

Elyar Sedaghati

ASTRONOMER · ASTROPHYSICIST

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Education

DLR & ESO (German Space Agency, European Southern Observatory)

Berlin, Germany & Santiago, Chile

PHD IN ASTRONOMY & ASTROPHYSICS

Oct. 2014 - Jun. 2017

- **Thesis:** Exploring Alien Skies: *Detection & Characterisation of Exoplanetary Atmospheres with Groundbased Transmission Spectroscopy*
- **Defence:** 30. Jun. 2017. **Summa Cum Laude**
- **Advisors:** Prof. Heike Rauer (DLR) & Dr. Henri Boffin (ESO)

Freie Universität Berlin

Berlin, Germany

MASTER'S IN PHYSICS & ASTRONOMY

2012 - 2014

- **Thesis:** 1-year research project of exoplanet transmission spectroscopy with FORS2/VLT. **Grade 1.0**
- **Grade:** 120 ECTS (European Credit Transfer System) credits. **Overall grade 1.5 (Scale 1.0 to 5.0)**

Clare College, Cambridge University

Cambridge, United Kingdom

MASTER'S OF ARTS, NATURAL SCIENCES

2008

- Awarded automatically to all graduates of Cambridge University.

Clare College, Cambridge University

Cambridge, United Kingdom

BACHELOR'S OF ARTS, NATURAL SCIENCES

2001 - 2004

- **1st year:** Physics Ia, Mathematics Ia, Computer software, Computer hardware
- **2nd year:** Physics Ib, Advanced Physics II, Mathematics Ib.
- **3rd year:** Part II Astronomy at the IoA.

Vocational Experience

Universidad Adolfo Ibáñez – Instituto Milenio de Astrofísica

Santiago, Chile

POST-DOCTORAL RESEARCH FELLOW

Sep. 2021

Instituto de Astrofísica de Andalucía

Granada, Spain

POST-DOCTORAL RESEARCH FELLOW

Oct. 2020 - Sep. 2021

- Membership of atmospheric working group, CARMENES consortium

European Southern Observatory

Santiago, Chile

VLT SUPPORT ASTRONOMER (UT1 & UT3), POST-DOCTORAL FELLOW

Aug. 2017 - Oct. 2020

- Support astronomer for UT1 & UT3 at Paranal observatory.
- Operational certifications for FORS2, KMOS, NACO, ESPRESSO, SPHERE instruments.
- Instrument follow for FORS2 & ESPRESSO instruments, with training certification.

Internationale Schule Frankfurt Rhein-Main

Frankfurt am Main, Germany

HEAD OF SCIENCE DEPARTMENT

2006 - 2012

- Teacher of Physics and Mathematics at the school, as well as head of science responsible for some 10 teachers in the department.

CVC Capital Partners

London, United Kingdom

FINANCIAL RISK ANALYST AT THE PROPRIETARY DESK

2004 - 2006

- Management of financial accounts and assessment of risk for a variety of portfolios.

Professional Skills

Research interests

Exoplanet atmospheres [observations & modelling], Low-resolution multi-object spectrophotometry, High-resolution spectroscopy, non-LTE, non-equilibrium chemistry, 1D/2D/3D atmosphere models, Atmospheric retrieval algorithms for low & high resolution spectra

Software

Python [preferred], PyRAF, LaTeX, bash, IDL [basic]

Data handling/reduction

PySQL, IRAF, Esorex, Gasgano, Skycat, FIMS, Reflex

Web interface

HTML/CSS, Django with Python

Analysis techniques

MCMC, MultiNest, Bayesian inference, Machine Learning, Gaussian Processes, Cross Correlation analysis

Python interests

Multi-threading, multi-processing, GPU acceleration, vectorization, OOP

Publications & Conferences (selected)

Main author Peer-Reviewed

- **Sedaghati E.**, Sánchez-López A., Czesla S., López-Puertas M., Amado P., Pallé E., et al., (2021). *Moderately misaligned orbit of the warm sub-Saturn HD 332231 b* **A&A**, *submitted*.
- **Sedaghati E.**, MacDonald R. J., Casasayas-Barris N., Hoeijmakers H. J., Boffin H. M. J., Rodler F., Brahm R., et al., (2021). *A Spectral Survey of WASP-19b with ESPRESSO*. **MNRAS**, 505, 1, 435-458 [3 citations]
- **Sedaghati E.**, Boffin, H. M. J., MacDonald, R. J., Gandhi, S., Madhusadhan, N., Gibson, N. P., Oshagh, M., Claret, A. & Rauer, H. (2017). *Detection of titanium oxide in the atmosphere of a hot Jupiter*. **Nature**, 549, 238-241 [136 citations]
- **Sedaghati E.**, Boffin, H. M. J., Delrez, L., Gillon, M., Csizmadia, Sz., Smith, A. M., & Rauer, H. (2017). *Probing the atmosphere of a sub-Jovian planet orbiting a cool dwarf*. **MNRAS**, 468, 3123-3134 [16 citations]
- **Sedaghati E.**, Boffin H. M. J., Jeřabková T., Muñoz A. G., Grenfell J. L., Smette, A., ... & Rauer, H. (2016). *Potassium detection in the clear atmosphere of a hot-Jupiter: WASP-17b transmission spectroscopy*. **A&A**, 596, A47 [36 citations]
- **Sedaghati E.**, Boffin H. M. J., Csizmadia S., Gibson N., Kabath P., Mallonn M., & Van den Ancker M. E. (2015). *Regaining the FORS: optical ground-based transmission spectroscopy of the exoplanet WASP-19b with VLT+ FORS2*. **A&A**, 576, L11 [41 citations]
- Full list of publications at: ui.adsabs.harvard.edu

Conferences & Workshops

- **Talks & Posters:** Exoplanets II/III, Cambridge University/Iceland – EWASS2017 Prague – 2° Advanced School on Exoplanetary Science 2017, Vietri sul Mare, Italy – Astrophysics of planetary habitability 2016, Vienna, Pathways towards habitable planets 2015, Bern ...
- **Organization (main organizer):** Exoplanet atmospheres from the ground 2021, ESO Garching ([ESO - Atmo2021](#)) – Chilean exoplanet meeting 2019 – Astrobiology and planetary atmospheres, ESO

Teaching

Courses & Lectures


- **Lecture series** Universidad Católica del Norte, Exoplanet transit modelling, Bayesian statistics & Gaussian Processes
- **Electivo Universidad Antofagasta:** exoplanet atmospheres for the Exoplanets Masters course; ref. Dr. Karla Peña Ramírez.
- **Molecfite Lecture** ESO Atmos2021 on telluric correction of high resolution spectra; [Youtube](#)
- **Transmission Spectroscopy Lecture** ESO Atmos2021 spectrophotometric transmission spectroscopy; [Youtube](#)
- **Lecture** Universidad Andrés Bello on spectrographs and spectroscopy; ref. Prof. Dante Minniti.

Students

- **Bastian Olivares:** UCN undergraduate, thesis on archival HARPS exoplanet transmission spectroscopy
- **Mathis Houlle:** ESO PhD student, Marseille, co-supervision, spectroscopy of directly imaged planets and the HiRise project.
- **Dr. Raissa Estrela:** PhD student Universidade Presbiteriana Mackenzie (CRAAM) 3-months ESO studentship (post-doc at JPL).
- **Catalina Zamora:** Masters student Universidad de Valparaíso. 2-months studentship at ESO.
- **Quentin Duchaufour:** Student Marseille, master's project supervision on exoplanetary atmospheres.

Miscellaneous

Advisory Boards, Consortia & Refereeing

- **Chilean National Telescope Allocation Committee (CNTAC).** Served for 2 years (4 cycles) on the galactic panel.
- **HST** Exoplanet Atmospheres Panel
- **FONDECYT** Project grant referee.
- **Nature, APJ, MNRAS & A&A** >10 papers refereed.  orcid.org/0000-0002-7444-5315
- **CARMENES consortium** Active member of the atmospheric working package.

Paranal Science Operations

- **FORS2 QC:** Automated code performing in-situ quality assessment for all modes of the FORS2 instrument, written in python.
- **LHATPRO** software to obtain line of sight atmospheric profile measurements for *in-situ* telluric correction of spectra taken at Paranal, effort leading to 30% increase in time efficiency.
- **ESPRESSO & KMOS QC:** I successfully lead two student projects at Paranal (Yared Reinartz, UA, and Cristobal Moya, PUC) for automated codes analyzing in-situ observation quality. Both based on my FORS2 QC code.

Telescope proposals

- **6** successful ESO proposals as **PI** all of which have been published, or are in the process of being published, in the last 5 years.
- Many more successful proposals as **Co-I** for a variety of instruments.

Observing experience

- **Over 240 nights** as support astronomer at the VLT, UT1 & UT3.
- **>40 nights** as visiting astronomer on HARPS/3.6m, EFOSC/NTT, FEROS/MPG2.2m, 2m/TLS Tautenburg.

Extracurricular interests and activities

- **Spoken Languages:** English [native], Spanish [fluent], German [advanced], Persian [native].
- My main interest in life is **astronomy**.
- I also enjoy **free-style skiing & surfing**, as well as reading and travelling.

References

Prof. Kevin Heng CSH Director & Professor, Office G6 116
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