A Few Words From Dr. Maria-Alexandra Paun, Chair of the IEEE Switzerland Section

Maria-Alexandra Paun

Hello, and welcome! It is my great pleasure to write this article for *IEEE Antennas and Propagation Magazine*. Born on Pi Day and on the same day as Albert Einstein, I am an electrical engineer and a Doctor of Sciences. As a female scientist with more than 12 years of professional experience as well as a devoted IEEE volunteer for 10 years, and currently the chair of the IEEE Switzerland Section, I am very happy to share a few words about myself and our IEEE Switzerland Women in Engineering (WIE) Affinity Group. I hope you enjoy reading this article.

EDITOR'S NOTE

In this "Women in Engineering" column, Dr. Maria-Alexandra Paun describes her experience as a female scientist in electrical engineering. She is very active as an IEEE volunteer, chairing the IEEE Switzerland Section as well as the IEEE Women in Engineering (WIE) Affinity Group in Switzerland. Her professional experience and her volunteer activities in the WIE community will be an inspiration for female researchers entering the engineering world.

Francesca Vipiana

INTRODUCTION

When I started as an IEEE volunteer in 2011 in the IEEE Switzerland Section, I might not have immediately thought that someday I would become chair of the Section (in 2017) for two mandates in a row. It was not for lack of motivation, but sometimes we do not immediately see the things that we might accomplish in a few years before we actually accomplish them. I was the youngest and second female to hold such a position in our Section, and I would occupy the chair position for two consecutive mandates (which is rarely seen and not customary in our Section).

Being an engineer is a passion, no matter your gender. I was continuously encouraged from an early age in my family by my parents (my father is a university professor of physics with a Ph.D. degree in nuclear physics, and my mother is a senior specialist economist with a master's degree in chemistry) to pursue my dream career and become an engineer. Real sciences run deep in my family, as my grandparents were schoolteachers of mathematics and physics too. As I am Romanian by nationality, being an engineer in our country is a pride, and young girls are encouraged from an early age in school to pursue real sciences and eventually become engineers, because they have a strong affinity toward and have high scores in mathematics and physics. Therefore, the percentage of female engineers in Romania is very high. For example, according to an infographic from a study in 2017 [1], Romania is the second-ranking country in terms of number of female engineering workers after Latvia, with a percentage of 25.3% (that is, from a total number of 252,600 engineers, the female engineers are approximately 64,000). However, in Latvia, there is a far smaller number of total engineers (19,600). Switzerland has a percentage of 9.2% women engineers out of a 109,800 total number of engineers.

PROFESSIONAL BACKGROUND

Now let me introduce myself a bit better. I am currently working as a telecommunications engineer at the Federal Office of Communications of Switzerland. However, I have always dreamed of an academic career and being a professor. I received my B.Sc. and M.Sc. degrees with honors and was delivered the Engineer Diploma in 2008 from Politehnica University of Bucharest, Faculty of Engineering in Foreign Languages, English stream, Romania, with a major in computer science, graduating at the top of my class. I received a fellowship from Switzerland to carry out my master's project at the Swiss Federal Institute of Technology (EPFL) in the electronics laboratory with the subject "Low Power Electronics for Low Dropout Voltage

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Regulator Feedback Loop: Analysis and Optimization," with an emphasis on circuit design, verification, and optimization. During 2008–2009, I was awarded a postgraduate Marie Curie research fellowship at the University of Kent at Canterbury, United Kingdom, where I worked in the field of applied optics and optical coherence tomography, with scientific work devoted to "Training in Methods and Devices for Non-Invasive High Resolution Optical Measurements and Imaging."

Between 2009 and 2013, I was an assistant Ph.D. student at EPFL. I received my Ph.D. degree in June 2013 on the subject of Hall effect sensors with an elaborate and precise analysis of Hall cell offset and modeling approaches. My work was focused on the optimization and integration of magnetic sensors for the automotive industry in CMOS technology, during a CTI (now Innosuisse)-funded research project. My Ph.D. was in collaboration with an industrial partner, and my work was performed within a team of researchers. My research was devoted to analysis and modeling of sensors, device optimization, device and circuit layout, and development of physical and circuit models. Extensive measurements were done regarding Hall cell sensitivity, offset, offset temperature drift, statistical processing, and evaluation of data. The end result was a specialized application-specified integrated circuit used as a current sensor in the automotive industry. I have been teaching all this time, delivering seminars and practical laboratories on electronics as well as helping with lectures.

During 2013–2015, I was a visiting researcher at the University of Cambridge, United Kingdom, with two postdoctoral fellowships awarded from the Swiss National Science Foundation. During this time, my research was carried out in the High Voltage Microelectronics and Sensors Group, Department of Engineering and was focused on silicon-on-insulator Hall effect devices for energy and power measurements.

I then returned as a scientific researcher to EPFL Switzerland in the Radio Frequency Integrated Circuits Group (2016–2019), where I worked in the development of electronics for medical devices. During this time, I worked on a second CTI (currently Innosuisse)-funded research project with industrial and academic partners in the field of insulin injection pens as well as being awarded my own two grants to work on cochlear implants as principal investigator from Hasler Foundation, Switzerland.

I have published more than 50 scientific papers, two book chapters, and received more than 350 citations on Google Scholar. My h-index is currently 10.

I am committed to volunteer work within the IEEE, as I am currently the chair of the IEEE Switzerland Section and the IEEE WIE Affinity Group in Switzerland as well as a member of the IEEE Region 8 WIE Committee and IEEE Region 8 Humanitarian Activities Committee. I have been a Member of the IEEE since 2011 (becoming a Senior Member in 2017) and a member of the IEEE WIE (2011–present), the IEEE Magnetics Society (2014, 2018–present), the IEEE Solid-State Circuits Society (2018–present), and the IEEE Circuits and Systems Society (2018–present).

IEEE VOLUNTEER ENGAGEMENT

For me, IEEE membership has always been related to volunteering. Obviously, the IEEE is, first and foremost, the world's largest technical professional association, with more than 420,000 members. It is also where the largest database of technical papers resides (more than 5 million) and where we have access to a panoply of interesting conferences and technical standards that we all use (for example, the Wi-Fi standard). Even though I am an electrical engineer and a Doctor of Sciences with more than 12 years of work experience, and I have published in IEEE journals and participated in IEEE conferences, for me, the IEEE has always been about volunteering.

My first volunteer position was as the chair of the IEEE Switzerland WIE Affinity Group in 2011, a position that I continue to occupy at present. I

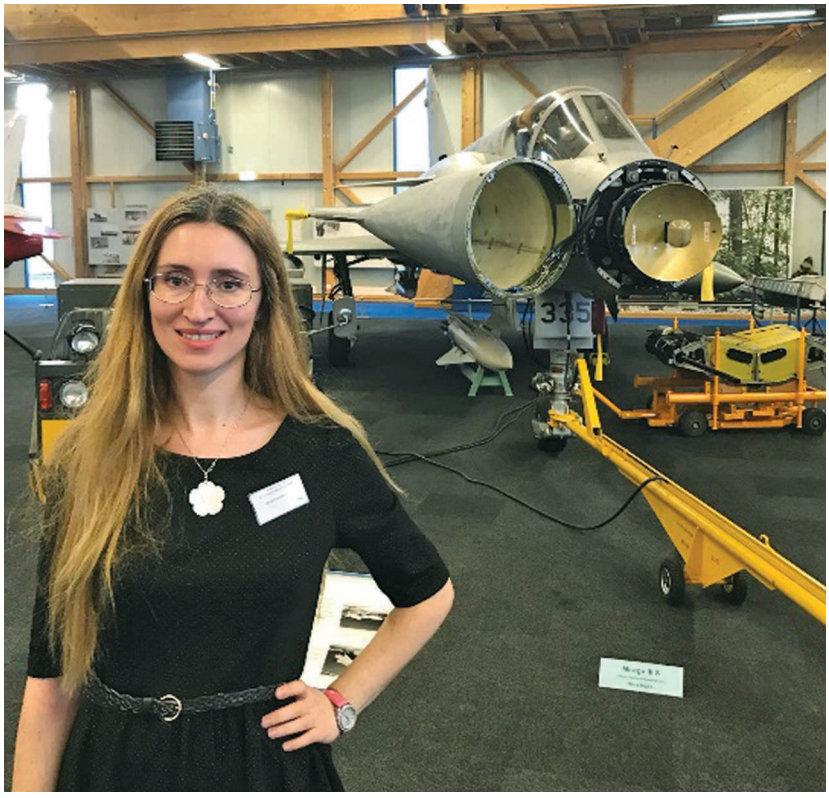

FIGURE 1. Dr. Maria-Alexandra Paun at the Dübendorf Aviation Museum on 26 March 2019, the day of her reelection as chair of IEEE Switzerland.

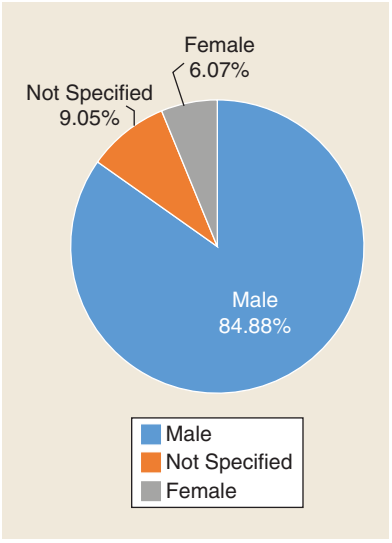

FIGURE 2. The count by gender in the IEEE Switzerland Section [3].

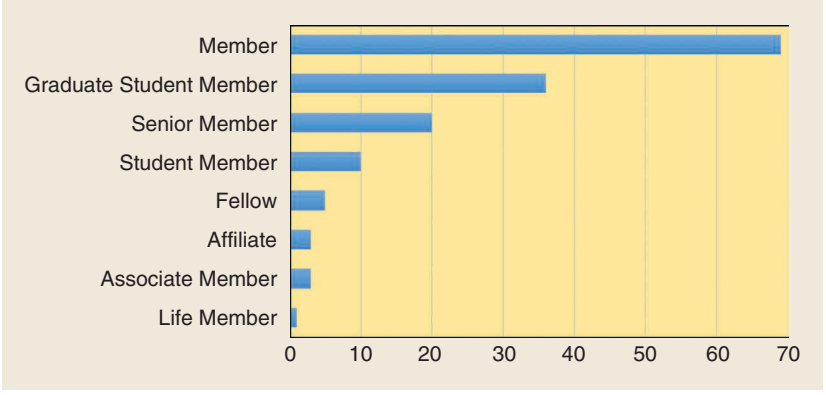

FIGURE 3. The count by grade and gender (female) [3].

then served various functions on the Executive Committee of the IEEE Switzerland Section, such as secretary (2013–2017), vice chair (2015–2017), and chair (2017–present). At the Annual General Assembly of the IEEE Switzerland Section, held on 27 April 2017 at the Federal Institute of Communications in Biel/Bienne, I was elected as chair of IEEE Switzerland. I was reelected for a second mandate at the Annual General Assembly of the IEEE Switzerland Section, held on 26 March 2019, at Switzerland Innovation Park Zurich in Dübendorf (see Figure 1).

I have also been involved at the IEEE Region 8 level, where I have been a member of the Region 8 WIE Committee (2017–present), the IEEE Region 8 Humanitarian Activities Committee (2019–present), the IEEE Member and Geographic Activities Training Committee (2019), and the IEEE Region 8 Professional Activities Committee (2016–2017). Being able to participate in various IEEE Region 8 (Europe, Middle East, and Africa) meetings from 2013 to the present and two Sections Congresses (2014 and 2017) as a Switzerland representative opened up my eyes to a vaster association where our voice is heard and respected at the highest level. The IEEE's headquarters has always been very supportive in all our activities.

At EPFL I organized, for the first time in Switzerland, the fifth IEEExtreme 24-h programming competition in October 2011. Then I continued to organize the 10th and 11th IEEExtreme 24-h programming competitions at EPFL in October 2016 and 2017, when I was the proctor to the EPFL team that won first prize both years. At EPFL, I also organized the 12th IEEExtreme 24-h programming competition in October 2018, when an EPFL team came in third and I was its proctor.

GENDER DISTRIBUTION IN THE IEEE SWITZERLAND SECTION

A study from 2017 [2] has shown that Switzerland has a strong gender bias in terms

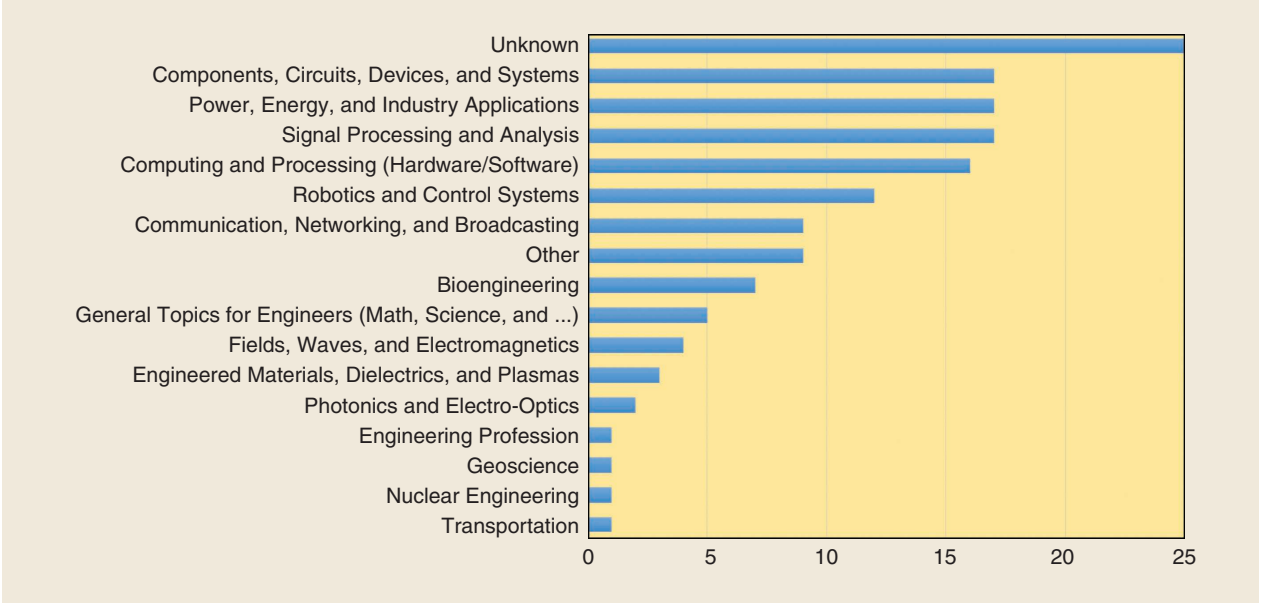

FIGURE 4. The count by technology focus area [3].

of field of study. Women are dominant in health and welfare fields. In Switzerland, 77% of students enrolled for bachelor's degrees in health and welfare were women. In contrast, only 22% of students working toward bachelor's degrees who specialized in science, technology, engineering, and mathematics were female.

At the time of writing this article (March 2020), I consulted with IEEE OU Analytics [3] to retrieve the gender percentage distribution in our IEEE Switzerland Section. Out of our 2,420 members, only 147 are female, which is about 6% (see Figure 2), although I must mention that approximately 9% of our members did not specify their gender. Out of the total number of female members, we have three Associate Members, five Fellows, 36 Graduate Student Members, one Life Member, 69 Members, 20 Senior Members, 10 Student Members, and three Affiliates (see Figure 3) with various technology focus areas (see Figure 4).

ACTIVITIES AT THE IEEE WIE AFFINITY GROUP IN SWITZERLAND

With such a low number of female Members in our Section, the activity of our IEEE WIE Affinity Group in Switzerland is more driven than ever. We are organizing events for the promotion of women in engineering, and we are present with booths (upon invitation or self-driven) at many important gatherings and forums.

For example, our full-day event "Women in Science and Engineering" was devoted to the promotion of women in engineering and science. It was organized on IEEE Day in October 2017 by the IEEE Switzerland Section and me. The idea was for the whole day to be filled with inspirational technical presentations from various women in the science and engineering fields. We had a total of six panelists, from CERN, Swiss Center for Electronics and Microtechnology, EPFL, and so forth, and I also delivered a talk. We had the important presence of Prof. Martin Vetterli, the president of EPFL, who was invited to give a key talk and welcome the participants. The talks allowed for an interactive discussion between the speakers and audience. Questions were asked about the careers of women who had children and the possibility of open indeterminate contract positions at EPFL. An article was written for *EPFL Magazine* in November 2017 to present this event.

In March 2018, 2019, and 2020, I had a booth at EPFL on International Women's Day together with other associations and organizations devoted to the promotion of women in science. The interest in our affinity group was very encouraging.

In 2018, IEEE Switzerland was a technical cosponsor for the very first IEEE-certified conference on blockchain in the world organized by Crypto Valley Association (CVA). Our collaboration with CVA for this conference continues to this day (see Figure 5).

SOME POWERFUL QUOTATIONS TO LIVE BY

As a female scientist, I draw a lot of inspiration from the professional achievements of Marie Curie, the first woman to win a Nobel Prize, the first person and the only woman to win the Nobel Prize twice, and the only person to win the Nobel Prize in two different scientific fields. Some of her quotations that inspire me the most are the following:

- "I am among those who think that science has great beauty."
- "Nothing in life is to be feared, it is only to be understood. Now is the time to understand more, so that we may fear less."
- "Life is not easy for any of us. But what of that? We must have perseverance and above all confidence in ourselves. We must believe that we are gifted for something and that this thing must be attained."

FIGURE 5. Dr. Maria-Alexandra Paun with her IEEE Switzerland booth at the Crypto Valley Association on Blockchain Technology Conference in Zug, Switzerland on 25 June 2019.

Another quotation that I find motivational in terms of expressing creativity is the following from Mae Jemison, the first African American woman astronaut in space: "Don't let anyone rob you of your imagination, your creativity, or your curiosity. It's your place in the world, it's your life. Go on and do all you can with it, and make it the life you want to live."

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