This is a worldwide concern in our community: there are too few women involved in engineering and even fewer in robotics. Each country is trying to tackle this issue with a variety of programs to attract and retain women in science, technology, engineering, and mathematics (STEM) fields. Many programs target university students and young professionals to help them design their career and seek a good life balance. Indeed, if we look at global figures, more than 85% of women in the workforce manage small teams or are part of a team, and only 15% hold managerial positions compared with 30% of men. In universities too, less than 18% of women hold professor-level positions, while 40% of assistant professors are women. The programs that do exist try to support the few women already involved in STEM. However, the imbalance in the proportion of men and women is already striking in first-year university students, so how can we recruit more women before then?

Several studies have shown that the decision to study STEM occurs in a very early stage of education, and being aware of that, there are some programs that promote STEM in high schools and junior high schools. These programs are often organized by universities (see, for example, the “Women in Engineering” column from September 2013 titled “Attracting and Retaining Young Japanese Women in Robotics”). However, even these programs may be too late.

In Switzerland, a very interesting initiative to increase girls’ interest in STEM, and particularly robotics, has been studied. Farinaz Fassa and Sabine Kradolfer from the faculty of social and political sciences at the University of Lausanne and Francesco Mondada from the Laboratoire de Systèmes Robotiques at École Polytechnique Fédérale de Lausanne have tested the effect of using robots in primary and secondary schools. In 2010, they started a national research program in robotics (NCCR Robotics) to include an effort in robotics for education, paying special attention to girls. According to Fassa, Kradolfer, and Mondada “a major achievement during these years was the creation of a robotics festival, quite attractive to girls [1]. Another success was the creation of the Thymio education robot [2], more affordable than other similar robots and thoroughly appreciated by girls and young children. Five thousand units of this robot have been sold, mostly in Switzerland.” Yet, to reach a larger audience, the only way they saw is to provide broad STEM education in schools. “During three years of these efforts to bring robotics into schools, we observed several factors blocking acceptance by teachers who are, in the limits of respect to the school curriculum, the final decision makers in classrooms. To better analyze these factors, we created an interdisciplinary project together with sociologists of the Research Centre for the Educational Science at the University of Lausanne, which pays special attention to gender issues. This study’s results have recently been presented in [3]. We observed that robots are used by teachers mainly for two different purposes: 1) as a tool to improve different types of learning and 2) as technical devices useful for studying robotics and the school subjects in which this is rooted (math, physics, electronics, computer science, etc.). Activities in the first category are mostly present at the elementary level, when gender stereotypes and gendering of tasks and roles are not yet strongly fixed. However, the children identify robots primarily as toys and are unaware of their technical dimension. Activities in the second category appeared mainly in classes clearly linked to sciences, math, and physics. Most of these courses incorporate technical knowledge and are taught at the end of compulsory education, when girls and boys have already made their vocational choices. They end up including very few girls. Thus, robots in schools fail to change points of view on science and technology and to create more equal opportunities.”

Fassa, Kradolfer, and Mondada believe that in Switzerland, the “principal factor blocking a broader use is the absence of policy decisions on the place robots have in formal education. The Swiss school curricula do not mention robots explicitly. The use of these devices in
classes depends mainly upon teachers’ know-how and willingness, and very few training opportunities exist to improve this expertise. Financial and training issues can be partially resolved by programs external to schools, but curricula remain the core problem. If robotics usage in schools is meant to attract girls, it should become a regular feature through all elementary and secondary classes. A proper integration of robots into classrooms depends on more active lobbying for an explicit mention of robotics in school curricula, in teacher training, lending robots to schools, and careful support of some local school program adaptations.”

Their report shows that there is still much work to be done to reduce the cultural and bias effects that prevent young girls from studying STEM and pursuing a fulfilling career in that area. Even if computer programming starts to appear in the school curriculum at an early age, it is important that, as robot scientists, we help the schools understand the importance of our field and promote it at the earliest stage of education by not only organizing public events but also by visiting schools and showing how great our field is.

References