

“She is an astronomer” in Spain; the International Year of Astronomy 2009 and beyond¹

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Abstract

The work of the Spanish node for the IYA2009 Cornerstone project, “She is an Astronomer” is presented. Our team developed several projects with the common goal of promoting gender equality and women participation in professional and amateur astronomy, and supporting the training of young women researchers and technologists. The main ones were: 1) Calendar “Women astronomers who made history”. We highlighted exceptional women, from different epochs and countries, whose contributions to the advancement of science deserve to transcend anonymity and occupy a place in history. 2) “Women in the stars” was a series of 8 TV programs devoted to the contribution of Spanish women astronomers, made in collaboration with the UNED. 3) “Women in Spanish Astronomy: analysis of a peculiar situation: A universe to discover”, was the first sociological study of this type, including quantitative and qualitative (individual and group interviews) analyses. 4) The exhibit “She Astronomer”, was aimed at teaching astronomy from a new perspective: the relevant contributions by women astronomers from different times and places. The main aims of the “Commission for Women and Astronomy”, recently created within the Spanish Astronomical Society (SEA), are also described.

1 Introduction

Promoting gender equality and empowering women is one of the United Nations Millennium Development Goals. The IYA2009 Cornerstone project, “She is an Astronomer” was aimed at providing information to female professional and amateur astronomers, students, and those interested in the gender equality problem in science. Approximately one quarter of

¹All the material can be found at the corresponding web entry of AIA2009, www.astronomy2009.es.

²On behalf of the team for the cornerstone project “She is an astronomer” in Spain, made up by F. Figueras (coordinator), B. López Martí, E. Pérez Sedeño, A. Kiczkowski, J. Ling, J. Masegosa, M. Villar-Martín, B. Troughton, and I. Márquez.



Figure 1: Two astronomers from the calendar “Women astronomers who made history”. *Left:* Fátima de Madrid, a Muslim astronomer from the X–XI centuries. *Right:* Paris Pismis (1911-1999), first professional women astronomer in México.

all professional astronomers are women. There is a wide geographical diversity, with few countries having more than 25% of female astronomers and many having less than 10%. The drop in numbers towards more senior levels suggests that scientific careers are heavily affected by social and cultural factors, and are not determined solely by ability. Astronomy continues to attract women and benefits from their contribution, but we are far from the desired 50% participation.

“She is an Astronomer” has been one of the adopted cornerstone projects in the Spanish node of the IYA2009. Coordinated by Cesca Figueras, the major activities of the Spanish node are described below. Our contribution was focused on promoting women’s participation in all environments related to professional and amateur astronomy, and to support the training of young female researchers and technologists.

2 Calendar “Women astronomers who made history”

Modern astronomy cannot be understood without the extraordinary work of all those women who, thanks to their dedication and love for science, have left us their legacy. While a well-documented history of the role of women in astronomy is scarce, various observatories and universities around the world show that many women, through their paid or unpaid work, have significantly contributed to shape our current vision of the Universe. With this calendar we aimed to help reconstruct the history of women in astronomy, which, as in other fields of knowledge, is poorly known. Coordinated by J. Ling, we highlighted exceptional women whose contributions to the advancement of science deserve to transcend anonymity and occupy a place in history (see Fig. 1). We tried to give visibility and to value the contributions of women astronomers from different epochs and countries: Hypathia of Alexandria, Fátima de Madrid, Maria Winkelmann Kirch, Nicole-Reine Lepaute, Caroline Herschel, Wang Zhenyi,



Figure 2: *Left*: These three panels are focused on our planets, the evolution of stars and the Sun, respectively. *Right*: Closing panel showing a mosaic constructed with the portraits of more than one hundred Spanish women astronomers.

Maria Mitchell, Williamina Fleming, Annie J. Cannon, Henrietta S. Leavitt, Cecilia Payne, and Paris Pismis were chosen. Of course, the selection presented in this calendar was not exhaustive; the list did not end here. Many projects developed by “She is an astronomer” teams in different countries have expanded and will continue to expand this work to produce a more complete view of the contributions of women to the history of Astronomy. Versions were published for the 2009 calendar in three of the four Spanish official languages. The English and Italian versions were made for 2010.³

3 Exhibit “She Astronomer”

This exhibit, coordinated by J. Ling and E. Pérez Sedeño, was designed to celebrate women’s contribution to astronomy together with their advancement, ambition, happiness and learning. This is a story that begins thousands, perhaps hundreds of thousands, of years ago. A time when our female ancestors first looked up at the sky and wondered what was in it. Women have been asking questions about the Sun and the Moon ever since. Thousands of years later, more women have fixed their eyes on the Cosmos and devoted their professional lives to the pursuit of its mysteries. There are women astronomers and there have been many, very many, of them. Their hard work and dedication have been crucial to astronomy’s progress. They have made some truly ground breaking discoveries. The core of the exhibit (see Fig 2) is made up of 9 panels, devoted to briefly introduce each sub-field in astronomy, from our Sun and the planets in our Solar System, to stars, galaxies, cosmology and instrumentation, highlighting the relevant works made by women astronomers. Another panel puts in context the progress made by women in all fields of human development, specially in politics and education. The next panel show women who, inspired by the star-filled sky, have

³All available at <http://www.sea-astronomia.es/drupal/?q=node/1164>.



Figure 3: Drs. Antonia Ferrín (University of Santiago de Compostela, *left*) and Asumpció Catalá (University of Barcelona, *right*.)

contributed to poetry, novels, music, painting, architecture, photography, cinema and comics. A final panel is a mosaic of hundreds of portraits of Spanish women astronomers. The exhibit was conceived in two formats: 1) museum-designed exhibit, composed of the panels above together with six interactive modules, and reproductions of scientific instruments and other objects from “Agora”, the most recent movie by Alejandro Amenábar dedicated to Hypathia of Alexandria (2009), and 2) the basic format, with only the panels. ⁴

4 “Women in the stars”

Coordinated by J. Masegosa, a series of 8 TV programmes were dedicated to the role of Spanish female astronomers on the development of Astronomy in Spain. Shown on TVE2, one of the two most important Spanish TV channels, it was the result from a collaborating effort with the educational television from the Spanish National Distance University (UNED). The pioneering role of Spanish female astronomers is shown, with a look at their experiences showing their difficulties to face a men-dominated working and social environment. Universities and research and technological centers were presented, trying to provide an overview of the emblematic places for astronomy in Spain. Our goal of enhancing the visibility of women astronomers was focused on making the general public know their contribution to science and to the development of astronomy in our country.

We had the opportunity to interview two of the first women astronomers in Spain, who unfortunately passed away during 2009: Drs. Antonia Ferrín (University of Santiago de Compostela) and Asumpció Catalá (University of Barcelona) (see Fig 3). Their recorded experiences provided all us with an invaluable document for current and future generations.⁵

⁴All available versions of the panels (English included) together with some didactic material can be reached at <http://www.sea-astronomia.es/drupal/?q=node/1163>.

⁵see <http://www.sea-astronomia.es/drupal/?q=node/1291>.



Figure 4: Cover-sheet of the DVD “Ella es una astrónoma”. All the programs from “Women in the stars” can be downloaded from <http://www.sea-astronomia.es/drupal/?q=node/1289>.

A DVD⁶ containing the TV series (recorded in Spanish, see Fig. 4) has been produced and distributed to all members of the SEA.

5 “Women in Spanish Astronomy: analysis of a peculiar situation: A universe to discover”

We have produced the first sociological study of women in Spanish professional astronomy,⁷ that will be published soon [3]. This study, coordinated by E. Pérez Sedeño with the collaboration of A. Kiczkowski, was twofold; on one hand, a quantitative analysis of the situation of women astronomers is provided, considering their relative presence in the different academic or research levels, together with their relative access to financial support from Spanish National programs. The percentage of Spanish women astronomers clearly drops towards more senior levels, from pre-docs to postdocs and staff (Fig. 5, top-left), with a strong decrease for the highest levels in all institutions (Fig. 5, top-right, shows the results for staff astronomers from the Spanish Research Council, CSIC). Women astronomers not only get much less financial support (both in number of proposals and in total amount of money, see

⁶All other materials available online have been also included. Available upon request (contact pepa@iaa.es).

⁷Previous analyses dealt with the general situation of astronomers in Spain, but with scarce information on gender issues [2, 1].

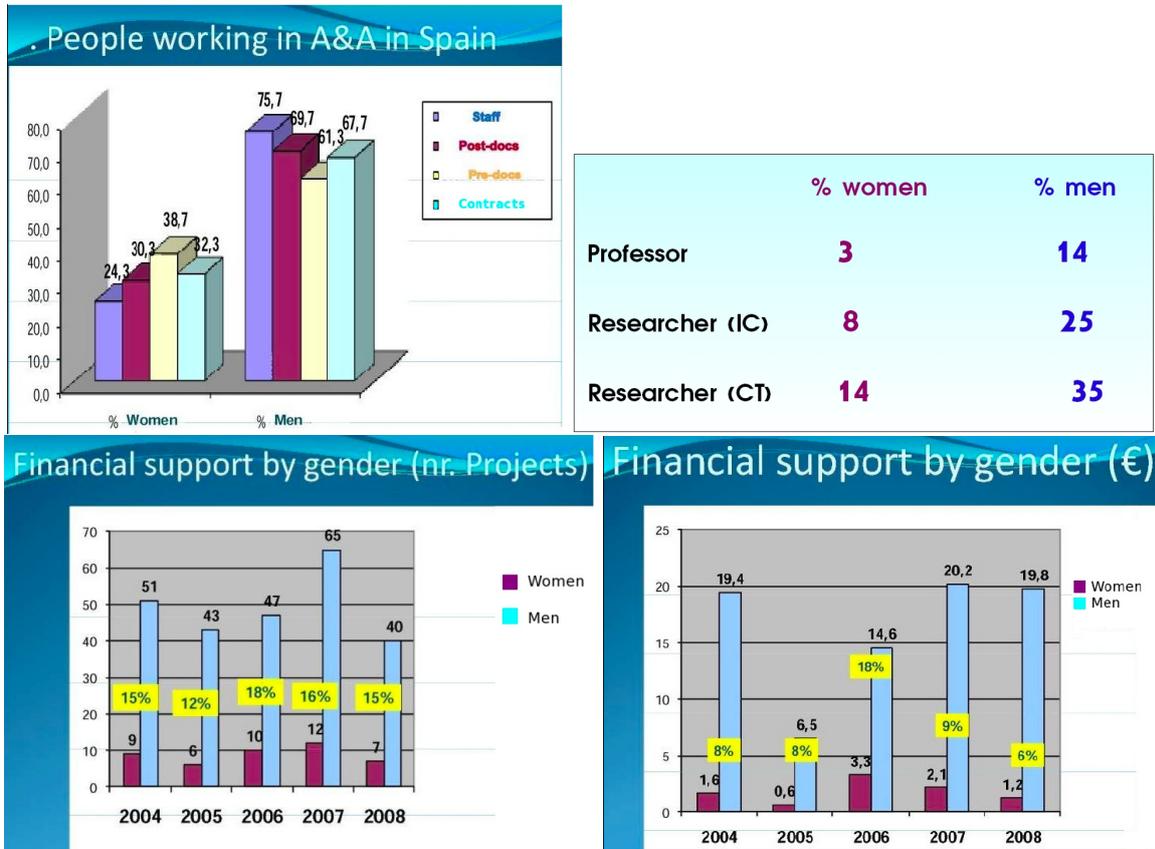


Figure 5: Results from the quantitative study. Only staff astronomers at the CSIC (Spanish Research Council) are used for the table to the top-right, showing the percentage by gender, from top (Professor), to intermediate (IC = “Investigador Científico”) and bottom (CT = “Científico Titular”) levels.

Fig. 5, bottom left and right) but also the average amount per project is a factor 3 smaller for women Principal Investigators.

On the other hand, a qualitative study covering gender, professional level and place, based on both individual in-depth interviews (for senior researchers) and discussion groups (with young researchers, pre and post-docs), dealt with the reasons to choose astronomy as the research field, with the accompanying threats and opportunities; it also faces the situation of Spanish women in astronomy in the past, present, and future, considering eventual changes, gender policies and comparison with other countries. Concerning the present situation, a substantial improvement surmounting gaps is detected. Nevertheless, differences still remain. We note that young astronomers (both men and women) consider that “gender disparity is an old-women problem”. This disparity clearly appears at the higher levels, in decision-taking positions what, in men’s opinion, “merely reflects the social situation”. Asked about the origins of disparity, discrimination, lack of interest, neglect, and external (social) origin appear among the most frequently invoked possibilities. Men astronomers are reluctant to accept

themselves as agents for discrimination. Family and care considerations are already present among young women astronomers; nevertheless they are not spontaneously risen among men, who do not consider these issues as an eventual problem for their professional careers. With respect to gender policies, women consider that their contribution in committees does not help to redress the imbalances reported above. Even if some of the interviewed astronomers accept that a higher level is required for women to have access to a given level, most are against reverse discrimination.⁸

6 The Commission “Women and Astronomy” within the Spanish Astronomical Society (SEA)

With the renewal of the Council of the SEA in the corresponding general assembly (Santander 2008), its new President, E. Alfaro, first proposed the creation of this Commission. In order not to interfere during 2009 in the activities of the Spanish node “She is as astronomer” already born at the beginning of 2008, the Council decided to postpone its creation until the end of the IYA2009. In March 2010 the Commission is established with an initial core group containing most members of the Spanish node of “She is as astronomer” together with Vicent Martínez. An extended, open and web-based group is also defined⁹, and that will be made up with all those people interested in collaborating in the discussion of objectives, the development of proposals and the implementation of activities.

The general objectives of the Commission are within those described in the Resolution B4 of the IAU, taken at the General Assembly on 13 August 2009, which states:

“The International Astronomical Union XXVII General Assembly, recalling: 1) the United Nations Millennium Development Goal 3: promote gender equality and empower women, 2) the IAU/UNESCO International Year of Astronomy 2009 goal 7: improve the gender-balanced representation of scientists at all levels and promote greater involvement by underrepresented minorities in scientific and engineering careers, recognizing 1) that individual excellence in science and astronomy is independent of gender, 2) that gender equality is a fundamental principle of human rights, considering 1) the role of the IAU Working Group for Women in Astronomy, 2) the role of the IYA2009 Cornerstone Project She is an Astronomer, resolves 1) that IAU members should encourage and support the female astronomers in their communities, 2) that IAU members and National Representatives should encourage national organisations to break down barriers and ensure that men and women are given equal opportunities to pursue a successful career in astronomy at all levels and career steps.”

The initial specific objectives of the Commission, that will be modified according to the resolutions the extended group will send to the SEA Council, can be enumerated as follows:

- To make a list of all senior women astronomers in Spain, with their specialities.
- To propose to the SEA Council the use of this list for all activities organised by SEA.

⁸The results of the sociological study can be found at <http://www.sea-astronomia.es/drupal/?q=node/1162>.

⁹Visit <http://www.sea-astronomia.es/drupal/?q=node/1138> to register in the extended group.

- To organise a specific meeting within the SEA Scientific Meetings.
- To elaborate yearly reports on the participation and progress of women astronomers from the SEAMOS database.
- To elaborate a report on the role of women in the Spanish astronomy, a project to be made in collaboration with sociologists.
- To propose, encourage and generate a number of activities and measures to attract women to study and work in astronomy.

The first meeting of the Commission took place during the IX Scientific Meeting in Madrid, on September 14th 2010, with about fifty participants. After a lively discussion, a number of proposals were made, to be updated in the web page of the Commission: www.sea-astronomia.es/drupal/mujer.

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References

- [1] Barcons, X., Domínguez, R., & Pallé, P.L. 2003, *Informe sobre la investigación en Astronomía en España*.
- [2] Battaner, E., et al. 2001, *Estudio sociológico de los doctores españoles en el campo de la Astronomía*, SEA bulletin, 6, ix-xv
- [3] Pérez Sedeño, E., & Kiczkowski, A. 2010, *Un universo por descubrir. Género y astronomía en España*, ed. Plaza y Valdés, Madrid