Akash Yadav

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Education

- **Indian Institute of Science Education and Research (IISER), Tirupati** — Tirupati, India
  BS-MS; CGPA: 7.6 — *Aug 2019 – Aug 2025*
- **Central Academy** — Lucknow, India
  Senior Secondary; Percentage: 88.6% — *May 2018*
- **Saraswati Vidya Mandir Senior Secondary School** — Basti, India
  Matriculation; GPA: 9.8 — *May 2016*

Projects & Thesis

- **Many-Body Localization in XXZ Models on Superconducting Quantum Processors** — IISER Tirupati
  Supervisor: Dr. Sambuddha Sanyal — *Jan 2025 – Present*
  - Simulations of quasi-periodic XXZ spin chains and 2D lattices mapped to IBM heavy-hex superconducting quantum processors.
  - Benchmark hardware runs against exact diagonalisation and matrix product state simulations to identify many-body localization signatures via imbalance dynamics.
- **MS Dissertation: Quantum Many-Body Simulation and Error Mitigation** — IISER Tirupati
  Supervisor: Dr. Sambuddha Sanyal — *Jan 2024 – Dec 2024*
  - Simulated 1D and 2D spin systems using quantum-circuit based time evolution with Trotterisation.
  - Applied and compared error mitigation strategies to improve the fidelity of measured observables on noisy hardware.
  - Utilized Qiskit for quantum circuit design, transpilation, and execution on IBM Quantum Experience backends and simulators.
- **Self Replication of Colloidal Clusters** — Semester Project
  Instructor: Dr. Rakesh Singh, IISER Tirupati — *Jan 2023 – Apr 2023*
  - Studied Brownian and Langevin dynamics in a binary colloidal system.
  - Simulated self-replicating off-lattice clusters and analysed their formation and growth behaviour.
- **Simulation of Active Matter Systems** — Semester Project
  Instructor: Dr. Annwesha Dutta, IISER Tirupati — *Aug 2022 – Nov 2022*
  - Reviewed Brownian, Langevin, and active particle dynamics in the context of active matter.
  - Performed Active Brownian dynamics simulations in LAMMPS and Python to explore emergent behaviour in active particle ensembles.
- **Three Body Problem** — Term Paper
  Instructor: Dr. G. Ambika, IISER Tirupati — *Jan 2022 – Apr 2022*
  - Studied the classical three-body and restricted three-body problems and their analytical limitations.
  - Implemented numerical simulations of the generalized three-body problem and studied representative trajectories.
- **Trajectories of Triple Pendulum System** — Term Paper
  Instructor: Dr. G. Ambika, IISER Tirupati — *Aug 2021 – Nov 2021*
  - Analysed the nonlinear dynamics of a triple pendulum as a model few-body system.
  - Performed numerical simulations of triple pendulum motion and investigated the resulting trajectory patterns.

Skills

- **Languages**: Python, Fortran, HTML, CSS
- **Tools & Libraries**: Qiskit, TeNPy, LaTeX, MATLAB, Wolfram Mathematica, LAMMPS, Origin, Tkinter
- **Soft Skills**: Leadership, Event Management, Writing, Public Speaking, Time Management

Courses

Classical Mechanics	Fluid Dynamics	Data Science I, II
Quantum Mechanics I, II	Simulation and Modelling	Linear Algebra
Electrodynamics	Photonics	Advanced Physics Lab
Statistical Thermodynamics	Optics	Atomic and Molecular Physics
Advanced Statistical Mechanics	Mathematical Methods in Physics	Non-Linear Dynamics
Soft Matter Physics	Computational Methods in Physics	

Conferences & Workshops

- **Young Investigators Meet on Quantum Condensed Matter Theory (YIMQCMT)** — IISER Tirupati
  Poster Presenter — *Dec 21 – Dec 23, 2025*
- **IISER Tirupati Physics Day** — IISER Tirupati
  Speaker: Talk on quantum many-body dynamics — *Nov 8, 2025*
- **Quantum Computing Workshop (Hands-on Session)** — IISER Tirupati
  Instructor: Beginner-level introduction to quantum computing using Qiskit — *Oct 12, 2025*
- **Quantum India Bengaluru Summit (QIB 2025)** — Bengaluru, India
  Participant — *Jul 31 – Aug 1, 2025*
- **IBM Quantum Challenge 2024** — Online
  Participant — *May – Jun 2024*
- **Quantum Computation: Introduction to Algorithm and Implementation using Qiskit** — IISER Tirupati
  Workshop participant (Qkrishi–IISER Tirupati) — *May – Jun 2022*
- **QC101: Quantum Computing & Quantum Physics for Beginners** — Online
  Course participant — *May 2022*
- **The MathWorks Online Course Challenge (MATLAB)** — Online
  Participant — *Jun 2020*

Achievements

- IIT JEE Mains and Advanced Qualified — *Jun 2019*

Extra-curricular Activities

- Member of Web Development Team at Minuscules — *Jul 2020 – Dec 2021*
- Web development for Quantiki — *Aug 2024 – Present*

References

- **Dr. Sambuddha Sanyal**
  Assistant Professor, IISER Tirupati, India
  `sambuddha.sanyal@iisertirupati.ac.in`
- **Dr. Rakesh S. Singh**
  Assistant Professor, IISER Tirupati, India
  `rssingh@iisertirupati.ac.in`