

Rogério Jorge

Birth Date: 12 April 1992

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Professional Experience

- 2022/09-Now **Invited Assistant Professor** Instituto Superior Técnico (IST), **Portugal**
Lecturer of the Physics Department teaching physics courses at undergraduate and graduate level.
- 2022/05-Now **Junior Research Scientist** Instituto Superior Técnico (IST), **Portugal**
Winner of the 2021 early research career program (CEEC) from FCT (Foundation for Science and Technology of Portugal) and Principal Investigator on research grants in the field of Nuclear Fusion.
- 2022/01-05 **Software Developer in the area of Machine Learning and Artificial Intelligence** KCS IT, **Portugal**
Agile development of Python libraries (RESTful APIs) at Defined.AI with integration on Azure and Kubernetes clusters. Big Data analysis with Continuous Delivery and Integration techniques.
- 2021/06-12 **Postdoctoral Researcher** Max Planck Institute for Plasma Physics, Greifswald, **Germany**
Fellow of the Alexander von Humboldt Foundation with a postdoctoral Fellowship.
- 2019-2021 **Postdoctoral Researcher** University of Maryland, College Park, **USA**
Fellow of the Simons Foundation and member of the international Hidden Symmetries project.
- 2015-2017 **Startup Co-founder & Web Developer** Company: **Portal da Sabedoria**
Project that started as an educational youtube channel (youtube.com/user/matmania1) and evolved to a tutoring website where students found tutors and had direct access to their schedule.

Education

- 2015-2019 **PhD in Physics (IST-EPFL Joint Doctoral Initiative)** Topics: Nuclear Fusion, Plasma Physics
Swiss Plasma Center (SPC) - EPFL, Lausanne, **Switzerland**
Instituto de Plasmas e Fusão Nuclear (IPFN), Técnico Lisboa, IST, University of Lisbon, **Portugal**
Thesis Title: *"A moment-based model for plasma dynamics at arbitrary collisionality"*.
Grade: Pass with Distinction and Honour. Funded by FCT.
- 2010-2014 **Bachelor's and Master's in Engineering Physics** Instituto Superior Técnico, **Portugal**
General Relativity, Quantum Mechanics, Programming, Electronics and Plasmas. Vice-president of the physics student section (NFIST). Organizer of the 1st and 2nd Engineering Physics Career Week.
Bachelor's grade: 17/20, Master's grade: 18/20, Thesis grade: 19/20.

Professional Certificates

- 2022 **MS Project - Planning in Project Management (16 hours)** Portuguese Engineers Association, Portugal
Gantt charts, resource allocation, report tables and graphics. Certificate n. RN213/2022.
- 2022 **Certificate of Pedagogical Aptitude (CAP)** Instituto do Emprego e Formação Profissional (IEFP), Portugal
Certificate n. F724224/2022 issued in 28-01-2022 to carry out the activity of certified trainer (formador).
- 2021 **Machine Learning (Advanced Level) – 3rd Ed. (16 hours)** Portuguese Engineers Association, Portugal
Certificate n. 866/2021 in line with the legal template n. 474/2010
- 2021 **Applied Machine Learning in Python** Coursera by University of Michigan
Scikit-learn, model selection, neural networks. Credential: coursera.org/verify/4ZCWKPCYXHLB
- 2021 **Introduction to Data Science in Python** Coursera by University of Michigan
Numpy, Pandas, Data Cleansing and DataFrames. Credential: coursera.org/verify/6298Y6WK48E3

Competitive Funding

- 2022 **High Performance Computing - OHARS Project** EUROfusion - European consortium of fusion research
47000 node-hours for the 6th Marconi Fusion cycle, corresponding to 2 256 000 core hours.
- 2022 **EUROfusion Enabling Research Grant** EUROfusion - European consortium of fusion research
Principal Investigator grant of 93.563€ on the topic of fast-particle confinement in stellarators.
- 2022 **Junior Researcher Contract** FCT (Fundação para a Ciência e Tecnologia), Portugal
6-year contract in the 4th edition of the Individual Scientific Employment Stimulus program.
- 2021 **Humboldt-Forschungsstipendium** Alexander von Humboldt-Stiftung, Germany
Humboldt Research Fellowship for Postdoctoral Researchers to conduct research in Germany

Awards and Distinctions

- 2020 **EPS-PPD Research Award** European Physical Society
Prize from the Plasma Physics Division of the European Physical Society granted annually in recognition of truly outstanding research achievements associated with their PhD study in the field of plasma physics.
- 2019 **Doctoral Program Thesis Distinction** EPFL, Switzerland
For placing on top 8% of physics EPFL PhD thesis as selected by the EDPY committee.
- 2018 **Publons Peer Review Award** Publons.com
For placing on top 1% of reviewers in Physics on Publons' global reviewer database.
- 2017-2020 **Outstanding Reviewer** IOP Publishing
Plasma Physics and Controlled Fusion

Fellowships and Studentships

- 2015-2019 **PhD Fellowship under Doctoral Program APPLAuSE** FCT, Portugal
Funding from "Fundação para a Ciência e Tecnologia" under grant PD/BD/105979/2014
- 2014 **Erasmus Scholarship** Swiss Plasma Center, EPFL, Switzerland
Tokamak edge turbulence simulations applied to the ISTTOK tokamak. Funding from the European Union under a 6 months grant. **Advisor:** Prof. Paolo Ricci, EPFL
- 2013 **Research Internship** Laboratório de Instrumentação e Partículas (LIP), Lisbon, Portugal
Supersymmetry search at the LHC experiment at CERN. Funding from "Fundação para a Ciência e Tecnologia" under grant CERN/FP/123601/2011. **Advisor:** Dr. Pedrame Bargassa, LIP/CERN
- 2012-2013 **Scientific Initiation Studentship** IST - Mathematics Department, Portugal
Point particle simulation of a fluid vortex in C++ with OpenGL visualization. Funding from University of Lisbon under grant BL89/2012_IST-ID. **Advisor:** Prof. Adélia Sequeira, IST
- 2011 **"Novos Talentos em Matemática" Fellowship** Calouste Gulbenkian Foundation, Portugal
One year scholarship for undergraduate students to carry research on pure/applied mathematics.
Research Topic: String Theory. **Advisor:** Prof. Gabriel Lopes Cardoso, IST

Peer Review - Web Of Science verified

- 27 reviews for Plasma Physics and Controlled Fusion
- 14 reviews for Journal of Plasma Physics
- 13 reviews for Nuclear Fusion
- 11 reviews for Physics of Plasmas
- 8 reviews for Physical Review Letters
- 3 reviews for Physical Review E
- 1 review for Cell Reports Physical Science
- 1 review for Journal of Fusion Energy

Teaching and Supervising Experience

Lecturer

- Mathematical Methods in Physics, 2nd semester Engineering Physics, IST 2022-2023

Guest Lecturer

- Classical Mechanics, Physics 410, 1st semester undergraduate studies, University of Maryland, 2020-2021
- Plasma Physics II, Physics 762, 2nd semester graduate studies, University of Maryland, 2019-2020

Teaching Assistantship

- Advanced Physics I, 1st semester Physics, EPFL 2017-2018, 2018-2019
- Mathematical Analysis 1B, 2nd semester MAN, EPFL 2017-2018
- General Physics I and II, 1st and 2nd semester Mechanical Engineering, EPFL 2016-2017, 2016-2017
- Mechanics and Waves, 1st semester Engineering Physics, IST 2015-2016

Supervision of Master's Thesis

- Paulo Figueiredo, IST, 2022: "*Particle Orbits in Near-Axis Magnetic Fields*"
- Lorenzo Perrone, EPFL, 2018: "*4-Dimensional Kinetic Scrape-off Layer Model*"
- Baptiste Frei, EPFL, 2018: "*A full-F Gyrokinetic Model for the Tokamak Periphery at Arbitrary Collisionality*"
- Sonia Gamba, Politecnico de Milano, 2017: "*Analysis of Linear Instabilities in the Scrape-off Layer of a Tokamak*"

Supervision of Semester Internships

- Clara Cottet, Renaissance Fusion, 2022: "*Confinement of Fast Particles in Realistic Stellarator Designs*"
- Patrick Kim, UMD, 2019: "*MHD Stability at Arbitrary Order in the Distance to the Magnetic Axis*"
- Konovets Vyacheslav, EPFL, 2017: "*Modelling of Coulomb Collision Full-F Moment Description*"
- Antoine Baillod, EPFL 2017: "*Gyrokinetic Equations for Scrape-off Layer Plasmas*"
- Nuno Teixeira, IST, 2017: "*Influence of Pitch-Angle Scattering in Electron Plasma Waves*"
- Lorenzo Perrone, EPFL, 2017: "*Parallel and Perpendicular Moment Description of Scrape-off Layer Instabilities*"
- Clara Pereira, IST, 2016: "*Magnetic Field Generation in Charged and Rotating Accretion Disks*"

Internship Advisor

- Luana Raquel and Bernardo Agostinho, António Damásio High School, *Web Development* and *Git*, IST, 2022

Academic Committee Service

- 2021-2024 **Member of the Scientific Counsel of Alan Goodman's PhD Thesis** Universität Greifswald, Germany
PhD Jury member. Thesis title: *Optimizing Quasi-Isodynamic Stellarator Configurations*.
- 2021 **APS-DPP Fundamental Plasma Physics subcommittee** American Physical Society, USA
Recommend and Selected Invited, Review and Tutorial talks for the 63rd APS-DPP annual meeting.
- 2020-2021 **Senator of the Postdoc/Faculty Assistant Community** University of Maryland at College Park, USA
The University Senate at UMD
- 2017-2018 **Physics PhD Student Representative** EPFL, Switzerland
EPFL Doctoral Program in Physics (EDPY)
- 2017-2018 **Member of the Working Group for Teaching Assistantship** EPFL, Switzerland
As PhD student representative, define the implementation of a European directive concerning the attribution of ECTS to teaching assistantship tasks at EPFL.

Professional Memberships

- 2020-Now **Order of Chartered Engineers (Ordem dos Engenheiros)** Portugal
Effective member, License 90009, Engineer Level 2
- 2020-Now **Portuguese Physics Society (Sociedade Portuguesa de Física)** Portugal
Effective member n. 6200
- 2018-2021 **American Physical Society (APS)** USA
Early Career Membership, Member 62002640

Invited Talks at International Conferences

- 09/2022 **Theory of Fusion Plasmas, Joint Varenna-Lausanne International Workshop, Varenna, Italy**
The direct construction of an exceptionally quasi-isodynamic stellarator
- 06/2022 **23rd International Stellarator-Heliotron Workshop (ISHW), Warsaw, Poland**
Novel Designs of Quasi-Isodynamic Stellarators
- 06/2021 **47th European Physical Society Conference on Plasma Physics, Sitges, Spain**
A moment-based model for plasma dynamics at arbitrary collisionality
- 10/2019 **61st Annual Meeting of the APS Division of Plasma Physics, Fort Lauderdale FL, USA**
An efficient treatment of the full Coulomb collision operator with applications
- 06/2019 **Platform for Advanced Scientific Computing (PASC) Conference, Zurich, Switzerland**
A Moment-Based Kinetic Model for Efficient Numerical Implementation
- 04/2018 **Sherwood Fusion Theory Conference, Auburn AL, USA**
A gyrokinetic model for the tokamak periphery
- 10/2017 **17th European Fusion Theory Meeting, Athens, Greece**
An analytical model for SOL plasma dynamics at arbitrary collisionality

Event Organization

- 2022 **IPFN Stellarator Talks** IST, Portugal
Series of biweekly talks by researchers and professors in the nuclear fusion domain broadcast online.
- 2017, 2018 **Physics Day** EPFL, Switzerland
1-day event with talks by professors, Nobel prize winners and a poster session.
- 2013, 2014 **Engineering Physics Career Week** IST, Portugal
3-day event devoted to physics and engineering physics students finalists from Lisbon universities with talks by professors, companies and alumni

Languages

Portuguese	native speaker
English	fluent
French	proficient
German	basic

Other Activities

- 2020-2021 **Newspaper Science Columnist** Observador, Portugal
Author of opinion pieces on science and economy: observador.pt/opiniao/autor/rogeriodejesusjorge
- 2018 **Music Teacher (Volunteering)** ACPns, Portuguese Association in Switzerland
Founder of the ACPns music school, and professor of music theory, guitar, ukelele and accordion
- 2013-2014 **NFIST - IST Physics Student Section** IST, Portugal
Vice-President and Treasurer
- 2002-2010 **Conservatory Degree in Classical Guitar** Conservatory of Music David de Sousa, Figueira da Foz, Portugal
Main subjects: Acoustics, Composition, Music Theory, Music History, Final Grade 18/20
1st prize classical guitar level V on the "International Contest of Fundão, Portugal" (2009)

Publications

First Author

- R. Jorge, P. Rodrigues, P. Figueiredo, C. Cottet, J. Ferreira, R. Coelho, A. Figueiredo, D. Borba, "Desig of fusion devices for low fast particle losses using global optimization methods", *to be submitted* (2022)
- R. Jorge, G. G. Plunk, M. Drevlak, M. Landreman, J.-F. Lobsien, K. Camacho Mata, P. Helander, "A single-field-period quasi-isodynamic stellarator", **J. Plasma Phys.**, 88, 5 (2022)
- R. Jorge, M. Landreman, "Ion-temperature-gradient stability near the magnetic axis of quasisymmetric stellarators", **Plasma Phys. Control. Fusion**, 63, 074002 (2021)
- R. Jorge, M. Landreman, "The Use of Near-Axis Magnetic Fields for Stellarator Turbulence Simulations", **Plasma Phys. Control. Fusion**, 63, 014001 (2020)
- R. Jorge, W. Sengupta, M. Landreman, "Construction of Quasisymmetric Stellarators Using a Direct Coordinate Approach", **Nucl. Fusion**, 60, 7 (2020)
- R. Jorge, W. Sengupta, M. Landreman, "Near-Axis Expansion at Arbitrary Order in the Distance to the Magnetic Axis", **J. Plasma Phys.**, 86, 1 (2020)
- R. Jorge, B. Frei, P. Ricci, "Nonlinear Gyrokinetic Coulomb Collision Operator", **J. Plasma Phys.**, 85, 6 (2019)
- R. Jorge, P. Ricci, S. Brunner, S. Gamba, V. Konovets, N. Teixeira, L. Perrone, N. F. Loureiro, "Linear Theory of Electron-Plasma Waves at Arbitrary Collisionality", **J. Plasma Phys.** 85, 2 (2019)
- R. Jorge, P. Ricci, N. Loureiro, "Theory of the Drift-Wave Instability at Arbitrary Collisionality", **Phys. Rev. Lett.** 121, 165001 (2018)
- R. Jorge, P. Ricci, N. Loureiro, "A Drift-Kinetic Analytical Model for SOL Plasma Dynamics at Arbitrary Collisionality", **J. Plasma Phys.** 83, 6 (2017)
- R. Jorge, E. S. de Oliveira, J. V. Rocha, "Superradiance of rotating cohomogeneity-1 black holes: scalar case", Proceedings **The Fourteenth Marcel Grossmann Meeting** 1810-1815 (2017)
- R. Jorge, P. Ricci, F. Halpern, N. Loureiro, C. Silva, "Plasma Turbulence in the Scrape-off Layer of the ISTTOK Tokamak", **Phys. Plasmas** 23, 10 (2016)
- R. Jorge, E. Oliveira, J. Rocha, "Greybody factors for rotating black holes in higher dimensions", **Classical and Quantum Gravity** 32, 6 (2015)

Co-Author

- K. Camacho Mata , G. G. Plunk, R. Jorge, P. Helander, "Direct construction of stellarator-symmetric quasi-isodynamic magnetic configurations", *accepted* **J. Plasma Phys.** (2022)
- M. Landreman, B. Medasani, F. Wechsung, A. Giuliani, R. Jorge, C. Zhu, "SIMSOPT: A flexible framework for stellarator optimization", **J. Open Source Softw.**, 6(65), 3525, (2021)
- B. J. Frei, J. Ball, A. C. D. Hoffmann, R. Jorge, P. Ricci, L. Stenger, "Development of Advanced Linearized Gyrokinetic Collision Operators Using a Moment Approach", **J. Plasma Phys.**, 87, 5 (2021)
- P. Kim, R. Jorge, W. Dorland, "The On-Axis Magnetic Well and Mercier's Criterion for Arbitrary Stellarator Geometries", **J. Plasma Phys.**, 87, 2 (2021)
- B. D. Dudson, W. Gracias, R. Jorge *et al.*, "Edge turbulence in ISTTOK: a multi-code fluid validation", **Plasma Phys. Control. Fusion** 63, 055013 (2021)
- L. M. Perrone, R. Jorge, P. Ricci, "Four-dimensional drift-kinetic model for scrape-off layer plasmas", **Physics of Plasmas**, 27, 112502 (2020)
- M. Landreman, R. Jorge, "Magnetic well and Mercier stability of stellarators near the magnetic axis", **J. Plasma Phys.**, 86, 5 (2020)
- B. Frei, R. Jorge, P. Ricci, "A gyrokinetic model for the plasma periphery of tokamak devices", **J. Plasma Phys.**, 86, 2 (2020)
- J. P. S. Bizarro, H. Hugon, R. Jorge, "Quasilinear approach to ray tracing in weakly turbulent, randomly fluctuating media", **Phys. Rev. A** 98, 2 (2018)
- G. Cardoso, R. Jorge, S. Nampuri, "Indefinite theta functions and black hole partition functions", **J. High Energy Phys.** 2, 19 (2014)