2019 Finalists

SIWI STOCKHOLM JUNIOR WATER PRIZE

Stockholm Junior Water Prize

Each year, Stockholm Junior Water Prize gathers young scientists and innovators from around the world who have created new solutions to the planet's growing water challenges. Each of the finalists represented in Stockholm are the champions of their national competitions and have been selected as overall winners from thousands of entries for their outstanding work.

The prestigious Stockholm Junior Water Prize has come a long way since its inception 23 years ago.
Today, 35 countries participate in the competition, all striving to win this coveted award for water ingenuity.
It truly is a global event bringing together young scientists and innovators onto the big stage in Stockholm. They hail from six continents and the process for these young visionaries in getting to Stockholm is a long one.
The participants are the champions of their own national competitions selected from literally thousands of entries. The solutions they bring to World Water Week are truly inspiring and the SJWP award ceremony represents the culmination of their outstanding work.
We are proud to welcome the national winners to Stockholm.

About Stockholm Junior Water Prize

This year SIWI is proud once again to host the long awaited 23rd annual ccompetition and welcome the winners of the national competitions from the following countries:
Argentina, Australia, Bangladesh, Belarus, Brazil, Canada, Chile, China, Cyprus, Denmark, Ecuador, France, Germany, Hungary, Israel, Italy, Japan, Latvia, Malaysia, Mexico, Netherlands, Nigeria, Norway, Russian Federation, Republic of Korea, Singapore, South Africa, Spain, Sweden, Switzerland, Thailand, Turkey, Ukraine, United Kingdom and the United States of America.
Stockholm Junior Water Prize proves that brilliant young minds can find inspiration in unlikely places. They are the solution-orientated youth of the present, providing water innovations for the future but above all bringing hope and the possibility of positive change to communities where many have failed in the past. They have developed cost-efficient and, ground-breaking inventions that have the potential to transform the societies they live in but also on a global scale. In this catalogue SIWI offers you a small glimpse into the innovative minds and research that have motivated these young innovators to do greater things, as they compete for the internationally recognized Stockholm Junior Water Prize Award.
All finalists invited to Stockholm have a wonderful opportunity to meet with leaders of the global water community and to make life-long friendships with like-minded youth from all corners of the world who share a passion and drive for science and water related issues. The Patron of the Award is H.R.H. Crown Princess Victoria of Sweden. This year the Prestigious Award Ceremony takes place on Tuesday, 27 August at Berns Salonger in Stockholm.
World Water Week participants will also get the chance to meet and mingle with these formidable next generation of water leaders by visiting the i-poster exhibition.

Cover Photo: Caleb Liow Jia Le, Johnny Xiao Hong Yu, and H.R.H. Crown Princess Victoria of Sweden
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Index

The international jury

An international jury of water and scientific experts appoint the overall winner by committee consensus during World Water Week. The decision is based on a written report required and submitted by all the finalists, together with a short presentation of their display material and three rounds of interviews. The jury members are appointed by the Stockholm International Water Institute Board.
All members of the jury have extensive experience in their fields and represent a wide range of disciplines from natural to social sciences. This is to ensure that all projects are impartially reviewed and judged.

The 2019 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
Argentine Association of Sanitary Engineering and Environmental Sciences (AIDIS)

Sponsors
Xylem; AySA; Ecopreneur; Aerolineas Argentinas

Argentina

Flocunat - Natural Flocculant

Valentin Maiolo and Ariana Terenzi

A method for family households is employed to obtain drinking water from river water by treating it with the seeds of the Moringaoleifera lam, thus eliminating the turbidity from the river water. After this process is carried out subsequent heat or chemical disinfection is applied.
The number of seeds required is adjusted according to the water turbidity using a self-designed dispenser in the tests carried out and after its application. The results established that the resulting water was within the limits considered drinkable.

National Organizer
Australian Water Association

Sponsors
Xylem

Australia

The SODiS Sticker

Macinley Butson

A new, novel and innovative ultraviolet radiation sticker has been developed to accurately measure large UV exposures for solar disinfection of water.
The SODIS Sticker is capable of accurately measuring the solar UV exposure required to sanitise drinking water through two innovative products built together.
A high accuracy and transparent UV sensitive film coupled with a partial UV blocking filter, was used to construct The SODIS Sticker.

National Organizer
House of Volunteers Foundation Bangladesh

Sponsors
House of Volunteers Foundation Bangladesh, WaterAid Bangladesh

Bangladesh

A Novel Approach for Purifying Contaminated Drinking Water Using Carbon Aerogel Electrodes Synthesized from Thermoplastic Waste

Didarul Islam and Md. Shahriar Hasan

The major emphasis of this study was to develop a rapid, portable and highly-effective water purification device via capacitive deionization for on the-spot water remediation using minimal energy consumption.
The single-pass filtration experiments conducted at 1.2 V through the gravitational force demonstrated that the electrode fabricated from PET carbon aerogels and mixed plastic carbon aerogels is superiorly more efficient.
It eliminates approximately 100% and 93.53% of both NaCl and As (5+) contaminants ions across a wide range of feedstock concentrations (50-1000 ppm) respectively, where the reverse osmosis system was proven relatively ineffective. This interdisciplinary study opens numerous possibilities for generating potable and affordable water when access to electrical power is inadequate and protecting the ecosystem from the consequences of thermoplastic debris.

National Organizer
Republican Center of Ecology and Tourism

Sponsors
Coca-Cola Beverages Belarus

Belarus

Adding of Microalgae Chlorella Vulgaris Improvements to Some Biological Parameters of Fishponds

Aleksandra Khankevich and Egor Sokol

Aquaculture is one of the most promising industries for low-volume private agriculture in Belarus. But breeding fish in ponds can lead to changes in water quality, resulting in eutrophication and subsequent pollution. To speed up the processes of biological rehabilitation the use of biological rehabilitation, as a method due to the algolization of the alga Chlorella vulgaris, is possible .
In order to assess the effectiveness of using the algolization method we conducted research into our own strain and estimated a number of water parameters, including the productivity of the Mirror Carp. Thus, we were able to obtain data indicating the high efficiency of the algolization of fish ponds which was expressed through the improvement of water while at the same time increasing carp productivity, thereby achieving a positive economic effect of the algolization.

National Organizer
Brazilcham Sweden

Sponsors
Adasa- Agência Reguladora de Águas, Energia e Saneamento Básico do Distrito Federal; Instituto Iguá; Iguá Saneamento

Brazil

Synthesis of Magnetite Particles Associated with Activated Carbon and Polyurethane for Adsorption of Dyes and Ions of Cd_2+Co_2+Fe^3O^4

Lívia Pinaso and Victor Marotta

The environmental instability caused by the increasing presence of metallic ions and dyes in water has exacerbated over several decades, as the number of researchers look for methods for depollution of liquid effluents. One of these methods is through adsorption. The group synthesized magnetite (Fe^3O^4) as a form of low cost but highly efficienct adsorber material, together with active carbon and polyurethane. It's aim was the removal of dyes, cobalt ions (Co^2+) and cadmium ions (Cd^2+) from effluents. To prove its efficiency, an experimental methodology was used to simulate the aquatic environment where the synthesized materials would act. Additionally, attempts were made to recover the material used in order to reduce the environmental impact of the research carried out.

National Organizer
Canadian Stockholm Junior Water Prize National Committee

Sponsors
Jacobs

Canada

A Heavy Metal Extraction Process to Clean Contaminated Water Using Tannin Embedded Biopolymers

Emily Mah and Jazlyn McGuinty

Throughout developing and developed countries, the proliferation of mining and smelting operations continue to occur. This industry is crucial to the economic development of nations across the globe. This impact includes contamination of surrounding bodies of fresh drinking water with heavy metals. To scientifically address this concern, an eco-friendly biopolymer was embedded with mechanically isolated tannins from oak leaves. The biopolymer was then used to extract sample heavy metals from contaminated water. The results were measured using the change in mass, change in clarity, change in concentration of metal in water, and the effects on radish seedling germination. It was found that using a tannin-embedded biopolymer is an economically and eco-friendly way to remove heavy metals from water.

Chile

National Organizer
General Water Directorate

Sponsors
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Low Cost Probe for Oceanic Monitoring in Artisanal and Scientific Fishing

Antonia Gallardo Escandón and Diego Oyarzún Muñoz

The project consists of the manufacture of a low cost underwater monitoring probe that uses underwater technologies to perform underwater measurements. The next stages of this project include evaluating whether these technologies can improve the productive performance of the artisanal fishing sector through the collection of sensitive data in the distribution and development of important commercial species for the sector. The prototype focuses initially on physicochemical parameters such as temperature, which is relevant for monitoring some marine species sensitive to this factor and for other fishing activities, such as diving. The question that arises is whether such data could help in the sustainability of artisanal fishing, helping to make extraction processes more selective?

China

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

Sponsors
Xylem Inc.

Attacking Fresh Water Crisis with Waste Materials and Solar Power: Preparation and Electrosorption Desalination Performance of Peanut Shell Based Activated Carbon and Defect-rich MoS_2

Pan Bole

To address the fresh water crisis, activated carbon was prepared using waste peanut shells and defect-rich MoS_2 was synthesized using a hydro-thermal method. The materials were then used as electrode materials for capacitive deionization process.
The hybrid electrodes reached a capacity of 8.98mg/g. Moreover, a solar-powered, automated, portable machine was assembled and it successfully processed real sea water (TDS=17g/L) to fresh water (TDS=0.2g/L) within nine cycles of the adsorption-desorption processes.

Cyprus

National Organizer
Water Board of Lemesos

Sponsors
PWC Cyprus;
Bank of Cyprus;
The Sewerage Board of Lemesos-Amathus;
KIOS Research and Innovation Center of Excellence of the University of Cyprus;
Nireas International Water Research Center of the University of Cyprus;
Eratosthenis Research Center of the Cyprus University of Technology;
Phileleftheros Newspaper.

Investigating Detection of Floating Plastic Litter from Space

Anna Koumi and Eirini Iskandar

The idea was to create a “plastic target”, in order to investigate if plastic floating in the sea can be detected, depending on its Spectral Signature using a satellite or drone. Firstly, we took in situ, laboratory measurements on plastic to create a representative database and discovered its special characteristics which were used as guidelines to identify it.
After creating and taking measurements on the target, we analyzed the data and created a Prototype Code.
Finally, by testing the Prototype Code of a plastic bottle, we confirmed that accumulated plastic rubbish can be successfully detected using a satellite or drone. Thus, a new, effective way of tracking plastic rubbish was introduced which can contribute to the protection of the marine environment.

Denmark

National Organizer
Unge forskere

Sponsors
Unge forskere

Method for Concentrating and Quantifying Microplastics

Sebastian Lykke and Kristian Katholm Nielsen

In recent years we humans have produced a vast amount of plastic and too much of it has ended up as pollution in the oceans, where it deteriorates into microplastics. Inspired by the separation methods used in the field of nanotechnology, a method based on hydrodynamics has been developed to concentrate and quantify microplastics from contaminated water. The method allows for effective and autonomous measurements of the microplast-concentration in the water. With an adequate detection method, it will be possible to get an insight into the extent of microplastic pollution of oceans and how to best fight the ever growing problem. We aspire to make the first move towards an efficient and clean decontamination of water.

Ecuador

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SR3 Invent

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Fondo para la Protección de Agua de Quito - FONAG; Tesalia CBC; Fondo de Agua para la Protección de la Cuenca del Río Paute - FONAPA; Agencia Francesa para el Desarrollo - AFD; Fundación AVINA; Dyamond Professional

Upcycling Chochos (Lupinus Mutabilis) Sustainable Reuse of Water from the Hydrating Process

Avelina De La Torre

Chocho (Lupinus Mutabilis) is a traditional Andean bean that has gained importance due to its widely appreciated nutritional value. Chochos must be processed before its consumption due to the presence of alkaloids (chemicals that protect the plant against insect attacks). Chochos is grown by farmers in the Ecuadorian Andes, where it is then dried and stored for commercial purposes. For consumption, chochos needs to be rehydrated, but sadly the water is usually discharged during the process. The main issue covered here is the unnecessary waste-water originating from the rehydration of chochos. This project aims to test the possibilities of upcycling the debittered water so it can be used as irrigation water for crops.

France

National Organizer
Teragir

Sponsors
Teragir

Washing with Degassed Water

Nils Donk and Floriane Caillieret

Detergents are a scourge for society, both in terms of public health and for the environment. We have conducted research to find washing methods without using detergents. We have tested an original idea based on a recent discovery showing that hydroxide ions, naturally present in the water, may serve as a surfactant, but only if water is degassed.
In this experimental study, we demonstrate that it is possible to wash dirty laundry, simply with water, degassed with a vacuum pump. Degassing plays a double function of mechanical desorption and emulsion stabilization.

National Organizer
Stiftung Jugend forscht e.V.

Sponsors
Federal Ministry for Education and Research, Germany

Germany

Automated Quantification of the Phototaxis of Microalgae

Jonas Grajetzki and Theo Sonnenberg

We have developed an experimental setup that can automatically and autonomously investigate the phototaxis of unicellular green algae.
The fields to be tested are phototaxis in terms of the wavelength and intensity of the triggering light. Other parameters to be considered are contrast, time of day, cell concentration and the speed of the source of light. With our apparatus we can investigate the phototaxis of the microalga Chlamydomonas reinhardtii.

National Organizer
Global Water Partnership Hungary

Sponsors
Xylem;
Hungarian Water Utility Association;
Budapest Water Works;
Hungarian Energy and Public Regulatory Authority

Hungary

Growing Plants, Growing Minds with Educational Aquaponics System

Eszter Kún

The project emphasizes the need for innovative solutions to the problem of water management and water protection. Young people long for a more enjoyable, more practical, experience-based education. Both problems can be tackled at the same time through the cultivation of a educational aquaponics system. This provides adolescents with the opportunity to acquire versatile knowledge by experimental learning while also increasing their environmental awareness with water management and putting protection in focus. The student designed an educational aquaponics system, which proved to be capable of functioning. The study presents the results of the research on aquaponic systems and discusses its introduction within secondary school education.

National Organizer
Tel Aviv University

Sponsors
Tel Aviv University

Israel

Development of a Novel Bio-Reporter for Monitoring Wastewater Quality

Marva Pistinner

Monitoring genotoxic materials (which alter genes) in the environment is crucial for public health. The traditional methods to monitor these substances are expensive and complicated.
This research project presents a novel and sensitive bio-reporter based on genetically engineered bacteria for monitoring genotoxic substances in wastewater.
The biosensor is composed of the umuD promotor (a part of the bacterial DNA correction system called SOS) which responds to DNA damage, coupled to a reporter gene that produces a measurable light signal. This sensor was tested in the form of a chip (which can be conveniently applied in the field) while the bacteria were exposed to different concentrations of known genotoxic substances as well as to real wastewater samples.
In both cases, the bacteria emitted a measurable signal which can be used for the detection of genetoxics.

National Organizer
FAST Federation of Scientific and Technical Associations

Sponsors
Xylem;
AICA;
CoRePla;
Etass;
FOIST;
Fondazione Salvetti;
SIF;
Silvio Lutteri;
Unichim

Italy

From the Earth for the Earth

Mariam Mahmoud and Fabio Luca Guzzi

The project aims at environmental protection through the use of new natural materials. We have created saponite pellets, a material capable of adsorbing a large quantity of pollutants on its surface. The synthesized pellets are able to adsorb, over a period of about a day, a high percentage of pollutant material present in the water. We conducted tests of contact between the pellets of saponite with a solution of a polluting standard molecule such as Rhodamine B. Then we calculated the adsorbed concentrations through a simple UV spectroscopy visible thanks to the colored nature of the sample solution. We thought in terms of an industrial application for those materials because they are natural, economical and easy to synthesize.

National Organizer
Japan Water Prize Committee (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.

Japan

Combined System of Energy-Saving H_2O-Electrolysis and Eco-Friendly Battery: Simultaneous Production of H_2 Gas and In Situ Treatment of Eutrophication

Hisato Kizu and Hayato Matsumoto

Eutrophication is mainly caused by the oversupply of nitrogen and phosphorus, and exerts negative impacts on the ecosystem and safe drinking water sources all over the world. In this project, a novel system was developed by combining energy-saving H_2O electrolysis with an eco-friendly iron carbon battery, which continuously removes nitrates and phosphates. This system utilizes the oxidation/reduction of iron to realize low-voltage H_2O electrolysis to produce H_2 and it can also collect phosphorus; it reuses solid waste (used tea leaves) and also uses solar energy. The simple structure of this system also enables us to easily apply it to on-site treatment of eutrophicated water in lakes and ponds, in addition, to its possible incorporation into conventional wastewater facilities or septic tanks.

National Organizer
Education, Culture and Sports Department of Riga City Council

Sponsors
SIA

Latvia

Adsorption of $Cd^{2+}Cu^{2+}Fe^{2+}$ and Fe^{3+} ions by Sphagnum Moss

Ineta Gritane

This research deals with the adsorption and kinetics of $Cd^{2+}Cu^{2+}Fe^{2+}$ and Fe^{3+} ions by Sphagnum Moss. It was conducted to establish if there is any relationship between these ions and which ions are better adsorbed by the moss. The pollution with these metal ions was studied in five different locations in Vilani, Latvia and it was established, which metal ions caused the pollution in each location. It was concluded that it is possible to determine air and water pollution by Sphagnum Moss as it purifies water and cleans air by absorbing metal ions. According to the results of the research, preventive measurements can be undertaken to counteract pollution in the future. The research can be repeated every 5 years and the results and changes can be compared and evaluated

Malaysia

National Organizer
Talent Developing Society

Sponsors
Talent Developing Society

Water Safety: How to Obtain Clean and Safe Water During Flooding Season for Domestic Use (except drinking water)

Nur Uyuni Shamimie Mohd Fisol and Balqis Binti Mustapha Kamil

Water safety for domestic use after floods, cyclones and disasters can be associated with health risks, infections and water-borne diseases.
During the flooding season, raw water is polluted with organic substances and decomposed animal corpses which contains a lot of harmful micro-organisms.
A study was conducted to investigate three sources of water, river A, river B and river C so it can be used as safe domestic water by villagers.

Mexico

National Organizer
Tecnológico de Monterrey

Sponsors
FEMSA Foundation; AAK; ABB; Grupo Urrea de México; Volvo; Essity; Astra Zeneca; Atlas Copco.

Life Powder: Water Flocculant and Disinfectant Powder

Andrés Orozco Grajales and Mario Rodríguez Esposito

Life powder is made for people with minimum resources and without drinking water in their homes. In Quintana Roo, 96,000 people live without water in their homes, a figure that increased when compared to 2014 when the numbers stood at 87,600, (Coneval 2016). Our product is a flocculant and disinfectant powder made of tamarind, moringa and acacia. Our goal was to create a powder, based on natural products and easily accessible. We measured the disinfecting and flocculating power of the powder using cenote water. Our powder can disinfect gray water and it is very cheap. It can have a positive impact on rural communities by giving them the possibility to improve the quality of their local water.

Netherlands

National Organizer
Wetsus, Centre of Excellence for Sustainable Water Technology

Sponsors
Platform Water; Ontmoet Water; Ik Onderzoek Water

Eliminating Microplastics from Bodies of Water by Using an Innovative System

Thomas Velders and Lucas Timmerman

It is reasonably certain that microplastics are the most dangerous forms of plastic pollutants for aquatic organisms and humans.
Thus far, there has not yet been a large-scale system in place to eliminate microplastics from major bodies of water.

In this report we describe different developmental phases of one such design and suggest possible applications.
It is named 'The Banana', and takes its name from its distinctive shape.

Nigeria

National Organizer
International Water Association Young Water Professionals Nigeria Chapter

Sponsors
Federal Ministry of Water Resources Nigeria; Embassy of Sweden Abuja Nigeria; National Agency for Food and Drug Administration and Control; Lagos State Government, Nigeria; Atlas Copco Nigeria Ltd; Xylem Inc

A Water Purifier

Naheem Opeyemi Hassan and Amir Boluwatife Sanusi

The Water Purifier combines purification processes in Chemistry, radiation and electrical effects on organisms in Physics to purify water. The water purifier has a filtering stage where the sediments, odour, colour, heavy metals and toxic compounds are removed, followed by a current passing electrode and UV chambers, where disinfection of the water from microbes takes place. The water is then re-filtered with a 1µm filter to remove the dead microbes to make the water safe for human consumption. Water samples contaminated with heavy metals, pathogens and other contaminants which passed through the water purifier, came out pure and safe for potable uses. The device is cost effective and efficient and if scaled up, could make potable water available to all.

Norway

National Organizer
Norwegian Water; Norwegian Water Association; Norwegian Hydrology Council

Sponsors
Oslo kommune Vann- og avløpsetaten; Norsk Vann; NRV/NRA; Powel; VA og VVS Produsentene; NVE

Storavatnet - A Potential Spare Water Supply at Haugalandet

Ann Rebekka Undheim and Andreas Aukland

The municipalities in the region of Haugalandet have looked at the possibility of creating a communal source for a spare water supply for the entire region.
One possible solution is Lake Storavatnet near Sandbekken in Tysvær.
We worked on finding out if Storavatnet could be used or not.

Republic of Korea

National Organizer
Korea Water Forum

Sponsors
Ministry of Environment; Korea Water Forum; Ministry of Education; Embassy of Sweden in Korea; K-water; Coway

Fabrication and Performance of Alginate Based Water Capsules as an Eco-friendly Means of Agricultural Water Supply

Jaihyun Kim and Minseok Kim

This study is focused on developing a water capsule to tackle drought, to decrease the water that is wasted from agriculture. By burying small capsules that steadily eject water near the roots, the immense amount of water that evaporates after being sprayed on crops can be saved.
This study first discusses the method of fabricating sphere-shaped alginate capsules, involving ice balls.

Alginate is a polymer that can form membranes by cross-linking with divalent cations.
Then it determines the ideal composition and concentration of the alginate membrane using Young's modulus comparisons to measure it's stiffness.
Experiments were conducted to measure the discharged water over time for each type of capsule.

Russian Federation

National Organizer
Environmental Projects Consulting Institute (EPCI)

Sponsors
Ministry of Natural Resources and Ecology of the Russian Federation;
Federal Purpose Program "Water of Russia";
Coca-Cola Hellenic Russia;
Federal Agency of Water Resources

A Comprehensive Assessment of Drinking Water Quality in Kondopoga, Kareliya

Eleonora Taranina

A survey of Kondopoga residents showed that they preferred to drink spring water and bottled water, because it looked more transparent than tap water. This study confirmed that even visibly clear water might contain a lot of bacteria and unwanted chemicals in concentrations above the prescribed MPLs.
The safest source of drinking water continues to be tap water. The activity of daphnia may serve as an indicator of chemical pollution.
The utilisation of daphnia is economically profitable, because it costs almost 40 times less than a complex analysis of water quality.
Publications in local newspaper "New Kondopoga", along with the posting of public information boards near the springs, has helped to build up awareness amongst local residents regarding water quality.

Singapore

National Organizer
Ngee Ann Polytechnic

Sponsors
Lien Foundation;
Sembcorp Industries

Novel Hybrid Regeneration Process for Adsorbent Used in Wastewater Treatment

Haiyi Wang

Research on adsorbent has been intensively studied to remove pollutants from wastewater, and layered double hydroxide (LDH) has shown to be remarkable in it's performance. However, regeneration of exhausted LDH, being the most difficult part of adsorption technology, is often overlooked. This project has developed an innovative method, electrochemical (EC) regeneration, to regenerate LDH and adsorbed products. It has a very low energy expenditure and can be done on-site with a simple setup. It was discovered that LDH activated through calcination has a remarkable adsorption capacity, 60 times more than that of activated carbon. The capacity of LDH can be fully recovered for six cycles consecutively. This project has successfully developed effective regeneration methods, thus turning wastewater and adsorbed products into resources again.

South Africa

National Organizer
Department of Water and Sanitation

Sponsors
Cape Peninsula University of Technology;
University of Kwa-Zulu Natal;
Water Research Commission;
Umgeni Water

The Hydro-Conservator

Calden Gounden and Kiaran Kumarasan Chetty

Water scarcity is becoming an increasing global phenomenon; its effects have been evident worldwide, particularly in our country, South Africa in provinces such as Western Cape and KwaZulu-Natal. Although in recent months, certain parts of the country have been blessed with heavy rainfall, these rains however can never be enough to rescue South Africa from being a water scarce country. Furthermore, the ever increasing population growth in the country is adding more pressure on available water resources; and therefore, new and innovative ways of saving water are needed. Hydro Conservator is a project that intends on reducing the quantity of water that is wasted daily in households across South Africa during the showering process.

Switzerland

National Organizer
Swiss Toilet Organisation

Sponsors
Swiss Water Partnership;
Skat Consulting Ltd.;
Xylem Inc.;
Seecon

Tardigrades Under the Influence of Acidic and Alkaline Solutions, and UV-C Radiation

Zamir Borojevic

Tardigrades are very small animals that belong to the taxon of Ecdysozoa, and are found in most water bodies, sediments and mosses.
They have developed the unique ability to react to rapidly changing environmental conditions by changing their physical characteristics and taking on different stages of resistance.
Climate change has not only had an influence on temperatures around the world, but it also affects the physical characteristics of different waters, which results in the need for adaptation of all organisms living in aquatic ecosystems.
The aim of my work is to investigate the tolerance and vitality of Hypsibius exemplaris under the influence of different pH values and different dosages of UV-C light and thereby create a diagram representing their tolerance and vitality for each experiment.

Spain

National Organizer
Fundacion Aquae

Sponsors
Fundacion Aquae

Sea Energy Project: The Revolution of the Waves

Ariadna González Navarro

The seas and oceans, the energy of the future. The constant increase in the demand for electric power worldwide, together with the problems of current models to generate it, has forced society into seeking new forms of energy that respect the environment, the wave, being a prime example. Currently several prototypes are being tested and developed. My proposal raises the possibility of improving one of these systems. A prototype has been designed with three anchoring points equidistant at an angle of 120º that independently, can generate electricity, thanks to the vertical movement of each of them, facilitating enough energy to illuminate a LED panel.

Sweden

National Organizer
Swedish Federation of Young Scientists

Sponsors
Xylem

Evaporative Desalination with Industrial Waste Heat

Jonatan Persson

I have developed a new desalination method that uses waste heat together with waters evaporative properties,
With this new method it is 30 times cheaper to clean seawater than buying tap water.
Today I am working with a pilot-project to build a machine that is capable of cleaning 40.000 liters of water per day which will be concluded by 2020.

Thailand

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

Sponsors
The Promotion of Teaching Science and Technology (IPST); Government Savings Bank (GSB); Metropolitan Waterworks Authority (MWA); Nestlé (Thai) Ltd.

Egg Stage Mosquitos Control from Balm Mint Extraction along with Water Quality Improvement

Palida Yongpisanpop and Suphaphichl Ongphan

Mosquitoes of genus Aedes, are vectors, or transmitters, of infectious disease. One of the traditional methods used to control the mosquitos' larvae is Temephos or Abate which can cause severe pollution on a water body higher than the recommended dose (2-5 g/m2). Thus, this research aims to produce Eggicide from plants such as Balm mint leaves and Morning Glory stems to control the mosquito population at the egg stage and improve water quality The results have shown that Eggicide powder inhibits mosquito egg shell decay, the embryolysis stage, and removes carbamate insecticide in water at a rate of up to 92 % as well as being user friendly.

Turkey

National Organizer
General Directorate of State Hydraulic Works

Sponsors
DSI Foundation

Transmission Electron Microscope Micrograph of Gold Nanoparticles

Birsen Beril Bildirici and Elifnaz Saatci

The natural characteristics of goat hair and sheep wool are combined in a unique textile to make a filtration system for polluted waters. This unique textile was tested with different oils on the surface of the water. Experiments were conducted in three stages. All the tested oil samples in the experiment were absorbed by the fabric and the water became clear as a result. The unique fabrics could be therefore used effectively, for the physical and chemical cleaning of water. The goat hair in the fabric provides the physical cleansing and endurance; sheep wool is helpful when it comes to absorbing chemicals. If woven closely together, whatever was absorbed can be washed away using detergents or solvents for re-use, which would lead to a significant improvement in the environment.

Ukraine

National Organizer
Ukrainian Water Society "WaterNet"

Sponsors
SPC LLC Ecosoft; Embassy of Sweden in Ukraine; NTUU "Igor Sikorsky Kyiv Polytechnic Institute"; WILO Ukraine; Ukrainian Water Association "Ukrvodokanalecologiya"; PC "Kyivvodokanal"

Stop the Tsunami

Mykhailichenko Vitalii

The tsunami is one of the most dangerous and destructive phenomena of nature on Earth. Effective tsunami protection systems so far do not exist. The author of this project offers an original idea when it comes to reducing the devastating effects of tsunami on coastal megacities and other important landmarks. Based on the mathematical modeling of bubble behavior in the zone of excessive pressure of the tsunami wave, using calculations and experiments, a proposed principal scheme of a protection system that can effectively protect the coastal area from the destructive impact of the tsunami is the aim. It is easy to fabricate and install a tsunami protection system – as all the necessary materials and technologies already exist.

United States

National Organizer
Water Environment Federation

Sponsors
Xylem Inc

A Novel Method of Monitoring the Health of our Global Fresh Water Supply Using DNA Barcoding of Chironomidae (Diptera)

Sonja Michaluk

It is forecasted that 66% of our population will experience water scarcity within a decade, leaving us more dependent on surface water for drinking. This requires more filtration infrastructure, and more monitoring of surface water. Current methods rely on expensive and technically challenging manual identification of biological samples. Macroinvertebrates spend their larval lives within a small area of water, showing cumulative effects of habitat alteration and pollutants that chemical testing and field sensors do not. Chironimidae are a global common denominator. DNA Barcoding of Chironomidae results in more accurate and precise waterway health data, adding significant value for monitoring scarce water resources. The learning from this data is being applied, building microbiology capability at a non-profit scientific water study institute.

United Kingdom

National Organizer
Chartered Institution of Water and Environmental Management

Sponsors
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Discovery of a New Photocatalyst to Solve Water Pollution

Diana Virgovicova

I used quantum chemistry software and finally found graphitic carbon nitride: g-C_3N_4 (form B).
After cooperation with scientists from Greece who helped me synthetize g-C_3N_4 (form B) I continued my experimental work in the lab. The efficiency of g-C_3N_4 (form B) was investigated by using UV/Vis spectrometry. The results showed that graphitic nitride has amazing properties and can clean polluted rivers in the world. This can be obtained by using a very simple method; by just sprinkling g-C_3N_4 (form B) into rivers and waiting for the results, that is, clean water.

Stockholm Junior Water Prize Winners, 1997-2018

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"

The Jury highlighted the wide local benefits of the students' method: "This year's winning project inspires communities to find local solutions to improve water quality and resource recovery. The project developed a leading edge, inexpensive, and widely applicable method to clean water.
Further development of this method will lead to public health and ecosystems protection. Therefore, the project embodies the themes of 2018 World Water Week – Water, Ecosystems and Human Development.
The winning project has included concepts of circular economy, nanotechnology, and green chemistry. The project's success will set new trends in the way we filter water."

Caleb Liow Jia Le and Johnny Xiao Hong Yu, 2018 Stockholm Junior Water Prize. "We will definitely try to think of ways to improve it and make it even more sustainable, even more environmentally friendly, so that it can be used to make an impact in the future", Johnny Xiao Hong Yu.

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"

2018 Diploma of Excellence
Tatsuyoshi Odai and Narumi Sakamoto, Japan

WaterTank

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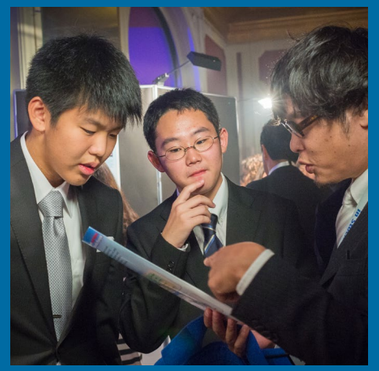
The world's best young water minds,
their water projects,
and the global community that supports them.



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

Humans of Stockholm Junior Water Prize

How did the SJWP competition impact you?

Didarul Islam
Bangladesh,
2018 finalist

This competition gave me another perspective to see the world. How the world, particularly third world countries, is facing a water crisis but we don't yet have sustainable solutions. We need sustainable solutions and the Stockholm Junior Water Prize inspired me. I saw the previous alumni, where they are now and what fields they are currently working in. Stockholm Junior Water Prize completely changed Didarul into another Didarul.

Micaela Itatí Argentina,
2018 finalist

To come here and see the other finalists, other young people from different cultures in a very international environment… And to realize that we have something in common. We are here for the same thing. We have the same interest. That's amazing.

Hava Herman,
Israel,
2018 finalist

Israel is a country that's suffering from drought, and we're continuously searching for the creation of new water sources. Waste water is definitely the most productive and promising form of doing that, but there's hardly any biological testing in the wastewater treatment process.We went through the plant (Sorek Treatment plant) and it was all chemical. Our results showed there is really a need for biological testing and detoxify. We really want to make sure that the effluent that we need to use is safe.

Blessing Umoukpong,
Nigeria, 2018 finalist

I have to say that in any place you find yourself, don't think to much about what others say. You can achieve your goal anywhere you find yourself. Maybe you don't feel like you are enough, or maybe you are not like "them", you don't feel like you belong, you have to struggle and anyway find yourself. You have to push and you can make it to the top.

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Tatsuyoshi Odai,
Japan,
2018 finalist

I think it changed me in an important way. We support many people with our idea because we spread knowledge about the project a great number of people. It gave me a pretty picture of the world. So many people, especially people older than me, supported me in seeing this through everyday. So, thank you so much. It's a change for me because before the SJWP competition my life was normal. I didn't think I was supported by other people, but this changed and now I know people support me and the other finalists here – every day. So every day I am thankful.

Valeriia Tyshchenko,
Ukraine,
2018 finalist

There was such a big amount of different emotions that I cannot to decide in this moment what is the most important. But I think that is this feeling that you're not alone, you know. If you want to do something great you can always find people who want to do the same or who can help you with that.
SJWP is like the place where I can see that I'm not the only one in this kind of big deal of making the world better.

Centaine Du Toy van Hees,
Netherlands,
2018 finalist

To come here and see the other finalists, other young people from different cultures in a very international environment… And to realize that we have something in common. We are here for the same thing. We have the same interest.
That's amazing.

Stockholm Junior Water Prize Finalists 2018

Stockholm Junior Water Prize gathers innovative young minds from all over the world. In 2018, 48 finalists came from 33 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 that including researchers, politicians and media.

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
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