



During summer of 2009 I was working on a project at Warsaw University. It is one of the largest and most prestigious university in Poland, ranked by the Times Higher Education Supplement as the first in Poland. It was also the only Polish university represented at iGEM competition in 2009.

Being part of the Warsaw iGEM team was a perfect summer project for me. It allowed me to learn new lab techniques as well as money management and team work. The project was run and organised by students with help of prof. Jacek Bielecki. The first challenge was to agree on the common idea for the genetically engineered machine to be designed. The team chose to develop a *E.Coli* based vector that would allow delivery of the proteins directly into the cytoplasm of the mammalian cells. We wanted to start with mitochondrially directed BAX protein that should induce apoptosis. To achieve the goal it the main challenges were 1) to clone genes responsible for attachment and entry to the mammalian cells 2) to construct regulatory system that would allow switching between cell invasion and protein secretion states.

The iGEM team was started thanks to students societies that merged the funding available for students initiatives. We also asked Polish and international companies for support. EuRx, Genomed and Oligo.pl helped us with reagents, DNA sequencing and synthesis. Common management of independently funded research project was a great lesson, that showed me the real costs of research and how to keep it down to minim by wisely choosing techniques and kit suppliers. I got chance to experiment with molecular cloning techniques and test different protocols. Now I know that lithium borate buffer for fast gel electrophoresis was definitely a good thing to try. Techniques that I have learned include: plasmid DNA isolation, PCR based mutagenesis. PCR primer design, DNA digest, ligation, basis of mammalian cell culture and Flow cytometry. iGEM also gave me opportunity to develop my programming skills. I wrote JavaFx based emulation of complex gene regulatory system, that was used to explain the assumption of the project during final presentation. The team also wrote the model of gene expression system , but we didn't have time to experimentally determine the coefficients. The project was only partially completed. We worked on regulatory

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          HphI
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TasI
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aaa ttg gtg aaa tgt
      I  G  E  M

          HpyF10VI
          -----
SdI
-----
ggg ctc gtt ctg ctt gga
W  A  R  S  A  W

          AluI
          -----
ctg aag cta tgt aaa
T  E  A  M
  
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*iGEM Warsaw Team protein.*

systems only, because we couldn't clone out of the genome one of the necessary genes for the invasion of mammalian cells. We concluded that there were differences in the ncbi sequence and strain available to us. The solution was to order synthetic DNA, but it was beyond our budget to do it in the time available. Warsaw Team also popularised the idea of synthetic biology and iGEM competition among general public. We published articles in a major national newspaper: 'Gazeta Wyborcza', and popular science magazine 'Swiat Nauki' (the Science World), and a footage about iGEM Warsaw Team was broadcasted by the 5 o'clock news (Teleexpress) on the first channel (TVP1). We were surprised that people in Poland are so supportive and enthusiastic about student scientific initiatives.

Moreover, I spend two weeks visiting Valencia iGEM team learning about their project – yeast based computer display. It was valuable experience because they had impressive approach to project – simplicity first. Instead of cloning or reusing large number of parts they looked for the simplest possible solution. It was effective approach since they won 3<sup>rd</sup> place in the competition.

In conclusion: I took part in a challenging summer project, learned skills that are helpful in my honours project, travelled Valencia and to Boston to represent the team at iGEM Final event. I am very happy with the silver medal that Warsaw team obtained and I am even more happy that Edinburgh won gold. Working in Warsaw was unique for me because I had the opportunity to meet people from biotechnology industry based in Poland and learn about my career options after I graduate. I would recommend working in and iGEM team to everyone who wants to have unforgettable summer and meet interesting, like-minded people. Working with iGEM team from different university or just visiting different team is a great experience because you can learn techniques used in various countries, not only lab techniques but also group management and general problem solving strategies.