News around the world

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scientific research training for gifted high school students in Hungary

Abstract

The first six years of a new program to organize high-level scientific research training for gifted high school students in Hungary are described. Besides giving top-level research opportunities for talented students in their most receptive age, the program already helped the establishment of almost two hundred scientific research clubs in high schools of Hungary, Romania, Slovakia and Serbia, provided a focal point for science training of high school teachers and helped regional cooperation in Central-Eastern Europe.

Introduction

Six years ago a new program was established in Hungary helping gifted high school students (in between 14 and 20) to find mentors to introduce them to scientific research in Hungarian universities or research institutes. The program gained an overwhelmingly positive response from the Hungarian scientific community. Mentors are of highest scientific merit: among them 107 are members of the Hungarian Academy of Sciences (George Olah is a Nobel Laureate), and most are respected professors of their research field. The patrons of the program are Ferenc Madl, the President of Hungary, Bálint Magyar, Minister of Education and Sylvester Vizi, President of the Hungarian Academy of Sciences.

Mentors and students

In 1996 we started with approximately 300 mentors. The number of scientists devoted to the program has doubled in the last six years. So far six editions of the list of mentors were published with 4000 copies for each, and they have been sent to each Hungarian high school, to 500 high school teachers who regularly recruit new students, and to almost 1000

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gifted students personally. Students were selected based on their achievements in various competitions, were student members of MENSA HungarIqa, or authors of scientific papers in the Hungarian Journal "World of Nature". In the first six years more than 5000 students began their scientific research in this program. 28% were from the capital of Hungary, Budapest; 14% from Hungarian towns with a population larger than 100,000; 32% from smaller towns of Hungary and 23% from villages. 50% of students worked in life science laboratories, 30% attended Faculties of Arts, 19% were in Faculties of Natural Sciences (life sciences excluded) and there was 1% in economy and law.

Organizations

In 1998 a Research Student Foundation was established to channel the financial help for the program. The annual budget of the Foundation grew to approximately 100,000 euros by 2002. Sponsors of the action include: the Beres Foundation, EGIS Ltd., Gedeon Richter Ltd., Hungarian Patent Office, Ministry of Education, Ministry of Environmental Protection, "Muszaki" Publishers Budapest, Program for Children and Youth and UNESCO.

In 1999 participating students, mentors, high school teachers and scientific research clubs formed a Research Student Association, which currently has approximately 500 members. The issues of the movement (including all finances) are decided by the student president (currently Mr Zoltán Borsodi) and by the two deputy presidents (currently Tamás Korcsmáros and Ms Eszter Soos). The president and the deputies are elected each year by the participants of the National Conference.

Students are eligible to be a member between age 14 and 20. After passing the age limit, or grade I at a university they continue their research in the undergraduate research student associations and can apply for being a "student-mentor" of the movement.

Annual Conference - Summer camp

Since 1997, six national student conferences have been organized. In each of these conferences 40 to 80 students participated, and 20 to 30 scientific presentations were made. From the second conference, these meetings were organized as a summer camp in July near the Lake Balaton [1]. Besides the short presentations of students on their own research, successful scientists talked about their approach to science and about their devotion. Psychologists and social-psychologists discussed the possible dangers of being outstanding in a field, and showed how to solve the conflicts which might arise.

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from this situation. The camps were all free for the participants. The major language of the camp is Hungarian. However, almost all participants speak a rather good English, and in case of a significant participation from abroad, we will organize an English program as well. As the size of the movement grew, more than twice as many students wanted to come in relation to the size of the camp: thus the selection of "campers" became increasingly difficult. We did not want to make "clones" of the camp, since the invitation of top-level scientists would not be possible to all of them. Therefore, from 2001 only the winners of the national conference of high school science clubs can participate in the research camp.

Science clubs in Hungarian high schools

The Research Student Foundation announced a competition for 2500 USD in the fall of 1999 to help the establishment of science clubs in Hungarian high schools [2]. Since then the call for application was repeated each year offering a steadily increasing financial support. Members of these clubs may be involved in a research project requiring team-work, or may perform individual studies and inform each other regularly about their progress. Most of the research clubs also invite established scientists to speak about their own experiences in research, or to summarize recent advances in their field. The Foundation receives approximately a hundred applications each year from Hungary, Romania and Slovakia. In these science clubs more than 3000 students are being introduced to scientific research.

From 2000 a special annual meeting of these research clubs has been organized. In these meetings almost 200 students gave an account on their research. From 2002 our movement grew to the point where a single annual meeting would be too large to accommodate. Therefore we organize regional student conferences (this year we had four: in Budapest, Gyor, Szeged and in Romania) and the winners of these conferences can participate on the annual meeting on the national (actually: multinational) level.

Organization of high school teachers

During the last six years we established a network of 500 high school teachers who regularly recruit students to work in research laboratories and/or lead science clubs in their own school. In 1999 the first national conference of these teachers was organized. The successful event was a forum to exchange various methods on the establishment of science clubs, local competitions, fundraising, recognizing talented students, etc. The conference also made a possibility for a discussion with government officials on several general issues, such as governmental help to enhance research activities in high schools, and to increase the number of Ph.D. studies among high school teachers. Recently, due to the increasing financial support, an expansion of this programme became possible by opening an office of the movement. We plan to offer scholarships/awards for the best teachers in scientific research training, organize student/teacher research pairs, form virtual teams with the help of the Internet, explore international collaborative teacher/student research through Internet connections, help the development of novel Science Education curricula (e.g. that of molecular biology, genomics, nanotechnology, etc.), develop a special web-site offering extra materials for current topics in science education, promote the formation of the Hungarian Association of Science Educators, etc.
Contacts

Most important Hungarian contacts
In the last six years we have established a good contact with almost all official members, bodies of the scientific life in Hungary as well as related government institutions and NGOs. Among this list we would like to mention only the two most important points, the "input" and the "output". Our initiative can help gifted children between the age 14 and 20. Seldom do we have an exceptionally independent and capable student of the age of 12 or 13 who is able to participate in scientific research in some special fields. Usually these children are recommended to us by the Hungarian Talent Support Association, where the vice-president, Dr Maria Herskovits, is a long-time supporter and friend of our initiative. Vice versa, if we are approached by a talented student (or - usually by the parents), who is below our usual age limit, we direct the student to Dr Herskovits. Research students who become "too old" for our movement enter the Hungarian Association of Research Undergraduates, which is the same movement at university level having more than 30000 members and which enjoys a huge and rich tradition of fifty years of existence.

International contacts
The program has several hundred Hungarian speaking students, high school teachers and science clubs from the neighboring countries of Romania, Slovakia and Serbia. Our primary goal in the international scene is to enhance the regional cooperation in this segment of Central-Eastern Europe. It was our great pleasure to organize a NATO-UNESCO conference on Scientific Research Training (www.chaperone.sote.hu/natowork.htm). At this meeting we introduced the best scientific research training practices from all around the world (Brasil, Germany, Ireland, Israel, Italy, Spain, Turkey, UK, USA) and research training in the Central-Eastern European region (Belarus, Bulgaria, Croatia, Czech Republic, Hungary, Macedonia, Poland, Romania, Russia, Ukraine) to the widespread international audience. Our goal is to form an international network for student/teacher exchange as well as to exchange and propagate existing "know how" of scientific research training. We have mentors from Australia, Austria, Canada, Italy, Romania, Slovakia, Serbia and the USA.

As another type of activity, the program has already established several contacts with other organizations helping gifted children abroad. The sponsorship of the Deutsche Schulerakademie, Bildung und Begabung, made possible to one of our members the participation in their summer camp from 1998, two of our students are invited to the SciTech camp in the Weizman Institute in Israel from 1999. We sent two students to Dublin, to the camps of the Irish Center for Talented Youth, and we will send our first student to the National Institute of Health (NIH, Bethesda, USA) for a two-month research practice in 2002. We also accepted a Belgian and an American student in our summer camps. It is our goal to extend these contacts in the future possibly in the form of mutual exchanges of talented young students.

As a recent development, our best student was invited to the Nobel Ceremonies in Stockholm (photo 1.). The selection of the student will be arranged by a special competition together with the Hungarian Association for Innovation (http://www.innovacio.hu).

References

P. Csermely. Scientific research training for gifted children in Hungary. The Biochemist, 21 (June 1999) 28-30. (more information can be found on the web site http://kutdiak.hu)


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The 2002 student president, Mr Balint Patot with Crown Prince Victoria in Stockholm at the 2001 Nobel Ceremonies. Mr Pato is a final grade student of the St. Stephen High School of the Cistercian Order in Székesfehérvár and commutes approx. 100 km-s to the lab, where he pursues his research project on stress proteins (http://www.chaperone.sote.hu). Mr. Pato won the contest of the Hungarian Association of Innovation, received a 2nd prize on the EU Contest of Science and Innovation and Presented his results in several international scientific meetings.

Livia Meszaros with her mentor, Dr Andrea Ladanyi. Livia studies the molecular genetics of the vicious cancer, melanoma. She won several major prizes with her project, is a 2002 summer intern of the National Institutes of Health in Bethesda, MD, USA and will represent the Hungarian high school students on the 2002 Nobel ceremonies.

Gabor London (middle) works on chemical catalysis in collaboration with the Nobel Laureate, George Olah. As a high school student he was a co-author of a high quality scientific research paper on the subject. He is together with his friends in a research camp of the Hungarian Student Research Foundation.

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