

CURRICULUM VITÆ

DARIUS (DARIO) MODIRROUSTA-GALIAN

www.dmodirrousta-galian.com

darius.modirrousta-galian@yale.edu

EDUCATION

- **Ph.D., Physics**, National Institute for Astrophysics (INAF), Palermo Astronomical Observatory, Palermo, Italy, 2022.
DISSERTATION: *A Theoretical Analysis of Super-Earths and Sub-Neptunes*.
ADVISOR: Prof. Giuseppina Micela.
- **Visiting Graduate Researcher**, California Institute of Technology (CalTech), Pasadena, United States, 2020.
ADVISOR: Prof. David J. Stevenson.
- **M.Sc., Planetary Science**, University College London (UCL), London, United Kingdom, 2018.
DISSERTATION: *The Interior Structure of Hot Super-Earths: Transmission Spectroscopy of Silicate Species*.
ADVISOR: Prof. Giovanna Tinetti.
- **B.Sc., Astrophysics**, University College London (UCL), London, United Kingdom, 2017.

PROFESSIONAL APPOINTMENTS

- **Postgraduate Associate**, Yale University, New Haven, Connecticut, United States, 2021.
RESEARCH: *Loss of volatiles from the Hadean Earth and its influence on the subsequent redox evolution of the atmosphere*.
SUPERVISOR: Prof. Jun Korenaga.

1ST AUTHOR PUBLICATIONS

6. **Modirrousta-Galian, D.** & Korenaga, J., (2022). The three regimes of atmospheric evaporation for super-Earths and sub-Neptunes. Submitted.
5. **Modirrousta-Galian, D.** & Maddalena, G., (2021). Of aliens and exoplanets: Why the search for life, probably, requires the search for water. *Journal of the British Interplanetary Society* 74, p.238–242.
4. **Modirrousta-Galian, D.**, Ito, Y. and Micela, G., (2021). Exploring super-Earth surfaces: Albedo of near-airless magma ocean planets and topography. *Icarus*, 358, p.114175.
3. **Modirrousta-Galian, D.**, Stelzer, B., Magaudda, E., Maldonado, J., Güdel, M., Sanz Forcada, J., Edwards, B. and Micela, G., (2020). GJ 357 b. A super-Earth orbiting an extremely inactive host star. *Astronomy & Astrophysics*, 641, p.A113.
2. **Modirrousta-Galian, D.**, Locci, D. and Micela, G. (2020). The bimodal distribution in exoplanet radii: Considering varying core compositions and H₂ envelope's sizes. *The Astrophysical Journal*, 891(2), p.158.
1. **Modirrousta-Galian, D.**, Locci, D., Tinetti, G. and Micela, G. (2020). Hot super-Earths with hydrogen atmospheres: A model explaining their paradoxical existence. *The Astrophysical Journal*, 888(2), p.87.

OTHER PUBLICATIONS

7. Mugnai, L. & **Modirrousta-Galian, D.**, (2022). RAPOC: The Rosseland and Planck opacity converter: A user-friendly and fast opacity program for Python. In press.
6. Mugnai, L., **Modirrousta-Galian, D.**, Edwards, B., Changeat, Q., Bouwman, J., Morello, G., Al-Refaie, A., Baeyens, R., Bieger, M., Blain, D., Gressier, A., Guilluy, G., Jaziri, Y., Kiefer, F., Morvan, M., Pluriel, W., Poveda, M., Skaf, N., Whiteford, N., Wright, S., Yip, K., Zingales, T., Charnay, B., Drossart, P., Leconte, J., Venot, O., Waldmann, I. and Beaulieu, J., (2021). ARES. V. No evidence for molecular absorption in the HST WFC3 spectrum of GJ 1132 b. *The Astronomical Journal*, 161(6), p.284.
5. Benatti, S., Damasso, M., Borsa, F., Locci, D., Pillitteri, I., Desidera, S., Maggio, A., Micela, G., Wolk, S., Claudi, R., Malavolta, L. and **Modirrousta-Galian, D.**, (2021). Constraints on the mass and on the atmospheric composition and evolution of the low-density young planet DS Tucanae A b. *Astronomy & Astrophysics*, 650, p.A66.
4. Guilluy, G., Gressier, A., Wright, S., Santerne, A., Jaziri, A.Y., Edwards, B., Changeat, Q., **Modirrousta-Galian, D.**, Skaf, N., Al-Refaie, A., Baeyens, R., Bieger, M.F., Blain, D., Kiefer, F., Morvan, M., Mugnai,

- L.V., Pluriel, W., Poveda, M., Zingales, T., Whiteford, N., Yip, K.H., Charnay, B., Leconte, J., Drossart, P., Sozzetti, A., Marcq, E., Tsiraras, A., Venot, O., Waldmann, I. and Beaulieu, J.-P. (2020). ARES IV: Probing the atmospheres of the two warm small planets HD 106315c and HD 3167c with the HST/WFC3 camera. *The Astronomical Journal*, 161(1), p.19.
3. Pluriel, W., Whiteford, N., Edwards, B., Changeat, Q., Yip, K.H., Baeyens, R., Al-Refaie, A., Fabienne Bieger, M., Blain, D., Gressier, A., Guilluy, G., Yassin Jaziri, A., Kiefer, F., **Modirrousta-Galian, D.**, Morvan, M., Mugnai, L.V., Poveda, M., Skaf, N., Zingales, T., Wright, S., Charnay, B., Drossart, P., Leconte, J., Tsiraras, A., Venot, O., Waldmann, I. and Beaulieu, J.-P. (2020). ARES. III. Unveiling the two faces of KELT-7 b with HST WFC3. *The Astronomical Journal*, 160(3), p.112.
 2. Skaf, N., Bieger, M.F., Edwards, B., Changeat, Q., Morvan, M., Kiefer, F., Blain, D., Zingales, T., Poveda, M., Al-Refaie, A., Baeyens, R., Gressier, A., Guilluy, G., Jaziri, A.Y., **Modirrousta-Galian, D.**, Mugnai, L.V., Pluriel, W., Whiteford, N., Wright, S., Yip, K.H., Charnay, B., Leconte, J., Drossart, P., Tsiraras, A., Venot, O., Waldmann, I. and Beaulieu, J.-P. (2020). ARES. II. Characterizing the hot Jupiters WASP-127 b, WASP-79 b, and WASP-62b with the Hubble Space Telescope. *The Astronomical Journal*, 160(3), p.109.
 1. Edwards, B., Changeat, Q., Baeyens, R., Tsiraras, A., Al-Refaie, A., Taylor, J., Yip, K.H., Bieger, M.F., Blain, D., Gressier, A., Guilluy, G., Jaziri, A.Y., Kiefer, F., **Modirrousta-Galian, D.**, Morvan, M., Mugnai, L.V., Pluriel, W., Poveda, M., Skaf, N., Whiteford, N., Wright, S., Zingales, T., Charnay, B., Drossart, P., Leconte, J., Venot, O., Waldmann, I. and Beaulieu, J.-P. (2020). ARES I: WASP-76 b, a tale of two HST spectra. *The Astronomical Journal*, 160(1), p.8.

CONFERENCES & SEMINARS

- SEMINAR: “*Interior Structure, Composition, and Mineralogy of the Terrestrial Planets*,” Department of Earth & Planetary Sciences, Yale University, Connecticut, USA, 19/09/2022.
- INVITED TALK: “*Role of Planetary Winds in Planet Evolution and Population*,” International Astronomical Union General Assembly, Busan, South Korea, 11/08/2022.
- SEMINAR: “*Super-Earth, sub-Neptunes, and their extreme loss of volatiles*,” Department of Astronomy, Yale University, Connecticut, USA, 19/04/2022.
- SEMINAR: “*Super-Earth, sub-Neptunes, and their extreme loss of volatiles*,” Department of Earth & Planetary Sciences, Yale University, Connecticut, USA, 16/03/2022.
- SEMINAR: “*Atmospheric evaporation, geological outgassing, and the bimodal distribution of exoplanet radii*,” Ariel Consortium Meeting, [online], 20/09/2021.
- SEMINAR: “*Dynamical systems and machine learning approaches to Sun-Earth relations*,” Osservatorio Astronomico di Palermo, Palermo, Italy, [online], 19/03/2021.
- SEMINAR: “*Exploring Super-Earth Interiors: Core erosion and envelope metallicity*,” Osservatorio Astronomico di Palermo, Palermo, Italy, [online], 29/10/2020.
- Ariel Virtual Consortium Meeting, [online], 12/10/2020 – 14/10/2020.
- Seminar: “*ARES: Ariel Retrieval of Exoplanets School*,” Osservatorio Astronomico di Palermo, Palermo, Italy, [online], 21/06/2020.
- SEMINAR: “*Core erosion of super-Earths and sub-Neptunes*,” California Institute of Technology, California, USA, [online], 05/06/2020.
- SEMINAR: “*Understanding the XUV-induced atmospheric erosion of young planets and their evolution with Time*,” NASA JPL, California, USA, [online], 01/06/2020.
- GUEST SPEAKER: “*Understanding the XUV-induced atmospheric erosion of young planets and their evolution with Time*,” Ariel Consortium, [online], 12/05/2020 – 14/01/2020.
- GUEST SPEAKER: “*Understanding the XUV-induced atmospheric erosion of young planets and their evolution with Time*,” 16th GAPS meeting, Osservatorio Astronomico di Padova, Padova, Italy, 05/05/2020.
- SEMINAR: “*Exploring super-Earth surfaces: Albedo of near-airless magma ocean planets and topography*,” California Institute of Technology, California, USA, 29/04/2020.
- SEMINAR: “*Exploring super-Earth surfaces: Albedo of near-airless magma ocean planets and topography*,” Osservatorio Astronomico di Palermo, Palermo, Italy, 12/02/2020.
- GUEST SPEAKER: “*Exploring super-Earth surfaces: Albedo of near-airless magma ocean planets and*

topography,” Ariel: Science, Mission & Community 2020 conference, ESA/ESTEC, Noordwijk, The Netherlands, 14/01/2020 – 16/01/2020.

- SEMINAR: “*The importance of theoretical exoplanetology*,” University of Palermo, Palermo, Italy, 04/11/2019.
- SEMINAR: “*The importance of theoretical exoplanetology*,” Osservatorio Astronomico di Palermo, Palermo, Italy, 29/10/2019.
- GUEST SPEAKER: “*GJ 1132 b*,” Ariel School, Village de vacances VTF Le domaine de Françon, Biarritz, France, 27/09/2019 – 06/10/2019.
- SEMINAR: “*Very hot super-Earths with hydrogen atmospheres: A model explaining their paradoxical existence*,” Telescopio Nazionale Galileo, La Palma, Spain, 16/05/2019.
- GUEST SPEAKER: “*Very hot super-Earths with hydrogen atmospheres: A model explaining their paradoxical existence*,” Ariel Consortium Meeting, Palermo, Italy, 18/03/2019 – 20/03/2019.
- SEMINAR: “*Very hot super-Earths with hydrogen atmospheres: A model explaining their paradoxical existence*,” Osservatorio Astronomico di Palermo, Palermo, Italy, 21/01/2019.

AWARDS & GRANTS

- \$175—International Astronomical Union, Yale University, New Haven, Connecticut, United States, 2022.
- \$2500—Heising-Simons Foundation, Yale University, New Haven, Connecticut, United States, 2022.
- \$45,000—“Scienze Fisiche e Chimiche” – Internazionale – A.A. 2018/2019 (XXXIV ciclo), National Institute for Astrophysics (INAF)/University of Palermo (UNIPA), Palermo, Italy, 2018.

OUTREACH

- I am a member of the British Interplanetary Society (BIS).
- INVITED INTERVIEW: “*Did this scorching-hot planet lose—and regain—an atmosphere?*” WIRED magazine, 04/2021.
- PUBLIC TALK: “Human extinction—what can we learn from exoplanets about climate change on Earth,” PalermoScienza (INAF, OAPa), Palermo, Italy, 19/02/2020.
- PUBLIC TALK: “From the position of the stars to life in the universe” and “Astronomy storytelling and new ways to conceptualise the universe,” Esperienza InSegna (INAF, OAPa), Palermo, Italy, 23/02/2019 – 24/02/2019.

EXPERIENCE & TEACHING

- **Mentor to Ph.D. students**, The Europlanet Early Career (EPEC) network, 2021 – Present.
- **Member**, Ariel Consortium, working groups: Albedo and reflected light, atmospheric chemistry, connection planet interior-atmospheres, phase-curves, prebiotic chemistry and astrobiology, upper atmosphere/star-planet interaction, and complementary science, 2018 – Present.
- **Lecturing**, Exoplanet module in the *Stellar evolution course, AA2021*, University of Palermo (UniPa), Palermo, Italy, 2020.
- **Observational Astronomer**, Galileo National Telescope, La Palma, Spain, 2019.
- **Tour Guide**, University College London Observatory (UCLO), London, United Kingdom, 2016 – 2018.

PROGRAMMING

- Proficient in *Python 3/2.7*, understands *Fortran*.
- Codeveloper of the publicly available *Python 3* code RAPOC: Rosseland And Planck Opacity Converter.

EXTRA SKILLS

- Native speaker of English and Spanish, fluent in Italian.
- I have attended courses on *Ethical Conduct and Scientific Research* and *Harassment Prevention*, Yale University, New Haven, Connecticut, United States, 2022.
- Trained on the safe use of lasers, University College London (UCL), London, United Kingdom, 2017.