RITHWIK S V

EDUCATION

Michigan State University, MI, USA *August 2021 - Ongoing*
Doctoral student
Department of Mathematics

IISER Pune, India *August 2015 - June 2020*
BS-MS integrated degree, Majoring in Mathematics
Department of Mathematics
CGPA: 8.8/10.0

Kendriya Vidyalaya No.1, Mangalore, India *July 2013 - May 2015*
Class 11th and 12th
Overall Percentage: 96.0

PROJECTS

Coherent States and Geometric Quantization *August 2020-April 2021*
Dr. Rukmini Dey, ICTS Bangalore
Geometric Quantization is motivated by finding quantum system corresponding to a classical system. Any classical system can be represented by a symplectic manifold. The quantum system corresponding to it is the Hilbert space of square integrable sections over a suitable hermitian line bundle over the symplectic manifold. Coherent states are interesting objects to study in their own right, since they form an overcomplete set of basis vectors for the Hilbert space. We try to look at coherent states corresponding to certain nice homogeneous manifolds.

The Hodge Theorem and Applications *June 2019-March 2020*
Dr. Harish Seshadri, IISc Bangalore
The goal of the project was to prove the Hodge decomposition theorem for compact Riemannian manifolds. This theorem states that any smooth differential form on such a manifold can be expressed in a unique way as a sum of a harmonic form, a closed form and a co-closed form. It involved the study of elliptic differential operators on manifolds. We also saw some applications.

Galois Cohomology *January 2019 - May 2019*
Dr. Supriya Pisolkar, IISER Pune
The aim of this project was to study about group cohomology, in particular of galois group for number field extensions. It involved learning about Homological algebras and important functors like Tor and Ext. Saw a proof of Hilbert's Theorem 90 as an application.

Riemannain Surfaces *December 2018*

Dr. Vivek Mohan Mallick, IISER Pune

This was a reading project to learn about the basics of Riemannian Geometry, and surfaces in particular. Saw how many theorems in complex analysis pass over to Riemannian surfaces by using charts. This was mainly based on the first few chapters of the TIFR pamphlet on Riemannian Surfaces.

Geometric Group Theory *June 2018 - July 2018*

Dr. Subhojoy Gupta, IISc Bangalore

The aim of this project was to study Mapping Class Groups. I studied Hyperbolic Geometry, and then proceeded to read about mapping class groups, and how it is finitely generated from Dehn Twists for closed orientable surfaces. Also worked out the calculation of these groups for surfaces of sphere and torus.

Algebraic Number Theory *August 2017 - November 2017*

Dr. Supriya Pisolkar, IISER Pune

This was an introduction to Modern Number Theory. First I learnt the various results in elementary number theory, most important of all, the quadratic reciprocity. Then proceeded to learn the basics of algebraic number theory to extend this result to cubic reciprocity by working with the ring $\mathbb{Z}[\omega]$.

Symmetries and Group Theory *June 2017 - July 2017*

Dr. Anupam Kumar Singh, IISER Pune

This was a project to motivate the study of groups and see how they arise naturally as symmetries of certain objects. Worked with the particular case of the symmetries and isometries of the euclidean plane, and the permutation group of n objects. Studied the properties of each of these groups.

SEMINARS AND WORKSHOPS

Surface Group Seminar *August 2019 - November 2019*

Dr. Subhojoy Gupta, IISc

Riemannian Geometry Workshop *June - July 2019*

AIS Advanced Instructional School, IISc

Algebraic Geometry Seminar *January 2019 - March 2019*

Dr. C Bhagwat, IISER Pune

Geometry and Topology for Lecturers *June 2018*

Dr. C S Aravinda, Dr. Rukmini Dey, ICTS

ACADEMIC ACHIEVEMENTS

- Selected to participate in the Global Young Scientists Summit(GYSS), Singapore 2021, after being nominated by ICTS, Bangalore.
- Selected for Long Term Visiting Students Program at ICTS, Bangalore for the academic year 2020-21.
- One among 35 students selected for for the NIUS 13.1 Physics Program held at TIFR Bombay during June 2016.
- Selected for Vijyoshi Camp, a forum for interactions between bright young students and leading researchers, at Indian Institute of Science(IISc), Bangalore during December 2015
- Cleared the Kishore Vaigyanik Protsahan Yojana (KVPY) exam in my class 12 and became a KVPY scholar.

REFERENCES

- Dr. Rukmini Dey
  Department of Mathematics
  International Center for Theoretical Sciences(ICTS), Bangalore
- Dr. Harish Seshadri
  Department of Mathematics
  Indian Institute of Science(IISc), Bangalore
- Dr. Tejas Kalelkar
  Department of Mathematics
  Indian Institute of Science Education and Research(IISER), Pune