MichałBejger

Scientific areas

Data analysis and detection of gravitational waves, machine learning, dense matter equation of state, numerical simulations of relativistic compact objects, high-performance computing

Contact

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Languages (CERF scale)

English (C2), German (B2), Italian (A2)

Bibliometry

(21 February 2026)
Citations: 101118
h: 104
SAO/NASA ADS

Education

2013	**Habilitation** *"Astrophysical parameters of neutron stars as tests of the dense matter properties"* (25.10.2013)	Nicolaus Copernicus Astronomical Center, PAS
2001–2005	**PhD** in physics (astrophysics) *"Neutron stars dynamics and the equation of state of dense matter"*. Supervisor: Paweł Haensel (16.06.2005; with distinction from the NCAC Scientific Council).	Nicolaus Copernicus Astronomical Center, PAS
1996–2001	**Master** of Science	Warsaw University, Faculty of Physics

Positions

2021–present	**Associate professor**	Istituto Nazionale di Fisica Nucleare, Ferrara, Italy
2014–present	**Associate professor**	Nicolaus Copernicus Astronomical Center, PAS, Warsaw, Poland
2018–2019	**Researcher**	AstroParticule et Cosmologie (APC), CNRS, Paris, France
2008–2014	**Assistant professor**	Nicolaus Copernicus Astronomical Center, PAS, Warsaw, Poland
2007–2008	**Post-doc**	Nicolaus Copernicus Astronomical Center, PAS, Warsaw, Poland
2006-2007	**Marie Currie Fellow post-doc**	Observatoire de Paris, LUTH, Paris-Meudon, France

Fellowships and awards

10.10.2016	W. Rubinowicz Science Prize from Polish Physical Society for the discovery of gravitational waves
04.05.2016	Gruber Cosmology Prize, Gruber Prize foundation, for the discovery of gravitational waves
02.05.2016	Special Breakthrough Prize in fundamental physics for the authors of the first direct detection of gravitational waves
15.03.2016	Nicolaus Copernicus Medal of the Polish Academy of Sciences (for members of the Virgo-POLGRAW team)
09–11.2015	DAAD Research Stay for University Academics and Scientists (Steinbuch Centre for Computing, Karlsruhe Institute of Technology, Germany)
04.2008–03.2011	Marie Curie Re-integration Fellowship (NCAC, Warsaw, Poland)
03.2006–08.2007	Marie Curie Intra-European Fellowship (LUTH, Paris, France)

Peer review service

AAS & APS journals (ApJ, ApJ, Phys. Rev. D, Phys. Rev. Lett.), MNRAS, A&A, EPJA, MLST, General Relativity and Gravitation, NWA

Institutional responsibilities

2014–2018: Proceedings of the Polish Astronomical Society editor

2009–2021: Member of the Scientific Council, NCAC

2008–2012: Institute Journal Club host, NCAC

Invited talks

29.10.2025	CoCoNuT meeting, Strassbourg, France, "Machine learning applications to gravitational wave data analysis"
21.02.2025	PAIP Warsaw 2025, "LIGO-Virgo-KAGRA gravitational-wave sources and observational results"
09.01.2025	TMEX Vietnam 2025, "LIGO-Virgo-KAGRA gravitational-wave sources and observational results"
16.09.2024	GEMMA2, Rome, Italy, "LIGO-Virgo-KAGRA gravitational-wave sources and observational results"
09.01.2023	TMEX Vietnam 2023, "Dense-matter equation of state from GW observations"
24-10-2022	From holography to machine learning, Helsinki Finland, "Machine learning methods in gravitational wave astrophysics"
05-10-2022	3rd Gravi-Gamma Workshop, Volterra Italy, "Continuous GWs from known and unknown sources: O3 observations and beyond"
23.11.2021	Cortona TNPI2021, "Unraveling the character of possible dense-matter state transition from neutron stars observations", Pisa Italy (online)
07.07.2021	Marcel Grossman MG16, "Search for gravitational waves from r-mode oscillations in PSR J0537–6910", on behalf of the LIGO-Virgo-KAGRA Collaboration and NICER Team, (online)

Leader roles in research grants

2021–present	LIGO-Virgo-KAGRA Collaboration data analysis (Continuous Waves) working group co-chair
2021–present	Einstein Telescope Observation Science Board division 9 coordinator
2024-2026	Local PI at NCAC in "Virgo-PL: Polish contribution to Virgo gravitational-wave observatory", Ministry of Science and Higher Education project (2023/WK/13 (anex 2024/WK/03))
2024-2028	Local PI at NCAC in "Science with Gravitational Waves in the Era of LIGO-Virgo-KAGRA Discoveries" OPUS project, funding NCN (2023/49/B/ST9/02777)
10.2023-02.2026	Local PI (INFN Ferrara) in "Model discovery in the complex parameter space of unmodeled gravitational waveform reconstructions", funding MUR, PRIN 202275HT58
2022-2027	PI at NCAC in "Calm before the storm: rethinking the gravitational-wave analysis toolbox in the face of future challenges" OPUS project, funding NCN (2021/43/B/ST9/01714)
2018-2023	Management Committee Member and Work Group Leader in the COST Action "A network for Gravitational Waves, Geophysics and Machine Learning", funding: EU Horizon2020 (COST Action CA17137)
2018–2022	PI at NCAC in "Gravitational-wave astronomy: participation of the Polgraw group in Advanced Virgo and Advanced LIGO projects" HARMONIA project, funding: NCN (2017/26/M/ST9/00978)
2017–2022	PI in "Transient gravitational waves from neutron stars: models and data analysis" SONATA BIS project, funding: NCN (2016/22/E/ST9/00037)

10 recent selected publications

"Dynamical Tides in Neutron Stars with First-Order Phase Transitions: The Role of the Discontinuity Mode", Pereira, Jonas P., Lucas Tonetto, Michał Bejger, J. Leszek Zdunik, and Paweł Haensel

Phys. Rev. Lett. *135.23, 231401 (Dec. 2025) p. 231401. 2025 (arXiv: 2504.16911 (astro-ph.HE))*

"Microlensing of long-duration gravitational wave signals originating from Galactic sources", Suyamprakasam, Sudhagar, Sreekanth Harikumar, Paweł Cieciel g, Przemysław Figura, Michał Bejger, and Marek Biesiada

Phys. Rev. D *112.12, 124019 (Dec. 2025) p. 124019. 2025 (arXiv: 2503.21845 (gr-qc))*

"APRIL: Auxiliary Physically-Redundant Information in Loss - A physics-informed framework for parameter estimation with a gravitational-wave case study", Scialpi, Matteo, Francesco Di Clemente, Leigh Smith, and Michał Bejger

arXiv e-prints*, arXiv:2510.13677 (Oct. 2025) arXiv:2510.13677. 2025 (arXiv: 2510.13677 (gr-qc))*

"Neural posterior estimation of neutron star equations of state", Carvalho, Valéria, Márcio Ferreira, Michał Bejger, and Constança Providência

Phys. Rev. D *112.8, 083044 (Oct. 2025) p. 083044. 2025 (arXiv: 2507.23506 (nucl-th))*

"Approximating neutron-star radii using gravitational-wave only measurements with symbolic regression", Bejger, M.

Phys. Rev. D *112.2, 023044 (July 2025) p. 023044. 2025 (arXiv: 2504.19962 (gr-qc))*

"Explainable autoencoder for neutron star dense matter parameter estimation", Di Clemente, Francesco, Matteo Scialpi, and Michał Bejger

Machine Learning: Science and Technology *6.2, 025044 (June 2025) p. 025044. 2025 (arXiv: 2501.15222 (physics.comp-ph))*

"The Science of the Einstein Telescope", Abac, Adrian et al.

arXiv e-prints*, arXiv:2503.12263 (Mar. 2025) arXiv:2503.12263. 2025 (arXiv: 2503.12263 (gr-qc))*

"Conditional variational autoencoder inference of neutron star equation of state from astrophysical observations", Ferreira, Márcio and Michał Bejger

Phys. Rev. D *111.2, 023035 (Jan. 2025) p. 023035. 2025 (arXiv: 2403.14266 (nucl-th))*

"Neural network time-series classifiers for gravitational-wave searches in single-detector periods", Trovato, A., E. Chassande-Mottin, M. Bejger, R. Flamary, and N. Courty

Classical and Quantum Gravity *41.12, 125003 (June 2024) p. 125003. 2024 (arXiv: 2307.09268 (gr-qc))*

"Detecting the third family of compact stars with normalizing flows", Carvalho, Valéria, Márcio Ferreira, Constança Providência, and Michał Bejger

Phys. Rev. D *109.10, 103032 (May 2024) p. 103032. 2024 (arXiv: 2403.09398 (nucl-th))*

Software projects

PolgrawAllSky
Data-analysis pipeline, implementing the network-of-detectors time-domain $\mathcal{F}$-statistic method search for almost monochromatic gravitational wave signals (github.com/mbejger/polgraw-allsky)

SageManifolds
Contribution to the free and open source computer algebra system *SageMath* (www.sagemath.org) with the implementation of the differential geometry and symbolic tensor calculus package *SageManifolds* (sagemanifolds.obspm.fr)

Teaching

27.10.20–09.02.21	Gravitational waves, monograph lecture at Nicolaus Copernicus Center, winter semester 2020/21, Warsaw, Poland
8–22.07.17	4th Cosmology School: Introduction to cosmology lecturer, "Cosmology with Gravitational Waves", Kraków, Poland
17.07.17	Helmholtz International Summer School "Nuclear theory and astrophysical applications" lecturer, "Gravitational waves from neutron stars in the era of Advanced LIGO and Advanced Virgo detectors", Dubna, Russia
24–28.10.16	Fifth GraWIToN School (GW Initial Training Network) lecturer, "Computational aspects of continuous wave data analysis and its optimization", Rome, Italy
Spring 14	Monographic lecture for graduate students *"Relativistic Astrophysics and Related Computational Methods"* (https://users.camk.edu.pl/bejger/lectures)
2015–	Supervision of theses: PhD - 6, master - 1, bachelor - 1

Popularization of science

2011–2023	Astronomy editor at the "Delta" monthly magazine, aimed at the high-school and pre-graduate students interested in mathematics, computer science, physics and astronomy (in Polish: journal author's website)
see also	Scientific outreach site for the list of texts and recordings
2015–2021	Polgraw-Virgo Collaboration outreach representative

Organization of scientific meetings

24–26.09.2020	Conference of the Polish Society on Relativity (Polskie Towarzystwo Relatywistyczne, SOC, 194 participants online)
2–5.09.2019	LIGO-Virgo Collaboration meeting, Warsaw, Poland (LOC, 250 participants)
26–28.03.2018	POLNS18, Warsaw, Poland (SOC & LOC, 57 participants)
27–31.03.2017	Annual NewCompStar Conference 2017, Warsaw, Poland (SOC & LOC, 150 participants)

Collaborations and memberships

2021–present	Member of the Einstein Telescope Observational Science Board
2011–present	Member of the Virgo gravitational-wave detector project and the LIGO-Virgo collaboration
2013–2017	Polish Einstein Telescope design & study team
2015–present	International Astronomical Union
2016–present	Polish Astronomical Society