Dr. Eros Montin Ph.D.

Research Scientist & AI/ML Specialist in Biomedical
Imaging

280 Marin boulevard, apt 5T, Jersey City, USA, 07302

(+1) 347-254-2759

eros.montin@gmail.com

Professional Summary

Research Scientist & AI/ML Specialist in Biomedical Imaging with extensive expertise in advancing diagnostic precision through innovative imaging solutions. Leveraging over two decades of experience in neuroscience, oncology, and musculoskeletal fields, excels in translating scientific research into practical AI applications, enhancing patient outcomes. Proficient in deep learning frameworks, data analytics, and advanced radiomics, utilizing languages such as Python and C++ to drive personalized medicine initiatives.

Employment History

NYU Langone Health | Research Scientist & Head of Software Development | New York, USA

May 2022 - Present

- Lead MRI simulation projects, enhancing user experience with cloud-based solutions.
- Develop AI tools for hip joint analysis, improving diagnostic accuracy.
- Collaborate with interdisciplinary teams, advancing medical imaging techniques.
- Present research at conferences, fostering innovation in medical device testing.
- Spearhead cloud-based MRI simulation platform, integrating AI for hip joint analysis and developing web tools for RF field estimation
- Drive interdisciplinary projects, uniting bioengineers, and clinicians to advance medical imaging techniques and patient care solutions
- Lead comparative studies on deep learning networks for temperature prediction, enhancing accuracy in human body modeling
- Pioneer AI-based radiomics for femoroacetabular impingement management, revolutionizing 3D MRI analysis in orthopedics
- Optimize multi-application workflows, boosting functionality across diverse applications and significantly improving user experience

NYU Langone Health | Postdoctoral Research Fellow | New York, USA

May 2022

- Developed MRI web apps enhancing SNR evaluation, simulation, and RF coil customization.
- Created MR Optimum, CAMRIE, and Coil Designer for advanced MRI analysis.
- Improved MRI experiment simulations and RF coil settings for better performance.
- Enhanced MRI signal analysis through innovative web applications.
- Advanced MRI technology by designing key applications for improved diagnostics.
- Pioneered Coil Designer application, enabling customization of RF coil settings and precise measurement of SNR performance in MRI technology.
- Partnered with cross-functional teams to design and implement user-friendly interfaces for complex MRI simulation and analysis tools.
- Spearheaded the development of innovative web applications, positioning NYU Langone Health at the forefront of MRI research and technology.

Politecnico di Milano | Postdoctoral Research Fellow | Italy

March 2018

- Develop radiomics interfaces for cancer prognosis.
- Collaborate on image segmentation in oncology, improving diagnostic precision.
- Implement genomic data mining, driving significant insights in pediatric imaging.
- Led radiomics and genomic data mining for BD2Decide Horizon 2020 cancer study, enhancing prognosis accuracy through advanced image analysis techniques.
- Pioneered semi-automatic segmentation methods in oncological imaging, streamlining parameter calculations and improving diagnostic efficiency.
- Optimized image registration processes for pediatric imaging, resulting in more precise and timely diagnoses for young patients.
- Coordinated with multidisciplinary teams to integrate radiomics and genomic data, fostering comprehensive approaches to cancer prognosis.
- Spearheaded development of innovative interfaces for data mining, setting new standards in head and neck cancer research methodologies.

Politecnico di Milano | Postgraduate Research Fellow | Italy

Jan 2011

- Analyze MRI data for oncology research, enhancing diagnostic accuracy and treatment planning.
- Spearheaded multi-modal image registration and segmentation in oncology, enhancing precision in brain tumor and multiple myeloma analysis.
- Pioneered advanced functional and structural MRI analysis techniques, revolutionizing oncological imaging methodologies.
- Optimized rigid and non-rigid image registration processes, significantly improving diagnostic accuracy in complex oncology cases.
- Partnered with cross-functional teams to integrate innovative MRI analysis techniques, elevating research outcomes in oncology.
- Develop novel MRI analysis techniques for oncology, enhancing diagnostic precision and treatment planning in brain tumor and multiple myeloma cases.
- Optimize image registration algorithms, improve accuracy in complex oncology diagnoses and facilitate more targeted treatment approaches.

HUPAC S.p.A. | Manager of Intermodal Logistics | Italy

Sep 2002

- Spearheaded intermodal logistics strategies, optimizing cross-border operations, and implementing innovative tracking systems for enhanced efficiency.
- Streamlined supply chain processes, reducing transit times, and improving delivery rates on time, resulting in substantial cost savings for clients.
- Fostered strong partnerships with international stakeholders, coordinating seamless logistics solutions across diverse transportation modes.
- Pioneered sustainable logistics practices, integrating eco-friendly transportation options, and reducing the company's carbon footprint.

Education

Politecnico di Milano, Italy | Ph.D. in Bioengineering

2011 - 2015

Thesis: A Novel Image Registration Strategy for Oncological Pediatric Brain Images Fusion

Achievements: Developed a registration strategy for aligning pediatric brain images over long-term re-evaluations.

Politecnico di Milano, Italy | Master of Science in Biomedical Engineering

2006 - 2009

Thesis: Exploring Cortical Attentional System by using fMRI during a Continuous Performance Test

Achievements: Analyzed fMRI data to study brain activation patterns related to attentional control.

Skills

Image segmentation *(Expert)*

Registration *(Expert)*

Parameter extraction *(Expert)*

ITK *(Expert)*

VTK *(Experienced)*

ParaView *(Expert)*

PyTorch *(Expert)*

TensorFlow *(Experienced)*

Scikit-learn *(Expert)*

Generative AI *(Experienced)*

Cloud technologies *(Expert)*

AWS *(Expert)*

Azure *(Skillful)*

SQL *(Expert)*

NoSQL *(Experienced)*

Angular *(Experienced)*

ReactJS *(Skillful)*

Node.js *(Experienced)*

PHP *(Expert)*

Laravel *(Expert)*

Docker *(Expert)*

Kubernetes *(Expert)*

C++ *(Experienced)*

Python *(Experienced)*

MATLAB *(Expert)*

Predictive Modeling *(Expert)*

Statistical Analysis *(Expert)*

Machine Learning Operations *(Expert)*

Data Visualization *(Experienced)*

Languages

English *(Highly proficient)*

Links

[LinkedIn](#)   [GitHub](#)

Additional Information

Key Achievements

- Invited Speaker at AWS HCLS Customer Meetup Q124 - NYC - March 2024: Presented the talk 'Cloud MR: AWS-Powered Advancements in MRI Research and Education.'
- Invited Speaker at the EJP RD ERN Workshop on Desmoid Tumors: Presented on 'Radiomics and Radiogenomics Challenges', focusing on interdisciplinary approaches.

Last Update Oct 24

- Featured in three Aunt Minnie articles on machine learning and MRI radiomics estimating brain age and predicting knee replacement needs and SAR/Temperature estimation.
- Magna Cum Laude Merit Award Recipient at ISMRM 2022: Awarded for the work 'A Web-Accessible Tool for Temperature Estimation from SAR Simulations (TESS)', presented at the 2022 Joint Annual Meeting ISMRM-ESMRMB & ISMRT 31st Annual Meeting.
- Editor for Frontiers in Radiology: Research topic titled 'Radiomics and AI for Clinical and Translational Medicine', contributing to advancing knowledge and shaping discussions in these dynamic fields.
- PhD awarded with merit.
- Awarded by SIOP Young Investigator Day during the 44th Congress of the International Society of Pediatric Oncology (SIOP) 2012, London, United Kingdom.

Professional Affiliations

- Member, International Society for Magnetic Resonance in Medicine (ISMRM)
- Member, IEEE Engineering in Medicine and Biology Society (EMBS)

Open-Source Projects

- pynico: A Python library for managing filenames and directories, aimed at improving workflow efficiency.
- pyable: A collection of classes for handling meshes, images, and vector fields based on simpleITK, ITK, and VTK.
- registrationMplus: A C++ library for multi-modal image registration tasks.
- pyfe: A Python-based framework for radiomics feature extraction.
- cloudmr-ux: The NPM package for the CloudMR project.
- lambdaKoma: A cloud/desktop block equation solver for MRI simulations.
- pydaug: A library for geometric data augmentation.

Publications and Presentations

Articles

- 2024 - Journal of Orthopaedic Research® - "Radiomics Features Outperform Standard Radiological Measurements in Detecting Femoroacetabular Impingement on Three-Dimensional Magnetic Resonance Imaging."
- 2024 - Informatics in Medicine Unlocked - "The Impact of Data Augmentation and Transfer Learning on the Performance of Deep Learning Models for the Segmentation of the Hip on 3D Magnetic Resonance Images."
- 2023 - Frontiers in Radiology - "A Radiomics Approach to the Diagnosis of Femoroacetabular Impingement."
- 2022 - NMR in Biomedicine - "Relevance of Apparent Diffusion Coefficient Features for a Radiomics-Based Prediction of Response to Induction Chemotherapy in Sinonasal Cancer."
- 2021 - Journal of Magnetic Resonance Imaging - "Seeking a Widely Adoptable Practical Standard to Estimate Signal-to-Noise Ratio in Magnetic Resonance Imaging for Multiple-Coil Reconstructions."
- 2021 - Plos one - "Retrospective Study of Late Radiation-Induced Damages after Focal Radiotherapy for Childhood Brain Tumors."
- 2020 - Medical Engineering & Physics - "Application of an OCT-Based 3D Reconstruction Framework to the Hemodynamic Assessment of an Ulcerated Coronary Artery Plaque."
- 2020 - Medical & Biological Engineering & Computing - "A Multi-Metric Registration Strategy for the Alignment of Longitudinal Brain Images in Pediatric Oncology."
- 2019 - PloS one - "Automatic Segmentation of Optical Coherence Tomography Pullbacks of Coronary Arteries Treated with Bioresorbable Vascular Scaffolds: Application to Hemodynamics Modeling."
- 2018 - Journal of Magnetic Resonance Imaging - "Radiomic Analysis of Soft Tissues Sarcomas Can Distinguish Intermediate from High-Grade Lesions."

- 2018 - Medical Engineering & Physics - "A Patient-Specific Study Investigating the Relation between Coronary Hemodynamics and Neo-Intimal Thickening after Bifurcation Stenting with a Polymeric Bioresorbable Scaffold."
- 2018 - Journal of digital imaging - "Assessment of Stability and Discrimination Capacity of Radiomic Features on Apparent Diffusion Coefficient Images."
- 2018 - Physica Medica: European Journal of Medical Physics - "Retrospective Study of Late Radiation Damages after Focal Radiotherapy for Childhood Brain Tumors."
- 2017 - Medical Engineering & Physics - "A Framework for Computational Fluid Dynamic Analyses of Patient-Specific Stented Coronary Arteries from Optical Coherence Tomography Images."
- 2017 - PLoS One - "Reconstruction of Stented Coronary Arteries from Optical Coherence Tomography Images: Feasibility, Validation, and Repeatability of a Segmentation Method."
- 2017 - Applied Sciences - "A Patient-Specific Study Investigating the Relation between Coronary Hemodynamics and Neo-Intimal Thickening after Bifurcation Stenting with a Polymeric Bioresorbable Scaffold."
- 2015 - Radiotherapy and Oncology - "Image Registration Framework to Investigate Children Neurocognitive Outcome after Focal Brain Irradiation."
- 2010 - Computational intelligence and neuroscience - "Exploring Cortical Attentional System by Using FMRI during a Continuous Performance Test."
- 2009 – "Cyberpsychology & Behavior "- - Web-Based Tool for Cooperating Behaviors in Eating and Activity Control

Conference Presentations

- 2024 - 2024 ISMRM & ISMRT Annual Meeting & Exhibition - "Radiomic Features Outperform Clinical Metrics in Distinguishing Femoroacetabular Impingement Patients from Healthy Subjects"
- 2024 - 2024 ISMRM & ISMRT Annual Meeting & Exhibition - "Predicting Total Knee Replacement Surgery Using Radiomic Features Extracted from MRI Scans"
- 2024 - 2024 ISMRM & ISMRT Annual Meeting & Exhibition - "Predicting Brain Age of Healthy Adults Based on Morphological MRI Parcellation Using Radiomics"
- 2023 - 2023 IEEE USNC-URSI Radio Science Meeting (Joint with AP-S Symposium) - "A Deep Learning Model for the Estimation of RF Field Trained from an Analytical Solution."
- 2023 - 2023 International Conference on Electromagnetics in Advanced Applications (ICEAA) - "A Web-Accessible Tool for 2D Analytical Solutions of Electromagnetic Fields in Concentric Cylinders."
- 2023 - 2023 IEEE EMBS Special Topic Conference on Data Science and Engineering in Healthcare, Medicine and Biology - "Impact of the Complexity of the Geometry in an Analytical Solution Used to Train a Deep Learning Network."
- 2023 - 2023 IEEE EMBS Special Topic Conference on Data Science and Engineering in Healthcare, Medicine and Biology - "A Comparative Study of 2D and 3D Deep Learning Networks for Human Body Models Temperature Prediction."
- 2022 - 30th Scientific Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) - "A Web-Accessible Tool for Temperature Estimation from SAR Simulations (TESS)."
- 2022 - 30th Scientific Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) - "A Software Tool to Assess Radiofrequency Coil Designs with Respect to Ultimate Intrinsic Performance Limits."
- 2022 - Proc. ISMRM Annual Meeting - "Comparison of 2D vs 3D Deep Learning Algorithms to Estimate Temperature Throughout the Human Body."
- 2022 - 30th Scientific Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) - "Automatic Segmentation of the Hip Bony Structures on 3D Dixon MRI Datasets Using Transfer Learning from a Neural Network Developed for the Shoulder."
- 2021 - 29th Scientific Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) - "A Web-Accessible Tool for Rapid Analytical Simulations of MR Coils via Cloud Computing."

- 2021 - 28th Scientific Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) - "CAMRIE–Cloud-Accessible MRI Emulator."
- 2019 - 27th Scientific Meeting of the International Society for Magnetic Resonance in Medicine (ISMRM) - "MR Optimum–A Web-Based Application for Signal-to-Noise Ratio Evaluation."
- 2019 - 2018 40th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC) - "Use of Apparent Diffusion Coefficient Images to Predict Response to Induction Chemotherapy in Sinonasal Cancer."
- 2018 - Atti del Congresso del Gruppo Nazionale di Bioingegneria GNB - "Validation of a Segmentation Method for OCT Images of Coronary Arteries Treated with Bioresorbable Stents for Numerical Modelling."
- 2017 - VII Annual Meeting Italian Chapter of the European Society of Biomechanics - "Reconstruction of Stented Coronary Arteries for CFD Analyses: From in Vitro to Patient-Specific Models."
- 2017 - 39th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC) - "Stability Assessment of First Order Statistics Features Computed on ADC Maps in Soft-Tissue Sarcoma."
- 2016 - VPH 2016-Book of Abstracts - "Stented Coronary Arteries: A Semi-Automatic Segmentation Method for OCT-Based Reconstruction."
- 2016 - 38th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC) - "A Method for Coronary Bifurcation Centerline Reconstruction from Angiographic Images Based on Focalization Optimization."
- 2015 - 2015 37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC) - "Tuning of a Deformable Image Registration Procedure for Skin Component Mechanical Properties Assessment."
- 2014 - 4th conference of Gruppo Nazionale di Bioingegneria - "Tuning and Validation of an Image Registration Procedure for Pediatric MR Images."
- 2013 - XIII Mediterranean Conference on Medical and Biological Engineering and Computing 2013: MEDICON 2013 - "A Fully Automatic Method for the Soft Tissues Sarcoma Treatment Response Based on Fuzzy Logic."
- 2013 - 13th IEEE international conference on bioinformatics and bioengineering - "Coronary Stenting: From Optical Coherence Tomography to Fluid Dynamic Simulations."
- 2012 - 44th Congress of the International Society of Pediatric Oncology (SIOP) 2012, - "Study of Magnetic Resonance Diffusion Tensor Imaging (DTI) as a tool to investigate the correlation between radiation dose distribution and neurocognitive outcomes after treatment of childhood malignant brain tumors."
- 2012 - Annual International Conference of the IEEE Engineering in Medicine and Biology Society - "A Registration Framework for Evaluation of T1, T2 and DWI Signal Intensities in Multiple Myeloma."
- 2012 - European Congress of Radiology-ECR - "Whole-Body DWI, Whole-Body and Whole-Spine MRI in Multiple Myeloma."
- 2010 - European Congress of Radiology-ECR - "An Effective 3D Segmentation Method for Sinonasal Cancer in Response to Chemotherapy."