DIVESH SONI

Pasadena, California
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EDUCATION

California Institute of Technology Jun 2022 - Present
Ph.D. in *Space Engineering* *Pasadena, CA*
Pursuing research in the field of flexible body dynamics and control.

California Institute of Technology Sep 2021 - Jun 2022
M.S. in *Space Engineering* *Pasadena, CA*
CGPA: 4.1/4.2
Selected Coursework: Solids + Controls

Indian Institute of Space Science and Technology July 2012 - May 2016
B.Tech in *Aerospace Engineering* *Kerala, India*
CGPA: 9.05/10.00
Department Rank: 2
Selected Coursework: Kinematics and Dynamics of Mechanisms, Aerospace Structures-I & II, Multi Disciplinary Design Optimisation, Finite Element Methods, Elastic Wave Propagation in Solids.

RESEARCH EXPERIENCE

GALCIT, California Institute of Technology July 2022 - Present
Graduate student, Space Structures Lab *Pasadena, CA*

Key achievements

- **Pyramid CMG :** Mechanical and electronics design of pyramid CMG attitude control device from scratch. Developed custom PCB to work with Teensy 4.1 and relevant components
- **Trajectory tracking in attitude dynamics :** Developed Arduino based framework for quaternion feedback control in attitude. Implemented quaternion estimator based on Madgwick's algorithm.
- **Flexible structure for testing** Designed and built test structure from carbon fiber composites for attitude dynamics experiments
- **Gravity compensation system :** Developed protocol and balancing techniques for tests using spherical air bearing

PROFESSIONAL EXPERIENCE

U.R. Rao Satellite Center, Indian Space Research Organization (ISRO) July 2016 - Aug 2021
Scientist, Advanced Mechanisms Section, Spacecraft Mechanisms Group *Bangalore, Karnataka, India*

Development of spacecraft payload systems with a primary focus on design of deployable mechanisms. Analysis of mechanical appendages to demonstrate margin and correlation with on-ground tests to establish proof of design.

- **Solid state reflectors and solar arrays :** Rigid body dynamics and modelling of sensitive details like mechanical pulley based close control loops(CCL's) for synchronous deployment.
- **Large Unfurlable Refector (6m) :** Flexible multi-body dynamic analysis. Major focus on modelling of mesh, system of rope and pulleys with the help of explicit dynamics in ABAQUS. Correlation with qualification model in large thermo-vacuum chamber with various sun angles and temperatures.
- **Spacecraft docking :** Developed ADAMS model for contact dynamics. Performed Design of Experiments study to determine safe system parameters for successful on-orbit capture. Ongoing work with machine learning to classify successful capture from a failed docking attempt and hence estimating a safe capture envelop for initial state vector.

- **Ground station support :** System health monitoring and data extraction of mechanical appendages for three GEO and two LEO missions.

Jet Propulsion Laboratory, NASA Jun 2015 - July 2015
Summer Intern *Pasadena, CA*

- Worked on active control of an externally excited mechanical system coupled with a Macro Fibre Composite (MFC) as the controlling element.
- **Objective :** Predicting model parameters and control of the continuous mechanical system with a single degree of freedom approximation.
- **Hardware Experience :** Kinetic measurements were done with the help of a piezoelectric transducer as well as a laser vibrometer. Worked with Mid-wave IR based thermal imaging system used to characterize the temperature of MFC actuators with Voltage and Frequency of combined system.

TECHNICAL STRENGTHS

Computer Languages	Python, Matlab, C++
Tools	Abaqus, Nastran, Adams, Altium, *LaTex*, Microsoft Office

PUBLICATIONS

- Divesh S., Eleftherios G., Sergio P., 2026, *Deployment and Attitude Control Device for Large Lightweight Spacecraft* Journal of Guidance, Control, and Dynamics (in progress)
- Divesh S., Eleftherios G., Sergio P., 2026, *Experiments with a Momentum Exchange Actuator for Ultralight Flexible Spacecraft* AIAA SciTech Forum (in progress)
- Vijay S. Rai, Divesh S., 2018, *Dynamic Simulation Studies for On-orbit Spacecraft Docking Experiment* National Symposium and Exhibition on Aerospace and Related Mechanisms(ARMS)[Preview]
- Divesh S., Sohan K.Y.,K. Kurien I., 2016, *Design and analysis of Mesh based Deployable Reflector for Space Applications* National Symposium and Exhibition on Aerospace and Related Mechanisms(ARMS) [Preview]

CONFERENCES

- Divesh S., T. Gdutos., S. Pellegrino., 2025, *Deployment and Attitude Control Device for Large Flexible Spacecraft* ASME 2025 Aerospace Structures, Structural Dynamics, and Materials Conference (SSDM2025)

ACHIEVEMENTS

- Fully funded Bachelor's Level Studies by the Government of India - Merit Based Scholarship
- Fully funded internship at Jet Propulsion Laboratory, NASA by Government of India. (Merit + Interview based) [Memoir Document]
- Awarded "Outstanding" grade in four consecutive years during Annual Performance Review at Indian Space Research Organization.

CERTIFICATES/TRAININGS

- Machine Learning through Coursera. [Credentials]
- Neural Networks and Deep Learning through Coursera. [Credentials]
- Improving Deep Neural Networks: Hyperparameter Tuning, Regularization and Optimization through Coursera. [Credentials]
- Convolutional Neural Networks through Coursera [Credentials]

- Introduction to Data Science in Python through Coursera. [Credentials]
- Department funded training on Abaqus/Explicit: Advanced Topics by Dassault Systems Bangalore, 2019
- Responsible Conduct of Research(RCR) Training for Students and Postdocs through CITI Program. [Credentials]