

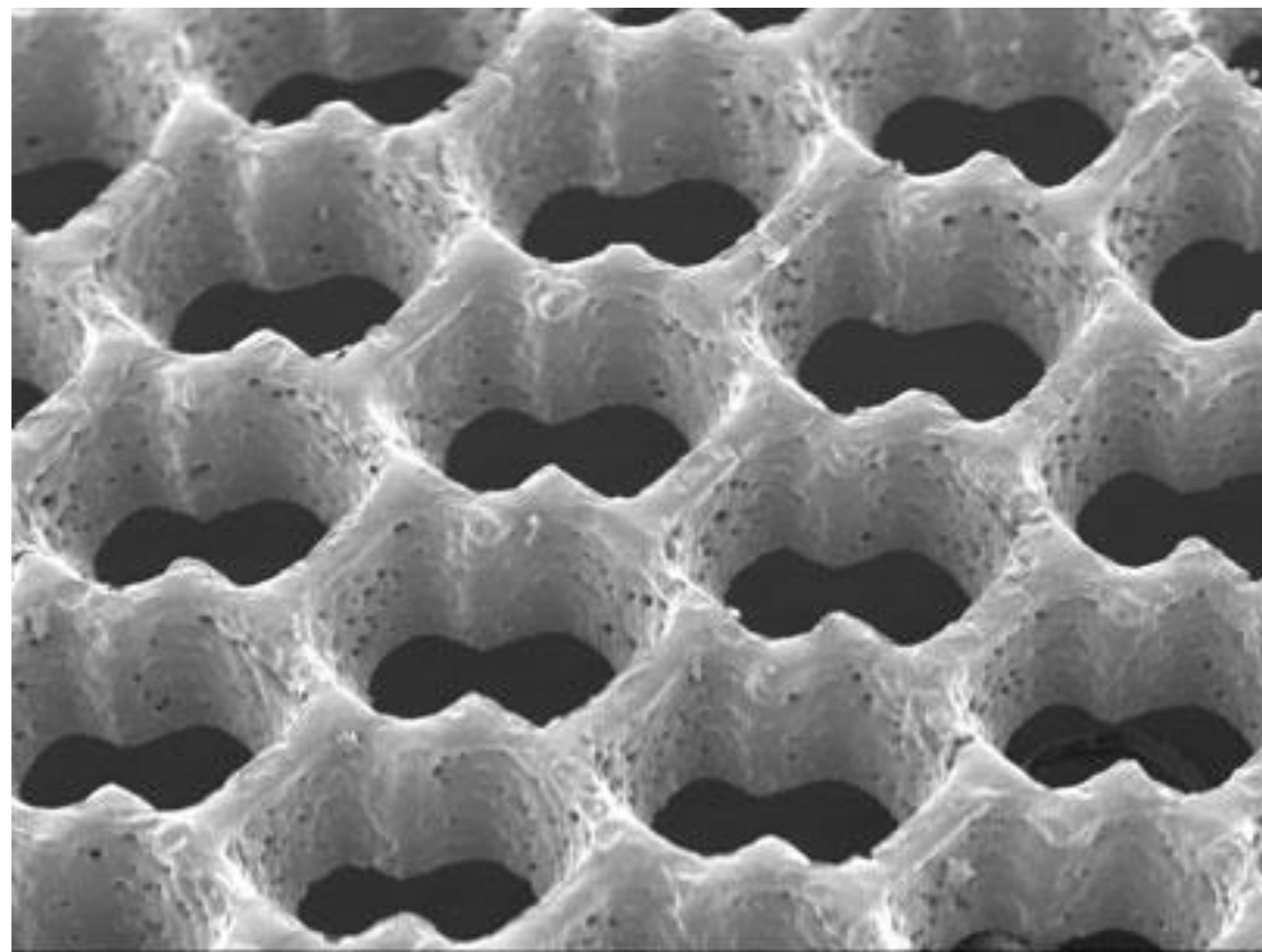
Computational Simulations of Cell Diffusion in Matrix Environments

Nick Evans

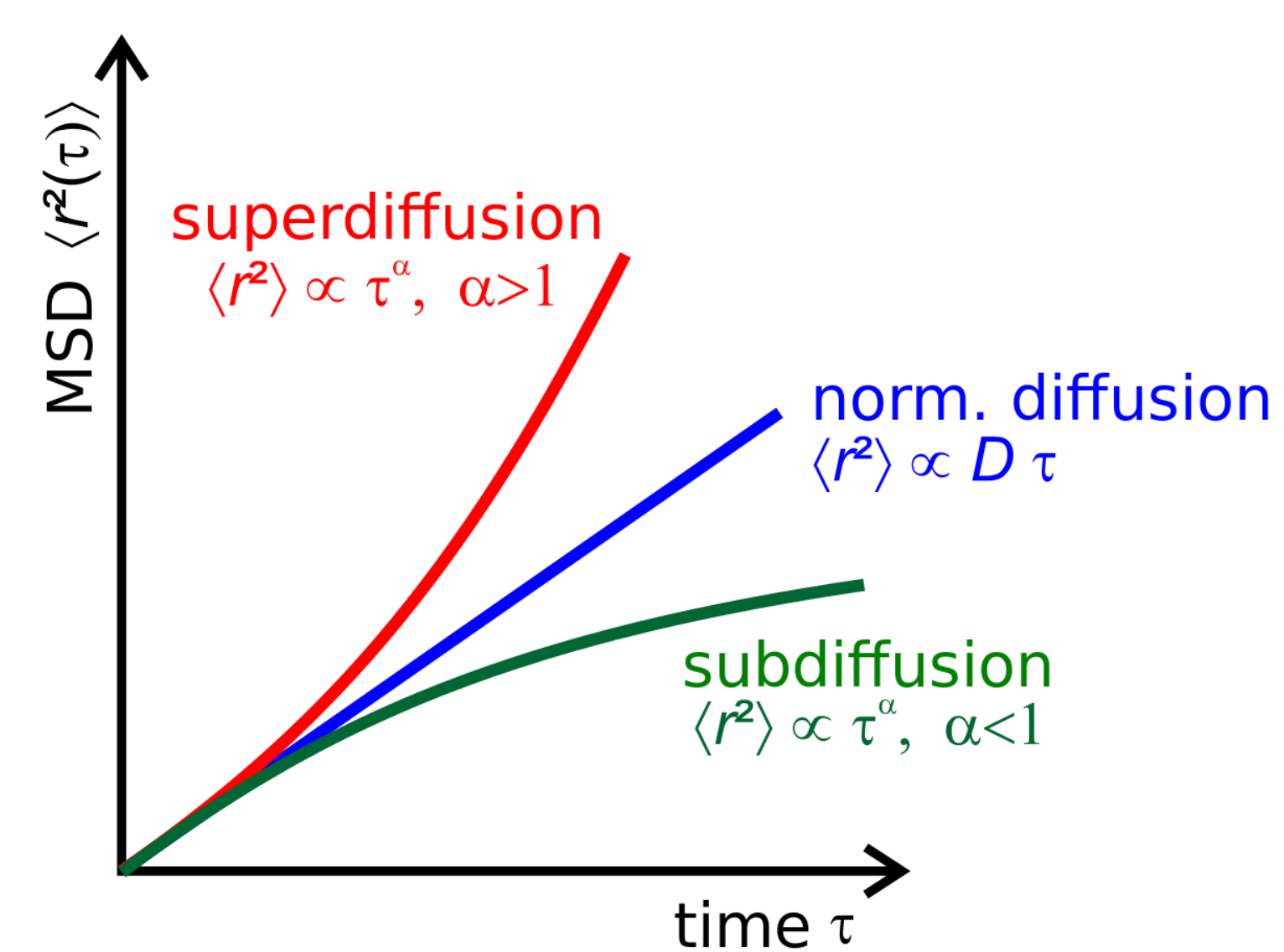
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BACKGROUND

Tissue Scaffolds



Mean-squared displacement (MSD): an average measurement of the distance a cell travels throughout the scaffold.



HYPOTHESIS

We hypothesize that cell diffusion will be confined when in a high local fiber fraction.

RESULTS

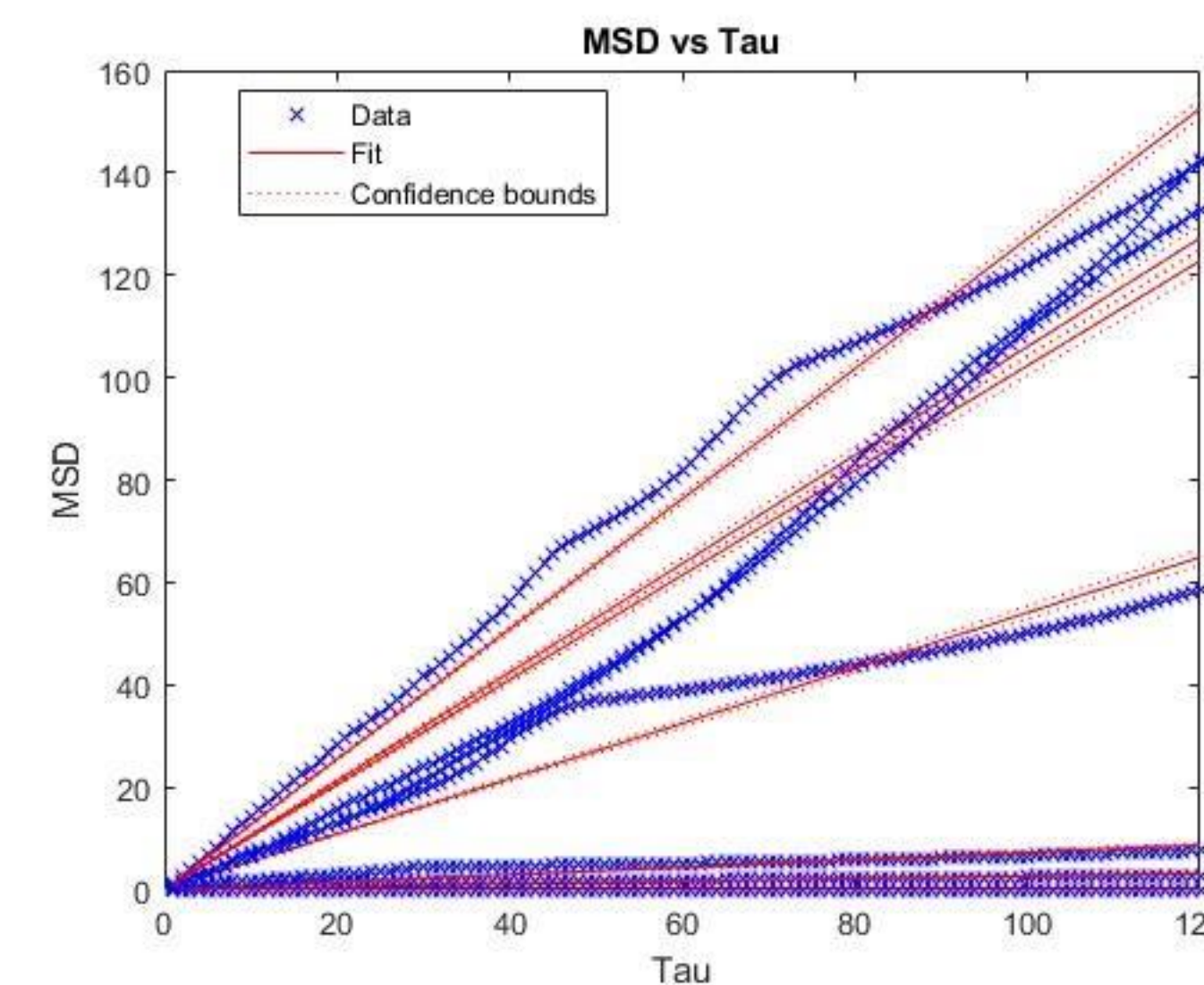


Figure 1: simulation of 15 cells diffusing throughout a 3D matrix environment for five days.

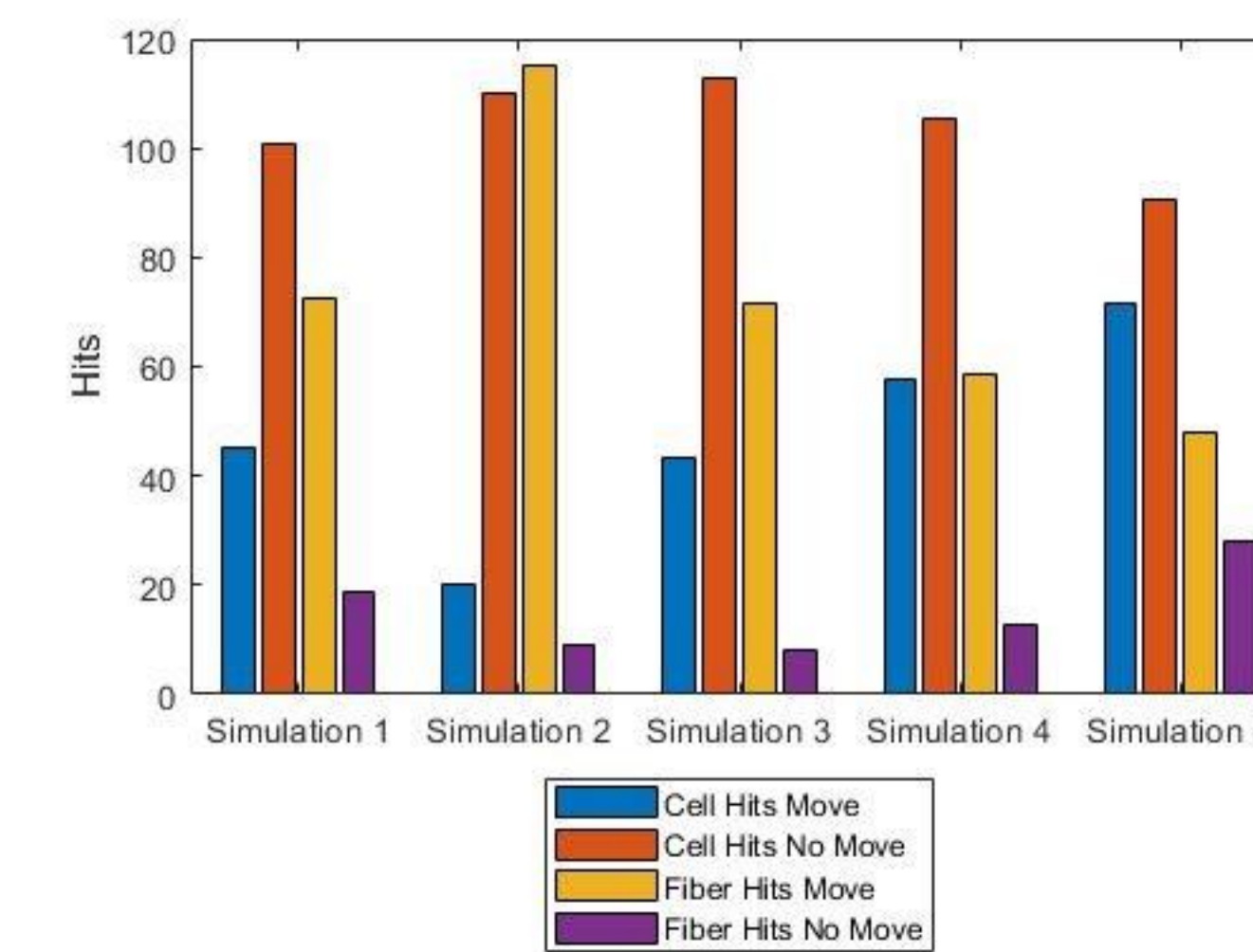


Figure 4: histogram showing five simulations that count the number of cell and fiber hits for cells that move and do not move.

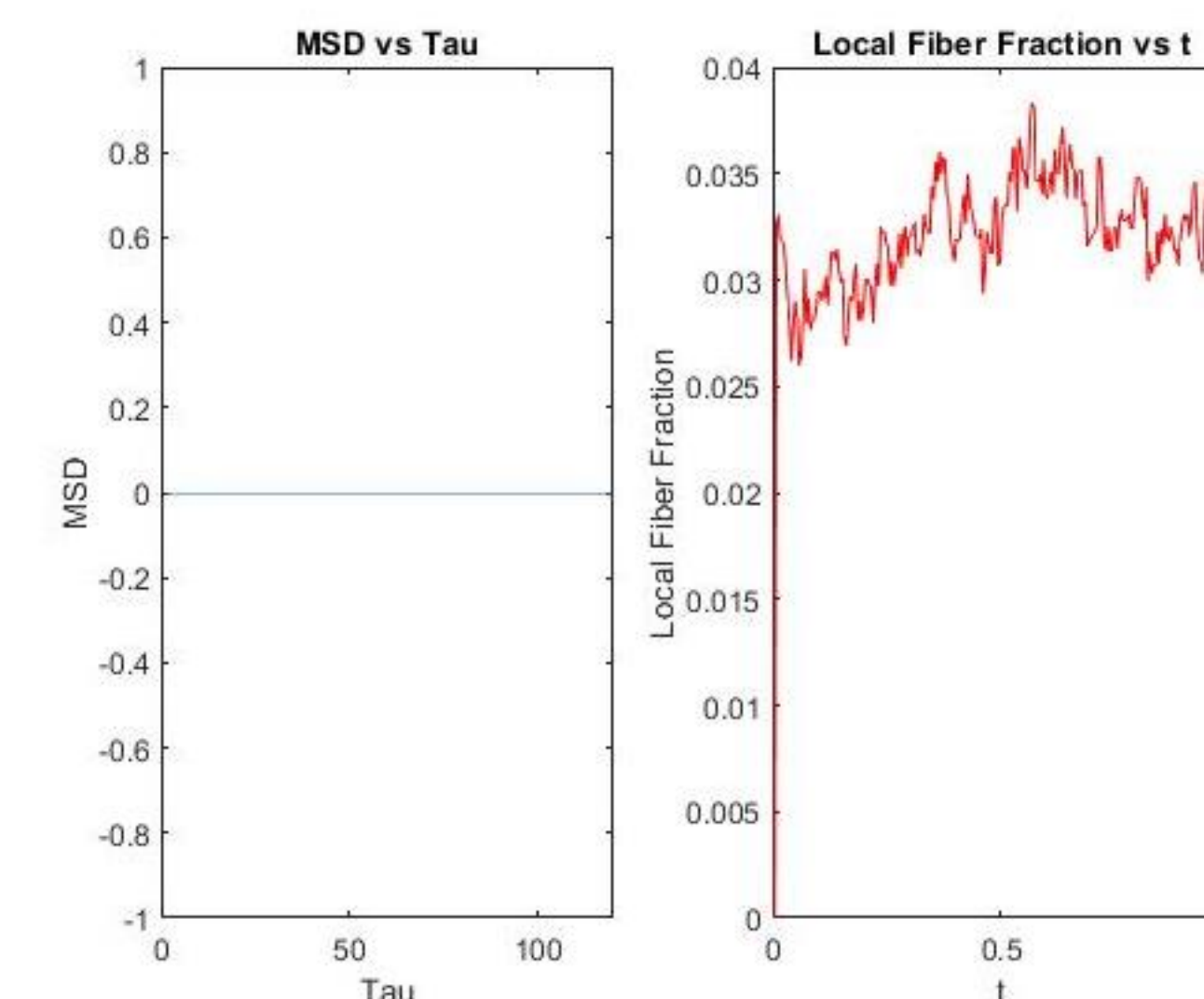


Figure 2: Comparing MSD and fiber fraction versus time for a cell that did not diffuse.

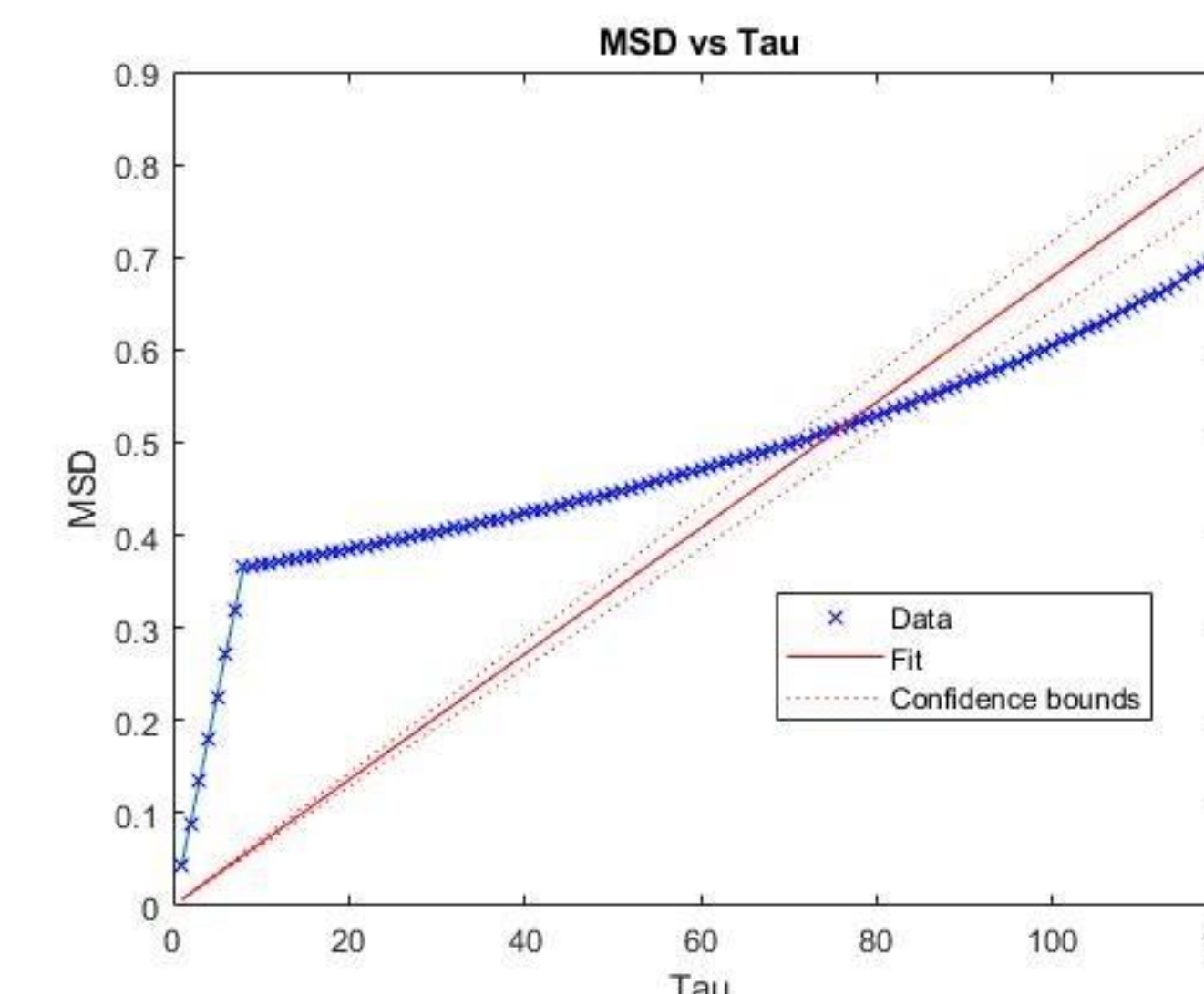


Figure 5: Comparing MSD versus time for a single cell.

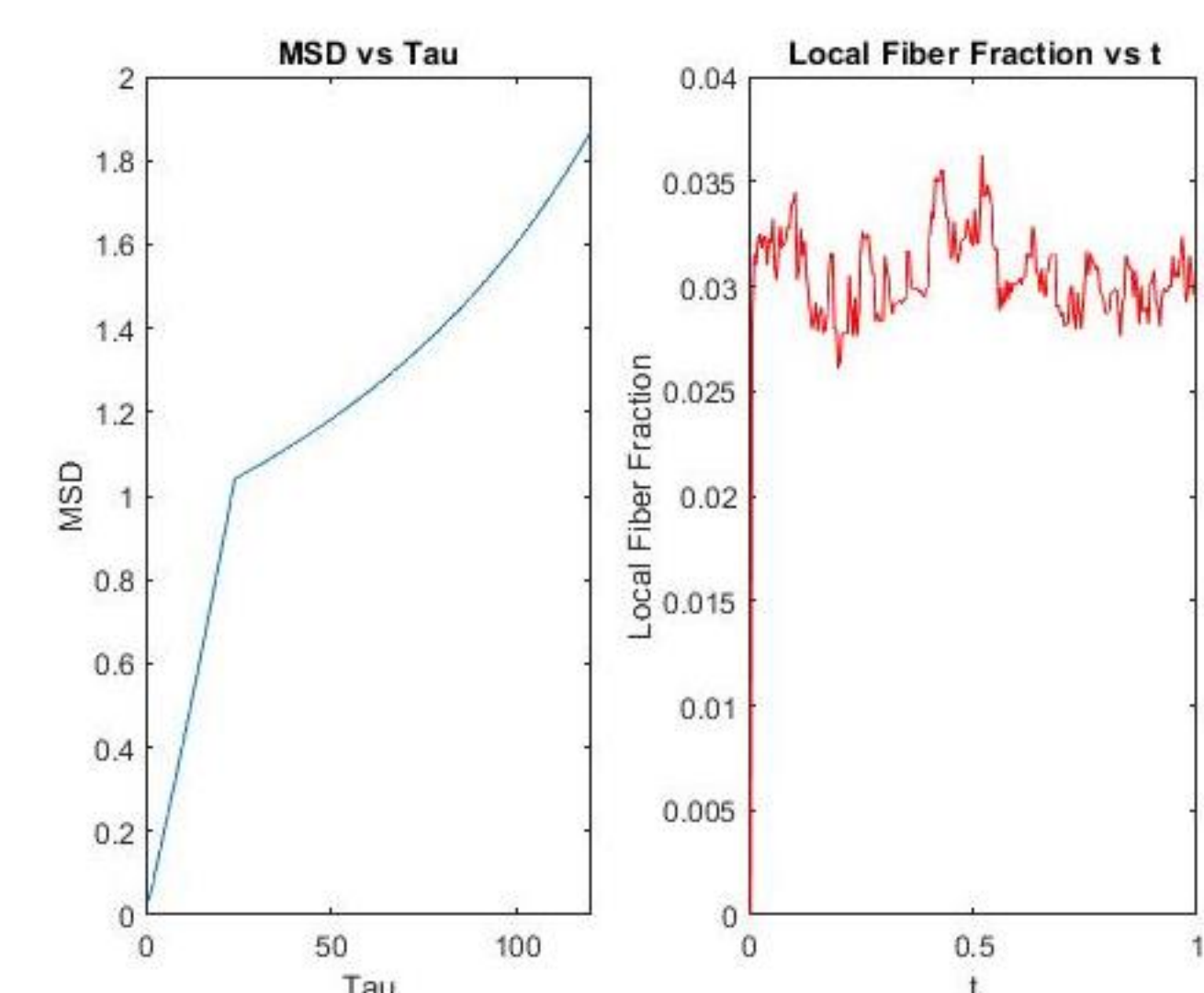


Figure 3: Comparing MSD and fiber fraction versus time for cell that experienced confinement.

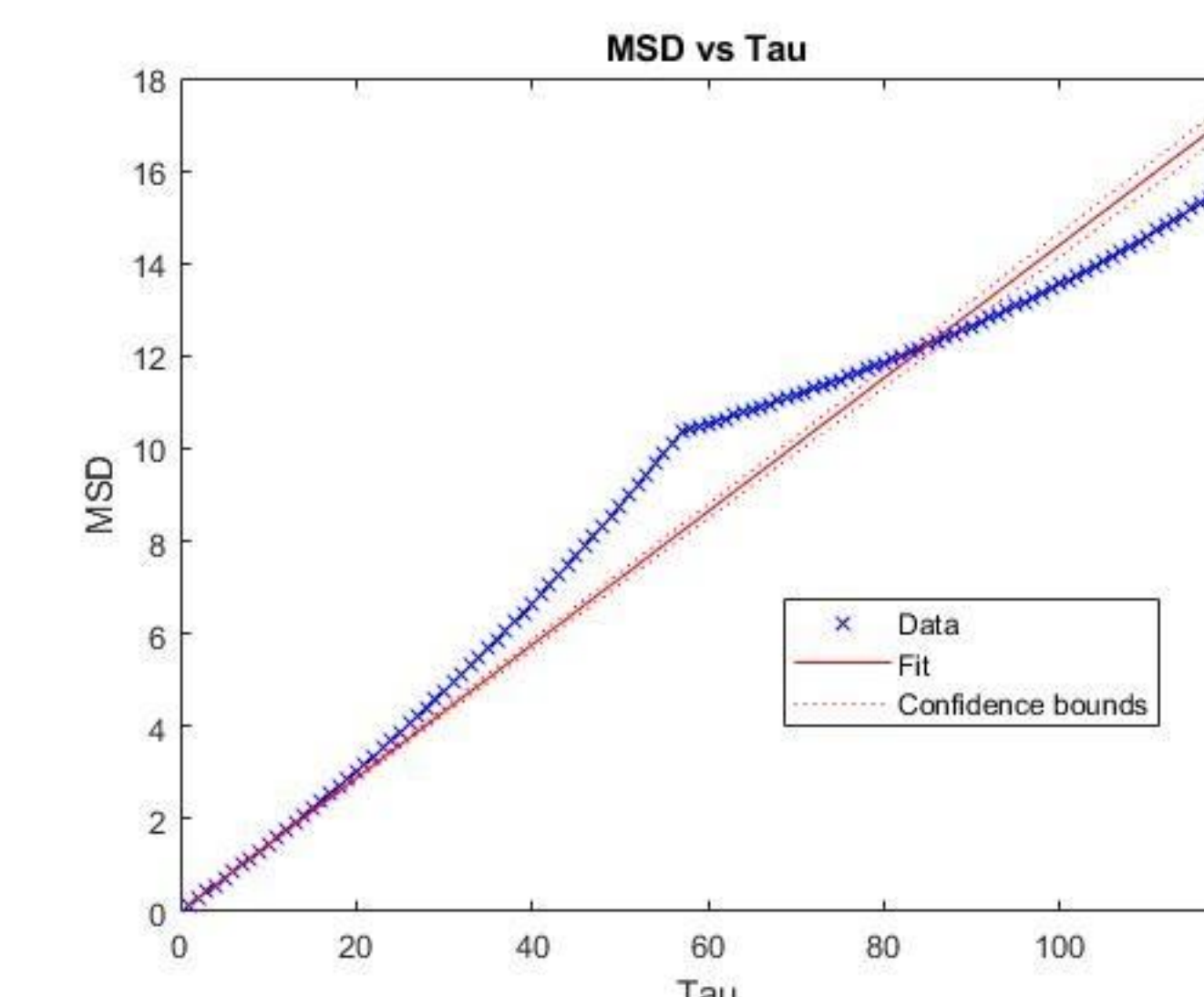


Figure 6: Comparing MSD versus time for a single cell using the updated code.

FUTURE WORK

Literature review

Adjust parameters

Rerun simulations based off new parameters

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