

ALEJANDRO RODRÍGUEZ GARCÍA

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ABOUT ME

[DOB: 08-05-2000] I am a highly motivated and driven individual with a passion for learning and professional growth. My background in Theoretical Physics has equipped me with strong analytical skills, which I now apply to the field of computational neuroscience. I am currently pursuing a PhD focused on developing more adaptive and intelligent AI systems through neuromodulatory-aware spiking neural networks (SNNs). I also hold experience in teaching, managing, and mentoring students to conduct research projects. I am a quick learner, decisive, resilient, ambitious, and dedicated, with a strong sense of responsibility, creativity, and adaptability, enabling effective and efficient work in diverse situations.

EDUCATION

PhD in Biosciences, Newcastle University 2023 - 2027 (expected)

- PhD thesis: *The Role of Neuromodulation in Shaping Continual Learning within Artificial Neural Networks*.
Supervisor: Dr. Srikanth Ramaswamy, Neural Circuits Laboratory, Biosciences Institute (NU).

Master in Physics of Condensed Matter and Biological Systems, UAM 2022 - 2023

GPA: 8.33/10. Biophysics specialization: Neuroinformatics, Systems biology, Image analysis and processing.

Master's thesis project:

- Computational Neuroscience: *Dopamine, its role during learning and motivation* (2023).
Supervisor: Néstor Parga Carballada, Theoretical Physics Department (UAM).

Bachelor in Physics, Autonomous University of Madrid (UAM) 2018 - 2022

GPA: 7.16/10. Theoretical physics itinerary: Advanced Mathematical Methods, Classical electrodynamics, Particle Physics, Cosmology, Advanced Quantum Mechanics.

Bachelor's thesis projects:

- Paper-based sensors and luminescent nanoparticles for biomedical and environmental applications:
(PoC) Nanoparticles doped with Er and Yb as chromium(III) sensor (June 2022).
Supervisor: Emma Martín Rodríguez, Applied Physics Department (UAM).
- Metal-hydrogen systems:
Formation and decomposition of palladium hydride (December 2021).
Supervisor: Pablo Molina de Pablo, Materials Physics Department (UAM).

Member of the varsity basketball team.

Evaluation for University Access (EvAU): 9.425/10. 2018

PUBLICATIONS & PREPRINTS

- **Rodriguez-Garcia, A.**, Ghosh, A. & Ramaswamy, S. Noradrenergic-inspired gain modulation attenuates the stability gap in joint training. Preprint at <https://doi.org/10.48550/ARXIV.2507.14056> (2025).
- **Rodriguez-Garcia A.**, Whyte C.J., Munn B.M., Mei J., Shine J.M., Ramaswamy S. The role of gain neuromodulation in layer-5 pyramidal neurons. Preprint at <https://doi.org/10.48550/ARXIV.2507.03222> (2025).
- Mei, J.*, **Rodriguez-Garcia, A.***, Takeuchi, D., Wainstein, G., Hubig, N., Mohsenzadeh, Y., & Ramaswamy, S. (2025). Improving the adaptive and continuous learning capabilities of artificial neural networks: Lessons from multi-neuromodulatory dynamics (Version 1). arXiv. <https://doi.org/10.48550/ARXIV.2501.06762> (* equal contribution).
- **Rodriguez-Garcia, A.**, Mei, J., & Ramaswamy, S. (2024). Enhancing learning in artificial neural networks through cellular heterogeneity and neuromodulatory signaling (Version 1). arXiv. <https://doi.org/10.48550/ARXIV.2407.04525>.

- López-Peña, G., **Rodríguez García, A.**, García Solé, J., & Martín Rodríguez, E. (2024). Luminescent rare-earth-doped up-converting nanoparticles for Cr³⁺ sensing in water. *Journal of Luminescence*, 274, 120701. <https://doi.org/10.1016/j.jlumin.2024.120701>.

RECOGNITIONS AND AWARDS

Summer School stipend , NorthFutures	2025
Full stipend to assist the Digital Health and Care Summer School in Newcastle Upon Tyne, UK.	
NeuroAI Cajal stipend , Cajal Advanced Training Programme	2025
Partial stipend to assist to the NeuroAI Cajal Advanced Training Programme Summer School in Champalimaud, Lisbon, Portugal (€1700).	
Conference Fellowship , Imperial College London	2025
Conference Fellowship to assist at the UKNC25 at Imperial College London (£375).	
Travel Grant , Organization for Computational Neuroscience	2025
Travel award associated with the presentation at the CNS*25 meeting (\$400).	
Student Exchange Program Award , US Department of Defense	2024
Scholarship to undertake research stays at Harvard University during the PhD.	
NUAcT PhD Studentship , Newcastle University	2023
Scholarship to pursue a PhD in Bioscience at Newcastle University.	
Vice-Chancellor's EU Scholarship , Newcastle University	2023
Scholarship to assist tuition fees of EU students in studying a postgraduate research degree at Newcastle University.	
Excellence Grant , Community of Madrid and Council of Education and Research	2019
Scholarship for excellent academic achievement - Course 2018-2019 (€2100).	

REVIEWER

Web of Science: <https://www.webofscience.com/wos/author/record/OIU-5274-2025>

- IEEE Transactions on Cognitive and Developmental Systems.

CONFERENCE PRESENTATIONS AND POSTERS

Neuromorphic Computing for Development and Learning Workshop (NCDL)	2025
Poster: "Object perception through visual attention".	
Rodriguez-Garcia A., Ghosh A., Ramaswamy S., D'Angelo G.	
https://doi.org/10.5281/zenodo.15802809 .	
34th Annual Computational Neuroscience Meeting (CNS*25)	2025
Oral: "The role of gain neuromodulation in layer-5 pyramidal neurons".	
Rodriguez-Garcia A., Whyte C.J., Munn B.M., Mei J., Shine J.M., Ramaswamy S.	
https://doi.org/10.48550/arXiv.2507.03222 .	
UK Neural Computation (UKNC25)	2025
Poster: "Balancing stability and plasticity through gain neuromodulation and inhibitory gating".	
London, UK	
Spiking Neural networks as Universal Function Approximators (SNUFA)	2024
Flash talk (and Poster): "Adaptive learning with neuromodulation-aware spiking neural networks".	
Online	
Rodriguez-Garcia A., Ramaswamy S.	
https://www.youtube.com/watch?v=o6kT44eYNk&t=146s .	
Bernstein Conference	2024
Poster: "Enhancing learning through neuromodulation-aware spiking neural networks".	
Frankfurt, Germany	
Rodriguez-Garcia A., Ramaswamy S.	
https://doi.org/10.12751/nncn.bc2024.077 .	
Neuroplasticity in Brain Health and Disease Conference (Physoc)	2024
Poster: "Enhancing Continual Learning in ANNs through Neuromodulation".	
Newcastle, UK	
Rodriguez-Garcia A., Ramaswamy S.	

EXPERIENCE

Physics Demonstrator	Jan 2025 - Jul 2026 (expected)
Newcaslte university	<i>Newcastle, UK</i>
Teaching Compton Scattering to Stage 2 Physics students, covering theoretical principles, experimental demonstration, and providing feedback on lab reports.	
Intern mentor	Feb 2025 - Apr 2025
Newcaslte university	<i>Newcastle, UK</i>
Mentoring a Computer Science intern working on heterogeneous SNNs for multi-task learning.	
MRes Supervisor	Jan 2025 - Jul 2025
Newcaslte university	<i>Newcastle, UK</i>
Supervising a Neuroscience MRes project on neuromodulated SNNs, focusing on the roles of dopamine and acetylcholine.	
Venture Scientist Fellow (Cohort 7)	2024
Conception X	<i>London - Newcastle, UK</i>
Basketball Coach	2018-2023
Colegio Ábaco	<i>Madrid, Spain</i>

KNOWLEDGE AND SKILLS

Programming skills	Python, R, C++, LaTeX, HTML/CSS, SQL.
Software Skills	MatLab, Excel, OriginPro, RStudio, Fiji, ImageJ, Wolfram Mathematica.
Languages	Spanish (native), English (advanced), French (beginner).

LICENSES AND CERTIFICATIONS

Digital Health and Care Summer School , NorthHFutures	2025
The Digital Health and Care Summer School 2025 (23–25 Sept, Newcastle upon Tyne) is an immersive programme for PhD students and early-career researchers working in health and care technologies and innovation.	
NeuroAI Summer School , Cajal Advanced Training Programme	2025
The NeuroAI course (14 Jul – 1 Aug 2025, Lisbon) is an advanced and highly competitive program focused on cutting-edge AI methods applied to modelling brain activity, cognition and behaviour, taught by leading experts in the field.	
Reinforcement Learning Onramp , MathWorks	2022
Course Completion Certificate:100% - 4h.	
Cambridge Assessment English: CAE , Cambridge	2023
Grade C - Score: 186 (C1).	

VOLUNTEERING

Great North Run (21 Km) Fundraiser (£700)	2025
Parkinson's UK	<i>Madrid, Spain</i>
Teacher of children in social exclusion	2015 - 2017
Cáritas	<i>Madrid, Spain</i>