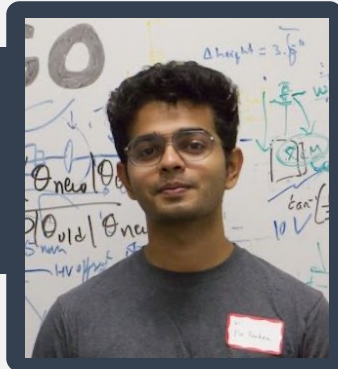# Reuben Shibu Mathew

Masters Student,
Advanced Optical Technologies

rbnsmathew@gmail.com
+49 176 35111 604
rbnsmathew.github.io

■ 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:**

– 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