

# Opening Doors to AI in Medical Imaging: Lessons from REPU

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It is often said that talent is universal, but opportunity is not, and the development of artificial intelligence is no exception. Many students in low- and middle-income countries face barriers that prevent them from joining global research, including financial limitations, visa constraints, and scarce access to specialized infrastructure. Medical imaging AI research requires mentorship, curated data, and computational resources that can be difficult for these students to reach. When these obstacles are reduced, students show how much potential they have when supported.

The Research Experience for Peruvian Undergraduates, known as REPU<sup>1</sup>, is a non-profit organization created to open such pathways across disciplines. The program offers a three-month internship during the Peruvian summer from January to March, during which selected students from Peruvian universities join cutting-edge research groups across North America and Europe. Over 17 years, it has trained nearly 200 students at more than 50 international institutions,

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<sup>1</sup><https://www.repuprogram.org>

resulting in more than 40 scientific publications<sup>2</sup>. Most of the alumni continue into graduate studies and remain involved with the program, which shows the long-term value of early research exposure and the commitment of participants to giving back to the community.

Personally, I first joined REPU in 2017 as an intern at Yale University working on microfluidic devices, coming from an electrical engineering background. That early experience broadened my view of what research could be and played an important role in shaping my path toward a DPhil in AI for cardiac imaging at the University of Oxford. I stayed involved with the program in the years that followed. In 2020, I co-founded the Computer Science branch of REPU, called REPUcs, to expand opportunities for students interested in artificial intelligence and computational research.

REPUcs welcomed its first cohort in 2021, and since then it has prepared 28 students to work on problems across artificial intelligence, machine learning, data science, and computational modeling. Through collaborations with host institutions, students learn how algorithms support real scientific questions across areas such as natural language processing, biomedical wearables, and medical data analysis, including projects that involve imaging and other forms of biomedical data. REPUcs is the result of an effort to give students training that matched the growing importance of computational skills in global research.

Medical imaging has been an active area of AI development, and several REPUcs students have contributed to this field through their internships. For example, William Berrios in the REPUcs 2021 cohort joined the University of Illinois Chicago for a project that later formed part of the BI-LAVA system [1]. BI-LAVA combines active learning and visual analytics to help researchers label large biomedical image collections more efficiently. By organizing images into hierarchical categories and highlighting uncertain predictions, the system supports better data curation and strengthens the foundation on which medical imaging AI is built.

Other REPUcs projects have demonstrated how students can contribute to imaging research that connects AI with clinical needs. Leya Barrientos from the 2022 cohort completed her internship at Yale University and worked on automated measurement of isovolumic relaxation time [2] from cardiac magnetic resonance cines. The method used deep learning to estimate a physiological marker related to diastolic function and validated these estimates against manual annotations and invasive pressure measurements. Another student, Daniel Ibáñez from the 2023 cohort, completed his internship at the University of Oxford and contributed to a deep learning framework for automated segmentation of late gadolinium enhancement images [3], which included a built-in quality control mechanism to identify reliable results. The project also incorporated validated virtual native enhancement data, a contrast-free imaging approach, to improve both the robustness and overall performance of the segmentation pipeline.

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<sup>2</sup><https://scholar.google.com/citations?user=rzpFruoAAAAJ>

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Programs like REPU demonstrate the importance of creating pathways that support young researchers in regions where opportunities are limited. Students from diverse backgrounds can influence the progress of medical imaging AI when given strong mentorship and access to meaningful work. The contributions of REPU students span data labeling, physiological biomarker extraction, and clinically focused segmentation, which reflect different stages of the AI pipeline. These examples also show how early research experiences help students develop the confidence, technical skills, and curiosity needed to continue in scientific careers.

When students are invited into research communities that value mentorship and collaboration, their work benefits both the field and the broader scientific ecosystem. Opening doors for talented students is not only an equitable choice but also practical way to accelerate scientific progress. Medical imaging AI grows through collaboration, and diverse perspectives strengthen the development of responsible and innovative tools. As AI continues to expand its role in medicine, programs that nurture early talent will help guide the field toward a more inclusive and promising future.

## References

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