

# Prateek Malhotra

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## Experience

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- **Solar Analyst** Futr Energy  
June 2022 - Present
  - **Solar plant fault detection and root cause analysis:** Plant generation is examined on MPPT/SMB/String level to find anomaly type, downtime, soiling, and revenue loss due to individual anomaly.
  - **Digital twin:** Created predictive models for individual solar plant strings and a digital twin using geospatial data for visualization and analytics.
  - **Solar plant monitoring :** Implemented KPI parameters calculation and complete loss analysis for monitoring and maintenance, including interactive graphical dashboards.
  - **Fault detection with infrared imaging:** YOLOV7 model is created to detect various solar panel faults using infrared images (thermal images) of solar plant captured using drone.
- **Senior Research Fellow (SRF), Pursuing PhD** The LNMIIT, Jaipur  
Feb 2018 - June 2022  
(PI : Prof. G.D. Sharma)
  - **Prediction of photovoltaic properties:** Machine Learning, Deep Learning, models to predict photovoltaic parameters in Organic Solar Cells and drawing meaningful insights.
  - **Organic materials discovery / D:A combinations discovery:** Iterative approaches are used for organic materials / D:A combinations discovery using Bayesian Optimization and Random Forest based techniques.
  - **Organic Solar Cell Fabrication and characterization:** Fabrication with spin coating and thermal evaporation. Characterization using Keithley-2450 SourceMeter, UV-Vis Spectrophotometer, Spectrofluorometer, Cyclic Voltammetry(CV), External Quantum Efficiency(for calculation of Integrated Jsc and Voltage Loss Analysis).

## Education

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- **The LNM Institute of Information Technology** Jaipur, India  
July 2018 - Present  
*Pursuing PhD in Physics; CGPA: 7.75*
- **Rajasthan Technical University** Jaipur, India  
Aug 2015 - March 2018  
*M.Tech in Power Systems*
- **Rajasthan Technical University** Jaipur, India  
Aug 2011 - May 2015  
*B.Tech in Electrical Engineering*

## Skills Summary

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- **Languages:** Python **PV Softwares:** PVsyst, HelioScope, Homer Pro
- Machine Learning, Data Science, Web Application, GitHub, MLOps

## Web Applications

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- Calculating Jsc from EQE [Link](#)
- Calculating solar cell parameters from IV curve [Link](#)
- Solar DC Pump Design [Link](#)

## Publications

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- **Directed Message Passing Neural Network for Predicting Power Conversion Efficiency in Organic Solar Cells**, Prateek Malhotra et al., ACS Applied Materials Interfaces (2023). [Link](#)
- **Active discovery of donor:acceptor combinations for efficient organic solar cells**, Prateek Malhotra et al., Applied Materials Interfaces. [Link](#)
- **Opportunities and challenges for machine learning to select combination of donor and acceptor materials for efficient organic solar cells**, Prateek Malhotra et al., Journal of Materials Chemistry C. [Link](#)
- **Calculating short circuit current density (Jsc) from external quantum efficiency (EQE),**, Prateek Malhotra et al. [Link](#)
- **Prediction of non-radiative voltage losses in organic solar cells using machine learning**, Prateek Malhotra et al. Solar Energy. [Link](#)
- **24 Tech Blogs on Solar Energy.** [Link](#)

## Conference Proceedings

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- **“Predicting photovoltaic properties of organic solar cells from encoded 2D images of donor molecules using Convolutional Neural Network”** in ACMS 2022 organized by IICE Kolkata, 14-16 April 2022.
- **“Prediction of power conversion efficiency (PCE) in organic solar cells using machine learning”** in IWPSD 2021 Conference”, IIT, Delhi, 14-17 December.

## Workshops and Meetings Attended

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- Attended 5-day workshop on “Big Data Analytics and Data Science” organized by National Institute of Solar Energy. (14th to 18th December 2020).
- Attended 3-day workshop on “Theory and Technology of Silicon Solar Cell” organized by IIT, Bombay. (26th to 28th September 2019).