CMU Portugal

Exploring new research frontiers in ICT towards a global innovation ecosystem
CMU Portugal at a glance

Overview

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

This partnership was launched in 2006, and is split into three phases:

- **Phase I**: 2006 - 2012
- **Phase II**: 2012 - 2017
- **Phase III**: 2018 - 2023

Mission

The mission of the Carnegie Mellon Portugal Program is to place Portugal at the forefront of research and technological development in the area of ICT, by promoting an innovation ecosystem with a tight coupling between cutting-edge research, world-class graduate education, and highly innovative companies in the data-driven economy.
CMU Portugal Program
ICT Focus Areas

- Software Engineering
- Design and Engineering at large
- AI and Machine Learning
- Autonomy and Robotics
- Data Science and Engineering
- Design and Engineering at large
- Language Technologies
- Engineering and Public Policy
- Engineering and Public Policy

CMU Portugal - Exploring new research frontiers in ICT towards a global innovation ecosystem
The CMU Portugal collaboration is based on a contractual arrangement between CMU and the Portuguese Science and Technology Foundation (FCT).

The program’s Governance structure begins with the **Board of Directors**, who are responsible for policy oversight, approval of the annual plan and budget allocation for any proposed activities and an **External Review Committee (ERC)**, responsible for reviewing specified objectives and suggest changes.

The Program is supported by the **Program Directors**, the **Scientific Directors** and the **Coordination Office staff** who work in conjunction as a unified body to ensure that the program runs effectively.
CMU Portugal Program

Governance

**Board of Directors**

- **José Paulo Esperança**
  President of the Board of Directors, Vice-President, Fundação para a Ciência e a Tecnologia (FCT) (representation of Helena Pereira)

- **Paulo Jorge Ferreira**
  Rector, University of Aveiro Representative of Council of Portuguese Rectors (CRUP)

- **James H. Garrett**
  Provost, Carnegie Mellon University

- **William H. Sanders**
  Dean of the College of Engineering at Carnegie Mellon University

- **Rogério Carapuça**
  President, Portuguese Association for Development of Communications (APDC) Representative of Industry

**External Review Committee**

- **Professor Sir John O'Reilly**
  (Chairman)
  University College London, United Kingdom Chairman, SERC, A*STAR, Singapore

- **John Guttag**
  Department of Electrical Engineering and Computer Science, Massachusetts Institute of Technology

- **Fernando Pereira**
  VP and Engineering Fellow at Google

- **Ali Sayed**
  Dean of Engineering, EPFL School of Engineering

- **Giulio Sandini**
  Senior Researcher, Founding Director, Italian Institute of Technology

- **Yvonne Rogers**
  Professor and Director, Centre of Excellence in Human-Computer Interaction, University College London
CMU Portugal Program
Governance

Program Directors

Nuno Nunes
National Director at Portugal of the Carnegie Mellon Portugal Program

Inês Lynce
National Director at Portugal of the Carnegie Mellon Portugal Program

José M. F. Moura
Director at CMU of the Carnegie Mellon Portugal Program

Scientific Directors

Joana Mendonça
Instituto Superior Técnico, Universidade de Lisboa

Fernando Velez
Instituto de Telecomunicações & Universidade da Beira interior

João Paulo Cunha
Faculdade de Engenharia da Universidade do Porto

Luis Filipe Antunes
Faculdade de Ciências da Universidade do Porto

Luís Caires
Faculdade de Ciência e Tecnologia da Universidade Nova de Lisboa

Paulo Marques
CTO of Feedzai

Rui Maranhão
Instituto Superior Técnico, Universidade de Lisboa

Susana Sargento
Universidade de Aveiro

Coordination Office

Portugal office

Silvia Castro
Executive Director

João Fumega
Education Officer

Mariana Carmo
Communications and Events Officer

Alexandra Mendes
Project Officer

Carnegie Mellon office

Megan Flohr
Associate Director

Maya Colacito
Administrative Coordinator

Mary Adelson
Administrative Coordinator
CMU Portugal

3rd Phase Initiatives & Activities
3rd Phase Main Initiatives

Talent Development – Education Initiatives

**Dual Degree Ph.D. Programs**
- 4 Calls
- 13 New Students

**Affiliated Ph.D. Programs**
- 1 Call
- Up to 12 scholarships available for 2021/2021

**Visiting Faculty and Researchers**
- 2 Calls
- 10 visits at CMU in 2019
- 6 selected to visit CMU in 2020

**Visiting Students**
- 1 Call
- 9 selected to visit CMU in 2020

**Advanced Training Programs**
- Expected to start on Spring 2021

Research Initiatives

**Exploratory Research Projects**
- 8 Closed Projects
- 1 New Call
- 7 New Projects Selected

**Entrepreneurial Research Initiatives**
- 7 Closed Projects
- 5 Ongoing

**Large Scale Collaborative Projects**
- 1 Call
- 12 New Projects Selected
CMU Portugal Timeline of Activities
2018-2020

February
- Renewal of FCT International Partnerships
- Establishment of an agreement for international cooperation in science, technology, and higher education within CMU Portugal with 12 new industrial affiliates
- CMU Portugal Technical Workshops +140 attendees at workshops led by Portuguese and CMU researchers

July
- Participation at Encontro Ciência
- Open call for applications for CMU Portugal scientific directors - Selection of 8 new scientific directors

November
- Launch of CMU Portugal new image and website

December
- Open Call for CMU Portugal PhD.s - 6 scholarships awarded
- Participation at INCoDe Conference of the National Forum for Digital Competences
CMU Portugal Timeline of Activities
2018-2020

**2019**

**February**
- Visit to CMU by the Minister of Science, Technology and Higher Education, the FCT President and a delegation of 12 Portuguese Researchers

**March**
- CMU Portugal Project Review meeting
- Photo and Video Exhibition of the Screen DR project at FCT
- Open Call for visiting faculty & researchers at CMU

**June**
- Open Call for Large-scale collaborative research projects

**July**
- Participation at Encontro Ciência
- Presentation of the new ERP Call & Phase III Initiatives at CMU

**October**
- Participation at the International Day (iDay2019) from IST
- CMU Portugal Distinguished lecture (Porto and Lisbon): “Towards a Conscious AI – A computer architecture inspired by cognitive neuroscience”

**November**
- Open Call for visiting faculty & researchers at CMU

**December**
- Workshops on gender Balance in Stem, in Porto and Lisbon
- CMU Portugal Scientific directors visit to CMU to promote CMU Portugal activities
- CMU Portugal Distinguished lecture “Beyond User Centered Design”

**2020**

**February**

**March**

**June**

**September**
- CMU Portugal Welcome Reception for its Community in Pittsburgh

**October**

**November**

**December**
CMU Portugal Timeline of Activities
2018-2020

February
- Participation at two FLAD Sessions in Porto and Minho, to promote training initiatives in the USA.

April
- Keynote Lecture by Jamie Callan, CMU Language Technologies Institute Professor, at ECIR 2020
- Announcement of the winning CMU Portugal Large Scale Collaborative research projects, partnering PT companies, Universities and Research Institutions with research groups at CMU.

June
- Annual Board of Directors (BoD) Meeting.

2020

January
- Seminar at UTAD with the Conclusions of CMU Portugal eCSAAP project.

March
- Announcement of the Visiting Students Program results
  - 9 master students from PT Institutions were selected to visit CMU

May
- Announcement of the Visiting Faculty & Researchers Program results
  - 6 faculty & researchers were selected
- Announcement of the 7 new Exploratory Projects
CMU Portugal Timeline of Activities
2018-2020

**October**
- Open Call for CMU Portugal Dual Degree Ph.D. Scholarships
- CMU Portugal Online Info Session “How to apply for a CMU Portugal Dual-Degree Ph.D. Scholarship” with +200 attendees.
- CMU Portugal Webinar at Técnico Job Shop to promote the Program’s Education activities.
- Carnegie Mellon Portugal 2020 Orientation Day to welcome the new Dual Degree Ph.D. students
- CMU Portugal National Director Rodrigo Rodrigues at Encontro Ciência “Warm up Session to anticipate the upcoming event

**July**
- CryptoSummer School organized under the Bee2WasteCrypto CMU Portugal Project.

**September**
- Remote joined the CMU Portugal list of Industrial affiliated Partners
- Disclosure of the CMU Portugal Annual Report (2018-2019), both online and printed versions

**November**
- CMU Portugal Session at Encontro Ciência: “CMU Portugal – defining new frontiers in Technology within the health sector” & Launch of the new CMU Portugal Institutional Video.
Education Initiatives

The educational offer of CMU Portugal Program comprises research based, professional and mobility programs.

**Educational Programs**

- **5 Year Dual Degree PhD Programs** between CMU and Portuguese Universities
- **Intensive short-duration educational programs in Data Science and User Experience for professionals in ICT**
- **4 Year Ph.D. Programs in Portugal in collaboration with industry and a visiting period at CMU**

**Mobility Programs**

- **Mobility program for masters students to develop research at CMU up to 6 months**
- **Mobility program for faculty affiliated with Portuguese higher education institutions to spend up to 4 months at CMU to develop research**
Dual-Degree PhD Programs

**Objectives**
Dual Degree PhD programs in selected cutting-edge areas of ICT

Graduates receive dual degrees conferred by Carnegie Mellon and affiliated Portuguese University

**Research Topics**
- Computer Science
- Electrical and Computer Engineering
- Engineering and Public Policy
- Language Technologies
- Robotics
- Software Engineering
- Human Computer Interaction (2020-2021)

**Collaborative consortiums**
Research in Portugal and at CMU
Co-advisors by Portuguese and CMU faculty

**Format**
3 years in Portugal + 2 years at CMU
Dual-Degree PhD Programs

Applications: Number of applications per academic year and department

- Robotics: 0 (2018-19), 6 (2019-20), 3 (2020-21)

Total:
- 2018-19 Call: 48 (Results: AY2019-20)
- 2019-20 Call: 84 (Results: AY2020-21)
- 2020-21 Call: 123 (Results: AY2021-22)
Dual-Degree PhD Programs
Active, enrolled, alumni and withdraw students per year

Total
- 81 Alumni
- 24 Withdraw
- 133 Enrolled

Active

Enrolled

Alumni

Withdraw

CMU Portugal - Exploring new research frontiers in ICT towards a global innovation ecosystem
Dual-Degree PhD Programs

Students: Enrolled students in each Ph.D. Program by entering year

- CS
- CS/R
- ECE
- EPP
- LT
- Math
- SE
- TCE

Moving Average
Dual-Degree PhD Programs

Students Enrolled by host CMU department and Portuguese university

133 Enrolled Students

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<thead>
<tr>
<th>Host Portuguese university</th>
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<tbody>
<tr>
<td>Universidade do Porto</td>
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<td>Universidade de Aveiro</td>
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<tr>
<td>Universidade de Coimbra</td>
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<td>Universidade de Lisboa</td>
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<tr>
<td>Universidade Católica Portuguesa</td>
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<td>Universidade Nova de Lisboa</td>
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</table>

- 54 Electrical and Computer Engineering
- 33 Engineering and Public Policy
- 16 Computer Science Department
- 12 Language Technologies Institute
- 3 Public Policy & Management
- 9 Social and Decision Sciences
- 2 Institute for Software Research
- 2 Mathematical Sciences
- 2 Robotics Institute

CMU Portugal - Exploring new research frontiers in ICT towards a global innovation ecosystem
Luis Borges  
Cohort: 2019/2020  
**Ph.D. Program:** ECE Ph.D.  
**Ph.D. Research Topic:** Neural Information Retrieval  
**Affiliation:** IST and CMU  
**Supervisors:** Bruno Martins (IST), Jamie Callan (CMU)  
Currently, I am doing coursework in Portugal and working on neural methods for tackling the MSMARCO passage ranking task. For the following two years, I will be doing coursework in Pittsburgh and also continuing my research on the aforementioned topic. My last two years will be in Portugal, where I will be doing directed research only.

Maria Casimiro  
Cohort: 2019/2020  
**Ph.D. Program:** SE Ph.D.  
**Ph.D. Research Topic:** Resilient and Adaptive Machine Learning based Systems  
**Affiliation:** IST and CMU  
**Supervisors:** Paolo Romano (IST), David Garlan (CMU)  
I believe the work I will develop during my Ph.D. has the potential to impact multiple sectors, ranging from autonomous vehicles and robots to fraud detection and medical diagnosis systems. I expect this to be a thrilling journey, and in particular one that allows me to substantially expand my knowledge in Software Engineering.
**Diogo Cardoso**  
Cohort: 2019/2020  
Ph.D. Program: ECE Ph.D.  
Ph.D. Research Topic: Improving the efficiency of distributed optimization algorithms  
Affiliation: IST and CMU  
Supervisors: João Xavier (IST), Yuejie Chi (CMU)

“...My research work focuses on developing distributed algorithms with faster convergence rates that require less communication between agents, alongside with the concern of determining and proving theoretically the conditions in which their convergence to the result of interest is certain. To be a part of the CMU Portugal program while working on this engineering topic represents an unparalleled opportunity for my research. On the one hand, I expect that the direct contact with leading experts and the newest developments in this area will impact greatly my work and the way I approach research. On the other hand, I expect that the conditions gathered by this program, such as the time divided between two top-tier institutions, will turn out to be very enriching for my personal and academic development."

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**Rudolph Sanatorromana**  
Cohort: 2019/2020  
Ph.D. Program: ECE Ph.D.  
Ph.D. Research Topic: Deep decarbonization of economic sectors  
Affiliation: IST and CMU  
Supervisors: Joana Mendonça (IST), Granger Morgan (CMU)

“...Regarding the following years I plan to develop simulations, data analyses, technology assessments, and policy recommendations to develop a low-carbon economy."

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**Neil Mehta**  
Cohort: 2019/2020  
Ph.D. Program: ECE Ph.D.  
Ph.D. Research Topic: Developing and applying machine learning techniques for non-invasive neuro-stimulation and neuro-sensing problems for applications in stroke rehabilitation, chronic pain management, and prosthetic control  
Affiliation: IST and CMU  
Supervisors: Patrícia Figueiredo (IST), Pulkit Grover (CMU)

“...Currently, I am heavily involved in two projects - one with a goal in focusing currents in the brain to recruit specific cortical cell types on a sub-micron resolution scale. The second is more broadly focused on developing high resolution invasive spinal cord stimulation techniques for fine motor control and potentially disruption of afferent pain-carrying fibers. In the coming years, I hope to gain an understanding of the different neural representations of data that exist and apply this knowledge towards developing more biologically plausible and useful deep learning models.”
Dual-Degree PhD Programs

**Students 2020/2021 cohorts**

**Manuel Carneiro**
Cohort: 2020/2021
Ph.D. Program: Electrical and Computer Engineering
Ph.D. Research Topic: Stretchable multi-electrode bioelectronics
Affiliation: FCT-UC
Supervisors: Carmel Majidi (CMU); Mahmoud Tavakoli (UC)

**Pedro Valdeira**
Cohort: 2020/2021
Ph.D. Program: Electrical and Computer Engineering
Ph.D. Research Topic: Distributed Learning
Affiliation: IST
Supervisors: Yuejie Chi (CMU); Claudia Soares (IST); João Xavier (IST)

**Nuno Sabino**
Cohort: 2020/2021
Ph.D. Program: Computer Science
Ph.D. Research Topic: Automatic Vulnerability Detection
Affiliation: IST
Supervisors: Limin Jia (CMU); Pedro Adão (IST); Rui Maranhão (IST/FEUP)

**Latifah Almaghrabi**
Cohort: 2020/2021
Ph.D. Program: Electrical and Computer Engineering
Ph.D. Research Topic: Study of adECM/GBM Scaffolds with Electrical Stimulation Functionality for Spinal Cord Injury Treatment
Affiliation: IST
Supervisors: Philip LeDuc (CMU); Paula Marques; Pedro Fonseca (Universidade Aveiro)
Dual-Degree PhD Programs

Students 2020/2021 cohorts

Afonso Tinoco  
Cohort: 2020/2021  
Ph.D. Program: Computer Science  
Ph.D. Research Topic: Security, Algorithms and Distributed Systems  
Affiliation: IST  
Supervisors: Rodrigo Rodrigues (IST)

Daniel Ramos  
Cohort: 2020/2021  
Ph.D. Program: Software Engineering  
Ph.D. Research Topic: Program Synthesis, Repair, and Applications  
Affiliation: CMU, IST  
Supervisors: Claire Le Goues (CMU), Ruben Martins (CMU); Vasco Manquinho (IST)

Patrick Fernandes  
Cohort: 2020/2021  
Ph.D. Program: LTI  
Ph.D. Research Topic: Latent Variable Models for Contextualized Translation  
Affiliation: IST  
Supervisors: Graham Neubig (CMU); André Martins (IST)

Afonso Amaral  
Cohort: 2020/2021  
Ph.D. Program: Engineering and Public Policy  
Ph.D. Research Topic: Technology and Innovation Policy  
Affiliation: IST  
Supervisors: Granger Morgan (CMU), Erica Fuchs (CMU); Joana Mendonça (IST)
Dual-Degree PhD Programs

Alumni By host CMU department and Portuguese university

- Electrical and Computer Engineering: 31
- Engineering and Public Policy: 25
- Social and Decision Sciences: 14
- Computer Science Department: 7
- Language Technologies Institute: 6
- Mathematical Sciences: 2
- Robotics Institute: 2
- Institute for Software Research: 1
- Public Policy and Management: 1

Host Portuguese university:
- 6: Faculdade de Ciências e Tecnologia Universidade do Porto (MAPI)
- 12: Faculdade de Engenharia Universidade do Porto
- 4: Universidade de Avelino
- 6: Faculdade de Ciências e Tecnologia Universidade de Coimbra
- 47: Instituto Superior Técnico da Universidade de Lisboa
- 8: Católica Lisbon School of Business & Economics
- 3: Faculdade de Ciências Universidade de Lisboa
- 3: Faculdade de Ciências e Tecnologia Universidade Nova de Lisboa
Dual-Degree PhD Programs

Alumni

Legend

Government
University
Industry
Non-Governmental

41
United States of America

3 (7%)

16 (38%)

22 (55%)

13
Rest of Europe

5 (38%)

7 (54%)

15
Portugal

6 (40%)

9 (60%)

7
Asia and Middle East

1 (14%)

1 (14%)

5 (72%)
**Zita Marinho**  
Research Scientist at DeepMind  
**PhD:** Computer Science/Robotics  
**Affiliation:** IST/CMU  
**Graduation year:** 2018  

My PhD experience was very enriching, I had the chance of meeting and collaborating with other students and great researchers at CMU. It was very motivating and inspiring to be a part of my research lab, and the campus provides a very intense and thriving student life.

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** João Semedo**  
Postdoctoral Research Associate at  
Professor Yu’s Lab (CMU)  
**PhD:** Electrical and Computer Engineering  
**Affiliation:** IST/CMU  
**Graduation year:** 2018  

My experience working at Professor Yu’s is being absolutely fantastic! He is really inspiring, both professionally and personally. The lab does leading work in systems neuroscience and is composed of very talented people, who are great to work with every day.

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** Rui Correia**  
Lead Machine Learning Engineer at DefinedCrowd  
**PhD:** Language Technologies  
**Affiliation:** IST/CMU  
**Graduation year:** 2018  

Above all, it’s a privilege to be part of the CMU Portugal Program. The experience of pursuing your PhD in two different institutions, surrounded by two very distinct social and cultural surroundings was incredible.
Publications authored or co-authored by CMU Portugal students, alumni, faculty and researchers per year and type of publication

**Total number of publications by type (%)**

- Journal Paper: 519 (32%)
- Conference: 1015 (64%)
- Books and book chapter: 60 (4%)

**Graph showing:***

- Yearly publications from 2007 to 2019.
- Distribution of publications by type each year.
Publications authored or co-authored by CMU Portugal Ph.D. students per year and type of publication.

CMU Portugal publications authored or co-authored by Ph.D. students by number of citations per year according to Google Scholar ©.
Visiting Faculty & Researchers

Portuguese Faculty at CMU University

**Objectives**
Immersion period of Portuguese faculty at Carnegie Mellon University to experience its culture and best practices in the field of research, education and innovation.

**Funding**
Number: 16 scholarships (€2 245,00/month)
Duration: up to 4 months

2019 call: 10 Faculty admitted
2020 call: 6 Faculty admitted (visits suspended due to COVID-19)

CMU Faculty at Portuguese Universities
A similar program is planned to be implemented for CMU Faculty members to be in residence at Portuguese Universities.
Visiting Faculty & Researchers

By host CMU department and Portuguese university

- 21 Electrical and Computer Engineering
- 14 Institute for Software Research
- 11 Computer Science
- 10 Human-Computer Interaction Institute
- 10 Engineering and Public Policy
- 3 Chemical Engineering
- 3 Robotics Institute
- 3 Tepper School of Business

- 2 Civil and Environmental Engineering
- 2 Machine Learning
- 1 Entertainment Technology Center
- 1 Chemistry
- 1 Psychology
- 1 Mechanical Engineering
- 1 Information Systems & Management
- 1 Software Engineering Institute

- 79 Visiting Faculty

Host Portuguese university

- 12 Instituto Politécnico de Castelo Branco
- 12 Instituto Politécnico de Coimbra
- 11 Instituto Politécnico do Porto
- 11 Instituto Universitário de Lisboa
- 8 Universidade Católica de Lisboa
- 8 Universidade da Beira Interior
- 8 Universidade de Trás-os-Montes
- 7 Universidade do Algarve
- 7 Universidade do Minho
- 5 Universidade do Porto
- 5 Universidade de Aveiro
- 3 Universidade de Coimbra
- 3 Universidade de Lisboa
- 3 Universidade Nova de Lisboa
- 10 Universidade da Madeira
Visiting Students

Open Call for Expressions of Interest

Objectives
Extend research opportunities to MSc and PhD students of Portuguese University to participate in research projects and be supervised by researchers at Carnegie Mellon University.
This program aims to encourage and prepare graduate students to pursue research careers within the scientific areas of the dual degree doctoral programs offered by CMU Portugal.

Funding
Number: 9 scholarships (€ 1362.37/month)
Duration: up to 6 months

Calls
2020 Call – 9 masters students admitted (visits suspended due to COVID-19)
Visiting Students
By host CMU department and Portuguese university

- Computer Science Department: 14 students
- Electrical and Computer Engineering: 12 students
- Robotics Institute: 4 students
- Language Technologies Institute: 3 students
- Engineering and Public Policy: 2 students
- Institute for Software Research: 2 students
- Mechanical Engineering: 2 students
- Computational Biology Department: 1 student

Host Portuguese university:
- Universidade do Porto: 15 students
- Universidade de Coimbra: 4 students
- Instituto Politécnico de Coimbra: 1 student
- Universidade de Lisboa: 17 students
- Universidade Nova de Lisboa: 2 students
- Universidade da Madeira: 1 student
Advanced Training Programs

To start next Spring 2021

Data Science & Machine Learning

User Experience Design

A Carnegie Mellon University (CMU) Partnership
The programs are designed together with CMU, and various modules will be co-lectured by a CMU faculty member.

Highly Customizable
Participants can enrol independently in each module*, choose a specific track of modules*, or enrol at all of them for the full advanced training program experience.

Providing tools to tackle the company daily challenges
Comprehensive and hands on approach through cutting-edge methods and tools across all modules and tailored to the student's professional background.

CMU Portugal - Exploring new research frontiers in ICT towards a global innovation ecosystem
Affiliated Doctoral Programs – 2021/2022
Call to open January - March 2020

Objectives
Degree awarded by a Portuguese University
Non-CMU degree student status at CMU

Selection
Students pre-selected by a Portuguese Committee
Approved by CMU
Period at CMU: 3 – 12 months

Requirements
Registered at Portuguese University
Native speaker of English/ TOEFL IELTS
Good academic standing
Partnership with companies/ CMU industrial affiliates/
Promoters of Large Scale Projects
Co-supervisor at CMU

Funding:
12 Scholarships (Bolsa Mista)
74 Research Projects funded (2006-2020)

1st Phase (2006 – 2012)
- 2008 Call for Projects
  - 10 Projects approved
  - Concluded in 2012-2013
- 2009 Call for Projects
  - 15 Projects approved
  - Concluded in 2013-2014
- 2009 Joint Call for Projects with UT Austin
  - 3 Projects approved
  - Partnership with UT Austin Portugal in Applied Math
  - Concluded in 2012-2013
- 2013 Early Bird Projects
  - 10 projects approved
  - Jumpstart exploratory research
  - 1 year
  - Concluded in 2015

2nd Phase (2013 – 2017)
- 2013 and 2014 Entrepreneurial Research Initiatives (ERIs)
  - 12 projects approved
  - Integrated activities in R&I and advanced education, with industry collaboration
  - 4 years
  - 7 Concluded in 2018-19
  - 3 still Ongoing
- 2017 Call for Exploratory Research Projects
  - 8 projects approved
  - Identify emerging key strategic areas for 3rd phase
  - 1 year
  - Concluded in 2018-19

3rd Phase (2018 – 2020)
- 2019 Call for Large-Scale Collaborative Research Projects
  - 12 projects approved
  - Projects in co-promotion projects led by national companies
  - 3 years
  - 24M € (Public and private PT and CMU Budget)
- 2019 Call for Exploratory Research Projects
  - 7 projects approved
  - Jumpstart new high-impact initiatives on exploratory research
  - 1 year
  - 820K € (PT and CMU Budget)
- 2021 Call for Exploratory Research Projects*
  - Up to 8 projects
  - Jumpstart new high-impact initiatives on exploratory research
  - 1 year
  - 800K € (PT and CMU Budget)
  *OPENING soon
Entrepreneurial Research Initiatives

- 12 ERIs
- Public Investment: 81%
  - 13.4 M€
- Private Investment: 19%
- 26 Portuguese Institutions
- 46 Companies
- 11 CMU Departments
## Researchers funded by the Project

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
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<tbody>
<tr>
<td>Post Docs</td>
<td>25</td>
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<tr>
<td>Ph.D. (total)</td>
<td>45</td>
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<tr>
<td>MSc</td>
<td>73</td>
</tr>
<tr>
<td>Dual Ph.D. degrees</td>
<td>17</td>
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<tr>
<td>Other researchers</td>
<td>44</td>
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Overall, 310 researchers participated in the ERIs and 204 researchers were funded directly by the project.

## Publications

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<tr>
<th>Type</th>
<th>Number</th>
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<tbody>
<tr>
<td>Prototypes</td>
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<tr>
<td>Patents</td>
<td>10</td>
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<tr>
<td>Ph.D. Thesis</td>
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<td>Peer review conference papers</td>
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<td>Peer review papers</td>
<td>141</td>
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<tr>
<td>Master Thesis</td>
<td>159</td>
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Numbers from June 2020
Large-Scale Collaborative Research Projects

CMU Portugal - Exploring new research frontiers in ICT towards a global innovation ecosystem

12 LSCR

AIDA  BEE2 Waste Crypto  Building Hope*  Camelot
Floyd*  Golem  iFetch  Intelligent Care
MAIA  Safe Forest  TAMI  WoW

*Starting in 2021

CMU Portugal (starting in 2021)

Private Investment

25 M€

26%
18%
FCT
15%

PT2020
41%
2019 Calls
Large-scale collaborative research projects

Objectives
• Alignment with the national and regional strategies
• Foster industry-science relationships
• Strengthen competitiveness and international integration

Total Funding:
5 M€ (PT) + 3M€ (CMU)
• 3–4 projects
• Maximum duration of up to 36 months

Research Topics
Information and Communication Technologies
• Data science and Engineering
• Artificial Intelligence and Machine Learning
• Autonomy and Mobility
• Design in a variety of societal settings and applications

Collaborative consortia
• Leadership by Portuguese company
• At least two R&D centers in Portugal
• At least one CMU research team

Submissions
• 17 projects submitted
• 17 Portuguese institutions
• 9 CMU departments

By the end of the Call, 12 projects were selected for a total investment of 24M
Large-scale Collaborative Research Projects

**12 Industry Promoters**
- ALTRANPORTUGAL, S.A.
- FUTURE COMPTA - EMERGING BUSINESS, S.A.
- DST SOLAR, S.A.
- FARFETCH PORTUGAL - UNIPESSOAL LDA*
- FEEDZAI - CONSULTADORIA E INOVAÇÃO TECNOLÓGICA, S.A.**
- FIRST SOLUTIONS - SISTEMAS DE INFORMAÇÃO S.A.
- GLINTT - HEALTHCARE SOLUTIONS, S.A.
- GLSMED LEARNING HEALTH, S.A.
- INGENIARIUS, LDA
- OUTSYSTEMS - SOFTWARE EM REDE S.A.*
- UNBABEL, LDA**
- MOBILEUM

**7 Industry Co-Promoters**
- 3 DRIVERS - ENGENHARIA, INOVAÇÃO E AMBIENTE, LDA
- ALTICE LABS, S.A.
- HOSPITAL DA LUZ S.A.
- INNOVATION POINT - INVESTIGAÇÃO E DESENVOLVIMENTO S.A.
- PRIBERAM INFORMÁTICA, S.A.*
- SILVAPOR, AMBIENTE & INOVAÇÃO LDA
- WATT-IS, S.A.

*CMU Portugal Industrial affiliates
**CMUPortugal Startups & Industrial affiliates
Large-scale Collaborative Research Projects

8 CMU Departments

- Civil and Environmental Engineering,
- Computer Science, Engineering Research Accelerator,
- Heinz College of Information Systems and Public Policy,
- Institute for Software Research, Language Technologies
- Institute, Mechanical Engineering, Robotics Institute

20 Academic Co-Promoters

PORTO:
- Administração Regional De Saúde Do Norte, I.P.
- FRAUNHOFER PORTUGAL
- INESC TEC
- ISEP
- IT Porto

COIMBRA:
- Associação para o Desenvolvimento da Aerodinâmica Industrial
- Centro Hospitalar e Universitário de Coimbra
- CISUC
- FCTUC
- ISR Coimbra

LISBOA:
- FCUL
- FCT NOVA
- INESC ID
- IN+, Centre for Innovation, Tech. and Policy Research, IST
- ISR Lisboa
- IT – Instituto de Telecomunicações
- IST
- LASIGE
- NOVA Cidade – Urban Analytics Lab
- NOVA IMS
Large-scale Collaborative Research Projects

In The Media

Carnegie Mellon Portugal atribui 2,7 milhões a consórcio de Gestão de Resíduos

OutSystems Launches Research Projects with Carnegie Mellon and Several Universities Aimed at Revolutionizing App Development

Farfetch partners with Portuguese universities to develop ultimate chatbot

Farfetch cria "chatbot" de 2,3 milhões de euros em parceria com universidades

O Programa Carnegie Mellon Portugal vai apoiar dez projetos que abrangem as áreas das ciências e engenharia de dados, inteligência artificial, design e engenharia aplicada a problemas sociais.
Exploratory Research Projects

- **Exploratory Research Projects 2017**
  8 Projects funded
  1.4 M €

- **Exploratory Research Projects 2019**
  7 Projects funded
  814k€

- **Exploratory Research Projects 2021**
  Up to 8 Projects funded
  400K in Portugal + Matching funds at CMU
Call 2017
Exploratory Research Projects (ERPs)

- Publications
  - 5 Prototypes
  - 43 Peer-review conference papers
- Researchers funded by the Project
  - 2 Post Docs
  - 13 MSc
  - 16 Peer-review papers
  - 11 Master Thesis
- 6 Other researchers

8 CMU Departments & 16 Portuguese Institutions

- UTAD
- APD
- FOUP
- FEUP
- INESC TEC
- IT-Aveiro
- UCoimbra
- IFPortalegre
- MITI

15 Participants

- Computer Science Department
- Engineering and Public Policy
- Electrical and Computer Engineering
- SEEES
Call 2019
Exploratory Research Projects (ERPs)

Objectives
• Bootstrap high-impact potential research activities
• High-risk/high-reward
• Significant future expansion

Total Funding:
400 K€ for Portuguese teams
+ matching funds for CMU Team
• Up to 8 projects
• Up to 12 months

Collaborative consortia
• At least one R&D centre in Portugal
• At least one CMU research team
• Industry partners is not mandatory but it is beneficial

Research Topics
• ICT with a focus on the opportunities provided by the data economy as a driver of growth and change.

Submissions
• 38 projects submitted
• 17 Portuguese institutions
• 9 CMU departments

By the end of the Call, 7 projects were selected for a total investment of 814K
Exploratory Research Projects (ERPs)

CMU Portugal ERPs 2019

- Automatic generation of humor for social robots*
- CRUAV: Cooperative Trajectory Planning for Real-Time Surveillance in UAV-assisted Intelligent Transportation Systems*
- Intelligent Beamforming Metasurfaces for Future Telecommunications
- PassCert: Exploring the Impact of Formal Verification on the Adoption of Password Security Software*
- Privacy in speaker diarization: Detecting "who spoke when" privately*
- SecurityAware: Fine-grained approach to detect and patch vulnerabilities
- Synthesizing Network Accelerators using Programmable Switching Equipment

*Starting in 2021
Exploratory Research Projects (ERPs)

In the Media

Cinco projetos “made in” Técnico selecionados pelo programa Carnegie Mellon Portugal

Dos sete projetos selecionados e que serão apoiados nacionalmente com 435 mil Euros pela Fundação para a Ciência e a Tecnologia (FCT), cinco são liderados por investigadores do INESC-ID.

CMU Portugal já selecionou os sete projetos nacionais de investigação que vão receber financiamento da FCT

De um total de 38 candidaturas foram escolhidas sete propostas que vão receber um financiamento de 435 mil euros pela FCT. Os projetos vão permitir explorar temáticas como a robótica, a inteligência artificial, os sistemas de transporte inteligentes ou o processamento de linguagem.
Call 2021
Exploratory Research Projects (ERPs)

Objectives
• Bootstrap high-impact potential research activities
• High-risk/high-reward
• Significant future expansion

Total Funding:
400 K€ for Portuguese teams
+ matching funds for CMU Team
• Up to 8 projects
• Up to 12 months

Collaborative consortia
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Research Topics
• ICT with a focus on the opportunities provided by the data economy as a driver of growth and change.

Call
• Opening soon - 1st trimester 2021
Research Projects 2019-2022

2019
- Call for ERPs
- Call for LSCRPs
- Announcement of results for LSCRPs

2020
- Kick off of 10 LSCRPs and 3 ERPs
- Announcement of results for ERPs

2021
- Kick off of 4 ERPs
- Call for ERPs 2021
- Announcement of results for +2 LSCRPs
- Final Project Review ERIs
- First Project Review LSCRPs
Innovation and Entrepreneurship
The CMU Portugal Program has been working to establish a very close relationship with the Portuguese industry, namely through the companies that are part of its Industrial Affiliates Program.

Since the beginning of the Program’s 3rd Phase in 2018, 15 CMU Portugal Industrial Affiliates have committed to actively contribute to the advanced education and research programs of the partnership and also to increase their competitiveness by investing in R&D, in advanced training of human resources, and in building a highly-skilled workforce dedicated to innovation activities.
**Innovation and Entrepreneurship**

**CMU Portugal Startups**

CMU Portugal has also been building a strong innovation ecosystem through a close link with academic institutions, Portuguese industry, and Carnegie Mellon University. **Over 130 companies** have been actively engaged with the initiatives of the Program and have fostered the creation of **12 knowledge-based startups**.

- 150+ Industry Partners
- 12 Startups created by students, alumni, postdocs, and/or faculty members
- Over 200M € of international investment secured by startups
- 1000+ skilled jobs created by startups
Innovation and Entrepreneurship
CMU Portugal startups companies are already references in their sectors

**Feedzai** company focused on fraud prevention in electronic payments, was listed for the second consecutive year on the Tech Tour list, which highlights the 50 companies with the highest growth potential in Europe. The startup has raised since 2011 more than $82M.

**Veniam** connects vehicles to each other and to the internet using vehicular mesh networking technologies. Veniam has raised more than $30M in venture capital is backed by top VCs as well as Verizon, Cisco, Liberty Global, Yamaha Motors and Orange and already operates mesh networks of connected vehicles in New York, Singapore and Porto.

**Mambu** is a startup company established by 3 alumni of the CMU Portugal Master in HCI, Sofia Nunes, Eugene Danilakis and Frederick Pflister. The company now based in Germany is the 1st Unicorn company founded under the scope of the Program. Mambu is the market-leading SaaS banking platform and the round of investment in early 2021 raised the company’s valuation to over €1.7 billion.

**Unbabel** is a Portuguese Translation company that combines neural Machine Translation with professional human editing to deliver high quality translation at massive scale, raised a total funding of more than $31.2M and will soon open a new office in Pittsburgh dedicated to AI, adding to the two others in New York and San Francisco.
Innovation and Entrepreneurship
Industry Involvement in Projects

The CMU Portugal Program has built through its projects, strong collaborations between Academia in Portugal and at Carnegie Mellon, and also with industry partners.

- The 12 **Entrepreneurial Research Initiatives (ERIs)** were developed in partnership with 46 companies from different sectors of activity, with an industry involvement translating to a **2.6M€ financial commitment by private companies**.

- The **Large-Scale Collaborative Research Projects recently launched**, have created a new strategy for Industry engagement with companies leading the Projects as promoters as well as investors, with nearly **4.2 M€ of private funding**.

The **12 selected projects** will be led by top national ICT companies, including the CMU Portugal Program startup Feedzai and Unbabel, which are now reinvesting in R&D, Altran, Compta, DST SOLAR, Farfetch, First Solutions, Glintt, GLSMED Learning Health, Ingeniarius, Mobileum, and Outsystems.
Communication & Events
Outreach, Events & Media Activities

Within the scope of **Communications activities**, the CMU Portugal Coordination Office oversees a very wide spectrum of actions as listed below:

I. Internal Communication Activities
II. Media Related Activities
III. CMU Portugal events (promoter and supporter)
IV. Outreach & Networking activities

The **key communication objectives** for the CMU Portugal Program in 2018-20 included:

➢ Enhancing the Program’s visibility, particularly in online platforms;
➢ Positioning and strengthening the Program’s new initiatives and activities.
➢ Promoting the key stakeholders and representatives of the Program;
➢ Building a strong communication network with all our stakeholders to share initiatives and increase our outreach.
Outreach, Events & Media Activities

New Image & New Website

Main Logos

Initiatives Logos

Areas Icons
Outreach, Events & Media Activities

New Image & New Website

Branding Materials
Outreach, Events & Media Activities

New Image & New Website

New CMU Portugal Institutional video
Outreach, Events & Media Activities

Online Presence

**Website:** with regular updates of new CMU Portugal content.

**Direct-targeted mailing campaigns:** E-mail messages for specific audiences used for announcements, invitations to events, recruitment for graduate programs, and other relevant topics.

**Newsletter:** bi-monthly online newsletter named “News from the Fence” to promote all our initiatives, including news, events and CMU Portugal papers, distributed through electronic mail, shared on our social media networks and available on our website.

**Social Media platforms:** daily updates and shares in our web platforms, namely Facebook, Twitter, Instagram, LinkedIn and YouTube.
Outreach, Events & Media Activities
Online Presence in Numbers

**Website** (since launch in Nov. 2018)

- 90 CMU Portugal News articles
- 40 Events Shared
- 11 Newsletters
- +90 CMU Portugal Papers shared

**Social Media** (2018 - 2020)

**Facebook**
- 788 Nº of followers
- 699 Published posts
- +152 Global Reach

**Twitter**
- 1548 Nº of followers
- 1402 Tweets
- 9606 Profile Visits
- 449 Mentions 2019/20

**Linkedin**
- 654 Nº of followers
- 254 Published posts
- 1488 Clicks
- 645 Likes

**Instagram**
- 244 Nº of followers
- 74 Published posts
- 281 Likes
Outreach, Events & Media Activities

Media Related Activities

A **broad range of communication activities** addressed to the Media were set up during this period, aligned with the strategic objective of communicating and promoting the CMU research portfolio and Education achievements, namely:

- **14 Press releases**
- **+15 pieces from One-to-one negotiations with the media:** to promote interviews, opinion articles and other media news.

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**Summary of CMU Portugal presence in the media (2018/2019)**

CMU Portugal articles in the media

- **280 Articles Published in the Media**
  - **244 Online Articles**
  - **13 Printed Articles**
  - **1 Video Coverage by Reuters**
  - **1 Piece in TV**
  - **1 Piece in Radio**
Outreach, Events & Media Activities
CMU Portugal Events

- **July 2018**
  - Participation at Encontro Ciência 2018

- **October 2019**
  - Networking event at CMU for CMU Portugal affiliates

- **December 2018**
  - Participation at “INCoDe 2030: 2nd Conference of the National Forum for Digital Competences”

- **December 2019**
  - CMU Portugal Distinguished lecture “Beyond User Centered Design” with Jodi Forlizzi and Yvonne Rogers
  - CMU Portugal Seminar “Why are we still talking about Gender Balance in STEM?” and Distinguished Lecture “Towards a Conscious AI” with Lenore and Manuel Blum

- **July 2019**
  - Nuno Nunes presents CMU Portugal Calls and activities at CMU

- **March to May 2019**
  - Photo Exhibition of the CMU Portugal Project SCREEN DR at FCT

CMU Portugal - Exploring new research frontiers in ICT towards a global innovation ecosystem
Outreach, Events & Media Activities

CMU Portugal Events

- **February 2019**: Minister of Science, Technology and Higher Education and President of FCT visits CMU with a delegation of 12 Portuguese Researchers
- **March 2019**: CMU Portugal Project Review Meeting
- **December 2019**: CMU Portugal Scientific directors promote CMU Portugal activities at CMU
- **October 2019**: CMU Portugal Board Meeting
Outreach, Events & Media Activities

CMU Portugal Events

**February 2020**
- FLAD Sessions in Porto and Minho, to promote training initiatives in the USA.

**March 2020**
- Announcement of the Visiting Students Program results

**June 2020**
- Annual Board of Directors (BoD) Meeting.

**November 2020**
- Encontro Ciência 2020: Session “CMU Portugal – defining new frontiers in Technology within the health sector”
- Career development Session with company Chaperone, for CMU Portugal Dual Degree students.
- Online Info Session "How to apply for a CMU Portugal Dual-Degree Ph.D. Scholarship" (+200 attendees.)
- Webinar at "IST Job Shop" to promote the Program's Education activities.
- CMU Portugal 2020 Orientation Day

**October 2020**
- CMU Portugal 2020 Orientation Day
CMU Portugal

Activities planned for 2021
CMU Portugal 2021
Timeline

January
- “Conversational Speech” online Session – kick off for CMU Portugal Advanced Training Programs + 170 registrations
- Call Open for CMU Portugal Affiliated Ph.D. Scholarships

February
- Career Development session (online): “How to prepare an effective talk”, with the CMU Student Academic Success Center

March
- Call Open for CMU Portugal Exploratory Projects

April
- Launch of the CMU Portugal Advanced Training Programs

May
- Call open for CMU Portugal Visiting Students and Visiting Faculty & Researchers Programs - pending on CMU restraints for the 2nd semester

June
- Call Open for CMU Portugal Dual Degree Ph.D. Scholarships

July
- CMU Portugal Conference - format (online, onsite or mixed) pending on the health and safety constraints at the time.
- Meeting of CMU Portugal Board of Directors (online, onsite or mixed)
- Launch of the CMU Portugal video for the 12 LSCRPs

October
- ERIs Final Project review & LSCRPs mid-term Project reviews (online, onsite or mixed)