

**Summary sheet**  
Participation teams VLC / CAMPUS in  
international competition IGEM

---

**VLC/CAMPUS**  
VALENCIA, INTERNATIONAL CAMPUS OF EXCELLENCE



Summary of the project	
Project	"Talking Life", a project by Valencia Biocampus team for the 2012 iGEM (international Genetically Engineered Machine competition) edition.
Field	RESEARCH
Program	Scientific outreach programme
Adressed to	Bachelor or masters degree students.
Call	Strengthening Subprogram 2011
Responsible Unit	Manuel Porcar Miralles
Start Date	January 2012
Finishing Date	October 2012
Running State	The project was presented in the european jamboree, being awarded with a gold medal. The project results are currently under preparation for their publication in different international scientific journals.
Investment	
Description	iGEM is the most important competition on Synthetic biology at the international level. In this competition, different teams composed of students from different fields (biology, biochemistry, physics, engineering...) develop a project aiming at the creation of genetically modified organisms (using synthetic biology techniques) that present interesting applications for humans.
Interesting links	iGEM competition: <a href="http://2012.igem.org/Main_Page">http://2012.igem.org/Main_Page</a> Wiki of the Valencia Biocampus Team: <a href="http://2012.igem.org/Team:Valencia_Biocampus">http://2012.igem.org/Team:Valencia_Biocampus</a> Short movie on the ethical and societal aspects associated with the project: <a href="http://www.youtube.com/watch?feature=player_embedded&amp;v=PW4o7-V7KeY">http://www.youtube.com/watch?feature=player_embedded&amp;v=PW4o7-V7KeY</a> Crowdfunding campaign: <a href="http://www.indiegogo.com/projects/talking-life">http://www.indiegogo.com/projects/talking-life</a>
Goals	The main goal of Valencia Biocampus team's project was to obtain genetically engineered bacteria and yeast able to communicate with humans through an artificial language based on fluorescent proteins and light of different wavelengths. Another goal of the project was to provoke a reflection/debate on the ethical concerns associated to Synthetic biology in general and, in particular, to the application of the technology proposed in the project to different problems of the current society.
Results	Several strains of the bacterium Escherichia coli and the yeast Saccharomyces cerevisiae expressing fluorescent proteins under the control of promoters sensitive to different conditions of the medium (temperature, glucose concentration, nitrogen concentration and oxygen levels) were obtained in the lab. The use of a fluorimeter allowed the team to determine the conditions of the medium by means of asking simple questions ("Are you hot?", "Are you hungry?"), that were translated to the excitation wavelength of a given fluorescent protein, in order to obtain answers from the culture in the form of a different wavelength (the emission wavelength of the protein that had been excited), which was backtranslated to a voice message ("Yes", "No"...). During the development of the experimental work, the system was mathematically modeled, and different "cheater" strains that spontaneously arose in the lab were thoroughly characterized. In parallel, the team coordinated the shooting of a short movie on the possible consequences of this technology for the current society. This short movie was projected to public from different countries and the subsequent debates were analyzed by the team and presented in the competition as a complement to the experimental work. Taken together, these results (not only experimental but also theoretical and sociological) allowed the team to obtain a gold medal in the European jamboree of the competition.