

# IEEE Transactions on Radiation & Plasma Medical Sciences

## Special issue on Artificial Intelligence in Radiation Therapy

Call for papers: submission deadline extension 10/01/2021

Guest Editors

Xun Jia, Lei Ren, Leonard Wee

Artificial intelligence (AI) has attracted a lot of attention in radiation therapy recently. With advancements in deep learning techniques enabled by multi-layered neural networks, AI has demonstrated its successes in solving a number of challenging clinical problems with substantial improvements over conventional methods. We are seeing a strong rise of AI in various radiotherapy applications - medical imaging reconstruction, tumor and organ-at-risk segmentations, automated treatment planning, and automatic machine or treatment plan quality assurance - to name but a few. AI has also opened up new horizons to tackle some problems that have proven too challenging for conventional machine learning techniques. For instance, AI may be used to build models with intelligence to solve problems in a human-like fashion. The penetration of AI through clinical radiation therapy is expected to generate valuable impacts on treatment accuracy, efficiency, and safety, which we hope will eventually translate into benefits for patient care.

Meanwhile, it has also been brought to the fore that adoption of AI technology in the clinic faces numerous challenges, such as the lack of interpretability of many deep learning models, and the concerns about their robustness and generalizability. Studies are actively conducted to overcome the challenges to bring the promises of AI to clinical practice.

We organize this special issue and invite authors to submit AI-related papers on topics that include, but are not limited to, the following:

- Dose calculation and treatment planning
- Machine and patient-specific treatment plan quality assurance
- AI-based autonomous decision systems and its applications in radiotherapy
- Adaptive radiation therapy
- Medical image acquisition and processing (e.g. registration, segmentation, and synthesis) as applied to radiotherapy
- Radiomics, radiogenomics, and treatment outcome prediction and assessment
- Challenges of adopting AI-based tools in radiotherapy clinics, such as “interpretability” or “generalizability”, and their corresponding solutions
- Practical aspects for implementing AI in the clinical practice
- Evaluation of clinical impacts of AI techniques in radiotherapy

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

Submission of manuscripts: Jan 10, 2021

Acceptance/rejection notification: March 31, 2021

Revised manuscripts due: May 31, 2021

Publication: Sept 2021