EUROPEAN COMMISSION

Community Research

SUCCESS STORIES

Background Fact sheet no. 3

Tomasz Wdowik (PL) – *First Prize, Stockholm, 2006*

At the end of his final year in secondary school, Tomasz Wdowik was chosen by the Polish selection board to take part in the 18th European Union Contest for Young Scientists. "My research was not undertaken for that purpose. It was already well under way. It has to do with the complex organic synthesis of a new compound in the family of beta-blockers, molecules that are used in the treatment of diseases and conditions of the cardio-vascular system, such as cardiac arrhythmia, hypertension, migraines, and glaucoma... Besides the steps of the chemical synthesis itself, the posters on my stand described the biochemical principles of the action of known beta-blockers. That was necessary for an understanding of the structure of this new molecule and the reason for trying to create it. I could see that the judges were interested, but I didn't expect first prize."

This recognition gave him new wings. During those days in Stockholm he got to know some of the other competitors, took an interest in their projects and met research scientists from every field.

On his return to Poland, Tomasz entered the Warsaw University of Technology. He has been interested in chemistry since the age of 12, proving that science still exercises its fascination over some of the younger generation.

As well as being a student, Tomasz is also – at the age of 19 – a member of a research group at the Institute of Organic Chemistry of the Polish Academy of Sciences.

(A longer report on Tomasz's success is to be found in the special issue of *research*eu* on science education: http://ec.europa.eu/research/research-eu/).

Lina Tomasella (IT) - *First Prize, Brussels, 1989*

Lina Tomasella was one of the winners at the inaugural Young Scientist Contest. Her project was called the "Toxicity of colour dyes used as tracers". After the European Union Contest, she continued studying for her physics degree in the University of Padua in Italy. Lina initially wanted to specialise in biophysics, but was soon drawn to

astrophysics. After the completion of her degree she spent a year at the Observatoire de la Côte D'Azur in Nice where she worked on planetary system formation. Later she moved to the Netherlands, where she took part in the Rosetta space mission organised by ESA-ESTEC (European Space Agency / European Space Research and Technology Centre). I was here that here she developed some software to simulate the trajectory of a spacecraft around a comet's nucleus and this led to a PhD fellowship from the Department of Astronomy at the University of Padua. She now works as an observer at the Asiago Observatory, which is part of the Astronomical complex in Padua. Lina also works on another ESA project called the GAIA Mission which is a project designed to measure the position and velocity of one billion stars within our galaxy.

Fidel Costa (ES) - *First Prize, Berlin, 1993*

Fidel Costa, along with his team mates Maria Cinta Salvany and Antoni Camprubí, won first prize in Berlin with a project entitled, “The geological mapping of a Neolithic mine”. After Fidel finished his Earth Sciences degree at the University of Barcelona, he moved to Geneva to do a PhD in Petrology and Vulcanology. The Department of Mineralogy at the University of Geneva has a strong research interest in the geology of the South American Andes cordillera. "The subject of my thesis, which I completed in November 2000, was to study a part of the Tatara-San Pedro Volcanic Complex in Southern Andes (central Chile)”, he explains. Fidel has been addressing issues such as the petrologic mechanisms that lead to the impressive diversity of rock compositions in the Andes. He is also looking at the rates of growth and destruction of volcanic edifices to the amount of volatiles that can be found in rocks prior to eruption. A great deal of his work involves looking at the fundamental aspects of variances and the history of our current continents. He admits that, amongst his future plans, he may choose to go and establish himself in Chile for a while in order to undertake more detailed investigations.

Gabor Bernath (HU) - *First Prize, Porto, 1998*

Encouraged by his father, Gabor started working on a project for the Young Scientist Contest in 1997. His goal was to develop a 3D scanning tool at a reasonable price without compromising its quality. The result was ScanGuru, his own 3D scanner, which won him first prize both at the 10th EU Young Scientist Contest and at the 50th Intel International Science and Engineering Fair. The project has enabled Gabor to travel extensively and has opened his eyes to the international science scene. It attracted the attention of an enterprising businessman who helped Gabor set up a small company, EasyScan Ltd., and start the application procedure for a patent. Since then, the company has developed the 3D scanner for different purposes. Their biggest project at present is the production of made-to-measure shoes using the ScanGuru based 3D system.

Thomas Aumeyr and Thomas Morocutti (AUT) - *First Prize, Bergen, 2001*

Thomas Aumeyr and Thomas Morocutti won first prize for their project named “CURE - Controlled Ultraviolet Radiation Equipment”. The two boys wanted to develop an improved treatment for skin diseases by trying and enhance some of the leading skin radiation techniques. The project was to stop healthy parts of the skin from being harmed by the radiation treatment being used to treat diseased skin. For example the conventional method of treating psoriasis means that healthy skin is unnecessarily exposed to ultraviolet light radiation and is thus exposed to a potentially higher risk of

skin cancer. Standard radiation devices cannot distinguish between healthy and diseased areas of skin. Morocutti and Aumeyr developed a treatment which marks off the healthy skin area so that only the diseased skin is radiated.

The skin that is to be treated is photographed using a digital camera. The picture is then sent to a computer where it is stored and displayed. When the physician marks the area of the skin that has to be treated a special image processing software identifies this area and then turns it into a format that can be processed by the hardware. The device consisting primarily of many small controllable mirrors is arranged in a matrix and is aligned via a serial port. In this way all the mirrors that are required to radiate the selected skin parts are switched on and it is only these mirrors that deflect the ultraviolet light to the diseased skin.

Uwe Treske (DE) - *First Prize, Budapest, 2003*

Eighteen-year-old German Uwe Treske won first prize for his project developing a "Low-cost scanning tunnelling microscope". A Scanning Tunnelling Microscope feels the surface of the material with the help of an extremely fine tip. It is one of the most important tools in nanotechnology because it can make even partial atoms of a material surface visible. Such devices usually cost several thousand euros. Uwe's microscope can be made at a cost price of 40 euros.

Filaments from ordinary light bulbs serve as the microscope's tip and a pile of towels dampens undesirable vibrations. Uwe's biggest reduction in costs came from using a standard PC sound card for the digitisation of the measuring signal. His device offers a unique relation between price and resolution. After winning the European contest in 2003, Uwe went on to win one of the three grand prizes at Intel International Science and Engineering Fair in May 2004. He would like to pursue a career as a physicist or nanotechnologist.

Charlotte Strandkvist (DK) - *First Prize, Dublin, 2004*

Charlotte Strandkvist won first prize for her project entitled "Improving the method for synthesising N-methyl fluoxetine in the laboratory". This project combined theoretical observations with experimental work to improve an original method of synthesizing an antidepressant drug. One of the main objectives of this project was to help students realise that work in the laboratory has a very real effect on people's lives outside the laboratory.

Charlotte conceived the idea for the project through her previous interest in the topic of depression and was intrigued further by the connection between the scientific aspect and social context of the disease.

Charlotte believes that her project can be used as a guide in an interdisciplinary education course and she hopes that it will contribute to increasing social awareness in the next generation of chemistry students.

A student of Svendborg College, Charlotte plans to pursue a career in either chemistry or biochemistry.

(background fact sheet updated September 2007)