

## UniSysCat Colloquium

Dr. James Allen Frank

Oregon Health & Science University

Start Time: Wednesday, July 3, 2019 05:15 pm

End Time: Wednesday, July 3, 2019 06:45 pm

Chemistry Building, C 264

Technische Universität Berlin, Straße des 17. Juni 115, 10623 Berlin

### Photolipids V2.0: manipulating signalling at the membrane with optical probes

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Lipids are amphiphilic molecules which function not only as sources of energy and structural components of cells, but are ubiquitously involved in signal transduction. However, our understanding of these processes is still limited by our inability to selectively manipulate lipids and their receptors with sufficient spatiotemporal precision. To address this, we prepared a collection of photoswitchable lipids, or *photolipids*, that harbor an azobenzene photoswitch allowing us to reversibly fine-tune their pharmacological and biophysical properties on illumination. Photolipids mimicking sphingolipids, phospholipids or diacylglycerols permit optical control over ion channels, GPCRs and enzymes, and provide insight into the mechanisms underlying synaptic transmission and hormone secretion. They can also be incorporated into synthetic membranes, placing membrane properties like fluidity, curvature and domain segregation under optical control. We will discuss the next-generation applications of photolipids in controlling signalling and model membranes, and describe new hardware that allows us to utilize photolipids *in vivo* to control behavior in freely moving rodents.

Prof. Dr. Joachim Heberle (FU Berlin)

Organizer