Jinwoo Choi
Curriculum Vitae

Robotics Ph.D. candidate
Oregon State University
✉ *choijinw@oregonstate.edu*

Research Goal	**Understanding of optimal motions of robotic locomoting systems via geometric frameworks and derives control strategies**. Geometric mechanics, Model-based Control, Optimal Control, Undulatory Locomotion

Education & Experience

2021–present	**Ph.D., Robotics**, *Oregon State University*, Advised by Dr. Ross L. Hatton.
2019–2020 :	**Visiting Scholar**, *Johns Hopkins University*, Advised by Dr. Noah. J. Cowan, Funded by Korea Institute for Advancement of Technology.
2018–2021 :	**M.S., Mechanical Engineering**, *Korea University*, Advised by Dr. Dahie Hong.
2012–2018 :	**B.S., Mechanical Engineering**, *Korea University*.

Publications

REFEREED JOURNAL ARTICLES

J. Choi, S. Deng, N. Justus, N. J. Cowan, and R. L. Hatton, "The Geometry of Optimal Gait Families for Steering Kinematic Locomoting Systems," Feb. 2025, submitted to IEEE Transaction on Robotics (T-RO).

S. Kim, B. Kim, H. Choi, D. Hong, S. Jang, K. Hong, **J. Choi**, S. Kim, J. Lee, E. Kim, B. Keum, Y. Jeen, H. Lee, and H. Chun, "Endoscopic submucosal dissection using a detachable assistant robot: A comparative in vivo feasibility study (with video)," *Surgical Endoscopy*, vol. 35, no. 10, pp. 5836–5841, Oct. 2021.

REFEREED CONFERENCE PUBLICATIONS

J. Choi, C. Bass, and R. L. Hatton, "Optimal Gait Families using Lagrange Multiplier Method," in *2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Oct. 2022, pp. 8873–8878.

J. Choi, A. Cabrera, and R. L. Hatton, "Geometric Optimal Control of Mechanical Systems with Gravitational and Resistive Force," Mar. 2025, submitted Letter on the IEEE Control Systems Letters (L-CSS).

J. Choi and R. L. Hatton, "Optimal Control Approach for Gait Transition with Riemannian Splines," Dec. 2024, to appear 63rd IEEE Conference on Decision and Control.

REFEREED THESIS ARTICLES

J. Choi, "Dead-band Estimation Method of Tendon-Sheath Mechanism with Proximal Force Sensors," Master's thesis, Korea University, 2021.

——, "Gait-family-based Hierarchical Control of Kinematic Locomoting Systems," Ph.D. dissertation, Oregon State University, 2025 expected.

Research Experience

LRAM Lab, Oregon State University

Geometrically Gait Optimization, *Generating gait families of swimming robots for hierarchical maneuver-based planning*, and exploring a geometry of optimal gait transition.

Underwater Locomotion, *Developing the floating three-link robots with water thruster and its hierarchical maneuver-based control algorithms.*

LIMBS Lab, Johns Hopkins University

Programming Thermobiochemomechanical (TBCM) Multiplex Robot Gels, *Developing a mathematical framework for soft robot motion amenable to path planning by geometric mechanic tools.*

System Identification and Comparison between Two Weakly Electric Fishes, *Evaluating the linearity of multisensory integration of electric fish.*

MFR Lab, Korea University

Field Robots for Disaster Response, *Developing a crawler-legged system to overcome rough terrain.*

Endoscopic Surgical Robots, *Developing a surgical robot helping endoscopic surgery to avoid abdominal wall incisions.*

Teaching & Mentorship Experience

Teaching Assistance

2024 **ME 217: Mechanical Engineering Dynamics**, *Oregon State University*, Teaching Assistant, Prof. Ravi Balasubramanian.

2023 **ME 203: Computing Methods for Engineering**, *Oregon State University*, Teaching Assistant, Prof. Cindy Grimm.
As a TA, I ran laboratory sessions for over 100 students

2021, 2022 **ME 317: Intermediate Dynamics**, *Oregon State University*, Teaching Assistant, Prof. Ross L. Hatton.

2019 **MECH 226: Dynamics**, *Korea University*, Teaching Assistant, Prof. Daehie Hong.

2019 **MECH 404: Finite Element Method**, *Korea University*, Teaching Assistant, Prof. Woochun Choi.

2018 **MECH 330: Mechanical Engineering Laboratory**, *Korea University*, Teaching Assistant, Prof. YunJae Kim.
As a TA, I ran laboratory sessions for about 8 students

Research Mentorship

2024-2025 **Zachary Thomas**, *Undergraduate*, Oregon State University.

Work Experience

2021 **Embedded Firmware & Control Engineer**, *EndoRobotics*.
Develop a embedded software for a robotic surgery device and control algorithm for a Tendon-Sheath Mechanism.

Fellowships & Awards

2021	**_Global Research Fellowship_**, Korea Institute for Advancement of Technology for a visiting scholar in LIMBS lab at Johns Hopkins University
2017	**_Merit-Based Scholarship_**, Korea University
2015	**_The KU Rock Foundation Scholarship_**, Korea University

Academic Serivce

Reviewer for	IEEE Transactions on Robotics (T-RO), IEEE Robotics and Automation Letters (RA-L), International Conference on Robotics and Automation (ICRA), The International Journal of Robotics Research (IJRR).
Session Chair for	Cooperative Control in 63rd IEEE Conference on Decision and Control (CDC 2024).

Skills

Programming	MATLAB, Python, C/C++, MANIM (Mathematical Animation), Optimal Control (CasADi)
Prototyping	CAD (Solidworks, Inventor, Fusion360), Embedded Firmware (Real-Time OS, STM32, Arduino, Raspberry Pi)

Referees

Dr. Ross L. Hatton
Associate Professor, Department of Robotics and Mechanical Engineering
Oregon State University
✉ rosslhatton@oregonstate.edu

Dr. Noah J. Cowan
Professor, Department of Mechanical Engineering
Johns Hopkins University
✉ ncowan@jhu.edu

Dr. Daehie Hong
Professor, Department of Mechanical Engineering
Korea University
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