Simranjeet Singh

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EDUCATION

Bachelor of Technology in Mechanical Engineering **2018 - 2022**

CGPA: 9.34/10 **Distinction**

Baba Banda Singh Bahadur Engineering College, Punjab affiliated to *I.K Gujral Punjab Technical University, Jalandhar, Punjab*

Senior Secondary (XII), Science (CBSE) **2017 - 2018**

Percentage: 95.60%

S.D. Model Senior Secondary School, Punjab

RESEARCH EXPERIENCE

Research Fellow (Junior Scale) **Sept. 2022 - Present**

Indian Institute of Technology Ropar, Punjab

- Research Project: *"Wind generation of ocean waves: from primary instabilities to cyclogenesis"* under the supervision of *Dr. Devranjan Samanta, Assistant Professor*, IIT Ropar
- Developing in-house FEM codes for simulation of water-wave scattering problems
- Providing simulation support using OpenFOAM to teams working on
  - Multi-phase non-Newtonian fluid flow problems
  - Marangoni flow in Newtonian fluid droplets
- Experimentally investigating the delayed Leidenfrost effect in impacting droplets of alcohol-water binary mixtures at different impact velocities on heated surfaces
- Employing high-speed photography and synthetic schlieren visualization technique to experimentally study the generation of gravity waves
- Designing and assisting the fabrication of the experimental setup

Research Trainee **January 2022 - June 2022**

Terminal Ballistics Research Laboratory, Chandigarh

Defence Research and Development Organisation (DRDO)

- Research Project: *"Design and analysis of Hybrid VTOL Tilt-Rotor UAV"* under the supervision of *Sh. Ashwani Mudgil, Scientist F*, TBRL, DRDO
- Planned and executed the design of surface geometry of Tilt-Rotor type, Vertical Take Off and Landing (VTOL) UAV using Onshape & Solidworks
- Optimized the aerodynamic shape of the aircraft for minimum drag and maximum aerodynamic efficiency using OpenFOAM and XFLR5 program resulting in 8 times increase in flight range.

- Prepared technical reports, design specification documents and engineering drawings; suggested fabrication methods

Research Intern **May 2021 - July 2021**

Indian Institute of Technology Ropar, Punjab

- Research Project: *"Study of Medium Density Fibreboard manufacturing using rice-straw based fibres"* under the supervision of *Dr Harpreet Singh, Professor*, IIT Ropar
- Part of an international project, titled *"Transforming India's Green Revolution by Research and Empowerment for Sustainable food Supplies* (**TIGR2ESS**)*"*, in collaboration with *University of Cambridge, UK*
- Researched into the specifics of defibration of rice straw, MDF board manufacturing process and the effect of binder resin on various properties of the board and the production costs
- Manufactured rice straw based MDF boards on a lab-scale; Performed standard tests to ascertain the satisfaction of IS 12406 : 2021

RELEVANT RESEARCH SKILLS

- Mathematical Modelling, FEA & FVM
- Computer Simulation – Deal.II FE Framework, OpenFOAM
- C/C++, MATLAB, Python Programming
- High Speed Photography, Schlieren Imaging, Rheology

ACHIEVEMENTS & SCHOLARSHIPS

- **University Topper**, third semester & fourth semester of B.Tech. (Among students from **200+ colleges** affiliated to I.K.G P.T.U)
- **First Position**, *Mathematics Quiz*, *National Mathematics Day* - 2018, Punjab State Council for Science and Technology, Chandigarh
- Mentioned in *Newspaper* (Jagran) for **10/10** semester GPA in 3rd semester
- Merit Based **Scholarship** (from institute) for excellent academic performance (INR 20,000/- per semester)
- **Gold Medal**, Chess Competition, at College Sports Event
- **Merit Certificate - Physics**: Among top 0.1 percent of successful candidates with 99/100 in Physics (Among **1,000,000+ Candidates**), by Central Board of Secondary Education
- Mentioned in *Newspaper:* District Topper in 12th Standard, Science (Non-Medical) with 95.6%
- Award of Appreciation - Best in Academics, for 12th standard performance, by Principal, S. D. Model Sen. Sec. School

POSITIONS OF RESPONSIBILITY

President, ISHRAE BBSBEC Student Chapter (December 2021- July 2022)

Indian Society of Heating Refrigeration and Air Conditioning Engineers (ISHRAE) Student Chapters

- Managed and supervised the core working committee conducting seminars and workshops on HVAC&R

Coordinator, Aero-Modeling Club, BBSBEC (March 2020 - July 2022)

- Organized workshops on RC Aircraft design.

Coordinator, Mech-Finix Lab, BBSBEC (January 2019 - July 2022)

(Mechatronics Laboratory)

- Engaged first-year students in hands-on workshops on designing mechatronics systems

PROJECTS

Study of impact dynamics of polymeric drops on super-hydrophobic surfaces using multi-phase simulations (March 2022 – Present)

- Performed multi-phase, incompressible, isothermal simulations (axisymmetric) of a viscous non-Newtonian (viscoelastic) fluid drop impacting a superhydrophobic surface with variable velocities using OpenFOAM, to study the impact dynamics.

Design and aerodynamic analysis of Hybrid VTOL Tilt-Rotor UAV (January 2022 – June 2022)

- Designed of surface geometry of Tilt-Rotor type, Vertical Take Off and Landing (VTOL) UAV in Onshape; Optimized for minimum drag and maximum propulsive efficiency using using OpenFOAM and XFLR5

Surveillance drone for detection and control of pest infected patches in crops (May 2021- Sept. 2021)

- Designed and developed a scaled-down prototype of quad-copter drone equipped with pesticide spraying mechanism and real-time video-feed

Design and analysis of spiral plate heat exchanger (December 2020 – January 2021)

- Designed the heat exchanger in Onshape, optimized for maximum heat transfer effectiveness using Conjugate Heat Transfer (CHT) simulations performed using OpenFOAM.

TRAININGS

Autodesk Fusion 360 Integrated CAD/CAM/CAE (February 2021 - March 2021)

Autodesk through Coursera

Scilab (February 2021 - March 2021)

Spoken Tutorial Project, IIT Bombay

MATLAB Master Class 2020 (September 2020 - October 2020)

IETE Mumbai and Pantech Prolabs India Pvt Ltd.