NBIA MSc Day 2024

Martin Cramer Pedersen, October 8th

KØBENHAVNS UNIVERSITET

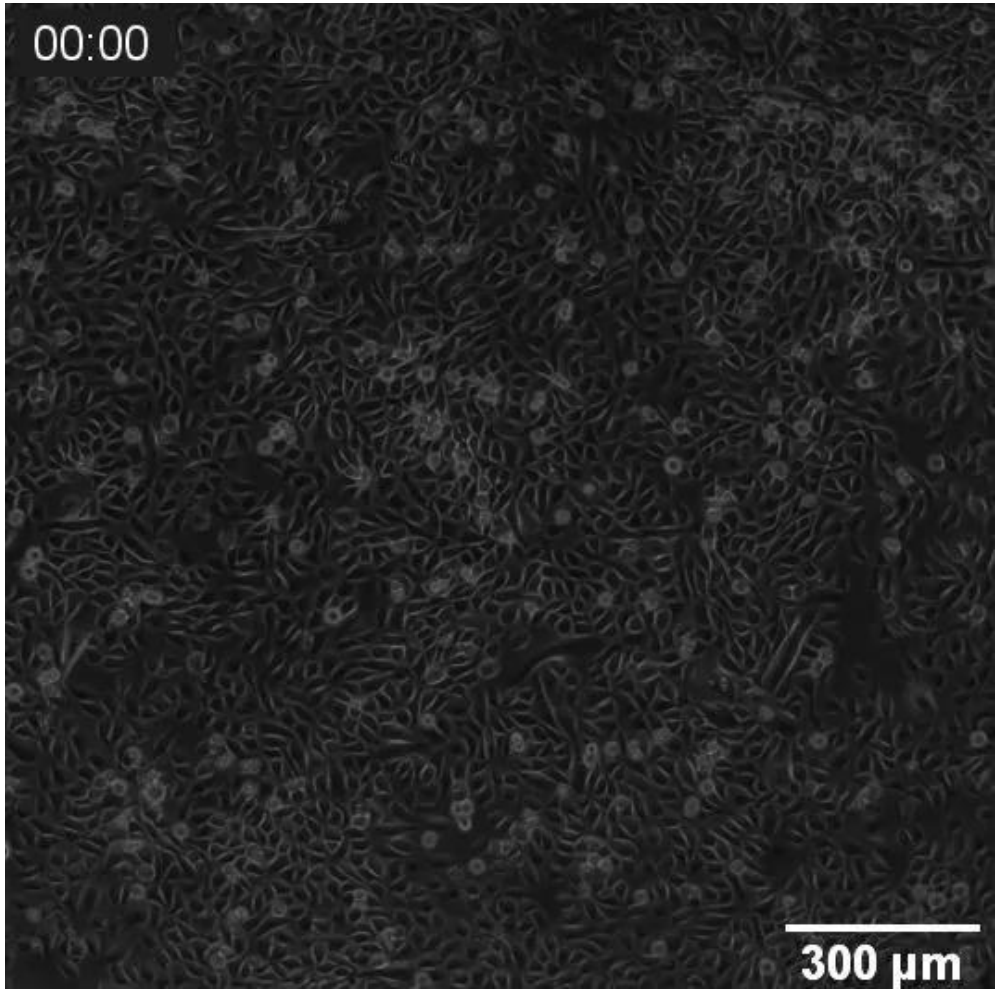
3-in-1

Amin

Kristian

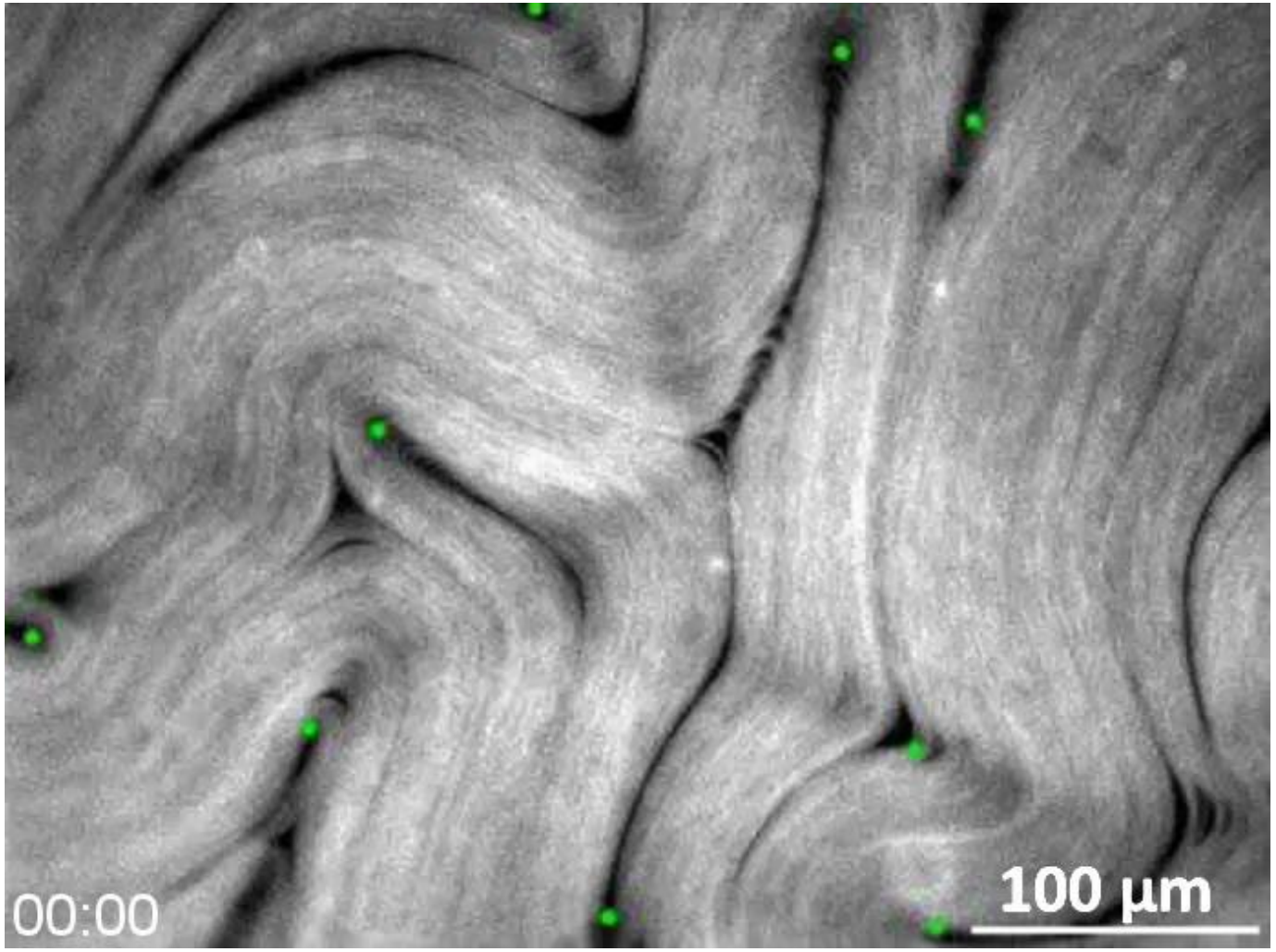
Martin

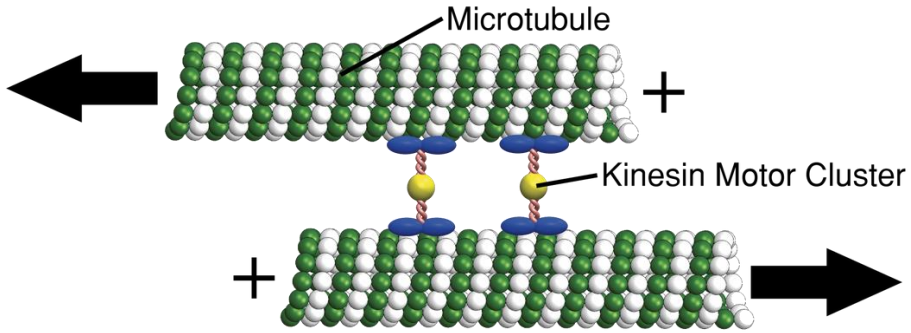
Active matter



HBEC colony
Blanch-Mercader (2018)

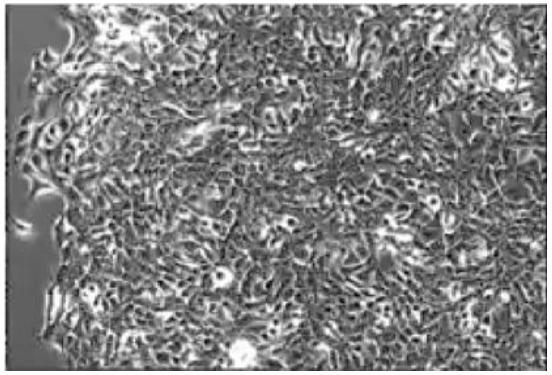
Active matter



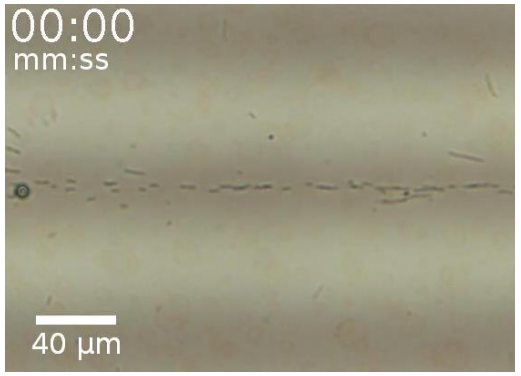


Kinesin/microtubules
Doostmohammadi et al. (2018)
Sanchez et al. (2012)

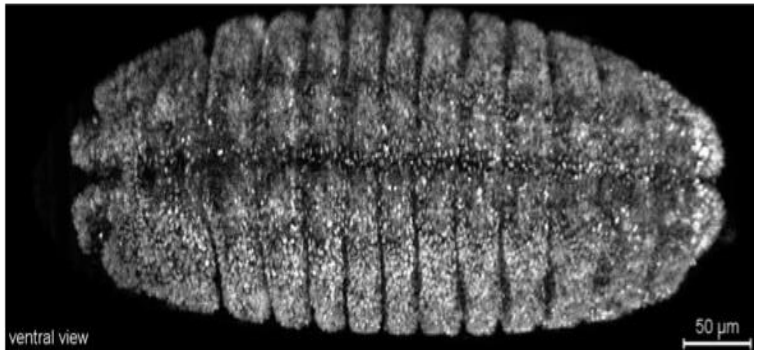
Active matter



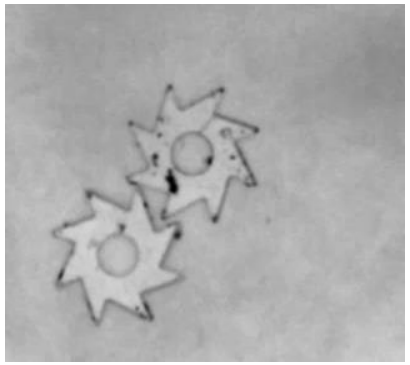
Invasive cancer cells
Weiger et al. (2013)



Microscale transport
Turiv et al. (2020)



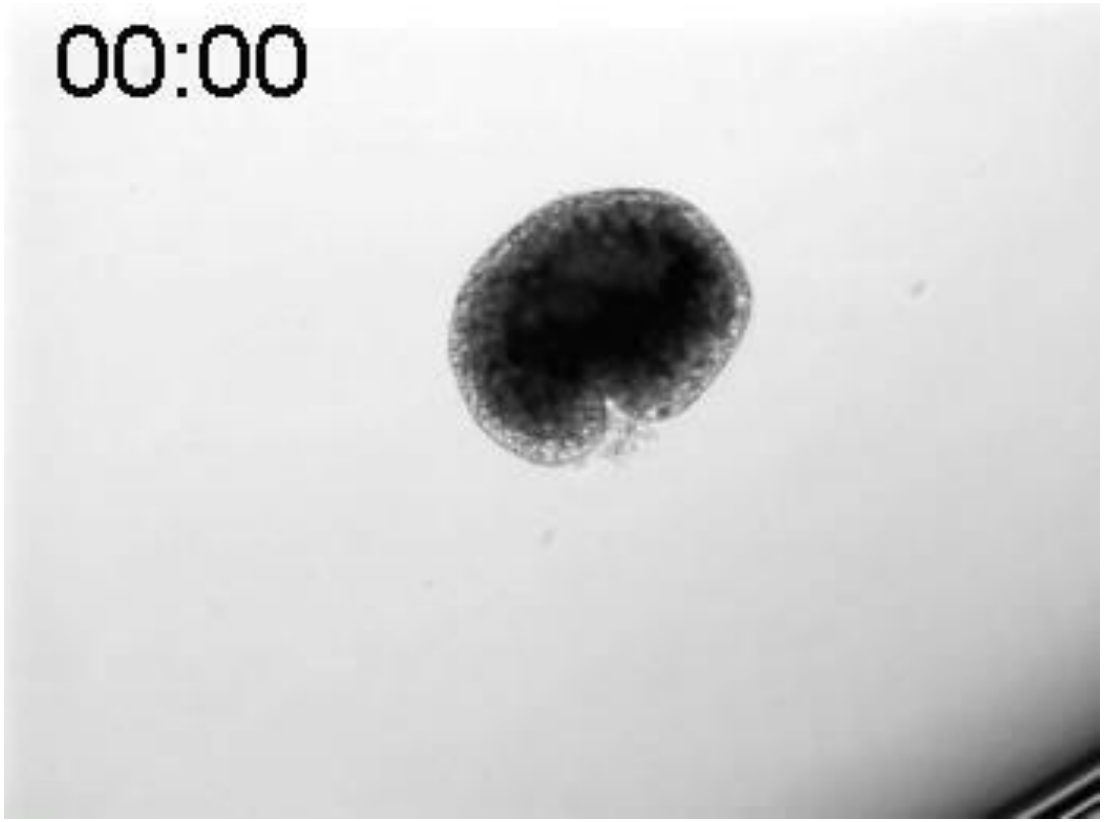
Organ formation (fly embryo)
Tomer et al. (2012)

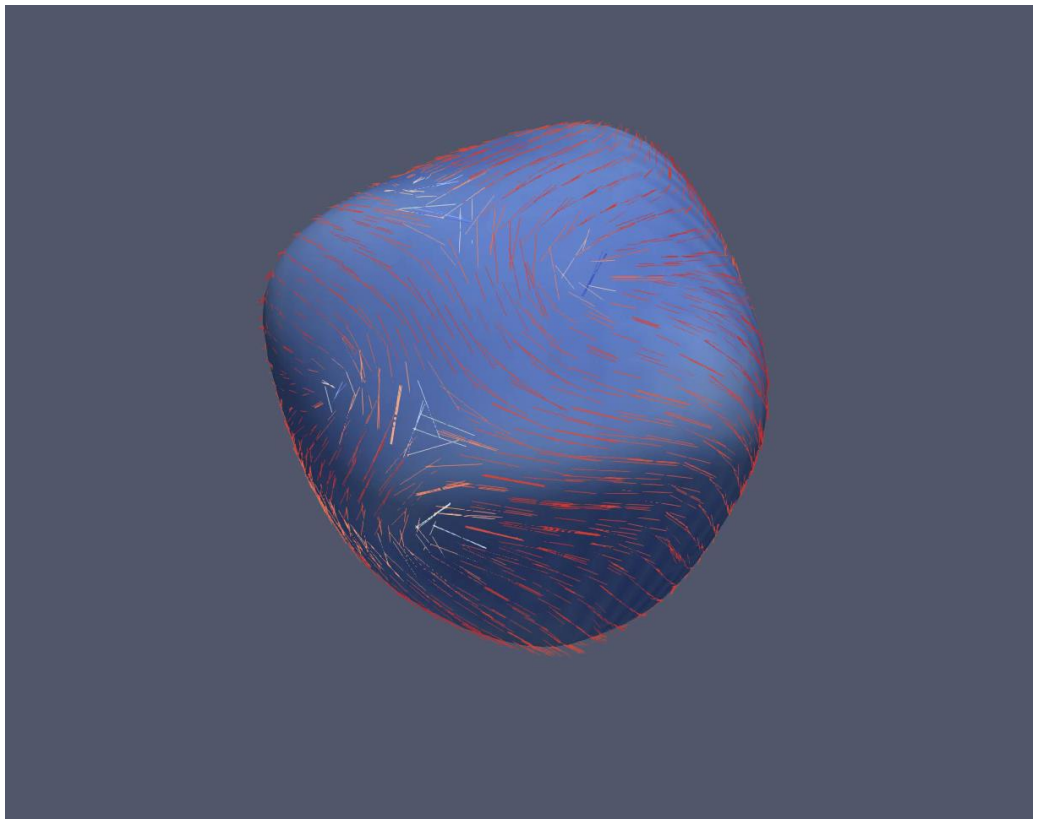


Microscale mechanics
Sokolov et al. (2010)

Current interests and projects

How do we handle with the (incredible) complexity that emerges in models of active matter?

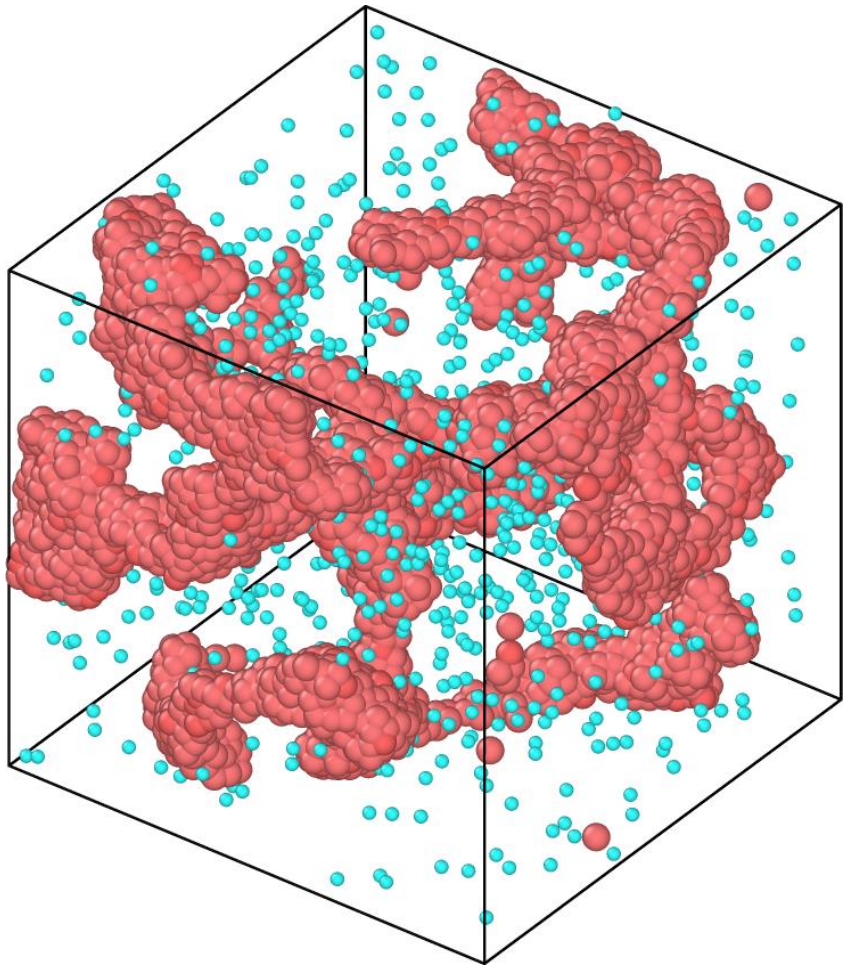


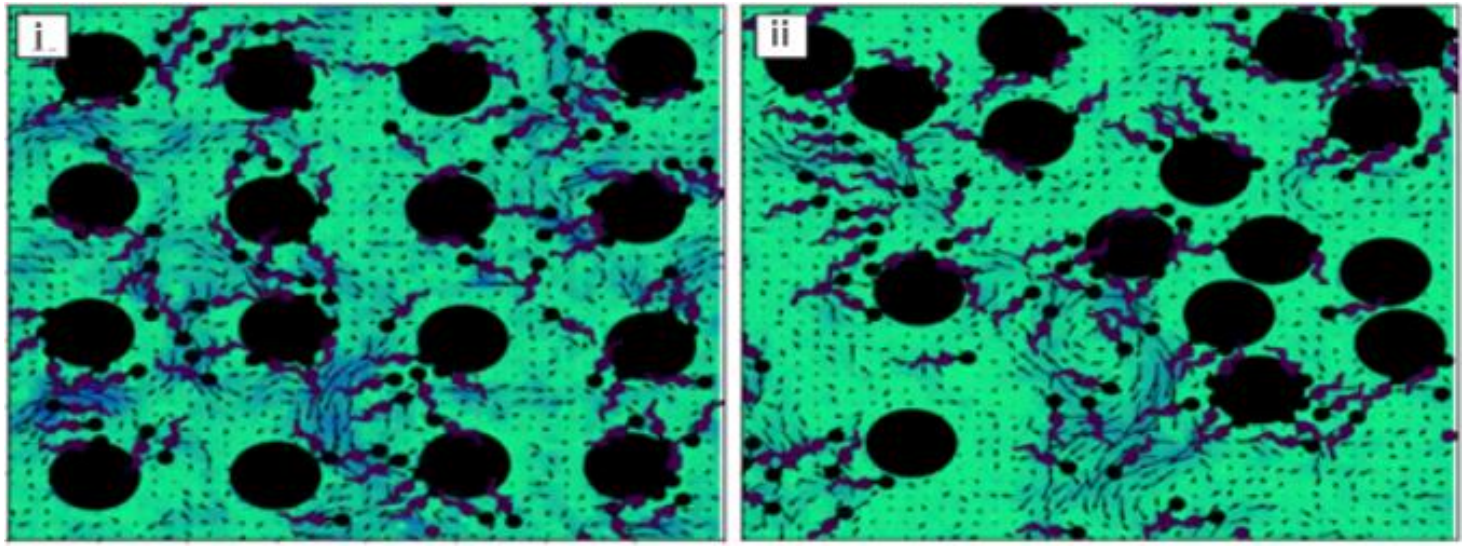


Metselaar et at. (2019)
Livshitz et al. (2017)

Current interests and projects

How does active matter shape the environment in which it is embedded?

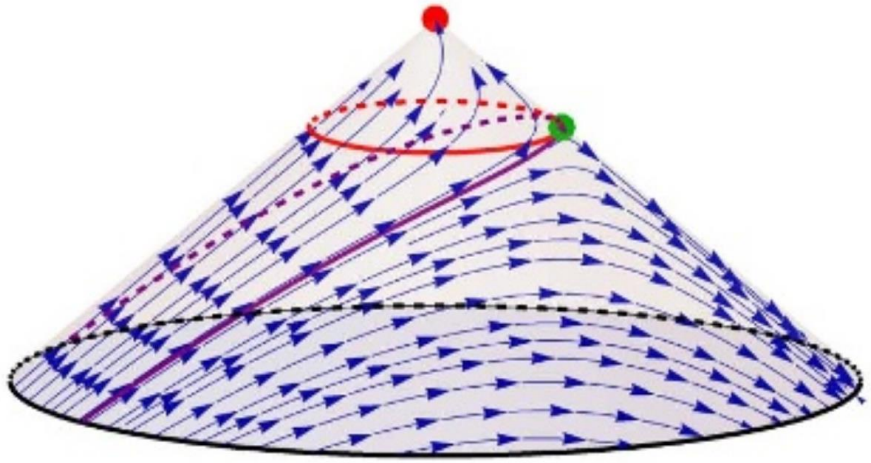


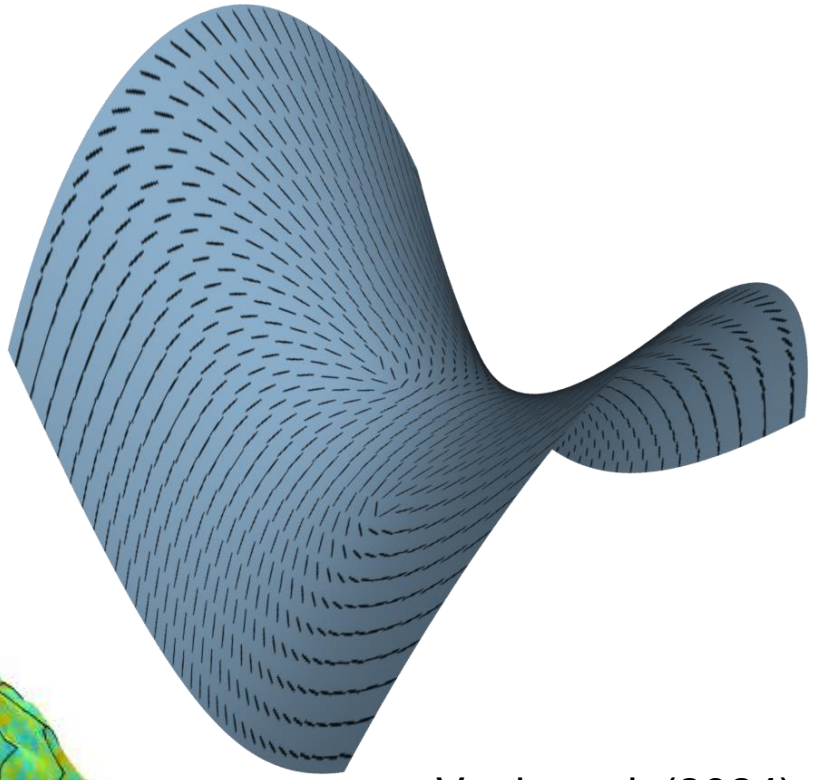


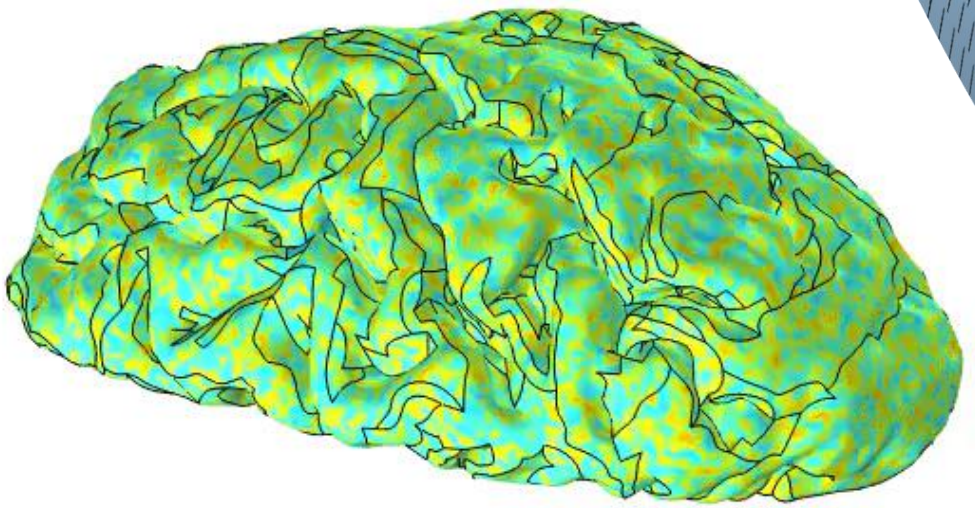
Thijssen (2024)
Pedersen et al. (2024)

Current interests and projects

What happens when we begin considering curved substrates?



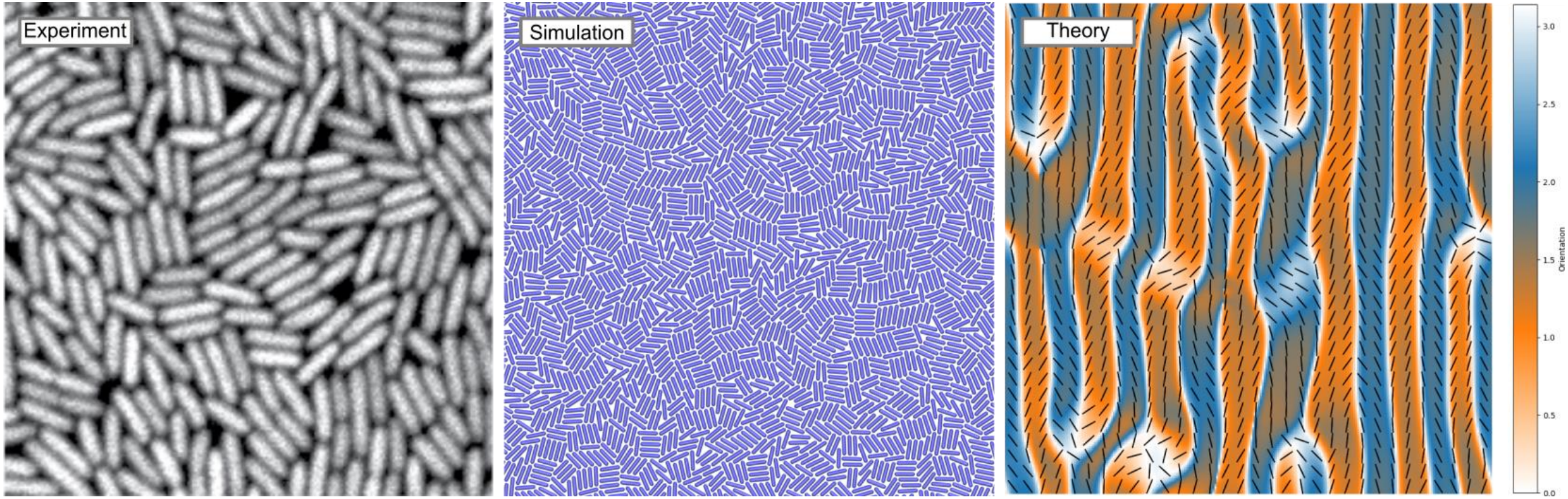




Venkatesh (2024)
Pedersen (2024)
Vafa et al. (2023)

Current interests and projects

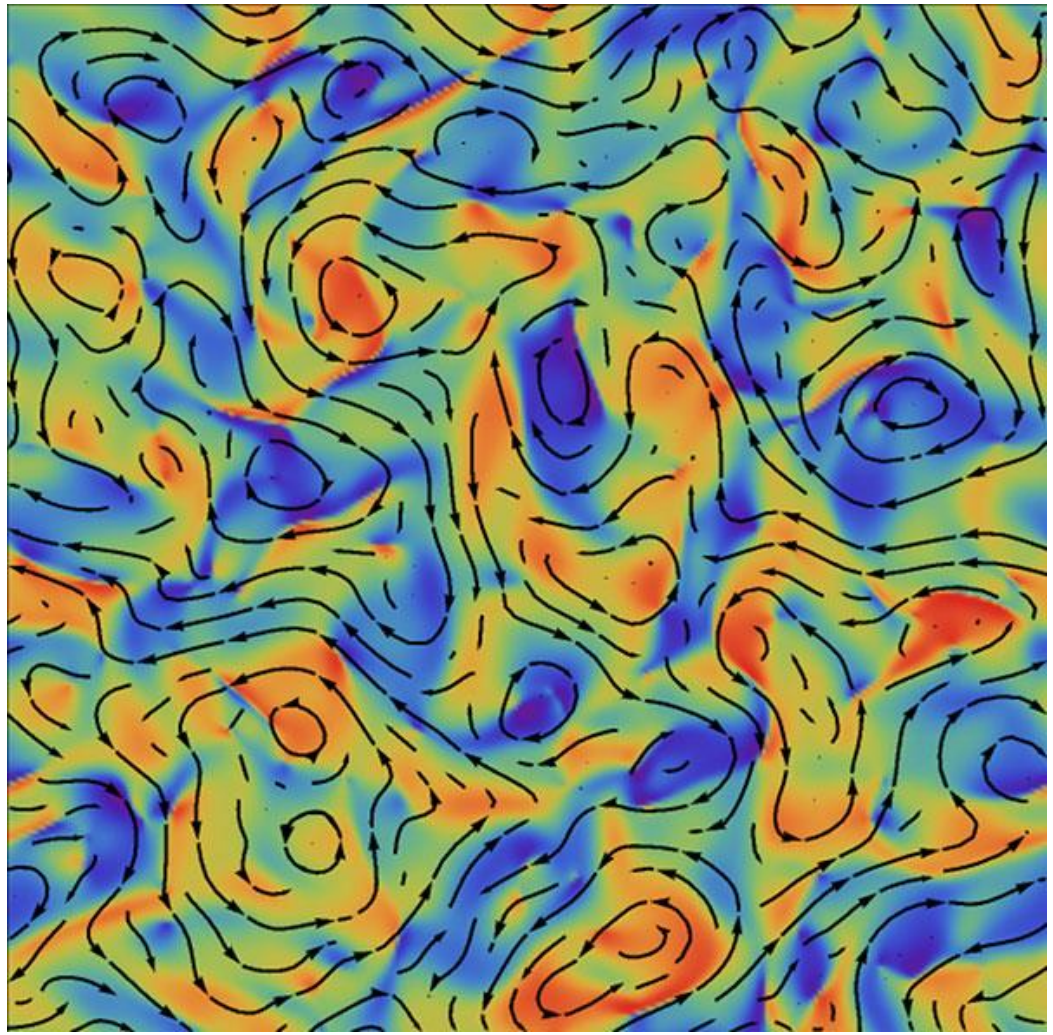
How do we match and compare our experiments to our theories and simulations?



Pseudomonas aeruginosa
Meacock et al. (2021)
Pedersen (2024)

We work in…

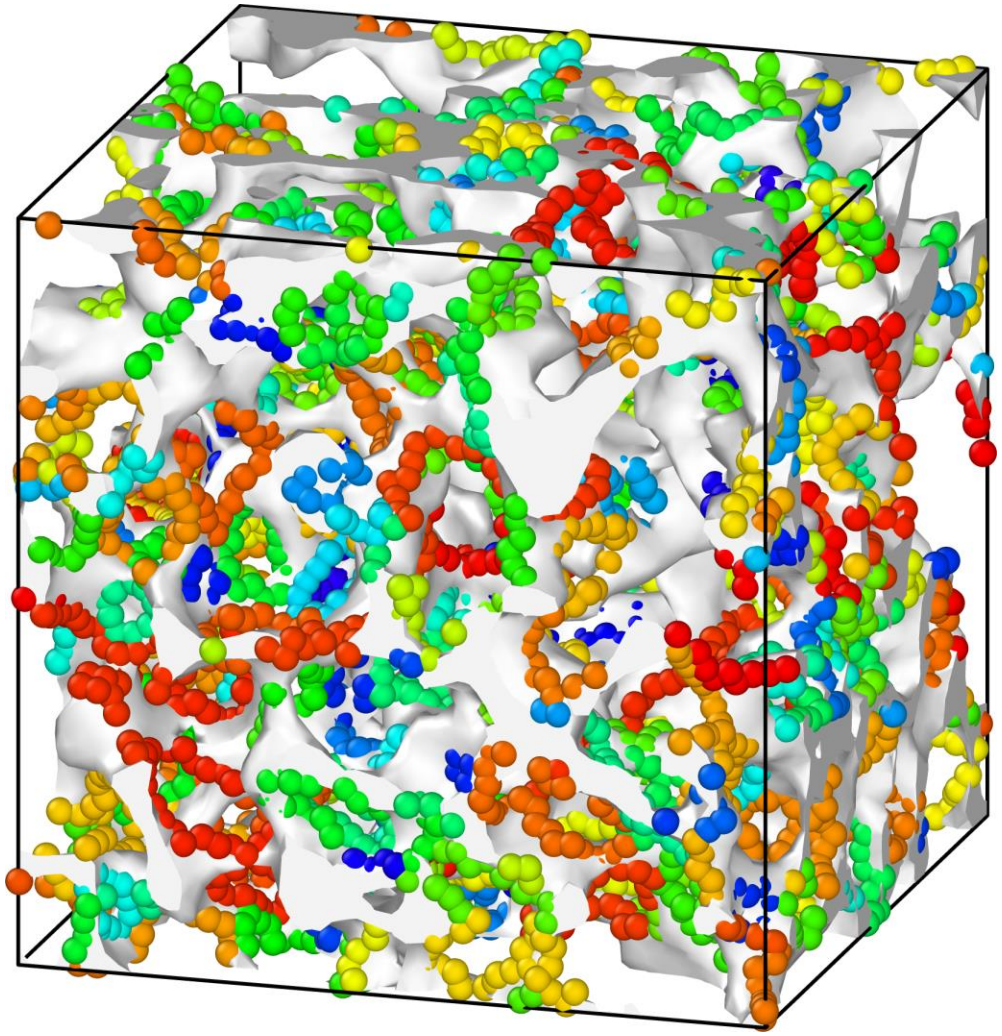
- Fluid dynamics
- Soft and condensed matter physics
- Cell (and bacteria) biophysics
- Statistical mechanics
- Polymers, gels, foams



Active nematics simulation
Giomi et al. (2015)

We work with…

- ODEs and PDEs
- Many different simulation tools
- Applied differential geometry
- Applied topology
- Image analysis
- Lots of data scientific methods
- High performance computing



Pedersen et al. (2024)