Department of Mathematics
Ramakrishna Mission Vivekananda Educational and Research Institute

Half-day workshop

Commutative Algebra and *Algebraic Geometry*

Date	Time	Venue
Monday, 16 November 2026	2:00–5:00 pm	Saradananda Seminar Hall, Prajna Bhavan RKMVERI, Belur Math, Howrah 711202

$y^2 = x^3 - x + c$

Programme

2:00–2:50 pm — From the Narasimhan–Seshadri theorem to Bruhat–Tits theory
Prof. Vikraman Balaji · Distinguished Professor, Chennai Mathematical Institute

2:50–3:40 pm — The Jacobian Problem
Prof. R. V. Gurjar · Retired Professor, TIFR Mumbai; former Visiting Professor, IIT Bombay

3:40–4:00 pm — *Tea break*

4:00–4:50 pm — On Affine Forms
Prof. Amartya Kumar Dutta · Director, Indian Statistical Institute

4:50 pm — Concluding remarks
Prof. Sukumar Adhikari · Dean, School of Mathematical Sciences, RKMVERI

Each talk is 45 minutes, followed by 5 minutes of questions. Abstracts overleaf.

Registration

All are cordially welcome.

Registration is free; please register by **Sunday, 15 November 2026**.

Register online: https://forms.gle/PiMyvR8wjxpWntW19

Abstracts

I From the Narasimhan–Seshadri theorem to Bruhat–Tits theory

Prof. Vikraman Balaji · 2:00–2:50 pm

We will try to trace a path from the work of Narasimhan and Seshadri to Bruhat–Tits theory, two ends of the mathematical spectrum which are quite distinct. The path goes through Seshadri's theory of parabolic bundles. If time permits, I will talk of new developments arising from this connection.

About the speaker Prof. Vikraman Balaji is a Distinguished Professor at the Chennai Mathematical Institute, where he has taught and researched for over three decades. He received his doctorate under the guidance of the eminent mathematician Prof. C. S. Seshadri. His research lies in algebraic geometry, representation theory and differential geometry, particularly the moduli of principal bundles. He has collaborated with leading mathematicians, including Fields Medallist Pierre Deligne and János Kollár. His work has appeared in major international journals such as the American Journal of Mathematics, Duke Mathematical Journal and Journal of Differential Geometry. He received the Shanti Swarup Bhatnagar Award in Mathematical Sciences in 2006 and the J. C. Bose National Fellowship in 2009. He is a Fellow of the Indian Academy of Sciences and of the Indian National Science Academy. Alongside his mathematical work, Prof. Balaji is a long-standing student of the teachings of Sri Aurobindo and, through them, of the Vedas and Upanishads. He has written exegetical studies and translations of the Isha Upanishad and other Upanishadic texts, published in the *Vivekananda Review* and *Sraddha*.

II The Jacobian Problem

Prof. R. V. Gurjar · 2:50–3:40 pm

Recently, a surprising counterexample to the Jacobian Problem in three or more variables was found by L. Alpöge with the help of Claude Fable 5. In this lecture, we will focus on the 2-variable Jacobian Problem, which is still open. Starting with some easy observations about the Jacobian Problem, we will discuss interesting special results proved by many mathematicians like S. S. Abhyankar, Abhyankar–Gurjar, Applegate–Onishi, Bass–Connell–Wright, Jagžev, T. T. Moh, A. Magnus, Nakai–Baba, S. Wang and S. Kaliman.

Due to lack of time no proof will be discussed. We will suggest possible special results for young mathematicians to try to prove.

About the speaker Prof. R. V. Gurjar is a retired Professor of the School of Mathematics, Tata Institute of Fundamental Research (TIFR), Mumbai, and a former Visiting Professor at the Indian Institute of Technology Bombay. His research is in algebraic geometry, particularly complex algebraic surfaces and affine algebraic geometry, and he has worked on the Jacobian Problem, including joint work with S. S. Abhyankar.

III On Affine Forms

Prof. Amartya Kumar Dutta · 4:00–4:50 pm

Let k be a field and $B \subset A$ be k-algebras. One of the challenges in the area of affine algebraic geometry is to determine whether A is a polynomial ring over B, when there are reasons to suspect so.

In this context, we consider the following situation: suppose we know that A becomes a polynomial ring over B after a suitable base change, i.e., there exists a field extension L of k such that $A \otimes_k L$ is a polynomial ring in n indeterminates over $B \otimes_k L$. Extending a standard terminology, we say in this case that A is an affine n-form (or $\mathbb{A}^n$-form) over B with respect to k.

In this talk, we shall discuss a few known results around the general problem: under what conditions is an affine form necessarily a polynomial ring?

About the speaker Prof. Amartya Kumar Dutta obtained his PhD in Mathematics under Prof. S. M. Bhatwadekar at the Tata Institute of Fundamental Research (TIFR), Mumbai, in 1994, and has several research publications in Commutative Algebra and Affine Algebraic Geometry. A recipient of the INSA Teachers Award, he has taught, mentored and guided several students since he joined ISI Kolkata as a faculty member in 1996. For the past 25 years he has also been regularly delivering lectures and writing articles on topics in the history of science, especially on ancient Indian mathematics. He is the recipient of the first Satish C. Bhatnagar Award in History of Mathematics of the Indian Mathematical Society. He has been teaching history of mathematics in ancient India and science in modern India in the one-year Indology course at the Ramakrishna Mission Institute of Culture, Kolkata, and since January 2022 has been writing serially on mathematics in India in the mathematics magazine *Bhāvanā*.