



# HUNGARY

## 2018



# About the Stockholm Junior Water Prize



The Stockholm Junior Water Prize (SJWP) was established in 1997 and is an annual competition open to young people between ages 15 and 20, who have conducted water-related projects focusing on local, regional, national or global topics of environmental, scientific, social or technological importance. The Stockholm International Water Institute administers the Stockholm Junior Water Prize and it serves as its secretariat [www.siiw.org/prizes/stockholmjuniorwaterprize/](http://www.siiw.org/prizes/stockholmjuniorwaterprize/).

The Stockholm Junior Water Prize consists of two parts: the National Competition and the International Final. All participating countries organize their own National Competition. The winner proceeds to the International Final in Stockholm. As a result of the competitions, thousands of young people around the world develop personal interests, undertake academic studies and often pursue careers in water or environment-related fields.

The International Final takes place during the World Water Week in Stockholm, an ample event where water people from all over the world meet. This generates many opportunities for networking and exposure. The efforts of the participating countries are highlighted globally.

The winner of the Stockholm Junior Water Prize receives a 15,000 USD award, a blue crystal prize sculpture, a diploma, as well as the stay in Stockholm. Nevertheless, the participation is what genuinely matters.

H.R.H. Crown Princess Victoria of Sweden is the Patron of the Stockholm Junior Water Prize.

## Hungary and the SJWP

Hungary joined the SJWP in 2013. Mr. János Áder, the President of the Republic, has been the patron of the competition since 2014.

The national organizer of the SJWP is the GWP Hungary Foundation in agreement with the Stockholm International Water Institute. Details of the competition are available at [www.ifivizdij.hu](http://www.ifivizdij.hu).

## Previous winners of the national competition

**2013:** Dézi Kakas, János Béri and Péter Polák Jr. (Fényi Gyula Jesuit Secondary Grammar School, Miskolc) – Project title: The Importance of the Szinva Stream: Biological and Chemical-Physical Examinations

**2014:** Claudia Li, Lívía Mayer and Nikolett Sebestyén (Eötvös József Grammar School, Tata) – Project title: Our Water is Our Future

**2015:** Márton Czikkely, Tamás Gergely Iványi, Tamás Márkus (Városmajori Grammar School, Budapest) – Project title: The Secrets of Drinking Water – How to Combat Polyethylene Terephthalate

**2016:** Dávid Kovács, Ákos Iván Szűcs (Kada Elek Secondary School of Economics, Kecskemét) – Project title: What Can We Gain by Using Grey Water?

**2017:** Anna Tari, Kristóf Stefán, Nikolett Szabó (Szent László High School, Budapest) – Project title: „Tanks of Water”

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Finalists and jury members of the national contest



## The Hungarian National Final



The jury during the national final

Ten entries were received for the 2018 Hungarian National Competition. Altogether, there were nineteen secondary school students involved, participating either as individual contestants, or as teams of two members.

The projects were written in English, according to the requirements of the call and dealt with different topics, such as water reuse, the quality of drinking water and of surface waters, environmental awareness, eutrophication, wastewater treatment. Five projects were selected by the jury for the national final on the basis of the SJWP judging criteria.

The Hungarian National Final was organised at Danubius Grand Hotel Margitsziget in Budapest on the 26th of May 2018. The event was an optional program point of the Global Water Partnership's annual Regional Days held back to back and the participants of the Days were invited. The finalists were requested to prepare an A0 poster per team displaying the results of their project. During the final, the contestants presented their main findings and answered the jury's questions. Approximately 15 minutes per team were allocated. The presentations and the interviews were conducted in English.

### The jury of the SJWP – Hungary 2018

**Chair:**

- **András Szöllősi-Nagy**, Professor, National University of Public Service

**Members:**

- **Edit Nagy**, Secretary General at the Hungarian Water Utility Association
- **Marcell Marschall**, senior project manager, SUEZ Water Technologies & Solutions
- **Péter Szűcs**, Dean at the University of Miskolc
- **Tamás Krámer**, Associate Professor at the Budapest University of Technology and Economics
- **Adrienne Clement**, Associate Professor at the Budapest University of Technology and Economics
- **Zsolt Edgar Rasztovits**, Business Development Director for Xylem Water Solution Hungary
- **Veronika Major**, director of the VTK Innosystem Plc.
- **Gábor Szűcs**, advisor to the Office of the President of the Republic

**Secretary:**

- **József Gayer**, Chair of GWP Hungary Foundation

For the final two further experts were invited to the jury:

- **Danka Thalmeneirova**, Senior Knowledge and Learning Management Consultant, GWP
- **Jerome Delli Priscoli**, Chair of the Technical Committee, GWP

## Summary of the finalists' projects

### HOW STUDENTS CAN HELP WATER UTILITY COMPANIES WORK MORE EFFECTIVELY?

**Bence Tóth and Miklós Zsigó –**

NySzC Bánki Donát Polytechnical High School, Nyíregyháza

Water is the foundation of life, so without water there is no life on the Earth. Everyone knows these facts. The underwater exploration robot which is being developed by us can also perform activities that a diver could not be able to do and it is all cost-effective. The robot makes its job with remote control on a predefined route and it can also perform predefined tasks. Our prototype was made two years ago, which received an award on the Youth Innovation Competition. Based

on the experiences we got there, we started to build a new robot. Water must be treated with care. It is forcing more and more people and users to change and transform their water habits.





Summary of the finalists' projects

LET'S DRINK WATER! - MAKING WATER DRINKING MORE POPULAR AMONG YOUNG PEOPLE

**Csenge Pap and Ákos Olasz –**  
Verseghy Ferenc Grammar School, Szolnok

Nowadays one of the greatest issues is reaching and passing clear drinking water. Hungary is considered to be lucky, it is often called the land of waters. However, water consumption is a problem in Hungary too, not because of the shortage of drinking water, but because of the eclipse of tap water drinking, misconceptions

and bottled products. We have examined water consumption habits of young people. We have drawn attention to incompletions of the legal basis and we have suggested solutions on both national and local levels, for example by installing modern drinking-fountains. Our project aims to draw everyone's attention to tap water consumption. We are saying to everyone: Let's drink water!

RAINWATER, THE MOSTLY UNTAPPED WATER SOURCE

**Márk Szigeti and Bence Toldy –**  
Városmajori Grammar School, Budapest

If we think about how we get our drinking water, we probably say that it is from lakes, rivers, or from an underground water source. This is all true, but what if we can use rainwater for drinking? Most of the rainwater is wasted in the sewage system or just get absorbed into the soil. To solve this problem, and gain extra clean water, we must collect, storage, and clean it. So, we came up with two different ideas, and in the end, we linked them to each other. Bence's idea was to

collect the rainwater from the eaves, using a separated water pipe system, taking it to a water-purifier, and we get clean water. My idea was a machine, which collects rain water, purifies it, also, running with solar power, so you can place it a sunny and rainy place, and you get clean water almost free. We call it WATPUR. So, if we combine the green purifier machine with the rainwater pipe system, we can get lots of clean water (but in this case, we must use more solar panels, so we get the water faster).





# Summary of the finalists' projects

## HILLSIDE WATER MANAGEMENT AND POSSIBILITIES OF MELIORATION IN THE CSATÁRI-VALLEY

**Bence Zsolt Rappay –**  
I.Béla Secondary Grammar School, Szekszárd

Hillside water management is an important issue of our present and future. The more extreme weather, the rashly raining and the runoff of those are not provide harmony in the next decades.

It is urgent to recognise the problem in time and to act in case of to have a better and safer tomorrow. The importance of surface and ground waters, also the effects to the direct environment are controversial cases for years. Unfortunately, few people deal with the question of water management or drainage. What can we do for our local environment? How can we improve the ecosystem of our town? These questions motivated me, to start my research, which is about my hometown, Szekszárd.

Szekszárd – county town of Tolna county – is located at the meeting of the Szekszárd Hills and the Great Plain. Its hillside part consists of ridge canals which are frequently segmented with valleys and glens. On the other hand, the east part is plain far until the Danube. Rainwater of the town is collected by the catchment canals of the valleys. There are two major rivers in the town: the west-east oriented Szekszárd-Séd and Parászta-Séd. All the catchment streams, collector ditches and drainage systems flow into these rivers.

Hills can be divided into four valleys: Parászta, Séd, Csatári and Tót valleys. At the first two, there were water management measurements, while the last two are waiting for developments. That is why I chose the Csatári-valley to propose solutions about its surface waters.

The Csatári-valley (see Figure 1) lies in the southern part of Szekszárd, between the Bartina and the Őcsény Hill. Its area is near 8 km<sup>2</sup>. Characteristic viticulture and wine production going on in the region, by a lot of noted oenologists and more private owners. Most of the area is vinery or forest. The valley has other sub-valleys, which are (from east to west) the Iván, Cinka, Gyűszű, Porkoláb, Csötönyi, Gesztenyész, Faluhely and Baranya valleys. The valley has a catchment stream at the floor called Csatári-stream. This collects the rainwater of the sub-valleys and flows into the Szekszárd-Séd.

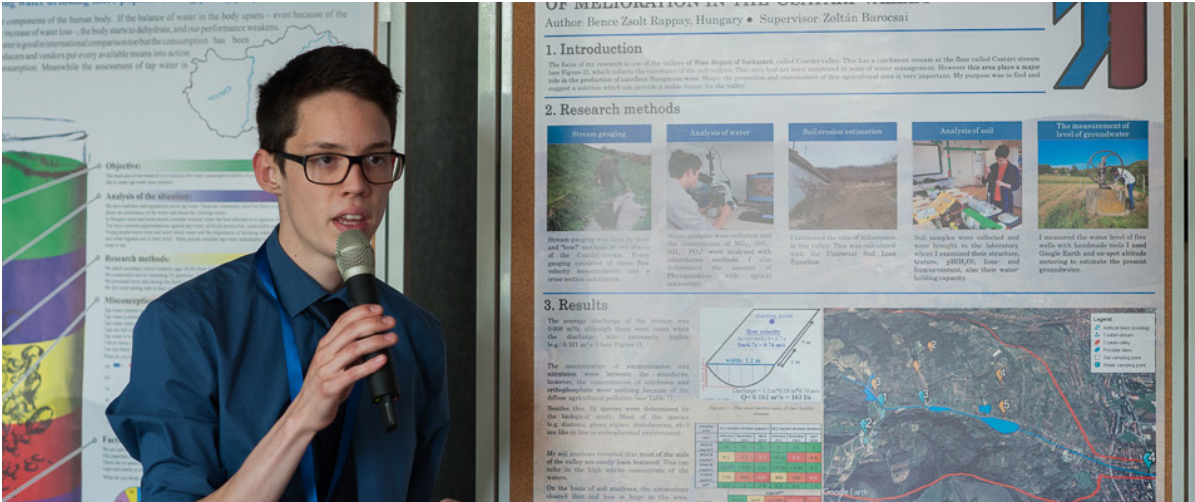
This area had not been monitored in point of water management. However, it plays a major role in the production of excellent Hungarian wine. Hence the protection and sustainment of this agricultural area are very important. The main problem is that the valley is not prepared for the extreme weather conditions and it cannot retain surface waters for the droughty periods. The aim of my research was to find and suggest a solution for a stable future with considering the parameters of the valley.

## TAPPING THE TAP

**Bence Hervay and Iván Tóth-Rohonyi –**  
Fazekas Mihály Secondary Grammar School, Budapest

In the issue we tackled in our project, water is not part of the problem, but is the solution to it. Excessive soft drink consumption is a serious problem of our times both in terms of health and environmental cost. This problem is important not only because of its numerous negative consequences, but also because its solution is basically given, only people should be made aware of it. Sugary soft drinks one the one hand cause obesity, diabetes and bone loss, as well as dental erosion, and on the other hand their manufacturing and transportation costs huge amounts of water and energy. The majority of the bottles and cans are not recycled and thus create a lot of nondegradable waste. The solution is simple: let's drink tap water! This is much cheaper than any other drink (including mineral water), its transportation is more energy-efficient, and much less polluting for the environment. The situation is especially regrettable in Budapest, where the quality of tap water rivals that of mineral water, yet people consume a great amount of soft drinks and mineral water. We find it really sad that people hold various misbeliefs related to this (there are a number of different misbeliefs and they are widely held), and the various soft drinks are featured in an unbelievable number of ads and promotional materials, unlike tap

water. We have prepared a survey about this issue in which we ask people about their drinking habits. From the findings we have drawn the conclusion that the two main reasons for not drinking tap water is the inconvenience of drinking from taps, and the misbeliefs about its quality. In our project we tackle both. In Hungary there are no drinking fountains in schools or public spaces and thus drinking tap water is often very difficult when we are not at home. This is the problem we wanted to address, and our solution is a 3D printable module that can be fixed on a tap. This ejects the water coming from the tap upwards, thereby making it easier both to drink from the tap and also to fill a bottle. We had several versions (altogether 6 so far), the current one is already functional, but we can still improve it further. We have made the different versions available on the Internet for anybody interested. As mentioned above, the most important factor in solving the problem is changing people's attitudes, so we found it very important to raise people's awareness. For this purpose, we held 'water tasting' events at our school, which made the participants realise that tap water in Budapest differs so slightly from mineral water that they cannot really be distinguished. We also organised an 'escape room' with the theme of water for students in lower grades, on the world day of water, to alert them to its importance.





# The result of the National Final

The jury decided on the winner in a closed session and announced the result on the spot. The decision was based on the same judging criteria used during the international final (Relevance, Creativity, Methodology, Subject Knowledge, Practical Skills, Report and Presentation), considering both the written project and the presentation, including the interview. The winner of the Stockholm Junior Water Prize – Hungarian competition 2018 is:

Bence Zsolt Rappay (I. Béla Secondary Grammar School, Szekszárd) with the project: „Hillside water management and possibilities of melioration in the Csatári-valley”

The focus of the research is one of the valleys of the Wine Region of Szekszárd, called Csatári-Valley, which allows different agricultural activities. This area has not been monitored from the perspective of water management. The problem of the valley (and its owners) rests in the fact that it is not prepared for the extreme weather of the next decades, thus the risk of soil erosion in the area is extremely large. The purpose of the research was to find and suggest a solution which can provide a stable future for the valley. The teacher who assisted Bence was Mr. Zoltán Barocsai.



The winner of the SJWP Hungary 2018

The GWP Central and Eastern Europe special award went to Bence Tóth and Miklós Zsigó (NySzC Bánki Donát Polytechnical High School, Nyíregyháza) for the project: “How students can help water utility companies work more effectively?”.



GWP Central and Eastern Europe Regional Coordinator Richard Müller also greeted the finalists

All finalists received diplomas and recognition on stage. The members of the teams were awarded a six-month subscription to the magazine National Geographic. All finalists were invited to the Budapest Zoo and the Széchenyi Bath as well. The support of the teachers was also recognized on stage.

For the official Award Ceremony of the 2018 Hungarian SJWP competition President János Áder invited the five finalist teams to his office. There the students shortly explained their results to the President in the presence of the media. Mr. Áder spoke about the importance of involving the young generation into finding solutions for today’s challenges of water management and handed over the SJWP 2018 Hungary Prize to the winner.



The winner of the SJWP Hungary 2018 receiving the prize from President János Áder



Finalists with President Áder on the balcony of Sándor palace



# The international final

The finalists from the participating countries were invited to the World Water Week in Stockholm. There they actively took part in the global conference through a variety of activities for five consecutive days. An i-poster exhibition of all student projects gave the finalists an opportunity to discuss their projects with a wide range of conference attendees including researchers, politicians and the media.

This year, representatives from 32 countries competed for the SJWP: Argentina, Australia, Bangladesh, Belarus, Brazil, Canada, Chile, China, Finland, Germany, Hungary, Israel, Italy, Japan, Latvia, Malaysia, Mexico, The Netherlands, Nigeria, Norway, Republic of Korea, Russian Federation, Singapore, South Africa, Spain, Sweden, Switzerland, Thailand, Turkey, Ukraine, United Kingdom and the United States of America. Following

### A Novel, Eco-friendly Synthesis of Reduced Graphene Oxide (rGO) from Durian Rind and Sugarcane Bagasse for Water Filters

**Caleb Liow Jia Le and Johnny Xiao Hong Yu**  
Singapore

The conventional method of synthesizing reduced graphene oxide (rGO), a promising material for water purification, is expensive and produces toxic gases. In this study, rGO was synthesized from durian rind and sugarcane bagasse using a novel, eco-friendly, simple and low-cost process. The rGO synthesized from durian rind was comparable to commercial activated carbon in removing methylene blue, a toxic dye, and is 32% more effective than commercial activated carbon in absorbing copper(II) ions. The rGO synthesized can be incorporated into filters for the removal of dyes and metal ions.

the presentations, each finalist was interviewed by a jury of international experts, who then decided on the winner.

Hungary was represented by the one-member team formed of Bence Zsolt Rappay (Secondary Grammar School, Szekszárd) with his project: „Hillside water management and possibilities of melioration in the Csatári-valley”.

The 2018 Stockholm Junior Water Prize was awarded to two students from Singapore (Caleb Liow Jia Le and Johnny Xiao Hong Yu) who developed a more sustainable way to produce a material used in water filters. The students found a safer way to create reduced graphene oxide using an eco-friendly, simple and low-cost process. H.R.H. Crown Princess Victoria of Sweden presented the prize at an award ceremony during World Water Week in Stockholm on 28 August.

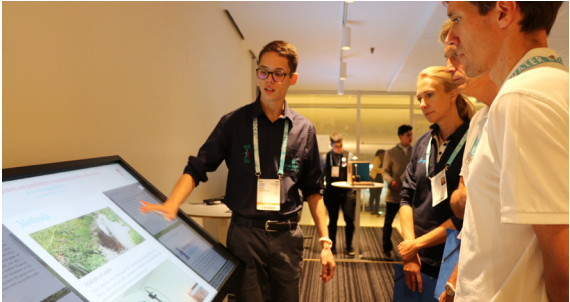


The winners of SJWP 2018 receiving the prize from H.R.H Crown Princess Victoria

A Diploma of Excellence was awarded to the students from Japan: Tatsuyoshi Odai and Narumi Sakamoto. Their amazing achievement with the new green revolution: hybrid system of phytoremediation and food production in eutrophicated pounds/lakes.



The Diploma of Excellence was awarded to the team of Bangladesh



Bence during his presentation



Crown Princess greeting the finalists



Mingle



Finalists before the Award Ceremony





Stockholm Junior Water Prize 2018 finalists with H.R.H Crown Princess Victoria of Sweden



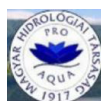
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