

Special issue on

“Digital Twins in Medical Imaging and Therapy”

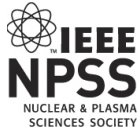
Call for papers

Medical data including images have significant potential to help practitioners arrive at specific and optimized protocols for individualized therapy of patients. Digital twins, specifically, hold significant potential to this end and to transform healthcare decision-making. However, biomedical digital twins are still emerging and significant challenges must be addressed to unlock their full potential. A digital twin, as a virtual representation of a subject or patient, can be updated with real data, possesses predictive capabilities, and can support clinical decision-making. A key feature of a digital twin is the bidirectional interaction between the virtual and real counterparts, and that it is actionable. Digital twins can be utilized, for instance, to predict responses to therapy and clinical outcome, and to narrow down the list of best treatment options for patients (e.g. by conducting virtual therapies).

In this special issue, we invite papers on methodological developments and clinical translations of digital twins, with special focus in radiation-based imaging (e.g. CT, PET, SPECT) and/or therapies (e.g. external-beam, radiopharmaceutical therapies). We hope to provide a dedicated forum for interested researchers to review past achievements, report recent progresses and novel techniques, and discuss remaining challenges and future directions towards clinical translations. The topics include, but are not limited to:

- Use of theranostics for digital twinning of cancer patients and optimization of radiopharmaceutical therapies
- Use of digital twins for predictive modeling and optimization of patient responses to external-beam radiation therapies (e.g. IMRT, proton therapy)
- Role of digital twins in training and evaluating AI models
- Use of computational fluid dynamic models towards personalization of selective internal radiation therapy (SIRT; i.e. radioembolization)
- Use of digital twins in training clinicians for optimization of imaging and therapy delivery
- Multiscale modeling for tumor response to radiation therapies
- Evaluation of clinical translational potentials of digital twins
- And many other applications

Authors must submit papers digitally to <https://mc.manuscriptcentral.com/trpms>, using the standard IEEE Transactions format, indicating in their cover letter that the



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submission is aimed for this special issue. Authors are encouraged to contact the guest editors to determine suitability of their submission for this special issue.

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Schedule:

Deadline for manuscript submission: 15 July 2025

Acceptance/rejection notification: October 2025

Revised manuscripts due: November 2025

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