

“Number Theory Day 2026”

August 20, 2026

Tata Institute of Fundamental Research, Mumbai

LECTURE SCHEDULE

Lecture Timings	Name of the Speaker	Title of Talk
09:30 – 10:30	Sundara Narasimhan (AG-66)	<i>Extreme value problems arising in fixed-shift inhomogeneous Diophantine approximation</i>
TEA / COFFEE		
11:00 – 12:00	Srimathy Srinivasan (AG-66)	<i>On the u-invariants of perfectoid fields</i>
12:00 – 13:00	Arshay Sheth (AG-66)	<i>Birch and Swinnerton-Dyer asymptotics for higher genus curves</i>
LUNCH		
14:00 – 15:00	Devadatta Hegde (AG-69)	<i>A simple construction of the automorphic residual spectrum</i>
15:00–15:30	Sannidhya Basu (AG-69)	<i>The unit distance problem</i>
TEA / COFFEE		
16:00–17:00	Dinesh Thakur (AG-69)	<i>Diophantine approximation in finite characteristic</i>

Lectures will be held in the Lecture Room AG-66 and AG-69 of the Institute

Number Theory day

Thursday, August 20, 2026

Abstracts of Talks

**School of Mathematics
Tata Institute of Fundamental Research**

Title of Talks

Sundara Narasimhan	<i>Extreme value problems arising in fixed-shift inhomogeneous Diophantine approximation</i>
Srimathy Srinivasan	<i>On the u-invariants of perfectoid fields</i>
Arshay Sheth	<i>Birch and Swinnerton-Dyer asymptotics for higher genus curves</i>
Devadatta Hegde	<i>A simple construction of the automorphic residual spectrum</i>
Sannidhya Basu	<i>The unit distance problem</i>
Dinesh Thakur	<i>Diophantine approximation in finite characteristic</i>

Abstracts

Thursday, 20 August 2026 (09:30-10:30)

Speaker : Sundara Narasimhan
Title : **Extreme value problems arising in fixed-shift inhomogeneous Diophantine approximation**

I will discuss recent work, joint with Sourav Das and Anish Ghosh, on extreme value problems arising in fixed-shift inhomogeneous Diophantine approximation on the circle. For sufficiently lacunary sequences, we establish Weibull and Fréchet limit laws for suitably normalized minima and maxima of the r -th nearest-neighbour functions. Our approach reformulates the arithmetic problem as a question about dynamics on the homogeneous space

$$\mathrm{SL}_2(\mathbb{R}) \ltimes \mathbb{R}^2 / \mathrm{SL}_2(\mathbb{Z}) \ltimes \mathbb{Z}^2.$$

Effective multiple equidistribution of natural measures on this space yields Poisson limit theorems for shrinking targets, from which our claimed extreme value laws follow.

Thursday, 20 August 2026 (11:00-12:00)

Speaker : Srimathy Srinivasan
Title : **On the u -invariants of perfectoid fields**

For a field F , the u -invariant of F is the largest dimension of an anisotropic quadratic form over F . In this talk, we compute the u -invariants of various subfields of $\mathbb{C}_p$. Moreover, given any number that is the u -invariant of a field of characteristic $p \neq 2$, we give an explicit construction of a perfectoid field with the same u -invariant. Based on joint work with E. Ghate.

Thursday, 20 August 2026 (12:00-13:00)

Speaker : Arshay Sheth
Title : **Birch and Swinnerton-Dyer asymptotics for higher genus curves**

The original version of the Birch and Swinnerton-Dyer conjecture is an assertion about the asymptotics of a product formed via taking point counts of an elliptic curve over finite fields. Although stronger than the modern formulation of the conjecture, the original version is nevertheless believed to be true and has received renewed interest in recent years due to its connection to the theme of studying Euler products of L -functions inside the critical strip. The goal of this talk is to present a new generalisation of this conjecture for smooth projective algebraic curves of genus at least two. This is based on joint work with Alina Bucur and Kiran Kedlaya.

Thursday, 20 August 2026 (14:00-15:00)

Speaker : **Devadatta Hegde**
Title : **A simple construction of the automorphic residual spectrum**

We show that a simple regularization of the spherical Borel Eisenstein series induced from the trivial representation is nonzero and square-integrable at the special points attached to distinguished nilpotent orbits of the Langlands dual group. As a consequence, we obtain a uniform proof of Arthur's unitarity conjecture, previously known only via case-by-case analysis and/or machine computation.

Thursday, 20 August 2026 (15:00-15:30)

Speaker : **Sannidhya Basu**
Title : **The unit distance problem**

The unit distance problem asks for the maximum number of pairs of points that are a unit distance apart in a set $U \subseteq \mathbb{R}^2$ with n points. This problem was posed by Paul Erdős in 1946, who conjectured that the maximum number is at most of the order $n^{1+\frac{c}{\log \log n}}$. This was recently disproved by a team at OpenAI, who showed the existence of sets with n points where the number of unit distances is $n^{1+\delta}$ for some $\delta > 0$, for large n .

Based on the strategy of the proof done by the team at OpenAI, Will Sawin (<https://arxiv.org/abs/2605.20579>) explicitly constructed one such set where the maximum number of points is $\geq n^{1.014114}/C$ for large enough n and an absolute constant $C > 0$. The proof technique is purely based on algebraic number theory, and the goal of this talk would be to give an outline of the proof.

Thursday, 20 August 2026 (16:00-17:00)

Speaker : **Dinesh Thakur** (University of Rochester)
Title : **Diophantine approximation in finite characteristic**

After reviewing some basics of classical Diophantine approximation and Diophantine equations, we will discuss various analogs, contrasts, tools, and open questions in the finite characteristic situation.