

# DAVID DOUWE HENDRIKS

## CONTACT

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## RESEARCH AND PROFESSIONAL ACTIVITIES

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- OCT 2018 - PRESENT | PhD study: “Binary stellar interactions and mass loss in mass-transferring systems”  
*Supervisors: Dr. R.G. Izzard, Dr. A. Gualandris, UNIVERSITY OF SURREY, UNIS, Guildford*  
Investigating the effect of mass loss in mass transferring binary systems, through the simulation of discs. I will initially use a 1-d disc evolution code to mimic mass loss in this process, and use population synthesis (*binary.c*) to investigate the impact on populations of stars. Continuing my study of the impact of Pulsational Pair-Instability supernovae on black hole merger populations across cosmic time. Supervising several students throughout the course of the PhD, including an international summer student for a project on globular cluster evolution and black hole retention. Developed a python package using C-bindings to interface with *binary.c*. Worked together with Dr Payel Das on improving Hamiltonian Monte-Carlo techniques with normalising flows and action-angle coordinates.
- SEP 2017 - SEP 2018 | Master Thesis: “Black hole mass distribution with Pulsational Pair Instability Supernova and the measure of stellar explodability”  
*Supervisors: Dr. S.E. de Mink, Dr. M. Renzo, API, UVA, Amsterdam*  
Using a rapid stellar population synthesis code, I am investigating the binary black hole mass distribution. I will implement the Pulsational Pair-Instability supernovae mechanism and study the effects it has on the resulting distribution. Furthermore I will look into the compactness parameter as an indicator of explodability of massive stars.
- JAN 2017 - SEP 2018 | Entrepreneur at Demonstrator lab VU, Amsterdam  
*Supervisor: Dr. T. in 't Veld, Prof D. Iannuzi, VU, UVA, Amsterdam*  
Entrepreneur at VU Demonstrator lab. Developing a diagnostic apparatus for quantitatively determining the severity of a patients Dry Eye Syndrom. With the use of sensors we correlate the evaporation of the eye surface to the rise of humidity in preocular compartments. This includes in-depth evaporation knowledge, doing field research and correlation questionair results with the measurements.
- APR 2014 - JUN 2014 | Bachelor thesis: “Analyzing the Higgs particle”  
*Supervisor: Prof. S. Bentvelsen, Nikhef, UVA, Amsterdam*  
Through simulations and comparisons to existing datasets, I studied the spin of the Higgs particle. Specifically, I investigated the possibility of the Higgs particle having a spin of value 2, by looking at the leptonic decay in the Collins-Sopper frame.
- MAR 2015 - DEC 2016 | Technical Assistance Engineer at TRUE, Amsterdam  
*Investigating and improving the server monitoring system through data analysis*  
Technical employee focussed on the improvement of the server status monitoring system at True. I implemented trend analysis and “exponential smoothing algorithms” to detect aberrant behaviour and this led too more proactive monitoring.
- SEP 2013 - SEP 2015 | Research assistant at OOGHEELKUNDIG MEDISCH CENTRUM (OMC), Zaandam  
*Investigating and assisting the research on eye diseases*  
Assistent at the development and design of protocols to investigate the Dry eye Syndrom. We developed a spectacle to measure certain aspects and improve the diagnostics of this problem.

## PROGRAMMING LANGUAGES

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Using GNU/Linux, Windows. Advanced in Python, Latex. Intermediate in C/C++, MySQL, Django and Mathematica. Beginner Html, CSS, JavaScript, Perl. Used population synthesis (*binary.c*) and stellar evolution codes (MESA) for my master thesis. Experience with running simulations on clusters (surfSARA). Experience with Emcee, python-c bindings, and creating python packages. Chaired the development committee for website of study association. Developed alumni website for institute (API). Admin for both (Ubuntu server/Apache/Mysql/Nginx/Docker).

## RESEARCH INTERESTS

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My research interest lie in the areas of physics and computational (astro)physics. Specifically theoretical stellar population evolution, their effect on the environment they live in and which of these binary systems form black hole pairs. Recently I have worked on improving sampling techniques and uncertainty estimation and I would like to continue working on and learning more about this.

## EDUCATION

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SEP 2015 - SEP 2018	Master ASTRO (ASTRONOMY AND ASTROPHYSICS), <b>University of Amsterdam</b> , Amsterdam Sciencepark GRAVITATIONAL ASTROPARTICLE PHYSICS IN AMSTERDAM (GRAPPA) TRACK GRADUATION DATE: 28 SEPTEMBER 2018
SEP 2011 - AUG 2015	Bachelor PHYSICS AND ASTRONOMY, <b>University of Amsterdam</b> , Amsterdam Sciencepark MINOR: COMPUTATIONAL SCIENCES GRADUATION DATE: 15 JULY 2015

## CAREER & EMPLOYMENT

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MAR 2017 - MAR 2018	Administrative/technical employee at API, Amsterdam <i>Administrative/technical employee at the Anton Pannekoek Instituut (API).</i>
SEP 2016 - DEC 2016	Graduate Teaching Assistant at UVA, Amsterdam <i>Teaching assistant at Programming for Physics and Astronomy, assisting dr. I. van Vulpen and drs. M. Stegeman.</i>
MAR 2015 - DEC 2016	Technical Assistance Engineer at TRUE, Amsterdam <i>Investigating and improving the server monitoring system</i>
SEP 2013 - SEP 2015	Research assistant at OMC, Zaandam <i>Investigating and assisting the research on eye diseases</i>
FEB 2014 - FEB 2015	Boardmember, Treasurer at NSA, Amsterdam <i>Financial responsible at the study association for physics and mathematics</i>

## EXTRA CURRICULAR ACTIVITIES

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JAN 2018 - JULY 2018	Organizing national astronomy olympiad at UVA in June 2018, Amsterdam Under supervision of DR. A. WATTS (API), AMSTERDAM
2014 - 2019	Committees Study association at NSA, Amsterdam <i>Committee member of the following committees:</i> <ul style="list-style-type: none"><li>• <b>Outreach committee (<i>Physicsfair</i>)</b>: Organizing outreach activities regarding physics demonstrations for classes and public events..</li><li>• <b>Website committee</b>: Developing and maintaining the new website of the physics association, as chairman. The development team works with Python and Django.</li></ul>
FEB 2017 - APR 2017	Developing a software package to visualise (GIFs) physics simulations For DR. I. VAN VULPEN(NIKHEF), AMSTERDAM

## COURSES AND CERTIFICATES

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APRIL 2015	Mathematica Student Certificate
SEP 2010 - SEP 2011	Cambridge Certificate in Advanced English

## TALKS AND POSTERS

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PUBLIC LECTURE GAS 201 POSTER EAS 2022	Improving Hamiltonian monte-carlo samplers with more Hamiltonian mechanics techniques: <a href="#">Link to interactive poster</a>
POSTER EAS 2022	Matching the feature in the observed binary black hole mass distribution by varying the pulsational pair instability mass loss and onset mass: <a href="#">Link to interactive poster</a>

## HOBBIES AND ACTIVITIES/GENERAL FIELDS OF INTEREST

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Technology, movies, programming, webdevelopment, making/listening to music, reading, visiting festivals, art, games, learning languages.