

JASPREET KAUR

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Portfolio: <https://deployme-dev.vercel.app/portfolio/jaspreet>

CAREER SUMMARY

MSc Physics graduate with focused research experience in functional materials for energy harvesting and storage. Demonstrated expertise in designing, fabricating, and characterizing polymer-based systems and triboelectric nanogenerators (TENGs), with hands-on proficiency in advanced techniques such as **XRD, XPS, FTIR, SEM/FESEM, CV, and electrical analysis**. Proven ability to translate experimental data into presentations and manuscripts, supported by strong analytical skills in **Python and COMSOL Multiphysics**. Experienced through internships at Punjab University, Patiala, and SGTB Khalsa College, University of Delhi, India, demonstrating both collaborative and individual research aptitude. **Hands-on experience includes thin-film deposition via thermal evaporation**. I proactively established connections with facilities at institutions like Thapar University and INST Mohali to acquire new skills and access advanced instrumentation. Beyond research, I exhibit excellent teaching and mentoring abilities, integrating practical experiments with theoretical concepts.

EDUCATION

- **M.Sc. (Hons) Physics** | Punjabi University Patiala | 2023–2025

Relevant Modules: Condensed Matter Physics, Functional Materials, Solid State Physics, Quantum Mechanics, Experimental Techniques in Materials Science

Dissertation:

1. P(VDF-TrFE)-BCZT/Nylon based Triboelectric Nanogenerator (Output: 100 V)
2. PVDF–DIPAB/Nylon based Triboelectric Nanogenerator (Output: 996 V)
3. PVDF/PDMS based Triboelectric Nanogenerator (Output: 15 V)

- **B.Sc. (Hons) Physics** | University of Delhi | 2019–2022 | CGPA: 7.7

Core Modules: Quantum Mechanics, Electromagnetic Theory, Statistical Mechanics, Solid State Physics

RESEARCH EXPERIENCE

- **Research Intern** | SGTB Khalsa College, University of Delhi | *August 2025 – Present*

Supervisor: Prof. Kuldeep Kumar

Descriptions: Synthesized and optimized CsPbI₃ perovskites, investigating interfacial stability

and degradation mechanisms using XRD and XPS. Studied lattice interactions and defect pathways, and gained **hands-on experience in thin-film deposition via thermal evaporation**.

- **Research Intern | Punjabi University, Patiala** | *May 2025 – July 2025*

Supervisor: Dr. Jaspal Singh

Descriptions: Designed and fabricated **hybrid piezo-triboelectric nanogenerators** to study charge transport under mechanical excitation. Investigated polymer structure–property relationships and characterized devices using **XRD, FTIR, SEM/FESEM**, and **electrical measurements**, contributing to a manuscript on energy conversion mechanisms.

- **Master’s Thesis | Triboelectric Nanogenerators** | *Nov 2024 – May 2025*

Supervisor: Dr. Jaspal Singh

Descriptions: Developed PVDF–DIPAB/Nylon TENGs (up to 996 V) and investigated BCZT loading effects, with **hands-on electrospinning and spin coating**. Integrated experimental analysis with **COMSOL simulations** and **presented findings at conferences**.

COLLABORATION

- Currently collaborating with Prof. Srikanth Ponnada at VSB - Technical University of Ostrava on a publication.

PUBLICATION

1. **Jaspreet Kaur**, Jaspal Singh, Jasveer Singh, Kirti Dutta, Output Asymmetry in Hybrid Triboelectric-Piezoelectric Nanogenerators under Touch and Mechanical Excitation, **Communicates in Materials Letters**, Manuscript No.- MLBLUE-D-26-00658. [IF=2.7] [ISSN: 0167-577X]

POSITION OF RESPONSIBILITY

1. **Creative Head**, SPARKS – The Physics Society, SGTB Khalsa College, University of Delhi, India - Led the design and creative direction for society events, publications, and outreach initiatives (2021-22)

WORKSHOPS/CONFERENCES ATTENDED

1. **4th position**-Poster Presentation, Indo-Canadian one day Workshop, IIT Ropar, India (2025)
2. **3rd position**-Oral Presentation, National Conference Cum Workshop On Computational and Experimental Techniques for Advanced Functional Materials (NCCET-AFM), Punjab University, Punjab, India (2025)
3. Attended Indo-Canadian Workshop, IIT Ropar, Punjab, India (2025)
4. **Poster Presentation:** 8th IBMEC **International Workshop**, IUAC, Delhi (2024)

5. **Quiz Competition**, Punjabi University Patiala, & PSCST, Chandigarh, Punjab, India (2024)
6. Attended online workshop Google Cloud Community Days (GCCD), India (2020)
7. Quiz Competition, SGTB Khalsa College, University of Delhi, India (2020)

SKILLS

- **Materials Characterization:** XRD, FTIR, SEM/FESEM, XPS, Electrical response analysis, Cyclic Voltammetry (CV).
- **Data & Modelling:** Python, COMSOL Multiphysics, Fortran, VESTA, X'Pert HighScore, CurveExpert
- **Teaching and Mentoring:** 6+ years of experience in teaching Physics and Mathematics to senior secondary (Classes XI & XII) students, as a tutor.
- **Interpersonal:** Collaboration, Time Management, Adaptability, Independent.

LANGUAGES

English (C2) | Hindi (C2) | Punjabi (C2) | German (A1)

REFERENCES

1. **Prof. Kuldeep Kumar** – SGTB Khalsa College, University of Delhi, kuldeep@sgtbkhalsa.du.ac.in
2. **Dr. Jaspal Singh** – Punjabi University, Patiala, jaspal_physics@pbi.ac.in