

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).

Languages

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

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

Awards, Scholarships, and Grants

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

Teaching and Supervision

November 2020–October 2021	Supervision , <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	Co-supervision , <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	Teaching , <i>ESO Vitacura</i> , ESOPy4.0: Python for people in quarantine. Lectures on “Loops and Conditionals” & “Plotting with python”
February 2020	Tutoring , <i>ESO Vitacura & 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	Co-supervision , <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	Co-supervision , <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

Observing Experience and Time Allocation

Experience

2018–2021 **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

Publications

Under Review

J. Hartke, M. Arnaboldi, O. Gerhard, L. Coccato, M. Merrifield, K. Kuijken, C. Pulsoni, A. Agnello, S. Bhattacharya, C. Spiniello, A. Cortesi, K. C. Freeman, N. R. Napolitano, and A. J. Romanowsky. The halo of M105 and its group environment as traced by planetary nebula populations: II. Using kinematics of single stars to unveil the presence of intragroup light around the Leo I galaxies NGC 3384 and M105. *arXiv e-prints*, page arXiv:2201.08710, January 2022.

Refereed publications

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. *MNRAS*, 509(4):4962–4981, February 2022.

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 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.

Selected proceedings and other publications

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.

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*, vol-

ume 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

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

- January 2022 **Astrophysics Colloquium: Early Career Showcase**, *held remotely*, Oxford, UK.
- December 2021 **University of Southampton Astronomy Seminar**, Southampton, UK.
- 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.

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 (2019-2021)
ESO Director's Discretionary Time technical review (2019-2021)
- 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 (2018-2021)
ESO Chile fellow representative (2020-2021)
IMPRS student representative (2015-2018)
Scientific Assistant at ESO OPC P98 and P99 (2016)
- Outreach ESO Chile outreach volunteer (2019-2021)
ESO Garching Outreach & Supernova volunteer (2015-2018)
Volunteer at the Blaauw Sterrenwacht, Groningen (2014-2015)

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