

# LAKSHAY ARORA

@ lakshaya32@gmail.com/lakshayarora@cmail.carleton.ca ☎ +1 613-413-0202  
in linkedin.com/in/lakshay-arora-945045106 🌐 https://github.com/lakshaya17

## EDUCATION

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Doctor of Philosophy, Aerospace Engineering *September 2020 - Present*  
**Carleton University, Ottawa, Canada**

- Research topic: **Path planning(Guidance and control) for Spacecraft rendezvous and proximity operations under uncertainties, using Machine Learning techniques**

Master of Science (Thesis-based), Aerospace Engineering *August 2017 - May 2020*  
**Wichita State University, Wichita, United States**

- Area of Study: Dynamics and Control
- Thesis title: **Reinforcement Learning Framework for Spacecraft Low-Thrust Orbit Raising**

Bachelor of Technology, Aeronautical Engineering *August 2013 - May 2017*  
**Manipal Institute of Technology, Udupi, India**

## SKILLS

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- **Programming languages:** MATLAB, Python, Julia, R, C++
- **Modelling and simulation software:** ANSYS(CFD), CATIA V5, Solid Edge, Simulink
- **Other computer skills:** SQL, Tableau, SPSS, Microsoft Office- Word, PowerPoint, Excel, Neuralworks Pro II, L<sup>A</sup>T<sub>E</sub>X
- **Language skills:** English, Hindi and German (A2 level)
- **Soft skills:** Confident, Articulate, Able to work with minimum supervision, Self-Motivated, Communication, Team Player

## WORK EXPERIENCE

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Graduate Research Assistant *September 2020 - Present*  
**Spacecraft Robotics and Control Laboratory, Carleton University, Ottawa, Canada**

- Reviewing various **data-driven techniques** to implement on the **path planning** of spacecraft during rendezvous and proximity operations.

Graduate Teaching Assistant *September 2021 - December 2021*  
**Mechanical and Aerospace department, Carleton University, Ottawa, Canada**

- Conducted theory and labs tutorials for the course MAAE 3202 A, graded weekly assignments, labs, reports, etc, and proctored examinations held for the course.

Lab Assistant *July 2018 - August 2019*  
**Project Innovation Hub, Wichita State University, USA**

- Assisted undergraduates in their projects related to 3D printing, CNC machine, and all the types of equipment available in the lab.

Summer Research Intern *June 2016 - July 2016*  
**4 Base Report Depot, Indian Air Force Station, Kanpur, Uttar Pradesh, India**

- Analyzed various types of jet engines such as Viper, M-53P2, R-29 and cargo plane AN-32 used by Indian Airforce for flight training purposes and observed the overhauling processes for the jet engines.

## PUBLICATIONS/POSTERS

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Arora L., Dutta A.

### **Reinforcement Learning for Sequential Low-Thrust Orbit Raising Problem**

*January 2020*

30th AAS/AIAA Space Flight Mechanics Meeting in conjunction with the AIAA Science and Technology Forum and Exposition (SciTech 2020)

- Developed a reinforcement learning algorithm, Deep Q-learning to be more specific, using **MATLAB** for optimal tuning of the weights of the objective function for the electric orbit-raising problem of the spacecraft. Best MSE: 0.0025.

Dutta A., Arora L.

### **Objective Function Weight Selection for Sequential Low-Thrust Orbit-Raising Optimization Problem**

*January 2019*

- Explored the impact of weights the objective function components on the optimality gap of computed orbit-raising trajectories, and numerical examples based on a variety of orbit-raising scenarios are used to illustrate this effect.

Poster: **Rarefied Hypersonic Flow**

Manipal Research Colloquim-2016

- Designed two blunt bodies on CATIA V5, Analyzed and compared flow results over those two bodies for Mach numbers 5, 10 and 15 using ANSYS

## CERTIFICATIONS

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### **IBM Data Science Professional Certificate**

*December 2019*

- Provided hands-on in the IBM Cloud using real data science tools and real-world data sets.
- Included 9 courses with latest job-ready skills and techniques covering a wide array of data science topics including: open source tools and libraries, methodologies, Python, databases, SQL, data visualization, data analysis, and machine learning.

## ACTIVITIES AND LAURELS

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- Recipient of the James Sutherland Garvey International Center Scholarship, Wichita State University, May 2018
- Alumni of Controls and Optimization Research and Education (CORE) Laboratory, Wichita State University
- Volunteer for Annual Technical festival of Manipal Institute of Technology, Manipal, October 2013
- Attended 10 days camp hosted by 18 KARNATAKA BATTALION NCC, Mangalore, March 2014
- Organizer for Annual Technical festival of Manipal Institute of Technology, Manipal, October 2014
- Secured B-certificate in National Cadet Corps exam held under the authority of Ministry of Defense, Government of India, March 2015