

Students in the Spotlight

FISSION Seniors Ivana, Misho, and Tsveta: Critical Thinking and Team Work - That's What Science Is All About

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On top of all regular school assignments and university applications, ACS seniors Ivana Andreeva, Mihail Georgiev, and Tsveta Kamenova have been extremely busy with their project FISSION (Fair of International Student Science for Implementable Original Notions), a student-organized science fair with a focus on the practical side of science and mathematics. The fair is to take place in March at ACS, and will gather high school students from all over Bulgaria and several other European countries. The young scientists participating will provide new original solutions to relevant and yet unanswered scientific questions and issues. We are thankful to have had Ivana, Misho, and Tsveta make some time to share more about their project.

How did you come up with the idea of organizing an international science fair at ACS?

Misho: Tsveti and I took part in the INMM¹ Vienna International Science and Engineering Fair. We didn't expect to win anything, but actually both ACS projects - the other one, the Maze Robot, becoming the overall winner - were very successful. We won in our category, Health and Human Behavior, and this showed us that Bulgarian students, in spite of having far less practical lab work, can make projects good enough to win international science competitions. At the fair, we were very impressed by the cultural exchange and the spirit of cooperation. We decided we needed to create a place back home where young scientists could compete with each other but also share and collaborate. However, since there are just a few available spots at a national level for people who want to compete in international Olympiads, there is hardly any chance for similar benchmarking to occur. Enter FISSION.

Ivana: Last year I participated in the European Union Science Olympiad,



Misho – king of the lab

¹Institute of Nuclear Material Management



Tsveta (left) and fellow ACSer Victoria (right)

a practice-oriented competition. The tasks required participants to apply scientific knowledge to solve problems. The first task was a crime scene investigation and the second was an analysis of a soil sample from an industrial area. I worked together with a physicist and a biologist to solve the tasks, and that was when I realized the importance of everything I have been taught at ACS. Science is all about critical thinking and team work because it is impossible for a single person to be an expert in all the different areas of science. One of the goals of FISSION is to give Bulgarian students the opportunity to develop precisely those qualities and skills. Interacting with other EUSO participants, I found out that students in other EU countries have more opportunities to work on independent scientific projects than students at most Bulgarian schools. FISSION aims to become

a platform through which Bulgarian students will be able to conduct their own scientific research, meet peers who are interested in science, and be inspired by our jury members and lecturers who will offer their support for the projects. The fair will motivate students to seek the application of theoretical ideas in practice, to envision the future of their projects beyond the presentation in March, and to be not only scientists but also entrepreneurs.

Is science your natural habitat or are you multi-talented, as is not uncommon among ACSers?

Tsveta: Natural sciences are my primary interest but I enjoy humanitarian disciplines, as well. I love learning foreign languages and find it extremely satisfying to be able to read or listen to someone speaking in a new language and be able to understand them and reply.

At ACS, I take Spanish but I have also attended Russian language private lessons and would like to study some German at some point in my life. Also, I enjoy Math quite a lot. I like the logic in it, as well as the idea that everything follows and is derived from the same basic set of principles.

Misho: It was very difficult for me to be sure, and still is, that I am a “scientific type of person.” I’ve always had interests in a wide range of subjects and I value the holistic approach to knowledge and education. I love debate, drama, philosophy, and literature just as much as I love science. Science is just another way to develop yourself, though it requires a different approach. Nonetheless, the application process and many other pigeonholing processes forced me to look for the stereotypical scientific traits in myself. It was hard

and I resisted a lot. I felt like I had to erase such a large part of my personality to make it fit. Organizing FISSION and working with Tsveti and Ivana gave me back my self-respect as a scientist. A large part of my motivation is something I like to call “the fission of the stereotypes about science,” that is to promote discussion on the skills pupils are taught as part of science classes.

Ivana: Science is my main focus at ACS because chemistry is the subject I am most passionate about. I like to think of the sciences as interconnected and I am always excited about learning something additional in the field of physics, astronomy or biology; that’s because it usually changes my perspective on a chemical concept that I didn’t understand as well before. However, at school I am also interested in the Humanities and Social Sciences, especially in history and philosophy. Last year I qualified for the National Round of the Philosophy Olympiad. Unfortunately, it took place the weekend before EUSO and so I was unable to attend. I had a very important conversation with my parents at that time and realized that I had to choose wisely and prioritize. I do not believe that I am multi-talented, because none of the things I have achieved were because of talent. To understand science I have put in a lot of effort. Moreover, I do not have the physical ability to commit as much time as I would like to each of my interests. Both philosophy and history are connected with science. As our astronomy teacher likes to say, the more interested we are in science, the more metaphysical we get, because science exposes the basic principles of the Universe.

It must be hard combining the senior year work load with an ambitious project like FISSION. How are you managing?

Ivana: Combining the responsibilities of a 12th grader with demands of daily work on the SIHP¹ is also a very difficult job that led us to divide up our roles very carefully within the team. What is more, time management has a new meaning for me this year. It is not a balance between available time for fun and work anymore. It is a balance between time for socially beneficial work on one side and studying and applications on the other.

Tsveta: I would say that there is also a great deal of stubbornness in the whole thing. Sometimes, when balance fails, sheer stubbornness is what keeps us going. We love this project, and have already spent so much time on it that right now I can hardly think of anything that would make us drop it. At the same time, school work is no less important and the university applications are... well, what will determine where each of us is going to spend the next three or four (probably more for Ivana and Misho) years of our lives.

You must have needed financial support at most stages of the project. Have you been able to find such?

Ivana: We found financial support, but we are still far from being able to provide the access we wish to provide to all interested students. We want to cover the costs for all people from outside of Sofia. The necessary budget is large and sponsors are afraid that they cannot support us with all of the costs of FISSION. However, we appreciate all donations regardless of how big

they are. We also need help with the accommodation and food, so we are also searching for sponsors who could offer us a discount or provide them.

Did you, at some point, almost give up on the idea?

Ivana: I continue doubting that we will succeed, because there have been very discouraging moments. When one receives continuous rejections from sponsors and there doesn’t seem to be as much enthusiasm about FISSION as we had expected, it is difficult to keep up the motivation. However, the three of us somehow always divide our roles and while one is pessimistic, the others manage to introduce a positive note. It is not only the team that inspires and motivates me, though. Having conversations with students and teachers who want to participate is one of the main reasons for us to continue, even at difficult times. After all, it is those people we are organizing FISSION for.

Tsveta: I think we will succeed. ACS supports us. People like our idea. I don’t think they will let us give it up. A teacher once told me, “You can’t give up. You have a responsibility to all those people who support you.” I think I see what she meant now.

Are the three of you friends outside the classroom? What is your formula for successful team work?

Misho: We are friends outside of the classroom and in a lot of non-chemistry classrooms, like Ms. Velinova’s, where we passionately debate. Our friendship is a debate and rarely involves one party admitting defeat. We fight! That makes it such an enriching friendship.

¹Senior Independent Honors Project

Ivana: We balance our relationship so that if the professional aspect suffers, the personal one does not break down and vice versa. I have been in the same section with Tsveti for four years now and our friendship and academic collaboration has changed dramatically. I find that in the beginning of our relationship we used to be extremely competitive whereas now we are open and supportive of each other. We are in a constant cycle of interchanging

roles in terms of FISSION: when I am having a nervous panic attack about something going wrong, she attempts to be calm and balance me out; when she is angry, I try to stop her from acting impulsively. Last year I was in the same chemistry profile class with Misho and our scientific debates brought us together. We both want to study medicine and he understands my plans for the future very well.

What will you be taking with you

once you leave the college? What is ACS to you?

Misho: I'll be taking with me all the people, as well as the indescribable sense of ambiguity and conflict that every great school has in it. The clash between the desire for freedom and ambition, the clash between being natural and playing a role, and the conflict between being existential and being an overachiever. The drama, the sleeplessness, the sheer rate at which you forget and you have to move on. The things you forget which you cannot forget. I think the greatest thing about ACS is that it's full of all kinds of people, confusion, problems, debates and wasted paper in the library. It's an island on the verge between two and more cultures. This hybridity and opulence of ACS-specific inside-jokes makes it so charmingly Markezian.

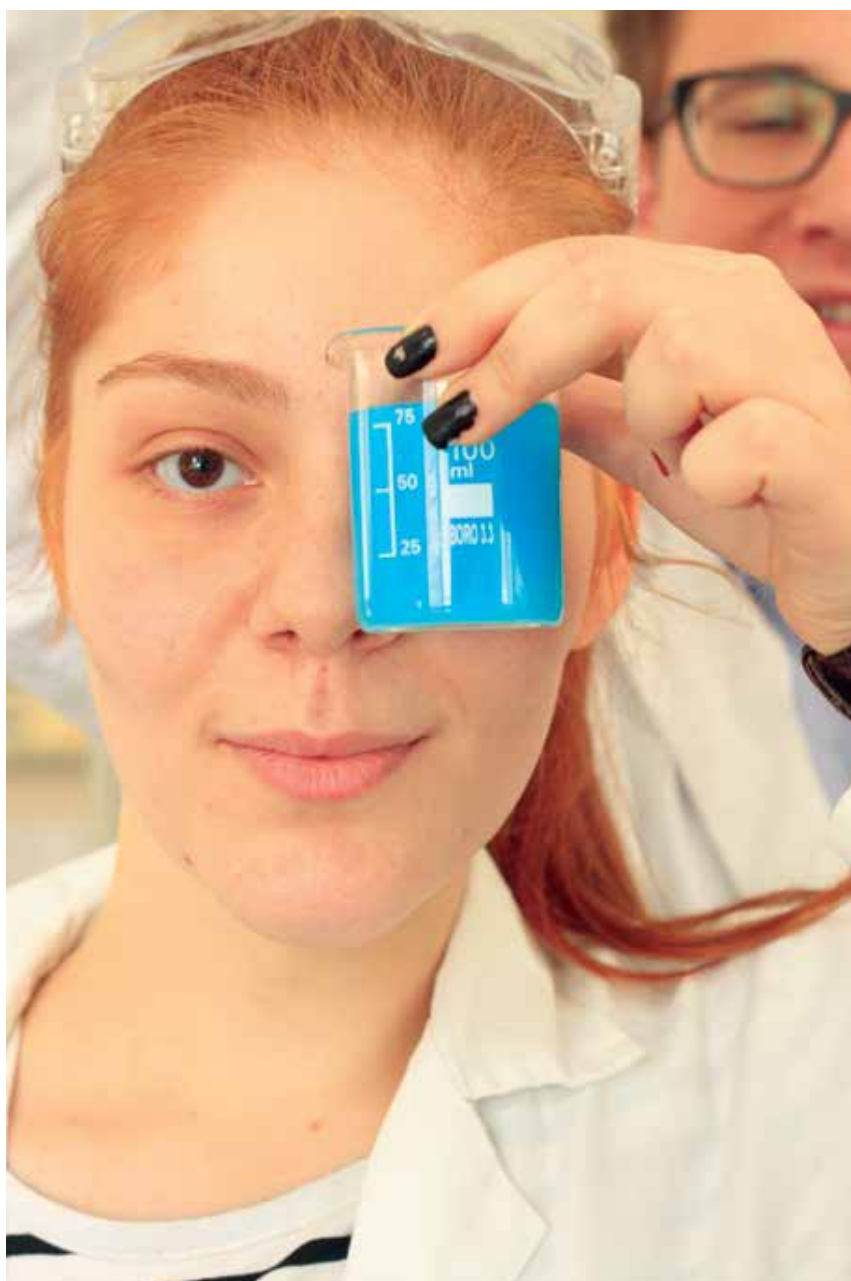
What's next? Do you already know what and where you are going to study?

Tsveta: I want to study natural sciences, probably in the UK. I have not yet decided in what area of professional development I am going to pursue a career but for now, I am thinking about Genetics.

Ivana: My dream is to become a surgeon, although my parents have attempted to warn me about the risks of that profession. Right now, I just want to study medicine. It does not matter where, as I simply want to better understand the human body, apply all the concepts I have learnt in science classes so far and participate in humanitarian projects by being a different type of volunteer. I hope that one day the three of us can collaborate on a research project at a more advanced lab than ours here at ACS.

Best of luck!

Find more about FISSION including ways to support or participate at fission.acs.bg



Kamelia is one of the many students involved in the different stages of the project