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Research Interests: My lab strives to gain detailed information about cellular nanoscale structures, dynamics, and molecular mechanisms by designing and applying innovative and versatile single-molecule super-resolution imaging tools.

Strengths or Unique Resources: My lab develops and applies microscopy platforms for 3D single-molecule tracking and 3D super-resolution imaging within cells. We push the limits of optical microscopy and extend our platforms with light sheet microscopy and microfluidics.

Type of collaborator you seek: We look for collaborators with biological and biomedical questions that would need tracking of the dynamics of single molecules or super-resolution imaging of cellular structures to address their questions.

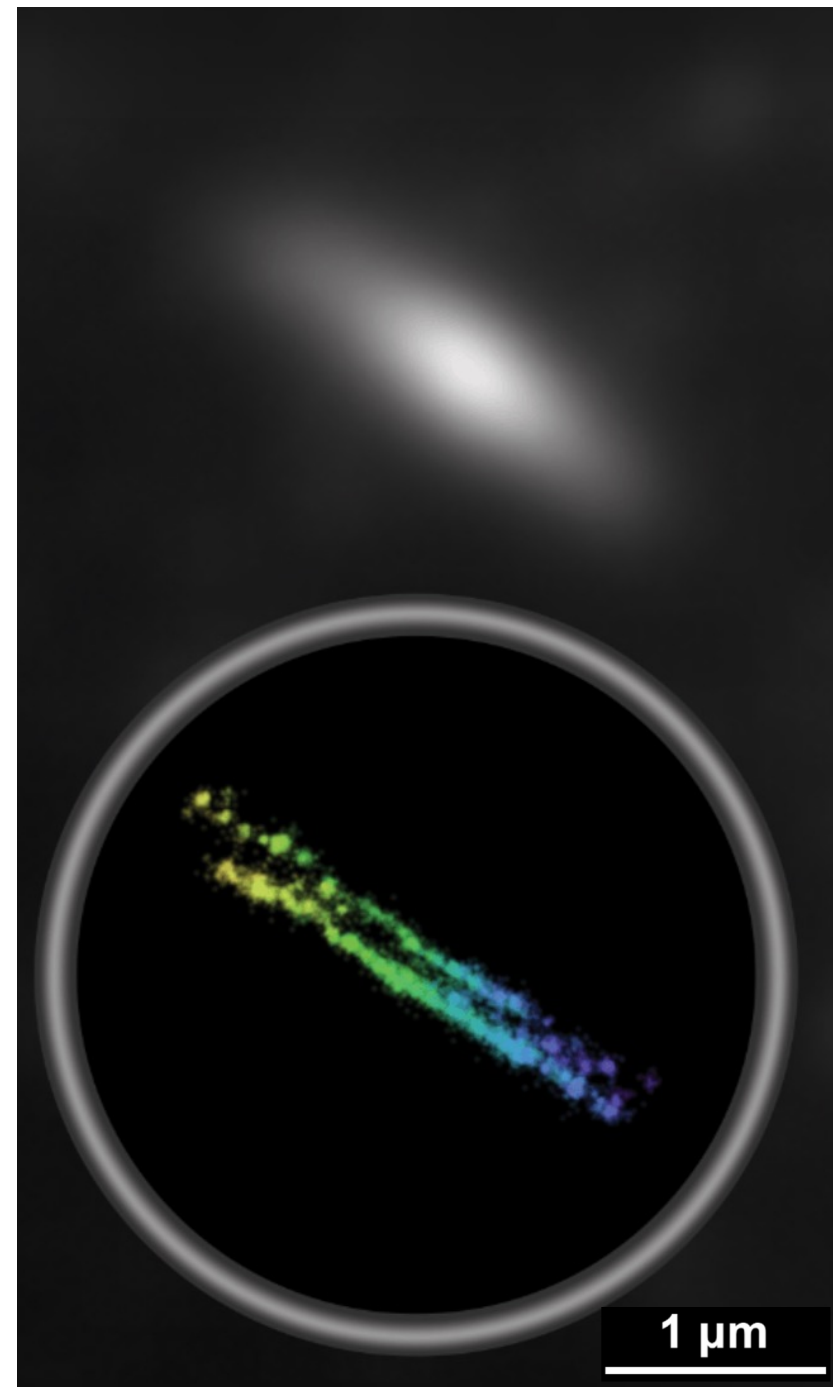
Publication List:

<https://scholar.google.com/citations?user=luXF06cAAAAJ&hl=en&oi=ao>



Lab website:

<https://gustavssonlab.rice.edu>



Gustavsson Lab

- *Molecular mechanisms regulating cellular function*



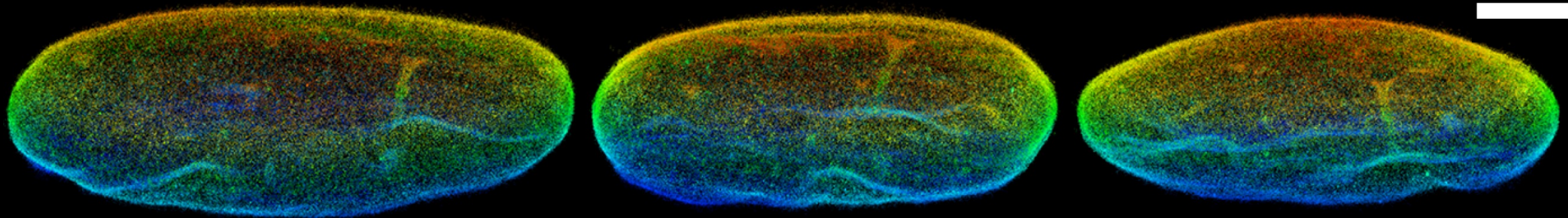
Methods development

- Single-molecule localization microscopy
- Light sheet illumination
- PSF engineering
- Microfluidics
- Labeling schemes
- Algorithms



Applications in biophysics and biomedicine

- The primary cilium and the centrosome
- Laminopathies
- Chromatin organization and gene regulation
- Cancers



5 μm

Gustavsson *et al.*, *Nat. Commun.* **9** (2018)

Gustavsson *et al.*, *Opt. Express* **26** (2018)

Möckl *et al.*, *Dev. Cell* **50** (2019)

Bayas *et al.*, *Prot. Exch.* (2019)

Bennett*, Gustavsson* *et al.* *Mol. Biol. Cell* **31** (2020)

Gagliano *et al.* *Front. Synaptic Neurosci.* **13** (2021)

Gustavsson# *et al.* *Mol. Biol. Cell*, 33 (2022)

Kanie *et al.* *in revision and on BioRxiv* (2022)

<https://doi.org/10.1101/2023.01.06.522944>

Ghanekar *et al.* *in press, IEEE TPAMI* (2022)

Weiss *et al.* *Methods Cell Biol.*, 176 (2023)

Saliba*, Gagliano* *et al.* *in revision and on BioRxiv* (2023)

<https://doi.org/10.1101/2023.09.27.559876>, patent pending

Chowdury *et al.* *in revision and on BioRxiv* (2024)

<https://doi.org/10.1101/2024.02.20.581246>

Nelson *et al.*, *Biomed. Opt. Express* 15 (2024)

Example of multi-target 3D single-molecule super-resolution imaging of whole mammalian cells

