



VELPURI LEELADEVI

Date of Birth: 21st March 1999, Address: 5-191/3 ,Siddhartha Engineering Road, Near Kenedy High School, Durga Nagar, Kanuru, Vijayawada , Krishna, Andhra Pradesh -520007

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My area of research is focused on Design and simulation of next-generation solar cells, including dye-sensitized, perovskite, and tandem photovoltaics.

Education

University of Petroleum and Energy Studies July. 2022 – till date(will be submitted by end of Nov)
PhD (Electrical Engineering)(GPA 7) Dehradun, India

Thesis Title: “Computational design and validation of high efficiency and stable perovskite solar cells ”

Energy Institute Bengaluru ,Centre of Rajiv Gandhi Institute of Petroleum Technology 2020 – 2022
M.Tech (Power and Energy System Engineering)(GPA 7.24) Bengaluru, India

Osmania University 2016 – 2020
B.E (Electrical and Electronics Engineering) (GPA 7.76) Hyderabad, India

Experience

University of Petroleum and Energy Studies, (QS World Ranking - 239) Oct. 2022 – Present
Teaching Assistant, Department of Electrical and Electronics Engineering

- **Microprocessor and Microcontroller Lab:** Facilitated laboratory sessions on programming, interfacing, and applications of microprocessors and microcontrollers; guided undergraduate students on projects and experiments.
- **Basic Electrical and Electronics Lab:** Supervised hands-on experiments emphasizing fundamental concepts of electrical circuits, electronic components, instrumentation, and troubleshooting methods; provided mentoring to undergraduate students.

Technical Projects

Ph.D.

1. Characterization of $\text{FA}_{0.8}\text{Cs}_{0.2}\text{Pb}(\text{I}_{0.7}\text{Br}_{0.3})_3$ for Tandem Solar Cell Applications.
2. Design and Simulation of Single-Junction Perovskite Solar Cells Using AI/ML Techniques.
3. Tandem Solar Cell Design with Heterojunction silicon solar cell as Bottom Cells (HSSC-based).
4. Computational Performance Evaluation of Tandem Devices.

M.Tech

1. Fabrication of Dye Sensitized Solar Cells (DSSC) with TiO_2 anode and Natural Dye Sensitizer.
2. DSSC Fabrication with ZnO Nanorods and Natural Anthocyanin Dye.
3. Fabrication of single junction Perovskite Solar Cell using TiO_2 as the ETL.

B.E

1. Automatic Solar Tracking with Street Lighting Phenomena.
2. RFID Security Door System for Industrial Applications.

Publications

Journal Publications

1. **Velpuri Leela Devi**, Debasis De, Piyush Kuchhal, Rupendra Kumar Pachauri, “Photovoltaic performance of TiO₂ and ZnO nanostructures in anthocyanin dye-sensitized solar cells,” *Clean Energy* Volume 8, Issue 5, October 2024, Pages 144–156 (<https://doi.org/10.1093/ce/zkae059>).
2. **V. Leela Devi**, P. Kuchhal, D. de, A. Sharma, N. Kumar Shukla and M. Aggarwal, “Machine Learning-Driven Optimization of Transport Layers in MAPbI₃ Perovskite Solar Cells for Enhanced Performance,” *IEEE Access*, vol. 12, pp. 179546-179565, 2024, (<https://doi.org/10.1109/ACCESS.2024.3492378>).
3. **V. Leeladevi**, Piyush Kuchhal, Debasis De, “Scaps-1D Performance Analysis of MAPbI₃ and MASnI₃ Based Perovskite Solar Cells,” *Sigma Journal of Engineering and Natural Sciences*, 2025, (<https://doi.org/10.14744/sigma.2025.00172>)
4. **Velpuri Leeladevi**, Piyush Kuchhal, Debasis De, Neeraj Kumar Shukla, Piyush Dua, Design strategies for heterojunction silicon/CsSnBr₃ lead-free tandem solar cells using machine learning and SCAPS-1D, *Results in Engineering*, 2025, 107312, ISSN 2590-1230, (<https://doi.org/10.1016/j.rineng.2025.107312>).
5. **Velpuri Leeladevi**, Piyush Kuchhal, Debasis De, and Neeraj Kumar Shukla, “Comprehensive Design and Performance Evaluation of Monolithic Perovskite/Silicon Tandem Solar Cells” (not yet published)
6. **Velpuri Leeladevi**, Piyush Kuchhal and Debasis De, “Bandgap-tuned FA_{0.8}Cs_{0.2}Pb(I_{0.7}Br_{0.3})₃ perovskite films with WS₂/Cu₂O interfaces for efficient tandem solar cells” (yet to be published)

Conference Publications

1. Anitesh Anand, Sreya Mittal, **Velpuri Leeladevi**, Debasis De, (2023). Nanoflower shaped ZnO photoanode and natural dye sensitizer based solar cell fabrication. International Conference on “Novel Materials and Technologies for Energy and Environment Applications”, Volume 72, Part 1, Pages 227-231, ISSN 2214-7853, **Materials Today: Proceedings** (<https://doi.org/10.1016/j.matpr.2022.07.048>)
2. Ankit Singh, **Velpuri Leela Devi**, Vibhu Jatety, Sunaina Singh, Vartika Dahima, Shreshth Dobriyal Praveen Kapoor, “3D Printed Solar Cell: A Short Review,” in Intelligent Communication, Control and Devices, A. Kumar, R. K. Pachauri, R. Mishra, and P. Kuchhal, Eds., Singapore: Springer Nature Singapore, 2025, pp. 917–930. (https://doi.org/10.1007/978-981-97-8329-8_67)
3. S. Singh, V. Dahima, R. Mishra, A. Kapoor, A. Singh and **V. L. Devi**, “Pioneer Design of a Single-band U-slotted Patch Antenna Tailored for Enhanced Performance in WiMAX and WLAN Environments,” 2024 Second International Conference on Microwave, Antenna and Communication (MAC), Dehradun, India, 2024 (<https://doi.org/10.1109/MAC61551.2024.10837556>)
4. Sunaina Singh, Vartika Dahima, Ranjan Mishra, Soni Singh, **Velpuri Leela Devi**, Ankush Kapoor, Ankit Singh, “Design and Performance Analysis of a Compact Wearable Antenna Integrated into FR4 Substrates for Enhanced Wireless Communication,” 2025 7th International Conference on Signal Processing, Computing and Control (ISPCC), SOLAN, India, 2025, pp. 592-596, (<https://doi.org/10.1109/ISPCC66872.2025.11039531>)
5. Ankit Singh, **Velpuri Leela devi**, Vartika Dahima, Sunaina Singh, Shreshth Dobriyal, Sukirti Dobriyal, Hitesh Thakur, Jyoti Joshi, Vibhu Jatety “A Compact DSSC–Boost–Thirteen-Level SCMLI to Improve High-Quality for Renewable Power Generation,” 7th International Conference on Intelligent Communication, Control and Devices (ICICCD-2025) (yet to publish)
6. Bipul Chandra Biswas, **Velpuri Leeladevi**, Vibhu Jatety “Integrating SCAPS-1D and Machine Learning for Modeling and Optimization of KCuAlCl-Based Double Perovskite Solar Cells” 7th International Conference on Intelligent Communication, Control and Devices (ICICCD-2025) (yet to publish)
7. **Velpuri Leeladevi**, Piyush Kuchhal and Debasis De “Environmental Stability and Degradation Mechanisms in CsSnBr₃ Perovskite Solar Cells: Comparative Insights into Thermal, Moisture, and Photonic Aging” 5th International Conference on Communication, Devices and Computing (ICDC 2025) (yet to publish)
8. **Velpuri Leeladevi**, Piyush Kuchhal and Debasis De “Data-Driven Multi-Objective Optimization of Perovskite Solar Cells Using SCAPS-1D, Gaussian-Process Surrogates NSGA-II” IEEE International Conference on Smart Technologies for Power, Energy, and Control 2025 (STPEC) (yet to publish)

Book chapter Publications

1. **Velpuri leeladevi**, “Chapter 7- Principles, Methods, and Industrial Applications of Perovskite Silicon Tandem Solar Cell”, “Revolutionizing Solar Energy Harvesting Advanced Semiconductor Devices and Technology with Artificial Intelligence and Machine Learning Integration”, Kuchhal, P., Kumar, D., Kumar Pachauri, R., Kumar Sharma, V. (Eds.). (2026). (1st ed.). CRC Press. (<https://doi.org/10.1201/9781003515784>)

Professional Training

1. Industrial Training in Sukhila Power Electronics Pvt. at Moula Ali Industrial Estate, Hyderabad, Telangana, India: Underwent hands-on training in the design and manufacturing of Integrated Power Supplies and Switch Mode Power Supply (SMPS) systems.
2. Summer Internship at Smart Bridge Educational Services Pvt.Ltd. at Hyderabad, Telangana, India: Designed and implemented an embedded IoT-based security system using RFID technology for access control in industrial environments.

Technical skills

- MATLAB/Simulink, SCAPS 1D, WXAMPS, Oghmanano, Google Collab, Origin pro, ImageJ, QuantumATK: Atomistic Simulation Software.
- **Thin Film Processing:** Spin coating, hot plate annealing, drop casting, hydrothermal method, chemical bath deposition
- **Characterization Techniques:** UV-Vis, FTIR, SEM, EDX, XRD

Conference Presentations and Awards

1. Attended workshop on hands-on training on solar energy conversion devices (DSSC and perovskite solar cell) on 22nd and 23rd September 2022. (offline Vellore Institute of Technology, Vellore), India.
2. Presented poster at Perovskite Society of India Meet (PSIM)-2023 on 1st to 3rd March 2023 (offline IIT Roorkee), India
3. Presented a paper titled “SCAPS-1D Performance Analysis of MAPbI and MASnI Based Perovskite Solar Cells” and received the Best Poster Award at the International Conference on Recent Advances in Fluid Mechanics and Nanoelectronics (ICRAFNM 2023) held offline at MIT Bangalore, India, from 12th to 14th July 2023.
4. Certificate of Reviewer Recognition **Sigma Journal of Engineering and Natural Sciences** Recognised for contributing as a peer reviewer for this international journal in the fields of engineering and natural sciences. (2025)
5. Presented a paper titled “A Comprehensive Modeling and Optimization of KCuAlCl-Based Double Perovskite Solar Cell using SCAPS-1D and Machine Learning Models” and received the Best Paper Award in its track at the 7th International Conference on Intelligent Communication, Control and Devices (ICICCD-2025), held offline at UPES, Dehradun, India, on 10th–11th October 2025.

Languages

English: Advanced Reading, Writing and Speaking

Telugu: Native Language

Hindi: Spoken only

References

Prof (Dr.) Piyush Kuchhal, Professor
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