# MARÍA MARQUEZ SOSA

From Mérida, VENEZUELA | Based in Lyon, FRANCE

+33 07 44 89 99 23 | mmarquezsosa28@gmail.com


Driven by a passion for innovation, I strive to push the boundaries of AI-driven diagnostics and treatment solutions, seeking opportunities to contribute to transformative advancements in healthcare and public health.

## RESEARCH EXPERIENCE

### PHD STUDENT (2024 – PRESENT)

Laboratoire CREATIS – Université de Lyon 1 | Lyon, France

- Designing and implementing a **specialized image processing algorithm** for the project *"Fast Lung Segmentation and Registration to Assess Local Ventilation from Computed Tomography (CT) Images of Patients with Acute Respiratory Distress Syndrome (ARDS)."*
- Developing **computational geometry and deep learning (DL) algorithms** using **C++ and Python**, integrating specialized libraries for efficient medical image analysis.
- Advancing **automated CT image analysis** to enhance clinical decision-making for **ARDS diagnosis and treatment**, contributing to improved patient outcomes.
- Collaborating with a **multidisciplinary team** of researchers, engineers, and clinicians to bridge the gap between **AI-driven image processing and real-world clinical applications**.

### RESEARCH INTERN (2023 – 2024)

CREATIS – Université de Lyon 1| Lyon, France

- Developed and implemented an advanced image processing algorithm, leveraging **C++ and Python** with specialized libraries for **computational geometry, machine learning (ML), and DL**.
- Managed and curated medical image databases, applying diverse analysis techniques to extract meaningful insights.
- Collaborated effectively with **multidisciplinary teams**, including clinicians and researchers, delivering **innovative solutions** and clear, data-driven problem-solving approaches.

### RESEARCH ASSISTANT (2022 – 2024)

Pontificia Universidad Javeriana | Bogotá, Colombia

- Conducted an extensive **literature review** and analysis on the use of artificial intelligence and advanced techniques for medical image processing, with a focus on Magnetic Resonance Imaging (MRI) in neurodegenerative diseases.
- Managed research projects, overseeing **organization, technical writing, and proofreading of scientific articles** for national and international academic conferences.
- Collaborated effectively with **multidisciplinary teams**, maintaining clear communication with researchers and supervisors.

### RESEARCH STUDENT TEAM LEADER (2020 - 2022)

PROMISE – Universidad del Rosario & Escuela Colombiana de Ingeniería Julio Garavito | Bogotá, Colombia

- Applied **filtering, enhancement, segmentation, and classification techniques** to analyze **2D and 3D medical signals and images**.
- Developed and implemented **ML and DL algorithms** for **segmentation and classification** of medical images.
- Led research efforts resulting in **scientific publications** presented at **national and international conferences**.

## EDUCATION

### PHD IN SIGNAL AND IMAGE PROCESSING (2024 - PRESENT)

École Doctorale EEA – Université Lyon 1 | Lyon, France

**MASTER'S IN ARTIFICIAL INTELLIGENCE (2022 - 2024)**

GPA: 4.86 / 5.0 | Pontificia Universidad Javeriana | Bogotá, Colombia

**BACHELOR'S IN BIOMEDICAL ENGINEERING (2017 - 2022)**

GPA: 4.53 / 5.0 | Pontificia Universidad Javeriana | Bogotá, Colombia

- Major in Medical Signal and Image Processing

## AWARDS

**SUMMA CUM LAUDE – HONOR GRADUATE (2024)**
**HONOR MENTION FOR THESIS (2024)**
MULTIPLE **ACADEMIC EXCELLENCE CERTIFICATES & SCHOLARSHIPS (2022-2023)**

- Master's in Artificial Intelligence, Pontificia Universidad Javeriana

**VALEDICTORIAN HONOR GRADUATE (2022)**
MULTIPLE **ACADEMIC EXCELLENCE SCHOLARSHIPS (2019-2021)**

- Biomedical Engineering, Universidad del Rosario & Escuela Colombiana de Ingeniería Julio Garavito

## TEACHING EXPERIENCE

**BIOMEDICAL ENGINEERING MENTOR (2021)**
*Escuela Colombiana de Ingeniería Julio Garavito* | Bogotá, Colombia
Guided students in **Medical Signal & Image Processing**

**ELECTRONIC & BIOMEDICAL ENGINEERING MENTOR *(2019–2020)***
*Escuela Colombiana de Ingeniería Julio Garavito* | Bogotá, Colombia
Assisted in **Electrical Circuits** coursework.

**MATHEMATICS MENTOR (2019)**
*Escuela Colombiana de Ingeniería Julio Garavito* | Bogotá, Colombia
Tutored **Precalculus, Calculus, and Fundamentals of Mathematics**.

**BIOCHEMISTRY MENTOR (2021)**
*Universidad del Rosario* | Bogotá, Colombia
Guided students in **Fundamentals of Biochemistry and Advanced Biochemistry.**

## PUBLICATIONS – CONFERENCE PAPERS

- Márquez-Sosa M., Roux E., Florez-Valencia, L., et al., "Intégration de l'analyse spectrale de la forme dans une approche d'apprentissage profond pour la segmentation des poumons dans le syndrome de détresse respiratoire aiguë", Colloque Français d'Intelligence Artificielle en Imagerie Biomédicale (IABM 2025), Nice 2025, Poster 7.
- Penarrubia L., Caracalla B., Milcent R., Márquez-Sosa M., et al., "Augmentation de données par synthèse de lésions pour renforcer la robustesse de la segmentation des poumons de patients atteints du syndrome de détresse respiratoire aiguë", Colloque Français d'Intelligence Artificielle en Imagerie Biomédicale (IABM 2025), Nice, 2025, Poster 124.
- Márquez-Sosa M., Roux E., Florez-Valencia, L., et al., "Differentiable spectral shape deformation for 3D-mesh registration in medical imaging", Colloque Français d'Intelligence Artificielle en Imagerie Biomédicale (IABM 2024), Grenoble, 2024. Poster 102: Recalage de maillages par déformation spectrale différentiable pour l'imagerie médicale.
- M. M. Sosa and D. F. Hernandez, "Predictive Modeling of Diabetes Hospital Readmission Using Machine Learning Algorithms," 2023 3rd International Conference on Electrical, Computer, Communications and Mechatronics Engineering (ICECCME), Tenerife, Canary Islands, Spain, 2023, pp. 1-6, DOI: 10.1109/ICECCME57830.2023.10252626.
- M. Marquez-Sosa and D. Muñoz-Gordillo, "Characterization of Dermatoscopic Images for Melanoma Diagnosis by means of the ABCD Criteria," 2022 IEEE ANDESCON, Barranquilla, Colombia, 2022, pp. 1-6, DOI: 10.1109/ANDESCON56260.2022.9989777.

- M. M. Marquez-Sosa, Á. D. Orjuela-Cañón, J. M. L. López and S. L. Cancino, "Characterization and Classification Algorithm for Mammography Images by means of the BIRADS Assessment Categories," 2021 IEEE URUCON, 2021, pp. 237-241, doi: 10.1109/URUCON53396.2021.9647173
- M. M. Marquéz Sosa y S. Cancino Suárez, «CARACTERIZACIÓN DE LESIONES MAMARIAS POR MEDIO DEL PROCESAMIENTO DE IMÁGENES DE MAMOGRAFÍA DIGITAL», EIEI ACOFI, sep. 2021. DOI: https://doi.org/10.26507/ponencia.1839 o https://acofipapers.org/index.php/eiei/article/view/1839

## SKILLS

Language skills: Spanish (Native proficiency), English (Full proficiency), French (Professional)

## REFEREES

- Prof. Maciej ORKISZ, PhD - CREATIS, team MYRIAD - Université Claude Bernard Lyon 1
  maciej.orkisz@creatis.insa-lyon.fr
- Prof. Leonardo FLOREZ VALENCIA, PhD – Pontificia Universidad Javeriana
  florez-l@javeriana.edu.co
- Prof. Jean-Christophe RICHARD, MD, PhD Service de Médecine Intensive – Réanimation Hôpital de la Croix Rousse, Hospices Civils de Lyon
  j-christophe.richard@chu-lyon.fr