

# Pooja Ranganathan

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## PROFESSIONAL SUMMARY

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Graduate research assistant with a background in interdisciplinary engineering and sciences research. Looking forward to address challenges in electrochemical energy storage and safety through development and optimization of sodium ion batteries.

## EDUCATION

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<b>Purdue University</b> PhD program, Department of Mechanical Engineering	<i>August 2022 - Present</i>
<b>BITS Pilani, Hyderabad</b> Integrated M.Sc program B.E(hons) in Mechanical Engineering M.Sc(hons) in Chemistry	<i>August 2013 - July 2018</i> Overall GPA: 8.35/10
<b>St. Patricks Junior College</b> Class XII	<i>July 2012 - May 2013</i> 95.7%
<b>Sachdeva School</b> Class X	<i>June 2010 - May 2011</i> 93.5%

## RESEARCH WORK EXPERIENCE

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**Energy and Transport Sciences Laboratory, Purdue University** Aug 2022 - Present  
*Graduate Research Assistant*

- Core team member of 'Center for Advances in Resilient Energy Storage', a brainchild of the joint forces of Purdue University and Electrochemical Safety Research Institute (ESRI). My role involves examining alternative chemistries to achieve sustainable energy storage systems
- Carrying out synergistic design and optimization of electrolytes and anode composites for minimizing the capacity degradation of sodium ion batteries
- Development of electrolyte formulations and additives for enhancing thermal stability of sodium metal batteries.

**Bits Pilani Hyderabad Campus** December 2021 - June 2022  
*Project Assistant*

- Carried out research project titled "Synthesis and characterization of silver magnetite nano-fluid for heat transfer applications".
- The duties involved synthesis of magnetite nano-fluids and optimizing the surface functionalization through quaternization of ammonium groups.
- The end product is characterized through XPS, FESEM, UV-Visible spectroscopy etc, to examine the modification in chemical composition and thermal stability of nano-fluid.

**Indian Institute of Science** Nov 2019 - May 2020  
*Project Assistant(Interdisciplinary Center for Energy Research)*

- Devised a centrifugal compressor for an air-cycle machine of the 'Tejas' aircraft, a fighter jet of the Indian Defence. The project was funded by DARE-DRDO to optimize the design of the same.
- Calculated the parameters such as the blade angles, impeller radius and the co-efficients subjected to a specific mass flow rate. Aerodynamic performance optimization of 3D model carried out in Ansys CFX.

- Worked on optimizing the heat treatment parameters of annealing time and temperature, for enhancing the spectral selectivity of metal/alloy surfaces
- Characterized the optimized samples for composition and optical properties to rationalize the increase in absorption
- Received a scholarship of merit for presenting the same from the alma-matter

## **PUBLICATIONS**

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Pooja Ranganathan, V. Amrutha, H.C. Barshilia, Thermal oxidation of stainless-steel substrate with tunable spectral selectivity: transition from a reflecting to a highly absorbing Cr-Fe spinel surface, Sol. Energy Mater Sol. Cells, 233 (2021), Article 111381, <https://doi.org/10.1016/j.solmat.2021.111381>

## **SELECT HONORS AND AWARDS**

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2024 Travel grant winner - 3rd Annual GWEN(Graduate Women in Engineering Network) symposium, Purdue University

2018 Practice School Merit Scholarship - Bits Pilani Hyderabad Campus, India

## **DEPARTMENTAL SERVICE AND ENGAGEMENT**

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### **Vice President and Event Co-ordinator**

*Electrochemical Society (Purdue Chapter)*

- Introduced the 'Modeling-Characterization Workshop series' as a part of events conducted by Purdue ECS Chapter for engineering graduate students.
- Convened researchers across various disciplines for a collective learning experience. Aim to enhance electrochemistry and materials engineering fundamentals as an integral part of graduate students' learning through interactive workshops

### **Women in ME Chair**

*Purdue Omega Association*

- Designated as the 'Women in ME Chair' for the school year 2024-2025, as a liaison between the graduate women in Mechanical engineering and the ME department leadership.
- Looking forward to organize technical workshops and informative sessions through female alumni in academic and industrial positions.

### **Graduate Mentor**

*Purdue Society for Women Engineers*

- Volunteered as a mentor for the 'Undergraduate to Graduate mentorship program'.
- Guided an undergraduate student on the application process, choosing a research lab, approaching Professors for a research position and many more experiences to expect as a graduate student.

## **UNDERGRADUATE PROJECT WORK**

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**Synthesis and characterization of nano-particles for nano-fluid applications** Aug 2017 - Dec 2017

*Experimental project*

- The Microwave Synthesis of TiO<sub>2</sub> Nanoparticles was carried out to be suspended in Graphene Oxide solvent. The chemical functionalization of GO was an advantage to stabilize the solution

- The time period of photo-catalytic reduction of the TiO<sub>2</sub>-GO solution was optimized for a prolonged dispersion of nano-particles
- The samples were characterized by XRD, UV Visible Spectroscopy, FTIR Spectroscopy, Raman Spectroscopy and DLS to conclude the optimized time period of reduction leading to highest stability of the nno-fluid

**A DOE based Simulation studies for design of an ISO 5 Clean-room** Jan 2017 - Apr 2017  
*Design oriented project*

- Employed Comsol Multiphysics to optimize the control parameters and fluid flow in an ISO 5 Cleanroom
- The placement of inlet and outlet configurations were the variable parameters to arrive at a streamline flow and to avoid any back-pressure in the Clean-room with distinct work-spaces
- The project was being constructed in Bits Pilani Hyderabad Campus for MEMS fabrication

**CFD based aerodynamic studies of a 2D NACA 2412 airfoil configuration** Jan 2016 - Apr 2016  
*Design oriented project*

- A design oriented project aimed at studying the Lift and Drag characteristics of NACA 2412 airfoil configuration and to arrive at the stall.
- Simulation studies had been carried out in Ansys Fluent, with wind velocity and angle of attack as the variable parameters

**TECHNICAL PRESENTATIONS AND WORKSHOPS**

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**3rd Annual GWEN Symposium** *Purdue University*  
Delivered technical presentation on 'Synergistic Influence of Anode Composition and Electrolyte Interactions in Sodium-Ion Cells'

**2024 OIGP Spring Reception** *Purdue University*  
Poster presentation on 'Sodium ion batteries an an evolviog technology: Progressing past lithium ion frontier '

**Workshop on Time management** *Purdue University*  
Purdue Graduate Student Professional Development

**SKILLS**

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**Design and Simulation tools**  
Autocad, Creo Parametric, Ansys Fluent, Comsol Multiphysics, Ansys CFX

**Programming/Statistical Softwares**  
MS Excel, MySQL, R, Origin

**Languages**  
English, Kannada, Tamil, Telugu, Hindi