



Call for Workshop Papers

PIMRC 2018 Workshop W9: Mathematical Tools for IoT Networks (MoTION)

Date: Sunday, September 9. Time: 14.00 – 17.30

Workshop Organiser(s): Philippe Mary, Univ. Rennes, INSA Rennes, CNRS, IETR, France; Jean-Marie Gorce, Univ. Lyon, INSA Lyon, CITI Lab, France; Laurent Clavier, IMT Lille Douai, France.

Motivation and Background

This workshop is organized in the framework of the ANR project ARBurst and the COST action CA14104 IRACON. IoT, myth or reality, is in an intensive development phase. Existing technical solutions, such as the ones developed by Sigfox but also those supported by LoRa alliance or 3GPP, lie on proprietary solutions whose effectiveness seems difficult to evaluate or are based on techniques devoted to wireless broadband networks in a first place. From a theoretical point of view, IoT networks lie on a paradigm shift with respect to usual broadband cellular networks; the main issue is no longer to achieve the highest possible data rate but rather an ultra-high reliability and very low latency in order to transmit few information bytes without protocols, or at least with the minimal overhead. The main features of IoT networks could be summarized as: i) short packet communications, ii) bursty interference, iii) high number of nodes and iv) connectionless communications. The first feature invalidates the use of the classical asymptotic Shannon theory as a unique mathematical tool to assess the performance of IoT systems. The second feature is due to the small packet size, the different sources are random and generate bursty interference which is not Gaussian distributed. The large number of nodes advocates for the use of the stochastic geometry that should be adapted to i) and ii). Finally, due to the high number of nodes, perfect scheduling is not possible and only light coordination mechanisms should be used. This workshop aims at identifying the approaches and mathematical tools allowing to handle correctly the radio access interface optimized for IoT.

Topics of interest include, but are not limited to:

- Non-asymptotic information theory, estimation theory
- Stochastic geometry and associated tools for dense wireless networks
- Non-Gaussian interference and rare events dependency modeling
- Low overhead protocol for radio access
- Signal processing and channel coding techniques for non-Gaussian interference and short packets
- Non-orthogonal multiple access schemes, massive connectivity
- Machine learning for spectrum access

Submission Guidelines

Prospective authors are invited to submit technical papers of their previously unpublished work. Accepted workshop papers will be part of the Conference Proceedings and will be uploaded to IEEE Xplore. Papers should be submitted via EDAS; the links are available at <http://pimrc2018.ieee-pimrc.org> under “Authors”. Papers should follow the same Author guidelines of the general symposium, which are available at <http://pimrc2018.ieee-pimrc.org/authors/submission-guidelines/>.

Key Dates

Paper submission:	May 18, 2018
Acceptance notification:	June 15, 2018
Final paper due:	June 29, 2018

Steering/Technical Committee

Philippe Mary, Univ. Rennes, INSA Rennes, CNRS, IETR, France.
Jean-Marie Gorce, Univ. Lyon, INSA Lyon, CITI Lab, France.
Laurent Clavier, IMT Lille-Douai, France.