Curriculum Vitae for Prof. T.M. Rogers

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Summary of Academic Leadership

Research I am a recognized leader in the multi-dimensional simulation of hydrodynamic and magneto-hydrodynamic processes in stellar and planetary interiors. I use these simulations to understand and guide observations and to build better one-dimensional stellar evolution models. I have made significant contributions in understanding how waves shape stellar interiors and how magnetism affects hot Jupiters.

Leadership I led the re-development of the Physics programme at Newcastle University (after it was dismantled in 2003). This included writing the strategy for growth of Physics, including planning and execution of student numbers, academic staff, space and lab requirements and financial investment. I was also Director of Physics and Applied Mathematics, Director of EDI (details below) and now serve as the Institutional Director for a Centre for Doctoral Training.

Equality, Diversity and Inclusion (EDI) I took over Chair of the EDI committee as soon as I arrived at Newcastle. I implemented numerous initiatives and changes (detailed in my DEI statement), which led to vastly increasing the number of female academic staff in the School, a successful Athena/SWAN bid (after two unsuccessful attempts before my arrival) and a fundamental shift in culture.

Professional Career & Education

2019–	**Professor of Computational Astrophysics**, *Newcastle University, UK*
2015–	**Senior Scientist at Planetary Science Institute**. *Tucson AZ, USA*
2017-2019	**Reader in Computational Astrophysics**, *Newcastle University, UK*
2015–2017	**Lecturer then Senior Lecturer**, *Newcastle University, UK*
2008–2014	**Assistant Professor**, *University of Arizona, USA*
2006–2008	**NSF Astronomy & Astrophysics Postdoctoral Fellow**, *NCAR, Boulder, CO, USA*
1999–2006	**PhD in Astronomy & Astrophysics**, *University of California, Santa Cruz, CA, USA*
1995–1999	**BsC in Physics & Astronomy**, *Magna Cum Laude, University of Arizona, USA*
1992-1999	**United States Air Force**, *Intelligence Operator, AK, USA*

Publication Record

Refereed publications: 41, of which 19 first author, 8 authored by PhD students I directly supervised, 3 in Nature Astronomy, 9 in ApJL and 1 in ARAA.
H-index 29, i10 index 38. >2500 citations.
Full publication list at end of document, on my website .

Seminars and Presentations (last 10 years)

40 Invited Talks in 13 countries
13 International Conferences, 28 Invited Seminars, 2 international talks on DEI
Presentation list (last 10 years) at end of document.

Leadership

2022–	Institutional Director NUdata Centre for Doctoral Training
2017–2021	Director of Physics and Applied Mathematics
2017–2021	Director of Research, School of Mathematics, Statistics & Physics
2018	Senior Women's coaching and Mentoring Program (as Mentor)
2016	Strategic Leaders Development Course
2016	Faculty of Science, Agriculture and Engineering Leadership Program
2015-2019	Chair Equality, Diversity and Inclusion Committee

Grants and International Facility Allocation

2022–2029	£1,1000,000 *Centre for Doctoral Training in Data Intensive Science in Astrophysics (NUdata)* , STFC, Institutional PI: Rogers
2022–2025	£390,000 *Dynamical Processes in Stellar Interiors* , STFC, PI: Rogers
2019–2022	£320,000 *Internal Waves in Evolved Stars*, STFC, PI: Rogers
2017–2022	£223,000 *Modeling Inhomogeneous magnetohydrodynamics in hot Jupiter atmospheres*, The Leverhulme Trust, PI: Rogers
2017–2022	$515,000 *The role of Wave Dynamics on the origin and Evolution of hot Jupiters*, NASA, PI: Rogers
2016–2019	£290,000 Internal Gravity Waves in Massive Stars, STFC, PI: Rogers
2016–2017	$50,000 *The role of Wave Dynamics on the origin and Evolution of hot Jupiters*, NASA, PI: Rogers
2015-2020	More than 40 million CPU hours on Pleiades at NASA Ames as PI
2013-2018	$368,000 *Numerical Simulations of Magnetism in hot Jupiters*, NASA, PI: Rogers
2012-2015	$330,000 *Numerical Simulations of Solar Interior Dynamics*, NASA, PI: Rogers
2008-2013	$1,000,000 *Faculty Position in Solar Physics*, NSF, Acting PI: Rogers, PI: Jokipii

Commissions of Trust

2024	NSF AAPF Panel
2015–2023	Hiring Committee for Academic Staff in Astrophysics (8), Physics (8), Applied Maths (2), Data Science (3) and Statistics (3), (24 in total)
2021–2024	Chair STFC Grants Panel, Astrophysics Theory
2021–2024	Faculty Promotions Panel (Science, Agriculture & Engineering Faculty)
2018–2021	STFC Grants Panel, Astrophysics Theory
2019–2020	Newcastle University, NUAcT Fellowship Panel
2019	Niels Bohr Institute of Physics Fellowship Panel
2019	NASA Theoretical Astrophysics Panel
2018	NASA Theoretical Astrophysics Network Panel
2017–2018	Athena/SWAN Panel
2017–2018	STFC DiRAC Research Allocation Committee
2016	NASA Astrophysics Theory Review Panel
2015	NASA Exoplanet Research Program Panel

Teaching

2023	**Advanced Stellar Structure and Evolution** Fourth year (Masters) course where students learn to use the stellar structure code MESA. @Newcastle University
2020–2023	**Stellar Structure and Evolution** Third (final) lecture based course on stellar physics @Newcastle University
2021	**Algebra** First year Math course for Physics students @Newcastle University
2015–2019	**Introduction to Astrophysics** First year Astronomy course @Newcastle University
2015–2017	**Instabilities, Turbulence and Scaling** Third year course for Math students @Newcastle University
2009-2014	**Universe and Humanity, Origin and Destiny** General Education course in basic astronomy
	and planetary science, typically $\sim$ 150 students @University of Arizona
2011-2013	**Principles in Planetary Physics** Graduate course covering kinetic theory,
	basic fluid dynamics, MHD and basic computational fluid dynamics @University of Arizona
2011	**Methods in Computational Astrophysics** Graduate course on computational methods in fluid dynamics @University of Arizona

PhD Student Supervision & Thesis Committees

9/2019-12/2023	Ashlin Varghes - *Chemical Mixing by IGW in Massive Stars*
9/2016-07/2020	Alex Hindle - *Shallow water MHD in hot Jupiters*
5/2016-10/2020	Rathish Ratnasingham - *IGW in Massive Stars*
8/2013-8/2015	Tad Komacek - *Magnetism in hot Jupiters*
8/2012-8/2015	Jess Vriesema - *Dynamics of the Solar Interior*
01/2020	May Gade Pederson - *External Examiner for Ph.D., KU Leuven*
09/2017	Timothy van Reeth - *External Examiner for Ph.D., KU Leuven*
09/2009	Eileen Chollet - *Examiner for Ph.D., University of Arizona*

Awards & Prizes

2017 Vice Chancellors award for Faculty Inititiative in Equality, Diversity and Inclusion *Award for developing new Physics Department with Equality, Diversity and Inclusion embedded*

2011 National Academy of Sciences Kavli Frontiers of Science Fellow
"The Academy's Kavli Frontiers of Science symposia bring together outstanding young scientists to discuss exciting advances and opportunities in a broad range of disciplines. Since its inception, 136 program alumni have been elected to the National Academy of Sciences and eight have won Nobel Prizes."

Contributions to EDI (Highlights, see EDI statement for more details)

2015–2020	**Responsible for Doubling number of Female Academics in School** *Designed and implemented new recruiting and interviewing methods which oversaw the hiring of five female academics, three early career fellows and 11 members of staff from outside the UK.* *Methods now used in the rest of the Faculty, in the University Fellowship scheme (NUAcT) and in the Mathematics department at Exeter.* *Gave two international talks on these methods.*
2019	**Led the successful Athena/SWAN bid** *After two failed attempts before I joined the School.*
2015–2019	**Doubled the percentage of females speakers at internal Seminars** *Percentage of female speakers increased from 10-20% (depending on Section and Year) to 30-40% now (and for the last three years).*
2017	**Implemented Carer's Fund** *Fund for academics to use for extra caring costs associated with work travel or other commitments.*
2016	**Developed Best Practice Maternity Guidelines** *Now utilised twice within the School. Paternity leave also increased by a factor of three in last three years.*

Engagement Activities

I have been very active in public outreach. Early in my career I gave numerous (30+) public talks or lectures on Solar Physics, Astronomy and Planetary Science, with audiences ranging from elementary school children to enthusiastic adults. At Newcastle University I have participated in numerous activities including the Maths WISDOM event, multiple Physics Open Days, Explore Your Universe at the Hancock museum, school visits and a talk to Year 11 students. I have also done multiple videos for the University answering questions for school children about space (AskExpert1, AskExpert2) and I am featured in the Centre for Life?s new Space Zone (Centre4Life). More recently, my outreach activities have dropped because of my other administrative and management duties. The "engagement" I currently do revolves around facilitating our PhD students in industry and charity placements to better equip them for jobs outside academia.

Refereed Publications

+ **Refereed publications: 41, of which 19 as first author, 8 with students as first authors, 1 in ARAA, 3 in Nature Astronomy (2 on the "cover"), 9 in ApJL.**
+ >2500 citations; including >1200 to first-author publications.
+ Starred (*) publications were led by students/postdocs that I directly supervised
My full publication list, with auto-generated metrics, is available on googlescholar.

2023

41. *A. Varghese et al. and **T.M. Rogers** in press
"Effect of Rotation on Wave Mixing in Intermediate Mass Stars"
40. * R.Vanon et al. and **T.M. Rogers**, ApJ, 954, 171
"Three-dimensional Simulations of Massive Stars. II. Age Dependence"
39. *R. Ratnasingham et al. and **T.M. Rogers** A&A,674, A134
"Internal Gravity Waves in Massive Stars-II. Frequency analysis across stellar mass"
38. *A. Varghese et al. and **T.M. Rogers** ApJ, 942, 53
"Chemical Mixing Induced by Internal Gravity Waves in Intermediate-Mass Stars"

2021

37. *A. Hindle, P. Bushby and **T.M. Rogers**, ApJ, 922, 176
"The magnetic mehcanism for hotspot reversals in hot Jupiter atmospheres"
36. *A. Hindle, P.Bushby and **T.M. Rogers**, ApJL, 916, L8
"Observational consequences of Shallow-Water Magnetohydrodynamic Waves on hot Jupiters"
35. Pedersen et al. and **T.M.Rogers** Nature Astronomy, 5, 715
em "Internal mixing of rotating stars inferred from dipole gravity modes

2020

34. *R. Ratnasingham, P.Edelmann and **T.M. Rogers** MNRAS, 497,4231
"Two-Dimensional Simulations of Internal Gravity Waves in The Radiation Zones of Intermediate-Mass Stars"
33. Bowman, Bursens, et al including **T.M. Rogers** A&A, 640,A36
"Photometric detection of internal gravity waves in upper main-sequence stars II. Combined TESS photometry and high resolution spectroscopy"

2019

32. C. Aerts, S. Mathis and **T.M. Rogers**, ARAA, 2019, 57, 35-78, *"Angular momentum transport in stellar interiors"*,
31. D. Bowman et al. and **T.M. Rogers**, Nature Astronomy, 2019, 3 (8), 760-765, *"Low frequency gravity waves in blue supergiants revealed by high precision space photometry*,
30. *P.V.F. Edelmann, R. Ratnasigham et al. and **T.M. Rogers**, ApJ, 2019, 876 (1), 4 *"Three-Dimensional Simulations of Massive Stars I. Wave generation and Propagation"*
29. *A. Hindle, P. Bushby and **T.M. Rogers**, ApJL, 2019, 872 (2), L27 *"Shallow-water Magnetohydrodynamics for Westward Hotspots on hot Jupiters"*
28. *R. Ratnasingham, PVF Edelmann and **T.M. Rogers**, MNRAS, 2019, 482 (4), 5500-5512 *"Onset of non-linear internal gravity waves in intermediate-mass stars"*
27. D. Bowman, C. Aerts et al. and **T.M. Rogers**, A&A, 2019, 621, A135 *"Photometric detection of internal gravity waves in upper main-sequence stars -I. Methodology and application to CoRoT targets*

2018

26. T. Ramiaramanantsoa, R. Ratnasingham et al. and **T.M. Rogers**, MNRAS, 2018, 480 (1), 972-986
"A BRITE view on the massive O-type supergiant V973 Scorpii: hints toward internal gravity waves or sub-surface convection zones

25. MG Pederson, C. Aerts, P. Papics and **T.M. Rogers**, A&A, 614, A128 *"The shape of convective core overshooting from gravity-mode period spacings"*

2017

24. **T.M. Rogers** and J.N.McElwaine, ApJL, 2017, 848,1 *" On the Chemical Mixing Induced by Internal Gravity Waves"*
23. **T.M. Rogers** Nature Astronomy 1, *"Constraints on the magnetic field strength of HAT-P-7b and other hot giant exoplanets"*
22. C. Aerts et al. and **T.M. Rogers** A&A, 602, A32, *"Kepler sheds new and unprecedented light on the variability of a blue supergiant: Gravity waves in the 90.5lab star HD 188209"*
21. **T.M. Rogers** and J.N.McElwaine, ApJL, 2017, 841,2 *" The hottest hot Jupiters may host atmospheric dynamos"*

2015

20. **T.M. Rogers**, ApJL, 815 (2), L30 *"On the differential rotation of massive main-sequence stars"*
19. C. Aerts and **T.M. Rogers**, ApJL, 806 (2), L33 *"Observational signatures of convectively driven waves in massive stars"*

2014

18. **T.M. Rogers** and T.D. Komacek, ApJ, 794 (2), 132 *" Magnetic Effects in hot Jupiter atmospheres"*
17. **T.M. Rogers** and A.P. Showman, ApJL, 782 (1), L4 *"Magnetohydrodynamic simulations of the atmosphere of HD 209458b"*

2013

16. **T.M. Rogers**, DNC Lin, JN McElwaine and HHB Lau, ApJ, 772 (1), 21 *"Internal gravity waves in massive stars: angular momentum transport"*
15. **T.M. Rogers** and DNC Lin, ApJL, 769 (1), L10 *"On the tidal dissipation of obliquity"*

2012

14. **T.M. Rogers**, DNC Lin and HHB Lau, ApJL 758 (1), L6 *"Internal gravity waves modulate the apparent misalignment of exoplanets around hot stars"*

2011

13. **T.M. Rogers**, ApJ, 735 (2), 100 *"Toroidal field reversals and the axisymmetric Tayler Instability"*
12. K.B. MacGregor and **T.M. Rogers**, Solar Physics, 270 (2), 417-436 *"Reflection and ducting of gravity waves inside the Sun'*
11. **T.M. Rogers**, ApJ, 733 (1), 12, *"On limiting the thickness of the solar tachocline"*
10. **T.M. Rogers** and K.B. MacGregor, MNRAS, 410 (2), 946-962 *"On the interaction of internal gravity waves with a magnetic field -II. Convective Forcing"*

2010

9. **T.M. Rogers** and K.B. MacGregor, MNRAS, 401 (1), 191-196 *"On the interaction of internal gravity waves with a magnetic field -I. Artificial wave forcing"*

2009

8. G.A. Glatzmaier, M. Evonuk and **T.M. Rogers**, GAFD, 103 (1) 31-51 *"Differential rotation in giant planets maintained by density stratified turbulent convection"*

2008

7. **T.M. Rogers**, K.B. MacGregor and GA Glatzmaier, MNRAS, 387 (2) 616-630 *"Non-linear dynamics of gravity wave driven flows in the solar radiative interior"*

2006

6. **T.M. Rogers**,G.A. Glatzmaier and C.A .Jones, ApJ, 653 (1), 765 *"Numerical simulations of penetration and overshoot in the sun"*
5. **T.M. Rogers**,and G.A. Glatzmaier, ApJ, 653 (1), 756 *"Angular momentum transport by gravity waves in the solar interior"*

2005

4. **T.M. Rogers** and G.A. Glatzmaier, MNRAS, 364 (3), 1135-1146 *"Gravity waves in the Sun"*
3. **T.M. Rogers**,and G.A. Glatzmaier, ApJ, 620 (1), 432 *"Penetrative Convection within the anelastic approximation"*

2003

2. **T.M. Rogers**, G.A. Glatzmaier and SE Woosley PRE, 67 (2) *"Simulations of two-dimensional turbulent convection in a density-stratified fluid"*

2001

1. PA Pinto, RG Eastman and **T.M. Rogers** ApJ, 551 (1), 231 *"A test for the nature of the Type Ia Supernova explosion mechanism"*

Invited Presentations (last 10 years)

2023

- Birmingham Seminar

2021

- Joint Geneva-EPFL Seminar

2020

- Newton Institute, Cambridge, Invited long term participant in Dynamos
- University of Exeter, Applied Maths Seminar

2019

- Aarhus University, Chemistry Department, Denmark, Diverse Recruiting
- Aarhus University STEM Faculty, Denmark, Building a Diverse Physics Programme
- National Astronomy Meeting, UK, Invited Talk
- Geophysical and Astrophysical Fluid Dynamics Workshop, Corsica, 4 hours Invited Lectures

2018

- Queens University Belfast, UK, Astrophysics Seminar
- University of Leeds, UK, Astrophysics Seminar
- University of Amsterdam, Netherlands, Astrophysics Seminar
- Imperial College London, UK, Astrophysics Seminar

2017

- Keele University, UK, Astrophysics Seminar
- University of Leeds, UK, Applied Maths Seminar
- National Astronomy Meeting, UK, Invited Talk
- Natural Dynamos Conference, Czech Republic, Invited Talk
- Kavli Institute of Theoretical Physics (KITP), Santa Barbara, USA, Invited Talk, *Phenomena, Physics and Puzzles of Massive Stars and their Explosive Outcomes*

- KITP, Santa Barbara USA Invited long term participant, *Physics of Massive Stars*
- Birmingham University, UK, Astrophysics Seminar

2016

- Queen Mary University, UK, Astrophysics Seminar
- Royal Astronomical Observatory, Edinburgh, UK, Astrophysics Seminar
- Seismology of the Sun and Stars, Azores, Portugal, Invited Review
- Pulsation and Rotation in Massive Stars, Lake District, UK, Invited Talk

2015

- University of Exeter, UK, Astrophysics Seminar
- UK Exoplanet Meeting, University of Warwick, Institutional Overview Talk
- Toulouse, France, Astrophysics Seminar
- KU Leuven, Belgium Symposium on Waves in Astrophysics
- Cambridge, UK Department of Applied Mathematics and Theoretical Physics Seminar
- University of Hertfordshire, UK, Astrophysics Seminar

2014

- KITP, Santa Barbara, Invited long term participant in *Wave Mean-Flow Interaction*
- UA Origins Program, Invited Seminar
- Exoclimes III, Davos, Switzerland, Invited Talk

2013

- Ohio State University, Astrophysics Seminar
- University of Alberta, Applied Math Seminar
- Connecting Theory to Experiments in GAFD, UCLA, Invited Talk
- Next Generation Stellar Models, Leiden, The Netherlands, Invited Talk
- University of California, Santa Cruz, Astrophysics Seminar
- Waves and Instabilities in Geophysical and Astrophysical Fluid Dynamics (GAFD), Invited Speaker, Les Houches, FR

Professional References

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