

Rakshit Jain

CONTACT INFORMATION

Department of Applied and Engineering Physics
Cornell University
#142 Sciences drive, Ithaca
NY, 14853

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RESEARCH INTERESTS

Experimental Condensed Matter Physics: Spintronics, Topological insulators, two-dimensional magnetism, antiferromagnets

EDUCATION

Cornell University, Ithaca, USA

Doctoral Candidate, Department of [Applied and Engineering Physics](#)
M.S. 2020
Advisor: [Prof. Daniel C Ralph](#)

August 2018 – Present

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](#)

AWARDS AND FELLOWSHIPS

- **American Physical Society (APS) Topical Group on Magnetism and its Applications (GMAG) Travel Award** to attend APS March Meeting 2023
- **Cornell University Conference Travel Grant** to attend APS March Meeting 2022
- **DAAD WISE fellowship** for a summer traineeship in Germany
- **INSPIRE fellowship** by the Government of India to pursue studies in basic sciences.

PUBLICATIONS : FIRST OR CO-FIRST AUTHORS

- **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* ; [arXiv: 2210.05636](#), Submitted to *Phys. Rev. X*
- 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, 71667172](#)
- 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](#)
- 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, 267274 \(2022\)](#)
- **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

- Xiaoxi Huang*, Xianzhe Chen*, John Mangeri*, Hongrui Zhang, Lucas Caretta, Sandhya Susarla , **Rakshit Jain**, Christoph Klewe, Tianye Wang, Isaac Harris, Hao Pan, Jia Yin, Peter Meisenheimer, Padraic Shafer, Zi Qiu, Davi Rodrigues, Olle Heinonen, Dilip Vasudevan, Jorgeiguez, Sayeef Salahuddin, Lane Martin, Daniel Ralph, Albert Fert, Zhi Yao, Ramamoorthy Ramesh; *Manipulating chiral-spin transport with ferroelectric polarization*. Submitted to *Nature*
- Arnab Bose, Jocienne N. Nelson, Xiyue S. Zhang, P. Jadaoun, **Rakshit Jain**, D. Schlom, D. C. Ralph, D. Muller, K. M. Shen and R. A. Buhrman; *Effect of Anisotropic Strain on the high spin Hall conductivity of epitaxial IrO_2 thin films* . [ACS Appl. Mater. Interfaces 2020, 12, 49, 5541155416](#)

* denotes equal contribution

INVITED TALKS	<ul style="list-style-type: none"> • Gate-tunable anomalous Hall effect in a 3D topological insulator/2D magnet van der Waals heterostructure; International Conference on Magnetism; <i>May 2023</i> • Spin orbit torques in heavy metals and topological materials; IEEE EDS Guest Seminar, IIT Roorkee; <i>Jan 2020</i> 						
CONTRIBUTED TALKS	<ul style="list-style-type: none"> • Gate-tunable anomalous Hall effect in a 3D topological insulator/2D magnet van der Waals heterostructure; Magnetism and Magnetic Materials; <i>November 2022</i> • Origins of transverse voltages generated by applied thermal gradients and applied electric fields in ferrimagnetic-insulator/heavy-metal bilayers; Spin Caloritronics XI; <i>May 2022</i> • Origins of transverse voltages generated by applied thermal gradients and applied electric fields in ferrimagnetic-insulator/heavy-metal bilayers; APS March Meeting; <i>March 2022</i> • Spin Nernst effect in a topological insulator ; APS March Meeting; <i>March 2021</i> 						
MENTORSHIP EXPERIENCE	<ul style="list-style-type: none"> • Cornell University: 2 Graduate Students and 1 Undergraduate Student 						
POSTER PRESENTATIONS	<ul style="list-style-type: none"> • Tilted spin current generated by collinear antiferromagnet RuO₂; Semiconductor research Corporation Annual Meeting, University of Notre Dame; <i>August 2022</i> • Gate-tunable anomalous Hall effect in a 3D topological insulator/2D magnet van der Waals heterostructure ; Quantum Science Summer School, University of California Santa Barbara; <i>July 2022</i> 						
KEY PROJECTS	<ul style="list-style-type: none"> • Gate tunable anomalous Hall effect in the bilayers of topological insulator and 2D magnet <ul style="list-style-type: none"> • Demonstration of large gate tunable anomalous Hall effect in the vanderwaals hetero-structures of BiSbTeSe₂ and Cr₂Ge₂Te₆. (See Nano Letters 2022, 22, 17, 71667172) • With the groups of Prof. Vikram Deshpande and Prof. Taylor Sparks with theoretical assistance from Prof. Di Xiao. • Magnetic Spin Hall effect in exotic antiferromagnets and ferromagnets. <ul style="list-style-type: none"> • Collinear Anti-ferromagnet RuO₂ with the group of Prof. Darrell Schlom. (See Nature Electronics 5, 267274 (2022)) • Non collinear antiferromagnet Mn₃Ge with the group of Dr. Anand Bhattacharya • Spin Nernst effect in heavy metal and topological insulators <ul style="list-style-type: none"> • Heavy Metal-Ferrimagnet (TmIG) bilayers with the group of Prof. Caroline Ross. (See Phys. Rev. B 105, L100408 2022) • Topological insulators with the group of Prof. Nitin Samarth (See arXiv: 2210.05636, Submitted to Phys. Rev. X) 						
TEACHING EXPERIENCE	<ul style="list-style-type: none"> • Teaching Assistant, <i>Interfacing digital domain with the analog world Spring 2018, Fall 2018</i> • Teaching assistant, <i>PH108: Electricity and Magnetism Summer 2016, January 2018 - May 2018(at IIT Bombay)</i> 						
VOLUNTEERING EXPERIENCE AND COMMUNITY SERVICE	<ul style="list-style-type: none"> • President, <i>Cornell Tango</i> <i>June 2022 -</i> • CNF Ambassador, <i>Cornell Nanofabrication Facility (CNF)</i> <i>Jan 2020 -</i> • Expanding your Horizons, Committee Chair, Workshops <i>2020</i> • Outreach Volunteer, <i>Cornell center for materials research (CCMR)</i> <i>November 2018-</i> • Volunteer, <i>Science center, Family science night</i> <i>September-December 2019</i> • Webmaster, <i>Ithaca Community Garderns</i> <i>September 2021 -</i> 						
LANGUAGE PROFICIENCY	<table border="0"> <tr> <td>English</td> <td>Native</td> </tr> <tr> <td>Hindi</td> <td>Native</td> </tr> <tr> <td>Spanish</td> <td>Working proficiency, vocational and writing</td> </tr> </table>	English	Native	Hindi	Native	Spanish	Working proficiency, vocational and writing
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