

Carlos Castillo-Passi

Postdoctoral Scholar, Department of Radiology,
Stanford University

✉ cacp@stanford.edu
ID 0000-0001-6227-0477

Education

- 2025–Present **Postdoctoral Scholar**, *Stanford University*, California, USA
- 2022–2024 **Joint PhD in Biological and Medical Eng.**, *King's College London*, London, UK
- 2019–2024 **PhD in Biological and Medical Engineering (Ranked #1)**, *PUC*, Santiago, Chile
- 2015–2018 **MSc in Electrical Engineering (Highest Distinction)**, *PUC*, Santiago, Chile
- 2011–2018 **Electrical Engineering**, *PUC*, Santiago, Chile

Academic experience

Teaching

- 2026 **Primary Instructor, BIOS214 Open-Source MRI Sequence Development: Simulation to Scanner (Autumn 2026)**, *Stanford University*, California, USA
- 2025 **Guest Lecturer, RAD229 MRI Sequences and Signals (Spring 2025)**, *Stanford University*, California, USA
- 2024 **2-Day Workshop - Advanced Scientific Computing using Julia - librehub.github.io/2024/12/19/julia-ws-2024.html**, *PUC*, Santiago, Chile
- 2019 **Diploma in Fundamentals and Applications of Magnetic Resonance**, *PUC*, Santiago, Chile
- 2014–2015 **Developed 4 Precalculus MOOCs – online.ing.uc.cl**, *PUC*, Santiago, Chile

Teaching assistant

Electrical Engineering (PUC):

- IEE2103 Signals and Systems [2014–2020]
- IEE2513 Communications
- IEE3764 Image Formation
- IEE3794 Image Reconstruction [2019–2021]

Medical Imaging Sciences (KCL):

- 7MIGEP43 Medical Imaging Acquisition
- 7MIGEP45 Medical Image Reconstruction

Biomedical Engineering (KCL):

- 5CCYB050 Signal and Image Processing

Mathematical Engineering (PUC):

- IMT3840 Topics in Inverse Problems

Biomedical Engineering (PUC):

- IBM2101 Biomedical Imaging
- IBM2122 Biomedical Design I [2016–2018]
- IBM2122 Biomedical Design II [2016–2018]
- IBM3103 Mathematical Methods for BME
- IBM3102 Advanced Topics in BME II

Selected scientific publications

- 2026 **Versatile and Highly Efficient MRI Simulation of Arbitrary Motion in Ko-maMRI**, Pablo Villacorta-Aylagas, **Carlos Castillo-Passi**, Ryan Anders Kierulf, Rosa María Menchón-Lara, Justino R. Rodríguez-Galván, José Benito Sierra-Pallares, Pablo Irarrazaval, and Carlos Alberola-López. *Magnetic Resonance in Medicine*. Paper.
- 2026 **Bringing Julia to Health: A Concise Overview of JuliaHealth**, Jacob S. Zelko, **Carlos Castillo-Passi**, Jakub Mitura, Divyansh Goyal, Kosuri Lakshmi Indu, and Jay Sanjay Landge. *Proceedings of the JuliaCon Conferences*. Paper.

- 2025 **Simultaneous liver T1, T2, and ADC MR fingerprinting using optimized motion-compensated diffusion preparations: An initial validation on volunteers**, Carlos Velasco, **Carlos Castillo-Passi**, Nadia Chaher, Dimitrios Karampinos, Pablo Irarrazaval, Alkystis Phinikaridou, René Botnar, and Claudia Prieto. *Magnetic Resonance in Medicine*. Carlos Velasco and **Carlos Castillo-Passi** contributed equally. Paper.
- 2025 **Simultaneous 3D aortic lumen and vessel wall imaging at 0.55 T at either systole or diastole**, Matias Paredes, **Carlos Castillo-Passi**, Karl P. Kunze, Anastasia Fotaki, Simon Littlewood, René M. Botnar, and Claudia Prieto. *Magnetic Resonance in Medicine*. Paper.
- 2025 **Highly efficient image navigator based 3D whole-heart cardiac MRA at 0.55T**, **Carlos Castillo-Passi**, Karl P. Kunze, Michael G. Crabb, Camila Munoz, Anastasia Fotaki, Radhouene Neji, Pablo Irarrazaval, Claudia Prieto, and René M. Botnar. *Magnetic Resonance in Medicine*. Paper.
- 2024 **Fast and Accessible T2 Mapping Using Off-Resonance Corrected DESPOT2 With Application to 3D Prostate**, Ronal Coronado, **Carlos Castillo-Passi**, Cecilia Besa, and Pablo Irarrazaval. *Magnetic Resonance Imaging*. Paper.
- 2023  **KomaMRI.jl: An Open-Source Framework for General MRI Simulations with GPU Acceleration**, **Carlos Castillo-Passi**, Ronal Coronado, Gabriel Varela-Mattatall, Carlos Alberola-López, René Botnar, and Pablo Irarrazaval. *Magnetic Resonance in Medicine*. Paper.
- 2022 **Accurate characterization of dynamic microbial gene expression and growth rate profiles**, Gonzalo Vidal, Carolus Vitalis, Macarena Muñoz Silva, **Carlos Castillo-Passi**, Guillermo Yáñez Feliú, Fernán Federici, and Timothy J. Rudge. *Synthetic Biology*. Paper.
- 2022 **DeepSPIO: Super Paramagnetic Iron Oxide Particle Quantification using Deep Learning in Magnetic Resonance Imaging**, Gabriel Della Maggiora, **Carlos Castillo-Passi**, Wenqi Qiu, Shuang Liu, Carlos Milovic, Masaki Sekino, Cristian Tejos, Sergio Uribe, and Pablo Irarrazaval. *IEEE Transactions on Pattern Analysis and Machine Intelligence*. Paper.
- 2021 **A spatial off-resonance correction in spirals for Magnetic Resonance Fingerprinting**, Ronal Coronado, Gastao Cruz, **Carlos Castillo-Passi**, Cristian Tejos, Sergio Uribe, Claudia Prieto, and Pablo Irarrazaval. *IEEE Transactions on Medical Imaging*. Paper.
- 2020 **MAPL1: q-space reconstruction using ℓ_1 -regularized mean apparent propagator**, Gabriel Varela-Mattatall, **Carlos Castillo-Passi**, Alexandra Koch, Joaquin Mura, Rüdiger Stirnberg, Sergio Uribe, Cristian Tejos, Tony Stöcker, and Pablo Irarrazaval. *Magnetic Resonance in Medicine*. Paper.
- [International conference participation](#)
- 2026 **[Invited educational talk] Introduction to numerical phantoms and MRI sequence simulation with KomaMRI**, **Carlos Castillo-Passi** and Pablo Villacorta. *MRITogether 2026 · Virtual meeting*.
- 2026 **[Oral presentation] How I Drew the Julia Logo Using Spins in an MRI Machine**, **Carlos Castillo-Passi**. *Health Mini Symposium, JuliaCon 2026 · Mainz, Germany*. Abstract.
- 2026 **[Oral presentation] State of JuliaHealth**, Hetarth Shah, **Carlos Castillo-Passi**, and Jacob Zelko. *Health Mini Symposium, JuliaCon 2026 · Mainz, Germany*. Abstract.
- 2026 **[Invited educational talk] Open-Source Frameworks for MRI Reconstruction II**, **Carlos Castillo-Passi**. *Demystifying MRI Reconstruction: Classical Foundations to AI Frontiers, ISMRM 2026 · Cape Town, South Africa*.
- 2026 **[Power pitch] Simulation and Evaluation of Joint Velocity-Acceleration Encoded 4D-Flow MRI**, Charles McGrath, **Carlos Castillo-Passi**, Pablo Villacorta-Aylagas, Michael Loecher, and Daniel B. Ennis. *ISMRM 2026 · Cape Town, South Africa*. Presented by Charles McGrath Abstract.

- 2026 **[Digital poster] Highly-Efficient RF Pulse Design via Compiler-Level Reverse-Mode Automatic Differentiation of GPU-Accelerated MRI Simulations**, Kareem Fareed, Charles McGrath, Jakub Mitura, Daniel B Ennis, and **Carlos A Castillo-Passi**. *ISMRM 2026 · Cape Town, South Africa*. Presented by Kareem Fareed Abstract.
- 2026 **[Power pitch] Fast and accurate Bloch simulations using Magnus expansions**, **Carlos Castillo-Passi**, Charles McGrath, Kareem Fareed, Jacob S. Blum, and Daniel B. Ennis. *ISMRM 2026 · Cape Town, South Africa*. Abstract.
- 2026 **[Oral presentation] Fast and accurate Bloch simulations using Magnus expansions**, **Carlos Castillo-Passi**, Charles McGrath, Kareem Fareed, Jacob S. Blum, and Daniel B. Ennis. *ISMRM 2026 Workshop on Data Sampling and Image Reconstruction · Sedona, USA*. Abstract.
- 2025 **[Invited talk] Go with the Flow: Using Extensible and Shareable Motion Phantoms in KomaMRI**, **Carlos Castillo-Passi**. *MRITogether 2025 · Virtual meeting*.
- 2025 **[Invited educational talk] Modern Open-Source MRI Simulations**, **Carlos Castillo-Passi**. *Open Innovation in MR from Vendor & Academia Perspective, ISMRM 2025 · Honolulu, USA*.
- 2025 **[Oral presentation] What's New with KomaMRI.jl**, **Carlos Castillo-Passi**. *JuliaHealth Minisymposium, JuliaCon 2025 · Pittsburgh, USA*. Abstract.
- 2025 **[Oral presentation] KomaMRI.jl Device-Agnostic, Highly Efficient, and Pulseseq-compatible MRI Simulations**, **Carlos Castillo-Passi**, Pablo Villacorta, Justino Rodriguez-Galvan, Carlos Alberola, Claudia Prieto, Pablo Irarrazaval, and René M. Botnar. *SCMR 2025 · Washington, DC, USA*. Abstract.
- 2024 **[Invited educational talk] Interactive Visualizations**, **Carlos Castillo-Passi**. *Unlocking Productivity & Impact in Teaching & Publishing II, ISMRM 2024 · Singapore*.
- 2024 **[Oral presentation] Liver T1, T2 and ADC Magnetic Resonance Fingerprinting in a single breath-hold at 3T**, Carlos Velasco, **Carlos Castillo-Passi**, Nadia Chaher, Alkystis Phinikaridou, René M. Botnar, and Claudia Prieto. *ISMRM 2024 · Singapore*. Abstract.
-  2024 **[Power pitch] Cardiac Magnetic Resonance Fingerprinting for Simultaneous T1 and T2 Mapping at 0.55T**, **Carlos Castillo-Passi**, Carlos Velasco, Donovan Tripp, Karl P. Kunze, Radhouene Neji, Pablo Irarrazaval, René M. Botnar, and Claudia Prieto. *ISMRM 2024 · Singapore*. Abstract.
- 2024 **[Traditional poster] Magnetic Resonance Fingerprinting for Simultaneous T1, T2 and ADC Mapping at 0.55T using Convex-optimized Diffusion Prepared Waveforms**, **Carlos Castillo-Passi**, Carlos Velasco, Donovan Tripp, Karl P. Kunze, Radhouene Neji, Pablo Irarrazaval, René M. Botnar, and Claudia Prieto. *ISMRM 2024 · Singapore*. Abstract.
- 2024 **[Oral presentation] Simultaneous iNAV-based 3D Whole-Heart Bright-Blood and Black-Blood Imaging at 0.55T**, **Carlos Castillo-Passi**, Michael Crabb, Camila Munoz, Donovan Tripp, Karl Kunze, Radhouene Neji, Pablo Irarrazaval, Claudia Prieto, and René Botnar. *SCMR 2024 · London, United Kingdom*. Abstract.
-  2024 **[Digital poster] Cardiac Magnetic Resonance Fingerprinting for Simultaneous T1 and T2 Mapping at 0.55T**, **Carlos Castillo-Passi**, Carlos Velasco, Karl P. Kunze, Radhouene Neji, Pablo Irarrazaval, René M. Botnar, and Claudia Prieto. *SCMR 2024 · London, United Kingdom*. Abstract.
- 2023 **[Invited talk] KomaMRI.jl: Framework for MRI Simulations with GPU Acceleration**, **Carlos Castillo-Passi**. *MRITogether 2023 · Virtual meeting*.
- 2023 **[Invited talk] Using KomaMRI.jl for Comprehensive Quantitative MRI**, **Carlos Castillo-Passi**. *Vendor-Agnostic Pulse Sequence Programming with Pulseseq: From Basics to Advanced Topics, ISMRM 2023 · Virtual meeting*.

- 2023 [Oral presentation] **KomaMRI.jl: Framework for MRI Simulations with GPU Acceleration**, Carlos Castillo-Passi. *JuliaCon 2023 · MIT, Cambridge, USA*. Abstract.
- 2023  [Oral presentation] **Whole-Heart Cardiovascular Magnetic Resonance Angiography with iNAV-based Non-Rigid Motion-Corrected Reconstruction at 0.55T**, Carlos Castillo-Passi, Michael G. Crabb, Camila Muñoz, Karl P. Kunze, Radhouene Neji, Pablo Irarrazaval, Claudia Prieto, and René M. Botnar. *ISMRM 2023 · Toronto, Canada*. Abstract.
- 2023 [Oral presentation] **Whole-Heart Cardiovascular Magnetic Resonance Angiography with iNAV-based Non-Rigid Motion-Corrected Reconstruction at 0.55T**, Carlos Castillo-Passi, Michael G. Crabb, Camila Munoz, Karl P. Kunze, Radhouene Neji, Pablo Irarrazaval, Claudia Prieto, and René M. Botnar. *SCMR 2023 · San Diego, USA*. Abstract.
- 2022 [Digital poster] **MRIsim.jl: A framework for end-to-end spin-level MRI simulations with GPU acceleration**, Carlos Castillo-Passi, Ronal Coronado, Sergio Uribe, and Pablo Irarrazaval. *ISMRM & SMRT Annual Meeting 2022 · London, United Kingdom*. Abstract.
- 2018–2021 **And 9 other abstracts**

Book chapters

- 2026 **Cardiac MRI: Myocardial tissue characterization**, D. Ennis, C. Castillo-Passi, S. O. A. Thalen, and A. Hannum. *Biomechanics of the Heart: From Patient to Model and Back*, Elsevier. Book chapter · In press.

Grants/Fellowships

- 2025 **Small Development Grant**, NumFOCUS, USD 10,000
Improving JuliaHealth Documentation Accessibility for Community Onboarding. The Julia Language (JuliaHealth) · Project lead. Blog post.

Achievements and awards

- 2026 **3rd Place Trainee Abstract Award: “Fast and Accurate Bloch Simulations using Magnus Expansions”**, *ISMRM Open & Reproducible Research Study Group*
- 2026 **Top Viewed Article in MRM (Top 10%): “Highly efficient image navigator based 3D whole-heart cardiac MRA at 0.55T”**, Wiley
- 2025 **APS DCOMP Travel Award (JuliaCon 2025)**, American Physical Society, Division of Computational Physics (DCOMP)
- 2025 **Top Viewed Article in MRM (Top 10%): “KomaMRI.jl: An Open-Source Framework for General MRI Simulations with GPU Acceleration”**, Wiley
- 2024 **2nd Place for Liver T1, T2, and ADC at 3T**, *Trainee Abstract Presentations*, ISMRM MR in Drug Research Business Meeting
- 2024 **Magna Cum Laude Merit Award (Top 15%) for Liver T1, T2, and ADC at 3T**, *ISMRM Annual Meeting*, Singapore, Singapore
- 2024 **Early Career Award (1st Place) - Basic Science for iT2prep-BOOST at 0.55T**, *CMR2024*, London, United Kingdom
- 2023 **Summa Cum Laude Merit Award (Top 5%) and part of MRM’s fast-track initiative for CMRA at 0.55T**, *ISMRM Annual Meeting*, Toronto, Canada
- 2023 **Editor’s pick July 2023 for KomaMRI.jl**, *Magnetic Resonance in Medicine (MRM)*
- 2020 **Recognition for his outstanding work as a teacher assistant**, *Institute of Biological and Medical Engineering, PUC*, Santiago, Chile

- 2018 **Recognition for the making of the MOOCs: EINP001, EINP002, EINP003 and EINP004**, *PUC*, Santiago, Chile

Mentoring

- 2026 **Kosuri Indu — Improving JuliaHealth Documentation Accessibility for Community Onboarding**, *NumFOCUS Small Development Grant*, Julia, USA
Grant proposal · Blog post
- 2026 **Alya Kurt — GPU-Accelerated Multicoil Bloch Simulations for Nonlinear Inversion in MRI Reconstruction and Quantitative Mapping**, *Summer Undergraduate Research Fellowship (SURF)*, Stanford University, USA
Multicoil tutorial
- 2026 **Anvika Singhal — komamripy Python Wrapper for KomaMRI.jl**, *Google Summer of Code (GSoC)*, Julia, USA
GSoC project · Blog post · Code
- 2026 **Kareem Fareed — Differentiable GPU-accelerated MRI Simulations**, *Google Summer of Code (GSoC)*, Julia, USA
GSoC project · Code
- 2026 **Kareem Fareed — Enabling Fast, Arbitrary, MRI RF Pulse Design**, *Research Experience for Undergraduates (REU)*, Stanford University, USA
- 2025 **Kareem Fareed — Compiler-Level Reverse-Mode Automatic Differentiation (AD) of GPU-Accelerated MRI Simulations**, *Research Experience for Undergraduates (REU)*, Stanford University, USA
ISMRM 2026 abstract
- 2024 **Ryan Kierulf — Enhancements to KomaMRI.jl GPU Support**, *Google Summer of Code (GSoC)*, Julia
GSoC project · Blog post