

Jakub Klencki

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massive stars – binary evolution – gravitational-wave sources

EMPLOYMENT

10/2021 – now	ESO Fellow , European Southern Observatory, Garching bei München	Germany
09/2017 – 10/2017	PhD Candidate Radboud University, Nijmegen	Netherlands

EDUCATION

2017 – 2021	PhD in Astrophysics (Cum Laude) , Radboud University supervisors: Gijs Nelemans, Alina G. Istrate, Onno Pols (<i>4 first-author publications</i>)	Netherlands
2015 – 2017	MSc. in Astronomy , University of Warsaw supervisor: Chris Belczynski (<i>thesis published in MNRAS</i>)	Poland
2012 – 2015	BSc. in Physics , University of Warsaw supervisor: Lukasz Wyrzykowski (<i>thesis published in ActaAstronomica</i>)	Poland

RESEARCH TRAINING

2017 – 2021	PhD research at the Radboud University <i>Evolution of massive binary stars and their fate as gravitational wave sources (detailed 1D stellar models with MESA)</i>	Advisors: Gijs Nelemans Alina Istrate, and Onno Pols
2015 – 2017	Master research at the University of Warsaw <i>Formation of gravitational wave sources and black-hole X-ray binaries, microlensing black holes (population models)</i>	Advisor: Chris Belczynski
2015 – 2016 (25 nights)	Bologna Astronomical Observatory, Loiano <i>Photometric follow-up of Gaia alerts (1.52m telescope), data reduction and calibration (IRAF, SExtractor)</i>	Host: Giuseppe Altavilla PI: Lukasz Wyrzykowski
2016 (2 months)	Internship at Nicolaus Copernicus Astronomical Center <i>Tidal disruption events by intermediate-mass black holes in globular clusters (Monte Carlo cluster models with MOCCA)</i>	Advisor: Mirek Giersz
2014 – 2015	Bachelor research at the University of Warsaw <i>Rapid transient detection in photometric surveys with machine learning (implemented for the OGLE survey)</i>	Advisor: Lukasz Wyrzykowski
2014 (2 months)	Internship at Interdisciplinary Centre for Mathematical and Computational Modelling (ICM Warsaw) <i>Study of quantum vortex reconnection in helium superfluid</i>	Advisor: Miron Kursa

AWARDS, GRANTS, AND SCHOLARSHIPS

2021	ESO Fellowship	
2021	MPA Fellowship (declined)	
2014, 2015	(~200 k€) "Generation of the Future" grant to kick-start a physics students' lab	
2012–2016	(~15 k€) Scholarships from the Ministry of Science and Higher Education, Poland	
2014	5th place at the International Physicists Tournament , EPFL, Lausanne, Switzerland	
2012	International Olympiad on Astronomy and Astrophysics , Rio de Janeiro (bronze medal)	
2011	International Olympiad on Astronomy and Astrophysics , Katowice (honorable mention)	

TEACHING AND SUPERVISING EXPERIENCE

- 2021 – now **Mentor** of Simon Weng, **PhD student** at ESO (Germany) and University of Sydney (Aus)
- 2021 – now **Co-supervisor** of Amedeo Romagnolo, **PhD student** at Nicolaus Copernicus Centre (Poland)
- 2019 – 2020 **Supervisor** of Michelle Wassink, **Master student** at RU (NL) and Monash (Australia)
- 2017 – 2020 **Teaching Assistant**, Faculty of Science, Radboud University, NL
Advanced Stellar and Binary Evolution (Master level), *Gravity and the Cosmos* (Master level),
Nuclear Evolution of the Universe (Bachelor level), *Galaxy Formation and Evolution* (Master level)
- 2012 – 2018 **Volunteer lecturer**, astronomy youth camps by Astronomical Club "Almukantarat", Poland
Multiple different lectures, tutorials, and hand-on sessions for passionate high-school students.
Various topics: general astronomy, stellar astrophysics, gravitational waves, undergraduate physics, etc.

REFEREED PUBLICATIONS

Publication record: 14 papers in refereed journals (A&A, ApJ, MNRAS, A&A), with **>660 citations**, including **6 first-author publication** with **>150 citations**.

First or second authored

1. **Klencki, J.**, Istrate, A. G., Nelemans, G., Pols, O. (2021), A&A accepted
"Partial-envelope stripping and nuclear-timescale mass transfer from evolved supergiants at low metallicity"
2. Blagorodnova, N., **Klencki, J.**, Pejcha, O., Vreeswijk, P. M., Bond, H. E., et al. (2021), A&A, 653, A134
"The luminous red nova AT 2018bwo in NGC 45 and its binary yellow supergiant progenitor"
3. **Klencki, J.**, Nelemans, G., Istrate, A. G., Chruslinska, M. (2021), A&A, 645, A54
"It has to be cool: on supergiant progenitors of binary black hole mergers from common-envelope evolution"
4. **Klencki, J.**, Nelemans, G., Istrate, A. G., Pols, O. (2020), A&A, 638, A55
"Massive donors in interacting binaries: effect of metallicity"
5. Belczynski, K., **Klencki, J.**, Fields, C., Olejak, A., Berti, E., Meynet, G., et al. (2020), A&A, 636, A104
"Evolutionary roads leading to low effective spins, high masses, and O1/O2 rates of LIGO/Virgo binary black holes"
6. **Klencki, J.**, Moe, M., Gladysz, W., Chruslinska, M., Holz, D. E., Belczynski, K. (2018), A&A, 619, A77
"Impact of inter-correlated initial binary parameters on double black hole and neutron star mergers"
7. **Klencki, J.**, Wiktorowicz, G., Gladysz, W., Belczynski, K. (2017), MNRAS, 469, 3088
"Dynamical formation of black-hole low-mass X-ray binaries in the field: an alternative to the common envelope"
8. **Klencki, J.**, Wyrzykowski, L., Kostrzewa-Rutkowska, Z., Udalski, A. (2016), Acta Astronomica, 66, 15
"Robust Filtering of Artifacts in Difference Imaging for Rapid Transients Detection"

Co-authored

1. Vigna-Gómez, A., Wassink, M., **Klencki, J.**, Istrate, A., Nelemans, G., et al. (2022), MNRAS, 511, 2326
"Stellar response after stripping as a model for common-envelope outcomes"
2. Belczynski, K., Romagnolo, A., Olejak, A., **Klencki, J.**, Chattopadhyay, D., et al. (2022), ApJ, 925, 69
"The Uncertain Future of Massive Binaries Obscures the Origin of LIGO/Virgo Sources"
3. Wyrzykowski, L., Mroz, P., Rybicki, K., Gromadzki, M. et al. incl. **Klencki, J.** (2020), A&A, 633, A98
"Full orbital solution for the binary system in the northern Galactic disc microlensing event Gaia16aye"
4. Wiktorowicz, G., Wyrzykowski, L., Chruslinska, M., **Klencki, J.**, Rybicki, K., et al. (2019), ApJ, 885, 1
"Populations of Stellar-mass Black Holes from Binary Systems"
5. Rybicki, K., Wyrzykowski, L., **Klencki, J.**, de Bruijne, J., et al. (2018), MNRAS, 476, 2013
"On the accuracy of mass measurement for microlensing black holes as seen by Gaia and OGLE"
6. Chruslinska, M., Belczynski, K., **Klencki, J.**, Benacquista, M. (2018), MNRAS, 474, 2937
"Double neutron stars: merger rates revisited"

Conference proceedings

1. **Klencki, J.**, Nelemans, G. (2019), IAU Proceedings, 346, 417
"High mass X-ray binaries as progenitors of gravitational wave sources"
2. **Klencki, J.**, Wyrzykowski, L. (2016), Proceedings of the Polish Astronomical Society, 3, 56
"Real-time detection of transients in OGLE-IV with application of machine learning"

CONFERENCE CONTRIBUTIONS

- 2021 Jul **Contributed Talk**, IAU Symposium 361 Massive Stars Near and Far Virtual Preview Meeting
- 2020 Jul **Contributed Talk**, European Astronomical Society Meeting, "Gravitational waves" Leiden, NL (online)
- 2020 Jul **Contributed Talk**, European Astronomical Society Meeting, "Common envelope" Leiden, NL (online)
- 2020 Jan **Invited Talk**, Astrophysics of LIGO/Virgo sources in O3 era Workshop, Tokyo, Japan
- 2020 Jan **Invited Talk**, 16th Rencontres du Vietnam Conference, Quy Nhon, Vietnam
- 2019 Oct **Poster**, Yukawa International Seminar 2019, Kyoto, Japan
- 2019 Sep **Contributed Talk**, Astrophysics with GW detections Workshop, Warsaw, Poland
- 2019 May **Contributed Talk**, The 74th Dutch Astronomers' Conference, Groningen, NL
- 2018 Oct **Contributed Talk**, NOVA Fall School, Dwingeloo/ASTRON, NL
- 2018 Aug **Contributed Talk**, IAU Symposium 346, "High-mass X-ray binaries", Vienna, Austria
- 2018 May **Poster**, The 73th Dutch Astronomers' Conference, Groningen, NL
- 2017 Jul **Contributed Talk**, The Impact of Binaries on Stellar Evolution Conference, ESO Garching, Germany
- 2016 Jul **Poster**, Binary Stars in Cambridge 2016 Conference, Cambridge, UK
- 2015 Sep **Poster**, 37th Polish Astronomical Society Assembly, Poznan, Poland

INVITED SEMINARS/COLLOQUIA

- 2022 Jun (scheduled) MPA Seminar at **Max Planck Institute for Astrophysics**, Germany
- 2022 May (scheduled) Lunch Seminar at **Carnegie Observatories**, USA
- 2022 Mar Colloquium at **Nicolaus Copernicus Astronomical Center**, Poland
- 2022 Mar Seminar at Theoretical High Energy Astrophysics group, **Columbia University**, USA
- 2022 Feb Informal visit seminar at Stellar Astrophysics group meeting, **University of Bonn**, Germany
- 2021 Feb Seminar at CCA Stars & Compact Objects meeting, **CCA, Flatiron Institute**, USA
- 2021 Jan Informal visit talk at Stellar Astrophysics group meeting, **KU Leuven**, Belgium
- 2020 Oct Stellar-astrophysics colloquium, **Gevena observatory**, Switzerland
- 2020 Sep Seminar talk, Institute for Physics and Astronomy, **University of Potsdam**, Germany
- 2020 Jun Informal seminar, **Team COMPAS research group** meeting, Monash, Australia

SCHOOLS

- 2018 Oct NOVA Fall School, Dwingeloo/ASTRON, Netherlands (1 week)
- 2018 Jul "Summer school of gravitational waves", Les Houches, France (4 weeks)

OUTREACH AND OTHER ACTIVITIES

- 2022 (in progress) co-organizer and supervisor at **Summer Research Programme**, ESO, Garching
- 2022 **Outreach talks** for visitors at ESO Supernova Center, Garching
- 2022 **LOC/SOC**, MESA Tutorial sessions, ESO, Garching
- 2011–now **Journal club** organizer, ESO Garching
- 2019 **Co-organizer**, Dutch Astronomy Olympiad, Nijmegen, NL
- 2018–2019 **Volunteer** at outreach activities in Nijmegen (popular talks, stargazing, children festival, etc.)
- 2014–2016 **Presenter** at Science Picnics of Polish Radio and Copernicus Science Center, Warsaw, PL
- 2014–2015 **Co-founder** of Physics Students' Lab at the University of Warsaw (**~200 k€ in grants**), PL
- 2015 **Organizer**, nation-wide Conference of Students Astronomical Societies, Izera Dark-Sky Park, PL
- 2012–2018 **Co-organizer**, astronomy youth camps by "Almukantarat" Astronomical Club, PL
- 2015 **Outreach talks** at I LO (high school) & children summer schools, PL

Codes:

- **MESA**: 1D stellar evolution code (<http://mesa.sourceforge.net/>) open-sourced, actively developed. Extensive experience (**Klencki+2019,2020,2021a,2021b**). Numerous collaborators in the MESA community.
- **StarTrack**: binary population synthesis code (Belczynski+2002,2008), optimized for massive binaries and gravitational-wave sources. Extensive experience in usage and development (**Klencki+2017,2018**).
- **Starburst99**: spectral synthesis code for star-forming galaxies (<https://www.stsci.edu/science/starburst99/docs/default.html>) Limited experience (**Klencki+2018**).
- **FEWBODY**: toolkit for small-N gravitational dynamics (Fregeau+2004) Good knowledge (**Klencki+2017**).
- **MOCCA**: stellar cluster Monte Carlo simulator (<https://moccacode.net/>) Limited experience, in collaboration with main developers (Klencki et al. in prep).

Languages: Python, C/C++, Fortran

REFERENCES

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