TO SAY WHAT I AM GOING TO SAY...

① Some historical and institutional notes
   ① Portugal, Porto, The University of Porto, The Faculty of Engineering

② The Faculty of Engineering
   ② The Mission: Education; R&D; The third mission within the mission – Facts&Figures and some real applications

③ Concluding Notes – Expectations for the future
Cantino Planisphere (1502): The oldest known map from the days of the Portuguese discoveries
THE MOST WESTERN COUNTRY OF THE EUROPEAN CONTINENT, THE OLDEST STABLE BOUNDARIES

PORTO – PORTUGAL

PORTO METROPOLITAN AREA

• Figures and Facts
  – 16 Municipalities
  – ~1,700,000 inhabitants
  – Porto, capital of the north region

• Porto brands – assets and attractions
  – Port Wine
  – The University of Porto
  – F.C. Porto
  – Culture, architecture, the bridges of Porto, World Heritage Site

• 2 Pritzker award winners
  – 1992 – Álvaro Siza Vieira
  – 2011 – Eduardo Souto de Moura
PORTO AND GAIA – FROM THE DAYS OF THE ROMANS...

PORTUS CALE

D. Pedro Restaurant

Port Wine Cellars

PORTO AND GAIA – FROM THE DAYS OF THE ROMANS...

RIBEIRA AND PONTE DA ARRÁBIDA – ARRÁBIDA BRIDGE

WORLD HERITAGE SITE - UNESCO 1996

SFA, Mobility Network, 21 November 2011
Vinho do Porto – Port Wine – The Reference...

Rabelos Boats and Bridge Luis I, Teófilo Seyrig, 1886-1887

World Heritage Site - UNESCO 1996
A Boat Race in Douro River
Port Wine and the University of Porto... together

Porto, City of Architecture: Serralves Museum, Arq. Álvaro Siza, 2005
PORTO, CITY OF CULTURE: CASA DA MÚSICA – CONCERT HALL

Arq. Rem Koolhas, Pritzker Winner, RIBA European Award 2007

SFA, Mobility Network, 21 November 2011

PORTO, CITY OF TRADE, WITH EXCELLENT EASY ACCESSES

2nd Best European Airport (ACI award 2011)

SFA, Mobility Network, 21 November 2011
PORTO, CITY OF SCIENCE: THE UNIVERSITY OF PORTO

1837-1911 Polytechnic Academy, the Rectorate of U.Porto since 1911
The teaching of engineering in Portugal started in this building, in 1837

SFA, Mobility Network, 21 November 2011
**University of Porto**

**A Comprehensive Research University**

- The University of Porto is the largest comprehensive University in Portugal
  - Organised in 3 main campuses in the city
  - more than 30,000 students (10% plus foreign students)
  - 14 Faculties and a Business School.

- A leading research University in the country
  - 60 R&D units
  - responsible for ~22% of the published scientific papers in Portugal

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**International Rankings U.Porto 2010**

[SFA, Mobility Network, 21 November 2011]
Performance Ranking of Scientific Papers for World Universities (Taiwan)

<table>
<thead>
<tr>
<th>Ranking</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top 500 Universities (World rankings)</td>
<td>459</td>
<td>375</td>
<td>332</td>
<td>328</td>
<td>320</td>
</tr>
<tr>
<td>European Ranking</td>
<td>195</td>
<td>161</td>
<td>140</td>
<td>141</td>
<td>141</td>
</tr>
<tr>
<td>Ibero-American Ranking</td>
<td>10</td>
<td>11</td>
<td>9</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>National Rankings</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

TO SAY WHAT I AM GOING TO SAY...

① Some historical and institutional notes
② Portugal, Porto, The University of Porto, The Faculty of Engineering
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③ Concluding Notes – Expectations for the future
Faculty of Engineering buildings in Asprela, 2000 -

UNIVERSITY OF PORTO

Asprela: the Technology Campus

More than 17,000 people work in science and technology, within U.Porto, at Asprela

- 7 Faculties
- 6 main R&D Interface Institutes,
- 2 Hospitals
- The Science and Technology Park, supporting today 58 innovative companies
**Faculty of Engineering**

**Mission**

- **Core activity**
  - Education – all cycles of the European Qualifications Framework adopted within the Bologna Process agreements
  - Research & Development
  - Activities of the Third Mission

- Education, including cultural, ethical and civic education

- Underlying principles – keywords are
  - Quality, Internationalisation, Cooperation
  - Building trust through reputation

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**Faculty of Engineering**

**The Third Mission**

- Lifelong learning education
- Human resources – transfer to industry and public services other than academic institutions
- Intellectual property
- Spin offs
- Contracts with industry
- Contracts with Public Bodies
- Participation in policy making
- Involvement in social and cultural life
- Public understanding of science

*After Philippe Laredo, Toward a third mission for Universities, UNESCO research seminar for the Regional Scientific Committee for Europe and North America, Paris 5-6 March 2007.*

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SFA, Mobility Network, 21 November 2011
## Campus Infrastructures

<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total campus constructed area</td>
<td>~84 000 m²</td>
</tr>
<tr>
<td>Green area</td>
<td>23 000 m² (30% of total)</td>
</tr>
<tr>
<td>Library area/seats</td>
<td>5 694 m² (500 seats)</td>
</tr>
<tr>
<td>Computers for teaching</td>
<td>1350</td>
</tr>
<tr>
<td>Computer labs</td>
<td>30 (open 365d/24h)</td>
</tr>
<tr>
<td>Teaching labs</td>
<td>63</td>
</tr>
<tr>
<td>Multimedia equipped classrooms</td>
<td>43</td>
</tr>
<tr>
<td>Investment in Lab equipment</td>
<td>1,81 M€ (2010)</td>
</tr>
</tbody>
</table>

**Services:** bookstore, printing, merchandising, snack-bars, restaurant, canteen
### FEUP General

#### Academic Community (2010)

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faculty - Permanent</td>
<td>360</td>
</tr>
<tr>
<td>Faculty - Invited</td>
<td>244</td>
</tr>
<tr>
<td>Faculty - Total FTE</td>
<td>460.4 (78.6% Ph.D.)</td>
</tr>
<tr>
<td>Research staff (5 year contracts)</td>
<td>34</td>
</tr>
<tr>
<td>Technical staff</td>
<td>338.5</td>
</tr>
<tr>
<td>Students</td>
<td>7145</td>
</tr>
<tr>
<td>Ratio Technical /Faculty (FTE)</td>
<td>0.74</td>
</tr>
<tr>
<td>Ratio Students / Faculty (FTE)</td>
<td>14.6</td>
</tr>
</tbody>
</table>

### FEUP General

#### Academic Community – Students (2010)

**Degree programmes - 7112**

<table>
<thead>
<tr>
<th>Programme</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate</td>
<td>202</td>
<td></td>
</tr>
<tr>
<td>Integrated Masters</td>
<td>5739</td>
<td>(23.4% female)</td>
</tr>
<tr>
<td>Independent Masters</td>
<td>417</td>
<td>(50.2% female)</td>
</tr>
<tr>
<td>Doctoral Programmes</td>
<td>754</td>
<td>(34.9% female)</td>
</tr>
</tbody>
</table>

**Non-degree programmes - 33**

<table>
<thead>
<tr>
<th>Programme</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specializations</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Advanced Studies</td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>

**Total students - degree and non-degree programmes - 7145**

**Lifelong Learning - 1159**

<table>
<thead>
<tr>
<th>Programme</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refresher courses</td>
<td>789</td>
</tr>
<tr>
<td>Course individual units</td>
<td>370</td>
</tr>
</tbody>
</table>
Bologna Process – QF in the EHEA

3rd Cycle
Doctoral Programmes (PhD)

2nd Cycle
Masters (MSc)

1st Cycle
Licences (BSc)

Integrated Masters

2 years

3 years

5 years

Programme Portfolio 2011

Degree programmes

Undergraduate programmes 3

Integrated Masters 9

Independent Masters 13

Doctoral Programmes 22

Non-degree programmes

Specializations / 2nd cycle level 7

Advanced Studies / 3rd cycle level 4

Lifelong Learning -

Refresher courses 14

Course units 119

Summer courses 4
**EDUCATION**

**Undergraduate Programmes**

**Undergraduate Programmes – 1st cycle**
- Information Science
- Communication Sciences: Journalism, Public Relations, Multimedia
- Mining and Geo-Environmental Engineering

**Integrated Masters – 1st + 2nd cycle**
- Bioengineering
- Chemical Engineering
- Civil Engineering
- Electrical and Computers Engineering
- Environmental Engineering
- Industrial Engineering and Management
- Informatics and Computing Engineering
- Mechanical Engineering
- Metallurgical and Materials Engineering

**EDUCATION**

**Independent Master Programmes – 2nd Cycles**

- Biomedical Engineering
- Information Engineering *
- Mining and Geo-Environmental Engineering
- Occupational Safety and Hygiene Engineering
- Production Engineering *
- Services Engineering and Management
- Communication and Sports
- Computational Mechanics *
- Industrial Design and Development *
- Information Science
- Innovation and Technological Entrepreneurship
- Multimedia
- Spatial Planning and Urban Project *

* program awaits A3ES accreditation

SFA, Mobility Network, 21 November 2011
Doctoral Programmes - 3rd Cycles

Biomedical Engineering
Chemical and Biological Engineering
Civil Engineering
Electrical and Computer Engineering
Engineering and Public Policy *
Engineering of Refining, Petrochemistry and Chemistry
Environmental Engineering
Industrial Engineering and Management
Informatics Engineering
Mechanical Engineering

* program awaits A3ES accreditation

Doctoral Programmes (Cont.)

Metallurgical and Materials Engineering
Mining and Geo-Resources Engineering
Physics Engineering

Applied Mathematics
Computer Science
Digital Media
Industrial Design and Development *
Leaders for Technical Industries
Occupational Safety and Health
Sustainable Energy Systems
Telecommunications
Transport Systems

* program awaits A3ES accreditation
EDUCATION

Dual Degree Agreements

Integrated Masters – 1st + 2nd cycle
Civil Engineering (ENPC ParisTech)

Doctoral Programmes – 3rd cycle
Computer Science (CMU)
Digital Media (UTAustin)
Electrical and Computer Engineering (CMU)
Telecommunications (CMU)

EDUCATION

Non-degree Programmes

Specializations (2nd cycle)
European Executive Master in Innovative Service Systems
Operations Management
Product Design and Development
Services Engineering and Management
Technological Entrepreneurship and Sustainability
Technological Entrepreneurship in Occupational Safety
Thermal Engineering

Advanced Studies (3rd cycle)
Product Design and Development
Refining, Petrochemical and Chemical Engineering
Sustainable Energy Systems
Technology Management Enterprise
### Academic work outside FEUP 2010

<table>
<thead>
<tr>
<th>Cooperation agreements with companies (active)</th>
<th>93</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master dissertations undertaken in companies (2009/2010)</td>
<td>235 (24.0%)</td>
</tr>
<tr>
<td>Cooperation agreements with international universities</td>
<td>526</td>
</tr>
<tr>
<td>Master dissertations undertaken within mobility programmes</td>
<td>40 (4.1%)</td>
</tr>
</tbody>
</table>

### Employment for FEUP Graduates

FEUP FirstJob fair brings each year to the campus more than 50 companies for job hunting, business presentations and chat rooms.

FEUP also organizes career workshops, recruitment simulations and supports entrepreneurship.

Employment survey results 2010 (graduate students in 2008/2009)
Foreign Regular Students 2011

1st+2nd cycle: 114 students
2nd cycle: 33 students
3rd cycle: 140 students

- America: 40%
- Europe: 19%
- Asia: 19%
- Africa: 22%

Foreign Regular Students 2011: 286 FTE students from 49 Countries
Almost 15% of FEUP students have a study or training period abroad.

Mobility 2005-2010: 2500 exchanges with 218 Universities in 32 Countries
Internships 2005-2010: 172 internships in 47 Countries

Research & Outreach – Facts and Figures
Research and Extension work of Faculty Staff is carried out in:

- 9 Research and Development (R&D) units recognized and financed by the National Foundation for Science and Technology based in FEUP.
- 22 other units based in institutions other than FEUP (within U.Porto’s other Faculties, within Interface Institutes or within other Universities).

Interface Institutes – non-profit organizations of which U.Porto or U.Porto-FEUP are shareholders:

- More flexible organizations for cooperation with stakeholders in general.
- They also house R&D Units of the National Foundation.

### Research

**Associated Laboratory**

Separation and Reaction Engineering / Catalysis and Materials

**R&D units evaluated with ‘Excellent’**

- Laboratory for Process, Environment and Energy Engineering
- Transport Phenomena Research Center

**R&D units evaluated with ‘Very good’**

- Centre for Wind Energy and Atmospheric Flows
- Laboratory for the Concrete Technology and Structural Behaviour

**Other R&D units evaluated with ‘Good’**

- Construction Studies Centre
- Geo-Environmental and Resources Research Center
- Institute for Systems and Robotics of Porto
- Research Centre for Territory, Transports and Environment
**Interface Institutes**

- Institute for Systems and Computer Engineering of Porto
- Mechanical Engineering and Industrial Management Institute
- Mechanical Engineering Institute
- Biomedical Engineering Institute
- Construction Institute
- Institute for Technological Research and Development
- Hydraulics and Water Resources Institute
- Building Materials Testing Laboratory

**The University or the Faculty are shareholders of these institutes**

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**Some indicators**

*Publications, Contracts, patents, spin-offs, 2010*

- **Publications ISI WoS**: 489
  - Publications / PhD (FTE) - 1,25
- **Contract work (active)**: 30
- **Patent applications filed in 2011/Cumulative total**: 2/46
- **Spin-off companies set up in 2011/Cumulative total**: 3/20

**11-13 % of the budget comes from provision of service to the economic activities**
Research 2005-2010: 67 projects involving 410 Institutions in 38 Countries
RESEARCH & OUTREACH

International R&D Colab @U.Porto

Carnegie Mellon | Portugal
Information and Communication Technologies Institute
- Security and Critical Infrastructure Protection
- Future Internet Services and Technologies
- Services and Technologies for Interactive Media
- Software Engineering

MIT | Portugal
- Stem Cell Engineering for Regenerative Medicine
- Sustainable Energy and Transportation Systems
- Materials and Design-Inspired Products
- Fundamentals of Engineering Systems

UT Austin | Portugal
- CoLab - International Collaboratory for Emerging Technologies
  - PhD programme in Digital Media
- UTEN-University Technology Enterprise Network - Professionalizing and Advancing S&T Commercialization in Portugal

Fraunhofer Portugal Research Center
- Assistive Information and Communication Solutions

IBM Portugal Center for Advanced Studies
- Enterprise Engineering and Management

SFA, Mobility Network, 21 November 2011
**INTERNATIONALISATION**

- American Society for Engineering Education (ASEE)
- Conference of European Schools for Advanced Engineering Education and Research (CESAER)
- Environmental Association for Universities and Colleges (EAUC)
- European Centre for Strategic Management of Universities (ESMU)
- European Society for Engineering Education (SEFI)
- International Association for Continuing Engineering Education (IACCE)
- European Research Community on Flow, Turbulence and Combustion
- European Energy Research Alliance
- European Federation of Chemical Engineering
- Industrial Energy-related Technologies and Systems
- Institute of Nanotechnology

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**RESEARCH AND OUTREACH**

**2010 Rankings@FEUP - I**

- QS-WUR Eng
- THE-WUR
- ARWU
- SIR SCimago
- HEEACT-Eng
- Ibero-Americano
- Europa
- Mundial

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SFA, Mobility Network, 21 November 2011
**Research and Outreach**  

**2010 Rankings@FEUP - II**

![Graph showing rankings of different metrics like QS-WUR Eng, THE-WUR, SIR Scimago, HEEACT-Eng, Ibero-Americano, and Portugal across various metrics.](image)

**Research and Outreach**  

**2011 Rankings@FEUP – III**  

**Engineering**

<table>
<thead>
<tr>
<th>Taiwan Rankings* 2011 - Engineering areas</th>
<th>Europe</th>
<th>World</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical Engineering and related areas</td>
<td>13</td>
<td>47</td>
</tr>
<tr>
<td>Chemical Engineering and related areas</td>
<td>16</td>
<td>58</td>
</tr>
<tr>
<td>Civil Engineering and related areas</td>
<td>25</td>
<td>97</td>
</tr>
</tbody>
</table>

*Research Productivity (20%); Research Impact (30%); Excellence in Research (50%)*
**OUTREACH**

**OUTSTANDING STRUCTURES AWARD - OStrA**

Segadães Tavares
Madeira International Airport – Funchal, Portugal
Outstanding Structures Award 2004

José Mota Freitas
The Church of the Most Holy Trinity, Fátima, Portugal
Outstanding Structures Award 2010

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**OUTREACH**

**Applied Research – some Industrial Partners**

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New bone graft for regenerative medicine. Bonelike it is an international patented product.
Launched on the Portuguese market in 2007, the new Super Bock alcohol-free beer is the result of an innovative patented production process, developed in a partnership of Unicer with FEUP. This new process keeps all the original flavour of the beer with the convenience of a 0º alcohol graduation.

Underwater remote operation vehicles.
VENTOS - Wind flow prediction software

To support decisive agents in the search for sustainable mobility solutions.

TRIENMO
Inspired by the way natural structures work (Biomimicry), specifically the human muscle, the Organic PreStressing System is a set of cables, hydraulic jacks, sensors and other components, that are attached to self-launching gantries (large, heavy equipment used in bridge construction), performing in order to compensate the charges the metallic structure is subject to.

Clean technologies and natural resources perfume design.

High purity Oxigene and Xenon production unit.
WalkinSense is an easy to use wireless portable patented device that gathers and processes data of lower limb movements during walking, measuring both diabetic patient mobility patterns and plantar pressure.

Wireless and portable skinfold caliper wireless developed at FEUP. It allows a reliable and quick way of measuring body fat. It’s a patented device.
OUTREACH

Feeding Innovation

Parque de Ciência e Tecnologia da Universidade do Porto

107 start-ups
100% occupancy rate

OUTREACH

Scientific and Cultural Events

- The Conference Centre provides professional services related with the production, communication and technical and logistic support of events.

- The campus has significant facilities for large and complex events

- 225 Events in 2010
  - 33 Internacional Conferences
  - 50 Scientific
  - 68 Academic
  - 27 Institucional
  - 25 Cultural
  - 21 Other external

SFA, Mobility Network, 21 November 2011
The institution has recognized expertise in a wide number of engineering areas.

FEUP attracts the best students in engineering in the country and is committed with the valorization of the knowledge that is created through university research.

**Media notoriety in 2010**

Press releases 65 (12 for international media)

Media clipping

<table>
<thead>
<tr>
<th>Medium</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>in press</td>
<td>935</td>
</tr>
<tr>
<td>in radio and television</td>
<td>142</td>
</tr>
<tr>
<td>online</td>
<td>899</td>
</tr>
</tbody>
</table>

Some historical and institutional notes

Portugal, Porto, The University of Porto, The Faculty of Engineering

The Faculty of Engineering

The Mission: Education; R&D; The third mission within the mission – Facts&Figures and some real applications

Concluding Notes – Expectations for the future
FEUP’s Mission
Strategic Plan for 2011-2015 (I)

Approved by the General Council of the University, on November 4, 2011

Quality and Internationalization
Two transversal commitments

- Education
- Research & Development
- Third Mission
- Human Factor
- Governance and Management

OUTREACH
Expand International Partnerships

SFA, Mobility Network, 21 November 2011
THIRD MISSION – A MUST...

- Our duty within the mission
- Obviously, a significant source of financial support
- But, attention - a careful balance should be kept between contract work and research work
  - Knowledge and innovation should go together or in close paths
  - Knowledge is the basis for innovation, without creating knowledge the potential for innovation slowly, but steadily would fade away
- The way for the future is tough, but clear...
  - Research and Innovation, International Cooperation, Mobility, Trust through quality perceived by all stakeholders