Milton Nogueira da Silva Junior

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Education

Leiden University	09.2021 – 07.2023
Master Leraar Voorbereidend Hoger Onderwijs	*Leiden, the Netherlands*
Leiden University	03.2015 – 05.2019
Master in Applied Mathematics, CumLaude	*Leiden, the Netherlands*
Federal University of Rio de Janeiro	02.2001 – 08.2005
Master in Pure Mathematics	*Rio de Janeiro, Brazil*
Federal University of Rio de Janeiro	02.2006 – 12.2010
PhD in Mechanical Engineering	*Rio de Janeiro, Brazil*
Federal University of Rio de Janeiro	02.2001 – 12.2004
Bachelor in Mathematics	*Rio de Janeiro, Brazil*

Research Experience

Theoretical Biology & Bioinformatics November 2019 – May 2021, The Netherlands
Utrecht University *Research Project*
- I have carried out the whole translation of a grid-based model into an object-oriented-based model of a plant root in c++.

Semrau-Lab-Quantitative-single-cell biology April 2017– March 2018, The Netherlands
Leiden University *Master Thesis Project*
- My task was to tell whether or not the observations of the experiments can be found in the formulated models by means of mathematical analysis and computational simulations.

CONICET February 2011– Mei 2011, Argentina
National Scientific and Technical Research Council *Postdoctoral Position*
- Contributed to the numerical implementation of a phasefield model for fracture.

COPPE-UFRJ February 2011– Mei 2011, Brazil
Alberto Luiz Coimbra Institute for Graduate Studies and Research in Engineering *Postdoctoral Position*
- Investigated the connections between a Cahn-Hilliard based theory for phase separation and a phase-field theory.

Department of Mechanical Engineering April 2009 – October 2009, Canada
McGill University *PhD guest student*
- Established the asymptotic correspondence between a phase-field model and the classical Griffith's theory for fracture.

Talks & International Conferences

ESMC-2012 8th European Solid Mechanics Conference 2012, Austria
Institute of Biomechanics, Graz University of Technology *Chair*
- A Phase-Field Based Theory as a Regularization of a Sharp Theory for Crack Propagation.
  http://www.esmc2012.tugraz.at/images/stories/esmc-2012_programme_final.pdf

National Scientific and Technical Research Council 2011, Argentina
CONICET *Postdoctoral Position*
- A Phase-Field Based Theory as a Regularization of a Sharp Theory for Crack Propagation.

Docent/stagiair   September 2021 –

Het Bonaventuracollege   *The Netherlands*
- Give classes of Wiskunde A, Wiskunde B and Wiskunde D.

Docent   February 2010 – December 2011

Federal University of Rio de Janeiro   *Brazil*
- Gave classes of differential & integral calculus and vector analysis.

Docent   Augustus 2007 – December 2008

State University of Rio de Janeiro   *Brazil*
- Gave classes of differential & integral calculus and vector analysis.

Docent   February 2005 – December 2006

Federal University of Rio de Janeiro   *Brazil*
- Gave classes of differential & integral calculus and vector analysis.

Short description of Graduate Courses: Master of Applied Mathematics at Leiden University 2015 – 2018

Year I and II components:

- **Mathematical Biology: The Virtual Cell**: a course about computational cell biology.

- **DMPM Mathematical Biology**: a survey of powerful techniques in dynamical systems and PDE to analyze mathematical models of biological systems.

- **Mathematical Biology: Metabolic Network Analysis**: the mathematical modelling of large biochemical networks with contrained-based analysis of their dynamic properties.

- **Multiscale Mathematical Biology**: the mathematical modeling of multicellular organisms using ODEs, PDEs, cellular automata and Hamiltonian systems.

- **Advanced Biophysics**: Self-organized systems and pattern formation, protein folding, cellular networks, molecular motors, polymers and membranes, and gene regulation.

- **Theoretical Biophysics**: DNA target search, nucleosome dynamics, and kinetic proofreading in transcription.

- **Soft and Biomechanics**: an introduction to the mechanics of soft materials.

- **DMPM Continuum Mechanics**: rational continuum physics.

- **DMPM Continuum Optimization**: linear and conic optimization theory.

- **DMPM Numerical Methods for Time Dependent PDEs**: numerical solution methods for evolutionary PDEs.

- **Quantum information theory and cryptography**: the mathematical formulation of quantum mechanics from an information-theoretic framework.

- **Linear Analysis**: an introduction to operator theory.

- **Logic**: propositional, predicate and intuitionistic logic.

Extracurricular components:

- **Statistics and probability (master of applied statistics):** Introduction to probability theory and statistics from a data perspective.

- **Mathematics for Statisticians (master of applied statistics):** Advanced calculus for statisticians.

- **Introduction to life and behavioral science(master of applied statistics):** This course puts emphasis on the role of methodology and statistics in the field of the Life and Behavioural Sciences.

Followed subjects without taking exams: Master of Applied Mathematics at Leiden University 2015 – 2018

- **Cell Adhesion Signaling in Health and Disease:** study of how cells use cell-cell and cell-matrix interactions to communicate with their environment.

- **In-vivo Biomolecular Interactions Underlying Diseases (IBID):** specific in-vivo interactions controlling cell cycle, differentiation, metabolism, proliferation, and apoptosis events.

- **Soft and Biomatter Theory:** fluid mechanics & elasticity theory, small Reynolds number hydrodynamics in biomatter, brownian motion, Colloids, wormlike chain model of biopolymers, behavior of chains in solution, elements of liquid crystals, and frank elastic energy of liquid crystals.

- **Linear & Generalized Linear Models and Linear Algebra:** Regression, ANOVA, ANCOVA, and generalized linear models.

- **Statistical Computing with R:** R language, using and writing functions, producing graphics with R, efficient programming with R, and fitting simple regression models.

- **Bayesian Statistics:** two Markov Chain Monte Carlo (MCMC) techniques: Gibbs and Metropolis-Hastings sampling with its adaptive variants.

- **Logic and the First Person:** the role of the first person in logic is investigated by studying the writings of Frege, Wittgenstein, Martin-Löf, and others.

- **Philosophy of Science:** empirism, positivism, inductivism, falsificationism, realism, and instrumentalism.

- **Philosophy of Mathematics:** logicism, formalism, constructivism, and intuitionism.

Short description of Graduate Courses: Master of Pure Mathematics
Federal University of Rio de Janeiro 2001–2005

- **Functional Analysis:** Mathematical Analysis in infinite dimensional spaces (e.g. Banach Space, Hilbert Space, and Fréchet space).

- **Polynomials in Infinite Dimension:** Extending the notion of a complex polynomial to infinite dimensional spaces.

- **Holomorphy in Infinite Dimension:** Extending complex analysis to infinite dimensional spaces.

- **General Topology:** A point-set-theoretical framework to study continuity, compactness and connectedness.

- **Operator Theory:** Linear operators on function spaces with emphasis on operator algebra.

- **Complex Analysis**: Mathematical Analysis on the field of complex numbers.

- **Partial and Ordinary Differential Equations** : Mathematical Analysis of the existence and uniqueness of differential equations.

- **Algebraic Structures**: Galois & Field theory.

- **Differential Geometry**: The geometry of curves and surfaces in Euclidean space.

- **Mathematical Analysis**: The study of the notions of limit, differentiation and integration from a rigourous point of view..

Especialisations: Coursera–2022

- Neuroscience and Neuroimaging.

- Machine Learning.

- Computational Social Science.

Certifications: Coursera–2022

- Computational Neuroscience.

- Supervised Machine Learning: Regression and Classification.

- Unsupervised Learning, Recommenders, Reinforcement Learning.

- Advanced Learning Algorithms.

- Fundamental Neuroscience for Neuroimaging.

- Introduction to Neurohacking In R.

- Principles of fMRI 1.

- Principles of fMRI 2.

- Social and Economic Networks: Models and Analysis.

- Big Data, Artificial Intelligence, and Ethics.

- Computer Simulations.

- Computational Social Science Methods.

- Computational Social Science Capstone Project.

- Social Network Analysis.

- Introduction to Agent-based Modeling with NetLogo.

- Dynamical Modeling Methods for Systems Biology.

Certifications: Nascholing LUMC 2016–2017

- Linear Regression Analysis.

- Advanced course in R.

- Using R for Data Analysis.

- Analysis of Repeated Measurements.

- Survival Analysis.

- Basic Methods and Reasoning in Biostatistics.

- Advanced Genetic and Omics Data Analysis.

- Introduction to Genetic Epidemiology.

- Survival Analysis.

Publications

- **N. da Silva Jr, M.**, P. Duda, F. : A continuum model within a geometric framework for growth in plant morphogenesis based on the configurational force theory. To submitted, 2023.

- **N. da Silva Jr, M.**, P. Duda, F., Fried, E. : Sharp-crack limit of a phase-field model for brittle fracture. Journal of Mechanics and Physics of Solids, 61, 11, 2178–2195, 2013.

- A. Ciarbonetti; A.E. Huespe; P.J. Sánchez; **M. N. da Silva Jr.** Modelo de campo de fase para simular fráctura frágil. Mecánica Computacional, volume XXXI, 10, 1655–1670, 2012.

- Fried; E.; **N. da Silva Jr, M.** ; Duda, F.P. ; Souza, A. C. Phase-field model for the corrosion and cracking of metals in aqueous environments. ISOPE, 327–334, 2011.

- **N. da Silva Jr, M.** Sobre modelos matemáticos para fratura em sólidos elásticos. On mathematical models for fracture in elastic solids. PhD Thesis, Federal University of Rio de Janeiro, Brazil, 2010.

- **N. da Silva Jr, M.** Dynamical systems and lineage decision making: a systematic approach for the evaluation of a phenomenological mathematical model. Master Thesis, Applied Mathematics, Leiden University, The Netherlands, 2019.

- **N. da Silva Jr, M.** Estudo do espectro de uma álgebra de aplicações holomórficas. The study of the spectrum of an algebra of holomorfic functions. Master Thesis, Pure Mathematics, Federal University of Rio de Janeiro, Brazil, 2005.

The PhD Course Centre of the Graduate School of Life Sciences: Utrecht University

- The Art of Presenting Science.

- Research Planning and Time Management.

- Selling your Science.

- Writing a Scientific Paper.

- Giving Effective Presentations.

- Academic Writing in English.

- Analytic Storytelling.

Scholarships

- CAPES Scholarship Plasticity (2012).

- CAPES Scholarship Cahn-Hillard (2011).

- CAPES Sandwich Scholarship (2009).

- FAPERJ-Nota 10 fellowship (2008).

- CNPQ Scholarship for PhD-project (2006).

- CAPES scholarship for Master project (2001).

- CNPQ scientific initiation scholarship (2000).

Programming Languages

Object Oriented Programming with c++ advanced
Finite element method with R advanced
Data Analysis with R advanced

Other Interests

- **Environmental Awareness**: The effects of global warming on biodiversity from a social perspective. The creation of better strategies to promote the dynamics of environmental consciousness with an actual positive feedback.

- **Political Science (Democracy)**: How to optimally refine the notion of democracy? How to understand the evolution of the relationship between *state*, *power* and *social groups*?

- **Analytic Philosophy**: Gottlob Frege, Martin-Löf, & Maria van der Schaar.

- **Psychologism**: *Intentional psychologism* as an essential notion to understand the driving forces in *social-psychological interactions* within modern societies. The concept of *institutional psychologism* to apprehend the structure of such webs of interactions.

Communication skills

- English (fluent).

- Dutch (fluent).

- Portuguese (fluent).

- German (intermediary).

- Russian (beginner).

- Japanese (beginner).

- Danish (beginner).

- French (beginner).

- Spanish (beginner).

Hobbies

- Drawing Animals, Landscapes and Faces.

- Jogging.

- Working out.

- Learning Languages.

Supplementary Information

- **Master Thesis LU:**https://www.universiteitleiden.nl/binaries/content/assets/science/mi/scripties/master/2018-2019/mnoguiera_msc_thesis_final_for_uploading_20190609.pdf

- **Master Thesis UFRJ:**http://www.pgmat.im.ufrj.br/index.php/pt-br/teses-e-dissertacoes/dissertacoes/2005

- **Doctoral Dissertation UFRJ:**https://w1files.solucaoatrio.net.br/atrio/ufrj-pem_upl//THESIS/1260/pemufrj2010dscmiltonnogueiradasilvajunior.pdf