Artificial intelligence-based solution for bioluminescence tomography reconstruction for glioblastoma multiforme

Propositions accompanying the dissertation

Artificial Intelligence-Based Solution for Bioluminescence Tomography Reconstruction for Glioblastoma Multiforme

Behzad Rezaeifar

1. Pre-clinical image-guided radiotherapy is a helpful tool for potential translation of novel treatments, such as FLASH radiotherapy, into effective clinical treatments that can impact the prognosis of cancer treatments. (This thesis)
2. Reconstructing the 3D Bioluminescence Tomography (BLT) images, although a challenge, allows for non-invasive tumor monitoring and radiation delivery planning without further X-ray imaging burden on the animals. (This thesis)
3. Artificial Intelligence (AI) is a powerful tool in solving ill-posed inverse problems such as BLT reconstruction problem. (This thesis)
4. Adding complementary information can help AI models to improve their predictions. (This thesis)
5. The AI-assisted BLT reconstruction algorithms, presented in this thesis, can be directly employed in the pre-clinical radiotherapy workflow to increase the number of imaging checkpoints in a longitudinal study without additional X-ray imaging dose on the animals. (Valorization)
6. "Quantifying uncertainty in machine learning is important in new research areas with scarce high-quality data." – Chu-I Yang & Yi-Pei Li

7. “Preclinical research on small animals should mainly focus on effective translation of its findings into clinical practice.” – Behzad Rezaeifar

8. “Medicine, the only profession that labors incessantly to destroy the reason for its existence.” - James Bryce

9. "I am not free while any woman is unfree, even when her shackles are very different from my own." – Audre Lorde

10. "In the collaboration between two universities, it gets challenging when they don't see eye to eye. It's akin to merging two different perspectives, adding an extra layer of complexity to the learning process.” – Behzad Rezaeifar