RWTH AACHEN UNIVERSITY

RWTH's first ENHANCE Blended Intensive Programme

Physics Informed Machine Learning
Applications to Geotechnical Engineering

Online: July 18 – 19, 2022
On site: July 25 – 29, 2022
Course credits: 3 ECTS
Organized by: Prof. Raul Fuentes
(Institute of Geomechanics and Underground
Technology at RWTH Aachen University)
Funding available

More information on our **website**

Application deadline: June 13, 2022
Application Form

Program Description

The aim of this program is to gain an understanding of the principles behind physics-informed machine learning, as well as to explore various scenarios in which these methods can be applied. The course consists of two parts: an online introductory course and a workshop that will be held on-site at RWTH.

1. Online introduction (July 18 – 19, 2022)

The online course consists of lectures, drop-in sessions, and self-study. Two weeks prior to the on-site workshop, reading materials are provided. This includes literature on data preparation, optimization, and an introduction to machine learning. A special focus will be on neural networks and their relationship with gradients and differential equations. This will also feature an introduction to the tools the students will work with, which is mainly Python code written in Jupyter Notebooks. On July 18th and 19th, lectures regaring the topics will be held online. After the lectures drop-in sessions are hosted where the materials and any questions can be discussed.

2. Workshop at RWTH (July 25 – 29, 2022)

During this full week, the students will apply their newly gained theoretical knowledge in a hackathon-style workshop. Different tasks and problems will be provided, which will be solved by the students in a collaborative and informal setting. The goal of this session is to deepen the skills gained in the theoretical seminar and to share knowledge among participants. The practical nature of the workshop will also lead to a better understanding of the implementation, chances, and limitations of physics-informed machine learning methods. Last but not least, the hackathon is a great opportunity to crack interesting modelling problems and network with students and faculty from different countries. Besides the coursework social events such as BBQs and local tours will be held.