



Assistant Professor Nicoletta Nicolaou is one of the authors of the paper *Extendable Hybrid approach to detect conscious states in a CLIS patient using machine learning* accepted for presentation at the [10th Eurosim Congress 2019, La Rioja, Logroño, Spain, 1-5 July 2019](#).

ABSTRACT:

In this study a method for uncovering consciousness in complete locked-in syndrome (CLIS) patients is proposed. The main characteristic of CLIS patients is sufficiently intact cognition, but complete paralysis. It is, thus, vital to develop alternative means of communicating with CLIS patients, and brain-computer interfaces offer a possible platform to do so. A major issue in the study of consciousness in CLIS patients is that there is no certitude regarding their actual state of consciousness. Existing methods provide only a probability of what the states of the patients might be at each moment. This paper proposes a hybrid system based on the combination of complex coherence, sample entropy and Granger causality to uncover the underlying state of consciousness in a CLIS patient from electrocorticography signals. The contribution of each method to the system is determined using machine learning techniques. The aim of the research is to increase the probability of correctly detecting the patients' consciousness states and, ultimately, use that to develop a reliable brain-computer interface-based communication tool.