An Education, Research and Innovation Ecosystem
Carnegie Mellon Portugal Program

The Carnegie Mellon Portugal Program is a platform for education, research and innovation that brings together Portuguese universities, research institutions and companies, and Carnegie Mellon University.

Mission

Its mission is to place Portugal at the forefront of innovation in key focused areas of Information and Communication Technologies (ICT), by promoting cutting-edge research, world-class graduate education and a close collaboration with the Portuguese industry.
The partnership was launched in 2006, and in 2012 it was renewed for another five years, until 2017. In its ten years of existence, it has established in Portugal a successful international innovation engine in ICT, and is building on the achievements of its first years to carry out an ambitious Roadmap, crafted by the Program community, for its Phase II.

<table>
<thead>
<tr>
<th>STRATEGIC AREAS</th>
<th>INSTRUMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Talent Development</td>
<td>Entrepreneurial Research Initiatives</td>
</tr>
<tr>
<td>Knowledge Creation</td>
<td>inRes – Entrepreneurship in Residence</td>
</tr>
<tr>
<td>Innovation</td>
<td>Early Bird Projects</td>
</tr>
<tr>
<td></td>
<td>Industry Affiliates Program</td>
</tr>
<tr>
<td></td>
<td>Exploratory Research Projects</td>
</tr>
</tbody>
</table>

The activities of the Carnegie Mellon Portugal Program are financed by Fundação para a Ciência e a Tecnologia (FCT), supported by the Conselho de Reitores das Universidades Portuguesas (CRUP) and co-financed by industry partners and by Carnegie Mellon University.

**PARTNERS**

- Portuguese Universities
- Research Institutions
- Public Organizations and Companies
- Carnegie Mellon University
Talent Development

Dual Degree Ph. D. Programs
Dual Degree Professional Master Programs
Faculty Exchange Program
Undergraduate Internship Program
Talent Development
Dual Degree Ph. D. Programs

- Applied Mathematics (Math) - FCT-UNL | IST
- Computer Science (CS) - FCT-UNL | FCUL | FCUP (MAP-i) | IST
- CS/Robotics (CS/R) - IST
- Electrical and Computer Engineering (ECE) - FCUL | FCUP (MAP-i) | FEUP | IST | UA
- Engineering and Public Policy (EPP) - FEUP | IST
- Language Technologies (LT) - FCT-UNL | IST
- Software Engineering (SE) - FCTUC
- Technological Change and Entrepreneurship (TCE) - CLSBE | IST

**Highlights**

- One diploma from a Portuguese University and another from Carnegie Mellon University
- 8 programs with 8 schools in Portugal
- Typical duration of five years, three years in Portugal and two years at Carnegie Mellon University
- Co-supervised by a faculty member in each university
- Other sources of financial assistance available

![Graph showing distribution of PhD students by university]
Opportunities

- Two countries, two diplomas, one world-class education and research experience
- The dual-international graduate credentials give students an excellent basis to build their careers
- While pursuing their Ph. D., students:
  - Access greatest ICT companies, through internships, like Apple, Google, Qualcomm, Cisco, Novabase, Feedzai, among others;
  - Learn and publish papers with top research experts on ICT field;
  - Are immersed on an Alumni network that won several prizes like IBM Scientific Award
Talent Development
Dual Degree Professional Master Programs

- Entertainment Technology (ET) - UMa
- Human Computer Interaction (HCI) - UMa
- Information Technology Software Engineering (IT-SE) - FCUL
- Information Technology Information Security (IT-IS) - FCUL
- Information Networks (IN) - UA
- Software Engineering (UC) - UC

Highlights
- One diploma from a Portuguese University and another from Carnegie Mellon University
- 6 programs created; only MHCI operating since 2015
- Typical duration of 16 months, one semester at Carnegie Mellon University and two in Portugal
- Industry-oriented, real-world projects
- Cybersecurity at PT, Software engineering at Novabase, Capstone and studio projects with OutSystems, Critical Software, CGI, among other
- Self-funded double degree in ECE at Carnegie Mellon University/MBA at Porto Business School

Total number of masters students enrolled:
- Universidade da Lisboa: 37
- Universidade de Coimbra: 53
- Universidade da Madeira: 138
- Universidade de Aveiro: 19

247 admissions
215 graduates
Opportunities

• Two countries, two diplomas, one world-class education and research experience

• The dual-international graduate credentials give students an excellent basis to build their careers

• Strong connection with the industry, corporate affiliates provide financial support to students in the Program

• High rates of international enrolment, nearly half of alumni are from other countries

• Alumni are currently working in leading technological companies in Portugal and abroad such as Critical Software, EDP, Novabase, Apple, BBC, Disney, Dropbox, eBay, Google, IBM, Microsoft, PayPal, Samsung, and many others

• Students are part of an organized Alumni Chapter that is inclusive and active
Launched in 2007, the Faculty Exchange Program supports an extended exposure to research and education best practices at Carnegie Mellon University, and fosters the integration of faculty members from Portuguese universities in international knowledge networks.

Faculty members can spend one term working in research, education and innovation at Carnegie Mellon University, to experience its culture and best practices.

**Most frequent activities**

**At CMU**
- Attend invited talks
- Participate in periodic seminars and discussion forums
- Preparation of joint publications
- Interact with additional faculty and researchers
- Presentation of research findings
- Interaction with companies

**Post-exchange**
- Incorporate best practices in classes and supervision
- Joint publications
- Preparation of joint proposals
- Continue joint research further collaborations
- Co-supervise students and internships
- Open doors for collaborations beyond CMU

**Highlights**
- Diverse network developed by the exchanges
- Promote a positive exchange of culture and experiences
- Visitors are exposed to the same environment and working conditions as a colleague at Carnegie Mellon University
- Experiencing more student-centered teaching methods

**68 Faculty exchanges**

![Diagram showing exchanges between universities, indicating connections and the number of faculty exchanges.]
The main goal of the Undergraduate Internship Program is to provide high-quality research opportunities to talented undergraduates, while opening perspectives for graduate studies and career opportunities in cutting-edge fields of ICT.

Launched in May 2014, this instrument offers an intensive eight to twelve weeks research experience, and the opportunity to be mentored by leading faculty and researchers, in a cultural immersion at Carnegie Mellon University.

**Most frequent activities**

**At CMU**
- Participate in periodic seminars
- Interact with CMU Ph.D. and dual degree Ph.D. students, and other internship members
- Attend invited talks
- Preparation of research findings

**Post - internship**
- Preparation of joint publications
- Continue with other CMU Faculty
- Apply to CMU Ph.D. and dual degree Ph.D. Program
- Open doors for industry/academic careers

**Highlights**

- Develop knowledge and skills as researchers
- Participate in state-of-the-art research projects
- Interact with Carnegie Mellon University faculty and researchers
- Admission to dual and regular Ph.D. Programs
- Preparation of joint publications

**41 Undergraduate internships**

![Diagram showing CMU host organizational units and Portuguese home institutions]
Knowledge Creation

Research in Phase I

Entrepreneurial Research Initiatives

Early Bird Projects

Publications
During Phase I, the Program held three calls for collaborative research projects, involving at least two different institutions in Portugal, one or more companies, and Carnegie Mellon University.

- **2008 Call** – 10 projects concluded in 2012-2013
- **2009 Call** – 15 projects concluded in 2013-2014
- **2009 Call** – 3 projects concluded in 2014, in Applied Mathematics, Joint call with the UT Austin Portugal Program
Knowledge Creation
Research in Phase II

12 Entrepreneurial Research Initiatives

- Integrated activities in research, innovation, advanced education;
- with industry collaboration;
- for real world impact;
- 12 proposals approved;
- approximately 11.5 million Euros;
- four years.

10 Early Bird Projects

- Jumpstart new high-impact initiatives;
- emphasis on exploratory research;
- 10 proposals were approved;
- approximately 300 thousand Euros;
- one year;
- two EBPs continued into ERIs in the second call.

2017 Call for Exploratory Research Projects

- Identify emerging key strategic areas for a potential third phase;
- expected to finance 7-10 awards;
- approximately 1.2 million Euros;
- one year.
Knowledge Creation
Research in Phase II - Overview

Industry and academic partners in Portugal and at Carnegie Mellon University in Phase II Research

- 47 PIs
- 75 Co-PIs
- 86 Researchers
- 35 Industry Partners
- 149 Students

Global composition of the teams involved
Knowledge Creation

Publications

The Program has been an enabler of the increase in the number of high impact publications for research groups in Portugal.

The total number of publications reported by the Program community is now more than 1,300.

Publications between 2007 and first quarter of 2017

Over 1,300 publications between 2007 and 2017

Diverse and strong co-authorships between Carnegie Mellon University and institutions in Portugal

Increasing level of co-authorships among Portuguese institutions

Highlights

Network of co-author affiliations

Network of co-author affiliations in joint publications between Carnegie Mellon University and Portuguese institutions between 2013 and 2015
Innovation

Industry Involvement

Startups

inRes – Entrepreneurship in Residence
Innovation

Industry Involvement

Companies contribute to the Program with important guidance in the design and operation of its multiple instruments, the promotion of a culture of innovation and internationalization, knowledge of product and service design, manufacturing and delivery, and financial and in-kind support.

The recent involvement of new companies in Entrepreneurial Research Initiatives, Early Bird Projects, and inRes, has raised to more than 120 the number of companies that have been actively engaged with the initiatives of the Carnegie Mellon Portugal Program.

Benefits

• New solutions for industry problems
• Competitive or complementary products
• Internal capabilities and best practices
• Insights on performance improvement
• Increased visibility
• Access to international knowledge networks

... and more
The Program has also provided conditions and opportunities for faculty members, students or alumni involved in the partnership to launch their own entrepreneurial initiatives.

**Highlights**

- 11 startups have been created within the Program
- 67 million USD raised by four of the 11 startups
- 400 highly qualified job positions are estimated to have been created by these startups
- 20 members of the startups’ teams are involved in the Program activities

**Job Creation**

- 1-10 employees: 4 startups
- 11-50 employees: 5 startups
- 51-100 employees: 1 startup
- 101-200 employees: 1 startup

**Funding Raised**

- Feedzai: $26.1 million
- Mambu: $13.1 million
- Streambolico: $1.0 million
- Veniam: $26.9 million

Funding raised by Feedzai, Mambu, Streambolico, and Veniam (USD millions)
Innovation

inRes – Entrepreneurship in Residence

The inRes program was launched in 2014 as a very early stage *acceleration* program for *entrepreneurial* teams working in ICT, in Portugal. This initiative builds on the experience of a pilot program run on 2011.

inRes provides teams with a very specific profile exposure to Carnegie Mellon University’s *innovation ecosystem* and enables them to harness its potential to *grow* their *ideas* into viable *business* opportunities capable of reaching relevant *markets* and *succeeding*.

**Structure**

**Phase I** – Preparation in Portugal - 4 Workshops

**Phase II** – 7 weeks immersion at Carnegie Mellon University, in Pittsburg and Silicon Valley Campuses
  - Networking and business development
  - Internship at an accelerator
  - Training program

**Phase III** – Final public session
Showcase the projects and the results achieved

**Highlights**

| Establish multiple connections and interactions | > 900 Contacts |
| Clearer understanding of customer needs | > 15 Letters of intent |
| Validation of product concept | > 5 Pilot Programs |
| Improvements in the business model | > 15 Partnerships |

**Partners**

Hovione Capital for Health.

**Participating Teams**

- AllinSurf
- adapttech
- displr
- Heippier
- playsketch
- Followprice
- Soft Bionics
- Xchockware
- AddVolt
- twervo
- SCRAIM
- SCeelix
Innovation
inRes – Entrepreneurship in Residence

Investment and job creation

5.5 million euros – Total of investment received by 6 of the startups from the first two editions.

>70 – The estimated total of highly qualified job positions created by these startups. A significantly fast growth in job creation, for such recent startups.

Investors

<table>
<thead>
<tr>
<th>inRes Team</th>
<th>Project Creation (Year)</th>
<th>Company Creation (Year)</th>
<th>Industry</th>
<th>City</th>
</tr>
</thead>
<tbody>
<tr>
<td>inRes 2014</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AddVolt</td>
<td>2013</td>
<td>2014</td>
<td>Automotive</td>
<td>Porto</td>
</tr>
<tr>
<td>Displr</td>
<td>2013</td>
<td>2013</td>
<td>Media</td>
<td>Braga</td>
</tr>
<tr>
<td>Followprice</td>
<td>2013</td>
<td>2015</td>
<td>e-commerce</td>
<td>Lisbon</td>
</tr>
<tr>
<td>Xhockware</td>
<td>2014</td>
<td>2014</td>
<td>Retail</td>
<td>Porto</td>
</tr>
<tr>
<td>inRes 2015</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adapttech</td>
<td>2014</td>
<td>2015</td>
<td>Medical Devices</td>
<td>Porto</td>
</tr>
<tr>
<td>Playsketch</td>
<td>2014</td>
<td>-</td>
<td>Video Games</td>
<td>Coimbra</td>
</tr>
<tr>
<td>Scraim</td>
<td>2014</td>
<td>2014</td>
<td>Internet</td>
<td>Porto</td>
</tr>
<tr>
<td>inRes 2016</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All in Surf</td>
<td>2013</td>
<td>2015</td>
<td>Technology</td>
<td>Porto</td>
</tr>
<tr>
<td>Helppier</td>
<td>2013</td>
<td>2014</td>
<td>Software Develop.</td>
<td>Porto</td>
</tr>
<tr>
<td>SoftBionics</td>
<td>2013</td>
<td>2016</td>
<td>Medical Devices</td>
<td>Coimbra</td>
</tr>
<tr>
<td>TWEvo</td>
<td>2014</td>
<td>2017</td>
<td>IT</td>
<td>Leiria</td>
</tr>
</tbody>
</table>
In its 10 years, the Program has built a creative environment in which Portugal and Carnegie Mellon University have collaboratively engaged with the challenges of knowledge societies and their ICT foundations. Strengthened by its achievements, the Program remains firmly committed to creating a future with Portugal at the forefront of Science and Innovation.
An Education, Research and Innovation Ecosystem