

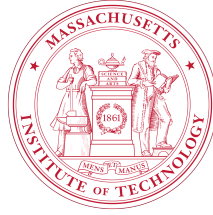
Pratyush Anand

Curriculum Vitae

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ETH zürich



"I, a universe of atoms, an atom in the universe."
-Prof. Richard Feynman

Education

- Sep 2024 - Present **EECS Ph.D. Researcher**, *Massachusetts Institute of Technology (MIT)*, USA.
CGPA* : 5.0/5.0, Supervisor: Prof. Dirk R. Englund, Quantum Photonics and AI Group
- 2019–2022 **Masters in Physics**, *ETH Zürich*, Switzerland.
CGPA : 5.41/6.00
- 2015–2019 **Bachelor of Technology (B.Tech)**, *Indian Institute of Technology (IIT) Madras*, Chennai.
CGPA : 9.58/10; **Physics GPA**: 9.82/10, Engineering Physics
- 2014–2015 **Higher Secondary Certificate**, *Delhi Public School*, Ranchi.
94.6%, Class XII, Central Board of Secondary Education
- 2012–2013 **Secondary School Certificate**, *Delhi Public School*, Ranchi.
CGPA : 10/10, Class X, Central Board of Secondary Education

Research Metrics

- Google Scholar **Citations**: 18; **h-index**: 2; **i10 index**: 1
- ResearchGate **RG Score**: 16.3; **Reads**: 1711; **Recommendations**: 3
- Numbers **Papers**: 6; **Patents**: 2 (pending)

Research Experience

- Aug 2023– June 2024 **1. Massachusetts Institute of Technology**, *United States of America*, Research Associate (Full-time: 40hrs/week).
Worked with **Prof Dirk Englund's** group, on spin opto-mechanical interfaces, and SnV color centers. Following were the aims:
- AI assisted co-design of quantum protocols and quantum repeaters
 - Optimize a spin opto-mechanical interface for heralded entanglement protocol
 - Developing protocols for MW single photon detection
 - Collaborating with MITRE on piezo-driven color center platforms
- Dec 2022 – June 2023 **2. Niels Bohr Institute**, *Copenhagen, Denmark*, Research Assistant (Full-time: 40hrs/week).
Worked with **Prof Peter Lodahl's** group, on designing, and simulating a microwave resonator for the coherent control of InGaAs quantum dots. Following were the aims:
- Designing a CPW resonator using gds Spy framework
 - B-field simulations on Comsol
 - Characterization of the devices
- Nov 2021 – July 2022 **3. Harvard University**, *United States of America*, Master's Thesis Project (Full-time: 40hrs/week).
Worked with **Prof Mikhail Lukin's** Silicon Vacancy subgroup, on Designing, Fabricating and Characterizing a Superconducting Coplanar Waveguide Quarter Wave Resonator for a Silicon Vacancy based Quantum Network Node. Following were the aims:
- Designing a SC CPW resonator using gds Spy framework
 - Simulating on Sonnet Software and loss modelling
 - Learning the nano-fabrication steps and getting trained on the Harvard CNS tools for: Sputtering, Resist spinning, Photolithography, Development, Lift-off, SEM, and Reactive Ion Etching
 - Fabricating a number of resonators and using a flow cryostat and dilution fridge to characterize the resonator using a VNA
 - Analyze the variation in Q-factor as a function of temperature and power
- Mar 2021 – Jul 2021 **4. ETH Zürich**, *Switzerland*, Research Assistant (Part-time: 30hrs/week).
Worked with **Prof Christian Degen's** Spin Physics Group, under the supervision of **Dr. Takuya Segawa** on single particle distance measurements between 5-nm diamonds containing NV centers. Following were the aims:
- Confocal scans and ODMR are run on sample, to find good NV spots
 - Two closest pairs of nanodiamond NV centers are selected using Super-resolution imaging
 - Characterize individual NVs: ODMR contrast, Rabi frequency and coherence time T_2

*Grades upto Fall 2024

- Oct 2020 - **5. ETH Zürich, Switzerland**, Semester project (Part-time: 30hrs/week).
 Feb 2021 Worked with **Prof Tilman Esslinger's** Quantum Optics. Group, under the supervision of **Dr. Abdulkadir Akin** on calibration of a gaussian laser beam via fast readout using FPGA and camera, for feedback stabilization. Following were the aims:
- Readout industrial camera with high FPS via USB
 - Process pictures to determine position and waist of a Gaussian beam
 - Control 2x Cameras with 1 FPGA to determine position, angle and focus shift of the beam
- Full report can be found [here](#).
- Jun 2019 - **6. Harvard University, United States of America**, Research Fellow (Full-time: 40hrs/week).
 Aug 2019 Worked with the DUNE Group, under the supervision of **Prof. Roxanne Guenette**, on the R&D of Anode Plane Assembly (APA) in the DUNE detector
- Developed a Python script using PyVISA (**Py**thon **V**irtual **I**nstrument **S**oftware **A**rchitecture) to control the experimental apparatus remotely
 - Performed a remote electrical measurement of the anode wire length using Time Domain Reflectometry (TDR)
 - Performed a remote tension measurement of the anode wire using bipolar resonance method and tested the working of my Python script
- Full report can be found [here](#).
- Jun 2018 - **7. CERN (European Organisation for Nuclear Research), Switzerland**, Research Intern (Full-time: 40hrs/week).
 Aug 2018 Worked with the ATLAS Group, under the supervision of **Dr. Arely Cortes Gonzalez**, on the Laser and Cesium Calibration of the ATLAS Tile Calorimeter
- Studied and compared the laser and cesium measurements and evaluated the systematic uncertainty for the laser system, which is an important parameter for reconstructing back the energy deposited in the hadronic calorimeter.
 - Measured the PMT response drift and its RMS variation over time
 - This study will continue to include a comparison of Cesium – Laser for 2016 and 2017 (covering the full year).
- Full report is present on the [CERN Document Server \(CDS\)](#).

Contributed Works/Publications/Patents

- Linsen Li, **Pratyush Anand**, Kaiming He, Dirk Englund, *[Dynamic Inhomogeneous Quantum Resource Scheduling with Reinforcement Learning](#)*, arXiv 2024
- Hamza Raniwala, **Pratyush Anand**, Stefan Krastanov, Matt Eichenfield, Matthew Trusheim, Dirk R. Englund, *[A spin-optomechanical quantum interface enabled by an ultrasmall mechanical and optical mode volume cavity](#)*, arXiv 2024
- Pratyush Anand**, Ethan G. Arnault, Matthew Trusheim, Dirk R. Englund, *[Microwave single-photon detection using a hybrid spin-optomechanical quantum interface](#)*, arXiv 2024
- Stefano Marti, Enis Mustafa, Giacomo Bisson, **Pratyush Anand**, Philipp Fabritius, Tilman Esslinger, Abdulkadir Akin, *[FPGA-based real-time laser beam profiling and stabilization system for quantum simulation applications](#)*, IEEE Xplore 2024
- European Patent Application no. 23198811.4 (pending),
Pratyush Anand, Zhe Liu, Stefano Paesani, Leonardo Midolo, Anders Søndberg Sørensen, Peter Lodahl
[A spin qubit system having a quantum dot](#)
- Dorothea Pinotsi, Rui Tian, **Pratyush Anand**, Koichiro Miyanishi, Jens Michael Boss, Kevin Chang, Pol Welter, Frederick Tze, Kit Tze Kit So, Daiki Terada, Ryuji Igarashi, Masahiro Shirakawa, Christian Degen and Takuya Fabian Segawa, *["Distance measurements between 5-nanometer diamonds – Single particle magnetic resonance or optical super-resolution imaging?"](#)*, Nanoscale Advances, Royal Society of Chemistry
- Sebastien Prince, **Pratyush Anand**, James Battat, Russell Farnsworth, Nathan Felt, Roxanne Guenette, Shion Kubota, Austin Li, Em Murdock, John Oliver, Chris Stanford, Jackson Weaver, *["Digital wire analyzer of mechanical tension, electrical continuity, and isolation"](#)*, IEEE Transactions on Instrumentation and Measurement
- Pratyush Anand**, Arely Cortes Gonzalez, Attila Jozsef Rád, *["Cesium and Laser calibration of the ATLAS Tile Calorimeter"](#)*, CERN Document Server (CDS) 2018

Conferences/Presentations

1. **Digital System Design (DSD) Euromicro Conference 2023**, Durres, Albania.

"FPGA-based real-time laser beam profiling and stabilization system for quantum simulation applications" is presented, also accepted for IEEE Xplore

2. **International Society of Magnetic Resonance Conference 2021**, online due to Covid.

"Distance measurements between 5-nanometer diamonds – Single particle magnetic resonance or optical super-resolution imaging?" is presented

3. **American Physical Society (Division of Particles and Fields) Meet 2019**, Northeastern University, Boston.

Represented the Harvard Neutrino Group and presented the poster titled *"Implementation of electrical wire-tension measurement method for liquid-argon time projection chambers"*.

4. **CERN Summer Student Poster Session 2018**, Geneva, Switzerland.

"Cesium and Laser calibration of the ATLAS Tile Calorimeter" is presented.

Skills

- **Programming Languages:** C, C++, Python
- **Operating Systems:** Windows, Ubuntu Linux
- **Software & Packages:** QuTiP, NVIDIA Omniverse, COMSOL, Zemax, ROOT, RooFit, MATLAB, Mathematica, AutoCAD, Verilog, Sonnet Software
- **Documentation:** \LaTeX
- **Languages known:** English, Hindi, Sanskrit, German (Level A1)

Academic Achievements

- Received **MIT Presidential Fellow Award 2024**.
- Received an **Honorable Mention** for the poster presented in the meeting of the **American Physical Society 2019**.
- **One among 13 candidates** from India to become scholar-2019 of Inlaks Shivdasani Foundation & Narotam Sekhsaria Foundation for M.Sc. studies at ETH Zurich
- One among **top 4** students from India (and 140 all over the world) to get selected for the **CERN Summer Student Programme -2018**
- One among **top 196** students in India to get selected for **Summer Research Fellowship Programme - 2017** by Indian Academy of Sciences
- Received IIT Madras's **Institute Merit Prize 2016-19**
- Received the **Best Volunteer Award 2015-16** from National Service Scheme
- Secured an **All-India-Rank of 2257 (top 0.2%)** in Joint Entrance Examination-Advanced (JEE-Advanced) for getting into IIT's
- Awarded **National Top- 1%** Certificate for National Standard Examination in Physics - 2014-15, conducted by **Indian Association of Physics Teachers**
- Selected for **International Mathematics Olympiad Training Camp 2013,14**. Youngest among **top 30** students in India
- Awardee of **Regional Mathematics Olympiad- 2012,13**. Selected among **top 600** students in India

Certificates can be found [here](#).

Miscellaneous

- Offered guidance to students regarding CERN Summer Student Program on my [YouTube channel](#), which so far has generated **more than 13k views and 88 comments**