

**35th IASP World Conference  
on Science Parks and Areas of Innovation 2018  
Isfahan, Iran**

**Science and Technology in feminine**

*Parallel session 6:*

*The 'Lab factor': Living Labs, Fab Labs and STPs*

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ISFAHAN  
SCIENCE & TECHNOLOGY TOWN  
(ISTT)

## Science and Technology in feminine

### Executive Summary:

Currently there are few women working in **STEM** (science, technology, engineering and mathematics) disciplines, which is detrimental to society as a whole because it dispenses with the views, ideas, creativity, work and knowledge of half of the population, undoubtedly beneficial for the collective.

In **APTE (Association of Science and Technology Parks of Spain)**, we believe that we can help change this. Science and technology parks (STPs) are currently playing an important role in innovation processes, as they act as links between the main agents that make up the innovation ecosystem.

In this way, the APTE working group called “fostering science vocations” designed the project “**Science and Technology in feminine**” the main goal of which is promote feminine science and technology vocations in order to increase the future choice of STEM careers among girls.

In this document we have included the main conclusions and lessons learned from the project activities carried out so far.

### Development of activities, lessons learned and proposals for the future of the initiative:

With this project from our Association we intend to collaborate in the **generation and promotion of the talent** that will lead the companies of the future in the Spanish science and technology parks, and also **reduce the gender gap in STEM fields**.

To achieve this goal, APTE is collaborating with 17 science and technology parks throughout Spain which are participating in the project work plan, providing the action with coverage and impact at the national level.

The aim of the “Science and Technology in feminine” programme is to promote scientific and technological vocations with a view to increasing the choice of scientific and technological studies among young women in the future.

The program will be aimed at students from the 1st to 3rd years of Compulsory Secondary Education (11-13 years) and will consist of a series of workshops to be held in the collaborating parks, in-person exhibitions, competitions, and a guide to degree opportunities for all girls who are interested in studying science and technology degree.

The project workplan began at the beginning of 2018, so we have just finished the first group of activities included in the workplan. These activities are as follows:

1. The design of the visual identity of the project.
2. A selection of 15 women who have stood out in history for the advances and discoveries they have made in the field of science and technology.

3. A selection of 4 women from the science and technology parks that are contributing in some way to the development of STEM area.
4. A plan to develop the communication activities of the project.
5. The design of an exhibition with all the selected women, both scientific and technological, that have stood out in history and those related to the participating science and technology parks.
6. Promotion of partnerships between entities related to the objective to help us disseminate the initiative in all areas.
7. The creation of the content of an **illustrated guide adapted to young audiences**, which details the career opportunities of each of the current scientific and technological careers.

In the design of the **corporate identity of the project**, several elements have been used that stand for the theme to be promoted. The shape or icon that represents the imagotype is composed of two concepts; the symbol of venus or commonly called the symbol of woman, along with a laboratory test tube filled with a moving content that symbolizes the dynamism and advancement of women and the scientific projects they lead.

As for the set that symbolizes the logo, it is presented with a message in Spanish that coincides with the name of the project: "Science and Technology in feminine". In this section, it is decided to highlight the words "in feminine" to emphasize the sectorization of the project in the field of women, and thus achieve greater memorability and positioning.

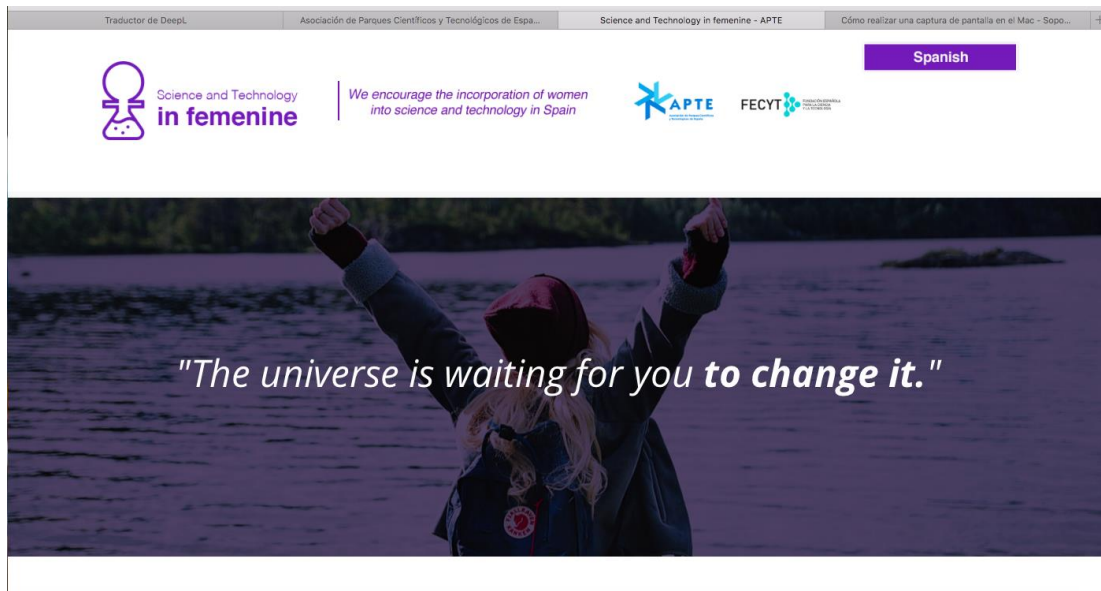
Finally, the colour of the logo is represented by a purple with violet tones. This color is a representative visual identification of the most progressive movements of women today.



Following this same line of design, a microsite<sup>1</sup> has been created in Spanish and English in which you can consult the main characteristics of the project, the activities it includes, its participants, pictures and a link to the project's social networks: <https://www.apte.org/science-technology-in-feminine>

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<sup>1</sup> Home image of the project website



The project's social networks are Instagram, Twitter and Facebook. However, the most important is Instagram because young people use it more frequently than the others.

The aim of the project is to connect directly with the target audience and for this reason, it is very important to do so through the channels in which this audience locates and receives information. We believe that this is the main characteristic that differentiates us from other initiatives: the direct connection and communication with the future generation of STEM professionals.

Through the website and especially the social networks, APTE and the parks participating in the initiative will inform the target public of news and information related to the scientific and technological activity taking place in science and technology parks, as well as competitions, awards and other activities to support the promotion of scientific vocations. **One of the main objectives is to create around the project and each of the parks a future talent pool that sees in the science and technology parks an opportunity to develop their professional careers.**

Another of the activities in which work has been carried out is the design of an exhibition made up of 10 panels that will showcase 15 women who have stood out throughout history for their advances in science and technology and 4 women from the participating science and technology parks who are developing an important career within this environment.

The exhibition is called **"Women that changed the world"** and the aim of this exhibition is to inform groups of students visiting science and technology parks about the important work that women have done in the field of science and technology over the years, and also about the women who are standing out in their area. In this way the girls will be able to appreciate

the importance of studying a STEM career and identify with some of the women in the exhibition.

For the selection of the first 15 women of the exhibition, we have consulted several bibliographies and have had the contribution of all the participating parks. Finally, the criteria taken into account for the selection of the 15 representatives were the diversity of contributions to science and technology and the selection of representatives from throughout history.

The women selection was the following one:

Marie Curie	Physicist and Chemist
Alice Ball	Chemist
Cecilia Payne-Gaposchkin	Astronomer and astrophysicist.
Hedy Lammar	Actress and Inventor
Rosalind Franklin	Researcher and chemist.
Rita Levi-Montalcini	Italian neurologist and senator
Valentina Tereshkova	Engineer and cosmonaut.
Katherine Jackson	Researcher, astronomer and mathematician
Cristiane Nusslein - Volhard	Biologist
Margarita Salas	Biochemist
Lene Vestergaard Hau	Physicist and mathematician
Arlene Sharpe	Doctor
Emmanuelle Charpentier	Biochemist
Marketing campaign	Will you be the next great scientist or technologist? #STEMfemenino

The selection of the scientists and technologists in the science and technology park environment is becoming more complicated than initially thought. Since the requirements for the parks participating in the project to make the selection were not specified, some of them are encountering many difficulties when choosing 4 women from their surroundings.

These difficulties stem from the controversy that can arise from the choice of one over the other, so they are trying to identify specific requirements and have even asked other entities to collaborate in making this selection.

In addition, another of the objectives of this project is to demonstrate that science and technology parks are places of excellence where talent and the development of highly qualified and projected professional profiles are promoted. For this reason, it was decided to leave part of the exhibition to show the public this very positive aspect of science and technology parks.

Finally, the women selected by the participating science and technology parks include leading researchers, technologists, etc.

Among the professionals selected by the participating parks are experts in several areas, for example: the development of new materials, nanomaterials and biomaterials, additive manufacturing, predictive quantitative simulation of complex biological and physical processes, precision processes and dimensional metrology for the aeronautical sector, development of mathematical models that allow us to understand and predict how a drug works. Also, there is a researcher who has identified a biomarker of resistance to therapy and hopes it can contribute to the stratification of breast cancer patients and discover more effective and selective forms of therapy. In addition, the list includes a researcher who had identified new genes whose mutations are related to pancreas formation and diabetes. Furthermore, in the field of technology, we have the examples of professionals who lead human-machine interaction projects in intelligent contexts, in which the system perceives other interaction modalities besides voice.

For all of the above, we consider this last part of the exhibition as the most important part because the girls who visit it will be able to see cases of real, local women who are working and standing out in the world of science and technology and who help to eliminate negative stereotypes that may be holding back the choice of these careers.

The design of the exhibition has been elaborated by APTE team and will be sent to each of the participating parks so that they can contract the production of the 10 panels and install it in their respective exhibition halls.

The exhibition includes a final panel with an interrogation in which a small contest will be held with the girls who visit it. The contest consists of girls who wish to become the next scientist or technologist to appear in this exhibition, upload a selfie or a portrait to Instagram and tell us their dream of transforming the world.

Subsequently, a jury made up of people from each park and from APTE will decide on the most original "dream as a STEM woman" among all the participants. The winner will receive two tickets to attend the science museum in the city in which they reside and a #STEMfemenino gift set.

Specifically, the advertising claim for the contest is as follows:

*History has a space reserved for you, it shows that you are the next genius to discover. Upload a selfie to Instagram with the hashtag "STEMfemenino" telling us what your dream is to transform the world. The most original dream will win two tickets to your city's Science Park or Museum and a #STEMfemenino gift set.*

The design of the exhibition is as follows:



One of the main pillars of this initiative is communication and for this reason, during the first month of the year we have worked on the design of a communication plan that coordinates all the activities that each of the participants has to develop.



The communication plan has 3 communication strategies:

1. Dissemination of the project through the media and digital media to capture leads and announce the project among the different stakeholders.
2. Creation of physical advertising supports such as merchandising to promote the loyalty and commitment of the attendees.
3. Organize different face-to-face communication activities in the different participating parks.

Among the guidelines included in this plan are those that promote a strong communicative impact of the activities to be carried out and those that promote the coordination of the messages and information to be distributed within the program.

One of the most important strategies included in this communication plan is the one that describes how to organize the first of the four workshops included in the work plan. This first event will be held simultaneously in all the parks in which the project will be presented. In this way, it is intended to start the cycle of workshops with a great media impact that focuses the public's interest in it. In addition to the first workshops being held on the same day, during that day all the participating parks will broadcast via twitter, using the hashtag of the project in all their messages. In this way, we hope to become a **trending topic** on that day and that the celebration of this first workshop will have a great media impact, which will be maintained throughout the entire activity by implementing the communication plan to achieve this goal . The hashtag chosen for the initiative is **#STEMfemenino**

A very important element in ensuring the success of the initiative is **to enlist the support of other entities interested in this type of initiative**. For this reason, in parallel with the project development work, APTE is contacting entities such as the network of Spanish universities (**CRUE Spanish Universities**) or other initiatives such as **Fem Talent**, initiative promoted by the Barcelona city council and supported by **women in IASP (International Association of Science Parks and Areas of Innovation)**, to agree on a series of activities in which a collaboration can be developed.

Specifically, with CRUE Spanish Universities, we are working in a framework of collaboration to support us in disseminating the initiative among all Spanish universities and training centres. In addition, they will support us in the distribution of the online career opportunities guide STEM to all educational institutions.

Regarding Fem Talent, we believe we can support each other. For Fem Talent it is very positive that a national initiative supports them and for our project, it is important to have support in all regions of Spain.



Indeed, during the last Fem Talent forum in which the initiative celebrated its tenth anniversary, **our project Science and Technology in feminine was one of the finalists in the category of the special Fem Talent 2018 award**, which has helped the initial dissemination of the project. <http://femtalent.cat/blog/>

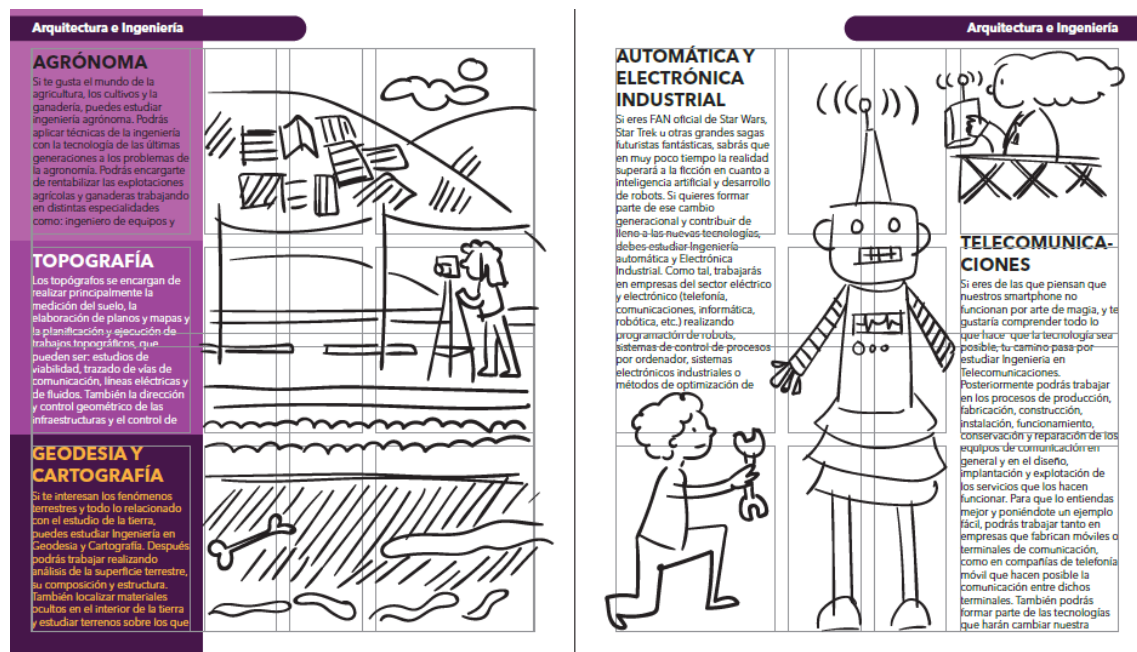


The next entities to be contacted to request their collaboration will be foundations committed to supporting education and administrative bodies that support the internationalisation of talent, as well as associations and sectoral clusters.

In APTE we believe that one of the main reasons why young women do not choose a STEM career is due to the lack of knowledge of the professional opportunities that these studies may have, and therefore, they are not attractive to them. For this reason, the project is completed with the preparation of an **illustrated guide adapted to young audiences**, which details the career opportunities of each of the current scientific and technological careers.

As we have pointed out above, one of the differentiating elements of this project, as well as one of the main objectives, is to connect and capture the attention of the target audience: girls between the ages of 11 and 13. Therefore, both the design of all the elements of the project and the language has been carefully analysed and adapted to the characteristics and preferences of the audience. Consequently, for the design of the guide we have had the collaboration of one of the most important illustrators in the region, Alejandro Villén, <https://alejandrovillen.wordpress.com/> and creator of one of the best-selling children's books of the last years, Oh Málaga, book released in 2011: <http://www.ohmalaga.com/>

Here are some sketches of the guide so you can get an idea of the style and approach of the guide<sup>2</sup>:



During the first two months we have been developing research to select the main areas of stem study and which are the most attractive career opportunities and which can persuade girls between the ages of 11 and 13 to decide to study a scientific or technological career.

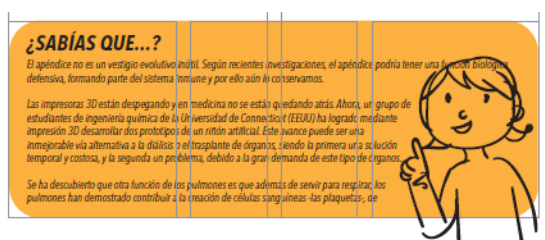
<sup>2</sup> Sketch of the STEM illustrated career path guide for the field of architecture and engineering.

The selection of studies on which the guide has worked is as follows:

STEM Studies	
Knowledge Groups	Joint Studies
Science	Mathematics, Statistics
	Biology, Biochemistry, Geology, Environmental sciences, Oceanography, Anthropology
	Physics, Chemistry, Optics
Health sciences	Nursing, Pharmacy, Physical Therapy, Speech Therapy, Medicine, Dentistry, Podiatry
	Veterinary
	Biotechnology, Genetics
	Nutrition and Food Science
	Occupational therapy
Engineering and architecture	Architecture
	Roads, canals and ports, public works
	Mining, Forestry, Cartography, Geodesy, Topography, Agronomy
	Industrial Automation and Electronics, Telecommunications, Image and Sound
	Aeronautics, Naval, Industrial, Materials, Electrical
	Chemistry
	Computer Science

In addition, the guide includes a section on "**Did you know that?**" in which we complete the information with interesting aspects and anecdotes of the studies included in the guide to further arouse the curiosity of the girls who read the guide.

Below you can see an example of this section:



I would like to make it clear at this point that the aim of **the guide is not to report on all career opportunities in all STEM studies**, as this would require a much more extensive guide and we believe that the target audience would lose interest in looking at a very large document. In this sense, the document that we are finishing will have 20 pages and in them we want to capture attention and make the girls see that studying a scientific or technological career can be exciting.

However, when we have been in contact with the network of Spanish universities they have found it very interesting to be able to develop a complete guide of STEM outputs. Spanish universities currently do not have a document that unifies all the studies they offer and therefore, this exercise can be very interesting to give a better knowledge of the existing training on offer, and if you add the professional opportunities of this offer we can have a document of great value.

**This will be a project proposal for the future**, to work on a document that can gather all the studies related to scientific and technical branches and explain in detail all the professional opportunities they may have, many of which do not yet exist today.

We believe that with this initiative, science and technology parks will be able to play a **new role**, both in promoting scientific and technological vocations and in supporting the creation and retention of talent, both aspects of great importance for the future of the parks and the regions in which they are located.