**T29 – Pedestrian and Evacuation Dynamics**

**Learning Aim**

The aim of this section of the T29 module is to introduce students to the area of pedestrian and evacuation dynamics by providing them with an understanding of the mathematics and human behaviour theories relevant to this topic, so that they can critically evaluate simulation models and evacuation experimental design.

**Learning Objectives**

The objectives of this section of the module are:

1) To introduce an overall appreciation and knowledge of pedestrian dynamics, both from an academic and industry perspective.

2) To develop an understanding of the different theories of human behaviour during evacuations, and stress the importance of accounting for human behaviour in emergencies.

3) To develop competence in mathematical modelling and an understanding of computational simulation of pedestrian and evacuation dynamics.

4) To stress of the importance of data and introduce basic experimental design for investigating concepts related to evacuations and pedestrian dynamics.

**Intended Learning Outcomes (ILOs)**

Upon successful completion of this section of the module, students will be able to:

* Define the topics of pedestrian and evacuation dynamics and describe how different approaches can be used for specific design scenarios.
* Outline the main emergent properties of crowd behaviour, and their current usage for validation of microscopic models.
* Employ the hydraulic model of evacuation to calculate total evacuation times for simple building geometries.
* Outline the main theories of human behaviour in evacuations, and apply these theories to descriptions of real events in order to identify evidence that can be used to support these theories.
* Recall and develop different algorithms used for pedestrian dynamics simulation models, and compare these based on their advantages and disadvantages for different applications.
* Evaluate the design of pedestrian dynamics and evacuation experiments, and differentiate experimental conditions from real world occurrences, especially with respect to extreme scenarios.