Pinakinath Saha

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Personal Information

Date of Birth:	02 March 1993
Nationality:	Indian
Current Address:	IIT Delhi, Hauz Khas, New Delhi 110016, India
Current Position:	Assistant Professor of Mathematics, IIT Delhi (October 1, 2024–)

Education

- **Ph.D. in Mathematics**, Chennai Mathematical Institute (2015–2020).
  Thesis Supervisor: Prof. S. Senthamarai Kannan.
- **M.Sc. in Mathematics**, Visva-Bharati University, Santiniketan (2013–2015). CPI: 9.3.
- **B.Sc. in Mathematics (Hons.)**, Suri Vidyasagar College, Burdwan University (2010–2013).
  Percentage in Mathematics: 81%.

Postdoctoral Experience

- **NBHM Postdoctoral Fellow**, Indian Institute of Science, Bengaluru (2023–2024).
  Supervisor: Prof. Apoorva Khare.
- **Postdoctoral Fellow**, IIT Bombay (2022–2023). Supervisor: Prof. Saurav Bhaumik.
- **Postdoctoral Fellow**, Tata Institute of Fundamental Research, Mumbai (2020–2022).
  Supervisors: Prof. A.J. Parameswaran and Prof. Indranil Biswas.

Research Interests

Algebraic groups, flag varieties, Schubert varieties, Bott–Samelson varieties, Weyl group combinatorics, and representation theory from a geometric perspective.

Teaching

At IIT Delhi

- MTL 101: Linear Algebra and Differential Equations (Jan–Apr 2025).

Past Teaching Activities

- Teaching Assistant, IISc: MA 219 (Linear Algebra), Autumn 2023. Instructor: Prof. Apoorva Khare.
- Graduate Algebra II (Jan–Apr 2020). Instructor: Prof. S. Senthamarai Kannan.
- Linear Algebra (Aug–Nov 2019). Instructor: Prof. Kavita Sutar.
- Graduate Topology I (Aug–Nov 2018). Instructors: Prof. S. Senthamarai Kannan, Prof. T.R. Ramadas.

- Algebra II (Jan–Apr 2017). Instructor: Prof. S. Senthamarai Kannan.

Workshops and Conferences

- AIS in Algebraic Geometry, ISI Bangalore (May–June 2016).
- Workshop on Schubert Varieties, IMSc Chennai (Oct–Nov 2017).
- Workshop on Geometric Invariant Theory, KSOM Kozhikode (May 2018).
- AIS on Linear Algebraic Groups, IIT Bombay (June–July 2019).

Honors and Awards

- Institute Postdoctoral Fellowship, IMSc (2023, not availed).
- NBHM Postdoctoral Fellowship (2021).
- NBHM Ph.D. Fellowship (2015).
- CSIR Research Fellowship (2014).

Doctoral Thesis

Automorphism groups of Schubert varieties and rigidity of Bott–Samelson–Demazure–Hansen varieties.
Advisor: Prof. S. Senthamarai Kannan.

Publications

1. S. Senthamarai Kannan, P. Saha, *Parabolic subgroups and automorphism groups of Schubert varieties*, **C.R. Math. Acad. Sci. Paris** 356 (2018), no. 5, 542–549. doi.
2. S. Senthamarai Kannan, P. Saha, *Rigidity of Bott–Samelson–Demazure–Hansen variety for* $PSO(2n+1, C)$, **Journal of Lie Theory** 29 (2019), 107–142. link.
3. S. Senthamarai Kannan, P. Saha, *Rigidity of Bott–Samelson–Demazure–Hansen variety for* F_4 *and* G_2, **Proc. Math. Sci.** 130 (2020), Article 19. doi.
4. S. Senthamarai Kannan, A. Nayek, P. Saha, *Torus quotient of the Schubert varieties in the Grassmannians* $G_{2,n}$, **Indian J. Pure Appl. Math.** (2021). doi.
5. S. Senthamarai Kannan, P. Saha, *Minimal Parabolic Subgroups and Automorphism Groups of Schubert varieties*, **Journal of Lie Theory** 32 (2022), no. 4, 1025–1052. link.
6. S. Senthamarai Kannan, P. Saha, *Minimal Parabolic Subgroups and Automorphism Groups of Schubert varieties–II*, **J. Ramanujan Math. Soc.** 38 (2023), no. 2, 139–156. link.
7. A. Nayek, P. Saha, *Torus quotient of the Grassmannian* $G_{n,2n}$, **C.R. Math. Acad. Sci. Paris** 361 (2023), 1499–1509. doi.
8. I. Biswas, S. Senthamarai Kannan, P. Saha, *On the geometry of the anti-canonical bundle of the Bott–Samelson–Demazure–Hansen varieties*, **Acta Mathematica Sinica (Engl. Ser.)** (2024). doi.
9. M. B. Can, P. Saha, *Application of Homogeneous Fiber Bundles to the Schubert Varieties*, **Geom. Dedicata** 217 (2023), no. 6, Paper No. 103. doi.

10. S. Bhaumik, P. Saha, *Line bundles on G–Bott-Samelson–Demazure–Hansen variety*, **J. Pure Appl. Algebra** 228 (2024), no. 7, 107640. doi.
11. A. Nayek, A.J. Parameswaran, P. Saha, *On Automorphism group of a G–twisted variety*, **New York J. Math.** 30 (2024), 998–1023. arXiv.
12. M. B. Can, P. Saha, *Toric Richardson varieties*, to appear in **Communications in Algebra**. doi.

Submitted Papers

- A. Nayek, P. Saha, *On torus quotients of Schubert varieties in Orthogonal Grassmannian*, submitted.
- A. Nayek, P. Saha, *On torus quotients of Schubert varieties in Orthogonal Grassmannian–II*, submitted.
- A. Pramanik, P.K. Roy, P. Saha, *Positivity on simple G–varieties*, submitted.
- M. B. Can, S. Senthamarai Kannan, P. Saha, *From Schubert Varieties to Doubly-Spherical Varieties*, submitted.

Preprints

- S. Bhaumik, P. Saha, *Fibration with smooth rational projective scheme as fiber*, preprint.
- P. Saha, *On the geometry of the anti-canonical bundle of the Bott–Samelson–Demazure–Hansen varieties–II*, preprint.
- P. Saha, *Automorphism groups and local rigidity of Bott–Samelson–Demazure–Hansen varieties*, preprint.
- P. Saha, *Ample Homogeneous Vector Bundles on Flag Varieties*, preprint.

MathSciNet Reviews

- MR4334374 Li, Hao; Zhong, Changlong: *On equivariant oriented cohomology of Bott-Samelson varieties.* **New York J. Math.** 27 (2021), 1443–1464.
- MR4310016 Bao, Huanchen; He, Xuhua: *A Birkhoff–Bruhat atlas for partial flag varieties.* **Indag. Math. (N.S.)** 32 (2021), no. 5, 1152–1173.
- MR4461077 Süß, Hendrik: *Orbit spaces of maximal torus actions on oriented Grassmannians of planes.* In: **Springer Proc. Math. Stat.** 386 (2022), 335–349.
- MR4565639 Kiritchenko, Valentina: *Push–pull operators on convex polytopes.* **IMRN** (2023), no. 4, 3305–3328.
- MR4681307 Cho, Soojin; Hong, Jaehyun; Lee, Eunjeong: *Permutation module decomposition of the second cohomology of a regular semisimple Hessenberg variety.* **IMRN** (2023), no. 24, 22004–22044.
- MR4659445 Hu, Haoqiang; Li, Changzheng; Liu, Zhaoyang: *Effective good divisibility of rational homogeneous varieties.* **Math. Z.** 305 (2023), no. 3, Paper No. 52.