

# SHREESH KULKARNI

(+91)8976733195 ◊ shreesh12@gmail.com ◊ LinkedIn Profile ◊ Github Profile

## ABOUT ME

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A highly curious, motivated and passionate individual who loves exploring new ideas and paradigms in Computing, Physics, Animal Behavior and Music. I strive to do work that is cooperative, novel and impactful. My goal in life is to multiply and magnify the collective health, wealth and happiness of the world.

## EDUCATION

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**Birla Institute of Technology and Science, Pilani (BITS, Pilani)** *Aug 2017 - Aug 2022*

Master of Science in Physics

Bachelor of Engineering in Computer Science and Engineering

*(concurrently, under the dual degree scheme)*

**CGPA - 8.05/10**

**Lilavatibai Podar High School, Mumbai**

*Graduated in 2017*

ISC examination (12th Grade)

Percentage - 97%, Nation-wide Top 1%ile

## WORK EXPERIENCE

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**Transasia Bio-medicals Ltd, R&D Division, Bengaluru** *August 2023 - March 2026*

*Software Development and Research Engineer*

Embedded systems software development for Computer Vision based robot, including GUI development in C++ using LVGL for the front end and in C for the RemoteProc/RPMsg framework for inter-processor communication. Worked to optimize USB camera performance on the resource-constrained single board computers. Implemented ML models on the Renesas system using the proprietary DRP-AI accelerator library for usage in stereo Image Processing chains for the robot.

**Transasia Bio-medicals Ltd, R&D Division, Bengaluru** *May 2022 - March 2023*

*R&D Intern*

Worked on a Computer Vision project focusing on vein segmentation and 3D vein reconstruction. Developed novel image processing and camera calibration algorithms.

**TEE Lab, CES, IISc Bengaluru** *July 2021-May 2022*

*Masters Thesis Project*

A year long research thesis project to fulfil the requirements of the final year of the program at BITS Pilani. The research done is interdisciplinary, in the fields of Theoretical Ecology and Image Processing.

**Maker's Asylum, Mumbai**

*May-July 2019*

*Summer Intern*

A summer internship focusing on the rapid prototyping of Arduino and Raspberry Pi based projects for electronics workshops.

## PROJECTS

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### GUI Development for Single Board Computer (SBC)

*Feb 2023 - March 2026*

- Built a GUI for the vision robot using MVC, MVVM, Observer, Strategy and Repository design patterns for a Renesas SBC. Python and PySimpleGUI was used for the prototype, which ran on a Linux x86\_64 PC.
- The final version was written in C/C++ for the arm64 SBC, used SquareLine Studios + LVGL for graphics, and Wayland for driver support. I worked directly with Linux's V4L2 framework to manage the GUI thread's communication between two fHD cameras and achieve high speed screen refresh on the screen.
- The GUI supports a multi-threaded environment to be able to run multiple robotics threads along with the main GUI thread. An event-based inter-process communication routine using RPIMsg was developed to coordinate the threads, including a special CAN communication system that ran the peripherals of the robot.

### Vein segmentation and 3D reconstruction

*May 2022 - Feb 2023*

Developed and implemented 3D vein reconstruction techniques for a vision robot. Created a novel implementation for the annular ring camera calibration needed for sub-pixel accuracy using the *OpenCV* library, and a novel vein boundary estimation algorithm.

### Image processing of fish school videos

*July 2021-May 2022*

This Master Thesis research project was done under the guidance of Dr. Vishwesh Guttal, Associate Professor at CES, IISc Bengaluru, and Dr. Danny Raj M, INSPIRE faculty at the Dept of Chem Engg. at IISc Bengaluru. It focuses on the image processing and data analysis involving the positional tracking of fish in videos of fish schools. I worked on improving the quality and accuracy of tracking of fish in recorded videos. Doing this allowed us to diversify away from solely mean field models of collective fish behavior, and to feed the data into newer spatially explicit models.

### Development of Cross Platform Open Source VSTs

*Jan-May 2021*

A project done under the guidance of Dr. Pritam Bhattacharya, Associate Professor under the Department of Computer Science at BITS Pilani, Goa campus. This project explores the field of audio software development and digital signal processing using the JUCE framework, written in the C++ language.

## TECHNICAL SKILLS

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<b>Software &amp; Tools</b>	Linux, Bash scripting, C/C++, Javascript, Python, OpenCV, MATLAB, Julia, Qemu/KVM virtualization, DRP-AI, $\text{\LaTeX}$
<b>Creative Software</b>	p5.js, TouchDesigner, FL Studio, VST3, JUCE

## ACADEMIC ACHIEVEMENTS AND SCHOLARSHIPS

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INSPIRE Scholarship for Higher Education (SHE) - 2018-2022  
- Offered by the Department of Science and Technology, India

National top 1% in National Graduate Physics Examination - 2019 (India)

## LANGUAGES KNOWN

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English (first language), Kannada, Marathi, Hindi