DIVESH SONI

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LinkedIn — Google Scholar

SUMMARY

Ph.D. researcher and aerospace engineer with 7+ years of experience spanning ISRO, NASA JPL, and Caltech. Specialized in deployable and flexible space structures, multi-body dynamics, and actuator–structure interaction. Strong background in simulation-to-test correlation, flight hardware support, and experimental validation. Seeking R&D roles in space systems, robotics, and advanced mechanical design.

EDUCATION

California Institute of Technology (Caltech) — Pasadena, CA
M.S. in Space Engineering — 2022
GPA: 4.10 / 4.20

Indian Institute of Space Science and Technology (IIST) — Trivandrum, India
B.Tech in Aerospace Engineering — 2016
GPA: 9.05 / 10.00 — Department Rank: 2

RESEARCH EXPERIENCE

Graduate Student – Space Structures Laboratory — 2022 – Present
California Institute of Technology — Pasadena, CA

- Designed Pyramid Control Moment Gyroscope cluster prototype
- Developed experimental procedure to perform slew maneuvers on 3-DOF air bearing
- Established 3-axis stabilization and trajectory tracking in attitude on Teensy 4.1
- Fabricated test structure for studying flexible body deformations

PROFESSIONAL EXPERIENCE

Scientist – Spacecraft Mechanisms Group — 2016 – 2021
Indian Space Research Organization (ISRO) — Bangalore, India

- Performed structural analysis of spacecraft mechanisms for GEO and LEO missions, including solar arrays and large reflector systems.
- Developed flexible multi-body dynamic models using ADAMS and Abaqus/Explicit to simulate deployment dynamics and structural loads.
- Modeled pulley-based closed control loops (CCLs) enabling synchronized deployment of foldable appendages.

- Led flexible-body simulation of a 6-meter unfurlable reflector, modeling mesh, cable, and pulley subsystems; correlated simulations with thermo-vacuum qualification tests.
- Built failure models and performed Design of Experiments (DOE) studies for spacecraft docking to identify safe capture envelopes.
- Supported mission operations by analyzing on-orbit telemetry for mechanical appendages across multiple flight missions.

Summer Intern – Jet Propulsion Laboratory (NASA) Summer 2015
Pasadena, CA

- Developed an active vibration control model for an externally excited mechanical system using Macro Fiber Composite (MFC) actuators.
- Identified system parameters and control laws using reduced-order (SDOF) modeling techniques.
- Performed experimental validation using piezoelectric sensors and laser vibrometry.
- Conducted thermal characterization of MFC actuators using mid-wave infrared imaging under varying voltage and frequency inputs.

TECHNICAL SKILLS

Programming: Python, MATLAB, C++
Simulation & Analysis: Abaqus, MSC Nastran, ADAMS
Dynamics & Controls: Multi-body dynamics, flexible structures, actuator–structure coupling, DOE
Tools: Arduino, LaTeX, Microsoft Office

PUBLICATIONS

- Soni, D., Gdoutos, E., Pellegrino, S., "Experiments with a Momentum Exchange Actuator for Ultralight Flexible Spacecraft," SciTech, AIAA, 2026.
- Soni, D., Issac, K., et al., "Design and Analysis of Mesh-Based Deployable Reflectors," ARMS, 2016.
- Rai, V. S., Soni, D., "Dynamic Simulation Studies for On-Orbit Spacecraft Docking," ARMS, 2018.

LEADERSHIP & SERVICE

- Organized laboratory outreach tours for Southern California Science Olympiad students at Caltech.
- Mentoring first-year Caltech undergraduate for practicing research
- Core designer for IIST Aerospace Club magazine; organized hands-on aerospace workshops.