



Josinaldo Menezes da Silva

Birth Date and Place

1975, April 27, Recife, Brazil, Portuguese and Brazilian Citizen.

Education

- 2003–2007 **Ph.D. in Physics**, *University of Porto*, Porto, Portugal, Specialized in Cosmology and Classical Field Theory.
- 2001–2003 **Masters in Physics**, *Federal University of Paraiba*, João Pessoa, Brazil, Elementary Particles and Field Theory.
- 1996–2001 **Bachelor of Science in Physics**, *Federal University of Paraiba*, João Pessoa, Brazil, GPA – 8.5.
Scientific Project in Field Theory

Ph.D. Thesis

- Title *Cosmological Consequences of Topological Defects: Dark Energy and Varying Fundamental Constants*
- Supervisors Prof. Dr. Pedro Pina Avelino & Prof. Dr. Caroline dos Santos Silva
- Description In this thesis we applied domain wall networks as a candidate to explain the accelerated expansion of the universe. In addition, cosmic strings and magnetic monopoles were investigated with the fundamental constants varying in space-time. By means of mathematical models and accurate numerical simulations, it was shown that topological defects play an important role on the dynamics of the Universe.

Social Media

- Website **josinaldomenezes.weebly.com**.
- Research **J. Menezes**.
- Gate

Guest Researcher

- 2017–2018 **Institute for Biodiversity and Ecosystem Dynamics**, *Department of Biology*, University of Amsterdam, Amsterdam, The Netherlands.
Supervisor: Dr. Arne Janssen

2013-2015 **Institute for Biodiversity and Ecosystem Dynamics**, *Department of Biology*, University of Amsterdam, Amsterdam, The Netherlands.
Supervisor: Prof. Dr. Maurice Sabelis

Postdoctorate

2008-2009 **Soft matter and Biological Physics Group**, *Department of Physics*, Federal University of Paraiba, João Pessoa, Brazil.
Supervisor: Prof. Dr. Fernando Moraes

Grants

2018 **Visitor's Travel Grant - 040.11.643**, *Netherlands Organisation for Scientific Research (NWO)*, University of Amsterdam, Amsterdam, The Netherlands.
2015-2017 **Science Without Borders - 2486-13-0**, *Capes - Brazilian Government*, University of Amsterdam, Amsterdam, The Netherlands.

Articles in Scientific Journals

Top 5 Publications

- 2019 **Uneven rock-paper-scissors models: Patterns and coexistence**, *J. Menezes, B. Moura, T. A. Pereira*, Europhysics Letters 126, 18003, DOI:10.1209/0295-5075/126/18003.
- 2018 **How directional mobility affects biodiversity in rock-paper-scissors models**, *P. P. Avelino, D. Bazeia, L. Losano, J. Menezes, B. F. de Oliveira, M. A. Santos*, Phys. Rev. E 97, 032415, DOI:10.1103/PhysRevE.97.032415.
- 2012 **Junctions and spiral patterns in generalized rock-paper-scissors models**, *P. P. Avelino, D. Bazeia, L. Losano, J. Menezes, and B. F. de Oliveira*, Phys. Rev. E 86, 036112, DOI: <http://dx.doi.org/10.1103/PhysRevE.86.036112>.
- 2006 **Frustrated expectations: Defect networks and dark energy**, *P. P. Avelino, D. Bazeia, L. Losano, J. Menezes, and B. F. de Oliveira*, Phys. Rev. D 73, 123519, DOI: <http://dx.doi.org/10.1103/PhysRevD.73.123519>.
- 2003 **New Global Defect Structures**, *D. Bazeia, J. Menezes, and R. Menezes*, Phys. Rev. Lett. 91, 241601, DOI: <http://dx.doi.org/10.1103/PhysRevLett.91.241601>.

Other Publications

- 2019 **Expanding spatial domains and transient scaling regimes in populations with local cyclic competition**, *P. P. Avelino, J. Menezes, B. F. de Oliveira, T. A. Pereira*, Phys. Rev. E 99, 052310, DOI:10.1103/PhysRevE.99.052310.
- 2018 **Spatial patterns and biodiversity in off-lattice simulations of a cyclic three-species Lotka-Volterra model**, *P. P. Avelino, D. Bazeia, L. Losano, J. Menezes and B. F. de Oliveira*, Europhysics Letters 121, 48003, <https://doi.org/10.1209/0295-5075/121/48003>.
- 2018 **Interface networks in models of competing species**, *T. A. Pereira, J. Menezes and L. Losano*, Int. J. Model. Simul. Sci. Comput. 9, 1850046, DOI:10.1142/S1793962318500460.

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- 2017 **Hamming distance and mobility behavior in generalized rock-paper-scissors models**, *D. Bazeia, J. Menezes, B.F. de Oliveira, J.G.G.S. Ramos*, Europhysics Letters 119, 58003, DOI: 10.1209/0295-5075/119/58003.
- 2017 **Phantom domain walls**, *P. P. Avelino, V.M.C. Ferreira, J. Menezes, and L. Sousa*, Phys. Rev. D 96, 043506, DOI: <https://doi.org/10.1103/PhysRevD.96.043506>.
- 2017 **String networks with junctions in competition models**, *P. P. Avelino, D. Bazeia, L. Losano, J. Menezes, and B. F. de Oliveira*, Phys. Rev. E 89, 042710, DOI: <http://dx.doi.org/10.1103/PhysRevE.89.042710>.
- 2014 **Interfaces with internal structures in generalized rock-paper-scissors models**, *P. P. Avelino, D. Bazeia, L. Losano, J. Menezes, and B. F. de Oliveira*, Phys. Letters A 381, 1014, DOI: 10.1016/j.physleta.2017.01.038.
- 2014 **String networks in ZN Lotka-Volterra competition models**, *P. P. Avelino, D. Bazeia, J. Menezes, and B. F. de Oliveira*, Physics Letters A, Volume 378, Issue 4, 393, DOI: 10.1016/j.physleta.2013.11.041.
- 2012 **von Neumann's and related scaling laws in rock-paper-scissors-type games**, *P. P. Avelino, D. Bazeia, L. Losano, and J. Menezes*, Phys. Rev. E 86, 031119, DOI: <http://dx.doi.org/10.1103/PhysRevE.86.031119>.
- 2009 **The role of domain wall junctions in Carter's pentahedral model**, *P.P. Avelino, J.C.R.E. Oliveira, R. Menezes, and J. Menezes*, Physics Letters B, Volume 681, Issue 3, 282, DOI: 10.1016/j.physletb.2009.10.009.
- 2008 **Dynamics of domain wall networks with junctions**, *P. P. Avelino, C. J. A. P. Martins, J. Menezes, R. Menezes, and J. C. R. E. Oliveira*, Phys. Rev. D 78, 103508, DOI: <http://dx.doi.org/10.1103/PhysRevD.78.103508>.
- 2007 **Scaling of cosmological domain wall networks with junctions**, *P. P. Avelino, C. J. A. P. Martins, J. Menezes, R. Menezes, and J. C. R. E. Oliveira*, Physics Letters B, Volume 647, Issues 2, 63, DOI: 10.1016/j.physletb.2007.02.025.
- 2006 **Defect junctions and domain wall dynamics**, *P. P. Avelino, D. Bazeia, L. Losano, J. Menezes, and B. F. de Oliveira*, Phys. Rev. D 73, 123520, DOI: <http://dx.doi.org/10.1103/PhysRevD.73.123520>.
- 2006 **Gravitational Effects of Varying Alpha Strings**, *P. P. Avelino, C. Santos and J. Menezes*, Int. J. Mod. Phys. A 21, 3295, DOI: 10.1142/S0217751X06031430.
- 2006 **Evolution of the fine-structure constant in the non-linear regime**, *P. P. Avelino, C. J. A. P. Martins, C. Santos and J. Menezes*, JCAP 12, 018, DOI:10.1088/1475-7516/2006/12/0180.
- 2005 **Varying-alpha monopoles**, *J. Menezes, P. P. Avelino, and C. Santos*, Phys. Rev. D 72, 103504, DOI: <http://dx.doi.org/10.1103/PhysRevD.72.103504>.
- 2005 **Cosmic strings in Bekenstein-type models**, *J. Menezes, P. P. Avelino, and C. Santos*, JCAP 02, 003, DOI:10.1088/1475-7516/2005/02/003.
- 2005 **Global Defects in Field Theory with applications to condensed matter**, *D. Bazeia, R. Menezes and J. Menezes*, Mod. Phys. Lett. B 19, 801, DOI: 10.1142/S0217984905008736.

- 2002 **Complete factorization of equations of motion in supersymmetric field theories**, *D. Bazeia, J. Menezes, and M. M. Santos*, Nuclear Physics Volume 636, Issues 1, 140, DOI: 10.1016/S0550-3213(02)00460-1.
- 2001 **Complete factorization of equations of motion in Wess-Zumino theory**, *D. Bazeia, J. Menezes, and M. M. Santos*, Physics Letter B, Volume 521, Issues 3, Pages 418, DOI: 10.1016/S0370-2693(01)01224-2.

Professional Experience

Academia

- 2009–now **Associate Professor**, *School of Science and Technology*, Federal University of Rio Grande do Norte, Natal, Brazil.
Permanent Position

Secondary School

- 2000–2003 **Physics and Mathematics Teacher**, *Private Secondary School Santa Terezinha*, Santa Rita, Brazil.
- 1999–2002 **Physics and Mathematics Teacher**, *Public Secondary School Luis Azevedo Soares*, Santa Rita, Brazil.
- 1999–2001 **Physics and Mathematics Teacher**, *Community School João Agripino Filho*, Santa Rita, Brazil.

Lecture Experience

- 2018 **Differential Equations**, *School of Science and Technology*, Federal University of Rio Grande do Norte, Natal, Brazil.
- 2017 **Pre-Calculus**, *School of Science and Technology*, Federal University of Rio Grande do Norte, Natal, Brazil.
- 2009–2017 **Calculus**, *School of Science and Technology*, Federal University of Rio Grande do Norte, Natal, Brazil.
- 2009–2016 **General Physics**, *School of Science and Technology*, Federal University of Rio Grande do Norte, Natal, Brazil.
- 2012 **Theory of Relativity**, *School of Science and Technology*, Federal University of Rio Grande do Norte, Natal, Brazil.
- 2008 **Physics for Biology**, *Department of Physics*, Federal University of Paraiba, João Pessoa, Brazil.
- 2008 **Physics for Pharmacy**, *Department of Physics*, Federal University of Paraiba, João Pessoa, Brazil.
- 2005 **Electromagnetism**, *Faculty of Engineering*, University of Porto, Porto, Portugal.

Project Leadership

- 2018–now **Numerical Simulations of the Growth and the Effects of Cancer - Cachexia**, *Federal University of Rio Grande do Norte*, Natal, Brazil, Supported by CNP - Brazilian Government.

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- 2017–now **Topological Defects with Phantom Energy in Cosmology**, *Federal University of Rio Grande do Norte*, Natal, Brazil, Supported by CNP - Brazilian Government.
- 2012–2016 **Numerical and Analytical Investigation of Field Theory**, *School of Science and Technology*, Federal University of Rio Grande do Norte, Natal, Brazil.
Supported by Fapern-Capes - Brazilian Government

Administrative Position

- 2010–2011 **Director of the Department of Mathematics**, *School of Science and Technology*, Federal University of Rio Grande do Norte, Natal, Brazil.
- 2009–now **Council of Professors**, *School of Science and Technology*, Federal University of Rio Grande do Norte, Natal, Brazil.

Scientific Journal Referee

- 2019–now **Journal of Theoretical Biology**, *ISSN: 0022-5193*, Elsevier, Amsterdam, The Netherlands.
- 2009–now **Europhysics Letters**, *Online ISSN: 1286-4854*, European Physical Society, Mulhouse, France.
- 2009–now **Annals of the International Society of Dynamic Games**, Society of Dynamic Games, Amsterdam, The Netherlands.

Areas of Expertise

Applied Mathematics, *Postdoctorate*.
Computational and Mathematical Biology, *Postdoctorate*.
Population Dynamics, *Postdoctorate*.
Cosmology, *Ph.D. Thesis*.
Elementary Particles and Field Theory, *Bachelor and Masters*.

Communication Skills

Oral Presentations

- 2018 **Understanding Cancer Through Evolutionary Game Theory**, *Leiden, The Netherlands*, Title: Preliminary results in modelling of cachexia in cancer.
- 2016 **II Latin American congress of Acarology**, *Montenegro, Colombia*, Title: Spatial modelling of cry-wolf plants in tritrophic systems.
- 2016 **Game Theory and Evolutionary Biology: Exploring Novel Links**, *Leiden, The Netherlands*, Title: Preliminary results in spatial modelling of tumor growth.
- 2014 **Spatio-Temporal Dynamics in Ecology**, *Leiden, The Netherlands*, Title: Spatio-Temporal Dynamics of Disease and Predation can promote coexistence in Lotka-Volterra Competition Systems.
- 2014 **International Conference on Applied Mathematics**, *Hong Kong, China*, Title: Topological properties of interface networks in Rock-Paper-Scissors models.

- 2014 **IX European Conference on Mathematical and Theoretical Biology**, *Göteborg, Sweden*, Title: Dynamics of spatial pattern networks in predator-prey systems.
- 2014 **16th International Symposium on Dynamic Games and Applications**, *Amsterdam, The Netherlands*, Title: Interfaces between partnerships in rock-paper-scissors games.
- 2013 **International Conference: AMMCS-2013**, *Waterloo, Canada*, Title: Dynamics of pattern networks in rock-paper-scissors type model.
- 2008 **II Workshop on Modern Trends in Field Theory**, *João Pessoa, Brazil*, Title: Dynamics of domain wall networks.
- 2006 **1st Iberian Cosmology Meeting**, *Porto, Portugal*, Title: No-frustration conjecture for domain wall networks.

Posters

- 2005 **Albert Einstein Century International Conference**, *Paris, France*, Varying Alpha Cosmic Strings.
- 2005 **The Dark and Luminous Sides of the Formation of Structures**, *Novigrad, Croatia*, Varying Alpha Monopoles.
- 2004 **Conference on Fundamental Symmetries and Fundamental Constants**, *Trieste, Italy*, Cosmic Strings in Varying Alpha Theories.

Languages

Portuguese, *Mother Tongue*.

English, *Advanced Level*.

Dutch, *Basic Level*.

Participation in Judging Comissions's Boards

- 2012 **Public Contest: Assistant Professor**, *Federal University of Paraíba*, Area: Mathematical and Computational Modeling.
- 2011 **Public Contest: Assistant Professor**, *Federal University of Rio Grande do Norte*, Area: Mathematics and Physics.
- 2010 **public Contest: Assistant Professor**, *Federal University of Rio Grande do Norte*, Area: Mathematical and Computational Modeling.
- 2010 **Public Contest: Assistant Professor**, *Federal University of Rio Grande do Norte*, Area: Mathematics and Physics.
- 2009 **Public Contest: Assistant Professor**, *Federal University of Rio Grande do Norte*, Area: Mathematics and Physics.

Academic Advisory

- 2018–now **Beatriz do Nascimento Pinheiro Moura**, *Scientific Initiation*, Undergraduate Student in Biomedical Engineering, Federal University of Rio Grande do Norte.
- 2017–now **Matheus Tenório Barbosa**, *Scientific Initiation*, Undergraduate Student in Computation Engineering, Federal University of Rio Grande do Norte.

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- 2016–2018 **Tayna Arruda Câmara da Silva**, *Scientific Initiation*, Undergraduate Student in Computation Engineering, Federal University of Rio Grande do Norte.
- 2015–2017 **Thamires Vieira Germano**, *Scientific Initiation*, Undergraduate Student in Physics, Federal University of Rio Grande do Norte.
- 2015–2016 **Fabrísia Marques de Azevedo**, *Scientific Initiation*, Undergraduate Student in Physics, Federal University of Rio Grande do Norte.
- 2012–2015 **Tibério Azevedo Pereira**, *Scientific Initiation*, Undergraduate Student in Physics, Federal University of Rio Grande do Norte.
- 2012–2014 **Lara Cavalcante Freitas da Silva**, *Scientific Initiation*, Undergraduate Student in Engineer, Federal University of Rio Grande do Norte.
- 2009–2012 **Joel da Cruz Campos**, *Scientific Initiation*, Undergraduate Student in Physics, Federal University of Rio Grande do Norte.
- 2010–2012 **Kamila Araújo Nobre**, *Scientific Initiation*, Undergraduate Student in Physics, Federal University of Rio Grande do Norte.
- 2009–2011 **Francys Anthony da Silva**, *Scientific Initiation*, Undergraduate Student in Physics, Federal University of Rio Grande do Norte.

Awards

- 2003 **Honorary Citizenship of Santa Rita**, *Santa Rita, Brazil*, Award bestowed due to the work on education of poor children.