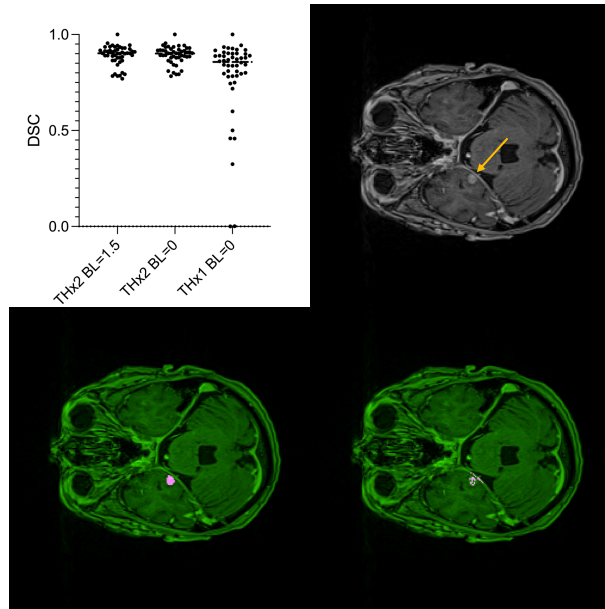
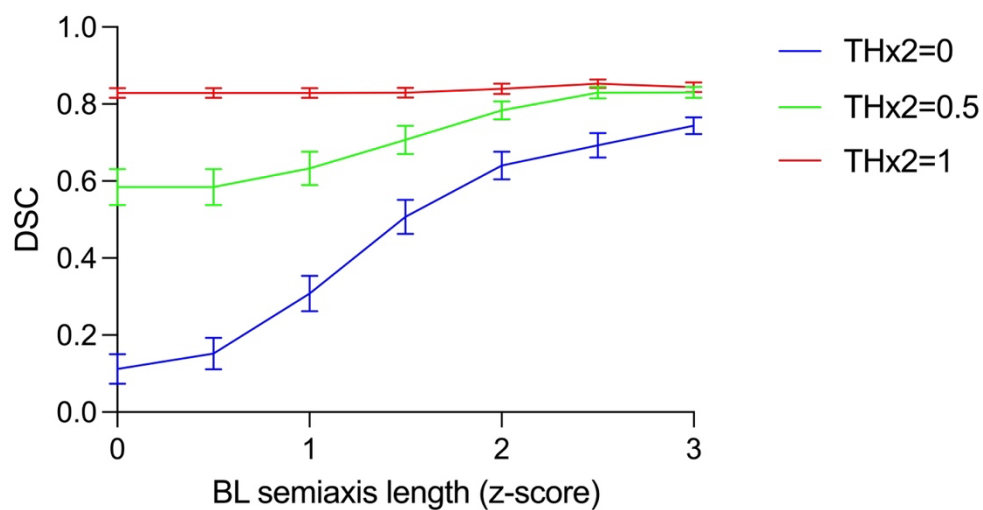


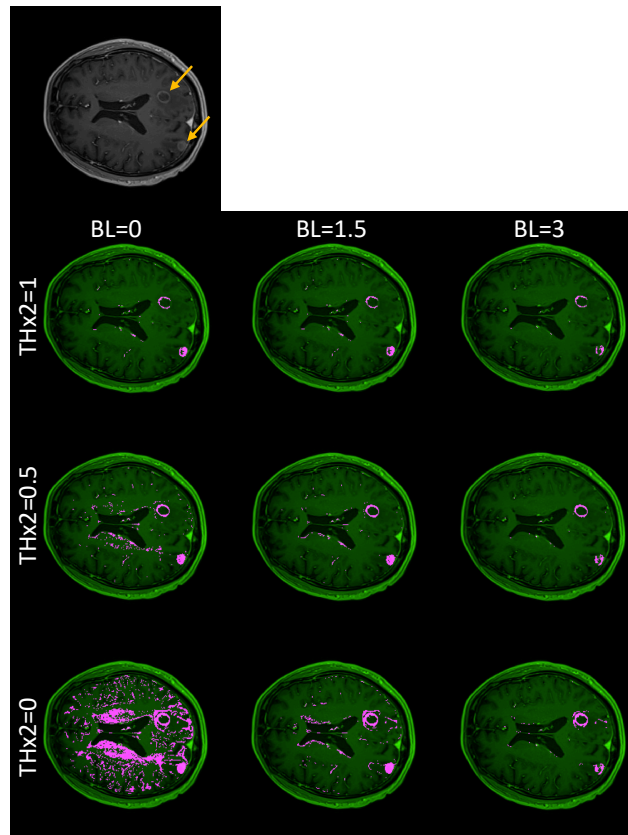
Supplemental Figure: Segmentation of enhancing tumor with vasogenic edema is shown for the metastasis depicted in Figure 1. Axial T2 FLAIR, corresponding segmentation (pink), and BLAST parameter space (left to right). Voxels corresponding to vasogenic edema and voxels corresponding to enhancing tumor fall within the right lower and right upper corner of parameter space respectively. To segment both edema and enhancing tumor in parameter space, the threshold in T2 FLAIR was set to z-score = 0 and T1 MPAGE to z-score = -4 and voxels with values greater than these thresholds were included. To remove background layer voxels, the ellipsoid corresponding to the background layer was subtracted. The resulting voxels in parameter space (pink) were projected back into image space and the final segmentation was created by grouping the 3D connected voxels.



Supplemental Figure: Results of the ablation experiment comparing the complete BLAST algorithm (THx2 BL=1.5) to an algorithm without background layer subtraction (THx2 BL=0) and an algorithm without background layer subtraction and thresholding in T2 FLAIR (THx1 BL=0). There was no significant difference in DSC between THx2 BL=1.5 and THx2 BL=0 ($P=0.94$). The DSC for THx2 BL=1.5 and THx2 BL=0 were significantly higher than DSC for THx1 BL=0 ($P<0.001$). A sample case for a small metastasis abutting the tentorium (top row right) is shown. Tumor segmentations (pink) for THx2 BL=1.5 and THx1 BL=0 are shown (bottom left to right) with DSC=0.91 and DSC=0.46 respectively. The latter requires a higher threshold to reduce the inclusion of the adjacent dura (T1 MPRAGE threshold = 3.5) which degraded the segmentation of the metastasis. The thresholds used for THx2 BL=1.5 is T1 MPRAGE = 2 and T2 FLAIR = 2.



Supplemental Figure: Effect of background layer subtraction on segmentation performance at different thresholds. DSC (mean \pm SEM) for 46 brain metastases as a function of increasing size of the background layer ellipsoid semiaxis length (z-score 0 to 3) for three different thresholds in T1 MPAGE and T2 FLAIR (z-score 0, 0.5 and 1). At low thresholds, increasing background layer subtraction improves segmentation performance. As thresholds increase, the incremental benefit of background layer subtraction is reduced.



Supplemental Figure: A sample case of two faintly enhancing brain metastases segmented with different amounts of background layer subtraction and different thresholds. At low thresholds (T1 MPAGE 0 to 0.5), background layer subtraction reduces background voxels included in the segmentation allowing better visualization of brain metastases. At higher thresholds, there is less of a difference between segmentations without and with background layer subtraction. At higher thresholds or greater background subtraction, there is reduction in background voxels, but a reduction in tumor segmentation is also observed.