On a recent visit to Carnegie Mellon, the Portuguese Minister and the State Secretary for Science, Technology, and Higher Education witnessed how the Carnegie Mellon Portugal program is pushing an ambitious agenda in Information and Communication Technologies (ICT).

Mariano Gago and Manuel Heitor, respectively Portuguese Minister and State Secretary for Science, Technology, and Higher Education, visited Carnegie Mellon University in April, 2010. The purpose of the visit was to participate in the XI Annual PAPS Forum, and also to meet with the students, researchers, and program coordinators who are involved in the Carnegie Mellon Portugal program. The goal was to hear about their current achievements and future plans for the partnership.

The following key questions were asked: (i) Is the Carnegie Mellon Portugal program building critical mass in Information and Communication Technology (ICT), and (ii) is the engagement between researchers and students authentic, strong and sustainable? The answer given by all the participants in the meetings with the Minister and the State Secretary was an enthusiastic “Yes”. In different ways and levels, students and researchers are working side-by-side to develop their work, and to contribute to the economic development of Portugal.

During their visit, the Minister and the State Secretary had the opportunity to talk with the 24 dual degree Ph.D. and Professional Master students that are currently at Carnegie Mellon University. The students talked about their experience, research fields, advisor’s role, and goals for the future. They agreed that this is a very demanding, challenging and hard program that prepares them for the academic or industrial world. In February 2010, the program graduated 60 students that are now agents of change in their companies.

“I am delighted to know that each one of you is motivated and engaged with researchers and professors.”
-Mariano Gago, Minister for Science, Technology, and Higher Education

“FCT Fundação para a Ciência e a Tecnologia
MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E ENSINO SUPERIOR"
Carnegie Mellon Portugal Creates Master of Entertainment Technologies

The Madeira Interactive-Technologies Institute (MITI) at Universidade da Madeira (UMa), and the Entertainment Technology Center (ETC) at Carnegie Mellon University (CMU), jointly provide a two-year program offering Masters of Entertainment Technology dual degree (MET). Read article>>

April 2010, Canal UP and Wintech

Portuguese Students Won International Competition in Innovation

Two Portuguese students, Marina Santana and João Pina, won the first competition in Innovation organized by the Carnegie Mellon University. Read article>>

April 2010, Exame Informatica

The Change that Comes from the Outside

João Barros, National Director of the Carnegie Mellon Portugal program, considers the impact of this partnership with one of the top universities in the USA. Read article>>

March 2010, TSF News Radio

Interview with Francisco Veloso

Veloso talks about his research projects, his professional career and his ambitions. Read article>>
The problems involved in software security have real world significance, whether in everyday activities - such as changing profile security settings on popular networking sites - or large-scale business endeavors - such as modifying web applications in response to changing requirements.

Most often, security malfunctions are the result of “bugs,” or mistakes in the programming. The INTERFACES project seeks to develop programs that will automatically analyze software, helping developers to detect potential errors in the programming before they occur. INTERFACES will be able to signal which parts of the system are insecure - for example, by coloring the program code on the screen - and possibly even correct the software.

This is a complex problem because many software systems are constructed as a piecemeal from internet sources, and are subject to strict security and resource usage requirements.

The INTERFACES project is approaching these challenges by conducting thorough research that runs the gamut from theory to actual development.

In a short brief detailing various aspects of the project, Principal Investigators Luís Caires and Frank Pfenning said that the “broad objective of this partnership is the promotion of bothways knowledge transfer between top notch academic research and industrial R&D.”

Team members represent several of the Carnegie Mellon Portugal program's affiliates: Vasco Vasconcelos of the Faculdade de Ciências da Universidade de Lisboa (FCUL), António Melo and Lúcio Ferrão of OutSystems, João Costa Seco of Faculdade de Ciências e Tecnologia da Universidade Nova de Lisboa (FCTUNL), Filipe Militão and Bernardo Toninho, dual degree Ph.D. students, and Hugo Vieira of FCTUNL. Two postdoctoral researchers were also recently hired to assist with the project.

In keeping with the Carnegie Mellon Portugal program precedent of collaboration, this project works in tandem with OutSystems, one of the program's many Industrial Affiliates. OutSystems is a Portugal-based software company with clients in 16 industries. The company provides an “All-in-One Agile Platform” for management of web business applications that are built for

“We will be delivering not a specific application or system, but computer programs that may automatically check other computer programs for correctness and compliance to security and integrity.”
- Luís Caires, Portuguese researcher
continuous change, a special consideration of INTERFACES.

“A key novelty of this project is the use of sophisticated logic and type systems that will lead to the design of programs that can actually automatically analyze other programs, and help developers to detect and correct errors even before the modules are installed, just by looking at the way they are glued to each other, i.e. at their INTERFACES.”

The INTERFACES project was launched in May of 2009, but is already showing promise. Technical results have already been published and team members are currently working on a prototype of a self-correcting web-application development system, which will be able to “detect possible security breaches before they happen, and warn the software developer at the right time.”

With completion projected for 2012, the project team is making towards its goal of “bridging basic research results to validation and product improvement in real systems.”


Frank Pfenning researcher at the INTERFACES project.

On the Calendar: Upcoming Events

June

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June 14, 2010, Lisbon
2010 Annual Conference
Carnegie Mellon Portugal Program

June 15, 2010, Lisbon
2010 Doctoral Consortium

Workshop “Social Sciences and Engineering: What I need; What I can Offer”

June 15-16, 2010, Lisbon
Workshop “Corporate Partnering to Facilitate University Commercialization Activities”

June 19, 2010
Alumni Chapter

more information available at www.cmuportugal.org
Portuguese Firemen Begin to Test New Vital Jackets™ on the Field

An interdisciplinary team under the Carnegie Mellon Portugal program is currently working on a project that will provide real time bio-feedback for First Responders.

Five Portuguese firemen from Amarante, Portugal, are already using Vital Jackets™ when in duty. An experience within the interdisciplinary research project Vital Responder - Monitoring Stress among First Responder Professionals, which seeks to change the way First Response Professionals are able to do their work. The end goal is to produce a new garment in the form of a t-shirt that monitors the vital signs of First Responders, while still comfortable and non intrusive to their work.

Currently, these jackets are only collecting ECG data, because the purpose is to make sure that those jackets are wearable during stress situations. “The jacket should not interfere with all the equipment that the fireman uses during his task,” said Pedro Gomes, researcher of the Vital Responder project.

Bruno Pinto, Diogo Pinheiro, José Ribeiro, Luís Martins, and Rui Ribeiro are from the Permanent Intervention Team from the Firemen Corporation of Amarante, on the North of Portugal. This team works night and day to rescue people in car accidents, put out forest and building fires, and many other activities.

“Using the jacket is a very positive experience which allows us to contribute to the development of innovative firemen protective clothing,” said Ribeiro, adjunct of the firemen commander and leader of the team. “[The jacket] will aid the firemen in high temperature situations, and also will aid the commanders to make decisions according to the real health condition of the firemen.”

Ribeiro’s hope is that if the jacket works, it will provide crucial information that can help save many more people’s lives.

At this time, the research team has over than 140 hours of data. The target is to create a large database of sensor data which will allow them to answer the question: “How can we use a variety of sensors such as the ones present in the Vital Jacket™ technology to quantify, detect, and predict physiological stress on first responder professionals?” The answer to this question will be given by part of this research project team led by Miguel Coimbra, from the Faculdade de Ciências da Universidade do Porto.

The project Vital Responder - Monitoring Stress among First Responder Professionals, in Portugal, is led by João Paulo Cunha from IEETA. This team is composed of researchers from the Faculdade de Ciências and the Faculdade de Engenharia da Universidade do Porto, Instituto de Telecomunicações, IEETA, Universidade de Aveiro, Carnegie Mellon University, and partner companies like Biodevices, Petratex and McLaren. Engineers, computer scientists, clinical consultants and Ph.D. students are working alongside to achieve the same goal:

“Explore the synergies between innovative wearable technologies, scattered sensor networks, intelligent building technology, and precise localization services to provide secure, reliable and effective first-response systems in critical emergency scenarios.” (Extract from the project proposal)
The team responsible for this project envisions two modes of operation: offline and online. In the offline mode, data collected from the First Responders under critical situations is used to post-analyze their health status and reactions to different stress situations and infer their fitness for further service in these situations.

The online mode will enhance its usefulness even further, enabling the management of their effort, life threatening alarms to the First Responders coordinators and nearby colleagues and facilitate intervention for rescue in case of life threatening events.

In addition to the ECG sensors and embedded electronics already present in the Vital Jacket™, the Vital Responder research project team will embed oxygen saturation, body and ambient temperature, 3 axis MEMS accelerometer, gyroscope, humidity, and sweat level.


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**XI Annual PAPS Forum Creates Networking Opportunity for Post-Graduate Students**

More than 100 young Portuguese Post-Graduates attended the XI Annual Forum of the Portuguese American Post-Graduate Society (PAPS), “Science, Technology, and I.”

The event took place at Carnegie Mellon University, Pittsburgh (USA), from April 10-11, 2010, and was organized by the Portuguese American Post-Graduate Society (PAPS), with the aid of the Carnegie Mellon Portugal program, sponsored by the Fundação para a Ciência e a Tecnologia (FCT). Currently, PAPS has 618 members.

Pradeep Koshla, Dean of the College of Engineering at Carnegie Mellon University, José M. F. Moura, Director of ICTI@Carnegie Mellon, and Anabela Maia, PAPS President, made the Welcoming Remarks. In her segment, Anabela Maia stressed the goal of the event, which was to establish a networking opportunity for Portuguese American Post-Graduates to talk about their achievements, difficulties, and goals.

“The title and the agenda were made to impel the connection between Science, Technology and each of us,” said Anabela Maia.

Mariano Gago and Manuel Heitor, respectively Portuguese Minister and State Secretary for Science, Technology, and Higher Education, said that the Portuguese American Post-Graduates whose goal is to return to Portugal should create their research or entrepreneurial opportunities.

“This can be impelled by the foundation of dynamic social networks, which can enable networking,” said Heitor.

Gago added, “In Portugal we have an average of seven researchers for 1000 workers, whereas in Europe there are six researchers per 1000 workers.” According to Gago, the private investment in Research and Development (R&D) has raised to 0.8% of the GDP (Gross Domestic Product) in the past five years. This fact explains the growth of doctorates has manager’s or founders of Portuguese companies, so “there are opportunities when returning to Portugal,” said Gago. “We cannot plan the future,” said Heitor, “but we can try to develop opportunities.”

Manuela Veloso, Portuguese Professor in the Carnegie Mellon’s Computer Science Department, talked about the research work that she is developing with robots. Veloso addressed general myths about robots, saying that the ones that exist in the movies are totally different from the ones that are being developed at Carnegie Mellon University. She explained with examples the difficulties of creating a robot that moves, and of synchronizing movement with other robots. Veloso is the president of...
Robot World Cup Initiative (RoboCup™), an international research and education initiative that fosters Artificial Intelligence (AI) and intelligent robotics research by providing a standard problem where a wide range of technologies can be integrated and examined, as well as being used for integrated project-oriented education.

The other sessions were about “Science, Technology and Art,” by Miguel Amado, curator, and Joana Ricou, artist; “Science, Technology and Society,” by Raphael Costa, historial from York University (Toronto); and “Science and Technology in Industry and Academia,” by Cláudia Ferreira, Hovione General Manager of the Technology Transfer Center in New Jersey, and Vasco Calais Pedro, from Bueda Inc. co-founder and CEO.

Ph.D. EPP Student Recognized for Research with a Global Impact

On April 8, Ph.D. student Rebecca Mayer was awarded the “Where in the World?” Award for Global Impacts of Research. The area was Economic and Environmental Sustainability and her project was entitled “Alternative Energy Options for Cellular Base Stations in Nigeria.”

Mayer, who is currently working on her Ph.D. in Engineering and Public Policy, says she was driven to apply for the award because of her interest in global impact.

Before enrolling in the Carnegie Mellon Portugal program, Mayer worked for Winrock International, a non-profit organization that works with developing countries to establish sustainable energy solutions and viable infrastructure. She says that a key element to this work is sensitivity to site specifications, which will dictate the size and integration of the energy system.

“It’s really important to integrate the infrastructure into the community,” says Mayer. “Ultimately the community needs to support and maintain it.”

Mayer became aware of the issues addressed by her award-winning project while at Winrock International. In response to a World Bank call for proposals, she organized and headed a team that won a contract to work on a...
telecommunications project in Africa.

“It immediately became clear that there was a problem in African countries where cellular base stations were growing, but really fast and with not enough infrastructure to support them,” says Mayer. “There is a definite need for new energy solutions.”

The “Where in the World” Award Competition was one of several awards that comprised Graduate and Professional Student Appreciation Week, an annual five-day series of events to recognize Graduate presence on Carnegie Mellon’s campus. It was created to acknowledge the importance of research and its impact on the global stage.

“I’m really glad there is support from universities for research with a global impact,” Mayer says. “That’s what is so important about this award. That’s what is so great about the Carnegie Mellon Portugal collaboration.”

Rui Meireles is a Ph.D. student of Computer Science (CS) who is funded by the Carnegie Mellon Portugal program. He is intrigued by how cars can communicate with each other over wireless channels.

Having earned his undergraduate degree and completed an internship as a software engineer, Meireles says that he wanted to further pursue his education at the graduate level. “I realized I wanted to continue learning and not get into some routine work that would leave me unfulfilled.” He visited the website of the Faculdade de Engenharia da Universidade do Porto and noticed an announcement about a partnership between UPorlo and Carnegie Mellon University.

“In the future I would like to become a university professor. Teaching always fascinated me...”
- Rui Meireles, Ph.D. student

“Like many things in life, it was a fortunate accident,” said Meireles. “A Ph.D. at one, if not the best university in Computer Science seemed like one of those ‘once in a life time’ opportunities.” Through the Carnegie Mellon Portugal program, Meireles is currently involved in a research project that is developing a way for messages to be routed between moving vehicles. (DRIVE-IN project)

“Think of two vehicles preventing an accident by exchanging trajectory information with one another,” said Meireles.

The project team is working on extending the power of wireless communications to automobiles, allowing cars to exchange information with one another and the internet at large. After the successful completion of this project, Meireles is interested in exploring other protocols and specific applications to this type of networks.

In conjunction with this project and others, Meireles has three co-advisors: João Barros and Michel Ferreira, at the Universidade do Porto, and Peter Steenkiste, at Carnegie Mellon University. Their role is to mentor him “through the ups and downs of research. They suggest problems for me to work on, help me when I am intimidated by something and provide much valuable constructive criticism to make sure my work is as solid as can be.”

Meireles says that his experience so far has been demanding but ultimately beneficial. Through his courses, he feels that he has become an expert in his area of study and a versatile student in Computer Science. “Also, everyone is very enthusiastic and motivated about their research,” says Meireles. “In the end, there are no magic tricks, it’s all hard work.”
Ferreira and Agyapong Examine Spillover Effects from Wiring Schools with Broadband

Does the usage of Internet in schools spill over society in general? The research paper entitled “Spillover Effects from Wiring Schools with Broadband: Implications for Universal Service Policy,” states that the answer is yes.

The paper, written by Pedro Ferreira, faculty at Instituto Superior Técnico, and Patrick Agyapong, a Ph.D. student in Engineering and Public Policy, analyzes Portuguese data on the Internet usage in schools and by society between January 2006 and December 2008. By means of the Fundação para a Computação Científica Nacional (FCCN), Portugal completed connecting all schools to the Internet through DLS (1 Mbit/s or more) in January 2006.

“The students carry the habit of using Internet at school to other Internet access points, most notably home, where they can act as liaison to older family members and friends transferring the specific Internet related training they get in school to people that otherwise would find it hard, and perhaps useless, to obtain,” said Ferreira. “[This conclusion has] deep implications for Universal Service Policy (USP) because it shows how, in the absence of such a formal policy, specific USP-like projects that fully engage local communities with telecommunication operators through the local Government can contribute to a more widespread effective adoption of broadband by society at large.”

Ferreira and Agyapong measured internet usage in schools by the amount of traffic through the DSL router at the school premises. The usage by population at large was measured by the amount of traffic through a carrier's Central Offices (CO).

“The carrier sampled is the one that provides the DSL connection to all schools in the country who, coincidentally, has a very significant share of the broadband market in the country,” explained Agyapong. “[This data was complemented] with yearly information on population density and a number of education related variables such as basic education rate, dropout rate and illiteracy rate.”

Based on the results, Ferreira and Agyapong concluded that “doubling the traffic from schools yields roughly a 5% increase in the traffic through the carrier's COs in the subsequent year.” They also found that “population density is highly correlated with Internet usage by society at large and that illiteracy rate is a significant barrier to using the Internet.”

Now this research team feels that it is necessary to design and administer a survey targeted at both schools and students to ask for more details about how internet has been used. This will help to learn more about how students use the Internet in schools in order to better appreciate the mechanics behind the spillover effect, and also how students carry the habit of using the Internet in the school to other access points. Another concern is to explore the panel structure of the data, because, Ferreira and Agyapong explained, “we have data on the CO traffic and on the school's traffic on a monthly basis for the entire period of analysis, but we lack monthly data for our control variables because population density and the relevant education related variables are only measured once a year.”
Novabase Academy Sends Its Best

From April 10-15, the Carnegie Mellon Portugal program hosted Paulo Trigo, Novabase Executive Director, and several Novabase Academy students for the Novabase Study Tour 2010.

They attended classes such as Management of Software Development for Technology Executives and met with several Program researchers and professors, including Manuela Veloso, Herbert A. Simon Professor of Computer Science at Carnegie Mellon, and David Garlan, Professor and Director of the Master of Software Engineering Professional Programs (MSE).

Novabase, a corporate sponsor for the Carnegie Mellon Portugal program, is the largest IT company in Portugal. Founded in 1989, it currently employs about 1700 people. Trigo, who has been with Novabase for ten years, is a managing director responsible for the partnership between Novabase and Vodafone, a multinational mobile network operator based in Newbury, England.

Novabase Academy is a training program for recent college graduates that offers a two week intensive training program prior to becoming full time employees at the company. The program consists of courses, projects and team-building exercises, all designed to prepare participants for their work at Novabase. The trip to Carnegie Mellon, the Novabase Academy Study Tour, is a prize that is offered to the “best” students coming out of the Academy.

“It’s to engage them,” says Trigo. “It’s a good opportunity to have some offsite team-building.”

While visiting Carnegie Mellon, Trigo and the students were afforded the opportunity to learn more about the Carnegie Mellon Portugal Program and various university practices. Of particular interest to Novabase, says Trigo is the manner in which Carnegie Mellon emphasizes practical applications into course methodology.

“We felt immediately that we could apply some of the lessons that people brought from here.” Trigo says that the academic and practical worlds are not very “connected” in Portugal, and that Novabase stands to benefit from applying practices learned at Carnegie Mellon. He sees the visiting students as ambassadors from Portuguese industry. The company’s hope is that the students who attend the Novabase Academy Study Tour will be able to bring this knowledge back to Portugal with them and propagate it internally.

“The Carnegie Mellon Portugal program is very in touch with reality, with the industry,” Trigo says. “It’s not some disconnected academic track.”

What do you think of our Newsletter? Share your thoughts and concerns about articles, suggest topics, or contribute with articles and pictures. Please send your feedback to: news@cmuportugal.org