Curriculum vitae

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H-index: 18 (Google Scholar), Total citations: 2410 (Google Scholar: September 2023)
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Summary

More than 20 years of experience in scientific research. Study of the immune system from different perspectives. My current research interest is positioned at the interface of experimental immunology, theoretical immunology, mathematics, autoimmunity, and hematology with a focus on human health. Proven track record in people management skills in motivating and leading high-performing teams in multicultural environments. Demonstrated capacity to drive change and manage complex challenges and tight deadlines.

Work experience

- 2021-Currently: Assistant Professor. Faculty of Medicine at **Universidad Complutense de Madrid** (Spain). Visitor Researcher at **Instituto de Medicina Molecular (iMM)** (Lisbon, Portugal)
- 2019-2020: Senior Research Scientist at **Instituto de Medicina Molecular (iMM)**(Lisbon, Portugal)
- 2015-2018: Research Scientist at Aaron Diamond AIDS Research Center, affiliated to **Columbia University** (New York, USA)
- 2013-2015: Research Postdoctoral Fellow at **New York Blood Center** (New York, USA)
- 2008-2013: Research Postdoctoral Fellow at **NYU Langone Health** (New York, USA)
- 2012: Visitor Scientist at Universidad Nacional de la Amazonia Peruana (Iquitos, Peru)
- 2007-2008: Research Postdoctoral fellow at **National Center of Biotechnology/CSIC** (Madrid, Spain)

Education

- 20018- 2019: Translating cutting-edge technology and scientific discoveries into high-growth business opportunities **HiSeeds Tech training program** NOVA University Lisbon (Portugal)
- 2004- 2006: **PhD student** on Immunology and Cellular Biology area. Autonomous University of Madrid and National Center for Biotechnology/CSIC (Madrid, Spain). Honors: *Cum laude*
- 2003- 2004: **Advanced Studies Diploma (DEA)** in Immunology. Autonomous University of Madrid (Spain)
- 1998- 2001: **Undergraduate student** (Immune system and cancer immunotherapy). Department of Cellular Biology. Complutense University of Madrid (Spain)
- 1996- 2001: **Bachelor's Degree** in Biology: Specialty area Biochemistry. Complutense University of Madrid (Spain)

Awards and honors

- 2009-2011: **Postdoctoral Research fellowship** from Spanish Research Council and Ministry of Science
- 2008-2009: **Post-doctoral fellowship** from Alfonso Martin Escudero Foundation (Private Spanish Foundation)
- 2008-2009: **Post-doctoral fellowship** from Ramon Areces Foundation (Private Spanish Foundation)
- 2002-2006: **Graduate fellowship** from Madrid Regional Government
- 2000-2001: **Undergraduate fellowship** from Complutense University of Madrid

Fields of research interest

Immune system, conceptual immunology, mathematical models in biology, theoretical biology, inflammation, host-parasite interaction, immunotherapy with dendritic cells, TLRs, autoimmunity, tolerance, hematology, homeostasis, T cells, B cells, vaccine, malaria vaccine, influenza vaccines, adjuvants, atherosclerosis, anemia, neocytolysis, myelodisplastic syndromes

Research projects as principal investigator

- **EXPL/BIA-BIO. Foundation for Science and Technology**. 2021-2023. Enemy within: The unexpected role of the red blood cells homeostasis in the onset of malarial anemia. Instituto de Medicina Molecular (iMM) Lisbon, Portugal; and Facultad de Medicina, Universidad Complutense de Madrid, Spain. Rating: 9 Cut-off mark: 7.25
- **Plan Nacioanl**. 2023-2026. Unveiling the Implications of Disrupted red blood cell lifespan and Homeostatic autoimmunity in the onset of Malarial Anemia. Facultad de Medicina, Universidad Complutense de Madrid, Spain.

Selected research projects (as postdoc researcher)

- **FPJ 1190 La Caixa**. Molecular mechanisms of Plasmodium survival in the liver-stage of infection. Instituto de Medicina Molecular (iMM) Lisbon, Portugal.
- **NIH 2015 R01**. Mechanisms of induction of protective anti-malarial CD8+ T Cells. Aaron Diamond AIDS Research Center. New York, US.
- **NIH 2013 R01 AI**. Development of a novel adjuvant for vaccine sparing. New York Blood Center. New York, US
- **Grand Challenges Explorations 2009 Gates Foundation**. New York Langone Health. Collaboration with Caltech. New York and California, US.
- **NIH 2008 R56 AI**. New *Plasmodium* strategies to modulate inflammation. New York Langone Health. New York, US
- **Burroughs Welcome Fund Award for Investigators in the Pathogenesis of Infectious Disease** (2006-2011). New York Langone Health. New York, US.

Research monographies

Book chapter: **Fernández-Arias C** and Tsuji M (2017) *Viral Vector Vaccines for Liver-Stage Malaria.* In MM Mota and A Rodriguez (Eds.) *Malaria* (pp. 157-169). Springer International

Publishing.

Publications from Congresses

Fernández-Arias Cristina and Fernández-Arias Clemente (2021). A homeostatic approach to malarial anemia. *Eur. J. Immunol.* (2021. 51 (Suppl. 1): 1-448 Abstract). DOI: 10.1002/eji.202170200

Publications

As principal investigator:

- Arias CF, Acosta FJ Fernandez-Arias C. Killing the competition: a theoretical framework for liver-stage malaria. Under review in Nature Communications.

1 Arias CF, Acosta FJ, Bertocchini F, Herrero MA, Fernández-Arias C. The coordination of anti-phage immunity mechanisms in bacterial cells. Nat Commun. 2022 Dec 1;13(1):7412. doi: 10.1038/s41467-022-35203-7. PMID: 36456580; PMCID: PMC9715693.

2 Arias, C.F., Acosta, F.J., Bertocchini, F. et al. The coordination of anti-phage immunity mechanisms in bacterial cells. Nat Commun 13, 7412 (2022)

3. Arias, C.F.; Acosta, F.J.; and Fernández-Arias, C. (2022) Killing the competition: a theoretical framework for liver-stage malaria. *Open Biology* **12,3**

4. Arias, C.F.; Herrero MA; Bertocchini, F.; Acosta, F.J.; and Fernández-Arias, C. (2021) Modeling the Dependence of Immunodominance on T Cell Dynamics in Prime-Boost Vaccines. *Mathematics* **9, 28**

5. Arias, C.F.; Acosta, F.J.; Bertocchini, F.; Fernández-Arias, C. Interference of SARS-CoV-2 with the Homeostasis of Ventilation and Perfusion in the Lung. *Preprints* (2020), 2020050177 (doi: 10.20944/preprints202005.0177.v1).

6. Arias CF and **Fernández-Arias C** (2017) How do red blood cells know when to die? *Royal Society Open Science* **4**(4), 160850.

7. Arias CF, Herrero MA, Acosta FJ, and **Fernández-Arias C** (2017) Population mechanics: A mathematical framework to study T cell homeostasis. *Scientific Reports* **7**, Article number: 9511.

8. Arias CF, Herrero MA, Cuesta JA, Acosta FJ and **Fernández-Arias C** (2015) The growth threshold conjecture: a theoretical framework for understanding T-cell tolerance. *Royal Society Open Science* **2**(7)

9. Arias CF, Herrero MA, Acosta FJ and **Fernández-Arias C** (2014) A mathematical model for a T cell fate decision algorithm during immune response. *Journal of Theoretical Biology* **349C**:109-120.

As first author:

10. **Fernández-Arias C**, Arias CF, Zhang M, Herrero MA, Acosta FJ, and Tsuji M (2018). Modeling the effect of boost timing in prime-boost vaccines against malaria. *PLoS One* Jan **12**;13 (1).

11. **Fernández-Arias C**, Rivera-Correa J, Gallego-Delgado J, Rudlaff R, Fernandez C, Roussel C, Götz A, Gonzalez S, Mohanty A, Mohanty S, Wassmer S, Buffet P, Ndour PA and Rodriguez A (2016). Anti-Self Phosphatidylserine Antibodies Recognize Uninfected Erythrocytes Promoting Malarial Anemia. *Cell Host & Microbe* **19(2)**:194-203.

12.**Fernández-Arias C**, Mashoof S, Huang J and Tsuji M (2015) Circumsporozoite protein as a potential target for antimalarials. *Expert Rev Anti Infect Ther* **13(8)**:923-6.

13. **Fernández-Arias C**, Arias CF and Rodriguez A (2014) Is malarial anemia homologous to neocytolysis after altitude acclimatization? *International Journal of Parasitology* **44**(1):19-22.

14.**Fernández-Arias C**, Lopez JP, Hernandez-Perez JN, Bautista-Ojeda MD, Branch O and Rodriguez A (2013) Malaria inhibits surface expression of complement receptor 1 in monocytes/macrophages, causing decreased immune complex internalization. *Journal of Immunology* **190**(7):3363-72.

15. **Arias CF**, Zotes, TM, Fuster JJ, Spada R, Perez-Yague S, Hirsch E, Wymann M, Carrera AC, Andres V and Barber DF (2013) PI3K p110gamma deletion attenuates murine atherosclerosis by reducing macrophage proliferation but not polarization or apoptosis in lesions *PLoS One***8**(8).
16. **Arias CF**, Ballesteros-Tato A, García MI, Martín-Caballero J, Flores JM, Martínez-A C and Balomenos D (2007). p21(CIP1/WAF1) controls proliferation of activated/memory T cells and affects homeostasis and memory T cell responses. *J Immunol***178**:2296-2306.

Other papers:

17. Min Zhang, Julio Gallego-Delgado, **Cristina Fernández-Arias**, Norman Waters, Ana Rodriguez, Moriya Tsuji, Ronald Wek, Victor Nussenzweig and William Sullivan (2017). Inhibiting the Plasmodium eIF2alpha kinase PK4 prevents artemisinin-induced latency. *Cell, Host and Microbe* Dec **13**;22 (6):766-776
18. Rivera-Correa J, Guthmiller J, Vijay R, **Fernández-Arias C**, Pardo-Ruge M, Gonzalez S, Butler N Rodriguez A (2017). Plasmodium direct activation of T-bet+ B cells through TLR9 leads to autoimmunity during malaria. *Nat Commun* **3**;8(1):1282.
19. Zhou J, Kaiser A, Ng C, Karcher R, McConnell T, Paczkowski P, **Fernández-Arias C**, Zhang M, Mackay S and Tsuji M (2017). CD8+ T-cell mediated anti-malaria protection induced by malaria vaccines; assessment of hepatic CD8+ T cells by SCBC assay. *Human Vaccines & Immunotherapeutics* **3**;13(7):1625-1629.
20. Gallego-Delgado J, Basu-Roy U, Ty M, Alique M, **Fernández-Arias C**, Movila A, Gomes P, Weinstock A, Xu W, Edagha I, Wassmer SC, Walther T, Ruiz-Ortega M, Rodriguez A (2016) Angiotensin receptors and β-catenin regulate brain endothelial integrity in malaria. *J Clin Invest* **126**(10):4016-4029. doi: 10.1172/JCI87306.
21. Trakala M, **Fernández-Arias C**, García MI, Moreno-Ortiz MC, Tsilingiri K, Fernández PJ, Mellado M, Díaz-Meco MT, Moscat J, Serrano M, Martínez-A C and Balomenos D (2009) Regulation of macrophage activation and septic shock susceptibility via p21(WAF1/CIP1) *Eur J Immunol* **39**(3), 810-819.
22. Mejías R, Costo R, Roca AG, **Fernández-Arias C**, Veintemillas-Verdaguer S, González-Carreño T, del Puerto Morales M, Serna CJ, Mañes S and Barber DF. 2008. Cytokine adsorption/release on uniform magnetic nanoparticles for localized drug delivery. *J Control Release* **130**(2):168-74.
23. Barber DF, Bartolomé A, Hernández C, Flores JM, **Fernández-Arias C**, R-Borlado L, Hirsch E, Wymann M, Balomenos D and Carrera AC (2006) Class IB phosphatidylinositol 3-kinase (PI3K) deficiency ameliorates IA-PIK-induced systemic lupus but not T cell invasion. *J Immunol* **176**:589-593.
24 Barber DF, Bartolomé A, Hernández C, Flores JM, Redondo C, **Fernández-Arias C**, Camps M, Ruckle T, Rodríguez S, Martínez-A C, Balomenos D and Carrera AC (2005). PI3Kgamma inhibition blocks glomerulonephritis and extends lifespan in a mouse model of systemic lupus. *Nature Med* **11**:933-935.
25. Martínez del Hoyo G, Martín P, Hernández Vargas H, **Arias CF** and Ardavín C (2002) Characterization of a common dendritic cell-committed precursor. *Nature* **415**:1043-1047.
26. Martínez del Hoyo G, Martín P, **Arias CF**, Rodríguez Marń A and Ardavín C (2002) CD8alpha(+) dendritic cells originate from the CD8alpha(-) dendritic cell subset by a maturation process involving CD8α, DEC-205, and CD24 up-regulation. *Blood* **99**:999-1004.
27. Martín P, Martínez del Hoyo G, Anjuère P, **Arias CF**, Hernández Vargas H, Fernández-López A, Parrillas V and Ardavín C (2002) Characterization of a new subpopulation of mouse CD8α+ B220+ dendritic cells with tolerogenic potential. *Blood* **100**:383-390.
28. Ardavín C, Martínez del Hoyo G, Martín P, Anjuère P, **Arias CF**, Marín AR, Ruíz S, Parrillas V and Hernández H (2001). Origin and differentiation of dendritic cells. *Trends Immunol* **22**:691-700.
29. Martín P, Martínez del Hoyo G, Anjuère F, Ruíz S, **Arias CF**, Marín AR and Ardavín C (2000) Concept of lymphoid versus myeloid dendritic cell lineages revisited: both CD8α- and CD8α+ dendritic cells are generated from CD4low lymphoid committed precursosrs. *Blood* **96**:2511-2519.

Supervision of undergraduate, graduate and postdoc students

- 2021- Nuno Valente Leal - master student at Instituto de Medicina Molecular (Lisboa, Portugal)
- 2016-2017 Sara Mashoof - junior postdoc fellow at Rockefeller University (New York, US)
- 2016 Summer Undergraduate Research Program Thomas Morgan Li - NYU School of Medicine (New York, US)
- 2011- 2013 Juan Rivera-Correa - Master Student at NYU School of Medicine (New York, US)
- 2011- 2013 Maureen Ty - Master Student at NYU School of Medicine (New York, US)
- 2012 Summer Undergraduate Research Program Rachel Rudlaff - NYU School of Medicine (New York, US)
- 2007- 2008 Teresa Zotes Ciprés - Master Student at National Center of Biotechnology/CSIC (Madrid, Spain)

Selected professional presentations and meetings

- The role of the macrophages in the erythrocytes homeostasis regulation. Cristina Fernández-Arias and Clemente F. Arias. 43 Congreso de la Sociedad Española de Inmunología, 22-24 September 2022, León, España. Poster
- Why do sporozoites traverse hepatocytes?. Cristina Fernández-Arias and Clemente F. Arias. XXII Congreso de la Sociedad Española de Parasitologia, 4-7 July 2022, Madrid, España. Talk
- The role of T cell population dynamics in the efficiency of prime-boost vaccines. Cristina Fernández-Arias and Clemente F. Arias. BioMalPar XVIII, 23-25 May 2022, Heilderber, Alemania. Talk
- Plasmodium sporozoites go viral: cell traversal and superinfection exclusion in malaria. Cristina Fernández-Arias and Clemente F. Arias. BioMalPar XVIII, 23-25 May 2022, Heilderber, Alemania. Poster
- A Homeostatic approach to malarial anemia. Cristina Fernández-Arias and Clemente F. Arias. 6th European Congress of Immunology, 1–4 September 2021, Virtual meeting. Poster/Talk.
- How do red blood cells know when to die? Cristina Fernández-Arias and Clemente F. Arias. Tissue environment in health and disease. **Champalimaud Foundation**, Lisbon (Portugal). October 8th-10th, 2019. Oral communication.
- Algorithmic Cell Biology. Clemente F. Arias and Cristina Fernández-Arias. **Multiscale Modelling of Tumour Initiation, Growth and Progression: From Gene Regulation to Evolutionary Dynamics**. ZiF, Biefeld (Germany). November 2016. Oral communication.
- To be two or not to be: a short introduction to Algorithmic Cell Biology. Clemente F. Arias and Cristina Fernández-Arias. **Instituto de Biotecnología de Cantabria (IBBTEC)**, Cantabria (Spain). May 2016. Oral communication.
- How do red blood cells know when to die? Cristina Fernández-Arias. **Invited Seminar in CHU, Grenoble (France)**. November 2016. Oral communication.
- Anti -self antibodies against phosphatidylserine induce anemia in malaria. Cristina Fernández-Arias and Ana Rodríguez. **ASTMH,The American society of tropical medicine and hygiene**. 62nd Annual Meeting. Washington (USA). November, 2013. Oral communication.

Teaching experience

- Curso 2021-2022: Teaching General Immunology (theory and practices), first-grade Medical students. Universidad Complutense de Madrid

- Since 2005: Teaching and tutoring undergraduate and graduate students.
- 2015: Volunteering in the American non-profit organization Citizen School (Teaching basic immunology in Renaissance School of the Arts middle school).
- 1998-2002: Assistant Teacher (practical classes in doctorate courses in Spain).

Languages

Spanish: native
English: professional proficiency. C1 certificate by UCM
Portuguese: fluent

Technical skills

- Lab technical skills: cellular and molecular techniques,*In vivo* murine models, cytometry, ELISA, histology, microscopy, antibody purification, western blot, *in vitro* cellular cultures of primary and tumor cells.
- Scientific writing: writing research papers, reports, research proposals, and funding applications, reviews, and summaries.
- Text editing, presentations: Latex, Prezi, and Office.

Soft skills

Patient, strong work ethic, creativity, drive for results, boundless curiosity, a logical and independent mind, analytical and critical thinking, problem-solving, Flexibility, resilience, written and oral communication skills, teamwork skills,and interpersonal skills.