Devansh R Agrawal

dra16@ic.ac.uk · https://www.linkedin.com/in/devansh-r-agrawal/ · https://dev10110.github.io

I am an eager and motivated graduating senior from Imperial College London in aeronautical and aerospace engineering. I have a particular interest in space systems design, control and optimisation, and in advanced bluesky projects. I have four publications and excellent leadership skills, having founded Imperial's drone and rocketry societies in my first and second years respectively. I always strive to understand fundamental principles and use them to guide my thinking.

EDUCATION

Massachusetts Institute of Technology, AeroAstro, USA 8/2018–6/2019
Year Abroad Exchange Program - GPA: 4.9/5.0
Selected by Imperial professors as one of two students representing Imperial's aeronautical eng. department to MIT
Courses: 16.410 Principles of Autonomy and Decision Making (Undergrad), 16.82 Flight Vehicle Engineering (Capstone), 16.83 Space Systems Engineering (Capstone), 16.522 Space Propulsion (Grad), 16.13 Aerodynamics of Viscous Fluids (Grad), 18.385 Non-linear Dynamics and Chaos (Grad), 16.32 Optimal Control and Estimation (Grad), 15.373 Venture Engineering (Sloan School)
16.82 Project: Designed 30% scale STOL vehicle (55 lbs), built and successfully flown in Spring 2019, to demonstrate ability to use blown lift to achieve STOL for urban air mobility applications. Co-led wind tunnel study of blown wing mechanism in Wright Brothers Wind Tunnel. Project supervised by Prof Mark Drela and Prof John Hansman,
16.83 Project: Designed orbiter mission to Enceladus to detect signs of life. Led spacecraft design team, personally in charge of power, propulsion, mass budgets, and trajectory design, including both optimal electric kick-stage trajectory and multiple passive gravity assists. Project supervised by Prof Dava Newman and Prof Richard Binzel.

Imperial College London, UK 10/2016–6/2020
MEng, Aeronautical Engineering
First Year: 83.42%, Second Year: 78.65%
Dean's List (Amongst top 10 students in department out of 150 students) in both years
Best Subjects: Structural Analysis, Aerodynamics and Aircraft Performance, Circuits and Signals.
Recent Project: Designed full conceptual design of a new regional jet of 50 passengers in a team of five over 2 months.

Anglo-Chinese School (Independent), Singapore 1/2013–12/2015
International Baccalaureate Diploma Programme (44 out of 45 points)

PUBLICATIONS

[1] Haofeng Xu, Nicolas Gomez-Vega, Devansh R Agrawal, and Steven R H Barrett. Higher thrust-to-power with large electrode gap spacing electroaerodynamic devices for aircraft propulsion. *Journal of Physics D: Applied Physics*, October 2019. doi: 10.1088/1361-6463/ab4a4c. URL https://doi.org/10.1088/1361-6463/ab4a4c.

[2] Devansh Agrawal, Faisal Asad, Blake M. Berk, Trevor Long, Jackson Lubin, Christopher Courtin, Mark Drela, R John Hansman, and Jacqueline L. Thomas. Wind tunnel testing of a blown flap wing. In *AIAA Aviation 2019 Forum*. American Institute of Aeronautics and Astronautics, June 2019. doi: 10.2514/6.2019-3170. URL https://doi.org/10.2514/6.2019-3170.

[3] Devansh R. Agrawal, Yuji Tanabe, Desen Weng, Andrew Ma, Stephanie Hsu, Song-Yan Liao, Zhe Zhen, Zi-Yi Zhu, Chuanbowen Sun, Zhenya Dong, Fengyuan Yang, Hung Fat Tse, Ada S. Y. Poon, and John S. Ho. Conformal phased surfaces for wireless powering of bioelectronic microdevices. *Nature Biomedical Engineering*, 1(3), March 2017. doi: 10.1038/s41551-017-0043. URL https://doi.org/10.1038/s41551-017-0043.

[4] Hae Ung Lee, Agata Blasiak, Devansh R. Agrawal, Daniel Teh Boon Loong, Nitish V. Thakor, Angelo H. All, John S. Ho, and In Hong Yang. Subcellular electrical stimulation of neurons enhances the myelination of axons by oligodendrocytes. *PLOS ONE*, 12(7):e0179642, July 2017. doi: 10.1371/journal.pone.0179642. URL https://doi.org/10.1371/journal.pone.0179642.

RESEARCH EXPERIENCE

Electro-Aerodynamic Thruster, MIT 9/2018–6/2019
Studied possibility of using ionic wind as primary thruster for light aircrafts, enabling solid state planes without emissions. Developed 2D mathematical and numerical model to predict thrust and power consumption of various thruster geometries. Only 1D models had been studied and reported in literature. Resulted in publication.

Dyson, Floorcare Separation Systems Research Team 6/2018–8/2018
Summer Internship, 11 weeks.
Studied gas cyclone aerodynamics, with applications to solids separation. Developed simple analytical model to predict cyclone separation efficiency and pressure drop. Validated model with experimental results relevant to Dyson. Used model to suggest cyclone designs to be used in future Dyson vacuum cleaners, and future design direction.

Robot Intelligence Lab, Imperial College London 6/2017–9/2017
Summer Undergraduate Research Opportunity Programme
Self-proposed project. Inspired by the inability to call for help when in distress underground. Traditional radios do not work as the Earth blocks radio waves. Pitched and won a £500 grant to develop project from Imperial Advanced Hackspace. Conceptualized simplest design to meet objectives and constraints. First working prototype completed in 8 weeks.

Singapore Institute of Neurotechnology, NUS 1/2016–10/2016
Research Intern, Wireless Powering Lab
Developed reliable and consistent fabrication methods for antenna and receiver. Performed numerical radio freq simulations and experiments to characterise system. Analysed experimental and simulation data, produced figures used in publication using MATLAB and Illustrator. First author of published paper.

EXTRA-CURRICULAR ACTIVITIES

Imperial College London Rocketry, Co-lead and Integration Lead 9/2019–present
Leading preliminary and detailed design of scratch built hybrid (paraffin + N2O) rocket to compete in Spaceport America Cup, an intercollegiate rocketry competition. Team of sixty members. Designed control scheme to allow optimal throttling of rocket engine to hit target apogee (10,000 ft AGL). Teaching new members to build L1 rockets.

MIT Rocket Team, Aero-thermal, Aero-elastic analysis 9/2018–6/2019
Designed and built experimental set up to compare various ablatives and material choices
Wrote 1D heat transfer solver to determine expected stagnation point heating of our rocket (expected to reach Mach 3.5) through rocket ascent.
Analysed aero-elastic behaviour of carbon-fibre fins, to determine minimum number of layers required to sustain expected forces during flight.

Imperial Drone Society, President and Founder 2/2017–6/2018
Founded a new society dedicated drones in Feb 2016. We teach members about drones, explore future ideas through industry talks and volunteer through outreach programmes. Society has grown to 120+ paying members and over 800 people on mailing list. Organised large events (250 attendees) and executed a highly popular 6-session course on quadcopter building and flying. Led a well-received intense 3D printed drone competition where participants were trained, and then competed to build a 'crazy' drone, using the abilities of the 3D printers, sponsored by Autodesk.

ICSEDS (Rocketry and Space Society), Member 10/2016–6/2018
Co-lead designer of hybrid rocket engine with aerospike nozzle. Developed MATLAB scripts to automatically size the engine based on target specs and constraints. Wrote quasi-2D MATLAB function to solve for required nozzle geometry with shocks and some non-isentropy correction terms.

AWARDS

Dean's List 2016-19: For performing academically amongst top 10 students in the cohort
Honorable Mention, International Olympiad of Astronomy and Astrophysics
Singapore Physics Olympiad: Gold (2013, Junior Category), Bronze (2014, Senior Category)

SKILLS

Python, MATLAB, Simulink, Mathematica, ROS, Solidworks, Autodesk Fusion, 3D Printing, Laser Cutting, Milling, Turning, Arduino, Rasp Pi, Adobe Photoshop, Illustrator, Microsoft Office, LaTeX.
I am a quick learner and can adapt to new software and methods easily.