

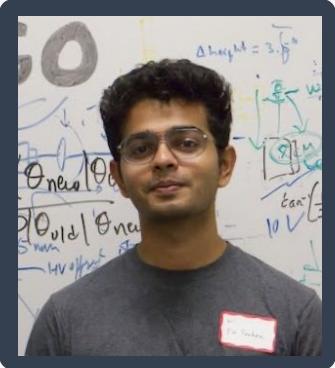
Reuben Shibu Mathew

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Advanced Optical Technologies

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■ Education

— Friedrich-Alexander-Universität, Erlangen-Nürnberg

2024 - Present

- Masters in Advanced Optical Technologies
 - Grade 1.4
 - Scholarship from Max Planck School of Photonics.
 - Majors: Optical Materials and Systems & Physics of Light.

— National Institute of Technology, Calicut

2020 - 2024

- Bachelor of Technology in Engineering Physics
 - CGPA 8.5/10
 - Graduated First Class with Distinction.

■ Project Experience

— Masters project at Max Planck Institute for the Science of Light, Erlangen

November 2025 - Present

- Quantum correlation in modulation instability in twisted photonic crystal fibers.
 - Supervisors: Dr. Vishal Choudhary & Prof. Nicolas Joly; *Joly Group @ MPL*.
 - Working with mode locked lasers, fibre free space coupling, polarisation and quantum correlation measurements.

— Internship at Max Planck Institute for the Science of Light, Erlangen

2025 April - 2025 November

- Relative intensity noise analysis of MOPA lasers.
 - Supervisors: Dr. Vishal Choudhary & Prof. Nicolas Joly; *Joly Group @ MPL*.
 - Gained experience with MOPA lasers, fibre splicing and nonlinear optical phenomena in photonic crystal fibers.

— Undergraduate project at National Institute of Technology (NIT), Calicut

August 2023 - May 2024

- Analysis of microplastics using incoherent broadband cavity enhanced absorption spectroscopy.
 - Supervisors: Salma Jose and & Prof. M. K. Ravi Varma; Department of Physics @ NIT Calicut.
 - Gained experience with aethalometers, lasers, broadband sources and building and aligning broadband cavities.

— Summer internship at California Institute of Technology, Pasadena ↗

May 2023 - July 2023

- Improving frequency stabilisation at the 40m detector with digital controllers.
 - Supervisors: Radhika Bhatt and & Prof. Rana Adhikari; The Division of Physics, Mathematics and Astronomy @ Caltech LIGO 40m lab.
 - Gained hands-on experience in control theory, laser locking and digital controllers (Moku platform) and related programming.

— Summer internship at Indian Institute of Space Science and Technology (IIST), Trivandrum ↗

May 2022 - June 2022

- Design and realisation of a rotation stage for characterisation of optical gyroscopes

- Supervisors: Dr. Dinesh Naik; Applied and Adaptive Optics Lab & Small Spacecraft Systems and Payload Centre (SSPACE) @ IIST.
- Experience gained in working with laser, optical fibers, interferometers and related components and in the design and machining of related parts.
- Presented a poster on the above project at quantum optics symposium, COPaQ'22 @ IIT Roorkee.

— Design and realisation of a simple quadruped robot ↗

August 2021

- A robot with four legs, capable of moving forward and backwards under static stability, made with 3D printed parts powered by servo motors and controlled with micro controllers.
- 3D modelling – Autodesk Inventor; Movement and gait simulation – MATLAB and Simulink; Hardware and code – Raspberry Pi Pico running MicroPython.

■ Achievements

- Scholarship under Max Planck School of Photonics.
- LIGO Caltech Summer Undergraduate Research Fellowship (SURF), 2023.
- Head of Bhauthiki, the physics association at NIT Calicut.
- GATE Physics 2022, All India Rank 514.
- GRE general score – Quantitative 168/170, Verbal 158/170, Analytical Writing 4.0/6.0

■ Skills

- Laboratory experience
 - Fibre lasers, mode locked lasers, high power lasers.
 - Fibre cleaving, splicing, free space coupling, characterisation.
 - Oscilloscopes, optical and electronic spectrum analysers, FPGA based controllers, and SCPI interfacing with python.
- Software and coding
 - Advanced Python coding and basic coding in Java, C, HTML and MATLAB scripting. Capable of picking up on object-oriented languages easily.
 - Experience in working with CAD, MATLAB & Simulink, Blender and Linux based systems/servers.
 - Design of hardware and coding for micro controllers and peripherals on Raspberry Pi, Arduino and ESP32 platforms.
- Mechanical design and problem solving related to physics and robotics.
- Handling power tools like drills, cutters, grinders, circular saws and angle grinders.

■ Main courses taken

— Masters:

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|-------------------------|--|--------------------------|
| - Quantum Optics | - Nonlinear Optics | - Nonlinear fibre optics |
| - Quantum Communication | - Optics in Communication | - Machine Learning |
| - Advanced Laser | - Waveguides and photonic crystal fibres | |

— Bachelors:

- | | | |
|--------------------------------|--------------------------------|----------------------------|
| - Quantum Mechanics | - Thermodynamics | - Critical Phenomena |
| - General theory of Relativity | - Digital/Analogue electronics | - Condensed Matter Physics |
| - Physics of Climate | - Nuclear Physics | - Electromagnetics |
| - Statistical Physics | - Computational Physics | - Classical Mechanics |