

# Clinical implementation of deep learning: Automatic contouring via U-Net architecture

**Matthew Cooper**<sup>1</sup>

Simon Biggs<sup>2</sup>

Yu Sun<sup>1</sup>

Matthew Sobolewski<sup>2</sup>

<sup>1</sup>Institute of Medical Physics, The University of Sydney

<sup>2</sup>Riverina Cancer Care Centre, Cancer Care Associates.

**Thesis:** [github.com/matthewdeancooper/masters\\_thesis](https://github.com/matthewdeancooper/masters_thesis)

**Video overview:** [docs.py-medphys.com/background/autocontouring](https://docs.py-medphys.com/background/autocontouring)



THE UNIVERSITY OF  
**SYDNEY**



**Riverina Cancer Care Centre**

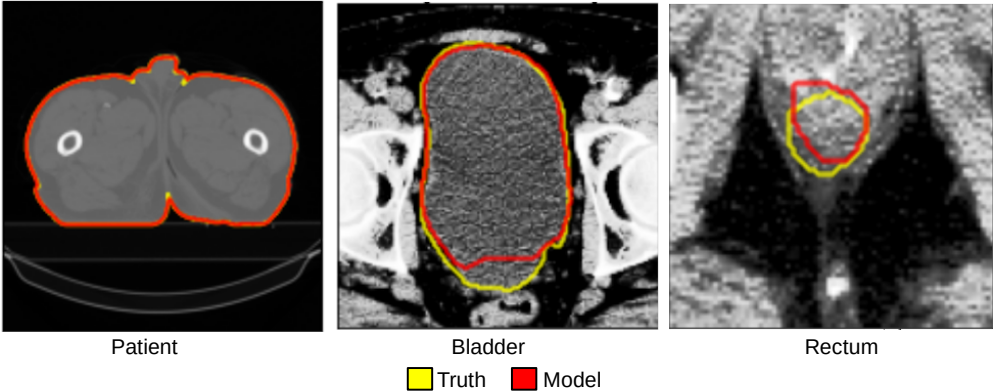


**PyMedPhys**

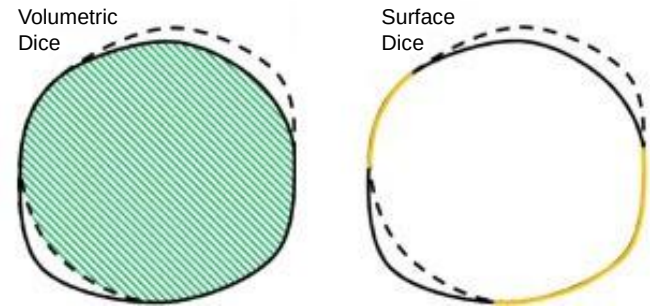
Table S1.A.i. Photon/electron EBRT high-risk failure modes for initial plan/chart review.

Process	Failure mode	Cause
Tx plan	"Wrong" or inaccurate MD contours	Workflow/communication Issue, for example, attending MD does not review resident contours, MD does not clearly identify dose levels, incorrect CT dataset, fusion incorrect or with wrong image set, target motion not considered, <b>wrong set of contours imported</b>
Tx plan	"Wrong" or inaccurate dosimetrist contours	Human performance issue by dosimetrist or other, e.g. <b>distraction or interruption</b> , inattention, <b>slip</b> , lack of training, <b>mistakes CTV for PTV</b> , forgets to expand CTV to PTV, <b>full structure not contoured</b> (e.g. partial cord in Tx region)

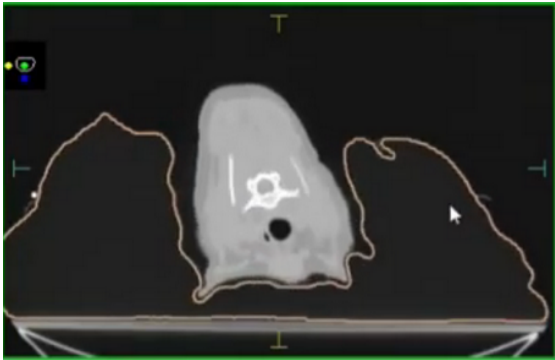
Ford et al. TG-275. Med Phys 2020;47:6 (Redrawn)



Average contour representations for prostate cancer model.



Vaassen et al. Phys Img Rad Onc. 2020;13:1-6 (Redrawn)



Clinical case: Canine vacuum bag segmentation. Monaco TPS