

---

# Event detection and data-driven models: hands-on with machine learning

Gautier Nguyen\*<sup>1</sup>

<sup>1</sup>Laboratoire de Physique des Plasmas – Université Paris-Sud - Paris 11, Observatoire de Paris, Ecole Polytechnique, Sorbonne Université, Centre National de la Recherche Scientifique : UMR7648 – France

## Résumé

Machine learning algorithms represent a promising tool to tackle already large and ever-growing databases of in-situ spacecraft measurement. Their application in the field of space physics is currently flourishing. These methods have especially been used on solar image tasks such as the prediction of solar flares or the detection of sunspots. Their application to event detection in time series has also been investigated through a classification method of data intervals containing Flux Transfer events or detection of the starting and ending time of Interplanetary Coronal Mass Ejections (ICMEs) in streaming time-series.

These applications are especially useful to rapidly provide reproducible catalogs of events that can be used for further scientific investigations.

In this lecture, we will present general concepts on Machine Learning and its utilization in space plasma physics. We will then apply these techniques to the detection and the construction of a data-driven bow-shock model.

---

\*Intervenant