# Pradip Prajapati

*Bangalore, India*

+91-9727274937 | pradip.prajapati.official@gmail.com | linkedin.com/in/pradip-prajapati/

## Personal Profile

Formal Verification Engineer with over two years of experience at Intel, specializing in building formal environments for cutting-edge IP blocks. Expertise in formal property verification, with a track record of identifying 60+ critical corner case bugs. Proficient in integrating GenAI methodologies into formal verification, significantly enhancing test coverage and reducing verification cycles. Led a team of five engineers, driving efforts in test planning and verification sign-off for datacenter products.

## Education

**Indian Institute of Technology** *Gandhinagar, India*

Bachelor of Technology in Electrical Engineering *July 2018 - May 2022*

- CGPA 8.81/10
- Minors in Computer Science and Engineering
- Led a cross-functional team for the technical summit of IITGN, coordinating with various stakeholders and ensuring its success
- **Relevant Courses:** Digital Systems, Data Structures and Algorithms, Computer Organization and Architecture, VLSI design, Microprocessors and Embedded Systems, Operating Systems, Machine Learning

## Work Experience

**Intel** *Bangalore, India*

Senior Formal Verification Engineer *June 2022 - Current*

- Formally verifying cutting-edge IP blocks for a datacenter product with **formal property verification**
- Led a team of 5 engineers to achieve successful sign-offs on 4 IP blocks
- Integrating **deep learning and GenAI methodologies** to aid formal methods to reduce time in ramp-up and testplanning by 80%
- **Winner** of the year-end live project **bug hunting challenge**, **recipient of 5 Intel recognitions and awards**
- **Technical Skills:** JasperGold, System Verilog, Python and Tickle scripting, Abstraction techniques, State Space Tunnelling

**Redpine Signals** *Remote Internship*

Design & Verification Intern *May 2021 - July 2021*

- Designed a concept for a **hardware accelerator** for efficient inference of **Graphical Neural Networks**
- Attained **design and verification** skills with **Synopsys tools** for testing speed and power performance
- Received a full-time job offer for creating a new more **flexible design hierarchy with lesser on-chip hardware requirements**

**Necessario Innovations Pvt Ltd** *Remote Internship*

Machine Learning Intern *May 2020 - July 2020*

- Developed **face recognition** and pedestrian removal features with image segmentation techniques
- Consolidated Machine Learning skills via working with tools such as **FastAI**, **OpenCV** and **NumPy**

## Publications

**DAC- Design Automation Conference** *San Francisco, California*

Watt's Up with DDR5: Formal Verification Framework for Robust DRAM Power Management *June 2024*

- Published a **DRAM power management verification framework** in Engineering IP track as a presentation
- Framework ensures **shift left in verification** and **reduction power consumption** with exhaustive proofs
- In a cutting edge server design, this framework **found 45+ bugs and power enhancements**

**DVCon - Design and Verification Conference India** *Bangalore- India*

GenAI Leap in Formal Verification Testplanning *September 2024*

- Received **Best Paper Award** for the first of its kind use of GenAI in formal test planning
- Presented a **chain-of-thought prompt engineering technique** to build exhaustive FV testplans
- Covered 80-90% of bugs in different classes of designs

## University Projects

**In-Memory Computing in 8T-SRAM Cell** *Gandhinagar, India*

Prof. Joycee Mekie, Indian Institute of Technology, Gandhinagar *Sep 2020 - Dec 2020*

- Explored power and area efficient method to implement faster dot product for DNNs with **in-memory computation in 8T-SRAM cells**
- Verified self-compensating **charge accumulation and sharing method** proposed in a recent research article using **Cadence Virtuoso**

**Image restoration wit neural diffusion models** *Gandhinagar, India*

Prof. Shanmuganathan Raman, Indian Institute of Technology, Gandhinagar *Jan 2022- May 2022*

- Created a **deep neural network architecture for inpainting** and other image restoration tasks
- Acquired deep learning programming skills with **PyTorch** and other deep learning tools
- Integrated **diffusion models with internal learning** to eliminate need for pre-training

**Air Quality Inference with Graph Neural Networks** *Gandhinagar, India*

Prof. Nipun Batra, Indian Institute of Technology, Gandhinagar *Feb 2022- May 2022*

- Derived valuable insights on the spatial and temporal correlation in air quality trends
- Compared importance of each atmospheric and geographic variable for inference of air quality with Graph Neural Network
- Formulated various approaches to create the adjacency matrix for GNN to improve the performance

**Sparse Online Modelling of Secondary Path for ANC** *Gandhinagar, India*

Prof. Nithin George, Indian Institute of Technology, Gandhinagar *Feb 2022- May 2022*

- Implemented **Re-weighted zero attracting algorithm** for sparse modelling of secondary path
- Modeled various versions of **FxLMS algorithms** for performance improvements in original algorithm

**FPGA implementation of the classic Snake game** *Gandhinagar, India*

Prof. Joycee Mekie, Indian Institute of Technology, Gandhinagar *Oct-Nov 2019*

- Recreated the classic snake game using **VLSI design** and **VGA configuration**
- Programmed **Basys-3** FPGA board to configure it with VGA.

## Skills

**Programming** Python (Pandas, PyTorch, NumPy, Scikit-learn. etc.), C/C++, MATLAB, SystemVerilog

**Tools** JasperGold, VCFormal, Verdi, Linux, Shell (Bash/Zsh), Git

**Formal Methods** System Verilog Assertions, Python/Tickle scripting, Complexity Management, Post-Si Bug hunting

## Achievements

2024 **Best Paper Award**, First of its kind GenAI formal testplanning at DVCon India 2024 *India*

2022 **Winner**, Year-end bug hunting challenge in real projects at **FVCTO Intel** *India*

2020 **Cargill Global Scholar**, (top 10 in India, top 60 globally) for outstanding academic and leadership potential, selected among thousands of candidates *India*

2018 **Dean's list**, **Academic Excellence award** during 4 out of 5 eligible semesters at IIT Gandhinagar *India*

## Languages

**English** Professional proficiency

**Hindi** Native proficiency

**Gujarati** Bilingual proficiency