Nicolas Iro, PhD

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Professional Profile

My research interests include atmospheric radiative transfer modelling, evolution modelling, spectral models and exoplanetary transits of extrasolar planets, atmospheric dynamics, planetary habitability, as well as analysis of planetary atmosphere data. Finally, I have experience in organising workshops and conferences of various sizes.

Core Skills

- Programming and Coding
- Research
- Project Management
- Github
- Python
- Fortran
- Scientific Writing
- Collaboration and Teamwork
- Willingness to Learn
- Problem Solving
- Microsoft, MacOS, Linux, UNIX
- Multilingual
- Adaptability
- Communication
- Teaching

Work Experience

2022–2024 Postdoctoral Researcher, Institute for Planetary Research - German Aerospace Center (DLR), Berlin, DE
INCREASE (INfluence of strong stellar particle event and galactic Cosmic Rays on Exoplanetary Atmo-SpherEs), Contact: J. L. Grenfell

Tasks:
- Studying the effect of energetic particles on the atmospheres of exoplanets.
- Adding new features to the 1D climate model 1D-TERRA.
- Migrating it from SVN to git framework.
- Participating in international consortia such as Cheops, PLATO, ARIEL, JWST.
- Leading an intercomparison effort for hot Jupiter climate models.

2019–2020 Parental leave (continuing Master students supervision)

2017–2022 Postdoctoral Research Fellow, Astrophysics Department - University of Vienna, Austria
Pathways to Habitability, Contact: M. Güdel

Tasks:
- Using a hierarchy of models in order to study planetary atmospheres and habitability:
- 1D radiative transfer (to be combined with upper atmosphere),
- 3D radiative transfer (PHOENIX)
- 3D General Circulation Model (Plasim / PUMA).

2012–2017 Postdoctoral Researcher, Theoretical Meteorology Group, Klimacampus - University of Hamburg, Germany
Planetary Atmospheres research, Contact: V. Lucarini

Tasks:
- Expending the expertise of the Group by developing a new Planetary Atmosphere division.
- Studying the diverse radiation and circulation regimes of exoplanets - from Hot Jupiters to Earth-like planets.
- Responsible of modifying the radiative transfer schemes in the PlanetSimulator and PUMA exoplanets GCM codes.

2010–2012 Postdoctoral Research Associate, Astrophysics Group, Keele University, UK
Exoplanet research in the WASP project, Contact: C. Hellier

Tasks:
- Bringing a theoretical insight in the WASP project.
- Participating to the characterization of the WASP planets by modelling their atmospheres.

2007–2010 NASA Postdoctoral Program Fellow, NASA Goddard Space Flight Center, Planetary Systems Laboratory, Greenbelt, MD, USA
Optical and Infrared Detection and Characterization of Exoplanets, Contact: D. Deming

Tasks:
- Modelling the atmosphere of extrasolar planets.
- Developing a time-dependent radiative transfer code that allows to model a planet under time-varying conditions due to rotation, eccentricity, ...
- Writing proposal for High Performance Computing

Work Experience (cont.)

2005–2007 Postdoctoral Associate, Department of Physics, Univ. of Florida, Gainesville, FL, USA
Cassini CIRS data analysis and interpretation of Saturn, Contact: Prof. K. Matcheva

Tasks:
- Analyzing the spectral data of the atmosphere of Saturn by the Cassini/CIRS instrument.
- Implementing and use a retrieval code to constraint the thermal and cloud properties of Saturn's atmosphere.
- Continuing modelling research on exoplanet atmospheres.

2001–2004 Ph.D. in Astrophysics, LESIA, Observatoire de Paris, France
Modelling of extrasolar giant planets atmosphere, Advisors: B. Bézard & T. Guillot

Tasks: Developing a radiative transfer code for the modelling of extrasolar planets atmosphere. Including new opacity sources, improving the stability for the deeper pressures, implementing a time-dependent method for the thermal structure and spectra of exoplanets.

Education

01.2005 **Ph.D.** in Astrophysics *with honors, 'mention Très Honorable'*, *Modelling extrasolar giant planets atmosphere*, Université Pierre & Marie Curie, Paris, France

07.2001 **M. S.** in Astrophysics and astrophysical instrumentation *with honors*
Université Pierre & Marie Curie, Paris, France

07.1998 **B. S.** in Physics *with honors, 'mention bien'*, Université Denis Diderot, Paris, France

Teaching and Mentoring

2020–2022 **Supervisor**, Master project, *Modelling hot Jupiters' upper atmospheres*, University of Vienna.

2020–2022 **Exercise Instructor** for Mathematic Analysis for Physicists I and II, University of Vienna.

2019–2022 **Supervisor**, Master project, *Climate of circumbinary planets*, University of Vienna.

2018–2022 **Co-lecturer** (3 lecturers in total), *Planets and exoplanets*, University of Vienna.

2017–2018 **Exercise Instructor** for Quantum Mechanics, University of Vienna.

2013–2017 **Lecturer** of the optional module *Comparative Planetology*, for Climate Systems Master students, University of Hamburg. Proposed, designed and performed this course.

2013 **Co-lecturer** (with V. Lucarini): *General Circulation of the Atmosphere* for Master students, Univ. Hamburg. 2 lectures.

Administration – Planning

- **Lead organizer**: *Les Houches school on atmospheric circulation of planetary atmosphere* (Mar. 2017). This involved devising the scientific program, choosing the invited lecturers, selecting the applicants, ensuring that the School went well. I also gave a lecture on flexible modelling of planetary atmospheres.
- **Organizing committee**, *Les Houches school on exoplanet clouds, "Cloud Academy"* (Sep. 2018). This involved helping devising the scientific program, choosing the invited lecturers, selecting the applicants, ensuring that the School goes well. I also gave a lecture on clouds and atmospheric circulation.
- **Organizing committee**, *"Cloud Academy II/III"* (initially Mar 2022, postponed due to COVID-19, then renamed and scheduled March 2023). This involved helping devising the scientific program, choosing the invited lecturers, selecting the applicants, ensuring that the School goes well.
- **LOC**, *Astrobiology summer school* (Vienna, 2018)
- **Organizing committee, session panel chair**: *Atmosphere Science in the Context of CHEOPS, TESS, K2 and PLATO* (Berlin, 2015)
- **Session co-convener**: *PS5.1 Exoplanets atmosphere studies: climates, clouds, and magnetic coupling* at the EGU 2025 General Assembly (Vienna, 2025)
- **SOC**, *BUFFET series (2-5): Building a Unified Framework For Exoplanet Treatment* (alternate hybrid and in person , 2022–)

High Performance Computing

2017-2022 Vienna Scientific Cluster: VSC-3 & the newly built VSC-4 (manager of the private nodes of our Group)

2012-2017 Access to DKZR (German Climate Computing Center), ZMAW (Center for Marine and Atmospheric Sciences) IT facilities and Univ. Hamburg RRZ (Regional Computing Center)

2010-2011 High End Computing (HEC) NASA time on *Pleiades* through proposals to the SMD

2007-2011 High End Computing (HEC) NASA time on *Columbia* through proposals to the SMD

2001-2014 Unlimited access to the Observatoire de Meudon SIO *Quadri* cluster

Languages

English	Fluent (seven years living in USA and England)
French	Native language
German	Intermediate

Publication Summary

I published a total of 42 refereed publications. 4 publications as first author, and 4 publications as 2nd or 3rd author.

Conference presentations

Numerous presentations (oral and posters) at national and international meetings (DPS, EPSC, Exoclimes, Protostars & Planets, ...). I gave an invited talk at the German Physical Society (DPG) on reviewing the observations of exoplanet clouds (March 2023), and my last noteworthy presentations were a talk at the EGU General Assembly (April 2024), as well as a talk at he BUFFET meeting (Sept. 2025), presenting the progress of the MOCHA project I am leading.

Invited talks

Sept. 2025	*MOCHA: Hot Jupiter 3D models intercomarison – update on the protocol paper draft*, given at the BUFFET-5: Building a Unified Framework For Exoplanet Treatments, fifth edition – Bordeaux, France.
Oct. 2024	*MOCHA: Hot Jupiter 3D models intercomarison – update on the protocol*, given at the BUFFET-4: Building a Unified Framework For Exoplanet Treatments, fourth edition – online.
Oct. 2023	*MOCHA: Hot Jupiter 3D models intercomarison – first updates*, given at the BUFFET-3: Building a Unified Framework For Exoplanet Treatments, third edition – New York, USA.
Mar. 2023	*Observational constraints of exoplanet clouds*, given at the Deutsche Physikalische Gesellschaft (DPG) Assembly – Dresden, Germany.
Oct. 2022	*MOCHA: Hot Jupiter 3D models intercomarison – Presentation of a new model intercomparison project*, given at the BUFFET-2: Building a Unified Framework For Exoplanet Treatments, second edition – online.
Feb. 2017	*Modelling the atmospheres of extrasolar giant planets*, given at the Department of Astrophysics, University of Vienna – Vienna, Austria.
Jul. 2013	*Modelling the atmospheres of extrasolar giant planets*, given at the Deutsches Zentrum für Luft- und Raumfahrt (DLR) – Berlin, Germany.
Jul. 2013	*Modelling the atmospheres of extrasolar giant planets*, given at the Centro de Astrofisica – Universidade do Porto, Portugal.
Nov. 2012	*Atmospheres of extrasolar giant planets*, given at the Gemeinsamen Seminar, University of Hamburg, Hamburg, Germany.
Oct. 2011	*Time-dependent modeling of extrasolar planet atmospheres*, given at the Physics and Astronomy colloquia, Exeter University, Exeter, UK.
Oct. 2011	*Time-dependent modeling of extrasolar planet atmospheres*, given at the LAB, Observatoire de Bordeaux, France.
Jun. 2009	*Time-dependent modeling of extrasolar planet atmospheres*, given at the CAS seminar, Johns Hopkins University, Baltimore, MD.
Nov. 2008	*Time-dependent modeling of extrasolar planet atmospheres*, given at the DTM, Washington, DC.
Nov. 2008	*Time-dependent modeling of extrasolar planet atmospheres*, given at the LESIA's "Tea-minar", Observatoire de Paris, France.
Oct. 2007	*A Time-Dependent Model for Extrasolar Planet Atmospheres*, given at the NASA Goddard Extrasolar Planets Seminar, Greenbelt, MD.
Nov. 2005	*Modeling extrasolar giant planet atmospheres*, given at the Florida Theoretical Astrophysics seminar, Gainesville, FL.