Rakshit Jain

Contact Information

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Research Interests

I build new computing hardware by identifying and engineering emergent order parameters such as spin, topology, and polarization that enable energy-efficient information processing beyond charge-based electronics.

Research Positions

UC Berkeley, Berkeley, CA, USA
Postdoctoral associate with Prof. Sayeef Salahuddin — *February 2026 – now*

Cornell University, Ithaca, USA
Visiting Scientist — *August 2025 – now*
Postdoctoral Associate , — *January 2025 – August 2025*

Education

Cornell University, Ithaca, USA — *August 2018 – December 2024*

Ph.D., Department of Applied and Engineering Physics
M.S. in Applied Physics (2020)
Advisor: Prof. Daniel C. Ralph

Indian Institute of Technology Bombay, Mumbai, India — *July 2014 – May 2018*

Bachelor of Technology in Engineering Physics with honors, Department of Physics
Advisors: Prof. Vishvendra Poonia, Prof. Dinesh Kabra

- **Minor Degree:** Department of Electrical Engineering

Selected Awards and Fellowships

- **APS Topical Group on Magnetism (GMAG) Outstanding Dissertation Award 2024** (Best dissertation among the magnetism APS community).
- **Kavli Graduate Fellowship** by Kavli Institute for Nano-Scale Science at Cornell
- **Banner Bearer, Class of 2025, Cornell University Commencement Ceremony** (Selected to lead the graduating class as a ceremonial honor for academic excellence)
- **APS Divison of Materials Physics Ovshinsky Award** to attend APS March Meeting 2024
- **Materials Innovators Program**, Columbia University – Selected Participant (2023)
- **APS Topical Group on Magnetism and its Applications (GMAG) Travel Award** to attend APS March Meeting 2023
- **DAAD WISE fellowship** for a summer traineeship in Germany

Publications : First or Co-First Authors

1. **Rakshit Jain** et al. Strong change in damping of antiferromagnet CrSBr; in preparation

2. **Rakshit Jain**, Daniel C. Ralph *Out of plane spin currents induced by hexagonal warping in topological insulators*; in preparation

3. **Rakshit Jain**, Matthew Roddy, Vishakha Gupta, Benjamin Huang, Hasan M. Sayeed, Husain F. Alnaser, Amit Vashist, Kenji Watanabe, Takashi Taniguchi, Vikram V. Deshpande, Taylor D. Sparks and Daniel C. Ralph *A quantized anomalous Hall effect above 4.2 K in stacked topological insulator/magnet bilayers*; arXiv:2412.05380,

4. **Rakshit Jain**, Max Stanley, Arnab Bose, Anthony R. Richardella, Xiyue S. Zhang, Timothy Pillsbury, David A. Muller, Nitin Samarth, and Daniel C. Ralph *Thermal Generation of spin currents in topological insulator* Bi_2Se_3; Science Advances adi4540 2023

5. Vishakha Gupta*, **Rakshit Jain***, Yafei Ren, Xiyue S. Zhang, Husain F. Alnaser, Amit Vashist, Vikram V. Deshpande, David A. Muller, Di Xiao, Taylor D. Sparks, and Daniel C. Ralph; *Gate-tunable anomalous Hall effect in a 3D topological insulator/2D magnet van der Waals heterostructure*; Nano Letters 2022, 22, 17, 7166–7172

6. Arnab Bose*, **Rakshit Jain***, Jackson J. Bauer, Caroline A Ross, Robert A Buhrman, Daniel C. Ralph; *Origins of transverse voltages generated by applied thermal gradients and applied electric fields in ferrimagnetic-insulator/heavy-metal bilayers*; Phys. Rev. B 105, L100408 2022

7. Arnab Bose*, Nathaniel J. Schreiber*, **Rakshit Jain***, Ding-Fu Shao, Hari P. Nair, Jiaxin Sun, Xiyue S. Zhang, David A. Muller, Evgeny Y. Tsymbal, Darrell G. Schlom, Daniel C. Ralph; *Tilted spin current generated by collinear antiferromagnet* RuO_2; Nature Electronics 5, 267–274 (2022)

8. **Rakshit Jain**, VS Poonia, K Saha, D Saha, S Ganguly; *The avian compass can be sensitive even without sustained electron spin coherence* . Proceedings A Royal Society 2020.0778

Other Publications

1. Yuhan Liang et al.; *Unconventional magnon-mediated spin torque enabled by ferroelectric domain engineering in multiferroic* $BiFeO_3$. In press at Nature Communications
2. Xiaoxi Huang et al.; *Turn-on of current-induced spin torque upon noncollinear antiferromagnetic ordering in delafossite* $PdCrO_2$. Adv. Mater. 2026, 38, e02670
3. Xiaoxi Huang*, Xianzhe Chen* et al. *Manipulating chiral-spin transport with ferroelectric polarization.* Nature Materials 23, 898–904 (2024)

4. Arnab Bose et al. *Effect of Anisotropic Strain on the high spin Hall conductivity of epitaxial IrO2 thin films* . ACS Appl. Mater. Interfaces 2020, 12, 49, 55411–55416

Invited Talks

- Magnetic Spins and the Future of Computing: From Quantum Phenomena to Next-Generation Devices; **Renaissance Technologies**; *May 2025*
- A quantized anomalous Hall effect above 4.2 K in stacked topological insulator/magnet bilayers; **SPIE Spintronics XIII**; *August 2025*
- Spin Physics in topological insulators and spin split antiferromagnets; Special quantum seminar; **Princeton**; *Feb 2025*
- Spin Physics in topological insulators and spin split antiferromagnets; Special condensed matter seminar; **MIT**; *May 2024*
- Tilted spin current generated in collinear aniferromagent ruthenium dioxide; **APS March Meeting**; *March 2024*
- Spin Physics in topological insulators and spin split antiferromagnets; **APS March Meeting**; *March 2024* **(APS GMAG Dissertation Award Talk)**
- Gate-tunable anomalous Hall effect in a 3D topological insulator/2D magnet van der Waals heterostructure; **Magnetism and Magnetic Materials**; *November 2023*
- Gate-tunable anomalous Hall effect in a 3D topological insulator/2D magnet van der Waals heterostructure; **Material Innovators in Quantum Materials, Columbia University**; *June 2023*
- Gate-tunable anomalous Hall effect in a 3D topological insulator/2D magnet van der Waals heterostructure; **INTERMAG**; *May 2023* (**Cornell University Conference Travel Grant**)
- Spin orbit torques in heavy metals and topological materials; **IEEE EDS Guest Seminar, IIT Roorkee**; *Jan 2020*

Contributed Talks

- Changes in magnetic properties of a 2D magnet in proximity to a 3D topological insulator **APS March Meeting**; *March 2023, (**APS GMAG Travel Award**)*
- Gate-tunable anomalous Hall effect in a 3D topological insulator/2D magnet van der Waals heterostructure; **Magnetism and Magnetic Materials**; *November 2022*
- Origins of transverse voltages generated by applied thermal gradients and applied electric fields in ferrimagnetic-insulator/heavy-metal bilayers; **Spin Caloritronics XI**; *May 2022*
- Origins of transverse voltages generated by applied thermal gradients and applied electric fields in ferrimagnetic-insulator/heavy-metal bilayers; **APS March Meeting**; *March 2022 (**Cornell University Conference Travel Grant**)*
- Spin Nernst effect in a topological insulator ; **APS March Meeting**; *March 2021*

Teaching Experience

- **Teaching Assistant,** *Interfacing digital domain with the analog world* *Spring 2018, Fall 2018*
- **Teaching Assistant,** *PH108: Electricity and Magnetism* *Summer 2016, January 2018 - May 2018*(*at IIT Bombay*)

Outreach Service

- **CNF Ambassador,** *Cornell Nanofabrication Facility (CNF)* *Jan 2020 -*
- **Expanding your Horizons, Committee Chair,** *Workshops* *2020*

- **Outreach Volunteer,** *Cornell center for materials research (CCMR) November 2018- Present*

Academic Service

- **Session Chair, Magnetism and Magnetic Materials** *Nov 2023*
- **Referee: Science, Advanced Materials, ACS Nano, Nano Letters, Physical Review Letters, Physical Review B, Physical Review Materials, Physical Review Applied**