



# Tracking of Crowded Similar-Appearance Targets from Low-Continuity Image Sequences

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1



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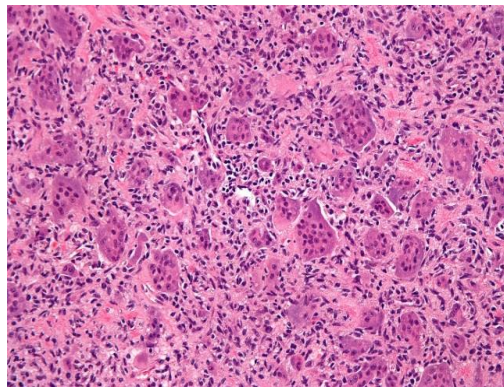
2



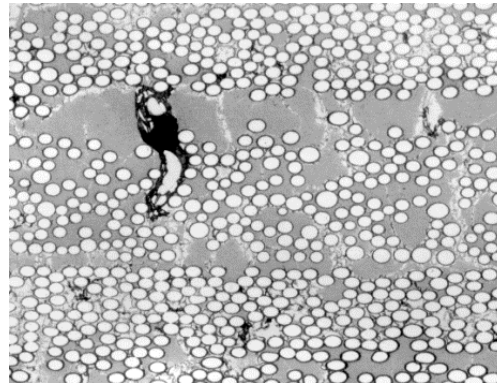
\* indicates equal contribution

## Problem

Track a large number of similar-appearance targets through a **low-continuity** image sequence



Cell



Fiber



Crowded human

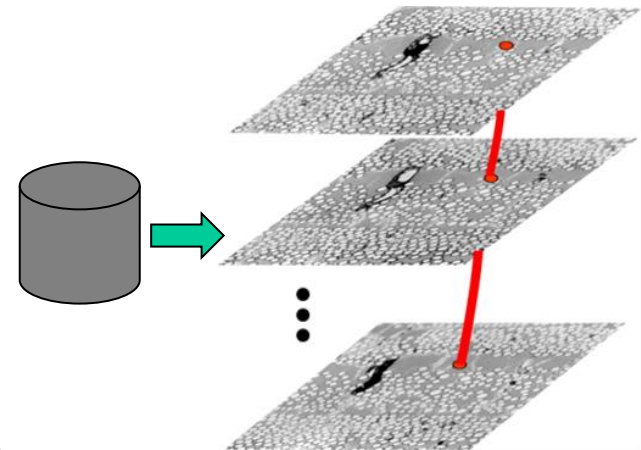


# Fiber Tracking as An Example

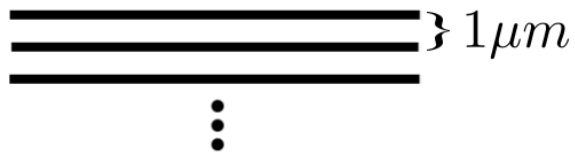
**Track** about 500 fibers with similar appearance

**Low continuity:** Large inter-slice distance for fast imaging and micro-structure characterization

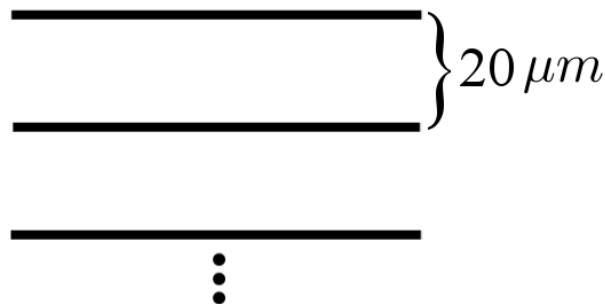
Cross-sectioning for 3D micro-structure



High continuity



Low continuity



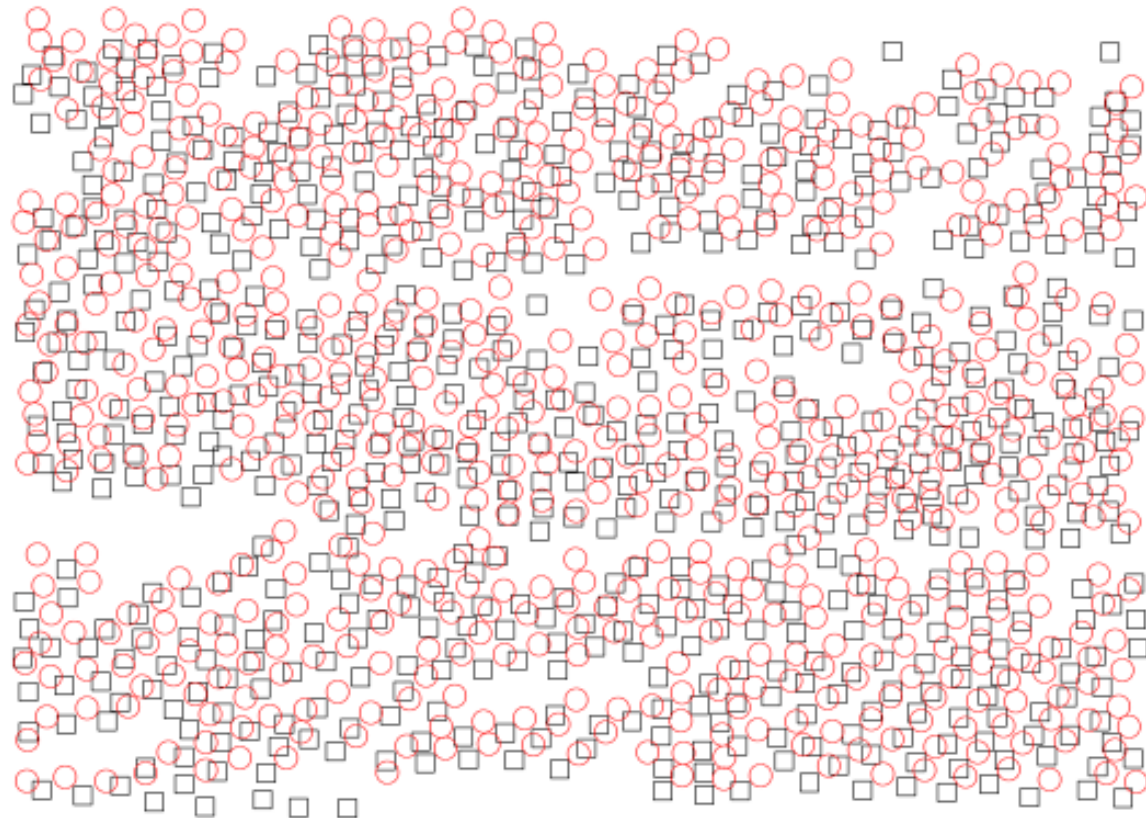
# Approach – Kalman Filter Framework

Recursive steps: Prediction and Correction

**Main Challenge: Association**

Black boxes:  
predictions

Red circles:  
detections

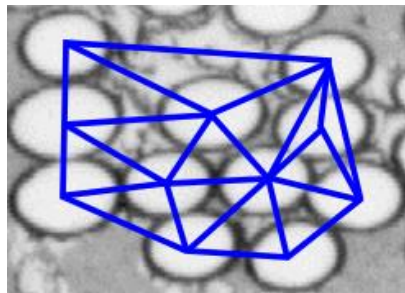
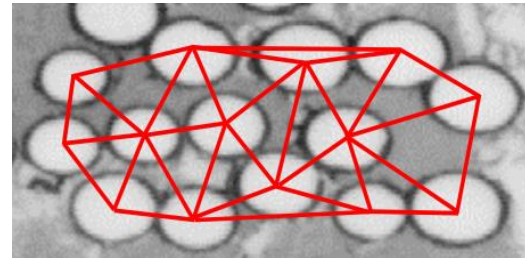
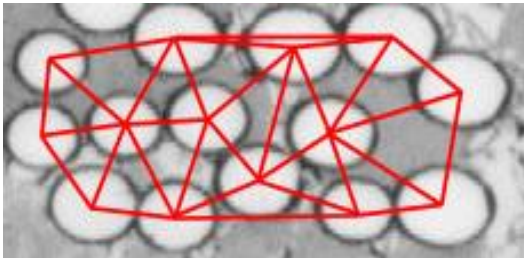




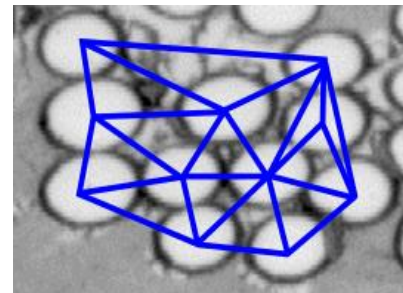
## Our Association Method

### Group-wise modeling of the association

- Key idea: mapping with **homeomorphism**



slice 00



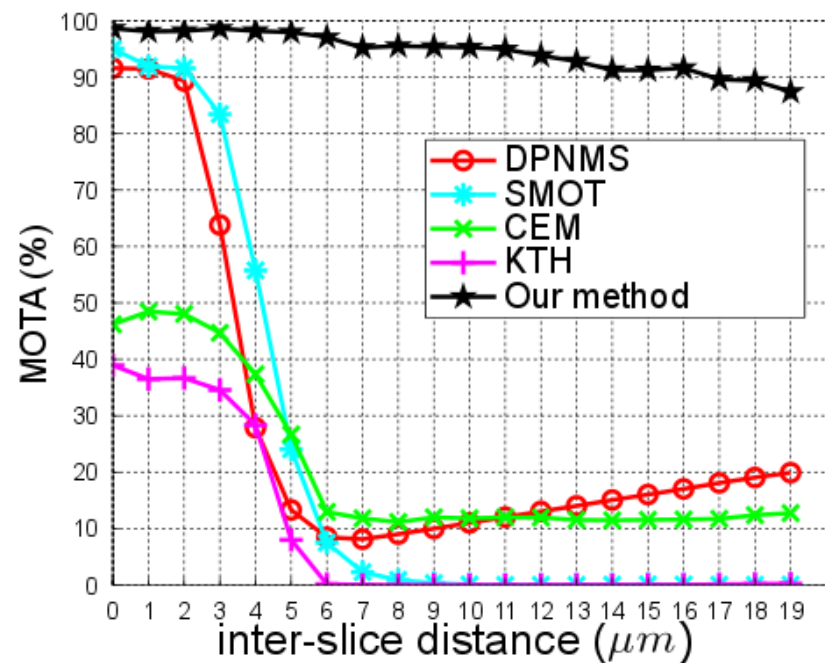
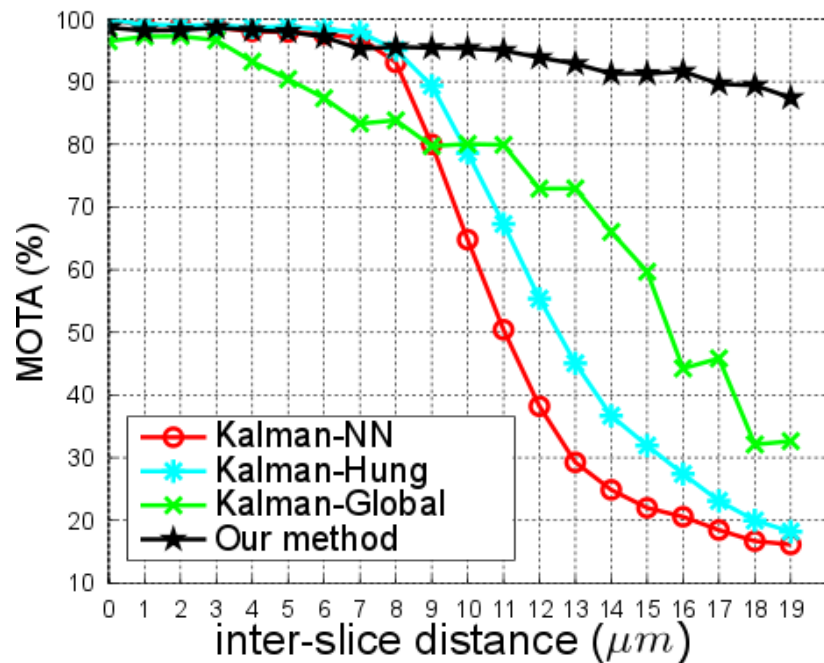
slice20

Homeomorphism is modeled by Thin-Plate Splines (TPS) bending energy



# Experimental Results

## MOTA: Multiple Object Tracking Accuracy



# Crowded Human Tracking



## Poster Session 1-2: No. 21

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Dataset and code:

available



<http://cvl.cse.sc.edu/project/cvpr2016.html>

***Thank you***

