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Johanna Hartke

Curriculum Vitae

Research Experience and Employment

2022–present **Postdoctoral Fellowship**, *Finnish Centre for Astronomy with ESO (Turku, FI)*.

2018–2022 **Postdoctoral Fellowship**, *European Southern Observatory (Santiago, CL)*.

- October 2021–2022: 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

2022–2023 **Fellowship**, *German Scholars Organisation*.
Full funding to attend GSO Leadership Academy 6 in Boston and Darmstadt

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

Teaching and Supervision

March 2023 **Teaching**, *University of Turku*, MSc-level lecture and exercise.
Spectroscopic diagnostics with Integral Field Units

July 2022 **Teaching**, *ESO Garching*, MSc-level lecture.
Integral-field spectroscopy with VLT-MUSE

July 2022–August 2022 **Supervision**, *ESO Garching*, ESO Summer Research Programme.
MSc-level student S. Penger: Extragalactic planetary nebulae in the central regions of galaxies

May 2022–August 2022 **Supervision**, *University of Oxford*, Summer Research.
BSc-level student L.S. Guité: Planetary nebulae in late-type galaxies with SITELLE

May 2022 **Teaching**, *University of Antofagasta*, MSc-level lecture.
3D Spectroscopy and adaptive optics: MUSE+GALACSI at the ESO-VLT

November 2020–October 2021 **Supervision**, *ESO Vitacura*, 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**, *Paranal Observatory*, Paranal Summer Student Internship Programme.
MSc-level student A. Cornejo: Exploring machine learning techniques for MUSE Quality Control: image quality of frames without stellar sources

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.
BSc/MSc-level students A. Reyes and C. Moya: MUSE performance monitoring

April–July 2017 **Co-supervision**, *ESO Garching*, MSc Intership.
MSc-level student 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

[1] D. A. Simon, M. Cappellari, and **J. Hartke**. Supermassive black hole mass in the massive elliptical galaxy M87 from integral-field stellar dynamics using OASIS and MUSE with adaptive optics: assessing systematic uncertainties. *arXiv e-prints*, page arXiv:2303.18229, March 2023.

[2] C. Pulsoni, O. Gerhard, S. M. Fall, M. Arnaboldi, A. I. Ennis, **J. Hartke**, L. Coccato, and N. R. Napolitano. The extended Planetary Nebula Spectrograph (ePN.S) early-type galaxy survey: The specific angular momentum of ETGs. *arXiv e-prints*, page arXiv:2303.06132, March 2023.

Refereed publications

[3] Ignacio Martín-Navarro, C. Spiniello, C. Tortora, L. Coccato, G. D'Ago, A. Ferré-Mateu, C. Pulsoni, **J. Hartke**, M. Arnaboldi, L. Hunt, N. R. Napolitano, D. Scognamiglio, and M. Spavone. INSPIRE: INvestigating Stellar Population In RElics - IV. The initial mass function slope in relics. *MNRAS*, 521(1):1408–1414, May 2023.

[4] G. D'Ago, C. Spiniello, L. Coccato, C. Tortora, F. La Barbera, M. Arnaboldi, D. Bevacqua, A. Ferré-Mateu, A. Gallazzi, **J. Hartke**, L. K. Hunt, I. Martín-Navarro, N. R. Napolitano, C. Pulsoni, M. Radovich, P. Saracco, D. Scognamiglio, and S. Zibetti. INSPIRE: INvestigating Stellar Population In RElics. III. Second data release (DR2): testing the systematics on the stellar velocity dispersion. *A&A*, 672:A17, April 2023.

[5] M. Arnaboldi, S. Bhattacharya, O. Gerhard, C. Kobayashi, K. C. Freeman, N. Caldwell, **J. Hartke**, A. McConnachie, and P. Guhathakurta. The survey of planetary nebulae in Andromeda (M31). V. Chemical enrichment of the thin and thicker discs of Andromeda: Oxygen to argon abundance ratios for planetary nebulae and HII regions. *A&A*, 666:A109, October 2022.

[6] S. Bhattacharya, M. Arnaboldi, N. Caldwell, O. Gerhard, C. Kobayashi, **J. Hartke**, K. C. Freeman, A. W. McConnachie, and P. Guhathakurta. The survey of planetary nebulae in Andromeda (M31) - IV. Radial oxygen and argon abundance gradients of the thin and thicker disc. *MNRAS*, 517(2):2343–2359, December 2022.

[7] **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 M 105 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 M 105. *A&A*, 663:A12, July 2022.

[8] 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.

[9] 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.

[10] **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.

[11] 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.

[12] 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.

[13] **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.

[14] **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.

[15] 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

[16] T. Wevers, F. Selman, A. Reyes, M. Vega, **J. Hartke**, F. Bian, O. Beltramo-Martin, R. J. L. Fétick, S. Kamann, J. Kolb, T. Kravtsov, C. Moya, B. Neichel, S. Oberti, C. Reyes, and E. Valenti. Performance characterization and near-real-time monitoring of MUSE adaptive optics modes at Paranal. In David S. Adler, Robert L. Seaman, and Chris R. Benn, editors, *Observatory Operations: Strategies, Processes, and Systems IX*, volume 12186 of *Society of Photo-Optical Instrumentation Engineers (SPIE) Conference Series*, page 121860T, August 2022.

[17] A. I. Ennis, **J. Hartke**, and F. Bian. Characterizing the build-up of extended halos with planetary nebulae. *Boletin de la Asociacion Argentina de Astronomia La Plata Argentina*, 63:175–177, July 2022.

[18] **J. Hartke**. Tracing halo and intra-group light assembly in nearby groups and clusters. In *Joint Observatories Kavli Science Forum in Chile (joksfic2022). Proceedings of the conference held 25-29 April*, page 13, April 2022.

[19] **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.

[20] 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.

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

[22] **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.

[23] **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.

[24] 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.

[25] 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

April 2023 **LEWIS collaboration meeting**, *Invited talk*, Naples, IT.

July 2022 **VEGAS collaboration meeting**, *Invited talk*, Pimonte, IT.

April 2022 **Joint Observatories Kavli Science Forum in Chile**, *Contributed talk, held remotely*, Santiago, CL.

March 2022 **Cosmic Nuggets – A feast of massive and compact galaxies across the Universe**, *Invited talk, held remotely*, Sexten, IT.

June 2021 **EAS 2021, S11: The outer reaches of galaxies: structure, kinematics, and accretion history**, *Contributed talk, held remotely*, Leiden, NL.

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, CL.

July 2020 **EAS 2020, S11: The Local Group in context**, *Contributed talk, held remotely*, Leiden, NL.

June 2019 **Light in the suburbs: structure and chemodynamics of galaxy halos**, *Contributed talk*, Sexten, IT.

April 2018 **EWASS 2018, SS13: Galaxy clusters and groups across cosmic time**, *Contributed talk*, Liverpool, UK.

October 2017 **4th IMPRS student symposium**, *Contributed talk*, Garching, DE.

July 2017 **MIAPP In & Out. What rules the Galaxy Baryon Cycle?**, *Contributed talk*, Garching, DE.

October 2016 **IAUS 323: Planetary Nebulae: Multi-Wavelength Probes of Stellar and Galactic Evolution**, *Contributed talk*, Beijing, CN.

October 2016 **2nd IMPRS student symposium**, *Contributed talk*, Garching, DE.

Seminars and Colloquia

March 2023 **Astro seminar, University of Helsinki**, Helsinki, FI.

February 2023 **FINCA retreat, University of Turku**, Teijo, FI.

June 2022 **Astronomy seminar, University of Turku**, Turku, FI.

March 2022 **Galaxy dynamics group seminar, University of Vienna**, *held remotely*, Vienna, AT.

March 2022 **SPIMAX Seminar, University of Oxford**, Oxford, UK.

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, CL.

December 2019 **DARK Cake Talk, Niels Bohr Institute**, Copenhagen, DK.

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, NL.

December 2018 **Astronomy Colloquium, Universidad de Concepción**, Concepción, CL.

February 2018 **Galaxy Cluster Discussion Group**, Garching, DE.

January 2018 **ESO Wine and Cheese Seminar**, Garching, DE.

Service

Review Panels	ESO Paranal internship student selection committee (2019, 2020)
	ESO Workshop selection committee (2019)
Proposal Review	ESO distributed peer review (2022)
	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 & SOC: 4th Wetton workshop, Oxford, 2022
	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 (2019-2021)
	ESO students and fellows coffee organiser (2016–2018)
	LOC: 1st IMPRS student symposium, Garching (2016)
Service	Member of the ESO ELT PSF-R working group (2022–present)
	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 (2019–2022)
ESO Garching Outreach & Supernova volunteer (2015-2018)
Volunteer at the Blaauw Sterrenwacht, Groningen (2014-2015)

Training and Soft Skills

2022–2023 GSO Leadership Academy

2015–2022 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

Turku, April 10, 2023