

# Mike Y. M. Lau

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<https://themikelau.github.io/>

Heidelberg Institute for Theoretical Studies  
OzGrav: The ARC Centre of Excellence for Gravitational Wave Discovery

## Education

- Sep 2019 – Mar 2023 **PhD, Monash University**  
Dissertation: *Interactions in Stellar Binaries*, supervised by Ilya Mandel, Daniel J. Price, and Ryosuke Hirai
- Oct 2015 – Jul 2019 **MMathPhys, The University of Oxford**  
Master of Mathematical and Theoretical Physics with First Class in Parts A, B, & C  
Dissertation: *Detecting Double Neutron Stars with LISA*, supervised by Ilya Mandel and Philipp Podsiadlowski

## Research experience

- Sep 2023 – Present **Heidelberg Institute for Theoretical Studies**  
Croucher Research Fellow
- Jan – Jun 2022 **Center for Computational Astrophysics (CCA), Flatiron Institute**  
Research Analyst as part of the CCA Pre-Doctoral Program, supervised by Matteo Cantiello and Adam Jermyn

## Publications

*Published by a peer-reviewed journal* (\*=key publication)

1. González-Bolívar, M., De Marco, O., **Lau, M. Y. M.**, Hirai, R., Price, D. J. *Common envelope binary interaction simulations between a thermally-pulsating AGB star and a low mass companion*. *MNRAS*, 517, 3, p.3181-3199 (2022).
2. **\*Lau, M. Y. M.**, Hirai, R., Price, D. J., Mandel, I. *Common envelopes in massive stars II: The distinct roles of hydrogen and helium recombination*. *MNRAS*, 516, 4, p.4669-4678 (2022).
3. Renzo, M., Zapartas, E., Justham, S., Breivik, K., **Lau, M. Y. M.**, Farmer, R. J., Cantiello, M., Metzger, B. D. *Rejuvenated accretors have less bound envelopes: Impact of Roche lobe overflow on subsequent common envelope events*. *ApJ Letters* (in press, 2022)
4. **\*Lau, M. Y. M.**, Hirai, R., González-Bolívar, M., Price, D. J., De Marco, O., Mandel, I. *Common envelopes in massive stars: Towards the role of radiation pressure and recombination energy in ejecting red supergiant envelopes*. *MNRAS*, 512, 4, p.5462-5480 (2022).
5. Amaro-Seoane, P., et al. (including **Lau, M. Y. M.**). *Astrophysics with the Laser Interferometer Space Antenna*. *Living Reviews in Relativity*, Volume 26, Issue 1, article id.2.
6. Team COMPAS: Riley, J., et al. (including **Lau, M. Y. M.**). *Rapid stellar and binary population synthesis with COMPAS*. *ApJ Supplement*, 258, 2, id.34, p.34 (2022).
7. Team COMPAS: Riley, J., et al. (including **Lau, M. Y. M.**). *COMPAS: A rapid binary population synthesis suite*. *Journal of Open Source Software*, 7, 69, id.3838 (2022).
8. Ackley, K., et al. (including **Lau, M. Y. M.**). *Neutron Star Extreme Matter Observatory: A kilohertz-band gravitational-wave detector in the global network*. *Publications of the Astronomical Society of Australia*, 37, id.e047 (2020).
9. **Lau, M. Y. M.**, Mandel, I., Vigna-Gómez, A., Neijssel, C. J., Stevenson, S., Sesana, A. *Detecting Double Neutron Stars with LISA*. *MNRAS*, 492, 3, p.3061-3072 (2020).

*Submitted to a peer-reviewed journal*

1. **\*Lau, M. Y. M.**, Cantiello, M., Jermyn, A. S., MacLeod, M., Mandel, I., Price, D. J. *Hot Jupiter engulfment by a red giant in 3D hydrodynamics*. Submitted to *MNRAS* (2022; *arXiv:2210.15848*).

## Selected talks

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Mar 2023	Colloquium	ICRAR-Curtin, Perth
Feb 2023	Phantom users workshop 2023 (LOC)	Monash University
Jan 2023	SESTAS meeting	MPA, Garching
Jan 2023	Common envelope group meeting	HITS, Heidelberg
Dec 2022	Gravitational Wave Physics and Astronomy Workshop (GWPAW, <b>invited</b> )	Melbourne
Jun 2022	CCA Predoctoral Program Symposium	CCA, Flatiron Institute
Jun 2022	Physics and Astrophysics of Common Envelope	Los Alamos National Laboratory
Mar 2022	CCA Stars & Compact Objects Group Meeting	CCA, Flatiron Institute
3 Dec 2021	OzGrav Data/Astro Telecon	Virtual
Sep 2021	Common Envelope Physics and Outcomes 2021	Virtual
Jul 2021	ASA Annual Meeting 2021	University of Melbourne
Jul 2021	EAS Annual Meeting 2021	Leiden, virtual
Feb 2021	LISA Workshop ( <b>invited</b> )	University of Auckland, remote
Aug 2020	The 13th International LISA Symposium	University of Auckland, remote
Feb 2020	ANITA workshop and school 2020	UNSW, Canberra
Jan 2020	Gravitational Waves Group Meeting	Cardiff University
Jan 2020	Astrophysics Seminar	University of Birmingham
Dec 2019	2019 Stars in Melbourne	Monash University
Nov 2019	2019 OzGrav Annual Retreat	Lorne, Melbourne
Nov 2019	OzGrav Data/Astro Telecon	Virtual

## Grants & awards

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Apr 2023	Croucher Research Fellowship	Croucher Foundation
Mar 2023	Humboldt Research Fellowship (declined for Croucher Fellowship)	Alexander von Humboldt Foundation
Dec 2022	Max Planck Institute for Astrophysics Fellowship (declined for Croucher Fellowship)	Max Planck Institute for Astrophysics
Q3/4 2021	Lead chief investigator, NCI Astronomy Program computing grant (670 kSU)	AAL Astronomy Supercomputer
Q1/2 2021	Lead chief investigator, NCI Astronomy Program computing grant (544 kSU)	AAL Astronomy Supercomputer
2019 – 2022	J. L. William International PhD Scholarship	Monash University
2019 – 2023	Research Training Program (RTP) Stipend	Monash University
2019 – 2023	Monash International Tuition Scholarship (MITS)	Monash University
Jul 2019	Schools Prize	St Edmund Hall, University of Oxford
2017, 2018	Open Scholarship	St Edmund Hall, University of Oxford
2016	Open Exhibition	St Edmund Hall, University of Oxford
Aug 2015	Hong Kong Scholarship for Excellence (tuition)	Hong Kong Government

## Teaching & supervision

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Nov – Dec 2021	Co-supervisor for summer undergraduate student at Monash University
Feb – Jun 2021	TA for <i>ASP3051 Relativity and Cosmology</i>
Aug – Nov 2020	Tutor for <i>ASP3162 Computational Astrophysics and the Extreme Universe</i> under the Monash University Indigenous Academic Enhancement Program (IAEP)
Aug – Nov 2020	IAEP tutor for <i>ASP3012 Stars and Galaxies</i>
Aug – Sep 2020	Tutor for <i>MCD1180: Introductory Physics</i> under the Monash Indigenous Access Program (MIAP)
Apr – Jun 2020	IAEP tutor for <i>ASP3051 Relativity and Cosmology</i>
Apr – Jun 2020	IAEP tutor for <i>MAT9004 Mathematical Foundations for Data Science</i>
Feb – Jun 2020	TA for <i>ASP1010: Earth to Cosmos—Introductory Astronomy</i>

## Academic service & outreach

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Feb 2023	Local organising committee for 2023 Phantom Users Workshop
Nov 2022	OzGrav Outreach Superstar Award
2022 – Present	Reviewer for Monthly Notices of the Royal Astronomical Society

2022 – Present	Reviewer for The Astrophysical Journal Letters
Oct 2019 – Present	Organiser of weekly Whiteboard Sessions at Monash University
10 Sep 2022	World Science Festival, Ipswich, Queensland
6 Jul 2021	Dark Science holiday programme, Casey Tech School (Berwick)
4 Jul 2021	Black Hole Sunday, TwistED Science Centre, Echuca, Victoria
16 Apr 2021	OzGrav Interactive tech showcase, Bendigo Discovery Science and Technology Centre
1 Dec 2019	Monash Minimizer Faire, Monash University
2018	Founder & organiser of St Edmund Hall Physics Journal Club
Aug 2017 – 2019	Academic and Scholarship Mentor at Project Access HK: Mentorship for talented, under-privileged students in Hong Kong

### Software contributions

- Code development: COMPAS (rapid population synthesis), PHANTOM (smoothed particle hydrodynamics)
- Programming: MATLAB, Fortran, C++, Python