

Figure . Representative collagen patterns observed in human breast cancer tissue sections. Wavy (A) and straight (B). Dense (C) and well defined (D). Thick bundles (E) and thin strands (F). Discontinuous (G) and continuous (H). Crossing (I) and parallel (J). Scale bar = 10 microns.

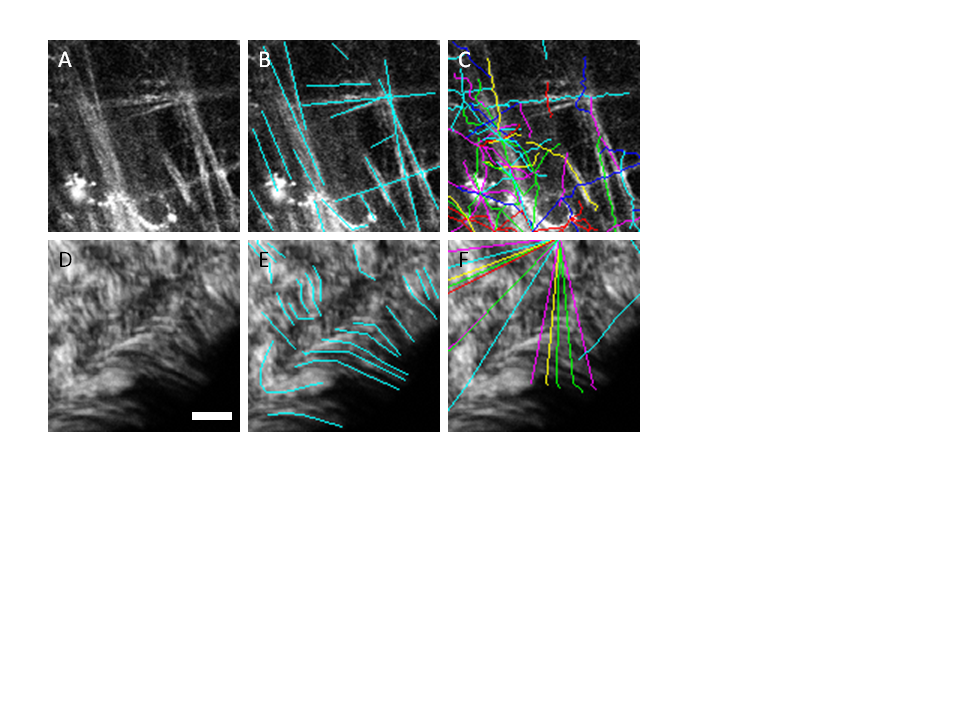


Figure . Fibers extracted by the FIRE algorithm without preprocessing. A and D are the original images, B and E are show manual segmentations of the fibers, D and F show the automatic fiber segmentations that are extracted by the FIRE algorithm. Scale bar =25 microns.

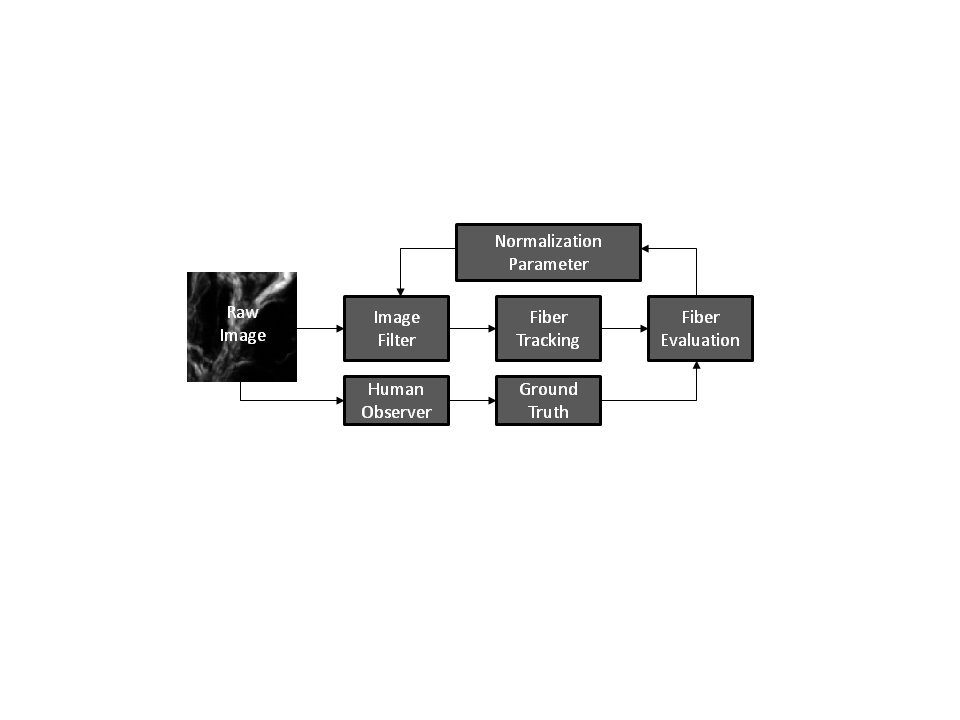


Figure . Block diagram describing the iterative process for optimizing the performance of a single image processing filter for fiber tracking. The raw image is processed by the image filter using an initial normalization parameter, the result of which is sent to the fiber tracking algorithm (we used the FIRE algorithm in this paper). Fiber extractions were compared against manually performed fiber extractions. Several normalization parameters were evaluated and one optimal parameter was selected for each filter that optimized the fiber evaluation result.

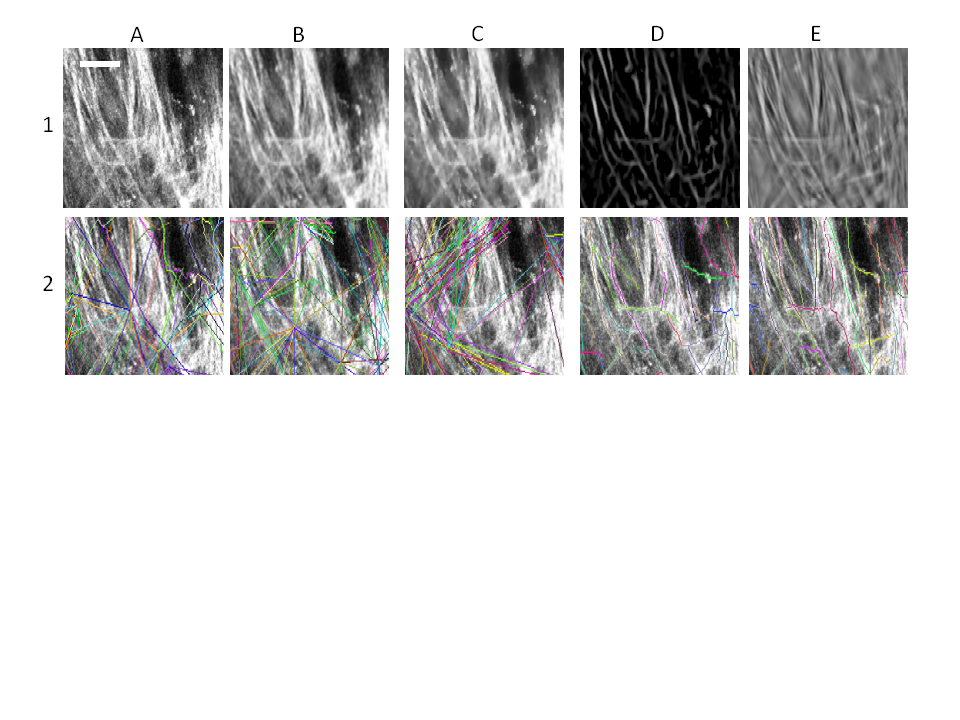


Figure . Output of the image processing techniques (row 1) and output of the fiber tracking algorithm (row 2) for a single test case. Column A is the result of no processing, B: GF, C: SPTV filter, D: TF, and E: CT. Scale bar corresponds to 25 microns.

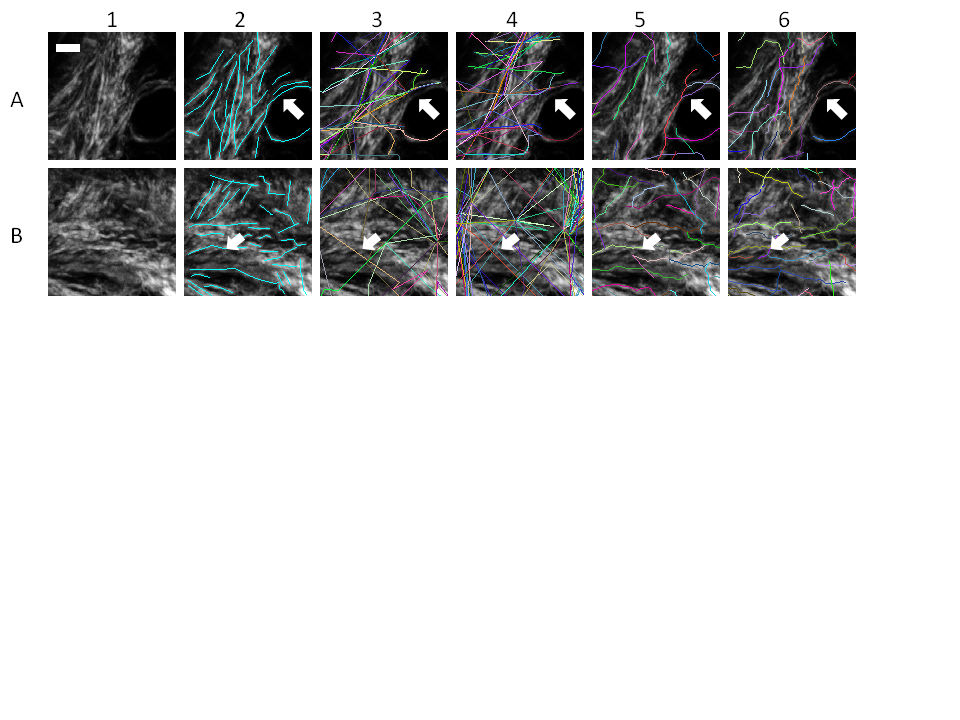


Figure . Two test cases (A&B), showing different processing methods in each column. The original image (column 1) is shown overlayed with a manual segmentation (column 2), GF (column 3), SPTV (column 4), TF (column 5), and CT filter (column 6). Scale bar represents 25 microns.

.

Figure . F measure result comparing the automated segmentation techniques to the manual segmentations of three independent raters, for 25 test cases, representing a total of 9290 fiber evaluations. The error bars indicate the standard deviation between average F measure scores of each of the raters.





Figure . Distribution of lengths (top row) and angles (bottom row) of all fibers in all simulated test cases. Ground truth data is on the left and the results of the automated CT+FIRE algorithm are shown on the right.