

## Professional Experience

- 2022/09- **Invited Assistant Professor** Instituto Superior Técnico (IST), **Portugal**  
Lecturer of the Physics Department teaching physics courses at undergraduate and graduate level.
- 2022/05- **Junior Research Scientist** Associação do Instituto Superior Técnico Investigação e Desenvolvimento (IST-ID), **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 Fusion Energy.
- 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.
  - Development of a hybrid Python/C++ package to optimize the performance of nuclear fusion reactors.
  - Deployment of massively parallel codes in supercomputing platforms.
- 2019-2021 **Postdoctoral Researcher** University of Maryland, College Park, **USA**  
Fellow of the Simons Foundation and member of the international Hidden Symmetries project.
  - Derivation of a mathematical model to design nuclear fusion reactors in three dimensions.
  - Numerical implementation of the model using Python, Fortran, Matlab, and Mathematica.
- 2015-2017 **Startup Co-founder & Web Developer** Company: **Portal da Sabedoria**  
Project that started as an educational youtube channel ([youtube.com/user/matmania1](https://www.youtube.com/user/matmania1)) and evolved to a Tutoring website where students found tutors and had direct access to their schedule
  - Recruit and teach tutors how to develop effective online content.
  - Website development and deployment: Apache, MySQL, HTML, PHP, and Javascript.

## Education

- 2015-2019 **Ph.D. in Physics (IST-EPFL Joint Doctoral Initiative)** Topics: Fusion Energy, 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.

## Languages

<b>Portuguese</b>	native speaker
<b>English</b>	fluent
<b>French</b>	proficient
<b>German</b>	basic

## Competitive Funding

2023	<b>Unite! Seed Funding</b>	University Network for Innovation, Technology and Engineering Co-PI grant of 10.000€ on <i>Freshman Math Skills and Anxiety Evaluation</i>
2022	<b>High Performance Computing - OHARS Project</b>	EUROfusion - European consortium of fusion research 47000 node-hours for the 6th Marconi Fusion cycle, corresponding to 2 256 000 core hours.
2022	<b>EUROfusion Enabling Research Grant</b>	EUROfusion - European consortium of fusion research Principal Investigator (PI) grant of 93.563€ on the topic of fast-particle confinement in stellarators.
2022	<b>Junior Researcher Contract</b>	FCT (Fundação para a Ciência e Tecnologia), Portugal 6-year contract in the 4th edition of the Individual Scientific Employment Stimulus program.
2021	<b>Humboldt-Forschungsstipendium (Postdoctoral grant)</b>	Alexander von Humboldt-Stiftung, Germany Humboldt Research Fellowship for Postdoctoral Researchers to conduct research in Germany

## Awards and Distinctions

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

## Fellowships and Studentships

2015-2019	<b>Ph.D. Fellowship - Doctoral Program APPLAuSE</b>	FCT, Portugal Funding from "Fundação para a Ciência e Tecnologia" under grant PD/BD/105979/2014
2014	<b>Erasmus Scholarship</b>	Swiss Plasma Center, EPFL, Switzerland Tokamak edge turbulence simulations applied to the ISTTOK tokamak. Funding from the European Union under a 6 months grant. <b>Advisor:</b> Prof. Paolo Ricci, EPFL
2013	<b>Research Internship</b>	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. <b>Advisor:</b> Dr. Pedrame Bargassa, LIP/CERN
2012-2013	<b>Scientific Initiation Studentship</b>	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. <b>Advisor:</b> Prof. Adélia Sequeira, IST
2011	<b>"Novos Talentos em Matemática" Fellowship</b>	Calouste Gulbenkian Foundation, Portugal One year scholarship for undergraduate students to carry research on pure/applied mathematics. <b>Research Topic:</b> String Theory. <b>Advisor:</b> Prof. Gabriel Lopes Cardoso, IST

## Peer Review (Web of Science certified - profile 1655044)

- 33 reviews for Plasma Physics and Controlled Fusion
- 15 reviews for Journal of Plasma Physics
- 15 reviews for Nuclear Fusion
- 15 reviews for Physics of Plasmas
- 9 reviews for Physical Review Letters
- 3 reviews for Physical Review E
- 1 review for Journal of Computational Physics
- 1 review for Cell Reports Physical Science
- 1 review for Journal of Fusion Energy

# Teaching Experience

## Professor

- Classical Electrodynamics, 1st-semester Engineering Physics (Undergraduate), IST 2023-2024

## Trainer

- Python Fundamentals, 50 hours, EISNT (vocational training company, UFCO 10793), 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

- Mathematical Methods in Physics, 2nd-semester Engineering Physics (Undergraduate), IST 2022-2023
- Nuclear Fusion Reactors, 2nd-semester Engineering Physics (Master's), IST 2022-2023
- 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

# Supervising Experience

## Postdocs

- Eduardo Neto, IST, 2023-2024: *IST and Proxima Fusion (startup) Collaboration Agreement*

## Master's Theses

- Miguel Madeira, IST, 2023: *"Permanent Magnet Design for Nuclear Fusion Reactors"*
- Paulo Figueiredo, IST, 2023: *"Transport of particles in nuclear fusion devices"*
- 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"*

## Bachelor's Theses

- João Rodrigues, IST, 2023, Physics Engineering, Project 26614, "Single Stage Optimization"
- João Cândido, IST, 2023, Physics Engineering, Project 26613, "Machine Learning Design"
- João Bui, IST, 2023, Physics Engineering, Project 26612, "Coil Winding Surfaces"
- Miguel Pereira, IST, 2023, Physics Engineering, Project 26612, "Magnetic Island Design"
- Francisco Campos, IST, 2023, Electronic Engineering, Project 26412, "Reactors with Magnetic Islands"

## 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 Bailod, 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"*

## Professional Internship Advisor

- Alexandre Almeida, Daniel Duarte and Rodrigo Inácio, António Damásio High School, *Web and Python*, 2023
- Luana Raquel and Bernardo Agostinho, António Damásio High School, *Web Development and GIT*, 2022

## Academic Committee Service

- 2021-2024 **Member of the Scientific Counsel of Alan Goodman's Ph.D. Thesis** Universität Greifswald, Germany  
Ph.D. 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 Ph.D. Student Representative** EPFL, Switzerland  
EPFL Doctoral Program in Physics (EDPY)
- 2017-2018 **Member of the Working Group for Teaching Assistantship** EPFL, Switzerland  
As Ph.D. 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-Now **American Physical Society (APS)** USA  
Early Career Membership, Member 62002640

## Invited Talks at International Conferences

- 10/2023 **65th Annual Meeting of the APS Division of Plasma Physics, Denver Colorado, USA**  
*Streamlined Stellarator Design: Single-Stage Optimization with Fixed Boundary Equilibria*
- 09/2023 **Simons-CIEMAT Joint Meeting on Stellarator Turbulence Optimization, Madrid, Spain**  
*Stellarator design using single stage transport and turbulence optimization*
- 06/2023 **IAEA, Technical Meeting on Fusion Data Processing, Validation and Analysis, Ghent, Belgium**  
*The Direct Optimization Framework in Stellarator Design: Transport and Turbulence Optimization*
- 03/2023 **Annual Meeting "Hidden Symmetries and Fusion Energy", Simons Foundation, New York, USA**  
*Direct Optimization for Enhanced Stellarator Design in Magnetic Confinement Fusion*
- 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*

## 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](https://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](https://coursera.org/verify/6298Y6WK48E3)

## Event Organization

- 2022 **IPFN Stellarator Talks** IST, Portugal  
Coordinated a series of online biweekly talks by fusion energy researchers and professors.
- 2017, 2018 **Physics Day** EPFL, Switzerland  
Organized a 1-day event featuring talks by Nobel prize winners and leading physics professors.
- 2013, 2014 **Engineering Physics Career Week** IST, Portugal  
Organized a 3-day event for physics students, featuring talks by industry leaders, alumni, and professors.

## Other Activities

- 2020-2021 **Newspaper Science Columnist** Observador, Portugal  
Author of opinion pieces on science and economy: [observador.pt/opiniao/autor/rogeriodejesusjorge](https://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, M. Landreman, "Direct Microstability Optimization of Stellarator Devices", submitted to Phys. Rev. E, arXiv:2301.09356 (2023)
- R. Jorge, A. Goodman, M. Landreman, J. Rodrigues, F. Wechsung, "Single-Stage Stellarator Optimization: Combining Coils with Fixed Boundary Equilibria", **Plasma Phys. Control. Fusion**, 65, 074003 (2023)
- 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

- A. Goodman, K. Camacho Mata, S. A. Henneberg, R. Jorge, M. Landreman, G. G. Plunk, H. Smith, R. Mackenbach, P. Helander, submitted to J. Plasma Phys., arXiv:2211.09829 (2022)
- K. Camacho Mata, G. G. Plunk, R. Jorge, P. Helander, "Direct construction of stellarator-symmetric quasi-isodynamic magnetic configurations", **J. Plasma Phys.**, 88, 5 (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)