Reinhold Willcox

+32 470720264| reinhold.willcox@kuleuven.be | linkedIn/reinhold-willcox | github/reinhold-willcox

RESEARCH INTERESTS

Binary Stellar Evolution, Rapid Population Synthesis, Supernovae, Pulsars, Statistical & Computational Astrophysics

EDUCATION

PhD. Astrophysics — Melbourne, AU | 2019 - 2023
Monash University — Supervisor: Ilya Mandel
Scholarships: — Dean's International Postgraduate Scholarship |

BSc. Joint Honours Mathematics and Physics — Montreal, QC | 2012 - 2016
McGill University

ACADEMIC EXPERIENCE

POSTDOCTORAL RESEARCHER | KU Leuven — Leuven, BE | 2023 - Current

SELECTED PUBLICATIONS

1. Fishbach, M., Breivik, K., **RW**., van Son, L. A. C. "Where are Gaia's small black holes?". Submitted, arXiv:2508.08986.
2. **RW**, Marchant, P., Vigna-Gómez, et al. "Binarity at LOw Metallicity (BLOeM): Bayesian inference of natal kicks from inert black hole binaries". Astronomy & Astrophysics, Volume 700, August 2025
3. Mandel, I., et al. incl. **RW**. "Rapid stellar and binary population synthesis with COMPAS: methods paper II". Submitted, arXiv:2506.02316.
4. Rauf, L., et al. incl. **RW**. "A trifecta of modelling tools: a Bayesian binary black hole model selection combining population synthesis and galaxy formation models". MNRAS, Volume 534, November 2024.
5. Shenar, T., et al. incl. **RW**. "Binarity at LOw Metallicity (BLOeM): A spectroscopic VLT monitoring survey of massive stars in the SMC". Astronomy & Astrophysics, Volume 690, October 2024.
6. Vigna-Gómez, A., **RW**, Tamborra, I., et al. "Constraints on Neutrino Natal Kicks from Black-Hole Binary VFTS 243". Physical Review Letters, Volume 132, May 2024.
7. **RW**, MacLeod, M., Mandel, I., Hirai, R. "The Impact of Angular Momentum Loss on the Outcomes of Binary Mass Transfer". Astrophysical Journal Letters, Volume 958, December 2023.
8. Romero-Shaw, I., et al. incl. **RW**. "Rapid population synthesis of black hole high-mass X-ray binaries: implications for binary stellar evolution". MNRAS, Volume 524, September 2023.
9. Richards, S. M., et al. incl. **RW**. "New constraints on the Bray conservation-of-momentum natal kick model from multiple distinct observations". MNRAS, Volume 522, July 2023.
10. O'Doherty, T. N., et al. incl. **RW**. "An observationally derived kick distribution for neutron stars in binary systems". MNRAS, Volume 521, May 2023.
11. Stevenson, S., **RW**, Vigna-Gómez, A., Broekgaarden, F. "Wide binary pulsars from electron-capture supernovae". MNRAS, Volume 513, July 2022.
12. Riley, J., Team Compas, et al. incl. **RW**. "Rapid Stellar and Binary Population Synthesis with COMPAS". Astrophysical Journal Supplement Series, Volume 258, February 2022.
13. **RW**, Mandel, I., Thrane, E., et al. "Constraints on Weak Supernova Kicks from Observed Pulsar Velocities". Astrophysical Journal Letters, Volume 920, October 2021.
14. Vigna-Gómez, et al. incl. **RW**. "Fallback Supernova Assembly of Heavy Binary Neutron Stars and Light Black Hole-Neutron Star Pairs and the Common Stellar Ancestry of GW190425 and GW200115". Astrophysical Journal Letters, Volume 920, October 2021.

SELECTED TALKS

IAC GROUP MEETING | Invited — Tenerife, ES | 2025
- "New constraints on black hole natal kicks"

HITS GROUP MEETING | Invited — Heidelberg, DE | 2024
- "New constraints on black hole natal kicks"

MASSIVE STAR MULTIPLICITY CONFERENCE | Contributed — Liege, BE | 2024
- "Systematic mistreatment of mass transfer stability boundaries"

MPA GARCHING GROUP MEETING | Invited — Garching, DE | 2024
- "Systematic mistreatment of mass transfer stability boundaries"

STABLE MASS TRANSFER WORKSHOP | Contributed — NYC | 2024
- "Progenitors of stripped-envelope supernovae as constraints on mass transfer stability"

BELGIAN DUTCH GW MEETING | Contributed — Maastricht, NL | 2023
- "Progenitors of stripped-envelope supernovae as constraints on mass transfer stability"

HARVARD GW GROUP MEETING | Invited — Cambridge, MA | 2022
- "Variations in stripped supernovae and mergers in binary star populations"

HERNQUIST GROUP MEETING | Invited — Cambridge, MA | 2022
- "Variations in stripped supernovae and mergers in binary star populations"

OZGRAV DATA/ASTRO TELECON | Invited — Online | 2021
- "Constraints on Weak Supernova Kicks from Observed Pulsar Velocities"

SEBA GROUP MEETING | Invited — Online | 2021
- "Using high speed pulsar observations to constrain models of supernovae in binary stars"

YITP-OZGRAV JOINT WORKSHOP | Contributed — Online | 2020
- "Limits on ECSN channels from pulsar speed observations"

STARS IN MELBOURNE CONFERENCE | Contributed — Melbourne, AU | 2019
- "Disruptive natal kicks in binary neutron stars"

TEACHING

HIGH ENERGY ASTROPHYSICS | Course lead: GW unit — KU Leuven | 2025

BINARY STARS | Teaching assistant — KU Leuven | 2023

INTRODUCTION TO ASTROPHYSICS | Teaching assistant — Monash University | 2019

ADVANCED CALCULUS FOR ENGINEERS | Teaching assistant — McGill University | 2013

OUTREACH

KU LEUVEN, SUMMER OF SCIENCE | Course lecturer — Leuven, Be | 2024,25
- Introduction to black holes, for high school students

PRINCETON ART COUNCIL | Invited speaker — Princeton, NJ | June 30 '22
- "The Diversity of Color, Size, and Texture of Planets"

CAS SERIES PUBLIC LECTURE | Invited speaker — Melbourne, AU | April 22, '22
- "Friendly stars: current frontiers in our understanding of stellar companions"

OZGRAV OUTREACH PROGRAM | — Swinburne University | 2019 - 2022
- Education and Public Outreach node representative and regular volunteer

PRIOR WORK EXPERIENCE

CITRIX SYSTEMS, INC. | Technical Analyst — Fort Lauderdale, FL | Sep '16 – Jun '17

- Trained as a technical consultant and sales engineer, with emphasis on technical communication.

SKILLS

Software (Proficient): COMPAS (active core developer), Python, Git, Bash, Numpy, Scipy
Software (Intermediate): Julia, C++, Slurm (HPC management), LaTeX
Languages: English (Native), French (Conversational)

REFERENCES

Prof. Ilya Mandel: ilya.mandel@monash.edu
Dr Ryosuke Hirai: ryosuke.hirai@monash.edu