Aarjoo Jain

Junior Undergraduate Student

Indian Institute of Science and Education Research (IISER), Thiruvananthapuram

+91 93529 63415

Thiruvananthapuram, KL

aarjoo22@iisertvm.ac.in

@aarjoojain

RESEARCH INTERESTS

- Photochemistry
- Organic Synthesis and Catalysis
- Experimental Material Science (with a special interest in Two-Dimensional Materials)
- Electrocatalysis
- Experimental Condensed Matter Physics

SKILLS

Languages: C, C++, Python, HTML, CSS

Technologies: Git, MATLAB, Origin, ChemDraw, Avogadro, Blender3D

Instruments: MALDI-TOF Mass Spectroscopy, Phosphorescence Spectroscopy, NMR, IR-Spectroscopy, UV-Vis Spectroscopy, Distillation, TLC, Sonicator, Centrifuge, Metal bath, Water bath, Column Chromatography, GC-MS, Water Splitting.

EDUCATION

Aug 2022 - Present — **Indian Institute of Science and Education Research (IISER), Thiruvananthapuram** — **University**
3rd Year, Integrated BS-MS Chemistry Major, Physics Minor
CGPA: 7.98/10

May 2020 - June 2021 — **Government Girls Higher Secondary School, Shahpur Sagar M.P.** — **Higher Secondary School**
Grade 12, MPBSE Board (97.6%)

Apr 2018- May 2019 — **Government Girls Higher Secondary School, Shahpur Sagar M.P.** — **High School**
Grade 10 MPBSE Board (96.8%)

RESEARCH INTERNSHIPS

May 2024 - July 2024 — **Synthesis and Electrochemical Studies of Electrode for Hydrogen Evolution Reaction, Research on MAX Phase Synthesis | Dr. Pooja Devi, CSIR-Central Scientific Instruments Organisation (CSIO), Sector 30, Chandigarh**

- Reviewed literature for MAX phase synthesis with and without Titanium.
- After a literature review, the synthesis method for the MXene/NiW electrode was developed, and a NiW/MXene cathode was synthesised that demonstrated a low overpotential of -0.04935V and achieved a stability of 24 hours at -100 mA/cm^2 current density.
- Performed Chrono Potentiometry, Chrono Amperometry, EIS, IR Compensation, LSV, CV, and stability test of the prepared cathode using Autolab Nova Software.
- Achieved >95 percent degradation of methylene blue dye within 120 minutes using the synthesised catalyst, performed using ultraviolet-visible (UV-vis) spectrophotometry, and an XRD sample was prepared.
- **All the data was analysed, and the Manuscript is in preparation.**

PROJECTS

Dec 2024 - Present — **Organic Synthesis and Photochemistry| Prof. Mahesh Hariharan, Indian Institute of Science Education and Research (IISER) Thiruvananthapuram**

- Set up reactions such as Suzuki-Miyaura Coupling reaction, Buchwald-Hartwig Cross Coupling reaction, distillation reaction, Imidation reaction, and condensation reaction. Distyrylpyridine reactions.
- Characterised compounds using NMR (^{1}H, ^{13}C) and MALDI-TOF spectroscopy, Absorption, Excitation and Emission Spectroscopy, Time-dependent Phosphorescence Spectroscopy, Time-delayed decay measurements, XRD, and characterised chromophores.
- I have learnt Computational methods for geometry optimisation using Gaussian Software. I have performed ground-state and excited-state studies, Density functional theory (DFT).

Aug 2023 - Nov 2023 — **Hands-on experience in Organic catalysis, Cross-coupling reaction and Grignard Reactions | Prof. Ramesh Rasappan, IISER Thiruvananthapuram**

- Learned and performed various organic analytical techniques for the reactions (TLC, Column Chromatography, Purification of organic compounds, Acid-Base extraction, Steam distillation, Rotatory evaporation, GC-MS).
- Learned to prepare an NMR sample and set up the reaction in a cold environment.
- Gained the theoretical knowledge of rotatory evaporator, Schenk line, highly purified solvents reactions, cross-coupling reaction and catalytic synthesis.

ACHIEVEMENTS

Jan 2025 **MIMAMSA | Indian Institute of Science Education and Research (IISER), Pune**

- Secured Rank under the top 100

Feb 2025 **2nd International Conference on Main Group Synthesis and Catalysis (ICMGSC-2025) | Indian Institute of Science Education and Research Thiruvananthapuram, Kerala**

- Presented Concept poster titled "Dependence of Redox Reactions in Everyday Life"

WORKSHOPS AND SEMINARS

June 2024 **Energy Traps in Atomic Nuclei**

- Attended an International Webinar on Energy Traps in Atomic Nuclei by Prof. P.M. Walker, University of Surrey, UK organised by Department of Physics, Akal University, Talwandi Sabo, Bathinda, Punjab

ACADEMIC COURSES

- Basic Concepts in Organic & Inorganic Chemistry I & II
- Principles of Spectroscopy & Theoretical Spectroscopy
- Quantum Chemistry
- Advanced Organic Chemistry and Synthetic Methods
- Electronics
- Condensed Matter Physics

SELF STUDIED COURSES

Jan 2024 **8.01x - MIT Physics I: Classical Mechanics by Walter Lewin**

Jan 2024 **MIT 18.06 Linear Algebra, Spring 2005 by Prof. Gilbert Strang**

Aug 2023-May 2024 **6.041 Probabilistic Systems Analysis and Applied Probability by Prof. John Tsitsiklis**

Aug 2023 – Present **Statistics 110 (Probability) by Joe Blitzstein**

Oct 2023 – Present **MIT 7.016 Introductory Biology, Fall 2018 by Prof. Barbara Imperiali, Prof. Adam Martin, Prof.Diviya Ray**

VOLUNTEERING

Jan 2025	**Fifth Fourth Frontier Symposium in Chemistry (FS-CHM), 2025**	**Student Event Volunteer**
Jan 2024	**Fourth Frontier Symposium in Chemistry (FS-CHM), 2024**	**Designer**
Jan 2024	**Fourth Foundation Week Symposium (PSIT), 2024**	**Designing**
Aug 2023-May 2024	**Student Committee of Mess IISER TVM (SCoM)**	**Hygine and Finance Department**
Aug 2023 – Present	**Chemical Society of IISER TVM (CSIT)**	**Website and Designing Volunteer**
Oct 2023 – Present	**Physics Society of IISER TVM (PSIT)**	**Website and Designing Volunteer**

LANGUAGES

English, Sanskrit, Hindi