Workshop : **Introduction to inference and decision analysis using Bayesian networks** (4h)

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In many fields where coherent reasoning in situations of uncertainty plays an important role, Bayesian Networks (BNs, for short) are now considered as a general scheme for the representation and use of expert knowledge. BNs involve elements from graph and probability theory and provide a pictorial representation of the dependencies and influences among variables deemed to be relevant for a particular probabilistic inference and decision problem. BNs also feature convenient extensions to elements of decision theory.

This workshop aims at providing basic knowledge, modelling capabilities and methodology. In particular, this workshop intends to :

- *familiarize* participants with the basic concepts of Bayesian networks;
- *draw attention* to the ways in which uncertainty affects the coherent evaluation of scientific evidence and how this issue can be addressed by probability theory;
- *introduce* participants to the connection between uncertainty management (using probability) and coherence in practical decision making (using statistical decision theory);
- *enable* participants to recognize potential applications of Bayesian networks and questions in decision analysis in their own field of expertise.

Participants will get an opportunity to:

- *acquire* the basic skills of analyzing and representing inference and decision problems using Bayesian networks;
- *apply* the Bayesian network methodology for studying standard probabilistic inference and decision procedures for common types of forensic traces;
- *implement* Bayesian networks models through the application of the graphical user interface of a standard Bayesian network software (i.e., Hugin).

TIME	TOPICS
8:00 – 9:00	• Introduction: welcome and general overview of the program. • Use of software to deal with Bayesian networks (tutorial / instruction and demonstration). • Introductory exercises on probability and inference.
9:00 – 9:30	• Discussion and feedback (on introductory exercises)
9:30 – 9:50	Break
9:50 – 12:00	• A step forward : elements of decision theory. • Exercises on probability and decision. • Discussion and feedback (on the analysis of decision).

Participants are encouraged to use their own laptop. Please download and install the Bayesian network software (i.e., Hugin) that will be used throughout this workshop, at http://www.hugin.com/productsservices/demo/hugin-lite