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## WOMEN IN SCIENCE IN SÃO CARLOS: REFLECTIONS, TRAJECTORIES AND STORIES

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*Mirlene Fátima Simões*

PhD in Sociology UNESP Araraquara/  
São Paulo, Brazil. São Paulo Regional  
Secretary of the Brazilian Society for the  
Progress of Science – SBPC, Member of  
the Brazilian Society of Sociology – SBS,  
Project Coordinator of the Instituto  
Angelim, São Carlos/São Paulo, Brazil

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**Abstract:** The vocation for science and research in São Carlos, a city in the interior of São Paulo, is recognized, but in relation to women researchers and scientists it is still little publicized. Data from Fapesp (2019) demonstrate that the municipality of São Carlos has an average ten times higher than the national average in the number of doctors per inhabitant: 1 doctor for every 100 inhabitants. This ratio of doctors per inhabitant in São Carlos is also the best index in Latin America. Furthermore, since 2011 the city has been awarded the title of National Capital of Technology (federal law 12,504/2011), which has reinforced the areas of innovation, robotics and nanotechnology. There are more than 250 technology and innovation companies installed in São Carlos, in addition to referenced research centers such as: USP, UFSCar, IFSP, ``Embrapa Instrumentação``, ``Embrapa Pecuária Sudeste``, UNICEP, ``ParqTec``, Inova and Onovolab. Although it is sensibly noted that women scientists carry out research and scientific activities in São Carlos, their presence in the public and media scene and in social representations both internal and external to the university are small and this contributes to the maintenance of inequality between men and women. women in science. The initial question of this project began with this observation: in a city with strong scientific, technological and innovation recognition, where are the women scientists? Who are these women? What is your work and life trajectories?

**Keywords:** women; science; search; São Carlos

## INTRODUCTION

### GLASS WALLS: THE HISTORICAL DELICACY OF WOMEN IN SCIENCE

Science is collective and is built from statements and contradictions about phenomena that occur in the different areas

of action and reflection of human beings. The trajectory of research and science follows the history of humanity, and in the Western world it increased after the Industrial Revolution, in the 18th century, where the production of techniques, the transmission of knowledge and the creation of new sciences became an obligatory factor for the social and industrial life.

However, it is recent to admit the participation of women in science. Research into who these women are is a recent debate, as until the 1970s they were invisible (SILVA, 2014). With the questioning of women's equality rights before men, based on North American feminist theses from the 1970s, the position of women underwent significant advances. In science, these advances were significant.

Dating back to the 1990s in Brazil, in more depth, the specialized literature on the participation and situation of women in research and science spaces. It was realized from then on that there were social, historical and ideological barriers to women's access and permanence in areas of knowledge and research, associated with this, scientific activities in people's general perception were (and still are) little associated with women.

Even with these difficulties, since the 1990s the number of women in science has grown in Brazil and, according to data from the National Council for Scientific and Technological Development (2014), the number of women scientists is the same as men. However, this equity is not sustainable in all areas, the concentration of women is particularly in the humanities and social sciences. The leaders of research groups, for example, are mainly men.

Another problem refers, as Massarani et al (2019) points out, to positions of power and leadership that have not yet been occupied by women, such as, for example, the Ministry of Science and Technology or the presidency

of development agencies. This notification is important, as it is clear that the space for decision-making and power for researchers is restricted.

It is noteworthy that this stratification of power in research and science centers occurs in different parts of the world, it is not a Brazilian characteristic, and this procedure once again causes the invisibility and dissociation of women in science.

## **TO WEAVE NETWORKS AND BUILDING THE FUTURE: WOMEN SCIENTISTS IN SÃO CARLOS**

The vocation for science and research in São Carlos, a city in the interior of São Paulo, is recognized, but in relation to women researchers and scientists, as previously demonstrated, it is still little publicized.

According to data from Fapesp (2019), the municipality of São Carlos has an average ten times higher than the national average in the number of doctors per inhabitant: 1 doctor for every 100 inhabitants. Data in Brazil show 1 doctor for every 950 inhabitants. This ratio of doctors per inhabitant in São Carlos is also the best index in Latin America.

Furthermore, since 2011 the city has been awarded the title of National Capital of Technology (federal law 12,504/2011), which has reinforced the areas of innovation, robotics and nanotechnology. There are more than 250 technology and innovation companies installed in São Carlos, in addition to referenced research centers such as: USP (2 campuses), UFSCar, IFSP-São Carlos, Embrapa Instrumentação, Embrapa Pecuária Sudeste, UNICEP, ParqTec, Inova and Onovolab.

Although it is clearly noted that women scientists have prominent research and scientific activities in São Carlos, their presence in the public and media scene and in social representations both internal and

external to the university are small and this contributes to the maintenance of inequality between men and women in science as well as for the establishment of common sense that dissociates women and research.

The initial question of this project began with this observation: in a city with strong scientific, technological and innovation recognition, where are the women scientists? Who are these women? What is your work and life trajectories?

Once again, it is reinforced that there is an underrepresentation or subtle ways in which women scientists are separated from their production environments. Because of this, especially among women in the areas of exact sciences, recognizing their empowerment and changing discourses of intolerance has been an agenda in academic spaces (Mello and Pedro, 2019).

Just like in other professions considered masculine, women in science have to continually overcome barriers in the work space. The debate about equal rights plays a fundamental role for representation and respect between men and women. The cultural changes resulting from these debates have been important in academia and have transported prejudices.

Remember that having more women in science, in addition to meaning equality with men, must also guarantee performance, visibility, academic production, dissemination and power relations. Recognizing the role of scientists throughout history is recognizing their importance and writing a role for future generations of researchers.

## **JUSTIFICATION**

It is known that in the world only 1/3 of scientists are women and that only 3% of Nobel prizes went to female scientists (Unesco, 2019). This project seeks, therefore, to stimulate the population's perception,

beyond the walls of colleges and research centers, about the importance of women in science in São Carlos. Rescue from oblivion and invisibility. Identify, through the life and work trajectories of these women, what their searches were and the challenges they overcame.

In addition to preserving memory and overcoming the invisibility of researchers, this project also aims to encourage future generations to choose a scientific career, relying on concrete examples of those who built their life and professional trajectories.

### **CONTEXTUALIZING: BRIEF HISTORY OF WOMEN IN SCIENCE**

As previously stated in this work, since the Industrial Revolution, science has been a key element in ensuring development and technology for society, in all situations. Particularly in the last two centuries, science has become synonymous with power linked to the male gender.

It is known that in the history of humanity, women could not occupy the same teaching spaces as men. It was only in the 20th century that women were able to advance in the educational system. Going to college was an exception for women, who were obliged to attend courses designed for them, far from the professional horizon of the world of work.

Women's restricted access to scientific careers is due to the fact that men are educated for the public sphere and women for the private sphere, and that the social structure is directed by male interests and power. [...] But this role puts a woman's career in danger, as it restricts her to the domestic space (MELO, 2018, p. 42).

It is worth remembering here that the burial in 1995 of scientist Marie Curie (1867-1934) in the Pantheon in Paris was due to feminist theses and all the feminist movements that

emerged since the 1970s. This scientist was the first woman to be buried in the place designated for the heroes of France. Having the names and stories of women in science allows new generations to realize that they can also be scientists, and also, historically, there is a mistake in interpretation that women were absent from these spaces by choice.

Brazil, as a country with colonial and slaveholding heritage, belatedly had university educational institutions, which were only organized at the end of the 19th century, strongly restricting women's access and permanence in these spaces. From this period until the middle of the 20th century, the presence of foreign researchers, white and, when Brazilian, trained outside the country, prevailed.

In the 1920s, the first female engineers in the country graduated and it was possible, gradually, to open the doors of universities to Brazilian women. In 1930, with the arrival of guest professors from other countries at USP – ``Universidade de São Paulo``, for Philosophy and Literature courses, this quickly led to the training of female scientists (Melo, 2018).

In the 21st century, historical differences have not yet been overcome and science and technology are still predominantly male, both in Brazil and around the world. Presenting women who, despite all these obstacles, managed to build solid careers within research centers is a task that must be remembered in public and private spaces as a way of guaranteeing the history of these women.

### **WHO ARE THE SCIENTISTS IN SÃO CARLOS?**

This project is divided into three stages, each of which corresponds to a cycle of research, systematization and dissemination of results, each with its own methodology. Please remember that given the pandemic context, the project is ongoing and has not yet

been completed.

Initially, research was carried out on the Capes, CNPq and Lattes platforms on senior researchers, still active in universities and research centers in São Carlos. At that time, the criteria established were: senior researchers, with international publications, with awards in their research area, with recognized notoriety by their peers in their area. In this first stage, it was also conditioned to search different areas of knowledge.

Later we moved on to historical research, using different sources to learn about the pioneers of science in São Carlos. We used: semi-structured interviews, consultation with human resources and administrative sectors where these researchers worked, search for public interviews granted, photo archives at the universities where they worked (work).

In the last stage between the first and last stage, a book and a documentary will be produced about women scientists in São Carlos.

The research referred us to nine scientists in São Carlos, who, even though retired, are active, senior researchers, fulfilling all the requirements of the initial search. Some of them with international awards in their areas:

Cibele Saliba Rizek

``Instituto de Arquitetura e Urbanismo``,  
USP São Carlos

Degree in Social Sciences, PhD in  
Sociology

Lucia Cavalcante de Albuquerque  
Willians

Department of Psychology, UFSCar  
Bachelor's degree in Psychology, PhD in  
Experimental Psychology

Maria Aparecida de Moraes Silva  
Department of Sociology, UFSCar  
Degree in Social Sciences, PhD in

Sociology of Development

Maria Aparecida Soares Ruas

ICMC USP São Carlos

Graduation Degree in Mathematics, PhD  
in Mathematics

Petronilha Beatriz Gonçalves e Silva  
Department of Teaching Methodology,  
UFSCar

Degree in Languages, Doctorate in  
Education

Yvonne Primerano Mascarenhas

IQSC USP São Carlos

Degree in Physics and Chemistry, PhD in  
Physical Chemistry

It is noteworthy that none of these researchers, even with an outstanding CV in their areas, has any space or room with their names on it. In São Carlos we still do not have any public space that honors women in science.

## CONCLUSION

This project seeks to rescue the memory and history of women in science in São Carlos, through a book and an audiovisual documentary. The aim is also to raise awareness and publicize the stories and trajectories of such women beyond academic spaces and thus, providing conditions for choices for young women in the scientific field. As a research methodology, we looked at CNPq, Capes and Lattes platforms, who were the senior researchers working in research in São Carlos. Nine researchers who met these criteria were presented.

It is known that even in the 21st century in which research and science are a constant part of everyone's daily life in society, women are still little mentioned. This project sought to historically repair the invisibility and oblivion that such researchers experienced.

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