

RISHABH DATTA

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EDUCATION

Massachusetts Institute of Technology

Ph.D. in Mechanical Engineering; Major in Plasma Physics, Minor in Photonics
Thesis: “*Experiments of Radiatively Cooled Magnetic Reconnection*”

2022-Present
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

Research Assistant, Plasma Science & Fusion Center, MIT

2020-Present

Supervisor: Dr Jack D Hare

- First laboratory experiments of radiatively-cooled magnetic reconnection, relevant to extreme astrophysical objects
- First high-fidelity computational modeling (magnetohydrodynamics, radiation transport) of high energy density reconnection
- Led the MARZ scientific collaboration (MIT, Sandia National Labs, Princeton, UMich, Colorado-Boulder, and others)
- Novel diagnostic development (spectroscopy with machine learning, tomography, shock-based imaging, etc.)
- Developed analysis and synthetic modeling software (visible/X-ray spectroscopy, interferometry, imaging, etc.)

Computational Research Intern, Technical University Munich

2018

Supervisor: Dr Stefan Adami

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

Research Assistant, Solar Fuels & Technologies Lab, Georgia Tech

2017-2018

Supervisor: Dr Peter Loutzenhiser

- Thermodynamic characterization of novel fuels for thermochemical concentrated solar reactors

AWARDS & HONORS

Fellowships

- MIT College of Engineering Exponent Fellowship (\$42,000) (1 selected, institution) **2023**
- MIT MathWorks Fellowship (\$84,000) **2022**
- First Year Graduate Student Fellowship, Caltech (declined) **2019**
- Diversity, Equity, and Inclusion Fellowship, Georgia Tech (20 selected, institution) **2018**

Research Awards & Grants

- Editor’s Suggestion, Physical Review Letters (1 in 6 accepted Letters) **2024**
- Editor’s Pick, Physics of Plasmas **2024**
- Igor Alexeff Outstanding Student in Plasma Science Award (\$2000) (1 selected, international) **2024**
- ZNetUS Program Grant (\$50,000) **2024**
- Wunsch Foundation Silent Hoist and Crane Outstanding Student Award (\$1500) (2 selected, department) **2023**
- Travel Award, International Magnetic Reconnection Workshop **2023**
- Finalist, Best Student Paper, IEEE International Conference on Plasma Science (5 selected, conference) **2023**
- Best Poster, MIT Machine Learning for Engineering Design Poster Expo **2022**
- Keck Award in Thermal Sciences, MIT (\$1500) (1 selected, department) **2021**
- GSC Conference Grant, MIT (\$1000) (1 selected, institute) **2021**
- Honorable Mention, Mechanical Engineering Research Exhibition, MIT **2021**
- President’s Undergraduate Research Award, Georgia Tech (\$1500) **2018**
- Practical Research Experience Program Scholarship, Technical University Munich (€5000) (20 selected, national) **2018**

Other Academic Awards

- Faculty Honors, Georgia Tech **2018, 2017, 2016, 2015**
- Dean’s List, Georgia Tech **2018**
- A*STAR Scholarship, Ministry of Education, Singapore (10 selected, national) **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*. *Editor's 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 & Editor's Pick*. <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*. (2023) <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>

SELECTED TALKS & PRESENTATIONS

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

GRANT WRITING

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

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
- **The Professor's Toolkit Teaching Course**, MIT, Cambridge, MA 2024
- **Teaching Days Course**, MIT, Cambridge, MA 2024
- **Graduate Student Coach**, MIT, Cambridge, MA 2021-2022
- **Undergraduate Researcher (UROP) Advisor** 2022-Present
Closely mentored 6 undergraduate students on research projects I proposed as part of my research.
 - 1) E. Neill (Spring 2023-Present): Measuring the adiabatic index in high energy density plasmas.
 - 2) O. Odiase (Spring-Summer 2023): Construction and testing of a 1kA pulsed-power device.
 - 3) D. Robinson (Spring 2023): Mach-Zehnder interferometry measurements in planar wire arrays.
 - 4) J. Atkinson (January 2023): Construction and testing of a 1kA pulsed-power device.
 - 5) J. Arevalo (Spring-Fall 2023): Design and modeling of a 1kA pulsed-power device.
 - 6) E. Wong (Fall 2022): Three-dimensional MHD modeling of planar wire arrays.

PRESS

- [Nature Astronomy](#). "Magnetic Reconnection on Z experiments."
- [AIP Scilights](#). "Accessing a new regime of reconnection."
- [MIT News](#) "Exploring the bow shock and beyond. Rishabh Datta seeks to further understanding of astrophysical phenomena."

SERVICE & LEADERSHIP

- Reviewer for *Physical Review Letters*, *Physics of Plasmas* 2023-2024
 - Chair, MIT GSC Sustainability Committee 2020-2022
 - Chair, MIT Sustainability Fund 2020-2022
 - Peer Mentor, MIT Graduate Association of Mechanical Engineers 2022-2023
 - Organizer, IPCC 6th Assessment Report Workshop, MIT 2022
 - Organizer, Sustainability Summer Book Club, MIT 2021
 - Organizer, Graduate Student Sustainable Living Series, MIT 2021-2022
 - Organizer, Climate Action Plan Student Workshops, MIT 2021
 - Organizer, MIT GSC Sustainability Projectathon 2021
 - Member, Housing and Community Affairs, MIT Graduate Student Council 2020-2022
 - Graduate Student Coach, MIT 2021
 - 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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