

# PS8. Geometry and Topology in Data Science and Machine Learning

Organised by Lisbeth Fajstrup (Aalborg University) and Søren Hauberg (Technical University of Denmark)

## Session overview

Much of modern data is high dimensional, very complex, and highly nonlinear. Recently, methods building on the centuries of knowledge in mathematics of such structures have been successfully brought in.

This session gathers the Danish community in the area and also invites the rest of the Data Science community to learn about these methods and ideas.

## Speakers

- Stefan Sommer, DIKU, University of Copenhagen.
- Christophe Biscio, Department of Mathematical Sciences, Aalborg University.
- Helene Hauschultz, Department of Mathematical Sciences, Aarhus University.
- Christian Pascal Hirsch, Department of Mathematical Sciences, Aarhus University.
- Miguel González-Duque, Creative AI Lab, IT University of Copenhagen

## Programme

13:45 – 13:50 Welcome

13:50 – 14:10 Stefan Sommer

Diffusion means in geometric statistics

14:10 – 14:30 Christophe Biscio

An introduction to Topological Data Analysis and its applications

Short break

14:45 – 15:05 Miguel González-Duque

Pulling back metrics using Variational Autoencoders: examples & problems

15:05 – 15:25 Helene Hauschultz

Is an encoder within reach?

15:25 – 15:45 Christian Hirsch

Topology-based hypothesis tests for sliced data

15:45 – 16:00 What next. Possible collaborations. Questions in general.