Javiera Jilberto

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Education

Ph.D. in Biomedical Engineering and Scientific Computing August 2020 - Present
University of Michigan
Dissertation Title: *A Computational Study of the Influence of Cardiac Mechanics in Desmoplakin Cardiomyopathy*
Advisor: David Nordsletten, D.Phil.

Master of Science in Civil Engineering November 2018
Pontificia Universidad Católica de Chile
Dissertation Title: *Non-Conforming Finite Elements Schemes for Cardiac Modeling*
Advisor: Daniel E. Hurtado, Ph.D.
Graduated with Maximum Distinction.

Bachelor of Science in Engineering and Professional Degree in Structural Engineering November 2018
Pontificia Universidad Católica de Chile
Graduated with Maximum Distinction. Ranked top 5%.

Research Experience

Graduate Research Assistant August 2020 - Present
Cardiac Biomechanics Lab (Advisor: David Nordsletten, D.Phil.)
University of Michigan

Research Assistant December 2018 - July 2020
Computational Medicine Laboratory (Advisor: Daniel Hurtado, Ph.D.)
Pontificia Universidad Católica de Chile

Young Researcher August 2019 - July 2020
Millennium Nucleus for Cardiovascular Magnetic Resonance

Fellowships

Rackham Pre-Doctoral Fellowship 2024 - 2025
Rackham Graduate School, University of Michigan

Fulbright Scholarship to pursue a Ph.D. in the United States 2020 - 2024
Beca Igualdad de Oportunidades Fulbright-Conicyt

MICDE fellowship 2021
Michigan Institute for Computational Discovery & Engineering, University of Michigan

Honors and Awards

Rising Stars in Computational and Data Sciences 2024
Oden Institute, The University of Texas at Austin

1st Place Student Poster Competition 2023
17th US National Congress on Computational Mechanics, US Association for Computational Mechanics

Edgardo Laborde Award 2023
Rackham Graduate School, University of Michigan

USNCCM17 Travel Award 2023
17th US National Congress on Computational Mechanics, US Association for Computational Mechanics

Cardiac Physiome Travel Award 2023
Cardiac Physiome Society

Rackham Conference Travel Grant 2021, 2022, 2023
Rackham Graduate School, University of Michigan

Best Master's Thesis 2018
Department of Structural Engineering, Pontificia Universidad Católica de Chile

Publications

1. Kobeissi H, Gao X, DePalma SJ, Ewoldt JK, Wang MC, Das SL, **Jilberto J**, Nordsletten D, Baker BM, Chen CS, & Lejeune E. (2024) MicroBundlePillarTrack: A Python package for automated segmentation, tracking, and analysis of pillar deflection in cardiac microbundles. microPublication Biology.
2. DePalma SJ, **Jilberto J**, Stis A, Huang D, Lo J, Davidson CD, Chowdhury A, Jewett M, Kobeissi H, Chen CS, Lejeune E, Helms A, Nordsletten D, & Baker BM. (2024) Matrix architecture and mechanics regulate myofibril organization, costamere assembly, and contractility in engineered myocardial microtissues. *In Press in Advanced Sciences*.
3. Kobeissi H, **Jilberto J**, Karakan MÇ, Gao X, DePalma SJ, Das SL, Quach L, Urquia J, Baker BM, Chen CS, Nordsletten D & Lejeune E. (2024) MicroBundleCompute: Automated segmentation, tracking, and analysis of subdomain deformation in cardiac microbundles. PLOS ONE 19(3): e0298863.
4. Jaimes P, Bottorff E, Hopper T, **Jilberto J**; King J; Wall M, Coronel M, Jensen K, Mays E, Morris A, Weiland J, Wrobel M, Nordsletten D, & Pinder-Grover T. (2024). The IT-BME Project: Integrating Inclusive Teaching in Biomedical Engineering Through Faculty/Graduate Partnerships. *Biomedical Engineering Education*.
5. **Jilberto J**, DePalma SJ, Lo J, Kobeissi H, Quach L, Lejeune E, Baker BM, & Nordsletten D. (2023). Generating in-silico Models of Engineered Heart Tissues: The Importance of Using Length-Dependent Activation. In: Skalli, W., Laporte, S., Benoit, A. (eds) Computer Methods in Biomechanics and Biomedical Engineering II. CMBBE 2023. *Lecture Notes in Computational Vision and Biomechanics*, vol 39. Springer, Cham.
6. **Jilberto J.**, DePalma SJ, Lo J, Kobeissi H, Quach L, Lejeune E, Baker BM, & Nordsletten D. (2023). A Data-Driven Computational Model for Engineered Cardiac Microtissues. *Acta Biomateralia*, 172, 123–134.
7. Zhang W, **Jilberto J**, Sommer G, Sacks MS, Holzapfel GA, & Nordsletten DA. (2023). Simulating hyperelasticity and fractional viscoelasticity in the human heart. *Computer Methods in Applied Mechanics and Engineering*, 411, 116048.
8. Stimm J, Nordsletten DA, **Jilberto J**, Miller R, Berberoğlu E, Kozerke S, & Stoeck CT. (2022). Personalization of biomechanical simulations of the left ventricle by in-vivo cardiac DTI data: Impact of fiber interpolation methods. *Frontiers in Physiology*, 13(November), 1–23.
9. Miller R, Marlevi D, Zhang W, Hirschvogel M, Hadjicharalambous M, Capilnasiu A, Balmus M, Hager S, **Jilberto J**, Bonini M, Wittgenstein A, Ahmed Y, & Nordsletten D. (2021). Modeling Biomechanics in the Healthy and Diseased Heart. In J. Málek & E. Süli (Eds.), Modeling Biomaterials (pp. 141–239). Springer International Publishing.
10. Hurtado DE, **Jilberto J**, & Panasenko G (2020). Non-ohmic tissue conduction in electrophysiology: upscaling the non-linear voltage-dependent conductance of gap junctions. *PLoS Computational Biology*, 16(2)
11. **Jilberto, J**, & Hurtado DE. (2018). Semi-implicit non-conforming finite-element schemes for cardiac electrophysiology: A framework for mesh-coarsening heart simulations. *Frontiers in Physiology*, 9(OCT), 1–12.

Presentations

1. **Jilberto J**, DePalma SJ, Quach L, Kobeissi H, Lejeune E, Helms A, Baker BM, Nordsletten D. *Unraveling the role of mechanics in genetic cardiomyopathies using biomechanical models of engineered heart tissues*. **19th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering**. Vancouver, Canada, July 30 - August 1, 2024, podium.
2. **Jilberto J**, Miller R, Helms A, Nordsletten D. *A computational study of the influence of cardiac mechanics in Desmoplakin Cardiomyopathy*. **16th World Congress on Computational Mechanics and 4th Pan American Congress on Computational Mechanics**. Vancouver, Canada, July 21-26, 2024, podium.
3. **Jilberto J**, Helms A, Nordsletten D. *Modeling fibrotic remodeling in Desmoplaking Cardiomyopathy*. **9th European Congress on Computational Methods in Applied Sciences and Engineering**. Lisbon, Portugal, June 3-7, 2024, podium.
4. **Jilberto J**, DePalma SJ, Lo J, Kobeissi H, Quach L, Lejeune E, Baker BM, Nordsletten D. *A Data-Driven Computational Model of Engineered Heart Tissues*. **17th U.S. National Congress on Computational Mechanics**. Albuquerque, NM, USA, July 23-27, 2023, poster, 1st place PhD student poster competition.
5. **Jilberto J**, DePalma SJ, Lo J, Kobeissi H, Quach L, Lejeune E, Baker BM, Nordsletten D. *A Data-Driven Computational Model of Engineered Heart Tissues*. **17th U.S. National Congress on Computational Mechanics**. Albuquerque, NM, USA, July 23-27, 2023, podium.
6. **Jilberto J**, DePalma SJ, Lo J, Kobeissi H, Quach L, Lejeune E, Baker B, Nordsletten D. *A Data-Driven Computational Model of Engineered Heart Tissues*. **18th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering**. Paris, France, May 3-5, 2023. podium.
7. **Jilberto J**, DePalma SJ, Lo J, Kobeissi H, Quach L, Lejeune E, Baker B, Nordsletten D. *A Data-Driven Computational Model of Engineered Heart Tissues*. **Cardiac Physiome Workshop**. Irvine, California, USA. April 24-26, 2023. podium.
8. **Jilberto J**. *Computational Modeling of Engineered Heart Microtissues*. Instituto de Ingeniería Biológica y Médica, Pontificia Universidad Católica de Chile, Santiago, Chile, January 4, 2023.
9. DePalma SJ, Stis AE, Huang D, **Jilberto J**, Lo J., Davidson CD, Chowdhury A, Jewett ME, Helms AS, Nordsletten D, Baker BM. *Matrix Mechanics Regulate Engineered Myocardial Microtissue Organization and Contractility*. **American Heart Association Scientific Sessions 2022**. Chicago, IL, USA, November 5-7, 2022. podium.
10. **Jilberto J**, Hirschvogel M, Miller R, Helms AS, Nordsletten D. *Computational Modeling of Subepicardial Mechanics in Demoplakin Cardiomyopathy*. **9th World Congress of Biomechanics**. Taipei, Taiwan. July 10-14, 2022, pre-recorded presentation.
11. **Jilberto J**, DePalma SJ, Lo J, Baker BM, Nordsletten D. *Computational Modeling of iPSC-Cardiomyocyte Tissues*. **9th World Congress of Biomechanics**. Taipei, Taiwan. July 10-14, 2022, pre-recorded presentation.
12. **Jilberto J**, Hirschvogel M, Miller R, Helms AS, Nordsletten D. *Computational Modeling of Subepicardial Mechanics in Demoplakin Cardiomyopathy*. **11th European Solid Mechanics Conference**. Galway, Ireland. July 4-8, 2022, podium.
13. Lo J, **Jilberto J**, DePalma SJ, Baker BM, Nordsletten D *Computational Modeling of iPSC-Derived Engineered Cardiac Microtissues*. **2022 Summer Biomechanics, Bioengineering, and Biotransport Conference**. Eastern Shore, Maryland, USA. June 20-23, 2022, poster.
14. **Jilberto J**, Hirschvogel M, Miller R, Helms AS, Nordsletten D. *Computational Modelling of Subepicardial Mechanics in Desmoplakin Cardiomyopathy*. **42nd Ibero-Latin-American Congress on Computational Methods in Engineering**. Rio de Janeiro, Brazil. November 9-12, 2021, pre-recorded presentation.
15. **Jilberto J**, Hirschvogel M, Miller R, Helms AS, Nordsletten D. *Computational Modelling of Subepicardial Mechanics in Desmoplakin Cardiomyopathy*. **17th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering**. Bonn, Germany. September 7-9, 2021, pre-recorded presentation.
16. **Jilberto J**, Miller R, Hirschvogel M, Helms AS, Nordsletten D. *Patient-Specific Heart Modeling in Health and Disease*. **1st Annual Marvin M Kirsh Resident Research Symposium**. Ann Arbor, Michigan, USA. May 21, 2021, poster.
17. **Jilberto J**, Hirschvogel M, Miller R, Helms AS, Nordsletten D. *Computational Modelling of Subepicardial Mechanics in Desmoplakin Cardiomyopathy*. **Workshop en Avances en Resonancia Magnética Cardiovascular**. Santiago, Chile. May 11-12, 2021, remote presentation.
18. **Jilberto J**, Hurtado DE. *Non-conforming Finite-element Method for Cardiac Electrophysiology Simulations*. **13th World Congress in Computational Mechanics**. New York City, USA. July 22-27, 2018, podium.
19. Hurtado DE, **Jilberto J**. *Non-Conforming Finite-Element Schemes for Cardiac Electrophysiology*. **Workshop on Cardiovascular Modeling and Imaging**. Santiago, Chile. May 4, 2018, podium.
20. Hurtado DE, **Jilberto J**. *Non-Conforming Finite-Element Schemes for Cardiac Electrophysiology*. **INdAM Workshop on Mathematical and Numerical Modeling of the Cardiovascular System**. Rome, Italy. April 16-19, 2018, podium.

Teaching and Mentoring Experience

Undergraduate Student Mentor 2022 - Present

Cardiac Biomechanics Lab, University of Michigan

- *Ahmad Warchafani El Moghrabi* (UROP, 2023-2024)
- *Lani Quach* (UROP and undergraduate research assistant, 2023-Present)
- *Brennen McManus* (Undergraduate research assistant, 2022-2023)

Masters Student Mentor 2021
Cardiac Biomechanics Lab, University of Michigan
- *Jason Lo* (Graduate Research Assistant)

BME Graduate Application Assistance Program 2022 - 2023
University of Michigan
- Assisted a prospective Ph.D. student of underrepresented STEM background in his applications to graduate school.

Teaching Assistant 2014 - 2019
Pontificia Universidad Católica de Chile
- Non-Linear Finite Elements (2019)
- Finite Elements (2019)
- Innovative Systems of Seismic-Resistance Design (2018)
- Introduction to Biomechanics (2017)
- Properties and Resistance of Materials (2015)
- Optimization (2014)

Professional Development

Preparing Future Faculty Seminar 2024
Center for Research on Learning and Teaching, University of Michigan
- Five week program to help prepare doctoral candidates for the academic job search and success in their subsequent faculty positions.
- Designed a course syllabus using the concepts of backwards course design and equity-focused teaching.

Inclusive Teaching in BME 2022
Biomedical Engineering Department, University of Michigan
- Program to boost Diversity, Equity, and Inclusion (DEI) in the BME department by training graduate students and faculty in Inclusive Teaching strategies.
- Teamed up with faculty to make concrete interventions, such as updating class syllabus and lectures, and defining learning objectives in the undergraduate level class Quantitative Physiology.

Inclusive STEM Teaching Project 2022
edX certification (Online Learning Platform)

Service

Ad Hoc Journal Reviewer 2022 - Present
Journal of Biomechanics and Modeling in Mechanobiology, Scientific Reports

DEI Graduate Student Committee 2022 - Present
University of Michigan
- Organizing events to foster Diversity, Equality, and Inclusion within the BME department with a special focus on visualizing students with different cultural or ethnical backgrounds.

Technical skills

Python, FEniCS, LaTeX, Cheart, Matlab, Linux, Paraview, Fortran.

Languages

Spanish: Native, English: Fluent.