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30th SEFI Annual Conference

# The Renaissance Engineer of Tomorrow

SEFIrenze 2002  
Firenze, 8-11 September 2002

Claudio Borri  
Tor-Ulf Weck  
Editors

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# The Renaissance Engineer of Tomorrow

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Edited by:

Claudio Borri, Università degli Studi di Firenze, Italy  
Tor-Ulf Weck, Helsinki University of Technology, Finland



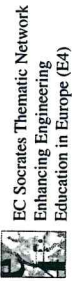
Founded in 1973, SEFI, the largest network of engineering institutions and educators, is an international non-governmental organisation under Belgian Law, whose *aims and objectives* are to contribute to the development and the improvement of engineering education and of the position of the engineering professionals, to provide appropriate services and to promote information about engineering education, to improve communication and exchanges between teachers, researchers and students in the various European countries, to develop co-operation between educational engineering institutions and establishments of higher technical education, to promote co-operation between industry and those engaged in engineering education, to act as an interlocutor between its members and other societies or organizations and to promote the European dimension in higher engineering education. This is done through a series of activities such as annual conference, ad hoc seminars, publications, newsletters, scientific journals, participation in and coordination of international projects.

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Tel: + 32 2 502 36 09 - Fax + 32 2 502 96 11 - E-mail: info@sefi.be - <http://www.sefi.be>



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## The Renaissance Engineer of Tomorrow

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### Co-organised by:

The *University of Florence*, whose origins can be traced back in 1321 with the "*Studium Generale*", is the main Organiser of the Conference, principally through its School of Engineering (established in 1971). Despite being the youngest of all the Faculties, this School is very active and recognised at international level, both in research and in educational matters.

The famous "*Istituto e Museo di Storia della Scienza*", one of the jewels amongst the museums of Florence, is Co-organiser of the Conference and, in particular, of a Session on the "Historical Development of Engineering Education". The Conference participants were invited to visit the Museum, with its collection of approximately 5,000 original instruments, many from the Medici and "Accademia del Cimento" collections.

### Under the Auspices of:

The "*Comune di Firenze*" also collaborated with the promotion of SEFITrenze 2002 and hosted the Inaugural Session in Palazzo Vecchio.

The "*Consiglio Nazionale delle Ricerche (CNR)*" is a public organisation of great relevance in the field of scientific and technological research of the Country whose original institution goes back to year 1923. CNR primary function is to carry on, through its own organs, advanced basic and applied research, both to develop and maintain its own scientific competitiveness, and to be ready to effectively and timely take part in the strategic fields defined by the national planning system.

The "*Fondazione Antonio Ruberti*" has recently been established in honour of the late Professor, Dean of Engineering and Rector of "La Sapienza", Italian Minister for University and Research, and European Commissioner, with the aim of promoting researches and exchanges in frontier sectors, both scientific and humanistic-artistic, in order to contribute to the development of a common European knowledge space and a European identity.



## Open and Distance Learning - New Possibilities for Higher Education

Dr. Danguole Rutkauskienė  
Distance Education centre, Kaunas University of Technology, Lithuania  
E-mail: danrut@umi.ktu.lt

Assoc. Prof. Dr. Petras Barsauskas  
Vice-Rector, Kaunas University of Technology, Lithuania  
E-mail: petras@ct.ktu.lt

Assoc. Prof. Dr. Daiva Dumciuvienė  
Office of Academic Affairs, Kaunas University of Technology, Lithuania  
E-mail: Daiva.Dumciuviene@ct.ktu.lt

**Keywords:** Open and Distance Learning (ODL), Higher education.

Lithuania, while creating knowledge based economy, is paying bigger and bigger attention to the development of competence of its citizens using Information Communication Technologies (ICT). Kaunas University of Technology is aiming to include ODL in traditional education. In different ways the University encourages teachers to take part in transferring traditional modules into ODL. The University is also assisting in gaining funds for the development of ODL. KTU is developing a strategy of e-university. E-studies Council at KTU is working on the establishment of policy for e-learning organisation and implementation. ODL is going to develop in two directions: University Studies and Continuing Professional Training Studies (CPTS). KTU strategy is to develop full DL study programmes and modernise full time studies using e-learning.

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**Curriculum vitae:** Mrs. Danguole Rutkauskienė's main research areas focus on the methodology and management of ODL, learning support system in ODL and sociological research in adult education. She is the author of 38 presentations and 5 books about Distance Education, and the co-ordinator of different national and international projects, such as Phare, Leonardo da Vinci, Socrates, UNESCO, FP4, FP5 etc.

**Curriculum vitae:** Mr. Petras Barsauskas' has his main responsibilities in the University: Infrastructure, International relations and contacts; European international programs; and Representation of the University and Lithuanian Institutions of Higher Education overseas. Publications: 42 articles, 4 books for students, and 1 scientific monograph.

**Curriculum vitae:** Mrs. Daiva Dumciuvienė's basic research and professional interests are: Industrial Economics, Industrial Policy, Industrial Competitiveness and Concentration, International Trade, European economic integration, Internationalisation of Higher Education and Continuing Education. Participation in the projects: SOCRATES, Increasing Adult Education in European Universities, SOCRATES/Erasmus, PHARE-2000.

## Developing a Virtual Tutorial System for Online Simulation Games

Prof. Bernd Scholz-Reiter, Sylvie Gavrey, Wolfgang Echelmeier, Tilo Hamann, Ronald Doberenz  
BIBA, Department of Intelligent Production- and Logistic Systems  
University of Bremen, Hochschulring 20, D-28359 Bremen, Germany  
Tel. +49 421 218 5635  
E-mail: ham@biba.uni-bremen.de

Jens Hoheisel  
INNOVI GmbH, Fahrtenheistrasse 1, 28359 Bremen  
E-mail: jens.hoheisel@innovi.de

**Keywords:** e-Learning, Tutorial Support, Online Simulation Games, Engineering Competencies.

The ongoing trend of globalisation and increasing international competition of European industries have changed the way companies design, produce and distribute their products and services. This has a strong impact on future work places and the requirements placed on qualification. Universities need to react to these changing demands. New training approaches for students are needed to train their ability to act and co-operate within complex distributed production systems.

Simulation games are well known to support that kind of knowledge and skills. For a successful simulation game course a sound didactical strategy is needed. The didactic strategy of simulation games is based on two theories of learning, the reflective learning and the constructive learning theory. Reflective learning means that the learner observes his or her own learning and guides his or her own learning activity with the help of the learning tools (i.e. COSIGA game) provided. Constructive learning is based on the idea that learning is actually an active construction of knowledge instead of a passive reception of information.

Simulations are an excellent way of combining these two learning styles in one package. The learning based on simulations and games can be described as a learning cycle including the following stages: Concrete experience, reflective observation, abstract conceptualisation and active experimentation. But the learning success of the constructive learning theory as a didactic method also depends on the care given to the individual by an instructor.

The paper will describe a concept of e-learning, where learning goals are not limited to the conveyance of expertise, but communication and co-operation competencies are trained in order to combine single production processes into a holistic context. The need for tutorial support of web-based training and especially of simulation games will be highlighted, thus leading to the concept of a "virtual tutorial system".

**Curriculum vitae:** Prof. Dr.-Ing. Bernd Scholz-Reiter is a full professor for the Planning and Control of Production Systems at the University of Bremen and also serves as Director of the Bremen Institute of Industrial Technology and Applied Work Science (BIBA) at the University of Bremen. He is recognised nationally and internationally as a leading authority in the fields of distributed production systems, process modelling and simulation as well as the planning and control of production systems. He is a member of numerous professional societies, specialist working groups and international organisations dedicated to his field of expertise.