Andrea Gebek

Postdoctoral Researcher in Astrophysics

University of Bath, UK ag4038@bath.ac.uk

Research Experience

Postdoctoral Research Associate — Oct 2026 - present
Department of Physics, University of Bath — Bath, UK

Postdoctoral Researcher — Nov 2025 - Jun 2026
Faculty of Sciences, Universiteit Gent — Ghent, Belgium

Education

Doctor of Science: Astronomy — Sep 2020 - Oct 2025
Faculty of Sciences, Universiteit Gent — Ghent, Belgium

- PhD Thesis: From cosmological simulations to observables: Radiative transfer models and their comparison with real galaxies
- Advisor: Maarten Baes

Master of Science ETH in Physics — Sep 2018 - Aug 2020
Departement Physik, Eidgenössische Technische Hochschule Zürich — Zurich, Switzerland

- Master Thesis: Alpha-enhancement in the EAGLE simulation
- Advisors: Jorryt Matthee and Simon Lilly

Bachelor of Science in Physics with Special Qualification in Astronomy — Sep 2015 - Sep 2018
Philosophisch-naturwissenschaftliche Fakultät, Universität Bern — Bern, Switzerland

- Bachelor Thesis: Evolution of escaping exoplanet atmospheres in space and time
- Advisors: Apurva V. Oza and Christoph Mordasini

Publications

First-author

The mass-dependent UVJ diagram at cosmic noon. A challenge for galaxy evolution models and dust radiative transfer — Mar 2025
Andrea Gebek, Benedikt Diemer, Marco Martorano et al. — A&A

The many colours of the TNG100 simulation — Jul 2024
Andrea Gebek, Ana Trčka, Maarten Baes et al. — MNRAS

The atomic-to-molecular hydrogen transition in the TNG50 simulation: Using realistic UV fields to create spatially resolved HI maps — Jun 2023
Andrea Gebek, Maarten Baes, Benedikt Diemer et al. — MNRAS

On the variation in stellar alpha-enhancements of star-forming galaxies in the EAGLE simulation — Jan 2022
Andrea Gebek and Jorryt Matthee — ApJ

Alkaline exospheres of exoplanet systems: evaporative transmission spectra — Oct 2020
Andrea Gebek and Apurva V. Oza — MNRAS

Other publication data

- First-author publications: 5 (111 citations)
- Second/third-author publications: 6 (90 citations)
- Other co-authored publications: 16 (539 citations)
- h-index including all refereed articles: 13

Granted Funding & Resources

Computation time: Tier-1 Compute Grant 2026
2.4 Million CPU hours at the HPC infrastructure (sofia) of the Flemish Supercomputing Center (VSC)

Computation time: Tier-1 Compute Grant 2025
3.5 Million CPU hours at the HPC infrastructure (Tier-1 Hortense) of the Flemish Supercomputing Center (VSC)

PhD Fellowship Fundamental Research Nov 2021 - Oct 2025
Research Foundation Flanders (FWO)

Observing time: Scientific co-I for VLT/ESPRESSO 2020-2021
Proposal title: Anomalous Sodium at WASP-49b: Evidence of Circumplanetary Evaporation akin to the Jupiter System?

Observing time: Scientific co-I for KECK/HIRES 2019-2021
Proposal title: Exogenic Metals at Two Close-in Gas Giant Systems

Awards

46th International Physics Olympiad Jul 2015
Honorable Mention Mumbai, India

Talks

Lorentz Center Workshop Nov 2026
From Galaxy Formation Simulations to Observations Using Forward Modelling Leiden, Netherlands

Colloquium at University of Sussex Oct 2026
Making simulated galaxies visible with dust radiative transfer Falmer, UK

High-redshift galaxy formation at the interface between observations and simulations Jan 2026
Dust on-the-fly: A crucial ingredient for realistic mock observations? Munnar, India

SWIFTCON Oct 2025
Dust radiative transfer modelling: The fiducial COLIBRE-SKIRT pipeline Leiden, Netherlands

SKIRT Days 2025 Oct 2025
COLIBRE: How to radiative transfer a simulation with a live dust model Ghent, Belgium

COLIBRE extended team meeting Apr 2025
SKIRT dust radiative transfer Leiden, Netherlands

COLIBRE extended team meeting Sep 2024
COLIBRE in UV-FIR broadbands Leiden, Netherlands

SKIRT Days 2024 — May 2024
How to simulate the reddest galaxies ever — Ghent, Belgium
Mock HI maps in TNG50

Modeling MeerKAT's 2 — Feb 2024
Mock HI images from TNG50: The evolution of the HI size-mass relation up to z=0.5 — Stellenbosch, South Africa

New simulations for new problems in galaxy formation — Dec 2023
Dusty, star-forming galaxies at z=2: Can simulations reproduce these extreme galaxies? — Paris, France

SKIRT Days 2022 — Dec 2022
A 21 cm view of the TNG universe — Ghent, Belgium

EAS 2022 — Jun 2022
The Atomic-to-Molecular Transition in IllustrisTNG: Exploration of HI Maps using Realistic UV Fields — Valencia, Spain

Nederlandse Astronomenconferentie 2022 — May 2022
The Atomic-to-Molecular Transition in IllustrisTNG: Exploration of HI Maps using Realistic UV Fields — Blankenberge, Belgium

EPSC-DPS joint meeting 2019 — Sep 2019
Nonhydrostatic Density Profiles of Sodium & Potassium at Close-in Gas Giant Exoplanets — Geneva, Switzerland

Mentoring Experience

Thorben Plugge (Leiden Observatory) — Sep 2025 - Jul 2026
Host galaxy obscuration of AGN in the X-ray regime (co-supervision) — MSc thesis

Mathieu Willems (Ghent University -> STScI Baltimore) — Sep 2023 - Jul 2024
Hidden in the shadows: Dark HI clouds — MSc thesis

Teaching

Theoretical and Numerical Astrophysics — 2024-2025
MSc-level course (co-developed & led computational group project in Python) — Ghent University

Radiative Transfer Simulations in Astrophysics — 2022/2024
MSc-level course (co-developed & led computational group project in Python) — Ghent University

Astrophysical Simulations — 2022-2023
MSc-level course (led exercise sessions and computational group project in C++) — Ghent University

Service

- Refereed four articles for the journals Universe, MNRAS, and A&A.
- Co-organizer of the SKIRT Days (2022/2024/2025), a meeting with 30-40 participants for users and developers of the SKIRT dust radiative transfer code.