

## **From Matter to Life: Build Your Own Cell**

Prof. Dr. Reinhard Lipowsky

*MPI of Colloids and Interfaces, Potsdam*

All living organisms consist of cells, and all cells are built up from the same molecular species and supramolecular assemblies. Furthermore, as far as we know, the complex behaviour of these living cells obeys the fundamental laws of physics and thermodynamics. Therefore, it should be possible to construct synthetic protocells that mimic the most important features of their natural counterparts. This bottom-up approach is based on different modules such as membrane compartments, molecular motors, and template-controlled assemblers. Important insights into these modules come from biophysics, statistical thermodynamics, and stochastic modelling. Based on these insights, we can identify important control parameters, optimize the performance of individual modules, and integrate these modules into more and more complex protocells.