

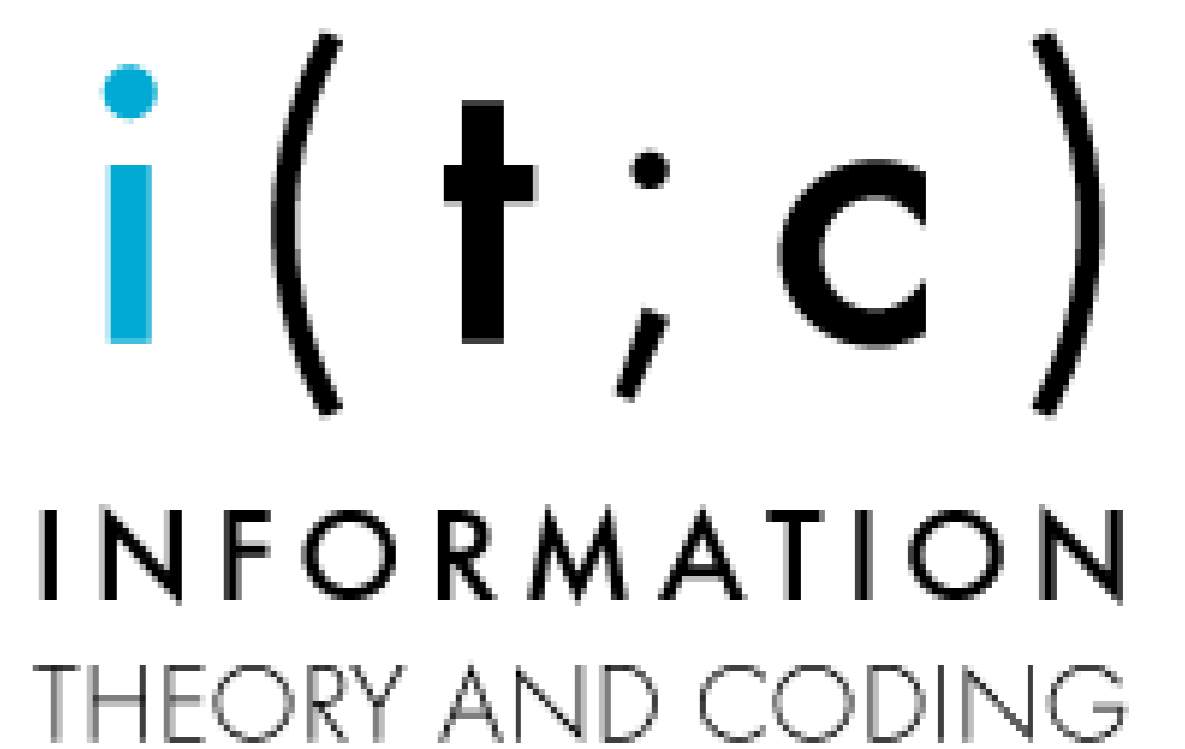
PhD Scholarship in Information Theory

Information Theory and Coding Group

<http://itc.upf.edu>



**Universitat
Pompeu Fabra**
Barcelona



Group

The Information Theory and Coding (ITC) group at the Department of Information and Communication Technologies of Universitat Pompeu Fabra started its activities in September 2011 to study the mathematical foundations of communications and data compression, spanning the fields of Information Theory, Coding Theory, Communications Theory and Signal Processing.

Position and Funding

A PhD position in Information Theory is available, funded by the European Research Council and the Spanish Ministry of Economy and Competitiveness. The duration of the position is 4 years and the salary will be in accordance with experience. Remunerated teaching will be optional.

Background

Shannon's Information Theory establishes the fundamental limits of information processing systems. A concept that is hidden in the mathematical proofs of most of the previous work in Information Theory, is that in order to achieve the fundamental limits asymptotically long sequences are needed. Real information processing systems have strict limitations in terms of length, induced by system constraints on delay, energy and complexity. When finite-lengths are employed, asymptotic analysis techniques (laws of large numbers, large deviation analysis) cannot be invoked and a new mathematical approach must be sought. A fundamental understanding of the impact of finite-lengths is crucial to harvesting the potential gains in practice. This project is aimed at contributing towards the ambitious goal of providing a unified framework for the study of finite-length Information Theory. This unconventional and challenging treatment of Information Theory will advance the area and will contribute to disciplines where Information Theory is relevant, such as communication theory, probability theory, statistics, physics, computer science, mathematics, economics, bioinformatics and computational neuroscience.

Topics

Specific research topics include (but are not limited to) the finite-length analysis of:

- Joint source-channel coding
- Mismatched decoding
- Multiple-access and broadcast techniques

Contact

Interested candidates should contact Albert Guillén i Fàbregas (guillen@ieee.org) for further particulars.

