

SUPPLEMENT OF THE UPM MAGAZINE

INTERCAMPUS



UPM INTERNATIONAL: AN ACADEMIC PERSPECTIVE

The internationalization of universities is becoming a more and more important factor in the modernization of higher education systems. In this new global context, and as one of its distinctive features, the Universidad Politécnica de Madrid is driving the international character of its activity, which is created as a stimulus for people to know other societies, increase their capacity for integration into a multicultural environment and contribute as citizens of the world of international understanding.



POLITÉCNICA

UPM MAGAZINE

EDITORIAL BOARD:

ETS DE ARQUITECTURA: Antonio Mas-Guindal
 ETSI AERONÁUTICOS: Vanesa García
 ETSI AGRÓNOMOS: Cristina Velilla
 ETSI DE CAMINOS, CANALES Y PUERTOS: Manuel Romana
 ETSI INDUSTRIALES: Angeles Soler
 ETSI DE MINAS: Alberto Ramos. Fátima Fernández
 ETSI DE MONTES: Fernando Blasco
 ETSI NAVALES: David Díaz
 ETSI DE TELECOMUNICACIÓN: Francisco Javier Jiménez Leube.
Alberto Hernández
 ETSI EN TOPOGRAFÍA, GEODESIA Y CARTOGRAFÍA: María Luisa Casado
 FACULTAD DE CIENCIAS DE LA ACTIVIDAD FÍSICA
 Y EL DEPORTE (INEF): Javier Pérez
 FACULTAD DE INFORMÁTICA: Ricardo Imbert
 EU DE ARQUITECTURA TÉCNICA: Agustín Rodríguez
 EU DE INFORMÁTICA: Francisca López
 EUIT AERONÁUTICA: Marta Sánchez-Cabeza
 EUIT AGRÍCOLA: Tomás Herrero Tejedor
 EUIT FORESTAL: Leticia de Salas
 EUIT INDUSTRIAL: Julián Pecharrarán
 EUIT DE OBRAS PÚBLICAS: Javier Olmedo
 EUIT DE TELECOMUNICACIÓN: Rafael Herradón
 CENTRO SUPERIOR DE DISEÑO DE MODA DE MADRID –CENTRO ADSCRITO–:
 Mercedes Jamart
 RECTORADO OFFICE: Victoria Ferreiro. Cristina Pérez. Jesús
 Vázquez Minguela

PRODUCTION BOARD (CR):

Press Communications Office UPM

PHOTOGRAPHY:

Lucía Castillo
 Image Database Fotolia
 Page 2: Technische Universität München, Beijing University
 of Technology
 Page 5: Delft University of Technology, Norwegian University
 of Science and Technology (Mentz Indergaard/Erik Børseth),
 Czech Technical University in Prague, Politecnico de Milano,
 Katholieke Universiteit Leuven, Warsaw University of
 Technology
 Page 9: Illinois Institute of Technology at Chicago
 Page 16: Zhejiang University
 Page 17: Beijing University of Technology
 Page 19: Ana Barrera

GRAPHIC DESIGN:

Special Programs and Graphic Design Services.
 Graphic Design Unit

LAYOUT AND EDITORIAL SERVICES:

Cyan, Proyectos Editoriales, S.A.

ISSN: 1699-8162

LEGAL COPYRIGHT: M-51754-2004

www.upm.es

Printed on recycled paper.



The UPM magazine respects the opinions expressed
 in the signed collaborations, although they are not
 necessarily those held by the management.



SUMMARY

INTERCAMPUS

Nº 23 – JULY 2012

Presentation: The way of the UPM towards internationalisation	3
Erasmus Program <i>Beatriz Plaza, Pilar Izquierdo and Paz Arraiza</i>	4
ATHENS Program <i>Ernesto Llorente</i>	7
Double Degrees <i>Victor Gómez</i>	9
International and European PhDs <i>Agatángelo Soler</i>	11
Erasmus Mundus <i>Yolanda Espinar and Subhra Sundar</i>	12
Magalhães <i>Israel Arribas</i>	14
Other mobility programs: Vulcanus and GE4	14 and 15
Sino-Spanish and Hispanic-Chinese Programs <i>Song Jie and Orlando Martinez</i>	16
Cooperation for Development <i>Ana Barrera and Miguel Marchamalo</i>	18
Services for Internationalisation Grants Programs Attention to Visitors Service Languages for Internationalisation Program	21

The way of the UPM towards internationalisation: An academic perspective

The phenomenon of globalization has characterized the evolution of Higher Education in recent decades. With it, the culture of university mobility is becoming the norm rather than the exception by becoming another element in education strategy. Universities have taken on the challenge of becoming more competitive in research as well as in the training of students better prepared to adapt to the world labour market. In this area, the Universidad Politécnica de Madrid places great importance on international education since it is a way of getting to know different cultures, to get close to other societies, in short, to complete the training of the people and facilitate their integration into a multicultural environment.

As a leading institution in our country in the teaching of and research into engineering, architecture, sports and fashion, the Universidad Politécnica de Madrid has traditionally been a destination for students and teachers from Latin American universities. The UPM is today a destination for students from both the European Union and other places from the American continent. It is also increasingly becoming the preferred destination for young Asians.

The UPM has the firm conviction of being a University with a clear international vocation. This strategic line is common in all of its activities and is especially present in its academic programs and research. As regards the former, in recent years the UPM has increased its international mobility programs so that the students can optimise their university studies to the maximum and, at the same time, strengthen collaboration with institutions from other continents.

A consequence of this is the intensification of student exchange at all levels: undergraduate and postgraduate. The university has signed almost a thousand academic and scientific collaboration agreements with international universities. Every academic year, more than a thousand students complete their training in other countries, and in some cases in more than one destination. A similar number of foreign students study at the UPM. In some of its centres, up to 50% of the students have had on average two semesters of international experience during their university studies.

In this edition of Intercampus we will describe the main academic international mobility programs that the UPM offers its students, teachers, researchers and administrative staff. More than 90 double degree agreements have been signed with different foreign universities, an outstanding participation in the Erasmus Mundus Program, the leadership of the Magalhães network (European Union, Latin America and Caribbean countries), or the expansion of exchange programs with Asian universities, especially in China, just to name a few. The UPM also has a solid commitment to the problematic area of third world development. It demonstrates its solidarity by means of a wide range of programs and cooperation activities, which encourages the involvement of the university community in less fortunate countries.

All of these mobility programs are managed through the International Offices of each of the UPM Centres that, in coordination with the Vice-Rectorate for International Relations, carry out the evaluation and orientation work. The Universidad Politécnica de Madrid also has an Attention to Visitors Service, whose objective is to provide information on practical and useful questions related to the university to facilitate the integration of students, staff and teachers.

All of this is oriented to encouraging the internationalisation of the Universidad Politécnica de Madrid, an essential factor in achieving academic excellence as a centre for training global citizens, with an innovative and entrepreneurial spirit which will contribute to the improvement of society in all areas.

Promoting opportunities between students is a maxim to be followed in any university, and in the case of the UPM, the development of international opportunities was and has always been a priority objective. Both the academic and personal relationships developed during one's student days always leave a lasting impression on us, especially if it leads us towards a fairer and more understanding world, in which the students are, undoubtedly, our best future and greatest hope.



Erasmus Program

The general objective of the Lifelong Learning Programme of the European Commission is to stimulate exchange, cooperation and mobility between education and training systems within the European Union, so that it becomes a reference of quality in an international environment. The Erasmus subprogram, the first large-scale European project in the area of Higher

Education is founded within the framework of this general program. It is the most prestigious program in the European Union as regards education and the preparation of students. It allows university students to study and work abroad as well as coordinating cooperation activities between the institutions of Higher Education in Europe.

Since its foundation in 1987, Erasmus has made it possible for almost 3 million young people to complete their training in another European country. Thanks to this program, young people are able to complete their studies in a place different from their country of origin, learn a foreign language and develop their capacity to adapt, thus improving their work profile.

Its implementation and later development has not been free from difficulties. However, after 25 years in service, it can be said that all of the students who are currently participating in the Erasmus mobility at the UPM are benefiting from the main objective of the Program: completing their studies in another European University. The academic studies of the students are recognised when they return to our country.

Erasmus student mobility is based on bilateral agreements between institutions associated with this initiative. There are currently 4,000 universities from 33 countries participating: the 27 Member States of the European Union, the four countries of the European Free Trade Association (Iceland, Liechtenstein, Switzerland and Norway) and two candidate countries (Croatia and Turkey). In the 2012 call other members of the European Higher Education Area have taken part: Serbia and the former Yugoslav Republic of Macedonia.

Erasmus, whose number of participants increases every year, has become the most productive university exchange program at an international level, with

Spain the country that sends and receives the most students.

In the case of the UPM, Erasmus constitutes the main International Mobility Program. In the 2011–2012 academic year, 1,072 from this University benefited from it and the different Centres received 653 students. Within the framework of this initiative, the UPM has signed 1,082 bilateral agreements with 418 renowned, prestigious European universities.

Student Mobility

Participating in the Erasmus Program means that the students are able to study for a period at a Higher Education institution in another European country. At the end of the study period abroad, the institution of origin recognises academically the studies carried out.

By means of this type of mobility, the students are able to benefit educationally, linguistically and culturally from the learning experience acquired from other European countries. Other objectives of the program consist of fostering cooperation between institutions and enriching their educational environment, thus contributing to the creation of a community of young people and well-qualified future professionals

with open minds and international experience. Erasmus also facilitates the transfer of credits and the recognition of stays abroad, through the ECTS system or a compatible system of credits.

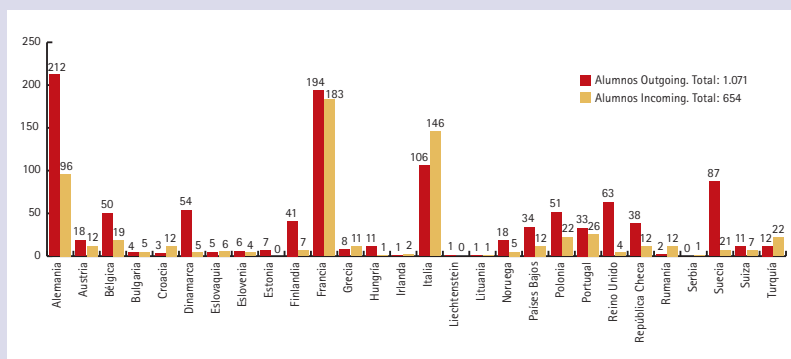
The Program is open to students enrolled in undergraduate or postgraduate university studies at Higher Education institutions with the Erasmus University Charter. The students must also have a sufficient knowledge of the language in which the courses that they are taking abroad are given. The study period abroad cannot be less than three months nor more than twelve.

Work experience for students in companies

The Erasmus Program also helps students to carry out work experience in European countries. By means of this activity, set up in 2007, the students are able to carry out a period of work experience in a company or organization in another country within the European Union, as well as Norway, Iceland, Liechtenstein, Turkey, Switzerland, Macedonia and Croatia.

The work experience helps the students to adapt to the exigencies of the work market on a European community scale and acquire specific aptitudes

as well as improving their comprehension of the economic and social environment of the country in question. At the same time they will acquire work experience. These work experiences are also accompanied, where necessary, by courses to advance



Erasmus statistics UPM 2011–2012.



the language of the host country or work environment.

To access this program, the students must be enrolled in a University participating in the Lifelong Learning/Erasmus Program. The duration of the stay is a minimum of three months and a maximum of six. The centres for student work experience can be companies, training centres, research centres and other organizations.

In the 2011-2012 academic year, more than 70 students from the UPM carried out this type of work experience, mainly in France and Germany. They came from the ETS de Arquitectura, ETSI Industriales, ETSI de Telecomunicación, Facultad de Informática, ETSI Aeronáuticos and ETSI Agrónomos, the areas that demand more work experience.

Teaching and administration staff mobility

The Erasmus Program is aimed not only at students, but also to the teachers who want to carry out their work abroad as well as other teaching, administration and service staff who would like to learn abroad for a maximum period of one week.

The main activity of the Erasmus **teacher mobility** is the teaching given by a teacher at a University from a member country. The objective is to allow the students that are unable to participate in a mobility program to benefit from the knowledge and experience of the academic staff of the Higher Education institutions from other European countries.

It also fosters the exchange of abilities and experience in pedagogical methods, and encourages the Universities to expand and enrich the variety and content of the courses that they offer.

More than 50 teachers from the UPM participate in this program every year. During the last academic year teachers from the Escuelas Técnicas Superiores de Arquitectura and Ingenieros Agrónomos stood out per number of teachers.

A similar number of administration and services staff participated in the Erasmus Mobility program **for training**. Likewise, both the teaching and non-teaching can benefit from the Higher Education institutions that have an Erasmus University Charter.

The objective of this type of mobility is that the beneficiaries learn from the transfer of knowledge or abilities and acquire practical aptitudes. The activities can be very varied: seminars, workshops, courses and conferences, etc.

The stay helps the staff to learn from the experiences and good practices of the member institution and improve the aptitudes required for their work. The main activity is a brief stay at a member institution: short service commissions, the observation of professionals, study visits, etc.

Other Programs

As well as Erasmus, the Lifelong Learning Program of the European Commission has three other options, of a sectorial nature: **Comenius**, centred on

School Education; **Leonardo da Vinci**, dedicated to Professional training, and **Grundtvig**, which centres on Adult Education.

Added to these three pillars is the **Transversal Program**, with four key activities. The first of them, known as activity 1, encompasses all of the initiatives related to political cooperation and innovation in the area of Lifelong Learning. Key activity 2 fosters the promotion of language learning by means of the financing of multilateral projects, networks or accompaniment measures whose objective is the teaching and learning of foreign languages. The third group comprises the development of pedagogical, practices, content and services of innovative Lifelong Learning based on TIC. For its part, the 4 initiatives are dedicated to the dissemination and use of the results of activities subsidised within the ambit of the Lifelong Learning Program, together with the exchange of good practices.

Finally, these activities are complemented by the **Jean Monnet Program** that supports teaching, research and the reflection on European integration and European institutions.

The Universidad Politécnica de Madrid currently has 18 projects within the Lifelong Learning program from the European Commission, both as a member University and as coordinator. The projects comprise the four sectorial programs and other transversal ones, such as Tempus and Lingua, in which the UPM has a very active participation.

Interviews



BEATRIZ PLAZA

Student of the Escuela Técnica Superior de Arquitectura, Beatriz Plaza carried out a nine-month Erasmus stay at the University of Bath. She went to England because "I wanted to know its culture, lifestyle and especially the way that Architecture is taught". She recommends "without doubt" this experience, which ought to be "almost compulsory", since "it makes you grow as a person and as a student".

Did you speak English well when you arrived?

When I arrived I could speak enough English to survive in a foreign country. The evolution was spectacular and

when I returned to Spain I was able to speak fluently, communicate without difficulty and work in an international environment in which the language was not Spanish.

You are going to set up an ESN (Erasmus Student Network) association at the UPM. What does this association consist of?

The ESN is one of the best interdisciplinary associations that exists in Europe and develops its activity at a local, national and international level. This association tries to promote a more flexible and mobile educational environment and develops the exchange between students.

The most positive aspect of having studied for a year away is that my vision of Architecture is now more global. I have learnt new ways of constructing, of thinking at the time of carrying out a project and how to communicate an idea.

PILAR IZQUIERDO

Professor from the Escuela Universitaria de Arquitectura Técnica, Pilar Izquierdo had an Erasmus stay at the *Facoltà di Ingegneria Edile* (Edile Faculty of Engineering), of the Politecnico di Bari (Technical University of Bari). Thanks to this activity, an agreement was signed to allow exchanges of students, teachers and administration and service staff between both centres.

Has your stay helped you deal with a different vision of teaching and research work?

Stays abroad are always very enriching and, specifically, by means of my stay I had the opportunity to meet exceptional teachers, such as Carmelo Torre, the head of

international relations at the *Facoltà di Ingegneria Edile de Bari*. Together we have already begun to prepare different activities that will help our Schools to build a better relationship.

What vision does the Spanish teaching style have at an international level?

My personal perception is that in the area of Architecture and Engineering Spanish Universities and, especially, The Universidad Politécnica de Madrid, are very highly valued.



PAZ ARRAIZA

Professor at the ETSI de Montes, Paz Arraiza went to Rostock (Germany) to carry out a research stay, after getting to know her opposite number at this University at another Erasmus stay at the University of Oulu (Finland). On that occasion, she explains, "a bilateral agreement was signed between both Schools", and we now have a student exchange via Erasmus.

What differences have you found there a regards teaching and research in respect a Spain?

Not too many. During these times, the difference is probably the economic resources dedicated to these ends. Also, the fact that in many of our centres the courses are not given in English, which limits somewhat the affluence of the students.

What vision do you have of Spanish teaching at an international level?

The general vision of Spanish university teaching is good. Spanish education is facing the same problems as the rest of Europe, especially as regards the Bologna Process. When the European students that come to Spain for their Erasmus stays return to their respective countries, the *feedback* is good in general.

What stands out from your stay abroad?

Every country is its own world, but we also have much in common. Finding out the reality about European universities opens the mind and provides a more global vision of the panorama of the European Higher Education Area.

ATHENS Program

ATHENS (Advanced Technology Higher Education Network/SOCRATES) is a network of universities made up of 15 European Higher Education institutions related to the different branches of Engineering. It integrates one University per country, the UPM being the Spanish University in the network and one of the most active.

The ATHENS Program was created 1996 within the SOCRATES Program of the European Union. It is currently coordinated by the Institut des Sciences et Technologies ParisTech. Its main objective is to facilitate student mobility and exchange, between the main European technological universities and institutions that make up the Program.

The main activity of ATHENS is the organization of intensive courses given at the different institutions that make up the network. These high-level scientific courses, of a week in duration, offer the students the opportunity to experience another European education system. The experience fosters the students' interest in carrying out a longer stay at a later date (Erasmus or Postgraduate) at another institution, promoting exchanges between the most important technological universities in Europe.

These courses are given on two occasions during the academic year, in the months of November and March. Students from all of the universities in the network may participate.

The ATHENS courses are made up of 30 hours of lectures (between classes,

laboratories, technical visits, work experience, etc.), spread out over a week of lectures, and 15 hours of cultural activities. The subject of the course is chosen by the teacher, as is its degree of difficulty (general or specialized), the language in which it is given (preferably English), the timetables and the prerequisites that must be fulfilled by the participants. The teaching of the course may be done by one or more teachers.

After an exam or work, the host institution awards a certificate. The passing of the exam and assistance of the complete course (hours of lectures and cultural activities) may be validated into ECTS credits.

In 2011, the UPM sent 296 students to this Program, and received 510. During the same period, the University organised a total of 31

courses within the framework of the ATHENS Program.

Participating institutions

- ParisTech
- Aristotle University of Thessaloniki
- Budapest University of Technology and Economics
- Czech Technical University in Prague
- Delft University of Technology
- Instituto Superior Tecnico Lisboa
- Istanbul Technical University
- Katholieke Universiteit Leuven
- Norwegian University of Science and Technology
- Politecnico di Milano
- Technische Universität München
- Technische Universität Wien
- Universidad Politécnica de Madrid
- Université Catholique de Louvain
- Warsaw University of Technology



Ernesto Llorente, student from the ETSI Aeronáuticos

"I have known some of the best universities in Europe"



Ernesto Llorente is a student from the Escuela Técnica Superior de Ingenieros Aeronáuticos and has participated in several ATHENS courses. One of them was completely related to his studies, as "it was centred on trials and the contents of Aeronautical Engineering itself". In the other three courses it dealt with different technical branches (Civil Engineering, Petroleum Engineering and Automobile Engineering), which "has helped me to get a more global vision on the problems and solutions of Engineering".

How has your participation in these courses improved your training?

At the margin of the technical content that was dealt with in each one, the student that attended with a positive attitude and mixed in with their colleagues from all of the nationalities can give a significant boost to languages; in particular English, but also others such as French, German, Italian and Portuguese. It is a good framework in which to build up communications skills.

If we restrict ourselves to the contribution of the course itself, the ATHENS Program allows the training

of the students to be complemented with free-choice subjects in the form of courses that may be more related to technical branches, such as Physics, Architecture or other types of Engineering, so that they can commit themselves to a versatile and multidisciplinary profile, although always looking for positive contributions and connections with the main area of study of each student.

On occasions, what is learnt is not a new branch of knowledge or unconnected to the student, but simply a new way of focusing on it or dealing with it. It is interesting to know the different educational systems of some of the best technical universities in Europe, their points in common and their differences when dealing with different questions.

The courses have a practical part and a theory part. What stands out in each of them?

The theory classes are fairly similar to those that we have at the UPM, where in recent times more use is made of slides rather than the blackboard. The classes are in English (or French, if the destination is one of the Technical Schools in Paris) and usually tackle subjects at a different degree of difficulty. The

course usually finishes with a written exam which aims to measure the students' level of knowledge in the area given.

As regards the practical classes, they normally consist of visits to laboratories where some of the experiments that apply to the knowledge given in the theory classes are reproduced. A report can also be written by the groups that develop the concepts acquired. Sometimes a computer program may be used which has made a special impact. In some educational systems it is more common to make presentations in public, and it is always interesting to work in groups with colleagues from different nationalities.

It is also usual to make a visit to a place away from the University, often to a big corporation or factory, or to a structure, building or worksite *in situ*. This helps the student to get into immediate contact with the professional sectors connected to each course and understand their applications.

Finally, the ATHENS Program carries out the work of cultural dissemination, and has several visits to the most representative places of each city.

You have come into contact with students from other countries during these courses. How is the UPM perceived from abroad?

At a training level, it has been demonstrated that students from the UPM have a strong theory background that permits us to tackle the courses, or the majority of them, with great ability. Many colleagues have shown interest in attending, at least, one of the courses that the UPM offers within the ATHENS Program and, in general, I would state that they idea that they have of this University is positive, although perhaps they do not know about some of the Postgraduate Programs.

Double degrees

Shortly after starting the Erasmus Program, which consisted of only six months or a year of academic student exchange, different formulas were carried out to extend the international experience beyond the initial objective.

The double degree consists of offering the students the possibility of taking international university studies, combining the training in two fields of Engineering. The student that takes a double degree usually spends a period of two academic years at the host institution. This means in most cases taking the total length of their studies in a just few months. Upon their return, the students obtain two degrees at the same time: that of the institution of origin and a degree from the foreign university that they have chosen. As well as obtaining a double degree, the students achieve a higher degree of specialization.

Although, in general, the double degree agreement of the UPM follows the aforementioned model, in recent years the process has been simplified. The stay abroad has been reduced to one academic year, and a period of six months to develop the Final Undergraduate Studies Project. This reduction has been especially due to the increase in the agreement of the syllabus



between the majority of the European institutions, which has meant that the students do not need such a specialised training.

The experience of the double degree was promoted by the École Centrale Paris, when the TIME (Top Industrial Managers) network was created for Europe. TIME currently integrates 65 members, of which 5 are Spanish institutions and 7 from countries outside the European Union. After nineteen consecutive years, TIME has been directly involved in the training of more than 2,500 double degree graduates. It is important to highlight the large number of institutions that, in spite of not belonging to the network, have implemented Double Degree

One of these new initiatives consisted of the creation of double degree: agreements between the Universities that participate in the Erasmus Program. Double degrees soon became the most popular choice of the exchange students within the framework of the Erasmus Program.

Programs influenced by the TIME experience.

The UPM, by means of the ETSI Industriales, is one of the founding members of TIME and the Double Degree Programs. As a result of this, the University currently has 94 specific double degree agreements, signed with 55 centres of excellence, which has made it the second placed European university as regards number of agreements. These figures make the UPM leader among Spanish universities and third among the European ones. Although the majority of double degree agreements have been signed with European universities, la UPM has formalised four with universities from the USA, which will soon be increased to include Universities from Brazil, Japan and China.

The student mobility in the 2010-2011 academic year reached the number of 82 students from the Universidad Politécnica de Madrid and 50 foreign students who have obtained a double degree.

Below is a list of some of the Universities that have a double degree agreement with the UPM:

Argentina

- Universidad Nacional de la Patagonia Austral

Austria

- Technische Universität Wien

Belgium

- Faculté Universitaire des Sciences Agronomiques de Gembloux
- Université Catholique de Louvain
- Université Liège
- Université Libre de Bruxelles

Czech Republic

- Czech University of Life Sciences Prague-FFWS

Denmark

- Danmarks Tekniske Universitet

France

- École Polytechnique
- Écoles Nationales Supérieures (SIPAERO, ENSICA, ENSMA, ENSAM, ENSTA, ENPC, SUPELEC, Mines, Télécommunications, etc)
- Écoles Centrales (ECP, ECLi, ECLy, ECN, ECM)
- Institut National Polytechnique de Grenoble-ENSGI

Germany

- Technische Universität München
- Technische Universität Darmstadt
- Universität Stuttgart

Italy

- Politecnico di Torino
- Politecnico de Milano
- Università degli Studi di Trento

Peru

- Pontificia Universidad Católica de Perú

Sweden

- Kungliga Tekniska Högskolan-KTH
- Lunds Tekniska Högskola

United Kingdom

- Cranfield University
- North East Wales Institute of Higher Education-NEWI

USA

- Illinois Institute of Technology at Chicago

Victor Gómez, Civil Engineer

"The intercultural character of the Program was fundamental: it changed my life"

Victor Gómez has a double degree from the Escuela Técnica Superior de Ingenieros de Caminos, Canales y Puertos and from the École des Ponts ParisTech. The Program consisted of studying "two years" at the École des Ponts, return to Madrid to do the final year, and thus obtain the double diploma from both institutions". Ten years later, I returned to take up the role of academic sub-director at the French school at which I carried out my Erasmus stay.



What made you decide to take a double degree?

When I found out from the International Relations office of the ETSI de Caminos that I would be able to carry out an Erasmus exchange to attend the École Nationale des Ponts et Chaussées, among other destinations, without doubt it convinced me that it would be an interesting academic experience that would be great to take advantage of having achieved good results thus making it possible to go. The prestige of the institution was also an important factor in my decision to go. These were reasons enough to convince me but not to enthrall me, as it was, and I suppose that it was due more to my curiosity for things international and my European spirit.

What differences did you find as regards the way of teaching in France and in Spain?

In Spain engineering degrees, on being a regulated profession that qualifies the graduate for a wide range of attributions, they demand many different technological applications to be studied, that are tackled at a fairly theoretical level. In France, as Engineering is a profession that is not regulated, the pedagogical option of the schools is usually

that of a generalist training in sciences and in the knowledge of the social and business media. However, it is limited to a more specific sector of engineering, which allows a more practical aspect of teaching to be carried out.

What stands out from your experience abroad?

The comradeship with the French students together with that of the other 30 nationalities. It supposes an opening up and a sensitisation to intercultural aspects which without doubt was the most distinctive background on the Erasmus mobility.

On balance, I believe that my mobility was not only an intense personal and academic experience, but it really changed my life in many ways: my interest in social sciences and the humanities in relation to Engineering, a more independent spirit in all senses, the opening up and interest in things international, as well as the knowledge, especially of French culture and language, which I feel as close to as the Spanish.

After your stay as a double degree student at the École des Ponts ParisTech, What does your return as academic sub-director of this institution imply?

I had the professional opportunity to return to the École des Ponts ParisTech as academic sub-director, almost ten years after my Erasmus stay. It meant a great personal satisfaction. Here I am able to apply both my academic and management experience, as second in command of a department of 70 people that coordinates the training of the School for 2,000 students, with 300 teachers and 800 lecturers.

Going back to work at the School at which I had learnt so much as a student and enjoyed enormously has been very gratifying. It is very easy to commit yourself to a job when one can benefit years later from those who in their time dedicated their greatest efforts to the same cause.

In your experience, how is the UPM valued abroad?

From France, the UPM is considered one of the top-ranking Universities in Europe. In particular, the Double Degree Programs which have been signed between the UPM and the greatest French schools demonstrate the recognition between the leading institutions in their respective countries and disciplines.

International and European PhD



The International PhD and the European PhD are two complementary Seals of Honour of the PhD degree. In order to obtain these distinctions it is necessary to comply with a series of requirements linked to student mobility, together with the inter-university relationship between different Higher Education institutions, at an international or European level.

Both PhDs may be considered as an indication of quality, and its awarding recognises the transcendence of the research or training activity carried out by the PhD students in other countries.

When a student defends his/her PhD thesis, their qualification may have the recognition of **"Doctor Europeo" (European PhD Graduate)** if a series of requirements are achieved. Among others, having carried out a minimum stay of three months out of Spain at a Higher Education Institution or research centre in a Member State of the European Union, for the training period necessary to obtain a PhD Degree.

Part of the PhD thesis, at least the summary and the conclusions, must be written and presented in a language different from any of the official languages in Spain. The thesis also has to be referenced by a minimum of two experts belonging to international institutions.

As a final requirement, an expert from a non-Spanish Higher Education Institution, who holds a PhD degree, and different from the person responsible for the PhD stay and the experts who have referenced their thesis, have to make up the Panel of Experts who will evaluate the thesis.

In recent years, the mentions of a European PhD degree have experienced a significant increase at the UPM. Its number has risen and is now slightly more than 20% of the theses presented. The mentions obtained through PhD Programs are a good measure of the internationalisation. Help from the Vice-Rectorate for Research and the Social Council has been of great value.

They have allowed us to boost the internationalisation of the PhD Degree enormously.

The new Royal Decree on PhDs also establishes the possibility of obtaining the mention of **"Doctor Internacional" (International PhD Degree)**. With conditions very similar to those of the European PhD Degree, it also opens up the possibility of going to any country in the world, which makes it possible for the percentage of these mentions to grow significantly over the next few years, since many of the PhD degree graduates from the UPM will carry out stays in countries such as the United States, Canada, Japan or Australia.

AGATÁNGELO SOLER

Architect of the Escuela Técnica Superior de Arquitectura, Agatángelo Soler carried out a three-month research stay at the Institut Parisien de Recherche: Architecture, Urbanism, Society (IPRAUS), in order to achieve the European PhD Degree mention. When he finishes his Architect thesis, he would like to teach at the UPM.

¿Why did you decide to carry out a research stay abroad?

In the first place, it is one of the requirements for achieving the European PhD Degree mention. On the other hand, it was necessary for my research to extend the bibliographical sources beyond the material available in Madrid, which is not very wide-ranging in my opinion.

What is your opinion of teaching and research in Spain, from the perspective of having had a stay abroad?

I saw two basic differences between Spain and France. In the first place, there are many more resources available there for research. This has given rise to having better infrastructures for work, especially a greater stability for the researchers, which brings with it the possibility of creating work in the long term. In second place, I could see that both the teacher and the researchers (and the work that they carry out) have a greater social value in France than here, which has a direct influence on their salaries and on the capacity of impact on their scientific production.

What are the advantages of carrying out research abroad?

The greatest advantage consists of the possibility of focusing on the areas of

study from new points of view, thanks to the contact with other researchers. That is, the stay abroad can complete the training, the methods used for research and even on their results.

How do you value your time at the UPM?

The Escuela de Arquitectura of the UPM is one of the best in Europe and it has given me the opportunity to work with and learn from excellent architects, both in the development of my Architecture thesis and in my teaching work.

What image of the UPM is perceived from abroad?

In general, it is considered that the teaching of Spanish Architecture is outstanding and that the Escuela de Arquitectura has the best representatives of it

Erasmus Mundus Program

In 2004, The European Union (UE) put Erasmus Mundus into action, a Program of international cooperation and mobility in the field of Higher Education with the objective of improving the quality of European Higher Education and promote dialogue and understanding between the people and the different cultures, through cooperation

with third countries (that is, countries in geographical areas different from the EU).

Erasmus contributes to the development of human resources and the capacity for international cooperation with the Higher Education institutions, increasing mobility between the EU and other countries.

The first edition of this Program ranged from 2004 to 2008 and was oriented to Masters' and joint PhD Degrees. The Agency of the European Union in charge of its management is the Education Audiovisual and Culture Executive Agency (EACEA). From 2009, the Program profiled two types of action. The first of them known as Action 1, concerned the setting up of Masters' and joint PhD Degrees between at least three Higher Education European institutions. Action 2 consists of the creation of consortia between European institutions and third countries with mobility financing.

In 2007, the EACEA set up the External Cooperation Windows Program (ECW), which complemented the Erasmus Mundus Program with grants for students, researchers, academic

and institution administration staff from third countries to carry out mobility at European institutions, and vice versa. In 2009 the second edition of the Erasmus Mundus Program (2009–2013) was approved, and the ECW as Erasmus Mundus Action 2 is included.

Joint Masters' and PhD Erasmus Mundus Program

At least three European Higher Education institutions, of which one of them is the coordinator, are grouped together in order to set up a Masters' or PhD Program, and apply for its recognition from the European Union, through the EACEA. If the Program is approved, the EU will finance grants for students, both from third countries and the EU itself.

The UPM has participated in eight Masters' Programs and is currently taking part in four, coordinating one of them, and is present in two joint PhDs:

- EMSE: European Masters' Degree in Software Engineering (UPM coordinating)
- Agris Mundus: Sustainable Development in Agriculture Masters' Degree Course (member)
- ME3: Master of Science in Management and Engineering of Environment and Energy (member)
- Vinifera Euromaster: European Masters' Degree in the Science of Viticulture and Ecology (member)
- AgTraIn: Erasmus Mundus Joint PhD in Agricultural Transformation through Innovation (member)
- EDIM: European PhD in Industrial Management (member)

YOLANDA ESPINAR



Student from the Escuela Técnica Superior de Arquitectura, Yolanda Espinar carried out an Erasmus Mundus stay at the University de São Paulo, an experience that she will repeat in the next semester with a five-month exchange in Bogotá. In her opinion, "it is

absolutely necessary and almost compulsory for all students to study abroad in order to finish their university training".

Why did you choose Brazil as your destination?

Brazil has a wide-ranging experience in social housing. In Madrid, the basic habitability projects that you study or develop are in a very sad state. The Architecture students do not have the opportunity to study this problematic area at first hand from here and thus we are attracted by the circumstances of countries such as Brazil.

What did your studies in Brazil involve?

Mainly, I went ahead in concepts of social housing and urban planning. São Paulo is a very interesting city, because it offers cases of single study: its evident chaos and unkempt aspect seems to contradict the existence of numerous hidden

paradises, only accessible to those truly interested in discovering the other face of the city.

¿What have been the main differences that you have found between the Spanish and Brazilian teaching systems?

In the subjects that I studied in Brazil the classes are organized into groups. It does not matter the subject being taught or the Faculty. Dialogue and debate is very important to resolve problems. They understand that the best proposals are those that arise from the groups rather than the individual. At the Spanish University the individuality of ideas rather than collectivity is imposed.

How has your participation in the Erasmus Mundus Program influenced your later academic trajectory?

More than just opening doors, I have had my eyes opened to a reality totally different to the European one.

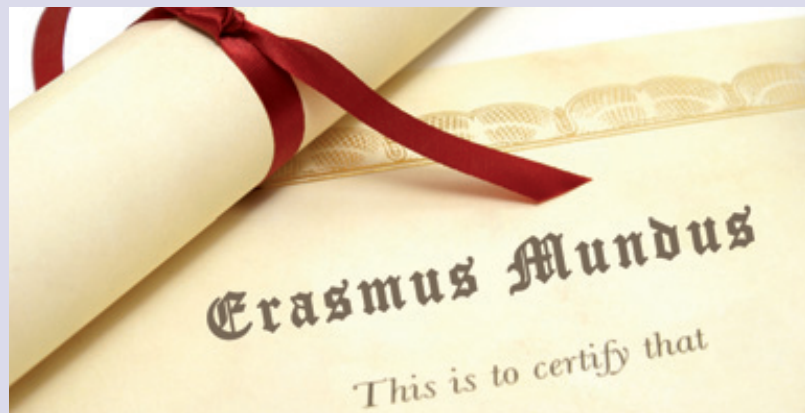
Consortia between institutions de Higher Education

These consortia favour academic cooperation and student and teacher exchanges, contributing to the socio-economic development of the geographic areas to which they are directed, in accordance with the cooperation policy established by the EU.

The consortia must be made up of at least five Higher Education institutions from a minimum of European countries together with another number of Higher Education institutions from the third countries proposed in the corresponding agreement.

Once the project is approved, the EU will put forward funds to finance grants to Undergraduate, Masters' Degree and PhD students, PhD researchers and academic or administrative staff, in order to carry out a stay at one of the European universities in the consortium.

The UPM, within the framework of this Program, has obtained financial resources valued at two million Euros.



TANDEM (2009–2013). With institutions from France, Sweden, Italy, Germany, Belgium, Spain and China participating.

INDIA4EU (2009–2013). With institutions from Italy, France, Sweden, Finland, Germany, Spain and India participating.

EUBRAZIL-STARTUP (2009–2013). With institutions from Italy, The Czech Republic, France, Portugal, Sweden, Spain and Brazil participating.

ARCOIRIS (2011–2015). With institutions from Italy, France, Portugal, Sweden, Germany, Spain and Argentina participating.

IDEAS (2011–2015). With institutions from Sweden, Holland, The United Kingdom, Estonia, Spain, Germany, Bhutan, India, Malaysia, Nepal and Pakistan participating.

BEAM (2010–2014). With institutions from France, The United Kingdom, Germany, Belgium, Spain, Japan and Korea participating.

SUBHRA SUNDAR

He carried out his Masters' Degree in Computer Sciences at the Visva Bharati University (India). Later, within the framework of the Erasmus Mundus Program, Subhra Sundar came to the UPM to "study a PhD Degree in Electronic Systems and work in biomedical image technology with the Biomedical Image Technology Group, led by Professor Andrés Santos, in the Department of Electronic Engineering at the ETSI de Telecomunicación".

Why did you choose the UPM to continue your studies abroad?

I chose the UPM as the destination for my research work in biomedical imaging not just because of the reputation of the University, but also for other reasons. The UPM is the leader in technical education, both in Spain and in Europe. The UPM also has the image of a

University with an international orientation, with students from all over the world. The most important reason that led me to choose the UPM is the possibility of joining a group (Biomedical Image Technology) outstanding in its field of research, and with a large number of quality research publications.

What are the main advantages of the India4U Program?

One of the main advantages is that it provides a grant that covers all of the



university costs, travel and medical insurance. I also found a good option in it for furthering my university studies, as the Program is only for students from India to come to Europe (or vice versa), which increased the possibility of my participating.

Do you consider that there are differences in the learning methods between India and Spain?

When I arrived from India I had some problems with the language, but I found a wide range of courses given in English. The quality of the School, the syllabus, the freedom and accessibility of the teachers accentuate the difference with education in India. The courses are really interactive and well designed in accordance with the syllabus. I believe that my experience at the UPM will be a positive part of my university studies and future life.

The Magalhães Network and Smile Program

Magalhães is a network of European, Latin American and Caribbean universities in the area of technology, led by the UPM and made up of the most prestigious European and Latin American Technical Universities. Established in 2005 through an initiative of the Universidad Politécnica de Madrid,

it arose as an element of the union between Europe and Latin America, with the objective of creating a common space for science, and collaborating specifically in the fields of Engineering and Architecture.

The network came about as a consequence of the ALCUE declaration (Latin America, Caribbean and European Union). This declaration was the fruit of different meetings between the Ministers of Education from more than 58 countries from these geographical regions, and brings together the setting up of a Common Space of Higher Education between Latin America, Caribbean countries and the European Union.

With the aim of advancing the development of this declaration, the UPM met in 2005 with those European members who share more cooperation initiatives. Sixteen European universities decided to set up the network and invited other Latin American and Caribbean universities to form part of it. These Universities were informed of the opportunity of joining a European network of technological universities, and a meeting was held in São Paulo with all of those who showed interest in the project.

After the meeting in São Paulo, in the June of 2005, at which both the interested European and Latin American and Caribbean universities attended, the

network was established under the name of Magalhães. In order to commence its progress the SMILE Program for student exchange (Student Mobility in Latin America and Europe) was created.

Since then, Magalhães/SMILE has established a student exchange program of Engineering and Architecture between Europe and Latin America. The student mobility will always be Latin American or Caribbean to Europe and vice versa. The program is based on the philosophy, principles and experience of the Erasmus Program, and has English as its official language.

SMILE is aimed at undergraduate and Masters' Degree students who want to carry out studies for a complete academic year or single subjects, even Final Undergraduate Studies Project and Final Masters' Degree work, for one or two semesters. The Program requires the students to have a minimum of 180 credits passed in order to be able to access the mobility. The studies carried out at the host University have complete academic recognition.

The location of the institutions belonging to the network (some found in the

Northern hemisphere and others in the Southern hemisphere) has given rise to a disparity in the months in which the courses begin and the academic year ends. However, from the Magalhães network a great effort has been made to ensure that this difference does not obstruct the suitable development of the program.

Although the program, in principle, envisaged that the student exchange be limited to undergraduate degrees, little by little students interested in taking a Masters' Degree have been incorporated. In the same way, the articles of the framework agreement have been modified so as to cover work experience in companies. The students are showing greater interest in this possibility.

It is made up of a network of the most prestigious technical universities from Argentina, Brazil, Chile, Colombia, The Dominican Republic, Mexico, Panama, Peru and Venezuela, together with institutions from European countries such as Belgium, France, Germany, Finland, Italy, Portugal, Spain, Sweden, Poland or The Czech Republic.

Other programs

VULCANUS PROGRAM

This Program allows students from the European Union to carry out industrial work experience in Japan. The mobility begins in September and ends in the August of the following year. During this period, the selected students attend a one-week seminar in Japan, an intensive four-month course in Japanese and eight months of work experience in a Japanese company.

The Vulcanus grant is financed by the Japanese host company and the EU-Japan Centre for Industrial Cooperation (an associated company co-financed by the European Commission and the Japanese

Ministry of Finance, Trade and Industry). The students receive a grant of two million Yen for travelling and living expenses in Japan. They are looked after by the host company who provides them with accommodation for the twelve months of their stay. The language courses and seminar are paid for by the EU-Japan Centre for Industrial Cooperation.

In order to be selected for the Vulcanus Program, the students must belong to the European Union and be enrolled at a European university in their third year or Postgraduate students, in a branch of engineering or science. There is an annual call for the program in the month of January.



Israel Arribas, student from the ETSI de Telecomunicación

"An international experience gives you a global vision"



Israel Arribas is finishing his engineering degree at the ETSI de Telecomunicación. He is currently in São Paulo, within the framework of the Magalhães Program, "not only to carry out a research project at the University, but also to complete my knowledge in the area of entrepreneurship and the creation of companies".

¿Why did you participate in the Magalhães Program?

My greatest unease has always been improvement, my daily struggle, of learning more. Travel has opened up my mind and has enriched me as a person. For this reason, I decided to go away to finish my studies. To learn a

new language and discover the real Brazilian culture with the help of one of the best research groups in the country. It was the final push that I needed.

Do you believe that participating in a program such as this one opens the door to further opportunities to finish your university studies?

I think that Magalhães, like other programs, offer a much more generalised vision of the world, an aspect that has helped me at the time of looking for work. I have seen my way of thinking about the future evolving. At the beginning I saw myself working in Logroño, at most in La Rioja. At the beginning of my studies at the UPM, I saw that I would be able to do it in any Spanish city. However now, I think that I could end up working in any place in the world.

As well as awakening my unease, I think that international experience is very attractive for the company that is going to employ you or indeed, you yourself, if you think of empowerment, since you have this global vision, tolerance and knowhow that other people have not had the opportunity to know.

¿Have you found many differences in the way that teaching is given?

The truth is yes, I have. My subjects have been fairly more dynamic and participative than that in Spain. Although I have to say that this has much to do with the teacher giving the course, since I have colleagues who have not come across so many differences. However, I miss tools such as the Moodle of the UPM. Here you can find the, more or less updated, class material, but centralised.

On a personal level, what has participating in this program meant to you?

For me it has been another adventure, through which I have learnt so much. My idea of Brazil has changed considerably and I am delighted with the people there, always smiling and friendly. I have also had the opportunity to complement my studies in the area of Bio-engineering working with ultrasound (up to now I have centred on magnetic resonance). At the same time I have experienced the gastronomy and culture in such a different country as Brazil.

GE4 PROGRAM

This Program is created by the GE4 (*Global Education for European Engineers and Entrepreneurs*) in Europe. It is the fruit of an association with industry and education with the objective of creating a global education. With this intention, GE4 creates administrative programs which link their members (European academic institutions) with its foreign members. The exchange programs managed through the GE4 are:

- United States – Europe Exchange in Engineering (AE3)

- Asia–Europe (ASE3)
- Latin America – Europe (LAE3)
- Japan – Europe (JE3)

The Program consists of the students carrying out part of their studies at the host university. The study period abroad is validated by the institution of origin, in accordance with the ECTS (European System for the Transfer of Credits) credit system.

As regards the requirements to participate in the GE4 Program, the applicants must be university students in their third year or Postgraduates, in a branch of engineering or science. The student's record and the

academic results, the opinion of the teachers and the knowledge of English are some of the criteria for the selection of the candidates.

The Universidad Politécnica de Madrid, as a member of the GE4 Program, manages the mobility of this program which has, throughout the academic year, two calls: the first for the autumn semester (in February), and the second for the spring semester (in October).

Sino-Spanish and Hispano-Chinese Programs

The Hispano-Chinese and Sino-Spanish Programs have as their objective the favouring of technical and scientific communication with the Peoples' Republic of China, contributing to establishing links of enormous interest for the future. The first of these is aimed at students from the UPM who want to carry out their Final Undergraduate

Studies Project (PFC) or Final Masters' Degree work at universities or academic or scientific institutions of the Asian country for a semester.

For its part, the Sino-Spanish Program allows Chinese postgraduate students with excellent academic progress to carry out research work at the UPM also for semester.

The UPM began its institutional relations with China at the end of 2004 and has currently established agreements with more than 20 Universities. The indicial collaboration formula was based on the experience of the Erasmus Program student exchange. To date, almost 60 students from the UPM have gone to Chinese Universities to carry out their PFC for six months thanks, in the beginning, to grants financed by a former student of the UPM, David del Val. On the other hand, 250 students have carried out equivalent R&D stays with grants partially financed with the help of the Banco Santander and currently with funds from the European Union and Chinese government or the Chinese students themselves. The Chinese students come to Spain to complete their studies in any area of engineering. For the Spanish students, the areas of



greatest interest have been Computer Science and Communications Technologies.

Starting with 10 students in 2006 and 20 in 2007, the current rate of six-month stays at the UPM is 30 to 40 students coming from China a year. On the other hand, the number of students

from the Universidad Politécnica de Madrid going to China is 10 to 15. There have also been some Chinese students coming to study their Masters' degree through the Erasmus Mundus Program in which the UPM participates, and a growing number of them are also coming financed mainly by the Chinese



SONG JIE

Coming from the Beijing University of Posts and Telecommunications, Song Jie has studied a PhD in Artificial Intelligence at the CeDInt of the UPM since 2011. Her research is centred on the environment of the Semantic Web and Ontological Engineering, and the application of semantic techniques in the field of intelligent systems in building management and energy efficiency.

How do you value your stay at the UPM?

My stay at the UPM is a positive experience. The first time I came to Spain was in 2009 through a six-month exchange program and, from 2011, I began my PhD studies at the UPM. I am very impressed with both the students and teachers, and the staff of the UPM who are very pleasant, and I have been able to make friends from different countries.

Have you found many differences between the Spanish and Chinese study model?

Comparing my studies in China and Spain, the students make more presentations in class in Spain. The composition of the colleagues is more international. As regards research, I think it is similar in the laboratories in both China and Spain. Something very positive about my current research centre is

that there are several research groups working on different lines, which allows me to meet people with different knowledge in a wide range of subjects, something which has helped me expand my vision of the research.

Why did you choose this University to continue your studies abroad?

In 2009 I had the opportunity to come to the UPM to carry out a six-month exchange program with a grant, and I was working at the CeDInt. At that time, I was very impressed with the research work which was being carried out there. I had the opportunity to work on advanced technologies in the field of research into Smart Buildings (Demotics). As a result, I decided to come back to the UPM to continue my PhD studies. My experience at the UPM and in Spain has been great and I would like to recommend it to other students.



government (*China Scholarship Council*), to carry out their PhD degree at the UPM (just in 2011, 28 of them came with a four-year grant).

There is currently a reduced, yet growing, number of former UPM students who are going to carry out Masters' and PhD Degree studies in China with complete grants from the *China Scholarship Council* (CSC). This organisation does not only award them so that the Chinese students can study abroad, but it also awards thousands of grants so that foreign students can carry out postgraduate studies in China. The Masters' degree studies in China, especially, receive a two-year grant if they take the courses in English, and for three years if they are offered in Mandarin Chinese. This is the first year in which the studies are taken in this language.

Also, in order to foster relations with this country, the UPM has been offering classes in Mandarin Chinese for the past four years directed to both students and teachers and administration and service staff. There are currently three levels of learning. About a hundred students enrol every year to these courses.

Finally, the recent "Sino-Spanish Campus" that the Technical Universities of Madrid and Cataluña opened at the end of May 2012 in Shanghai, in collaboration with the University of Tongji, opens up very ambitious perspectives for the future of exchanges with China. The objective is to start exchanging 40 students in both directions per academic year starting next September (half from the UPM and the other half

from the UPC), to carry out in the order of ten annual stays per year for teachers (each one of between three and ten weeks un duration) and immediately develop double degree agreements in areas such as Materials Technology, Architecture (two fields in which the University de Tongji is number one in China), Civil Engineering, Computer Science and Communications and Energy Technologies.

COLLABORATING UNIVERSITIES

- **In Beijing:** Beijing Institute of Technology, Beijing Jiaotong University, Tsinghua University, Beijing University of Posts and Telecommunications, Beijing University of Technology, Beijing Beihang University, Academia Sinica-Institute of Computing Technology, Beijing Sports University, Beijing Forestry University, North China Electric Power University.
- **In Shanghai:** Tongji University.
- **In Xi'an:** North Western Technical University, Xi'an Jiaotong University.
- **In other places:** Zhejiang University, Shandong University, Tianjin University, Nanjing University, Nanjing Agricultural University, Xiamen University, Harbin Institute of Technology, Jiangsu University, Fuzhou University.

ORLANDO MARTÍNEZ

With a Degree from the ETSI de Telecomunicación, Orlando Martínez carried out his studies through an Erasmus stay in Brussels. Upon his return, the UPM had established the Hispano-Chino Program, and Orlando was one of the first students to study through this type of mobility for an initial period of six months which "ended up becoming four years". The curiosity to get to know China and its political system led this former UPM student to live a "very intense international experience, due, especially, to the large cultural differences and the language" of the country.

The Spanish and the Chinese cultures are very different. Did you have any difficulties in this sense?

At the beginning, the main barrier was the language. As you continue learning it,

you realise that the greatest barrier is, in fact, cultural. As the Chinese are fairly understanding with cultural differences, it makes the adaptation much simpler.

Your current work has strong links with China, How did the idea of creating the dajiapin.com application arise? Do you have any more projects of this type?

Together with Andrés Areitio, who also lives in China, the idea arose of creating



a social gastronomic network, similar to the Japanese Cookpad, in China. However we first decided to create a Spanish version at www.recetasyvinos.com. We then decided to set up a Chinese version, which did not take off. However, we had the opportunity to develop a native application of recipes for the Alibaba mobile. We were the only foreign business to do it.

I am now dedicated to the development of Web and mobile applications for third parties as well as carrying out our own projects, with the help of my friend a business partner José María Calvo, who was also in China for a couple of years and studied with me at the ETSI de Telecomunicación. We have a project in Beijing, as well as in San Francisco, with the intention of reaching both sides of the world.

Cooperation for Development

The UPM has a solid commitment to cooperation programs, contributing technological solutions to societies under development. To achieve it, a basic instrument is the training of its students and a more active implication in the problematic area of development.

Through grants and the training of specialists in cooperation to development, the UPM encourages the generalised sensitisation of its students. With this training strategy it tries to reach the greatest number of students, allowing the levels in Masters' and PhD Degrees to become more profound in the ambit of cooperation.

Among other initiatives, the Direction of Cooperation for Development proposed in the 2008-2009 academic year, the degree of Expert in Cooperation for Development, a degree proper to undergraduates in which 24 departments and 13 Schools and Faculties of the UPM participate. The adaptation of the Degree of Expert to the new European Higher Education Area means the creation of the **Mastersí Degree in Technologies for Human Development and Cooperation**, an official Masters' Degree of a professional nature, implemented in the 2010-2011 academic year.

Teachers, researchers and experts from the cooperation and research groups of the UPM network give the course, with recognised experience in the application towards human development technologies and cooperation. All of

the students carry out a semester of professional work experience in bilateral or multilateral agencies for development, ONGD or companies with a presence in countries under development.

On the other hand, the UPM, with the sponsorship of the Comunidad de Madrid (Madrid Regional Government), began the **Final University Studies Project (PFC) Program for Development** in 2007. This grant program has as its objective the meeting the costs for carrying out a Final Undergraduate Studies Project, Undergraduate or Masters' Degree in official studies, in international environments and in the specific ambit of Cooperation for Development. They must carry it out in universities or scientific institutions with an average or low level of income (in accordance with the classification of the OCDE) and is orientated to research activity centred on human development or technical support to development projects, with special interest in areas linked to the Millennium Development Objectives and the priority regions of Spanish cooperation.

To date, a total number of 171 grants have been awarded to carry out a PFC of six months in duration at a Southern

From the Direction of Cooperation for Development, created in 2004, the UPM promotes training, research and dissemination activities, mainly among its, students and personal, together with the provision of services of common interest and other actions relative to Cooperation for Development.

university. The most requested destination to carry out the project is Latin America and, to a lesser degree, Africa. The countries in which there is the greatest collaboration are Peru, Mexico, Nicaragua, Cuba, Guatemala and Honduras. In Africa, the countries with the greatest presence are Mozambique, Tanzania, Kenya and Senegal.

Promotion of voluntary work and sensitisation activities

The **travel expenses** constitute a volunteer and sensitisation program for the members of the university community. Since their creation, they have been a fundamental instrument for fostering the participation of students, administration and service staff and teachers in cooperation activities not tied to projects or programs of the UPM.

These travel expenses offer the possibility of carrying out brief stays at the Cooperation for Development projects of different entities. The financial assistance is a complement to foster the activity and always has to be endorsed by a prior report and final report. In the past eight years there have been 500 applications for travel expenses of which 441 have been accepted. The students are those that have enjoyed this call the most, allowing from 40 to 60 annual departures.

Along the same lines of fostering experiences on the land, the UPM participates in three **Programs of university volunteers** together with other Spanish Universities or from the Comunidad de Madrid:

- United Nations volunteer program, UNITES, to encourage the volunteering of young professionals in organisations or entities that work with the United Nations.
- Volunteering with Latin American Universities, which consists of a stay



in a program together with a university colleague in Latin America.

- Volunteering in Saharan Refugee Camps, which are materialised as a stay in the aforementioned camps.

The UPM also promotes **sensitisation activities** among its students and staff. One of them is the Points Program for volunteer information (PIV), which is developed within the framework of an agreement signed with the Consejería de Familia and Acción Social (Family Council and Social Action) of the Comunidad de Madrid. In these activities, information is given on the different programs, activities and services available to the university community.

The presence of ONGD in different Schools and Faculties of the UPM has permitted an increase in the supply of activities for the sensitisation of students in many of its Centres, with conferences, seminars, Fair-Trade fairs or specific training courses given mainly in cooperation with ONGAWA–Engineering for Development (previously known as Engineering Without Frontiers), Solidarity for Development, The Red Cross, Zerca y Lejos (“Near” and Far), Habitat Africa, Architects Without Frontiers and other ONGD.

The UPM also organises Cooperation for Development conferences, whose main objective is to study the quality and impact of cooperation activities carried out by the Universities, as well as establishing strategic objectives and future lines for cooperation in this University.

Research Activities

The UPM has created the **Cooperation Groups** section as part of its institutional structure, which allows an intermediate space to be created between the relatively general inattentiveness to the South of the research groups and the most usual individual implication, which gives space and encouragement to the activity of the researchers and students in this field.

This initiative has been replaced later by other Spanish Universities. It represents an important instrument to tackle

problems against poverty, generalise knowledge on the conditions, propose and share reflections on the possible courses of action and try them in action in order to finally integrate the learning achieved in these processes in usual teaching practices.

There are currently 28 Cooperation Groups at the UPM. They have been the main beneficiaries of the Call for Subventions and Financial Help for University Cooperation Activities for Development at the UPM, which since the year 2000 has supported the best proposals for university development projects, and has allowed research programs to be created that respond to technical problems of countries under development and establish networks with other Universities in Latin America and Africa.

From the Direction of Cooperation support is also offered to other researchers together with the management of the PCI and CAP call for projects from the Spanish Agency for International Cooperation for Development (AECID).

In February 2012, the UPM created the **Centre for Innovation in Technology for Human Development** to take advantage of the synergies between the different Cooperation Groups and thus confront more and more complex problems and of greater importance. Its objective is to give institutional and theoretical support to the growing activity in technological development and cooperation at the heart of the UPM. This Centre will be an essential tool to complete the professionalization and sectorial specialization of university cooperation for development of the UPM.

Another instrument for fostering research activity, and within the CRUMA agreement (Conference of Rectors of Madrid Universities), the UPM has organised in recent years the call for the **Annual Prize for Quality in Research and PhD Theses** in International Cooperation for Human Development. The ambit of the prize corresponds to all Universities of the Spanish State. From 2008 to 2011, a total number of 35 prizes have been awarded to 128 applicants.



ANA BARRERA

Student of the Escuela Universitaria de Ingeniería Técnica Industrial, Ana Barrera carried out a cooperation stay in Peru. There, she developed a work for measuring the quality of the drinking water stored in water storage facilities in communities in the central plateau in Peru.

What led you to participate in the international cooperation program?

I have always had a special interest in cooperation and voluntary work. In the last year of my university studies I worked as a student with a grant for information points for voluntary workers. The grant was offered by the University, through which I applied for the Mobility program.

In your opinion what qualities do you think a student should possess to participate in a cooperation project?

You must be tolerant, flexible and reasonable, with the capacity to work in a team. You must also be an optimist, fighter and fair.

What have you learnt that will stay with you from your experience in Peru?

More than anything, I will always have the experience of having put myself in the shoes of another, having suffered like them and, at the same time, having laughed with them. I have a very positive balance of Peru with me: I have learnt to become mature and know how to value the simplicity of great moments. It has also contributed the capacity to me of never forgetting that this world is unjust and that I want to help improve it.

MIGUEL MARCHAMALO

Professor at the ETSI de Caminos, Canales y Puertos, Miguel has been, since the final years of his university studies, "very interested in rural development and how one might be able to collaborate from engineering to revitalise the countryside and Spanish villages". With his work as a student in the Spanish Unit of the LEADER Rural Development Observatory, he realised that he

had an "immense job" to be carried out in America, Asia and Africa. He obtained a Mutis grant from the Spanish Agency for Cooperation to carry out PhD studies at the University of Costa Rica (from 2001 to 2004). Later, he returned as a researcher in cooperation in 2007 and 2008.

What did your work in Costa Rica consist of?

During my first stay, I made my PhD thesis work compatible with collaboration with small initiatives in the rural



communities in the countries. I did my PhD thesis work in the territorial legislation of a small basin, with a conflict between hydroelectric production and the agrarian activity of many families with smallholdings. Within the framework of the thesis, I was able to get to know the reality of these communities and opportunities to collaborate with them arose in improving their socio-environmental situation. The experience that I remember the most is the creation of environmental groups at the small schools in the communities where I worked for three years implementing forestry plantations, environmental games, school allotments, trips to national parks and especially learning so much from the rural boys and girls, so wise thanks to their continuous observation of nature, such as how to cultivate the earth and breed animals.

From 2007 I was able to make contact again with Central America, as the

opportunity arose, this time as a teacher, to formulate cooperation projects with the region, supported by AECID and the UPM. "Community, Water and Forest in Central America" is the cooperation program that brings together all of our initiatives, a group that is growing as a result of its character open to new participants from the Central America isthmus.

What are the main differences that you have found?

The most outstanding aspect of Central America is its people. They showed us how to live life with happiness, within the enormous difficulties that they have faced throughout their history. They maintain a special freshness that you notice more and more over the years, when you see that the more you get older, you do not have to give up on what we usually identify with youth: good humour, physical activity and good health. Another fundamental aspect is that there is much to be done in many fields of science, and perhaps they expect too much from us, the Spanish. This fact must never prevent us from facing the problems of the region with great humility, since the "Spanish recipes" do not often work, and we can, and we must, learn much from the scientific techniques and inhabitants of these lands. As regards the aforementioned question, and paraphrasing Sergio, a good friend, perhaps I can state that "sometimes the return is the real voyage". When you return to Spain and see that many of the things that worry us are insignificant or that we live in a bubble without control, just like we are right now.

Do you recommend this experience?

I recommend it, especially now that we are more "motivated" to look beyond our borders. The new generations must be aware that a new globalised world is going to be developed and that within this framework we have to work hard. My experience has been and is essential in the configuration of my current person. I have learnt to listen, think and especially, to hope. The academic experience at the University de Costa Rica was excellent.

Internationalisation services

The Universidad Politécnica de Madrid has several programs available to facilitate the international mobility of students, staff and teachers. By means of these services, the international spirit of the university and its active participation in academic mobility projects becomes clear.

Among others, the UPM offers different grant programs to encourage the international mobility of the university community, and a program of languages for Internationalisation (PROLINTER) which fosters the learning of second languages.

Grant Programs

The Universidad Politécnica de Madrid offers different grant programs to encourage the international mobility of the university community.

Banco Santander Grants

- **Santander Formula Grant.** In 2010, the Banco Santander established this grant program to foster the international mobility of undergraduate students. Three grants have been called through the UPM to the value of 5,000 Euros, which can be made use of in any of the more than 833 Universities with whom the Banco Santander has agreements through its Global Santander Universities Division, which encompasses centres from The United States, Russia, Singapore and Latin America.
- **Latin American Undergraduate students Grant.** With a duration of five years (2011–2015), this program aims to strengthen mobility and exchange between Latin American Universities. The five grants awarded in 2011, to the value of 3,000 Euros each, are for Brazilian Universities.
- **Santander-CRUE grant for Latin American mobility.** These grants have as their objective the fostering of international mobility of Undergraduate students for an academic semester at a Latin American University. 12 grants are awarded to the value of 3,000 Euros each.
- **Santander-UPM Grants.** Its objective is to provide support to Latin American students so that they can finish their Postgraduate, Official Masters' and PhD Degrees at the UPM. Through this call, grants are awarded for PhD Programs to a maximum value of 7,500 Euros for the finishing of the PhD thesis; and



grants for the reimbursement of the enrolment fee for Official Masters' Degree studies, with a maximum value of 2,000 Euros.

- **Marco Polo Grants Program.** In collaboration with the China Construction Bank, the Banco Santander set up the Marco Polo, a program which aims to favour exchange and technical and scientific communication with the Peoples' Republic of China. The aim of these grants is to meet, totally to partially, the costs included in carrying out research stays at Universities or academic or scientific institutions of the Asian country. In its first edition, this program awarded grants to three researchers from the UPM, two of them PhD students and one post-doctoral, to carry out research stays for three to four months in China.

Financial travel aid program to carry out Undergraduate and Masters Degree stays at the University de Tongji, Shanghai

The UPM, the UPC and the University of Tongji, signed an agreement for the creation of a joint university campus, the Sino-Spanish Campus, at the facilities of the Chinese University. The new campus is structured into six areas: Civil Engineering, Materials Engineering, Architecture, Electronic Engineering, Computer Sciences Engineering and Energy, especially favouring the mobility of students between the three Universities. The financial travel aid program is aimed at Undergraduate and Masters' Degree students of the UPM who want to carry out one-semester stays at the Chinese University of Tongji, Shanghai.

UPM Program of financial aid to Latin America

This is a financial aid program for the carrying out of activities at the UPM with Latin America. In the 2011-2012 call, 36 projects in total were accepted. The program offers four types of help: seed projects for Research, Development and Innovation; R&D Projects; Thematic networks and Complementary activities.

MESCYT Grants

This Program is the fruit of a Postgraduate training agreement between the Ministry of Higher Education, Science and Technology of the Dominican Republic (MESCYT) and the UPM. By means of this agreement, the MESCYT awards grants for the training of Dominican postgraduates at the UPM. In the past 2011-2012 academic year, twenty-six Masters' and PhD Degree students benefited from this aid.

Fundación Carolina grants

These are grants for short research stays, for teachers and researchers coming

from Brazilian Universities or public research organisations.

CRUE grants for Haiti

The CRUE (Conference of Rectors of Spanish Universities) called this program of grants in 2011, with the objective of collaborating in the socio-economic recovery of Haiti, as well as fostering the international mobility of Haitian students, by supporting their training. In this program the UPM provides two grants from a total of nine.

MAEC-AECID grants

This program from the Spanish Agency for International Cooperation and Development awards grants in three different areas: Postgraduate, PhD and Research studies, together with summer courses and stays at Spanish universities for foreign students. In the past 2011-2012 academic year they awarded a total of 26 grants.

UPM grants for the USA and Canada

The international grants from the UPM for the United States and Canada are

aimed at students who are going to carry out a study stay or Final Undergraduate Studies Project at any University in these two countries. They have a value of 60.000 Euros for the 2012-2013 academic year.

Bancaja international Grants for the USA-Canada-Asia

These are aimed at Undergraduate students of the UPM who carry out exchange stays at universities in the United States, Canada and Asia. During the 2010-2011 academic year they had a value of 40,000 Euros.

Fundación Vodafone Spain Grants for the USA and Canada

The Fundación Vodafone Spain grants for the USA and Canada are aimed at students from the UPM to carry out exchange stays at Universities in the United States and Canada, with special interest in the area of Computer Sciences and Communications Technologies (TIC). During the 2010-2011 academic year they had a value of 25,000 Euros.

ATTENTION TO VISITORS SERVICE

The Universidad Politécnica de Madrid offers an Attention to Visitors Service which provides information on practical and useful questions related to the University to facilitate the integration of students, staff and teachers.

Within this framework, it has established an integral assistance service for visiting teachers which allows them to resolve problems related to foreign administrative tasks, social security and banks, among others. It also facilitates all of the administrative tasks related to the renewal of documents during their stay in Spain.

For those foreign students at the UPM, the service has simplified the procedures for the application of certain documents in groups, such as student residence cards, extension of studies, obtaining the NIE (Financial Identity Number) (for stays of less than six months) and return authorizations. It also provides an evaluation of the foreign proceedings that the students have to complete before their arrival and during their stay in Spain.

As regards accommodation, new agreements have been signed with hotels in Madrid for the teachers and staff who are visiting the UPM. A data base of flats and rooms to rent has been created. It is aimed especially at students.



Languages For Internationalisation Program (PROLINTER)



Its main aim is to increase, through the knowledge of foreign languages, the capacity for internationalisation at the UPM. For this, it offers a learning program for second languages, with a wide range which is of good quality, flexible and competitive, in accordance with MCERL (Common European Reference Framework for Languages) and following the principles of Lifelong Learning, to the benefit of the university community.

The antecedents of PROLINTER arose in 1992, with the first edition of their Spanish Course for Erasmus Students. Since then the activities have expanded progressively now with two editions (autumn and spring) of the general Spanish courses, and setting up intensive courses prior to the commencement of the academic year. At the same time, the teaching of other languages began (French, English, Danish, Swedish, Portuguese, German and Italian) in courses aimed at students selected for the mobility programs.

From 2007, with the creation of the Vice-Rectorate for International Relations, the program was consolidated, which has brought about a rationalization of the management of the program and an extension of

the teaching activities related to the learning of world languages and cultures. Among other successes the strengthening of the general courses program stands out together with the intensive Spanish courses of one semester; the increase in the supply of foreign languages, including the implementation of the Mandarin Chinese program and the signing of a series of agreements with educational institutions for the carrying out of external accreditation tests on different languages.

As regards the organisational structure of PROLINTER, the **Spanish Area** is dedicated to the teaching of Spanish (language and culture), with the program of general and intensive courses for international students. Together with this, "a la carte" courses are available at the request of *partner* centres of the UPM (mainly Asia), in which the students come to follow a course, whose characteristics and duration (one month, one semester, one year) are expressly under the jurisdiction of the institution of origin.

In the **Area of foreign languages** the linguistic preparation and accreditation programs stand out for all of the agents of the UPM who

are going to participate in mobility programs; European languages for candidates of the Erasmus program and similar ones and intensive and general courses in Mandarin Chinese for the future participants in the Hispano-Chino Program of the UPM. Through PROLINTER periodic calls for different external exams are also organised: DELE (Spanish), TOEIC (English), TFI (French).

The Continuous training in foreign languages for the UPM staff, managed by and from the Training Table of the UPM, together with the special programs for linguistic preparation in English for Secondary School teachers is also part of this project, in collaboration with the Comunidad de Madrid.

All of the courses are given using the Blended Learning methodology, structured to a lesser or greater degree according to the characteristics of the programs: classes in the classroom, virtual self-learning (online programs), classroom and virtual tutorials.

The teachers belong mainly to the Department of Applied Linguistics for Science and Technology at the UPM and which has specialists in certain languages.



POLITÉCNICA