

Joan Miquel González Navarra

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Physics Student | Aspiring Research Astrophysicist | Support Astronomer

Professional Profile

Final-year Physics student at the University of Barcelona (UB) with extensive hands-on experience in professional astronomy. I currently work as a support astronomer at the Sabadell Observatory (operated by the Sabadell Astronomical Society, the largest astronomy association in Spain) while conducting research for my Bachelor's Thesis (TFG) at the Institute of Cosmos Sciences (ICCUB). Highly skilled in professional-grade telescope operations (up to 2.2m), complemented by expertise in photometric and spectroscopic data reduction as well as Python programming for astronomical pipelines. For several years, I have been focused on observing and analyzing light curves of pulsating variable stars and exoplanet transits. As a member of several amateur research groups at the Sabadell Astronomical Society (AAS), I am deeply integrated into the local amateur community, regularly attending conventions and actively participating in international Pro-Am collaborations such as GEOS and ExoClock.

Education

Sep 2021 – Present **BSc in Physics (Fundamental Physics Track)**, *University of Barcelona (UB)*, Barcelona.

Expected Graduation: June 2026

- **Honors in Observational Astronomy:** Highest distinction awarded for outstanding performance across the entire curriculum, demonstrating mastery of the complete observational workflow: from theoretical foundations and observation planning to telescope operation and professional-grade data reduction and analysis.
- **Computational Excellence:**
 - **Python:** Achieved an outstanding grade of 9.6/10 (Excellent) in the *Informatics* course.
 - **Fortran:** Completed the *Computational Physics* course (numerical methods & scientific computing).
- **Bachelor's Thesis (TFG)** (in progress): Multi-telescope photometric and spectroscopic analysis of an interesting transient event. Conducted within the CET-3PO professional research group at ICCUB under the supervision of **Dr. Nadejda Blagorodnova**.

2018 – 2020 **Scientific Baccalaureate**, *Institut Joaquim Pla i Farreras*, Sant Cugat del Vallès.

Graduated with Honors.

- **Pre-university Research Project:** Investigating the evidence for dark matter in three nearby galaxies through the analysis of their rotation curves. Awarded the maximum grade of 10/10. Analyzed galactic rotation data to infer mass distribution discrepancies, demonstrating early aptitude for astrophysical data analysis and research workflows.

Languages

English	Full professional proficiency
Spanish	Native
Catalan	Native
German	Basic competence (A1 Certificate)
Esperanto	Basic competence

Research Experience

2024 – Present **Undergraduate Researcher**, *Institute of Cosmos Sciences (ICCUB)*, Barcelona.

Group: CET-3PO (Professional Research Group)

- **Bachelor's Thesis (Jan 2026 – Present):** Performing multi-telescope photometry and spectroscopy on interesting transient event.
- **Research Internship (Feb 2024 – May 2024):** Developed a Python pipeline to correct fringing effects in images from the Joan Oró Telescope (TJO), improving photometric precision for the group's research.

- 2022 – Present **Research Collaborator (Pro-Am)**, *Sabadell Astronomical Society (AAS)*, Sabadell.
- Exoplanet Research Group (AAS, ExoClock) | 2023 – Present**
- Regular monitoring of exoplanet transits to support the ephemerides for the future ESA Ariel Mission.
 - Specialized in detecting weak transits (depths $\lesssim 5$ mmag) utilizing professional 1m-class telescopes.
 - Research Output:** Planning efforts contributed to the study *ExoClock Project IV: A homogeneous catalogue of 620 updated exoplanet ephemerides* (Kokori et al., 2025; submitted to ApJS, arXiv:2511.14407).
 - Co-authorship:** Full co-author of the upcoming collaboration paper (in preparation, expected 2027) presenting the latest results of the ExoClock collaboration.
- Variable Star Research Group (AAS) | 2022 – Present**
- Long-term monitoring of RR Lyrae variable stars to study the Blazhko effect in international collaboration with **GEOS** (Groupe Européen d'Observation Stellaire).
 - Conducting photometric monitoring of diverse variable star types using the Sabadell Observatory telescope, submitting data to the **AAVSO** (American Association of Variable Star Observers) International Database.
- Spectroscopy Group | 2025 – Present**
- Initiating a high-resolution spectroscopy project utilizing Echelle spectrographs.

Observational Experience & Telescope Time

- Activity *Several nights per month dedicated to scientific data acquisition.*
- OdS-AAS **0.5m Telescope**, *Sabadell Observatory*, Barcelona.
Regular observer since 2022, conducting high-frequency observations multiple nights per week for research campaigns if weather permitted. Since April 2025, role expanded to include instrument maintenance, commissioning of new equipment, and intensive observing runs as Support Astronomer.
- CAHA **2.2m Telescope**, *Calar Alto Observatory*, Almería.
Awarded 2 nights of observing time via a selective UB internal program. Conducted in-situ photometric and spectroscopic observations of transients and extended objects in collaboration with a team of students and faculty members.
- CAHA **1.23m Telescope**, *Calar Alto Observatory*, Almería.
Extensive usage for high-precision exoplanet transit photometry within the AAS Exoplanet Research Group, including 2 nights in situ and subsequent regular remote operations of ~ 4 nights/semester since 2024.
- IAC **IAC80 Telescope**, *Teide Observatory*, Tenerife, Canary Islands.
Regular usage in service mode since 2023 for high-precision photometry within the AAS Exoplanet Research Group, averaging 6 nights per semester and specifically targeting shallow exoplanet transits.
- OdM **Joan Oró Telescope (TJO 0.8m)**, *Montsec Observatory*, Lleida.
Analysis of robotic observations data since 2023 within the AAS Exoplanet Research Group, averaging 4 nights per semester of remote operations focused on high-precision photometry of exoplanet transits.

Notable Observation

- Oct 2025 **Interstellar Comet 3I/ATLAS**, *Sabadell Observatory*.
- Global Impact:** Achieved recognition as one of the first observers worldwide to publish images of the comet during its critical post-perihelion phase.
 - Media Coverage:** The observation went viral on social media and attracted significant media attention, including a **dedicated TV reportage and interview** by the national broadcaster **TV3 (Televisió de Catalunya)** filmed at the observatory.

Professional Experience

- Apr 2025 – Present **Support Astronomer**, *Sabadell Observatory*, Sabadell.
- Hired staff member responsible for the operation and maintenance of the observatory's instrumentation (including the 50cm telescope).
- Public Outreach & Education:** Regularly leading guided tours and educational workshops for primary and secondary schools, explaining the workflow of professional astronomers.
 - Lecturer & Instructor:** Designing and delivering specialized elemental courses on astrophysics and observational astronomy for society members and the general public.
 - Mentorship:** Supervising High School Research Projects (*Treball de Recerca*) for high school students (aged 16–17), guiding them through data acquisition and analysis.
 - Summer School Instructor (July 2023 & 2024):** Taught theoretical astrophysics and practical data analysis (image pre-processing and basic photometry) to high school students during intensive summer courses. Led night observation sessions to demonstrate professional workflows.

Conferences & Workshops

- Oct 3–4 2025 **5th ExoClock Annual Meeting**, Attendee, Madrid.
The 5th ExoClock Annual Meeting gathered professional and amateur astronomers to coordinate exoplanet transit observations and refine ephemerides for future ESA's Ariel mission.
https://www.exoclock.space/annual_meetings
- May 24–25 2025 **1st National Workshop on Astronomical Spectroscopy**, Attendee, Madrid.
This national workshop promoted collaboration between professional and amateur spectroscopists in Spain through talks and practical sessions on astronomical spectroscopy techniques.
<https://sites.google.com/aam.org.es/workshop-espectroscopia/>
- Mar 14–16 2025 **26th Astronomy Convention of the Sabadell Astronomical Society**, Speaker, Sabadell.
The 26th Astronomy Convention of the Sabadell Astronomical Society covered a wide range of observational topics and included talks by both professional and amateur astronomers alongside hands-on data analysis and advanced image processing workshops.
<https://astrosabadell.org/Convencio2025/inicio.html>
- Oct 27–29 2023 **Photometric Workshops (Jornadas Fotométricas)**, Attendee, Albanyà Observatory.
Workshops focused on CCD/CMOS photometry of variable stars, asteroids, supernovae and other targets, combining lectures with hands-on observing sessions at Albanyà Observatory.
<https://federacionastronomica.es/.../449-jornadas-de-fotometria-albanya-girona>
- Jul 10–14 2023 **Code/Astro Software Engineering Workshop**, Participant, Northwestern University (Remote).
A week-long workshop on modern software engineering for astronomy, focused on collaborative development of open-source, research-grade Python packages.
<https://ciera.northwestern.edu/programs/code-astro/>
- May 27–28 2023 **5th European Variable Star Meeting (GEOS & AAS)**, Attendee, Barcelona.
European meeting at CosmoCaixa Barcelona on observational and theoretical studies of variable stars, emphasizing ProAm collaborations and long-term monitoring projects.
<http://rr-lyr.irap.omp.eu/photometry/EVS5/index.php>

Leadership

- Mar 2023 – Present **Directive Board Member**, *Sabadell Astronomical Society (AAS)*.
 - o Served as elected Directive Board Member (Mar 2023 – Apr 2025). Currently serving as Invited Member (Apr 2025 – Present) following appointment as observatory staff.
 - o Actively involved in institutional governance and high-level decision-making, including strategic planning for observatory infrastructure. Responsible for proposing and executing new initiatives, coordinating specialized courses and large-scale public observations, and overseeing the society's youth division.
- May 2025 – Present **Organizing Committee Member**, *27th National Astronomy Congress (CEA)*.
 - o Member of the organizing committee for the next edition of the topmost amateur astronomy event in Spain, the "Congreso Estatal de Astronomía", to be held in Oct 2026.
 - o Managing logistics, inviting speakers and coordinating scientific sessions.
- 2023 **Team Mentor & Supervisor**, *ESA "Hack an Exoplanet" Hackathon*.
 - o Mentored a team of high school students from the AAS Youth Group in this international competition organized by the **European Space Agency (ESA)**. Guided the team to be selected as one of the **winning teams** among international competitors.

Early Research Training & Excellence Programs

- 2018 – 2020 **Joves i Ciència ("Youth and Science")**, *Fundació Catalunya-La Pedrera*.
Highly selective excellence program (top 50 students in Catalonia) for pre-university high school students.
 - o **Research Stay (July 2019)**: Selected for Phase 2 to spend **one full week at Teide Observatory (IAC)**. Received intensive training in theoretical astrophysics and professional instrumentation from IAC researchers.
- 2019 **Bojos per la Física ("Mad for Physics")**, *Fundació Catalunya-La Pedrera*.
Year-long excellence program for pre-university high school students involving theoretical and experimental workshops at Catalonia's leading Physics research centers (IFAE, ICFO, ICN2).

Scientific Computing & Software

- Programming **Python** (Advanced, 9.6/10 Academic Grade) – *astropy, numpy, matplotlib, pandas, pipelines*.
Fortran (Intermediate) – *Numerical methods and scientific computing*.
- Data Reduction Custom Python pipelines, SAOImageDS9, IRAF, AstrolmageJ, HOPS, AIP4Win.