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TECHNOLOGY | INNOVATION | RESEARCHES | SCIENCE

UNIVERSITY
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Content

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SZTE

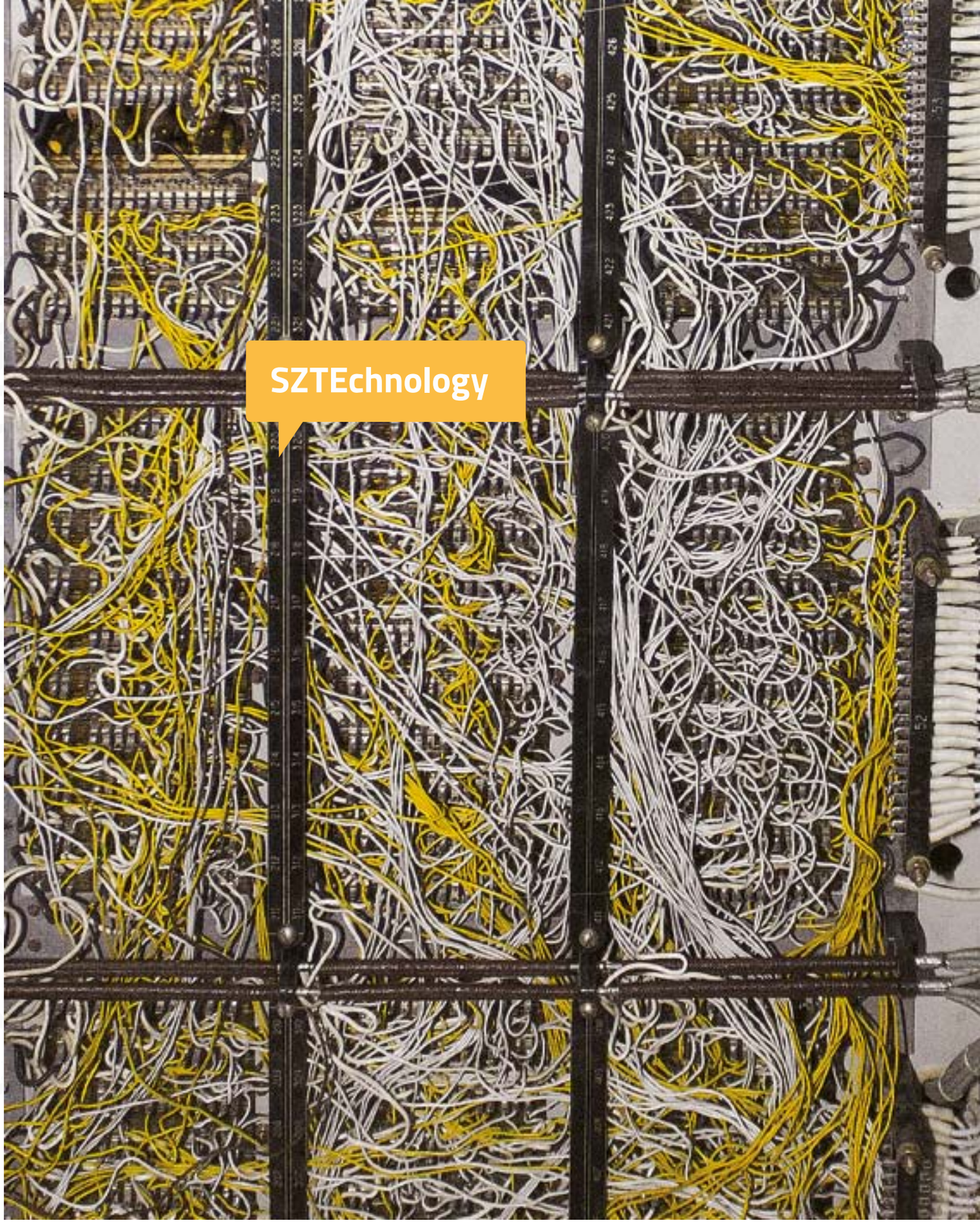
The missions of the University of Szeged

It is widely accepted that knowledge is one of the most important resources of any society. One of the two main missions of universities is the production of knowledge, through research activities, the second being the passing on of this knowledge. This is not limited to the education of a new generation of scholars, but includes the spreading of the knowledge to the widest possible audience – the popularization of science and knowledge. This traditional picture must be supplemented by a third mission: the utilization of this knowledge outside the academic field.

In 1940, Albert Szent-Györgyi, Nobel laureate and rector of the University of Szeged, expressed his view of the significance of knowledge as follows: "The function of universities is threefold. Their most ancient mission is to spread and accumulate human knowledge. Their second task is to raise and educate a small number of future scholars, who will take this profession over from us. The third function of universities is newer, but not less sublime: to raise and educate citizens of our nation in such a way that they be endowed with the faculty of intellect." In his rectorial inauguration speech, Szent-Györgyi set another goal for us: "Our university has a fourth, unique mission: to be the intellectual centre of the Hungarian Plain." We believe that we have already achieved this fourth goal, and we no longer wish to be the intellectual centre merely of the Hungarian Plain, but also that of the Euro region. The University of Szeged has fostered the traditions outlined by Szent-Györgyi and has made it its mission (even after the explosive increase in the number of students) to maintain the quality of education, to increase the range of scientific work, and to popularize research and its results in the widest possible circles. I myself consider it immensely important to undertake the mission of popularizing scientific knowledge. The dissemination of knowledge is essential in ensuring its utilization; it creates a simple way for the researcher and the entrepreneur to find each other. The third mission has become the determining activity of the university as a modern institution, and university education has come to play a major role in the economy worldwide. It is a challenge for the members of academia to decide how and to what extent to provide insight into the life of their intellectual centre, and into past and ongoing university research. It is difficult to gain attention in today's saturated media. The simplification of university-level knowledge to make it comprehensible to the general public is almost an art in itself. It demands broad and profound professional knowledge, and the cooperation of researchers and the media, which are striving to sell science in an easily comprehensible way through professional tools. Authentic, scientifically accurate simplifications can result in widespread knowledge, and only this kind of simplification can displace pseudoscientific explanations. Being uninformed is a dangerous state for the individual and those around him or her. At the same time, sciences and universities must also keep up with cultural changes and the changes in the "consumer" habits of the media. The knowledge that has accumulated must be made available to the new generation with the tools of the traditional and social media, in an easily accessible and youthful manner. Today's university press could be the experimental laboratory for such efforts. This could be a mission for the ever-renewing Magazine of the University of Szeged.

Prof. Dr. Gábor Szabó

Member of the Academy, Rector
University of Szeged



Vehicles in international competitions

Erzsébet GAJZER
Donát HERNER

Students at the Faculty of Engineering and the Faculty of Science and Informatics at the University of Szeged regularly complete both locally and internationally with vehicles that they themselves have designed and constructed.

The University of Szeged is one of the big names in the field of pneumobiles designed and driven by students. At the 8th International Aventics Pneumobile Competition in 2015, University of Szeged students took part with four individually designed and constructed compressed air-driven vehicles and achieved 2nd place in the senior category, 7th place in the arcade class, and 8th place in the acceleration section. In view of the fact that they were competing against 50 other teams, these results can be regarded as excellent. Another important event in the pneumobile calendar is the Kecskemét Gala Race, which provides an opportunity for designers of air-compressed vehicles to prove themselves and also to have great fun. In 2015, 14 teams from 7 countries competed from the viewpoint of acceleration and in a 50 m long-distance race, matching their knowledge and technological prowess. Two of the three teams from the University of Szeged scored podium finishes. Team Diff-Air won 2nd place, and team Pepp-Air 3rd place in the acceleration race. Szeged pneumobiles were recently tested by Norbert Michelisz, Eurocup champion and winner of numerous titles in the World Touring Car Championships, who praised them highly as very well-designed vehicles that work perfectly and without technical failures. Compressed air-driven vehicles are not the only ones in which students from the University of Szeged have attained great results. In 2015, the STECO group of students from the Faculties of Engineering and Science and Informatics entered one of the world's most demanding competitions for the first time: the international Shell Eco marathon. Their streamlined model vehicle Zeus, an eco-friendly, independently designed and constructed electric car prototype, weights about 30 kg, has three wheels and is mostly constructed from bicycle components; it is driven by a 250 W DC motor with 14 charged batteries. The team of talented young students reached the goal they had set for themselves: they successfully qualified for the Rotterdam race track by fully meeting the standards of the strict technological and safety regulations of the competition.

A missionary who propagates science

Ilona ÚJSZÁSZI
Gábor ÓCSAI

7

SCIENTIFIC TOPICS, PROVOCATIVE TITLES, PLAIN LANGUAGE

He is both loved and hated: both the scientific and science-popularizing lectures and articles of molecular biologist Zsolt Boldogkői are immensely influential. A Google search for his name leads to 7600 hits. He has over 4600 friends on Facebook, but his appearances in the media have also provoked highly critical comments and letters threatening him with legal action.

It is unusual for a university professor to write articles for the most popular online magazines in order to propagate science and to unmask pseudoscience. Why does Zsolt Boldogkői nevertheless commit himself to such a task?

One of my **missions** is to popularize biological knowledge - claims Zsolt Boldogkői, head of the Department of Medical Biology at the University of Szeged. In his opinion a feature very characteristic of human society is irrationality. Through his articles and appearances in the mass media, he aims to popularize rational thinking. His hard-hitting criticism of homeopathy has resulted in great dispute.

"Alternative medicine has no reason to exist, and neither does 'alternative' natural science," he told hvg.hu. In his answers to our questions, he made his position quite clear: to unmask charlatanism, frequently disguised behind a facade of pseudoscientific explanations, researchers have the task of restoring the honour of medical science, expressing themselves in plain language and style.

"The illusion of a free mind". This was the title of Zsolt Boldogkői's first famous article in Interpress Magazin. The text in which he sought an answer to the question Why are we unfaithful?, published in the Science section of Index.hu attracted a huge audience. His choice of popular, provocative topics and his use of straightforward, readily-understandable logic have led to the Szeged-based professor becoming one of the best-known science-popularizing personalities, with more than two hundred publications and numerous public appearances in the last two years.

I am interested in the world”

8

I value publications which are read by many people. Therefore, besides my scientific research articles in journals known only to the professionals, I have recently been publishing in popular online magazines - states the professor, who certainly has the widest readership among scientists at the University of Szeged. He believes that, from the aspect of the development of science, these publications are more influential than an article published in the most prestigious professional journal, which may be cited in their own arcticles by, say, a total of 8 other scientists.

I am interested in the world - he answered when we asked what inspires his work. - I started my career as an ecologist, I now deal with molecular genetics, but I am also interested in physics. I incorporate different fields of knowledge in the courses I teach. Modern science is characterized by interdisciplinarity.

A SCIENTIST IN A NEW ROLE

The professor also appears in television debates, for instance on areas of pseudoscience such as acupuncture. The “cultural sci-fi” film Lamplighters (Lámpagyújtogatók), premiered in April 2015, was marketed with his face. His science-popularizing novel San Diego – 2032 can be read on an open blog and in Gépnarancs, and will shortly be available in print and in e-book format. The autumn of 2015 will see the publication of his new book Hyenas around the sickbed and the dining-table (Hiénák a betegágy és az ebédlőasztal körül). He sees a potential for the popularization of science in community media. If justified, he comments on photos of well-known personalities: One of the most harmful things is false preaching by people regarded authentic”.

Together with his colleagues at the Department of Medical Biology Professor Boldogkői teaches cell biology and molecular genetics, with elective courses on molecular biology, developmental genetics, medical molecular biology and genomics. The most popular course is one that is open to students outside the Faculty of Medicine and available on YouTube: “On the borders of science”.

Ilona ÚJSZÁSZI
Anna BOBKÓ

ANTAL BERÉNYI:

If you have a good idea, try to put it into practice

What is the essence of research? We might say that it is making a new search, that is re-searching. The problem posed and the questions asked in science do not change, but developments in methodology can bring about new results," states Antal Berényi, leader of a group that carries out research in a really friendly atmosphere, who also teaches students of medicine at the University of Szeged.

– You were one of the founders of the Students in Research Movement (KutDiák) as a high-school student in Péteri. You were twice awarded a Scholarship Granted by the Republic as a student at the Faculty of Medicine here at the University of Szeged. As a doctoral student in Szeged, you began with the development of an experimental model for research on eyesight, and then you arrived at fundamental questions concerning the functioning of the brain. Did you consciously plan to be a researcher?

– Yes. Several generations of my family graduated from the University of Szeged. I also owe very much to my mentors. As a postdoctoral researcher, I had the great fortune to work in one of the world's leading laboratories in New York, with György Buzsáki, a researcher into the brain's rhythmic activities. I was introduced to this world-famous neuroscientist at a conference in Budapest by my mentor from Szeged, Professor György Benedek.

– How do you explain your significant successes in the United States, even as a junior researcher?

– My work was financed by a European Union scholarship, that is, by Brussels. In New York I was set free. The leader of the laboratory, Professor Buzsáki, had a working method characterized by expecting good ideas which the researcher would be happy to work on, since they would eventually produce results. We succeeded by proving in animal experiments that a certain type of epileptic seizures can be stopped by extracranial stimulation. My article in Science Magazine was a result of that research. One of the articles that I co-authored is about the development and testing of a transgenic animal strain that can be used in optogenetic experiments, and another reviews the results of research on the hippocampus, one of the most important organs of the brain from the aspects of spatial orientation and memory.

– Black and white rats are among your very important 'co-workers'. Why is it that these particular animals are so suitable for the study of brain functions?

Because they have good eyesight. Some of them are specially bred and transgenic animals that have a particular 'channel protein' implanted in their cells which can be opened or closed with light. If light can be sent to a given cell with a glass fibre, the researcher can take control over the cell with impulses of light. In this way the behaviour of the brain neurons can be influenced from outside.

– Besides your qualifications in medicine and neuroscience, you have a degree in medical economics from the University of Szeged. As a winner of the Momentum "Lendület" Program of the Hungarian Academy of Sciences, you moved back to Szeged and won an EU application to receive a prestigious ERC Starting Grant. This is an outstanding achievement. You have 3 million dollars at your disposal until 2018. What is the state of your scientific agenda at this point, in the autumn of 2015?

– I have set up the 'Hungarian Academy of Sciences – University of Szeged Momentum Oscillatory Neural Networks Research Group,' consisting of Hungarian, Spanish and Japanese researchers. The administration work takes several hours of my day, while I also have to manage the EU project. I additionally give seminars to students of medicine in the University of Szeged's Department of Physiology. The central theme of our common research is the study of epilepsy. We hope to develop tools or methods that function similarly to pacemakers. When pathological activity occurs in the brain, we would like to use electric stimuli to normalize the brain functioning as soon as possible. This method may later be promising in the treatment of depression, for example. Another of our topics is the study of the hippocampus. I expect very much here from the launching of our unique optogenetic laboratory in Szeged. We can explore the functioning of the brain at a deeper level and obtain more sophisticated answers while we record data from animals whose movements are unrestricted. I consider it my greatest achievement that I can work with a strong international team in which several fields of study are represented. This will be efficient. For every new step in our work, we need a new idea. In leading our common work, I rely on the American model: 'If you have a good idea, try to put it into practice!'
Ilona Újszászi

Designer drugs are growing in popularity among young people

Erzsébet GAJZER
Anna BOBKÓ

A COURSE ON DRUGS AT THE FACULTY OF PHARMACY AT THE UNIVERSITY OF SZEGED

Designer drugs are becoming more and more popular in clubs and pubs. We talked with Róbert Gáspár, docent of the Faculty of Pharmacy, about the tendencies in drug consumption among young people, the most popular substances, and about what can we do for drug-free entertainment.

TENDENCIES AND DESIGNER DRUGS

In Hungarian, the word 'drug' is generally taken to mean a chemical substance whose consumption alters the state of consciousness and can causes addiction, while the discontinuation of its intake causes psychic and physical withdrawal symptoms for an addicted person. From this perspective, alcohol and in a broader sense (addiction and withdrawal symptoms) nicotine and caffeine are also drugs, - explained Róber Gáspár.
He added that in Szeged it is difficult to asses the drug consumption of young people. Surveys in secondary schools in and around Szeged reveal that the use of cannabis and also amphetamine derivatives such as ecstasy is significant.
However, designer drugs are most popular among young people, since they are inexpensive and can be easily be purchased over the Internet. Moreover, it is difficult to punish people for using them.
As their name shows, these substances, are specially designed. Through redesigning, a given compound can be rapidly altered, and new compounds can be created overnight. The chemical structures of these new compounds are not known officially at first, and therefore the new substances cannot be banned. In Hungary, only the use of officially banned substances is illegal. This is a harmful situation not only because newer and newer substances are constantly reaching the market, but also because their effects and toxicological characteristics are not known. Surveys indicate that more and more young students, even those around 12-13 years of age, have started experimenting with these substances. One of the reasons is that they have also started smoking and consuming alcohol and caffeine earlier. Although caffeine does not cause serious addiction, and it is relatively easy to give up its use, its consumption makes it easier to decide to try new substances. That is why some call caffeine an "addiction glue."

CONSCIOUSNESS-ALTERING SUBSTANCES, SPLIT FAMILIES

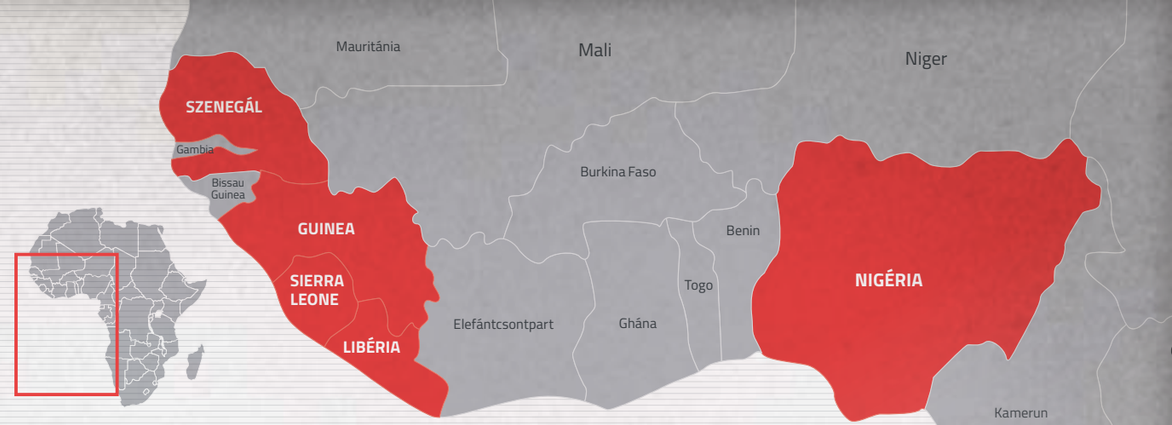
Róbert Gáspár went on to highlight that early substance abuse is closely connected with the fact that families fall apart and parents do not pay sufficient attention to the children. He also pointed out that as concerns the use of traditional drugs, it is important that Szeged is situated near the border of the country, whereas in the case of designer drugs this is not a significant factor since these substances are purchased over the Internet, not personally from a dealer, and the order therefore arrives in a package whether it comes from beyond the border or not.
Despite the tendency for drug abuse to grow, the

Alcohol is still the greatest problem”

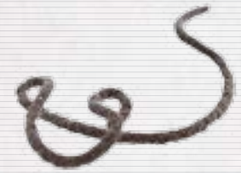
consumption of alcohol is still the greatest problem among teenagers and university students – he concluded. There are many signs that a person is a substance abuser. Cocaine and heroin constrict the pupils and alter the colour of the skin, while ecstasy users sleep too much, or are exhausted, reflecting the fact that the drug made them overactive earlier. Róbert Gáspár also highlighted that changes in personality and behaviour can be observed among those who use drug substances more actively, such as a deteriorating performance at school, a changed circle of friends, changes in interests, and changes in communication.

DRUG-FREE ENTERTAINMENT

Student at the Faculty of Pharmacy at the University of Szeged are offered a course on drugs, and they have the possibility to discuss the problems of drug abuse not only with professors, but also with police professionals. The Faculty of Pharmacy organizes competitions for secondary school students on the subjects of the dangers of drug abuse and the possibility of drug-free entertainment. Róbert Gáspár advises young people not to experiment with any consciousness-altering drugs, not to buy substances over the Internet, to consume only beverages that have been opened in front of their eyes, and not to leave their drinks unattended in clubs or pubs. The greatest problem in Hungary is that there are no entertainment facilities that are safe for young people. Solutions are needed that guarantee drug-free entertainment, and places of entertainment must be made available where consciousness-altering is not present in any form. In today’s virtualized world, drug prevention must also be used effectively online, in order to reach more young people. A solid economical and institutional background is clearly needed to achieve these goals, said Róbert Gáspár, who is also a member of the Drug Consultation Forum, and who took part in creating the drug-prevention strategy of the city of Szeged.



A mathematical model for Ebola



Mathematicians at the Bolyai Institute of the University of Szeged form the EPIDELAY research group, led by Gergely Röst, which has created a mathematical model to describe the Ebola epidemic, which predicts the spreading of the Ebola virus with great precision. The distinctive feature of the model is that it continuously traces the changes in the interventions relating to Ebola. The group has concluded that preventive action should not be stopped, even when the number of new cases of infection has greatly declined.

With the help of the estimates of the researchers in Szeged, the reproduction number of the Ebola virus indicates how many new infections are caused in general by one infected person. In West Africa this number is currently 1.44. This could be reduced to nearly 1 if the protocols of safe burial practices were adhered to. “One of our important mathematical findings is the final state equation. With this, we can estimate the total number of infections throughout the epidemic, since it includes a consideration of future interventions,” they claim in an article published on the website of the Faculty of Science and Informatics. The model demonstrates that, as long as new infections occur, intervention should be maintained, even if the numbers of new cases become less and less, as otherwise new waves of infection may occur. The research group has been studying the spread of different epidemics for years. The world’s greatest mathematical association, SIAM (Society for Industrial and Applied Mathematics), and the website of Science Daily have reported recently on the latest published work of the mathematicians in Szeged.

ABOUT THE VIRUS

Ebola febris haemorrhagica

Filoviridae family

Ebola virus is one of five known viruses within the genus Ebolavirus. Four of the five known ebolaviruses, including EBOV, cause a severe and often fatal hemorrhagic fever in humans and other mammals, known as Ebola virus disease (EVD). Ebola virus has caused the majority of human deaths from EVD, and is the cause of the 2013–2015 Ebola virus epidemic in West Africa, which has resulted in at least 28,635 suspected cases and 11,314 confirmed deaths. The natural reservoir of Ebola virus is believed to be bats, particularly fruit bats, and it is primarily transmitted between humans and from animals to humans through body fluids.

Source: wikipedia