

Short Concept of the

International Science Academy Estonia

of the Heidelberg Life-Science Lab
at the German Cancer Research Center (DKFZ)

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Breakthroughs in medicine and life sciences pose a challenge for modern society. Organising the International Science Academy Estonia the *Heidelberg Life Science Lab* wants to initiate and promote the discourse and exchange of ideas of young Europeans about scientific problems and their social and ethical implications. During the academy 15 German and 15 Estonian students age 16 to 18 will experience current research and discuss both its potential benefits and risks.

1 The Heidelberg Life-Science Lab

The *Heidelberg Life Science Lab* is a project to promote mathematically and scientifically interested and gifted secondary school students. It is funded by the German Cancer Research Center (DKFZ). The activities of the *Life-Science Lab* aim on introducing the participants to independent scientific work. One of these activities is the organisation of scientific academies abroad. These International Science Academies enable participants to set the methods and theoretical knowledge they acquired during their work in the *Life-Science Lab* in an international context and to extensively improve them. New experiences and challenges enable every participant to expand personality traits, so called "key competences".

2 International Science Academies

Since 2001 the *Heidelberg Life-Science Lab* has conducted five "International Science Academies" (ISA):

- ISA Portugal 2001 and 2002
- ISA Kenya 2004
- ISA San Francisco 2003 and 2005

For all participants these academies were a unique experience. Documentations of the scientific output are upon request available in print from the office of the *Heidelberg Life-Science Lab*.

The first International Science Academy took place in 2001 with scientific work at the "Instituto de Tecnologia Quimica e Biologica" (ITQB) and "Instituto Gulbenkian de Ciencia" (IGC) in Lisbon, Portugal. In 2002 the programm was successfully repeated .

Under the patronage of Prof. Dr. Klaus Toepfer – former federal minister of environment and current head of the United Nations Environment Programm UNEP – the International Sciece Academy Kenya was conducted in 2004 focussing on topics specifically related to Kenya, mainly aspects of nature conservation and floristic and faunistic observations.

Scientific projects at Stanford University and UC Berkeley were the core of the International Science Academy San Francisco, conducted in 2003 and repeated in 2005. After working on own three-week projects the participants – 16 high school graduates from the *Life-Science Lab* – spent another week reflecting and documenting their experiences and their scientific output. The experimental work as well as the experiences with a different culture made a major impression on the participants. But the American scientists were impressed by the interest and capabilities of the students as well.

Besides the ISA Estonia the *Heidelberg Life Science Lab* is currently planning Science Academies in Dresden, Germany (2006) and another academy in San Francisco (2007).

3 The International Science Academy Estonia

The programm of the ISA Estonia is divided into two phases: During phase one (Spring 2007) the German participants will have the opportunity to visit the University of Tartu, Estonia and to spend one week of scientific work together with the Estonian participants there. The following week will give the participants of both nations ample opportunity

to discuss ethical implications and possible ways of solutions in a European context. Additionally an intercultural program is supposed to complement the scientific and science related problems.

Phase two is planned for fall 2007 at Heidelberg. The stay will be divided into a practical scientific section and a discussion section as well. Cooperating partners will be the German Cancer Research Center (DKFZ) and the University of Heidelberg.

The ISA's student mentors were rewarded with the "IQuer" youth award of the *Evangelische Akademie der Pfalz* for the conception and the so far performance (www.jugendpreis.de)

3.1 Cooperating partners

The Estonian foundation "Domus Dorpatensis" will serve as the organisation equivalent to the *Heidelberg Life-Science Lab*. The staff of the foundation will support the German mentors with the coordination and the realisation of the phase in Tartu. The profile and further projects conducted by the organisation are portrayed under www.dorpatensis.ee. The selection and supervision of the Estonian participants will be taken on by the Teaduskool. This institution is attached to the University of Tartu and promotes scientifically interested and gifted pupils in Estonia. Since 30 years Estonian secondary school pupils are prepared for the international Science-Olympiades here, national Science-Olympiades are directed respectively. The Teaduskool reaches about 1000 pupils, who engage in different projects.

3.2 Schedule

until June 2006: Selection of the German participants

Oktober 2006: Seminar "Geography, History and Culture of Estonia"

November 2006: Seminar "Introduction to Biological und Chemical Basics"

Dezember 2006: Seminar "Introduction to Bioethics and Judicial Fundamentals"

Easter 2007: Academy I in Estonia (two weeks)

May 2007: Documentation of Academy I

Fall 2007: Academy II in Germany (two weeks)

November 2007: Documentation of Academy II and preparation of a final documentation

3.3 Participants

The German participants are chosen out of the participants of the *Heidelberg Life-Science Lab*. The targeted group are high school students of age 16 to 18, who already have encountered biological and ethical problems during their participation in the *Life-Science Lab's* program. In Estonia the Teaduskool selected pupils out of their pool of participants. All of them have successfully taken part in national and international Science-Olympiades. Prerequisite for all participants is a good knowledge of the English language and the willingness to engage oneself in scientific problems and to independently handle them.

3.4 Mentors

The academy will be supervised by mentors of the *Heidelberg Life-Science Lab*: Philipp Boersch-Supan, Christoph Fischer, Felix Gut, Natalia Jevglevskaja, Leonie Mueck, and Elisabeth Urban. The team will be coordinated by Jochen Reder. On the Estonian side

representatives of both cooperating organisations are involved in planning and directing the Academy.

Jochen Reder is director of studies at the Bunsengymnasium Heidelberg. He teaches mathematics, physics und computer science. At the *Life-Science Lab* he is in charge of the physics study group.

Philipp Boersch-Supan studies chemistry at the Philipps-University of Marburg. He has been a Mentor of the *Life-Science Lab* since fall 2004. He supervises the "young researchers lab", a study group independent project and an ornithological excursion of the zoology study group to the German wadden sea (Easter 2006).

Christoph Fischer is enrolled in law school at the Ruprecht-Karls-University of Heidelberg. At the *Life-Science Lab* he participated in the study groups mathematics, physics, and philosophy. Since 2003 he organizes and supervises the International Science Academy San Francisco.

Felix Gut studies pharmaceutics at the Ruprecht-Karls-University of Heidelberg. At the *Life-Science Lab* he mentored the pharmaceutics study group, participated in the ISA San Francisco 2003 and worked at the *Life-Science Lab* office. For three years he was part of the lead of the "JuniorAkademie Baden-Wuerttemberg".

Leonie Mueck is a chemistry student at the Philipps-University of Marburg. She was a member of the *Life-Science Lab* chemistry and philosophy study groups and supervised an exhibition about the problems of biological and chemical warfare.

Natalia Jevglevskaia is enrolled in law school at the Ruprecht-Karls-University of Heidelberg. As the only Estonian mentor she wants to pass on her experiences of living and studying in both countries to the participants.

Elisabeth Urban is enrolled in nursery studies at the clinical center of the Ruprecht-Karls-University of Heidelberg. She mentors the medical sciences study group at the *Life-Science Lab*, participated in the International Science Academy San Francisco 2005 and is a member of the philosophy study group.

3.5 Preparation

Three preparatory seminars will be held before visiting the corresponding guest-country. One of them will focus on geography, history and culture, the second one will introduce biological and chemical topics of relevance and the third one will introduce philosophical and ethical topics as well as the current legislative situation. The contents will be available on an online e-Learning platform allowing joint preparation and discussion by the estonian and german participants. The participants will be required to prepare assignments for the seminars. During the practical work each German participant will be assigned an Estonian participant as lab partner. To ensure an optimal preparation for the practical work the corresponding scientists will be contacted beforehand by their interns.

3.6 Scientific Work

During the practical work the participants are supposed to get an insight into current scientific research. This includes an overview of the methods and long term objectives of the corresponding research group as well as the opportunity to conduct simple experiments on their own. At Heidelberg researchers at the German Cancer Research Center and the University of Heidelberg have agreed to invite students to visit their workgroups.

Especially Prof. Roesl and Dr. Hoheisel have warranted their support. At Tartu a cooperation with Prof. Metspalu, Prof. Maimets and several institutions related to the University of Tartu exists.

3.7 Phase of Reflexion

After the practical work the participants are asked to critically reflect their experiences in the laboratory. During this phase the whole group will be divided into subgroups that are supposed to work on different topics and to present their results to and discuss them with the other two groups on a regular basis.

The phase of reflexion will embrace the issue of how different the German and the Estonian society deal with medical and biotechnological advancements and the question whether a paneuropean concept for the handling of bioethical problems is possible and desirable. If possible external speakers will be invited to give the participants a deeper insight into the topics of discussion. At Tartu the Centre for Ethics of the University of Tartu would be a possible cooperation partner.

3.8 Intercultural programm

The intercultural exchange of the participants is of great importance. Therefore an intercultural programm will complement the scientific work. In Estonia a day trip to Tallinn and an extensive guided tour through Tartu are planned. In Heidelberg there will be a similar programm with a visit to Strasbourg, where the recent history of the two participating nations and the process of European Unification are of special importance.

3.9 Documentation

A mutual documentation of all participants will be an important part of the academy. The participants are supposed to record their scientific work as well as their impressions and experiences of the exchange together. Each pair of participants is expected to report their scientific results and a possibly related ethical or social topic. As executed in the past a booklet containing all contributions will be published. Furthermore the Academy aims at creating a catalogue of requirements with guidelines to a paneuropean handling of ethical, social and cultural implications resulting from new technological developments. The participants will present the results during a lecture series in Heidelberg and Tartu.

3.10 Funding

A detailed funding plan has been elaborated. Apart from a financial contribution of the participants additional funding will be needed to realize the academy – especially for the Estonian participants. We aim at funding through the Robert-Bosch-Foundation, the European Union, and industry. The project is already supported by the Degussa AG. Donations can be addressed to the Alumni Association of the Heidelberg Life-Science Lab. Donations are tax-deductible.

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