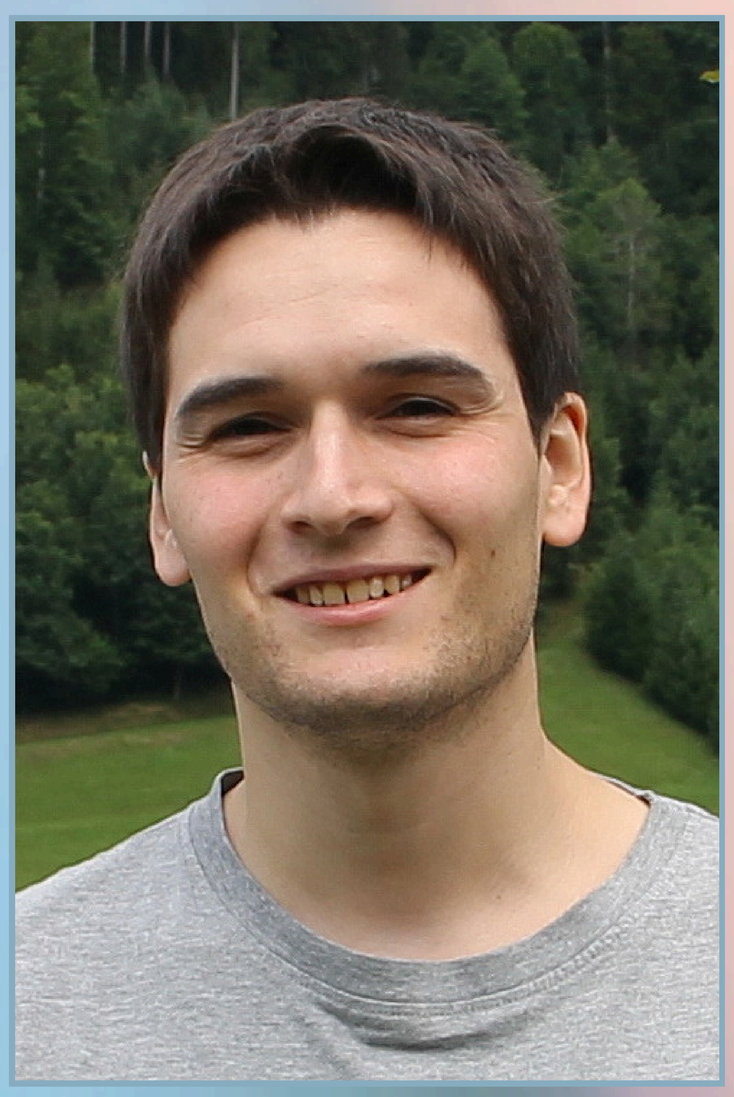
Friedrich-Alexander-Universität
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Mathematics of Data | MoD

FAU MoD Course



# Discovery of singularities with physics-informed neural networks


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EPFL - LAUSANNE


MOD.FAU.EU

#FAUMoDCourse

**WHEN**

Wed.-Fri. **December 02-04, 2026**
10:00H (Berlin time)

**WHERE**

On-site / Online

**Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU)**
Cauerstraße 5a, 91058
Erlangen. Bavaria, Germany

Time-table:
**Dec. 02** (10:00H – 12:00H) Room **H20**
**Dec. 03** (14:00H – 16:00H) Room **H21**
**Dec. 04** (11:00H – 13:00H) Room **H19**

Online • Live-streaming @FAUtv:
**www.fau.tv/clip/id/64145**


The course will be concerned with recent strategies to rigorously prove self-similar singularity formation, where the candidate for the singularity is obtained via physics-informed neural networks (PINNs). This is one of the strategies currently being considered to tackle the major open problems in the analysis of fluids, such as singularity formation for incompressible Euler or for Navier–Stokes, the latter being the Clay Millennium Prize problem. We will start by understanding the techniques in the simpler setting of the self-similar Burgers shock. Burgers is a 1-D model for compressible fluids that reflects the overall strategy while simplifying certain parts of the arguments due to being 1-D and local. Then, we will talk about the neural-network techniques and the mathematical reformulations of the problem that are useful in this context, in order to find a candidate for a self-similar singularity for fluids equations. Finally, we will explain how one can obtain a rigorous proof from such a candidate, which is intimately related to the question of the stability of these solutions and to the problem of turning an inviscid singularity into a viscous one.