

# 2020 Finalists



**SIWI** STOCKHOLM  
JUNIOR  
WATER PRIZE



# Stockholm Junior Water Prize

Each year, the Stockholm Junior Water Prize celebrates young scientists from all around the world who have designed new innovative solutions to the Earth’s increasing water challenges. Each of the national finalists competing for the ultimate title are the champions of their national competitions and have been selected as winners from thousands of entries for their outstanding work.



## About Stockholm Junior Water Prize

The 2020 edition is entirely held online and in spite of the corona pandemic, 29 countries succeeded in organizing national competitions. It is the winners of these national competitions who vie for the title Stockholm Junior Water Prize champion 2020.

This year we are proud to host the 24th annual competition and celebrate the winners of national competitions from the following countries: Australia, Bangladesh, Belarus, Bolivia, Brazil, Chile, China, Ecuador, Hungary, Israel, Italy, Japan, Laos, Malaysia, Mexico, The Netherlands, Nigeria, Republic of Korea, Russian Federation, Singapore, Spain, Sri Lanka, Sweden, Switzerland, Thailand, Turkey, Ukraine, United Kingdom and United States of America.

The Stockholm Junior Water Prize competition proves once again that given the opportunity, exceptional young minds can come up with outstanding and original solutions to our planet’s water related issues. Despite the ongoing crisis caused by Covid-19, these bright students have looked beyond problems and have created projects with potential for long-term benefits. In this catalogue, you can learn more about the innovative research and inventions that earned each of the finalists a place to compete for the internationally recognized Stockholm Junior Water Prize Award.

You can learn more about all of the amazing projects from the finalists, watch their videos and read all about them on the participants’ own web page [WaterTank](#).

You can find more information about the award and previous laureates on the [Stockholm Junior Water Prize website](#).

Cover Photo:  
Stockholm Junior Water Prize finalists 2019. Photo by Jonas Borg.

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## The international jury

The competitions’ international jury includes experts within the field of water who appoint the winner of the international final by committee consensus. The decision is based on the finalists’ written report and a short interview with the jury, during which students will make a short presentation of their project. The jury members are appointed by Stockholm International Water Institute Board.

All members of the jury have extensive experience and represent a wide range of disciplines from natural to social sciences in order to ensure all projects are equally reviewed and judged.

- The 2020 International Jury Members:**
- Dr Victoria Dyring (Chair), Sweden
  - Ms Fabienne Bertrand, Haiti
  - Dr Paula Owen, UK
  - Prof. Krishna R. Pagilla, USA
  - Prof. Yoshihisa Shimizu, Japan
  - Mr Johan Bratthäll, Sweden
  - Mr Manuel Fulchiron, France



**National Organizer**  
Australian Water Association

**Sponsors**  
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## Australia



**CRACK for the FUTURE: The use of eggshell waste as a bio-adsorbant of phosphates for water and soil quality**

**Emma Serisier**

This study looked at potential bio-waste adsorbents to decrease the phosphate run-off into natural

waterways from agricultural fertilisers and animal manures. Identifying eggshell waste as an effective adsorbent for phosphate, a mathematical model and website were developed for farmers to calculate cost savings and application rates of eggshell on their soils. This free and accessible tool will be available to help farmers counteract their environmental footprint.

**National Organizer**  
House of Volunteers Foundation Bangladesh

**Co-organizer**  
WaterAid Bangladesh

## Bangladesh



**Using naturally derived poly glutamic acid in association with Moringa oleifera seeds as a coagulant for treating water**

**Adittya Kumar Chowdhury, Iftekhar Khaled**

Bangladesh is currently undergoing some massive economic changes, and the river bodies are being affected by pollution. Unethical practices are not accounted and the rise in economic growth translates to more industries, which is good for the economy but bad for the water bodies. In the current system, in order to tackle such issues, people resort to many types of water purification measures. With about 63.37% of the total population living in rural areas and at a poverty rate of 24.3%, expensive purification means, like reverse osmosis, is not an option for them. We developed a method to carry out flocculation with Naturally produced poly-glutamic acid with Moringa olifera seeds, which are abundant in nature.

**National Organizer**  
Republican Center of Ecology and Local Study

**Sponsors**  
Coca-Cola Beverages Belarus

## Belarus



**Microplastics pollution of water in Belarus: from the problem to the solution**

**Kirill Veras**

Nowadays the microplastic pollution is becoming a macro problem and all countries are held responsible. In the results of the project it has been established that natural water ecosystems in Belarus are polluted by microplastics. The laboratory researches proved the toxic effect of microplastics on aquatic organisms. This result enriches the fundamental knowledge of the microplastics pollution. The creation of a special filter for collection of domestic microplastics in sinks and washing machines arose as a consequence of a huge research part of the project. The filters invented are easily used in all households, provided that owners have a conscious approach.

**National Organizer**  
Embassy of Sweden, La Paz

**Sponsors**  
Agua Tuya, Gaia Pacha, Innofsweden

## Bolivia



**Training for 20 low-income families from peripheral neighborhoods of the city of Cobija for the design and construction of greywater and rain-water purification modules, using Brazil nut and coconut shells**

**Shanne Nashely Montenegro Poma, Grover Velasquez**

This project seeks to improve the health of 20 low-income families from peripheral neighborhoods of the city of Cobija

who will have access to an alternative for self-management of greywater and rainwater. This project will ensure access to low-cost drinking water according to standards for water quality for human consumption in Bolivia. We seek to train 20 low-income families from peripheral neighborhoods of the city of Cobija for the design and construction of greywater and rainwater purification modules using Brazil nut and coconut shells. The material is easy to obtain since the nuts grow naturally in the Amazonian area of the department of Pando.

**National Organizer**  
Brazilian Association of Water, Sanitation and Environmental Engineering (ABES), Young Water Professionals (JPS)

**Sponsors**  
SABESP, SCANIA, Xylem

## Brazil



**Bioflocculant pectin activity extracted from the orange peel (Citrus sinensis (L.) Osbeck) for wastewater treatment**

**Daniel Victor Santos Silva, Iago Martins Felipe**

The principal flocculant agent used in the water and wastewater treatment process is the polyacrylamide, of which monomers are highly toxic. The purpose of this project is to solve this problem

by evaluating the behavior of the bioflocculant pectin extracted from the orange peel. The pectin extraction made by the citric acid and characterized the obtained material with the degree of esterification (DE) and galacturonic acid content (GAC) with the method of neutralization volumetric. The Flocculation tests made in synthetic residual water considering three values of initial pH: 3.3; 7.8 and 10.6. In pH 10.6, all the samples presented flocculation activities better than 90%, that is, is the most favorable to the pectin flocculation process.

**National Organizer**  
General Water Directorate

**Sponsors**  
Dirección General de Aguas (DGA) del Ministerio de Obras Públicas (MOP) de Chile

## Chile



**Use of FCH Filters (Human Hair Filters) in fishing boats artisan for the capture of hydrocarbons present in bilge maneuvers. Stage II**

**Nicolás Ignacio Sierralta Varas, Ferdy Guillermo Hernández González**

Oil spills can cause serious damage to the resources of the fishing sector and the aquaculture through physical contamination, toxic effects on fish and shellfish populations and by interruption of business activities. In some cases, the application of effective protection measures and cleaning can prevent or minimize damage. As a result of this, ideas arise to seek possible solutions. This is how our research tries to contribute to the ecosystem, capturing the hydrocarbons present in the Coasts of Caldera, with the use of human hair filters (FCH) in artisanal fishing vessels.



**National Organizer**  
Center for Environmental Education and Communications of Ministry of Ecology and Environment

**Sponsors**  
Xylem

## China



**A research on the basic formula development for marine environmental friendly sunscreen based on edible ingredients**  
**Zhang Baoxin**

The synthetic chemical components of sunscreen, such as benzophenone, are harmful to marine environments. It has been proven that plant oils (olive, jojoba, carrot seed, aloe, avocado, grapeseed and coconut) have the characteristics of ultraviolet absorption. The oils were mixed with the commonly used physical sunscreen materials (titanium dioxide and zinc oxide powder) to develop a self-made sunscreen. It has been proven that the sunscreen produced can achieve satisfying sun screening effect and can serve as substitute sunscreen formula of the current chemical-based sunscreen to reduce the chemical additive pollution of the marine ecosystems.

**National Organizer**  
SR3 INVENT

**Sponsors**  
Tesalia cbc;  
FONAPA -Fondo del Agua para la Conservación de la Cuenca del Río Paute; CELEC-EP HIDROPAUTE; Produbanco - Grupo Promérica

## Ecuador



**A Hybrid Artificial Wetland System, for the Treatment of Domestic Wastewater in Rural Areas**  
**Halberth Andrés López Córdova**

Wastewater generation is a current environmental and public-health problem. In this project, the influence of the species *Canna indica* and *Racinaea fraseri* on the removal of contaminants present in domestic wastewater was studied, through artificial wetlands, using concrete filtering media. The methodology was based on

an experimental model of a hybrid continuous system wetland, fed with wastewater with 2 individuals of *Canna indica* and two of *Racinaea fraseri*. The system was monitored using physical-chemical parameters: pH, chemical oxygen demand, phosphates, ammoniacal nitrogen, nitrates, and total suspended solids. Simultaneously, the apical growth of the plant was monitored. The results demonstrated that plants capture nutrients from the water, therefore contributing to the elimination of contaminants in the wetland.

**National Organizer**  
Tel Aviv University

**Sponsors**  
Faculty of Engineering, Tel Aviv University, Raquel Klachky Fund, JNF USA, Water Authority, Water Research Center, Tel Aviv University

## Israel



**The Effectiveness of Using Replacement Reactions of Carbonate Minerals in Removing Groundwater Pollutants**  
**Nadav Elgrably**

The aim of the research is removal of metals from contaminated groundwater via chemical reaction between the aquifer rocks and oxalic acid injected in the water. The research consisted of laboratory experiments demonstrating that the concentration of lead, zinc, nickel, barium in the water could be decreased. Further experiments are needed to better understand the appropriate conditions for the success of the method for various metals, and for conditions prevailing in groundwater.

**National Organizer**  
FAST Federation of scientific and technical associations

**Sponsors**  
FOIST, Fondazione Salvetti, Fondazione Cariplo, Ocmi Group, Xylem, Aica, British institutes Seregno, Cielo stellato Silvio Lutteri, Corepla, Erica, ETAss, Museo nazionale della scienza e della tecnologia Leonardo da Vinci, Unichim

## Italy



**Supramolecular chemistry a solution for the environment: Betacyclodextrins and Liquidambar to improve water quality and reduce waste**  
**Fiorenza Baratti, Giorgia La Iuppa**

Water is the most precious asset, and in our territory, it's contaminated with traces of pesticides and heavy metals. Our project, based on environmental sustainability and in particular the reduction of water waste, uses beta-cyclodextrins (completely natural and starch-derived) absorbed in Liquidambar berries (abundant material in nature) for the removal of heavy metals and polluting molecules from the water. Our idea, in addition to using abundant waste material as berries are not used in other sectors, it is also

very practical. Because we could use beta-cyclodextrins absorbed in berries, for water purification in the drainage channels of the rice paddies present in our territory. If waters are clean, the aquifers also benefit.

**National Organizer**  
GWP Hungary

**Sponsors**  
Hungarian Water Utility Association, Budapest Water Works, Xylem

## Hungary



**Detecting the Toxin Production of the Microcystis species in Hungarian Lakes**  
**Dóra Alexandra Gyémánt, László Török**

Algal bloom causes several damages to lakes all around the world. The goal of this project was to develop an efficient way to follow the toxin production during algal blooming at an early stage. The goal of the study was to create a biosensor which could detect the starting point of microcystin toxin production of blue-green algae, namely, the toxic *Microcystis* sp. population.

Microcystin is synthesized non-ribosomally by 10 genes. Four BioBricks were designed with the promoter of the genes. However, instead of the genes, green fluorescent protein (GFP) was used to predict the transcription of the genes responsible for microcystin synthesis. The students measured the fluorescence density emitted by the GFP when the toxin production had started.

**National Organizer**  
Japan River Association

**Sponsors**  
CTI Engineering Co., Ltd., Nippon Koei Co., Ltd., Tokyo Construction Consultants Co., Ltd, Pacific Consultants CO., LTD., IDEA Consultants, Inc., Yachiyo Engineering Co., Ltd., Kyowa Concrete Industry Co., Ltd.

## Japan



**Controlling soil runoff and increasing food production by the functional water collection system using traditional Japanese soil solidification technology: "Ta-ta-ki"**  
**Hiroki Matsuhashi, Takuma Miyaki**

In this research, "Ta-Ta-Ki" soil, a traditional Japanese soil solidification technology, was successfully applied to develop a novel multifunctional water collection system to control soil runoff and increase food production with low environmental impact and low cost. Major functions of this system include: (1) collection and retention of rainwater during the rainy season; (2) supply of nutrients to poor soil; and (3) control of soil runoff caused by rainfall. This inexpensive soil solidification technology with high operability can be an effective solution to various water and food shortage problems in developing countries, especially in the arid and semi-arid areas.

**National Organizer**  
Sirena Technologies  
Laos

**Sponsors**  
Magic Palms School

## Laos



**Treating Waste Water for Re-usage**  
**Anisa Philasouk, Sittiphon Pathammavong**

Last year, 2019, Laos was hit by one of the worst droughts in a decade. We thought of researching for a solution to save water and an idea we came up with was reusing the water from our household and using it for different

purposes. One challenge in achieving this goal was that the water coming out of our household had a bad smell and was discoloured. We found out that water can be treated with natural ingredients such as Alum, Hydrated-lime and Charcoal. These ingredients help make the water colour more clear and remove the unwanted smell. This project will contribute to reducing the wastage of water. This cost effective project can be our key solution to several water problems.

**National Organizer**  
Talent Developing Society

## Malaysia



**Smart Water Harvesting System For Agriculture**  
**Shiwaanee Jaga Jeevan**

According to New Straits Times, about 100 farmers in Pinang Tunggal, Paya Keladi and Pantai Kamloon in Penang, are at risk of suffering major losses when there is inadequate water supply to irrigate paddy fields. My innovative plan is

to harvest rain and runoff water by the usage of hi-tech solutions such as IoT to supply water in the underground storage automatically during drought. This idea does not only put an end to drought issues faced by the farmers but also increases the yield of food in my beloved country. It achieves 3 UN SDGs which are Goal 2- Zero hunger, Goal 13- Climate Action and Goal 15- Life on land. I believe that my project will certainly create a better and greener future globally.

**National Organizer**  
Instituto Tecnológico y de Estudios Superiores de Monterrey

## Mexico



**Use of ancestral Mazahua natural soaps for water sustainability**  
**Miritza Merari Velásquez Rangel, Ingrid Fanny Ruiz Tapia**

Mazahuas are an indigenous group that lives in a small area in Central Mexico and have accumulated centennial knowledge on the use of plant substrates as cleansing agents. In this project, students interviewed the Mazahua community, documented the artisanal soap making process, and compiled a list of seven substrates, such as soda, sanacoche and wood ashes, used by the Mazahuas in the elaboration of traditional natural biodegradable

soaps. Biodegradability and substrate performance as cleansing agents were assessed by performing phytochemical analysis, concluding that these soaps comply with their purpose as detergents while having a lower environmental impact. Preservation of the Mazahua culture can provide an alternative to the use of commercial detergents, one of the main sources of water pollution.

**National Organizer**  
Wetsus, Centre of excellence for sustainable water technology

**Sponsors**  
Wetsus, TKI Watertechnology

## Netherlands



**Biomimicry: Nature's Blueprint. Filtering water by imitating life.**  
**Elise Hornstra, Nikki van Haasteren**

Biomimicry is an art that uses processes that are found in nature to solve human problems. Biomimicry can be used to clean water. During this research, the problem-driven approach is used. This approach starts with the essence of a

problem and follows various research steps to find a solution. The filtration processes that were put in practice were filtration through sedimentation, soil and plants. These processes showed the most potential from processes that were researched. The filtered water was then tested on various components. The conclusion was that the design for a water filtration system that is broadly applicable and provides safe drinking water needs to be based on the filtration processes in the kidneys, soil and plants.

**National Organizer**  
Nigerian Young Water Professionals

**Sponsors**  
Embassy of Sweden Abuja Nigeria, Federal Ministry of Water Resources Nigeria, Atlas Copco Nigeria Ltd, Xylem

## Nigeria



**Natural Water Purifier with GSM Monitoring System**  
**Garuba Mustapha Ademola, Adeola Elizabeth Adedokun**

The use of chemicals in water treatment, which is a popular practice all over the world, contributes to climate change. For example, chlorine reacts to form tetrahalo-methane which are greenhouse gases and carcinogenic. This project used common plants (Moringa olifera and Jatropha curcas) to treat various contaminated

water and with GSM monitoring system we were able to evaluate the effectiveness of the pollution-control measures. With this technique, all the stations will operate in real time, and central station can access data from any of the above stations using GPRS/GSM and other cellular services. This work highlights the fact that our solution is in nature and this project if scaled-up, is capable of meeting the safe water needs of communities.

**National Organizer**  
Korean Water Forum

**Sponsors**  
Ministry of Environment, Ministry of Education, Embassy of Sweden in Korea, K-water, Korea Foundation for the Advancement of Science & Creativity

## Republic of Korea



**Treatment of Metal Containing Wastewater using Eco-friendly Alginate: Selective Recovery of Metal ions**  
**Hyunseok Hong, Jiung Nam**

Heavy metal pollution from wastewater poses a significant health risk. Conventional methods of heavy metal removal from wastewater use a coagulant to attract metal ions into sludge. The treatment is long, costly and results in large water loss, and is harmful to the environment. In this study, a novel metal filtration system for wastewater using alginate, an algae-derived polysaccharide

which forms a hydrogel with metal ions and traps them in place, is introduced. Using the motion of electrophoresis, the metal cations are moved through a compartmentalized alginate liquid filter and is separated based on their affinity toward alginate, making recycling more viable. The practicality of this method is that the resulting material is more eco-friendly and less water and metal are disposed.

**National Organizer**  
Environmental Projects Consulting Institute

**Sponsors**  
Ministry of Natural Resources and Ecology of the Russian Federation, Federal Agency of Water Resources, Coca-Cola HBC Russia, TVEL Fuel Company of Rosatom

## Russian Federation



**Pollution-induced changes in enzyme activity in aquatic ecosystems**  
**Darya Derevyagina**

The project goal was the improvement of the rivers' environmental monitoring using changes in enzymes' activity in the surface waters, bottom sediments and hydrophytes. Activity of the following hydrolase enzymes has been researched: urease and oxide reductase (nitrate reductase and polyphenol oxydase). Enzyme activity was measured by spectrophotometry methods. The level of enzyme activity increases with the concentrations of substances which

form the enzyme-substrate complexes with these enzymes. This level can indicate the presence of certain substances in the water reservoir and provide a measure for their concentrations. Activity of polyphenol oxydase, nitrate reductase and urease increased when the surface runoff and household waste waters containing nitrates and phenols entered the water reservoir. This scientifically sound method is available for replication.

**National Organizer**  
Ngee Ann Polytechnic

**Sponsors**  
Sembcorp Industries, Lien Foundation

## Singapore



**A Novel Electrochemical Enhancement of Activated Carbon Fibre for the Purification of Contaminated Pharmaceutical Effluents**

**Low Jeen Liang, Yiu Yi Hin Kinsey**

Adsorption by activated carbon is conventionally used for wastewater treatment but is inefficient for pharmaceutical wastewater purification. This study investigates a novel, low-cost electrochemical enhancement of activated carbon fiber (ACF). With 1.0V applied, ACF's effectiveness in removing acetone, a common pollutant in pharmaceutical waste, was increased by 107%. Over three cycles of adsorption and regeneration, the original effectiveness of unenhanced ACF plunged by 39.2%, while that of electrochemically enhanced ACF remained over 90%, demonstrating its increased reusability. A self-constructed prototype integrated electro-sorption and regeneration into one central chamber, allowing wastewater to be continuously purified as part of a cyclic process.

**National Organizer**  
Fundación Aquae

**Sponsors**  
Fundación Aquae

## Spain



**Remote Sensing Applied to Precision Agriculture**

**Marc Pérez Aladrén, Manuel Martínez**

We are Manuel Martínez, Joan Viñal-longa and Marc Pérez, students from the technological field. Our research project is called Remote sensing applied to precision agriculture. Our goal is to reduce the high water consumption in agriculture with new technologies. A multispectral camera coupled to a drone alongside an analysis of data obtained after multiple flights can help to reduce this consumption. Besides, we have focused on helping small farmers in our area monitoring and controlling their crops to improve productivity and have a more efficient use of water. In the long term, we would like to altruistically help farmers around the world since the agricultural sector is where more water is used and also wasted.

**Co-organizers**  
DreamSpace Academy, Sagacious Youth Lead Consortium Sri Lanka, Sri Lankan Tamil Student Association of Chicago

## Sri Lanka



**Syzygium cumini Seed Extract-Mediated Green Synthesis of Iron Oxide Particles for the Removal of Cadmium Ion in Wastewater**

**Thambipillai Thinojan, Kanesamoorthy Abinaya**

Water is an inevitable aspect of not only humans but all living beings. On the other hand, contamination of water results in many acute and chronic illnesses in humans, and environmental

pollution. In this study, the iron oxide particles were synthesized in a simple aqueous-based technique using the seed extract of Syzygium cumini as the source of both reducing and capping agent. These particles show the magnetic character therefore, an external magnetic field was applied to separate the particle from the solution. The kinetic study showed that particles removed 92% of Cd ion in 30 minutes from wastewater. Moreover, this research revealed that the synthesized particles could be a very promising material to remove Cd ion from the wastewater.

**National Organizer**  
Swedish Federation of Young Scientists

**Sponsors**  
Xylem

## Sweden



**Studying the Growth of Phytoplankton in Thiamine Enriched Water**

**Erika Eriksson**

A high mortality among animals due to thiamine deficiency, also known as vitamin B1, has recently been observed. The cause of it might be phytoplankton. Phytoplankton is the main producer of thiamine and the share of thiamine auxotrophic phytoplankton, plankton who

are unable to produce thiamine, is likely to substantially affect the thiamine deficiency. In this project it is examined how the concentration of phytoplankton in a water mass changes upon addition of thiamine. This is done by enriching water from the Baltic Sea with thiamine. The results indicated that the share of thiamine auxotrophic phytoplankton was substantial when and where the samples were collected, providing new ideas for further research.

**National Organizer**  
Swiss Toilet Organisation and Swiss Water Partnership

**Sponsors**  
Skat Consulting, Ltd., Xylem, seecon – society-economy-ecology consulting

## Switzerland



**First Evidence of Microplastics in the Waters of the Upper Engadine in Switzerland**  
**Anna Sidonia Marugg**

The objective of this study was to find out whether microplastic particles can be found at 8 locations in the Upper Engadine with different population densities, types of land use, and distances to the source of the river Inn at Lake Lunghin, a remote location in a major European watershed. A wooden, low-cost, light, easily transportable, self-constructed LADI-trawl was used for sampling. Plastic residues were detected in all locations, and the found particles were assigned to 22 different types of plastics, showing that even seemingly remote regions and sparsely populated areas are affected by microplastic pollution. The findings of this research are of key importance for alpine regions, as evidence of plastic was found at over 2400 meters above sea level.



**National Organizer**

The Institute for the Promotion of Teaching Science and Technology (IPST)

**Sponsors**

The Institute for the Promotion of Teaching Science and Technology (IPST), Development and Promotion of Science and Technology Talent Foundation (DPST), Government Savings Bank (GSB)

**Thailand**



**Magnetic Fluid Biochar, Eco-Friendly Novel from Sawdust for Wastewater Treatment**

**Kridtapon Petkaewna, Thipparada Berkban**

This innovation was developed to improve biochemical properties of biochar as adsorbent called Magnetic Fluid Biochar (MFB) for removal of heavy metal, microplastics and dyes from wastewater. MFB can absorb more than 83% of all types microplastics, 95% of all heavy metals and 90% of all dyes. The result of water treatment in natural water, found that MFB can absorb contaminants more than 90%, which the pH, TSS, TDS and turbidity had been improved up

to Surface Water Quality Standards. Therefore, MFB is a high absorbent of contaminants from wastewater with low price 0.02 \$/g/L of wastewater. It is an eco-friendly absorbent due to the best synthesized method. It can be reused up to 22 times and recycled to supercapacitor.

**National Organizer**

NGO WaterNet

**Sponsors**

SPC LLC Ecosoft

**Ukraine**



**AI FRESH STATION - Platform for Growing Eco-Green**

**Oleh Bielous**

AI Fresh Station (AIFS) - is an artificial intelligence home kitchen appliance that grows organic food all year round. It can save water, help keep soil clean and eliminate waste and CO2 emissions. AIFS is equipped by computer vision + neural system that can detect different types of plants diseases. The station also has software for monitoring the status of cultivation and receipt's date of the crop. AIFS is modular and has individual growth control, which makes it possible to receive the crop not all at the same time, but according to a schedule. AIFS saves water because it irrigates certain plants with certain doses, this also makes it possible for an individual approach to each plant.

**National Organizer**

General Directorate of State Hydraulic Works -DSI

**Sponsors**

DSI Foundation

**Turkey**



**Controlled Breeding and Selection of Resistant Species *Aegagropila linnaei* and *Taxiphyllum Barbieri* for Preventing Petroleum Based Pollution in Fresh Water Resources**

**Şeymanur Genbay, Esila Burç**

We produce a type of algae that can ensure the continuity of aquatic life in freshwater sources which are directly polluted by petroleum products. In order to ensure the selection of this algae type, we exposed algae to diesel concentrations in various proportions and created the most durable colony that can survive even if the petroleum product surrounds the algae. Special tanks have been designed with the aim of growing them in a tank where they can grow in a controlled manner in freshwater. The improved algae may form a source of oxygen which would ensure the continuation of many animal lives so that we can protect the vegetation and fauna of petroleum-based contaminated freshwater sources in the world.

**National Organizer**

Chartered Institution of Water and Environmental Management

**Sponsors**

Jacobs, Environment Agency

**United Kingdom**



**Hydro-Filtricity**

**Sofia Wright, Joe Thompson**

The amalgamation of both hydro-electricity and microplastic filtration is an area that is currently unexplored. Our project provides a new alternative ultimately making sustainable energy even more environmentally friendly. Both concepts combined, meet several of the UN's sustainable development goals. We have optimised our target market to appeal to both LIC's (Lower income countries), where clean energy will elevate living conditions, and to the HIC's (Higher income countries), who are the largest production point of microplastics. With minimal prevention of contamination of bodies of water for both locations from household wastewater, our product will tackle this due to its promise of clean energy in a world currently prioritising sustainable energy and the prevention of plastic pollution.

**National Organizer**

Water Environment Federation

**Sponsors**

Xylem

**USA**



**P.E.N.G.U.I.N.S: Promoting Emulsion Nullification Greenly Using Innovative Nucleation Surface**

**Zoe Gotthold**

Oil spills are environmental catastrophes- yet much of the danger comes from the less-famous emulsion that forms between spilled oil and seawater. This emulsion increases the volume of the spill, and floats underwater, threatening animals, especially penguins. But, if we can separate the emulsion, the oil will float back to the surface, where it is far easier to remediate. I developed prototypes to do exactly that: reduce overall emulsion stability (by up to 25%) by passively attracting oil/water particles. Think of emulsions like a-card towers, and my demulsifying devices as "card magnets" that pull out certain cards and destabilize entire towers. These devices can then be added to spill areas to protect sealife and the environment.

# Stockholm Junior Water Prize Winners, 1997-2019

**2019** | Macinley Butson, Australia

”The SODIS Sticker”

The Jury noted that ”This year’s winning project addresses public health through renewable energy and water. The project embodies simplicity and affordability leaving no one behind. Water for society: including all! This invention is practical, ready and globally deployable. The project demonstrates experience and expertise by a dedicated and creative young scientist.”

”Amazing people have inspired me so much this year and I never expected this outcome. Everyone here is doing so much amazing things and I feel confident the future is in good hands and I will never forget the connections I made here in Stockholm” said Mackinley Butson.



H.R.H Crown Princess Victoria presents the 2019 Stockholm Junior Water Prize to Macinley Butson, Australia.

**2018** | Caleb Liow Jia Le and Johnny Xiao Hong Yu, Singapore  
“A new method to produce reduced graphene oxide (rGO), a material that has huge potential to purify water”

**2017** | Rachel Chang and Ryan Thorpe, USA  
“A novel approach to rapidly and sensitively detect and purify water contaminated with shigella, e.coli salmonella, and cholera”

**2016** | Sureeporn Triphetprapa, Thidarat Phianchat and Kanjana Komkla, Thailand  
“Natural innovative water retention Mimicry Bromeliad (Aechmea aculeatosepala)”

**2015** | Perry Alagappan, USA  
“Novel renewable filter for heavy metal removal”

**2014** | Hayley Todesco, Canada  
“Waste to water: Biodegrading naphthenic acids using novel sand filters”

**2013** | Naomi Estay and Omayra Toro, Chile  
“Psychiobacter: Antarctic co-operation on bioremediation of oil-contaminated waters”

**2012** | Luigi Marshall Cham, Jun Yong Nicholas Lim, and Tian Ting Carrie-Anne Ng, Singapore  
“Investigation of the use of sodium-activated bentonite clay in the removal and recovery of non-ionic surfactants from wastewater”

**2011** | Alison Bick, USA  
“Development and evaluation of a microfluidic co-flow device to determine water quality”

**2010** | Alexandre Allard and Danny Luong, Canada  
“Research on biodegradation of he plastic polysterene”

**2009** | Ceren Burçak Dag, Turkey  
“A solution to energy-based water contamination: Rain as an alternative environmentally friendly energy source”

**2008** | Joyce Chai, USA  
“Modelling the toxic effects of silver nanoparticles under varying environmental conditions”

**2007** | Adriana Alcántara Ruiz, Dalia Graciela Díaz Gómez and Carlos Hernández Mejía, Mexico  
“Elimination of Pb(II) from water via bio-adsorption using eggshells”

**2006** | Wang Hao, Xiao Yi and Weng Jie, China  
“Application research and practice of a comprehensive technology for restoring urban river channels ecologically”

**2005** | Pontso Moletsane, Motebele Moshodi and Sechaba Ramabenyane, South Africa  
“Nocturnal hydro minimiser”

**2004** | Tsutomu Kawahira, Daisuke Sunakawa and Kaori Yamaguti, Japan  
“The organic fertilizer – An alternative to commercial fertilizers”

**2003** | Claire Reid, South Africa  
“Water wise reel gardening”

**2002** | Katherine Holt, USA  
“Cleaning the Chesapeake Bay with oysters”

**2001** | Magnus Isacson, Johan Nilvebrant and Rasmus Öman, Sweden  
“Removal of metal ions from leachate”

**2000** | Ashley Mulroy, USA  
“Correlating residual antibiotic contamination in public water to the drug resistance of Escherichia Coli”

**1999** | Rosa Lozano, Elisabeth Pozo and Rocío Ruiz, Spain  
“Echinoderms as biological indicators of water quality in the Alborán Sea coast”

**1998** | Robert Franke, Germany  
“The Aquakat – A solar-driven reactor for the decontamination of industrial wastewater”

**1997** | Stephen Tinnin, USA  
“Changes in development, sperm activity and reproduction across a 105 exposure range in Lytechinus Variegatus Gametes exposed to pesticides in marine media”



2019 Diploma of Excellence | Diana Virgovicova, United Kingdom



# WaterTank

WWW.WATERTANK.SE

The world's best young water minds,  
their water projects, and the global  
community that supports them.



WaterTank is a community for the finalists of the Stockholm Junior Water Prize competition. It allows participants to keep in touch, seek advice and advance their careers and projects in water. Would you like to join WaterTank? Participation is open to finalists of Stockholm Junior Water Prize as well as mentorship opportunities for senior professionals. We also welcome organizations to join us as partners.

**Get involved!**

Contact Ania Andersch at [ania.andersch@siwi.org](mailto:ania.andersch@siwi.org)





# Stockholm Junior Water Prize Finalists 2019



Stockholm Junior Water Prize gathers innovative young minds from all over the world. In 2019, 56 finalists came from 35 countries to World Water Week to participate in the international final of Stockholm Junior Water Prize and to discuss their projects with a wide range of conference attendees including researchers, politicians and media.



OPPORTUNITY  
OF A LIFETIME

Water challenges are escalating around the globe, placing people and communities, our environment, and our future at risk. By 2025, 1.8 billion people will be living in countries or regions with absolute water scarcity. We are a Fortune 1000 global water technology provider with one mission: to solve water through the power of technology and expertise so we can help make water more accessible and affordable, and communities more resilient. Let's create a world that is more water-secure and sustainable for all. We have the opportunity of a lifetime to solve water. Let's work together and lead the way.

**#LetsSolveWater**



## Do you want to be part of the Stockholm Junior Water Prize?

For more information about leading a national competition in your country or opportunities on how you can contribute, please contact **[ania.andersch@siwi.org](mailto:ania.andersch@siwi.org)**

If you are interested in taking part in a national competition, please contact your [national organizer](#). You can also meet previous participants and learn more on the SJWP online community, [WaterTank](#).

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