CURRICULUM VITAE – JORRYT MATTHEE

Department of Physics, ETH Zürich, Wolfgang-Pauli-Strasse 27, 8093 Zürich, Switzerland
phone: +41 44 632 42 13 – email: mattheej@phys.ethz.ch

RESEARCH INTERESTS

Galaxy formation in the early Universe – Cosmic reionization – Properties of the inter-stellar medium and stellar populations – Escape of ionizing radiation – Galaxy scaling relations – Galaxy-halo connection – Star formation histories – Chemical evolution.

RESEARCH IMPACT

· **Pioneering observations of galaxies in the early Universe**
I have contributed to the discovery and confirmation of rare bright galaxies at the end-stages of cosmic reionisation and lead follow-up campaigns to unveil their resolved structures and demonstrate that these reside in large early ionised bubbles. I developed and implemented new methods to identify the sources of reionization and am in a key position to test these with upcoming facilities.

· **A new way to understand galaxy evolution**
I developed new ways to analyse the multi-dimensional and temporal correlation structures of simulated galaxies. I revealed intimate connections between the assembly of dark matter halos, the formation of galaxies, the chemical abundances of gas and stars, and how these correlation structures impact well-known scaling relations.

· **Publication and Talk record**
I have co-authored **69 peer-reviewed publications** in scientific journals, of which I published **17 as first author** and **9 as second author**. Two second author papers are first-authored by students primary supervised by me. These articles have acquired $>$ **2700 citations**, of which $>$ **880 on first author papers.** h-index: 31. I have given >30 invited seminars and colloquia and >50 contributed talks at international workshops and conferences.

CAREER & EDUCATION

Assistant Professor, the Institute of Science and Technology Austria *September 2023 -*
Leader of a research group in the astrophysics of galaxies

Zwicky Prize Fellow, ETH Zürich *October 2018 - September 2023*
Independent postdoctoral researcher

PhD in Astronomy, Leiden University *September 2018*
Thesis: "Identifying the origins of galaxy formation"
Promotors: prof. H. Röttgering, prof. J. Schaye, Supervisor: dr. D. Sobral (Lancaster)

Master of Science (MSc) in Astronomy, Leiden University *September 2014*
De Sitter Cosmology specialisation *Cum Laude*. GPA 4.0/4.0.
Thesis: "The origin of scatter in galaxy scaling relations"
Supervisor: Prof. J. Schaye, dr. R. Crain

Bachelor of Science (BSc) in Liberal Arts & Sciences, Utrecht University *September 2012*
Major Physics & Astronomy *Cum Laude*, GPA 4.0/4.0
Honours minor 'Descartes College' on Philosophy of Science
Thesis: "Multiple stellar generations in globular clusters"
Supervisor: dr. Soren Larsen

HONORS

· MERAC Prize for best PhD Thesis in Observational Astrophysics, 2020
· IAU PhD Prize, Division J Galaxies and cosmology, International Astronomical Union, 2018
· C.J. Kok Jury Award, Best PhD thesis, Science Faculty, Leiden University, 2018
· Zwicky Prize Fellowship, ETH Zurich, 2018 -
· Huygens PhD fellowship, Leiden University, 2014-2018
· Master of Science Cum Laude, Leiden University, 2014
· Bachelor of Science Cum Laude, Utrecht University, 2012

SERVICES

· Referee for MNRAS, ApJ, Nature, Nature Astronomy, A&A.
· 10.4m Gran Telescopio Canarias time allocation reviewer.
· Organiser PhD talks in 2016 and Galaxy Journal Club in 2017-2018, both at Leiden Observatory.

STUDENT SUPERVISION

Supervisor **MSc thesis** research projects:
· Andrea Gebek, ETH Zurich, 2020 (now a PhD student at University of Ghent with M. Baes).
· Sergio Santos, University of Lisbon (co-supervisor), 2016 (continued to PhD at Lancaster University with D. Sobral).

Supervisor **undergraduate** research projects:
· Artem Basyrov, Yuzheng Kang, Andrea Gebek, Cheryl Lüssi, Christopher Golling at ETH Zurich, 2019-2022.
· Bayu Wilson, summer student at Leiden Observatory, 2017.

TEACHING

· **Substitute lecturer** 'Astrophysics I' at ETH Zurich, 2020-2022.
· **Substitute lecturer and teaching assistant** 'Evolution of the Universe' at ETH Zurich, 2019.
· **Teaching assistant** BSc course 'Life in the Universe' at ETH Zurich, 2019 and 2020.
· **Teaching assistant** for 2nd year BSc course 'Stars' at Leiden University in the years 2014-2017.

TALKS

Invited seminars, long talks and colloquia:
2015-2018: Hilo (Hawaii, USA), Lisbon (Portugal), Santa Cruz de La Palma (Spain), Riverside (USA), Leiden (NL)

2019: Lancaster (UK), Oslo (Norway)

2020: STScI (Baltimore, USA, remote), Plenary seminar during EAS 2020 (Leiden, remote), UC Santa Barbara workshop (remote), University of Geneva/EPFL Lausanne (remote), Stockholm University (remote)

2021: UC London (remote), ESO (remote), ESO Hypatia Colloquium (remote), Cosmic Dawn Centre Copenhagen (remote), University of Zurich (remote), Kapteyn Institute Groningen (remote), Instituto Astrofisica Canarias (Spain), University of Arizona (remote)

2022: XXXIst General Assembly of the International Astronomical Union (Korea)

Contributed talks at international workshops and conferences:
2015-2018: Sintra (Portugal), Groningen (NL), Paris (France), Crete (Greece), Nunspeet (NL), Heidelberg (Germany), Salt Lake City (USA), Cambridge (UK), Leiden (NL), Liverpool (UK), Strasbourg (France), Crete (Greece)

2019: Leiden (Netherlands), Goslar (Germany), Viana do Castelo (Portugal), Rome (Italy), Braga (Portugal)

2020: Sesto (Italy), Sazerac (virtual), EAS (virtual), STScI (virtual), Toulouse (virtual)

2021: EAS Leiden (remote)

2022: Carnegie / Universidad Diego Portales (remote)

SUMMARY OF AWARDED TELESCOPE TIME

· **Principal Investigator** for **18 hours** on the James Webb Space Telescope using NIRCam (2021), **218 hours** on the Very Large Telescope with the X-SHOOTER, MUSE and FLAMES instruments (2017-2022), **15 hours** on ALMA (2017-2019) and **36 nights** on the Isaac Newton Telescope (2016-2018).
· **Co-Investigator** on programs totalling 203 hours on JWST, 293 hours VLT, 106 hours VST, 14 hours ALMA, 38 orbits HST, 7 nights Keck, 10 nights CFHT, 8 hours GTC, 15 nights WHT and 49 nights INT.

Selected PI proposals:

· **26 hours on VLT/MUSE**, 'Disentangling the role of ISM and IGM on the Lyα Escape fraction from galaxies in JWST QSO fields', 2022.
· **36 hours on VLT/FLAMES**, 'Solving the Lyman Continuum escape fraction problem with high-resolution Lyman-α', 2022.
· **41.2 hours on VLT/X-SHOOTER**, 'Charting the luminosity dependence of the escape fraction of ionizing photons using lensed Lyα emitters at $z \sim 3$', 2022.
· **18.3 hours on JWST**, 'Anatomy of an ionized bubble at z=6.6: Which galaxies reionized the Universe?', 2021.
· **16 hours on VLT/FLAMES**, 'How does the shape and strength of the Lyα line vary among [OIII] emitters at z = 3?', 2021.
· **6.8 hours on ALMA**, 'The ISM properties and systemic redshift of a unique double-peaked Lya emitter in the epoch of re-ionisation', 2018.
· **72 hours on VLT/X-SHOOTER**, 'LYRS-z2: A spectroscopic Lyman-α Reference Sample at the peak of cosmic star formation history', 2018.

Selected co-I proposals:

· **114.3 hours on JWST/NIRCam** 'Exploring the End of Cosmic Reionization' (PI S. Lilly), 2021.
· **23.9 hours on JWST/NIRSpec** 'Emission line galaxies beyond the limits of the Hubble UDF: Physical conditions in ultra-faint star forming galaxies' (PI M. Maseda), 2021.
· **41.9 hours on JWST/NIRCam** 'The first blind H-alpha narrow-band survey of star-formation at $z > 6$' (PI P. Best), 2021.
· **24.4 hours on JWST/NIRSpec** 'Unraveling the knots of gaseous Cosmic Web filaments at $z \sim 3$ through H-alpha emission observations' (PI S. Cantalupo), 2021.
· **42 hours on ALMA** 'Unveiling a Massive Node of the Cosmic Web at z=3' (PI S. Cantalupo), 2021.
· **100 hours on VLT/MUSE** 'The MUSE cosmic assembly survey targeting extragalactic legacy fields (MUSCATEL)' (PI L. Wisotzki), 2019-2021.
· **63 hours on VLT/MUSE** 'Extended Lyman alpha emission in the neighbourhood of high redshift quasars at $z > 3$' (PI S. Cantalupo/S. Lilly), 2018.
· **44 hours on VLT/HAWK-I** 'HAWKI into the epoch of re-ionisation: a pilot for the first z=7.7 Lyα to unveil early ionisation bubbles and the nature of their luminous hosts' (PI D. Sobral), 2017.

INTERNATIONAL COLLABORATIONS

· Principal Investigator 'The X-SHOOTER Lyman-α Survey', including collaborators in the UK, Switzerland, Sweden, Germany, The Netherlands, Chile, France and the US.
· Core-Member of JWST/NIRCam Large Program Emission-line galaxies and Intergalactic Gas in the Epoch of Reionization (EIGER, PI: Lilly).
· Core-Member of JWST/NIRCam Medium Program JWST Emission-Line Survey (JELS, PI: Best), that builds upon the HiZELS survey and my work on CALYMHA (Matthee et al. 2016).
· MUSE GTO instrument science team member

OUTREACH ACTIVITIES

· Interview in online outreach video on Bilibili (Chinese, clickable link), 82k views, July 2022.
· Interview in online outreach video on Bilibili (Chinese, clickable link), 17k views, December 2021.
· Interview in online outreach video on YouTube (clickable link), 1.1k views, July 2020.
· Public talk 'Witnessing the formation of galaxies', part of a series on 'Cosmos: Science & Arts', Museum Boerhaave Leiden (NL), March 2020.
· Public seminar on 'Where do we come from? An astrophysical perspective', Windisch (CH), June 2019.
· Public talk on 'The first stars', Physics on Tap, ETH Zurich, March 2019.
· Public talk on 'The first stars', Astronomy on Tap, Leiden University, July 2018.
· Volunteered on 'NEMO/Klokhuis vragendag' organised by Dutch public broadcaster NTR ($\sim$ 500 participants). Answered live questions on astronomy from 6-12 year olds. May 2018.
· Research article on ALMA observations of CR7 featured in 'NOVA' - research highlights from the American Astronomical Society. 18 April 2018.

OUTREACH WRITINGS

· Invited publication in 'News & Views', 'Differences in galaxy colours are not just about the mass', Nature Astronomy 5, pages 984-985 (2021).
· Publication in Dutch amateur astronomy magazine 'Universum', target audience 8-18 year old, Spring edition 2018, in Dutch.
· Publication in the Dutch magazine for physicists, 'Nederlands Tijdschrift voor de Natuurkunde', June 2017. Printed Dutch version, online Dutch+English version.
· Press release 'Photons struggle to escape distant galaxies', January 2017. Covered in national and international astronomy news websites.
· Press release on the CR7 galaxy through ESO, June 2015. World wide coverage in e.g. NY Times, Nature news, Phys.org, National Geographic, BBC sports, and others. Japanese NHK broadcasted a 1hr TV documentary. Story covered in several popular science magazines.

NON-ACADEMIC INTERESTS

Reading (literature, history, popular science, mythology, politics, economics, philosophy); Sports (practicing cycling, speedskating, hiking); Music (playing piano); Writing (fiction).

REFERENCES

– Dr. David Sobral, Reader in Astrophysics, Lancaster University, d.sobral@lancaster.ac.uk
– Prof. Simon Lilly, Professor of Experimental Astrophysics, ETH Zurich, simon.lilly@phys.ethz.ch
– Prof. Joop Schaye, Professor in Galaxy Formation, Universiteit Leiden, schaye@strw.leidenuniv.nl
– Prof. Huub Röttgering, Professor in Cosmology, Universiteit Leiden, rottgering@strw.leidenuniv.nl