

Louise Dyregaard Nielsen

European Southern Observatory (ESO)
Karl-Schwarzschild-Straße 2
85748 Garching bei München, Germany

Phone: +49 (0) 1590 16 50 231

E-mail: Louise.Nielsen [at] eso.org

Born 1988 in Denmark (she/her)

Website: <https://louisedyregaard.github.io/>

Research fellow at European Southern Observatory (ESO), Germany

ESO fellow, mitigating and modelling stellar activity in radial velocity time series of young stars harbouring transiting planets. 75% science time, 25% functional work supporting NIRPS and ANDES instrument development. Dec 2021 - present.

Education

- 2017 Feb - PhD in astrophysics, Geneva Observatory at Geneva university, Switzerland. Thesis: *Density of Exoplanets*. Supervisor: prof. François Bouchy.
- 2021 Feb
- 2011 Sep - Master of Science with specialisation in astrophysics, the Niels Bohr Institute at
2015 Mar Copenhagen University, Denmark. Thesis: *Probing Kinematic and Thermal Properties of the Very Low Luminosity Object DC2742-04-IRS*, supervisor: prof. Jes Jørgensen.
- 2008 Sep - Bachelor of Physics with specialisation in Astronomy, The Niels Bohr Institute at
2011 Jun Copenhagen University, Denmark.

Employment history

- 2021 March - 2021 Nov **Swiss National Science Foundation fellow at Oxford University**, United Kingdom. Working on mitigating and modelling stellar activity in radial velocity time series of young stars harbouring transiting planets as part of Suzanne Aigrain's group.
- 2015 Oct - 2016 Dec **Young Graduate Trainee at the European Space Agency**, ESTEC, the Netherlands. Developing an exposure time calculator dedicated to transiting exoplanet observations with NIRSpec on the James Webb Space Telescope. Supervisor: Pierre Ferruit.
- 2015 May - Sep **Research Intern at the Gemini Observatory**, Hawaii. Reducing and processing spectra of high redshift galaxies. Supervisor: Inger Jørgensen.
- 2014 Mar - 2015 May **Student support astronomer at the Nordic Optical Telescope**, Spain. Planning and performing observations, supporting visiting astronomers, software development and instrument maintenance.
- 2013 Aug - 2014 Mar Research assistant at the Detector Group, University of Copenhagen, Denmark. Testing and characterizing CCDs and overall camera performance for astronomical use.
- 2010 Apr - 2014 Jun Laboratory instructor and teaching assistant at The University of Copenhagen. Taught Classical Mechanics and Electrodynamics.

Published work

4 first author papers (+3 not peer reviewed), 83 additional publications (+14 not yet peer reviewed).
H-index 24. Full list can be found at the ADS:
https://ui.adsabs.harvard.edu/public-libraries/NItFdYS2Q2OuJ_TZLSQsag
and ORCID 0000-0002-5254-2499.

Approved research projects

As principle investigator

ESO research fellowship, Dec 2021, 3 year fellowship at European Southern Observatories.

Fraunhofer fellowship, 2021, 2+3 year fellowship at Ludwig-Maximilians-Universität Munich. Declined.

SNSF Early Postdoc.Mobility, Feb 2021, 18 month fellowship, grant no. P2GEP2_200044.

Exploring the transition between ice- and gas giant exoplanets

12 nights on HARPS-ESO3.6m, 2020 + 2021, prog. 105.20FX & 106.216H.

Understanding giant planet formation through precise mass measurements of TESS planets

6 nights on HARPS-ESO3.6m, 2019, prog. 0103.C-0874.

Accurate Mass Determination of Bloated Saturns from the WASP-south Survey

5 nights on HARPS-ESO3.6m, 2019, prog. 0102.C-0414.

As co-investigator

Too Hot to Handle: TOI-824b, a young, highly irradiated Neptune along the edge of the desert

8 hr on ESPRESSO-VLT, 2020, prog. 106.20ZR.

SPICED: a Spectroscopic Inquiry of Close-in Exoplanets below the Desert

20 hr on ESPRESSO-VLT, 2020, prog. 106.20ZL.

Exploring the properties of warm mini-Neptunes revealed by TESS

68 hr on ESPRESSO-VLT, 2020, prog. 105.20P7.

Characterizing properties of TESS long-period giant planets

7.2 nights on HARPS-ESO3.6m, 2020, prog. 0105.C-0809.

NGTS-HARPS Program: Short, Young, and Cool

6.3 nights on HARPS-ESO3.6m, 2020, prog. 105.20G9.

Atmospheric escape in the young transiting planet DS Tuc A b

5 Orbits, STIS - Hubble Space Telescope, 2020, Cycle 27.

Naked Cores: Exploring the internal structure of planets with HARPS

72 nights on HARPS-ESO3.6m, 2018-2020, prog. 1102.C-0249.

Probing the transition between ice giants and gas giants with the NGTS Survey

16 nights on HARPS-ESO3.6m, 2017-2019, prog. 0101.C-0623, 0103.C-0719 & 0104.C-0588.

Characterising Hot Neptunes and Super-Earths from the NGTS Survey

6.1 nights on HARPS-ESO3.6m, 2017, prog. 0100.C-0474.

Talks and Seminars

- ★ ESO-Vitacura Thirty Minute Talk, Feb 2023, Santiago de Chile.

Invited talk: The transition between Ice and Gas giants.

- ★ Disks and Exoplanets across ESO facilities, November 2022, Garching.
Invited talk: Exoplanet Detection.
- ★ Exoplanets IV conference, May 2022, Las Vegas.
Contributed talk: Transition between Ice and Gas giants explored with TESS and RV follow-up.
- ★ GPRV workshop, March 2022, Oxford.
Invited talk + discussion: Robust RV masses of young planets.
- ★ TESS Science Team Meeting, Dec 2021, online.
Talk: public data release from the vetting of TESS target with CORALIE
- ★ TESS Science conference II, July 2021, Pasadena/online.
Poster: Spectroscopic vetting of TESS planet candidates with CORALIE on the Swiss 1.2m telescope.
- ★ KIPAC Tea series at Stanford University, May 2021, online.
Invited talk: Towards robust characterisation of young transiting planets.
- ★ SPIMAX seminar, May 2021, Oxford/online.
Invited talk: Probing planet formation through in-depth characterisation of transiting planets.
- ★ UK exoplanet meeting April 2021, Birmingham/online
Contributed pop-talk: Transition between ice and gas giants.
- ★ Astronomy seminar LMU, Jan 2021, Munich/online.
Invited talk: Snapshot of planet evolution: overcoming stellar noise to characterise young systems.
- ★ CfA Virtual Exoplanet Pizza Lunch, Nov 2020, Harvard/online.
Invited talk: Transition between Ice and Gas giants explored with TESS and radial velocity measurements.
- ★ Exoplanets III conference, July 2020, Heidelberg/online.
Contributed talk: The transition between Ice and Gas giants.
- ★ Geneva observatory seminar, June 2020, Geneva.
Seminar: Exoplanet demographics in the era of TESS.
- ★ Online TESS science meeting, June 2020, online.
Contributed talk: The transition between Neptune- and Saturn-like planets.
- ★ Jet Propulsion Laboratory's astrophysical journal club, February 2020, Pasadena, USA.
Invited talk: Exploring the transition between Ice and Gas giant exoplanets.
- ★ EPSC-DPS conference, September 2019, Geneva.
Contributed talk: Exploring the transition between ice- and gas giant exoplanets from TESS.
- ★ Plato ESP workshop, September 2019, Warwick, UK.
Contributed talk: RV-follow up of mono-transits from TESS.
- ★ TESS science meeting, July 2019, Cambridge, USA.
Contributed talk: Precise mass determination of three mini-neptunes transiting TOI-125.
Poster: Radial velocity follow-up with CORALIE on the Swiss 1.2m Euler telescope.
- ★ Summer school on exoplanet-demographics, May 2019, Vietri, Italy.
Contributed talk: Exoplanet demographics in the era of TESS: results from the radial velocity follow-up from the first 9 sectors.
- ★ Swiss 'PlanetS' TESS workshop, May 2019, Geneva.
Overview talk: Results from TESS sectors 1-9 and ground based follow-up observations.
- ★ NIRPS Science team meeting, April 2019, Geneva.
Invited talk: Geneva activities on TESS-follow up.

- ★ Exoplanet II Conference, July 2018, Cambridge, UK.
Poster: Exploring the transition between ice & gas giants through ground-based transit surveys and radial velocity measurements
- ★ Extremely precise RVs III, August 2017, Penn State, USA.
Poster: Exploring the power of Fabry-Perot calibration with the spectrographs SOPHIE and CORALIE.
- ★ Transiting Exoplanets conference, July 2017, Keele, UK.
Poster: Radial Velocity Follow-up of SuperWASP Candidates with the Swiss Euler Telescope.
- ★ Swiss JWST workshop, May 2017, Bern, Switzerland.
Invited talk: Capabilities of NIRSPEC-JWST for exoplanet science.

Student supervision and mentoring

- ★ Mentoring several PhD students at ESO-Garching. 2022 - present.
- ★ *Linn Friis-Liby*
Research Intern: Combat stellar activity through chromatic analysis of radial velocities. ESO Summer Research programme 2022.
- ★ *Cebine Ragn*
High school student: 'Junior researcher' competition in Denmark. (un)Habitability of planets around M-dwarfs. Summer 2020.
- ★ *Jules Dallant*
Master student: TESS follow-up and exoplanet databases. Spring 2020.
- ★ *Francesco DeMarco*
Master student: comparing methods of modeling RVs + transit light curves. Spring 2020.
- ★ *Maulik Bhatt*
Master student: Optimizing TESS follow-up by identifying blended stellar binaries. Spring 2020.
- ★ *Maxime Zahler*
Bsc. student: Global statistic of TESS results. Autumn 2019.
- ★ *Mohamed Chehik*
Bsc. student: Caractérisation des premiers candidats exoplanètes de TESS. Autumn 2018.
- ★ *Carmelo Mileto*
Bsc. student: Follow-up of NGTS planet candidates. Spring 2018.
- ★ *Erik Lindstrom*
High school student: final year project. Transit analysis on WASP-47. Spring 2018.

Teaching and Outreach

- ★ 'Dance like the solar system planets' interactive orrery workshop at Goulash Disko Festival 2022
- ★ Occasional 'guest expert' on Danish radio show *Den nye Rumalder*
- ★ Co-creator and host of the Danish-speaking podcast *Stjerneklart* about astronomy and space exploration. 39 episodes: <https://stjerneklart.dk/>
- ★ Lecture on 'Exploring the building blocks of exoplanets' at ESO Summer Research Programme 2022.
- ★ Tours at ESO visitor center Supernova and ESO HQ, 2022.
- ★ Speaker at Girls day in Science, October 2021, Skive Gymnasium, Denmark.

- ★ Guest speaker astrophysics summer-student programme *Introduction to Exoplanet science in the era of TESS*, summer 2021, Oxford/online.
- ★ Speaker at recruitment event 'Be a Star in ESA's Universe'. Nov 2020, online.
- ★ Teacher assistant for Masters course on 'Exoplanet detection techniques' at Geneva Observatory, Spring 2020, including in-person and online teaching.
- ★ Tours, talks and observation nights at Geneva observatory, about 10 groups per year, 2017-2020.
- ★ Taught exercise- and lab classes for Bachelor students at physics at Copenhagen University, including Classical Mechanics and Electrodynamics. April 2010 - June 2014.
- ★ Jens Martin Knudsen award for best teaching of the year at the Niels Bohr Institute, Copenhagen University, along with the full team of instructors in 2014.

Community services & Collaborations

- ★ Representative for fellows and postdocs at ESO-Garching. 2022- present.
- ★ Organising weekly 'Stellar Coffee and Planetary Tea' at ESO-Garching. 2022- present.
- ★ Chair of the committee selecting ESO workshops for 2023.
- ★ Scientific Assistant on the ESO Observing Programmes Committee 2022 .
- ★ Reviewer for ApJ, 2020-2022, A&A 2022.
- ★ Reviewer for NASA's Exoplanets Research Program, 2021.
- ★ External scientific reviewer for OPTICON (2021) and Gemini (2021, 2022).
- ★ External scientific reviewer for the ERC consolidator grant, 2020.
- ★ Reviewer for the ESO peer review experiment, 2019.
- ★ Member of the TESS follow-up programme (TFOP) spectroscopic steering committee, representing CORALIE-science team and Geneva observatory, 2018 - 2021.
- ★ Member of the NIRPS science team, contributing to the exposure time calculator, commissioning and target selection, 2017 - 2021.
- ★ Member of the NGTS consortium, coordinating radial velocity follow up of NGTS planet candidates, vetting and target selection, 2017 - present.

Conference organisation

- ★ Session chair and discussion moderator, Disks and Exoplanets across ESO facilities, Garching, 2022
- ★ Discussion lead, EPRV Research Coordination Network mini-workshop, 2022
- ★ Co-convenor for splinter session on exoplanet characterisation at the UK National Astronomy meeting, Warwick, 2022
- ★ Co-organiser of the first GPRV workshop in Oxford 2022
- ★ Convenor for splinter session on Young Planets at TESS Science conference II, August 2021, Pasadena/online.
- ★ Lab assistant and moderator for hands-on session on planet spectra at Sagan Summer School July 2021, Pasadena/online.
- ★ Session chair at the Exoplanets Demographics Conference, Pasadena/online, November 2020.
- ★ Moderator for the Exoplanets III conference, Heidelberg/online, June 2020.

- ★ Conference assistant at EPSC-DPS joint meeting, Geneva, Switzerland, September 2019.
- ★ Organiser of the NGTS Science meeting in Geneva, Switzerland, May 2019 .
- ★ Organiser of the PlanetS TESS workshop in Geneva, Switzerland, May 2019.
- ★ Local organising committee for Extremely precise RV workshop IV, Grindelwald, Switzerland, Feb 2019.

Computing Experience

I am proficient in Python including the `ASTROPY` package, `TENSORFLOW` and simple machine learning, as well as Unix/Shell programming. I have experience using `IRAF/PyRAF`, Matlab, IDL, HTML and SQL.

Language skills

I speak English and Danish fluently.

German, French, Spanish and Dutch I can get by with in non-academic situations, as well as Swedish and Norwegian.