

# Juan Pablo Carrillo-Mora

**Birth date:** February 26, 1999

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## EDUCATION

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<b>MSc. in Physics</b>   <i>Universidad de Chile</i>	2021–2023 Santiago, Chile
<b>BSc. in Physics</b>   <i>Universidad Católica del Maule</i> (91.4% GPA)	2017–2021 Talca, Chile

## FELLOWSHIPS AND AWARDS

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<b>National Master Fellowship</b>   <i>Agencia Nacional de Investigación y Desarrollo (ANID)</i> Full tuition funding and salary for MSc. degree	2022–2023
<b>DFI Scholarship</b>   <i>Departamento de Física, FCFM, Universidad de Chile</i> Tuition funding for MSc. degree	2021
<b>Outstanding Student</b>   <i>Universidad Católica del Maule</i> Award for outstanding academic performance in undergraduate degree	2021
<b>Honors Scholarship</b>   <i>Universidad Católica del Maule</i> Full funding of undergraduate tuition for outstanding academic performance	2018–2020

## RESEARCH EXPERIENCE

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<b>Other Projects</b>   <i>Laboratory of Matter Out-of-Equilibrium, Universidad de Chile</i> Research funded by <i>Millennium Nucleus Physics of Active Matter</i> <ul style="list-style-type: none"><li>– Numerical and experimental study about the bio-convection patterns formed by magnetotactic bacteria</li><li>– Experimental study about the collective dynamics of active agents with inertia (Hexbugs) in confined systems</li><li>– Numerical study about the motility induced phase separation in an inflationary space</li></ul>	2023–Current
<b>MSc. Thesis Project</b>   <i>Universidad de Chile</i> Research funded by <i>Millennium Nucleus Physics of Active Matter</i> and <i>Agencia Nacional de Investigación y Desarrollo (ANID)</i> <ul style="list-style-type: none"><li>– Experimental study about the effects of confinement on the motility of soil bacteria in synthetic porous media (microfluidics devices that simulate soil porosity)</li><li>– Experimental study about the effects of shear stresses on the motility and self-agglutination of soil bacteria</li><li>– Experimental and numerical study (simulations) about the effective diffusion of soil bacteria in disordered porous media</li></ul>	2021–2023
<b>Undergraduate Project</b>   <i>Universidad Católica del Maule</i> Research funded by <i>Vicerrectoría de Investigación y Postgrado (VRIP)</i> <ul style="list-style-type: none"><li>– Numerical study (simulations) about the entropy production by transmembrane ionic flows in electrically excitable cells</li></ul>	2020–2021

## PUBLICATIONS

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1. M. Pires-Monteiro, J.P. Carrillo-Mora, N. Gutiérrez, S. Montagna, A. Lodeiro, M.L. Cordero and V. Marconi. (2023). Soils-on-a-chip reveal unforeseen motility parameters of confined *Bradyrhizobium diazoefficiens*. Manuscript submitted for publication. Pre-print (bioRxiv): 2023.12.29.573673.

## TEACHING EXPERIENCE

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<b>Teacher Assistant</b> <i>Universidad de Chile</i> – <b>Courses:</b> * FI6030 Introduction to Microfabrication Techniques	2023
<b>Teacher Assistant</b> <i>Universidad de Chile</i> – <b>Courses:</b> * FI2003 Experimental Methods	2021–2022
<b>Teacher</b> <i>Universidad Católica del Maule</i> – <b>Courses:</b> * PBM-423 Physics and Chemistry II	2021
<b>Teacher Assistant</b> <i>Universidad Católica del Maule</i> – <b>Courses:</b> * PCI-111 Natural Sciences (physics module) * CCI-123 Physics I * IND-212 Physics I * PCI-123 General Physics I * PCM-321 Physics * TME-124 Physics in Medical Technology (laboratory) * QYF-125 Physics Applied to the Pharmaceutical Sciences * PCM-311 Electromagnetism	2018–2020

## SCHOOLS AND WORKSHOPS

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<b>XI GEFENOL Summer School on Statistical Physics of Complex Systems</b> · Organized by <i>GEFENOL &amp; UBICS, Universitat de Barcelona</i> · Presented a talk titled “Measuring motility of soil bacteria in a microfluidic porous media model”	2023
<b>XXIII Simposio Chileno de Física</b> · Organized by <i>Sociedad Chilena de Física</i> · Presented a poster titled “ <i>Effects of shear on the motility of soil bacteria Bradyrhizobium diazoefficiens</i> ”	2022
<b>School and Conference Physics of Active Matter</b> · Organized by <i>Millennium Nucleus Physics of Active Matter</i> · Presented a poster titled “ <i>Effects of shear on the motility of soil bacteria Bradyrhizobium diazoefficiens</i> ”	2022
<b>WE-Heraeus Summer School 2022 Active Matter and Complex Media</b> · Organized by <i>Université Grenoble Alpes, Universität Bayreuth, Institut d’Etudes Scientifiques de Cargèse</i> · Talk titled “ <i>Measuring motility of soil bacteria in a microfluidic porous media model</i> ”	2022

<b>XXI Meeting of Surfaces and Nanostructured Materials (NANO2022)</b>	2022
<ul style="list-style-type: none"> <li>· Organized by <i>Universidad Nacional de Río</i></li> <li>· Talk titled “<i>Soils on a chip: new tools for sustainable agronomy</i>”</li> </ul>	
<b>APS March Meeting 2022</b>	2022
<ul style="list-style-type: none"> <li>· Organized by <i>American Physical Society</i></li> <li>· Talk titled “<i>Visualization and modeling of soil bacteria under confinement</i>”</li> </ul>	
<b>107a Reunión de la Asociación Física Argentina</b>	2022
<ul style="list-style-type: none"> <li>· Organized by <i>Asociación Física Argentina</i></li> <li>· Poster titled “<i>Analysis of the motility parameters of soil bacteria in artificial microdevices</i>”</li> </ul>	
<b>The Physics of Life Online Summer School</b>	2020
<ul style="list-style-type: none"> <li>· Organized by <i>Princeton University</i></li> <li>· Introduction frontiers topics in biological physics and active matter</li> </ul>	

## SKILLS

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- **Languages:** Spanish, English.
- **Coding:** Python, MATLAB, C, LaTeX.
- **Software:** FIJI (ImageJ), BioTracker, AutoCAD, Fusion360, Adobe Illustrator, Adobe Photoshop.
- **Experimental:** Maskless optical lithography, Soft lithography, Bright-field and fluorescence optical microscopy, Bacterial culture, Particle tracking.

## INTERESTS

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- **Academic Interests:** Biophysics, Active Matter, Microfluidics.

## REFERENCES

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**María Luisa Cordero**  
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Assistant Professor  
*Universidad de Chile*

**Veronica Marconi**  
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*Universidad Nacional de Córdoba*

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Assistant Professor  
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