

# Johanna Hartke

## Curriculum Vitae

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## Research Experience and Employment

- 2018–present **Postdoctoral Fellowship**, *European Southern Observatory (Santiago, CL)*.  
Since October 2021: secondment to the Sub-department of Astrophysics, University of Oxford  
2018–2021: 50% Duties as Support Astronomer at Paranal Observatory and MUSE Instrument Fellow
- 2015–2018 **PhD Research**, *European Southern Observatory (Garching, DE)*, Dr. M. Arnaboldi & Prof. Dr. O. Gerhard.  
Substructures, accretion events, and surrounding diffuse intra-group light in bright early-type galaxies
- 2014–2015 **Master Research**, *University of Groningen (NL)*, Prof. Dr. E. Tolstoy & Dr. S. Jin.  
Dynamical modelling of the dwarf spheroidal galaxies Ursa Minor and Draco
- 2013–2015 **Research project**, *University of Groningen (NL)*, Dr. R.E. Sanderson & Prof. Dr. A. 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. A. Helmi & Prof. Dr. J. Vogt.  
Fitting orbits to stellar streams in the Aquarius Simulation
- July - September 2012 **Research Internship**, *Australian National University (Canberra, AUS)*, Prof. Dr. K.C. 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).

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## Languages

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

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## Computer Skills

Programming	Python, iraf, C, IDL, Mathematica, html5, SQL
Pipelines	SDFRED (Subaru Telescope), PN.S (William Herschel Telescope), Astromatic software suite, esorex, ESO reflex, PampelMUSE
Typesetting	LATEX, Microsoft Office, Markdown

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## Awards, Scholarships, and Grants

October 2016	<b>IAU Grant.</b> Travel grant to attend IAU Symposium 323
2011–2015	<b>Scholarship and Grant</b> , <i>Studienstiftung des dt. Volkes</i> . German Academic Scholarship Foundation, awarded for academic excellence
2012–2013	<b>President's List Award</b> , <i>Jacobs University Bremen</i> . Awarded to students with GPA better than 1.5
2010–2013	<b>Scholarship</b> , <i>Jacobs University Bremen</i> . Entrance scholarship awarded for duration of BSc studies
2012	<b>Scholarship</b> , <i>DAAD (German Academic Exchange Service)</i> , RISE worldwide internship program. Travel and lodging subsidy for internship at Australian National University

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## Teaching and Supervision

November 2020–October 2021	<b>Supervision</b> , <i>ESO Vitacura</i> , ESO Studentship. 1-year PhD project of Ana Ennis (home institute Instituto de Astrofísica de La Plata): Planetary nebulae in nearby elliptical galaxies with MUSE
January–February 2021	<b>Co-supervision</b> , <i>Paranal Observatory</i> , Paranal Summer Student Internship Programme, Exploring machine learning techniques for MUSE Quality Control: image quality of frames without stellar sources. Co-supervision of the MSc-level student A. Cornejo
April 2020	<b>Teaching</b> , <i>ESO Vitacura</i> , ESOPy4.0: Python for people in quarantine. Lectures on “Loops and Conditionals” & “Plotting with python”
February 2020	<b>Tutoring</b> , <i>ESO Vitacura &amp; La Silla Observatory</i> , 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	<b>Co-supervision</b> , <i>Paranal Observatory</i> , Paranal Summer Student Internship Programme, MUSE performance monitoring. Co-supervision of the BSc/MSc-level students A. Reyes and C. Moya
April–July 2017	<b>Co-supervision</b> , <i>ESO Garching</i> , 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

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## Observing Experience and Time Allocation

### Experience

2018–present **MUSE Instrument Fellow**, *ESO Very Large Telescope, Chile*.

- Support astronomer at UT4 and UT3
- Expert user of MUSE and HAWK-I with the adaptive optics facility, working knowledge of SPHERE and ESPRESSO
- Lead study on AO performance characterisation of MUSE+GALACSI in wide-field mode; selected figures now included in the MUSE user manual
- Member of the MUSE-IRLOS+ upgrade team: responsible for target selection and AO performance evaluation in narrow-field mode, support astronomer during the commissioning runs

2017–present **Observer**, *William Herschel Telescope, Spain*.

Expert user of the PN.S visitor instrument, including instrumental set-up, filter tuning, and calibration

### Successful Proposals

ESO P108 **MUSE@VLT**, **PI: J. Hartke**, 9 hours.

Zoom into the first phase of galaxy evolution with MUSE-NFM on the most extreme confirmed relic at  $z > 0.1$

ESO P108 **MUSE@VLT**, **PI: J. Hartke**, 3 hours.

VCC 1249: a dwarf elliptical galaxy in the making? The effects of potential shape on tidal stripping

ESO-VLT Co-I of 250+ hours with FORS2, HAWK-I, and MUSE, including a MUSE large programme (P108)

WHT Co-I of 17 nights with AF2-WYFFOS2 and PN.S

CFHT Co-I of 50+ hours with MegaCam

LBT Co-I of 5 hours with MODS

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## Publications

### In press

F. Gran, M. Zoccali, I. Saviane, E. Valenti, A. Rojas-Arriagada, R. Contreras Ramos, **J. Hartke**, J. A. Carballo-Bello, C. Navarrete, M. Rejkuba, and J. Olivares Carvajal. Hidden in the Haystack: Low-luminosity globular clusters towards the Milky Way bulge. *arXiv e-prints*, page 2108.11922 (accepted for publication in *MNRAS*), August 2021.

### Refereed publications

S. Bhattacharya, M. Arnaboldi, O. Gerhard, A. McConnachie, N. Caldwell, **J. Hartke**, and K. C. Freeman. The survey of planetary nebulae in Andromeda (M 31). III. Constraints from deep planetary nebula luminosity functions on the origin of the inner halo substructures in M 31. *A&A*, 647:A130, March 2021.

**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 environ-

ment 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.

#### Selected proceedings and other publications

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

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

R. Kokotanekova, S. Facchini, and **J. Hartke**. Fellows at ESO. *The Messenger*, 178:67–70, December 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 and Isaac Newton Group, La Palma
- October 2018 Three Dynamically Distinct Stellar Populations in the Halo of M49, Isaac Newton Group, La Palma

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## Conference contributions and Seminars

### Scientific Talks

- June 2021 **EAS 2021, S11: The outer reaches of galaxies: structure, kinematics, and accretion history**, *Contributed talk, held remotely*, Leiden, The Netherlands.
- June 2021 **AO4Astro II**, *Contributed talk, held remotely*.
- February 2021 **Streams 21: Constraints on Dark Matter**, *Contributed talk, held remotely*.
- December 2020 **SPIE Astronomical Telescopes + Instrumentation: Adaptive Optics Systems VII**, *Contributed talk, held remotely*, San Diego, USA.
- December 2020 **XVI SOCHIAS Annual Meeting: The Local Universe**, *Contributed talk, held remotely*, Temuco, Chile.
- July 2020 **EAS 2020, S11: The Local Group in context**, *Contributed talk, held remotely*, Leiden, The Netherlands.
- June 2019 **Light in the suburbs: structure and chemodynamics of galaxy halos**, *Contributed talk*, Sexten, Italy.
- April 2018 **EWASS 2018, SS13: Galaxy clusters and groups across cosmic time**, *Contributed talk*, Liverpool, United Kingdom.
- October 2017 **4th IMPRS student symposium**, *Contributed talk*, Garching, Germany.
- July 2017 **MIAPP In & Out. What rules the Galaxy Baryon Cycle?**, *Contributed talk*, Garching, Germany.
- October 2016 **IAUS 323: Planetary Nebulae: Multi-Wavelength Probes of Stellar and Galactic Evolution**, *Contributed talk*, Beijing, China.
- October 2016 **2nd IMPRS student symposium**, *Contributed talk*, Garching, Germany.

### Seminars and Colloquia

- July 2021 **ESA Science Seminar**, *held remotely*.
- August 2020 **Galaxy Evolution Seminar, University of Oxford**, *held remotely*, Oxford, UK.
- February 2020 **La Silla Observing School**, *Lecture*, Santiago, Chile.
- December 2019 **DARK Cake Talk, Niels Bohr Institute**, Copenhagen, Denmark.
- August 2019 **ESO Thirty Minute Talk**, Santiago, Chile.
- July 2019 **ESO Wine and Cheese Seminar**, Garching, Germany.
- July 2019 **Lunch Talk, Kapteyn Astronomical Institute**, Groningen, the Netherlands.
- December 2018 **Astronomy Colloquium, Universidad de Concepción**, Concepción, Chile.
- February 2018 **Galaxy Cluster Discussion Group**, Garching, Germany.
- January 2018 **ESO Wine and Cheese Seminar**, Garching, Germany.

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## Service

- Review Panels ESO Paranal internship student selection committee (2019, 2020)  
ESO Workshop selection committee (2019)
- Proposal Review Hubble Space Telescope external review (galaxies panel, 2020-2021)  
ESO VLT technical feasibility assessment for MUSE (2019-present)  
ESO Director's Discretionary Time technical review (2019-present)
- Meetings LOC: Extragalactic spectroscopic surveys: past, present and future of galaxy evolution (GALSPEC2021), Santiago (2019-2021)  
Founder and organiser of the ESO Chile astronomy lecture series (2021-2021)  
ESO students and fellows coffee organiser (2016-2018)  
LOC: 1st IMPRS student symposium, Garching (2016)
- Service Member of the MUSE Instrument Operations Team (2018-present)  
ESO Chile fellow representative (2020-present)  
IMPRS student representative (2015-2018)  
Scientific Assistant at ESO OPC P98 and P99 (2016)
- Outreach ESO Chile outreach volunteer (2019-present)  
ESO Garching Outreach & Supernova volunteer (2015-2018)  
Volunteer at the Blaauw Sterrenwacht, Groningen (2014-2015)

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## Training and Soft Skills

- 2015-present ESO-provided training and workshops through the students' and fellows' development programme
- Presentation skills
  - Unconscious bias
  - Fair treatment, courtesy, and respect
  - Science communication
  - Imposter syndrome
  - Conflict management

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## References

- **Dr. Magda Arnaboldi**  
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- **Prof. Dr. Ortwin Gerhard**  
Max Planck Institute for Extraterrestrial Physics  
Dynamics Group Leader  
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