# Charukhesh Balaji Rakesh

## Indian Institute of Technology Madras

Website GitHub LinkedIn Email




## Education

**Indian Institute of Technology Madras** *('22 – '27)*
*B.Tech in Aerospace Engineering & Interdisciplinary M.Tech in AI and Data Science* **CGPA**: 9.14/10.00

## Research Profile

Charukhesh Balaji Rakesh is an undergraduate researcher at the Indian Institute of Technology Madras working at the intersection of **artificial intelligence, robotics, control, and data-driven modeling**. His research interests include generative models for robotic manipulation, stochastic control, risk-aware decision making, and generative temporal modeling for complex physical systems.

## Selected Research Experience

**Purdue SURF Intern – IDEAS Lab, Purdue University** *May '26 – Present*
Fast & Precise Robotic Manipulation via Flow Matching and Latent World Models
- Developing generative trajectory planning using Flow Matching and latent world models for robotic manipulation.

**M.Tech Thesis – SENAI Lab, IIT Madras** *Aug '26 – Present*
Safety-Critical Trajectory Planning via Sequential Bayesian Inference and Stochastic Control
- Developing a stochastic control framework integrating CVaR, MPC, and state estimation for uncertain systems.

**Research Project – SENAI Lab, IIT Madras** *Mar '25 – Dec '25*
Generative Temporal Modeling and Risk Assessment for Complex Physical Systems
- Developed Δ-GMM and clustering methods to synthesize statistically coherent temporal sequences and quantify downside risk through Monte Carlo simulation.

## Selected Research & Publications

- **Rakesh, C. B., Srinivasan, R., & Rengaswamy, R.** "Endogenous Multi-Objective Optimization and Risk Assessment of Hybrid Renewable Energy Systems via GMM and Conditional Clustering." *ICRERA 2026*, Paris, France — **Oral Presentation**.
- **Rakesh, C. B., Srinivasan, R., Dandoria, P., Tomar, A., & Rengaswamy, R.** "Contractual and Resource-Aware Capacity Optimization for Hybrid Renewable Energy Systems with Storage." *Applied Energy*. Under review.

## Selected Achievements

- **1st Place, SUAS 2026** and **8th Place, SUAS 2025** among 70+ international teams; Co-Founder & Computer Vision Lead, Student Unmanned Aerial Systems, IIT Madras.
- **Purdue SURF (Top 3%)** and **NUS IRIS (Top 1%)** international research fellowships.
- **National 2nd Runner-Up, James Dyson Award 2024**; Top 2% in the **2025 Caterpillar Tech Challenge**.