

## Ph.D. in Information Technology:

### Thesis Defenses April 8th, 2021 online by TEAMS – at 10:30

[Fai clic qui per partecipare alla riunione](#)

**Marco Di Giovanni – XXXIII cycle**

Advisor: Marco Brambilla

PhD Thesis Title : Exploring and Challenging the Limits of Language Models and their Application to Human-generated Textual Content

#### Short Abstract:

Social networks are enormous sources of human-generated content. Users continuously create useful information, hard to detect, extract, and categorize.

Language Models (LMs) have always been among the most useful and used approaches to process textual data. At first designed by simple unigram models, through the years they have been improved until the recent release of BERT, a pre-trained model reaching state-of-the-art performances in many heterogeneous benchmark tasks.

In this thesis, I apply LMs to textual content publicly shared on social media, intending to find meaningful representations of users that encode syntactic and semantic features. Once embeddings are defined, I compute similarities between users to perform higher-level tasks. Tested tasks include the extraction of emerging knowledge, represented by users similar to a given set of well-known accounts, community detection and characterization, user classification (e.g., political inclination) and controversy detection in online discussions. The obtained successful results demonstrate that encoding techniques are adequate.

Finally, due to the evident noise of contents shared on social media, I investigate how robust LMs are, by designing an evolutionary adversarial algorithm (EFSG) that generates sentences with the sole purpose to fool LMs. Adversarial training is an effective defense technique to obtain more robust and reliable models.

#### Committee Members

Cristani Matteo	Università di Verona
Rico Mariano	Universidad Politécnica de Madrid
Carman Mark James	Politecnico di Milano - Deib