

DEBDOOT GHOSH

- Status: Sophomore Undergraduate student, Propulsion Engineer at Team Sammard Rocketry
- Skills: ANSYS FLUENT, CFX, Thermal Steady State and Mechanical Stress Analysis, SolidWorks, CATIA, FORTRAN, MATLAB, Julia, \LaTeX
- Interests: CFD, High-Speed Aerodynamics and Shock waves, Hypersonic Air-Breathing Propulsion Systems, Hybrid Rocket Motor Development



Education

2019 - 2023 **Sophomore in B.TECH program in Mechanical Engineering** **Vellore Institute of Technology, Vellore**

- CGPA: 8.58 on a 10 point scale.

Undergraduate Research Experience

05/2020-now **Numerical Investigation of Aerospike Nozzle Assisted Supersonic Retro-Propulsion** VIT

- Quantification Bow shock oscillation and extraction of Strouhal Number at a various angle of attacks and free-stream conditions.
- Optimizing the design of retro-nozzle.
- Validation of ANSYS FLUENT results with an available experimental data.
- Extended Manuscript submitted for AIAA Aviation Conference'21.

12/19- 5/20 **Design and Numerical Investigation for new Scramjet Model (Currently undisclosed idea)** VIT

- A new Scramjet model has been designed. Extensive numerical investigations using ANSYS FLUENT shown very promising results.
- SST $K-\omega$ and DES models were used for simulating the high speed compressible flow and the supersonic combustion processes, respectively.
- 30 times more thrust and 3 times more efficient than a typical scramjet.
- Manuscript submitted for publication in AIP Physis of Fluids.
- In its final stage for filling a patent application.
- Experimental investigations are to be conducted later this year.

1/20-6/20 **A review of Additive Manufacturing and an application to Hypersonic and Reentry Vehicle Heat Shielding [10/10|S-Grade]** VIT

- An extensive review of various rapid manufacturing technologies were carried out for Multi-Material Additive Manufacturing
- A new Multi-material Honey-Comb structure was created. Mechanical and Thermal Properties were simulated and analysed in extreme conditions using ANSYS Mechanical Stress and Thermal Steady-State Analysis
- Promising results were obtained and found very suitable for heat shielding purpose in Hypersonic and Re-entry Vehicle

12/2019-now **Hybrid Rocket Motor development for Sounding Rocket** Team Sammard, Creation Labs

- A team project to develop a fully-functional sounding rocket to reach 10,000ft propelled by hybrid rocket motor technology
- Going to participate in **Spaceport America Cup'21**, New Mexico,USA

Presentation

15/10/20 **Physical Characteristics of Supersonic Turbulent Combustion Processes and Recent Developments in Scramjet Combustor Design** AIAA Young Professionals, Students, and Educators (YPSE) Conference'20

15/10/20 **Recent Developments in Flame-Holding Mechanisms in Supersonic Combustion Process of Hypersonic Air-Breathing Vehicles** Annual Technical Symposium (ATS) 2020,AIAA Houston

Internship Experience

07/20-now **Research Internship** Simulation Lab,India

- › Modelling and CFD analysis of Multi-Feature on Wing to Enhance Aerodynamic Efficiency.
- › Shared a research project to the company's research showcase portal- Detached Eddy Simulation (DES) of Cavity Based Flame-Holder Scramjet Combustor

Other Experience

01/21-now **Delegate at Harvard College Project for Asian and International Relations (HPAIR), 2021** Virtual Event

- › Undergone a highly competitive selection process and served as an active participant focusing on need for Non-Proliferation of Hypersonic Technology for offensive and defensive purposes, especially in the in the Indo-Pacific Region.

Professional Affiliations

Present **Student Member at American Institute of Aeronautics and Astronautics (AIAA)** AIAA, USA

Present **Royal Aeronautical Society (RAeS)** London, UK

Present **Student Member Institute of Mechanical Engineers (IMechE)** London, UK

Certifications

9/2020 **Multi-Scale Computational Fluid Dynamics: Fundamentals and Applications** NIT Jalandhar

9/2020 **OpenFOAM-Beginner Workshop** IIT Bombay

9/2019 **Certified SolidWorks Associate (CSWA)** Dassault Systems

12/2019 **Indo-US Lecture Series on Aging Aircraft** IISc, Bangalore

Awards and Recognition

9/2019 **Design-a-thon: Cosmos 360** Fusion 360, Autodesk

9/2018 **Undergraduate Study Scholarship** ROSATOM,Moscow

- › Fully funded scholarship to study at Moscow Institute of Physics and Technology (MIPT)

Relevant Coursework

- › Fluid Dynamics, Heat Transfer, Engineering Mechanics, Engineering Graphics, Applied Numerical Methods, Application of Differential Equations
- › MOOCs: From Shock Waves to Scramjets (University of Queensland), Python for Research (Harvard University),Computational Fluid Dynamics using Finite Volume Method (Indian Institute of Technology, Madras), High Performance Computing (Indian Institute of Technology, Kharagpur)

Languages

- › English
- › Hindi
- › Bengali (Native)