

James Matthews

Astrophysicist

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Academic Career

- 2019–present **Herchel Smith Fellow**, *Institute of Astronomy, University of Cambridge.*
- 2016–2019 **Postdoctoral Researcher**, *University of Oxford.*
Project title: "The origin of ultra-high energy cosmic rays", PIs: Profs. A. R. Bell and K. M. Blundell
- 2012–2016 **PhD Physics**, *University of Southampton.*
Thesis: "Disc Winds Matter: Modelling Accretion and Outflow On All Scales", Supervisor: Prof. C. Knigge
- 2012 **Research Year Abroad**, *Harvard-Smithsonian CfA.*
Thesis: "Searching For Nearby Planets During Predicted Microlensing Events", Supervisor: Dr. R. Di Stefano
- 2008–2012 **MPhys Astrophysics**, *University of Southampton*, first-class honours.

Research Interests & Goals

- Unmasking the origin of the highest energy cosmic rays (CRs).
- Building models for particle acceleration and transport in magnetised plasmas.
- Studying the physics and observational signatures of accretion discs and their associated outflows.
- Understanding the connection between outflows and galaxy evolution, including the impact of CRs.
- Developing state-of-the-art radiative transfer and MHD methods to complement observations.
- Testing exotic particle physics (e.g. axions) with astrophysical probes.

Programming Skills

- Advanced Python, C, Fortran, git/github, travis-CI, L^AT_EX, OpenMPI Parallelisation, Visit.
- Familiar IDL, Topcat, Bash, MCMC methods.
- Astro (magneto)hydrodynamics, Monte Carlo radiative transfer, Cloudy, CRPropa, PLUTO.

Awards, Grants & Successful Proposals

- 2019 **Herchel Smith Fellowship.**
- 2018 **LBS Proposal, co-I**, *Laboratory model of particle acceleration in Supernova shocks*, PI: Chen.
- 2017 **HST Proposal, co-I**, *Wide band spectra of nova-like variables*, PI: Long.
- 2016 **Springer Thesis Prize**, *University of Southampton.*
- 2015 **SALT Proposal, PI**, *The spectra of nova-like variables.*
- 2013 **RAS Grant**, *Visit to Columbia University.*
- 2008–2012 **Academic Scholarship**, *Top 5 students in physics, University of Southampton.*

Responsibilities, Service and Outreach

- 2020–present IoA Forum on Racial Equality in Astronomy, Co-founder
- 2020–present IoA Equality & Diversity Committee
- 2020–present IoA Lunchtime Seminar Organiser
- 2020 LPN Summer School Speaker (Physics)
- 2019 Oxford women in physics career advice panel
- 2018–2019 Oxford Astrophysics Outreach for the Homeless, Organiser and founder
- 2018–2019 Undergraduate Tutor, Astrophysics C1
- 2018 Invited reviewer for “100 years of jets” review anthology.
- 2018 Astrophysics summer project admissions and co-ordination

- 2017-2019 SPI-MAX seminar organiser
- 2017-2019 Galaxies coffee organiser
- 2017, 2018 Summer project supervisor: Ziyang Li, Andrew Sellek
- 2017 Local Organising Committee, Plasma Astrophysics Conference, Oxford
- 2016-present Referee: ApJ, MNRAS, PASA, Nature Astronomy
- 2016 AstroAirport Demonstrator
- 2015, 2016 SETI Cipher Challenge Helper
- 2015 Local Organising Committee, TORUS 2015, Winchester
- 2012-2016 Outreach Demonstrator, University of Southampton Astrodome
- 2012-2016 Teaching Demonstrator, University of Southampton

Talk Highlights

Over 30 talks (17 invited) at international conferences and colloquia in Europe, Asia, USA.

- 2020 **Invited Review**, *EAS 2020, Leiden (remote)*.
- 2019 **Invited Review**, *A Centenary of Astrophysical Jets, Manchester*.
- 2019 **Invited Colloquium**, *University of Bath*.
- 2019 **Invited Colloquium**, *University of Glasgow*.
- 2018 **Invited Talk**, *Hillas Symposium, Heidelberg*.
- 2018 **Invited Talk**, *Particle Acceleration and Transport, Calabria*.
- 2018 **Invited Colloquium**, *Queen's University, Belfast*.
- 2018 **Contributed Talk**, *UHECR 2018, Paris*.
- 2018 **Invited Colloquium**, *University of Manchester*.
- 2017 **Invited Review**, *Broadband Astrophysical Processes, Southampton*.
- 2017 **Invited Colloquium**, *University of Southampton*.
- 2017 **Contributed Talk**, *AGN Winds on the Georgia Coast, Jekyll Island, GA*.
- 2015 **Contributed Talk**, *TORUS 2015, Winchester*.
- 2015 **Invited Talk**, *The Golden Age of CVs, Palermo*.
- 2015 **Contributed Talk**, *Black Hole Accretion and AGN feedback, Shanghai*.

Publications

30 articles published or in press, 9 first-author, H-index: 12, citations: 386 (ADS) 425 (Google Scholar), Please see attached publication list.

References

Prof. Tony Bell FRS, *University of Oxford*, tony.bell@physics.ox.ac.uk.

Connection: PI at Oxford.

Prof. Christian Knigge, *University of Southampton*, C.Knigge@phys.soton.ac.uk.

Connection: PhD Supervisor

Prof. Christopher Reynolds, *University of Cambridge*, csr12@ast.cam.ac.uk.

Connection: Collaborator at Cambridge.

Prof. Katherine Blundell OBE, *University of Oxford*, katherine.blundell@physics.ox.ac.uk.

Connection: PI at Oxford.

Dr. Knox Long, *STScI/Eureka Scientific*, long@stsci.edu.

Connection: Scientific collaborator and co-supervisor.