university of groningen / faculty of science and engineering / kapteyn astronomical institute

Hanneke Cornelia Woudenberg

PHD STUDENT GALACTIC ARCHAEOLOGY AND DYNAMICS

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Education

2022-Present

Kapteyn Astronomical Institute, University of Groningen
PhD Astronomy; Galactic Archaeology and Dynamics

Topic: *Substructure in the Milky Way*
Supervisor: Prof. dr. A. Helmi
Co-supervisor: Dr. E. Starkenburg

2020-2022

Kapteyn Astronomical Institute, University of Groningen
MSc Astronomy

Graduated Summa Cum Laude (9.4/10)
Thesis: *Constraining the Milky Way's gravitational potential with the Helmi Streams' clumps: a complex story involving resonances and chaos*
Supervisor: Prof. dr. A. Helmi

2019-2020

University of Groningen
Minor Art History

Completed the courses with Summa Cum Laude distinction (9.4/10)

2016-2019

Kapteyn Astronomical Institute, University of Groningen
BSc Astronomy

Graduated Summa Cum Laude (9.1/10)
Thesis: *Stellar Streams Investigated: Constraining the Milky Way halo potential with GD-1 and Palomar 5 and unravelling the secrets of Jhelum using Gaia DR2 and SDSS DR9 data*
Supervisors: Prof. dr. A. Helmi and dr. E. Balbinot

Academic awards and grants

April 2024

Leids Kerkhoven-Bosscha Fonds travel grant to attend "The Milky Way Assembly Tale" conference in Bologna (May 2024)

Nov. 2022

KHWM Jong Talent Afstudeerprijs 2022
Award for the best Dutch astronomy master thesis of the year 2022

Attended conferences, workshops and schools

IAU 403 Symposium (Oct. 2025, Córdoba, Spain)

The Hidden Beauty of the Galactic Outskirts
Talk: The evolution of stellar streams in highly realistic simulated Milky Ways

ExGal-Twin/Durham Advanced School on Astrophysical Simulations (Sept. 2025, Durham, UK)	School of 1 week on astrophysical simulations. I presented my ongoing work on streams in constrained Local Group simulations in a **Flash Talk**.
NOVA NW1 meeting (Jan. 2025, NL)	**Talk:** The Helmi Streams require a mildly triaxial inner dark matter halo
Streams 24: The Theory Edition (August 2024, Durham)	**Talk:** Phase-mixed streams as probes of the Galactic potential: the Helmi Streams require a triaxial DM halo
The Milky Way Assembly Tale - Plot and characters as of today, and what to expect in future editions (May 2024, Bologna)	**Talk (replacing Amina Helmi together with Emma Dodd):** The Milky Way's assembly tale told by the different characters **Contributed poster:** Substructure as probes of the Galactic potential: the phase-mixed Helmi Streams require a triaxial DM halo
XXXIV Canary Islands Winter School of Astrophysics (Nov. 2023, Tenerife)	**The Local Group as a benchmark for Galaxy Evolution** School of 1 week on the formation and evolution of galaxies in the Local Group
Vatican Observatory Summer School 2023 (Italy)	**Learning the Universe, Data Science Tools for Astronomical Surveys** School of 4 weeks on Big Data and Machine Learning
Nederlandse Astronomen Conferentie 2023 (NL)	**Contributed poster:** A novel constraint on the Milky Way's inner dark matter halo's shape using phase-mixed streams
NOVA meeting (Jan. 2023, NL)	**Contributed poster:** Unravelling the complexity of the stellar stream Jhelum with a tentative role for the dwarf galaxy Sagittarius
Lorentz Workshop (2022, NL)	**Towards Real-Time Galactic Dynamics** **Invited talk:** A novel constraint on the Milky Way's inner dark matter halo's shape using phase-mixed streams
EAS Annual Meeting 2022 (Spain)	**Contributed talk:** A novel constraint on the Milky Way's inner dark matter halo's shape using phase-mixed streams **Contributed poster:** Unravelling the complexity of the stellar stream Jhelum with a tentative role for the dwarf galaxy Sagittarius

Teaching and supervision

Co-supervision of bachelor students Sabine van den Brom, Hannelys Posthumus	with Amina Helmi, successfully defended their theses, titled "Finding resonant stellar streams in the Milky Way" and "Determining Resonances of Stellar Streams in the Milky Way halo", respectively.
Co-supervision of bachelor student Dominic Popp	with Amina Helmi, successfully defended his thesis titled "The relation between the ED-3 halo substructure and the globular cluster NGC 3201"

	Teaching Assistant	Calculus 1 (2019), Introduction Astronomy (2020), Astroparticle Physics (2021, 2023), Introduction Astronomy (2023), Introduction Astronomy (2024), Physics of Stars (2025).

Technical skills

Programming	Python, AGAMA, galpy, gala, GADGET-4, pynbody
Other	LaTeX, Excel

Others

Committees	Friday Talk organizer at the Kapteyn Institute (2025-now) Arxiv meeting organizer (2024-now) Set up and was part of the PhD Representatives at the Kapteyn Institute (2023-2025) PhD Representative within the Astronomy Program Committee (2023-now) Friday Borrel organizer at the Kapteyn Institute (2022-2023)
Outreach	"Getal van het Jaar"-verkiezing (2022), invited talk "Sterren Bewegen" for kids via JWG Groningen (2023), astronomy student for a morning (2023), invited talk "Hoe doe je onderzoek" for highschool students (2023), "De Melkweg" for kids via IMC Weekendschool Groningen (2023), invited talk "Dynamica en geschiedenis van de Melkweg en recente ontdekkingen van Gaia" at Vereniging voor Weer- en Sterrenkunde Noord-Drenthe (2024), invited talk "Wat vertellen de sterren om ons heen ons over de Melkweg?" at Museumfabriek Twente (2024), invited talk "Sterren Bewegen" at Landelijke Sterrenkijkdagen Groningen (2025), invited talk "Galactische Archeologie" at Stichting Weer- en Sterrenkunde Eemsmond (2025)
Languages	Dutch (native), English (fluent, C1), French (B2), German (elementary), Italian (elementary)

References

Prof. dr. A. Helmi	ahelmi@astro.rug.nl, Kapteyn Astronomical Institute, Groningen, the Netherlands

Publications – Accepted - First Author

Characterization and dynamics of the peculiar stream Jhelum. A tentative role for the Sagittarius dwarf galaxy
Woudenberg, H. C., Koop, O., Balbinot, E., and Helmi, A., *Astronomy and Astrophysics*, vol. 669, 2023. doi:10.1051/0004-6361/202243266.

First measurement of the triaxiality of the inner dark matter halo of the Milky Way
Woudenberg, H. C., and Helmi, A., *Astronomy and Astrophysics*, vol. 691, 2024. doi:10.1051/0004-6361/202451743.

The chaos induced by the Galactic bar on the orbits of nearby halo stars
Woudenberg, H. C., and Helmi, A., *Astronomy and Astrophysics,* vol. 700, 2025. doi: 10.1051/0004-6361/202555672

Publications – Accepted - Other

Swarming in stellar streams: Unveiling the structure of the Jhelum stream with ant colony-inspired computation
Awad, P., Canducci, M., Balbinot, E., Viswanathan, A. **Woudenberg, H.C.**, Koop, O., Peletier, R., Tino, P., Starkenburg, E., Smith, R., Bunte, K., *Astronomy and Astrophysics,* vol. 683, 2024. doi: 10.1051/0004-6361/202347848

Chemical characterisation of small substructures in the local stellar halo
Dodd, E., Matsuno, T., Helmi, A., Balbinot, E., Callingham, T.M., Starkenburg, E., **Woudenberg, H.C.,** and Ruiz-Lara, T., *Astronomy and Astrophysics,* vol. 700, 2025. doi: 10.1051/0004-6361/202554252

The metal-poor tail of the APOGEE survey. I. Uncovering [Fe/H] < -2.5 stars from the inner Galaxy to the Magellanic Clouds
Montelius, M, Starkenburg, E., **Woudenberg, H.C.,** Angrilli Muglia, A., Ardern-Arentsen, A., Viswanathan, A., Byström, A., Helmi, A., Martin, N., Matsuno, T., Navarrete, C., and Navarro, J., in production