

Francisco NOGUERAS LARA

PERSONAL DATA

PLACE AND DATE OF BIRTH: Granada, Spain | 04 July 1990
ADDRESS: Max Planck Institute for Astronomy
Königstuhl 17, 69117 Heidelberg, Germany
Galactic Nuclei Group (<http://www.mpia.de/galactic-nuclei/>)
PHONE NUMBER: +49 6221 528-393 / +34 615 393 594
EMAIL: nogueras@mpia.de

WORK EXPERIENCE

JUN2021 - JUN2023 | Humboldt fellowship at the MPIA Heidelberg (Germany).
Duration 2 years.

OCT2019 - JUN2021 | Postdoctoral researcher at the MPIA Heidelberg (Germany).
Duration 1 year and 9 months.

SEP2015 - SEP2019 | Ph.D. Scholarship (Spanish Ministry of Education) at the Instituto de Astrofísica de Andalucía (IAA-CSIC, centre of excellence Severo Ochoa) Granada (Spain).
Duration 4 years.

JAN2017 - NOV2017 | ESO studentship (European Southern Observatory grant) at ESO-Garching (Germany).
Duration 9 months.

SEP2014 - SEP2015 | Contract in the frame of an ERC (European Research Council) Consolidator Grant at IAA-CSIC Granada (Spain). "The fingerprint of a Galactic Nucleus: A MultiWavelength, High-Angular Resolution, Near-Infrared Study of the Centre of the Milky Way". PI. Rainer Schödel.

JAN2014 - MAY2014 | Student Job (in the frame of ÍCARO program) University of Granada (UGR) Teaching Innovation Project 13-46: "Learning Physics as a research driven process", Department of Applied Physics, Faculty of Science, University of Granada (UGR). PI. Modesto T. López-López.

EDUCATION

SEP2014 - SEP2019 | Ph.D student in Physics and Space Sciences, **University of Granada (UGR)**.
Thesis: "The stellar structure and population of the Nuclear Bulge of the Milky Way".
Supervisors: Rainer SCHÖDEL and Antonio María ALBERDI ODRIÓZOLA.
Grade: 10/10. Equivalent to Summa cum laude.

JULY 2014 | Master in Physics and Maths (FISYMAT), **University of Granada (UGR)**.
Specialization: Astronomy and Astrophysics. Bilingual master | Grade: 9,5/10.
Master thesis: "Dust, Gas and Star Formation in the Tidal Dwarf Galaxy Arp 245N" |
Supervisor: Prof. Ute LISENFELD.

SEP2008 - JUN2013 | Licenciado in Physics (Degree plus Master), **University of Granada (UGR)** |
Grade: 8,44/10.

JUNE 2008 | Professional degree in Music, **Conservatorio Ángel Barrios**, Granada.
Speciality: Piano.

SCHOLARSHIPS

- SEP2015 - SEP2019 Ph.D. Scholarship, Spanish Ministry of Education.
Instituto de Astrofísica de Andalucía (IAA - CSIC).
- JAN2017 - NOV2017 ESO studentship, European Southern Observatory (ESO).
Garching, Munich -Germany.
- DEC2013 - JUL2014 Research Fellowship.
Department of Applied Physics of the University of Granada (UGR).
- SEP2012 - SEP2013 Erasmus grant. European Union Program *LLP-ERASMUS*.
Katholieke Universiteit Leuven (KU Leuven), Belgium.
- JUL2012 - MAY2013 Research Studentship from the University of Granada (UGR).
Department of Theoretical and Cosmological Physics of the University of Granada (UGR).

PRIZES AND AWARDS

1. Humboldt fellowship at the MPIA (Heidelberg, Germany). 2021-23.
2. Nomination for MERAC e IAU doctoral thesis prizes on behalf of the Spanish Society of Astronomy. 2020.
3. ESO studentship, European Southern Observatory (ESO).
Garching, Munich -Germany (Feb-Oct 2017).
4. 66th Lindau Nobel Laureate Meeting alumnus.
Two steps selection process: a national selection with only 14 spanish young scientists and an international selection (among all the students selected by their countries) with only 400 award-winners.
5. Ph.D. Scholarship (FPU from Spanish Ministry of Education).
Less than 10 % of successful applicants (physics).
6. Extraordinary Prize High School Granada 2008.
The Regional Government of Andalucía ("Junta de Andalucía") grants an outstanding prize, for the best marks in the preparatory course for the university (one out of 1000 students).

RESEARCH LINES AND INTERESTS

Structure and stellar population of the nuclear bulge of the Milky Way.

Galactic nuclei.

High angular resolution imaging.

Near infrared astronomy.

Extinction Law in the infrared towards the Galactic Centre.

During my PhD. I have been working on the structure and stellar population of the nuclear bulge of the Milky Way. I have have been in charge of data acquisition, reduction and publication of the GALACTICNUCLEUS survey (Nogueras-Lara et al. 2018a, 2019b). Moreover, I have published the first scientific work using the resulting data (Nogueras-Lara et al. 2018b, 2019a, 2020a,b).

Virtual experiment design to explain physics. https://www.ugr.es/modesto/web_applets/index.html

PUBLICATIONS

Summary:

First author refereed publications: 7. Total refereed publications: 21 (Q1 JCR category). Conference proceedings: 7. H-index: 10 (as of 18/01/2021 in ADS, Astrophysics Data System). Total number of citations: 360 (as of 18/01/2021 in ADS, Astrophysics Data System).

Refereed publications:

1. Jeans modelling of the Milky Way's nuclear stellar disc.
M. C. Sormani, J. Magorrian, F. Noguerras-Lara, et al. *MNRAS*, 499:7-24, 2020.
2. GALACTICNUCLEUS: A high angular resolution JHKs imaging survey of the GC. III. Evidence for wavelength-dependence of the extinction curve in the near-infrared.
F. Noguerras-Lara, R. Schödel, N. Neumayer et al. *A&A*, 641, A141, 2020.
3. The Milky Way's nuclear star cluster: Old, metal-rich, and cuspy. Structure and star formation history from deep imaging.
R. Schödel, F. Noguerras-Lara et al. *A&A*, 641, A102, 2020.
4. Galactic extinction laws. I. A global NIR analysis with 2MASS photometry.
J. Maíz-Apellániz, M. Pantaleoni González, R. H. Barbá, P. García-Lario, and F. Noguerras-Lara. *MNRAS*, 494:396-410, 2020.
5. Asymmetric spatial distribution of metal-poor stars in the Milky Way nuclear star cluster.
A. Feldmeier-Krause, W. Kerzendorf, T. Do, F. Noguerras-Lara et al. *MNRAS*, 496:4951-4963, 2020.
6. New constraints on the structure of the nuclear stellar cluster of the Milky Way from star counts and MIR imaging.
E. Gallego-Cano, R. Schödel, F. Noguerras-Lara et al. *A&A*, 634, A71, 2020.
7. Early formation and recent starburst activity in the nuclear disk of the Milky Way.
F. Noguerras-Lara, R. Schödel, A. T. Gallego-Calvente et al. *Nature Astronomy*, 4, 377-381, 2020.
8. First results from a large-scale proper motion study of the Galactic Centre.
B. Shahzamanian, R. Schödel, F. Noguerras-Lara et al. *A&A*, 632, A116, 2019.
9. GALACTICNUCLEUS: A high-angular-resolution JHKs imaging survey of the Galactic centre II. First data release of the catalogue and the most detailed CMDs of the GC.
F. Noguerras-Lara, R. Schödel, A. T. Gallego-Calvente et al. *A&A*, 631, A20, 2019.
10. Variability of the near-infrared extinction curve towards the Galactic centre.
F. Noguerras-Lara, R. Schödel, F. Najarro et al. *A&A*, 630, L3, 2019.
11. Star formation history and metallicity in the galactic inner bulge revealed by the RGBB.
F. Noguerras-Lara, R. Schödel, H. Dong et al. *A&A*, 620, A83, 2018.
12. GALACTICNUCLEUS: A high angular resolution JHKs imaging survey of the GC. I. Methodology, performance, and near-infrared extinction towards the GC.
F. Noguerras-Lara, E. Gallego-Cano, H. Dong et al. *A&A*, 610, A83, 2018.
13. The distribution of stars around the Milky Way's central black hole. II. Diffuse light from sub-giants and dwarfs.
R. Schödel, E. Gallego-Cano, H. Dong, F. Noguerras-Lara, et al. *A&A*, 609, A27, 2018.
14. The distribution of stars around the Milky Way's central black hole. I. Deep star counts.
E. Gallego-Cano, R. Schödel, H. Dong, F. Noguerras-Lara, et al. *A&A*, 609, A26, 2018.
15. Kinetics of doublet formation in bicomponent magnetic suspensions: The role of the magnetic permeability anisotropy.
M.T. Lopez-Lopez, F. Noguerras-Lara, et al. *Phys. Rev. E* 96, 062604, 2017.
16. Near- infrared variability study of the central $2.3 \text{ arcmin} \times 2.3 \text{ arcmin}$ of the Galactic Centre II.
H. Dong, R. Schödel, B. F. Williams, F. Noguerras-Lara, et al. *MNRAS*, 471:3617-3631, 2017.
17. IRTF/TEXES observations of the H II regions H1 and H2 in the Galactic Centre.
H. Dong, J. H. Lacy, R. Schödel, F. Noguerras-Lara, et al. *MNRAS*, 470:561-575, 2017.
18. Near- infrared variability study of the central $2.3 \text{ arcmin} \times 2.3 \text{ arcmin}$ of the Galactic Centre I.
H. Dong, R. Schödel, B. F. Williams, F. Noguerras-Lara, et al. *MNRAS*, 470:3427-3452, 2017.
19. KMOS view of the Galactic Centre - II. Metallicity distribution of late-type stars.
A. Feldmeier-Krause, W. Kerzendorf, N. Neumayer, R. Schödel, F. Noguerras-Lara, et al. *MNRAS*, 464:194-209, 2017.
20. Dynamics of magnetic assembly of binary colloidal structures.
F. Noguerras-Lara, L. Rodríguez-Arco and M. T. López-López. *EPL*, 111:37002, 2015.

21. Compact Radio Sources within 30" of Sgr A*: Proper Motions, Stellar Winds and the Accretion Rate onto Sgr A*.
F. Yusef-Zadeh, H. Bushouse, R. Schödel, M. Wardle, W. Cotton, D. A. Roberts, F. Noguerras-Lara, E. Gallego-Cano. *ApJ*, 809:10, 2015.

Submitted:

1. Radio observations of massive stars in the Galactic Centre: The Arches Cluster.
A. T. Gallego-Calvente et al., including F. Noguerras-Lara. Submitted to *A&A*.

Proceedings:

1. The extraordinarily variable star formation history of the nuclear disc of the Milky Way.
F. Noguerras-Lara & R. Schödel. Proceedings of the conference: "New Horizons in Galactic Center Astronomy and Beyond". In press.
2. The GALACTICNUCLEUS survey.
F. Noguerras-Lara & R. Schödel. Proceedings of the conference: "New Horizons in Galactic Center Astronomy and Beyond". In press.
3. The star formation history and metallicity in the galactic inner bulge revealed by the RGBB.
F. Noguerras-Lara, R. Schödel, A. T. Gallego-Calvente, et al. The Galactic Bulge at the Crossroads (GBX2018), held 10-14 December, 2018 in Pucón, Chile. Online at <http://www.eso.org/sci/meetings/2018/gbx2018.html>, galacticbulge2018, id.33.
4. The stellar cusp around the Milky Way's central black hole.
E. Gallego-Cano, R. Schödel, B. Shahzamanian, H. Dong, F. Noguerras-Lara, A. T. Gallego-Calvente. Proceedings of the XIII Scientific Meeting of the Spanish Astronomical Society held on July 16-20, 2018, in Salamanca, Spain, ISBN 978-84-09-09331-1.
5. Identification of RR Lyrae Stars in the Milky Way Nuclear Star Cluster.
H. Dong, R. Schödel, B. F. Williams, T. Do, A. Ghez, M. Morris, M. Rich, F. Noguerras-Lara, et al. Proceedings of the Polish Astronomical Society, Vol. 6. ISBN 978-83-938279-9-2, pp.63-67, 2018.
6. The Fingerprint of a Galactic Nucleus.
F. Noguerras-Lara & R. Schödel. *IAU Symposium*, 322, 257-258, 2017.
7. The stellar cusp around the Milky Way's central black hole.
R. Schödel, E. Gallego-Cano, F. Noguerras-Lara, et al. Proceedings of the XII Scientific Meeting of the Spanish Astronomical Society, 308-315, 2017.

In preparation:

1. The Milky Way's spiral arms seen from the Earth to the Galactic centre.
F. Noguerras-Lara et al.
2. GALACTICNUCLEUS: A high-angular-resolution JHK_s imaging survey of the Galactic centre. IV. Extinction maps and de-reddened photometry.
F. Noguerras-Lara et al.
3. Video Game applets to explain physics.
F. Noguerras-Lara, J. Hernández García, and M. T. López-López.

REVIEWER

Referee for the American Astronomical Society Journals: *Astrophysical Journal* (5.745 Impact factor 2020).

INTERNATIONAL CONGRESSES AND MEETINGS

Invited talks and seminars:

- 10/02-12/02/2021 Invited key presentation on: "The Nuclear Disc".
Workshop: "Galactic Centre and Inner Galaxy". Heidelberg, Germany.

- 23/09-24/09/2020 (DELAYED) “The star formation history of the nuclear bulge”.
Workshop: “Formation and evolution of the Nuclear Star Cluster”. Lund, Sweden.
- APRIL 2020 (DELAYED) “Bursts of star formation at the Galactic Centre”.
Short stay at Observatoire de la Cote d’Azur.
- 27/02-03/03/2017 “The most detailed study of a Nuclear Stellar Cluster so far”.
Conference: “The exciting lives of galactic nuclei”. Ringberg, Germany.

Presentations:

I have presented 5 contributed talks and 5 posters at international congresses:

- 21/10 - 24/10/2019 “New Horizons in Galactic Center Astronomy and Beyond”.
Yokohama, Japan.
Talk presentation: “The extraordinarily variable star formation history of the nuclear disc of the Milky Way”.
Poster presentation: “The GALACTICNUCLEUS survey”.
- 09/12 - 14/12/2018 “The Galactic Bulge at the Crossroads”.
European Southern Observatory, Pucón, Chile.
Talk presentation: “SFH and metallicity in the galactic inner bulge revealed by the RGBB”.
- 16/07 - 20/07/2018 “XIII SEA meeting”.
Sociedad Española de Astronomía (SEA), Salamanca, Spain.
Poster presentation: “A new infrared view of the GC”.
- 25/06 - 29/06/2018 “Dense Stellar Systems in the Era of Gaia, LIGO & LISA”.
CIERA, Northwestern, Santorini, Greece.
Talk and poster presentation: “GALACTICNUCLEUS: A high angular Survey of the GC”.
- 16/10 - 19/10/2017 “Piercing the Galactic Darkness”.
Max Planck Society, Heidelberg, Germany.
Talk presentation: “The JHK extinction curve towards the GC determined from a new survey”.
- 18/07 - 22/07/2016 “The Multi-Messenger Astrophysics of the Galactic Centre”.
Palm Cove, Cairns, Australia.
Poster presentation.
- 25/05 - 29/05/2015 School of Astrophysics “Francesco Lucchin”.
Istituto Nazionale Astrofisico di Arcetri, Florence, Italia.
Talk presentation: “The structure and the stellar population of the nuclear bulge of the Milky Way”.
- 07/07 - 11/07/2014 “14th International Conference on Electrorheological Fluids and Magneto-rheological Suspensions”.
Department of Applied Physics, Faculty of Sciences, University of Granada, Spain.
Member of the organizer committee. Participation and poster presentation: “Ferrofluid mediated interactions between ferro and diamagnetic particles”.
- 15/10 - 18/10/2013 International symposium: “The Universe Explored by Herschel”.
Herschel Science Team, European Space Agency (ESA).
Co-author of poster presented by Dr. Ute Lisenfeld: “Dust and Star Formation in the Tidal Dwarf Galaxy in Arp245”.

Attendance:

- 15/05 - 18/05/2017 “Observing Programmes Committee 100”.
European Southern Observatory (ESO), Abbazia di Spineto, Tuscany, Italy.
Scientific assistant.
- 25/10 - 28/10/2016 “ESAC Data Analysis and Statistics”.
ESAC Madrid.
- 17/10 - 21/10/2016 “ICCUB School: Machine Learning and Data Mining”.
Instituto de Ciencias del Cosmos, Universidad de Barcelona, España.

- 26/06 - 01/07/2016 “66th Lindau Nobel Laureate Meeting”.
Lindau, Germany.
- 15/12 - 17/12/2015 “I Asterics VO School”.
Centro de Astrobiología, Madrid, Spain.
- 03/10 - 11/10/2015 “The Alájar meeting 2015”.
Organizers: Tal Alexander, Pau Amaro-Seoane, Xian Chen, Nadine Neumayer, Elena Rossi,
Rainer Schödel and Cliff Will. Workshop about Galactic Centre.
- 03/11 - 14/11/2014 XXVI Canary Islands Winter School of Astrophysics: “Bayesian Astrophysics”.
Instituto de Astrofísica de Canarias (IAC), San Cristóbal de la Laguna, Tenerife, Spain.

LANGUAGES

SPANISH: Native.

ENGLISH: Fluent.

FRENCH: Basic.

GERMAN: Basic. 45 hours course at ESO.

DUTCH: Basic. 40 hours course at KU Leuven.

SCIENTIFIC VISITS

- Jul 2018 ESO Headquarters, Garching-Germany. 1 week data reduction (with Michael Hilker).
- Jun 2018 Max Planck Institute for Astronomy, Heidelberg-Germany. 1 week collaboration (with Nadine Neumayer).
- Jan 2018 ESO Headquarters, Garching-Germany. 1 week preparing observations with KMOS (with Michael Hilker).
- May 2016 University Observatory, Vienna-Austria. 1 week collaboration (with Joao Alves).

SUCCESSFUL PROPOSALS AND OBSERVING EXPERIENCE

- Time awarded at ESO/VLT as PI:

- 2018 VLT-HAWK-I + GRAAL: “The star formation history of the Galactic Centre constrained by its bright stars”, (as PI). Allocated time: 40 h. Grade B.
- 2018 VLT-HAWK-I: “The star formation history of the Galactic Centre unveiled with HAWK-I+GRAAL”, (as PI). Allocated time: 12 h. Grade B.
- 2017 VLT-KMOS: “Finding hot massive stars and dissolved clusters at the Galactic Centre”, (as PI). Allocated time: 2 h. Grade B.

- Successful proposals as col:

2015-2020 14 successful proposals observed at VLT (ESO) and GTC (La Palma, Spain)

- Observing experience:

- 2016 VLT-HAWK-I: Campaign in visitor mode 11/06-14/06/2016.
- 2015 VLT-HAWK-I: Campaign in visitor mode 05/06-10/06/2015.
- 2014 CAHA observatory: One-night optical campaign as part of the master in Astronomy and Astrophysics. Almería (Spain).

TEACHING EXPERIENCE

I have given a total of 17 ECTS at the University of Granada as a professor of different subjects. Moreover I have been co-director of a final degree project (2015-16) and a master thesis (2019-20).

I am also co-tutoring a master-intern student at the MPIA (2020).

- 2018-2019 “Mechanics and Waves”. Degree in Physics. University of Granada (UGR). 6 ECTS.
2017-2018 “Mechanics and Waves”. Degree in Physics. University of Granada (UGR). 1.5 ECTS.
2017-2018 “Environmental Physics”. Degree in Physics. University of Granada (UGR). 1 ECTS.
2017-2018 “Physical fundamentals of engineering”. Degree in Telecommunications Engineering. University of Granada (UGR). 1.5 ECTS.
2017-2018 “Physics of the biological processes”. Degree in Biology. University of Granada (UGR). 1 ECTS.
2016-2017 “Physics I”. Degree in Chemistry. University of Granada (UGR). 6 ECTS.

TECHNICAL KNOWLEDGE

ASTROPHYSICS	DS9, IRAF, NED, VO TOOLS, SKYSURVEY, HIPE, FAMIAS, PERIOD04.
PROGRAMMING	Python, IDL, C, FORTRAN.
IMAGE PROCESSORS	Gimp, ImageJ, Geogebra, Adobe Illustrator.
TEXT EDITION	Latex, Miktex, Lyx, Office, Open Office.
CALCULUS	Mathematica, MATLAB.
INSTRUMENTATION	HAWK-I, KMOS at Very Large Telescope (ESO-VLT). Rheometers: MCR300 Physica-Anton Paar, Haake MARS III.

OUTREACH ACTIVITIES

- Organiser of “Astronomy on Tap”(Heidelberg, Germany), since November 2019.
- Short documentary for Canal Sur televisión “Conciencia”(https://www.canalsur.es/) 2019.
- Interviews:
 - La Vanguardia (https://www.lavanguardia.com) 2019.
 - National Geographic (https://www.nationalgeographic.es/) 2019.
 - Chilean newspaper “Las últimas noticias”(http://www.lun.com) 2019.
 - Spanish radio “Cadena COPE”, “La linterna”, 2019.
 - Spanish National Radio (RNE) at Lindau, Germany. Jun 2016.
- Press release (ESO, Nat. Astron, CSIC, MPIA, INTA-CAB, IAA) for the determination of the star formation history of the Nuclear bulge (Nogueras-Lara et al. 2020 Nature Astronomy, 4, 377). December 2019. High international impact (e.g. CNN https://edition.cnn.com/).
- Press release (CSIC & IAA, and local and national press) for the GALACTICNUCLEUS survey (A&A, 631, A20, 2019). October 2019. (e.g. CSIC https://www.csic.es/).
- Science divulgation activities. Parque de las Ciencias, Granada.
- European Researchers’ Night 2015 and 2016. Granada.
- Participation in divulgation activities. Instituto de Astrofísica de Andalucía (IAA-CSIC).