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Workshop Report: Becoming a Leader in Entrepreneurship

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Abstract. Despite significant inroads in female participation in the global workforce, senior leadership positions still remain predominantly male. Although many countries are promoting the participation of women in entrepreneurial activities, the reported outcomes still reflect the usual gender gap. As more physicists become involved in entrepreneurship, it is important support them, and in particular, those women who are facing gender inequality. This workshop was designed to give an overview of how to translate research ideas into tangible commercial applications—hence, becoming a leader in entrepreneurship. During the workshop, the panelists shared their personal experiences in spearheading start-ups. They also demonstrated how to craft an elevator pitch. The session also included discussion of how to encourage inclusion of training geared towards entrepreneurship and innovation as part of a holistic instruction for physicists.

INTRODUCTION

Although advances in gender equality are already observed around the world, they are not yet reflected in entrepreneurship [1]. Entrepreneurship is a high-value activity because it provides benefits to research and it allows physicists to diversify their career paths [2, 3]. The ability to pitch one’s research topic is a skill that physicists need to acquire. Although physicists are trained to present their work to the physics community, the workshop highlighted the need to learn how to put research ideas in layman’s terms (to speak with investors, for example). In addition, for women working in a male-dominated environment, a new perspective of becoming a leader is necessary, in terms of being a businessperson and being an innovator. The latter is more difficult than the former; starting a business is usually easier than conceiving a commercial idea springing from your research work. The idea of commercialization should be introduced at the beginning of a physicist’s studies and research, so that researchers may consider the possible applications of their research. Also, testimonies of physicists who are successful entrepreneurs themselves can motivate others to consider that such career path is also achievable.

PHYSICISTS AS ENTREPRENEURS

Physics graduates are under stereotyped expectations that they will work in academic and/or research institutions. Although there is some truth to this assumption, the physics field can be explored from different perspectives that introduce professionals not only to research but also to social and commercial career path options. This workshop focused on the fusion of the academic, commercial, and social components of research.

Entrepreneurship is broadly defined here as translating physics research into commercial applications. Research institutions are becoming increasingly supportive of researchers who practice entrepreneurship, although in some countries this path has little or no recognition. Moreover, social and economic conditions can impede innovation and the ability of physicists to collaborate with industry. Some countries that rely heavily on imports are in the lead on damping the spirit of innovation and consequently entrepreneurship.

Without proper training, this pursuit remains high-risk and ambiguous. The workshop aimed to implement a reflection on leadership, with a gender perspective, and how to develop it in a male-dominated environment, in the context of entrepreneurship. Besides introducing basic skills on the topic, some personal experiences from different regions were provided. The program consisted of a panel session, breakout rooms to introduce participants, a brief introduction by Ileana Feain to the hands-on session, which had the goal of developing 30-second pitches by small groups of participants. Each pitch was then shared with the full attendance. Finally, the resolutions were discussed.

THIRTY-SECOND PITCH

The workshop panel was composed of four successful female physics entrepreneurs from across the globe, who have translated their research into a commercial application or who operate in a role between research and industry. Prior to the workshop, the panelists each prepared a pre-recorded talk, which the participants watched before attending the session. **Ileana Feain**, commercialization specialist for the Astronomy and Space Science Business Unit of the Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia, discussed how a Gaddie pitch can be crafted. This type of elevator pitch provides a structure to easily convey the problem you are solving and how you do it in two or three sentences [4, 5]. The idea is to first point out the pains and difficulties that a specific problem brings and then focus on the benefits that the research offers. After this concept was explained, the four panelists presented their own pitches. Square Kilometre Array Telescope in Australia Director **Sarah Pierce** pointed out how arduous it is to process huge data and how their group could systematically and efficiently handle a formidable amount of digital information. LASER TECH México Director **Sofia Acosta** stressed how challenging it is to design and build laser systems for industrial applications and get international patents for these systems. **Mmantsae Diale**, South African Research Chair in Clean and Green Energy, related the fact that the whole world relies heavily on coal for electric power but that this energy source is not sustainable. Their work on photovoltaics, wind, and electric power, however, makes renewable sources more available and accessible to the public. Additionally, their group provides consulting services to the government and solutions to the industry.

SHARING EXPERIENCE

Sofia Acosta. We know that many industries require cutting, engraving, marking, drilling, or welding their materials with high precision. What we do in my company, LASER TECH, S.A. DE C.V., is to use cutting-edge laser technology to process different materials with high precision while maintaining being friendly to the environment and to the workers. We have supported many micro, small, and medium industries to compete in the global market by putting laser technology at their fingertips, and at the same time, we collaborate with large companies to ensure that products made in Mexico are accepted throughout the world.

The most significant thing for me is being able to be useful to society, that my knowledge helps make life better or easier for others. I believe that with what I do, I am not only giving work to several people but also helping other companies to compete in the global market and thus benefit many workers and their families with better working and economic conditions and in general with better living conditions.

Becoming a leader in entrepreneurship, as a woman in physics, is very important, as I know now that it is possible to put the acquired knowledge and the results of our research into practice so that they are useful to society. In particular, I consider that my training as a physicist has been extremely useful because we are basically trained to be able to solve problems. And physics is applied to almost any field, from medicine, to engineering, to aeronautics. The biggest challenge was to design and build laser systems for industrial applications and get international patents for these systems.

Certainly, going from research to entrepreneurship is not easy. It requires a lot of effort, and the best way to do it is to form a multidisciplinary group that includes scientists, engineers, designers, and marketers. Being a woman in this entrepreneurship environment is also difficult, but I am sure it is not impossible, and I am convinced that women can achieve everything we propose, so I hope many of you decide to become entrepreneurs.

Mmantsae Diale. The consultation we do with industry is well-supported by the University of Pretoria enterprise unit, which helps us with pricing of the consultancy work. As an example, we did some measurements with an

ultraviolet measurement system for the defense company, Denel, and the pricing and guidance to business were done by the University of Pretoria Enterprises Unit. Another project worth mentioning was a review done for the Department of Science and Technology (government) for the funding done to promote renewable solar energy research with universities. Since this project, I have gotten many requests for reviews, advisory roles, and research by companies in South Africa, including the government, and we get paid for the work. The money is either paid directly to the researcher or the research cost center by the Enterprise Unit, according to the guidance of the researcher.

RECOMMENDATIONS

To individuals and institutions. Entrepreneurs may share their experience with those interested in translating their research to commercial or social applications. Institutions should recognize and support entrepreneurship, providing training and logistical support to students and researchers. Institutions should promote international collaboration to support joint projects focused on entrepreneurship.

To IUPAP and the Working Group. Encourage IUPAP members to organize workshops to provide skills on entrepreneurship and innovation, from a gender perspective. Charge the Working Group to collaborate with organizers of these workshops, addressing the obstacles women face in these career paths.

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