



SOCIÉTÉ EUROPÉENNE POUR LA FORMATION DES INGÉNIEURS
EUROPEAN SOCIETY FOR ENGINEERING EDUCATION
EUROPÄISCHE GESELLSCHAFT FÜR INGENIEURAUSBILDUNG

SEFI and the Engineering Education in 2011

SEFI Annual Report



SEFI is the largest network of engineering education actors in Europe

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From the President

It is my pleasure as SEFI President 2011-2013 to present to you this Annual Report, in which we reflect upon the achievements of our recent past.

When I, on the occasion of our latest Annual Conference held in Lisbon on 27-30 September 2011, took over from Dr. Anette Kolmos (University of Aalborg, DK), I found an organisation in good, or better, in excellent shape. When reading this report, I hope you will share the same feeling with me. I would like to explicitly express here my gratitude to Anette for her exemplary leadership, her visionary approach and her endless commitment to our association, all inspired by her warm and enthusiastic personality. I am well aware it is a real challenge for me to follow in her footsteps!

Even more important than looking back is looking forward into the future.

SEFI is heading towards its 40th anniversary, and this makes us thinking where we are now and where we are going to in the coming years. Therefore, together with the colleagues from the Administrative Council, we prepared a set of questions as guiding principles for our common future. It is our believe that SEFI, because of its mission and objectives, could and should play a prominent role in the EU Europe 2020 Strategy, seeking for smart, sustainable and inclusive growth for all European citizens. This surely asks for engineering solutions and demands efforts from all engineering higher education institutions to prepare young professionals for dealing with these challenges. An interesting debate we want to have with the increasing community of all our members and partners!

Indeed, we care very much about your opinion and we want all of you to be more involved and to contribute in the discussion about the future directions of SEFI, as we all share a lot of common values. The activities reported here clearly demonstrate the dynamic community we are, the commitment of our members, our common body of knowledge and the outcomes of numerous collaborative efforts across borders – all great SEFI's values we are proud of. Surprisingly, so far, these values were never sufficiently articulated and I would love to set up an exercise in defining a set of characteristics for our Society that unite and position ourselves clearly among other organisations all over the world.

Of course, all of us have ambitions and dreams, and so do I. I am confident that we can succeed in a great share of them, thanks to you all, and I am really looking forward to serve you as SEFI's President in this endeavour together.



Prof. Dr. Wim Van Petegem
Katholieke Universiteit Leuven (B)
SEFI President 2011-2013

A few words from our Immediate Past President



I would like to thank the society for all the commitment and support given during my presidency period of 2009-2011. During this period, the overall priority of SEFI has been to promote and enhance the role of SEFI as the largest European network for Engineering Education. To achieve these goals, there have been meetings held, new initiatives and collaboration with corporates, student organisations, other European organisations for higher education and engineering education, professional engineering organisations and international organisations. The activities have been very comprehensive, both on the European scene as well as on the international scene whereby SEFI has participated in several IFEEES meetings and other international conferences. The visibility of SEFI and the various collaborations can be viewed in the growing number of international participants in our SEFI annual conferences. During the period, there has been special focus on collaboration with companies and student organisations. At

the end of my period as President, the number of companies involved in SEFI has been doubled. And the period has been very successful in many other respects as well. There has been special focus given on green innovation. Especially, I have addressed sustainability in engineering education as an important issue for the future of European EE. Engineers of today need to learn to participate in green innovation and show that European engineers take responsibility for contributing to solving the issues of climate change. The green agenda is also now more visible in the European policy as it occurs in the Europe 2020. Therefore, this agenda will still be of relevance for SEFI to work on in the future and it should be combined with the continuing implementation of the Bologna process. The SEFI organisation that I handed over to my successor is a growing and integrated society in a very good shape. I only wish the best for the future – and will always remain a resource to the Society.

Dr. Anette Kolmos
University of Aalborg

SEFI in 2011 An overview

Passion, commitment and dedication, enthusiasm, expertise and quality assurance are the terms that qualify without any doubt the way in which all those who contributed to the activities of our Society have worked. We thank all of them! Special issues have been on our agenda during the Year 2011 in the context of the SEFI 2009-2011 Work Plan: Global innovation and sustainability in engineering education, the Bologna Process and Employability and Cooperation with Corporate representatives. All these issues have been addressed through integration into existing activities or in the context of specific activities. 2011 was also The Year of the Cooperation with the students and in this context a series of events and activities have been implemented (*see also the invited BEST contribution later in this report*). Four meetings of the SEFI Student Task Force¹ were organised under the leadership of K. Korhonen (TEK) and L. Romagnoli (BEST) as well as one workshop, organised in the context of the Lisbon Flash Week/SEFI Annual Conference.



One of our Student Year activities is the **SEFI Student Contest** on developing engineering education in Europe, sponsored by **Academic Engineers and Architects in Finland (TEK)** and **Dassault Systems**. Its main target is to encourage students to think of ideas or carry out projects aiming at developing the engineering education (see <http://sefistudentcontest.com/>). Winners will be awarded on the occasion of the 2012 SEFI Annual Conference in Thessaloniki. In Lisbon, activities were also prepared by and for students, most of them being organised by BEST. This included for instance special pairing activities for students and professors. BEST Students also assisted us in the creation of the SEFI Blog and SEFI Facebook pages.

Our **membership** situation remained stable in spite of the financial crisis affecting all countries in the world as well our European Universities. The following figure gives a general idea of our membership evolution since 2010: 382 members in 48 countries, 193 individual professors and students, 155 higher engineering education institutions, 28 associate and related members and 6 corporate members and partners.²

SEFI Members		
	2011	2010
Total	382	364
Individual	193	178
Institutional	155	152
Associate	28	29
Industrial	6	5

1. Our thanks go to K. Korhonen and P. Hyotyinen (TEK) for their contribution to this report.

2. At the time of the publication of this report, a 7th company has joined our network, namely **National Instruments**.

The Year 2011 was also intense in the context of the international and global cooperation. Actions have been undertaken to reinforce the cooperation with European organisations (EUA, IGIP, CESAER, FEANI, CLAIU and ENAEE) and with organisations of other continents, in particular with ASEE. The SEFI President, Vice-Presidents and Secretary General participated in the successful 2011 ASEE Conference in June in Vancouver, and discussed the milestones of mutual cooperation over the coming year with ASEE President D. Giddens – present in Lisbon – and ASEE Executive Director, N. Fortenberry. Contacts were also reinforced with organisations such as ASIBEI, LACCEI, SPEED ... – notably in the context of the Lisbon Flash Week -, with IACEE – with SEFI President-Elect Van Petegem becoming IACEE Vice-President – which gives a closer link to the international community of continuing education.

The successful **IFEES 2011 Summit** was hosted in Lisbon in the context of the Flash Week. The excellent cooperation with IFEES President, K. Vedula, and Secretary General, H. Hoyer, has to be mentioned.



Together with IFEES, SEFI created in 2011 the **International Institute for the Development of Engineering Academics - IIDEA**, co-chaired by Dr. Kolmos (SEFI) and

Dr. Morell (HP) and co-directed by H. Hoyer (IFFES) and F. Côme (SEFI). The IIDEA web site is hosted and maintained by SEFI (J. Schibler).



The first IIDEA activities have been launched in China in May 2011, with a workshop organised at Tsinghua University (*photos*). Other workshops were successfully organised in Merida (Mexico) in August, in Estoril in September, in Lisbon in October.



On the occasion of the IFEES 2011 General Assembly organised in Lisbon last September, Prof. JC Quadrado, Rector



of ISEL, Vice-President of SEFI, and Prof. E. de Graaff, TU Delft/U. Aalborg, Chief Editor of the EJEE and SEFI Council member, were both elected respectively as IFEES President-Elect and IFEES Board member.

2011 was the year of the **3rd SEFI Convention for Engineering Deans**, organised in Paris in cooperation with CDEFI and CESAER (see specific section in this report). Already in September, contacts had been made with CESAER in view of another Joint Engineering Deans Convention, to be held in March 2012 in Birmingham.

SEFI was deeply involved in activities for Deans during 2011. Further to the Convention, together with ISEL (Instituto Superior de Engenharia de Lisboa), in the context of the EUGENE Academic Network, we facilitated the creation of a new international association, the so-called EEDC, the **European Engineering Deans Council**. Following a first meeting held in Paris in February 2011 prior to the Deans Convention, 25 Engineering Deans from several European countries, met in Lisbon and agreed to sign The Lisbon Declaration, fixing the terms of the creation of this new body. The objectives of the EEDC are to provide a forum for engineering deans¹, to identify opportunities for them in order to collaborate with the industry and other stakeholders in education, research and innovation, to build a network to support them in playing a leadership role in developing European and national policies for the benefit of Society. The signatories also committed to pull collective strengths for the advancements of engineering education and research and to pursue the establishment of links with similar networks, such as the Global Engineering Deans Council, that are committed to the same objectives worldwide.

Meetings with EC DG Research and DG Education and Culture were organised during the year to maintain the contacts and influence as much as possible the European political agenda.

Furthermore, SEFI participated, most of the time with an invited presentation, to many events of international significance: in February, the CLAIU Conference in Rome; in March, the OECD AHELO Meeting, Paris; the EU University-Business Forum, Brussels; in June, the U-Multirank conference, Brussels; the EUA Ranking conference, Brussels; the ASEE Conference, Vancouver; the SEFI WGCD Workshops (EER, CD) in the context of the CDIO, Copenhagen; in October, the OECD Innovation Summit, Brussels; the Global Engineering Deans Council, Beijing, the ASEE Global Symposium in Shanghai; in November, the EU European University-Business thematic forum, Enschede; the 3rd International Research Symposium, Coventry; in December, the 4th President's meeting of the European Engineering organisations, Brussels, and a contribution to the 2011 Conference of the Indian Society for Engineering Education, Punjab...

Information on our 2011 Annual conference and Flash Week 2011, very well organised by our colleagues and friends of ISEL, can be viewed further on in this report. After the excellent **2010 SEFI-IGIP Annual**



Conference organised in Trnava by the Slovak Technical University, by the team of our good friend and colleague, Prof. Oliver Moravcik (Dean), the challenge for 2011 was serious from many point of views: the format of the conference – *in the context of the First World Engineering Education Flash Week* -, the pairing activities organised by the students, the impressive number of delegates and students, the use of the new technologies – *all delegates receiving a tablet* -..., just to mention several of the challenges we had to face. The conference concept was unique and innovative and it



1. The term « dean » for the purpose of the Declaration and of the future EEDC association, designates a person in charge of an engineering institution, college, school or faculty in a university

SEFI in 2011 An overview

definitely gave inspiration to all the participants to integrate new methods of teaching and learning. In the end, the conference and flash week were of great success, the feedback returned by the participants was very positive and encouraging.



As far as our European Journal for Engineering Education is concerned, we can say, quoting Dr. Kolmos in her report to the SEFI 2011 General Assembly, that "one of the aims for the period was to locate the EJEE in the Engineering Education Research (EER) landscape with a European perspective and to strengthen the organisation of the journal". Further information about the EJEE can be found on www.sefi.be, or by contacting the Editor in

Chief, Prof. De Graaff. The EJEE is published 6 times per year by Taylor and Francis (UK) and it is free for our members.

Establishment of and participation in European and international projects was also one of our core activities.

Therefore, in 2011, SEFI was strongly involved in projects such as the **EUGENE** – Academic Network European and Global Engineering Education Academic Network – *see further on in this report an invited contribution from our EUGENE colleagues* –, in **ECCE** – *Engineering Observatory on Competence based Curricula for Job Enhancing*, in **EU-Drivers** –, *European Drivers for a Regional Innovation Platform* –, in **MODERN** - *European Platform Higher Education Modernisation* –, in **ECDEAST** – *Engineering Curricula Design aligned with EQF and EUR-ACE Standards* –, and **STECET** – *Science and Technology – European Cooperation in Education and Training 2012* . Information on all of these projects can be found on our web site, related meetings and workshops are regularly advertised through the News@sefi our monthly information bulletin.

Our **Working Groups** (WGs) and **Task Forces** (TFs) have been very active throughout the year 2011. In Lisbon, they formed the structure of the conference and chairs of the WGs and TFs were involved in the review of the papers and for the chairing of the sessions. Many of the actions that are described in our Workplan 2009-2011 have been carried out by the WGs. Through the activities of our WGs and TFs, the SEFI academic activities were visible in Europe. Our TF on Accreditation and Quality Assurance organised several meetings throughout the year, preparing a revision of the SEFI Position Paper on Accreditation of Engineering Education that was published in January 2012; in June, our WG on Research in Engineering Education held a workshop in Copenhagen in conjunction with the 2011 CDIO Conference. The WG on Research collaborated also with the Nordic network for Engineering Education Research (NNEER) that supports a Nordic - Baltic network among researchers in the field. In May 2011, the second NNEER seminar was arranged in

Finland and a seminar of our WG on research took place. Our WG on Physics contributed to the organisation of the Physics Teaching in Engineering Education (PTEE 2011) that was held in Mannheim in September. The WG on Continuing Engineering Education was actively involved into the preparation of the IACEE 13th International Conference on Continuing Engineering Education to be held in Valencia in May 2012, our WG on Attractiveness of Engineering Education, established in Trnava in 2010, has been closely matched to those of Line E of the EUGENE project, with a series a meetings and a workshop organised in Lisbon in conjunction with our Annual Conference.

Our WG on Mathematics in Engineering Education organised several meetings and concentrated on the preparation of a revised version of the "**Core Curriculum in Mathematics**" that should be finalised on the occasion of the 2012 Seminar organised by the working group in Salamanca in June 2012. The Group constituted a network of "maths" national contact persons and today, this group consists of 19 experts in maths from 13 European countries. The group also contributed to the preparation of a EU LLP application for a Math project.

Our WG on Gender and Diversity in Engineering Education supported, and is involved in, the GenSET project funded by the Science in Society Programme of the EU 7th Framework programme that runs for the period of 2009-2012. GenSET focuses on 5 key areas where gender inequalities and biases disadvantages women's participation in science: Science knowledge making, Research process, Recruitment and retention, Assessment and Science Excellence value system.

The WG on Curriculum Development also run a series of meetings and discussions, notably in view of the 2012 Valladolid seminar to be organised in May 2012, and also contributed in the work of our ECDEAST project with presentations in Kaunas (February 2011). The list of our WGs and TFs leaders is presented further on in this issue. Details about the activities of our other groups can be found on the SEFI site.

In addition to all these activities, several internal meetings of SEFI were organised: 3 Bureau meetings in Brussels, 3 Administrative Council meetings in Lisbon and in Brussels, the SEFI General Assembly 2011 in Lisbon. Details about decisions and elections of officers organised in the context of the General Assembly are presented later.



At the level of our **Head Office**, there were several changes in our team: Trine Riva (DK) left the Head Office in March 2011 to concentrate on her family duties, and she was replaced by **Jacques Schibler** (F).

Since March 2011, Jacques has dedicated his time on the SEFI Communication's activities and Membership.



We also had the great pleasure to welcome several German ERASMUS stagiaires from Bauhaus University and from University of Ilmenau, namely **Theresa Tschenker**, **Anna Reiners** and **Steffi Kalisch**, who have contributed a lot in our marketing activities and preparation of our news@sefi. Steffi is still with us until May 2012.



Last summer, we also had the pleasure to welcome Ms. **Marina Sainz** from BEST, UPC student (now a young engineer in Danone Spain!). Marina dedicated her time in the preparation of the BEST activities to be held during the SEFI Conference 2011 in Lisbon, she also created our SEFI Blog and Facebook pages and was a key actor in the reinforcement of our relationships with BEST. All these students and

stagiaires were of great help to us and they all very well integrated into our small team offering us their enthusiasm, new ideas and extraordinary energy.

2011 was also the year of the creation of our SEFI Sage.

The SEFI Bureau indeed observed that SEFI, approaching its 40th anniversary, could count on a large number of formerly very active, colleagues who have finished their official mandate within the Society. The idea then was raised to create an *informal network of "wise" (in French "sage") persons* to link to SEFI in order to avoid losing their expertise completely. It was denominated SEFI-SAGE, where the acronym stands for **Senior Advisory Group of Experts**.

To conclude this overview, I would like to thank all the members of our Society for their support and their commitment, I would like to invite them to regularly contribute to the various SEFI social media tools such as Facebook, LinkedIn, Blog, without forgetting our monthly newsletter, the "News@sefi". I also invite them to regularly consult our web site and let us have their suggestions for improvements.

We can help to promote your work and activities, don't miss this opportunity that we are offering to you.

SEFI is a dynamic organisation, and in spite of the constraints we have to face, like many NGOs of our kind (*small budget, lack of human resources, very heavy administration*), I am convinced that thanks to your dedicated work, we succeeded once again to fulfil our mission and objectives for the benefit of engineering education.

Thank you for your passion
and your enthusiasm!

Françoise Côme
Secretary General



The 2012 Annual Conference of SEFI will be held in Thessaloniki on 23-26 September 2012 on the theme of

"Engineering Education 2020: Meet the Future"
www.sefi2012.com

Organised by the Faculty of Engineering of the Aristotle University of Thessaloniki, the Conference will be held at the Conference and Cultural Centre "*Thessaloniki Concert Hall*" (Thessaloniki waterfront), designed by the famous Japanese architect Arata Isozaki.



The Conference is organised in cooperation with BEST.



BEST and SEFI – a unique and successful cooperation



“SEFI and BEST are two natural twins, and I hope we can share our lives together to the benefit of both our organisations” – SEFI

President Prof. dr. ir. Wim Van Petegem

The quote above is taken from the beautifully written testimonial from SEFI in the Annual Report of BEST 2010-2011 and we could not have expressed it better ourselves. The Board of European Students of Technology, with 3000 members located at 91 technical universities in 30 European countries and reaching around one million technology students, has indeed got a lot in common with SEFI and makes a natural fit as a hand in a glove. It is more than 15 years ago since BEST and SEFI started cooperating, at that time through the first Thematic Network BEST ever engaged in, H3E (Higher Engineering Education for Europe), and together with SEFI and CESAER, took our first aim at improving the quality of engineering education in Europe. Since then we have never looked back and over the years we have organised a large amount of Events on Education and been involved in various Thematic Networks and projects, trying to reach out to as many students as possible with our important mission. However, it is especially in 2010-2011 that the cooperation has really blossomed.

Not only due to 2011 being the SEFI Student Year, where BEST has played a significant role, it was also due to both organisations realising we could make more out of the opportunities standing right in front of us and together creating a synergy that would lead to an even larger impact on the European scale – both towards students, professors and educational institutions. A cooperation between our two networks, with two of the main stakeholders being students and professors/universities, is a very likely thing to happen at all scales: from the classroom between professors and students, to the European level with two of the largest organisations in their field. These collaborations are always desirable, but not as common as one would expect – we have seen this with our fellow student organisations in other fields, and are grateful for SEFI seeing the true value of BEST and all of the opportunities we bring along.

As we all know, the SEFI Student Year recently ended, with the 1st World Engineering Education Flash Week being the grand finale in September 2011. BEST was a part of the planning from the very beginning back in early 2010 and since then we invested a lot of time and resources in helping shape the event and bringing the students there. In the end we are proud of the outcomes, contributing with training sessions, engineering competitions and not to forget the local Portuguese groups showing true hospitality and BEST spirit through the social programme for the students. BEST members like to innovate, dream big and see the dreams come to life. Therefore there was no question about it when the challenge of Flash Week came along – a challenge that we definitely do not regret. As a result we are looking forward to helping shape the SEFI Annual Conference 2012 in Thessaloniki, where the preparations locally have already eagerly been started.

However, in the past couple of years we have not limited our cooperation to only Flash Week – both organisations are far too dynamic and passionate for this. We have had the pleasure of welcoming SEFI Key Note Speakers to our General Meetings and most recently the European BEST Engineering Competition Final, which took place in Istanbul August 2011. In addition there was a SEFI workshop conducted during the General Assembly in Belgrade, April 2011, where SEFI got direct input and interaction regarding the issues that are concerning them. We have increased the representation of BEST members as participants at various events, especially at the SEFI-IGIP Annual Conference 2010 in Trnava and naturally Flash Week, where we also at both events proudly presented papers based on outcomes from our Events on Education. By increasing the opportunities to meet and interact, the relations have strengthened and new acquaintances have been developed both ways, and consequently our organisations have become more and more aware of each other's activities.

When looking back, the above mentioned things are all just smaller factors connected to what really has been a year of truly fruitful cooperation. When the SEFI Student Task Force was developed in Trnava 2010, several inspiring BEST members took an active role in the initiative, amongst others Mr Lucien Romagnoli as Co-Chair of the Task Force together with D. Sc. Kati Korhonen-Yrjänheikki, Ms Marina Sainz Comas being responsible for the Student Blog and not to forget Mr Andrei Bursuc, who has played an important supporting role as student member of the SEFI Administrative Council.

The Student membership of SEFI has also been promoted heavily in our network as well as all the opportunities connected to Flash Week, the Student Competition, the blog - you name it. But what has it actually given BEST and our students in the end? In our eyes the Educational Involvement of BEST is stronger, the visibility and recognition of BEST is stronger and the awareness of ones right and possibility as a student to have a say in its own education is stronger. In other words: BEST and its students *stand stronger*. And seeing that this cooperation is two-way, it results in benefits for SEFI as well. We therefore also hope SEFI will continue to keep their crucial stakeholder – the students – in mind for the rest of the years to come. The SEFI Student Year was a great kick-start, now it just has to be proven that the focus is still there, even if the coming years are not directly entitled the “Student Years”. And BEST is here to help with this :)

As a final remark, the partnership between BEST and SEFI can be looked upon as both unique and successful and we are looking forward to a bright future together, with interesting opportunities. We hope the communication will continue to increase, the bonds become even tighter and that the involvement in each other's work will be nothing less than the cherry blossom in spring. With mutual trust and respect we can have all the impact we could ever wish for.

Monica Kviljo

President of BEST 2010-2011

Annual Conference

The 39th Annual Conference of SEFI was held in the context of the **First Engineering Education Flash Week** organised by ISEL, the Instituto Superior de Engenharia de Lisboa, directed by Prof. JC Quadrado, SEFI Vice-President.



In this context, the **SEFI Conference**, organised on the theme of **“Global Engineering Recognition, Sustainability and Mobility”** was followed by a series of invited events: the **2011 IFEES Summit**, the **2011 ASIBEI conference**, the **PAEE 2011 Symposium** and the **IACEE Executive committee meeting**.



The Conference and the Flash Week were organised in the beautiful Pavilhao Atlantico facing the Tagus River.

700 participants (corporate representatives, academic delegates and students)

attended the conference coming from 60 countries; **181** papers were presented in working sessions and in e-sessions.



The Opening ceremony chaired by Prof. Quadrado and Dr. Kolmos, President of SEFI, welcomed a very interesting keynote presentation given by Mrs. **Lesley Wilson** (picture on the left) Secretary General

of EUA, on **“Global University Rankings and their impact”** preceded by an official message from the President of Portugal, **Anibal Cavaco Silva**, given by the Portuguese secretary of state for Higher Education.

Further to the high level scientific contributions mentioned before, the Conference also welcomed **top level invited presentations** on topics such as the International Engineering Education Partnerships (Prof. Leonardo Pineda, RCI), the Attractiveness of Engineering Education (Prof. Kamel Hawwash, University of Birmingham), the Global Mobility (Prof. Mervyn Jones, Imperial College London), the Virtual and Remote Controlled labs (Prof. Suzane Zvacek, University of Kansas), the Sustainability of Engineering Education (Prof. Didac Ferrer, Universitat Politècnica de Catalunya), the European Union Committee of the Regions (Dr. Markku Markkula, University of Aalto), the Accreditation of engineering study programmes (Prof. Francesco Maffioli, Politecnico di Milano), the Curriculum Development (Prof. Erik de Graaff, TU Delft/University of Aalborg), the Engineering Education Research (Prof. Jonte Bernhard and Prof. Maura Borrego).

The event was also remarkable in several aspects. Let us mention only a few of them: the very fruitful exchanges between the professors and the students attending the conference (pairing activities) – *see on the right* –, it has to be kept in mind that 2011 was The Year of SEFI Student cooperation, the strong involvement of our corporate members and partners – *a special corporate plenary session was organised as well as an exhibition* – the use of the new technologies – *a tablet was offered to the participants informing them of a series of flash events and encouraging them to contribute on line to the discussions* –, the interaction with the engineering education societies from the world holding their conference during our Flash Week, the fantastic location along the river Tagus without forgetting the wonderful weather and the great atmosphere.



A welcome meeting for the new comers as well as several SEFI internal meetings such as Administrative Council meetings and General Assembly were also organised during the three days of the conference.

The proceedings of the conference are available on http://www.sefi.be/index.php?page_id=24.

The SEFI 2011 **Leonardo da Vinci** Medal was given on the occasion of the Conference Banquet. It was awarded to **Luis Ignacio Lula de Silva**, former president of Brazil – *see later in this report*.

Our thanks go to Prof. José Carlos Quadrado and his team for the excellent cooperation and for the unforgettable conference.

As evoked before, the Flash Week had the chance to welcome also meetings of LACCEI, ENAEE and EUGENE, the annual conference of PAEE, a workshop of the IFEES/SEFI IIDEA Institute, as well as a series of extra activities (IGIP, SPEE).

The **2011 IFEES Summit** in Lisbon on 1-2 October 2011, organised by our good friends of IFEES (www.ifees.net) was a tremendous success, with an excellent programme and a strong participation of IFEES members and observers (including many students) from throughout the world.

The Summit was articulated on three main sessions: Curriculum for sustainability / Mobility and accreditation / Intergenerational Discussion of Critical Issues.

The 2011 IFEES **General Assembly** elected José Carlos Quadrado (SEFI's candidate) as IFEES President-Elect. He will serve as IFEES President for two years effective in October 2012. Jennifer Deboer (SPEED), Erik de Graaff (SEFI), Euan Lindsay (AAEE), Ivan Esparragoza (LACCEI) and Duncan Fraser (AEEA), were elected to the Executive Committee for two years. Congratulations to all of them!

General Assembly and Awards

The 2011 SEFI General Assembly was organised at the Pavilhao Atlantico in the context of the Annual Conference 2011. It was attended by 120 members and observers, and was chaired by Dr. Anette Kolmos, President of SEFI.

Dr. Kolmos presented her President's report and specifically insisted on the 2010-2011 priority that was to promote and enhance the role of SEFI as the largest European network for engineering education, both as a professional body and as an important player in the process at the European and international levels. The members approved the financial report presented by Prof. Maffioli, SEFI Treasurer, as well as the budget 2012.



The General Assembly was also the occasion for the members of our society to elect Mr. **Xavier Fouger**, Director Global Academy, Dassault Systems (F), as SEFI three-year Vice President.

Prof. Enrica Caporali (University of Florence), Daiva Dumciuviene (Kaunas University of Technology), Ludo Froyen (KU Leuven), Anne-Marie Jolly (Polytech'Orléans), Mike Murphy (Dublin Institute of Technology), Katrina Nordström (University of Aalto), Angela Varadi (University of Miskolc) and Jan-Uwe Wolff (VIA University College) were elected as Administrative Council members. Profs. Alpay (Imperial College of London) and Mittinen (University of Aalto) were nominated as the new Chairpersons of our Working groups on Ethics and on Continuing Engineering Education. They replace Prof. Zandvoort and Mr. Markkula who had finished their respective terms of Working Groups' chairpersons, after a six-year period of outstanding contributions.

At the end of the Assembly, Dr. Kolmos gave the presidential powers to her successor, elected in Trnava in 2010, namely **Prof. Wim Van Petegem**, Head of the Media and Learning Dept, KU Leuven (B).



Fellowships

In recognition of their meritorious services towards engineering education over the last 5 years, **SEFI Fellowships** were awarded to Profs. **Pierre Padilla** (Director of ENIM and founder of the Cartagena Network) F, **Michael Auer** (IGIP President), A, and **Bohdan Macukow** (Warsaw University of Technology), PL. Congratulations to all of them.



Leonardo da Vinci Medal

The SEFI Leonardo da Vinci Medal is the highest distinction bestowed by the Society. It is awarded to living persons who have made an outstanding contribution of international significance to engineering education.

Below you will find abstracts of the Laudacium given by Prof. J-C Quadrado, President of ISEL, in presence of the Ambassador of Brazil in Portugal on the occasion of the award of the SEFI Leonardo da Vinci Medal to Doctor Luis Inácio "Lula" da Silva,

..." What some of you might not know is that Doctor Lula da Silva had little formal education. He did not learn to read until he was ten years old, and quit school after the fourth grade in order to work to help his family. His working life began at age 12 as a shoe shiner and street vendor. By the age of 14 he got his first formal job in a copper-processing factory as a lathe operator. At age 19, he lost the

little finger on his left hand in an accident while working as a press operator in an automobile parts factory. After losing his finger he had to run to several hospitals before he received medical attention and this experience increased his interest in participating on a necessary change of the Brazilian society. He is often regarded as the most popular politician in the history of Brazil and just recently one of the most popular in the world. Lula served 2 terms as president of Brazil and left office on January 1, 2011.

Social programs like "Bolsa Família" (family purse) and "Fome Zero" (unger zero) are hallmarks of his time in office. Lula played a prominent role in recent international relations developments, including the Nuclear program of Iran and global warming, and was described as "a man with audacious ambitions to alter the balance of power among nations." He was featured in Time's The 100 Most Influential People in the World for 2010, and has been called "the most successful politician of his time." During his farewell speech he said he felt an additional burden to prove that he could handle the presidency despite his humble beginnings. He stated: "If I failed, it would be the workers' class which would be failing; it would be this country's poor who would be proving they did not have what it takes to rule."

This very pragmatic approach had consequences because, and I quote the Washington Post on a recent review, "Under Lula, Brazil became the world's eighth-largest economy, more than 20 million people rose out of acute poverty and Rio de Janeiro was awarded the 2016 Summer Olympics, the first time the Games will be held in South America." Doctor Lula da Silva has attained numerous medals and awards for his achievements, such as the Brazilian Order of Merit, the Brazilian Orders of Military, Naval and Aeronautical Merit, the Brazilian Order of Scientific Merit, the Order of the Southern Cross, the Mexican Order of the Aztec Eagle and the Norwegian Order of Royal Merit; the First Class of the Order of Prince Yaroslav the Wise and the Ukraine Order of Liberty. He also received the Prince of Asturias Award for International Cooperation, and was also given the Jawaharlal Nehru Award. He also received the UNESCO's Félix Houphouët-Boigny Peace Prize, the Chatham House Prize, and was awarded as a Global Statesman by the World Economic Forum. Just this year Lula da Silva received a doctorate "honoris causa" from the university of Coimbra, the oldest university in Portugal.

But in spite of these life achievements they would not "per se" justify the attribution of the Leonardo da Vinci Medal. The Leonardo da Vinci Medal is the highest distinction SEFI can bestow. It is awarded to living persons who have made an outstanding contribution of international significance to engineering education.

What many people do not know is that, while Brazil's President, Luis Inácio "Lula" da Silva was personally committed in setting the initiative to create three new regional integration universities: Federal University for Latin America Integration (UNILA), the Afro-Brazilian University of Integration (UNILAB), and the University of Amazonian Integration (UNIAM).

These three institutions are aimed at creating a 'supranational', 'global' and 'regional' university respectively, drawing upon staff and students from within the wider region, or from across south-south networks (UNILAB). Described by the Brazilian Ministry of Education as particular "political-pedagogic innovation projects," these three new universities were designed to enhance national, regional and global integration, and demonstrate to the world that it may be possible to unite different countries through education. The

goals of UNILA are to pursue inter-regional trans-disciplinary research and teaching in areas of joint interest of the MERCOSUL member countries (Brazil, Paraguay, Argentina, and Uruguay). Some examples of areas of study are natural resources, trans-border biodiversity, with a strong component in engineering to promote economic and social development. UNILA's mission and approach to knowledge is shaped by a distinctive Latin American commitment. Each course has a Patron and a Founder. The first Patrons have been chosen for being Latin American names that have made significant academic-scientific contributions their field, while course Founders have been appointed as professors at UNILA and create their courses. Founders are recruited for the high academic prestige in their respective fields of knowledge as well as renowned international competence in their specialties. The target enrolment for UNILA is 10,000 students enrolled in undergraduate and post-graduate programs after a number of years. Lectures are offered in both Portuguese and Spanish. Half of the teaching staff is recruited from regional member countries. UNILAB has a more global ambition. It was created to encourage and strengthen co-operation, partnerships, and cultural, educational and scientific exchanges between Brazil and member states of the Community of Portuguese-Speaking Countries (Brazil, Angola, Cape Verde, Guinea-Bissau, Mozambique, Portugal, São Tomé and Príncipe, and East Timor). UNILAB is intended to become an integrated multi-campus institution with campuses in all the African member countries of the Community of Portuguese-Speaking Countries (CPLP). Its main campus is established in the city of Redenção in Brazil's North-Eastern state of Ceará. The main campus is also expected to function as an instrument for the strategic social-economic development of the North-East of Brazil. UNILAB also focus on collaboration with the African countries of the CPLP, aiming to contribute to these nations' socio-economic development, including reducing 'brain drain' problems currently experienced by African countries. Enrolment is focused to reach the 2,500 students, and the main target is engineering to support the development of these communities. The third, more regional initiative, University of Amazonian Integration (UNIAM), will be established as a public multi-campus university, with a main campus in the Brazilian city of Santarém, and three satellite campuses in the cities Itaituba, Monte Alegre and Oriximiná, all located in Brazil's state of Pará. The main aim of UNIAM will be to encourage social-economic integration with a strong component of engineering so much needed in the Amazon region, which includes not only parts of Brazil, but also areas of eight surrounding countries. UNIAM is expected to offer bachelor's, master's and doctoral degrees. The Brazilian government will cover the US\$107 million budget until 2012 that will pay for the establishment and personnel costs of the new university. The university is expected to be self-sufficient financially after 2012. Although Brazil's new universities have just opened their doors they are already gaining international attention. The design of the universities themselves is of great interest to the international higher education community because they differ from existing models in significant ways. Most universities in the developing world have built their universities attempting to emulate the prestigious institutions of the west. Brazil's regional integration universities, in contrast, were created to embed the characteristics of the communities that they are located into the design and mission of each institution. The innovative approach that was set in these projects is unquestionable, and do serve as an inspiration to all of us.

I am deeply convinced that it is an honour for all of us to have Luis Inácio Lula da Silva as a recipient of this year's Leonardo da Vinci Medal"

The video of the Medal award is available on www.sefi.be

SEFI and the Engineering Deans

EUROPEAN CONVENTIONS FOR ENGINEERING DEANS

Since 2005, SEFI organised Conventions for Engineering Deans, in cooperation with other organisations when possible. The general objectives of the Conventions are to bring together Deans from whole over Europe to meet and to discuss in depth common topics, share experiences, identify solutions for problems and build up a network with peers in different European countries. In 2005, Prof. Borri (President of SEFI 2005-2007), organised in Florence (I) the First Convention on the theme of "Present and Future Challenges for Engineering Education and Research in Europe". Following the high success of the event, Prof. Steinbach (President of SEFI 2007-2009) organised in Berlin in 2008, the 2nd Convention on the theme "Special Challenges for Higher Engineering Education". It is therefore in this context that SEFI invited CDEFI¹ and CESAER² to join their forces to organise the third edition of the Convention

in Paris, (Lycée Louis Le Grand) on 24-25 February 2011 on the theme of "**Engineering Education for an Innovative Europe**". The Convention featured two keynote sessions addressing the Convention's topics of Engineering Education for an Innovative Europe: *the Industrial' Perspective*, and *Engineering Education for an Innovative Europe: New governance of Engineering Schools*, followed by discussions in groups in order to create real exchanging and networking opportunities for those attending. All the presentations of the Conventions are available on the SEFI Web site, on the page "Activities for Deans".. During the autumn 2011, SEFI also invited CESAER to organise the 2012 Convention that was held at and organised by the University of Birmingham on 29-30 March 2012.

CREATION OF THE EUROPEAN ENGINEERING DEANS COUNCIL

As one of the outcomes of the 2011 Paris Deans Convention, when the Deans attended the EUGENE Transversal Action 2 meeting and agreed to participate in the creation of a permanent platform to meet and discuss specific common topics, we invited leaders of engineering education from Higher Education institutions (25) to converge to Lisbon from different European Countries to create the European Engineering Deans Council (EEDC) and signed the "**Lisbon Declaration**".

It was also decided that the EEDC *aisbl* will be hosted in SEFI with Prof. Ludo Froyen (K.U. Leuven) as its President. The creation of the EEDC results from Transversal Action 2 of the EUGENE project financed by the LLP EU programme. SEFI and ISEL are in charge of this Action on behalf of the EUGENE's partners.



The Deans who signed the Lisbon Declaration, the sponsors and some observers, Lisbon, 27th September 2011



The Lisbon Declaration is available on www.sefi.be

The next steps in the process are to constitute the new association under Belgian Law (*aisbl*)³ (SEFI is in charge of it) and to organise a first General meeting in conjunction with the 2012 Engineering deans Convention.

The PPT presenting the mission and activities of the EEDC can be obtained at SEFI HQ.

For further details:

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B-1050 Brussels
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The creation of the EEDC was supported by Dassault Systems and Hewlett Packard.

1. Conférence des Directeurs d'Écoles Françaises d'Ingénieurs
2. Conference of European Schools for the Advanced Engineering Education
3. Association Internationale sans But Lucratif – to be obtained by Royal Decree

SEFI and EUGENE: first encouraging results

“European Engineering Education is facing and challenging the global competition in HE”: this is, in short, the true meaning of the activity and of the first outcomes of the first half of lifetime of the EUGENE academic network.

The first remarkable element of cohesion is certainly given by the qualified and intense participation of the almost entire partnership to the different project lines of the project; this figure could be measured especially through the attendance to the two Scientific meetings (i.e.: a kind of plenary meeting of all the partner Institutions) held at Chalmers University of Technology at middle of December 2010 and at KU Leuven in October 2011.

Looking to some of the key achievements to highlight, one can certainly mention the work done on the definition of a European common set of “excellence standards” for Ph D studies, as a tool to improve the effectiveness, competitiveness and innovation in engineering and technology (Line A).

“Unifying Europe” in the emerging sector of Engineering Education Research (EER) has been the first main concern for the activity of Line B; as EER is yet not fully accepted as a scientific and research field in Europe, EUGENE network is working to recuperate the historical delay which is recorded in our continent with respect to other regions of the world (notably: Australia and North America). The first European summit on EER (Leuven, 28-29.10.2011) marked the beginning of a new scenario, which should bring the European stake-holders and research policy makers aware of EER as a “very strategic” research field to be fully supported and suitably financed like all other research fields in engineering and technology.

EUR-ACE (the European Accreditation label for engineering programme) and all its issues dealing with the consolidation of the QA practice in engineering education in a Europe, are dealt with by Line C, whose ultimate goal is to ensure mobility and recognition of degrees of students and graduates as the entry route to the profession of engineer in Europe. Besides the formidable progresses within the boundary of Europe, Line C is facilitating the spread of the label (explicitly recognised as an example of good practice by the EC) and disseminating its standards in a pan-European scenery (Middle-East and Central-Asia). Furthermore, the comparison with standards of the International Engineering Alliance is also progressing.



Line D is well advancing in developing concepts and tools for improving university's own innovativeness (including management innovation, university-industry cooperation and leadership), giving to the whole EUGENE project a strong innovative and original character. This contribution is going to be an added value also for other activities (like T1). The work of Line E is well proceeding along different directions: learning how to increase attractiveness from good practices, setting and defining employability attributes for compiling a draft repertory of them to be used by all partner universities in EUGENE, promotion of Engineering Education in the EU outside of EHEA .

One of the major elements of effectiveness of EUGENE action is given by transversal activity Lines which are interconnecting the main Lines like woof and warp in a fabric. They are revealing as fully consistent and complementing each other: T1 (on University-industry cooperation) is usefully complementing and supporting Line D and E and is preparing an handbook of practices and a professional development workshop which took place in Lisbon during the SEFI conference in September 2011.

The EEDC (European Engineering Deans Council, T2) is one more completely original outcome of EUGENE under the direct supervision and coordination of SEFI. It will allow Europe to set the “European chapter” of the Global Engineering Deans Council (GEDC) which is felt as an urgent need of the European HE in Engineering and Technology enabling the EHEA to face major developments occurring in other parts of the world.

Finally, EUGENE is investigating about the idea of definitely setting up a spontaneous group of European Institutions/Schools in Engineering and Technology which are participating in projects run by the University of Florence since more than 15 years now. The “Florens Group” is intended to become a permanent “agora” and a think-tank which shall enable EE in Europe to continuously work and cooperate together (long lasting sustainable effect of EUGENE also after project expiration). EUGENE T3 already worked out the definition of a set of priorities/rules to constitute a first MoU (Memorandum of Understanding): the first step towards the establishment of the Group.



*Claudio Borri¹
and Elisa Guberti²*

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 2. Dr. Elisa Guberti – Head of the International Relations Office - Facoltà di Ingegneria, Università di Firenze –(intreling@unifi.it).

SEFI and the Accreditation of Engineering Education

Engineering Curricula Design for master degree programmes in Russia



Russia is one of the signatory countries of the Bologna Process. Since some years it started to change the integrated programmes of study of 6 year duration and implement the two tier structure with normally 4 years undergraduate programmes for a bachelor degree and additional 2 years for a master. Russia also adopted new Federal Educational Standards:

the third and amended version of these standards from 2007 requires an outcomes-based approach and the active involvement of various stakeholders when planning and implementing new curricula. As a reference respective outcomes for various disciplines and branches have been specified including engineering. However, the Russian Higher Education Institutions, in particular the Research Universities, gained a lot of freedom in defining additional outcomes and deciding on the content of the programmes and the ways how to achieve the required outcomes.



This is the context of the TEMPUS project entitled "ECDEAST", which started in autumn 2010, focusing

on the development and implementation of master programmes at three leading Russian Research Universities which should satisfy not only the new Federal Educational Standards but in due course the EUR-ACE standards for the accreditation of engineering programmes. **SEFI is one of the partners of this project.** Besides SEFI the project consortium comprises: TPU – Tomsk Polytechnic University (Russia), BMSTU – Bauman Moscow State Technical University (Russia), SPbSPU – Saint-Petersburg State Polytechnical University (Russia), HSW – Hochschule Wismar (Germany) / project coordinator, KTU – Kaunas University of Technology (Lithuania), LBUS – Lucian Blaga University of Sibiu (Romania), ENAEE – European Network for Accreditation of Engineering Education.

Supported by the partners the three Russian Universities are going to:

- develop a methodology for engineering curriculum design based on the alignment of EQF & EUR-ACE Standards with Russian educational standards requirements;
- produce and publish respective curriculum development guidelines;
- train the involved universities' faculty to design engineering curricula according to EUR-ACE requirements including the application of ECTS;
- develop/update and implement 3 master engineering programmes and course modules materials at TPU, BMSTU and SPbSPU according to EUR-ACE requirements using ECTS and Dublin Descriptors;
- prepare the developed programmes for accreditation in order to get the EUR-ACE label for second cycle degrees.

The special role of SEFI in this project and processes is to:

- Contribute to a Workshop on European and Russian standards alignment as experts in EQF and European quality standards for engineering education;
- provide together with its members support for elaborating Guidelines in accordance with EQF, Dublin descriptors and graduates' competencies;
- contribute to the organisation of engineering faculty workshops at TPU, BMSTU and SPbSPU and delegate SEFI experts in engineering curriculum design according to requirements of Dublin descriptors and EQF;
- organise and host a meeting of the Project Board;
- provide together with its members support for the evaluation of programmes elaborated by TPU, BMSTU and SPbSPU.

Meanwhile many of the envisaged activities have already taken place and have been discussed by all partners at workshops at Kaunas, Tomsk, Moscow, St. Petersburg and Sibiu, namely a comparison of the Russian Federal Educational Standards and EUR-ACE standards, the development of guidelines for outcomes based curriculum design, training workshops for faculty, exchange of faculty, draft and implementation of curricula and new modules at the three Russian universities. SEFI contributed to it mainly by members and chairpersons of its Curriculum Development Working Group, in particular Erik de Graaff (University of Aalborg), Urbano Dominguez (University of Valladolid) and Guenter Heitmann (TU Berlin). The project is expected to finish in the autumn 2013 with some crucial activities going to take place in 2012 and 2013 including the presentation of the new curricula and the methodology of curriculum design to other Russian Universities at a conference in St. Petersburg in July 2012, the enrollment of students into the developed new master programmes in the forthcoming academic year, accreditation visits of ENAEE teams in 2013 and a revision and amendment of the guidelines for curriculum design.

It is expected that the outcomes of this TEMPUS project will significantly contribute to the current processes of curriculum revision and development also at other Russian Universities, to more transparency and the achievement and recognition of internationally agreed standards and degrees in Russia and to an enhancement of international collaboration in various networks of Universities as well as educational and professional associations like SEFI, ENAEE and others. For the time being the project is on a good way to these aims.

Details can be found on <http://ecdeast.tpu.ru/en/>



Prof. Guenter Heitmann
SEFI Honorary Member and SEFI Fellow
SEFI ECDEAST expert

The Role of Engineering Universities in Achieving the Targets of Europe 2020 Strategy



The changing role of universities cannot be defined without stressing the overall European need of understanding the on-going paradigm shift. This article is my wake-up call. We – the engineering universities – are facing enormous opportunities. The year 2012 is the right time for science-society dialogue. The economic crisis has created challenges both for people's everyday lives and for societal decision-making. Although the transformation brought about by digitalization and globalization has been recognized years ago, its revolutionary force was neither realized early enough nor taken seriously enough. The engineering universities can and should have something new to offer.

By this article¹, I try to paint a few elements to speed-up the modernization of universities.

Mindset – the critical success factor

Universities must be determined in developing their ways of operation if they are to answer the challenges related to their societal role. They must be able to let go of the traditional methods based on sectorization and silos. Instead, they ought to create a culture of networks that crosses through the entire university.

Reaching the target level requires that several critical success factors and necessary measures are recognized and defined, including a goal-oriented holistic roadmap with specific actions. If the university aims at success in its field and wishes to be a unique forerunner in a few specific focus areas, it must take advantage of the opportunities available for a university operating in the global environment and change its ways of operation with the help of the best leadership theories and practices.

The challenge for Europe 2020 strategy is on its implementation on practical level, in regions and cities. The required results will come through industries, universities and many others. For us this means: Can we get the European engineering universities to play a key role in implementing EU 2020 and the seven flagships, and by that to accelerate the reaction speed in answering the grand societal challenges and changing societal needs?

As the perspective for our own thinking, I have defined the mental mindset as the crucial driver for success. What does this mean as a guiding principle for the societal role of our engineering universities? We should:

1. Strengthen our own and the decision makers' understanding of digital economy and the huge opportunities to enable the renewal by the flagships.
2. Promote citizen and customer centeredness and new practices in leadership, both on strategic and operational level.
3. Create favorable conditions to change the attitude and mindset towards creativity, innovativeness and entrepreneurship in general and especially in our universities.

4. Make Knowledge Triangle a reality in our university operations by creating synergy or in many cases even interconnect small-scale project and pilot activities to a whole supporting the same goal.
5. Renew the working culture, since silos in management prevent efficient service development. Member state level, local level, third sector and businesses must be open-minded and cross organizational boundaries in seeking working practices for developing customer-centered production and optimizing costs.

European Higher Education Reform

Education is at the heart of the Europe 2020 strategy. The Commission's proposal for the next multiannual EU budget (2014-2020) includes substantial increases for education, training and youth (+73%), and for research (+46%), in recognition of their pivotal role in supporting growth. However, the real work is to be done at local level – with more national governments' financial investments in higher education.

As part of Europe's strategy for jobs and growth, the European Commission in the fall 2011 presented a reform strategy² to boost graduate numbers, improve teaching quality and maximise what higher education can do to help the EU economy emerge stronger from the crisis. The EU policy guidelines do not, however, guarantee the targeted outcomes and the needed added value.

As stated in the press release³ the strategy identifies priority areas where EU countries need to do more to achieve shared education objectives and sets out how the European Union can support their modernisation policies.

Many EU countries are prioritising the modernisation of their higher education systems. But unfortunately the potential remains underexploited: the potential of European higher education institutions to contribute to Europe's prosperity and fulfil their wider role in society.

1. This article is based on my keynote presentation at the SEFI Annual Conference 2011 and the World Engineering Education Flash Week in Lisbon in the fall 2011. The content comes on one hand my practical role within the Aalto University as the Advisor for our Presidents focusing on societal impact during the last few years and now on the EU strategic issues, and on the other hand from my membership and the role within the EU Committee of the Regions as the CoR rapporteur on the role of local and regional authorities in achieving the targets of the Europe 2020 Strategy and the CoR rapporteur on Digital Agenda for Europe, as well as the chairman of the CoR-EPP Task Force on Europe 2020.

2. COM(2011) 567 Supporting growth and jobs – an agenda for the modernisation of Europe's higher education systems

3. 20/09/11 – Europa Press: Modernisation and employability at heart of new higher education reform strategy

Special contributions

Need for Radical Transformation in Europe

The EU political leadership has stated the need for renewal of societal and industrial structures and processes. Europe cannot recover the financial crisis by only having short term measures. Europe calls for radical transformation and societal innovations. This can be summarized with the following, as stated already in 2010 in the flagship initiative Digital Agenda for Europe: "The crisis has wiped out years of economic and social progress and exposed structural weaknesses in Europe's economy. Europe's primary goal today must be to get Europe back on track."

My message is that the track, however, is not the same as it used to be. Old practices and structures are not enough to achieve the goals we have in our minds for welfare and quality of life. It is time to invent the future for Europe. The focus is defined by Europe 2020 strategy and the Seven Flagships. The implementation by the policy makers at practical level in Member States and regions, through new kind of collaboration between public, private and third sector, requires much more than is done so far. The measures concern all aspects of governance in the public and private sectors.

Europe 2020 strategy calls for transformation. For that we, in Europe, have much of the required high level research results and we have good systems to produce more. However, those are not in active use in political and business processes and governance. The gap between latest research knowledge and the real life practice is huge. And by stressing the need of use the research results, I do mean at the same time that we need to invest more on research. What are the differences in cultures around the world with respect to this? As an example, Asian businesses and political decision makers are using European knowledge as the engine for their global business development. In China the potential of globalization has been realized and taken into use. Economies of scale and rapid innovation have been combined with determination. Are we in Europe incapable of reacting quickly?



Europe 2020: 3 pillars 7 flagships

Smart Growth Developing an economy based on knowledge and innovation	Sustainable Growth more efficient, greener and more competitive economy	Inclusive Growth fostering a high-employment economy delivering social and territorial cohesion
Innovation "Innovation Union"	Climate, energy and mobility "Resource efficient Europe"	Employment and skills "An agenda for new skills and jobs"
Education "Youth on the move"	Competitiveness "An industrial policy for the globalisation era"	Fighting poverty "European platform against poverty"
Digital society "A digital agenda for Europe"		

Figure 1. Europe 2020 Strategy and the seven flagships.

Europe has now a strong political will defined through the Europe 2020 strategy and the seven flagships. In brief the different dimensions are described by the figure 1.

As the failure of the Lisbon Strategy indicates, good plans and even right analyses are not sufficient. Brave leaps to the future must be taken on practical level. Cities and regions must become real implementation fields for the EU 2020 strategy. Regions – at least some, but hopefully at least most of the regions – should be turned into innovation platforms for the strategic change. For this we need the new dynamic understanding of regional innovation ecosystems where public, private and third sector learn to operate together with people in a new and creative mood.

Good experience has been gained around Europe from the new open research, development and innovation platforms and methodologies mobilizing public private partnerships and encouraging especially people participations (so-called user-driven open innovation). The ongoing global digitalisation is having an enormous impact on everything. In universities this means especially the learning and working processes to happen in parallel in the real and virtual worlds.

New ways of COLLABORATIVE LEARNING AND WORKING by integrating real and virtual worlds



Figure 2. These developments can be followed through the Aalto Camp for Societal Innovation

From Benchmarking to Benchlearning

Using my Aalto experiences I have defined four benchmarking focus areas which are needed as a European-wide mutual learning process in modernising universities:

1. Strategic benchmarking of the university's existing policy to develop and when needed to change its strategic direction, i.e. developing systems based on learning from the others and using comparisons related to defining the university's strategic positioning in society and the content of the strategy and how it is implemented.
2. Process and capability benchmarking of the university's in-house structures, methods and processes needed and to be developed to achieve its long-term and annual strategic and operational targets, i.e. developing and using university's human capital through effective structures and processes.
3. Relations benchmarking of the university's cooperation, partnership and alliance policy used to achieve its strategic and operational targets, i.e. developing and using the resources of outside organisations and networks for the benefit of the university.

4. Performance benchmarking of the university's in-house development capacity to motivate staff members to achieve the desired performance/outcome targets in their different roles and responsibilities, i.e. developing and using the key performance indicator systems inside university.

The outcomes of EUGENE Thematic Network

Today's university operations are, first of all, overly fragmented – units are too small and efficiency measurements guide them excessively towards independent science publications and projects accentuating their own operations. New significance can only be created, first and foremost, by drawing on solid research expertise and both cross-disciplinary and international collaboration which envisions innovative research initiatives.

This preferred development also calls for a new university culture capable of challenging the traditional ways of working and thinking. Universities need to begin recognizing new innovative landscapes as immense opportunities, now more than ever.

Analyzing the recent developments of European higher education systems the Commission⁴ defined that higher education needs to respond to firstly on the skills needs of a knowledge economy, and secondly on the needs of delivering high quality education to an even larger proportion of the population. At a fundamental level, this implies complementing the traditional academic culture in universities with a focus on delivering a highly skilled, enterprising and more flexible workforce – which in turn requires increased interaction between higher education institutions and the world around them.

Experience from around the world has shown the benefits of cooperation with external partners, including employers, innovative businesses and local and regional authorities. As the EU Expert Group on New Skills for New Jobs put it: "Education and training can be effective and innovative only, if the institutions themselves are innovative and operate as learning organisations open to interactions with the world of business and work". This will require strong engineering universities with the ability to:

1. Educate excellent engineers and researchers with ability to build trust and with good understanding of societal and industrial needs.
2. Do research in close strategic collaboration with businesses and public stakeholders to achieve real innovation impact.
3. Implement the Knowledge Triangle concept where education, research and innovation go hand in hand and enhance each other.
4. Integrate a manifold of research fields to focus and reward innovation on multi-faceted societal challenges and systems awareness.
5. Adapt their strategies and role to a changing world facing new challenges, not necessarily correlated with traditional academic structures.

What does this mean on a very practical level inside universities? Answers can be drawn from the work and outcomes of the thematic network EUGENE. The pressure for change inside universities can be summed up by the figure 3 based on the EUGENE organized scientific conference in Gothenburg in December 2010.

EUGENE Line D – Direction based on the Scientific Papers Gothenburg – How?: More Innovativeness in Learning and Teaching Processes & Methods

1. Learning Based on Real Cases

- Contents more by market demands with focus on abilities to solve complex problems
- Modernization and development of new teaching laboratories with industrial partners

2. PBL and other Similar Methods

- Students migrate towards self-directed learning experiences
- Learning-by-Cooperation : Project Based Learning (PjBL) and Problem Based Learning (PBL)

3. Learner Centricity

- Also how to become an innovator and entrepreneur
- To cope with all challenges related with the global learning revolution: broad use of ICT

4. Methods

- Formal and informal teaching via seminars, workshops and other course components
- Simulations, demonstration of different experiments

5. Leadership of Change

- Orchestrating systems between learners, learning task providers, and training providers



Markku Markkula
Line D Leader



4. SEC(2011) 1063 final, commission working document on recent developments in European high educations systems

Special contributions

One Conclusion: Need of many different and specialised universities

What does this mean with respect to what kind of universities do we need? I can simplify my answer by the following main categories of universities:

1. We need a few very strong research-based universities focusing on a very broad spectrum of disciplines. Part of their research needs to be interdisciplinary by nature, however, post-graduate research students need primarily be scientifically one-discipline focused and some continue their research after the doctorate in interdisciplinary teams. Part of the time of the researchers of these research-oriented universities should be targeted for the collaboration with other universities and real life practitioners.
2. Some of these research-based universities should be multidisciplinary by nature, thus being strong in answering the grand societal challenges through innovation.

3. Most universities should be either specialized and focusing only on a few disciplines with a strong focus on real life solutions and applications, or universities of applied sciences with a focus on learning by developing and working life collaboration.

I hope this opens up discussion. And my statements should not be read the way that one category is better or more important than the other one. All these universities have, anyhow, a shared need for developing their study system and their teaching and learning concepts and processes. Knowledge Triangle, as concepts and processes to create more synergy between different activities, needs to be applied in all these three categories.

Markku Markkula

*Special Adviser to the Aalto University President
Member of the EU Committee of the Regions*

Paradigm Shift → Globalization → Europe to Become the Digital Single Market

Research & Innovation



"Fibre" to Europe



ICT products & services – open & interoperable



Enhance trust & security

"...an ambitious European Digital Agenda that takes concrete steps towards the completion of an Online Single Market will be a key element in Europe's sustainable recovery and social development."

Borderless Services & Content Market



Digital Skills

3

USER STORY

Aalborg University Pioneers Problem-Based Learning



Professor Stoustrup and his students, working on a wind turbine control project.

Problem-based learning (PBL) replaces subject-based instruction with group work in which students collaborate to solve real-world problems. The PBL program at Aalborg University (AAU) in Denmark, founded more than 20 years ago, has become a model for universities around the world.

From their very first semester, AAU students use MathWorks tools and Model-Based Design to work on actual industry problems. “With MATLAB and Simulink, the distance between the theory and the implementation is very small,” says Professor Jakob Stoustrup, Ph.D., of the Aalborg University Department of Electronic Systems – Automation and Control. “The high-level programming interface and simulation environment enable students to complete meaningful projects and collaborate with our industry partners.”

Anette Kolmos, Chairholder for UNESCO Chair in PBL in Engineering Education at AAU, adds, “Students gain a deeper understanding of theory and concepts when they apply them to actual problems. Model-Based Design with MATLAB and Simulink is an effective way of enabling PBL that prepares students for real, multidisciplinary engineering work in industry.”

The Challenge

Students typically complete a three-year bachelor’s program followed by a two-year master’s program. Ensuring that the students finish 10 projects in 10 semesters is the faculty’s principal objective. “We need students to come up to speed quickly on each project and focus on the solution,” says Dr. Stoustrup. “If

C code is needed, then we prefer the students to generate it from a model instead of getting bogged down in hand coding.”

Because having a common development platform dramatically improved workflow when students collaborated on previous projects across engineering departments or with private companies, AAU wanted to enable all students to access an industry-standard set of tools.

“Many of our projects involve precommercial prototyping. Our partners often provide basic models of their systems, and the students frequently deliver a control model for simulations,” notes Dr. Stoustrup. “To make the process more efficient, we need to use the same tools as our partners.”

The Solution

Aalborg University acquired a Campus Total Academic Headcount license and a Student Total Academic Headcount license for MathWorks products, giving students and faculty both campus-wide and laptop access to MATLAB®, Simulink®, and dozens of companion toolboxes.

Each semester, students spend about 50% of their time in traditional course activities and the remaining 50% on projects. MathWorks tools are integrated throughout the curriculum. Dr. Stoustrup, for instance, teaches a third-year course on modern control theory in which students use MATLAB and Control System Toolbox™ to model systems, build state-space models, design controllers, and run simulations to verify their algorithms. In the postgraduate Robust Control course,

The Challenge

Work with industry partners to provide students with a deeper understanding of engineering concepts and real-world engineering challenges

The Solution

Use MathWorks tools university-wide to enable a project-oriented, problem-based engineering curriculum

The Results

- Multidisciplinary projects simplified
- Collaboration with industry partners streamlined
- Tight project deadlines met



"Our project-organized, problem-based learning model benefits immensely from a high-level programming and simulation platform. MathWorks tools enable students to concentrate on what is important: learning to apply new concepts and working with industry partners to develop real solutions." —PROFESSOR JAKOB STOUSTRUP, AALBORG UNIVERSITY

students use MATLAB, Control System Toolbox, and Robust Control Toolbox™ to simulate dynamic multivariable systems with uncertainty models and develop H_∞ control solutions.

Student projects vary and include renewable energy, marine boilers, and satellites. Within renewable energy, AAU works closely with several wind turbine companies on control systems for wind turbines and wind farms. AAU students are also working on the European AEOLUS project, using MATLAB and Simulink to model, simulate, and prototype control systems and condition monitoring algorithms for wind farms.

Most projects involve simulating, benchmarking, or prototyping potential solutions. In some cases, the solutions are refined and deployed by the sponsoring company. A manufacturer of marine boilers used Simulink Coder™ to generate production code from the control model that students developed in MATLAB and Simulink.

Automation and control students in the Department of Electronic Systems have completed several projects for the European Space Agency in which they used MATLAB, Simulink, and several toolboxes to model and simulate monitoring systems that detect faults during a spacecraft's re-entry. They also designed, developed, and generated code to control the attitude of two microsatellites that have been put into orbit; a third is under development. Collaboration was enhanced because the various teams could share models.

The Results

Multidisciplinary projects simplified. "With the Total Academic Headcount licenses, all faculty and students on campus have access to MATLAB, Simulink, and various toolboxes," says Dr. Stoustrup. "On multidisciplinary projects, students with quite different educational backgrounds can work together more easily because they are using the same tools."

Collaboration with industry partners streamlined. "Many of our industry partners use MATLAB and Simulink, which makes the PBL process more efficient," says Dr. Stoustrup. "Companies often provide models that help students jumpstart their work, and students deliver models that our partners use for simulation or even code generation."

Tight project deadlines met. "The students begin a new project each semester, and they need to be productive quickly to complete them on time," notes Dr. Stoustrup. "With MATLAB and Simulink, students can move quickly from simple equations and theory to testing real implementations. They don't have to reinvent the wheel because the toolboxes provide many of the advanced algorithms they require. Automatic code generation enables further time savings."

Industry

- Academia
- Aerospace and defense
- Energy production
- Industrial automation and machinery

Application Areas

- Data analysis
- Mathematical modeling
- Algorithm development
- System design and simulation
- Embedded systems
- Control systems

Products Used

- MATLAB®
- Simulink®
- Control System Toolbox™
- MATLAB Coder™
- Robust Control Toolbox™
- Simulink Coder™

Learn More About Aalborg University

www.en.aau.dk
www.control.aau.dk



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Rethinking European Engineers as Value Creators



The last decades have seen European, and more generally western economies struggling to maintain dynamic industrial activities as the value chain in product creation was reshaped while labor intensive activities migrated to low wages countries. In such a context, engineers are facing the challenge to remain at the center of product value creation by adapting the role of their profession. The grand challenge for engineering education is its capability not to follow a redistribution of roles but to define and anticipate it. This requires profound transformations in engineering education which are identified and understood by many of our institutions but which are difficult to execute within our education systems. Let us review a few of those critical changes and their implications in education.

Commercial success of a product is determined by multiple variables, among which those intrinsic to the product can be classified in three categories which constitute the space of motivations of purchasers:

Affordability and price competitiveness are the most obvious ones. Improving this dimension of a product has been and will continue to be the main driver of activity shifts toward low salary countries. Increasing manufacturing productivity is one lever to maintain low units prices but it is not a persistent advantage as most productivity gains can be transposed to any country in a relatively short time frame.

The services provided by a product, its functional proposition, are a factor which is driving the creation of products which are increasingly sophisticated, intelligent, "smart". The delay to global generalization of an advantage gained through product intrinsic levels of service increases with the sophistication of such product. This should drive a continuous effort of enhancing existing goods.

The emotional appeal of a product is the most difficult to apprehend for engineers as it mobilizes motivations that are not necessarily as rational within engineers mental representations. This dimension is however critical to sustain the price premium required for maintaining some portion of labor intensive activity in high salary countries. Scandinavian design products, French Luxury goods, Italian consumer product or German cars traditionally exemplify such items with high perceived brand value.

Orchestrating the dynamics value chain

Engineering products along multiple stakeholders, each of them being the current most appropriate or price-competitive for a given contribution, requires orchestrated work across globally dispersed specialists. While cars, machines, airplanes or consumer goods are traditional examples of dispersed value creation, this need for virtual co-location goes beyond transportable/exportable goods.

Static productions also require dispersed value chains. The Beijing Olympic stadium for instance, involved a Swiss architect, a British engineering company and a Beijing based project coordination. The manufacturing of the stadium's large steel structures could only be done by Shanghai based shipyards. Achieving consistent engineering from initial ideation to manufacturing and operation requires stakeholders not only to communicate easily but to continuously understand each other's technical or emotional anticipations of the final result. Central to enabling such understanding are co-located meetings, a practice ultimately condemned to gradually diminish as the adverse impact of global travel becomes more acute. The only substitute to meetings and its mandatory complement is the use of realistic digital representations and computer aided collaborative work processes.

In our curricula, this situation drives multiples questions: Do we provide students with opportunities for producing creative results in globally dispersed teams? Do we teach the latest methods and tools to enable digital collaboration? Are our curricula balanced enough between the methods and the principles of engineering? How do instill efficient behaviors to prepare students for fruitful engineering conversations about a product which does not exist yet, with partners located in a distant time zone?

Connecting usage value with product characteristics

Successful product innovation resides more and more in the value of its usage by the final purchaser. Smart phones are a good example of products driven by new ways of interacting with a product. This requires early consideration in the innovation process of the total experience of the final user. It requires designing an experience which will become the contextual specification of the product or service.

Often, it is our tradition in engineering education to at best consider functional specifications as the beginning of an innovation process. Vast improvement areas would be open in education if we would provide more occasions to students to design user experiences by combining models of the user itself, of his behaviors and desires, of his context of life. Gaming technology is there to create such models, from which the ideation of a usage can emerge to produce innovative and functional specifications in a second step. Usage models digitally created with gaming technology not only provide a globally sharable platform for the ideation of usages, they also encapsulate reusable information to feed the subsequent technical engineering processes and more product related thinking.

Only a few engineering curricula have made the step of considering gaming technology as intrinsic constituents of a product innovation continuum.

Special contributions

Upfront models of end-user experiences are also key asset to downstream marketing where they provide the language for conversational interaction with purchasers beyond the characteristics of the resulting product or service. In the multidisciplinary activities our curricula promote between engineering students and marketing specialists, there is a great potential to develop engineers' competences of creating more marketable results, more brand value, and therefore the premium in value perception which is needed in high salary economies. Digital usage models provide the tool to leverage this potential in education.

Conceptualizing systems of systems

Systems engineering provides a third set of practices which benefits to the creation of successful products. It provides the methodological framework to think in a multi-disciplinary manner. It relies on digital models of different levels of abstraction of a product and is the only way to conceptualize complex products, systems, systems of systems. Public bicycle sharing systems are a good example in which models of the user, the vehicles, the stations, the network and the network dynamics are to work in a single complex system

optimized at all levels. Any electro-mechanical system is subject to a similar engineering, mobilizing multiple disciplines.

Disciplines combination is a strong challenge in specialization driven education systems. Computer tools have been defined to enable it for industry. They can similarly be applied to provide education with digital spaces which aggregate various disciplinary models around single problems.

Europe has a lot to gain in generations of engineers capable to master new practices of value creation. Building this generation poses significant challenges to educators but in this endeavor they can expect a lot from digital technologies. They enable industry and successful early experience show that they will accelerate educational innovation as well.

Xavier Fouger
Director of Global Academic Programs
Dassault Systemes



The Granta Design Educational Division works with over 800 Universities, Lycées, and Colleges around the world to support their teaching of materials and sustainability across courses in engineering, science, processing, and design.

Granta, which was founded by Professors Mike Ashby and David Cebon in 1994, is a spin-off from the Cambridge University Engineering Department. The company is a corporate member of SEFI and has an international and multilingual team, based in Cambridge, that collaborates actively with academics throughout Europe. A major focus for this collaboration are the Materials Education Symposia that Granta co-ordinates each Spring, with support from SEFI and other engineering and materials societies. The European event, held in Cambridge, attracts academics from over 20 countries each year – details are at www.materials-education.com.

Granta's educational work is centred on the CES EduPack teaching resources. These include unique materials information resources, software, and an extensive Teaching Resources Website, designed to help educators as they develop and deliver their courses.

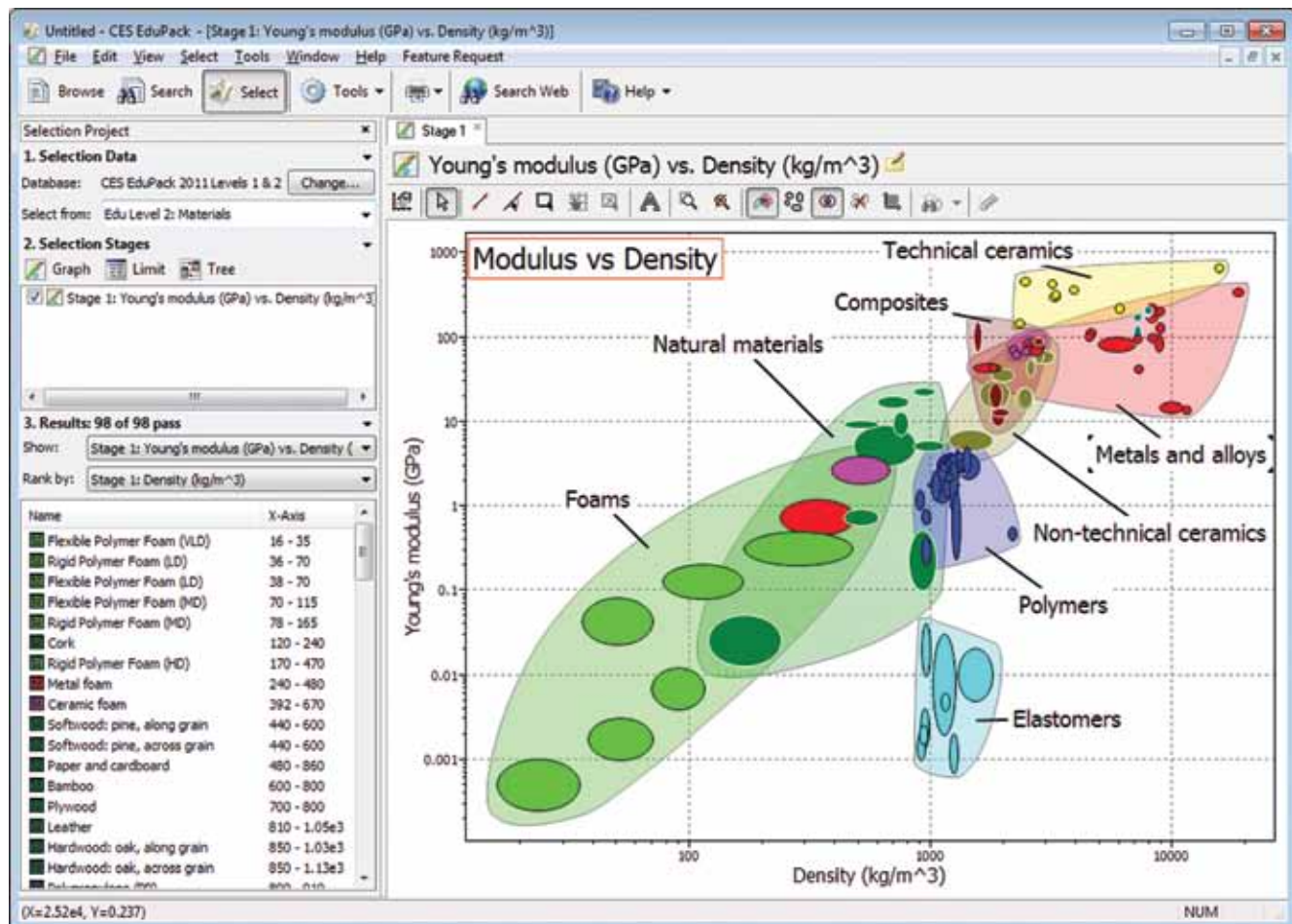
Materials information and software

Academic institutions that use CES EduPack can provide all of their students and academics with access to its information resources and software. CES EduPack can be licensed for use on a single course, or across multiple courses. Increasing numbers of universities are licensing it as a campus-wide resource, enabling it to be used as a common element across the many engineering disciplines to which materials and processes are relevant.

The comprehensive CES EduPack information resources are based around a unique database that provides information on the technical and economic properties of materials and processes, and their applications. Students can search and browse this information, finding out about the world of materials as they go. Integrated 'science notes' explain the underlying materials science. Students can 'drill down' and explore this textbook-style information during project work, classroom work, or while completing exercises. Specialist versions provide detailed coverage of materials types such as plastics, aerospace alloys, and bio-materials, and describe specific application areas including nuclear engineering, low carbon power systems, and architecture. Links to external Internet sources and cross-references to key textbooks support in-depth research and integrate CES EduPack into the wider learning environment.

The CES EduPack software includes a range of tools that apply the database to support teaching and learning. These, for example, allow users to quickly generate attractive material property charts, ideal for illustrating lectures or for helping students to understand and compare materials behaviour. A structured materials selection method, which helps students systematically choose the best materials for a given engineering application, is ideal for project-work and for building an understanding of the real-world use of materials. The Eco Audit Tool helps students to explore key concepts in eco design, allowing them to quickly predict the environmental footprint of products and study how changes in materials or processes impact this footprint. The Hybrid Synthesizer tool enables study of composite materials.

Exploring Materials Properties Using CES EduPack Software



Teaching Resources Website

Any academic on a course supported by CES EduPack can also use Granta's Teaching Resources Website. This contains over 200 separate resources for materials teaching across engineering, design and science. They are primarily aimed at undergraduate teaching and have been created by Professor Mike Ashby, Granta Design, and faculty from the CES EduPack community. Some resources are open access, others are there to support CES EduPack users and are available via a password. Resources include over 80 Power point lectures in 4 languages, 30 sets of exercises with worked solutions, interactive case studies, teach yourself booklets, white papers, and materials and process selection charts.

Supporting Materials Education

The Granta Educational Team works with academics to help them apply this range of resources to meet the specific requirements of their course and students. Lessons learned during this work are fed back into the further development of the CES EduPack resources. The scope is broad. CES EduPack is used from introductory-level teaching in Colleges and first-year University courses, up to postgraduate courses. Different 'levels' of its database support this varied range.

Its different editions support teaching not only in Mechanical Engineering and Materials Science departments, but in subjects including Architecture, Civil Engineering, Nuclear Engineering, Aerospace Engineering, Industrial Design, Chemical Engineering, Bio-engineering, Crystallography, and Physics. Sustainability and eco design are an increasingly common thread throughout many of these subject areas, and creating novel resources in this area has been a major focus in the development of CES EduPack in recent years.

Find out more

Contact Granta if you are interested in finding out more about Granta's work, in attending the Materials Education Symposia, or in collaborating with Granta to apply and advance development of the CES EduPack teaching resources. More details at Granta's educational websites:

- English language - www.grantadesign.com/education
- Français - www.grantadesign.com/fr/education
- Deutsch - www.grantadesign.com/de/
- Español - www.grantadesign.com/es/



HP Education Services - Partnerships for Growth: UK Universities

HP creates new possibilities for technology to have a meaningful impact on people, businesses, governments and society. The world's largest technology company, HP brings together a portfolio that spans printing, personal computing, software, services and IT infrastructure to solve customer problems. To design, develop, sell and implement its systems and services, HP actively recruits the best and brightest talent in the industry. Therefore, it's a logical step for HP to take an active interest in developing the next generation of graduates by working closely with universities.

HP has maintained longstanding strategic partnerships with universities around the world; in 2010, as part of a strategic partnering agreement in the UK, HP began a new project with the University of the West of England (UWE). HP Education Services, with the UWE IT faculty, designed a unique BSc Masters degree course with the aim of meeting the primary objectives of each organisation. For HP, it was to develop future graduates that had the best possible grounding in IT and business skills that would enable them to be effective and efficient employees in HP, or any other of the thousands of organisations around the world that utilise and operate HP technology. For UWE it was about creating a course that would attract top-notch students that would leave the course with an extremely high level of employability.

To achieve these ends, the course was carefully designed to include some of the best IT modules in the UWE portfolio, which are proven to provide an ideal grounding in IT skills. In addition, it contains a number of HP-led modules covering topics including Networking, Virtualisation, Storage and Datacentres. Finally, an essential knowledge set for any IT consultant must include an appreciation of IT Service Management. When students graduate from the UWE/HP degree course in Enterprise Computing, they will not only have a degree, but they will also have a number of first level HP ExpertONE industry recognised certificates and a Foundation Certificate in IT Service Management.

The partnership with UWE is one of a number of university initiatives that HP has embarked upon. In partnership with the Bucks New University, HP has developed a joint 2-year Foundation degree in IT. In contrast to the HP/UWE degree, this is an 'in work' degree featuring a combination of instructor-led and distance learning modules that enable people already in employment to obtain an ideal enhancement to their existing qualifications to benefit their current role, or expand their career horizons. Candidates graduate with their degree and HP certifications. Students may also return to complete a final year of study at any time, converting their Foundation degree to a full BSc degree.

Third in the current sequence is a joint degree with De Montford University (DMU) of Leicester. The Business informatics course is a rich mix of HP technology and business skills aimed at producing a well-rounded, business oriented graduate. The key themes of personal and professional skills development are woven through all the modules, delivering qualified professionals to commerce and industry. With an additional module in project management and the degree and HP certifications, candidates may graduate with a PRINCE 2 Foundation certificate.

These three joint degree programs are all currently recruiting students for the September 2012 academic year. A common feature of the degrees is the unique and added value of linkages with HP as an education partner, including special HP industry leading speakers, invitations to HP events and other opportunities for professional enrichment.

HP is proud of its association with all of these institutions and each degree offers a unique programme of study that enhance each of the universities' IT portfolios. The UWE and DMU programmes each include an industry placement in year three - in many cases at HP - during which the student will have the opportunity to experience the industry first hand, practice the skills they have acquired, and explore options for full-time placement after completing their studies.

For further details about these exciting opportunities in the UK and Ireland, please visit:

University of the West of England Enterprise Computing BSc degree:
<http://courses.uwe.ac.uk/G530/2012>

De Montford University Business Informatics BSc degree:
<http://www.dmu.ac.uk/study/courses/undergraduate-courses/business-informatics.aspx>

Bucks New University IT Services Management Foundation degree:
http://bucks.ac.uk/en/content_modules/news_content_module/university-and-hp-to-co-deliver-it-foundation-degr_gx223mks.html?&highlight=1&keys=hp&lang=0

HP Education Services UK and Ireland:
<http://h41156.www4.hp.com/education/index.aspx?cc=uk&ll=en>

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