

# Let women shine in science and maths

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*To celebrate the first annual [International Day of Women and Girls in Science](#), IB Diploma programme alumna Eva Manova tells us about the incredible opportunity to encourage young women to shine in science and maths.*

**By Eva Manova**



Alumna Eva Manova obtained an MChem degree from the University of Edinburgh and a PhD in Chemistry from ETH Zurich.

In high school, fewer females than males study science, technology, engineering and mathematics (STEM); This is also true at high schools that offer the IB Diploma Programme (DP). Why are women steering away from STEM? It is not because women are less suited for STEM than men. The root cause may be the fact that STEM opportunities are just not offered to women in the same way as they are to men.

A recently published study by [Bergeron and Gordon \(2015\)](#) examined enrollment and performance in higher level (HL) STEM subjects for DP students who sat IB exams between 2005 and 2010. Despite the fact that females ultimately performed equally well as males, the study showed they enrolled far less frequently in HL STEM courses.

Unsurprisingly, the largest difference in enrollment numbers was found for computer science, physics, and mathematics. Even though I am a woman in STEM myself, I must admit that these male-dominated STEM fields were never on my radar as an option. My attitude was shaped by gender role stereotypes and by a lack of available

information – I cannot remember a single event/career day where a woman spoke excitedly about these fields making them more attractive to me as a profession.

When discussing this issue with my female friends and colleagues in STEM, Maria Gabrani of the IBM Zurich Research Laboratory explained her take on the origin of the problem: She believes that already at a young age, girls are not encouraged to see these subjects as something fun and interesting. Later, and potentially as a result of the lack of encouragement, women tend to choose professions that have a positive impact on society rather than tinkering around, having fun, and building “cool stuff.” For example, biomedical engineering—having a more medical nature and a more direct impact on society—has a greater female representation than computer engineering. This leads me to believe that it is important to understand that all STEM subjects are central to addressing societal problems. Moreover, as research areas within STEM often overlap, knowledge of multiple STEM subjects is increasingly important. For instance, in chemistry or biology, computer simulation plays a significant role in the development of our understanding of systems that are difficult or impossible to study experimentally.

I regret that nobody encouraged me to learn programming in high school. I appreciate now how useful it would be if I had developed those skills early on. Nevertheless, apart from the lack of external encouragement, I acknowledge that it was also my own fault. When I look back at myself as a student, I realize that I placed too much emphasis on getting good grades rather than on the process of learning. While I do understand that grades play a significant role in the evaluation of university applications, I now wonder if I could have used my time more efficiently. The Creativity, Activity, Service (CAS) requirement is a mandatory core component of the DP; however, it is not graded. CAS projects should include purposeful activities, with significant outcomes serving the local community. I should have taken CAS as an opportunity to use available resources to build my skills and explore my STEM interests. Instead, I only made sure I met all the CAS requirements. I did not really give much thought to whether my time and efforts were actually worthwhile. I think I realized only much later on how many more skills I could have acquired that would have

served me well in classes (and beyond), and which would have definitely also contributed to achieving good grades in the end. I finished my DP a decade ago. Looking at the changes that have taken place during those ten years, I believe that when it comes to STEM education, the good news is that the number of initiatives focused on encouraging girls' interest in STEM fields through fun and hands-on activities they can get involved in is rising. There are also more high-profile female role models. A key to success is offering more exposure to the available options, e.g. through the CAS project for DP students. In a relaxed environment, girls can more easily find out what they are naturally good at. Discovering a new talent may completely change their career trajectory. On the other hand, this, of course, does not mean in any way that everyone will become passionate about STEM and nobody should be forced to do so, especially on grounds of gender inequality. However, I do believe that better understanding of the impact of STEM fields on all of us in our everyday life and gaining fundamental tech skills in our hyper-connected, technology-driven world is useful for everyone. It not only expands our professional skills but also advances our personal development. Moreover, being able to broaden constantly and mix our skills might open many doors, including those we haven't even been aware of.

*References and further reading:*

Bergeron, L. and Gordon, M. "Establishing a STEM Pipeline: Trends in Male and Female Enrollment and Performance in Higher Level Secondary STEM Courses." *International Journal of Science and Mathematics Education* (2015): 1-18.

*Eva Manova is passionate about passing on her love of science, technology, engineering and mathematics (STEM) fields. After receiving her IB Diploma in 2006 from the [Prague British School](#), she went on to obtain an MChem degree from the University of Edinburgh and a PhD in Chemistry from ETH Zurich. She currently works in the pharmaceutical industry. In her spare time, Eva enjoys reading paper books and the inspiring book club discussions that often follow, skiing, pilates, and experimental smoothie-making.*