



# HDR Digital Platform – Project Completion

DSI Infrastructures & Labs

## Final report / End of 2025

### Project overview

The HDR Digital Platform project has given the opportunity to the Digital Medicine Unit and its collaborators to establish strong interdisciplinary collaborations and to position themselves as a central component of medical image analysis research in Zurich. By developing the technical and organizational foundations for managing and processing imaging datasets, the project has created an infrastructure that supports both internal image collection and standardization, i.e. collecting and anonymizing data for research project, and external collaboration in a secure collaborative environment based on standardized data.

Thanks to this foundation, the project team is currently collaborating with the LOOP Biomedical Informatics Platform (BMIP) within the BMI2 project. This collaboration aims to integrate imaging datasets generated through the HDR platform into the central LOOP data infrastructure, thereby enabling broader accessibility, interoperability, and reuse of imaging data for biomedical research across the Zurich ecosystem.

In parallel, the team is advancing research activities based on the datasets collected through the HDR platform within the DIZH-supported MedTwins project. In collaboration with ZHAW and Balgrist University Hospital, this initiative focuses on the development of 3D digital twins and on supporting surgical planning through advanced 3D morphological analysis, e.g. for the shoulder and hip surgical teams. These ongoing research activities are made possible by the foundational work initiated through the HDR Digital Platform project [1]. Additional publications are currently being peer reviewed.

Our initiative will be able to develop and advance also thanks to the new DRIVE project «MedTwins Hub», supported by the UZH Innovation Hub. We aim to establish an interdisciplinary collaboration Hub around Digital Twins in medicine. Hosted at the Balgrist Campus, the Hub will connect academic, clinical, and industry partners, including the University of Zurich, ETH, ZHAW, LOOP Zurich, Dassault Systèmes, INSA Lyon, and SCALAC. The MedTwins Hub will build directly on the infrastructures and networks established through the HDR Digital Platform and the MedTwins projects, further strengthening Zurich's role as a leading center for Digital Twin research in healthcare.

## Project achievements

The HDR Digital Platform project successfully established a foundational technical and organizational framework capable of aggregating and managing medical imaging data while enabling collaborative research across institutions. The platform serves as a shared infrastructure embedded in the hospital network that facilitates interdisciplinary projects and has already become the basis for several ongoing collaborations, including the BMI2 project and the MedTwins project.

A key milestone of the project was demonstrating how the platform can function as a collaborative environment for imaging research, allowing partners to access, analyze, and build upon curated datasets. Through collaborations with the OR-X initiative and the Research in Orthopedic Computer Science (ROCS) groups, the project team was able to use the HDR infrastructure to support the publication of synthetically generated open-source datasets. Several publicly available datasets generated through this approach have already been released and can be accessed here: [Open Access](#).

At the same time, the project was confronted with the challenge associated with sharing clinical imaging data, even when anonymized. Although the framework allows researchers from multiple institutions to work on de-identified imaging datasets, accessing them within the platform hosted in the Balgrist University Hospital network, regulatory, ethical, and governance constraints remain significant barriers to open data exchange. Addressing these challenges is therefore a key focus of the ongoing work with the LOOP (BMIP), where the team is contributing to the development of a broader, interoperable framework for secure and compliant data sharing across the university hospitals in Zurich.

## Publications

[1] R. Santos, N. Büniger, B. Herzog, S. Caprara. 2024. Development of a cloud framework for training and deployment of deep learning models in Radiology: automatic segmentation of the human spine from CT-scans as a case-study. *Preprint MedRxiv*; doi: <https://doi.org/10.1101/2024.08.27.24312635>

## Future

The HDR infrastructure has become a foundation for medical image analysis projects at Balgrist University Hospital. Building on this basis, the platform will continue to be technically developed and expanded to support new research and clinical collaborations. In particular, ongoing partnerships will allow the HDR framework to further integrate with larger initiatives such as the BMI2 and BMIP projects, strengthening interoperability with the broader biomedical data infrastructure in Zurich.

On the research side, the MedTwins project is currently ongoing and aims to demonstrate the added value of advanced 3D morphological analysis derived from medical imaging for surgical planning. The project relies on the HDR framework and the generated datasets, showing how this foundational work is now supporting multiple collaborative projects on digital twin in musculoskeletal medicine.

Beyond individual research projects, the long-term vision is reflected in the development of the MedTwins Hub, which aims to consolidate activities around digital twins in medicine and create a collaborative ecosystem bringing together clinical, academic, and industrial expertise. Hosted at the Balgrist Campus, the hub will build directly on the technological foundations, datasets, and collaborative networks established through the HDR framework. Through this evolution, the HDR platform will continue to serve as a central technical backbone supporting future research, innovation, and interdisciplinary collaboration in medical imaging and digital twin technologies.