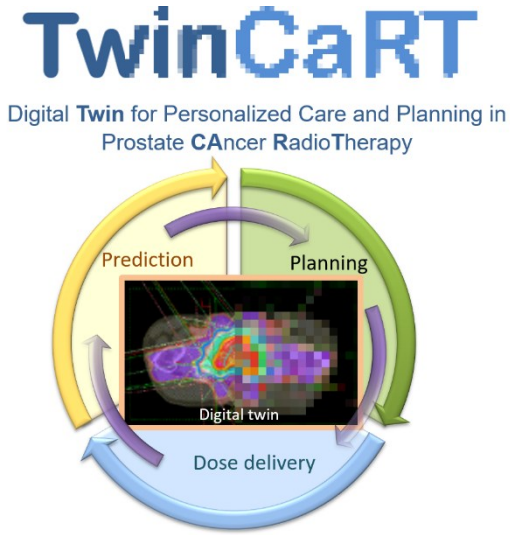
PhD Position : TARGETMR

Biological Adaptation of Radiotherapy Treatments via Quantitative MRI on MR-Linac



Context / Objectives

Prostate cancer treatment remains a challenge due to inter-patient variability in tumor biology and response to irradiation. The **TwinCaRT** project, funded by the PEPR Santé Numérique, involving 8 different Research Partners aims to shift from "one-size-fits-all" radiotherapy to a personalized, **in-silico-driven** approach. By creating a **Digital Twin (DT)**, we can simulate treatment outcomes before they occur, optimizing the therapeutic ratio for each individual.

The **TARGETMR** project aims to shift from standard treatments to biologically adapted radiotherapy. The specific objectives of this PhD include: **Sequence Development:** Developing new quantitative MRI sequences to be acquired during treatment sessions.

- **Biological Feature Extraction:** Exploiting images to extract specific biological characteristics of the tumor.
- **Digital Twin Integration:** Integrating these biological data (such as hypoxia) into a **multi-scale Digital Twin** to adapt the treatment for each specific patient.
- **In Silico Optimization:** Using the Digital Twin to simulate treatment outcomes and generate spatial distributions of surviving cells to optimize the therapeutic ratio.

. Required Profile

- **Education:** Master's degree (or equivalent) in Biomedical Engineering, Applied Mathematics, Computational Physics, or Computer Science.
- **Technical Skills:**
  - Knowledge of quantitative MRI and image processing.
  - Interest in mechanistic modeling and in silico simulations.
  - Familiarity with radiotherapy principles and medical imaging workflows.
- **Soft Skills**: Ability to work in a multidisciplinary environment (clinical and research).
- **Language:** Fluency in English (written and spoken); French is a plus but not mandatory.

Why Join TwinCaRT and the TARGETMR project ?

The **Digital Health Research Program (PEPR SantéNum)** is the major research initiative of the French National Strategy. You will be at the forefront of Digital Twin technology in oncology, working with unique datasets from the first MR-Linac platforms in France. Within the PEPR Digital health This project offers a high-impact research environment where your work directly contributes to improving the quality of life and survival rates for cancer patients. **Consortium:** LaTIM, EURECOM, CREATIS, ICO Nantes, HCL Lyon, Centre Eugène Marquis. **Main Industrial Partner:** Dassault Systèmes.

Location: Centre Eugène Marquis/LTSI , Inserm U1099, Rennes, France
Duration: 36 Months
Funding: Co-funded by the Brittany Region (ARED) and the PEPR Santé Numérique TwinCaRT project
How to Apply : Interested candidates should send their CV, a motivation letter, and academic transcripts to Renaud de Crevoisier : r.de-crevoisier@rennes.unicancer.fr.
Anais BARATEAU a.barateau@rennes.unicancer.fr
Oscar Acosta (oscar.acosta@univ-rennes.fr).