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1. PRESENTATION

The Research Institute for Sustainability Science and Technology of UPC - BarcelonaTech is the responsible unit for promoting, coordinating and carrying out academic activities in the fields of sustainability science and sustainable technologies.

The Institute’s mission is to generate technical and conceptual tools to create a more sustainable production and development model and to collaborate in the UPC’s endeavor to provide scientific and technical support for human, social, cultural and economic progress.

The IS.UPC is active in higher education, research and innovation, technology transfer and promotion of sustainability culture.

Its main objectives are as follows:

- Opening up sustainability research to UPC groups and researchers, by coordinating and promoting multi and trans-disciplinary research projects.
- Organizing and promoting specific postgraduate courses and degrees (Master’s degrees, PhD programmes and other specialized teaching activities) directly linked with the UPC research in the fields of sustainability science and sustainable technologies, as well as embedding sustainability in other UPC educational programmes.
- Disseminating the results of the research carried out at the IS.UPC, both to the university community and to the society as a whole, and sparking discussion about it.
- Encouraging the commitment and interaction of the UPC within society, and encouraging UPC’s support of civic demands for promoting progress towards more sustainable development models.
Letter from the Director

The Institute for Sustainability Science and Technology (IIST.UPC) is a catalyst for excellent interdisciplinary and transdisciplinary research across Universitat Politecnica de Catalunya that is working for global sustainability.

Today, our institute assembles more than 200 professionals, including staff scientists, postdocs, PhD students, technicians, general research support staff and administrators, devoted to the well-functioning of ISST.UPC.

This Annual Report covers the activities of ISST.UPC of the academic year 2019-2020. During this period, main efforts have focused on consolidating an interdisciplinary academic space within the UPC community to face the challenges of sustainable human development through science progress and technology innovation. The integration of economic, environmental and social aspects of technology, architecture and engineering, as well as the reference points of closing of cycles and systemic thinking, are some of the distinctive characteristics of the Institute research focus. Academic excellence, strategic international and local networking, and a trans-disciplinary approach to knowledge creation and dissemination are other key characteristics of the Institute. Since March 2020 the COVID pandemic has affected all society and indeed the activities of the institute, specially the master that has become 100% virtual. I would like to thanks the efforts of both faculty and students to overcome this situation and to carry on the teaching and learning processes successfully.

The ISST.UPC has its own Master degree in Sustainability Science and Technology (2 years – 120 ECTS). Besides the PhD studies in Sustainability. (94 PhD students)). With 11 PhD dissertations read in this academic year.

Since the beginning of 2020 the COVID pandemic has affected all society and indeed the activities of the institute, specially the master that has become 100% virtual. I would like to thank the efforts of both faculty and students to overcome this situation and to carry on the teaching and learning processes successfully.

Finally, I would like to highlight the national and international recognition that our institute is achieving in sustainability science, with many of the research groups that constitute an outstanding international reference in their areas of expertise.

I would like to express my profound gratitude to the whole of the ISST.UPC personnel, at every professional level for their dedication, motivation and enthusiasm!

Jordi Segalàs, director
2. ORGANIZATION STRUCTURE

2.1. ORGANIZATION CHART

2.2. INSTITUTE BODIES

Single-member bodies

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
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</thead>
<tbody>
<tr>
<td>SEGALÀS CORAL, JORDI</td>
<td>Director</td>
</tr>
<tr>
<td>VILLARES JUNYENT, MÍRIAM</td>
<td>Secretary</td>
</tr>
<tr>
<td>ALCARAZ SENDRA, OLGA</td>
<td>Deputy Director</td>
</tr>
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</table>
## 2.3. COLLEGIATE BODIES OF GOVERNMENT AND REPRESENTATION

### Institute Board

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<td>Subdirectory</td>
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<tr>
<td>VILLARES JUNYENT, MÍRIAM</td>
<td>Academic Secretary</td>
</tr>
<tr>
<td>ROCA BOSCH, ELISABETH</td>
<td></td>
</tr>
<tr>
<td>SUREDA CARBONELL, BÁRBARA</td>
<td></td>
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<tr>
<td>ROSAS CASALS, MARTÍ</td>
<td></td>
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<tr>
<td>GAROLA CRESPO, ÀLVAR</td>
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<tr>
<td>ALVAREZ DEL CASTILLO, JAVIER</td>
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<tr>
<td>CLIMENT VILARO, JUAN</td>
<td></td>
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<tr>
<td>CUCHI BURGOS, ALBERTO</td>
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<td>GIBERT, KARINA</td>
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</tr>
<tr>
<td>LAZZARINI, BORIS</td>
<td>Research Staff representative</td>
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<tr>
<td>WYBRANIEC, BARTOSZ</td>
<td>Students representative</td>
</tr>
<tr>
<td>Name</td>
<td>Position</td>
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<td>DE PABLO RIBAS, JOAN</td>
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<tr>
<td>LAZZARINI, BORIS</td>
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<td>TEJEDOR PAPELL, GEMMA</td>
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<tr>
<td>ASUA BERASALUCE, JOANA</td>
<td>Scholarship INIREC</td>
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<tr>
<td>GARCIA GALOFRE, VICTOR</td>
<td>Scholarship INIREC</td>
</tr>
<tr>
<td>OLIVER MARIN, ANDREA</td>
<td>Scholarship for apprenticeships</td>
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<tr>
<td>WYBRANIEC, BARTOSZ</td>
<td>Scholarship for apprenticeships</td>
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</table>


2.4. COLLEGIATE BODIES FOR CONSULTATION

Academic Committee of the Master’s in Sustainability Science and Technology

ALCARAZ SENDRA, OLGA
VILLARES JUNYENT, MÍRIAM
GAROLA CRESPO, ÀLVAR
ROCA BOSCH, ELISABET
ROSAS CASALS, MARTÍ
SUREDA CARBONELL, BÁRBARA
ALIER FORMENT, MARC
DE LA HOZ CASAS, JORDI
DE PABLO RIBAS, JOAN
ETXEBERRIA LARRANAGA, MIREN
GASSÓ DOMINGO, SANTIAGO
GIBERT OLIVERAS, KARINA
GIL ROIG, JOSÉ MARÍA
LOPEZ LOPEZ, JOSE
MAGRINYÀ TORNER, FRANCESC
MERCADÉ ALOY, JOSEP
MORATÓ FARRERAS, JORDI
SANCHEZ MARRE, MIQUEL
SANCHEZ VILA, FRANCISCO JAVIER
SEGALÀS CORAL, JORDI
VIDAL LOPEZ, EVA MARIA
LAZZARINI, BORIS
TEJEDOR PAPELL, GEMMA

Co-coordinator
Co-coordinator
University-Company Collaboration Agreements/
Employment Opportunities
International Mobility and Double Degrees
Quality and Tutorial Action Plan
Final Master’s Thesis
Teaching and Research Staff
Teaching and Research Staff
Teaching and Research Staff
Teaching and Research Staff
Teaching and Research Staff
Teaching and Research Staff
Teaching and Research Staff
Teaching and Research Staff
Teaching and Research Staff
Teaching and Research Staff
Research Support Staff
Research Support Staff
Academic Committee of the PhD programme in Sustainability

GIL ROIG, JOSÉ MARÍA  Coordinator
ARANDA GIMO, SILVIA  Secretary
CHAMS, NOUR
DE LA FUENTE ANTEQUERA, ALBERT
GIBERT OLIVERAS, KARINA
ROCA ROSELL, ANTONI
VILLARES JUNYENT, MÍRIAM
2.5. FACULTY AND STUDENTS PARTICIPATION

2.5.1. MEMBERS OF THE INSTITUTE

### Academic Staff
- ALCARAZ SENDRA, OLGA
- ALVAREZ DEL CASTILLO, JAVIER
- CLARET ROCA ROSELL, ANTONI-MARIA
- CLIMENT VILARO, JUAN
- CUCHI BURGOS, ALBERTO
- DE PABLO RIBAS, JOAN
- GAROLA CRESPO, ÀLVAR
- GIBERT OLIVERAS, KARINA
- MARGINYA TORNER, FRANCESC
- MARTIN ESCOFET, CARME
- MORATO FARRERAS, JORDI
- RIBA ROMEVA, CARLES
- ROCA BOSCH, ELISABET
- ROSAS CASALS, MARTÍ
- SANCHEZ CARRACEDO, FERMIN
- SEGALÀS CORAL, JORDI
- SUREDA CARBONELL, BÁRBARA
- TRULLOLS FARRENY, ENRIC
- VIDAL LOPEZ, EVA
- VILLARES JUNYENT, MÍRIAM

### Support for Research Staff
- LAZZARINI, BORIS
- TEJEDOR PAPELL, GEMMA
### 2.5.2. MASTER IN SUSTAINABILITY SCIENCE AND TECHNOLOGY

Faculty responsible for the organization and planning of master’s subjects:

<table>
<thead>
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<th>Position</th>
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<tbody>
<tr>
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<tr>
<td>VILLARES JUNYENT, MÍRIAM</td>
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2.5.3. DOCTORATE IN SUSTAINABILITY

UPC researchers responsible for the mentoring of doctoral theses:

AGUADO DE CEA, ANTONIO
ALCARAZ SENDRA, OLGA
ALIER FORMENT, MARC
ALVAREZ DEL CASTILLO, JAVIER
ALVAREZ DEL CASTILLO, M. DOLORES
ALMANTE GARCIA, BEATRIZ
BAIRAN GARCIA, JESUS MIGUEL
BARCEO GARCIA, MIQUEL
BOSCH TOUS, RICARD
CADAFALCH RABASA, JORDI
CARRILLO NAVARRETE, FERNANDO
CONSUL SERRACANTA, RICARD
CREMADES OLIVER, LÁZARO V.
CUCHI BURGOS, ALBERTO
DARBRA ROMAN, ROSA MARÍA
DE LA FUENTE ANTEQUERA, ALBERT
DE LA HOZ CASAS, JORDI
DOMENECH LEGA, BRUNO
ESCRIBANO RODRIGUEZ DE ROBLES, BEATRIZ
FELIPE BLANCH, JOSE JUAN DE
FERRER MARTI, LAIA
FONSECA CASAS, PAU
FUERTES PEREZ, PERE
GANGOLELLS SOLANELLAS, MARTA
GARCIA ALMIÑANA, JORDI
GARCIA CARRILLO, AGUEDA
GARRIDO SORIANO, NURIA
GIL ROIG, JOSE MARIA
HAURIE IBARRA, LAIA
KALLAS CALOT, ZEIN
LOPEZ ALBAREZ, DAVID
MARTIN CAÑADAS, MARIA ELENA
MASPOCH RULDUJA, MARIA LUÍSA
MAYORGA CARDENAS, MIGUEL YURI
MONGUET FIERRO, JOSEP MARIA
MONTSERRAT JORDA, JOSEP
MORATO FARRERAS, JORDI
NAVARRO MOLDES, LEANDRO
OLMEDO TORRE, NOELIA
ORTEGO MARTINEZ, MARIBEL
PABLO RIBAS, JOAN DE
PARDO BOSCH, FRANCESCA
PEÑA CARRERA, MARTA
PEREZ FOGUET, AGUSTÍ
PUJADAS ALVAREZ, PABLO
QUERA MIRO, MANUEL
RAHMANI MEDDOUR, DJAMEL
RIBA ROMEVA, CARLES
ROCA BOSCH, ELISABETH
ROCA ROSELL, ANTONI
RODRIGUEZ CANTALAPIEDRA, INMACULADA
ROSAS CASALS, MARTI
RUIZ MANSILLA, RAFAEL
SABATER PRUNA, ASSUMPTA
SALAN BALLESTROS, M. NÜRIA
SEGALAS CORAL, JORDI
TORRES LOPEZ, ANTONIO LUIS
TRULLOLS FARRENY, ENRIC
VALDERRAMA ANGEL, CESAR ALBERTO
VELO GARCIA, ENRIQUE
VIDAL LOPEZ, EVA
VILLARES JUNYENT, MÍRIAM
### 2.5.4. STUDENTS

Number of students:

<table>
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<tr>
<th>Academic year 2019 - 2020</th>
<th>Master in Sustainability Science and Technology</th>
<th>36</th>
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<tbody>
<tr>
<td></td>
<td>PhD in Sustainability</td>
<td>94</td>
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### 3. FINANCIAL INFORMATION

A description of IS.UPC financial accounts for the course 2019-2020 is summarized in this section.

#### 2019-2020 OPERATIONAL INCOME (EUR)

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<th>UPC</th>
<th>EUROPEAN COMMISSION</th>
<th>CATALAN GOVERNMENT</th>
<th>SPANISH GOVERNMENT</th>
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<td>INTERNAL</td>
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<td>14.218,27€</td>
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<tr>
<td>Cap 2</td>
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<td>14.218,27€</td>
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<tr>
<td>EXTERNAL</td>
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<td>343.273,80€</td>
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<td>1.514,32€</td>
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<td>293.439,65€</td>
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<td>Others</td>
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<td>49.834,15€</td>
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<td>TOTAL</td>
<td>14.218,27€</td>
<td>301.758,51€</td>
<td>1.514,32€</td>
<td>40.000,97€</td>
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### ISST Income 19-20

- **Spanish Government**: 11.2%
- **Catalan Government**: 0.4%
- **European Commission**: 64.4%
- **UPC**: 4.0%
2019 OPERATIONAL OUTCOME

The external income has been used to carry on the research projects, and the internal income has been distributed among Operating, Scholarships and PhD and Master activities.
4. RESEARCH AND PROJECTS

This section details research projects, agreements and collaborations undertaken by ISST.UPC researchers.

4.1. ONGOING PROJECTS

**EEISHEA, Enhancing Entrepreneurship, Innovation and Sustainability in Higher Education in Africa**

The Institute for Sustainability participates in a new Erasmus+ project that promotes entrepreneurship, innovation and sustainability at African universities.

The project is led by the University of Aalborg (Denmark) and aims to initiate a sustainable educational change at the five greatest educational institutions of Africa, participating in the project, by redesigning best practices focussed on learning, teaching and methods of delivery.

A consequence of this modernisation will be an impact on the educational sector, due to the dissemination of information about best practices. As a further consequence, the project will provide graduates with entrepreneurial and innovative skills, due to the employability and the self-employment and the recognition of sustainability topics relevant for society.

Together with the UPC represented by the Institute of Sustainability, the project counts on the participation of well-known European universities:

University of Copenhagen (UCPH – Denmark); Roskilde University (RUC – Denmark); Royal Institute of Technology (KTH – Denmark)

African universities:

Kwame Nkrumah University of Science and Technology (KNUST – Ghana); University of Ghana (UG – Ghana); Sokoine University of Agriculture (SUA – Tanzania); State University of Zanzibar (SUZA – Tanzania); Kilimanjaro Christian Medical University College (KMUCo – Tanzania).

**Scope:** Global

**Coordinator:** University of Aalborg

**Funding entity:** Education, Audiovisual and Culture Executive Agency (EACEA)

**Participating Entities/Institutions:** Universitat Politècnica de Catalunya through the IS.UPC and University of Aalborg (Dinamarca)

**Dates:** Started on September 2017

**Responsible researcher:** Segalàs Coral, Jordi
EDINSOST2-SDG: Integration of sustainable development goals in sustainability training in Spanish university degrees

The project is the continuation of the EDINSOST project (MINECO - EDU2015-65574-R). Built on the results of the previous project, adding the Sustainable Development Goals (SDGs) of the United Nations by analyzing how to efficiently and effectively introduce SDG competencies in the Spanish university system.

The main objective is to graduate students with the competencies in sustainability and the SDGs that society requires. Considering this, it will be studied how SDG competencies should be taught/learned in faculty and the learning tools required to teach/learn these competencies will be developed.

Scope: Education
Coordinator: Segalàs, Jordi y Sánchez, Fermín
Funding entity: Ministerio Español de Ciencia, Innovación y Universidades, Agencia Estatal de Investigación, y el Fondo Europeo de Desarrollo Regional, con el código RTI2018-094982-B-100.
Participating Entities/Institutions: Universitat Politècnica de Catalunya, Universidad Politécnica de Madrid, Universidad del País Vasco/Eusko Herriko Unibersitatea, Universidad de Sevilla, Universidad Internacional de Catalunya, Universidad de Murcia, Universidad de Salamanca y Universidad Complutense de Madrid.
Dates: Started on October 2019
Responsible researcher: Segalàs Coral, Jordi and Sánchez, Fermín

DIGNITY - DIGital traNsport In and for socieTY

The main objective is to graduate students with the competencies in sustainability and the SDGs that society requires. Considering this, it will be studied how SDG competencies should be taught/learned in faculty and the learning tools required to teach/learn these competencies will be developed.

The overall goal of DIGNITY, digital transport within and for society, is to foster a sustainable, integrated and easy-to-use digital travel ecosystem that improves accessibility and social inclusion, along with the travel experience and daily life of all citizens.

The project delves into the digital transport ecosystem to understand the full range of factors that can lead to disparities in the adoption of digitized mobility solutions by different user groups in Europe. Analyzing the digital transition from the perspective of both the user and the provider, DIGNITY analyzes the challenges posed by digitization, and then design, test and validate the
DIGNITY approach, a new concept that aims to become the “ABC for an inclusive digital travel system”.

The approach combines proven inclusive design methodologies with the principles of prospective analysis to examine how a structured involvement of all actors (local institutions, market players, stakeholders and end users) can help bridge the digital gap jointly creating more inclusive mobility solutions and by formulating user-centered policy frameworks.

**Scope:** Urban Sustainability

**Funding entity:** H2020 EU funding

**Participating Entities/Institutions:** ISINNOVA, MOBIEL 21, BUAS, UPC, IZT, UCAM, FACTUAL, BARCELONA REGIONAL, Tilburg, NEXTBIKE, Municipality of Ancona, myCicero, Conerobus, The Flemish Department of Mobility and Public Works.

**Dates:** Started on January 2020

**Responsible researcher:** Roca Bosch, Elisabet

**NATWIP: Nature-based solutions for peri urban water management: linking the ecological, social and economic dimensions**

The “Nature Based Solutions for Water Management in the Peri urban” project aims to help close the water cycle gap by exploring the potential offered by Nature Based Solutions (NBS) to address the challenges of water management in landscape areas that have been neglected because they are in the transition zones between urban and rural, called peri urban.

The main goal is to exchange learning experiences between the association and promote the debate between science and society in order to raise awareness among professionals and users about the application of NBS to manage water scarcity, pollution and risks related to extreme hydrological events.

There are 4 sub-objectives of the project that will be achieved through four work packages (WPs) that aim to (1) review international experiences, (2) establish a methodological framework for evaluating NBS, (3) apply the framework to case studies and (4) create a common narrative. It seeks to move beyond the state of the art where the issue of closing the water cycle gap is restricted to urban centers, ignoring the specificities of peri urban areas. The innovation of the project lies in building and sharing knowledge about the potential of NBS for water in peri urban spaces. The project will include case study sites in Norway, Sweden, Spain, Poland, South Africa, India and Brazil, where project partners have established contacts and will focus on peri urban areas.

**Scope:** Urban Sustainability

**Funding entity:** HSpanish Ministry of Science and Innovation (MCIU/AEI/FEDER) PCI2019
**Participating Entities/Institutions:** Södertörn University (Sweden), Norwegian geotechnical Institute (NGI, Norway), Universitat Politècnica de Catalunya Barcela-Tech (UPC, Spain), Stellenbosch University, Anugrah Narayan College (A.N. College, India), Royal Institute of technology (KTH, Sweden), International Institute for Sustainability (ISS-Rio, Brazil).

**Dates:** Started on April 2019

**Responsible researcher:** Roca Bosch, Elisabet

**COLEOPTER: Consulta Local per a l’optimització de Polítiques Territorials sobre Energía Rural**

COLEOPTER develops an integrated approach to energy renovation in public buildings, associating technical, social and economic challenges.

It aims to engage in a territorial dialogue with local stakeholders to co-construct the renovation work plan for a public building. The approach includes the use of innovative audits that involve the water-energy nexus.

The use of BIM as a collaboration tool facilitates dialogue (experts/non-experts) on a 3D model of buildings and allows the collaborative management of renovation work. It will be tested in exemplary buildings in Cartagena (Es), Combraille (Fr) and Póvoa de Lanhoso (Pt) and will be reproduced in Andorra to validate its transferability.

COLEOPTER is designed to address the challenges of Sudoe: raising awareness through dialogue to increase renewal rates, the study of the water-energy nexus and the dissemination of BIM collaborative tools.

[https://www.coleopter.eu/coleopter-es/](https://www.coleopter.eu/coleopter-es/)

**Scope:** Europe

**Funding entity:** European Union (FEDER)

**Participating Entities/Institutions:** RURENER, ADENE (Agencia para a Energía Portugal, Portugal), CETENMA (Asociación Empresarial Centro Tecnológico de la Energía y del Medio Ambiente de la Región de Murcia, España), UPC-ISST (Universitat Politècnica de Catalunya - Instituto universitario de investigación en Ciencia y Tecnologías de la Sostenibilidad, España), CIM DO AVE (Comunidad Intermunicipal do Ave, Portugal), Ayuntamiento de Cartagena (España), MPdL (Município da Póvoa de Lanhoso, Portugal), SM Est Creuse (Syndicat Mixte Ferme Est Creuse, Francia)

**Dates:** Started on October 2019

**Responsible researcher:** Rosas Casals, Martí
4.2 FINALIZED PROJECTS

**Circular Design - Learning for Innovative Design for Sustainability (L4IDS)**

The goal of the project is the promotion of sustainable production and consumption of products and services in Europe. This will be achieved by means of a co-creation process of knowledge and the development of teaching material, in order to form students, professors and professionals trained for the sector of innovative and sustainable design strategies.

The focus will be on social entrepreneurship and educational innovation, allowing the creation of sustainable products and services, aligned with European politics of circular economics and, consequently, with a more sustainable society.

The initiative aims to strengthen the co-creation of knowledge - Design for sustainability-Innovation, where specific learning schemes are missing, by means of design of courses and learning material in the field of higher education as well as in continuous training. In order to support the project, four hubs in four European nations (Ireland, Catalonia, Sweden and the Netherlands) have been created. Every hub includes universities, companies and national associations of design.

**Scope**: Europe

**Coordinator**: Universitat Politècnica de Catalunya (UPC)

**Funding entity**: European Commission - ERASMUS+

**Participating Entities/Institutions**: Linkopings Universitet (SE), Nutcreatives SL (ES), Habermann Design & Development Ab (SE), Oneoff Design Furniture Limited (IE), Institute of Designers in Ireland Limited (IE), Better Future Factory Bv (NL), Stichting House of Design (NL), Stiftelsen Svensk Industri design (SE), Ajuntament de Barcelona (ES), Stichting NHL (NL), University Of Limerick (IE), Fundacio Privada B.C.D. per la Promocio del Disseny Industrial (ES)

**Dates**: November 2016 to October 2019

**Responsible researcher**: Segalàs Coral, Jordi

**EDINSOST, Education and Social Innovation for Sustainability**

The project Educational and Social Innovation for Sustainability aims to train graduates who master the challenges our society faces on the way towards sustainability. The research is applied in a multidisciplinary way and in context with nine universities that work together in the framework of the Sectoral Commission of the CRUE of Sustainability, in the group
"Sensibilització Curricular", in order to create synergies and action frameworks basing on national agreements.

In this research area there are still missing common criteria about the competences that ought to be integrated and their intermediation and evaluation remain constraints.

During the project, frameworks and processes will be developed that simplify the holistic integration of sustainability in the university curriculum, by means of mapping and the validation of pedagogical practices, the diagnosis of the state of Spanish universities and the creation of teaching and learning material for the development of sustainability skills within the degrees of the Spanish university system.

**Scope**: National

**Coordinator**: Universitat Politècnica de Catalunya (UPC)

**Funding entity**: State secretariat on Research, Development and Innovation- State Programme on Research, Development and Innovation Focussed on Challenges in Society, Call 2015, Modality 1: «Projects of R+D+I»

**Partners**: Universidad Autónoma de Madrid, Universidad de Cádiz, Universidad Camilo José Cela, Universidad de Córdoba, Universitat de Girona, Universitat Internacional de Catalunya, Universidad de Sevilla and Universidad de Salamanca

**Dates**: September 2016 to September 2019

**Principal researcher**: Segalàs Coral, Jordi and Sánchez, Fermin

**RECC, Co-creation of an educational resource on climate change**

Improvement of an educational resource already created, using a co-creation methodology based on an active, creative and social process that facilitates collaboration between scientists who are experts in climate change, web designers and developers and users of the resource, thus generating added value for its potential users: teachers, secondary school pupils and the general public. The aim is for the resource to offer in the educational field of environmental education: targeted educational resources; the dissemination of experiences to raise awareness and promote co-responsibility for the improvement of the environment; contribution to the empowerment of educational networks; improvement of the user experience and interactivity. Webpage: http://www.ersilia.org/RECC/index.php

**Scope**: Local

**Coordinator**: Ersilia Foundation, **Funding entity**: Barcelona Climate Commitment 2018 - Urban Ecology Agency, Barcelona City Council

**Partners**: Ersilia Foundation, Institute for Sustainability Science and Technology (ISST-UPC), Institut Pau Claris (secondary school)
**Dates:** January 2018 to December 2019

**Principal researcher:** Segalàs Coral, Jordi (ISST-UPC) and Guevara, Maria Teresa (Ersilia)
5. TEACHING

5.1. MASTER’S DEGREE IN SUSTAINABILITY SCIENCE AND TECHNOLOGY

The master’s degree in Sustainability Science and Technology aims to provide students with advanced interdisciplinary training to help them understand the interactions between society, the economy and the environment. Graduates will also have a sound understanding of scientific and technical options and trends for tackling key challenges for the sustainable development of current socio-environmental systems.

The course will train students to become entrepreneurs and agents of change in the field of sustainable development. Based on their specialisation in areas related to biodiversity, the environment, the built environment, services, the production system and information management, graduates will be able to design, implement and evaluate sustainable solutions in different fields of engineering and technology. They will work in various cultural and professional contexts, applying a transdisciplinary approach based on scientific and technical rigour.

This master’s degree has received the International Master’s Programme distinction (2013 call) awarded by the Government of Catalonia’s Agency for the Management of University and Research Grants (AGAUR).

The Master in Sustainability Science and Technology was validated by the Universities Council’s Curriculum Validation and Accreditation Committee in July 2013.

Courses offered in academic year 2019-2020:

**Mandatory courses**

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<tr>
<th>Code</th>
<th>Subject</th>
<th>Professor</th>
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<tr>
<td>480011</td>
<td>Fundamentals of Economics, Environmental Economics and Ecological Economics</td>
<td>José María Gil</td>
</tr>
<tr>
<td>480012</td>
<td>Fundamentals of Engineering, Sustainability and Development</td>
<td>Bárbara Sureda</td>
</tr>
<tr>
<td>480021</td>
<td>Fundamentals of Mathematical and Systemic Sustainability Modelling (i)</td>
<td>Martí Rosas</td>
</tr>
<tr>
<td>480022</td>
<td>Fundamentals of Applied Statistics and Sustainability and Development Measurement</td>
<td>Karina Gibert</td>
</tr>
<tr>
<td>480041</td>
<td>Fundamentals of Social Sciences and Approaches to Socio-Environmental Conflicts</td>
<td>Míriam Villares</td>
</tr>
<tr>
<td>480051</td>
<td>Fundamentals of Geosciences and Geographic Information Systems</td>
<td>Xavier Sánchez</td>
</tr>
<tr>
<td>480031</td>
<td>Fundamentals of Ethics, Business and Innovation</td>
<td>Marc Alier</td>
</tr>
<tr>
<td>480032</td>
<td>Fundamentals of Sustainable Management and Environmental Management Systems</td>
<td>Santiago Gassó</td>
</tr>
<tr>
<td>480042</td>
<td>Research-Action Workshop on Sustainability Science and Technologies (i)</td>
<td>Jordi Segalàs</td>
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Elective courses

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<th>Subject</th>
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<tr>
<td>480081</td>
<td>Urban Metabolism and Ecological Urbanism (1)</td>
<td>Josep Mercade</td>
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<tr>
<td>480093</td>
<td>Socio-Environmental Data Science (1)</td>
<td>Karina Gibert</td>
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<tr>
<td>480111</td>
<td>Integral Management of Urban and Ecological Water Cycles</td>
<td>Joan de Pablo</td>
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<tr>
<td>480072</td>
<td>Climate Change Mitigation Policies</td>
<td>Olga Alcaraz</td>
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<tr>
<td>480071</td>
<td>Biodiversity and Socio-Ecological Systems (1)</td>
<td>Jordi Morató</td>
</tr>
<tr>
<td>480074</td>
<td>Transdisciplinary and Social Research</td>
<td>Elisabet Roca</td>
</tr>
<tr>
<td>480075</td>
<td>Intelligent Sustainability Decision Support Systems (1)</td>
<td>Miquel Sánchez</td>
</tr>
<tr>
<td>480083</td>
<td>Regional and Transport Infrastructure Metabolism</td>
<td>Francesc Magrinyà</td>
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<tr>
<td>480091</td>
<td>Information and Communication Technologies</td>
<td>Eva Vidal</td>
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<td>Industrial Ecology</td>
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<td>480152</td>
<td>Sustainable Design of Products and Services (1)</td>
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<td>Complex and Socio-Environmental Networks (1)</td>
<td>Martí Rosas</td>
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<td>480521</td>
<td>International Cooperation and Development</td>
<td>Alvar Garola</td>
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<td>480511</td>
<td>Urban and Regional Development (1)</td>
<td>Francesc Magrinyà</td>
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<td>480602</td>
<td>Construction and Building Construction Engineering and</td>
<td>Miren Etxeberria</td>
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<td></td>
<td>Technologies (1)</td>
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<tr>
<td>480073</td>
<td>Energy Economics and Sustainable Energy Systems (1)</td>
<td>Jordi de la Hoz</td>
</tr>
</tbody>
</table>

(1) Subjects taught in English language. Exams can be taken in Catalan, Spanish or English

Defended Master Thesis

Exclusió social de la digitalització de la mobilitat en l’ambit de l’AMB: anàlisi i proposta d’indicadors
Anàlisi i propostes de millora de l’abastament urbà d’aigua, des de la perspectiva de la sostenibilitat. Cas d’estudi: Igualada
Proposta de tancament del cicle de mètia d’un escorxador de porcs per a contribuir a l’economia circular
Anàlisis de la viabilitat de la reconversió d’una central tèrmica de carbó a biomassa, atenent a les diferents dimensions de la sostenibilitat
Aplicación del enfoque Nexo en América Latina: sistematización de las lecciones aprendidas en el análisis de acciones multisectoriales implementadas en el Estado Plurinacional de Bolivia
Hoja de ruta para la transición energética en el sector residencial en México
Data Mining of United States Greenhouse Gas Emission Inventory for Visualization and Analysis Emission Trends
Inventario de emisiones atmosféricas generadas entre 2009 y 2019 de los vuelos con origen en el aeropuerto El Dorado de Bogotá y escenarios a 2050 del consumo de combustible y emisiones de CO2
5.2. DOCTORAL PROGRAM IN SUSTAINABILITY

Sustainability research involves specialists from different origins and backgrounds with a variety of disciplinary perspectives but with the common will to contribute to the development of society by providing future generations with the options and skills required to forge their own path.

The doctoral programme in Sustainability encompasses the research and courses that deal with the current challenges to sustainability: exhaustion, distribution and management of natural resources, including energy and water; climate change impacts and adaptation and mitigation mechanisms; modelling of socio-environmental systems and assessment of their evolution and development; poverty and imbalances in urban and rural environments; technological innovation and integrated concepts in construction, architecture and management of public services and the environment; and preservation and promotion of environmental and cultural heritage.

Sustainability science and technology is a highly interdisciplinary field of research that offers the opportunity to make original contributions in understanding and solving problems that affect the welfare and development of peoples and societies, and in shaping a new perspective from which to analyse our reality, integrating approaches from different disciplines and embracing the very agents of change.

This programme, in which highly diverse research lines and fields of interest converge, may benefit from cross-disciplinary exchange between the different research lines. For this reason, in addition to the activities in which each research group is involved, a framework for discussion of research in progress is provided in the form of the Research Monitoring and Support Working Session. This session is held every academic year and is open to all doctoral candidates and lecturers who are interested in sustainability science and technology.

This PhD therefore, is open to professionals and researchers with the will and capacity to face these challenges and provide solutions through academic contributions of international impact.

The doctoral programme in Sustainability was validated by the Universities Council’s Curriculum Validation and Accreditation Committee, in accordance with the provisions of Royal Decree 99/2011, of 28 January, regulating official doctoral studies. The first academic year under Royal Decree 99/2011 was 2013-14.
PhD in Sustainability – Facts & Figures 2019-20

Access and enrolment

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<td>Research plans defended</td>
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<td>Read doctoral thesis</td>
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Defended PhD Thesis

**Pita Merino, Lina Paola**  
*Thesis title:* Análisis y modelización de la evolución de patrones globales y regionales en los conflictos socio ambientales. Aplicación a la Amazonia Ecuatoriana  
*Supervisor:* Rosas Casals, Martí | Orellana Vintimilla, Daniel Augusto  
*Reading date:* 29/01/2020

**Yance Carvajal, Carlos Leonidas**  
*Thesis title:* Incidencias de las pymes industriales en la conservación del medio ambiente en territorios en vías de desarrollo: caso de la provincia del Guayas-Ecuador  
*Supervisor:* Gil Martin, Joan Carles  
*Reading date:* 31/01/2020

**Díaz Montenegro, José Alberto**  
*Thesis title:* Livelihood strategies and risk behavior of cacao producers in Ecuador. Effects of national policies to support cacao farmers and specialty cacao landraces.  
*Supervisor:* Gil Roig, José María | Varela Redondo, Elsa  
*Reading date:* 08/10/2019

**Dogbe, Wisdom**  
*Thesis title:* Sustainable consumption: fiscal policies and household behaviour  
*Supervisor:* Gil Roig, Jose María  
*Reading date:* 15/10/2019

**Garza Rodríguez, Fabiola Rosamaría**  
*Thesis title:* La cultura como estrategia de regeneración urbana. Diagnosis y análisis de caso del centro de Monterrey, México  
*Supervisor:* Villares Junyent, Miriam | Roca Bosch, Elisabeth  
*Reading date:* 26/11/2019
Papachristou, Ioanna Anna
Thesis title: Assessing sustainability in cities. A complexity science approach to the concept of happiness for the urban environment
Supervisor: Rosas Casals, Martí
Reading date: 16/12/2019

Rey Bolaños, María Antonieta
Thesis title: The role of community-based tourism in sustainable rural development. Case studies from Ecuador
Supervisor: Lopez i Gelat, Feliu
Reading date: 12/11/2019

Ridaura Aldana, Gregorio
Thesis title: Innovation of the process-equipment system in a context of sustainability
Supervisor: Riba Romeva, Carles | Buj Corral, Irene
Reading date: 18/02/2020

Salazar Llano, Lorena
Thesis title: Portraying urban diversity patterns through exploratory data analysis
Supervisor: Rosas Casals, Martí | Ortego Martínez, María Isabel
Reading date: 09/12/2019

Tejedor Papell, Gemma
Thesis title: Transdisciplinarity for sustainability in engineering education
Supervisor: Segalàs Corral, Jordi
Reading date: 21/11/2019

Yang, Yunxian
Supervisor: Haurie Ibarra, Laia | Wang, De-Yi
Reading date: 05/12/2019
### Defended Research Plans

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<th>Director</th>
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<tr>
<td>AGUDELO VALDERRAMA, VANESSA</td>
<td>MORATÓ, JORDI</td>
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<td>BALTÀ SALVADOR, ROSÓ</td>
<td>OLMEDO, NOELIA / PEÑA, MARTA</td>
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<td>CAICEDO, ANGÉLICA</td>
<td>MAYORGA, MIGUEL / ESTRADA, MIQUEL</td>
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<td>SEGALÀS, JORDI / GARRIDO, NÚRIA</td>
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<td>DÍAZ BARBOSA, JAIR</td>
<td>MAYORGA, MIGUEL / GARCÍA, ÁGUEDA</td>
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<td>VALDERRAMA, CÉSAR A.</td>
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<td>VARELA, ELSA / THABET, CHOKRI</td>
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<td>MORALES VERGARA, IVETHEYAMEL</td>
<td>SEGALÀS. JORDI / MASSECK, TORSTEN</td>
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<td>NARANJO SILVA, HECTOR SEBASTIAN</td>
<td>ÁLVAREZ DEL CASTILLO, XAVIER</td>
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<td>PALMETT PADILLA, AIDA DEL C.</td>
<td>MAYORGA, MIGUEL / GARCÍA, ÁGUEDA</td>
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<td>POLANCO LÓPEZ DE MESA, CAMILO</td>
<td>MORATÓ, JORDI</td>
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<td>DARBRA, ROSA M.</td>
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<td>RAMIREZ PADILLA, CINDY ARACELI</td>
<td>ALCARAZ, OLGA / SUREDÁ, BÁRBARA</td>
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<td>AMANTE, BEATRIZ</td>
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<td>UGUET, JOSEPH</td>
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<td>VALLEJO CARTES, ROSANA</td>
<td>VARELA, ELSA / GIL, JOSÉ MARÍA</td>
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6. PUBLICATIONS

6.1. SCIENTIFIC PRODUCTION

The research activities and production of ISUPC members are included in the following link: http://futur.upc.edu/IS.UPC

Figure 8.1 Research activities over time
7. ACTIVITIES

7.1. RESEARCH SEMINARS AND WORKSHOPS

Workshop: Taller resiliencia territorial: Conca de Barberà
Participants: Students from the Sustainability Science and Technology Master
Date: 29/30 November 2019

Campanya de comunicació: No resoldrem l’emergència climàtica sense justícia climàtica
Participants: Institute for Sustainability Science and Technology (ISST), Observatori del Deute de la Globalització (ODG) and Students from the Sustainability Science and Technology Master.
Date: 1st December 2020
Web: https://odg.cat/blog/emergencia-justicia-climatica/

Dones i professions tecnològiques
Participants: DonesCOEINF
Date: 13th December 2019
Web: https://enginyeriainformatica.cat/?page_id=30210

7.2. CONFERENCES

European Roundtable for Sustainable Consumption and Production (ERSCP 2019)
Description: The European Roundtable for Sustainable Consumption and Production (ERSCP) is one of Europe’s most remarkable conferences in its field and has taken place periodically since 1994. ERSCPs favour discussions about the key issues in sustainable consumption and production; the exchange of thoughts, knowledge, experiences and SCP proposals; and the creation of a European (also worldwide) community of research and practice in sustainable consumption and production. The main goal of the ERSCPs is to encourage discussion amongst stakeholders involved in sustainable consumption and production: businesses, public institutions, universities, institutes and research centres, NGOs, SMEs, professional associations, decision-makers, etc.
Organized: Institute for Sustainability Science and Technology of the Universitat Politècnica de Catalunya - BarcelonaTech
Date: 15 - 18 October 2019
Web: https://erscp2019.eu
8. ANNEX

Academics with formal adscription to IS.UPC and research activity related:

- Alcaraz Sendra, Olga (http://futur.upc.edu/OlgaAlcarazSendra)
- Álvarez del Castillo, Javier (https://futur.upc.edu/JavierAlvarezDelCastillo)
- Claret Roca Rosell, Antoni-Maria (https://futur.upc.edu/AntonimariaClaretRocaRosell)
- Climent Vilaro, Juan (https://futur.upc.edu/JuanClimentVilaro)
- Cuchi Burgos, Alberto (https://futur.upc.edu/AlbertoCuchiBurgos)
- De Pablo Ribas, Joan (https://futur.upc.edu/JoandePabloRibas)
- Garola Crespo, Àlvar (https://futur.upc.edu/AlvaroGarolaCrespo)
- Gibert Oliveras, Karina (https://futur.upc.edu/karinaGibert)
- Magrinyà Torner, Francesc (https://futur.upc.edu/FrancescMagrinyaTorner)
- Martin Escofet, Carme (https://futur.upc.edu/CarmeMartinEscofet)
- Morató Farreras, Jordi (https://futur.upc.edu/JordiMoratoFarreras)
- Ribas Romeva, Carles (https://futur.upc.edu/CarlesRibaRomeva)
- Roca Bosch, Elisabet (https://futur.upc.edu/ElisabetRocaBosch)
- Rosas Casals, Martí (https://futur.upc.edu/MartiRosasCasals)
- Sanchez Carracedo, Fermin (https://futur.upc.edu/FerminSanchezCarracedo)
- Segalàs Coral, Jordi (https://futur.upc.edu/JordiSegalasCoral)
- Sureda Carbonell, Bàrbara (https://futur.upc.edu/BarbaraSuredaCarbonell)
- Trullols Farreny, Enric (https://futur.upc.edu/EnricTrullolsFarreny)
- Vidal Lopez, Eva (https://futur.upc.edu/EvaMariaVidalLopez)
- Villares Junyent, Miriam (https://futur.upc.edu/MiriamVillaresJunyent)