

Dr. Rajika Kuruwita

CONTACT INFORMATION	Heidelberg Institute for Theoretical Studies Schloß-Wolfsbrunnengasse 35 69118 Heidelberg, Germany	Tel: +45 71 68 44 53 E-mail: rajika.kuruwita@h-its.org Website: https://rajikalk.github.io/index.html ORCID: 0000-0002-9236-2919
RESEARCH INTERESTS	Star formation, binary and multiple star systems, protoplanetary disks and planets in binary star systems, MHD simulations, software development.	
EDUCATION	Australian National University , Canberra, Australia February, 2015 - January, 2019 PhD <ul style="list-style-type: none">• Thesis Topic: "The formation, evolution, and survivability of discs around young binary stars"• Primary Supervisor: Associate Professor Christoph Federrath• Secondary Supervisor: Professor Michael Ireland Macquarie University , Sydney, Australia February, 2010 - January, 2015 MRes. Physics and Astronomy <ul style="list-style-type: none">• Thesis Topic: "Fallback disks and the end of the common envelope phase"• Primary Supervisor: Professor Orsola De Marco• Secondary Supervisor: Assistant Professor Jan Staff BSc. Astronomy and Astrophysics	
EMPLOYMENT HISTORY	Heidelberg Institute for Theoretical Studies , Heidelberg, Germany <i>Independent Postdoc Fellow</i> October, 2019 - Present Research the formation of binary and multiple star systems via numerical simulations. University of Copenhagen , Copenhagen, Denmark <i>Post-doctorate researcher (European Union INTERACTIONS fellow)</i> April, 2019 - August, 2022 Investigate protostellar multiplicity and binarity on disk evolution. Australian National University , Canberra, Australia <i>Research Assistant</i> February, 2019 - April, 2019 Research the formation of binary stars systems via simulations. <i>Outreach Assistant</i> December, 2015 - April, 2019 Organise and run outreach observing and site tours for the public, school, scout, and private groups, as well as design activities for the observatory visitor centre. Macquarie University , Sydney, Australia <i>Laboratory Demonstrator</i> February, 2014 - January, 2015 Taught lab experiments for undergraduate students. This also involved marking lab books. <i>Observatory and Planetarium Supervisor</i> February, 2010 - January, 2015 Coordinated groups, created tours and presentations, operated observatory and planetarium. <i>Vacation Scholarship Researcher</i> December, 2012 - February, 2013 Simulated light curves to understand the influence of exoplanets on the asteroseismological pulsation spectrum of stars. <i>Vacation Scholarship Researcher</i> January, 2012 - February, 2012 Carried out research on nanowires using white light interferometry.	

TIME AWARDED	<p>Australian National University 2.3m Telescope</p> <ul style="list-style-type: none"> • PI: Building a Census of Protoplanetary Disks in Binary Star Systems (20 nights over 3 years) <p>LUMI Supercomputer</p> <ul style="list-style-type: none"> • CO-I: Embedded Disks: 24000000 core hours over 12 months <p>PRACE</p> <ul style="list-style-type: none"> • CO-I: Embedded Disks (2021250113): 40000000 core hours over 12 months
SELECTED TALKS	<p>Anton Pannekoek Institute for Astronomy April, 2022 Invited Talk Amsterdam, The Netherlands</p> <p>Distorted Astrophysical Discs May, 2021 Contributed Talk Cambridge, UK</p> <p>Niels Bohr Institute January, 2019 Invited Talk Copenhagen, Denmark</p> <p>Sutherland Astronomical Society Incorporated September, 2018 Invited Talk Sydney, Australia</p> <p>Franco-Australian Astrobiology and Exoplanet School and Workshop December, 2017 Contributed Talk Canberra, Australia</p> <p>Mt Stromlo Students Seminars December, 2016 Contributed Talk (Awarded Best Theme Talk) Canberra, Australia</p> <p>Star Formation August, 2016 Computational Astrophysics splinter session (Invited) Exeter, UK</p>
AWARDS AND HONORS	<ul style="list-style-type: none"> • 2021: Kvinder i Fysik (Danish Women in Physics) Prize 2021 Nominee • 2020: European Union INTERACTIONS Fellowship • 2017: Joan Duffield Research Supplementary Scholarship • 2015: Australian Postgraduate Award • 2013: Macquarie University Research Training Scholarship • 2012: Vacation Scholarship (Macquarie University) • 2011: Vacation Scholarship (Macquarie University)
TEACHING	<p>Computational astrophysics lecturing November, 2019 - 2020 Gave post-graduate level lectures on computational astrophysics reviewing hydrodynamics and modelling shock waves.</p> <p>Laboratory demonstrator February, 2014 - January, 2015 Taught lab experiments for undergraduate students in physics and astronomy. I also marked lab books.</p>
SUPERVISION	<p>Niels Bohr Institute masters students August, 2021 - Present I co-supervised three masters students that worked on producing synthetic observations from my simulations and built a pipeline using machine learning to fit synthetic observations to real observations of young protostars.</p> <p>Niels Bohr Institute bachelors projects February-April, 2021, 2022 Supervised 5 bachelor student groups on projects including modelling exoplanet interiors, and n-body simulations of the solar system and stellar systems.</p> <p>Mt Stromlo Observatory summer research December, 2017 - February, 2018 Co-supervised honours student Isabella Gerard on a research project on turbulent magnetic fields and star formation. I am co-author on the paper published from this project.</p> <p>Mt Stromlo Observatory winter school June-July, 2017 Advised undergraduate students Lara Cullinane, Patrick Armstrong, Joshua Ho and Lillian Guo in planning observations and writing telescope proposals.</p>

- COMPUTER SKILLS
- Computing Languages: Python, Fortran and html
 - Applications: \LaTeX , yt, simulation codes RAMSES, FLASH, DISPATCH and Enzo, analysis of hdf5 files from hydrodynamic simulations, reducing observational data in fits files, retrieving radial velocities.
 - Operating Systems: Unix/Linux, Windows, and Mac.
- OTHER ACADEMIC SERVICES
- Reviewer for Monthly Notices of the Royal Astronomical Society
 - Founded of Astronomy on Tap Copenhagen in 2020.
 - Treasurer of Kvinder i Fysik (the Danish women in physics society) from 2019 to present.
 - Contributed two popular science articles to the Sunday Space in the Canberra Times.
 - Member of the Local Organising Committee for the 2017 Harley Wood Winter School and Annual Scientific Meeting of the Astronomical Society of Australia.
 - Member of the Science Organising Committee for the 2016 Harley Wood Winter School.
 - Chair of the Organising Committee for the 2016 Mt Stromlo Student Seminars.
- REFeree DETAILS
- Associate Professor Troels Haugbølle, Center for Star and Planet Formation, University of Copenhagen, Geology Museum, Øster Voldgade 5-7, 1350 København K, tel: +45 35 32 11 41, email: haugboel@nbi.ku.dk
 - Associate Professor Christoph Federrath, Research School of Astronomy and Astrophysics, Australian National University, Research School of Astronomy & Astrophysics, Mount Stromlo Observatory, Cotter Road, Weston Creek, ACT 2611, tel: +61 2 6125 0217, email: christoph.federrath@anu.edu.au
 - Professor Jes Kristian Jørgensen, Center for Star and Planet Formation, University of Copenhagen, Geology Museum, Øster Voldgade 5-7, 1350 København K, tel: +45 35 32 41 86, email: jeskj@nbi.ku.dk
- REFereed PUBLICATIONS
- Kuruwita & Haugbølle**, *The contribution of core-fragmentation on protostellar multiplicity*, 2022, Astronomy & Astrophysics, *In Review*
- Lead author, and conductor of research and analysis.
- Kuruwita et al.**, *The dependence of episodic accretion on eccentricity during the formation of binary stars*, 2020, Astronomy & Astrophysics, 641, A59
- Lead author, and conductor of research and analysis.
- Kuruwita & Federrath**, *The role of turbulence during the formation of circumbinary disks*, 2019, Monthly Notices of the Royal Astronomical Society, 486, 3647-3663
- Lead author, and conductor of research and analysis.
- Kuruwita et al.**, *Multiplicity of disc-bearing stars in Upper Scorpius and Upper Centaurus-Lupus*, 2018, Monthly Notices of the Royal Astronomical Society, 480, 5099–5112
- Lead author, and conductor of research and analysis.
 - Collected the majority of observations.
- Kuruwita et al.**, *Binary star formation and the outflows from their discs*, 2017, Monthly Notices of the Royal Astronomical Society, 470, 1626-1641
- Lead author, and conductor of research and analysis.
- Kuruwita et al.**, *Considerations on the role of fall-back discs in the final stages of the common envelope binary interaction*, 2016, Monthly Notices of the Royal Astronomical Society, 461, 486-496
- Lead author, and conductor of research and analysis.

Jørgensen, J. & **Kuruwita, R.** et al, *Binarity of a protostar affects the evolution of the disk and planets*, 2021, Nature, Volume 606, Issue 7913, p.272-275

- Lead the theoretical component of paper. Conducted analysis of simulations used for comparison with observations.

Gerrard, I., Federrath, C., & **Kuruwita, R.**, *The role of magnetic field structure in the launching of protostellar jets*, 2019, Monthly Notices of the Royal Astronomical Society, 485, 5532-5542

- Co-supervised Gerrard in running simulations and analysing them

Green et al., *Testing the binary trigger hypothesis in FUors*, 2016, The Astrophysical Journal, 830, 29

- Obtained observational data with Keck and contributed to paper writing.

Childress et al., *The ANU WiFeS SuperNova Programme (AWSNAP)*, 2016, Publications of the Astronomical Society of Australia, 33, 29

- Obtained observational data with Australian National University 2.3m telescope.

Little et al., *Phase-stepping interferometry of GaAs nanowires: Determining nano-wire radius*, 2013, Applied Physical Letters, 103, 161107

- Obtained experimental data with white light interferometry of nanowires.