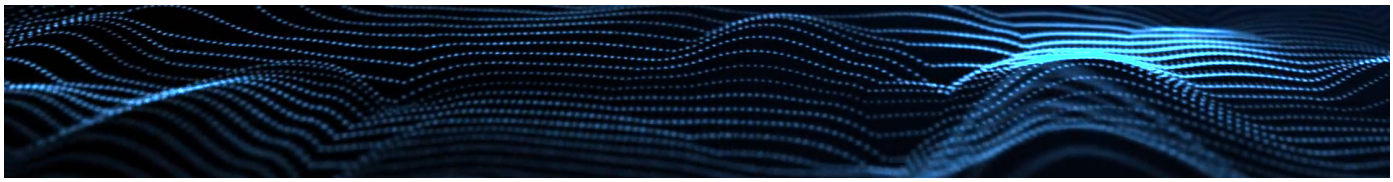
MLG MACHINE LEARNING GROUP

SEMINAR



DISCOVERING NATURAL LAWS FROM DATA

by Dr. Georges Tod

Mathematical models are used in many applications, for example to understand climate change, to predict the spread of an epidemy or to control the flight of an aircraft. To derive such models, it is usual to start by stating conservation laws, physical principles and/or phenomenological behaviors. The derivations then lead to mathematical models. When the systems are too complex to be modeled that way and if some data is available from observations or experiments, it is of great interest to be able to automatically derive a sufficiently general model out of the data with the help of a machine. When it comes to spatiotemporal data, this work explores the recently introduced Physics Informed Neural Networks (PINNs) and sparse regression to infer interpretable partial differential equations (PDEs) directly from data.

WHEN

October 13th, 16.00

WHERE

On Zoom, link below

https://bit.ly/36zScPm

Georges started his career in 2011 as an engineer designing helicopter rotors at Airbus. In 2015, he defended a PhD in mechanical engineering at Art et Métiers ParisTech on the modeling of bioaeroelastic behavior of helicopters using bond graphs. In 2016, during a first postdoc at ULB, he contributed to the hover flight stabilization of a robotic hummingbird. He then moved to the Flanders Make research institute in Leuven were he conducted industrial research and started working on how to model physical systems using machine learning. Back at ULB as a student in data science, he defended last September a master thesis on how to discover interpretable partial differential equations from spatiotemporal data. In November 2020, he will start a postdoc at Centre de Recherches Interdisciplaires in Paris (INSERM – Université de Paris) on physics inspired machine learning.

His main research interests are about the modeling and simulation of complex dynamic systems and hybrid physics machine learning approaches.