



PHYSICS

2021 ESTRO Physics Workshop: Science in Development

22-23 October 2021, online

Commissioning and Quality Assurance of Deformable Image Registration for Current and Future Radiotherapy Applications

Chairs: Mohammad Hussein and Michael Jameson

We are excited to report on this topic, which was discussed at the European Society for Radiotherapy and Oncology (ESTRO) physics workshop. The discussion was organised in collaboration with the Australasian College of Physical Scientists and Engineers in Medicine (ACPSEM). In total we had 20 participants and three invited speakers. The participants came from clinical practice, academia and industry at all career levels.

We were delighted by the speakers' thought-provoking presentations, which helped to stimulate discussion. The first was from Associate Professor Jamie McClelland (University College London (UCL), London, UK), who covered current challenges in commissioning and quality assurance (QA) of deformable image registration (DIR). Then Professor Kristy Brock (MD Anderson Cancer Center, University of Texas, Houston, Texas, USA) talked about future directions in the development of advanced DIR algorithms and issues that the community should consider. Last but not least, Johnson Yuen (St George Hospital, Sydney, New South Wales, Australia) shared his experience of developing a DIR position paper for the ACPSEM.

The workshop was run in three online sessions. The first session, in May 2021, was a "meet and greet", in which participants introduced themselves and their work and explained why they wanted to take part in the workshop. The second session in September was dedicated to the provision of detailed pitches from participants and discussion of ideas in the whole group.

The final session in October was a day of brainstorming in which Zoom breakout rooms were used to discuss ideas and potential outcomes, inspired by selection of the common 'hot topics' that had been raised in the pitches. These breakouts included a room in which participants discussed dose warping and accumulation. This discussion was led by Eliana Vasquez Osorio (University of Manchester, Manchester, UK) and Martina Murr (University of Tübingen, Tübingen, Germany). Another breakout room concentrated on commissioning and QA guidelines, metrics, tools etc. This debate was led by Adam Yeo (Peter MacCallum Cancer Centre, Melbourne, Victoria, Australia), Lando Bosma (University Medical Center Utrecht, Utrecht, The Netherlands) and Jamie McClelland (UCL).

Outcomes for the workshop are being developed. They will include review and recommendation papers on the above topics. The workshop also enabled participants to make contact with each other and to start to develop collaboration. The chairs would like to thank ESTRO for the opportunity to focus on DIR and the participants for their ideas and enthusiasm!



Figure 1 Word cloud created at the workshop through use of participants' expressions of interest.



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