

BUILDING TRANSATLANTIC COLLABORATION FOR EXCELENCE IN DOCTORAL EDUCATION

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** Presenting

Collaboration parameters

The collaboration started through a partnership (TEE or Transatlantic Excellence in Engineering) granted nearly 1 million euros by the European Commission (Erasmus Mundus ICI partnerships) for developing collaborative doctoral education. The partnership implemented a network for excellence in Engineering postgraduate programs including the following Universities: Universitat Politecnica de Valencia, University of Cambridge, Universita di Roma “la Sapienza”, Universite Paris-Sud, Ghent University, TU Berlin, North Carolina State University, University of California Davis, University of Pennsylvania, McGill University and the University of British Columbia.

The main objective of TEE has been to encourage structured cooperation at higher education level between European, US and Canadian Higher Education Institutions, by fostering interinstitutional relations and sustainable international cooperation. It has contributed to the development of doctoral education first by promoting bilateral research work and doctoral training through candidates, post-docs and staff exchanges. Specifically the Consortium has developed specific areas for cooperation with incipient researchers networks on the next focal topics selected from key priorities for EU, US and Canada (see below) through joint research activities and academic cooperation.

First results: mobilities

Similar experiences in other parts of the world require only dissemination at students level for obtaining high impact. However, doctoral research at High level Universities has proved, after 2 years of project operation, more difficult.

TABLE I - MOBILITIES UPDATED

| Type of mobility | From USA | From CANADA | From EUROPE |
|-----------------------|-----------|-------------|-------------|
| Doctorate (6 months) | 5 | 5 | 19 |
| Doctorate (10 months) | 0 | 1 | 7 |
| Post-doctorate | 0 | 0 | 10 |
| Staff | 6 | 3 | 14 |
| TOTAL | 11 | 9 | 50 |

Diagnosis of the situation has led to the following conclusions:

- Lack of doctoral, and post-doctoral candidates (even academic staff) meeting the nationality eligibility requirement fixed by the EU which allowed only applications from individuals with US/Canada (or European) nationality. It has been assessed that in

doctoral programs for US and Canada an average of only 32% of the participants are born nationals. this leads to a very restricted population which can apply for the grants. The number of applications was 2 to 1 in Europe while only 1.1 to 1 in US and Canada.

- USA and Canada doctoral programs are interested in high level research stays, but limited to 6 months. Long mobilities:
 - Meet high reluctance from supervisors since typically all PhD candidates are under contract by their supervisors and the transatlantic collaboration is not well developed in order to form real teams for research. This has been addressed by the project and specific activities leading to joint transatlantic proposals have achieved good results (3 cofunded proposals 2 NSF/EU, 1 NRC/EraCAN).
 - Raise problems with academic fees. The cost of enrolment for PhD programs is very asymmetric from most european countries and US/Canada. Therefore stays which are up to 10 months are accounted through a "visiting researcher" figure and reciprocity of exchanges apply.
 - Are difficult to implement under non structured cooperation because of problems for coordinating the research plans.

- Awareness and dissemination has to be focused on personal links and cooperation of researchers. TEE has proved that joint fund seeking activities are key to doctoral collaboration. This has been more clearly outlined by the lack of Post-doc activity in the US and Canada.

Research focus groups

Today's collaboration in education has not evolved at the same pace as interpersonal interactivities for research and joint work among research Universities. The excellence of an engineering program cannot be granted without the multidisciplinary spectra needed for maintaining a leading edge for Engineering in our interconnected world. TEE has established an institutional dialogue that, after important dissemination efforts and staff mobilities, is beginning to develop personal research contacts, creating a pool of expertise and know-how that will set the basis for the future implementation of joint doctoral collaboration in engineering.

Fostering the personal contacts is important for maintaining the cooperation alive (and developing it). TEE has identified the following research groups as a key focus for doctoral collaboration between Europe, US and Canada:

- Advanced materials & nanotechnology (3 transatlantic teams: 2 US/EU, 1 Canada/EU)
- Aerospace engineering (2 transatlantic teams: 2 Canada/EU)
- Information and Communication technologies (5 transatlantic teams: 2 US/EU, 3 Canada/EU)
- Sustainability (7 transatlantic teams: 3 US/EU, 4 Canada/EU)
- Bioengineering (2 transatlantic teams: 1 US/EU, 1 Canada/EU)

Financing

Research collaboration is closely linked to funding opportunities. The previous focus groups have been identified by matching key priorities under the funding programs of Europe (Horizon 2020, <http://ec.europa.eu/programmes/horizon2020/h2020-sections>), US (National Science

Foundation, http://www.nsf.gov/funding/pgm_list.jsp?ord=rcnt&org=NSF) and Canada (NSERC, http://www.nserc-crsng.gc.ca/Professors-Professeurs/Grants-Subs/index_eng.asp).

However public funding should be only the initial starter for an excellent and long lasting partnership. TEE has set the following initiatives for funding:

- Public funding (already described).
- Private funding based on results for successful joint cooperation which could define granting schemes for supporting doctoral research.
- Joint thematic doctoral programs based on private funding and collaborative, interdisciplinary research.

The development of these initiatives is already under way through TEE associated partners (Santander Group, <http://sgroup.be/>; Fulbright program, <http://eca.state.gov/fulbright>), and Institutional initiatives as the US State Department "American Spaces".

Foreseen evolution

TEE will close the EU grant next 2015. Sustainability of the partnership will be based on a Memorandum of Understanding among all actual (and possibly other) partners for the creation of the PoliMUNDUS network. In turn the following initiatives will be developed:

- Exchange: adhesion to the ICON platform (<http://sgroup.be/project/icon-programme>) managed by the Santander Group. This network is only a portal for presenting exchange possibilities to be developed only after bilateral agreements between Universities.
- Research groups: For researchers interested in presenting transnational proposals, and supported by LinkedIn Thematic groups which are providing info on funding opportunities, as well as institutional support. This has allowed 3 proposals to be under way.
- Multimedia education: Development of a community for the development of multimedia education contents. A workshop was organized in Cartagena de Indias for setting up the basis for collaboration, opportunities and business models. The results have led to the signature of the eGeoset agreement under the initiative by nobel prize winner Sir Harold Kroto. The event coordinated the TEE consortium with 8 latin american countries with strong support by corresponding latin american governments.
- Joint doctoral programs on selected, sustainable, transnational and interdisciplinary areas. Joint PhD programs are a good opportunity for research teams willing to cooperate on complementary teams on both sides of the Atlantic. Through the project the 19 transatlantic teams have proved their willingness to cooperate through collaboration on complex scientific objectives for which they have complementary capabilities. Actually they present an interdisciplinary approach that is proving very attractive for funding.
- TEE has established a strategy for the recognition of studies that starts at the moment of the application, where home universities must validate applications and host universities evaluate it. These documents are the basis for the mutual recognition system which is based on bilateral equivalence criteria. All accreditation issues are supported by the documents shared between partners and in place before any mobility begins.