Seung Hyeon Bang

4600 Mueller Blvd, Austin, TX 78723

**Tel**: (512) 662-9984 / **Email**: [bangsh0718@gmail.com](mailto:bangsh0718@gmail.com) / **Homepage**: <https://shbang91.github.io/>

**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**, C. Jové, and L. Sentis, “RL-augmented MPC Framework for Agile and Robust Bipedal Footstep Locomotion Planning and Control,” *IEEE-RAS International Conference on Humanoid Robots (Humanoids)*, 2024 (To appear) 2. **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) 3. 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 4. 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 5. **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 6. 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 7. 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 8. 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. 9. 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. 10. **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 11. 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. 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>) |