



Rutger (R.) van Haasteren

Gravitational-Wave research and Data Science

Research Interests

- GW Science:** LISA data analysis, Pulsar Timing Array science, 3rd gen detectors
Data Analysis: Time series analysis, Bayesian data analysis, algorithmic development, machine learning, statistics, and sampling methods.

Positions

- 2022–present **Group Leader**, *Albert Einstein Institute*, Hannover, Germany
2021–2022 **Owner**, *Artifacto (e-commerce)*, The Hague, Netherlands
2016–2021 **Senior Data Scientist**, *Microsoft Corporation*, Redmond, WA, USA
2013–2016 **Einstein Postdoctoral Fellow**, *NASA's Jet Propulsion Laboratory / Caltech*, Pasadena, CA, USA
2011–2013 **Postdoctoral Fellow**, *Albert Einstein Institute*, Hannover, Germany

Education

- 2007–2011 **Ph.D. in Astrophysics**, *Leiden Observatory, Leiden University*, Leiden, The Netherlands, *Dissertation: "Gravitational Wave Detection and Data Analysis for Pulsar Timing Arrays"*
Advisor: Yuri Levin
2001–2007 **M.Sc. in Theoretical Physics**, *Lorentz Institute, Leiden University*, Leiden, The Netherlands, *Thesis: Topics in Data Analysis and Pulsar Timing*
Advisor: Yuri Levin

Awards & Honors

- 2018 Microsoft Data Driven impact award
2013 Einstein Fellowship (NASA JPL/Caltech)
2013 Hubble Fellowship (declined)
2011 GWIC Thesis Prize (first awarded to pulsar timing research)
2011 Stefano Braccini Prize (Honourable mention)

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Service & Committees

- Journal Nature, MNRAS, Phys. Rev. (D, E, Letters), ApJ
Reviews
Lecturer Various (summer) schools and lecture weeks(2013–2022)
Organizing Science Organizing Committee for IPTA meetings (2013, 2014)
Committees GWIC thesis prize committee (2025, chair)

Teaching Experience

- 2022–2025 **PhD Supervisor / Lecturer**, *Albert Einstein Institute*, Hannover, Germany, Supervisor for three PhD students—taught one full lecture series for the institute
2007–2011 **Teaching Assistant**, *Leiden University*, Leiden, The Netherlands, Undergraduate/graduate astrophysics courses (e.g., data reduction)
2004–2006 **Student Teaching Assistant**, *Leiden University*, Leiden, The Netherlands, Undergraduate physics courses (e.g., Advanced Classical Mechanics)
2002–2007 **Mathematics Lecturer**, *Stichting Studiebegeleiding Leiden*, Leiden, The Netherlands, High school crash courses and substitute teaching
2004–2007 **High School Tutor**, *Descartes Onderwijsbegeleiding*, Leiden, The Netherlands, Natural sciences tutoring

Conference Presentations

Invited and contributed talks at major meetings including the IPTA and NANOGrav conferences, the 9th LISA Symposium (Paris), Amaldi, and various international workshops in Japan, USA, Canada, and Australia.

References

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|--------------------|-------------------------------------|-------------------------------|
| Bruce Allen | Director, Albert Einstein Institute | email: bruce.allen@aei.mpg.de |
| Michele Vallisneri | Professor, ETH Zurich | email: mvallisneri@ethz.ch |
| Neil Cornish | Professor, Montana State Univ. | email: neilcornish@gmail.com |

Selected Publications

- [1] Serena Valtolina and Rutger van Haasteren. *Regularizing the Pulsar Timing Array Likelihood: A Path towards Fourier Space*. Dec. 2024. DOI: 10.48550/arXiv.2412.11894. arXiv: 2412.11894 [astro-ph]. (Visited on 03/21/2025).
- [2] Rutger van Haasteren. “Use Model Averaging Instead of Model Selection in Pulsar Timing”. In: *Monthly Notices of the Royal Astronomical Society: Letters* 537.1 (Feb. 2025), pp. L1–L6. ISSN: 1745-3925. DOI: 10.1093/mnrasl/slae108. (Visited on 03/21/2025).
- [3] Rutger van Haasteren. “Pulsar Timing Arrays Require Hierarchical Models”. In: *ApJS* 273.2 (July 2024), p. 23. ISSN: 0067-0049. DOI: 10.3847/1538-4365/ad530f. (Visited on 08/07/2024).
- [4] Rutger van Haasteren and Yuri Levin. “Understanding and Analysing Time-Correlated Stochastic Signals in Pulsar Timing”. In: *Monthly Notices of the Royal Astronomical Society* 428.2 (Jan. 2013), pp. 1147–1159. ISSN: 1365-2966, 0035-8711. DOI: 10.1093/mnras/sts097. (Visited on 09/06/2022).
- [5] Michele Vallisneri and Rutger van Haasteren. “Taming Outliers in Pulsar-Timing Data Sets with Hierarchical Likelihoods and Hamiltonian Sampling”. In: *Monthly Notices of the Royal Astronomical Society* 466.4 (May 2017), pp. 4954–4959. ISSN: 0035-8711. DOI: 10.1093/mnras/stx069. (Visited on 09/15/2022).
- [6] Rutger van Haasteren and Michele Vallisneri. “Low-Rank Approximations for Large Stationary Covariance Matrices, as Used in the Bayesian and Generalized-Least-Squares Analysis of Pulsar-Timing Data”. In: *Monthly Notices of the Royal Astronomical Society* 446.2 (Jan. 2015), pp. 1170–1174. ISSN: 0035-8711. DOI: 10.1093/mnras/stu2157. (Visited on 09/15/2022).
- [7] Rutger van Haasteren and Yuri Levin. “Gravitational-Wave Memory and Pulsar Timing Arrays”. In: *Monthly Notices of the Royal Astronomical Society* 401.4 (Feb. 2010), pp. 2372–2378. ISSN: 0035-8711. DOI: 10.1111/j.1365-2966.2009.15885.x. (Visited on 09/06/2022).
- [8] Rutger van Haasteren. “Accelerating Pulsar Timing Data Analysis”. In: *Monthly Notices of the Royal Astronomical Society* 429.1 (Feb. 2013), pp. 55–62. ISSN: 1365-2966, 0035-8711. DOI: 10.1093/mnras/sts308. (Visited on 09/06/2022).
- [9] Neil J. Cornish and Rutger van Haasteren. *Mapping the Nano-Hertz Gravitational Wave Sky*. June 2014. DOI: 10.48550/arXiv.1406.4511. arXiv: 1406.4511 [astro-ph, physics:gr-qc]. (Visited on 09/06/2022).
- [10] Rutger van Haasteren, Yuri Levin, Patrick McDonald, and Tingting Lu. “On Measuring the Gravitational-Wave Background Using Pulsar Timing Arrays”. In: *Monthly Notices of the Royal Astronomical Society* 395.2 (May 2009), pp. 1005–1014. ISSN: 0035-8711. DOI: 10.1111/j.1365-2966.2009.14590.x. (Visited on 09/06/2022).
- [11] Rutger van Haasteren and Michele Vallisneri. “New Advances in the Gaussian-process Approach to Pulsar-Timing Data Analysis”. In: *Phys. Rev. D* 90.10 (Nov. 2014), p. 104012. DOI: 10.1103/PhysRevD.90.104012. (Visited on 09/15/2022).
- [12] R. van Haasteren, Y. Levin, G. H. Janssen, K. Lazaridis, M. Kramer, et al. “Placing Limits on the Stochastic Gravitational-Wave Background Using European Pulsar Timing Array Data”. In: *Monthly Notices of the Royal Astronomical Society* 414.4 (July 2011), pp. 3117–3128. ISSN: 0035-8711. DOI: 10.1111/j.1365-2966.2011.18613.x. (Visited on 09/06/2022).

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