2017 Finalists

SIWI STOCKHOLM JUNIOR WATER PRIZE

The Stockholm Junior Water Prize

Each year, the Stockholm Junior Water Prize congregates 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 competition and have been selected as winners from thousands of entries for their outstanding work.

This year we are proud to host the 21st annual competition and welcome the winners of national competitions from 33 countries: Argentina, Australia, Bangladesh, Belarus, Brazil, Canada, Chile, China, Cyprus, Finland, France, Germany, Hungary, Israel, Italy, Japan, Latvia, Mexico, The Netherlands, Nigeria, Norway, Russian Federation, Republic of Korea, Singapore, South Africa, Spain, Sweden, Switzerland, Thailand, Turkey, Ukraine, United Kingdom and United States of America.

The Stockholm Junior Water Prize competition proves that brilliant young minds can find inspiration in unlikely places. They see opportunity and hope where others find challenges and have developed cost-efficient and immediate solutions, applicable the world over. In this catalogue, you can learn more about the innovative research and inventions that earned each of the finalists a place to compete for this international honor.

All the finalists are invited to Stockholm for the special opportunity to meet with leaders of the global water community and to make life-long friendships with likeminded youth from around the world who share the passion for water and science. This visit includes the chance to receive the international prize from H.R.H. Crown Princess Victoria of Sweden during an exciting award ceremony which will be held this year on Tuesday August 29th at the Grand Hotel in Stockholm.

World Water Week participants have the opportunity to meet this next generation of water leaders by visiting the poster exhibition in Norra Latin, floor 3.

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, a short presentation of their display material and three rounds of interviews. 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 2017 International Jury Members

- Ms. 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

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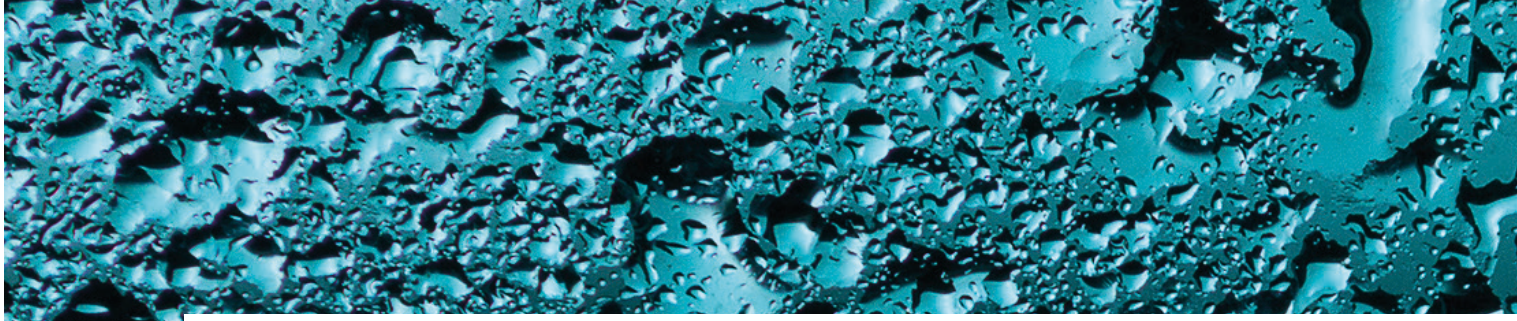
About the Stockholm Junior Water Prize competition

The competition is open to young people between the age of 15 and 20 who have conducted water-related projects at local, regional, national or global levels with environmental, scientific, social and/or technological importance. The aim of the competition is to increase awareness, interest and knowledge of water and the environment.

The international winner will receive an award of USD 15,000 and a prize sculpture, the winner's school receives USD 5,000 and the winner of the Diploma of Excellence USD 3,000. H.R.H. Crown Princess Victoria of Sweden is the patron of the Stockholm Junior Water Prize and Xylem Inc. is the global sponsor.



National Organiser
Asociacion Argentina de Ingeniería Sanitaria y Ciencias del Ambiente (AIDIS- Argentina)

Sponsors
AySA, Xylem Inc, Coca Cola Femsa

Argentina

Physical Adsorption of Arsenic

Nadia Molteni and Nazareno Rodriguez

Different samples of underground water from different sectors of the city of Bahía Blanca and Las Toscas, Argentina, were collected in the present work. In order to determinate a method for Arsenic (As) retention, chicken eggshells underwent a heat treatment at high temperatures in order to form hydroxyapatite (HAp), a compound capable of retaining Arsenic. In this way, mass transfer for the water to the material obtained was studied, taking advantage of a common household waste's physical adsorption properties.

National Organiser
Australian Water Association

Sponsors
Xylem

Australia

The SOLAR SYSTEM: An invention to produce STERILE water for medical use for developing Communities

Macinley Butson

The SOLAR SYSTEM, consisting of three distinctive parts all working together, has been invented to provide both clean potable drinking water for a community in need as well as sterile water for medical use. It produces its own energy (at 75% higher output than a conventional fixed solar panel) by utilizing a dripping water system which is then collected and filtered to provide clean potable drinking water. The collected power and some of the filtered water is then pressurized by the system to produce medical grade sterile water in an "all in one" self-contained unit.

National Organiser
House of Volunteers Foundation

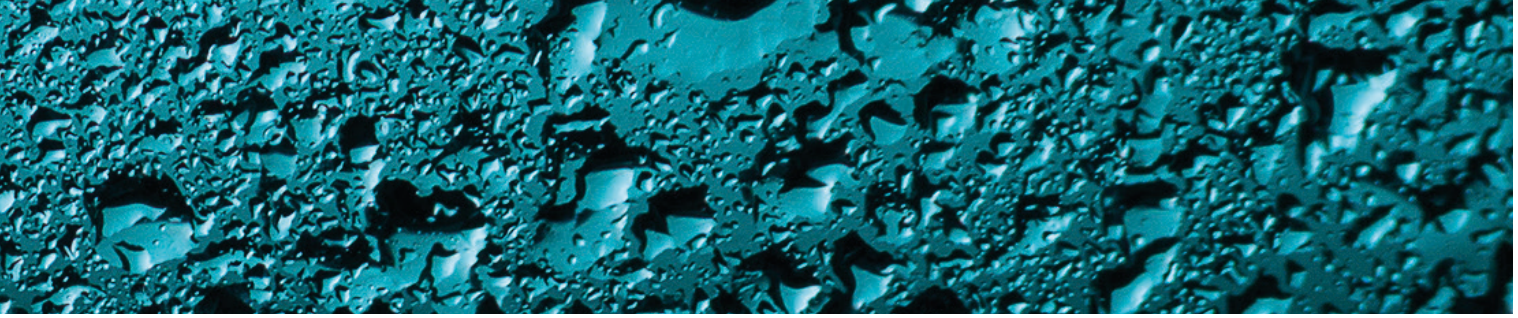
Sponsors
House of Volunteers Foundation Bangladesh, WaterAid Bangladesh

Bangladesh

Reinvention of Photocatalysis using doped TiO2 in industrial grey water treatment

Aniruddah Chowdhury, Arnab Chakraborty and Rituraj Das Gupta

The textile industry is the lifeline of our nation's economy. However, its effluent discharge, constituting mainly industrial dyes, is heavily affecting our major water bodies. Our research focuses on treating coloured water in textile effluents using TiO2 photocatalyst. Methods of doping TiO2 using cheap, locally sourced, chemicals were studied to enhance photocatalysis under visible light irradiation. Experiments were conducted to study the efficiency of our composite in degradation of methylene blue using UV-Vis spectroscopy. Our composite was found to be 26% more effective than undoped TiO2.



National Organiser
Republican Ecological Center

Sponsors
Coca-Cola Beverages Belarus

Belarus

The portable device for defining nitrate ion concentration in surface and ground waters

Daniil Sharoikin

It is widely known that nitrates found in water are 1.25 times more toxic than those found in food. In order to define nitrate ion concentrations in surface and ground waters, a portable handmade device was constructed - the colorimeter, working on the basis of the Bouguer-Lambert-Beer law. The device is not expensive to construct, It is easy to use even in field experiments, and it can be utilized by students from all over the world in studies of water sources.

National Organiser
National Youth Parliament for Water (PNJA), Brazilian Water Resources Association (ABRH)

Sponsors
FBDS - Fundação Brasileira Para o Desenvolvimento Sustentável, SABESP - Companhia de Saneamento Básico do Estado de São Paulo

Brazil

Solution for the Treatment of Water on Cisterns Installed in Brazil

Beatriz Ruscetto da Silva, Matheus Henrique Cezar da Silva, Gabriel Gertrudes Trindade

The northeast of Brazil is characterized by a semi-arid climate and chronic drought. Public policies have stimulated domestic use of cisterns to store water. However, the quality of collected water can be a threat to people's health, due to exposure to contaminants. In this project we developed a device, with low-cost material, to generate chlorine by an electrolysis process from a saline solution. The energy may come from a photovoltaic panel, which makes it an autonomous equipment to perform water treatment. Lab tests affirmed the prototype's efficiency against cistern's water contamination.

National Organiser
Western Canada Water Environment Association

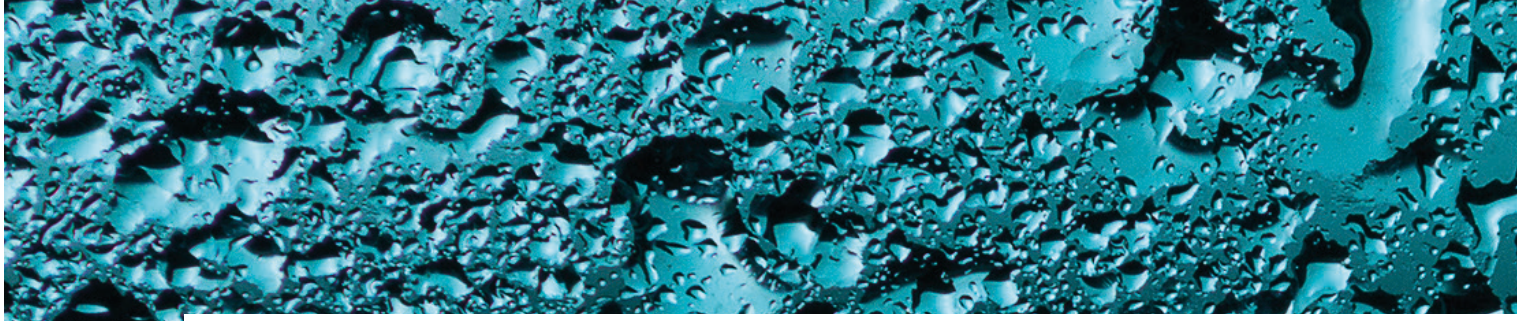
Sponsors
Water Environment Association of Ontario, Western Canada Water, Canadian Junior Stockholm Water Prize Committee, Canada Wide Science Fair, Town of Oakville, Ontario, City of Durham, Ontario, Associated Engineering Limited, Canada

Canada

Fluid Foam Development: A Novel Approach to Heavy Metal Contamination from Effluent Water

Nicole Schmidt

Through this project, a method to create and stabilize bulk bubble foam was developed. The bulk bubble foam was used to successfully separate ultra-fine heavy metal particles dispersed in industrial processing water and groundwater. Through a reduction in the frequency of bubble coalescence, it increased the agglomeration rate of the foam, improving overall stability and density, which increased the total recovery percentage of particulate matter from the fluid system.



National Organiser
General Water Directorate, Cazalac

Sponsors
Aguas Andinas, Nestlé, Colbún, Ministry of Education, Fundación Chile, Chilean Chapter of the international Hydrological Programme, Sochid, Ahlsud, Aidis

Chile

Marine Benthos Characterization in Chilean Antarctica Using an Environmentally-Friendly ROV

Pamela Noche and Catalina Taccone

The marine benthos are bottom-dwelling organisms that scientists want to study because they yield valuable data on water pollution, and its harmful effects, and can be a source of biological resources. But the need to study the marine benthos poses the question of the most appropriate methods to do so. We developed a ROV prototype, for example designed to collect underwater images, carry UV and measure temperature. It collects evidence of its impact on bottom-dwelling organisms without affecting the environment.

National Organiser
The Center for Environmental Education & Communications of State Environmental Protection Administration (SEPA CEEC)

Sponsors
Institute of Oceanology Chinese Academy of sciences (IOCAS), Qingdao HuaRen Pharmaceutical Packaging Material Technology co., LTD

China

Synthesis of A Novel Chitosan Resin and Its Application in Removal of Heavy Metal Ions from Water

Minzhang Li, Huilin Chen and Zekai Wang

Water pollution caused by heavy metals inflicts great threat on environment and human beings. The purpose of this project was to utilize huge amounts of abandoned crab and shrimp shells by converting it into a high-efficient adsorbent to remove heavy metals from water. A novel chitosan resin (EDTAEC) was designed, synthesized, characterized and applied successfully. Experimental data revealed that EDTAEC had an outstanding performance on adsorption of heavy metals from waste water. The new resin EDTAEC, which is reusable, showed great potential in scavenging heavy metal ions from water.

National Organiser
Water Museum of Lemesos

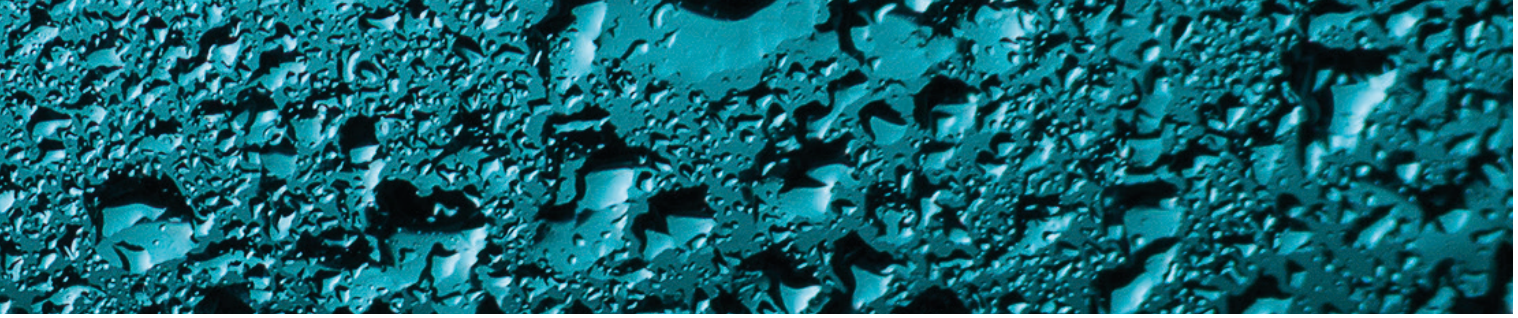
Sponsors
Water Board of Lemesos, PWC Cyprus, Hellenic Bank, Bank of Cyprus, Sewerage Board of Limassol-Amathus, USB Bank, Universal Life, Green Dot Cyprus, Phileleftheros Newspaper

Cyprus

Exploiting Biological Treatment Plants with the aim to Generate Electrical Energy

Ioannis Theodorou, Dimitris Karapanagiotis and Nikol Papageorgiou

We investigated the amount of methane produced by the Biological Treatment Plant recycling waste water in our school and how methane can be exploited to generate electrical energy. We also researched several different plants similar to our own and visited the Sewerage Board to understand the process. We collected samples of waste water from the plant for a Chemical Oxygen Demand analysis, and investigated if there was a sufficient production of methane to use it for electricity production. Based on the results we could expand our project further in terms of how to increase the production of methane.



National Organiser
Association of Biology and Geography Teachers

Sponsors
Helsinki Region Environmental Services Authority HSY, Fortum Waste Solutions Py

Finland

The Effect of the Proximity of Agricultural Cultivated Fields to a Body of Water on the Eutrophication Level of the Freshwater Area

Maija Utriainen

Fertilizers, used to make plant cropping more efficient, often end up in water areas by dissolving in water and running off along drains. These fertilizers contain compounds that may be working as accelerator, or even cause eutrophication of water areas. To answer the research question "What effect does the proximity of agricultural cultivated fields to a body of water have on the eutrophication level of the freshwater area?", eutrophication levels were analyzed and compared quantitatively and qualitatively between four different locations, three that were near different kind of sources of fertilizer containing runoff water and one which was not. Based on the findings it is hard to conclude whether the proximity of a cultivated field has an effect since the results from the locations were very similar.

National Organiser
TERAGIR

Sponsors
The Ministry of National Education, The Ministry of Higher Education and Research, The Ministry of Ecological and Solidarity Transition, The 6 French Water Agencies, The French Water Partnership, Sciences & Vie Junior

France

Weather RotoSmart

Maeva Pirat, Maud Martinez Almoyna Carlhand and Emilya Luque

«Weather RotoSmart» is a weather controlled plant wall which has been designed to grow crops while optimizing water intake. It is meant to: limit the water intake on a planetary level, because lentil and buckwheat co-cultivation can provide all essential amino acids and therefore replace meat, which requires large amounts of water to be produced; limit water loss of our culture thanks to the rainwater recycling and the integrated pump; optimize crop growth thanks to seedling spatial distribution, the panel's rotation and the symbiosis provided by Rhizobium bacteria on the lentil crops; limit fertilizer intakes which are harmful for groundwater and thus provide cleaner drinking water for the living world.

National Organiser
Stiftung Jugend forscht e. V.

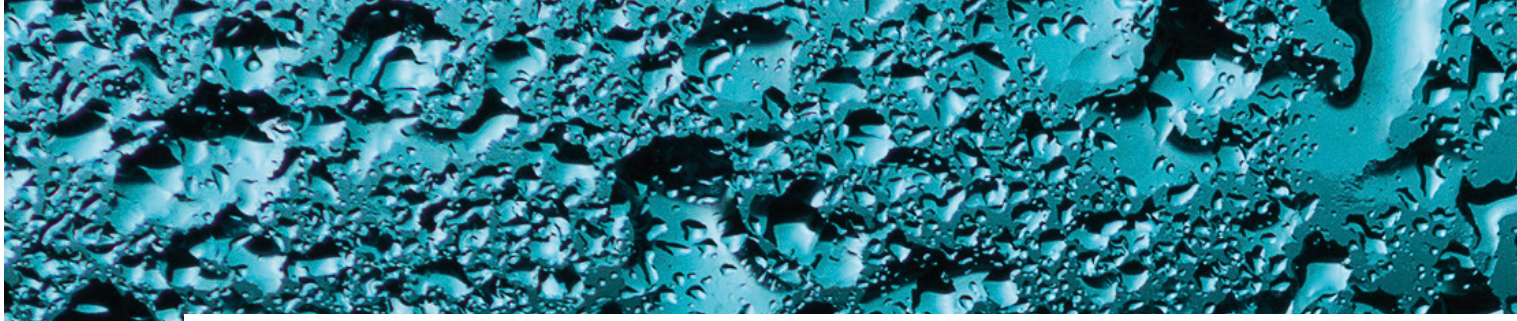
Sponsors
Federal Ministry of Education and Research, Germany

Germany

Condensed milk calibration - a new method to determine turbidity of water samples at school

Marie Isabel Breuer

When analysing water quality, turbidity is an important parameter. Because of the poisonousness of formazine, a new measuring standard had to be established for usage in school. With the help of condensed milk, a calibration graph could be set up. Using this method, samples were measured from India and Germany during a school exchange program on the topic "Water – basic resource of life". This method provides reproducible results and even more information can be received. The results will be applied to future monitoring of water samples from Germany and India.



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Global Water Partnership Hungary

Sponsors
Hungarian Water Utility Association, Budapest Waterworks, GE Water & Process Technologies, Xylem, Hungarian Energy and Public Utility Regulatory Authority, Grundfoss

Hungary

"Tanks of Water"- Let's Play!

Nikolett Szabo, Anna Tari and Kristofer Stefan

Through our project we wish to raise awareness of water footprints. It is an important, but not widely known concept. This is why we created a board game, an easy and effective way to reach students. Our game includes 50 question cards about water, and 28 picture cards. The goal of the game is to collect water droplets and whoever has the most water droplets wins, indicating that water is treasure. Our goal is to never end up with a real life game-over concerning water.

National Organiser
Tel-Aviv University, Manuel and Raquel Klachky Fund, JNF, Israeli NewTech Program, Water Authority

Sponsors
Tel-Aviv University, JNF USA, Raquel and Manuel Klachky Fund, NewTech Israel, Israeli Water Authority

Israel

Catalytic Degradation of Organic Contaminants in Water by Gold Nanoparticles and Hydrogen Peroxide

Noah Golan

This project researched the efficiency of water pollutants removal by using hydrogen peroxide as an oxidant and gold nanoparticles as a catalyst. Lissamine green b (LGB), a known color contaminant used in the food and fashion industry, was used as a representative pollutant and its rate of degradation as a measure of efficiency. Systematic laboratory experiments were made, in which the concentration of LGB was measured by spectrophotometer while nanoparticles size and concentration was measured through electron microscope. The main finding was that the catalyst caused efficient degradation of the contaminant.

National Organiser
Federazione delle Associazioni Scientifiche e Tecniche (FAST)

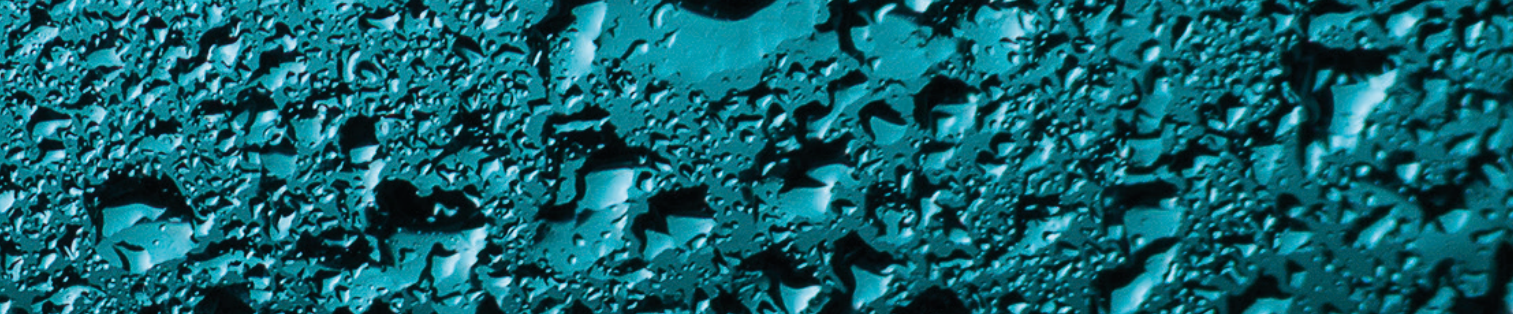
Sponsors
Aica, Associazione italiana di metallurgia, Foist, Fodazione Cariplo, Fondazione Salvetti, Xylem, High patronage of the Ministry of Education

Italy

Realization of weather station to monitoring water lagoon in the beach area of Marsala

Diego Dado, Federico Jacopo Catalano and Alessandro Nuccio

For the purpose of our project, information was collected of the geology, history and geomorphology of the Stagnone Lagoon. We performed water tests as well as designed and built a weather station to be able to monitor the reserve. The objective of our project was to gather more data to inform the public about a problem looming in the lagoon. For an overall understanding of the ecosystem's health, the weather station is aimed to provide a large amount of environmental data, with probes for measuring pH and oxygen levels, exploiting the IoT technology in an open-source database. A web application will be realized that can build historical archives.



National Organiser
Japan River Association

Sponsors
Lion Corporation , CTI Engineering Co., Ltd., Nippon Koei Co., Ltd, Tokyo Construction Consultants Co., Ltd, Pacific Consultants Co., Ltd., Executive Committee of River Day

Japan

MAP, a useful resource recovered from sewage to increase food production and reduce water pollution

Asuka Masuda, Eolie Nelki Collombon and Ryoma Kondo

Our research project started with greening the leaves by Japanese lawn grass as reconstruction assistance to the tsunami damage of the Great East Japan Earthquake. We discovered the weed suppressant and fertilizer effect of magnesium ammonium phosphate (MAP), recovered from sewage. We also found that the growth and yield of the wheat with MAP were equivalent to or higher than those with compound fertilizer even in salt-damaged soil. Our study showed that MAP can be used as an alternative to compound fertilizers in cultivation and contribute to reduce eutrophication.

National Organiser
Children and Youth Environmental Education Center "Riga School of Natural Sciences"

Sponsors
Riga City Council, Rigas udens

Latvia

Microbiological quality of commercially available drinking water using the cultivation method

Ernests Tomass Auzins

With the classical cultivation method, it is possible to determine the number of microorganisms including the presence of Escherichia coli (E. coli) in water samples, which could imply a fecal contamination. The aim was to investigate the microbiological quality of commercially available drinking water products and to compare how the obtained data correlates with the microbiological parameters given in local regulations. In our study, we did not find E. coli in water samples, and 9 water samples out of 13 violated the given microbiological parameters in the rules of the regulations.

National Organiser
FEMISCA (Mexican Federation of Environmental Engineering), Institute of Engineering, UNAM

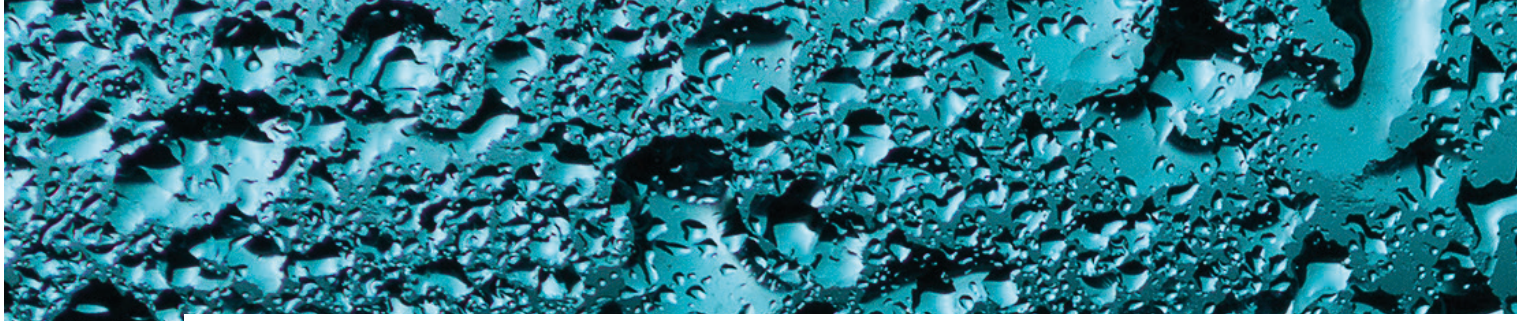
Sponsors
Academia Mexicana de Ciencias, Embajada de Suecia en México, Comisión Nacional del Agua, Instituto Mexicano de la Juventud, Sistema de Aguas de la Ciudad de México, Colegio de Ingenieros Ambientales de México AC, Aarhus Karlshamn S.A. De C.V, Alfa Laval, S. A. de C. V., Atlas Copco Mexicana S.A. de C.V., Ericsson Telecom, S. A. de C. V., Sandvik de México, S.A. de C.V., SCA Consumidor México-Centroamérica, Tetra Pak, S.A. de C.V. and Grupo Urrea

Mexico

Guava (Psidium guajava) Seeds Adsorption System for Arsenic Removal in Water from the Aquifer

Jimena Chávez Velasco, Manuel Lucas Mateo and Juan Pablo Zamudio Salazar

The presence of Arsenic (As) in water is a major health hazard, however, the use of guava seeds (Psidium guajava) as a bioadsorbent is an option for water sanitation. In this study, the pulverized seeds were tested as adsorbents under two conditions: magnetized and natural. Data was analyzed using an adsorption kinetic model of pseudo-first and second order reactions, which showed that samples treated with natural seeds removed 81.4% (R 0.83) of As via physisorption while the magnetized seeds removed 66.97% by chemisorption. The aforementioned occurred due to seed saturation by magnetic particles which reduce its adsorbent capacity when used in complex samples.



National Organiser
Wetsus, European centre of excellence for sustainable water technology

Sponsors
Wetsus - Centre of Excellence for Sustainable Water Technology, Platform Water ontmoet Water

The Netherlands

Antioxirice - Increasing yield by adding antioxidants after floods

Niels Bouwman and Margot Knapen

Floods are a recurring phenomenon in many regions all over the world and most of the crops are destroyed after these events. Rice plants, after being inundated by water, are mostly still alive. However, it is during the time after being desubmerged in which they die. This gives hope for the post-flood antioxidant spray, Antioxirice Ltd., that can help plants recover after being submerged that we have developed. The spray can be purchased and utilized by farmers after their crops are desubmerged, providing them the possibility to maintain a stable income during problematic times.

National Organiser
Pan African Vision for the Environment (PAVE)

Sponsors
Swedish Embassy, Abuja, Nigeria, Pan African Vision for the Environment (PAVE), Lagos, Nigeria, Federal Ministry of Water Resources, Abuja, Nigeria

Nigeria

Pure Water for Life

Muhammed Malami, Fayzal Ganiyu-Adewumi and Mustapha Bello Abdulrahman

The aim of this project is to see how we can curb the incidences of water related diseases using Moringa Oleifera and Activated Carbon in a water purification system to help the people in the Jahi Community, who mainly are poor peasant farmers who rely on stream water. We became interested in using Activated Carbon (which can be made from firewood) and Moringa Oleifera because of its availability in the community. We have created a prototype of the purification system and had it demonstrated before the chief of Jahi village, and now we are pushing the awareness to the entire village and hoping to get sponsors to build an advance project for the Jahi people.

National Organiser
Norwegian Water, The Norwegian Water Association and The Norwegian Hydrological Council

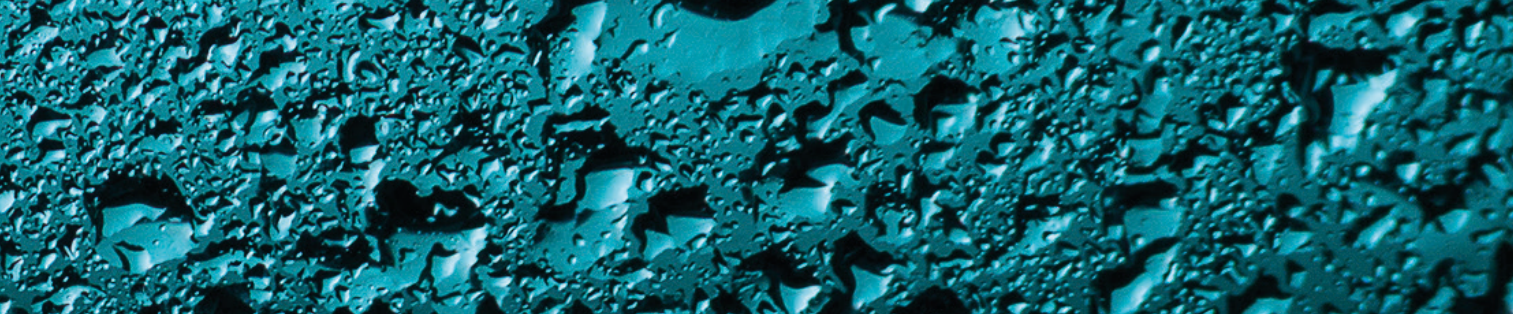
Sponsors
Norsk Vann - Norwegian Water, City of Oslo, Agency for Water and Wastewater Services, NVE - Norwegian Water Resources and Energy Directorate, Powel, Ulefos AS representing VVP

Norway

Reuse of nutrients from artificial fertilizer, with focus on phosphorus

Kristian Hansen

My project started from a fear of the future and the phosphorus-crisis that our planet is facing. In order to solve this problem, I wanted to determine if it is possible to reuse run-off water, and thus reuse the minerals it contains as fertilizers for plants. The result of my research showed that the plants who was given run-off water, with higher concentration of nutrients, got a greater growth. The conclusion drawn from the results is that run-off water can be reused and used as fertilizers for plants, and therefore hopefully solve the future phosphorus- crisis that is threatening our world.



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Korea Water Forum

Sponsors
Ministry of Land, Infrastructure and Transport, Rep. of Korea; Ministry of Environment, Rep. of Korea; Gyeonsangbuk-do, Rep. of Korea; Daegu Metropolitan City, Rep. of Korea; K-Water, Rep. of Korea

Republic of Korea

Development of Rainwater Reclamation and Reuse System in Agricultural Areas through Use of Drone and IoT Communication

Eun Soo Lee and Yeokyoung Yoo

Nowadays, steady water levels and optimal crop conditions have been hard to maintain due to fluctuating weather conditions. By employing technology to gather data on soil moisture levels and trigger appropriate responses from water supply systems, this paper constructs a water management method that only releases water when needed and requires minimum human labor. With a system designed through Arduino, this project gathers measurements through sensors, accumulates data through wireless communication via drones and enables remote control of reclaimed rainwater supply through Smartphone application.

National Organiser
Environmental Projects Consulting Institute

Sponsors
Federal Ministry of Natural Resources and Ecology, Federal Centre for Water Complex Development, Coca-Cola Hellenic Russia, State Atomic Energy Corporation "ROSATOM", Federal Agency of Water Resources, State Research Center "Planeta"

Russian Federation

Environmental Assessment of River Uvod within Ivanovo City Limits by Bioindication Methods

Alexander Golubev

The water quality in River Uvod was assessed using bioindication methods and water quality improvement measures were proposed. The study involved bioindication technique and simple chemical analysis to assess the quality of water. Through the project it was concluded that the water in selected sections of the river was acceptably clean or mildly polluted. The principal mechanisms of water pollution included slow-down of river current, discharge of industrial effluents, and natural processes such as excessive growth of aquatic vegetation which produced secondary pollution.

National Organiser
Lien Foundation, Sembcorp Industries, Ngee Ann Polytechnic

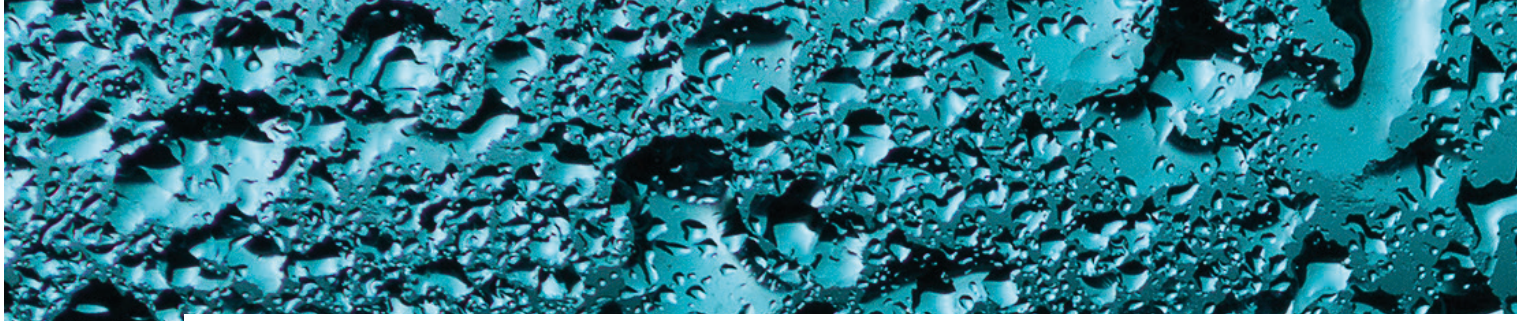
Sponsors
Lien Foundation, Sembcorp Industries

Singapore

Removal of Heavy Metals and Tetracycline using Cost-Effective and Readily Available Materials

Kia Teng Lim and Jiahao Zhou

Heavy metals and antibiotics are commonly found in water bodies and the removal is costly. Our study showed that red beans and green beans, bamboo biochar and SG Al-WTR are all extremely efficient in removing metal ions and tetracycline. Adsorption reached equilibrium in 120 minutes under the Freundlich isotherm model. The optimal pH and temperature for beans were pH 6-7 and 25 °C, while the adsorption by bamboo biochar was unaffected. Our findings highlight the potential use of these cost-effective, eco-friendly and readily available natural sources for water treatment.



National Organiser
Department of Water Affairs and Forestry

Sponsors
Water Research Commission, Department of Science and Technology, Cape Peninsula Technology, Coca Cola

South Africa

Water Wastage a Thing of a Past

Mmola Desmond Kutullo, Mokgotho Temogelo Thami and Nkwane Wayne Luka

South Africa has a problem of water scarcity and water wastage is very high in our schools and communities. Water is wasted mainly during break time when we have to wash our hands and food containers, and taps remain unclosed after use. We decided to come up with a mechanism to address and put an end to the waste water challenge we are currently facing. The system uses three aspects- a sensor that can sense an individual's hands and turns the system on discharging water, a timer that is set to discharge water for a certain period or till it fills a certain volume, and a soak-away that absorbs the water under the tap, recharges the groundwater and refills the water table underneath.

National Organiser
La Escuela del Agua

Sponsors
Fundación Aquae

Spain

Microalgae and slurry, a new source of Resources

Rita Blasi Alsinal

With the aim of finding a profitable system to treat surplus slurry and to obtain products of high added value, we worked with microalgae and advanced wastewater treatment techniques (electrocoagulation). The microalga Synechococcus nidulans was selected as the most efficient microalga for slurry treatment, based on the elimination of the total quantity of nitrogen and the biomass production. The strain selected, together with the optimal slurry concentration determined (32%), allowed us to develop a monoculture on a large scale which gave maximum productivity and efficiency.

National Organiser
Förbundet Unga Forskare

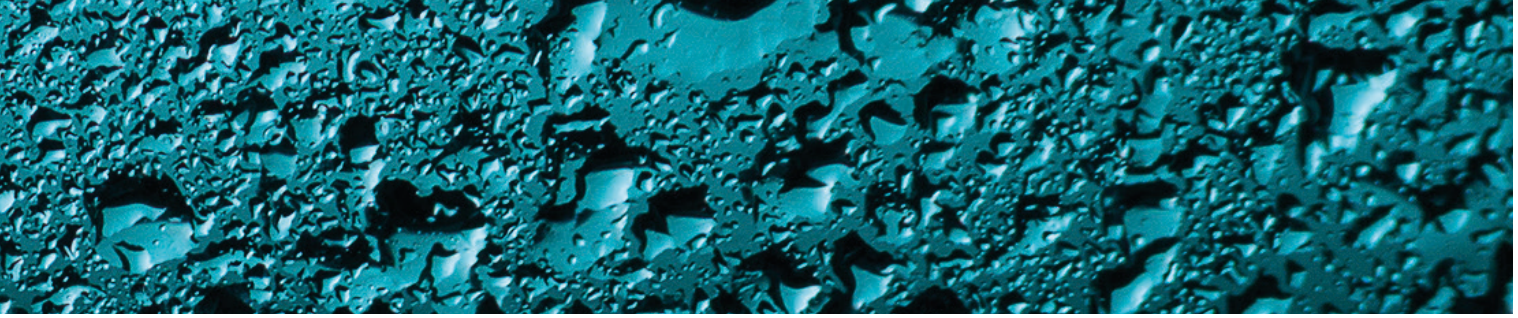
Sponsors
Xylem

Sweden

Effective Environmentally-friendly Efforts

Hannah Bassek

To increase the effect of environmentally-friendly efforts, a three-step strategy for raising climate awareness was developed. The strategy builds on making abstract climate changes concrete and integrates Aristotle's Rhetoric. Awareness was targeted as it might contribute towards streamlining climate action. This is illustrated by a constructed two-dimensional model, presenting the relationship between climate awareness, climate politics and the effect of environmentally-friendly efforts. Ultimately this could result in the world coming one step closer towards a more sustainable society.



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Swiss Toilet Organisation

Sponsors
Swiss Water Partnership (Host), cewas, seecon

Switzerland

Algae-Based Bioplastics – A solution approach to the global plastic-pollution of the ocean

Anna Lena Klein

This project serves as a minor contribution towards fighting the serious environmental issue of marine plastic pollution. The purpose of this work is to provide an insight into alternative "bioplastics" by examining a new approach using alginates instead of corn or potato starch as raw material. An algae -based bioplastic is self-produced and its degradability tested and assessed. The use of (algae-based) bioplastic film can possibly become an efficient means of reducing the plastic pollution in our oceans.

National Organiser
The Institute for the Promotion of Teaching Science technology (IPST)

Sponsors
IPST, Government Saving Bank, Metropolitan Waterworks Authority, Nestle' (Thailand) ltd.

Thailand

A Remote Water Quality Monitoring System in Bang Pood Canal and Chao Phraya River

Peeranat Meechai, Paramate Mahasakpitak and Napat Yodruk

An automatic system is developed to monitor water quality in Bang Pood Canal and Chao Phraya River in Nontha-buri Province. The prototype boat works by integrating an EV3 Microcontroller Lego and ATX2 Microcontroller Inex. The prototype can work automatically, continuously and report water quality survey data through Cloud Storage system which working together with GPS system can identify areas where water resources are problematic. The efficiency of the monitoring system is examined; it indicates that the outcomes are as expected. The data results from the sensors are accurate.

National Organiser
General Directorate of State Hydraulic Works (DSI)

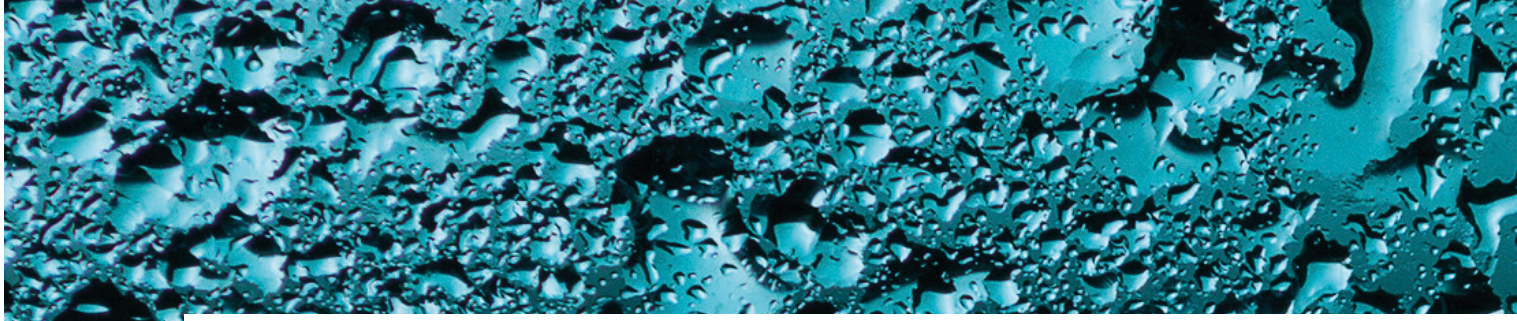
Sponsors
DSI Foundation

Turkey

Nanoplasmonic Microfluidic Chip Platform for Rapid Detection of Pathogens in Drinking Water

Hüseyin Mert Asal and Anil Ertekin

We aimed to develop a cost-effective methodology, that could be utilized by everyone without professional aid, to determine the types of bacteria in drinking water and be used in food safety applications. In our project, an antibody-antigen interaction was used to eliminate interferences. We determined the presence of the E.coli DH5-alpha species in nanoplasmonic microfluidic chip, created with gold nanoparticles of 22 nm diameter size, depending on the color change.



National Organiser
NGO Ukrainian water society "WaterNet"

Sponsors
Dow Chemical, Ecosoft, NTUU Kyiv Polytechnic Institute, Embassy of Sweden in Ukraine, Kievvodokanal, Ministry of Environment and Natural Resources

Ukraine

Environmental friendly washing

Anastasiia Livochka

Through this project a new way of washing was invented, which is that detergent is fed slowly and in small portions with constant monitoring of change in transparency of the detergent solution. It was found to result in detergent savings, from 25% to 75%, and water savings, from 10% to 30%, and it could lead to worldwide annual savings to be assessed in tens of billions of euros. In the process of the project research, a mock-up model of the washing machine was made, which clearly demonstrated that for all detergents and types of fabrics, a minimum amount of used detergent and water can be guaranteed without compromising with the washing quality.

National Organiser
CIWEM (Chartered Institution of Water and Environmental Management)

Sponsors
Chartered Institution of Water and Environmental Management, Cranfield University

United Kingdom

A Novel, Photocatalytic, Lead-Sequestering Bioplastic for Sustainable Water Purification

Krtin Kanna Nithiyanandam

The aim of this project was to synthesise a novel, photocatalytic, lead-sequestering bioplastic for sustainable water purification. Cellulose, a complex carbohydrate and the world's most abundant organic resource, provided the basis for synthesising the bioplastic capable of facilitating an advanced oxidation process (AOP). The bioplastic developed in this study uses readily available resources, can withstand strenuous use and is insoluble in water, thus opening numerous possibilities for sustainable, multimodal and cost-effective environmental remediation and water purification.

National Organiser
Water Environment Federation

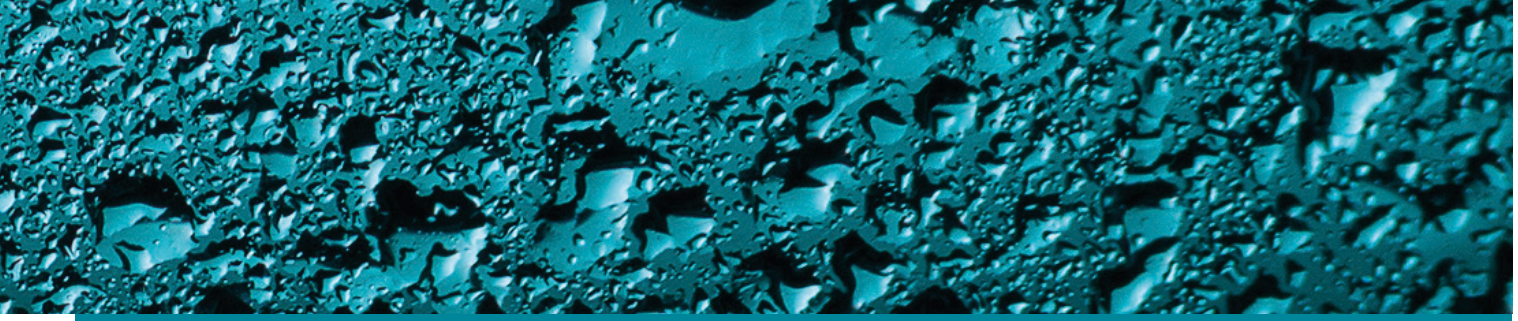
Sponsors
Water Environment Federation, Xylem, Inc.

United States of America

A Novel Approach to Rapidly and Sensitively Detect and Purify Water Contaminated with Shigella, E. coli, Salmonella, and Cholera

Ryan Thorpe and Rachel Chang

3.4 million deaths occur annually due to waterborne diseases, yet, the conventional methods for bacterial detection take 1-2 days and have detection limits of up to 1000 colonies. This study constructed a more rapid and sensitive method to detect and purify water contaminated with the prevalent waterborne bacterium. These sensors detected 1 CFU of each bacterium in 1 L of water instantaneously, and the purification unit safely eliminated bacterial presence in ~10s. This system could prevent the contraction and outbreak of waterborne diseases and expand potable water throughout the world.



2016 Stockholm Junior Water Prize Finalists

Stockholm Junior Water Prize gathers imaginative young minds from all over the world. In 2016, the 50 finalists came from 29 countries to World Water Week to participate in the international final of Stockholm Junior Water Prize and to discuss their projects with the wide range of conference attendees, including researchers, politicians and media.

Stockholm Junior Water Prize Winners, 1997-2016

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

"I'm really happy but I think every team is the best! And thank you everyone", said Kanjana Komkla after the three received the prize. Asked how she would want to take the winning project further, Sureeporn Triphetprapa said: "I will use our idea to relieve poverty in our community."

The Jury was impressed by the winners' exceptional creativity, unrelenting diligence, enthusiasm and true passion for water.

"The theme of the 2016 World Water Week is Water for Sustainable Growth. The winning project addresses future water security and rural livelihoods using an elegant leap-frog technology which looks simple, but its beauty masks its complexity! The project embodies the theme well through its journey from the idea to application. It has already proven to be scalable and is now being tested in the field, by hundreds of farmers, who are now benefiting from the inspiration from beautiful plants which have an exceptional capacity to collect and store water." the Jury said in its citation.

Sureeporn Triphetprapa, Thidarat Phianchat and Kanjana Komkla from Thailand received the 2016 Stockholm Junior Water Prize for their innovative water retention device that mimics the water retention of the Bromeliad plant. In 2016, H.R.H. Prince Carl Philip of Sweden presented the prize in absence of his sister H.R.H. Crown Princess Victoria of Sweden who is the Patron of the prize.

2015 | Perry Alagappan, USA
"Novel renewable filter for heavymetal removal"

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

2013 | Naomi Estay & 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 benton ite 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"

Watertank

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

Water Tank is a community for the finalists of the Stockholm Junior Water Prize competition. It allows participants to connect and collaborate with each other and with advisors and partners, in order to advance their water projects and develop careers in a water-related field.

WaterTank showcases projects and success stories and provides educational resources and job opportunities from both SIWI and its partners.

Get involved! Contact Ania Andersch at **ania.andersch@siwi.org**

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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 to contribute, please contact
ania.andersch@siwi.org

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WITH THANKS

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