

RISHABH DATTA

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EDUCATION

Massachusetts Institute of Technology

Ph.D. in Mechanical Engineering

Thesis: “*Radiatively Cooled Magnetic Reconnection Experiments Driven by Pulsed Power*”

2022-2024

Cambridge, MA

GPA: 5.0/5.0

Massachusetts Institute of Technology

S.M. in Mechanical Engineering

Thesis: “*High Energy Density Shocks in Magnetized Hypersonic Plasma Flows*”

2019-2022

Cambridge, MA

GPA: 5.0/5.0

Georgia Institute of Technology

B.S. in Mechanical Engineering (Highest Honors)

2015-2019

GPA: 3.97/4.0

RESEARCH EXPERIENCE

Postdoctoral Associate, Plasma Science & Fusion Center, MIT

- Computational modeling of MHD disruptions & runaway electrons in magnetic fusion devices

2024-Present

Cambridge, MA

Research Assistant, MIT

Supervisor: Dr Jack D Hare

- First laboratory experiments of magnetic reconnection in a radiation-dominated regime
- High-fidelity computational modeling (magnetohydrodynamics, radiation transport) of pulsed power-driven reconnection
- Led the MARZ collaboration (MIT, Sandia National Labs, Princeton, Imperial College, Oxford, and others)

2020-2024

Cambridge, MA

Computational Research Intern, Technical University Munich

Supervisor: Dr Stefan Adami

- Developed Riemann solver(s) in C++ for compressible multiphase flow modeling

2018

Munich, Germany

Undergraduate Researcher, Solar Fuels & Technologies Lab, Georgia Tech

Supervisor: Dr Peter Loutzenhiser

- Thermodynamic characterization of novel fuels for thermochemical concentrated solar reactors

2017-2018

Atlanta, GA

AWARDS, HONORS & FELLOWSHIPS

Fellowships

- Schmidt Science Fellowship (Finalist)
- MIT College of Engineering Exponent Fellowship (\$42,000) (1 selected, institution)
- MIT MathWorks Fellowship (\$84,000)
- First Year Graduate Student Fellowship, Caltech (declined)
- Diversity, Equity, and Inclusion Fellowship, Georgia Tech (20 selected, institution)

2024

2023

2022

2019

2018

Research Awards & Grants

- Igor Alexeff Outstanding Student in Plasma Science Award (\$2000) (1 selected, international)
- Editors' Suggestion, *Physical Review Letters* (1 in 6 accepted Letters)
- Editors' Pick, *Physics of Plasmas*
- ZNetUS Program Grant (\$50,000)
- Finalist, De Florez Competition
- Wunsch Foundation Silent Hoist and Crane Outstanding Student Award (\$1500) (2 selected, department)
- Travel Award, International Magnetic Reconnection Workshop
- Finalist, Best Student Paper, IEEE International Conference on Plasma Science (5 selected, conference)
- First Prize, MIT Machine Learning for Engineering Design Expo
- Keck Award in Thermal Sciences, MIT (\$1500) (1 selected, department)
- GSC Conference Grant, MIT (\$1000) (1 selected, institute)
- Honorable Mention, Mechanical Engineering Research Exhibition, MIT
- President's Undergraduate Research Award, Georgia Tech (\$1500)
- Practical Research Experience Program Scholarship, Technical University Munich (€5000) (20 selected, national)

2024

2024

2024

2024

2024

2023

2023

2023

2022

2021

2021

2021

2018

2018

Other Academic Awards

- Faculty Honors, Georgia Tech
- Dean's List, Georgia Tech
- A*STAR Scholarship, Ministry of Education, Singapore (10 selected, national)

2018, 2017, 2016, 2015
2018
2010-2014

PUBLICATIONS (7 first author)

[8] **R. Datta**, K. Chandler, C. E. Myers, J. P. Chittenden, A. J. Crilly, C. Aragon, D. J. Ampleford, J. T. Banasek, A. Edens, W. R. Fox, S. B. Hansen, E. C. Harding, C. A. Jennings, H. Ji, C. C. Kuranz, S. V. Lebedev, Q. Looker, S. G. Patel, A. Porwitzky, G. A. Shipley, D. A. Uzdensky, D. A. Yager-Elorriaga, J.D. Hare (2024). "Plasmoid Formation and Strong Radiative Cooling in a Driven Magnetic Reconnection Experiment." *Physical Review Letters. Editors' Suggestion*.

<https://doi.org/10.1103/physrevlett.132.155102>

[7] **R. Datta**, K. Chandler, C. E. Myers, J. P. Chittenden, A. J. Crilly, C. Aragon, D. J. Ampleford, J. T. Banasek, A. Edens, W. R. Fox, S. B. Hansen, E. C. Harding, C. A. Jennings, H. Ji, C. C. Kuranz, S. V. Lebedev, Q. Looker, S. G. Patel, A. Porwitzky, G. A. Shipley, D. A. Uzdensky, D. A. Yager-Elorriaga, J.D. Hare (2024). "Radiatively cooled magnetic reconnection experiments driven by pulsed power." *Physics of Plasmas. Invited Paper, Editors' Pick, and Cover Article*.

<https://doi.org/10.1063/5.0201683>

[6] **R. Datta**, A. J. Crilly, J. P. Chittenden, S. Chowdhry, K. Chandler, N. Chaturvedi, C. E. Myers, W. R. Fox, S. B. Hansen, C. A. Jennings, H. Ji, C. C. Kuranz, S. V. Lebedev, D. A. Uzdensky, J. D. Hare (2024). "Simulations of radiatively cooled magnetic reconnection driven by pulsed-power." *Journal of Plasma Physics*. <https://doi.org/10.1017/S0022377824000448>

[5] **R. Datta**, F. Ahmed, J.D. Hare. "Machine learning assisted analysis of visible spectroscopy in pulsed-power-driven plasmas." *IEEE Transactions on Plasma Science*. (2024) <https://doi.org/10.1109/TPS.2024.3364975>

[4] **R. Datta**, J. Angel, J. B. Greenly, S. N. Bland, J. P. Chittenden, E. S. Lavine, W. M. Potter D. Robinson, T. W. O. Varnish, E. Wong, D. A. Hammer, B. R. Kusse, J. D. Hare. "Plasma flows during the ablation stage of an over-massed pulsed-power-driven exploding planar wire array." *Physics of Plasmas* 30, no. 9 (2023). <https://doi.org/10.1063/5.0160893>

[3] **R. Datta**, D.R. Russell, I. Tang, T. Clayson, L.G. Suttle, J.P. Chittenden, S.V. Lebedev, and J.D. Hare. "The Structure of 3-D Collisional Magnetized Bow Shocks in Pulsed-Power-Driven Plasma Flows." *Journal of Plasma Physics* 88, no. 6 (2022): 905880604. <https://doi.org/10.1017/S0022377822001118>

[2] **R. Datta**, D. R. Russell, I. Tang, T. Clayson, L. G. Suttle, J. P. Chittenden, S. V. Lebedev, and J. D. Hare. "Time-Resolved Velocity and Ion Sound Speed Measurements from Simultaneous Bow Shock Imaging and Inductive Probe Measurements." *Review of Scientific Instruments* 93, no. 10 (2022): 103530. <https://doi.org/10.1063/5.0098823>.

[1] H. E. Bush, **R. Datta**, and P. G. Loutzenhiser. "Aluminum-doped strontium ferrites for a two-step solar thermochemical air separation cycle: Thermodynamic characterization and cycle analysis." *Solar Energy* 188 (2019): 775-786.

<https://doi.org/10.1016/j.solener.2019.06.059>

Preprints (Under Review)

[P.1] T. Varnish, Chen, J., S. Chowdhry, **R. Datta**, G. V. Dowhan, L. S. Horan IV, N. M. Jordan, E. R. Neill et al. "Quadrupolar Density Structures in Driven Magnetic Reconnection Experiments with a Guide Field." Submitted to *Phys. Plasmas*. (2024) [arXiv:2412.02556 \(2024\)](https://arxiv.org/abs/2412.02556).

PRESS

- [Nature Astronomy](#) "Magnetic Reconnection on Z experiments."
- [AIP Scilight](#) "Accessing a new regime of reconnection."
- [MIT PSFC News](#). "Recreating celestial X-ray bursts in a lab"
- [MIT News](#) "Exploring the bow shock and beyond. Rishabh Datta seeks to further understanding of astrophysical phenomena."

GRANT WRITING

- Lead; ZNetUS FY24-25 (\$50,000)
- Co-investigator; Z Fundamental Science Program FY23-24 (awarded experimental time worth ~\$1M)

SELECTED TALKS & PRESENTATIONS

- American Physical Society (APS) Division of Plasma Physics Meeting, Atlanta, GA. *Contributed Talk.* 2024
- American Physical Society (APS) Division of Plasma Physics Meeting, Denver, CO. *Invited Talk.* 2023
- Z Fundamental Science Workshop (Virtual). *Invited Plenary Talk.* 2023

SELECTED TALKS & PRESENTATIONS (contd.)

- Dense Z Pinch Conference, Ann Arbor, MI. Contributed talk. 2023
- International Magnetic Reconnection Workshop, Japan. Contributed talk. 2023
- International Conference on Plasma Science, Santa Fe, NM. *Best Student Paper Finalist Talk.* 2023
- MIT PSFC-NSF Meeting, Cambridge, MA. *Invited talk.* 2023
- MIT Machine Learning for Engineering Design Expo, Cambridge, MA. *Best Poster Award.* 2022
- APS Division of Plasma Physics Meeting, Spokane, WA. Contributed talk. 2022
- MIT HEDP-Imperial College Meeting. *Invited Talk.* 2021
- High Temp. Plasma Diagnostics, Rochester, NY. Contributed poster. 2022
- APS Division of Plasma Physics Meeting, Pittsburgh, PA. Contributed poster. 2021
- MIT-Imperial College Meeting (Virtual). *Invited Talk.* 2021
- MIT Graduate Association of Mechanical Engineers Lunch Seminar. 2021

TEACHING & MENTORSHIP

- **Teaching Assistant**, 2.005 Thermal-Fluids Engineering, MIT 2024
Delivered lectures and prepared teaching/examination materials; 75 undergraduate students.
- **Teaching Assistant**, Mechanical Engineering Advanced Fluid Mechanics Qualifying Exam, MIT 2022
Weekly review sessions to support students' preparation
- **The Professor's Toolkit Teaching Course**, MIT 2024
- **Teaching Days Course**, MIT 2024
Training courses on teaching practice and pedagogy
- **Graduate Student Coach**, MIT 2021-2022
Provided professional mentorship and guidance to Ph.D. students
- **Undergraduate Researcher (UROP) Advisor**, MIT 2022-Present
Mentored 7 undergraduate students on research projects I proposed. Nominated for Best UROP Mentor.
 - 1) S. Engebretson (Summer 2024): Oblique shocks in high energy density plasmas.
 - 2) E. Neill (Spring 2023-Present): Measuring the adiabatic index in high energy density plasmas.
 - 3) O. Odiase (Spring-Summer 2023): Construction and testing of a 1kA pulsed-power device.
 - 4) D. Robinson (Spring 2023): Mach-Zehnder interferometry measurements in planar wire arrays.
 - 5) J. Atkinson (January 2023): Construction and testing of a 1kA pulsed-power device.
 - 6) J. Arevalo (Spring-Fall 2023): Design and modeling of a 1kA pulsed-power device.
 - 7) E. Wong (Fall 2022): Three-dimensional MHD modeling of planar wire arrays.
- **Graduate Application Assistance Mentor**, MIT 2024-Present
Mentored underrepresented students in graduate school applications to the Mechanical Engineering program

SERVICE & LEADERSHIP

- **Journal Peer Reviewer** 2023-2024
 - Physical Review Letters
 - Physics of Plasmas
- **Sustainability**
 - Chair, MIT GSC Sustainability Committee 2020-2022
 - Chair, MIT Sustainability Fund 2020-2022
 - Graduate Student Representative, MIT Student Sustainability Coalition 2022-23
 - Organizer, IPCC 6th Assessment Report Workshop, MIT 2022
 - Organizer, Sustainability Summer Book Club, MIT 2021
 - Organizer, Graduate Student Sustainable Living Series, MIT 2021-2022

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| - Organizer, Climate Action Plan Student Workshops, MIT | 2021 |
| - Organizer, MIT GSC Sustainability Hackathon | 2021 |

SERVICE & LEADERSHIP (contd.)

• Community & Leadership

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| - Member, Housing and Community Affairs, MIT Graduate Student Council | 2020-2022 |
| - Peer Mentor to First-Year Ph.D. Students, Graduate Association of Mechanical Engineers | 2022-23 |
| - Diversity and Inclusion Fellow, Georgia Tech | 2018 |
| - Executive Board Member, Georgia Tech Mental Health Student Coalition | 2017 |
| - Chair, Council of Grad Life, Georgia Tech | 2017-2019 |
| - Diversity & Inclusion Chair, Student Center Programs Council, Georgia Tech | 2016-2017 |
| - Committee Chair, Student Government Association, Georgia Tech | 2016-2017 |
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