

## Report on CAPE Forum 2005 Cluj-Napoca, ROMANIA February 25-26, 2005

The traditional **CAPE Forum** was held this year in Cluj-Napoca, ROMANIA, between February 25-26, under the organization of Prof. Șerban AGACHI (*Babeș-Bolyai University Cluj-Napoca*) and Prof. Valentin PLEȘU (*University POLITEHNICA of Bucharest*).

The new building of the *Center of International Cooperation of BBU* assured very good scenery for the meeting, most of the participants being accommodated in the *Universitas* Hotel situated in the same location.

The meeting included two sections: the lecture section and the poster section.

In the lecture section 4 keynote lectures were presented by invited world wide known professors and researchers (Prof. GANI - Denmark, Prof. DAOUTIDIS - U.S.A., Prof. MOSER - Hungary and Prof. KRASLAWSKI - Finland) and 15 lectures. In the poster section, 24 works were presented.

The topics of the presented works included:

- molecular modeling and topology,
- phase equilibrium,
- mathematical modeling,
- process control and monitoring,
- optimization,
- CAD tools in Process Engineering,
- education,
- retrofit and process integration

according to the motto of the meeting: "*CAPE from molecular modeling to process integration*".

The number of participants to **CAPE Forum 2005** was the largest ever in the history of CAPE meetings, more than 65 participants (Belgium – 1, Denmark – 1, Finland – 2, Germany – 2, Hungary – 11, Italy – 1, Holland – 3, Poland – 1, Romania – 40, Spain – 1, Switzerland – 2, U.S.A. – 2) being in Cluj. The main auditorium of the *Center of International Cooperation* of BBU, most of the time, had no empty seats. Many PhD students and representatives of industry were present most of them playing an active role in the discussions about



the presented works.

The activities of the **CAPE Forum 2005** were completed with a series of additional activities:

- Course for PhD students with the title *Modelling of turbulent reacting flow and coupling of CFD with micromixing model and population balance* presented by Prof. BARRESI (Politecnico di Torino, Italy) in February 23, 2005;
- International seminar with the title *Creativity support tools and methods in process engineering*, lecturer: Prof. KRASLAWSKI (Lappeenranta University of Technology, Finland) on February 24, 2005.
- Workshop with the title: *Chemical Pinch approach in Pinch Analysis and the use of existing software* organized by University POLITEHNICA Bucharest - ROMANIA, VUB - Vrije Universiteit Brussel, BELGIUM and VITO - BELGIUM on February 26, 2005
- Course with the title *Process Synthesis: sequencing distillation columns* presented by in February 28, 2005, by Prof. LAUREANO (University of Barcelona, Spain) on February 28, 2005.



The agenda of the **CAPE Forum 2005** included a round table with the title *Perspectives in CAPE*. In this framework all participants had the chance to express their opinion about the present and future of CAPE. A transcript of these discussions is presented in the Appendix.

In the final day, a short visit to the laboratories of the *Faculty of Chemistry and Chemical Engineering* of BBU and to the *Central building* of BBU allowed the visitors to appreciate the tradition and endowment of the *Department of Chemical Engineering* of BBU – the main organizer of the **CAPE Forum 2005**. On this occasion, common research projects between the institutions of the participants were discussed in order to accede to international financing resources in the frame of FP6, Erasmus Mundus.

In conclusion, **CAPE Forum 2005** concurred to the development of CAPE activities by:

- Allowing researchers from all over the world to meet and discuss about their achievements, research topics and problems;
- Finding common research topics, thus enhancing the integration of researchers from EU member states with the colleagues from new member states as well as other countries of Central and Eastern Europe;
- Enabling a better planning of the future common EU supported projects and other forms of collaboration;
- Enhancing students' and the researchers' exchange;
- Ensuring the frame to present new research ideas.

## CAPE Forum 2005 – round table

### *Perspectives in CAPE*

Transcript of the discussions

#### What is CAPE?

Woinaroschy: Romanian models improved creativity supports probability to work with computer artificial intelligence. Creativity based on computer are the future. Romanian paper can give new ideas, CAPE can inspire from this papers.

- PSE: To have a systematic method solve process engineering problems
- Process: is the process of solving a problem (including chemical process). Process includes also product.
- CAPE = applying a system to solve a problem (the process of solving problem)
- For ther future: everything can be in CAPE and to include different topics

Is needed:

- Develop of Cape opens software
- software (interface between different software) project with industry. P = Process and also products.
- Include the tools.

What was done: the standards were defined. COLA -> to know about standards.

Creativity things: to know what we have to do with such detailed models? The generation of new ideas which can't be done by computers.

Jezowski: Is impossible for a person to develop complex models, the complex models are developed by computers.

Daoutidis: A lot of activity: system biology, material sciences are good developed, modeling and analysis are also good developed.

Heeres: To find generic framework to developed new products for the future.

- Daoutidis: Products design is important, creativity issues, but he is not sure how product design leads with CAPE It is need to understand the models. By the time new models are developed, new products appear.
- Agachi: CAPE should be directed in increasing efficiently, redesigning, find ways research can improve old processes.
- To be realistic about the fact who will support our research and where our students (products) will work
- EMENSON rapport -> how quickly was developed.
- Process intensification (big effort): nano + bio + IT + integration of this.
- Daoutidis: Report for tradition -> process engineering chemical is able to cover this direction. Selection tools must give a better task which are rules to follow (to make selection).
- Questions: In Romanian's industry: there exist instruments and tools to manage?
- Answer: Not yet (industry). In general some industrial plants have and are interesting in their development.
- Abonyi: There are many problems in modeling solid process. The old problems are not solve (electrochemistry).
- Comment: The problem was not yet open. Each company are developing regarding their problems. In the last year was an interest, but the industrial problems are keep secret.
- Nagy: In industry they have tools and ask for implemented something, but they don't give access to see models (BASF Company). Two steps modeling idea: is good to have the complex model.
- Daoutidis: The idea to develop a model reduction should be pushed.
- Agachi: Industrial examples: Chevron Company was interested to accept NMPC. A gap between industry from USA and from Europe. PVC production and control -> hired a Italian company not a Romanian.
- Question: do they observe the efficiency of CAPE in Hungary?
- Answer: They start to accept.
- Kiss: In Holland they are using empirical models in industry. The industry takes tools from academy, but they don't give back information. They are not CAPE tools for industry.
- Li: Some companies use CAPE tools.
- Kraslawski: Companies want solution for their problems, rather then tools (in Finland).
- Laureano: In some industrial sectors are very conservative companies.

### **About e-learning?**

- Laureano: We have to force students to think, not to use CAPE tools.
- Agachi: The gain of e-learning: you have to use e-learning where it can be used.  
In Bucharest e-learning exist. E-learning can be done synchronic or asynchronous. E-learning in Bucharest is at the beginning
- Li: E-learning should be combined with theoretical work.
- Barresi: The question: how much is students motivated for e-learning? It is necessary to be careful the time to dedicate for work. The students have less time for this. Preparing additional material fro students.
- Laureano: Teaching modules for CAPE. New challenge in CAPE education:
- e-learning,
  - teaching module for CAPE,
  - new activities for Eureka.
- E-learning in not o good tool for labs

### **CAPE Working Party&EFCE**

- Networking
- Conference
- New activities
- Future of CAPE Forum

### **For the future**

- Woinaroschy: Each poster should be presented before the poster presentations, increase the number of the posters.
- Agachi: Increase the number of presentations, reduced the time for this.