Abhinav Krishna Jha

https://abhinav_jha.codeberg.page/
University of California, Santa Cruz
Email ID: abhinav@ucsc.edu

Mathematics
PhD
Male

Examination	University	Institute	Year	GPA/%
PhD	UC Santa Cruz	UC Santa Cruz	2023-present	
Graduation	IISER Tirupati	IISER Tirupati	2018-2023	**8.7**
Intermediate/+2	HSC	Sri Chaitanya, Vijaywada	2016-18	**89.3**
Matriculation	SSC	Fr. Agnels, Vashi	2016	**83.21**

COURSEWORK at UC Santa Cruz

- **Geometric Analysis: Quantum Field Theory** (Fall '23) by Prof. Jie Qing
- **Differential Geometry** (Fall '23) by Dr. Maria Alejandra Ramirez Luna
- **Analysis I** (Fall '23) by Dr. Francois Monard

Teaching Experience

- **Math 11A TA** Calculus with Applications *Oct '23 - Dec '23*

Awards and Honors

- **Regents Fellowship**, University of California Santa Cruz. *Oct '23*

PROJECTS

- **Variational Aspects of The Yamabe Problem**
  (*Master's Thesis* | Guide: **Dr. Ved V. Datar** | **Indian Institute of Science, Bangalore**) *(May'22- May'23)*
  - Sobolev Spaces, Rellich-Kondrakov Compactness, Trace Theorem.
  - Calculus of Variation, Coercivity, Convexity, Euler-Lagrange Equations.
  - Hopf Maximum Principle, Alexandroff Maximum Principle, Viscosity Solutions.
  - L^2 Regularity, Schauder's Estimates, DeGiorgi-Nash-Moser Theorem.
  - Concentration-Compactness Lemmas, Best Sobolev Constant.
  - Palais Smale condition, Blow up Theory in Equations of Yamabe Type.
  - Conformal Normal Coordinates, Aubin's Test functions.
  - Proof of The Yamabe Problem.

- **Differential Manifolds & Lie Groups**
  (*Semester Project* | Guide: **Dr. Gururaja H.A.** | **IISER Tirupati**) *(Jan'22-April'22)*
  - Smooth Manifold, Smooth Maps.
  - Tangent Bundle, Cotangent Bundle, Vector Bundle.
  - Submersions, Immersions, Embeddings
  - Sard's Theorem, Weak Whitney Embedding Theorem.
  - Lie Group, Vector Fields, Flows, Lie Brackets, Lie Algebras.
  - Distributions, The Frobenius Theorem.

- **Travelling Salesman Problem**
  (*Summer Intern* | Guide: **Prof. Bikas K. Chakrabarti** | **Saha Institute of Nuclear Physics, Kolkata**) *(June'19-July'19)*
  - Simulated Annealing: Homogeneous and Non-Homogeneous Algorithm.
  - Classically testing with higher accuracy lower bounds for Travelling Salesman Problem(TSP) on a Torus.
  - Observing Quantum Tunneling is the reason for better results given by Quantum Annealing for TSP.

COURSEWORK at IISER Tirupati in Math and Physics

- Introduction to Abstract Harmonic Analysis
- Partial Differential Equations
- Functional Analysis
- Ordinary Differential Equations
- Fourier Analysis
- Measure Theory and Integration
- Calculus on Manifolds
- Complex Analysis
- Real Analysis
- Topology

- Algebraic Topology
- Commutative Algebra
- Representation Theory of Finite Groups
- Fields and Galois Theory
- Introduction to Algebraic Topology
- Introduction to Lie Algebras
- Rings and Modules
- Group Theory
- Linear Algebra

- Elementary Number Theory
- Basic Structures in Mathematics
- Probability and Statistics
- Multi-variable Calculus
- Linear Algebra and Applications
- Single Variable Calculus
- Classical Mechanics

Achievements

- **Joint Entrance Examination – Main (JEE-Main) 2018**: ranked **11,706** out of approximately **1 Million** candidates.

TECHNICAL SKILLS

- **Programming & Scripting Languages**: Java, Python, HTML, Bash.
- **Tools & Libraries**: SageMath, LaTeX, Git, Linux, Vim, Emacs.
- **Machine Learning & A.I.**: Keras, TensorFlow.

POR & EXTRA-CURRICULARS

- **Core Committee Member,** The Math Club, IISER Tirupati. *(Jan'22-Present)*
- **Member,** The Math Club, IISER Tirupati. *(Aug'18-Present)*
- **Center,** Basketball team, IISER Tirupati. *(Aug'18-Apr'22)*
- **Member,** Unnati: Social Outreach Club, IISER Tirupati. *(Aug'18-Apr'20)*
- **Member,** Schrödinger's Kittens: The Physics Club, IISER Tirupati *(Aug'18-Apr'20)*
- **Member,** CELESTIC: The Astronomy and Astrophysics Club, IISER Tirupati *(Aug'18-Apr'20)*

CONTACT DETAILS

- **Email ID**: abhinav@ucsc.edu
- **Alternate Email ID**: jhaabhinav@protonmail.com