Seung Hyeon Bang

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EDUCATION

Aug. 2018 – present	**The University of Texas at Austin**, *Austin, TX* Doctor of Philosophy in Aerospace Engineering • Advisor: Luis Sentis
Aug. 2018 – Aug. 2022	**The University of Texas at Austin**, *Austin, TX* Master of Science in Aerospace Engineering • Thesis topic: Operational Space Control of Compliant Isoelastic Robots and Their Interaction with an DIARC Cognitive Architecture • Advisor: Luis Sentis
Aug. 2014 – May. 2018	**Stonybrook University**, *Stonybrook, NY* Bachelor of Engineering in Mechanical Engineering • *Summa Cum Laude*

WORK AND RESEARCH EXPERIENCE

Jan. 2019 – present	**Graduate Research Assistant** The University of Texas at Austin, *Austin, TX* • Planning, control, optimization, and machine learning algorithms for humanoid robots • Control and optimization algorithms for an isoelastic manipulator
June. 2023 – August. 2023	**Robotics Software Engineer Intern** Apptronik Inc, *Austin, TX* • Development of inertia-aware model predictive control (MPC) algorithms for humanoid robots • Trajectory generation support for the Apollo humanoid robot bring up

PUBLICATIONS

1. **SH. Bang**, J. Lee, C. Gonzalez, and L. Sentis, "Variable Inertia Model Predictive Control for Fast Bipedal Maneuvers," *IEEE Conference on Decision and Control (CDC)*, 2024 (To appear)
2. L. Rossini, E. Hoffman, **SH. Bang**, L. Sentis, and N. Tsagarakis, "A Real-Time Approach for Humanoid Robot Walking including Dynamic Obstacles Avoidance," *IEEE-RAS International Conference on Humanoid Robots (Humanoids)*, 2023
3. M. Seo, S. Han, K. Sim, **SH. Bang**, C. Gonzalez, L. Sentis, and Y. Zhu, "Deep Imitation Learning for Humanoid Loco-manipulation through Human Teleoperation," *IEEE-RAS International Conference on Humanoid Robots (Humanoids)*, 2023
4. **SH. Bang**, C. Gonzalez, J. Ahn, N. Paine, and L. Sentis, "Control and Evaluation of a Humanoid Robot with Rolling Contact Joints on its Lower Body," *Frontiers in Robotics and AI*, 2023
5. C. Gonzalez, **SH. Bang**, P. Li, S. Chinchali, and L. Sentis, "Learning Adaptive Horizon Maps Based on Error Forecast for Model Predictive Control," *IEEE Conference on Decision and Control (CDC)*, 2023
6. J. Ahn, **SH. Bang**, C. Gonzalez, Y. Yuan, and L. Sentis, "Data-driven safety verification for legged robots," *IEEE-RAS International Conference on Humanoid Robots (Humanoids)*, 2022
7. J. Lee, J. Ahn, D. Kim, **SH. Bang**, and L. Sentis, "Online gain adaptation of whole-body control for legged robots with unknown disturbances," *Frontiers in Robotics and AI*, vol. 8, 2022.
8. J. Ahn, S. J. Jorgensen, **SH. Bang**, and L. Sentis, "Versatile locomotion planning and control for humanoid robots," *Frontiers in Robotics and AI*, vol. 8, 2021.

9. J. Lee, **SH. Bang**, E. Bakolas, and L. Sentis, "MPC-Based Hierarchical Task Space Control of Underactuated and Constrained Robots for Execution of Multiple Tasks," *IEEE Conference on Decision and Control (CDC)* 2020
10. J. Ahn, D. Kim, **SH. Bang**, N. Paine, and L. Sentis, "Control of a high performance bipedal robot using viscoelastic liquid cooled actuators," *IEEE-RAS International Conference on Humanoid Robots (Humanoids)*, 2019

UNDER REVIEW

1. **SH. Bang**, C. Jové, and L. Sentis, "RL-augmented MPC Framework for Agile and Robust Bipedal Footstep Locomotion Planning and Control,"
2. **SH. Bang,** C. Gonzalez, G. Moore, DH. Kang, M. Seo, and L. Sentis, "RPC: A Modular Framework for Robot Planning, Control, and Deployment,"

TEACHING EXPERIENCE

Jan. 2022 – May. 2022	**Graduate Teaching Assistant** The University of Texas at Austin, Aerospace Engineering & Engineering Mechanics, *Austin, TX* • Decision and Control of Human-Centered Robots (ASE389)
Jan. 2021 – May. 2021	**Graduate Teaching Assistant** The University of Texas at Austin, Aerospace Engineering & Engineering Mechanics, *Austin, TX* • Flight Dynamics (ASE367K)
Sep. 2018 – Dec. 2018	**Graduate Teaching Assistant** The University of Texas at Austin, Mechanical Engineering, *Austin, TX* • Experimental Fluids Mechanics (ME 130L)

SKILLS

Program Language	C++, Python, Matlab
Library	Pinocchio, PyTorch, Protobuf, ZeroMQ
Simulator	Dart, Pybullet, MuJoCo
Language	English (fluent), Korean (native)

SOFTWARES

RPC	C++ library designed to integrate multiple physics-based simulators, planning and control modules, visualization tools, plotting and logging utilities, and operator interfaces for robotic systems. (https://github.com/shbang91/rpc)

OPEN SOURCE CONTRIBUTIONS

PnC	C++ library designed for generating trajectories for a robot system and stabilizing the system over the trajectories. (https://github.com/junhyeokahn/PnC)
PyPnC	Python implementation of PnC. (https://github.com/junhyeokahn/PyPnC)
pink	**P**ython **in**verse **k**inematics for articulated robot models based on Pinocchio (https://github.com/stephane-caron/pink)