RISHABH DATTA

Email: rdatta@mit.edu • Website: ridatta.com • LinkedIn: rishabh-datta

EDUCATION

Massachusetts Institute of Technology **2022-Present**
Ph.D. in Mechanical Engineering; Major in Plasma Physics, Minor in Photonics *Cambridge, MA*
Thesis: "*Experiments of Radiatively Cooled Magnetic Reconnection"* *GPA: 5.0/5.0*

Massachusetts Institute of Technology **2019-2022**
S.M. in Mechanical Engineering *Cambridge, MA*
Thesis: *"High Energy Density Shocks in Magnetized Hypersonic Plasma Flows"* *GPA: 5.0/5.0*

Georgia Institute of Technology **2015-2019**
B.S. in Mechanical Engineering (Highest Honors) *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
- High-fidelity computational modeling (magnetohydrodynamics, radiation transport) of pulsed power-driven reconnection
- Led the MARZ collaboration (MIT, Sandia National Labs, Princeton, Imperial College, Colorado-Boulder, and others)

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
- Schmidt Science Fellowship (MIT Finalist) **2024**
- 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
- Editors' Suggestion, *Physical Review Letters* (1 in 6 accepted Letters) **2024**
- Editors' Pick, *Physics of Plasmas* **2024**
- Igor Alexeff Outstanding Student in Plasma Science Award ($2000) (1 selected, international) **2024**
- ZNetUS Program Grant ($50,000) **2024**
- Finalist, De Florez Competition **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. 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.* (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**
  Mentored 7 undergraduate students on research projects I proposed. Nominated for Best UROP Mentor.
  1) S. Engebretson (Summer 2024-Present): 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.

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**