

Wrap up Newsletter 2025 and Happy Holidays Season!



With best wishes
for the Holiday Season and for
a Happy and Successful 2026!



December 2025

Dear all,

We are ending now **Month 15 of the TETRIS project**, and since the project's launch, the first results are starting to take shape.



We met in **Barcelona** for the **2nd General Assembly**, an important opportunity to review progress, strengthen collaboration, and plan the next steps for the upcoming months.

A special thank you goes to the **VHIO** team for their warm hospitality and excellent organisation, to our **Scientific Advisors, Professor Alfons Hoekstra and Professor Carolyn Taylor**, who joined us during these two days and enriched the discussions with their valuable insights and to **patients** from our **Patients Advisory Board, Britt Sandberg, Marianne Wolfbrandt and Raffaella Baldi!**

SCIENTIFIC CONTRIBUTIONS 2025

The first paper was published, "***Density and volume of cardiac calcifications detected on planning CT predicts cardiotoxicity after hypo-fractionated whole breast Radiotherapy***" (Belardo A, Dimayuga KB, Perna L, Fodor A, Giannini L, Mangili O, Palazzo G, Pasetti M, Tummineri R, Vecchio AD, Di Muzio NG, Fiorino C). It presents results on the association between cardiac calcification scores and cardiac events in a cohort of breast cancer patients treated with moderate

hypo-fractionation. It also assesses the interaction between cardiac calcifications and dosimetry/clinical predictors.

The work was also presented at ESTRO 2025, to read the full study, [click here *Density and volume of cardiac calcifications detected on planning CT predicts cardiotoxicity after hypo-fractionated whole breast Radiotherapy*](#)

Paolo Zunino (Politecnico di Milano) had two oral presentations on the work done by the MOX team on digital twins for radiotherapy and oncology at the 3rd IACM Digital Twins in Engineering Conference & 1st ECCOMAS Artificial Intelligence and Computational Methods in Applied Science (Paris, February 2025) “***Designing Digital Twins for Personalized Risk Assessment in Breast for Cancer Radiotherapy: Insights From the Tetris Project***” and at the CIRM Workshop: Mathematical and Computational Foundations of Digital Twins (Marseille, August 2025) “***Probabilistic Formulation of Personalized Risk Assessment: A New Approach for Digital Twins in Oncology***”

Tiziana Rancati discussed the research ideas from TETRIS at the National Congress of the Italian Association of Medical Physics (Verona, October 2025) “***TETRIS: use of NTCP tools to personalize the follow-up of breast cancer patients treated with radiotherapy***”

We had **four oral contributions at the Radiogenomic Consortium Annual Meeting** (Barcelona, September 2025):

Tiziana Rancati “*EU initiatives: TETRIS*”, Benedetta Dionisi Ferrera “*Causal inference models for the prediction of radio-induced toxicity after breast cancer radiotherapy*”,

Claudio Fiorino “*Density and volume of cardiac calcifications detected on planning CT predict cardiotoxicity after hypofractionated whole breast Radiotherapy*”,

Paolo Zunino “*A framework for the development of digital twins for radiotherapy*”.

Tiziana Rancati and **Benedetta Dionisi Ferrera** from **Fondazione IRCCS Istituto Nazionale dei Tumori di Milano**, and **Jacqueline Peñaloza** from **Vall d'Hebron Institute of Oncology** presented the first posters related to Project TETRIS.

Tiziana Rancati presented the radioprotection goals and new tools from TETRIS at the 2025 Annual Meeting of Italian Association of Radioprotection, “***TETRIS – Strumenti di valutazione del rischio per effetti tardivi severi dopo radioterapia per tumore al seno: sicurezza radiologica tramite modelli biologici estesi e Digital Twin***”.

Benedetta Dionisi Ferrera's poster “***Causal inference models for the prediction of radio-induced toxicity after breast cancer radiotherapy***” presents the first steps towards a directed acyclic graph (DAG) for radiation-induced fibrosis, representing the casual pathways linking fibrosis to radiation dose, treatment characteristics, patient-specific factors and genetic susceptibility, to the development of late fibrotic toxicity.

✦ To read more about the presentation click here: Poster [Causal inference models for the prediction of radio-induced toxicity after breast cancer radiotherapy.](#)

Jacqueline Peñaloza's poster, "**Collaborative and challenge-driven research to generate transformative impact in health**" presents how the VHIO team is working to develop guidelines to integrate polygenic risk scores (PRS) into predictive models for severe radio-induced side effects, enabling more personalised evaluation and follow up management for breast cancer patients who received radiotherapy.

✦ Click here: Poster [Collaborative and challenge-driven research to generate transformative impact in health.](#)

INFORMATIVE MATERIAL

The In Silico Medicine Info Kit created by the VPH Institute and suggested and shared by Prof. Hoekstra during our latest General Assembly can be found at this link:

✦ [The In Silico Medicine info kit.](#)

Designed for researchers, project managers, and directors, this free resource provides practical support across all phases of in silico medicine projects, from proposal writing to execution.

Enjoy the reading!

LOOKING AHEAD TO 2026

We are delighted to announce that in 2026 we will be hosting **two educational webinars** focusing on key topics central to our project. Our speakers will be:

- **Eva Onjukka and Filippo Schiavo** from Region Stockholm- Karolinska Hospital on January, 22nd, at 1 pm CET, session titled "**Models to estimate the risk of normal-tissue complications after radiotherapy.**"
- **Claudio Fiorino** from UniSR on February, 27th, at 1 pm CET, session titled "**Methods to assess CT-based biomarkers to predict cardiac and respiratory toxicities after breast cancer radiotherapy**".

Stay tuned for further details.

VPH 2026 – In Silico Oncology

The 9th International Conference on the Virtual Physiological Human (VPH 2026) will be held in Milan, Italy, on 1–4 September 2026, with a focus on digital twins in healthcare.

We invite researchers and clinicians to attend and submit contributions to the **In Silico Oncology** track, coordinated by **Paolo Zunino** and **Tiziana Rancati**, and dedicated to the multiscale cancer modeling, hybrid AI approaches, multimodal data integration, and clinically actionable patient-specific models. For more info, ✦ [click on 9th International Conference on the VPH.](#)



European Virtual Human Twins

In October, we have been invited to Brussels to join the meeting organised by **DG CONNECT** and the European AI Office on the **European Virtual Human Twins Initiative**. More info [here](#).

The Pink Side of Prevention

Tiziana Rancati and **Claudio Fiorino** took part to the awareness conference "**The Pink Side of Prevention**" organised by Myriam Pesenti from **Associazione Cuore di Donna**, one of the TETRIS Patients Advisory Board associations, focused on the importance of breast cancer prevention and awareness.



LAST BUT NOT LEAST...

Please forward this newsletter to your network and anyone who might be interested, and follow us on our Project TETRIS Channels!

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