

# Jessica Danica Vaz

Master of Science Student, University of Illinois Urbana-Champaign

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## EDUCATION

- **University of Illinois Urbana-Champaign** 📍 Champaign, IL, USA  
Master of Science in Electrical and Computer Engineering  
Current GPA: 3.5/4.0  
Aug 2024 - Jul 2026
- **Nitte Meenakshi Institute of Technology (NMIT)** 📍 Bengaluru, India  
Bachelor of Engineering in Electronics and Communication Engineering  
GPA: 9.56/10.0 [Department Rank: 2]  
Aug 2018 - Jul 2022

## WORK EXPERIENCE

- **Research Assistant** Aug 2024 - Present  
Dept. of ECE at UIUC 📍 Champaign, IL, USA
  - Working on the design of trusted execution environments for secure and trusted hardware platforms.
- **ASIC Design Engineer** Aug 2022 - Aug 2024  
SiFive India Pvt. Ltd. 📍 Bengaluru, India
  - Integrated and validated a System-on-Chip (SoC) based on SiFive's E6-AB automotive class processor. This SoC showcases the dual-core lockstep as a functional safety mechanism and is targeted for the Arty A7-100T board.
  - Developed and verified an IP-XACT-based SoC design for SiFive's performance-class P470 processor on the VCU118 board. This involved integrating various 3rd party vendor IPs within the same SoC and automating the design integration to the bitstream generation flow as much as possible.
  - Designed and validated an evaluation platform based on SiFive's essential-series E6 processor. This platform demonstrates the WorldGuard security model to enable a trusted execution environment on RISC-V platforms.
- **FPGA Design Intern** Feb 2022 - Jul 2022  
SiFive India Pvt. Ltd. 📍 Bengaluru, India
  - Integrated NVIDIA's Deep Learning Accelerator (NVDLA) with SiFive's X280 intelligence family processor and tested the system's functionality on convolution, activation, and max pooling.
- **Research Intern** Aug 2021 - Jan 2022  
Centre for Nanomaterials and MEMS (CNM), NMIT 📍 Bengaluru, India  
Supervised by: Nithya G, Assistant Professor, ECE Dept., CNM, NMIT
  - Worked on the design and simulation of a novel comb drive-based capacitive MEMS in-plane gyroscope with parallel beam suspension, which resulted in improved sensitivity for an input rotation rate of 100 degrees/second.
  - This design was submitted at the national-level "Sukshma Samrachana" MEMS Innovation Challenge 2021, conducted by Semiconductor Technology and Applied Research Centre (STAR-C), India. It was also nominated for the Institute of Smart Structures and Systems (ISSS) student award.

## PROJECTS

- **RISC-V Processor Development** Aug 2024 - Dec 2024
  - Implemented an Out-of-Order RV32IM processor based on the explicit register renaming (ERR) strategy. The processor had advanced features like early branch recovery and split load/store queue. (group project)
  - Implemented a 2-stage pipelined write-back write-allocate cache with tree pseudo-LRU replacement policy.
  - Implemented a 5-stage pipelined RV32I core with full forwarding in System Verilog. The processor was verified using RISC-V formal verification infrastructure and spike co-simulation.
- **Reconfigurable Memory Controller Architecture for System-on-Chip** Sep 2021 - Jun 2022  
*Advised by: Sowmya Madhavan, Associate Professor, ECE Dept., NMIT*
  - Implemented dynamic memory partitioning scheme for simultaneous video, audio, and text input using a priority-based FSM memory controller to achieve parallel memory accesses. The design also utilizes serial communication protocols like UART, SPI, and I2C for data transmission.
  - Presented a poster at "Kaushalya" 2022, NMIT's open house exhibition attended by over 200 students, faculty members, and industry experts.

- **APB Protocol-based Slave State Memory**

May 2021 - Jun 2021

*Advised by: Sowmya Madhavan, Associate Professor, ECE Dept., NMIT*

- Designed an Advanced Peripheral Bus (APB) slave state machine to write and read data to and from memory with or without wait states and developed a test bench to verify the functionality.

- **Heart Disease Prediction Model**

Jun 2021

- Developed a machine learning model using the K-Nearest Neighbours algorithm based on a dataset of 303 people (from UCI Repository) to predict whether the patient is likely to be diagnosed with heart disease or not based on the medical history of the patient with an accuracy of 83.16%.

- **Handwritten Digital Classifier using CNN**

Nov 2020

- Built a Convolutional Neural Network (CNN) model to recognize real-time images of handwritten numerical digits and classify them accordingly with an accuracy of 99% using the Chars74K dataset of 10,000 images of digits 0-9.

- **Smart City**

Sep 2019 - Nov 2019

- Constructed a Ranger Robot using Lego Mindstorms and Tetrix components like NXT microcontroller, servo controllers and motors, light sensors, and ultrasonic sensors.
- The robot was programmed in RobotC to navigate and perform predefined tasks like lifting objects, ringing a bell, etc.
- It could be reprogrammed to detect different types of waste using a light sensor and segregate them accordingly.

## TECHNICAL SKILLS

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- **Programming Proficiency:** C/C++, Python, x86, ARM and RISC-V Assembly, MATLAB
- **Hardware Description Languages:** Verilog, System Verilog, Chisel
- **EDA Tools:** Xilinx Vivado, Synopsys CoreTools, VCS, and Verdi, Arteris Magillem, Siemens ModelSim, Ngspice
- **Softwares/Environments:** ARM Keil uVision, COMSOL Multiphysics, Bash, Git

## RELEVANT COURSEWORK

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### Electronics & Communication Engineering

EC411: Computer Organization and Design  
EC422: Introduction to Computer Security  
Low Power VLSI Design  
VLSI Testing  
Fundamentals of VLSI Design  
Digital System Design using Verilog  
Digital Electronics

### Computer Science & Engineering

Computer Architecture and Organization  
Artificial Neural Networks  
Machine Learning for Pattern Recognition  
ARM programming  
Advanced Microcontroller  
Computer Networks  
Data Structures using C++  
C Programming

## EXTRACURRICULAR ACTIVITIES

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- **National Cadet Corps**

Aug 2018 - Jul 2021

- Achieved B and C certifications.
- Organized and actively participated in over 100 hours of annual social initiatives involving COVID-19 vaccination drives, awareness campaigns, street plays, outreach programs to teach underprivileged students at government schools, tree plantation drives, and cleanliness drives.

- **Head Coordinator, IRIS Forum, Dept. of ECE, NMIT**

Aug 2020 - Jul 2021

- Responsible for conducting various technical and cultural events at the institute level.

## REFERENCES

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- **Prof. Kirill Levchenko**

Associate Professor, Dept. of Electrical and Computer Engineering, UIUC.  
Email: [[✉ klevchen@illinois.edu](mailto:klevchen@illinois.edu)]

- **Prof. Sowmya Madhavan**

Associate Professor, Dept. of Electronics and Communication Engineering, Nitte Meenakshi Institute of Technology, Bengaluru, India.  
Email: [[✉ sowmya.madhavan@nmit.ac.in](mailto:sowmya.madhavan@nmit.ac.in)]

- **Prof. Nithya G**

Assistant Professor, Dept. of Electronics and Communication Engineering, Centre for Nanomaterials and MEMS, Nitte Meenakshi Institute of Technology, Bengaluru, India.  
Email: [[✉ nithya.g@nmit.ac.in](mailto:nithya.g@nmit.ac.in)]