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EDUCATION	2019-ongoing	<b>Physics PhD Candidate</b> University of Maryland, College Park, MD, USA
	2019-2023	<b>Master of Science, Physics</b> University of Maryland, College Park, MD, USA
	2015-2018	<b>B.S. in Computational Physics</b> University of São Paulo, São Carlos, SP, Brazil
EMPLOYMENT HISTORY	2023 summer	<b>3M</b> , Graduate Data Science & Engineering Intern Consumer Business Group – Digital Hub, Manager: Jonathan Kahl
	2023-present	<b>NIST</b> , Graduate Research Associate National Institute of Standards and Technology, Laser Cooling and Trapping Group, Advisor: Ian Spielman
	2020-present	<b>University of Maryland</b> , Graduate Research Assistant University of Maryland, Physics Department, Advisor: Prof. Christopher Jarzynski
	2019-2020	<b>University of Maryland</b> , Graduate Teaching Assistant University of Maryland, Physics Department
	2019-2019	<b>Serasa Experian</b> Data Analytics, Manager: Carlos Tafinel
FELLOWSHIPS & AWARDS	2020	Ralph Myers & Friends of Physics Award, for Teaching Assistant 1 <sup>st</sup> place University of Maryland, Physics Department
	2019	Dean's Fellowship University of Maryland, Physics Department
	2018	Undergraduate Research Fellowship São Paulo Research Foundation - FAPESP (Brazil)
	2016-2018	Bernhard Gross award with the best academic record of Computational Physics major of 2016-2018 University of São Paulo, Physics Institute of São Carlos, Brazil
	2014	Best academic record of all three years of high school Colégio Técnico de Lorena, Universidade de São Paulo
	2012-2014	Medals on Scientific Olympiads of Physics, Astronomy and Mathematics (High school): 4 gold medals, 1 silver medal, 2 bronze medals
RESEARCH INTERESTS	Quantum control; Quantum measurement and feedback; Quantum thermodynamics; Open quantum systems; Statistical mechanics	

*Curriculum Vitae, Guilherme de Sousa*

RESEARCH PROJECTS	2023-present	<b>Continuous measurement and feedback with atomic quantum matter:</b> investigation and implementation of an optimal measurement and feedback scheme into the ultracold atomic experiment. Development of a ML pipeline for feedback. PI's: Christopher Jarzynski and Ian Spielman.
	2020-present	<b>Quantum Fokker-Planck Master Equation: FQXi "Information as Fuel"</b> project - study and development of a microscopic model for continuous weak measurement and feedback in quantum systems. Applications to thermalization, cooling, energy extraction and state preparation. Advisor: Christopher Jarzynski.
	2018-2019	<b>Thermodynamics of negative temperatures:</b> study of the foundations of thermodynamics and thermostatistics. Use of Extended Jaynes-Cummings model for thermalization dynamics and to test the thermodynamics of negative temperatures. Advisor: Frederico Brito.
	2017-2018	<b>Maxwell's equations in 2D:</b> studied the formulation of Maxwell's equations in two spatial dimensions. Advisor: Diogo Boito.
	2017-2017	<b>Thermalization process:</b> developed a microscopic model for thermalization based on quantum quenches and unitary evolutions. Advisor: Frederico Brito.
	2016-2016	<b>Simulation of Self-Avoiding Random Walks:</b> simulations of self-avoiding random walks. On average, the length necessary to being trapped is dependent on the dimension and lattice structure. Advisor: Frederico Brito.
	2015-2015	<b>Simulation of atomic clock:</b> simulation of kinematics evolution of atomic clock. The Ramsey fringes were obtained. Advisor: Sérgio Muniz.
ACADEMIC OUTREACH	2016-2021	<b>Jury Committee for the International Young Physicists' Tournament (IYPT) Brazil</b> B8 Projetos, São Paulo, Brazil
TEACHING		<b>PHYS270: General Physics: Electrodynamics, Light, Relativity and Modern Physics</b> <i>Teaching Assistant</i> , Instructors: Prof. Hailu Gebremariam and Prof. Howard M. Milchberg University of Maryland, Spring 2020
		<b>PHYS375: Experimental Physics III: Electromagnetic Waves, Optics and Modern Physics</b> <i>Teaching Assistant</i> , Instructors: Prof. Manuel F. Sevilla and Prof. Andris Skuja University of Maryland, Fall 2019
		<b>University of São Paulo</b> 2016 Discussion sessions - Physics I (Mechanics), <i>Spring semester</i> 2016 Discussion sessions - Physics II (Fluids, Thermo.), <i>Fall semester</i>

## PUBLICATIONS

1. *Quantum Fokker-Planck Master Equation for Continuous Feedback Control*. Björn Annby-Andersson, Faraj Bakhshinezhad, Debankur Bhattacharyya, Guilherme De Sousa, Christopher Jarzynski, Peter Samuelsson, and Patrick P. Potts. Phys. Rev. Lett. **129**, 050401 (2022)
2. *On Maxwell's electrodynamics in two spatial dimensions*. D. Boito, L. N. S. de Andrade, G. de Sousa, R. Gama, C. Y. M. London. Rev. Bras. Ens. Fis. **42** (2020).

## PRE-PRINTS

## PRESENTATIONS AND POSTERS

1. *Quantum Fokker-Planck Master Equation with multiple filters*  
March 2023, Poster  
Maryland Quantum-Thermodynamics Symposium 2023
2. *Cooling a quantum harmonic oscillator using feedback*  
February 2023, Talk and Poster  
FQXi Information as Fuel Workshop (Poster available on [YouTube](#))
3. *Quantum Fokker-Planck Master Equation for Continuous Feedback Control*  
August 2022, Virtual Talk
4. Seminar at QUEST Talk (Available on [Youtube](#))
5. *Quantum harmonic oscillator under measurement and feedback*  
August 2022 Poster,  
RQS Summer School and Workshop, Duke University
6. *Quantum harmonic oscillator under measurement and feedback*  
June 2022 Flash talk and poster,  
Quantum Thermodynamics Conference (QTD22)
7. *Quantum harmonic oscillator under measurement and feedback*  
May 2022 Poster,  
Workshop on Stochastic Thermodynamics (WOST III)
8. *Rare events collision model for open quantum systems*  
August 2021 Poster,  
Quantum Thermodynamics Summer School (SQUID)
9. *A study about thermodynamics of negative temperatures*  
October 2018, São Carlos-SP, Brazil  
Presentation at the “USP Symposium of Undergraduate Research” at São Carlos Institute of Physics, USP.
10. *“Bang-bang” model for simple open systems*  
October 2017, São Carlos-SP, Brazil  
Presentation at the “USP Symposium of Undergraduate Research” at São Carlos Institute of Physics, USP.
11. *Computational study of atomic clock with cold atoms*  
October 2015, São Carlos-SP, Brazil  
Presentation at the “USP Symposium of Undergraduate Research” at São Carlos Institute of Physics, USP.

## PARTICIPATION

1. *Maryland Quantum-Thermodynamics Symposium 2023*  
March 2023, College Park-MB, USA

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2. *FQXi Information as Fuel Workshop*  
February 2023, Obergurgl, Austria  
TU Wien
3. *RQS Summer School and Workshop*  
August 2022, Durham-NC, USA  
Duke University
4. *Quantum Thermodynamics Conference 2022 (QTD22)*  
June 2022, Virtual  
Queen's University Belfast, Northern Ireland
5. *Workshop on Stochastic Thermodynamics III (WOST III)*  
May 2022, Virtual  
University of Tokyo, Japan
6. *Quantum Thermodynamics Conference 2021 (QTD21)*  
October 2021, Virtual  
University of Geneva, Switzerland
7. *Quantum Thermodynamics Summer School 2021*  
August 2021, Virtual  
ETH Zürich, Schools for Quantum Information Development (SQUID)
8. *Workshop on Stochastic Thermodynamics II (WOST II)*  
May 2021, Virtual  
Santa Fe Institute, USA
9. *A mini-course on Quantum-Information Thermodynamics*  
November 2020, Virtual  
University of São Paulo, Brazil
10. *Journeys into Theoretical Physics*  
July 2019, São Paulo, SP, Brasil  
Perimeter-ICTP-SAI FR, Universidade Estadual Paulista
11. *VI Quantum Information School and Workshop*  
August 2017, Paraty-RJ, Brazil.
12. *1st workshop on topological matter and quantum information science*  
July 2017, São Carlos-SP, Brazil  
University of São Paulo, São Carlos Institute of Physics.
13. *Advanced Theoretical Physics School (Escola Avançada de Física Teórica)*  
June 2016, São Carlos-SP, Brazil  
University of São Paulo, São Carlos Institute of Physics.