
Medical imaging specialist passionate about developing diagnostic solutions through collaborative research. I enjoy working across disciplines to turn innovative ideas into practical tools that can make a meaningful difference in patient care and healthcare.

RESEARCH EXPERIENCE

Ph.D. Student

Laboratoire CREATIS – Université de Lyon 1

2024 – Present

Lyon, France

- Develop computer vision and deep learning (DL) methods for quantitative lung Computed Tomography (CT) analysis, focusing on segmentation and diffeomorphic registration
- Implement 3D medical image processing pipelines in C++ and Python for preprocessing, segmentation, registration, and quantitative analysis
- Validate algorithm performance and robustness on clinical datasets through quantitative evaluation
- Establish reproducible research workflows and maintain high standards for code organization and experimental documentation
- Collaborate with researchers, engineers, and clinicians to ensure computational methods address real clinical questions, communicating technical findings through presentations and written reports

Research Intern

CREATIS – Université de Lyon 1

2023 – 2024

Lyon, France

- Developed segmentation and registration algorithms for Acute Respiratory Distress Syndrome (ARDS) patient CT imaging using computational geometry and DL to quantify local ventilation patterns
- Implement image processing pipelines in C++ and Python using different specialized libraries
- Evaluated and validated image analysis methods on ARDS patient datasets through quantitative experiments with clinical collaborators

Research Assistant

Pontificia Universidad Javeriana

2022 – 2024

Bogotá, Colombia

- Explored artificial intelligence (AI) and medical image processing methods for analyzing neurodegenerative diseases from Magnetic resonance imaging (MRI) data
- Conducted comprehensive literature reviews identifying state-of-the-art approaches and research gaps in neuroimaging analysis
- Contributed to research design, experimental validation, and manuscript preparation supporting multiple peer-reviewed publications

Research Student Team Leader

PROMISE – Universidad del Rosario & ECI Julio Garavito

2020 – 2022

Bogotá, Colombia

- Developed and validated ML/DL models for medical image segmentation and classification across 2D and 3D imaging modalities
- Applied computer vision techniques (filtering, enhancement, segmentation, classification) to diverse clinical datasets
- Led experimental design and validation to develop solutions for complex imaging problems
- Mentored student research teams and presented findings at national and international conferences and through peer-reviewed publications

EDUCATION

PhD. in Signal and Image Processing **2024 – Present**
École Doctorale EEA – Université Claude Bernard Lyon I *Lyon, France*

MSc. in Artificial Intelligence **2022 – 2024**
Pontificia Universidad Javeriana *Bogotá, Colombia*

GPA: 4.86 / 5.0 | *Summa Cum Laude* Honor Graduate | Honor Mention Thesis

BSc. in Biomedical Engineering **2017 – 2022**
Universidad del Rosario – Escuela Colombiana de Ingeniería Julio Garavito *Bogotá, Colombia*

GPA: 4.53 / 5.0 | *Valedictorian* Honor Graduate
Major: Medical Signal and Image Processing

Baccalaureate in Sciences **2016**
Colegio Nuestra Señora de Fátima *Mérida, Venezuela*

GPA: 19.6 / 20.0 | *Salutatorian* Honor Graduate | ASOVAC Outstanding Thesis

TEACHING EXPERIENCE

INSA Lyon *Lyon, France*

· *Formation Initiale aux Métiers d'Ingénieur (FIMI)* **Present**

Object-Oriented Programming and Graphical Interface

· *Télécommunications, services et usage (TELECOM)* **2025 – Present**

Master en Intelligence Artificielle (Master MINDS (AI))

Signal and Image Processing, Introduction to Machine Learning and Deep Learning

Polytech Lyon *Lyon, France*

· *Department of Biomedical Engineering* **2026 – Present**

Master 2 Ingénierie de la Santé, parcours MISS (Medical Imaging and Signal System)

Filtering Segmentation, Registration, and Machine Learning for Medical Images

Université Claude Bernard Lyon 1 (UCBL) *Lyon, France*

· *Département Génie Électrique et des Procédés (GEP)* **2026**

Master 1 Électronique, Énergie Électrique, Automatique (EEEA)

Vision Industrielle: Image Processing

IUT Lyon 1 *Lyon, France*

· *Génie Industriel et Maintenance (GIM)* **2026**

Bachelor Universitaire de Technologie (BUT)

Fundamentals of Electricity and Electronics

Labex PRIMES – INSA Lyon *Lyon, France*

· *Deep Learning for Medical Imaging – Summer School* **2025**

PUBLICATIONS – CONFERENCE PAPERS

- M. Marquez-Sosa, É. Saillard, A. Basarab, and M. Sdika, “TrICON: Learning diffeomorphic lung CT registration through triplet consistency,” presented at the Thoracic Image Analysis Workshop, MICCAI 2026, Strasbourg, France, Sep. 2026, hal-05728043.
- M. Marquez-Sosa, “How well do segmentation methods perform on computed tomography (CT) scans of patients with acute respiratory distress syndrome (ARDS)?,” presented at the Colloque Français d’Intelligence Artificielle en Imagerie Biomédicale (IABM), Lyon, France, Mar. 2026, hal-05728038.
- M. M. Marquez-Sosa, E. Roux, L. Flórez Valencia, E. E. Dávila Serrano, and M. Orkisz, “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,” presented at the Colloque Français d’Intelligence Artificielle en Imagerie Biomédicale (IABM), Nice, France, Mar. 2025.
- M. M. Marquez-Sosa, E. Roux, L. Flórez Valencia, E. E. Dávila Serrano, and M. Orkisz, “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,” presented at the Colloque Français d’Intelligence Artificielle en Imagerie Biomédicale (IABM), Nice, France, Mar. 2025.
- M. M. Marquez-Sosa, E. Roux, L. Flórez Valencia, E. E. Dávila Serrano, and M. Orkisz, “Differentiable spectral shape deformation for 3D-mesh registration in medical imaging,” presented at the Colloque Français d’Intelligence Artificielle en Imagerie Biomédicale (IABM), Grenoble, France, Mar. 2024.
- M. Marquez-Sosa and D. F. Hernandez, “Predictive modeling of diabetes hospital readmission using machine learning algorithms,” in *Proc. 2023 3rd Int. Conf. Electrical, Computer, Communications and Mechatronics Engineering (ICECCME)*, Tenerife, Spain, Jul. 2023. 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,” in *Proc. 2022 IEEE ANDESCON*, Barranquilla, Colombia, Nov. 2022, pp. 322–327. doi: 10.1109/ANDESCON56260.2022.9989777.
- M. M. Marquez-Sosa, Á. D. Orjuela-Cañón, J. M. López López, and S. L. Cancino, “Characterization and classification algorithm for mammography images by means of the BIRADS assessment categories,” in *Proc. 2021 IEEE URUCON*, Montevideo, Uruguay, Nov. 2021, pp. 237–241. doi: 10.1109/URUCON53396.2021.9647173.

- M. M. Marquéz Sosa and S. Cancino Suárez, “Caracterización de lesiones mamarias por medio del procesamiento de imágenes de mamografía digital,” in *Proc. Encuentro Int. de Educación en Ingeniería (EIEI ACOFI)*, Colombia, 2021. doi: 10.26507/ponencia.1839.

TECHNICAL SKILLS & LANGUAGES

Programming Languages	Python, C++, MATLAB, SQL, LaTeX
Deep Learning Frameworks	TensorFlow, PyTorch, Keras
Medical Imaging Libraries	OpenCV, ITK, VTK, SimpleITK, Nibabel
Data Science Tools	NumPy, Pandas, Scikit-learn, SciPy
Visualization	Matplotlib, Plotly, Paraview, ImageJ, ITKSnap, Slicer
AI & LLM Tools	Claude, ChatGPT, Gemini, GitHub Copilot
Development Tools	Jupyter Notebook, Google Colab, VS Code
Operating Systems	Linux, Windows, macOS
Languages	Spanish (Native), English (Full proficiency), French (Professional)

AWARDS & HONORS

Academic Recognitions

- *Summa Cum Laude Honor Graduate* 2024
Master’s in Artificial Intelligence, Pontificia Universidad Javeriana
- *Outstanding Thesis Mention* 2024
Master’s in Artificial Intelligence, Pontificia Universidad Javeriana
- *Valedictorian Honor Graduate* 2022
Bachelor’s in Biomedical Engineering, ECI Julio Garavito – Universidad del Rosario
- *Salutatorian Honor Graduate* 2016
Baccalaureate in Science, Colegio Nuestra Señora de Fátima
- *Outstanding Thesis Mention* 2016
Venezuelan Association for the Advancement of Science (ASOVAC)

Academic Excellence Scholarships

- *Multiple Academic Excellence Scholarships* 2022 – 2023
Master’s in Artificial Intelligence, Pontificia Universidad Javeriana
- *Multiple Academic Excellence Scholarships* 2019 – 2021
Bachelor’s in Biomedical Engineering, Universidad del Rosario – Escuela Colombiana de Ingeniería Julio Garavito

REFERENCES

- Prof. Adrian BASARAB, PhD – CREATIS – Université Claude Bernard Lyon 1
adrian.basarab@creatis.insa-lyon.fr
- Prof. Leonardo FLOREZ VALENCIA, PhD – Pontificia Universidad Javeriana
florez-l@javeriana.edu.co
- Prof. Jean-Christophe RICHARD, MD, PhD – Hôpital de la Croix Rousse, Hospices Civils de Lyon
j-christophe.richard@chu-lyon.fr
- Prof. Sandra Liliana CANCINO, PhD – Pontificia Universidad Javeriana
sandra@jumpcube.io