Dongho Kang

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RESEARCH INTERESTS	My research aims to create legged robots that exhibit natural and animal-like behaviors. Thus, my research interests are broad ranging to legged locomotion control, character animation, and design optimization for robotics applications.

EDUCATION

ETH Zürich, Zurich, Switzerland

- Doctoral Student in Computer Science — Apr 2020 – Present
  - Main advisor: Prof. Dr. Stelian Coros
  - Second advisor: Prof. Dr. Marco Hutter

- M.Sc. ETH in Mechanical Engineering — Sep 2016 – Aug 2019
  - Advisor: Prof. Dr. Marco Hutter
  - Graduated with distiction

Seoul National University, Seoul, South Korea

- B.Sc. in Mechanical Engineering and B.Sc. in Computer Science — Mar 2009 – Aug 2016
  - Advisor: Prof. Dr. Dongjun Lee
  - Graduated with honor (Cum Laude)

RESEARCH EXPERIENCE

Computational Robotics Lab, ETH Zürich

- Scientific Assistant — Dec 2019 – Present
  - Supervisor: Prof. Dr. Stelian Coros
  - Control methods for animal-like motions of bio-inspired quadrupedal robots.

Robotic Systems Lab, ETH Zürich

- Master's Student — Sep 2017 – Nov 2019
  - Supervisors: David Höller, Dr. Jemin Hwangbo and Prof. Dr. Marco Hutter
  - Learning-based collision avoidance for legged robot.
  - Participated in the development of RaiSim: a physics engine for robotics and AI research.

Interactive & Networked Robotics Lab, Seoul National University

- Undergraduate Research Assistant — Sep 2014 – Jan 2016
  - Supervisors: Prof. Dr. Dongjun Lee
  - State estimation and control strategies for multi-robot cooperative systems

PROFESSIONAL AFFILIATIONS & ACTIVITIES

NVIDIA, Zurich, Switzerland

- Deep Learning Intern — Jun 2018 – Dec 2018
  - Projects: Deep learning-based super-resolution and anti-aliasing.

LeisureQ Inc., Seoul, South Korea

- Software Engineer Intern — Jan 2016 – Sep 2016
  - Projects: Backend web application for E-commerce website Gajago.

CNP Technology Inc., Seoul, South Korea

- Hardware and CAD Engineer — Dec 2011 – Mar 2014

PUBLICATIONS

JOURNALS

[1] Taerim Yoon, Dongho Kang, Seungmin Kim, Minsung Ahn, Stelian Coros, and Sungjoon Choi, "Spatio-Temporal Motion Retargeting," in *Neural Networks*, 2024. (submitted)

[2] Dongho Kang, Jin Cheng, Miguel Zamora, Fatemeh Zargarbashi, and Stelian Coros, "RL + Model-based Control: Using On-demand Optimal Control to Learn Versatile Legged Locomotion," in *IEEE Robotics and Automation Letters (RA-L)*, Oct 2023.

CONFERENCES

[1] Adrian Hartmann, Dongho Kang, Fatemeh Zargarbashi, Miguel Angel Zamora Mora, and Stelian Coros, "Deep Compliant Control for Legged Robots," in *International Conference on Robotics and Automation (ICRA)*, May 2024.

[2] Daniel Widmer, Dongho Kang (equal contribution), Bhavya Sukhija, Jonas Hübotter, Andreas Krause, and Stelian Coros, "Tuning Legged Locomotion Controllers via Safe Bayesian Optimization," in *Conference on Robot Learning (CoRL)*, Nov 2023.

[3] Dongho Kang, Flavio De Vincenti, Naomi C. Adam, and Stelian Coros, "Animal Motions on Legged Robots Using Nonlinear Model Predictive Control," in *International Conference on Intelligent Robots and Systems (IROS)*, Oct 2022.

[4] Dongho Kang, Simon Zimmermann, and Stelian Coros, "Animal Gaits on Quadrupedal Robots using Motion Matching and Model-Based Control," in *International Conference on Intelligent Robots and Systems (IROS)*, Sep 2021.

[5] Flavio De Vincenti, Dongho Kang, and Stelian Coros, "Control-Aware Design Optimization for Bio-Inspired Quadruped Robots," in *International Conference on Intelligent Robots and Systems (IROS)*, Sep 2021.

[6] Changu Kim, Hyunsoo Yang, Dongho Kang and Dongjun Lee, "2-D Cooperative Localization with Omni-Directional Mobile Robots," in *International Conference on Ubiquitous Robots and Ambient Intelligence*, Oct 2015.

WORKSHOP

[1] Dongho Kang, Flavio De Vincenti, and Stelian Coros, "Nonlinear Model Predictive Control for Quadrupedal Locomotion Using Second-Order Sensitivity Analysis," in *ICRA 2022: 6th Full-Day Workshop on Legged Robots*, May 2022.

THESIS

[1] Dongho Kang, "End-to-End Collision Avoidance from Depth Input with Memory-based Deep RL," Master's thesis, the Department of Mechanical and Process Engineering, ETH Zürich, Aug 2019.

INVITED TALK	▪ **Computational Robotics for Legged Locomotion Control and Co-design**	May 2024
	Speakers: Dongho Kang and Gabriele Fadini	
	Johou Systems Kougaku Laboratory, University of Tokyo	
	Tokyo, Japan	
	▪ **Computational Robotics for Legged and Construction Robotics**	May 2024
	Speakers: Yijiang Huang, Dongho Kang and Gabriele Fadini	
	Suzumori Laboratory, Tokyo Institute of Technology	
	Tokyo, Japan	
	▪ **Control Methods for Animal Motion Imitation**	Jan 2024
	Autonomous & Intelligent Robotics Lab, Chonnam National University	
	Gwangju, South Korea (Remote)	
	▪ **Animal Motion Imitation for Legged Robots**	Nov 2023
	Biomimetic Robotics Lab, Massachusetts Institute of Technology	
	Cambridge, United States	
	▪ **Motion Capture-Driven Legged Locomotion Control**	Dec 2022
	Interactive and Networked Robotics Lab, Seoul National University,	
	Seoul, South Korea	
AWARDS & SCHOLARSHIPS	▪ Birkigt Scholarship, ETH Zürich	Feb 2018
	Stipendiary scholarship for international master student.	
	▪ Eminence Scholarship, Seoul National University	Aug 2014
	Full-tuition scholarship for one academic semester for outstanding academic performance.	
	▪ Development Fund Scholarship, Seoul National University	Feb 2010
	Full-tuition scholarship for one academic year for outstanding academic performance.	

TEACHING EXPERIENCE	**ETH Zürich**, Zurich, Switzerland	
	▪ Teaching Assistant, Introduction to Machine Learning (F. Perez-Cruz, F. Yang)	Spring 2024
	▪ Teaching Assistant, Computer Science (M. Fischer, F. Friedrich Wicker)	Autumn 2023
	▪ Teaching Assistant, Digital Humans (S. Coros, Siyu Tang)	Spring 2023
	▪ Teaching Assistant, Linear Algebra (Ö. Imamoglu, O. Sorkine-Hornung)	Autumn 2022
	▪ Teaching Assistant, Computational Models of Motion (S. Coros, B. Thomaszewski)	2021 – 2022
	▪ Teaching Assistant, Visual Computing (S. Coros, M. Pollefeys)	2020 – 2021

Seoul National University, Seoul, South Korea

	▪ Mentor, SNU Samsung Convergence Software Course Program	2015
	▪ Teaching Assistant, MAE 446.204A: Dynamics	2014
	▪ Teaching Assistant, PA 034.013: Basic Physics 2	Autumn 2011

TECHNICAL SKILLS

Programming and Software

C/C++, C#, Python, Matlab/Octave, Unix/Linux, Tensorflow, Pytorch, ROS, Open Dynamics Engine, Unity

Experience with Robots

UnitreeRobotics Aliengo, A1, Go1, Go2, ANYbotics ANYmal

SERVICES

Reviewer

RA-L, IROS, ICRA, RSS, BioRob, Eurographics

LANGUAGES

▪ Korean: Native language.
▪ English: Fluent.

REFERENCES

▪ **Prof. Dr. Stelian Coros**
Associate Professor in the Department of Computer Science
ETH Zürich
Wasserwerkstrasse 12, 8092, Zurich, Switzerland
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▪ **Prof. Dr. Marco Hutter**
Associate Professor in the Department of Mechanical and Process Engineering
ETH Zürich
Leonhardstrasse 21, 8092 Zurich, Switzerland
mahutter@ethz.ch • +41 44 632 74 17

▪ **Prof. Dr. Jemin Hwangbo**
Assistant Professor in the Department of Mechanical Engineering
Korea Advanced Institute of Science and Technology
291 Daehak-Ro, Yuseong-Gu, Daejeon, 34141, South Korea
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▪ **Prof. Dr. Dongjun Lee**
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