Laryssa Abdala

Personal Information

Institution:	University of North Carolina, Chapel Hill
Subdivision:	Department of Mathematics
Office:	Phillips Hall 374
email:	laryssa@live.unc.edu

Research Interests

Mathematical, statistical and computational methods in medicine and biology, especially cardiac electrophysiology and electro-mechanical coupling, cardiovascular fluid-structure interaction; multiscale physiological models; medical devices; scientific computation; high-performance computing; data science.

Education

Aug. 2019 - April 2024 (expected)	**University of North Carolina at Chapel Hill (UNC)** Ph.D. Candidate in Mathematics Advisor: Boyce Eugene Griffith
Aug. 2016 - Dec. 2018	**University of Campinas, Campinas** Master of Science in Applied Mathematics Thesis: "Heart chamber modeling using Navier-Stokes equations" Advisor: Carlos Eduardo Keutenedjian Mady Co-advisor: Maicon Ribeiro Correa Sponsored by São Paulo Research Foundation (FAPESP).
Feb. 2011 - July 2016	**University of Campinas, Campinas** Bachelor of Science in Mathematics with emphasis in Mathematical Physics
Aug. 2014 - July 2015	**University of Bergen (UiB), Bergen** Exchange Year Coursework: Education, Norwegian Language, Quantum Mechanics, Continuum Mechanics. Sponsored by the Science Without Borders Program.

Relevant Skills

Languages	Portuguese, English, Spanish
Programming Languages	C++, Matlab, Python, Shell scripting, Javascript, React JS, CSS, Fortran 90, LaTeX
Linear Algebra and Finite Element Libraries	PETSc, LAPACK, LibMesh, Deal II
Python Libraries	NumPy, SciPy, Pandas, Matplotlib
High Performance Computing	MPI, Slurm workload manager
Softwares	Paraview, Meshmixer, Coreform Cubit, Blender, fTetWild
Version Control	Git
CI, CD, CT	CMake, Github Actions

Professional Development

August 2019 - Present
Research Assistant
University of North Carolina at Chapel Hill
Advisors: Boyce E. Griffith

May 2022 - August 2022
Research and Development intern with the Medical Computing Team
Kitware
- Development of a Bootstrap UI for the Insight Toolkit (ITK) Viewer released as an NPM package.
- Worked in Javascript, React JS, CSS, Python, Git and Github Actions. Documentation using Read the docs, Sphinx, and MyST.

Jan. 2020 - May 2020
NIH BD2K Biomedical Graduate Training Program at UNC
3 credit hours

Summer 2020
Joint Leader of Scientific Computation Review Session
Department of Mathematics of University of North Carolina at Chapel Hill
18 hours in classroom, 36 hours prep

June 2015 - July 2015
Summer intern
Statoil, Bergen

Aug. 2013 - July 2014
Undergraduate research assistant
University of Campinas
Project Title: "Discrete symmetry groups in Classical Mechanics".
Advisor: Guillermo Cabrera Oyarzun.
Sponsored by National Council for Scientific and Technological Development (CNPq).

Leadership

Aug. 2022 - May 2023
Graduate Mathematics Association seminar organizer
UNC, Chapel Hill
This is a weekly seminar designed to familiarize graduate students to the work being done in the department.

Aug. 2021 - July 2023
Committee member of the Directed Reading Program
UNC, Chapel Hill
This program exposes undergraduate students to advanced level mathematics that are not featured in regular classes. They get connected to graduate students that mentor them for a semester.

Aug. 2021 - July 2022
Social Chair
UNC, Chapel Hill
The social chair is responsible for creating social environments that are welcoming to all graduate students throughout the year. During the COVID-19 pandemic, precautions and creativity have been part of planning the events.

May 2021 - May 2022
Graduate student representative (GSR)
Math department - UNC, Chapel Hill
This is a new Graduate Mathematics Association (GMA) officer position elected by the graduate student population. The two GSRs serve as a point of communication between graduate students and faculty.

Distinctions and Awards

Aug. 2019	Honorable Mention Thesis Award 2018 by Instituto de Matemática e Computação Científica, University of Campinas. Award given to one student in the Institute (including the pure, applied and statistics departments) graduate student annually for excellence in the performed work.
Aug. 2018	Unicamp Development Foundation (FAEPEX) 2416/18 - used as *travel award* to ECCM-ECFD 2018.
May 2018	Poster recognition at Brazilian National Conference on Computational and Applied Mathematics (CNMAC) 2018. - Title of the poster: *Computational model of a heart chamber through Navier-Stokes Equation*; - Ranked as one of the top fifteen in the Session of the General Panels among the 126 presented; - Ranked as one of the top four by the public.
Mar. 2017 - July 2018	São Paulo Research Foundation (FAPESP) Master Thesis Fellowship (2016/19126-2).
Aug. 2014 - July 2015	Science Without Borders Program (CAPES) Scholarship to study for a year at University of Bergen.

Papers and extended abstracts

2022	"Rule-based Definition of Muscle Bundles in Patient-Specific Models of the Left Atrium", *Frontiers in Physiology,* 1471, DOI:10.3389/fphys.2022.912947.
2022	"A Pipeline for Automated Coordinate Assignment in Anatomically Accurate Biventricular Models", *Computational Physiology. Springer, Cham*, 1-11, DOI:10.1007/978-3-031-05164-7_1
2018	"Heart chamber modeling using Navier-Stokes equations: Modelo computacional de uma câmara do coração a partir das equações de Navier-Stokes", DOI:10.47749/T/UNICAMP.2018.1080794 M.Sc. Dissertation - University of Campinas
2018	"Computational Model of a Heart Chamber through Navier-Stokes equations" Anais do CNMAC 2018, 2018.

Oral Presentations

Apr. 2023	*Fluid-Structure Interaction Model of the Human Heart.*Computational Fluids Conference (CFC). Cannes, France.
Aug. 2018	*Fluxo sanguíneo através de um ventrículo do coração: uma variação das equações de Navier-Stokes.* Week of Applied Mathematics at University of Campinas. Campinas, Brazil.
June 2018	*Computational model of a heart chamber.* Joint 6th European Conference on Computational Methods (Solids, Structures and Coupled Problems) and the 7th European Conference on Computational Fluid Dynamics (ECCM-ECFD 2018). Glasgow, Scotland.

Poster presentations

July 2022 | *Rule-based Definition of Muscle Bundles in Patient-Specific Models of the Left Atrium.*
SIAM Conference on the Life Sciences (LS22). Pittsburgh, Pennsylvania
Co-authors: Simone Rossi, Andrew Woodward, John P. Vavalle, Craig S. Henriquez, Boyce E. Griffith.

June 2022 | *Rule-based Definition of Muscle Bundles in Patient-Specific Models of the Left Atrium.*
Summer Biomechanics, Bioengineering, and Biotransport Conference (SB3c). Cambridge, Maryland
Co-authors: Simone Rossi, Andrew Woodward, John P. Vavalle, Craig S. Henriquez, Boyce E. Griffith.

Sept. 2018 | *Computational model of a heart chamber through Navier-Stokes Equation.*
Brazilian National Conference on Computational and Applied Mathematics (CNMAC). Campinas, Brazil.
Co-authors: Carlos Eduardo Keutenedjian Mady, Maicon Ribeiro Correa.

Feb. 2018 | *Computational model of a heart chamber.* II Biomathematics Meeting (EncBioMat). Campinas, Brazil.
Co-authors: Carlos Eduardo Keutenedjian Mady, Maicon Ribeiro Correa.

Oct. 2014 | *Discrete symetry groups in Classical Mechanics.* XXII Congresso Interno de Iniciação Científica da Unicamp. Campinas, Brazil.
Co-autor: Guillermo Cabrera Oyarzun.

Journal and Conference Reviewer

Apr. 2023 | Springer Computational and Applied Mathematics.

Mar. 2023 | MDPI Pathophysiology.

Mar. 2018 | 6th Brazilian National meeting of Biomechanical Engineering (ENEBI 2018).

Graduate Coursework

Math Classes

- Scientific Computation I&II (MATH661, 662)
- Methods of Applied Mathematics I&II (MATH668, 669)
- Numerical ODE/PDE I (MATH761)
- Numerical ODE/PDEs: Introduction to Finite Elements (MATH762)

Interdisciplinary Classes

- Introduction to Statistical Modeling (BCB720)
- Computational Modeling Laboratory (BCB718)
- Computational and Experimental Models of Prosthetic Heart Valves (MATH891.003)
- Chromosome Conformation and Dynamics (MATH891.004)
- Introduction to Machine Learning (COMP562)
- Applied Statistics I (STOR664)
- The Immersed Boundary Method for Fluid-Structure Interaction (MATH892)

Teaching

Jan. 2023 - May. 2023 | *Recitation Leader* - University of North Carolina at Chapel Hill
Class: MATH231 - Calculus of Functions of One Variable I
1 credit hour

Aug. 2022 - Dec. 2022 | *Recitation Leader* - University of North Carolina at Chapel Hill
Class: MATH233H - Calculus of Functions of Several Variables (Honors Version)
1 credit hour

Aug. 2022 - Dec. 2022 | *Recitation Leader* - University of North Carolina at Chapel Hill
Class: MATH233 - Calculus of Functions of Several Variables
1 credit hour

Aug. 2022 - Dec. 2022 | *Instructor* - University of North Carolina at Chapel Hill
Class: MATH383L - First Course in Differential Equations Laboratory
2 credit hour

Aug. 2021 - Dec. 2021 | *Instructor* - University of North Carolina at Chapel Hill
Class: MATH383L - First Course in Differential Equations Laboratory
3 credit hours

Aug. 2019 - Dec. 2019 | *Teaching Assistant* - University of North Carolina at Chapel Hill
Class: MATH381 - Discrete Mathematics
6 hours weekly

Feb. 2019 - Aug. 2019 | *Lecturer* - Paulista University at Jundiaí
Classes: Topics in General and Experimental Physics; Topics in Mathematics; Basic Electricity; Fluid Mechanics: Theory and Laboratory. Teaching, preparation of material, elaboration of homework and exams, grading.
12 credit hours (12 hours in classroom, 30 hours prep).

Aug. 2018 - Dec. 2018 | *Undergraduate teaching assistant* - University of Campinas
Class: MA327 - Linear Algebra. Professor: Francesco Matucci.
8 hours weekly

Feb. 2016 - July 2016 | *Undergraduate teaching assistant* - University of Campinas
Class: MA141 - Analytic Geometry. Professor: Simone Marchesi.
8 hours weekly

Aug. 2015 - Dec. 2015 | *Undergraduate teaching assistant* - University of Campinas
Class: MA111 - Calculus I. Professor: Maria Lúcia B. Queiroz.
8 hours weekly

Feb. 2013 - July 2013 | *Undergraduate teaching assistant* - University of Campinas
Class: MA327 - Linear Algebra. Professor: Sueli Irene R. Costa.
8 hours weekly

Workshop and School Participations

July 2021 - August 2021 | Simula Summer School in Computational Physiology
Project: A Pipeline for Automated Coordinate Assignment in Anatomically Accurate Biventricular Models
Co-authors: Lisa Pankewitz, Aadarsh Bussooa, Hermenegild Arevalo.

Aug. 2015 | *Urban heat island.* Workshop on Biodiversity and Sustainability. Collaboration between University of Campinas, University of York
Co-authors: Lais Akemi Oushima, Juno Zhu, Saher Ahmed.

Educational Outreach

Sept. 2019	Monitor at FEMMES UNC Camp 2019 Event designed for young girls to enhance their love for STEM fields. Station of work: Hydrodynamic quantum analogs - bouncing fluid droplets 3 hours
May 2018	Monitor at the University of Campinas open doors event 8 hours
Dec. 2012	Monitor on VI Brazilian Biennial of Mathematics 30 hours
Feb. 2012 - June 2013	Organizer of the Freshman's Support Group (GAp) Brief description: GAp was created in 2012 by a group of undergraduate students to help first-semester undergraduate students majoring in Mathematics and Physics with problems of basic Mathematics follow undergraduate courses.