

# Nahir Muñoz Elgueta

## Curriculum Vitae

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### Education

- 2019–2023 **Ph.D. in Astrophysics**, Ludwig-Maximilians-Universität München, Germany.  
2015–2018 **M.Sc. in Astronomy**, Universidad de La Serena, Chile.  
2011–2014 **B.Sc. in Physics, Astronomy specialization**, Universidad de La Serena, Chile.

### Working Experience

- 2019–2023 **Doctoral Researcher**, Max Planck Institute for Astrophysics, Garching, Germany.  
Advisors: Prof. Dr. Guinevere Kauffmann, Dr. Fabrizio Arrigoni Battaia  
2018–2019 **Observer & Plugger**, SDSS IV / APOGEE-2 South, Carnegie Observatories, Las Campanas, Chile.  
Researcher in charge: Dr. Steve Majewski, UVa  
2016–2019 **Swope Telescope Observer**, Swope Supernova Survey, Carnegie Observatories, Las Campanas, Chile.  
Researcher in charge: Dr. Ryan Foley, UCSC

### Scientific Experience

- 2019–2023 **PhD Thesis**, Gas reservoirs in and around high- $z$  galaxies.  
Advisors: Prof. Dr. Guinevere Kauffmann, Dr. Fabrizio Arrigoni Battaia  
2016–2018 **Master Thesis**, Physical properties of a nearby TDG candidate and its parent galaxy NGC 4656.  
Advisors: Dr. Sergio Torres-Flores, Dr. Fernanda Urrutia  
2017 **Research Assistant**, S-PLUS (Southern Photometric Local Universe Survey), T-80 telescope, Cerro Tololo Inter-American Observatory.  
2014 **Undergraduate Project**, Star-forming regions in the tidal tails: The case of NGC 1487.  
Advisor: Dr. Sergio Torres-Flores

### Observations

- Dec 2019 APEX, Chajnantor, Chile (11 days)  
2018–2019 SDSS IV/APOGEE-2 South, du Pont Telescope, Carnegie Observatories, Las Campanas, Chile (~60 nights), Researcher in charge: Steve Majewski, UVa  
2016–2019 Swope Supernova Survey, Swope Telescope, Carnegie Observatories, Las Campanas, Chile (~150 nights), Researcher in charge: Dr. Ryan Foley, UCSC  
Sept 2017 Goodman HTS Multi-Object Slit mode, SOAR 4.1-m telescope, Cerro Pachón, Chile (1 night)  
June 2017 Gemini Speckle Program, Gemini-South, Chile (~4 nights), Researcher in charge: Dr. Steve Howell, NASA ARC

### Proposals Awarded

- 2022 APEX/SEPIA180: “Large molecular reservoirs in  $z \sim 3$  quasars with small and dim Ly $\alpha$  nebulae”, PI, 60 hours (rank A), 28 hours (rank B)

- 2021 APEX/nFLASH460: "APEX at the QSO MUSEUM: exploring the most massive  $z \sim 3$  quasar host galaxies in [CII]", PI, 15 hours (rank B)
- 2021 ALMA band 5: "Uncovering the extended molecular gas reservoir around two promising  $z \sim 3$  quasars", PI, 6.3 hours (rank C)
- 2021 ALMA band 8: "A deep search for cold gas in the circumgalactic medium of a  $z \sim 3$  quasar system", Co-I, 7.7 hours (rank C)
- 2020 APEX/LABOCA: "Constraining the powering budget in 4  $z \sim 3$  quasars' Ly $\alpha$  nebulae", Co-I, 96 hours
- 2017 Goodman HTS/SOAR 4.1-m telescope: "Compact group of galaxies as laboratories to study metallicity gradients: The effect of galaxy interactions", PI, 1 night

## Conferences and Schools

### Attendant

- 2019 9th IRAM Summer School, Pradollano, Spain
- 2017 Astronomy School on Photometric Redshift, Universidad de La Serena, Chile
- 2015 LSST Workshop, La Serena, Chile
- 2014 II Congreso Nacional de Estudiantes de Ciencias Físicas y Astronómicas, Valparaíso, Chile
- 2013 ESANFI 2013, Universidad de La Serena, Chile
- 2012 SOCHIAS Meeting 2012, Viña del Mar, Chile

### Poster Contributions

- 2022 "APEX at the QSO MUSEUM: Molecular gas reservoirs associated with  $z \sim 3$  quasars and their link to the extended Ly $\alpha$  emission", Multi-line Diagnostics of the Interstellar Medium, Nice, France
- 2021 "Molecular gas reservoirs associated with  $z \sim 3$  quasars and their link to the extended Ly $\alpha$  emission", EAS conference, virtual
- 2018 "Kinematics and physical properties of the galaxy NGC 4656 and its TDG candidate", Second Binational Meeting AAA-SOCHIAS, La Serena, Chile
- 2017 "Physical properties of a nearby TDG candidate and its parent galaxy NGC 4656", Galaxy Groups and Clusters II, SOC, La Serena, Chile
- 2016 "Star-forming regions in the tidal tails: The case of NGC 1487", SOCHIAS Meeting 2016, Antofagasta, Chile

### Oral Contributions

- 2023 "Simulated extended [CII] emission around high-redshift galaxies" (invited Talk), The multiphase CGM, Ringberg castle, Germany
- 2022 "APEX at the QSO MUSEUM: molecular gas reservoirs associated with  $z \sim 3$  quasars and their link to the extended Ly $\alpha$  emission", EAS conference, Valencia, Spain
- 2022 "Simulated extended [CII] emission around high-redshift galaxies", ORIGINS/MPA Workshop, Garching, Germany
- 2022 "Molecular gas reservoirs associated with  $z \sim 3$  quasars and their link to the surrounding extended Ly $\alpha$  emission", MPA Institute Seminar, Garching, Germany
- 2021 Multiple talks at Young European Radio Astronomers Conference, Ringberg Science Retreat, and Galaxy Retreat, Germany
- 2019 "Kinematics and physical properties of the galaxy NGC 4656 and its TDG candidate", MPA-ULS Workshop, La Serena, Chile
- 2017 "Physical properties of a nearby TDG candidate and its parent galaxy NGC 4656", Second Chilean Gemini Users Meeting and SOCHIAS Meeting, Chile

## Academic Experience

### Undergraduate Teaching Assistant

2013–2014 Introducción a la Física, Laboratorio de Física I & II, Universidad de La Serena, Chile

2013–2014 Laboratorio de Física I & II, Universidad de La Serena, Chile

### Teacher

2015–2016 Laboratorio de Física I & II, Universidad de La Serena, Chile

## Outreach Activities

May 2021 High-school workshop “Cazadoras de Estrellas” (virtual)

Jul–Dec 2018 School astronomy workshop monitor, PAR Explora, Conicyt, Chile

Sept–Oct 2015 Touristic guide, Observatorio La Silla, ESO, Chile

## Skills and Competences

Languages Spanish (Native), English (Fluent), German (Intermediate)

Data Reduction Images, GMOS multi-slit data, Fabry-Perot cubes, APEX data

Software RADEX, L<sup>A</sup>T<sub>E</sub>X, Topcat, IRAF, ADHOC software, Fluxer

Programming Python, IDL

## Certifications

05/2025 “Unsupervised Learning, Recommenders, Reinforcement Learning”, Stanford University, Coursera

04/2025 “Advanced Learning Algorithms”, Stanford University, Coursera

03/2025 “Supervised Machine Learning: Regression and Classification”, Stanford University, Coursera

11/2024 “Introduction to Machine Learning”, Duke University, Coursera

09/2024 “Machine Learning with Python”, IBM, Coursera

02/2024 “Python for Data Science, AI & Development”, IBM, Coursera

## Publications

### First Author

- [1] **Muñoz-Elgueta, N.**; Arrigoni Battaia, F.; Kauffmann, G.; et al. “Simulated [CII] in high-z galaxies”, 2024, A&A, 690, 392
- [2] **Muñoz-Elgueta, N.**; Arrigoni Battaia, F.; Kauffmann, G.; De Breuck, C.; et al. “APEX at the QSO MUSEUM: molecular gas reservoirs associated with z~3 quasars and their link to the extended Ly $\alpha$  emission”, 2022, MNRAS, 511, 1462
- [3] **Muñoz-Elgueta, N.**; Torres-Flores, S.; et al. “Kinematics and physical properties of the nearby galaxy NGC 4656 and its TDG candidate”, 2018, MNRAS, 480, 3257

### Nth Author

- [4] Arrigoni Battaia, F. et al. (including **Muñoz-Elgueta, N.**), “JCMT/SCUBA-2 uncovers an excess of 850  $\mu$ m counts on megaparsec scales around high-redshift quasars...”, 2023, A&A, 676, 51
- [5] Kilpatrick, C. D. et al. (including **Muñoz-Elgueta, N.**), “The Gravity Collective: A Search for the Electromagnetic Counterpart to GW190814”, 2021, ApJ, 923, 258
- [6] Armstrong, P. et al. (including **Muñoz-Elgueta, N.**), “SN2017jgh: high-cadence shock cooling light curve of a SN I Ib”, 2021, MNRAS, 507, 3125

- [7] Molino, A. et al. (including **Muñoz-Elgueta, N.**), "Assessing photometric redshift precision of S-PLUS survey", 2020, MNRAS, 499, 3884
- [8] Torres-Flores, S. et al. (including **Muñoz-Elgueta, N.**), "Revealing effects of galaxy interaction in Arp 314", 2020, MNRAS, 494, 2785
- [9] Burns, C. R. et al. (including **Muñoz-Elgueta, N.**), "SN 2013aa and SN 2017cbv", 2020, ApJ, 895, 118
- [10] Mendes de Oliveira, C. et al. (including **Muñoz-Elgueta, N.**), "S-PLUS survey overview", 2019, MNRAS, 489, 2410