

Curriculum Vitae

Jorge Luiz Coelho Domingos

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Personal Details

Name: Jorge Luiz Coelho Domingos
Current position: ERA Postdoctoral Research Fellow, University of Latvia, Riga, Latvia
Nationality: Brazilian
Date of birth: 11 August 1987
Place of birth: Fortaleza, Brazil

Profile

Computational soft-matter physicist with a strong background in molecular and Langevin dynamics, active matter, magnetic colloids, and modelling of complex environments. Experienced in high-performance computing, including Fortran, C, CUDA, MPI/OpenMP, and GPU-based simulations. Research interests include collective behaviour, self-assembly, field-driven pattern formation, and the physics of magnetic and active systems in complex media.

Additional experience includes open-science practices, scientific code development, supervision, teaching, peer review, and cross-disciplinary projects involving biophysics, biomaterials, and bio-inspired systems.

Education

- **Ph.D. in Physics**, Universidade Federal do Ceará, Brazil / University of Antwerp, Belgium.
Awarded: 15 March 2018.
- **M.Sc. in Physics**, Universidade Federal do Ceará, Brazil.
Awarded: 14 August 2013.
- **B.Sc. in Physics**, Universidade Federal do Ceará, Brazil.
Awarded: 1 July 2011.

Professional Experience

- **ERA Postdoctoral Research Fellow**, University of Latvia, Riga, Latvia.
15 July 2024–present.
- **Postdoctoral Research Fellow**, Universidade Federal do Ceará, Brazil.
15 April 2018–14 July 2024.
- **Visiting Researcher**, Géosciences Montpellier, Université de Montpellier, France.
23 December 2019–20 March 2020.
- **Visiting Researcher**, Géosciences Montpellier, Université de Montpellier, France.
15 June 2019–13 September 2019.

Supervision and Teaching

Co-supervision

- Co-supervisor of the Ph.D. thesis *Study of colloidal systems of magnetic particles driven by oscillating fields*, Universidade Federal do Ceará, 2021–2025.

Teaching Experience

- **Lecturer**, *Soft Nanomaterials*, Master's Programme in Physics, Department of Physics, University of Latvia, Spring Semester 2026.
- **Teaching Assistant**, General Physics for Engineering, Laboratory Course, Universidade Federal do Ceará, 2012–2014.
- **Teaching Assistant**, Undergraduate Physics, Teacher Education Programme, Universidade Federal do Ceará, August–December 2017.

Peer-Review Activity

Referee for international peer-reviewed journals, including *Physical Review E*.

Research Projects

- **Pattern Formation in Systems of Magnetic Spinners – PATTSPIN.**
HORIZON-WIDERA-2022-TALENTS-04, August 2024–present.
Role: Postdoctoral Researcher.
- **Formação de Padrões Estruturais de Sistemas de Spinners Magnéticos** (*Structural Pattern Formation in Magnetic Spinner Systems*).
CNPq and FUNCAP, Brazil, April 2023–July 2024.
Role: Postdoctoral Researcher.
- **Simulação Numérica de Invasão de Água em Poços Produtores nos Campos do Pré-Sal** (*Numerical Simulation of Water Invasion in Producer Wells in Pre-Salt Reservoirs*).
Petrogal Brasil S.A., January 2019–April 2022.
Role: Postdoctoral Researcher, Applied R&D / intersectoral project.
- **Abordagens Biotecnológicas para Produção de Lectina Recombinante em Sistema Heterólogo e Investigação de sua Ação Citotóxica sobre Células de Glioblastoma C6 e U87** (*Biotechnological Approaches for Recombinant Lectin Production in Heterologous Systems and Investigation of its Cytotoxic Action on Glioblastoma C6 and U87 Cells*).
FUNCAP Universal Call 06/2023, Brazil, 2025–present.
Role: Team Member.
- **Tecnologia Inovadora na Estimulação de Crescimento de Probióticos: o Poder das Lectinas Vegetais na Formulação de Produtos Funcionais** (*Innovative Technology for Probiotic Growth Stimulation: the Power of Plant Lectins in Functional Food Formulation*).
CNPq/MCTI Call 44/2024, Faixa B – Consolidated Groups, Brazil, 2025–present.
Role: Team Member.
- **Biossensores Baseados em Nanomateriais e Lectinas para Detecção de Células Tumoriais** (*Biosensors Based on Nanomaterials and Lectins for Tumour Cell Detection*).

CAPES PrInt-UFC, Brazil, 2018–2022.

Role: Team Member.

Conferences and Scientific Events

- **17th International Conference on Magnetic Fluids (ICMF17)**, Vienna, Austria, 2026. Speaker.
- **Autumn Meeting of the Brazilian Physical Society**, Cuiabá, Brazil, 2026. Speaker.
- **International Soft Matter Conference**, Crete, Greece, 2025. Speaker.
- **Autumn Meeting of the Brazilian Physical Society**, Belém, Brazil, 2025. Speaker.
- **83rd International Scientific Conference of the University of Latvia – Section: Active, Soft and Magnetic Matter**, Riga, Latvia, 2025. Speaker and Main Organizer.
- **Interdisciplinary Challenges in Non-equilibrium Physics: from Soft to Active, Biological and Complex Matter** – INTCHA 2024, Max Planck Institute for the Physics of Complex Systems, Dresden, Germany, 2024. Speaker.
- **1st Latvian-Brazilian Workshop on Active and Soft Matter Physics**, 2022. Speaker and Organizer.
- **XXXV EFNNE**, remote format, 2021. Speaker.
- **15th International Conference on Magnetic Fluids**, Paris, France, 2019. Speaker.
- **Liquids 2014**, Lisbon, Portugal, 2014. Speaker.
- **XXXI EFNNE**, Campina Grande, Brazil, 2013. Speaker.
- **Frontiers in Condensed Physics**, Fortaleza, Brazil, 2013. Participant.
- **XVII SNEF**, São Luís, Brazil, 2007. Participant.

Schools and Training

- **ESPresSo Summer School**, Stuttgart, Germany, 2025.
- **MolSim CECAM School**, Amsterdam, The Netherlands, 2016.
- **46th IFF Spring School: Functional Soft Matter**, Jülich, Germany, 2015.

Fellowships and Funding

- **ERA / MSCA Fellowship**, University of Latvia, August 2024–present.
- **Ph.D. Funding Assistance**, Flemish Science Foundation, FWO-V1, September 2015–September 2016.
- **Teaching Assistant Fellowship**, undergraduate course in theoretical general physics, Universidade Federal do Ceará. Funding agency: FUNCAP, August–December 2017.
- **Postdoctoral Research Fellowship**, Department of Physics, Universidade Federal do Ceará. Funding agency: CAPES, 15 April 2018–15 November 2022.
- **Postdoctoral Researcher, Applied R&D / Intersectoral Project**, Universidade Federal do Ceará. Funding agency: Petrogal Brasil S.A., 2 January 2019–30 April 2022.

Prizes and Awards

- **Honorary Mention**, OBMEP – Olimpíada Brasileira de Matemática das Escolas Públicas, Brazil, 2005.
- **Seal of Excellence**, Horizon Europe Marie Skłodowska-Curie Actions, HORIZON-MSCA-2021-PF-01-01 – MSCA Postdoctoral Fellowships 2021. Score: 85.4/100.
- **Seal of Excellence**, Horizon Europe Marie Skłodowska-Curie Actions, HORIZON-MSCA-2022-PF-01-01 – MSCA Postdoctoral Fellowships 2022. Score: 90/100.

Languages

- Portuguese: native language.
- English: C1 level.
- Spanish: beginner.
- French: beginner.
- Italian: beginner.
- Latvian: beginner.

Technical Skills

Software and Programming

Windows, Linux, Fortran, C, Python, L^AT_EX, Blender, POV-Ray, ParaView.

Numerical Methods and High-Performance Computing

Molecular dynamics, Langevin dynamics, Brownian dynamics, Monte Carlo methods, Lattice Boltzmann methods, OpenMPI, OpenMP, GPU-CUDA.

Publications

1. F. P. S. Júnior, J. L. C. Domingos, W. P. Ferreira, and F. Q. Potiguar, “Controlling vortex rotation with obstacles in nonaligning dry active matter,” *Physical Review E* **113**, 054119 (2026). DOI: 10.1103/sjy3-qzp8.
2. J. L. C. Domingos, “Advanced Modelling Methodologies for Anisotropic Magnetic Colloids,” *Current Opinion in Colloid & Interface Science*, 84, 102039 (2026).
3. J. L. C. Domingos, F. Q. Potiguar, C. L. N. Oliveira, and W. P. Ferreira, “Emergence of synchronization-induced patterns in two-dimensional magnetic rod systems under rotating magnetic fields,” *Soft Matter* **21**, 488–498 (2025).
4. F. P. S. Júnior, J. L. C. Domingos, F. Q. Potiguar, and W. P. Ferreira, “Correlations between two vortices in dry active matter,” *Physica A* **656**, 130181 (2024).
5. B. S. Cavada, V. J. S. Osterne, J. L. C. Domingos, M. V. Oliveira, F. W. V. Martins, F. V. R. Cruz, F. E. O. Lima, H. S. Oliveira, J. S. Sousa, W. P. Ferreira, K. S. Nascimento, and V. R. Pinto-Junior, “Lectin-carbohydrate interactions by protein bioinformatics: Parkia lectins case study,” *Anais da Academia Brasileira de Ciências* **96**, suppl. 3 (2024).

6. B. S. Cavada, V. R. Pinto-Junior, V. J. S. Osterne, M. V. Oliveira, I. B. Silva, E. P. P. Laranjeira, A. F. Pires, J. L. C. Domingos, W. P. Ferreira, J. S. Sousa, A. M. S. Assreuy, and K. S. Nascimento, “In-depth analysis on the carbohydrate-binding properties of a vasorelaxant lectin from *Dioclea lasiophylla* Mart. ex Benth seeds,” *Journal of Biomolecular Structure and Dynamics* (2021).
7. B. S. Cavada, V. J. S. Osterne, V. R. Pinto-Junior, L. A. G. Souza, C. F. Lossio, M. T. L. Silva, C. Correia-Neto, M. V. Oliveira, J. L. A. Correia, A. H. B. Neco, J. L. C. Domingos, W. P. Ferreira, G. A. de Farias, and K. S. Nascimento, “Molecular dynamics and binding energy analysis of *Vatairea guianensis* lectin: a new tool for cancer studies,” *Journal of Molecular Modeling* **26**, 1–9 (2020).
8. J. L. C. Domingos, E. A. de Freitas, and W. P. Ferreira, “Steady states of non-axial dipolar rods driven by rotating fields,” *Soft Matter* **16**, 1201–1210 (2020).
9. A. D. Borba, J. L. C. Domingos, E. C. B. Moraes, F. Q. Potiguar, and W. P. Ferreira, “Controlling the transport of active matter in disordered lattices of asymmetrical obstacles,” *Physical Review E* **101**, 022601 (2020).
10. J. L. C. Domingos, F. M. Peeters, and W. P. Ferreira, “Self-assembly and clustering of magnetic peapod-like rods with tunable directional interaction,” *PLOS ONE* **13**(4), e0195552 (2018).
11. J. L. C. Domingos, F. M. Peeters, and W. P. Ferreira, “Self-assembly of rigid magnetic rods consisting of single dipolar beads in two dimensions,” *Physical Review E* **96**, 012603 (2017).