

1 CURRICULUM VITAE of Simon Portegies Zwart

Personal details

Name: Simon Frederik Portegies Zwart
Born: Amsterdam, The Netherlands, 1965
Nationality: Dutch
Work address: Sterrewacht Leiden
P.O. Box 9513
2300 RA Leiden
The Netherlands
Tel.: +31-71-5278429
Fax: +31-71-5275819
E-mail: spz@strw.leidenuniv.nl
homepage: <http://home.strw.leidenuniv.nl/~spz/index.html>

Employment

Professor Computational Astrophysics at Leiden University

Other appointments and memberships

Editor in Chief *Journal of Computational Astrophysics and Cosmology*, 2013– (Springer)

Royal Holladsche Maatschappij der Wetenschappen (member)

Visiting senior scientist at RIKEN (2013– Kobe, Japan)

Visiting professor CITA (Aug.-Dec. 2018, Toronto, Canada)

President of the IAU commission C.B1 Computational Astrophysics (2015–2018)

Awards and prizes

- Innovationaward, NWO/SURF, 2016
- IEEE Gordon Bell prize nominee, 2014
- Nominated J.C. Kok prize, 2014
- Wim Nieuwpoortprijs, NWO/SurfSARA, 2014
- Enlighten your research, NWO, 2011
- NWO-VICI, 2008
- Pastoor Schmeits prize of Dutch Astronomy, 2007
- KNAW fellowship, 2002
- Honor Gravity Research Foundation, 2000
- Hubble fellowship, 1998
- JSPS fellowship, 1997

Doctorate

Utrecht University, The Netherlands, 1996, Thesis title: *Interacting stars*, Promotor: Frank W. M. Verbunt

Work experience since completing your PhD

Assistant Professor: University of Amsterdam, 2007-2009

KNAW Fellow: University of Amsterdam, 2002-2007

Hubble Fellow: Center for Space Research, 1998-2002
Massachusetts Institute of Technology, Ma, USA, and Boston University

JSPS fellow: (Japanese Society for the Promotion of Science), 1997-1998
Department of General System Studies
University of Tokyo, Japan,

Spinoza fellow: Astronomical Institute *Anton Pannekoek*, 1996-1997
University of Amsterdam, The Netherlands,

Academic staff supervised

• SUPERVISION OF GRADUATE STUDENTS AND POSTDOCOTRAL FELLOWS

• PhDs with Cum laude:

2012–2016 Adrian Hamers (copromotor Hagai Peretz);
2007–2011 Diederik Kruijssen (copromotores Henny Lamers en Vincent Icke);
2002–2006 Mark Gieles (copromotores Henny Lamers en Vincent Icke).

• PhDs:

2016– Francisca Concha Ramirez (copromotor Michiel Hoogerheide);
2016– Santiago Torres (copromotor Anthony Brown);
2016– Arjen van Elteren (copromotor TBD);
2012– Edwin van der Helm (copromotor Onno Pols);
2012– Tjibaria Pijloo (medepromotor Paul Groot [stoppen]);
2011– Thomas Wijnen (copromotor Onno Pols);
2014–2018 Ann-Sofie Bak-Nielsen (copromotor Alessandro Patrino);
2011–2016 Alex Rimoldi (copromotor Elena Rossi);
2011–2016 Carmen Martines Barbosa (copromotor Anthony Brown);
2011–2015 Tjarda Boekholt (copromotor Douglas Heggie);
2010–2015 Daniel Caputo;
2009–2014 Jeroen Bédorf;
2009–2013 Steven Rieder;
2006–2010 Derek Groen (copromotores Ed van den Heuven en Peter Sloot);
2004–2008 Evghenii Gaburov;
2004–2008 Evert Glebbeek (copromotor Onno Pols);
2004–2008 Nicolas Faber (copromotor Chris Boily);
2002–2006 Thijs Kouwenhoven (copromotores Anthony Brown and Lex Kaper);
2002–2006 Alessia Gualandris.

• PostDocs: 2018– Alexander Muchtkov (VENI); 2016– Maxwell Cai; 2015– Jeroen Bedorf; 2009–2016 Inti Pelupessy; 2013–2016 Lucie Jilkova; 2013–2016 Siliva Toonen; 2009–2014 Nathan de Vries; 2010–2013 Michiko Fujii; 2009–2011 Marcel Marosvolgi; 2010–2013 Bernadetta Deveccio; 2007–2009 Stefan Harfst; 2003–2006 Micheal Sipior.

• MScs:

2017 D. Petit, H. Hashemi, M. Wilhelm, F. Fagginer, M. Leemker, T. Sweegers.
2016 T. Zabel (computer science), E. Cagri (Erasmus), E. Vaher, J. Hanse, J. Majie, L van der Haak, R. Nagtegaal.
2015 A. Abdullah, J. Jensen, M. Meijer, G. Cardolus, M. Veenman, N. Wisse.
2014 E. Hammer (LEAPS), A. Vromans, E. Por, S. Haffert, J. Janes, H. Klein Woud, J. Lay.
2013 B. Lau; J. den Hartoch, F. Verhagen, H. Het Lam, J. de Boer, Q. Qian.
2012 L. Harms, P. Biernacki.
2010 M. Lamee, J. Franse, T. Pijloo, T. Boekholt, P. Langelaan, J. Campos Figueira.
2008 E. Heinsman, J. Withagen, S. de Kievit.

2007 F. van Deuveren, P. Geldof (computer science), J. Bédorf (computer science), S. Prianto Rusli (Erasmus).

2006 D. Stibbe.

2005 J. Gemmeke, J. van den Berk.

1999 R. Brassier.

- **Software engineer:** 2009– Arjen van Elteren.
- **Scientific programmer:** 2009–2016 Inti Pelupessy, 2009–2014 Nathan de Vries, 2009–2012 Marcel Marosvolgi.

Brief summary of research of the last five years

Since 2009 Simon Portegies Zwart leads an interdisciplinary research team on Computational Astrophysics at the Sterrewacht Leiden (CAstLe). This team is currently composed of 1 software engineer, 2 postdoctoral researchers, 6 PhD students and 4 MSc students. The aim of this team is to study the universe by means of simulation. The specific areas of research in astrophysics include the evolution of exotic planetary systems, the evolution of binary (and higher order multiple) stars, and the dynamical evolution of dense stellar systems such as globular clusters and galactic nuclei. From a computational point of view the research group aims at the development of simulation environments for solving the equations for gravitational dynamics, stellar structure and evolution, hydrodynamics and radiative transfer. Calculations are performed on computers built by the research group and equipped with GRAPE hardware or graphical processing units (GPU) but also using supercomputers and grids.

His recent important activity of the last 5 years has been the initiation, development and building of the Astronomical Multi-purpose Software Environment (AMUSE). The source code of AMUSE is free to the community and can be downloaded from the project website <http://amusecode.org>. At the moment AMUSE is producing new scientific results. Over the last few years the group on Computational Astrophysics Leiden has been producing over 20 scientific publications using the AMUSE framework on topics that range from planet formation, star cluster dynamics, gamma-ray bursts and supernova to cosmological structure formation simulations.

International activities

- Lorentz Center, Computational Science board member
- Qatar NSF, Qatar national science foundation, external advisor
- IAU Member of Division VII Galactic System
- IAU Member of Division VII Commission 37 Star Clusters & Associations

Other academic activities

- Huygens fellowship
- Oort Fellowship
- MSc admission committee
- NOVA ISC, AMUSE progress representative
- VPRO Noorderlicht, science advisory board
- European Ambassador, Meta Institute for Computational Astrophysics,
- Beta Ambassador for the Netherlands

Grants

- 20M-CPU hours NWO-rekentijd, “AMUSE-FLASH”, 2016
- H2020 FET “High Performance Multiscale Computing”, 2015, 4MEuro (P.I. prof. A. Hoekstra, UVA)
- 27M-CPU hours DD-time on Piz-Daint “The Fine Structure of the Galaxy”, 2014

- NLeSC “ABCMUSE”, 2013, 50kEuro
- 80M-CPU hours DD-time on Titan in “The Virtual Galaxy”, 2013
- NWO-rekentijd, “Sakura”, 2013
- NWO-rekentijd, “Brutus”, 2013
- INCITE, ORCL TITAN computer time, “Virtual Galaxy”, 2012
- ESCC Hector computer time, “Virtual Galaxy”, 2012
- 20M-CPU hours competitive proposal on HA-PACS “Galactic simulations”, 2012
- NCF “Capturing Pluto”, 2012
- NOVA-4, “Simulating Planets in their environment”, 2011
- NCF, “The Gravitational Billion Body Problem”, 2011
- NCF, “The major impact of minor mergers”, 2010
- NWO, “The formation of Wolf-Rayet ? Black Hole X-ray binaries. Bezoeker: Dr. L.R. Yungelson”, 2010
- NCF, “CosmoGrid Data Analysis”, 2010
- NWO-M, “The Astrophysical Multipurpose Software Environment”, 2010, 300kEuro
- NCF, “Colliding Galaxies in Different Gravities”, 2009
- DEISA, “CosmoGrid”, 2009
- NWO-VICI, “The Final Parsec: Multi-Scale Simulations of Supermassive Black-Hole Coalescence in Galaxy Mergers”, 2008, 1.5MEuro
- NOVA-3, “The Astrophysical Multipurpose Software Environment”, 2007, 500kEuro
- NWO STARE, “D2G2: Dutch Dynamic GRAPE Grid”, 2004, 500kEuro
- NWO-M, “Parallel Dedicated Platform for Modeling Stellar Systems”, 2003, 250kEuro

Personal selection of publications

- **White dwarf pollution by planets in stellar binaries** Hamers, A. S., Portegies Zwart, S. F. 2016. MNRAS 462, L84-L87.
- **The origin of chaos in the orbit of comet 1P/Halley** Boekholt, T. C. N., Pelupessy, F. I., Heggie, D. C., Portegies Zwart, S. F. 2016. MNRAS 461, 3576-3584.
- **Secular dynamics of hierarchical multiple systems composed of nested binaries, with an arbitrary number of bodies and arbitrary hierarchical structure. First applications to multiplanet and multistar systems** Hamers, A. S., Portegies Zwart, S. F. 2016. MNRAS 459, 2827-2874.
- **Mass transfer between debris discs during close stellar encounters** Jílková, L., Hamers, A. S., Hammer, M., Portegies Zwart, S. 2016. MNRAS 457, 4218-4235.
- **The evolution of the Sun’s birth cluster and the search for the solar siblings with Gaia** Martínez-Barbosa, C. A., Brown, A. G. A., Boekholt, T., Portegies Zwart, S., Antiche, E., Antoja, T. 2016. MNRAS 457, 1062-1075.
- **The Origin of OB Runaway Stars.** Fujii, M. S., Portegies Zwart, S. 2011. Science 334, 1380.
- **Young Massive Star Clusters.** Portegies Zwart, S. F., McMillan, S. L. W., Gieles, M. 2010. Annual Review of Astronomy and Astrophysics 48, 431-493.
- **A runaway collision in a young star cluster as the origin of the brightest supernova.** Portegies Zwart, S. F., van den Heuvel, E. P. J. 2007. Nature 450, 388-389.

- **Short gamma-ray bursts from binary neutron star mergers in globular clusters.** Grindlay, J., Portegies Zwart, S., McMillan, S. 2006. *Nature Physics* 2, 116-119.
- **Formation of massive black holes through runaway collisions in dense young star clusters.** Portegies Zwart, S. F., Baumgardt, H., Hut, P., Makino, J., McMillan, S. L. W. 2004. *Nature* 428, 724-726.