

## THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

## **Department of Mathematics**

# **SEMINAR ON PDE**

## **Area Variations with Differential Constraints**

### Prof. Tristan Rivière

### ETH Zurich

#### <u>Abstract</u>

The study of the variation of the area of sub-manifolds under pointwise constraints on the tangent plane has numerous motivations from various branches of mathematics such as control theory, elasticity, symplectic and calibrated geometry or minimal surface theory. We will explain the difficulties for developing the analysis of the PDEs such variational problems are generating and expose various regularity results obtained in this direction so far. We will then come to a recent work in collaboration with Alessandro Pigati in which we are proving that surfaces which are critical points of the area under Legendrian constraint, that is surfaces which are tangent to a non integrable plane distributions and critical point of the area under this sub-Riemannian constraint, are smooth away from isolated conical singularities. We will then come to the still mysterious problem relative to the location of these conical singularities and explain why it is relevant to fundamental questions in differential geometry which have to do with the realization or not of special homology classes by calibrated surfaces.

#### Date: 24 April 2025 (Thursday)

#### **Time: 4:00pm**

Zoom Meeting: <u>https://hkust.zoom.us/j/99230774811</u> (Passcode: 896212)

All are Welcome!