

Milan Pešta

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RESEARCH PROFILE

I hold a PhD in astrophysics and a master's degree in theoretical physics. In my research, I integrate LLM agents into citizen science projects and design agentic active learning frameworks for anomaly detection in astronomical datasets. I also study contact binary stars and work on identifying dormant black holes in binaries with luminous companions. Previously, I used numerical methods to study horizons surrounding singular ring sources in general-relativistic spacetimes.

RESEARCH POSITIONS

Apr 2025 – present	Czech Science Foundation Fellow Department of Astronomy, The Ohio State University, Columbus, OH, USA
Apr 2025 – present	CCAPP Affiliate Fellow Center for Cosmology and AstroParticle Physics, The Ohio State University, Columbus, OH, USA
Oct 2024 – Mar 2025	Postdoctoral Researcher Institute of Theoretical Physics, Charles University, Prague, Czech Republic

EDUCATION

Oct 2020 – Sep 2024	PhD in Astrophysics Charles University, Prague, Czech Republic <i>Thesis:</i> Illuminating binary star evolution with observed populations and theoretical modeling <i>Advisor:</i> Ondřej Pejcha
Oct 2016 – Mar 2019	Master's in Theoretical Physics Charles University, Prague, Czech Republic <i>Thesis:</i> Space-times of ring sources
Oct 2013 – Jun 2016	Bachelor's in Physics Charles University, Prague, Czech Republic <i>Thesis:</i> Space-times with toroidal horizons

PUBLICATIONS

1. **Pešta, M.**, Ting, Y.-S., 2026, “Agentic Active Learning Meets Visual Embeddings: Finding Anomalies among 370 000 Variable Stars from ASAS-SN”, submitted to ApJ, [arXiv:2608.23688](https://arxiv.org/abs/2608.23688)
2. **Pešta, M.**, Pejcha, O., 2025, “Distinguishing between light curves of ellipsoidal variables with massive dark companions, contact binaries, and semidetached binaries using principal component analysis”, [A&A](#), **696**, A16
3. **Pešta, M.**, Pejcha, O., 2023, “Mass-ratio distribution of contact binary stars”, [A&A](#), **672**, A176
4. Pejcha, O., Cagaš, P., Landri, C., Fausnaugh, M. M., De Rosa, G., Prieto, J. L., Henzl, Z., **Pešta, M.**, 2022, “The complex dynamical past and future of double eclipsing binary CzeV343: Misaligned orbits and period resonance”, [A&A](#), **667**, A53
5. Korth, J., Moharana, A., **Pešta, M.**, Czavalinga, D. R., Conroy, K. E., 2021, “Consequences of parameterization choice on eclipsing binary light curve solutions”, [CAOSP](#), **51**, 58–67

FUNDING & FELLOWSHIPS

Apr 2025 – Mar 2028	Czech Science Foundation Postdoc Individual Fellowship (~260 000 EUR) Host institutions: The Ohio State University and Charles University
2025 – 2027	MSCA COFUND SMASH Fellowship (~150 000 EUR • declined) Host institution: University of Nova Gorica

Apr 2024	Charles University Mobility Fund (~800 EUR) Travel award supporting a research visit to the Australian National University
Mar 2017 – Sep 2018	Charles University Grant Agency (~3 500 EUR • co-investigator) Student research grant supporting a project on numerical studies of black-hole space-times

RESEARCH STAYS

Apr 2024 (1 month)	Australian National University Research School of Astronomy and Astrophysics, Canberra, Australia Host: Yuan-Sen Ting
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TALKS

INVITED

Jun 2026	<i>Agent ASAS-SN: Replicating Citizen Science Variable Star Classification with LLM Agents</i> , Zooniverse Seminar, online
May 2026	<i>Finding Anomalies among 370 000 ASAS-SN Variable Stars Using Visual Embeddings and Agent-Driven Active Learning</i> , Cosmology & ML Meeting, Center for Computational Astrophysics, Flatiron Institute, NY, USA
Apr 2026	<i>Agent ASAS-SN: License to Classify</i> , Chalk Talk, The SkAI Institute, Northwestern University, Chicago, IL, USA
Apr 2026	<i>AI³: Agent-Driven Identification of Anomalies in ASAS-SN</i> , Research at Noon, The SkAI Institute, Northwestern University, Chicago, IL, USA
Oct 2024	<i>Revealing Patterns in Close Binary Light Curves: From Darwin Instability to Dark Companions</i> , Astronomical Seminar, Masaryk University, Brno, Czech Republic
Apr 2024	<i>Utilizing Low-Dimensional Representations in the Analysis of Close Binary Light Curves</i> , Astronomical Seminar, Australian National University, Mount Stromlo Observatory, Australia

CONTRIBUTED

Jun 2026	<i>Anomaly Detection in ASAS-SN Using Visual Embeddings and Agent-Driven Active Learning</i> , AstroAI Workshop 2026, Center for Astrophysics Harvard & Smithsonian, Cambridge, MA, USA
Sep 2025	<i>Toward the detection of massive dark companions in photometric surveys using GPR and PCA</i> , CCAPP Fellows Symposium 2025, The Ohio State University, Columbus, OH, USA
Sep 2024	<i>Inferring the minimum mass ratio of contact binary stars with data from Kepler</i> , International Conference: Binary and Multiple Stars in the Era of Big Sky Surveys, Litomyšl, Czech Republic
Mar 2024	<i>Low-Mass Contact Binaries: Laboratories for Studying Mass Transfer, Tidal Instabilities, and Angular Momentum Loss</i> , Workshop on Stable Mass Transfer in Binaries: from onset to remnants, Center for Computational Astrophysics, NY, USA
Jul 2023	<i>Signature of the Darwin instability in the populations of contact binary stars from TESS and Gaia DR3</i> , European Astronomical Society Annual Meeting, Krakow, Poland
Nov 2022	<i>Minimum mass ratio of contact binary stars</i> , The Impact of Binaries on Stellar Evolution Workshop, Garching, Germany
Jun 2022	<i>Mass-ratio distribution of contact binary stars</i> , European Astronomical Society Annual Meeting, Valencia, Spain

SERVICE

Journal Referee	<i>Astronomy & Astrophysics (A&A)</i> • <i>The Open Journal of Astrophysics (OJA)</i>
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SUMMER SCHOOLS & TRAINING

2023	Summer School in Statistics for Astronomers XVIII Center for Astrostatistics, The Pennsylvania State University
2021	NBIA Summer School on Gravitational Wave Astrophysics Niels Bohr International Academy, The University of Copenhagen • Online
2020	Gaia & TESS: Tools for Understanding the Local Universe Department of Theoretical Physics and Astrophysics, Masaryk University • Online
2019	Machine Learning Coursera • Online

SKILLS & LANGUAGES

Programming	Python, SQL, $\text{\LaTeX}$
Languages	Slovak, English