

# J. Ted Mackereth

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## EDUCATION & TRAINING

**University of Birmingham**, Birmingham, UK

*Galactic Archaeology Research Fellow*, School of Physics & Astronomy 2019-Present  
*ASTEROCHRONOMETRY Project (European Research Council Consolidator Grant)*

**Liverpool John Moores University**, Liverpool, UK

*PhD*, Astrophysics Research Institute

2015 - 2019

*Unveiling the History and Nature of the Milky Way using Galactic Surveys and Numerical Simulations*

**University of Liverpool / Liverpool John Moores University**, Liverpool, UK

*Master of Physics (MPhys)*, Astrophysics Research Institute, 1:1

2011-2015

*The variation of NIR spectral lines by stellar parameters and chemical abundances*

## PAPERS

### As first author

- 5 **Mackereth, J. T.**; Bovy, J.; Leung, H. W.; Schiavon, R. P. et al., *Dynamical heating across the Milky Way disc using APOGEE and Gaia*, 2019, MNRAS, 489, 176 (arXiv:1901.04502)
- 4 **Mackereth, J. T.**; Schiavon, R. P.; Pfeffer, J.; Hayes, C. R. et al., *The origin of accreted stellar halo populations in the Milky Way using APOGEE, Gaia, and the EAGLE simulations*, 2019, MNRAS, 482, 3426 (arXiv:1808.00968)
- 3 **Mackereth, J. T.**; Bovy, J., *Fast Estimation of Orbital Parameters in Milky Way-like Potentials*, 2018, PASP, 130, 114501 (arXiv:1802.02592)
- 2 **Mackereth, J. T.**; Crain, R. A.; Schiavon, R. P.; Schaye, J. et al., *The origin of diverse  $\alpha$ -element abundances in galaxy discs*, 2018, MNRAS, 477, 5072 (arXiv:1801.03593)
- 1 **Mackereth, J. T.**; Bovy, J.; Schiavon, R. P.; Zasowski, G. et al., *The age-metallicity structure of the Milky Way disc using APOGEE*, 2017, MNRAS, 471, 3057 (arXiv:1706.00018)

### As Co-Author

- 8 Trick, W. H.; Fragkoudi, F.; Hunt, J. A. S.; **Mackereth, J. T.** et al., *Identifying resonances of the Galactic bar in Gaia DR2: Clues from action space*, 2019 (arXiv:1906.04786)
- 7 Bovy, J.; Leung, H. W.; Hunt, J. A. S.; **Mackereth, J. T.** et al., *Life in the fast lane: a direct view of the dynamics, formation, and evolution of the Milky Way's bar*, 2019 (arXiv:1905.11404)
- 6 Vincenzo, F.; Miglio, A.; Kobayashi, C.; **Mackereth, J. T.** et al., *He abundances in disc galaxies – I. Predictions from cosmological chemodynamical simulations*, 2019 (arXiv:1905.08309)
- 5 Hunt, J. A. S.; Bub, M. W.; Bovy, J.; **Mackereth, J. T.** et al., *Signatures of resonance and phase mixing in the Galactic disc*, 2019 (arXiv:1904.10968)
- 4 Aguado, D. S. et al. (incl. **JTM**), *The Fifteenth Data Release of the Sloan Digital Sky Surveys: First Release of MaNGA-derived Quantities, Data Visualization Tools, and Stellar Library*, 2019, ApJS, 240, 23 (arXiv:1812.02759)
- 3 Abolfathi, B. et al. (incl. **JTM**), *The Fourteenth Data Release of the Sloan Digital Sky Survey: First Spectroscopic Data from the Extended Baryon Oscillation Spectroscopic Survey and from the Second Phase of the Apache Point Observatory Galactic Evolution Experiment*, 2018, ApJS, 235, 42 (arXiv:1707.09322)
- 2 Albareti, F. D. et al. (incl. **JTM**), *The 13th Data Release of the Sloan Digital Sky Survey: First Spectroscopic Data from the SDSS-IV Survey Mapping Nearby Galaxies at Apache Point Observatory*, 2017, ApJS, 233, 25 (arXiv:1608.02013)
- 1 Schiavon, R. P. et al. (incl. **JTM**), *Chemical tagging with APOGEE: discovery*

*of a large population of N-rich stars in the inner Galaxy*, 2017, MNRAS, 465, 501 (arXiv:1606.05651)

## Submitted & in press

- 4 Trick, W. H.; Fragkoudi, F.; Hunt, J. A. S.; **Mackereth, J. T.** et al., *Identifying resonances of the Galactic bar in Gaia DR2: Clues from action space*, 2019 (arXiv:1906.04786)
- 3 Bovy, J.; Leung, H. W.; Hunt, J. A. S.; **Mackereth, J. T.** et al., *Life in the fast lane: a direct view of the dynamics, formation, and evolution of the Milky Way's bar*, 2019 (arXiv:1905.11404)
- 2 Vincenzo, F.; Miglio, A.; Kobayashi, C.; **Mackereth, J. T.** et al., *He abundances in disc galaxies – I. Predictions from cosmological chemodynamical simulations*, 2019 (arXiv:1905.08309)
- 1 Hunt, J. A. S.; Bub, M. W.; Bovy, J.; **Mackereth, J. T.** et al., *Signatures of resonance and phase mixing in the Galactic disc*, 2019 (arXiv:1904.10968)

## Conference Proceedings

- 1 **Mackereth, J. T.**; Bovy, J.; Schiavon, R. P.; SDSS-IV/APOGEE Collaboration, *The age-metallicity structure of the Milky Way disc with APOGEE*, 2018, Rediscovering Our Galaxy, 334, 265 (arXiv:1708.05399)

## TALKS

- *Linking insights into the disc, bulge and halo for a holistic approach to constraining the assembly of the Milky Way*, Contributed Talk, *The Gaia Treasure Hunt*, MWGAIA COST action workshop, Cambridge, UK
- *Linking insights into the disc, bulge and halo for a holistic approach to constraining the assembly of the Milky Way*, CITA Seminar, Toronto, ON, Canada
- *Constraints on the assembly of the Milky Way from APOGEE, Gaia and the EAGLE simulations*, Invited Talk, KITP Conference: ‘In the balance: stasis and disequilibrium in the Milky Way’, Santa Barbara, CA, USA
- *Constraining the formation of the Milky Way disk with APOGEE, Gaia and the EAGLE simulations*, Invited Plenary Talk, SDSS-IV Collaboration Meeting 2018, Seoul, South Korea
- *The origin of diverse  $\alpha$ -element enrichment in galaxy discs*, Invited Lunch Seminar, ICC, Durham University
- *Constraints on the origin of the high- $[\alpha/\text{Fe}]$  disc with APOGEE-Gaia*, Contributed Talk, *Gaia: The billion-star galaxy census: at the threshold of Gaia data release 2*, EWASS 2018, Liverpool, UK
- *Contextualising  $[\alpha/\text{Fe}]$  bimodality in the EAGLE simulations*, Contributed Talk *Hello, goodbye: understanding the duality of the Milky Way*, EWASS 2018, Liverpool, UK
- *Galactic Archaeology with mono-age stellar populations*, Invited Seminar, March 2018, University of Birmingham
- *The Milky Way in a cosmological context: The origin of diverse  $\alpha$ -element enrichment in galaxy discs*, Contributed Talk, Virgo Collaboration Meeting 2017, Garching, Germany
- *The origin of  $\alpha$ -element bimodality in the Milky Way and galaxy discs*, Informal Talk, Flatiron CCA Stars Group Meeting, New York City, USA
- *Reconstructing the history of the Milky Way disc*, Poster Prize Talk, IAUS334: *Rediscovering our Galaxy*, Potsdam, Germany
- *Reconstructing the history of the Milky Way disc*, Contributed Talk, *Bridging the near and the far: from the Milky Way to nearby galaxies*, EWASS 2017, Prague, Czech Republic
- *Constraining models for Galactic disk formation with APOGEE and EAGLE*, Contributed Talk, SDSS-IV Collaboration Meeting 2016, Madison, WI

## WORKSHOPS

- *Weighing Stars from Birth to Death: How to Determine Stellar Masses?*, 2018 Lorentz Center Workshop (Invited), Leiden, The Netherlands
- *2018 Gaia Sprint*, CCA, Flatiron Institute, New York City, USA
- *2017 Gaia Sprint*, MPA, Heidelberg, Germany

## GRANTS & AWARDS

- LJMU Faculty of Engineering Thesis prize, 2019
- SDSS Early Career Travel Fund Grant, 2018
- Dunlap Institute Visiting Member, Dunlap Institute, University of Toronto, Toronto ON, Canada
- RAS Personal Grant, 2017, *The kinematics and dynamics of mono-abundance populations in the Milky Way using Gaia and APOGEE*
- IAUS334 Travel Grant
- Poster Prize, IAUS334, Potsdam, Germany

## OTHER AFFILIATIONS

- SDSS ‘Milky Way as a Galaxy’ Working Group Co-Chair
- SDSSIV/APOGEE-2 Team member
- APO-K2 Core science team member
- WEAVE survey Galactic Archaeology science working group Member
- **Reviewer:** MNRAS, ApJ, A&A, CanTAC

## SOFTWARE

- *galpy* galactic dynamics package contributor -
- *apogee* python package contributor
- **Languages:** Python, R, Stan, Tensorflow, SQL/ADQL, L<sup>A</sup>T<sub>E</sub>X.

## STUDENT MENTORING

Danny Horta-Darrington, *PhD Student*, LJMU, 2018-Present  
Rayhan Mahmud, *Undergraduate Summer Student*, UoB, 2019

## TEACHING

### University of Birmingham

- Demonstrator, *Computational Physics*
- Instructor, *Postgraduate Research Skills*

### Liverpool John Moores University

- Senior Demonstrator, *Practical Astrophysics*
- Tutor, *Computational Galactic Dynamics, Distance Learning MSc*
- Teaching Assistant, *Introduction to Astrophysics*
- Mentoring of *MPhys* project students
- PhD student talks organiser, 2017

## OUTREACH ACTIVITIES

- Featured on Japanese national broadcaster NHK’s *Cosmic Front NEXT* documentary on the ‘Miracle Milky Way’
- Tim Peake Cosmic Classroom Event, February 2016 *World Museum, Liverpool*
- The Size of the Universe (talk/workshop), April 2016 *Werneth Primary School, Oldham, UK*
- Travelling to Space (talk/workshop), March 2018 *Abraham Moss Community School, Manchester, UK*
- Undergraduate open days student representative, 2016-2018 *Liverpool John Moores University / University of Liverpool*