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Silvia Onorato

Curriculum Vitae

I am a Ph.D. student at Leiden Observatory working with optical and near-infrared spectroscopy of high redshift quasars. My focus is to place constraints on the fraction of neutral hydrogen, quasar lifetimes, and radiative efficiency of supermassive black holes by studying their proximity zones. I am also a researcher in stellar astrophysics, specialized in the study of multiple stellar populations through ultraviolet and optical photometry.

5 papers, of which 3 as a first-author; a complete publication list is enclosed and available on NASA/ADS.

Education

2021–Nov 2025 **Ph.D. in Astrophysics**, *Leiden Observatory*, Leiden, The Netherlands
Thesis title: *"High redshift quasars as probes of supermassive black holes and the intergalactic medium in the Epoch of Reionization"*; Supervisor: Prof. Joseph F. Hennawi.

2018–2021 **MSc in Astrophysics and Cosmology**, *Alma Mater Studiorum University of Bologna*, Bologna, Italy, Final grade: *109/110*. GPA: *28.24/30*.
Thesis title: *"The primordial structure of Multiple Populations in the Globular Cluster NGC 2419"*; Supervisors: Mario Cadelano, Emanuele Dalessandro, Barbara Lanzoni

2015–2018 **BSc in Astronomy**, *Alma Mater Studiorum University of Bologna*, Bologna, Italy, Final grade: *106/110*. GPA: *27.35/30*.
Thesis title: *"Mechanisms of Energy Transport in Astrophysics"*; Supervisor: Daniele Dallacasa

Work experience

Dec 2025 (upcoming) **Postdoctoral Researcher**, *Gemini Observatory/NSF NOIRLab*, Hilo, Hawaii, USA
Topic: High-redshift quasar studies with JWST; Supervisor: Dr. Emanuele Paolo Farina.

2022–present **Teaching assistant**, *Leiden Observatory*, Leiden, The Netherlands

2022 **Telescope observations**, *Leiden Observatory*, Leiden, The Netherlands
We observed for two nights remotely using Keck/LRIS.

Scientific collaborations

2024–present **Member of the EREBUS collaboration**

2021–present **Member of the PypeIt collaboration**

Honours and grants

2024 **Travel funding for "Probing the Genesis of Supermassive Black Holes" conference**, *Kavli IPMU*, Kashiwa, Japan

2017 **Incentives to deserving students enrolled in the a.y. 2015/16 in courses belonging to classes L-41, L-27, L-30 and L-35**
Winner of the scholarship: "Notice of competition for the allocation of incentives for deserving students enrolled in courses of study in the a.y. 2015/16 of special national and community interest at the University of Bologna" issued by Alma Mater Studiorum.

Telescope experience

I have reduced data obtained from the following facilities: HST WFC3/UVIS, VLT/X-Shooter, Gemini/GNIRS, Keck/NIRES, Gemini/GMOS, Keck/LRIS, Keck/DEIMOS, LBT/MODS, LBT/LBC, MPI/WFI, VLT/GIRAFFE, Chandra, VLA.

Digital skills

Analysis of optical and near-infrared spectra with `PypeIt`.

Analysis of ultraviolet and optical data with `DAOPHOT` and IRAF.

Analysis of X-ray data with CIAO and XSPEC.

Analysis of radio data with AIPS.

Knowledge of Python, Fortran90, R, GitHub, LaTeX, and Microsoft Office.

Knowledge of DS9, Ginga, TopCat, Sculptor, SuperMongo, and CataPack.

Colloquia/Conference contributions

Invited talk

2024 **Invited colloquium**, *University of Bologna/INAF-OAS*, Bologna, Italy

Contributed talk

2025 **EREBUS/COSMOS-3D meeting 2025**, *INAF-OAS*, Bologna, Italy

2024 **Probing the Genesis of Supermassive Black Holes: Emerging Perspectives from JWST and Expectation toward New Wide-Field Survey Observations**, *Kavli IPMU*, Kashiwa, Japan

2024 **The Origin and Evolution of Supermassive Black Holes**, Sexten, Italy

2024 **Massive Black Holes in the First Billion Years**, Kinsale, Ireland

2023 **NOVA Fall School**, *ASTRON*, Dwingeloo, The Netherlands

2023 **Young Astronomers on Galactic Nuclei**, *YAGN23*, Palermo, Italy

2023 **Reionisation in the Summer**, Heidelberg, Germany

2022 **Panchromatic view of the life-cycle of AGN**, *ESAC*, Madrid, Spain

Lightning talk

2024 **Cosmic Dawn Revealed by JWST: The Physics of the First Stars, Galaxies, and Black Holes**, *KITP*, Santa Barbara, USA

2024 **European Astronomical Society Annual Meeting 2024**, *EAS24*, Padua, Italy

2023 **First Light in the Early Universe**, *MIT*, Cambridge, USA

2022 **What Drives the Growth of Black Holes?**, Reykjavík, Iceland

Workshop/Training courses

2024 **NOVA Ph.D. weekend**, *Being an effective presenter: body language and stage presence*, Almere, The Netherlands

2024 **NOVA-SKIES**, Amersfoort, The Netherlands

2024 **Active Bystander Course**, Leiden, The Netherlands

2021 **Time management**, Leiden, The Netherlands

2021 **Effective Communication**, Leiden, The Netherlands

2021 **Scientific integrity**, Leiden, The Netherlands

Proposals

2025 **Co-I of accepted JWST Cycle 4 proposal**, *Ushering in the JWST Era of Precision Constraints on Reionization: A Survey of Quasar IGM Damping Wings at* $6.5 < z < 7.4$
Proposal ID: 9180; 12 months; 01/07/2025 - 30/06/2026
PI: Joseph F. Hennawi

2021 **Co-I of accepted DOLORES/LBT proposal**, *Does the host galaxy set the IMF of star clusters?*
Proposal ID: IT-2021B-039; 12h; 30/05/2022 - 03/09/2023
PI: Mario Cadelano

Other activities and Service

2022–2023 **Borrel Committee**, *Leiden Observatory*, Leiden, The Netherlands
Organizer of weekly social gatherings for colleagues. Responsible for providing food and drinks, scheduling activities, and inviting people to the events.

2018 **Science outreach activity as a tour guide**, *Specola Astronomical Museum*, Bologna, Italy

2012–2015 **Tutor in Math and Physics**, Bagheria, Italy

2004–present **Volleyball player**
2023–present: SKC Leiden. 2017: PGS Welcome Bologna. 2004–2015: U.S. Volley Bagheria.

Languages

Italian Mother tongue

English Fluent

Other interests

I am very passionate about volleyball, skiing, and cycling. While I discovered the first of my passions long ago, the last two proved to me that I can always learn new beautiful things, as I learned skiing in 2023 and cycling in 2022. From my Sicilian heritage, I inherited a deep connection with the sea, but recently I also discovered I like to hike to the mountains. I really love traveling and discovering new places to take pictures of. In my chilling time, I love to read books and watch TV series.

References

Joseph F. Hennawi, *UCSB/Leiden Observatory* *joe@physics.ucsb.edu*

Mario Cadelano, *University of Bologna/INAF-OAS* *mario.cadelano@unibo.it*

Jan-Torge Schindler, *Hamburg Observatory* *jtschindler@hs.uni-hamburg.de*

Main collaborators

Bram P. Venemans, *Leiden Observatory*

Anna-Christina Eilers, *MIT Kavli Institute for Astrophysics and Space Research*
Silvia Belladitta, *MPIA*
Jinyi Yang, *University of Michigan*
Feige Wang, *University of Michigan*
Frederick B. Davies, *MPIA*
Sarah E. I. Bosman, *MPIA/Institute for Theoretical Physics, Heidelberg University*

Publications

Published/Submitted

1. **Silvia Onorato**, Mario Cadelano, Emanuele Dalessandro, Enrico Vesperini, Barbara Lanzoni, and Alessio Mucciarelli 2023. The structural properties of multiple populations in the dynamically young globular cluster NGC 2419. Astronomy and Astrophysics, 677, A8.
2. **Silvia Onorato**, Joseph F. Hennawi, Jan-Torge Schindler, Jinyi Yang, Feige Wang, Aaron J. Barth, Eduardo Bañados, Anna-Christina Eilers, Sarah E. I. Bosman, Frederick B. Davies, Bram P. Venemans, Chiara Mazzucchelli, Silvia Belladitta, Fabio Vito, Emanuele Paolo Farina, Irham T. Andika, Xiaohui Fan, Fabian Walter, Roberto Decarli, Masafusa Onoue, and Riccardo Nanni 2025. Optical and near-infrared spectroscopy of quasars at $z > 6.5$: public data release and composite spectrum. Monthly Notices of the Royal Astronomical Society, staf787.
3. **Silvia Onorato**, Joseph F. Hennawi, Elia Pizzati, Bram P. Venemans, and Anna-Christina Eilers 2025. Homogeneous measurements of proximity zone sizes for 59 quasars in the Epoch of Reionization. ArXiv e-print; submitted to MNRAS.
4. Suk Sien Tie, Joseph F. Hennawi, Feige Wang, **Silvia Onorato**, Jinyi Yang, Eduardo Bañados, Frederick B. Davies, Jose Oñorbe 2024. First measurement of the Mg II forest correlation function in the Epoch of Reionization. Monthly Notices of the Royal Astronomical Society, stae2193.
5. Silvia Belladitta, Eduardo Bañados, Zhang-Liang Xie, Roberto Decarli, **Silvia Onorato**, Jinyi Yang, Manuela Bischetti, Masafusa Onoue, Federica Loiacono, Laura N. Martínez-Ramírez, Chiara Mazzucchelli, Frederick B. Davies, Julien Wolf, Jan-Torge Schindler, Xiaohui Fan, Feige Wang, Fabian Walter, Tatevik Mkrtchyan, Daniel Stern, Emanuele P. Farina, Bram P. Venemans 2025. Discovery and Characterization of 25 new Quasars at $4.6 < z < 6.9$ from Wide-Field Multi-Band Surveys. ArXiv e-print; accepted for publication to A&A.

In preparation

1. **Silvia Onorato**, Joseph F. Hennawi, Timo Kist, and Frederick B. Davies in prep. The Lyα transmission probability distribution function from the E-XQR-30 sample. (Analysis ongoing)