

Curriculum Vitae

Dr. Robert Farmer

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Research Interests:

- Stellar evolution codes (MESA), Single star evolution, Binary star evolution, PPISN, PISN, SAGB stars, CCSN, Population synthesis, Nucleosynthesis

Current Position:

- (Sept 2017) Senior Post-Doc, “*BINCOSMOS*”, Amsterdam, Netherlands

Previous Position:

- (July 2014 - July 2017) Post-Doc (NASA TCAN), “*Supernovae Progenitors, Internal Dynamics and Evolution Research (SPIDER)*”, Arizona State University, USA
- (July 2014 - July 2017) Post-Doc (NSF SI²), “*MESA development and support*”, Arizona State University, USA

Education:

- (Sept 2010 - June 2014) PhD (STFC) “*Stellar and binary variability of survey fields*”, Dr Ulrich Kolb, Dr Andrew Norton, Dr Boris Gänsicke, The Open University, UK
- (Sept 2006 - June 2010) MPhys (Hons) 1:1, University of Warwick, UK

Publications (22 published, 5 as first author, 1 submitted, 2319 citations):

1. **Farmer, R.**, et al (Submitted ApJ) “[Constraints from gravitational wave detections of binary black hole mergers on the C12\(alpha,gamma\)O16 rate](#)”
2. van Son et al, w/**Farmer, R.**, 2020, ApJ, 897, 100V, “[Polluting the pair-instability mass gap for binary black holes through super-Eddington accretion in isolated binaries](#)”
3. Renzo, M, **Farmer, R.**, et al (Accepted A&A) “[Predictions for the hydrogen-free ejecta of pulsational pair instability supernovae](#)”
4. Farag, E, et al w/**Farmer, R.**, 2020, ApJ, 893, 133F, “[On Stellar Evolution In A Neutrino Hertzsprung-Russell Diagram](#)”
5. Laplace, E, et al w/**Farmer, R.**, 2020, A&A, 637A, 6L, “[The expansion of stripped-envelope stars: consequences for supernovae and gravitational-wave progenitors](#)”
6. Renzo, M, **Farmer, R.**, et al, 2020, MNRAS, 493, 433R, “[Sensitivity of pulsational pair instability to the treatment of time dependent convection](#)”
7. Schwab, J, **Farmer, R.**, Timmes, F. X, 2020 ApJ, 891, 5S, “[Laminar Flame](#)”

- [Speeds in Degenerate Oxygen-Neon Mixtures](#)"
8. **Farmer, R.**, et al, 2019, ApJ, 887, 53, "[Mind the Gap: The Location of the Lower Edge of the Pair-instability Supernova Black Hole Mass Gap](#)"
 9. Marchant, P, et al w/**Farmer, R.**, 2019, ApJ, 882, 36, "[Pulsational Pair-instability Supernovae in Very Close Binaries](#)"
 10. Paxton, Bill et al; w/**Farmer, R.**, 2019, ApJS, 243, 10, "[Modules for Experiments in Stellar Astrophysics \(MESA\): Pulsating Variable Stars, Rotation, Convective Boundaries, and Energy Conservation](#)"
 11. Renzo, M. et al; w/**Farmer, R.**, 2019, A&A, 624, A66, "[Massive runaway and walkaway stars. A study of the kinematical imprints of the physical processes governing the evolution and explosion of their binary progenitors](#)"
 12. Zapartas, E; et al w/**Farmer, R.**, S, 2019 A&A, 631, A5, "[The diverse lives of progenitors of hydrogen-rich core-collapse supernovae: the role of binary interaction](#)"
 13. Paxton, Bill et al; w/**Farmer, R.**, 2018, ApJS, 234, 34, "[Modules for Experiments in Stellar Astrophysics \(MESA\): Convective Boundaries, Element Diffusion, and Massive Star Explosions](#)"
 14. Fields, C. E., et al w/**Farmer, R.**, 2018, ApJS, 234, 19, "[The Impact of Nuclear Reaction Rate Uncertainties on the Evolution of Core-collapse Supernova Progenitors](#)"
 15. Patton, K, et al w/ **Farmer, R.**, 2017, ApJ, 851, 6, "[Neutrinos from Beta Processes in a Presupernova: Probing the Isotopic Evolution of a Massive Star](#)"
 16. Patton, K, et al w/**Farmer, R.**, 2017, ApJ, 840, 2, "[Presupernova Neutrinos: Realistic Emissivities from Stellar Evolution](#)"
 17. **Farmer, R.**, et al, 2016, ApJS, 227, 22, "[On Variations Of Pre-supernova Model Properties](#)"
 18. Fields, C. E., **Farmer, R.**, et al, 2016, ApJ, 823, 46, "[Properties of Carbon-Oxygen White Dwarfs From Monte Carlo Stellar Models](#)"
 19. Paxton, Bill et al; w/**Farmer, R.**, 2015, ApJS, 220, 15, "[Modules for Experiments in Stellar Astrophysics \(MESA\): Binaries, Pulsations, and Explosions](#)"
 20. **Farmer, R.**, et al, 2015, ApJ, 807, 184, "[On Carbon Burning in Super Asymptotic Giant Branch Stars](#)"
 21. Rauer, H. et al; w/**Farmer, R.**, 2014, ExA, 38, 249, "[The PLATO 2.0 mission](#)"
 22. Miglio, A., et al w/**Farmer, R.**, 2014, ApJL, 784, L3, "[Prospects for Detecting Asteroseismic Binaries in Kepler Data](#)"
 23. **Farmer, R.** et al 2013, MNRAS, 433, 113, "[The true stellar parameters of the Kepler target list](#)"

Grants:

- (2020) LKBF travel funding (1K euros)
- (2019) LKBF travel funding (2*1K euros)

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- (2018) LKBF travel funding (2*1K euros)
- (2018) 500K CPU hours on Carteus super-computing cluster
- (2017) LKBF travel funding (1K euros)
- (2013) RAS Grant for travel to KASC6
- (2013) IOP Research Student Conference Fund for travel to KASC6

Presentations:

- (27/08/2020), Hebrew University of Jerusalem, **colloquium**, “What can we learn about stellar astrophysics from LIGO/VIRGO?”
- (2020) Invited lecturer for “Stellar Modelling for Nuclear Astrophysics”, Summer school, Louisiana State University (Cancelled Covid)
- (02/07/2020) EAS 2020, “Constraints from gravitational wave detections of binary black hole mergers on the C12(alpha,gamma)O16 nuclear reaction rate”
- (13/08/2019) Keele, **colloquium**, “What can we learn about stellar astrophysics from LIGO/VIRGO?”
- (2019) July 2, Lancaster, NAM 2019, talk “*What can we learn about stellar astrophysics from LIGO/VIRGO?*”
- (2019) May 30, KITP, Santa Barbara, talk “*How to Make Black Holes*”
- (2019) May 19, Nijmegen, Colloquium, “*What can we learn about stellar astrophysics from LIGO/VIRGO?*”
- (2018) November 8, Bariloche, “*Mind the gap: The pair instability boundary*”
- (2018) June 1, Stockholm, “*Mind the gap: The pair instability boundary*”
- (2018) May 12, NAC Groningen, “*Mind the gap: The pair instability boundary*”
- (2017) Dec 14, Bonn, Colloquium, “*Variation in pre supernovae model properties*”
- (2017) Dec 11 -12, 11 Bonn neutron star workshop “*Variation in pre supernovae model properties*”
- (2017) Oct 31 Nova 2 Groningen, “*How far can we trust stellar models?*”
- (2017) March 20 – March 2017, Phenomena, Physics, and Puzzles Of Massive Stars and their Explosive Outcomes, Santa Barabra, “*Variation in pre supernovae model properties*”
- (2016) EC-SN/SAGB workshop, “*Carbon burning in SAGB stars*”
- (2016) AAS227, poster, “*Help, my star is on fire - Carbon burning flames in SAGB stars*”
- (2015) OU, colloquium, “*Final fates of SAGB stars*”
- (2013) EPSC, 2013, “*The true stellar parameters of the Kepler target list*”
- (2013) KASC6, “*The true stellar parameters of the Kepler target list*”
- (2013) KASC6, poster, “*The binary star population as seen by Kepler*”

Teaching:

- (2020) Guest lecturer(3hrs), Master’s course, Stellar Astrophysics, Amsterdam, The Netherlands
- (2019) 2x Guest lecturer(6hrs), Master’s course, Stellar Astrophysics, Amsterdam, The Netherlands
- (2018) 2x Guest lecturer (8hrs), Master’s course, Computational Astrophysics, Amsterdam, The Netherlands
- (2016) TA MESA Summer school “*Pulsations*”, Santa Barabra, USA

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- (2015) TA MESA Summer school “*X-ray bursts*”, Santa Barabra, USA
- (2014) TA MESA Summer school “*Customizing PGSTAR plots*”, Santa Barabra, USA
- (2014-) MESA User support
- (2013) Night Duty Astronomer, S288, The Open University, UK
- (2012) Night Duty Astronomer, S382, The Open University, UK

Service:

- Consultant on 400K Euro computing cluster (~1000 cores)
- Chair of 2019 ASPIRE summer school for students from under privileged backgrounds
- Referee for ApJ, ApJL, Royal Society

Students:

- Carla Garcia, ASPIRE Summer project, University of Amsterdam (2019)
 - *Improving the efficiency of supernovae simulations.*
- Sarah Kok, Masters, University of Amsterdam (2019-)
 - *The impact of binarity on PPISN progenitors.*
- Javier Fraile, Masters, University of Amsterdam (2018-2019)
 - *Effects of chemically homogeneous evolution due to spin up on the binary black. hole population*
- Mirron van der Kolk, Masters, University of Amsterdam (2018-2019)
 - *Modelling the population of black holes and neutron stars.*
- Mathieu Renzo, co-supervisor Phd, University of Amsterdam (2017-2019)
 - *The evolution of massive binary stars.*
- Eva Laplace, co-supervisor Phd, University of Amsterdam (2017-)
 - *Modelling the binary progenitors of supernovae.*
- Carl Field, Undergraduate Summer projects, Arizona State University (2014-2016)
 - *The effect of rotation on the evolution of SAGB stars.*
 - *The effect of nuclear reaction rate uncertainties on white dwarfs*

Advisors:

- Associate Prof Selma De Mink, University of Amsterdam/Harvard University, Post-doc Advisor
- Prof Frank Timmes, Arizona State University, Post-doc Advisor
- Dr Ulrich Kolb, The Open University, Phd Supervisor

Memberships:

- Fellow of the Royal Astronomical Society, UK
- Associate member of the Institute of Physics, UK
- IAU junior member