Taizoon Aliasgar Chunawala

taizoonac@vt.edu — linkedin.com/in/taizoon-chunawala — taizoonaliasgar.github.io

Education

Virginia Tech, Blacksburg, VA — Aug 2021 – Present
Ph.D., Mechanical Engineering — GPA: 3.85/4.00
Relevant Coursework: Adaptive Control, MPC for Agile Robots, Learning Theory for Dynamics

University of Southern California, Los Angeles, CA — Dec 2019
M.S., Aerospace & Mechanical Engineering (Dynamics & Control) — GPA: 3.81/4.00
Relevant Coursework: Nonlinear Control, Robust Control, Multivariable Control

BITS Pilani, Pilani, India — Jun 2016
B.E. (Hons.), Mechanical Engineering — GPA: 8.13/10

Research Experience

Graduate Research Assistant — Feb 2022 – Present
Agile Robots for Control, Optimization & Learning, Virginia Tech, Blacksburg, VA

- Built a multi-rate NMPC framework enabling wall-supported bipedal locomotion on the Unitree Go2, achieving **13× higher traversal success** compared to a Raibert heuristic controller.
- Implemented a high-rate onboard state estimator fusing kinematics and IMU data to enable stable trotting in a dynamically unstable upright configuration.
- Designed a Robust MPC controller for a wrist exoskeleton, improving tremor suppression and reference-tracking stability under real-time disturbances.

Research Assistant — Feb 2020 – Dec 2020
Dynamic Robotics & Control Lab, University of Southern California, Los Angeles, CA

- Implemented a direct collocation-based optimization solver for quadruped jumping on compliant terrain.
- Validated optimal trajectories for an 18-DOF quadruped, achieving target jump height and stance-to-flight transitions in simulation.

Research Assistant — May 2018 – May 2019
Autonomous Microrobotic Systems Lab, University of Southern California, Los Angeles, CA

- Developed adaptive and predictive controllers for piezo-actuated flapping-wing micro-robots.
- Implemented multi-frequency wing actuation in Simulink Real-Time for closed-loop flight experiments.

Professional Experience

Control Engineer — Jun 2019 – Aug 2019
Polybee, Singapore

- Developed a high-precision vision-based localization system achieving millimeter-level accuracy for autonomous pollination using micro-quadrotors in vertical farming environments.
- Fused vision-based localization with IMU sensing to deliver robust state estimation and smooth trajectory tracking in constrained indoor spaces.

Operations Manager — Jul 2016 – Nov 2017
Tata Steel Global Wires, Tarapur, India

- Streamlined production scheduling across wire grades and gauges, identifying bottlenecks to improve line uptime and throughput.

Technical Skills

Programming: C++, Python, MATLAB/Simulink
Robotics & Control: Model Predictive Control(MPC), Optimal Control, Kalman Filtering, State Estimation
Frameworks & Tools: ROS/ROS2, MuJoCo/Raisim, OpenCV, Linux, Git
Modeling & Design: SolidWorks, Dynamic Modeling, URDF

Selected Publications

T. Chunawala et al., "Robust Model Predictive Control of a Tremor-Suppression Exoskeleton under Tremor-Induced Disturbances," *In Review*, 2025.

B. M. Imran, J. Kim, T. Chunawala et al., "Safety-Critical and Distributed Nonlinear Predictive Controllers for Teams of Quadrupedal Robots," *IEEE Robotics and Automation Letters*, 2025.

L. Amanzadeh, T. Chunawala et al., "Predictive Control with Indirect Adaptive Laws for Payload Transportation by Quadrupedal Robots," *IEEE Robotics and Automation Letters*, 2024.

T. Chunawala, M. Ghandchi-Tehrani, J. Yan, "An Optimum Design of a Double Pendulum in Autoparametric Resonance for Energy Harvesting Applications," *Vibroengineering Procedia*, vol. 8, pp. 163–168, 2016.

Achievements

Pratt Fellowship, Virginia Tech (2021–22)
Formula Student Italy Representative (2014)
Top 0.1% in AIEEE (2012)