

Short report on the 6th SIPTA Summer School

The *6th SIPTA Summer School* took place in Montpellier, France in the time between the 21th and the 25th of July 2014. Here, the term *SIPTA* abbreviates the *Society for Imprecise Probability: Theories and Applications*, which constitutes one of the biggest and most productive communities doing research on the theory of *imprecise probability*. In particular, this involves theoretical topics like for instance *decision theory under generalized uncertainty*, *generalized inference theory*, *imprecise stochastic processes*. However, also a special focus on applications of the theory is set.



Right before the beginning of the summer school, I started looking for topics to write my master's thesis on. As I already had some experiences with and a great interest in decision theory under imprecise probability (I attended the lecture *Decision Theory* held by Prof. Thomas Augustin and a seminar on *Generalized concepts of uncertainty* during my studies), I decided to choose a topic from this area. After having talked about it with my supervisor Thomas Augustin, he mentioned the possibility to participate in the SIPTA Summer School, in order to see what are the hot topics in the field and to obtain an overview on the research being done in related areas in general.

This is where *Lehre@LMU* came into play: The 500€ funding I received from this project made it possible for me to indeed go to Montpellier and to participate in the Summer School there (coincidentally, this was exactly the participation fee). In the following, I want to briefly summarize the schedule of the summer school and report on some experiences I made there.

STARTING TIME	Monday 21 July	Tuesday 22 July	Wednesday 23 July	Thursday 24 July	Friday 25 July
	Registration				
8:30					PET
9:00	IPT	ALGO		INFER	ENV
9:30					
10:00					
10:30	Break				
11:00	IPT	ALGO	STUDENT SESSION	INFER	CCI
11:30					
12:00					
12:30	Break				
13:00	Break				
13:30	Break				
14:00	GRAPH		DEC	OTH	REVISION SESSION
14:30					
15:00					
15:30					
16:00	Break				
16:30	GRAPH		DEC	OTH	REVISION SESSION
17:00					
17:30					
18:00					
18:30					

The first day was reserved for two introductory sessions on *Imprecise probability theories* held by Sebastien Destercke (UTC, Compiègne, France) and Enrique Miranda (U.

Oviedo, Spain) in the morning and to two sessions on *Graphical models and knowledge discovery* held by Alessandro Antonucci, Cassio Polpo de Campos and Francesca Mangili (all IDSIA Lugano, Switzerland) in the afternoon.

The second day was all about computation: In two sessions on *Algorithms and approximation methods for Imprecise Probabilities* the people from IDSIA demonstrated ways of making the very sophisticated mathematics underlying IP theory computational tractable. The afternoon was reserved for the social event, which was a very impressively guided tour through the botanic garden of Montpellier.

The third day started with a session in which PhD students had the opportunity to present their research projects and to discuss those with the experts present. In the afternoon, it was finally *decision making* time: In this session held by Matthias C. M. Troffaes (U. Durham, UK) a fascinating overview of lots of topics relevant for modern IP-driven decision theory was provided (including a discussion of decision criteria under IP and computation of optimal decisions in both single-stage and sequential decision problems).

On the fourth day, there were two sessions on generalized *Inference* (inference based on imprecise probabilistic models) held by Gert de Cooman (U. Ghent, Belgium) and Erik Quaeghebeur (CWI Amsterdam, the Netherlands). Here, especially the part on *group theoretical interpretation of exchangeability* ending with an algebraic proof for *De Finetti's Theorem* stayed in mind. In the afternoon, with addressing *Special cases of lower previsions and their use in statistics* Ines Couso (U. Oviedo, Spain) and Didier Dubois (IRIT Toulouse, France) also gave very interesting talks.

The last day was all about applications: There were talks belonging to very different scientific areas, namely *Non parametric Bayesian inference for Positron Emission Tomography reconstruction* by Mame Diarra Fall (MAPMO, Orléans, France), *Joint treatment of stochastic and epistemic uncertainties: applications in the field of environmental risks* by Dominique Guyonnet (BRGM, Orléans, France) and *Climate Change Impact* by Hermann Held (PIK Postdam, Germany). The week was completed by a very nice revision session, where all participants once again had the opportunity to ask questions on topics treated during the whole week.



Finally, it is left to say that I am very grateful to the *Lehre@LMU* project for giving me this opportunity. Since then, not only I have successfully completed my master studies, but I have also started working on a PhD in the field of imprecise probability at the LMU Munich.