Elyar **Sedaghati**

Astronomer · Astrophysicist

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Personal Information

Home Address: HahnStrasse 37, 60528, Frankfurt am Main, Germany
Gath y Chaves 2436, Dpto 603, Providencia, Santiago de Chile, Chile
Date of Birth: 27 March 1982
Nationality: German/Persian (dual)

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 sofware, Computer hardware
- **2nd year:** Physics Ib, Advanced Physics II, Mathematics Ib.
- **3rd year:** Part II Astrononmy at the IoA.

Vocational Experience

Universidad Adolfo Ibáñez – Instituto Milenio de Astrofísica

Santiago, Chile

Post-doctoral Research Fellow — *Sep. 2021*

- Membership of ACCESS collaboration, exoplanet transmission spectroscopy survey.

Instituto de Astrofísica de Andalucía

Granada, Spain

Post-doctoral Research Fellow — *Oct. 2020 - Sep. 2021*

- CARMENES consortium, atmospheric working group.
- ELT-HIRES Scientific Technical Committee (was offered to lead the group at IAA).

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, Planet formation theories through observations of the Rossiter-McLaughlin effect, Telluric correction of high resolution spectra. Astronomical instrumentation.
Programming Languages	Python [preferred], bash, html/css, IDL [basic], JavaScript [basic]
Data handling/reduction	IRAF, PyRAF, Esoreflex/Esorex, Gasgano, Skycat, FIMS, Molecfit, PySQL
Web interface & misc.	HTML/CSS, Django with Python, LaTeX
Analysis techniques	Bayesian inference with MCMC & MultiNest, Machine Learning, Gaussian Processes, Cross Correlation analysis
Python interests	Multi-threading, multi-processing, GPU acceleration, vectorization, OOP

Publications & Conferences (selected)

Main author Peer-Reviewed (∼257 citations)

- **Sedaghati E.**, Sánchez-López A., Czesla S., López-Puertas M., Amado P., Palle E., et al., (2022). *Moderately misaligned orbit of the warm sub-Saturn HD 332231 b* **A&A**, 659, A44 [1 citation]
- **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 [6 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 [148 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 [18 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 [42 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 [42 citations]
- Full list of publications at: ui.adsabs.harvard.edu (peer-reviewed) – ui.adsabs.harvard.edu (all)

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** Univerisdad 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.
- **Molecfit Lecture** ESO Atmos2021 on telluric correction of high resolution spectra; Youtube
- **Transmission Spectroscopy Lecture** ESO Atmos2021 spectrophotometric transmission spectroscopy; Youtube
- **Lecture** Univerisdad 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 & 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 & MDPI** >15 papers refereed. orcid.org/0000-0002-7444-5315

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 Reinarz, 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, CARMENES/3.5m, 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.