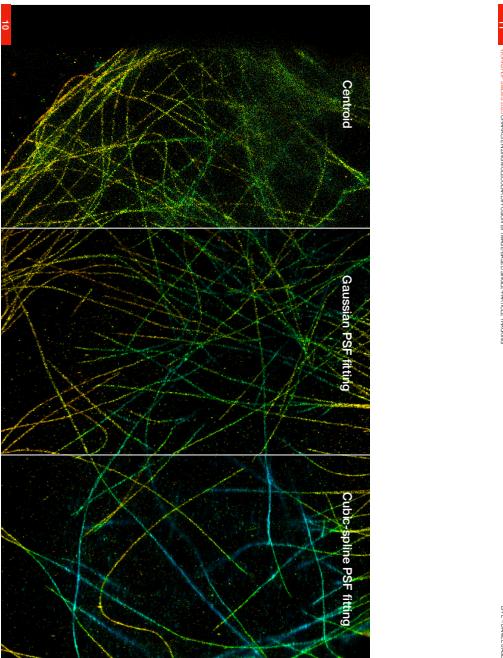
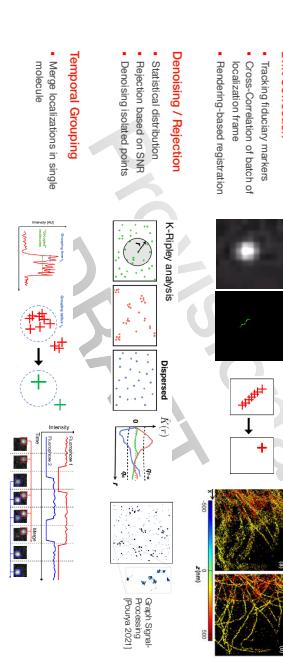


Point Data Processing



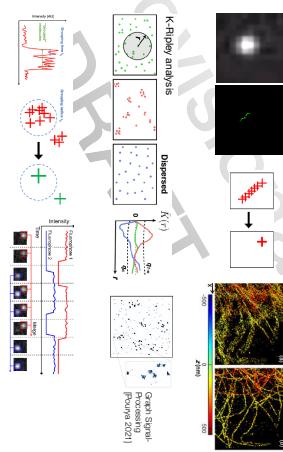
Point Data Rendering



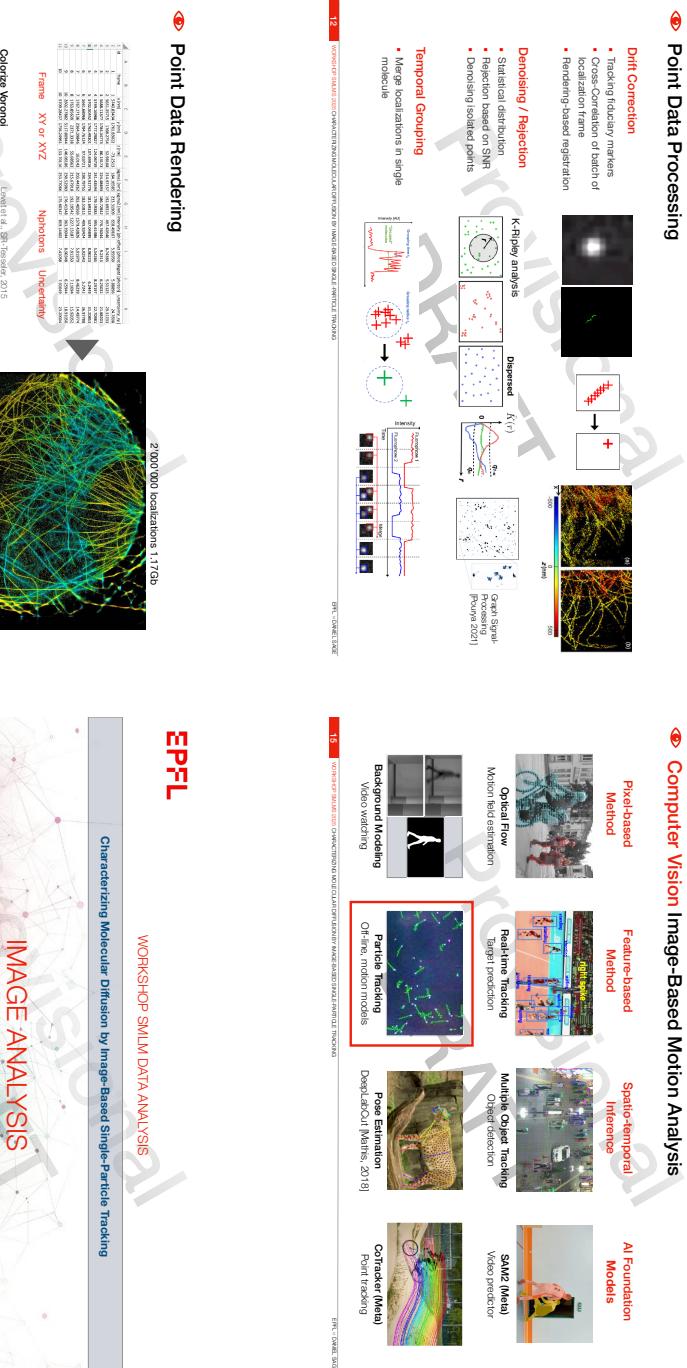
- Tracking fiducial markers
- Cross-Correlation of batch of localization frame
- Rendering-based registration

- Merge localizations in single molecule
- Denoising isolated points

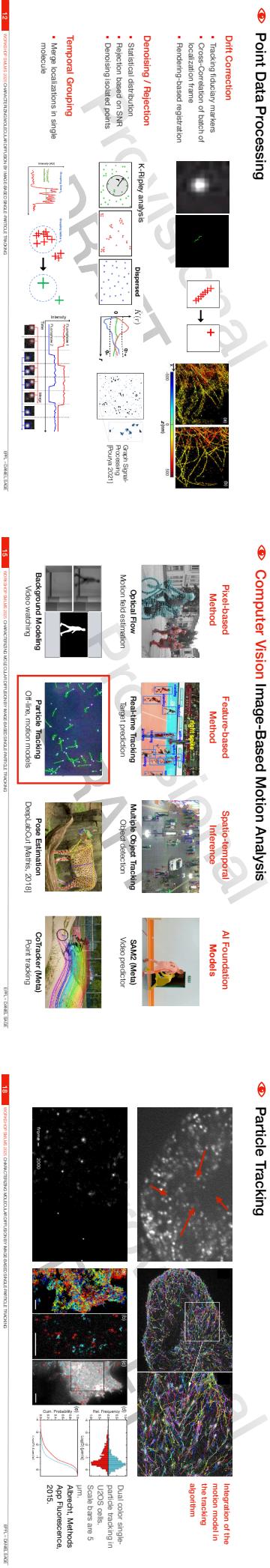
Temporal Grouping / Rejection



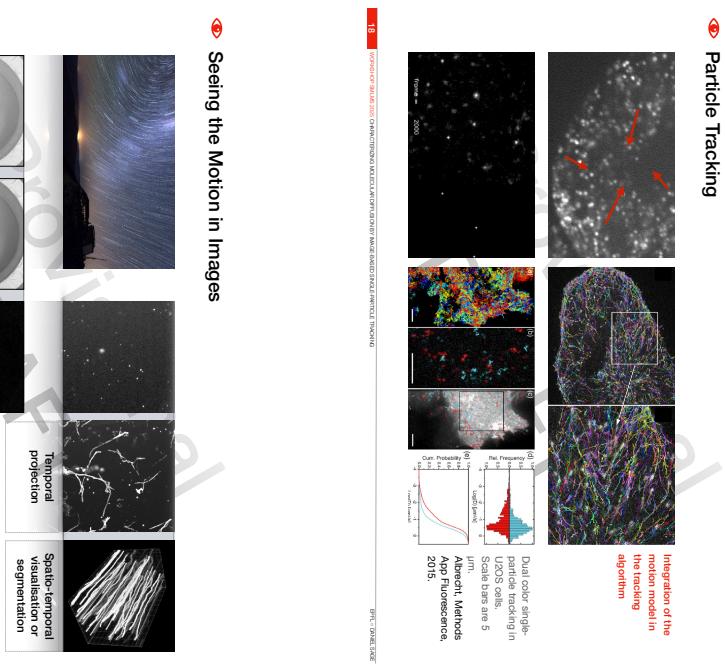
Computer Vision Image-Based Motion Analysis



Particle Tracking



Seeing the Motion in Images



Particle Tracking

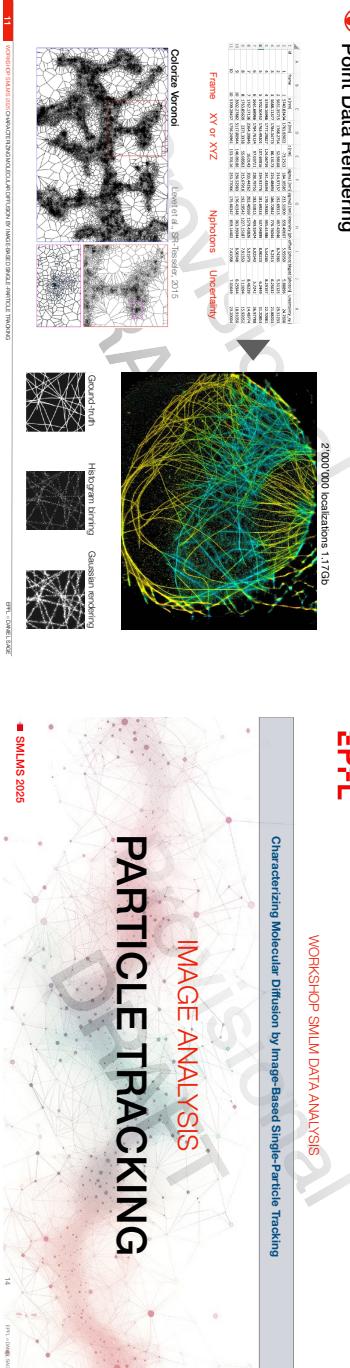
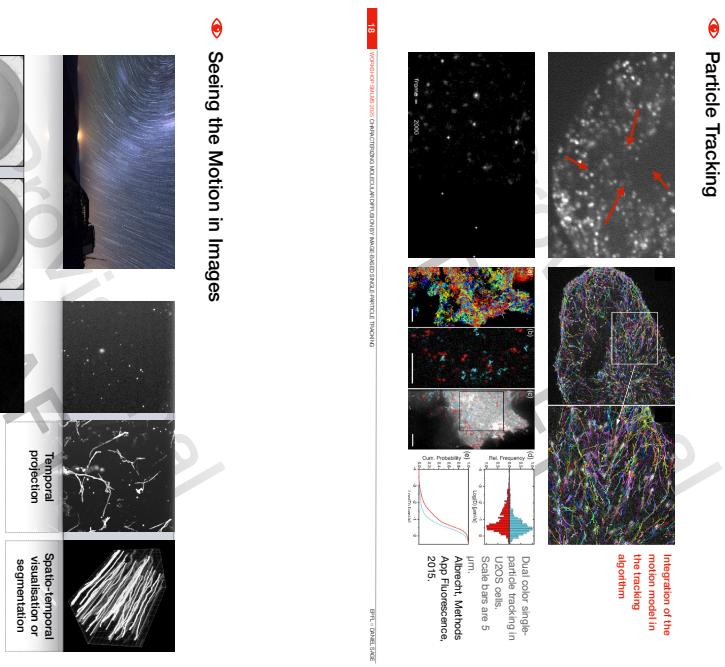
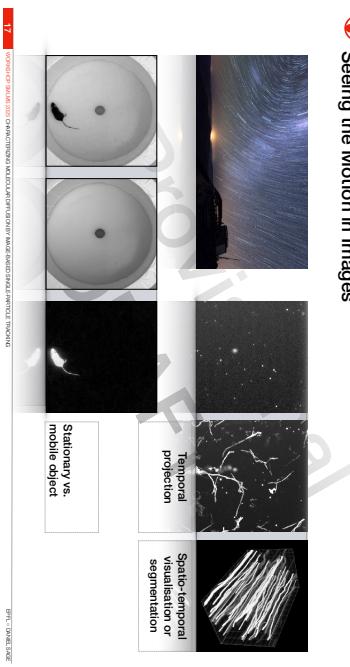


Image-based Motion Capture



Seeing the Motion in Images



Particle Tracking

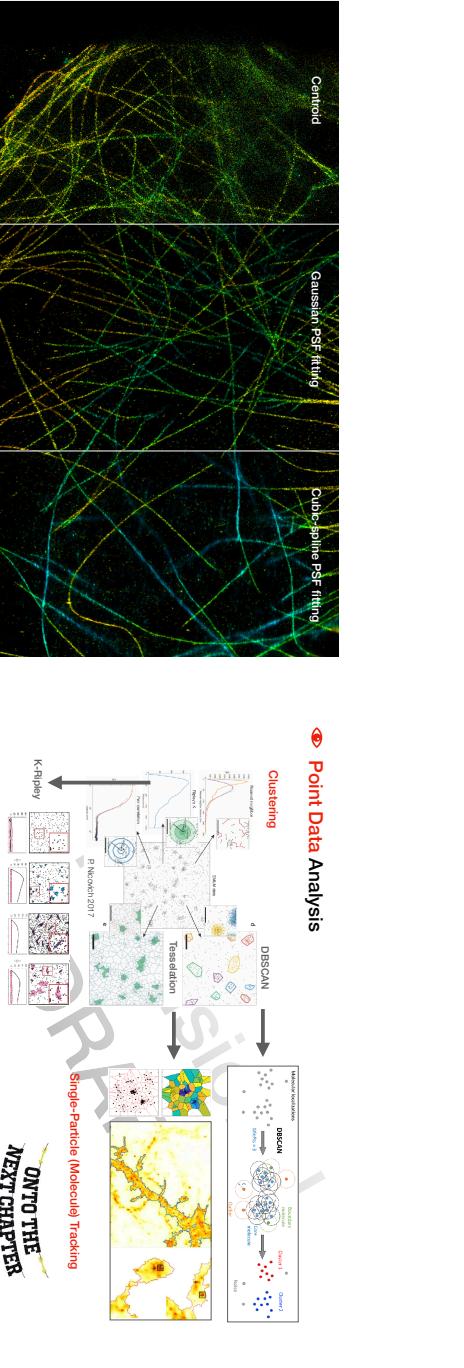
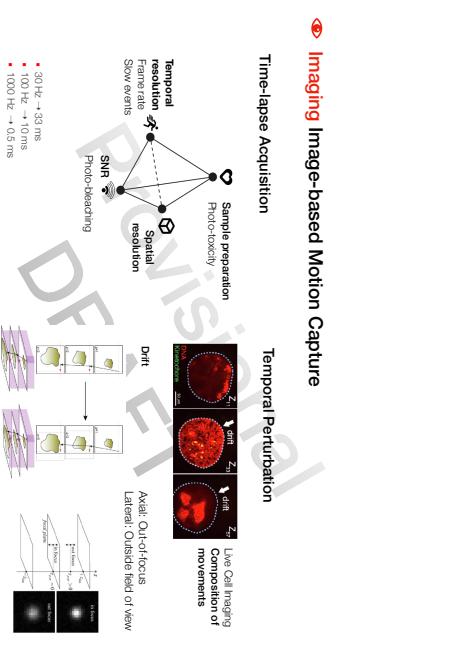


Image-based Motion Capture



● Trajectory Features

17 descriptive features of Pithoff

60 engineered features DeepTRACE

[Kastell-Hesse, Nat. Meth., 2023]

- Raw features: Localization, photometric, tracking
- Static feature: object centroid location; Step size
- Distance to center/boundary
- Local window features: Smoothness step size, Step angle, Local straightness, Local track dimension
- Local trajectories: Local Velocity Autocorrelation
- Data **hullness**: comparison of two local context, dispersion

40 dimensional fingerprinting of DeepSPT

[Pambos, Beiravv, 2023]



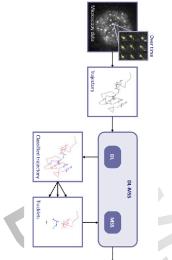
DeepSPT's features expanding on the work of Pithoff

Scientific Reports, 2019.

● Multiple-states Tracklets

Marcos Ants et al. Particle Mobility Analysis Using Deep Learning and the Moment Scaling Spectrum, Scientific Reports, 2019.

Vega, A. R., Freeman, S. A., Grinstein, S., & Jacobson, K. Multistep track segmentation and motion classification for transient mobility analysis. Biophysical Journal 114, 1018–1025 (2018).



TO DO

ETH - CHICAGO

ETH - DALLAS

ETH - DALLAS