

# Taizoon Aliasgar Chunawala

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## Education

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**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

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**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

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**Control Engineer** Jun 2019 – Aug 2019  
Polybee, Singapore

- Built a vision-based UAV localization system achieving millimeter-level precision for autonomous pollination in vertical farming environments.
- Integrated sensor fusion and Kalman filtering to enable smooth trajectory tracking in constrained indoor environments.

**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

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**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

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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

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Pratt Fellowship, Virginia Tech (2021–22)

Top 0.1% in AIEEE (2012)

Formula Student Italy Representative (2014)