**Topic:** Hybrid Quantum-Classical Machine Learning Applications with Qiskit

**Presenters/Lecturers:**

Stephanie Müller/ Ndivhuwo Nyase (TBC)

**Target audience and prerequisite background:** The workshop targets researchers and students either with a background in machine learning, data science or data analysis.

**Format:** Workshop

**Duration:** 180 min (half day)

**Any special requirements:** Laptops, Wi-Fi access

**Syllabus/Agenda:**

**Abstract:**In this workshop we explore some of the available quantum algorithms designed for data analysis. Specifically, our focus will be in hybrid quantum machine learning, a paradigm integrating classical machine learning models with quantum algorithms. We will also examine techniques for integrating quantum models into pre-existing machine learning workflows, using transfer learning as an example. The hands-on aspect of the workshop will use the Qiskit SDK to implement tutorial examples, providing practical experience with quantum programming.

**Agenda:**

1. Theory (90 min)
   1. Introduction to Quantum Computing (15 minutes)
   2. Introduction to Hybrid classical-Quantum machine learning (30 minutes)
   3. Overview of quantum algorithms for machine learning (30 minutes)
   4. Introduce strategies for incorporating quantum machine learning algorithms into existing machine learning workflows (15 minutes)
2. Hands-On quantum programming (90 min)
   1. Introduction to Qiskit 1.0 (15 mins)
   2. Building and running quantum circuits (15 mins)
   3. Building Classical-Quantum models (30 mins)
   4. Applications in Quantum ML (30 mins)