MASTEAM

MASTER IN APPLIED TELECOMMUNICATIONS AND ENGINEERING MANAGEMENT

MAY 29, 2020
UPC – Rankings as of Feb 2018

**Academic Ranking of World Universities (ARWU) - Shangai**
- In the 234-267 rank in Europe and the 17-22 rank in Spain

**Times Higher Education (THE) WUR**
- In the 200-251 rank in Europe and the 6-7 rank in Spain

**QS World University Rankings**
- 120th in Europe and 6th in Spain

**Academic Ranking of World Universities (ARWU) - Shangai**
- Engineering, Technology and Computer Science (2016)
  - In the 76-100 rank globally and the 2nd rank in Spain

**QS World University Rankings by Subject**
- Engineering and Technology
  - 24th in Europe and 2nd in Spain

**Times Higher Education (THE) by Subject**
- Computer Science
  - In the 40-53 rank in Europe and 1st in Spain

https://www.upc.edu/rankings/en
UPC – Rankings as of Feb 2018

Times Higher Education (THE) Young University Rankings
In the 60-86 rank in Europe and the 5-7 rank in Spain

Shanghai Ranking’s Global Ranking of Academic Subjects
Instruments Science & Technology
8th globally and 1st in Spain

QS World University Rankings – Top 50 under 50
8th in Europe and 3rd in Spain

QS World University Rankings by Subject
Architecture and the Built Environment
9th in Europe and 1st in Spain

National Taiwan University Ranking by Subject
Telecommunications, Electrical and Electronic Engineering
47th globally and 1st in Spain

QS World University Rankings by Subject
Civil and Structural Engineering
8th in Europe and 1st in Spain
UPC Facts & figures

- 1st Spanish university in funding of EU Horizon 2020 research projects, and among the firsts across Europe

5G Barcelona

- Local and EU H2020 research project – MASTEAM groups involved
- i2Cat, UPC, CTTC, Atos, Telefonica, MWCapital, local & regional government, among other partners
- Presence of local partners in 22 out of 37 5G H2020 EU projects
5G Barcelona field trial
YOUR CAMPUS

CAMPUS DEL BAIX LLOBREGAT (CBL)
PARC MEDITERRANI DE LA TECNOLOGIA (PMT)
A Campus (CBL) embedded in a Technological Park (PMT)
The PMT

What is the PMT?

- The PMT is a nerve centre for research and innovation that aims to foster relations between:
  - University engineering schools (CBL - Campus del Baix Llobregat of the UPC, and UOC – Open University)
  - Public research centres
  - Private companies involved in technological innovation
  - Technology-based spin-off companies

Topic Areas

- Information and Communication Technologies
- Aeronautics and Space Engineering
- Biological Engineering
- Agri-Food Engineering and Biotechnology
- Photonic Technologies
- Geo-Information and Remote Sensing
- Environmental Technologies
- Numerical Methods in Engineering

Website: http://www.pmt.es/front-page/not_available_lang?set_language=en&cl=en
Video: https://www.youtube.com/watch?v=tXwZwET0tlo
European Space Agency - Business Incubator (BIC)
Institute of Photonic Sciences
MASTEAM
MASTER IN APPLIED TELECOMMUNICATIONS AND ENGINEERING MANAGEMENT
MASTEAM

- Master in Telecommunications Engineering, with emphasis in:
  - Internet of Things
  - Smart Cities
  - Mobility – 5G
  - Management

Areas: sensors, embedded systems, radiocommunications, optical communications, signal processing, IP protocols and services, network security, programming, data analytics and big data, project management, business plans

- Official program, accredited by Ministerio & Generalitat
  - Access to PhD program
  - Grants
MASTEAM

- "Mejores 5 másteres de Ingeniería en España 2016"
  [http://www.elmundo.es/mejores-masters/ingenieria.html]

**Applied Telecommunications and Engineering Management**

Destaca por sus contenidos actualizados y punteros, la activa metodología de aprendizaje, la internacionalización y la adaptación a las necesidades de la industria.

*Universidad Politécnica de Cataluña*

*Sede*: Barcelona

*Teléfono*: 934 137 056


*Nº de plazas*: 30

*Duración*: 60 ECTS

*Precio*: 3.266 Euros
MASTEAM

- “Master of Excellence” grants by FCLP
  - Best candidate receives 5000 euros grant

http://www.fundaciocatalunya-lapedrera.com/es/content/becas-m%C3%A1sters-de-excelencia
Two EETAC master students have received an Excellence Grant from Fundació Catalunya-La Pedrera

Albert Toro (MASTEAM) and Marta Granados (MAST) have been awarded by the Fundació Catalunya-La Pedrera in the eighth edition of the Scholarship Program for Masters of Excellence.

On October 17th, The Fundació Catalunya-La Pedrera celebrated the ceremony of the Excellence Grants program, in which Albert Toro (MASTEAM) and Marta Granados (MAST) received their grants in the eighth edition of the Scholarship Program for Masters of Excellence.

This initiative aims to recognize talent, promote excellence and impulse postgraduate quality. In this edition of the program have been awarded 52 scholarships in 51 programs among all the masters taught in Catalonia.

The awarded masters must fulfill several conditions, such as being taught by recognized professors with a research career, and being consolidated programs with a trajectory of excellence.
Faculty & Research

- World-class research in the areas of the master

Internet Engineering Task Force (IETF)
Request for Comments: 8724
Category: Standards Track
ISSN: 2070-1721

A. Minaburo
Acklio
L. Toutain
IMT Atlantique
C. Gomez
Universitat Politècnica de Catalunya
D. Barthel
Orange Labs
JC. Zuniga
SIGFOX
April 2020

**SCHC: Generic Framework for Static Context Header Compression and Fragmentation**

**Abstract**

This document defines the Static Context Header Compression and fragmentation (SCHC) framework, which provides both a header compression mechanism and an optional fragmentation mechanism. SCHC has been designed with Low-Power Wide Area Networks (LPWANs) in mind.
Faculty & Research

- World-class research in the areas of the master

Carles Gomez

Roles

<table>
<thead>
<tr>
<th>Role</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chair of IPv6 over Networks of Resource-constrained Nodes (6lo)</td>
<td><a href="mailto:carlesgo@entel.upc.edu">carlesgo@entel.upc.edu</a></td>
</tr>
<tr>
<td>Reviewer in Internet of Things Directorate (iotdir)</td>
<td><a href="mailto:carlesgo@entel.upc.edu">carlesgo@entel.upc.edu</a></td>
</tr>
</tbody>
</table>

RFCs

<table>
<thead>
<tr>
<th>RFC</th>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>rfc6606</td>
<td>May 2012</td>
<td>Problem Statement and Requirements for IPv6 over Low-Power Wireless Personal Area Network (6LoWPAN) Routing</td>
</tr>
<tr>
<td>rfc7668</td>
<td>Oct 2015</td>
<td>IPv6 over BLUETOOTH(R) Low Energy</td>
</tr>
<tr>
<td>rfc8352</td>
<td>Apr 2018</td>
<td>Energy-Efficient Features of Internet of Things Protocols</td>
</tr>
</tbody>
</table>

Active Drafts

- draft-bormann-lwig-7228bis
- draft-gomez-frag-lpwan-considerations
- draft-ietf-lpwan-ipv6-static-context-hc
- draft-ietf-6lo-blemesh
- draft-gomez-lpwan-rto-considerations
- draft-gomez-tcpm-ack-pull
- draft-ietf-lwig-tcp-constrained-node-networks
- draft-ietf-lpwan-schc-over-sgfox
- draft-zuniga-lpwan-schc-over-sgfox
The IEEE Communications Society Charles Kao Award for Best Optical Communications & Networking Paper

Prize
Plaque and honorarium of US$500 per author (up to a maximum total of US$2,000). If there are more than four authors, the maximum of US$2,000 would be split between each author.

Description
Award to recognize the best paper published in the IEEE/OSA Journal of Optical Communications and Networking.

2019 Award Recipients
Jordi Perelló, Joan M. Gené, Albert Pagès, Jose A. Lazaro, Salvatore Spadaro
Faculty & Research

● World-class research in the areas of the master

UPC patents system for cardiovascular pre-diagnosis—in under a minute—based on contact with user’s hands or feet

The Universitat Politècnica de Catalunya (UPC) has patented an affordable, easy-to-use electrocardiograph that can provide a cardiovascular pre-diagnosis in less than a minute. It is the first system to measure both the electrical activity of the heart (electrocardiogram) and its mechanical activity (arterial pulse wave) based on data collected via two metal sensors in contact with the user’s hands or feet. The prototype has already been granted patents in Spain, the United States and China, and applications have also been filed in Europe, Japan, Korea and India. The system will be presented next week at the Mobile World Congress, along with other projects that reflect the University’s technological capabilities.

27/02/2017

Cardiovascular diseases caused three out of every ten deaths in 2012. According to the World Health Organization, that translates into a total of 17.5 million deaths. Many of these tragic outcomes could be prevented through early diagnosis, but the equipment used for cardiovascular diagnosis is usually complex to use and unaffordable for most people.

Now, researchers with the UPC’s Instrumentation, Sensors and Interfaces (ISI) Group, led by Ramon Pallàs, have patented an electrocardiograph that provides a cardiovascular pre-diagnosis in less than 60 seconds. The results are more accurate than those offered by existing devices and can be communicated to medical professionals from any place where there is mobile phone coverage.
Faculty & Research

UPC contact

The University of
Barcelona
delivers.

The health
sensors
in the
next week.

Cardio
information,
into a
unit, used for

Now, in
electrodes
those

Radiograph that can
electrical activity of

27/02/2017

the equipment

have patented an

more accurate than

there is mobile phone

was invented.

was established.
The UPC participates in a European trial of a treatment to reduce mortality of cardiogenic shock

The EURO SHOCK trial includes the main cardiovascular hospitals in nine European countries. The UPC is participating in the project with CardioSense, a device that provides an early cardiovascular diagnosis in less than 60 seconds. Over 400 patients will participate in the trial, which will begin on 1 February and continue for 34 months.

Jan 16, 2019

Cardiogenic shock is a very complex clinical condition that entails a reduction of blood flow in the most important organs of the human body due to a massive myocardial infarction. More than 50,000 patients are diagnosed this condition in Europe every year, and women and elderly patients have the worst prognosis. The last major breakthrough in this field was around 20 years ago, when it was shown that the prognosis could be improved by urgent reopening of the occluded coronary artery that causes the myocardial infarction and leads to the cardiogenic shock. However, despite several recent attempts to improve the survival of patients with this condition, no significant improvement in mortality has yet been achieved. Most patients with cardiogenic shock end up with multiple organ dysfunction syndrome, which has a mortality rate of around 50% during the first 30 days after its appearance.

The EURO SHOCK project is funded by the European Union's Horizon 2020. Research and Innovation programme is the first large-scale clinical trial to investigate the early application of extracorporeal membrane oxygenation (ECMO) to reduce mortality associated with cardiogenic shock. ECMO is a type of mechanical circulatory support with which deoxygenated blood is extracted from the patient's veins, enriched with oxygen and administered directly to the arterial system, thus preserving the body's critical organs during the most serious stage of the disease. In the European trial scheduled to begin on 1 February, patients will receive an immediate revascularisation to open the occluded artery (a stent angioplasty). If they give their informed consent, they will be randomised to receive either a standard treatment or the same treatment with the application of ECMO in the first few hours after the diagnosis of cardiogenic shock.

A team of researchers from the Universitat Politècnica de Catalunya - BarcelonaTech (UPC) and the August Pi i Sunyer Biomedical Research Institute (IDIBAPS) - Hospital Clinic de Barcelona (IDIBAPS) are participating in the project with CardioSense, a cardiovascular monitor that provides an early diagnosis with more accurate results than the current ones in less than 60 seconds. The results can be transmitted from anywhere with cell phone coverage. This "heart watchman" patented by the UPC detects both the electrocardiogram (the conventional signal of the heart's electrical activity) and the arterial pulse wave velocity (related to blood pressure and arterial elasticity) through sensors touched by the patient's hands or feet. The sensors can be placed on cell phone cases, tablets, watch straps, scales, steering wheels, handlebars or any other object that can be touched with both the user's hands or feet at once. This system, developed by researchers of the UPC's Instrumentation, Sensors and Interfaces Group (ISI) led by
The UPC, a major player in the development of Industry 4.0

Of students now attending primary school, 63% will end up working in a job that does not yet exist. This disturbing fact is closely related to what is known as the fourth industrial revolution, Industry 4.0, which is transforming industry through a combination of production methods and advanced information technologies to make manufacturing adaptive and flexible. The main challenge is to make all the information available in real time by integrating the entities that make up the value chain.

Jan 09, 2019

Industry 4.0, recognised as an emerging sector in Catalonia and elsewhere, will interconnect people, machines and systems in a different way. Governments of countries and regions are striving to consolidate this transformation by promoting skills-building, training and new professional profiles in order to minimise the social disruption that it may cause.

The Universitat Politècnica de Catalunya (UPC) is one of the main agents for the development of Industry 4.0 in Catalonia, and a large part of its academic activity is directly or partially linked to valorising and capitalising on existing knowledge and accelerating knowledge creation. In fact, the UPC is already working to identify the lines of research and knowledge transfer and course offerings that will provide knowledge and talent for the technological bases of Industry 4.0.

In total, one hundred of the UPC’s research groups are related to the principles of Industry 4.0, and around fifty of them are participating directly in relevant projects. Also, about 40 of the UPC’s master’s degrees cover all the technologies involved in this field. In this scenario, "the UPC must be a scientific and technological hub of this new paradigm of industrial production in the digital age", explains Professor Luis Romeral, co-director of the Motion Control and Industrial Applications Research Centre (MCIA), which specialises in predictive maintenance for the industrial sector, technology based on the industrial internet of things, and big data analytics. The MCIA aims to predict failures and defects in the operation of industrial machinery, avoid emergency stoppages and dead times, and gain efficiency and productivity.
### Alumni

- **LinkedIn:** 170+ contacts
Alumni

- LinkedIn: 170+ contacts
Structure

● **60 ECTS**
  ■ 1 year at full-time, or 1.5, 2 or more at part-time
  ■ 1 ECTS = 9h of classroom activities + 16 h of autonomous activities

● **Mandatory** contents: 15 ECTS

● **Optional** contents: 33 ECTS
  ■ Total optional offer: 45 ECTS

● **Master Thesis**: 12 ECTS
  ■ Performed during 2\textsuperscript{nd} semester (full-time) or later
Scope and Objectives – 5G

5G Scenario as foreseen by ITU
Scope and Objectives – Internet of Things

Optical networks, IP protocols, SDN

IoT gateway

Radiocomms, protocols, SDR

Sensors

Electronics, low-power

Data centers, networks, protocols, SDN, NFV, Big Data

Business models, service management
Structure of the program

First semester (7 weeks A1 courses + 7 weeks A2 courses)

A1
- OPTIM (3 ECTS)
- NETENG (3 ECTS)
- SENSORS (3 ECTS)
- WICOM (3 ECTS)
- ENTREP (3 ECTS)

A2
- OPTICAL (3 ECTS)
- IMAGE (3 ECTS)
- BODYSENS (3 ECTS)
- ARASM (3 ECTS)
- CREA (3 ECTS)
- BUSINESS (3 ECTS)

Second semester (7 weeks B1 courses + 7 weeks B2 courses)

B1
- BIGDATA (6 ECTS)
- IOT-IP (3 ECTS)
- 5GNET (3 ECTS)
- 5GPLAN (3 ECTS)
- LOWPOW (3 ECTS)
- MASTER THESIS (12 ECTS)

B2
- SERVICE (3 ECTS)
- SDR (3 ECTS)
- NETAUTH (3 ECTS)

Mandatory courses (15 ECTS)  Elective courses (33 ECTS out of a total offer of 45 ECTS)
Mobility, Double Degree, Internships

- **Master Thesis** in more than 30 institutions in Europe, China, Mexico…

- **Double Degree** agreements
  - 1 year MASTEAM + 1 year abroad = 2 master degrees
    - University of L’Aquila (Italy)
    - Cranfield University (UK) – 8 different masters (automotive, aeronautical communications, etc)
    - Currently finishing agreements with KTH (Stockholm - SWE), IST (Lisbon - PT), Karlstad (SWE)…

- **Internships**
  - Up to 600h, paid
Internships / Cooperation with companies

- Master Theses, Internships
- Currently we have more demand from companies than available students!
- MASTTEAM talks and presentations
  - Cellnex: SIGFOX technology, business models
  - Ficosa/Idneo: Connected car, Project management
  - Ajuntament Barcelona: Smart City network, Security
  - Datumize: Dark Data and IoT
  - Schibsted: Networking in Container/Docker environments
  - … check the EETAC website!
Weekly talks, seminars, visits
BSC-CNS supercomputer
MASTEAM talks - Building Quantum Technologies - Carlos Abellán

Wednesday 9 November, 17:30h, C4-001 (Sala de Actos / Main Hall), Campus Castelldefels UPC.

The Master's degree in Applied Telecommunications and Engineering Management (MASTEAM) organizes a weekly series of activities (talks, technical visits, discussion panels) that complement the academic activities with real-world experiences from companies, research centres and institutions in the main topics of the master: Internet of Things, Smart Cities, 5G mobile communications, Software-Defined Networking (SDN) and Radio (SDR), cloud computing, among others.

This week's activity will be a talk from Mr Carlos Abellán (ICFO, Institute of Photonic Sciences).

Title: Building Quantum Technologies

Abstract: In this talk we will review the state of quantum technologies at the industry level as well as current challenges and efforts towards creating scalable products. Following a pragmatic and intuitive approach, we will also discuss about those quantum effects that motivates the development of technologies. Finally, I will present a new worldwide scientific collaboration that will perform, on November 30th, several fundamental quantum physics experiments using the contribution of thousands of people like us.

Bio: BSc in Telecom engineering and MSc in Photonics Science. Experienced on bringing state-of-the-art technology from concept to customer validation. PhD student at ICFO, the Institute of Photonic Sciences, and trained at the Haas School of Business (UC Berkeley).

LinkedIn: https://www.linkedin.com/in/carlosabellan
Twitter: @cabellan
Work hard, play harder

- Castelldefesta
  - The Campus Festival [Video](https://www.youtube.com/watch?v=mH0nj55)
  - Spring 2020: May 6th

- Culture
  - Language courses (Catalan, Spanish) [Website](https://www.upc.edu/slt/en/)
  - Campus Choir [Website](https://cbl.upc.edu/ca/el-campus/viure-el-campus/la-coral)
  - Catalan Traditions and Folklore
    - Main festivities
      - Santa Eulàlia (Barcelona), Feb 12th
      - Sant Jordi, April 23rd
      - Sant Joan, June 24th
    - Castells [Website](https://www.facebook.com/GRILLATSCBL/)
Work hard, play harder – UPC Arts program
Work hard, play harder - Sports

- **Sports**
  - **UPC Sport Service** [http://www.upc.edu/esports](http://www.upc.edu/esports)
  - **Gym at the Castelldefels Olympic Canal**
Work hard, play harder

www.bcncatfilmcommission.com
QUESTIONS?

More info at https://eetac.upc.edu/en/study/masters-degrees/masteam