

# ISIPTA '07 PROGRAMME

## Monday 16 July 2007: Tutorials

08:00 - 09:00	<i>Registration</i>
09:00 - 09:45	Tutorial I (first part)
09:45 - 09:50	<i>Short Break</i>
09:50 - 10:35	Tutorial I (second part)
10:35 - 11:00	<i>Morning Coffee Break</i>
11:00 - 11:45	Tutorial II (first part)
11:45 - 11:50	<i>Short Break</i>
11:50 - 12:35	Tutorial II (second part)
12:35 - 14:00	<i>Lunch Break</i>
14:00 - 14:45	Tutorial III (first part)
14:45 - 14:50	<i>Short Break</i>
14:50 - 15:35	Tutorial III (second part)
15:35 - 16:00	<i>Afternoon Coffee Break</i>
16:00 - 16:45	Tutorial IV (first part)
16:45 - 16:50	<i>Short Break</i>
16:50 - 17:35	Tutorial IV (second part)
17:45	<i>Meeting for Guided City Walk</i>

## Tuesday 17 July 2007

08:30 - 08:40	Opening Session
08:45 - 10:25	Statistical Reasoning + Decision making I
10:25 - 10:40	<i>Morning Coffee Break</i>
10:40 - 12:00	Applications
12:00 - 13:10	Morning Poster Session
13:10 - 14:30	<i>Lunch Break</i>
14:30 - 16:30	Coherence and Natural extension
16:30 - 16:50	<i>Afternoon Coffee Break</i>
16:50 - 18:00	Invited Talk I
18:00 - 19:00	Afternoon Poster Session
20:00	<i>Meeting for Welcome Party</i>
20:30 - ...	<i>Welcome Party at Rezava Kotva Restaurant</i>

## Wednesday 18 July 2007

08:45 - 10:25	Markov models + Psychological studies
10:25 - 10:40	<i>Morning Coffee Break</i>
10:40 - 12:00	Foundations
12:00 - 13:10	Morning Poster Session
13:10 - 14:30	<i>Lunch Break</i>
14:30 - 16:30	Belief functions and Random sets
16:30 - 16:50	<i>Afternoon Coffee Break</i>
16:50 - 18:00	Invited talk II
18:00 - 19:00	Afternoon Poster Session
20:00	<i>Meeting for Symposium Dinner</i>
20:15 - ...	<i>Symposium Dinner at the Kamenny Most Restaurant</i>

## Thursday 19 July 2007

08:45 - 10:25	Credal nets + Probabilistic Logic
10:25 - 10:40	<i>Morning Coffee Break</i>
10:40 - 12:00	General aspects
12:00 - 13:10	Morning Poster Session
13:10 - 14:30	<i>Lunch Break</i>
14:30 - 16:10	Statistical Reasoning + Decision Making II
16:10 - 16:30	<i>Afternoon Coffee Break</i>
16:30 - 17:50	Predictive inference and Prior ignorance
17:50 - 18:50	Afternoon Poster Session
18:50 - 19:00	Closing Session

## TUTORIAL I

09:00 - 10:35

### *Risk analysis: rough but ready tools for calculations under variability and uncertainty*

Scott Ferson

Risk analysis is widely used in many disciplines to quantify risks or expectations in the face of pervasive variability and profound uncertainty about both natural and engineered systems. Although most analyses today are still based on point estimates, awkward qualitative assessments, or probabilistic calculations employing unwarranted assumptions, the methods of imprecise probability hold great promise for allowing analysts to develop quantitative models that make use of the knowledge and data that are available but do not require untenable or unjustified assumptions or simplifications. This tutorial will introduce some of the methods that are easiest to make calculations with, including probability bounds analysis, Dempster-Shafer evidence theory, and interval statistics, and will show how they can be used to address the basic problems that risk analysts face: not knowing the input distributions, not knowing their correlations, not being sure about the model itself, or even which variables should be considered. We suggest that these tools constitute a practical uncertainty arithmetic (and logic) that can be widely deployed for lots of applications. Of course, not all problems can be well solved by these relatively crude methods. Examples requiring fuller analyses with the methods of imprecise probability are described.

## TUTORIAL II

11:00 - 12:35

### *An introduction to the theory of coherent lower previsions*

Enrique Miranda

In this tutorial, I introduce the main elements of Peter Walley's theory of coherent lower and upper previsions. I review the notions of avoiding sure loss and coherence, and the representation of coherent assessments in terms of sets of linear previsions and sets of almost-desirable gambles. Then, I turn to the notion of natural extension, and give its expression under any of these three equivalent representations. Finally, I study how to update assessments in a coherent way, presenting the main facts about conditional lower previsions.

## TUTORIAL III

14:00 - 15:35

### *Generalized information theory*

George J. Klir

A research program whose objective is to study the dual concepts of information-based uncertainty and uncertainty-based information in all their manifestations was introduced in the early 1990s under the name "generalized information theory" (GIT). The purpose of this tutorial is to introduce conceptual boundaries within which GIT operates and a comprehensive overview of principal results that emerged from GIT. As in classical information theory, uncertainty is the primary concept and information is defined in terms of uncertainty reduction. GIT is based on a two-dimensional expansion of classical information theory. In one dimension, additive probability measures of classical information theory are expanded to various types of nonadditive measures. In the other dimension, the theory of classical sets, within which probability measures are formalized, is expanded to the various theories of fuzzy sets. Each choice of a particular set theory and a particular measure theory defines a particular information theory. The full development of any of these information theories requires that issues at each of the following four levels be adequately addressed: (1) an uncertainty function,  $u$ , of the theory be formalized in terms of appropriate axioms; (2) the calculus for dealing with function  $u$  be properly developed; (3) a justifiable functional,  $U$ , be determined by which the amount of relevant uncertainty (predictive, prescriptive, diagnostic, etc.) associated with function  $u$  is measured; and (4) methodological aspects of the theory be developed by utilizing functional  $U$  as a measuring instrument. The tutorial is presented in two parts of approximately the same duration. An overall characterization of GIT is presented in the first part. After a brief overview of classical information theory, a general framework for formalizing uncertainty and the associated uncertainty-based information of any conceivable type is sketched. The various theories of imprecise probabilities that have already been developed within this framework are surveyed and some important unifying principles applying to these theories are introduced. The second part is devoted to the issues of measuring uncertainty and information in the various theories and to the methodological principles based on these measuring capabilities. The tutorial is concluded by a discussion of some open problems in the area of GIT. The tutorial is intended as a gentle introduction to the area of GIT, which is covered in a greater depth in the recent book "Uncertainty and Information: Foundation of Generalized Information Theory" by George J. Klir (Wiley-Interscience, 2006).

## TUTORIAL IV

16:00 - 17:35

### *Decision theories for imprecise preferences and imprecise probabilities*

Teddy Seidenfeld

This tutorial offers an overview of selected alternative decision theories designed for use with IP theory. The review begins with an examination of the kinds of rival decision theories that ensue when each of the familiar axioms of, for instance, Anscombe-Aumann Horse Lottery theory is relaxed to accommodate normal-form IP theory. From this base, further generalizations are considered, including: multi-agent decision making, extensive form IP theory, and several interesting considerations that attend problems with infinite decision structures.

Tuesday 17 July 2007

## STATISTICAL REASONING AND DECISION MAKING I

08:45 - 10:25

*Coherent choice functions under uncertainty* (385)

Teddy Seidenfeld, Mark J. Schervish, Joseph B. Kadane

*Finite approximations to coherent choice* (425)

Matthias C. M. Troffaes

*Luceños' discretization method and its application in decision making under ambiguity* (327)

Michael Obermeier, Thomas Augustin

*Minimax regret treatment choice with finite samples and missing outcome data* (415)

Jörg Stoye

*Linear regression analysis under sets of conjugate priors* (445)

Gero Walter, Thomas Augustin, Annette Peters

## APPLICATIONS

10:40 - 12:00

*Uncertainty analysis in food engineering involving imprecision and randomness* (21)

Cédric Baudrit, Arnaud Hélias, Nathalie Perrot

*Predicting the next pandemic: An exercise in imprecise hazards* (41)

Mikēlis Bickis, Uģis Bickis

*Imprecise probability methods for sensitivity analysis in engineering* (317)

Michael Oberguggenberger, Julian King, Bernhard Schmelzer

*Estimating probability distributions by observing betting practices* (281)

Caroline Lynch, Donald Barry

## COHERENCE AND NATURAL EXTENSION

14:30 - 16:30

*Some results on imprecise conditional prevision assessments* (31)

Veronica Biazzo, Angelo Gilio

*Some bounds for conditional lower previsions* (337)

Renato Pelessoni, Paolo Viciq

*Coherence graphs* (297)

Enrique Miranda, Marco Zaffalon

*Enhancement of natural extension* (253)

Igor Kozine, Victor Krymsky

*Computing expectations with  $p$ -boxes: two views of the same problem* (435)

Lev Utkin, Sébastien Destercke

*Coherence and fuzzy reasoning* (165)

Serena Doria

## INVITED TALK I

16:50 - 18:00

*Game-theoretic probability: Theory and applications*

Glenn Shafer

Wednesday 18 July 2007

## MARKOV PROCESSES + PSYCHOLOGICAL STUDIES

08:45 - 10:25

*Multilinear and integer programming for Markov decision processes with imprecise probabilities* (395)  
Ricardo Shirota Filho, Fabio Gagliardi Cozman, Felipe Werndl Trevizan, Cassio Polpo de Campos, Leliane Nunes de Barros

*Regular finite Markov chains with interval probabilities* (405)  
Damjan Škulj

*Conditioning in chaotic probabilities interpreted as a generalized Markov chain* (365)  
Leandro Chaves Rêgo

*Human reasoning with imprecise probabilities: Modus ponens and denying the antecedent* (347)  
Niki Pfeifer, Gernot D. Kleiter

*On the explanatory power of indeterminate probabilities* (117)  
Horacio Arlo Costa, Jeffrey Helzner

## FOUNDATIONS

10:40 - 13:00

*The logical concept of probability: Foundation and interpretation* (455)  
Kurt Weichselberger

*Scoring rules, entropy, and imprecise probabilities* (307)  
Robert Nau, Victor Richmond Jose, Robert Winkler

*On coherent immediate prediction: Connecting two theories of imprecise probability* (97)  
Gert de Cooman, Filip Hermans

*An extension of chaotic probability models to real-valued variables* (193)  
Pablo I. Fierens

## BELIEF FUNCTIONS AND RANDOM SETS

14:30 - 16:30

*An independence concept under plausibility function* (287)  
Marcello Mastroleo, Barbara Vantaggi

*Independence concepts in evidence theory* (125)  
Inés Couso

*Compositional models of belief functions* (243)  
Radim Jiroušek, Jiřina Vejnarová, Milan Daniel

*Constructing predictive belief functions from continuous sample data using confidence bands* (11)  
Astride Aregui, Thierry Denoeux

*Multiparameter models: Probability distributions parameterized by random sets* (183)  
Thomas Fetz

*On various definitions of the variance of a fuzzy random variable* (135)  
Inés Couso, Didier Dubois, Susana Montes, Luciano Sánchez

## INVITED TALK II

16:50 - 18:00

*In the realm of probability: Limits to standard probability*  
Terrence Fine

**CREDAL NETS + PROBABILISTIC LOGIC**

08:45 - 10:25

*Credal networks for military identification problems* (1)  
Alessandro Antonucci, Ralph Brühlmann, Alberto Piatti, Marco Zaffalon

*Credal nets with probabilities estimated with an extreme Imprecise Dirichlet Model* (57)  
Andrés Cano, Manuel Gómez Olmedo, Serafín Moral

*Inference in credal networks through integer programming* (145)  
Cassio Polpo de Campos, Fabio Gagliardi Cozman

*Climbing the hills of compiled credal networks* (213)  
Rolf Haenni

*Qualitative and quantitative reasoning in hybrid probabilistic logic programs* (375)  
Emad Saad

**GENERAL ASPECTS**

10:40 - 12:00

*Comparative probability orders and the flip relation* (67)  
Marston Conder, Dominic Searles, Arkadii Slinko

*Measuring uncertainty with imprecision indices* (47)  
Andrey Bronevich, Alexander Lepskiy

*Relating practical representations of imprecise probabilities* (155)  
Sébastien Destercke, Didier Dubois, Éric Chojnacki

*On  $\sigma$ -additive robust representations of convex risk measures for unbounded financial positions in the presence of uncertainty about the market model* (263)  
Volker Krätschmer

**STATISTICAL REASONING AND DECISION MAKING II**

14:30 - 16:10

*Data-based decisions under imprecise probability and least favorable models* (203)  
Robert Hable

*Distributions over expected utilities in decision analysis* (175)  
Love Ekenberg, Mikael Andersson, Mats Danielson, Aron Larsson

*Information processing under imprecise risk with the Hurwicz criterion* (233)  
Jean-Yves Jaffray, Meglena Jeleva

*Quantile-filtered Bayesian learning for the correlation class* (223)  
Hermann Held

*Updating and testing beliefs: An open version of Bayes' rule* (271)  
Elmar Kriegler

**PREDICTIVE INFERENCE AND PRIOR IGNORANCE**

16:30 - 17:50

*Jury size and composition - a predictive approach* (87)  
Frank P. A. Coolen, Brett Houlding, Steven G. Parkinson

*Multinomial nonparametric predictive inference with sub-categories* (77)  
Frank P. A. Coolen, Thomas Augustin

*Immediate prediction under exchangeability and representation insensitivity* (107)  
Gert de Cooman, Enrique Miranda, Erik Quaeghebeur

*Learning about a categorical latent variable under prior near-ignorance* (357)  
Alberto Piatti, Marco Zaffalon, Fabio Trojani, Marcus Hutter