Professional scientific sessions for art, architecture and urban planning Thursday evenings
Held in: Conference hall of Herampey Consulting Engineers
Date: 28.12.2017
Title: Collective and Social intelligence in arts and architecture.
Speakers and panel members: Mrs. A. Fazli and Mr. N. Shamandi.

The speakers began their speech asserting that today the use of computer as a design tool has become usual, like the evaluation of the stability in the structures, environmental considerations or architectural design.

Presenting different uses they presented fields and spheres that the computer as a tool and knowledge serves to improve the final quality of the product.

Talking about the parametric design where different parameters are considered during the phase of design, like in architecture where different parameters like spaces, dimensions, measures… But today a new type of design called automatic parametric design. In this process when the operator changes some of the parameters in the project, the software changes automatically the related parameters. Of course this type of operation is possible to realize in projects that treat details and it's not possible to introduce it in projects that have larger dimensions, like schools, concert halls etc.

Another type is the combined systems where different and numerous components are put together, having also a complicated interrelationship between each other. They explained that in nature we can assist to many natural systems, like the way of collective life of many fish species.

genetic algorithm. In 1859 C. Darwin presented the theory of the evolution in the nature, where genetic population change in the time, transmitting hereditary characteristics as the result of their activity. In other words genetic algorithm can identify the hidden and common characteristics of different families in order to create new types of elements.

Talking about collective intelligence they explained that is a decentralized and auto organized behavior, that we can see in the natural environment or can be created artificially. This theory is usually the base of the creation of artificial intelligence. In this structure the data is used in collective and interrelated manner, inspired by natural and biological structures. The collective intelligence focuses on big groups that have an internal relationship. In this system the various parts of the group act independently but in a common context. The different parts act making separate and independent decisions, belonging at the same time to a common structure.

The speakers talked about the current process of collective intelligence dividing them in two principles, that are the self organization and the marking. Regarding the self organization they explained that it is working on four mechanisms that are the positive reaction, the negative reaction, the casual selection and multi reactions. They said that the collective behavior has been inspired by animal life and the ways the animals inter react, like what happens in the life of the

insects. They explained also the ways and the mechanisms that exist in the marking process and which are the uses and benefits that the animal enjoy from this activity, this can be used for the procreation process or for other spheres of the life, of course marking can a physical or chemical base.

Continuing their speech the speakers talked about the application of natural and animal successful cases introduced in the human life in order to improve the quality of our activities and to achieve better results. They spoke for example about the case of the design of railroads connecting Tokyo with adjacent cities. The goal was to find the best and shortest route of connection following somehow what the animals do in their everyday life in front of problems that create difficulties for their activity.

Talking about the use and application of collective intelligence in urban systems design, they talked about the experience realized in the USC university, where through the simulation of self organization processes the researchers transferred these experiences and results on the ground to improve and obtain results that they were looking for, for the solution of the problems that they had to face. One of the cases is the design of Hong Kong int'l airport. The research and design group considered the area of the old airport as an integral part of the city, where because of urban physical spaces limitations, the city was over loaded with population and infrastructures. Using elements and concepts of collective intelligence principles and experiences the designer group found the best solutions for the new airport, that permitted to satisfy actual and modern necessities, eliminating the problems that were created because of inappropriate choices in base of the existing conditions and capabilities.

The speakers shown charts and diagrams of how collective intelligence systems can function to organize the activity of the colonies that benefit from a smart organization of the activity through the transfer of the accumulated knowledge through a physical and instinctive process that in the course of centuries the animal life has perfected the conditions and quality of life of its components.