

Meridith Joyce, PhD

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www.meridithjoyce.com • <https://github.com/mjoyceGR> • ADS Library: DrMeridithJoyce • United States citizen

Research Interests & Areas of Expertise

Stellar evolution codes: MESA developers team; MIST, DSEP, GYRE, YREC, Monash

Theoretical and computational astrophysics: stellar structure and evolution, stellar age determinations, statistics and uncertainty analysis, stellar interiors, convection and mixing, stellar pulsations, stars across the mass and evolutionary spectra (late-stage, high-mass, young, disk-hosting, etc.), asteroseismology, numerical methods, astronomy software development.

Optical astronomy: variable and oscillating stars, low-metallicity stars, globular clusters.

Research Positions and Fellowships

Assistant Professor, tenure-track — University of Wyoming, starting August 2024

Marie Skłodowska-Curie Widening Fellowship — CSFK Konkoly Observatory, September 2022–present

Lasker Data Science Fellowship — Space Telescope Science Institute, NASA, June 2021–September 2022

Modules for Experiments in Stellar Astrophysics (MESA) developers team, September 2019–present

RSAA Postdoctoral Fellow — Australian National University, September 2018–June 2021

Visiting Astronomer — Konkoly Observatory, January 2018–present

Visiting Astronomer — University of Cape Town, June 2017–January 2019

Postgraduate Research Assistant (pre-doc) — South African Astronomical Observatory, June–November 2017

Research Assistant — Dartmouth College, September 2013–July 2018

Research Assistant — Massachusetts Institute of Technology, June–August 2015

Education

Ph.D. Physics and Astronomy — Dartmouth College, 2018 — Prof. Brian Chaboyer, adviser

On the Scope and Fidelity of 1-D Stellar Evolution Models, PhD Thesis

B.Sc. Mathematics, B.Sc. Physics — Bucknell University, 2009–2013

full academic scholarship via the university's Presidential Fellowship

Grants and Funding Secured

Principal Investigator

- * **€151,850.88** – Marie Skłodowska-Curie Actions (MSCA) Widening Fellowship, European Commission's Horizons 2020 program, 2021-2022 round
MATISSE: Measuring Ages Through Isochrones, Seismology, and Stellar Evolution
with a proposal score of 91/100 in the physics category; over 2 years
- * **\$48,000 (USD)** – Lasker Data Science Fellowship, Space Telescope Science Institute, February 2021; discretionary research spending; over 3 years
- * was offered but declined the Nordic Institute for Theoretical Physics (Nordita) Prize Fellowship, 2020-2021 round
- * **\$8,000.00 (USD)** – International Research Network for Nuclear Astrophysics (IReNA) travel grant to support the MESA@Konkoly 2023 Summer School
- * **\$4,000.00 (AUD)** – RSAA Distinguished Visitors Program, *Seismic Evolution of Variable Stars*, March 2020; to fund the travel, housing, and research expenses of Dr László Molnár while in Australia for collaboration with me on proposed project. Highly competitive program awarded to only two researchers per year
- * **\$1,000.00 (USD)** – Research Grant from the Neukom Institute for Computational Science, December 2017; Awarded to only three graduate students per year across all computational disciplines

Co-Investigator and/or substantial knowledge contribution

- * **\$405,459.00 (USD)** – NASA Astrophysics Theory Program (ATP) Proposal, Co-I (PI: Jamie Tayar), *Modeling Red Giants: A Fundamental Diagnostic for Ages Across the Universe*; over 3 years
- * **299 800 000 HUF (approx. \$946,000.00 USD)** – Asteroseismic Laboratories (*SeismoLab*) Élvonal Research Excellence Program, Hungarian Research, Development and Innovation Office, Co-I (PI László Molnár); over 5 years

Under Consideration:

- Core collaborator, NSF Proposal *Collaborative Research: A PanChromatic Survey of the Galactic Bulge* (PI Christian Johnson)

List of Publications

First Authorships & Equivalent Contributions

1. **Meridith Joyce**, László Molnár, Giulia Cinquegrana, Dóra Tarczay-Nehéz, Amanda Karakas, Jamie Tayar *Stellar Evolution in Real Time II: R Hydrae and an Open-Source Grid of ~1500 TP-AGB Models Computed with MESA*, January 2024 (*submitted*)
2. Tommaso Marchetti, **Meridith Joyce**, Christian Johnson, R. Michael Rich, William Clarkson, Andrea Kunder, Iulia T. Simion, Catherine A. Pilachowski *The Blanco DECam Bulge Survey (BDBS) VIII: Chemo-kinematics in the southern Galactic bulge from 2.3 million red clump stars with Gaia DR3 proper motions*, A&A, January 2024
3. **Meridith Joyce** and Jamie Tayar *A Review of the Mixing Length Theory of Convection in 1D Stellar Modeling*, **Invited Review** for the MDPI Special Issue “The Structure and Evolution of Stars,” June 2023
4. László Molnár, **Meridith Joyce**, Shing-Chi Leung *Comment on the Feasibility of Carbon Burning in Betelgeuse*, RNAAS, June 2023
5. **Meridith Joyce**, Christian Johnson, Tommaso Marchetti, R. Michael Rich, Iulia Simion, John Bourke *The Ages of Galactic Bulge Stars with Realistic Uncertainties*, ApJ, March 2023
6. Adrian E. Fraser, **Meridith Joyce**, Evan H. Anders, Jamie Tayar, Matteo Cantiello *Observed Extra Mixing Trends in Red Giants are Reproduced by the Reduced Density Ratio in Thermohaline Zones*, ApJ, December 2022 (**joint first and corresponding author**)
7. Jamie Tayar and **Meridith Joyce** *Is Thermohaline Mixing the Full Story? Evidence for Separate Mixing Events near the Red Giant Branch Bump*, ApJ Letters, August 2022 (**joint first and corresponding author**)
8. **Meridith Joyce**, Jamie Tayar & Daniel Lecoanet *Gender Disparity in Publishing 6 Months after the KITP Workshop “Probes of Transport in Stars”*, PASP, August 2022
9. Simon J. Murphy, **Meridith Joyce**, Timothy R. Bedding, Timothy R. White, Mihkel Kama *A precise asteroseismic age and metallicity for HD 139614: a pre-MS λ Boo star with a protoplanetary disk in Upper-Centaurus Lupus*, MNRAS, January 2021 (**lead: modeling**)
10. **Meridith Joyce**, Shing-Chi Leung, László Molnár, Michael J. Ireland, Chiaki Kobayashi, Ken’ichi Nomoto *Standing on the shoulders of giants: New mass and distance estimates for Betelgeuse through combined evolutionary, asteroseismic, and hydrodynamical simulations with MESA*, ApJ, October 2020
11. **M. Joyce**, L. Lairmore, D. J. Price, S. Mohamed, T. Reichardt *Density Conversion between 1-D and 3-D Stellar Models with ^{1D}MESA2HYDRO^{3D}*, ApJ, September 2019
12. **Meridith Joyce** *Asteroseismic Binaries as non-Solar Mixing Length Calibrators*, Proceedings of the conference Stars and their Variability Observed from Space, Vienna, Austria, August 2019
13. L. Molnár, **M. Joyce**, L. Kiss *Stellar Evolution in Real Time: Models Consistent with Direct Observation of a Thermal Pulse in T Ursae Minoris*, ApJ, July 2019 (**joint first and corresponding author**)
14. **M. Joyce** and B. Chaboyer *Classically and Asteroseismically constrained 1D Stellar Evolution Models of α Centauri A & B using Empirical Mixing Length Calibrations*, ApJ, September 2018
15. **M. Joyce** and B. Chaboyer *Not All Stars Are the Sun: Empirical Calibration of the Mixing Length for Metal-Poor Stars Using 1-D Stellar Evolution Models*, ApJ, March 2018
16. **M. Joyce** and B. Chaboyer *Investigating the Consistency of Stellar Evolution Models with Globular Cluster Observations via the Red Giant Branch Bump*, ApJ, December 2015

Publications led by my students

17. Giulia Cinquegrana, **Meridith Joyce**, & Amanda Karakas *Bridging the Gap between Intermediate and Massive Stars II: M_{mas} for the most metal-rich stars and implications for Fe CCSNe rates*, MNRAS, November 2023 (**PhD Student**)
18. Giulia Cinquegrana, **Meridith Joyce**, & Amanda Karakas *Bridging the Gap between Intermediate and Massive Stars I: Validation of MESA against the State-of-the-Art Monash Stellar Evolution Program for a $2M_{\odot}$ AGB Star*, ApJ, August 2022 (**PhD Student**)
19. Giulia Cinquegrana & **Meridith Joyce** *Solar Calibration of the Convective Mixing Length for Use with the \mathcal{A} SOPUS Opacities in MESA*, RNAAS, April 2022 (**PhD Student**)
20. Jianling Tang & **Meridith Joyce** *Revised Best Estimates for the Age and Mass of the Methuselah Star HD 140283 Using MESA and Interferometry and Implications for 1D Convection*, RNAAS, May 2021 (**honours student**)

21. Yixiao Zhou, Thomas Nordlander, Luca Casagrande, **Meridith Joyce**, Yaguang Li, Anish Amarsi, Martin Asplund, Henrique Reggiani *The relationship between photometric and spectroscopic oscillation amplitudes from 3D stellar atmosphere simulations*, MNRAS, January 2021 (**PhD Student**)
22. Yixiao Zhou, Martin Asplund, Remo Collet, **Meridith Joyce** *Convective excitation and damping of solar-like oscillations*, MNRAS, May 2020 (**PhD Student**)

Substantial contributions not led by students

23. Henryka Netzfel, László Molnár, **Meridith Joyce** *Detailed asteroseismic modelling of RR Lyrae stars with non-radial modes*, MNRAS, November 2023
24. Adam Jermyn, Evan Bauer, Josiah Schwab, Rob Farmer, **Meridith Joyce** including 7 co-authors at equivalent position (alphabetical) and 11 others *Modules for Experiments in Stellar Astrophysics (MESA): Time-Dependent Convection, Energy Conservation, Automatic Differentiation, and Infrastructure*, ApJ Supplement Series, March 2023
25. Susmita Das, László Molnár, Shashi M. Kanbur, **Meridith Joyce**, Anupam Bhardwaj, Harinder P. Singh *A Theoretical Framework for BL Her stars – II: The Gaia DR3 Era*, in prep for submission to A&A, March 2023
26. Tommaso Marchetti, Christian Johnson, **Meridith Joyce**, R. Michael Rich, Iulia Simion, and the BDBS collaboration *The Blanco DECam Bulge Survey (BDBS) VI. Cleaning the foreground populations from Galactic bulge Color-Magnitude Diagrams using Gaia EDR3*, A&A, June 2022
27. Amanda Karakas, Giulia Cinquegrana, **Meridith Joyce** *The most metal-rich asymptotic giant branch Stars*, MNRAS, November 2021

Publications led by other students

28. Yaguang Li et al., including 10 co-authors with **Meridith Joyce** at position 6 *A prescription for the asteroseismic surface correction*, MNRAS, July 2023
29. Yaguang Li, Timothy R. Bedding, Simon J. Murphy, Dennis Stello, Yifan Chen, Daniel Huber, **Meridith Joyce**, and 10 additional co-authors *Discovery of post-mass-transfer helium-burning red giants using asteroseismology*, Nature Astronomy, April 2022
30. Adam D. Rains, Maruša Žerjal, Michael J. Ireland, Thomas Nordlander, Michael S. Bessel, Luca Casagrande, Christopher A. Onken, **Meridith Joyce**, Jens Kammerer, Harrison Abbot *Characterization of 92 southern TESS candidate planet hosts and a new photometric [Fe/H] relation for cool dwarfs*, MNRAS, July 2021
31. Margaret Streamer, Michael J. Ireland, **Meridith Joyce**, Simon J. Murphy, Maruša Žerjal *RZ Mic: Identified modes in an Algol-type eclipsing binary with a δ Sct component*, submitted to MNRAS, January 2021

Contributing author publications

32. Susmita Das, László Molnár, M. Shashi Kanbur, **Meridith Joyce**, Anupam Bhardwaj, P. Harinder Singh, Marcella Marconi, Vincenzo Ripepi, Radoslaw Smolec *A theoretical framework for BL Her stars – II. New period-luminosity relations in the Gaia passbands*, in revision with A&A, January 2024
33. Andrea Kunder, Zdenek Prudil, Kevin R Covey, Joanne Hughes, **Meridith Joyce** and 16 additional co-authors *The Milky Way Bulge Extra-tidal Star Survey: BH 261 (AL 3)* AJ, January 2024
34. Evan Butler and 19 co-authors, with **Meridith Joyce** at position 14 *RR Lyrae Stars Belonging to the Candidate Globular Cluster Patchick 99*, in revision with ApJ, January 2024
35. Jamie Tayar and 28 co-authors, with **Meridith Joyce** last *The Importance of Neural Network Hyperparameters in Determining Age Inference Quality*, RNAAS, December 2023
36. David Yong, Yuan-Sen Ting, Fan Liu, **Meridith Joyce**, Aaron Dotter, Fei Dai, Michael Murphy, Bertram Bitsch *C3PO: Towards a Complete Census of Co-moving Pairs of Stars. I. Sample Selection, Observations, Analysis and First Results* MNRAS, December 2023
37. Simon Murphy, Timothy R Bedding, Anuj Gautam and **Meridith Joyce** *A grid of 200,000 models of young δ Scuti stars using MESA and GYRE*, MNRAS, December 2023
38. László Molnár, Emese Plachy, Attila Bódi, András Pál, **Meridith Joyce**, and 8 additional co-authors *To Grow Old and Peculiar: A Survey of Anomalous Variable Stars in M80 and Age Determination using K2 and Gaia*, A&A, October 2023
39. László Molnár, Csilla Kalup, **Meridith Joyce** *Asteroseismic sounding of bulge globular clusters with the Roman Space Telescope*, white paper, June 2023
40. Welch, Brian et al., including 62 co-authors with **Meridith Joyce** (alphabetical) *JWST Imaging of Earendel, the Extremely Magnified Star at Redshift $z = 6.2$* , accepted to ApJ, subm. August 2022
41. Jamie Tayar et al., including 15 co-authors with **Meridith Joyce** at position 5 *Spinning up the Surface: Evidence for Planetary Engulfment or Unexpected Angular Momentum Transport?*, accepted to ApJ, subm. June 2022
42. Christian I. Johnson et al., including 14 co-authors with **Meridith Joyce** at position 12 *Blanco DECam Bulge Survey (BDBS) V: Metallicity Distributions and Bulge Structure from 2.6 Million Red Clump Stars*, MNRAS, June 2022
43. Evan H. Anders, Adam S. Jermyn, Daniel Lecoanet, Adrian E. Fraser, Imogen G. Cresswell, **Meridith Joyce**, J. R. Fuentes *Schwarzschild and Ledoux are Equivalent on Evolutionary Timescales*, ApJ, March 2022
44. Murphy, Simon J.; Bedding, Timothy R.; White, Timothy R.; Li, Yaguang; Hey, Daniel; Reese, Daniel; **Joyce, Meridith** *Five young δ Scuti stars in the Pleiades seen with Kepler/K2*, MNRAS, April 2022

45. Molnár, László; Bódi, Attila; Pál, András; Bhardwaj, Anupam; Hamsch, Franz-Josef; Benkó, József M.; Derekas, Aliz; Ebadi, Mohammad; **Joyce, Meridith**; and 19 co-authors *First results on RR Lyrae stars with the TESS space telescope: untangling the connections between mode content, colors and distances*, MNRAS, March 2022
46. Yang, Tao-Zhi; Zuo, Zhao-Yu; Li, Gang; Bedding, Timothy R; Murphy, Simon J; **Joyce, Meridith** *TIC 308396022: a δ Scuti- γ Doradus hybrid with large-amplitude radial fundamental mode and regular g-mode period spacing*, A&A, October 2021
47. Zinn, Joel C. et al., including 31 co-authors with **Meridith Joyce** at position 22 *The K2 Galactic Archaeology Program Data Release 3: Age-abundance patterns in C1-C8, C10-C18*, ApJ, August 2021
48. Lorenzo Spina, Yuan-Sen Ting, Gayandhi M. De Silva, Neige Frankel, Sanjib Sharma, Tristan Cantat-Gaudin, **Meridith Joyce** and 24 others from the GALAH collaboration *The GALAH survey: tracing the Galactic disc with open clusters*, MNRAS, May 2021
49. Michael Hayden et al., including 30 co-authors with **Meridith Joyce** at position 24 *the GALAH Survey: Chemical Clocks*, submitted to MNRAS, November 2020
50. Daniel L. Holdsworth, H. Saio, D.M. Bowman, D.W. Kurtz, R. R. Sefako, **M. Joyce**, T. Lambert, B. Smalley *Suppressed phase variations in a high amplitude rapidly oscillating Ap star pulsating in a distorted quadrupole mode*, MNRAS, January 2018

—Summary of Publications—

over **50 total papers** (some pending papers not listed), nearly all in the highest-impact astronomy journals

Among these: **16 first author or equivalent** and an additional six on which I am second author behind a student I supervise directly, **for a total of 22**.

Teaching

—Supervision of Higher Degree Research—

External co-supervisor of Monash University Ph.D. student Giulia Cinquegrana, August 2020–present

Primary supervisor of RSAA Honours student Jianling Tang, January 2020–June 2021

Primary supervisor of RSAA Ph.D. student Yixiao Zhou, March 2020–January 2021

—Supervision of Undergraduate Research—

Primary supervisor for Konkoly Observatory’s Undergraduate Astronomy Demonstrators Program (year-long REU equiv.) student Anett Simon-Zsók, September 2022–present

Primary supervisor for RSAA Summer Scholar program (REU equiv.), November 2020–January 2021

—Full Course Lecturing—

Australian National University — **Full Lecturer, Astronomy 3007: Stars**, February–June 2020

Australian National University — **Full Lecturer, Astronomy 3005: Supervised Undergraduate Research**, February–June 2021

—Summer Schools and Special Training—

MESA Summer School — Lecturer and core coordinator, August 2022

IAU Symposium 336 Special Skills Training Session — Instructor, *Using MESA for teaching and research*

MESA Summer School — Teaching assistant, August 2021

RSAA Summer Scholars Program — Advisor, November 2020–January 2021; **resulted in student’s publication**

—Guest Lecturing & Teaching Assistance—

University of Cape Town — Teaching assistant & contributing lecturer, computational astrophysics, February–April 2018

University of Cape Town — Guest lecturer, undergraduate astronomy year 3, March 2018

South African Astronomical Observatory — Guest Lecturer, NASSP Summer School, South Africa, January–February 2018

University of Cape Town via Dartmouth College — Teaching assistant, Dartmouth Foreign Studies Program, Cape Town, South Africa, January–March 2017

Dartmouth College — Teaching assistant, September 2013–July 2018

Talks and Public Profile

Highlighted Contributions

1. invited talk at the European Astronomical Society (EAS)'s general meeting, session on Betelgeuse, Krakow, Poland, July 2023
2. Harvard Institute for Theory and Computation (host: ITC), October 2022
3. Contributed talk selected for Cool Stars 21, Toulouse, France, July 2022. One of 40 highly competitive slots for a conference of ~600 participants.
4. Invited review talk on the Mixing Length Theory of convection, KITP UCSB, November 2021
5. Invited lecturer on MESA and its applications, IAU 336 Special Skills session, KU Leuven, November 2021
6. Special two-hour seminar on Betelgeuse at Kamioka neutrino observatory, Japan, April 2021 (paid)
7. Invited speaker to the special session on Betelgeuse, Marcel Grossmann Meeting on General Relativity (MG16), July 2021

Invited Colloquia and Seminars

8. Thüringer Landessternwarte Tautenburg, January 2024
9. University of Arizona (host: Department of Astronomy), February 2023
10. University of Wyoming (hosts: Department of Physics and Astronomy; School of Computing), February 2023
11. The Ohio State University (host: Department of Astronomy), January 2023
12. University of Oregon (host: Department of Physics), January 2023
13. North Carolina State University (host: Department of Physics), January 2023
14. Smith College (hosts: Department of Physics; Department of Statistical and Data Sciences), December 2022
15. Harvard Center for Astrophysics (host: Andrea Dupree on behalf of the Women of CfA), October 2022
16. American Museum of Natural History (host: Joel Zinn), October 2022
17. Uppsala University (host: Anish Amarsi), October 2022
18. Yale (host: Sarbani Basu), November 2020
19. Northwestern University (host: Kerry Patterson), November 2020
20. Florida Institute of Technology, (host Saida Caballero-Nieves), November 2020
21. University of Hertfordshire (host: Chiaki Kobayashi), November 2020
22. UC Santa Cruz (host: Josiah Schwab), November 2020
23. Space Telescope Science Institute, (host: Kornpob Bhirombhakdi), November 2020
24. MPA Heidelberg (host: Hans-Walter Rix), October 2020
25. University of Birmingham (host: Guy Davies), October 2020
26. KIPAC Stanford (host: Alex Amon), October 2020
27. University of Auckland (host: Jan Eldridge), October 2020
28. UW Madison (host: Rich Townsend), October 2020
29. KITP/UC Santa Barbara (host: Lars Bildsten), October 2020
30. Aarhus University (host: Victor Silva Aguirre), September 2020
31. Harvard (host: Selma de Mink), September 2020
32. Harvard Center for Astrophysics (host: Charlie Conroy), September 2020
33. UT Austin (host: Craig Wheeler), September 2020

34. Flatiron (host: Dan Foreman-Mackey), September 2020
35. University of Sydney (host: Tim Bedding), February 2020
36. University of Tokyo (host: Ken'ichi Nomoto), January 2020
37. University of New South Wales (host: Sarah Martell), October 2020
38. Radboud University (host: Onno Pols), October 2020
39. Heidelberg Institute for Theoretical Studies (host: Saskia Hekker), October 2020
40. Macquarie University (host: Orsola De Marco), March 2019
41. Monash University (host: Amanda Karakas), November 2018
42. Rome Observatory (host: Paolo Ventura), 2018
43. Belgrade Observatory (host: Monika Jurkovic), 2018
44. Konkoly Observatory (hosts: Maria Lugaro, Robert Szabo, László Molnár), 2018
45. University of Cape Town (host: Shazrene Mohammed), 2017
46. KU Leuven (host: Conny Aerts), 2017

Invited conference talks:

47. invited speaker, *The Alpha Centauri System: Prospects for neighboring worlds*, Nice, France, June 2023 (*upcoming*)
48. invited panelist on stellar convection, *Probes of Transport in Stars* conference, KITP UCSB, November 2021
49. invited speaker, special session on Betelgeuse, 16th Marcel Grossmann Meeting on General Relativity, July 2021
50. invited speaker, *GAPS: unsolved problems in red Giants And suPergiantS* conference, June 2021
51. invited speaker, *Death Throes of Evolved Stars* conference, KU Leuven, April 2021
52. invited speaker, Workshop on Reference Stars, Lund University, March 2021
53. invited speaker, Australian National Institute for Theoretical Astrophysics (ANITA) annual meeting, UNSW, December 2020
54. invited contributor, *Astrophysics of LIGO/Virgo sources in the O3 era*, IPMU University of Tokyo, January 2020
55. session chair and invited speaker, *Stars in Melbourne*, Monash University, December 2019

Other contributed conference talks:

56. invited to present on *Gender Disparity in Publishing* at the DESI research forum through their diversity journal club, May 2023 (*upcoming*)
57. EAS 2021, session on Betelgeuse, Leiden, June 2021
58. *Stars and their variability, observed from space* Vienna, Austria, September 2019
59. *A Star Has Evolved* Smögen, Sweden, 2019
60. *Time Machine to the First Stars*, IPMU Tokyo, Japan, December 2018
61. *Advances with SALT (South African Large Telescope)*, Pretoria, South Africa, November 2018

Public Outreach Talks

62. ***Astronomy on Tap*** public lecture, Budapest, Hungary, September 2019
From Light to Insight: How computer modeling lets us watch stars die
63. Public astronomy nights **outreach lecture series**, SAAO, Cape Town, South Africa, February 2018
Stellar Stories: Filling in the Observational Gaps with Computer Models of Stars
64. Guest on **World Wide AstroFest**, United Kingdom, November 2020 (paid)

Communications Achievements

- * Winner, TASC6/KASC13 Best Talk Competition, postdoc category *Standing on the Shoulders of Giants: New Mass, Age, and Distance estimates for Betelgeuse*, July 2022
- * Winner, European Astronomical Society's Best Poster Competition, *Gaia Revolutions in Milky Way Modeling*, June 2021
- * Honorable Mention, American Astronomical Society's Chambliss Graduate Student Poster Competition, June 2016
- featured in BBC science documentary series *Science's Greatest Mysteries*, international release 2022
- Featured in *Sky & Telescope*: "How Big is Betelgeuse Really?" November 2020
- Television appearance on ABC News, Canberra, Australia
- Guest on popular podcasts, YouTube shows, radio
- Scientific work featured on CNN, Forbes, Newsweek, Astronomy Now, SkyNews, CNET, Phys.org, and others (see website)

Observing time

- . CHARA Array, 2021A semester, *Angular sizes and oblateness of delta scuti pulsators observed by TESS Co-I* (PI Tim White)
- . SAAO-Sutherland 1.9m, SpUpNIC grating spectrograph, 7 nights, **PI** *Preliminary Spectra of Metal-Poor Stars with HST Parallaxes*, November 2017
- . SAAO-Sutherland 1.9m, SpUpNIC grating spectrograph, 4 nights, September 2017
- . SAAO-Sutherland 1m, SHOC SAAO CCD, 7 nights, July 2017
- . MDM 1.3m, remote, 1 night, May 2017

Service

Refereeing and Grants

I have refereed for the following journals:

- Nature*
- The Astrophysical Journal*
- Monthly Notices of the Royal Astronomical Society*
- Astrophysics & Space Science*
- Frontiers in Astronomy and Space Science* (Review Editor in solar and stellar physics)

I have evaluated/served on the following evaluation committees:

- . European Research Council starting grants
- . NASA Astrophysics Decadal Survey Precursor Science program
- . NASA Advanced Theory Program

Conference and Program Organization

- **Program Director**, [MESA@Konkoly](#): the first MESA Summer School in Europe, Budapest, Hungary, August 2023
- Scientific Organizing Committee (SOC) *The Alpha Centauri System: Prospects for neighboring worlds*, Nice, France, June 2023
- Admissions Committee for the 2022 [MESA](#) Summer School
- Logistics Committee for the 2022 [MESA](#) Summer School
- Two-time volunteer lecturer and organizer at the National Astrophysics and Space Science Program (NASSP) Summer School, South African Astronomical Observatory & University of Cape Town, South Africa, 2017 and 2018

University Service

- as a postdoc, I organized an international thesis committee and graduated a PhD student at the Research School of Astronomy and Astrophysics (RSAA) at ANU
- as a postdoc, I served as a full lecturer for Australian National University's stellar astrophysics course when the need unexpectedly arose
- [MESA](#) instructor, IAU 336 skills training session
- teaching assistant for the 2021 [MESA](#) Summer School
- ARC Centre of Excellence ASTRO 3D Colloquium Committee, November 2020–May 2021
- RSAA computing time allocation committee, June 2019–May 2021
- RSAA hiring committee
- President of the Dartmouth chapter of the national organization Graduate Women in Science and Engineering (GWISE) and Dartmouth's representative to the multi-collegiate New England GWISE consortium, 2016–2017

Equity, Diversity & Inclusion

I lead an investigation of the impact of segregation by gender on research productivity: *Gender Disparity in Publishing Six Months after the KITP Program “Probes of Transport in Stars”*, PASP, August 2022

My academic mentees span all races, genders, gender identities, ages, geographic locations, socioeconomic backgrounds, and political ideologies. Every student I have formally supervised is either female, non-White, non-western, or a combination thereof.

I elevate the contributions of female, non-White, non-traditional, LGBTQIA-identifying, and international scientists, as supported by the author lists on my publications.

Additionally, my EDI service record includes the following committees and actions:

- * Invited lecture and discussion of *Gender Disparity in Publishing* (Joyce et al., 2022) for the Women of the Harvard-Smithsonian Center for Astrophysics, October 2022
- * Space Telescope Science Institute’s Women in Astronomy Forum, 2021–2022
- * Representative for the Research School of Astronomy and Astrophysics (RSAA) to the ANU **all colleges of science (CoS) Equity and Diversity Committee, by nomination of the RSAA director**. Two years.
- * RSAA Inclusion, Diversity, Equity, and Access (IDEA) committee representative. One year
- * RSAA cultural reform initiative: **chair, working group on mental health**. One year
- * Contributing author to the revised RSAA Code of Conduct
- * Organizer of ANU’s **Black Lives Matter** response and discussion group, June 2020
- * Volunteer organizer for the National Astrophysics and Space Science Program, Cape Town, South Africa. Two years
- * Volunteer women’s crisis advocate, ongoing
- * Astronomy and Astrophysics Outlist, ongoing

Scientific Collaborations

- . MESA developers team, August 2019–present
- . SDSS, June 2022–present
- . Blanco DECam Bulge Survey (BDBS), August 2021–present
- . *Asteroseismic Laboratories (SeismoLab)* affiliate researcher, Konkoly Observatory, Budapest, Hungary (September 2021–present)
- . TESS Asteroseismic Science Operations Center (**TASOC**) Working Group 2, December 2020–present
- . ASTRO3D ARC Centre of Excellence affiliate investigator, October 2019–present
- . GALactic Archaeology with HERMES (**GALAH**) collaboration; August 2020–June 2021

Professional Organizations

American Astronomical Society (AAS), 2021–present

Astronomical Society of Australia (ASA), 2019–2021

Australian National Institute for Theoretical Astrophysics (ANITA), 2019–2021

Workshops & Special Training

- * **Munich Institute for Astro-, Particle and BioPhysics (MIAPbP) Program *Stellar Astrophysics***, August 2023 (*upcoming*)
- * **KITP Program *Probes of Transport in Stars***, by invitation, October–December 2021
- * MESA Summer School, teaching assistant, August 2021
- * TESS*ninja* 3 data sprint, University of Sydney, Sydney, Australia, February 2020
- * Astrophysics of LIGO/Virgo sources in O3 era, participation by invitation, University of Tokyo IPMU, January 2020
- * MESA developers retreat, Santa Barbara, CA, USA, October 2019
- * Center for Scientific Computing Summer School, Espoo, Finland, Summer 2016
- * MESA Summer School, student, August 2015

Software Development

I am **MESA developer** and **the only junior woman on the team (2 women total)**.

I am the primary author and maintainer of the open-source Python package ^{1D}MESA2HYDRO^{3D}.

I have designed MESA-based exercises for undergraduate astronomy courses and written a range of publicly available visualization tools for stellar structure and evolution and asteroseismic data.

See <https://github.com/mjoyceGR>

Power user of several stellar evolution and related programs: MESA, GYRE, MIST, DSEP, YREC, Phantom

List of Referees

(1) Prof. Brian Chaboyer (PhD adviser)

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