

IST – LNEC Joint Doctoral Initiative

## Thesis Topic Proposal Form

<b>TITLE:</b> Laboratory and numerical study of woody and stony debris flow	<b>Order of preference</b>
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**Short Description** (max. 500 characters)

Debris flows have been seen as two-phase mixtures of sediment and water, but wood can represent a relevant fraction of total flow. The effects of this third phase on the rheology and macroscopic behavior of the flow are poorly understood. This phd project is aimed at investigating, through laboratory experiments and numerical data production with SPH and DEM, the effect of the size and concentration of wood elements on the macroscopic behavior of debris flows. The results of this investigation will be validated with field data from Madeira Island.

**Keywords:** debris flow; effect of wood; laboratory work; SPH; DEM

**SUPERVISORS**

IST: Rui Ferreira, Rodrigo Oliveira

LNEC: Teresa Viseu

 Planned start date: 1<sup>st</sup> April 2019

Start institution: IST

<b>TITLE:</b> Energy recovery in pressurised hydraulic systems: experimental studies and large-scale testing	<b>Order of preference</b>
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**Short Description** (max. 500 characters)

This project aims at the consolidation of knowledge on energy recovery solutions in different hydraulic infrastructures (water, wastewater, irrigation; treatment facilities). Pumps operating in the normal and reverse modes will be tested in the laboratory for estimating and optimizing the machine operation for supplying to requested demand and pressure. Data and parameter uncertainties will be analysed. A comprehensive methodology for assessing the energy recovery potential in water infrastructures will be consolidated, demonstrated and tested with analysis in real life systems.

**Keywords:** energy recovery, energy efficiency, experimental studies, field tests

**SUPERVISORS**

IST: Dália Covas

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 Planned start date: 1<sup>st</sup> April 2019

Start institution: IST

