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**The gravitational billion body problem : Het miljard deeltjes probleem**  
Bédorf, J.

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# List of publications

## Journal Papers

- R. G. Belleman, **J. Bédorf**, and S. F. Portegies Zwart. High performance direct gravitational N-body simulations on graphics processing units II: An implementation in CUDA. *New Astronomy*, 13:103–112, February 2008. doi10.1016/j.newast.2007.07.004.
- **J. Bédorf**, E. Gaburov, and S. Portegies Zwart. A sparse octree gravitational N-body code that runs entirely on the GPU processor. *Journal of Computational Physics*, 231:2825–2839, April 2012. doi10.1016/j.jcp.2011.12.024.
- **J. Bédorf** and S. Portegies Zwart. The effect of many minor mergers on the size growth of compact quiescent galaxies. *MNRAS*, 431:767–780, May 2013. doi10.1093/mnras/stt208.
- **J. Bédorf**, E. Gaburov, K. Nitadori, M.S. Fujii, T. Ishiyama and S. Portegies Zwart. How to simulate the Milky Way Galaxy on a star-by-star basis. *New Astronomy*, submitted.
- S. Portegies Zwart and **J. Bédorf**. Computational Gravitational Dynamics with Modern Numerical Accelerators. *Computer*, submitted.
- **J. Bédorf**, E. Gaburov and S. Portegies Zwart. Sapporo2: A versatile direct  $N$ -body library. *Computational Astrophysics and Cosmology*, submitted.

## Peer-reviewed Conference Proceedings

- E. Gaburov, **J. Bédorf**, and S. Portegies Zwart. Gravitational Tree-Code on Graphics Processing Units: Implementation in CUDA. In *International Conference on Computational Science 2010*. Elsevier, 2010.
- **J. Bédorf** and S. Portegies Zwart. A pilgrimage to gravity on GPUs. *European Physical Journal Special Topics*, 210:201–216, August 2012. doi10.1140/epjst/e2012-1647-6.



- **J. Bédorf**, E. Gaburov, M.S. Fujii, K. Nitadori, T. Ishiyama and S. Portegies Zwart. 24.77 Pflops on a Gravitational Tree-Code to Simulate the Milky Way Galaxy with 18600 GPUs. *SC'14 Proceedings of the International Conference on High Performance Computing, Networking, Storage and Analysis*, ACM, 2014.

## Conference Proceedings

- **J. Bédorf**, E. Gaburov, and S. Portegies Zwart. Bonsai: A GPU Tree-Code. In R. Capuzzo-Dolcetta, M. Limongi, and A. Tornambè, editors, *Advances in Computational Astrophysics: Methods, Tools, and Outcome*, volume 453 of *Astronomical Society of the Pacific Conference Series*, page 325, July 2012.
- **J. Bédorf** and S. Portegies Zwart. Parallel gravity: From embarrassingly parallel to hierarchical. In *Proceedings of the 2012 Workshop on High-Performance Computing for Astronomy Data*, Astro-HPC '12, pages 7–8, New York, NY, USA, 2012. ACM. ISBN 978-1-4503-1338-4. doi10.1145/2286976.2286980.
- J.A.C. van Toorenburg, N. Kijk in de Vegte, and **J. Bédorf**. On-line and off-line simulation of large motorway networks. In *Proceedings of 2nd International Conference on Models and Technologies for Intelligent Transportation Systems*, 2011.



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# Curriculum Vitae

Ik ben geboren op 1 mei 1984 te Alkmaar en begon mijn opleiding in 1988 op de Kleine en Grote Beer te Heerhugowaard. Om vervolgens in 1996 te beginnen aan het VWO op O.S.G Huygenwaard, ook in Heerhugowaard. In mijn vierde jaar van het VWO begon ik aan het “Economie & Maatschappij” profiel dat behoorde bij het pas ingevoerde “tweede fase” studie systeem. Aan het eind van het vierde jaar kwam ik er achter dat ik informatica interessant vond en heb toen Wiskunde A vervangen door Wiskunde B zodat ik een universitaire informatica opleiding kon volgen.

In 2002 heb ik mijn VWO opleiding afgerond en begon ik aan de opleiding “Informatica” aan de Universiteit van Amsterdam. Na het afronden van mijn bacheloronderzoek ben ik verder gegaan met de master opleiding in “Grid Computing” met als specialisatie “Computational Science”. Voor mijn masterscriptie heb ik gewerkt aan directe  $N$ -body simulaties op de grafische kaart onder leiding van Robert Belleman en Simon Portegies Zwart. Ik heb deze opleiding in november 2007 (cum laude) afgerond.

Vervolgens ben ik fulltime gaan werken voor Transpute B.V. te Amersfoort. Door het verkrijgen van een IsFast NWO grant eind 2008 ben ik in 2009 begonnen aan mijn promotieonderzoek binnen de computationale sterrenkunde groep van Simon Portegies Zwart aan de Universiteit van Amsterdam. Na twee maanden is de hele groep verhuisd naar de Sterrewacht Leiden waar ik het onderzoek heb voortgezet. In al die tijd heb 4 dagen per week aan mijn promotie onderzoek gewerkt en ben ik 1 dag per week blijven werken voor Transpute.

Ik heb de resultaten van mijn onderzoek gepresenteerd op conferenties in Nederland, Duitsland, Zweden, Italië en de Verenigde Staten. Tevens heb ik eind 2013 drie maanden stage gelopen bij NVIDIA in Californië, VS.





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Fewer than two dozen GPUs have died during the creation of this thesis.