Johanna Hartke

Curriculum Vitae

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Research Experience and Employment

2018–present **Postdoctoral Fellowship**, *European Southern Observatory (Santiago, CL)*.
Research (50%): understanding the formation of the extended metal-poor halos around galaxies in group and cluster environments
Observatory duties (50%): support astronomer at the Very Large Telescope, MUSE instrument fellow

2015–2018 **PhD Research**, *European Southern Observatory (Garching, DE)*, Dr. Magda Arnaboldi & Prof. Dr. Ortwin Gerhard.
Substructures, accretion events, and surrounding diffuse intra-group light in bright ETGs

2014–2015 **Master Research**, *University of Groningen (NL)*, Prof. Dr. Eline Tolstoy & Dr. Shoko Jin.
Dynamical modelling of the dwarf spheroidal galaxies Ursa Minor and Draco

2013–2015 **Research project**, *University of Groningen (NL)*, Dr. Robyn Sanderson & Prof. Dr. Amina Helmi.
Using tidal streams to determine the mass distribution of dark halos

January - May 2013 **Bachelor Research**, *Jacobs University Bremen (DE) & University of Groningen (NL)*, Prof. Dr. Amina Helmi & Prof. Dr. Joachim Vogt.
Fitting orbits to stellar streams in the Aquarius Simulation

July - September 2012 **Research Internship**, *Australian National University (Canberra, AUS)*, Prof. Dr. Ken Freeman.
Dynamics of the Aquarius star stream

Education

2015–2018 **PhD**, *Ludwig-Maximilians-Universität (International Max Planck Research School)*, "magna cum laude".
Astronomy

2013–2015 **Master of Science**, *University of Groningen*, "cum laude".
Astronomy

2010–2013 **Bachelor of Science**, *Jacobs University Bremen*, GPA 1.6 (awarded on a scale from 5 to 1, with 1 being the highest grade).
Physics

2004–2010 **Abitur**, *Gymnasium Lohne*, GPA 1.5 (awarded on a scale from 5 to 1, with 1 being the highest grade).

Computer Skills

Programming Python, iraf, C, IDL, Mathematica, html5

Pipelines	SDFRED (Subaru Telescope), PN.S (William Herschel Telescope), Astromatic software suite, esorex, ESO reflex
Typesetting	LATEX, Microsoft Office, Markdown

Languages

German	Native proficiency
English	Full professional proficiency
French	Limited working proficiency
Dutch	Elementary proficiency
Spanish	Elementary proficiency

Awards, Scholarships, and Grants

October 2016 **IAU Grant**.
Travel grant to attend IAU Symposium 323

2011–2015 **Scholarship and Grant**, *Studienstiftung des dt. Volkes*.
German Academic Scholarship Foundation, awarded for academic excellence

2012–2013 **President's List Award**, *Jacobs University Bremen*.
Awarded to students with GPA better than 1.5

2010–2013 **Scholarship**, *Jacobs University Bremen*.
Entrance scholarship awarded for duration of BSc studies

2012 **Scholarship**, *DAAD (German Academic Exchange Service)*, RISE worldwide internship program.
Travel and lodging subsidy for internship at Australian National University

Publications

Refereed publications

J. Hartke, M. Arnaboldi, O. Gerhard, L. Coccato, C. Pulsoni, K. C. Freeman, M. Merrifield, A. Cortesi, and K. Kuijken. The halo of M 105 and its group environment as traced by planetary nebula populations. I. Wide-field photometric survey of planetary nebulae in the Leo I group. *A&A*, 642:A46, October 2020.

S. Bhattacharya, M. Arnaboldi, Nelson Caldwell, O. Gerhard, M. Blaña, A. McConnachie, **J. Hartke**, P. Guhathakurta, C. Pulsoni, and K.C. Freeman. The survey of planetary nebulae in Andromeda (M 31). II. Age-velocity dispersion relation in the disc from planetary nebulae. *A&A*, 631:A56, Nov 2019.

S. Bhattacharya, M. Arnaboldi, **J. Hartke**, O. Gerhard, V. Comte, A. McConnachie, and N. Caldwell. The survey of planetary nebulae in Andromeda (M 31). I. Imaging the disc and halo with MegaCam at the CFHT. *A&A*, 624:A132, Apr 2019.

J. Hartke, M. Arnaboldi, O. Gerhard, A. Agnello, A. Longobardi, L. Coccato, C. Pulsoni, K. C. Freeman, and M. Merrifield. Three dynamically distinct stellar populations in the halo of M49. *A&A*, 616:A123, August 2018.

J. Hartke, M. Arnaboldi, A. Longobardi, O. Gerhard, K. C. Freeman, S. Okamura, and F. Nakata. The halo of M 49 and its environment as traced by planetary nebulae populations. *A&A*, 603:A104, July 2017.

R. E. Sanderson, **J. Hartke**, and A. Helmi. Modeling the Gravitational Potential of a Cosmological Dark Matter Halo with Stellar Streams. *ApJ*, 836:234, February 2017.

Proceedings

J. Hartke, D. Kakkad, C. Reyes, C. Moya-Sierralta, A. Reyes, T. Kravtsov, J. Kolb, and F. Selman. MUSE+GALACSI: the first years. In Dirk Schmidt, Laura Schreiber, and Elise Vernet, editors, *Adaptive Optics Systems VII*. SPIE, December 2020.

S. Bhattacharya, M. Arnaboldi, **J. Hartke**, O. Gerhard, V. Comte, A. McConnachie, and W. E. Harris. Newly discovered Planetary Nebulae population in Andromeda (M31): PN Luminosity function and implications for the late stages of stellar evolution. In Franz Kerschbaum, Martin Groenewegen, and Hans Olofsson, editors, *IAU Symposium*, volume 343 of *IAU Symposium*, pages 201–205, Dec 2019.

J. Hartke. What are the progenitors of the intragroup light stars around M49? In *Light in the Suburbs: Structure and Chemodynamics of Galaxy Halos. Proceedings of the conference held 9-14 June*, page 18, Jun 2019.

J. Hartke, M. Arnaboldi, A. Longobardi, O. Gerhard, K. Freeman, and S. Okamura. The halo of M49 and its environment as traced by planetary nebulae. *Proceedings of the International Astronomical Union*, 12(S323):293–297, 2016.

S. Jin, M. Irwin, E. Tolstoy, J. Lewis, and **J. Hartke**. Stellar Kinematics and Metallicities in the Draco and Ursa Minor Dwarf Spheroidal Galaxies from WHT/AF2-WYFFOS. In I. Skillen, M. Barcells, and S. Trager, editors, *Multi-Object Spectroscopy in the Next Decade: Big Questions, Large Surveys, and Wide Fields*, volume 507 of *Astronomical Society of the Pacific Conference Series*, page 241, October 2016.

R. E. Sanderson, **J. Hartke**, A. Helmi, and D. W. Hogg. Inferring the Galactic gravitational potential with Gaia and friends. In *American Astronomical Society Meeting Abstracts*, volume 225 of *American Astronomical Society Meeting Abstracts*, page 119.02, January 2015.

Press releases

October 2020 Green Light Unveils the Presence of an Old and Metal-Poor Halo in a Giant Elliptical Galaxy

- Subaru Telescope: `https://subarutelescope.org/en/results/2020/10/07/2907.html`
- Isaac Newton Group of Telescopes: `http://www.ing.iac.es/PR/press/pnesub.html`

October 2018 Three Dynamically Distinct Stellar Populations in the Halo of M49, Isaac Newton Group of Telescopes: `http://www.ing.iac.es/PR/press/pns.html`

Other publications

R. Kokotanekova, S. Facchini, and **J. Hartke**. Fellows at ESO. *The Messenger*, 178:67–70, December 2019.

E. Pompei, **J. Hartke**, H. Korhonen, C. Mazzucchelli, C. Navarrete, A. F. Pala, L. Sbordone, and L. Schmidtobreick. Report on the ESO Summer School "La Silla Observing Summer School 2020". *The Messenger*, 180:46–49, June 2020.

L. Sbordone et al. [incl. J. Hartke]. A high-resolution, high S/N, optical HARPS public spectrum of Betelgeuse during minimum. *The Astronomer's Telegram*, 13525:1, February 2020.

Conference contributions and Seminars

Scientific Talks

December 2020 **SPIE Astronomical Telescopes + Instrumentation: Adaptive Optics Systems VII**, *Contributed talk, held remotely*, San Diego, USA.
MUSE+GALACSI: The first years

December 2020 **XVI SOCHIAS Annual Meeting: The Local Universe**, *Contributed talk, held remotely*, Temuco, Chile.
A multi-tracer view on the assembly of galaxies in the Leo I group

July 2020 **EAS 2020, S11: The Local Group in context**, *Contributed talk, held remotely*, Leiden, The Netherlands.
Tracing the low-mass end of the galaxy group and cluster assembly: the dynamical status of galaxies and intra-group light in the Leo I group

June 2019 **Light in the suburbs: structure and chemodynamics of galaxy halos**, *Contributed talk*, Sexten, Italy.
Low-mass and metal-poor satellites as progenitors of the intragroup light stars around M49: a challenge for hydrodynamical simulations?

April 2018 **EWASS 2018, SS13: Galaxy clusters and groups across cosmic time**, *Contributed talk*, Liverpool, United Kingdom.
Tracing the transition from galaxy halos to the intra-cluster light with stellar kinematics

October 2017 **IMPRS symposium**, *Contributed talk*, Garching, Germany.
Three dynamically distinct stellar populations in the halo of M49

July 2017 **MIAPP In & Out. What rules the Galaxy Baryon Cycle?**, *Contributed talk*, Garching, Germany.
Baryons at low densities: M49's intra-group light discovered with planetary nebulae

October 2016 **IAUS 323: Planetary Nebulae: Multi-Wavelength Probes of Stellar and Galactic Evolution**, *Contributed talk*, Beijing, China.
The halo of M49 and its environment as traced by PNe populations

October 2016 **IMPRS symposium**, *Contributed talk*, Garching, Germany.
The halo of M49 and its environment as traced by PNe populations

Seminars and Colloquia

August 2020 "Using planetary nebulae to trace halo assembly in nearby galaxy groups and clusters", (Galaxy Evolution Seminar, University of Oxford)

February 2020 "Galaxy Halos", (La Silla Observing School, Santiago, Chile)

December 2019 "Planetary nebulae to trace halo assembly in galaxy groups and clusters", (Cake Talk, DARK Niels Bohr Institute, Copenhagen, Denmark)

August 2019 "Light in the suburbs conference summary and a spotlight on M49" (ESO thirty minute talk, Santiago, Chile)

July 2019 "Dynamics of Planetary Nebulae in the Leo I Group" (ESO Wine and Cheese Seminar, Garching, Germany)

July 2019 "Using planetary nebulae as tracers of halo assembly in galaxy groups and clusters: the case of M49" (Lunch Talk, Kapteyn Astronomical Institute, University of Groningen, NL)

December 2018 "Using planetary nebulae as tracers of halo assembly in galaxy groups and clusters" (Colloquium, Department of Astronomy, Universidad de Concepción, Chile)

February 2018 "Tracing the transition from galaxy halos to the intra-cluster light with stellar kinematics" (Galaxy Cluster Discussion Group, Garching, Germany)

January 2018 "Three dynamically distinct stellar populations in the halo of M49" (ESO Wine and Cheese Seminar, Garching, Germany)

Poster Presentations

July 2018 "Tracing the build-up of M49's extended halo and surrounding intra-group light with stellar kinematics" (Stellar Halos, Heidelberg)

April 2018 "The diffuse intra-cluster and intra-group light in the Virgo Cluster" (EWASS, Liverpool, UK)

July 2017 "Baryons at very low densities: M49's extremely blue intra-group light discovered using Planetary Nebulae" (The Galaxy Ecosystem, Garching, Germany)

June 2017 "The Intragroup Light around M49 discovered using Planetary Nebulae" (EWASS, Prague, Czech Republic)

May 2015 "New optical spectroscopy of Ursa Minor and Draco dSphs" (Dutch Astronomy Conference, Nunspeet, The Netherlands)

May 2014 "Using tidal streams to determine the mass distribution of dark halos" (Dutch Astronomy Conference, Nordwijk, The Netherlands)

Other conference attendance

October 2020 Wavefront sensing in the ELT era V, Nice (held remotely)

September 2020 Annual Meeting of the Astronomische Gesellschaft 2020 (held remotely)

June 2019 The VLT in 2030, ESO Garching

August 2017 Reaching new heights in Astronomy, ESO Garching

February 2015 Baryons at low densities: the stellar halos around galaxies, ESO Garching

July 2014 Masterclass: the inflationary Universe, Rijksuniversiteit Groningen

Observing Experience and Time Allocation

Successful Proposals

2020A **MUSE@ESO-VLT**, *dPI: J. Hartke, PI: F. Bian*, 16 hours, `105.20GY-1`.
Mapping the kinematics of the host galaxies from the dark matter in dwarf galaxies survey (Part of "A Filler Program for the Apocalypse", total time awarded 68 hours, *not observed due to COVID-19*)

2020A **MODS@LBT**, *PI: C. Spiniello*, 5 hours.
Measuring oxygen abundances for kinematically distinct stellar populations in the halo of M49, *not observed due to COVID-19*

2019B **FORS2@ESO-VLT**, *PI: M. Arnaboldi*, 20 hours, `0104B-0386`.
Dark matter-less ultra-diffuse galaxies - an independent distance from PNLF

2019B **PN.S@WHT**, *PI: M. Merrifield*, 5 nights, `W/2019B/05`.
Dark matter in dwarf galaxies - an independent distance from the planetary nebulae luminosity function

2019A **PN.S@WHT**, *PI: M. Merrifield*, 3.5 nights, `W/2019A/02`.
The Origin of the Blue Stellar Halos around Massive Group-Dominant Galaxies

2019A **PN.S@WHT**, *PI: K. Kuijken*, 3.5 nights, `W19AN001`.
The Origin of the Blue Stellar Halos around Massive Group-Dominant Galaxies

2018B **MegaCam@CFHT**, *PI: M. Arnaboldi*, 26 hours, `2018BC013`.
Glimpse of green light in Andromeda (M31): A survey of Planetary Nebulae in the inner halo (R≈50 kpc) with Megacam@CFHT

2017A **PN.S@WHT**, *PI: M. Merrifield*, 7 nights, `W/2017A/05`.
How do the metal-poor stellar halos around massive galaxies form?

2015A **AF2-WYFFOS@WHT**, *PI: E. Tolstoy*, 5 nights, `W15AN012`.
Stellar Kinematics and Metallicities in the Draco and Ursa Minor Dwarf Spheroidal Galaxies

Observing Experience

November 2018–present — ESO fellow with duties at Paranal Observatory (80 nights/year), MUSE instrument fellow

April 2019 — 7 nights with PN.S-WHT (counter-dispersed imaging, PI Merrifield/Kuijken)

February 2020 — 2 nights with DFOSC as the Danish telescope as tutor of the La Silla Observing School (multi-band imaging)

October 2017 — 4 nights sitting in on observations at ESO Paranal Observatory (mainly with UT4-MUSE and UT4-SINFONI)

March 2017 — 7 nights with PN.S-WHT (counter-dispersed imaging, PI Merrifield)

May 2015 — 5 nights with AF2/WYFFOS-WHT (multi-object spectroscopy, PI Tolstoy)

April 2014 — 4 nights with WFC-INT (multi-band imaging, University of Groningen coursework)

Teaching and Supervision

April 2020 **Teaching**, *ESO Vitacura*, ESOpy4.0: Python for people in quarantine.
Lectures on "Loops and Conditionals" & "Plotting with python"

February 2020 **Tutoring**, *ESO Vitacura & La Silla Observatory*, La Silla Observing School.
Conception and design of the project "Characterising nearby galaxies with photometry" and tutoring of the five PhD-level students during the two-week long school

January–February 2020 **Co-supervision**, *Paranal Observatory*, Paranal Summer Student Internship Programme, MUSE performance monitoring.
Co-supervision of the BSc/MSc-level students A. Reyes and C. Moya

April–July 2017 **Co-supervision**, *ESO Garching*, MSc Intership.
Co-supervision of V. Comte: "In search of the green light in the remote outskirts of galaxies: The survey of Planetary Nebulae in the halo of Andromeda (M31)"

Spring Semester 2012 **Teaching Assistant**, *Jacobs University Bremen*, General Physics IIB – Modern Physics.
Taught by Prof. Dr. T. Heine, grading of coursework and design and teaching of tutorial sessions

Training and Soft Skills

August 2020 — Training on imposter syndrome (1/2-day training)

June 2019 — Job Application training (1/2-day training)

April 2019 — ESO python bootcamp ESOpy3.0 (3-day training)

May 2018 — Conflict management (2-day training)

January 2018 — Science communication skills (1-day training)

December 2017	Fair treatment, courtesy, and respect (1-day training)
February 2017	Presentation skills (1-day training)

Service and Outreach

April 2020 - present	ESO Chile fellow representative
May 2019 - present	LOC member: Extragalactic spectroscopic surveys: past, present and future of galaxy evolution (GALSPEC2021), Santiago
May 2019	Member of the ESO Workshop selection committee
March 2019	Volunteer at the ESO Vitacura open house day
2016-2018	ESO Outreach & Supernova volunteer
2016-2018	ESO students and fellows coffee organiser
2015-2018	IMPRS student representative
2016	Scientific Assistant at ESO OPC P98 and P99
2014-2015	Volunteer at the Blaauw Sterrenwacht, Groningen

Interests and extracurricular activities

Choral singing	Member of the Coro Dietrich Bonhoeffer, past member of Münchner Motettenchor, participations in "Musikakademie der Studienstiftung des deutschen Volkes"
Piano	Multiple first and second prizes in the "Jugend Musiziert" competition on regional and state level
Sports	Swimming, Bouldering, Windsurfing

Santiago de Chile, December 15, 2020