



# STEM policies at the University of Salamanca

**Prof. Dr. Francisco José García-Peñalvo**

**Computer Science Department**

**Research Institute for Educational Science**

**GRIAL Research Group**

**University of Salamanca**

[fgarcia@usal.es](mailto:fgarcia@usal.es)

<http://grial.usal.es>

<http://twitter.com/frangp>

STEM Working Group  
Coimbra Group  
Granada, November 15th 2019

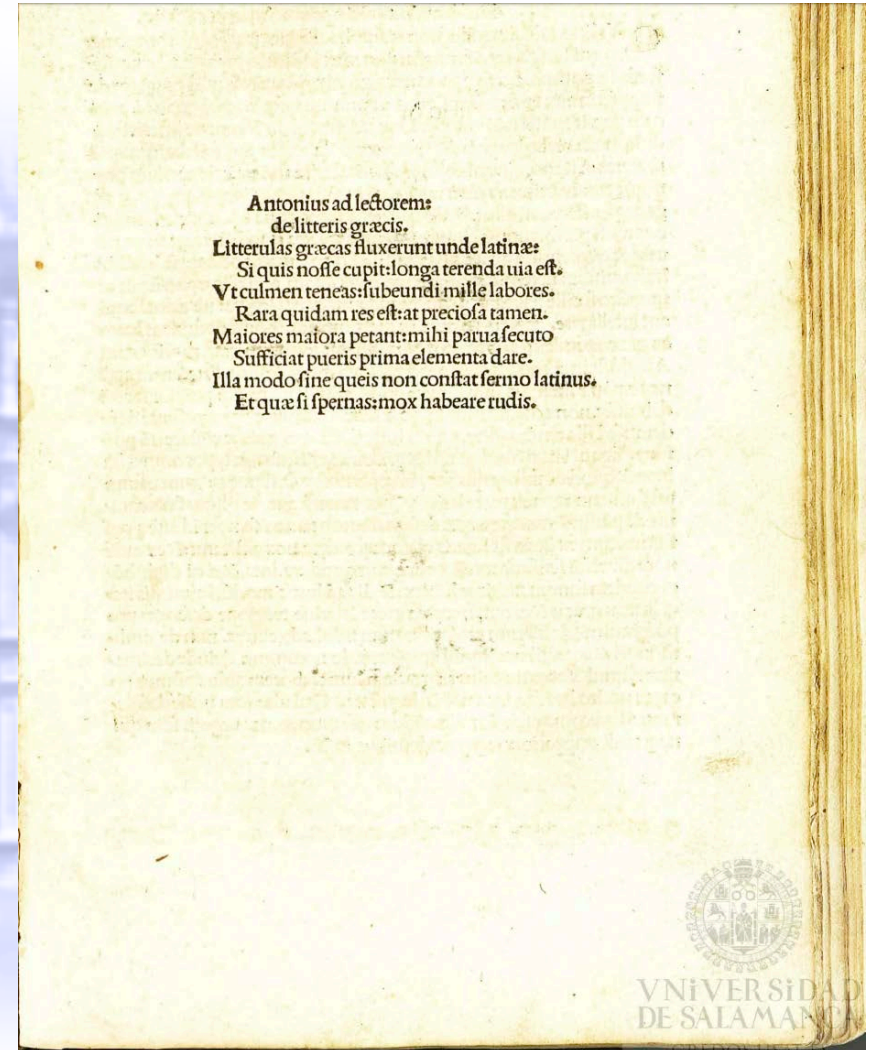






## The first university in the Hispanic world

- The University of Salamanca, which was founded in 1218 by Alfonso IX of León, is considered to be the oldest of existing Ibero-American Universities
- From the beginning, the University of Salamanca has been oriented to establish connections with other centers of higher education, achieving its international status when the Spanish Crown founded the first Universities of the American continent
- Its statutory framework inspired 80% of Latin-American Universities, which consider the University of Salamanca as their *Alma Mater*





## Eighth Centenary

- It celebrated the commemoration of its eight centuries in 2018





# STEM in the University of Salamanca





## Members

- Its 30,000 students and 2,500 teachers approximately make it an average-sized university
- With 1,750 full-time teachers, more or less, the staff is divided 50% related to Social and Legal Sciences and Arts and Humanities and 50% STEM disciplines (Engineering and Architecture, Health Sciences, Sciences)





## Members

- It is the third University in Spain as far as attracting students from other regions is concerned
- Indeed, more than half of its students come from outside the boundaries of Castilla and León, a percentage that is steadily growing







It is the first University considered as International Campus of Excellence regarding the Spanish Language

3 International cultural centers

13 Research Institutes (4 non-STEM; 8 STEM; 1 Interdisciplinary)







# International Teaching

- 1,100 Erasmus students (number 12 in Europe)
- 14% of our doctorate students are of European origin, and 35% are from other regions worldwide, especially Latin-America
- 7,000 foreign students enrolled in our International Courses





# Scientific Park

- 62 enterprises (most of them with a technological background)
- 823 employees
- 5M € per year in competitive funds







# Scientific Park

The ***Spanish Centre for Pulsed Lasers*** was established in December 2007 as a Consortium composed of the Ministry of Economy, Industry and Competitiveness (former Ministry of Science and Education), the Regional Government of Castilla y León, and the University of Salamanca

The main founding objectives of the Consortium are

- To design, build and operate a Petawatt laser in Salamanca
- To develop ultrashort pulses technology in Spain
- To make important advances in compact and intense laser technology
- To promote the use of this technology at several fields: Physics, Engineering, Biology, Medicine, etc.
- To open the facility to the national and international scientific community



<https://www.clpu.es/en>



# Some STEM research lines and projects in the University of Salamanca





# Virtual Alliances for Learning Society (VALS Project)



- European project for **building knowledge alliances** between Universities and Companies across Europe with the **aim of facing real business problems through an open innovation** approach based on using and developing open software solutions
- Supported by
  - *European Union. Lifelong Learning Programme (Sub-Programme Erasmus-Knowledge Alliances)*
- Duration: November 2013 – February 2016



# Virtual Alliances for Learning Society (VALS Project)



- Knowledge alliances among the entities (both from Academic and Business)
- The most interesting VALS innovation is about the definition of a system of virtual placements for students in companies
  - Entrepreneurship skills promotion
  - Definition of new teaching / learning methods
- Development of the *Semester of Code*
  - Semester in which one the students have their placements in companies and foundations related to open software
  - Virtual placements (telework)
  - Involved academic tutors (from the universities) and mentors (from the businesses)





# Virtual Alliances for Learning Society (VALS Project)



The Apache Software  
Foundation



More information: <http://virtualalliances.eu/>

(García-Peñalvo et al., 2014a, 2014b, 2015b, 2016a, 2016b)



## TACCLE 3 - Coding



- European project that aims to support Primary School and other teachers who want to teach Computing to 4 - 14 year olds. It equips classroom teachers with the knowledge and the materials they need by developing a website of ideas and resources together with in-service training courses and other staff development events
- Funded by the European Union Erasmus + KA2 Programme (Ref. 2015-1-BE02-KA201-012307)
- Duration: September 2015 – October 2017





## TACCLE 3 - Coding



1. To equip fellow classroom teachers, whatever their level of confidence, with the knowledge and the materials they need to teach coding effectively
2. To develop a website of easy-to-follow and innovative ideas and resources to aid teachers in teaching coding. It will also include a review of the current academic research and an overview of the resources currently available for teaching coding
3. To provide national and international in-service training courses and other staff development events to help support and develop confidence and competences in teaching coding

# TACCLE 3 - Coding



portal  
**TACCLE 3 Coding**

HOME IDEAS AND RESOURCES KEEP IN TOUCH

**Taccle3 coding**

Taccle 3 Coding is a project funded under Erasmus+ that supports Primary School and other teachers who want to teach Computing to 4 - 14 year olds. Taccle 3 will equip classroom teachers with the knowledge and the materials they need by developing a website of ideas and resources together with in-service training courses and other staff development events

Many European countries are introducing Computing as a core curriculum subject. Some have already done so; others are intending to. Inevitably the detail of the curricula will be different in each country but there is a substantial overlap - most all of the curricula available so far include coding/programming, control technology and computational thinking so we have started with these.

Click on **Ideas and Resources** or choose from the dropdown above to find curriculum linked resources for teachers in your language.

**THE TACCLE BRAND**

- Taccle1
- Taccle2
- eLearning for Primary Teachers
- eLearning for STEM Teachers
- eLearning for Creative and Performing Arts
- eLearning for Teachers of Key Competences
- eLearning for Humanities Teachers
- Training Courses

**NEWS**

- Learning Futures  
3 months ago with no comments
- High Quality Resources  
3 months ago with no comments
- Salamanca Meeting  
3 months ago with no comments
- First steps in Taccle3  
10 months ago with no comments

**CODING IN ACTION**

- Ynysowen Community Primary School use Sketch up to design their own e-portfolios  
5 months ago with 1 comment
- Ysgol Bryn Eilan pupils coding music with Sonic Pi  
9 months ago with 1 comment
- Bryn Deri Primary School use Scratch to learn maths.  
9 months ago with no comments
- MaKeyMaKey Workshops at Tonypandy Primary  
10 months ago with 1 comment

**#TACCLE3**

- 4 days ago  
RT @angelaarees: Such a good #edublog /t.co/SB6zEWMQ0w lots of great #coding #computing ideas and resources #taccle3
- 4 days ago  
RT @babl\_tech: So much useful research here on children interacting with computers from @ChCiGroup /t.co/KraSBN0ggc :) #Taccle3 #Ba...
- 18 days ago  
Join the @Taccle3 mailing list and share the ways you teach #coding in your classroom /t.co/Qa1Vwju0m

**META**

- Log In
- Entries RSS
- Comments RSS
- WordPress.org

SCROLL DOWN FOR THE MOST RECENT RESOURCES FROM AROUND EUROPE

More information:

<http://www.taccle3.eu/>

(García-Peñalvo, 2015, 2016a;  
García-Peñalvo et al., 2016c;  
García-Peñalvo & Mendes,  
2018)



# WYRED



- WYRED: netWorked Youth Research for Empowerment in the Digital society
- Project coordinator: Dr. Francisco José García-Peñalvo
- Call: European Union. Horizon 2020 Programme. Call H2020-SC6-REV-INEQUAL-2016-2017/H2020-SC6-REVINEQUAL-2016
- Reference: 727066
- Duration: 1/11/2016 – 31/10/2019







WYRED



## Objectives

- to provide a framework in which children and young people can articulate and explore their perspectives and interests in relation to digital society
- to provide a platform from which children and young people can communicate their perspectives to other stakeholders effectively through innovative engagement processes.
- to engage children and young people in a generative research cycle involving networking, dialogue, participatory research and interpretation
- to generate a diverse range of outputs, critical perspectives and other insights that can inform policy and decision-making in relation to children and young people's needs in relation to digital society
- to make this process continuous and sustainable



**WYRED**



Wyred is about **empowering young people**, by trusting them and listening to them.

What we do is bring them together, they **talk** to find out what issues matter most.

Then they **explore** the issues more deeply in projects, looking for solutions, and better understanding. Finally they **share** what they have discovered, with society, with those who make decisions.

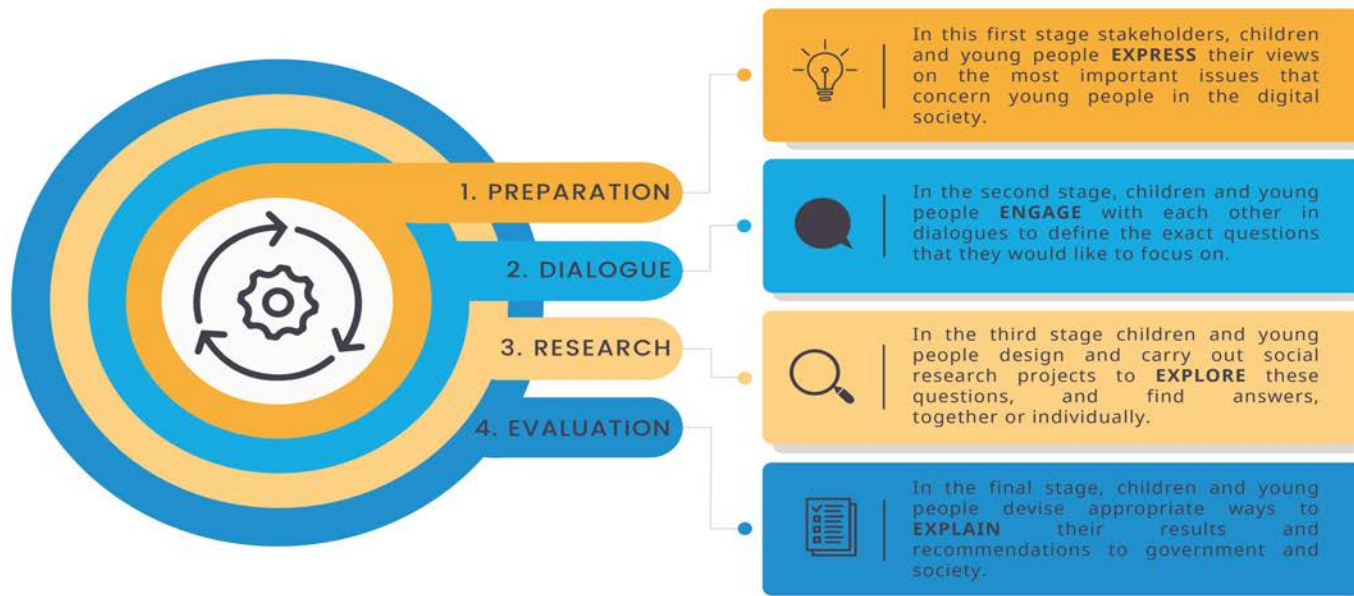
We guide them, they grow and realise their **voice** can be heard, and play a more active role in society.

And society, and policy, find out **what really matters** to young people

# WYRED



## Stakeholders, Children & Young People







# WYRED



Es seguro | <https://platform.wyredproject.eu/projects>

Para acceder rápido a una página, arrástrala a esta barra de marcadores. [Importar marcadores ahora.](#)

HOME COMMUNITIES PROJECTS EVENTS - HELP USER ACCOUNT -

**WYRED**  
The platform for the young

HOME PROJECTS PUBLIC PROJECTS

## Public projects

Please fill in the **Inclusion Questionnaire** before you go on.

Public projects: 89  
*Private projects are only available inside the private communities in which they are developed.*

Tags

Language: - Any - Sort by: Post date Order: Desc Apply Reset

**Our environmental future**

Wouldn't it be great when our world looked like the symbolic picture for the environment project? In fact, we are far away from there. [\(Read more\)](#)

**Animal Protection**

In a short text Romca - a dog - explains that it is a living being, having the right to be treated properly by humans. [\(Read more\)](#)

**Waste of Food - Appeal to the EU**

This project aims at reduction food waste in formulating an appeal to the EU. It is suggested [\(Read more\)](#)

**Radio interview on stress**

Young people are taking over the roles of experts in the topic of stress and are asked in a radio interview (mp3) how stress can be dealt with in everyday life. [\(Read more\)](#)

**School as it is.**

At its birthplace

**Digital implants**

This is a poem about the dangers of

**Tourism in China**

Did you know that in 2016 China

**What's wrong with the education system**

More information:  
<https://wyredproject.eu>

(García-Holgado & García-Peñalvo, 2018, García-Peñalvo, 2016c, 2017; García-Peñalvo & Durán-Escudero, 2017; García-Peñalvo & García-Holgado, 2019; García-Peñalvo & Kearney, 2016;; García-Peñalvo et al., 2018, 2019c, 2019d)



# PROgressive Visual DEcision Making for Digital Humanities



PROVIDEDH

PROgressive Visual DEcision Making for Digital Humanities

- Project coordinator: Dr. Roberto Therón Sánchez
- Call: MINECO. Acciones de Programación Conjunta Internacional, del Programa Estatal de I+D+I Orientada a los Retos de la Sociedad , en el marco del Plan Estatal de Investigación Científica y Técnica y de Innovación 2013-2016
- Reference: PCIN-2017-064
- Duration: 31/12/2017 – 31/12/2020

(Benito-Santos & Therón, 2019)



# PROgressive Visual DEcision Making for Digital Humanities



- In the recent years, with the pervasiveness of computers and a great variety of electronic devices connected to the Internet, Digital Humanities (DH) as a research field has experienced a great transformation that has permitted the completion of very ambitious projects with large impact in the society beyond the academia
- This project aims to provide visual interactive tools that convey the degree of uncertainty of the datasets and computational models used behind, designed to progressively adapt the visualizations to incorporate the new, more complete or more accurate data
- The project would not take only into account scholars, since it is most relevant in DH the fact that the role of citizens has changed enormously
- We live in a society that has democratized science, and the number of projects in which the contribution of citizens, either producing or using digital resources, has exploded
- The experience gained in other areas of science in which the intervention of computing has been much deeper and constant will be analysed and adapted to the case of humanities. Specially, regarding infrastructures, frameworks, models and tools that can be standardized for the different disciplines in the humanities





# RoboSTEAM

## Integrating STEAM and computational thinking development by using robotics and physical devices

Acronym

RoboSTEAM

Funding

European Union. Erasmus+ KA2 – Cooperation and Innovation for Good Practices.  
Strategic Partnerships for school education

Reference

2018-1-ES01-KA201-050939

Duration

2 years, 01/10/2018 to 30/09/2020

Budget

204.620€

More information:

<http://robosteampoint.eu/>

(Conde-González et al., 2019; Fernández-Llamas & Conde-González, 2019; García-Peñalvo, 2019b; Gonçalves et al., 2019a)



# RoboSTEAM

# Schools



IES Eras de Renueva - LEÓN



Agrupamento de Escolas  
Emídio Garcia



UNIVERSITY OF  
EASTERN FINLAND



Agrupamento Emídio Garcia



# RoboSTEAM

# Universities

---



UNIVERSIDAD  
DE SALAMANCA



UNIVERSITY OF  
EASTERN FINLAND





# RoboSTEAM

# Objectives

---

- Main objective
  - Definition of a knowledge base to facilitate integrating STEAM and computational thinking by using robots
- Subobjectives
  - **Analyse the different existing activities that deal with STEAM integration**
  - **Define some challenges and instruments to facilitate STEAM integration and computational thinking development**
  - Define metrics to evaluate both the integration and the competence development
  - **Establish guides for the definition of integration STEAM challenges by using PD&R**
  - **Define educational resources for in-service teachers and future teachers**
  - Establish ways of collaboration between robotic companies and educational institutions
  - **Publish the obtained results in order to involve other educational institutions of the same and different contexts**



# RoboSTEAM How to achieve this

---

- This require
  - Experimenting with STEAM integration projects that help learners to develop computational thinking by using/programming PD&R in pre-university education environments
- To achieve this
  - Exchange in the European context of experiences related to this topic
  - Challenges and tools
  - Analyse results



# Project information

## Building the future of Latin America: engaging women into STEM

Acronym

**W-STEM**

Funding body

**European Union. ERASMUS + Capacity-building in Higher Education Call for proposals EAC/A05/2017**

Reference

**598923-EPP-1-2018-1-ES-EPPKA2-CBHE-JP**

Dates

**3 years, 15/01/2019 too 14/01/2022**

Budget

**862.268€**

More information:

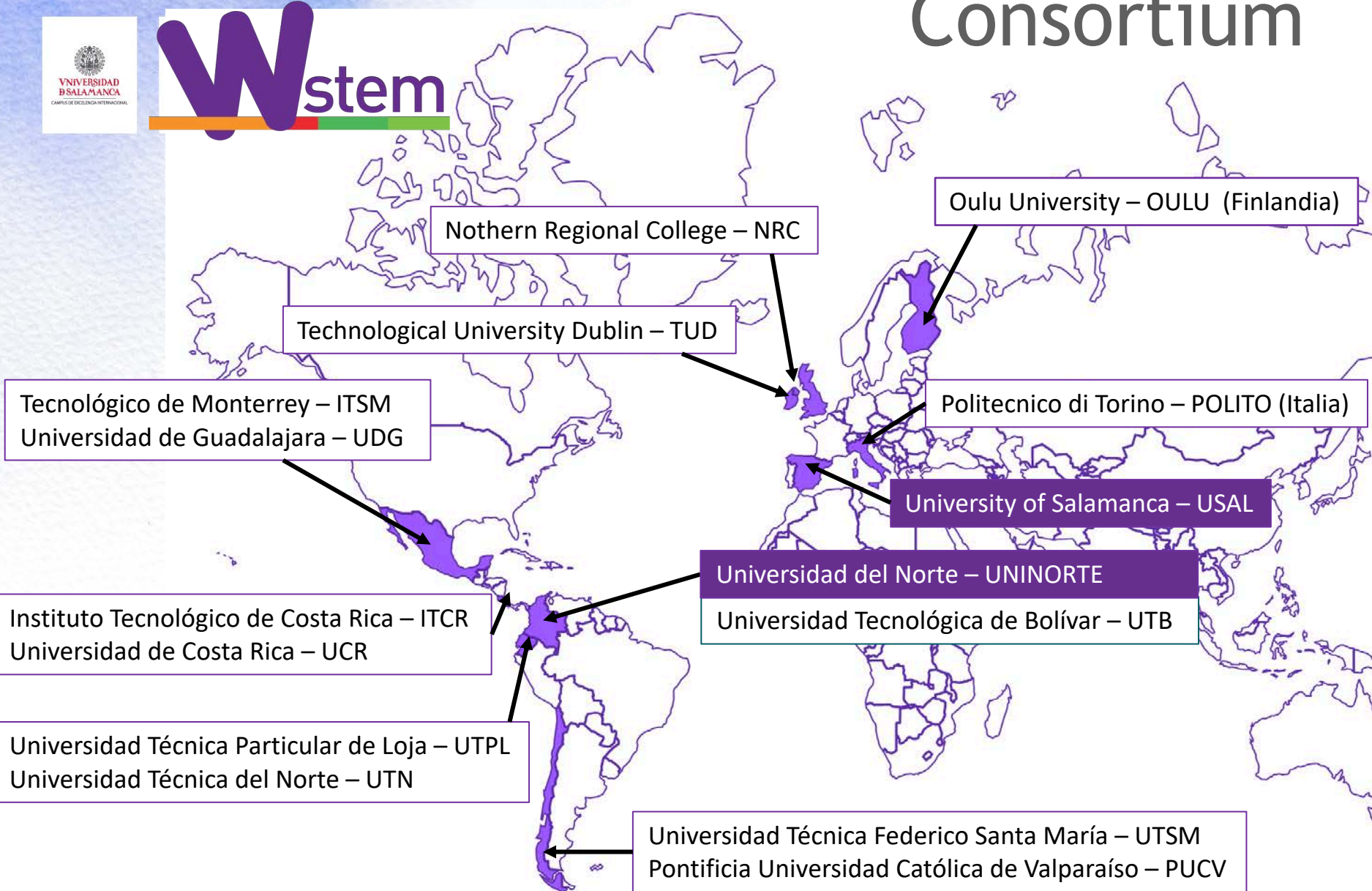
<https://wstemproject.eu/>

(García-Holgado et al., 2019a, 2019b;  
García-Peñalvo, 2019c, 2019d)





# Consortium





# Objetives

- Improve strategies and mechanisms for attracting, accessing and guiding women in Latin America in STEM higher education programs
- W-STEM aims to guarantee the transformation of the current situation in Higher Education Institutions in Latin America



Photo by [Bradley Hook](#) from [Pexels](#)  
<https://goo.gl/VbUxCx>

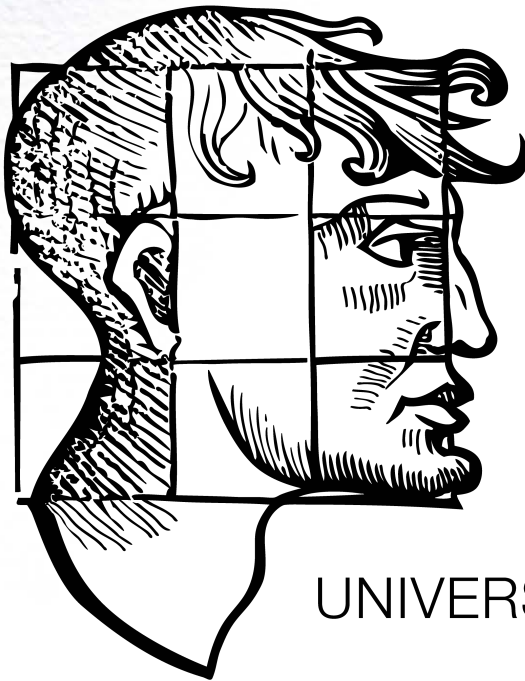


# University of Salamanca promotes STEM





# Scientific Culture & Innovation Unit



unidad  
de **cultura**  
**científica**  
e innovación

UNIVERSIDAD DE SALAMANCA

<http://culturacientifica.usal.es>



# Scientific Culture & Innovation Unit

## Objective



Managing and coordinating the dissemination and scientific culture initiatives that arise in any area of the University, covering all branches of knowledge and offering service to all agents that generate knowledge and innovation (centres, departments, institutes, research groups, researchers, etc.)



# Scientific Culture & Innovation Unit

## Actions



- Showing the scientific and technological potential of the University of Salamanca in its VIII Centenary
- Promoting the scientific vocations in all educational stages, with special attention to girls and young women and university students in the STEM studies
- Extending the scientific and technological cultural activity produced at the University of Salamanca outside the local area by collaborating with rural, regional and national agents through shared projects such as exhibition itineraries and dynamization of specific activities in these environments





# Scientific Culture & Innovation Unit

## Activities



- International Day of Women and Girls in Science





# Scientific Culture & Innovation Unit

## Activities



- International Day of Women and Girls in Science
  - Different events and activities <http://saladeprensa.usal.es/node/111832>
  - Research Speed Dating with research women
  - Breakfast of research women of the University of Salamanca
  - Exhibition "Female milestones in the biomedical sciences"
  - Exhibition "Woman had to be!"
  - Scientists in the classrooms
  - Etc.





# Medialab USAL

- More related to STEAM than STEM
- It means an open space for art, technology and society
- An approach to open science throughout the social innovation



MEDIALAB USAL

<http://medialab.usal.es/>





# Medialab USAL



## Activities

- Pechakucha Night Salamanca
  - PechaKucha 20x20 is a simple presentation format where you show 20 images, each for 20 seconds. The images advance automatically and you talk along to the images
  - MEDIALAB USAL organizes pechakucha events to present projects, ideas and innovative experiences of the University researchers
  - Several Pechakucha events on science have been organized. The last PechaKucha Night was last May 24. The event was focused on STEM
  - Seven speakers participated (physicists, statisticians, mathematicians, environmentalists, engineers, etc.)



# Medialab USAL



## Activities

- Pechakucha Night Salamanca





# Medialab USAL



## Activities

- 3D Printing Workshops
  - One of the objectives of MEDIALAB USAL is to promote the use of technology in the University and in society
  - MEDIALAB USAL organizes workshops and activities on various technologies, such as 3d printing, Arduino, etc.
  - In the 3D printing workshops MEDIALAB USAL teaches how to use these printers in academic and professional projects
  - It is very related to computational thinking. In this regard, GRIAL research group is participating with the National Association for Computers in Education (ADIE) and the National Scientific Informatics Association (SCIE) to define an Informatics curriculum for pre-university students in Spain (García-Peñalvo & Cruz-Benito, 2016, García-Peñalvo et al., 2017; Llorens-Largo et al., 2017; Velázquez-Iturbide, 2018; Velázquez-Iturbide et al., 2018)





# Medialab USAL



## Activities

- 3D Printing Workshops





# Medialab USAL



## Activities

- Augmented reality sandbox: a platform for educative experiences
  - A collaborative and interdisciplinary project developed in MEDIALAB USAL
  - The goal is to make teaching mathematics and natural sciences easier for elementary school children
  - This project uses the Augmented Reality to implement a resource for the teaching of mathematics and natural sciences. This installation uses an infrared camera to read the three-dimensional surface of the sand and then draw on it contours and bodies of water that are transformed when the user interacts with the sand

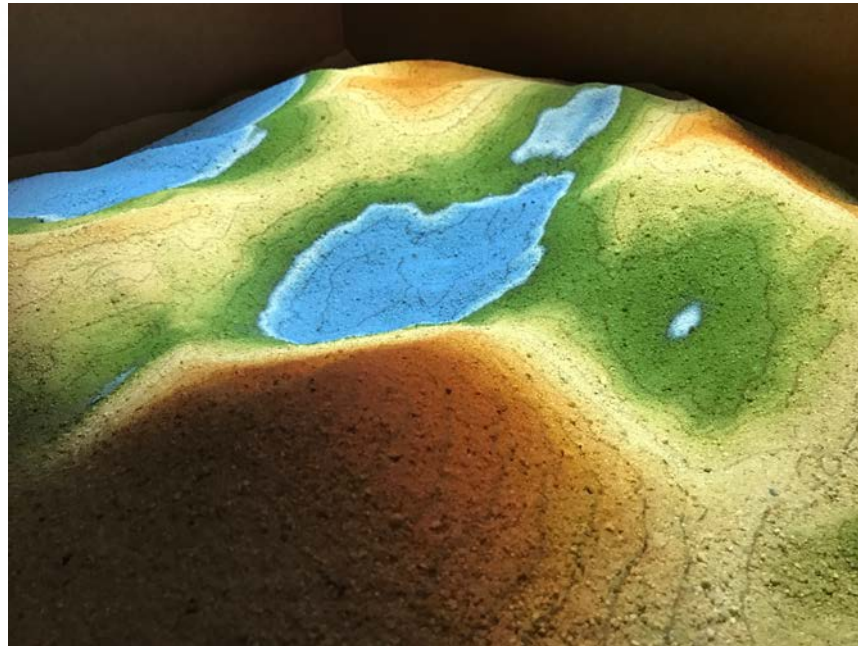


# Medialab USAL



## Activities

- Augmented reality sandbox: a platform for educative experiences



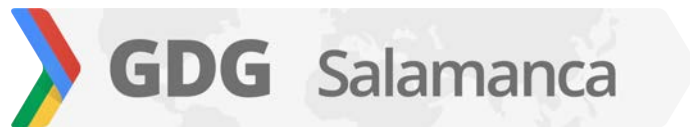


# Women in STEM

- Prof. Dr. Dolores Pereira Vice-president of the Association of Women in Research and Technology <http://www.amit-es.org>



- Collaboration with WomenTechmakers, a community which organizes Women Techmakers events and works to increase an environment of inclusivity in STEM areas <https://gdgsalamanca.com> <http://wtm.gdg.es>



Women Techmakers



# Women in STEM

- Teaching innovation projects such as a pilot experience to include the gender perspective in STEM careers (García-Holgado et al., 2017, 2018, 2019a, 2019b, 2019c)



**Fran García Peñalvo** @frangp · 28 feb. · 17  
"IBM International Women Day", a boost to the women  
#is1usal17

**Alicia García** @mambanegra86 · 8 mar. · 17  
Helping women progress in traditionally male dominated fields  
blog.frontiersin.org/2017/03/08/hel... #is1usal17

**TimesHigherEducation** @timeshighereducation · 16:18 - 20 mar. 2017  
Gender in the Global Research La mix of researchers in 1996 to 2000  
timeshighereducation.com/news/w

**Alicia García** @mambanegra86 · 3 mar. · 17  
The exact age when girls lose interest in science and math - CNNMoney  
cnnmon.ie/29rvu7 #is1usal17

**Alicia García** @mambanegra86 · 18 may. · 17  
20:20 in Peñuñas Pechakucha about Women and Science  
fcd1abusal #is1usal17 pechakuchasalamanca.es

**Alicia García** @mambanegra86 · 1:11 · 17  
From Argentina: How do you imagin  
/yUznq2SHKMs #is1usal17 @Plan

**111 Mil: Chi**  
youtube.com

**Empowering women to progress in trad**  
What are the factors that affect women f  
in STEM fields?

**"IBM International Women Day", un impulso a la visibilidad de la**  
Con motivo del Día Internacional de la Mujer, IBM quiere impulsar la  
visibilidad de las mujeres en el mundo profesional, por lo que han

**MANCHA LABUSAL VOL. 14**  
Mujer & Ciencia

**The exact age when girls lose interest in science and math**  
A new European survey commissioned by Microsoft found that young girls  
become interested in these subjects around the age of 11 and then quickly  
money.cnn.com



# STEM recognition

## PIIECYL 2019

- INICIO
- COMITÉS
- PROGRAMA
- ACTAS
- CONTACTO

### Sexta edición Premios de Investigación e Innovación en ESO, Bachillerato y Formación Profesional



#### Qué son

PIIECYL se organiza con el fin de incentivar la realización de proyectos de investigación e innovación mediante el reconocimiento oficial de los alumnos autores de aquellos que merezcan especial consideración. Para más información sobre estos premios, haz click aquí.



#### Donde y Cuando

La Exposición asociado a los VI Premios de Investigación e Innovación en ESO, Bachillerato y Formación Profesional tendrá lugar en la Facultad de Ciencias de la Universidad de Salamanca, el día 10 de abril de 2019.



#### Participantes

Alumnado que esté cursando ESO, bachillerato o formación profesional en centros educativos de la Comunidad de Castilla y León. Los alumnos participan de forma individual o colectiva, en este último caso, con hasta un máximo de tres personas.



#### Actas

Las Actas de los Premios en formato PDF son de dominio público a través de la licencia Creative Commons "BY-NC-ND 4.0 Internacional". El envío de comunicaciones supone la aceptación y constancia de esta normativa de publicación.

<https://piiecyL.usal.es/>



# Connecting with pre-university students

- Science Research/Excellence High School Diploma
  - Vaguada de la Palma High School in collaboration with the University of Salamanca
  - With the aim of favouring a rigorous, orderly and critical scientific mentality and providing a closer relationship between teachers and students in order to carry out a joint research
  - Project-based learning methodology
  - From 2014-2015 (five editions)
  - 71 projects developed in these years

<http://www.iesvaguada.com/oferta/bie.html>



# STEM divulgation



- Experience University – Post-graduate Science itinerary
  - Starting in 2017-2018 academic course
  - The most demanded itinerary of the programme
  - 75 enrolled students
  - Age average 62, the youngest 55 years old and the oldest 75 years old
  - A very heterogeneous group (people with basic studies, housewives, firemen, doctors, primary school teachers, nurses, etc.)
  - Syllabus (40 hours organized in 1.5-hour sessions)
    - Maths
    - Chemistry and Chemistry Engineering
    - Physics
    - Biology
    - Computer Science





# STEM divulgation

- Events about technology in collaboration with the GDG Salamanca, the Faculty of Sciences or the students delegations
  - Android Day <http://android2015.gdgsalamanca.com>
  - Design&Tech (three editions) <http://design.gdgsalamanca.com>
  - GeekUSAL <https://sites.google.com/usal.es/geekusal>
- Collaboration with "Pint of Sciences" Festival since 2016





## STEM divulgation



- Collaboration in workshops with children in rural areas “Con Ciencia de Pueblo” (2017)
- Sciences week in INCYL with exhibitions, workshops and other activities (2016)
- Educational Workshops about “Discover your DNA” or “Reveal your fingerprint as in CSI”
- Brain Awareness Week organized by INCYL since 2012 (seven editions)
  - <http://tv.usal.es/videos/3013/la-semana-del-cerebro-en-el-incyl>
  - <http://saladeprensa.usal.es/node/112276>



## STEM divulgation

- The University of Salamanca recovers one of the most important collections of Eocene vertebrates in Europe
  - The paleontological collection of the Turtles Room in the Faculty of Sciences renews its contents and exhibition space







# STEM and beyond





## An interdisciplinary approach

- An example of this is the Research Institute for Educational Sciences (IUCE - <https://iuce.usal.es/>)
- Integrating research groups from
  - Education
  - Communication
  - Computer Science
  - Medicine
- It promotes an interdisciplinary PhD Programme so called Education in the Knowledge Society (<https://knowledgesociety.usal.es/>)



INSTITUTO UNIVERSITARIO  
DE CIENCIAS DE LA EDUCACIÓN

[iuce.usal.es](https://iuce.usal.es)



# An interdisciplinary approach

knowledge society.usal.es

Personalizar vínculos

Buscar en el portal

Doctoral Programme Education in the Knowledge Society  
University of Salamanca

INICIO INFORMACIÓN CALIDAD MIEMBROS SEMINARIOS PUBLICACIONES TESIS CALENDARIO REPOSITORIO MULTIMEDIA AYUDA

Buscar

XXVIII Jornada Internacional de Tecnología Educativa (JUTE 2020)  
Enviado por PhD el 12 Noviembre 2019 - 11:15

**ECOPEDAGOGÍA EN PAISAJES DIGITALES: PENSANDO EL FUTURO Y MARCANDO EL RUMBO**  
25-26 DE JUNIO, 2020. SALAMANCA

XXVIII Jornada Internacional de Tecnología Educativa (JUTE 2020)  
25-26 JUNIO 2020  
Grupo de investigación en Innovación-Tecnología Educativa (GITE-USAL).  
UNIVERSIDAD DE SALAMANCA, SALAMANCA, SPAIN

Leer más

Llamada a la participación de las JENUI 2020  
Enviado por Ana Belén González Rogado el 11 Noviembre 2019 - 09:43

**Vice Jenui:2020**

El objetivo de las XXXVI Jornadas sobre la Enseñanza Universitaria de la Informática (JENUI 2020), promovidas por la Asociación de Enseñantes Universitarios de la Informática (AENUI) y organizadas por la Escola Tècnica Superior d'Enginyeria de la Universitat de València, es promover

Valencia  
Del 8 al 10 de Julio de 2020

Leer más

Streaming

PhDEducationKs

Próximos seminarios

No hay seminarios programados.

Enlaces de interés

Normativa del Programa

- Kick-off meeting curso 2019-2020
- Preguntas frecuentes
- Reglamento tesis doctoral por compendio de artículos
- Manual de Calidad del Programa
- Sesión de dudas con el coordinador del Programa

Calidad

- Informe favorable de renovación de la acreditación del Programa
- Portal del Programa como buena práctica de Gestión en la USAL

Escuela de doctorado

- Aplicación RAPI de la USAL
- Tu cuenta de correo institucional
- Información y trámites administrativos
- Impresos y formularios

Recursos

- Acceso a Web Of Sciences (WOS)
- Acceso a Scopus
- Índices de impacto
- Curriculum Vitae Normalizado (CVN)

Becas y ayudas

- Convocatorias de la USAL
- Ayudas FPU

More information:

<https://knowledgesociety.usal.es/>

(García-Holgado et al., 2015; García-Peñalvo, 2013a, 2014a, 2015a, 2019a; García-Peñalvo et al., 2019b)



# An interdisciplinary approach

TEEM'18  
TECHNOLOGY, TECHNICAL EDUCATION AND EMERGING MULTIDISCIPLINARY

24-26 October 2018  
Salamanca, Spain

**Proceedings**  
All accepted papers will be published in the ACM Digital Library as a volume in its International Conference Proceedings Series with ISBN and indexed in SCOPUS.

**Sixth edition**  
Sixth edition following the successful results obtained in the previous editions of TEEM, namely in 2012, in 2014, in 2016, in 2018 and in 2017 in both scientific outcomes, human relationships and cooperation opportunities.

**Innovation**  
It is divided in thematic and highly cohesive tracks. Each track shares the scientific and formal aspects for paper submissions, peer reviews and publication, but the track chairs will organize the proper dynamics to create a researching community.

**Conference Chair**  
Francisco J. García-Peñalvo  
HEAD OF ORAL RESEARCH GROUP

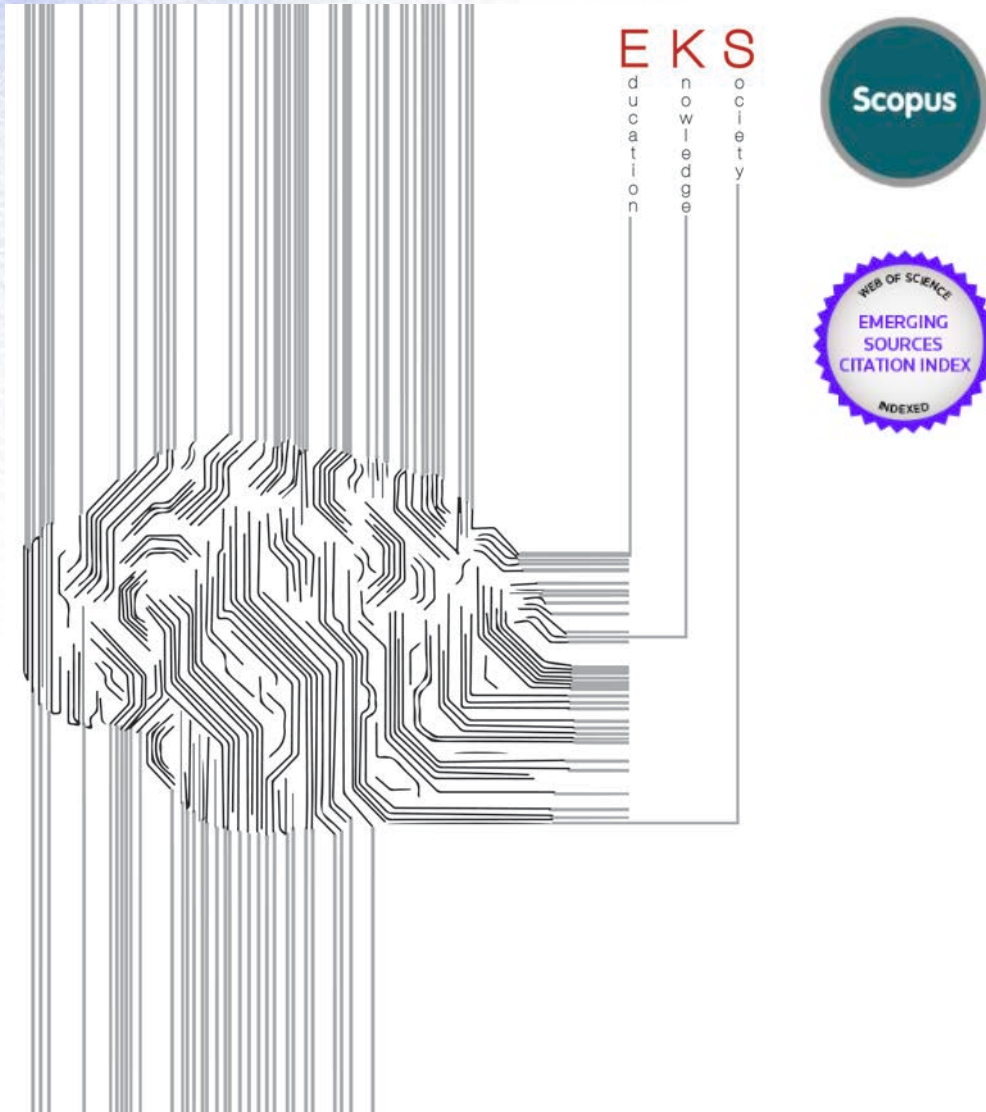
**Organization**

Past edition proceedings  
(García-Peñalvo, 2013b, 2014b, 2016b, 2018; Alves, & Felgueiras, 2015; Dodero et al., 2017; Conde-González et al., 2019b)

<https://2018.teemconference.eu/>



# An interdisciplinary approach



(García-Peñalvo et al., 2019a)

<http://revistas.usal.es/index.php/eks/>





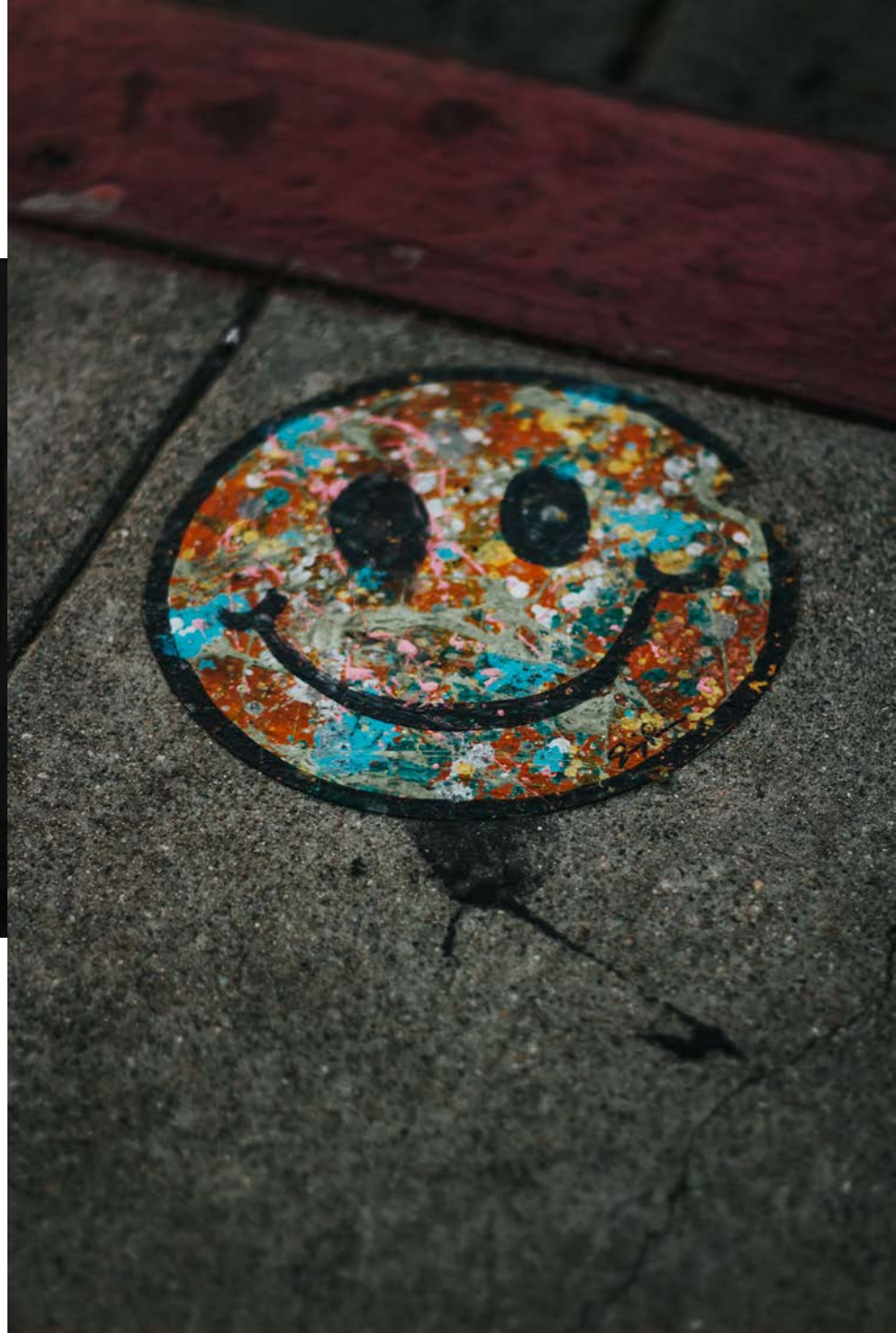
**Are you interested in a collaboration?**

**Contact us**

**[fgarcia@usal.es](mailto:fgarcia@usal.es)**



<https://goo.gl/WwP6fu>



<https://goo.gl/c5hJGR>  
Photo by [Devin Avery](#) on [Unsplash](#)





# REFERENCES



# References

- Alves, G. R., & Felgueiras, M. C. (Eds.). (2015). *Proceedings of the Third International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'15)* (Porto, Portugal, October 7-9, 2015). New York, USA: ACM.
- Benito-Santos, A., & Therón, R. (2019). Cross-domain visual exploration of academic corpora via the latent meaning of user-authored keywords. *IEEE Access*, 7, 98144-98160. doi:10.1109/ACCESS.2019.2929754
- Conde-González, M. Á., Fernández-Llamas, C., Ribeiro Alves, J. F., Ramos, M. J., Celis Tena, S., Gonçalves, J., . . . García-Peñalvo, F. J. (2019a). RoboSTEAM - A Challenge Based Learning Approach for integrating STEAM and develop Computational Thinking. In M. Á. Conde-González, F. J. Rodríguez-Sedano, C. Fernández-Llamas, & F. J. García-Peñalvo (Eds.), *TEEM'19 Proceedings of the Seventh International Conference on Technological Ecosystems for Enhancing Multiculturality* (Leon, Spain, October 16th-18th, 2019) (pp. 24-30). New York, NY, USA: ACM.
- Conde-González, M. Á., Rodríguez-Sedano, F. J., Fernández-Llamas, C., & García-Peñalvo, F. J. (Eds.). (2019b). *TEEM'19 Proceedings of the Seventh International Conference on Technological Ecosystems for Enhancing Multiculturality* (Leon, Spain, October 16th-18th, 2019). New York, USA: ACM.
- Doderó, J. M., Ibarra Sáiz, M. S., & Ruiz Rube, I. (Eds.). (2017). *Proceedings of the Fifth International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'17)* (Cádiz, Spain, October 18-20, 2017). New York, NY, USA: ACM.
- Fernández-Llamas, C., & Conde-González, M. Á. (2019). *RoboSTEAM Project – A brief review*. doi:10.5281/zenodo.3531941. <https://zenodo.org/record/3531941>
- García-Holgado, A., Camacho Díaz, A., & García-Peñalvo, F. J. (2019). Engaging women into STEM in Latin America: W-STEM project. In M. Á. Conde-González, F. J. Rodríguez-Sedano, C. Fernández-Llamas, & F. J. García-Peñalvo (Eds.), *TEEM'19 Proceedings of the Seventh International Conference on Technological Ecosystems for Enhancing Multiculturality* (Leon, Spain, October 16th-18th, 2019) (pp. 232-239). New York, NY, USA: ACM.
- García-Holgado, A., Camacho Díaz, A., & García-Peñalvo, F. J. (2019). La brecha de género en el sector STEM en América Latina: Una propuesta europea. In M. L. Sein-Echaluce Lacleta, Á. Fidalgo-Blanco, & F. J. García-Peñalvo (Eds.), *Actas del V Congreso Internacional sobre Aprendizaje, Innovación y Competitividad. CINAIC 2019 (9-11 de Octubre de 2019, Madrid, España)* (pp. 704-709). Zaragoza, Spain: Servicio de Publicaciones Universidad de Zaragoza
- García-Holgado, A., & García-Peñalvo, F. J. (2018). *WYRED Platform, the ecosystem for the young people*. Paper presented at the HCI International 2018, Las Vegas, NV, USA. <https://youtu.be/TRDiN5boky8>





# References

- García-Holgado, A., García-Peñalvo, F. J., Mena Marcos, J. J., & González, C. (2017). Introducción de la Perspectiva de Género en la docencia de Ingeniería del Software. In M. L. Sein-Echaluce Lacleta, Á. Fidalgo-Blanco, & F. J. García-Peñalvo (Eds.), *La innovación docente como misión del profesorado. Actas del IV Congreso Internacional sobre Aprendizaje, Innovación y Competitividad. CINAIC 2017 (4-6 de Octubre de 2017, Zaragoza, España)* (pp. 627-631). Zaragoza, España: Servicio de Publicaciones Universidad de Zaragoza.
- García-Holgado, A., García-Peñalvo, F. J., & Rodríguez-Conde, M. J. (2015). Definition of a technological ecosystem for scientific knowledge management in a PhD Programme. In G. R. Alves & M. C. Felgueiras (Eds.), *Proceedings of the Third International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'15) (Porto, Portugal, October 7-9, 2015)* (pp. 695-700). New York, NY, USA: ACM.
- García-Holgado, A., Mena, J., García-Peñalvo, F. J., & González, C. S. (2018). Inclusion of gender perspective in Computer Engineering careers: Elaboration of a questionnaire to assess the gender gap in Tertiary Education 2018 *IEEE Global Engineering Education Conference (EDUCON), (17-20 April 2018, Santa Cruz de Tenerife, Canary Islands, Spain)* (pp. 1553-1560). USA: IEEE
- García-Holgado, A., Vázquez-Ingelmo, A., Mena, J., García-Peñalvo, F. J., González, C., Sánchez-Gómez, M. C., & Verdugo-Castro, S. (2019a). Estudio piloto sobre la percepción de la brecha de género en estudios de ingeniería informática. In M. L. Sein-Echaluce Lacleta, Á. Fidalgo-Blanco, & F. J. García-Peñalvo (Eds.), *Actas del V Congreso Internacional sobre Aprendizaje, Innovación y Competitividad. CINAIC 2019 (9-11 de Octubre de 2019, Madrid, España)* (pp. 698-703). Zaragoza, Spain: Servicio de Publicaciones Universidad de Zaragoza.
- García-Holgado, A., Vázquez-Ingelmo, A., Verdugo-Castro, S., González, C., Sánchez-Gómez, M. C., & García-Peñalvo, F. J. (2019b). Actions to Promote Diversity in Engineering Studies: a Case Study in a Computer Science Degree. In A. K. Ashmawy & S. Schreiter (Eds.), *Proceedings of the 2019 IEEE Global Engineering Education Conference (EDUCON), (8-11 April 2019, Dubai, United Arab Emirates)* (pp. 793-800). USA: IEEE.
- García-Holgado, A., Verdugo-Castro, S., Sánchez-Gómez, M. C., & García-Peñalvo, F. J. (2019c). Trends in studies developed in Europe focused on the gender gap in STEM *Proceedings of the XX International Conference on Human Computer Interaction (Donostia, Gipuzkoa, Spain — June 25 - 28, 2019)* (Article Number 47). New York, NY, USA: ACM.
- García-Peñalvo, F. J. (2013a). Education in knowledge society: A new PhD programme approach. In F. J. García-Peñalvo (Ed.), *Proceedings of the First International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'13) (Salamanca, Spain, November 14-15, 2013)* (pp. 575-577). New York, NY, USA: ACM.



# References

- García-Peñalvo, F. J. (Ed.) (2013b). *Proceedings of the First International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'13) (Salamanca, Spain, November 14-15, 2013)*. New York, USA: ACM.
- García-Peñalvo, F. J. (2014a). Formación en la sociedad del conocimiento, un programa de doctorado con una perspectiva interdisciplinar. *Education in the Knowledge Society*, 15(1), 4-9.
- García-Peñalvo, F. J. (Ed.) (2014b). *Proceedings of the Second International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'14) (Salamanca, Spain, October 1-3, 2014)*. New York, USA: ACM.
- García-Peñalvo, F. J. (2015a). Engineering contributions to a Knowledge Society multicultural perspective. *IEEE Revista Iberoamericana de Tecnologías del Aprendizaje (IEEE RITA)*, 10(1), 17-18. doi:10.1109/RITA.2015.2391371
- García-Peñalvo, F. J. (2015b). Mapa de tendencias en Innovación Educativa. *Education in the Knowledge Society (EKS)*, 16(4), 6-23. doi:10.14201/eks2015164623
- García-Peñalvo, F. J. (2016a). A brief introduction to TACCLE 3 – Coding European Project. In F. J. García-Peñalvo & J. A. Mendes (Eds.), *2016 International Symposium on Computers in Education (SIIE 16)*. USA: IEEE. doi:10.1109/SIIE.2016.7751876
- García-Peñalvo, F. J. (Ed.) (2016b). *Proceedings of the Fourth International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'16) (Salamanca, Spain, November 2-4, 2016)*. New York, USA: ACM.
- García-Peñalvo, F. J. (2016c). The WYRED Project: A Technological Platform for a Generative Research and Dialogue about Youth Perspectives and Interests in Digital Society. *Journal of Information Technology Research*, 9(4), vi-x.
- García-Peñalvo, F. J. (2017). WYRED Project. *Education in the Knowledge Society*, 18(3), 7-14. doi:10.14201/eks2017183714
- García-Peñalvo, F. J. (Ed.) (2018). *TEEM'18 Proceedings of the Sixth International Conference on Technological Ecosystems for Enhancing Multiculturality (Salamanca, Spain, October 24th-26th, 2018)*. New York, USA: ACM.
- García-Peñalvo, F. J. (2019a). *Programa de Doctorado Formación en la Sociedad del Conocimiento. Kick-off de la Edición 2019-2020*. Seminarios del Programa de Doctorado en Formación en la Sociedad del Conocimiento (21 de octubre de 2019), Salamanca, España. <https://bit.ly/33kfJzl>



# References

- García-Peñalvo, F. J. (2019b). *O3 RoboSTEAM Environment – First overview and discussions*. Paper presented at the RoboSTEAM Erasmus+ project Kick-Off, Bragança, Portugal. <https://goo.gl/hro7tc>
- García-Peñalvo, F. J. (2019c). *W-STEM Project Overview*. W-STEM Erasmus+ project Kick-Off, Salamanca, Spain. <https://goo.gl/19vjtx>
- García-Peñalvo, F. J. (2019d). Women and STEM disciplines in Latin America: The W-STEM European Project. *Journal of Information Technology Research*, 12(4), v-viii.
- García-Peñalvo, F. J., & Cruz-Benito, J. (2016). Computational thinking in pre-university education. In F. J. García-Peñalvo (Ed.), *Proceedings of the Fourth International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'16) (Salamanca, Spain, November 2-4, 2016)* (pp. 13-17). New York, NY, USA: ACM.
- García-Peñalvo, F. J., Cruz-Benito, J., Conde, M. Á., & Griffiths, D. (2014a). Virtual placements for informatics students in open source business across Europe 2014 *IEEE Frontiers in Education Conference Proceedings (October 22-25, 2014 Madrid, Spain)* (pp. 2551-2555). USA: IEEE.
- García-Peñalvo, F. J., Cruz-Benito, J., Conde, M. Á., & Griffiths, D. (2015). Semester of Code: Piloting Virtual Placements for Informatics across Europe *Proceedings of Global Engineering Education Conference, EDUCON 2015. Tallinn, Estonia, 18-20 March 2015* (pp. 567-576). USA: IEEE.
- García-Peñalvo, F. J., Cruz-Benito, J., Griffiths, D., & Achilleos, A. P. (2016a). Virtual placements management process supported by technology: Proposal and firsts results of the Semester of Code. *IEEE Revista Iberoamericana de Tecnologías del Aprendizaje (IEEE RITA)*, 11(1), 47-54. doi:10.1109/RITA.2016.2518461
- García-Peñalvo, F. J., Cruz-Benito, J., Griffiths, D., Sharples, P., Willson, S., Johnson, M., . . . Lee, S. (2014b). Developing Win-Win Solutions for Virtual Placements in Informatics: The VALS Case. In F. J. García-Peñalvo (Ed.), *Proceedings of the Second International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'14)* (pp. 733-738). New York, USA: ACM.
- García-Peñalvo, F. J., & Durán-Escudero, J. (2017). Interaction design principles in WYRED platform. In P. Zaphiris & A. Ioannou (Eds.), *Learning and Collaboration Technologies. Technology in Education. 4th International Conference, LCT 2017. Held as Part of HCI International 2017, Vancouver, BC, Canada, July 9–14, 2017. Proceedings, Part II* (pp. 371-381). Switzerland: Springer International Publishing.



# References

- García-Peñalvo, F. J., & García-Holgado, A. (2019). WYRED, a platform to give young people the voice on the influence of technology in today's society. A citizen science approach. In K. O. Villalba-Condori, F. J. García-Peñalvo, J. Lavonen, & M. Zapata-Ros (Eds.), *Proceedings of the II Congreso Internacional de Tendencias e Innovación Educativa – CITIE 2018 (Arequipa, Perú, November 26-30, 2018)* (pp. 128-141). Aachen, Germany: CEUR-WS.org.
- García-Peñalvo, F. J., García-Holgado, A., Vázquez-Ingelmo, A., & Seoane-Pardo, A. M. (2018). Usability test of WYRED Platform. In P. Zaphiris & A. Ioannou (Eds.), *Learning and Collaboration Technologies. Design, Development and Technological Innovation. 5th International Conference, LCT 2018, Held as Part of HCI International 2018, Las Vegas, NV, USA, July 15-20, 2018, Proceedings, Part I* (pp. 73-84). Cham, Switzerland: Springer.
- García-Peñalvo, F. J., Griffiths, D., Cruz-Benito, J., Veenendaal, E., Achilleos, A. P., Wilson, S., & Kapitsaki, G. (2016b). Understanding the barriers to virtual student placements in the Semester of Code. *Education in the Knowledge Society*, 17(1), 147-173. doi:10.14201/eks2016171147173
- García-Peñalvo, F. J., & Kearney, N. A. (2016). Networked youth research for empowerment in digital society. The WYRED project. In F. J. García-Peñalvo (Ed.), *Proceedings of the Fourth International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'16) (Salamanca, Spain, November 2-4, 2016)* (pp. 3-9). New York, NY, USA: ACM.
- García-Peñalvo, F. J., Llorens Largo, F., Molero Prieto, X., & Vendrell Vidal, E. (2017). Educación en Informática sub 18 (EI<18). *ReVisión*, 10(2), 13-18.
- García-Peñalvo, F. J., Martínez-Abad, F., & García-Carrasco, J. (2019a). Twentieth Anniversary of EKS Journal. *Education in the Knowledge Society*, 20, 1. doi:10.14201/eks2019\_20\_a1
- García-Peñalvo, F. J., & Mendes, J. A. (2018). Exploring the computational thinking effects in pre-university education. *Computers in Human Behavior*, 80, 407-411. doi:10.1016/j.chb.2017.12.005
- García-Peñalvo, F. J., Reimann, D., Tuul, M., Rees, A., & Jormanainen, I. (2016c). *An overview of the most relevant literature on coding and computational thinking with emphasis on the relevant issues for teachers*. Belgium: TACCLE3 Consortium. doi:10.5281/zenodo.165123
- García-Peñalvo, F. J., Rodríguez-Conde, M. J., García-Holgado, A., & Gómez-Díaz, R. (2019b). *Portal para la gestión del conocimiento y difusión del Programa de Doctorado Formación en la Sociedad del Conocimiento (BP-G-002)*. Salamanca, España: Universidad de Salamanca. Retrieved from <https://bit.ly/31AClKe>





# References

- García-Peñalvo, F. J., Vázquez-Ingelmo, A., & García-Holgado, A. (2019c). Study of the Usability of the WYRED Ecosystem Using Heuristic Evaluation. In P. Zaphiris & A. Ioannou (Eds.), *Learning and Collaboration Technologies. Design, Experiences. 6th International Conference, LCT 2019, Held as Part of the 21st HCI International Conference, HCII 2019, Orlando, FL, USA, July 26–31, 2019. Proceedings, Part I* (pp. 50-63). Cham, Switzerland: Springer Nature.
- García-Peñalvo, F. J., Vázquez-Ingelmo, A., García-Holgado, A., & Seoane-Pardo, A. M. (2019d). Analyzing the usability of the WYRED Platform with undergraduate students to improve its features. *Universal Access in the Information Society*, 18(3), 455-468. doi:10.1007/s10209-019-00672-z
- Gonçalves, J., Lima, J., Brito, T., Brancalião, L., Camargo, C., Oliveira, V., & Conde., M. Á. (2019). Educational Robotics Summer Camp at IPB: A Challenge based learning case study. In M. Á. Conde-González, F. J. Rodríguez-Sedano, C. Fernández-Llamas, & F. J. García-Peñalvo (Eds.), *TEEM'19 Proceedings of the Seventh International Conference on Technological Ecosystems for Enhancing Multiculturality (Leon, Spain, October 16th-18th, 2019)* (pp. 36-43). New York, NY, USA: ACM.
- Llorens Largo, F., García-Peñalvo, F. J., Molero Prieto, X., & Vendrell Vidal, E. (2017). La enseñanza de la informática, la programación y el pensamiento computacional en los estudios preuniversitarios. *Education in the Knowledge Society*, 18(2), 7-17. doi:10.14201/eks2017182717
- Velázquez-Iturbide, J. Á. (2018). Report of the Spanish Computing Scientific Society on Computing Education in Pre-University Stages. In F. J. García-Peñalvo (Ed.), *Proceedings TEEM'18. Sixth International Conference on Technological Ecosystems for Enhancing Multiculturality (Salamanca, Spain, October 24th-26th, 2018)* (pp. 2-7). New York, NY, USA: ACM.
- Velázquez Iturbide, J. Á., Bahamonde, A., Dabic, S., Escalona, M. J., Feito, F., Fernández Cabaleiro, S., . . . Zapata Ros, M. (2018). *Informe del Grupo de Trabajo SCIE/CODDII sobre la enseñanza preuniversitaria de la informática*. España: Sociedad Científica Informática de España, Conferencia de Decanos y Directores de Ingeniería Informática. Retrieved from <https://goo.gl/dmCPgm>
-



## This work may be cited as follows

- García-Peñalvo, F.J. (2019). *STEM policies at the University of Salamanca..* STEM Working Group, Coimbra Group, 15 November 2019 – Granada, Spain. doi:10.5281/zenodo.3539482. <https://bit.ly/2NHqqXx>



# STEM policies at the University of Salamanca

**Prof. Dr. Francisco José García-Peñalvo**

**Computer Science Department**

**Research Institute for Educational Science**

**GRIAL Research Group**

**University of Salamanca**

[fgarcia@usal.es](mailto:fgarcia@usal.es)

<http://grial.usal.es>

<http://twitter.com/frangp>

STEM Working Group  
Coimbra Group  
Granada, November 15th 2019