut Geyer](#) and [Prof. Chris Atkeson](#))
- Planning and control of artificial lower limbs for resilient locomotion using interaction of user intent and environment sensing
- Research Intern, Carnegie Mellon University, PA Jun 2019 – Current
(Advisors: [Prof. Chris Atkeson](#) and [Dr. Ge Lv](#))
- Task-invariant control and experimental testing of lower-limb exoskeletons
- Graduate Research Student, Carnegie Mellon University, PA Oct 2017 – May 2019
(Advisor: [Prof. Howie Choset](#))
- Improving stability in diagonal sequence walking gaits using inertial tail appendage in Quadrupeds;
 - Improving static stability in diagonal sequence walking gaits using tail;
 - Designing legged system gaits and analyzing stability using Hildebrand diagram;
 - Geometric mechanics and quadruped back-bending
- Research Intern, Zhejiang University, China Apr 2017 – Jun 2017
(Advisor: [Prof. Dongliang Zhang](#))
- Lower-body fitting robot CAD design and control
- Undergraduate Research Assistant, University of California, Irvine Mar 2016 – March 2017
(Advisor: [Prof. John Larue](#))
- Analyzing the decay of kinetic energy downstream with turbulence using wind tunnel
- Undergraduate Research Assistant, University of California, Irvine Mar 2016 – Jun 2016
(Advisor: [Prof. Yun Wang](#))
- Designing a micro generator for small-size electronic devices

Leadership, Honor and Activities

UCI SAE Savage Team – Aero/Body Team Leader

UCI Deans Honor List (2013 - 2016)

Pi Tau Sigma Honor Society (Former Vice President)

Publications

G. Lv*, **Haosen Xing***, J. Lin, R. Gregg, and C. Atkeson, [A Task-Invariant Learning Framework of Lower-Limb Exoskeletons for Assisting Human Locomotion](#), submitted to **American Control Conference, 2020**

(* indicates equal contribution)

B. Chong, Y. Aydin, G. Sartoretti, J. Rieser, C. Gong, **Haosen Xing**, H. Choset, D. Goldman, [A Hierarchical Geometric Framework to Design Locomotive Gaits for Highly Articulated Robots](#), **Robotics: Science and Systems, 2019**

B. Chong, Y. Aydin, C. Gong, G. Sartoretti, Y. Wu, J. Rieser, **Haosen Xing**, J. Rankin, K. Michel, A. Nicieza, J. Hutchinson, D. Goldman, H. Choset, [Coordination of back bending and leg movements for quadrupedal locomotion](#), **Robotics: Science and Systems, 2018**

Abstracts & Workshops

Haosen Xing, B. Chong, G. Sartoretti, J. Whitman, Y. Aydin, D. Goldman, H. Choset, [Inertial Tail-like Appendage Use in Quadrupeds Improves Stability in Diagonal Sequence Walking Gaits](#), **American Physical Society, March 2019**

B. Chong, Y. Aydin, G. Sartoretti, J. Rieser, **Haosen Xing**, C. Gong, H. Choset, D. Goldman, [Coordination of legs and body undulation during turning in quadruped locomotion](#), **American Physical Society, March 2019**

Haosen Xing, B. Chong, G. Sartoretti, D. Goldman, and H. Choset, [Tail Use in Quadruped Improves Static Stability in Diagonal Sequence Walking Gaits](#), **Robotics: Science and Systems, 2018**

B. Chong, Y. Aydin, J. Rieser, Y. Wu, **Haosen Xing**, H. Choset, D. Goldman, [The importance of body-limb coordination in a walking tetrapod](#), **American Physical Society, March 2018**

Academic Projects

Carnegie Mellon University

- Obstacle Avoidance Trajectory Optimization (Course: Engineering Optimization)
- Policy Gradient Tutorial (Course: Statistical Techniques in Robotics)
- Grid World Navigation Using Deep Reinforcement Learning (Course: Deep RL & Control)
- Develop a Simple Image Processing Application Named FinePixel Using C++ (Course: Engineering Computation)

Academic Services

Conference Reviewer

- Robotics: Science and Systems, 2019

Courses Highlighted

Engineering Optimization (24-785)

Machine Learning (10-601)

Deep Reinforcement Learning and Control (10-703)

Robot Dynamics and Analysis (24-760)

Statistical Techniques in Robotics (16-831)

Sensing & Sensors (16-722)

Kinematic, Dynamic and Control (16-711)

Engineering Computation (24-780)

Numerical Method in Engineering (16-831)

References

- Dr. Chris Atkeson
Professor
Robotics Institute

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- Dr. Howie Choset
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- Dr. Ge Lv
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- Dr. Aaron Johnson
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- Dr. Dongliang Zhang
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