

INSTITUTE FOR  
**Sustainability Science**  
AND TECHNOLOGY

2019 – 2020  
ANNUAL REPORT



UNIVERSITAT POLITÈCNICA  
DE CATALUNYA  
BARCELONATECH

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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 Politècnica 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 thank 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.

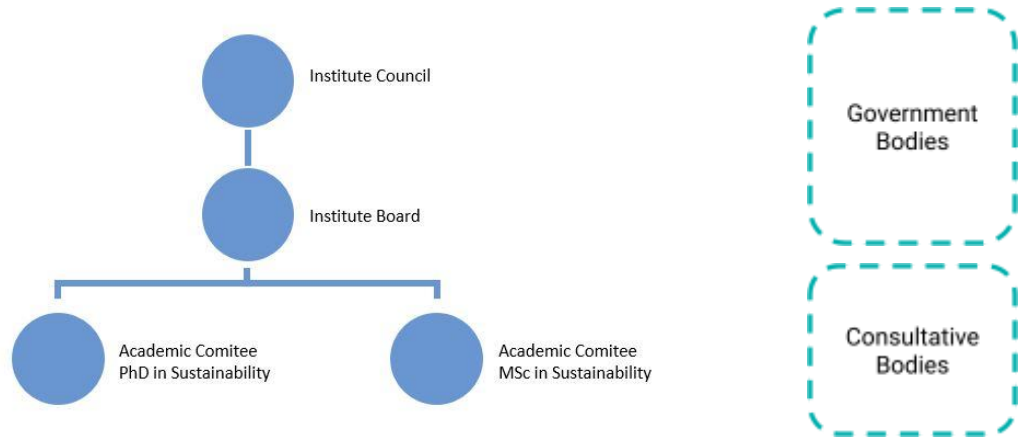
Finally, I would like to highlight the national and international recognition that our institute is achieving in sustainability science, with many of the research groups that constitute an outstanding international reference in their areas of expertise.

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

SEGALÀS CORAL, JORDI	Director
VILLARES JUNYENT, MÍRIAM	Secretary
ALCARAZ SENDRA, OLGA	Deputy Director

## 2.3. COLLEGIATE BODIES OF GOVERNMENT AND REPRESENTATION

### Institute Board

SEGALÀS CORAL, JORDI	<i>Director</i>
ALCARAZ SENDRA, OLGA	<i>Subdirectory</i>
VILLARES JUNYENT, MÍRIAM	<i>Academic Secretary</i>
ROCA BOSCH, ELISABETH	
SUREDA CARBONELL, BÁRBARA	
ROSAS CASALS, MARTÍ	
GAROLA CRESPO, ÀLVAR	
ALVAREZ DEL CASTILLO, JAVIER	
CLIMENT VILARO, JUAN	
CUCHI BURGOS, ALBERTO	
GIBERT, KARINA	
MAGRINYA TORNER, FRANCESC	
MARTIN ESCOFET, CARMÉ	
MORATO FARRERAS, JORDI	
DE PABLO RIBAS, JOAN	
RIBA ROMEVA, CARLES	
ROCA ROSELL, ANTONI-MARIA CLARET	
SANCHEZ CARRACEDO, FERMIN	
TRULLOLS FARRENY, ENRIC	
VIDAL LOPEZ, EVA	
LAZZARINI, BORIS	<i>Research Staff representative</i>
TEJEDOR PAPELL, GEMMA	<i>Research Staff representative</i>
WYBRANIEC, BARTOSZ	<i>Students representative</i>

## Institute Council

SEGALÀS CORAL, JORDI	<i>Director</i>
ALCARAZ SENDRA, OLGA	<i>Subdirectory</i>
VILLARES JUNYENT, MÍRIAM	<i>Academic Secretary</i>
ROCA BOSCH, ELISABETH	
SUREDA CARBONELL, BÁRBARA	
ROSAS CASALS, MARTÍ	
GAROLA CRESPO, ÀLVAR	
ALVAREZ DEL CASTILLO, JAVIER	
CLIMENT VILARO, JUAN	
CUCHI BURGOS, ALBERTO	
GIBERT, KARINA	
MAGRINYA TORNER, FRANCESC	
MARTIN ESCOFET, CARMÉ	
MORATO FARRERAS, JORDI	
DE PABLO RIBAS, JOAN	
RIBA ROMEVA, CARLES	
ROCA ROSELL, ANTONI-MARIA CLARET	
SANCHEZ CARRACEDO, FERMIN	
TRULLOLS FARRENY, ENRIC	
VIDAL LOPEZ, EVA	
LAZZARINI, BORIS	<i>Research Support Staff</i>
TEJEDOR PAPELL, GEMMA	<i>Research Support Staff</i>
ASUA BERASALUCE, JOANA	<i>Scholarship INIREC</i>
GARCIA GALOFRE, VICTOR	<i>Scholarship INIREC</i>
OLIVER MARÍN, ANDREA	<i>Scholarship for apprenticeships</i>
WYBRANIEC, BARTOSZ	<i>Scholarship for apprenticeships</i>

## 2.4. COLLEGIATE BODIES FOR CONSULTATION

### Academic Committee of the Master's in Sustainability Science and Technology

ALCARAZ SENDRA, OLGA	<i>Co-coordinator</i>
VILLARES JUNYENT, MÍRIAM	<i>Co-coordinator</i>
GAROLA CRESPO, ÀLVAR	<i>University-Company Collaboration Agreements/ Employment Opportunities</i>
ROCA BOSCH, ELISABET	<i>International Mobility and Double Degrees</i>
ROSAS CASALS, MARTÍ	<i>Quality and Tutorial Action Plan</i>
SUREDA CARBONELL, BÁRBARA	<i>Final Master's Thesis</i>
ALIER FORMENT, MARC	<i>Teaching and Research Staff</i>
DE LA HOZ CASAS, JORDI	<i>Teaching and Research Staff</i>
DE PABLO RIBAS, JOAN	<i>Teaching and Research Staff</i>
ETXEBERRIA LARRANAGA, MIREN	<i>Teaching and Research Staff</i>
GASSÓ DOMINGO, SANTIAGO	<i>Teaching and Research Staff</i>
GIBERT OLIVERAS, KARINA	<i>Teaching and Research Staff</i>
GIL ROIG, JOSÉ MARÍA	<i>Teaching and Research Staff</i>
LOPEZ LOPEZ, JOSE	<i>Teaching and Research Staff</i>
MAGRINYÀ TORNER, FRANCESC	<i>Teaching and Research Staff</i>
MERCADÉ ALOY, JOSEP	<i>Teaching and Research Staff</i>
MORATÓ FARRERAS, JORDI	<i>Teaching and Research Staff</i>
SANCHEZ MARRE, MIQUEL	<i>Teaching and Research Staff</i>
SANCHEZ VILA, FRANCISCO JAVIER	<i>Teaching and Research Staff</i>
SEGALÀS CORAL, JORDI	<i>Teaching and Research Staff</i>
VIDAL LOPEZ, EVA MARIA	<i>Teaching and Research Staff</i>
LAZZARINI, BORIS	<i>Research Support Staff</i>
TEJEDOR PAPELL, GEMMA	<i>Research Support Staff</i>



## Academic Committee of the PhD programme in Sustainability

GIL ROIG, JOSÉ MARÍA	<i>Coordinator</i>
ARANDA GIMO, SILVIA	<i>Secretary</i>
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, CARMÉ  
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:

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

### 2.5.3. DOCTORATE IN SUSTAINABILITY

UPC researchers responsible for the mentoring of doctoral theses:

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

## 2.5.4. STUDENTS

Number of students:

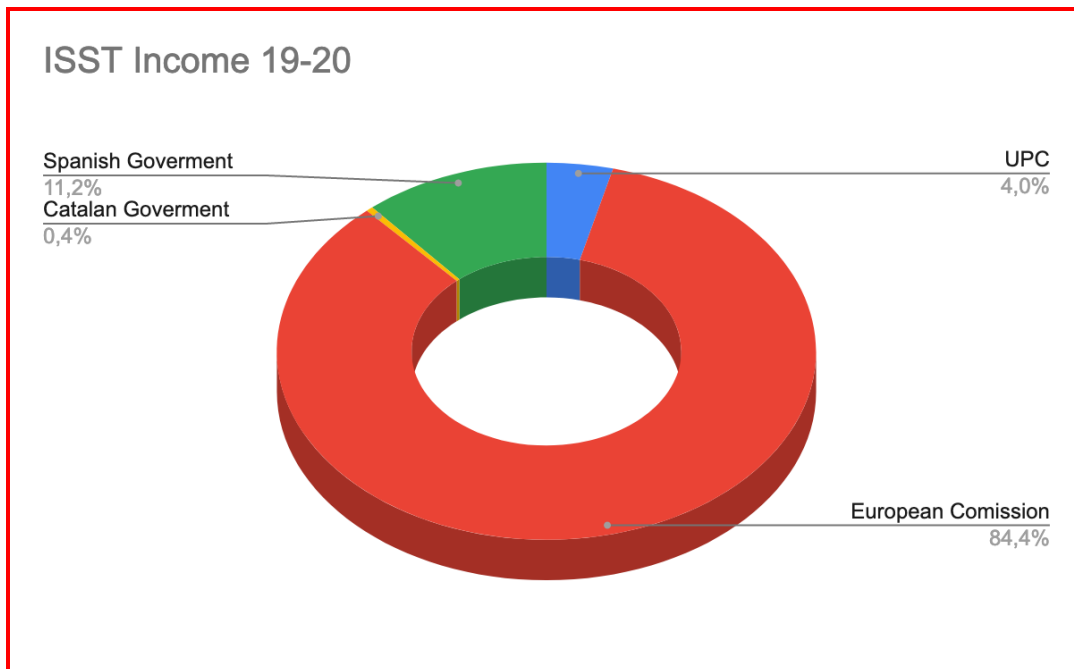
<b>Academic year 2019 - 2020</b>	
Master in Sustainability Science and Technology	36
PhD in Sustainability	94

### 3. FINANCIAL INFORMATION

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

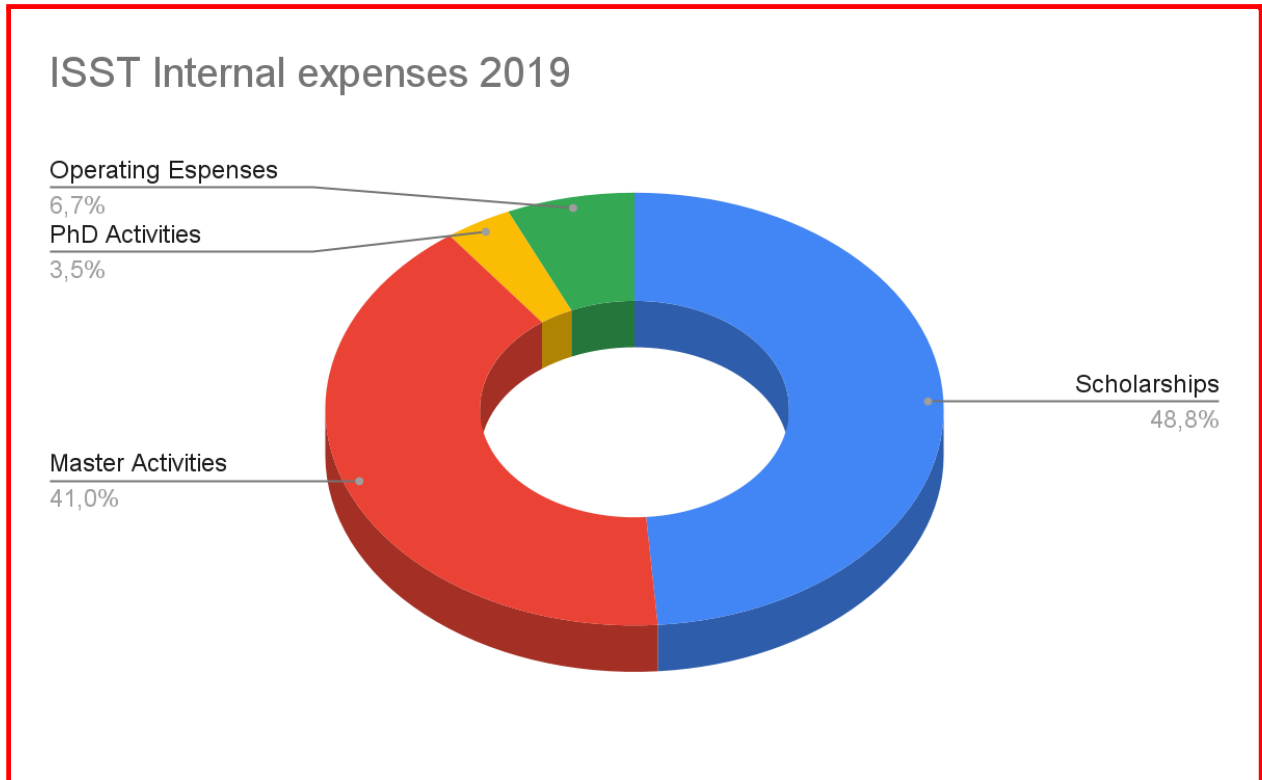
2019-2020 OPERATIONAL INCOME (EUR)

	UPC	EUROPEAN COMMISSION	CATALAN GOVERNMENT	SPANISH GOVERNMENT	TOTAL
INTERNAL					14.218,27€
Cap 2	14.218,27€				14.218,27€
EXTERNAL					343.273,80€
Competitive Projects		251.924,36€	1.514,32€	40.000,97€	293.439,65€
Others		49.834,15€			49.834,15€
<b>TOTAL</b>	<b>14.218,27€</b>	<b>301.758,51€</b>	<b>1.514,32€</b>	<b>40.000,97€</b>	<b>357.492,07€</b>



## 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-I00.

**Participating Entities/Institutions:** Universitat Politècnica de Catalunya, Universidad Politécnica de Madrid, Universidad del País Vasco/Euskal 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 Energia 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/>

**Scope:** Europe

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

**Participating Entities/Institutions:** RURENER, ADENE (Agencia para a Energia 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 the 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 Industridesign (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

Code	Subject	Professor
480011	Fundamentals of Economics, Environmental Economics and Ecological Economics	José María Gil
480012	Fundamentals of Engineering, Sustainability and Development	Bàrbara Sureda
480021	Fundamentals of Mathematical and Systemic Sustainability Modelling <sup>(1)</sup>	Martí Rosas
480022	Fundamentals of Applied Statistics and Sustainability and Development Measurement	Karina Gibert
480041	Fundamentals of Social Sciences and Approaches to Socio-Environmental Conflicts	Míriam Villares
480051	Fundamentals of Geosciences and Geographic Information Systems	Xavier Sánchez
480031	Fundamentals of Ethics, Business and Innovation	Marc Alier
480032	Fundamentals of Sustainable Management and Environmental Management Systems	Santiago Gassó
480042	Research-Action Workshop on Sustainability Science and Technologies <sup>(1)</sup>	Jordi Segalàs

## Elective courses

Code	Subject	Professor
480081	Urban Metabolism and Ecological Urbanism <sup>(1)</sup>	Josep Mercade
480093	Socio-Environmental Data Science <sup>(1)</sup>	Karina Gibert
480111	Integral Management of Urban and Ecological Water Cycles	Joan de Pablo
480072	Climate Change Mitigation Policies	Olga Alcaraz
480071	Biodiversity and Socio-Ecological Systems <sup>(1)</sup>	Jordi Morató
480074	Transdisciplinary and Social Research	Elisabet Roca
480075	Intelligent Sustainability Decision Support Systems <sup>(1)</sup>	Miquel Sànchez
480083	Regional and Transport Infrastructure Metabolism	Francesc Magrinyà
480091	Information and Communication Technologies	Eva Vidal
480092	Industrial Ecology	Joan de Pablo
480152	Sustainable Design of Products and Services <sup>(1)</sup>	Jordi Segalàs
480171	Complex and Socio-Environmental Networks <sup>(1)</sup>	Martí Rosas
480521	International Cooperation and Development	Alvar Garola
480511	Urban and Regional Development <sup>(1)</sup>	Francesc Magrinyà
480602	Construction and Building Construction Engineering and Technologies <sup>(1)</sup>	Miren Etxeberria
480073	Energy Economics and Sustainable Energy Systems <sup>(1)</sup>	Jordi de la Hoz

<sup>(1)</sup> 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'àmbit 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 matèria d'un escorxador de porcs per a contribuir a l'economia circular

Anàlisi 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



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Reparar, reciclar o verter un teléfono móvil, análisis comparativo de sus impactos

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Circular Conference Toolkit, Case Study ERSCP 2019

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## 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	
New doctoral students	13
Doctoral students already enrolled	81
<b>Total students</b>	<b>94</b>
<b>Research plans defended</b>	<b>23</b>
<b>Read doctoral thesis</b>	<b>11</b>

### 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**

*Thesis title:* Bio-based flame retardant for sustainable building materials.

*Supervisor:* Haurie Ibarra, Laia | Wang, De-Yi

*Reading date:* 05/12/2019

## Defended Research Plans

Student	Director
AGUDELO VALDERRAMA, VANESSA	MORATÓ, JORDI
BALTÀ SALVADOR, ROSÓ	OLMEDO, NOELIA / PEÑA, MARTA
CAICEDO, ANGÉLICA	MAYORGA, MIGUEL / ESTRADA, MIQUEL
CIFUENTES CHINCHILLA, MARISOL	SEGALÀS, JORDI / GARRIDO, NÚRIA
DÍAZ BARBOSA, JAIR	MAYORGA, MIGUEL / GARCÍA, ÁGUEDA
ESPINOZA AGUILAR, YURI PATRICIO	MAYORGA, MIGUEL
HEREU MORALES, JOAN	VALDERRAMA, CÉSAR A.
HIDROBO MORALES, JACQUELINE T.	GARCÍA, ÁGUEDA
LEDUCHOWICZ MUNICIO, ALBA	FERRER, LAIA / DOMÈNECH, BRUNO
LI, SHANSHAN	KALLAS, ZEIN
LÓPEZ DÍAZ, M. TERESA DE JESÚS	PEÑA, MARTA
MARCILLO DELGADO, JUAN CARLOS	GARCÍA, ÁGUEDA / ÁLVAREZ, ALICIA
MARTÍNEZ CABALLÉ, DANIEL	SALAN, NURIA / AMANTE, BEATRIZ
MISSAOUI BENT FETHI, SAMEH	VARELA, ELSA / THABET, CHOKRI
MORALES VERGARA, IVETHEYAMEL	SEGALÀS, JORDI / MASSECK, TORSTEN
NARANJO SILVA, HECTOR SEBASTIAN	ÁLVAREZ DEL CASTILLO, XAVIER
PALMETT PADILLA, AIDA DEL C.	MAYORGA, MIGUEL / GARCÍA, ÁGUEDA
POLANCO LÓPEZ DE MESA, CAMILO	MORATÓ, JORDI
RAMIREZ GARRIDO, ROSEMBER	DARBRA, ROSA M.
RAMIREZ PADILLA, CINDY ARACELI	ALCARAZ, OLGA / SUREDA, BÁRBARA
SALA ACOSTA, M.TRINIDAD	AMANTE, BEATRIZ
UGUET, JOSEPH	MORATÓ, JORDI / TOLLIN, NICOLA
VALLEJOS CARTES, ROSANA	VARELA, ELSA / GIL, JOSÉ MARÍA

## 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>

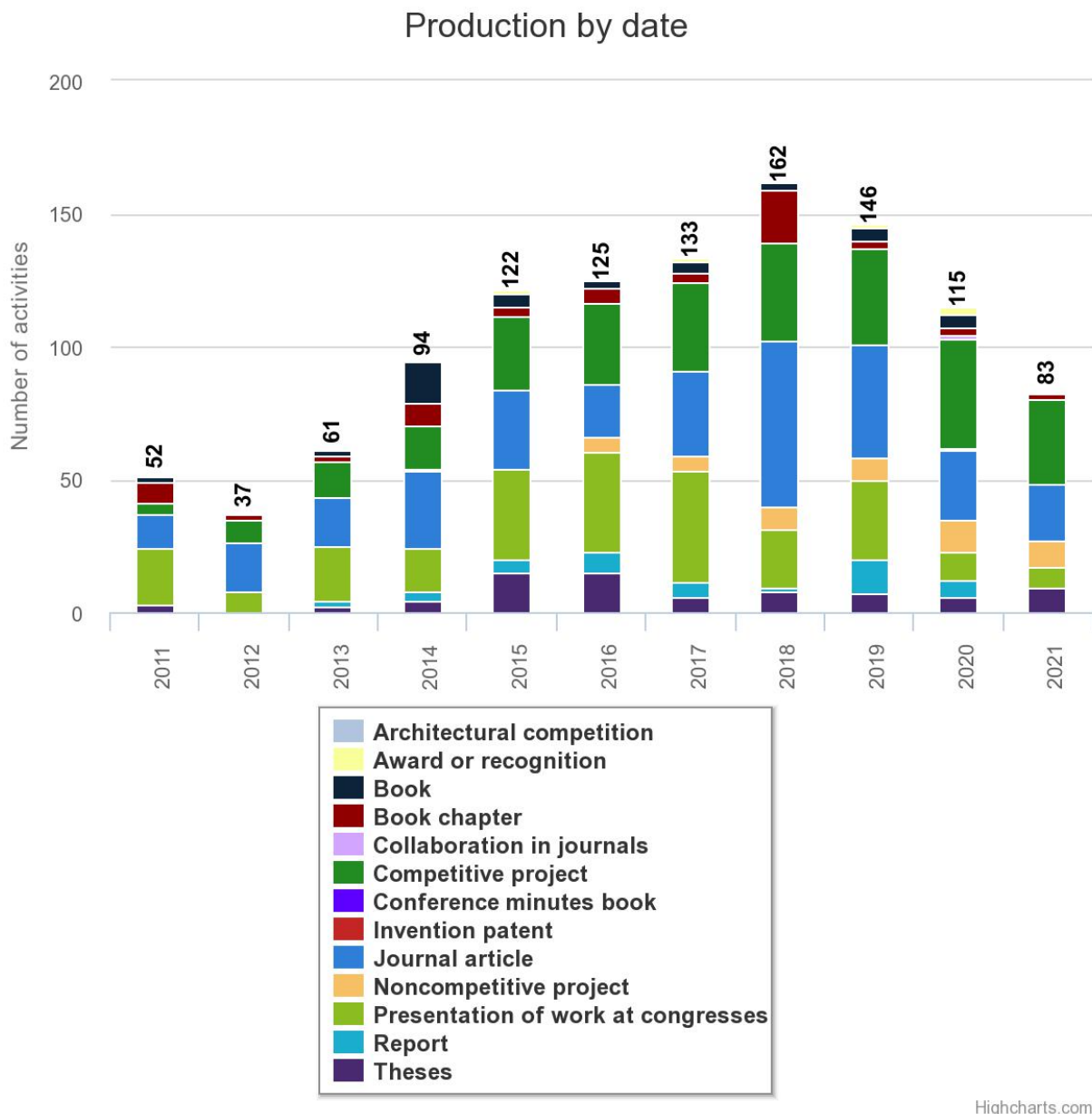


Figure 8.1 Research activities over time

## 7. ACTIVITIES

### 7.1. RESEARCH SEMINARS AND WORKSHOPS

***Workshop: Taller resiliència 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: 1<sup>th</sup> December 2020

Web: <https://odg.cat/blog/emergencia-justicia-climatica/>

***Dones i professions tecnològiques***

Participants: DonesCOEINF

Date: 13<sup>th</sup> December 2019

Web: [https://enginyeriainformatica.cat/?page\\_id=30210](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>)
- Àlvarez 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, Míriam (<https://futur.upc.edu/MiriamVillaresJunyent>)