# Joint Condensed Matter and Center for Soft Matter and Biological Physics Seminar


## Prof. Irep Gözen

(University of Oslo, Norway)

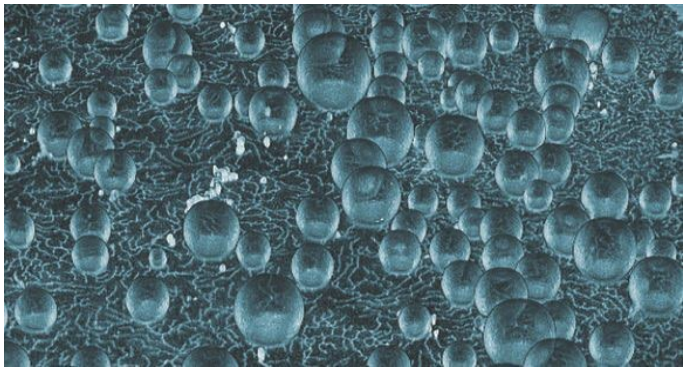

## "Lipid Nanotubes: a possible route to primitive cell formation and growth"

*Monday, March 2, 2020*

*4:00pm -5:00pm*

*304 Robeson Hall*


Membrane-enclosed cellular compartments create spatially distinct microenvironments which confine and protect biochemical reactions in the cell. On the early Earth, the autonomous formation of compartments is presumed to have enabled encapsulation of nucleotides, satisfying a starting condition for the emergence of life. Recently, surfaces have become into focus as potential platforms for the self-assembly of prebiotic compartments, as notably enhanced vesicle formation was reported in the presence of solid interfaces. The detailed mechanism of such formation at the mesoscale however is still under discussion.
I will describe the spontaneous transformation of lipid reservoirs on solid substrates to unilamellar membrane compartments through a sequence of topological changes, proceeding via a network of interconnected lipid nanotubes. We show that this transformation is entirely driven by surface-free energy minimization and does not require hydrolysis of organic molecules, or external stimuli such as electrical currents or mechanical agitation. The compartments grow by taking up the external fluid environment and can subsequently separate and migrate upon exposure to hydrodynamic flow. This may explain, for the first time, the details of self-directed transition from weakly organized bio amphiphile assemblies on solid surfaces to protocells with secluded internal contents.

3D micrograph of protocells by Elif Koksal, SoftLab. Average ø: 8 µm

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