Mathew Cherian Perumaly

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Profile

A highly motivated professional specializing in **Photonics** and **Optical System Design** with experience in the **simulation and optimization** of advanced optical systems. Skilled in **Finite Element Analysis (FEA)**, **COMSOL Multiphysics**, and **optical noise reduction** techniques, with a strong foundation in **mechanical engineering** and extensive research experience at the **Max Planck Institute**.

Professional Experience

Student Research Assistant

Max-Planck-Institut für Gravitationsphysik, Hannover, Germany
Oct 2021 – Sep 2023

- Designed and simulated **Silicon Nitride membranes (MEMS)** using **Finite Element Analysis (FEA)** in **COMSOL Multiphysics**.
- Developed an innovative method for precisely computing **Anchor Losses** of a Silicon Nitride membrane using the **Perfectly Matched Layer (PML)** function in COMSOL.
- Conducted comprehensive analysis of **thermal** and **mechanical losses** in MEMS structures, integrating simulation with experimental data.
- Performed vibration analysis of a Silicon Nitride membrane within a **Fabry-Perot cavity** using both simulation techniques and laser beam excitation.
- Collaborated with a team of researchers to improve the **Quality Factor** of optical systems by identifying and mitigating noise sources.

Proposal & Procurement Engineer

Emvees Wastewater Treatment PVT Limited, Ajman, UAE
Feb 2019 – Aug 2019

- Prepared detailed **technical and commercial proposals** for wastewater and water treatment plants in response to RFQs and RFPs.
- Performed **cost estimations** and prepared **technical documents**, designs, and drawings for project proposals.

- Managed the **procurement process**, identifying and evaluating suppliers based on technical capability, quality, pricing, and delivery times.

Project Engineer

Omega Furnaces Pvt. Ltd, Bangalore, India
Dec 2016 – Dec 2018

- Designed and manufactured **industrial furnaces** (up to 1800°C) and **ovens** (up to 400°C) for applications such as **tempering**, **annealing**, **hardening**, and **quenching**.
- Managed the entire design and production process, including **CAD modeling**, cost estimation, and proposal formulation for clients across **Middle East**, **Europe**, and **India**.
- Utilized **CAD** software to design custom furnace solutions, ensuring all components were accurately integrated.

Education

Master of Science: Optical Technologies

Leibniz Universität Hannover, Germany
Oct 2019 – Sep 2023

- **Specialization**: Design and simulation of optomechatronic systems, Laser Interferometry, Laser Spectroscopy, and Laser Material Processing.
- **Master's Thesis**: Simulation-based Analysis of Acoustic Radiation Losses in Clamped Silicon Nitride Membranes (at Max Planck Institute for Gravitational Physics).

Bachelor of Science: Mechanical Engineering

Mahatma Gandhi University, Kochi, India
Aug 2012 – Aug 2016

Skills

- **Technical Skills**:
  - FEM Simulation, Optical System Design, Laser Interferometry, opt mechatronic Systems
  - Industrial Furnace Design, Cost Estimation, Manufacturing Process Optimization
- **Software:**
  - COMSOL Multiphysics, Zemax OpticStudio, SolidWorks, MATLAB
  - Microsoft Word, Excel, PowerPoint

- **Languages:**
    - **English**: Fluent
    - **German**: B1 Proficiency
    - **Hindi, Malayalam**: Native

References

Prof. Dr. Michèle Heurs: "Quantum Control" group at Max Planck Institute for Gravitational Physics (AEI Hannover)

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