

# Dr. JAMES R. BEATTIE

updated: 8-Jul-2024

## PERSONAL INFORMATION

---

NATIONALITY: · Australia · New Zealand  
POSITIONS: · Joint Princeton & CITA Postdoctoral Fellow in astrophysical plasmas  
EMAIL: · [james.beattie@princeton.edu](mailto:james.beattie@princeton.edu) · [jbeattie@cita.utoronto.edu](mailto:jbeattie@cita.utoronto.edu)  
Online Profiles · [Google Scholar](#) · [ResearchGate](#) · [OrcID](#) · [Twitter](#)  
INTERESTS: · MHD / HD turbulence · structure of the interstellar medium · star-formation  
· high-performance computing · theoretical astrophysics · magnetic fields  
· cosmic ray propagation · plasma/fluid dynamics · shocks · turbulent dynamo  
· computer vision techniques · statistical modelling · interdisciplinary research

## EDUCATION

---

2024 **Doctor of Philosophy**, Australian National University, Australia  
**Specialisation:** Computational / theoretical astrophysics, magnetohydrodynamics.  
**Thesis:** The statistics of magnetised interstellar turbulence  
**Advisor:** Christoph Federrath

2019 **Honours (First Class)**, Australian National University, Australia  
**Major:** Astrophysics  
**Thesis:** Supersonic Turbulent Molecular Clouds: Filaments and Anisotropies  
(with University Medal, Chancellor's Commendations, Bok Prize)

2018 **Bachelor of Mathematics**, Queensland University of Technology, Australia  
**Major:** Applied and Computational Mathematics

2018 **Bachelor of Science**, Queensland University of Technology, Australia  
**Major:** Physics

2013 **Bachelor of Education**, Queensland University of Technology, Australia  
**Major:** Biology & Computing

**Exchange and Summer Programmes**

2022-23 Fulbright Exchange at the University of California, Santa Cruz, United States  
2017-18 Cross Institutional Exchange at the University of Queensland, Australia  
WINTER 2017 Summer Science Programme at The University of Cambridge, United Kingdom  
FALL 2015 Exchange Semester at Simon Fraser University, Canada

## SCHOLARSHIPS, AWARDS & GRANTS

---

### Selected Scholarships & Fellowships

2023 CITA Fellow, CITA  
2023 Research Associate, Princeton University  
2023 Stanford Science Fellow, Stanford (declined)  
2022 Fulbright PhD Fellowship  
2020 [Joan Duffield Research Supplementary Scholarship](#)  
2020 [Deakin PhD Scholarship](#)  
2020 [Dean's Merit \(theoretical physics\) HDR Supplementary Scholarship](#)  
2019 [Bok Honours Astrophysics Scholarship](#)

### Selected Significant Awards

2020 [Chancellor's Letter of Commendation: 7.0/7.0 Honours GPA](#)  
2020 [ASA Bok Prize: Best Astronomy Honours Thesis in Australia](#)  
2020 Best Student Talk at [ANITA](#), 2020  
2019 [University Medal](#) (top in graduating science cohort)  
2018 Admission to the Dean's List of Students with Excellent Academic Performance  
2018 [Vice Chancellor's Performance Award](#)  
2018 [Nominated for 2018 Vice-Chancellor's Awards for Excellence](#)  
2016 [Vice Chancellor's Performance Award: Best Sessional Teaching in Science & Engineering Faculty](#)

- 2016 Admission to the Dean's List of Students with Excellent Academic Performance
- 2015 Admission to the Dean's List of Students with Excellent Academic Performance
- 2014 Admission to the Dean's List of Students with Excellent Academic Performance

#### Computing grants awarded (1 core hour $\approx$ \$0.13)

- |      |  |                  |
|------|--|------------------|
| 2022 | (PI) <a href="#">LRZ large scale call extension</a>  | 1.5e7 core hours |
| 2021 | (PI) <a href="#">LRZ large scale call: The world's largest compressible MHD simulation</a> | 7e7 core hours   |

#### Competitive Grants Awarded (PI / CO-PI)

- 2021 (CO-PI) Australian Capital Territory Summer Holiday Grant, Inspire ACT
- 2020 (CO-PI) Australian Capital Territory National Science Week Grant
- 2020 (PI) SSAP Grant for Mt Stromlo Student Seminars, 2020

#### Selected Minor Awards

- 2018 Joint funding from the [ANU](#) and [QUT](#) to present at the Australian Institute of Physics (AIP) Congress, 2018
- 2017 [GHD](#) Groundwater Modelling Award for Best Overall Group Submission
- 2017 Financial Sponsorship from the CPME and Mathematical Science School for the Cambridge Summer Science Programme
- 2017 Recipient of [QUT's](#) International short-term mobility bursary
- 2015 Recipient of [QUT's](#) International Bursary
- 2014 Best Paper Finalist | Australasian Conference on Robotics and Automation

#### Selected non-professional awards

- 2023 [Astro. Plot of the Week](#) (Figure 3)
- 2022 [Astro. Plot of the Week](#) (Figure 1)

## PROFESSIONAL ACTIVITIES & ORGANISATION AFFILIATIONS

---

#### Professional Referee Activities

- (2 articles) Astrophysical Journal
- (3 articles) Monthly Notices of the Astronomical Society
- (1 article) Publications of the Astronomical Society of the Pacific
- (first call 2024) LRZ SuperMUC-NG large-scale compute project calls

#### Other Professional Activities

- 2023-present Coordinator for the Canadian Institute of Astrophysics Astro-Plasma Group
- 2022 [MSATT program](#) – connecting scientists with high school students
- 2022 Sustainability Committee, Member, [RSAA](#)
- 2021 Higher Degree Research Education Representative, [RSAA](#)
- 2021 Giving Committee, Member, [RSAA](#)
- 2020 President of the [RSAA](#) Student Seminar Committee
- 2019 ASTR4004, [ANU](#) Course Student Representative
- 2019 ASTR6007, [ANU](#) Course Student Representative
- 2014-16 [QUT's STIMULATE](#) Learning Support, Peer Learning Facilitator

#### Organisation Affiliations

- 2020 - PRES. Astronomical Society of Australia, student member
- 2014-18 [QUT](#) Physics Society, founding president
- 2016 [QUT's](#) Science Student as Partners, physics representative.
- 2016 [UQ's](#) Student as Partners, Fellow
- 2015 [Australian Institute of Physics](#), QLD Branch, [QUT](#) representative

## SUPERVISIONS & MENTORING

---

#### Supervisions

- 2023 **Student:** Louis Burnaz (co-supervised w. Bart Ripperda), Undergrad. Student  
**Institute:** École normale supérieure de Lyon  
**Project:** Compression-triggered fast reconnection in relativistic, resistive MHD
- 2023 **Student:** Shashvat Varma (co-supervised w. Bart Ripperda), Undergrad. Student  
**Institute:** University of Toronto  
**Project:** The fast-in-time dynamics of the small-scale dynamo

- 2023 **Student:** Sam Lakerdas-Gayle (co-supervised w. Bart Ripperda), Undergrad. Student  
**Institute:** University of Toronto  
**Project:** The secret-life of over-dense regions in magnetised, turbulent clouds
- 2021 **Student:** [Neco Kriel](#) (co-supervised w. Christoph Federrath), Honours Student  
**Institute:** Australian National University  
**Project:** [Fundamental scaling relations in the turbulent dynamo.](#)
- 2021 **Student:** [Matthew Sampson](#) (co-supervised w. Mark Krumholz), Honours Student  
**Institute:** Australian National University  
**Project:** [Cosmic ray transport in compressible ionised MHD turbulence.](#)

### Mentorships

- 2022 **Student:** Adrian Lehane  
**Institute:** Telopea Park School / Narrabundah College (high school)  
**Project:** Automated phase detection of Venus.

## TALKS

---

### Invited (16 total)

- APR. 2024 Invited to CITA Blackboard Theory Seminar
- APR. 2024 Invited to CITA Theory Seminar
- MAR. 2024 Invited to University Maryland Comp. Seminar and Theory
- FEB. 2024 Invited to KITP Discussion Talk.
- FEB. 2024 Invited to KITP Conference Talk.
- NOV. 2023 The most fascinating part of interstellar turbulence: the energy cascade  
Presented at: TASTY Seminar Series, University of Toronto.
- MAY 2023 The World's Largest Compressible MHD Turbulence Simulation on SuperMUC-NG  
Presented at: SuperMUC-NG Status and Results Workshop.
- SEP. 2022 KIPAC Tea talk: Peta-scale magnetised interstellar medium turbulence simulations.  
Presented at: SLAC / Stanford University.
- SEP. 2022 Magnetised interstellar medium turbulence: dynamics & energetics.  
Presented at: Susan Clark's research group, Stanford.
- SEP. 2022 Astro-coffee: Streaming cosmic rays ion Alfvén velocity statistics.  
Presented at: Institute for Advanced Study.
- SEP. 2022 Bachall lunch discussion: peta-scale simulations & turbulent dynamics.  
Presented at: Institute for Advanced Study.
- APR. 2022 Streaming cosmic rays ion Alfvén velocity statistics.  
Presented at: Siang Peng Oh's research group, UC Santa Barbara.
- NOV. 2021 Ubiquitous magnetic field fluctuations driven by large-scale supersonic turbulence.  
Presented at: Star formation and ISM Physics Seminar, Princeton.
- JAN. 2021 Ubiquitous magnetic field fluctuations driven by large-scale supersonic turbulence.  
Presented at: Research School of Astronomy and Astrophysics seminar, [ANU](#).
- JUL. 2020 The Anisotropic Density Variance for Highly-Magnetised Molecular Clouds.  
Presented at: Astronomical Society of Australia Bok Prize talk.
- JUN. 2020 Turbulence at the parsec scale of the Universe.  
Presented at: Research highlight talk at [RSAA](#) full school meeting.
- AUG. 2018 The Fractal Geometry of the Supersonic Turbulence in the Interstellar Medium.  
Presented at: [QUT](#) research highlights.
- MAY 2018 The Fractal Geometry of Turbulence.  
Presented at: [QUT](#) Physics Society Meeting.

### Colloquium (3 total)

- AUG. 2020 The Anisotropic Density Variance for Highly-Magnetised Molecular Clouds.  
Presented at: University of Macquarie Colloquium.
- NOV. 2017 The University of Cambridge and Quantum Mechanics.  
Presented at: School of Chemistry, Physics and Engineering Colloquium, [QUT](#).
- NOV. 2017 Mathematical Aspects of Mechanics.  
Presented at: School of Mathematical Sciences Colloquium, [QUT](#).

### Contributed (16 total)

- MAY. 2024 Interstellar medium turbulence and turbulence-regulated star formation theory  
Presented at: [Globular Clusters and Their Tidal Tails: From the Milky Way to the Local Group](#), Toronto, Canada

- MAY. 2024 The Supersonic Turbulent Dynamo  
Presented at: [HEDLA 2024 Workshop](#), Tallahassee, Florida
- FEB. 2022 Petascale magnetised interstellar medium turbulence simulations  
Presented at: [ANITA 2022 Workshop](#).
- DEC. 2021 Understanding the nature of magnetic field fluctuations driven by large-scale supersonic turbulence.  
Presented at: [Australian Institute of Physics Congress](#), [QUT](#).
- OCT. 2021 Understanding the nature of magnetic field fluctuations driven by large-scale supersonic turbulence.  
Presented at: Royal Astronomical Society: Galactic magnetic fields meeting.
- FEB. 2021 Steps towards anisotropic star formation theory: A multi-shock model for the density variance of anisotropic MHD turbulence.  
Presented at: [ANITA 2021 Workshop](#).
- DEC. 2020 Multi-shock model for the density variance of anisotropic, highly-magnetised ISM turbulence.  
Presented at: The Magnetic Field Awakens: A new era of star formation.
- NOV. 2020 Recent progress on anisotropic, magnetised, supersonic turbulence.  
Presented at: Mount Stromlo Student Seminars, 2020.
- SEP. 2020 Is the Starry Night Turbulent?  
Presented at: [RSAA Feast of Facts](#).
- FEB. 2020 Density, velocity and magnetic structures and correlations in sub-Alfvénic, supersonic turbulence.  
Accepted\* for contributed talk: Magnetic Fields in the Universe 7, Vietnam.
- FEB. 2020 Anisotropy in the column density of highly-magnetised supersonic turbulence.  
Presented at: [ANITA 2020 Workshop](#), [UNSW](#), Canberra.
- DEC. 2019 Anisotropic structures in highly-magnetised, observed turbulent clouds.  
Presented at: Universality: Turbulence across vast scales, Flatiron Inst., New York
- NOV. 2019 Reconstructing the 3D Density PDF from the 2D Column Density.  
Presented at: Cosmic turbulence and magnetic fields : physics of baryonic matter across time and scales in Cargèse, France, 2019.
- DEC. 2018 Mach number - fractal dimension relation for turbulent, molecular clouds.  
Poster presented at: [AIP Congress 2018](#), Perth, Australia.
- JAN. 2018 The Fractal Geometry of the World's Largest Turbulence Simulation.  
Presented at: Research School of Astronomy and Astrophysics, [ANU](#).
- JAN. 2017 The Analysis of Novel Magnetic Field Configurations in the H-1 NF Stellarator.  
Presented at: Research School of Physics and Engineering, [ANU](#).

\* did not attend due to COVID19

### Public Outreach Talks (10 total)

- AUG. 2021 Building the Universe, Brick-by-brick. Presented at: Young Stars, [ANU](#), Canberra.
- MAY. 2021 Understanding The Big Bang. Presented at: Young Stars, [ANU](#), Canberra.
- MAR. 2021 The Secret Life of Cells. Presented at: Young Stars, [ANU](#), Canberra.
- JAN. 2021 Mission to Mars. Presented at: Young Stars, [ANU](#), Canberra.
- JAN. 2021 The Jiggling Universe. Presented at: SciScouts Space Squad, Canberra.
- NOV. 2020 The Jiggling Universe. Presented at: Campbell Primary School STEM day, Canberra.
- OCT. 2020 Thinking Like An Atom. Presented at: Young Stars, Canberra.
- SEP. 2020 Simulating the Universe. Presented at: SciScouts Space Squad, Canberra.
- MAR. 2020 Modelling Pandemics. Presented at: Young Stars, Canberra.
- FEB. 2020 How do scientists test their ideas? Presented at: Young Stars, Canberra.

## TEACHING (23 TOTAL CONTRIBUTIONS)

---

### Guest Lectures

- OCT. 2022 ASTR8002 ([ANU](#)): Guest lecture on MHD turbulence theory for a graduate level gas dynamics class.
- OCT. 2020 ASTR8002 ([ANU](#)): [Guest lecture on linear MHD waves](#) for a graduate level gas dynamics class.

TA experience (Click on the “Semester” to see teacher evaluation reports)

2021	<b>Australian National University</b> , Canberra, Australia ASTR2013: Foundations of Astrophysics	Semester Two
2018	<b>Queensland University of Technology</b> , Brisbane, Australia PVB101: Physics of the Large MXB105: Calculus of One and Two Variables (wrote all assessment) MXB161: Computational Explorations SEB113: Quantitative Methods in Science SEB104: Grand Challenges in Science SEB115: Experimental Science	Semester Two Semester Two Semester One Semester One & Two Semester One Semester One
2017	<b>Queensland University of Technology</b> , Brisbane, Australia MXB105: Calculus of One and Two Variables PVB101: Physics of the Large (Lab Demonstrator) BVB204: Ecology SEB113: Quantitative Methods in Science SEB104: Grand Challenges in Science SEB115: Experimental Science (Lab Demonstrator) MXB161: Computational Explorations	Semester Two Semester Two Semester Two Semester One & Two Semester One Semester One Semester One
2016	<b>Queensland University of Technology</b> , Brisbane, Australia PVB101: Physics of the Large (Lab Demonstrator) BVB202: Plant Biology (Lab Demonstrator) BVB224: Plant Diversity (Lab Demonstrator) SEB113: Quantitative Methods in Science SEB104: Grand Challenges in Science SEB115: Experimental Science (Lab Demonstrator)	Semester Two Semester Two Semester Two Semester One & Two Semester One Semester One
2015	<b>Queensland University of Technology</b> , Brisbane, Australia SEB113: Quantitative Methods in Science	Semester One

## PUBLICATIONS

- **First author:** 13 publications (10 refereed) · **Total:** 25 publications
- **Citations:** 545 (7-July-2024) · **h index:** 14 (7-July-2024)

### First Author (and joint first) Refereed (10 total)

- Beattie, J. R., & Federrath, C.** (2020). Filaments and striations: anisotropies in observed, supersonic, highly magnetized turbulent clouds. *MNRAS*, 492(1), 668–685. <https://doi.org/10.1093/mnras/stz3377>
- Beattie, J. R., Federrath, C., & Klessen, R. S.** (2019). The relation between the true and observed fractal dimensions of turbulent clouds. *MNRAS*, 487(2), 2070–2081. <https://doi.org/10.1093/mnras/stz1416>
- Beattie, J. R., Federrath, C., Klessen, R. S., & Schneider, N.** (2019). The relation between the turbulent Mach number and observed fractal dimensions of turbulent clouds. *MNRAS*, 488(2), 2493–2502. <https://doi.org/10.1093/mnras/stz1853>
- Beattie, J. R., Federrath, C., Kriel, N., Mocz, P., & Seta, A.** (2023). Growth or decay – I: universality of the turbulent dynamo saturation. *arXiv e-prints*, arXiv:2209.10749.
- Beattie, J. R., Federrath, C., & Seta, A.** (2020). Magnetic field fluctuations in anisotropic, supersonic turbulence. *MNRAS*, 498(2), 1593–1608. <https://doi.org/10.1093/mnras/staa2257>
- Beattie, J. R., Krumholz, M. R., Federrath, C., Sampson, M. L., & Crocker, R. M.** (2022). Ion alfvén velocity fluctuations and implications for the diffusion of streaming cosmic rays. *Frontiers in Astronomy and Space Sciences*, 9. <https://doi.org/10.3389/fspas.2022.900900>
- Beattie, J. R., Krumholz, M. R., Sklidis, R., Federrath, C., Seta, A., Crocker, R. M., Mocz, P., & Kriel, N.** (2022). Energy balance and Alfvén Mach numbers in compressible magnetohydrodynamic turbulence with a large-scale magnetic field. *MNRAS*. <https://doi.org/10.1093/mnras/stac2099>
- Beattie, J. R., Mocz, P., Federrath, C., & Klessen, R. S.** (2021). A multishock model for the density variance of anisotropic, highly magnetized, supersonic turbulence. *MNRAS*, 504(3), 4354–4368. <https://doi.org/10.1093/mnras/stab1037>
- Beattie, J. R., Mocz, P., Federrath, C., & Klessen, R. S.** (2022). The density distribution and physical origins of intermittency in supersonic, highly magnetised turbulence with diverse modes of driving. *MNRAS*. <https://doi.org/10.1093/mnras/stac3005>
- Birch, M., **Beattie, J. R.**, Bennet, F., Rattenbury, N., Copeland, M., Travouillon, T., Ferguson, K., Cater, J., & Sayat, M. (2023). Availability, outage, and capacity of spatially correlated, australasian free-space optical networks. *J. Opt. Commun. Netw.*, 15(7), 415–430. <https://doi.org/10.1364/JOCN.480805>



## Second Author or Major Contributions Refereed (8 total)

Federrath, C., Klessen, R. S., Iapichino, L., & **Beattie, J. R.** (2021). The sonic scale of interstellar turbulence. *Nature Astronomy*, 5, 365–371. <https://doi.org/10.1038/s41550-020-01282-z>.

**Measured the sonic scale position from the second order structure functions and contributed to writing the manuscript.**

Kriel, N., **Beattie, J. R.**, Seta, A., & Federrath, C. (2022). Fundamental scales in the kinematic phase of the turbulent dynamo. *MNRAS*. <https://doi.org/10.1093/mnras/stac969>.

**Developed the spectral fitting methodology, spectral models, taught Kriel how to use the FLASH code throughout the project and contributed to writing the manuscript.**

McCool, C., **Beattie, J. R.**, Firn, J., Lehnert, C., Kulk, J., Bawden, O., Russell, R., & Perez, T. (2018). Efficacy of mechanical weeding tools: A study into alternative weed management strategies enabled by robotics. *IEEE Robotics and Automation Letters*, 3(2), 1184–1190. <https://doi.org/10.1109/LRA.2018.2794619>.

**Developed and applied the survival analysis models used to compare between the different automated weeding strategies and contributed to writing the manuscript.**

McCool, C., **Beattie, J. R.**, Milford, M., Bakker J. D., J. L., Moore, & Firn, J. (2018). Automating analysis of vegetation with computer vision: Cover estimates and classification. *Ecology and Evolution*, 8(12), 6005–6015. <https://doi.org/10.1002/ece3.4135>.

**Developed and applied the statistical model for comparing between the different computer vision techniques and contributed to writing the manuscript.**

Risch, A. C., Page-Dumroese, D. S., Schweiger, A. K., **Beattie, J. R.**, Curran, M. P., Finér, L., Liu, Y., Schütz, M., Terry, T. A., Wang, W., & Jurgensen, M. F. (2022). Controls of initial wood decomposition on and in forest soils using standard material. *Frontiers in Forests and Global Change*, 5, 829810. <https://doi.org/10.3389/ffgc.2022.829810>.

**Constructed the principle data set, developed and ran parallelised hierarchical Bayesian mixed effects models and model selection methods.**

Sampson, M. L., **Beattie, J. R.**, Krumholz, M. R., Crocker, R. M., Federrath, C., & Seta, A. (2023). Turbulent diffusion of streaming cosmic rays in compressible, partially ionized plasma. *MNRAS*, 519(1), 1503–1525. <https://doi.org/10.1093/mnras/stac3207>.

**Ran all MHD turbulence models, provided analytical Green's function solutions to the diffusion problems, helped develop the theory and fitting for fractional diffusion transport and contributed to writing the manuscript.**

Skalidis, R., Sternberg, J., **Beattie, J. R.**, Pavlidou, V., & Tassis, K. (2021). Why take the square root? An assessment of interstellar magnetic field strength estimation methods. *A&A*, 656, Article A118, A118. <https://doi.org/10.1051/0004-6361/202142045>.

**Ran all MHD turbulence simulations and contributed to the theoretical development of the coupling term energy model and drafting the manuscript.**

Thomas, M. L., Baker, L., **Beattie, J. R.**, & Baker, A. M. (2020). Determining the efficacy of camera traps, live capture traps, and detection dogs for locating cryptic small mammal species. *Ecology and Evolution*, 10(2), 1054–1068. <https://doi.org/10.1002/ece3.5972>.

**Developed and applied the occupancy analysis models used to compare between the different detection methods and contributed to writing the manuscript.**

## Multi-author Refereed (4 total)

Milford, M., Firn, J., **Beattie, J.**, Jacobson, A., Pepperell, E., Mason, E., Kimlin, M., & Dunbabin, M. (2014). Automated sensory data alignment for environmental and epidermal change monitoring. *Australasian Conference on Robotics and Automation 2014*, 1–10. <https://eprints.qut.edu.au/81684/>

Schneider, N., Ossenkopf-Okada, V., Clarke, S., Klessen, R. S., Kabanovic, S., Veltchev, T., Bontemps, S., Dib, S., Csengeri, T., Federrath, C., Di Francesco, J., Motte, F., André, Ph., Arzoumanian, D., **Beattie, J. R.**, Bonne, L., Didelon, P., Elia, D., Könyves, V., ... Ward-Thompson, D. (2022). Understanding star formation in molecular clouds - iv. column density pdfs from quiescent to massive molecular clouds. *A&A*, 666, A165. <https://doi.org/10.1051/0004-6361/202039610>

Seligman, D. Z., Rogers, L. A., Feinstein, A. D., Krumholz, M. R., **Beattie, J. R.**, Federrath, C., Adams, F. C., Fatuzzo, M., & Günther, M. N. (2022). Theoretical and Observational Evidence for Coriolis Effects

in Coronal Magnetic Fields via Direct Current Driven Flaring Events. *ApJ*, 929(1), Article 54, 54. <https://doi.org/10.3847/1538-4357/ac5b69>

Sharda, P., Menon, S. H., Federrath, C., Krumholz, M. R., **Beattie, J. R.**, Jameson, K. E., Tokuda, K., Burkhart, B., Crocker, R. M., Law, C. J., Seta, A., Gaetz, T. J., Pingel, N. M., Seitenzahl, I. R., Sano, H., & Fukui, Y. (2022). First extragalactic measurement of the turbulence driving parameter: ALMA observations of the star-forming region N159E in the Large Magellanic Cloud. *MNRAS*, 509(2), 2180–2193. <https://doi.org/10.1093/mnras/stab3048>

#### Preprints Undergoing Review or Other (4 total)

**Beattie, J. R.**, Federrath, C., Klessen, R. S., Cielo, S., & Bhattacharjee, A. (2024). Magnetized compressible turbulence with a fluctuation dynamo and Reynolds numbers over a million. *arXiv e-prints*, Article arXiv:2405.16626, arXiv:2405.16626. <https://doi.org/10.48550/arXiv.2405.16626>

**Beattie, J. R.**, Federrath, C., Kriel, N., Hew, J. K. J., & Bhattacharjee, A. (2023). Taking control of compressible modes: bulk viscosity and the turbulent dynamo. *arXiv e-prints*, Article arXiv:2312.03984, arXiv:2312.03984. <https://doi.org/10.48550/arXiv.2312.03984>

**Beattie, J. R.**, & Kriel, N. (2019). Is The Starry Night Turbulent? *arXiv e-prints*, arXiv:1902.03381.

Kriel, N., **Beattie, J. R.**, Federrath, C., Krumholz, M. R., & Hew, J. K. J. (2023). Fundamental MHD scales – II: the kinematic phase of the supersonic small-scale dynamo. *arXiv e-prints*, Article arXiv:2310.17036, arXiv:2310.17036. <https://doi.org/10.48550/arXiv.2310.17036>

#### MEDIA (21 TOTAL)

- 
- 2024 Quoted in “The Unexpected Poetry of PHD Thesis Acknowledgments”, *Australian National University*
  - 2024 Plasma: beautiful chaos, *Leibniz Supercomputing Centre July Newsletter*
  - 2024 The Beauty of Chaos, *New Scientist Magazine* (in print and online)
  - 2024 The world’s largest magnetohydrodynamic turbulence simulation, *Forschung Magazine*
  - 2024 2024 Research Highlight Calendar (March visualisation), *German Research Foundation (DFG)*
  - 2022 Unravelling magnetised turbulence in galaxies, *Lunations, Research Bytes*
  - 2022 The Magic And Mystery Of Turbulence, *IFL Science*
  - 2021 Extreme efficiency astrophysical turbulence simulations, *National Computing Infrastructure, Australia*
  - 2021 Coffee, planes and magnetism. *Space Australia, TikTok*
  - 2021 Unravelling the turbulent, magnetised dynamics of the interstellar medium. *Space Australia*
  - 2021 Turbulence in the heavens, *Nature Astronomy, News & Views*.
  - 2021 Researchers Use LRZ HPC Resources to Perform Largest-Ever Supersonic Turbulence Simulation, *Gauss Centre for Supercomputing*
  - 2021 The Role of Turbulence in the Birth of Stars, *University Heidelberg*.
  - 2021 Star-making motion, *COSMOS magazine*
  - 2021 Study helps unlocks secrets of star formation, *ANU Media*
  - 2021 Stellar Simulation Reveals The Turbulent Nature of Star Birth, *Space Australia*.
  - 2021 The Need for (Sound) Speed, *Astrobite research highlight*
  - 2019 Modelling Star Formation with a Supercomputer: Computational Astrophysics Research, *National Computing Infrastructure Australia*
  - 2019 Feature article on turbulence depicted in Van Gogh’s Starry Night in the Art’s and Culture section of the American Physical Societies Magazine.
  - 2018 QUT advertising photoshoot for the BSc and BMath degree on QUT’s blackboard website.
  - 2018 QUT media exposure, and photoshoot for our publication, Automating Analysis of Vegetation with Computer Vision: cover estimates.