# Jordy Davelaar

## Personal information


**DATE OF BIRTH**
18-09-1991

**ADDRESS**
Heyendaalseweg 135
6525 AJ, Nijmegen, NL

**EMAIL**
j.davelaar@astro.ru.nl

**NATIONALITY**
Netherlands

**TEL**
+31 6 10 00 39 65

**WEB**
www.jordydavelaar.com


## Work experience

**Sept. 2016 - now** **Ph.D student, Radboud University Nijmegen**
Supervisors: Prof. dr. H. Falcke (promotor) and dr. M. Mościbrodzka.
Thesis title: "Connecting the micro to macrophysics in black hole accretion"
Manuscript accepted: 18 June 2020.
Defense date: 24 August 2020

**Jan. 2019 - Jul 2019** **Research Analyst, Flatiron Institute, Center for Computational Astrophysics, NY**
Performed and analyzed first-principles simulations of jets.

## Membership in international scientific collaborations

**2016 - now** **Member of the event horizon telescope collaboration**
Active member of the EHT Theory Working Group, the DAAPP task force, and Imaging Working group team eht-imaging.

## Education

**2013 - 2016** **Master Physics and Astronomy - Cum Laude**
Master thesis: Modeling M81* with a tilted accretion disk.
Supervisors: Prof. dr. H. Falcke and dr. M. Mościbrodzka.
Radboud University Nijmegen

**2010 - 2013** **Bachelor Physics and Astronomy - Cum Laude**
Bachelor thesis: The propagation of comic rays in the galaxy
Supervisor: prof. dr. A. Achterberg.
Radboud University Nijmegen

## Awards

**Jan. 2020** **Bruno Rossi Prize**
Rewarded to the Event Horizon Telescope collaboration for the first image of a black hole.

| | |
|---|---|
| **Jan. 2020** | **Einstein Medal**<br>Rewarded to the Event Horizon Telescope collaboration for the first image of a black hole. |
| **Nov. 2019** | **Breakthrough Prize in Fundamental Physics**<br>Rewarded to the Event Horizon Telescope collaboration for the first image of a black hole. |
| **Mar. 2018** | **Face of Science**<br>The Royal Netherlands Society for Arts and Sciences elected me as a Face of Science for being a promising PhD student who stands out by presenting excellent research to the general public. |
| **May 2015** | **Student award Radboud university**<br>Reward for the many years I served in student politics at faculty and university level at Radboud University combined with excellent study results. Reward once a year to at most two students. |

## List of refereed/submitted publications

T. Bronzwaer, Z. Younsi, **J. Davelaar**, H. Falcke 2020, "RAPTOR II: Polarized radiative transfer in curved spacetime", A&A, *in press*

R. Gold, A. E. Broderick, Z. Younsi, C. M. Fromm, C. F. Gammie, M. Mościbrodzka, H.-Y. Pu, T. Bronzwaer, **J. Davelaar**, J. Dexter, D. Ball, C-K. Chan, T. Kawashima, Y. Mizuno, B. Ripperda, and the Event Horizon Telescope Collaboration, 2020, "Verification of Radiative Transfer Schemes for the EHT", ApJ, 897, 2, 148

A. E. Borderick, R. Gold, M. Karami, J. A. Preciado-Lopéz, P. Tiede, H.-Y. Pu, and the Event Horizon Telescope Collaboration, 2020, "THEMIS: A Parameter Estimation Framework for the Event Horizon Telescope", ApJ, 897, 2, 139

**J. Davelaar**, A. A. Philippov, O. Bromberg, and C. B. Singh, 2020, "Particle acceleration in kink unstable jets", ApJL, 896, 2, L32

J. van de Gucht, **J. Davelaar**, L. Hendriks, C.M. Fromm, O. Porth, H. Olivares, Y. Mizuno, and H. Falcke, 2019, "Deep Horizon; a machine learning network that recovers accreting black hole parameters", A&A, 636, A94

F. Roelofs, M. Janssen, I. Natarajan, R. Deane, **J. Davelaar**, H. Olivares, O. Porth, S. N. Paine, K. L. Bouman, R. P. J. Tilanus, I. van Bemmel, H. Falcke, and the Event Horizon Telescope Collaboration, 2019, "SYMBA: An end-to-end VLBI synthetic data generation pipeline; Simulating Event Horizon Telescope observations of M87", A&A, 636, A5

O. Bromberg, C. B. Singh, **J. Davelaar**, and A. A. Philippov, 2019, "Kink instability: evolution and energy dissipation in Relativistic Force-Free Non-Rotating Jets", ApJL, Volume 884, 1, 39.

O. Porth, K. Chatterje, R. Narayan; C.F. Gammie, Y. Mizuno; Peter Anninos, J.G. Baker, John G.; M. Bugli, C. Chan, Chi-kwan, **J. Davelaar**; L. Del Zanna, Z.B. Etienne; P.C. Fragile, B.J. Kelly, M. Liska; S. Markoff, J.C. McKinney, B. Mishra, S.C Noble, H. Olivares, B. Prather, L. Rezzolla, B.R. Ryan, J.M. Stone, N. Tomei, C.J. White, Z. Younsi, and the Event Horizon Telescope Collaboration, 2019, "The Event Horizon General Relativistic Magnetohydrodynamic Code Comparison Project" ApJS, Volume 243, 2, 26
H. Olivares, H., O. Porth, **J. Davelaar**, E.R. Most, C.M. Fromm, Y. Mizuno, Z. Younsi, L. Rezzolla, 2019, "Constrained transport and adaptive mesh refinement in the Black Hole Accretion Code", A&A, 629, A61

**J. Davelaar.**, H. Olivares, O. Porth, T. Bronzwaer, M. Janssen, F. Roelofs, Y. Mizuno ,C.M. Fromm, H. Falcke, and L. Rezzolla, 2019, "Modeling non-thermal emission from the jet-launching region of M 87 with adaptive mesh refinement", A&A, 632, A2

Event Horizon Telescope Collaboration, "First M87 Event Horizon Telescope Results. VI. The Shadow and Mass of the Central Black Hole" ApJL, Volume 875, Issue 1, article id. L6, 2019

Event Horizon Telescope Collaboration, "First M87 Event Horizon Telescope Results. V. Physical Origin of the Asymmetric Ring" ApJL, Volume 875, Issue 1, article id. L5, 2019

Event Horizon Telescope Collaboration, "First M87 Event Horizon Telescope Results. IV. Imaging the Central Supermassive Black Hole" ApJL, Volume 875, Issue 1, article id. L4, 2019

Event Horizon Telescope Collaboration, "First M87 Event Horizon Telescope Results. III. Data Processing and Calibration" ApJL, Volume 875, Issue 1, article id. L3, 2019

Event Horizon Telescope Collaboration, "First M87 Event Horizon Telescope Results. II. Array and Instrumentation" ApJL, Volume 875, Issue 1, article id. L2, 2019

Event Horizon Telescope Collaboration, "First M87 Event Horizon Telescope Results. I. The Shadow of the Supermassive Black Hole" ApJL, Volume 875, Issue 1, article id. L1, 2019

**J. Davelaar**, T. Bronzwaer, D. Kok, Z. Younsi, M. Mościbrodzka, H. Falcke. 2019, "Orbitting black holes in Virtual Reality, Computational Astrophysics and Cosmology, 5:1, 2018

**J. Davelaar**, M. Mościbrodzka, T. Bronzwaer, T., H. Falcke, "General relativistic magnetohydrodynamical k-jet models for Sgr A*" A&A 612, A34, 2018

T. Bronzwaer, **J. Davelaar**, M. Mościbrodzka, Z. Younsi, H. Falcke, M. Kramer, L. Rezzolla, "RAPTOR One: Time-dependent Radiative Transfer in Arbitrary Spacetimes" A&A, 613, 17, 2018

M. Mościbrodzka, J. Dexter, **J. Davelaar**, H. Falcke, "Faraday rotation in GRMHD simulations of the jet launching zone of M87", MNRAS, 468, 2214, 2017

C. Goddi, H. Falcke, M. Kramer, L. Rezzolla, C. Brinkerink, T. Bronzwaer, **J. Davelaar**, R. Deane‖, M. De Laurentis, G. Desvignes, R. P. Eatough, F. Eisenhauer, R. Fraga-Encinas, C. M. Fromm, S. Gillessen, A. Grenzebach, S. Issaoun, M. Janßen, R. Konoplya, T. P. Krichbaum, R., Laing, K. Liu, R.-S. Lu, Y. Mizuno, M.

Moscibrodzka, C. Müller, H. Olivares, O. Pfuhl, O. Porth, F. Roelofs, E. Ros, K. Schuster, R. Tilanus, P. Torne, I. van Bemmel, H. J. van Langevelde, N. Wex, Z. Younsi and A. Zhidenko, "BlackHoleCam: Fundamental physics of the galactic center", International Journal of Modern Physics D, 26, 1730001, 2017

## List of white papers

Leonid I. Gurvit, Zsolt Paragi, Viviana Casasola, John Conway, **Jordy Davelaar**, Heino Falcke, Rob Fender, Christian M. Fromm, Cristina Garcıa Miro, Michael A. Garrett, Marcello Giroletti, Ciriaco Goddi, Jose-Luis Gomez, Jeffrey van der Gucht, Jose Carlos Guirado, Zoltán Haiman, Frank Helmich, Elizabeth Humphreys, Violette Impellizzeri, Michael Kramer, Michael Lindqvist, Hendrik Linz, Elisabetta Liuzzo, Andrei P. Lobanov, Yosuke Mizuno, Luciano Rezzolla, Freek Roelofs, Eduardo Ros, Kazi L.J. Rygl, Tuomas Savolainen, Karl Schuster, Tiziana Venturi, Martina Wiedner, J. Anton Zensus, 2019 "TeraHertz Exploration and Zooming-in for Astrophysics (THEZA)", ESA Voyage 2050 White Paper

## Mentoring experience

**Sep. 2019 - NOW** **Jesse Vos - undergraduate student**
title: tbd.

**Sep. 2018 - Aug. 2019** **Joost de Kleuver - undergraduate student**
Thesis: Autonomous Bayesian parameter estimation for accreting supermassive black holes.

**Sep. 2018 - Aug. 2019** **Jeffrey van der Gucht - undergraduate student**
Thesis: Deep Horizon; a machine learning network that recovers accreting black hole parameters
Paper: *J. van der Gucht*, **J. Davelaar**, L. Hendriks et al., 2019, submitted, "Deep Horizon; a machine learning network that recovers accreting black hole parameters"

**Sep. 2017 - Jan. 2018** **Daniël Kok - undergraduate student**
Thesis: Black hole accretion from a particle perspective

## Teaching experience

**Jan. 2012 - Nov. 2018** **Teaching assistent - Radboud University**
Various courses including: Electromagnetism, general relativity, observational astronomy, and introduction to astrophysics.

## Ancillary activities

**Apr. 2017 - Jan. 2019** **Ph.D and postdoc representative in the IMAPP department board**
Radboud University Nijmegen.

## Accepted scientific proposals

**Okt. 2018** **Computing time Dutch national supercomputer (3.5M CPU Hours)**
Title: High resolution simulations of accreting black holes

Main applicant: **J. Davelaar**
Co applicants: T. Bronzwaer, Y. Mizuno, B. Ripperda, H. Falcke

**Sep. 2017** **Computing time Dutch national supercomputer (500K CPU Hours)**
Title: High resolution simulations of accreting black holes
Main applicant: **J. Davelaar**
Co applicants: O. Porth, H. Falcke, T. Bronzwaer, M. Moscibrodzka

**Mar. 2016** **Observing proposal Effelsberg telescope**
Title: Single-dish flux density monitoring of M81* with the Effelsberg telescope
Accepted for observations
PI: **J. Davelaar**
Co-pi's: S. Issaoun, M. Janssen, C. Brinkerink, C. Mueller, E. Körding, E. Ross, H. Falcke

**Mar. 2016** **Observing proposal VLBA**
Title: Core position angle measurements of M81*
Accepted for observations
PI: **J. Davelaar**
Co-pi's: S. Issaoun, M. Janssen, C. Brinkerink,, C. Mueller, E. Körding, E. Ross, H. Falcke

**June. 2017** **Observing proposal EVN**
Title: Core position angle measurements of M81*
Observed
PI: **J. Davelaar**
Co-pi's: S. Issaoun, M. Janssen, C. Brinkerink, E. Körding, R. Coppejans, E. Ross, H. Falcke

## Scientific presentations

**Feb 2020** **Colloquium speaker, MPIK**
Title: particle acceleration in relativistic jets

**Dec 2019** **Invited speaker, multi messenger workshop Prague**
Title: modeling accreting black holes

**Nov 2019** **Invited speaker, GRPIC workshop**
Title 1: the first image of a black hole
Title 11: particle acceleration in relativistic jets

**Aug 2019** **Invited speaker, KITP conference, connecting micro to macro scale**
Title: particle acceleration in relativistic jets

**Aug 2019** **Invited speaker, JILA seminar**
Title: particle acceleration in relativistic jets

**June 2019** **Invited speaker, Flatiron series seminar**
Title: The first image of a black hole

**April 2019** **Invited speaker, seminar Black Hole Initiative**
Title: modeling non-thermal emission of M87

**April 2019** **Invited speaker, High energy astrophysics seminar, Princeton university**
Title: The first image of a black hole

**April 2019** **Invited speaker, Astronomy seminar, Columbia University**
Title: The first image of a black hole

**April 2019** **Invited speaker, "event horizon collaboration meeting"**
Title: modeling non-thermal emission of M87

**Feb 2019** **Invited speaker, High Energy Astrophysics seminar, Columbia University**
Title: modeling non-thermal emission of M87

**Oct 2018** **Invited speaker, "The Central Arcsecond: Towards Testing General Relativity in the Galactic Center"**
Title: GRMHD models of SgrA*

**July 019** **Invited speaker KU Leuven**
Title: Modeling astrophysical black holes

**May 2018** **Invited review speaker at workshop "the radio to x-ray connection in accreting objects"**
Title: Imaging supermassive black holes

**Feb. 2018** **Speaker at BlackHoleCam Face-to-Face meeting**
Title: orbiting black holes in virtual reality

**May 2017** **Speaker at the Dutch astronomy conference**
Title: The effects of accelerated particles on the radiative properties of Sgr A*

**Feb. 2017** **Speaker at BlackHoleCam Face-to-Face meeting**
Title: the effect of accelerated particles on the radiative properties of Sgr A* and M87

**Nov. 2016** **Speaker at the Event Horizon Telescope collaboration meeting**
Title: The effects of accelerated particles on the radiative properties of black holes

**Feb. 2016** **Speaker at BlackHoleCam Face-to-Face meeting**
Title: Modeling M81* with a tilted accretion disk