3) **VISUALIZATION IN SUMA**

Visualization and interaction is important for both research and clinical usage.
- FATCAT can be used interactively with AFNI and SUMA.
- generate anatomical and functional connectivity simultaneously
  - AFNI’s InstaCorr for functional correlation
  - SUMA rendering of tracts, surfaces, volumes, and graphs
- Fig. 3 shows FATCAT track and ROI viewing with SUMA+AFNI.
- Fig. 4 shows interactive usage of InstaCorr and ROI selection with SUMA.

![Figure 3: Simultaneous viewing of both tracks and GM ROIs (from Fig. 1) in SUMA (A) and AFNI (B-C).](image)

![Figure 4: Example of interactive connectivity in SUMA.](image)

2) **ANTI-ROI MASKS**

WM tract patterns are complicated:
- they contain smoothing, crossing/kissing fibers in voxels and noise
- all tracking algorithms are prone to false negatives and positives.

Using anti-ROIs to:
- control for false positives ('overtracking')
- limit a tract, trim known error paths, investigate network subsets
- halts tract propagation when OR logic is being used

![Figure 2: (A) GM ROIs. (B) OR-logic with all ROIs in (A). (C) OR-logic when the red region in (A) is anti-masking, allowing controlled specificity of intra-network connections.](image)

1) **MINI-PROBABILISTIC TRACKING**

In both DTI and HARDI, noise sources get included in voxelwise fits.
- Deterministic tracking ignores these uncertainties
  - making them susceptible to error accumulation.
- Probabilistic methods account for model uncertainty
  - but generate voxelwise maps without linear track structure.
- New 'mini-probabilistic' tracking both includes voxelwise uncertainty and retains track structure (Fig. 1)
  - more robust and fewer false negatives than deterministic tracking
  - false positives tend to be isolated/obvious
  - fast way to view more representative track fibers
  - example use: initial viewing of data; highlight locations to place ROIs

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**REFERENCES**