



# **CHEMISTS WITHOUT BORDERS**

**Celebrating 14 years of international scientific-humanitarian  
collaboration**



# Who are we?

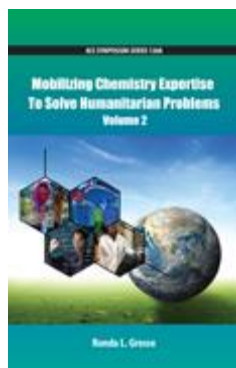
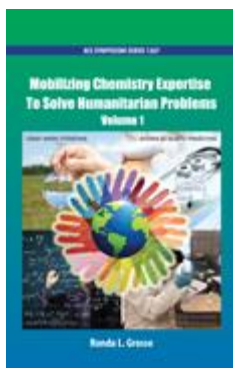
We are a group of chemists and others, who have at heart the vision of a better world using the resources and expertise of the global chemistry community and its networks.

We are progressing the organization (an equal opportunity, non-profit, 501(c)(3) organization) and our humanitarian goals, running our projects, and finding new ways to accomplish our mission. From science education in Sierra Leone to clean drinking water in Bangladesh, we invite you to read through this brochure and consider joining forces with us.



## Fun Facts

- Profiled in [Chemical & Engineering News](#), the weekly news magazine of the American Chemical Society (ACS).
- Featured in [Chemistry World](#), a Royal Society of Chemistry (RSC) publication.
- Published two ACS books: Mobilizing Chemistry Expertise To Solve Humanitarian Problems, [Volume 1](#) and [Volume 2](#) (bottom left photos).
- Organized a symposium for the analytical chemistry ACS division at 2016 National ACS Meeting.
- Currently developing a symposium with the environmental chemistry division for the 2019 Fall National ACS Meeting.





# Our Causes

We envision a global support network of volunteers providing mentoring, information and advice to ensure every person, everywhere, has affordable, consistent and persistent access to:

- Essential medicines and vaccines,
- Sufficient safe water,
- A sustainable energy supply,
- Education in green chemistry and business which people can apply in their daily lives and teach to others,
- Safe processes in work environments where chemical hazards exist,
- Emergency support including essential supplies and technology.



# Clean water initiatives

## Bangladesh Arsenic Project

Approximately 40,000 Bangladeshis die each year from illnesses caused by arsenic poisoning. Partnering with local and international experts, a model was devised to fight this affliction. Powered by a force of volunteers, this effective, realistic, extensive, and cost-effective model is in place and already bringing about change. This project is not just about water. It is about empowering people, especially youths, to solve this persistent health problem.

### Team Leader

Dr Ray Kronquist  
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Shahena Begum  
Field Program Leader, Bangladesh Arsenic Project  
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## What has been achieved so far?

- Education of about 600 high school students in Bangladesh on the hazards of arsenic in drinking water (2014).
- Identification of two high schools (Sitakinda High School and Terail High School) with very high arsenic concentration in the school wells (250 ppb) (2014).
- Determination of a solution for remediation method for the water supply for these two schools (2015).
- Funding and construction of the ring wells at these schools (2016).
- Development of a model for inexpensive remediation of arsenic contaminated wells in the community (2017).
- A campaign to solicit financial support from Rotary Clubs in Asia, Europe and the U.S. was run resulting in recruitment of an International Sponsor (San Francisco West Rotary Club) and a Host Sponsor in Bangladesh (Chittagong Khulshi Rotary Club) to work together on a Global Grant (2017).
- Collaboration with the International and Host Sponsor Rotary Clubs on the Global Grant proposal (2018).
- Testing completed on 320 community wells in Terail High School District and development of a well testing and mapping strategy that can be replicated in other locations in Bangladesh (2018).



*Youth Mappers from the Asian University for Women (AUW) and high school students mapping and testing a well for arsenic*



## Studying Water Quality Project

Following the repercussions of the high levels of lead found in the water supply in Flint, Michigan, the need to have better control on public water supplies became increasingly urgent. This gave rise to the Studying Water Quality Project, which plans to monitor water quality in various counties in the US to raise the awareness of water quality.

### Project Leader

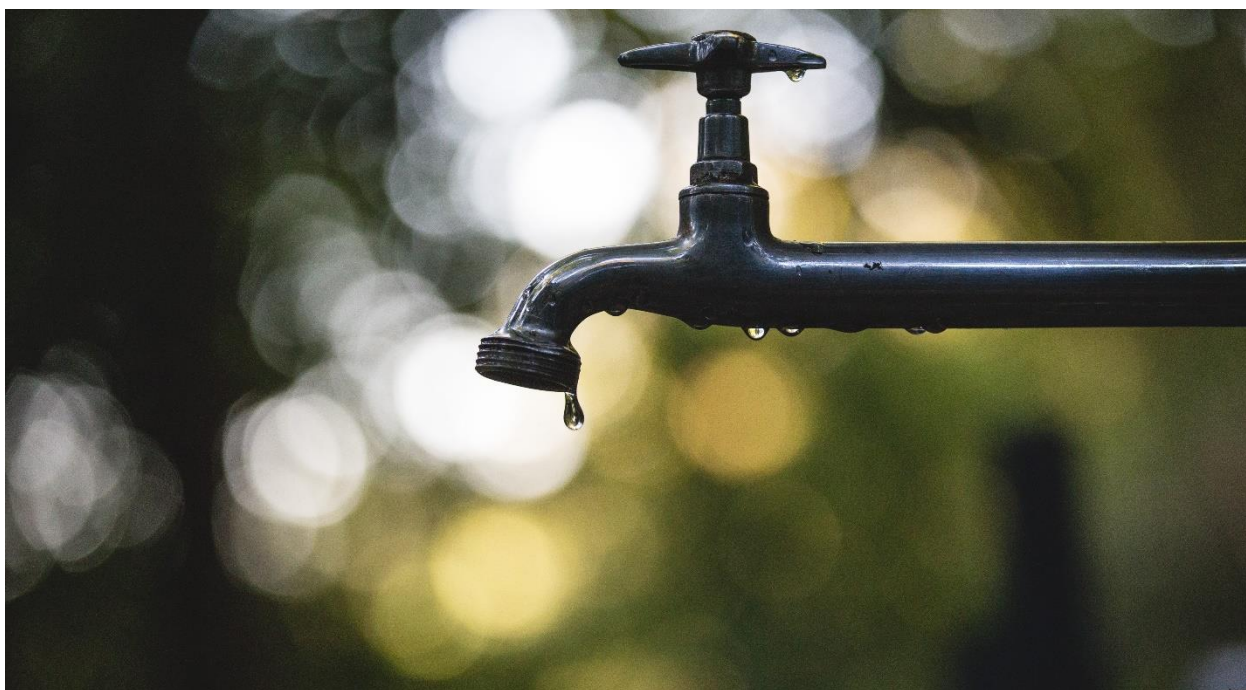
Dr Satinder (Sut) Ahuja

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### What has been achieved so far?

- A symposium was organized on 'Monitoring Water Quality to Avoid Future Flints' for the ACS August 2017 meeting in Washington DC. Prof. Marc Edwards was the featured speaker. Dr. Ahuja gave a lecture on lessons learned from water catastrophes.
- Adam Cooper and Alexa Fortuna volunteered to conduct a project entitled 'Investigating the Missing Link: Effects of Noncompliance and Aging Private Infrastructure on Water Quality Monitoring' under guidance of Dr. Ahuja.
- Dr. Ahuja was asked by Elsevier to publish a book on Evaluating Water Quality to prevent Future Disasters. The book will be published in 2019.



# Climate initiatives

## Biochar - Drought Relief and Climate Control

We believe that the agricultural industry can make better use of their available water while isolating huge quantities of carbon. Biochar, a charcoal-rich substance applied to soil for its ability to hold water and increase crop yields when paired with agriculture, can make a huge difference in the fight against climate change. Biochar stabilizes and sequesters carbon and it helps retain water and nutrients. We are investigating, supporting, and spreading technologies that produce and use biochar in agriculture, both commercially and at a subsistence level.

### Team Leader

Dr Joseph Aubertin

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### What has been achieved so far?

- Development of a website that explains how treatment of biomass (waste plant material on farms and in forests) to capture the carbon in the biomass can lower the CO<sub>2</sub> in the atmosphere that causes global warming and climate change.
- Development of strategies to promote these technologies to farmers throughout the world.



# Chemical Education initiatives

## Ongley-Myers Sierra Leone Chemistry Education Project

Studying in Sierra Leone with unreliable or non-existent electricity, limited equipment, and unaffordable textbooks is tough. Enrollment in secondary school is low and the enriching experience of learning is diminished. Chemists Without Borders has partnered with other organizations to provide laboratory chemistry material for science coursework and enhance student learning in Sierra Leone. The project is developing microchemistry kits for use by high school and first year university students in this country.



### Project Leader

Dr Bakarr Kanu

Associate Professor at Winston-Salem State University (WSSU)

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### What has been achieved so far?

- Dr Kanu visited Sierra Leone in July 2018 on a site visit fact-finding mission.
- Dr Kanu established collaboration with the Sierra Leone government officials, faculty and administrators at both University of Sierra Leone (Fourah Bay College), and Milton Margai College of Education and Technology (MMCET), and the administrators at local schools.
- Dr Kanu has reviewed facilities firsthand, acquired information, and interacted with students and the faculty.
- A book chapter has been published with ACS e-books about this project.
- Twenty kits for fifteen experiments have been finalized. A course is being developed at WSSU geared towards delivering the project in 2019.



# Collaborative Projects

## AIDSfreeAFRICA

We collaborate with AIDSfreeAFRICA which is under the direction of Dr Rolande Hodel. AIDSfreeAFRICA is building pharmaceutical manufacturing facilities in Africa to be owned and operated locally. We seek to accelerate AIDSfreeAFRICA's growth, and help replicate its effort in many parts of the world. For more information about AIDSfreeAFRICA you can check out their [website](#).

## Paper Analytical Device (PAD) Project

We collaborate with a group of researchers at the University of Notre Dame under the direction of Dr Marya Lieberman, in the effort to develop and distribute low-cost, paper-based tests to determine the potency of drugs in Africa. As many as 1 in 3 packages of medicine sold in the developing world don't meet pharmacopeia standards. Some of these products are poorly manufactured, some are degraded by bad storage conditions, and some are outright fakes in which expensive active ingredients are replaced with cheap fillers like acetaminophen, chalk, or flour. It's an injustice that affects billions of people who happen to live in countries that lack the technological and regulatory infrastructure to ensure a safe medicine supply.

## Arsenic in Rice Project

Eating rice irrigated with arsenic-contaminated water is compromising the health of millions of people. To be able to tackle this problem, we need reliable methods to measure the relevant arsenic compounds. Prof. Julian Tyson from the University of Massachusetts and his students have partnered with Chemists Without Borders to develop a relatively inexpensive, easy-to-use test kit to measure arsenic in Bangladesh's rice supply. The Hach EZ test kit for the determination of inorganic arsenic in water is being adapted for the determination of inorganic arsenic in rice. Once an accurate and reliable kit is developed, we will teach chemistry students at the Asian University for Women (AUW) in Chittagong, Bangladesh, to use it so that they can educate fellow Bangladeshis and increase awareness on how to reduce exposure to arsenic poisoning.

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## **CONTACT US**



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