EDUCATING THE FUTURE ENGINEERS

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7th ARCHENG International Architecture and Engineering Symposium

The European University of Lefke

29-30 November 2012
The World in the Future (in 2030)
Major Economic, Social, Cultural Challenges
New Engineering Areas and Jobs
The Engineering Perspective for 2030’s
How Different Nations Prepare for the Future
Where Do We Stand and What Can We Do?
WHAT IS ENGINEERING?

IS A PROFESSION OF SATISFYING OUR UNLIMITED DEMANDS WITH LIMITED RESOURCES USING TECH. TOOLS AND TECHNIQUES.
THE WORLD IN 2030

Source: cosmosmagazine.com

Source: luiswillumsen.com
THE WORLD IN 2030

Source: domusweb.it
THE WORLD IN 2030
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Key Global Trends in 2030’s
Technology, Environment, Economy, International Relations

- Robots physically and mentally superior to humans
- Intelligence, Biomedical/Genetic Enhancement by external means
- Learning superseded by transparent interface to smart computers
- 80% of world population living in cities (50% today)
- More Than 83% of World Will Have Electricity (50% today)
- Everything you say and do will be recorded (!!!)
- Space solar power stations, wave energy provide 50% of UK energy
- Carbon dioxide fixation technology for environment protection
- Artificial precipitation induction and control
- Nanotechnology plants & bacteria enhancement to fertilization

Ref: OUTLOOK 2009 report by World Future Society
Major Challenges for 2030…
Economic, Social, Cultural Issues

- Population Growth and Demographic Shift (7.1 to 8.3 billion)
- Coping with Increasing Life Span (80 to 85 years old)
- Increasing Needs & Economic Turbulence (food, energy…)
- Diversity of Life Styles and Generation Crossroads (…)
- Societies in Transition and Complex Politics (local, global…)
- Changing Modes Of Transportation (drive, fly, tele…)
- Global Expansion of Electronic Media (virtual reality + reality)
- Reshaping education and training (new skills required?)
- Challenges on Natural Resources (energy, water…)

Source: www.fastfuture.com
Engineering Issues for 2030’s

- Nano-medicine, Human Enhancement, Quarantine Experts, Cloning & Ethics, Old Age Wellness (Equipment Producers),
- Human Body Enhancement, Cloning, Synthetic Life Engineers
- Artificial Climate Regulators, Quarantine Enforcers
- Space Pilots, Space Engineers/Architects
- Intelligent Materials/Equipment, Memory Materials, Robotics
- Product/Food Design: Genetically Modified Crops & Livestock Eng.'s
- Enhanced Virtual Life: Virtual Polis & Lawyers
- Social Net Advisors, Personal Brand Makers, Social Eng.'s
- QUANTUM Computing Engineers, Waste Data Processors
- Energy, Multimode Communication, Leisure Engineers
Educational Issues in 2030’s

- Professional Knowledge Become Obsolete Rapidly: Retraining
- Carriers & Univ. Majors to Prepare for Carriers be more specialized
- Students will explore niche majors such as
  - sustainable business, strategic intelligence, entrepreneurship
- In Engineering, Specialization in
  - Biomedical Eng, Biomechanics,
  - New Houses & Work Environment, neuroscience, nanotechnology
  - security, sustainability,
  - computer & digital applications in forensics & legal issues

European Way Of Looking To The Future of Engineering Education

AREAS OF ADVANCE (BY EEDC)

Areas of Advance (by EEDC)

- Energy
- Built Environment
- ICT

- Transportation
- Nano-science/Nano-technology

- Material Science

- Production
- Life Sciences

- Self-Sufficient House Design and Construction

- Sports Materials
  - Health Materials
  - Future Materials
EU R&D Perspective: Support any investment if it will result in economic growth and new job opportunities

INTERACTION AROUND THE KNOWLEDGE TRIANGLE
US LOOK AT ENGINEERING PRACTICE, RESEARCH AND EDUCATION AS PART OF A MORE COMPLICATED SYSTEM

Global-Knowledge-Driven-Economy

Products, Systems, Services

Corporate Management
Business Plan
Market Optimization
Immune System Design
Radical Innovation
Development
Research

Vertical Integration
Horizontal Integration

Suppliers
Bus. Proc Outsor
Innovn Offshore
R&D Outsourcing

Applied Science, Eng, Med, Arch,

Source: US Vision 2030
A ROADMAP TO THE FUTURE OF ENGINEERING PRACTICE RESEARCH AND EDUCATION

Security

Environment

Sustainability

Threats

Elements

New Knowledge
(Research)

Human Capital
(Education)

Infrastructure
(Facilities, IT)

Policies
(Tax, IP, R&D)

Technological Innovation

National Priorities

Economic Competitiveness

National and Homeland Security

Public Health & Social Wellbeing

Global Challenges

Global Sustainability

Geo-politic Conflicts

American Way Of Looking To The Future of Engineering Education

Source: US Vision 2030
1) Implement Structural Reforms To Strengthen The Foundations For A Market based Economy

2) Accelerate pace of innovation & create an open innovation system
   - competitive pressures to encourage Chinese firms to engage in product and process innovation
   - by participating in global research and development networks
   - priority to increase both quality and quantity of R&D
CHINA 2030: BUILDING A MODERN, HARMONIOUS, AND CREATIVE HIGH-INCOME SOCIETY

Source: China 2030

CHINA 2030 VISION MILESTONES

3) Seize The Opportunity To “Go Green”
4) Expand Opportunities And Promote Social Security For All
5) Strengthen The Fiscal System
6) Seek Mutually Beneficial Relations With The World
WHERE DO WE STAND?

- In 1992, Prof. Dr. Özay Oral started an initiative to attract high quality academicians to Cyprus.
- A # of Turkish Cypriots are educated in top universities around world and they are inclined to return home.
- Hence, we have one of the highest academician/km2 environment suitable for academic studies and research.
- We have to use this advantage to do the thing we could do better than our rivals: Quality Education and Research.
- To achieve this, we have to develop an Academic Merit System where success is encouraged and awarded.
- Competition should start at leading universities and spread.
- We have all the know how and necessary legal background.
TO ENSURE CONTINUOUS IMPROVEMENT

- The rules of entering, advancing, retarding and exiting the academic system should be manifested clearly
  - and applied justly
- Benefits should be gained and lost depending on the individuals performance
- The new entries in the academic system should always be better than the existing ones
- There shall be a place for every academic staff at different success levels
Universities will be ranked with reference to a published set of criteria, such as:

- Quality of Education Confirmed by Accreditations
- # International Full-Time students
- # Articles published
- Economic Success

There should be an independent professional body for examination / audition of universities' local ranking.

Government will subsidize universities based on the above criteria.