

# imagine

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Program in Sustainable Design 2012 participants interview a teacher in Portobelo as part of their design project.

## Letter from the President

Dear Readers,

Thank you all for subscribing to our newsletter. For those who have known us a long time, we are grateful for your continued support. We also welcome all the new people we've had the pleasure of meeting in the past year. It's been big year for Future Scientist. We ran our first successful trip to Panama and began to grow as an organization.

Our first Program in Sustainable Design in Portobelo was a great success. Richard and I got to work with 5 intelligent, hard-working Berkeley students, 2 great teachers, other community leaders, and many of Portobelo's enthusiastic high school students. Working on this project really reinforced our idea that a multidisciplinary science education approach could really make a positive difference in the community. The trip was a fantastic learning experience for everyone involved, and we hope to apply the lessons we've learned during our upcoming January 2013 trip.

To continue our growth as an organization, we became a California nonprofit corporation. We put together a great Board of Directors whose diverse experience and enthusiasm will help shape the organization for years to come. Notably, we welcome Mark Leverette into the organization as a Director. We're excited to have Mark's nonprofit experience and his passion for helping Panamanian communities.

Next year will be another eventful one. We're planning to run more trips, and we're looking for qualified trip coordinators and participants. Keep an eye on our website for updates, and please be sure to contact us if you'd like to get involved in future projects.

Sincerely,  
Gautham Venugopalan

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## Program in Sustainable Design

Clean water for students in Portobelo, Panama

### What:

Clean water for the Portobelo Colegio. Read more in the Project Highlight.

### When:

January 2-14, 2013

### Itinerary:

**Day 1:** Arrive in Panama City, Panama

**Day 2:** Sightseeing at historic Casco Viejo and the Panama Canal; begin design lessons

**Day 3:** Rainforest hike and travel to project site; project orientation

**Day 4 to Day 11:** Community project in Portobelo; teaching science lessons; evening discussion and design lessons

**Day 12:** Wrap up projects and travel back to Panama City

**Day 13:** Depart Panama City

### Apply:

<http://www.futurescientist.org/application.html>

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3. Sign up for email updates at [FutureScientist.org](http://FutureScientist.org) (3-4/year)



A CAD drawing of the proposed clean water project at Portobelo Colegio. One tank is used to sediment and store water, and the second tank stores filtered and chlorinated drinking water.

## Project Highlight: Clean Water for 900 Kids

Imagine that the only water available to you in 95 degree weather and 100% humidity is full of mud and disease-causing bacteria and parasites. That's the situation of the 900 students at the Portobelo Colegio (high school). Working with agriculture teacher Wilfredo Aguilar, the Program in Sustainable Design participants found that local students were either drinking badly contaminated water or bringing all of their water for the day from home since few could afford to buy drinks for lunch.

Future Scientist program participants worked directly with school members and community leaders to design a system to provide clean drinking water for the students. Our proposed sustainable water purification and storage solution could alleviate many problems and serve as an example of a broadly beneficial community project. The overview image shows an initial storage and sedimentation tank that feeds a two-stage filtration system and chlorine dispenser that is automatically turned on based on water level in the second water storage tank. We will install clean water fountains at several sites around the school and provide a tap in the kitchen for cooking and washing. Toilets and hand washing taps will use sedimented but unchlorinated water to minimize chlorine consumption and system upkeep. Any excess water will continue directly to a duck and fish pond used by the agriculture classes.

On the upcoming January 2013 trip, new Future Scientist program participants will work with the community to implement this solution. The clean water system will provide drinking water for the 900 students attending the school, and will offer an example of how science, health, and engineering can make a difference in their daily lives. Participants will also be teaching hands-on science lessons to demonstrate key concepts like waterborne disease transmission, hand washing, and

filtration. Throughout the project, a group of up to 40 high school students will be working with us and learning how to assemble PVC piping, install water tanks, and maintain the whole system. We will teach them how to measure and report chlorine and Coliform bacteria levels to make sure the system is performing properly. The skills they learn can transfer

not only to future jobs but also to improved maintenance of the piping and storage systems at their homes in outlying villages or farms. Finally, we will measure the health impact of this project by tracking rates of waterborne disease with the local health center. Since up to 90% of the cases seen by the health workers are due to bad water, there is much we can do to help!



Bacterial tests of water show a large contamination problem.



# Spotlight on Neil Ray

**Neil** is currently a senior in Bioengineering at UC Berkeley and participated in our first Program in Sustainable Design in March 2012. As the president of the BioMedical Engineering Society and the director of the "Berkeley Engineering Initiative" (BEI) DeCal course, we wanted to find out what role the Future Scientist program played in his very busy life. We caught up with Neil while he was volunteering at the Health 2.0 Conference in San Francisco to ask him a few questions.



## What motivated you to participate in the Program in Sustainable Design?

I volunteered for two weeks at a rural clinic in Ecuador the summer after my freshman year, and I got annoyed that I was making only a small difference in the community. For example, we handed out small doses of meds and vitamins that I knew would not last once we left. I wanted to make a sustainable impact. The Future Scientist program caught my attention because I did not know about engineering design but found it appealing to make new things. It offered an educational opportunity as well as a chance to make a difference, unlike "voluntourism." I also had started the BEI DeCal course but wanted more formal and hands-on training in design. We were making an irrigation system on paper, but I felt like I needed a stronger grasp of the concepts.

## How did you contribute to the program?

Another team member had a strong engineering background, so I felt that my biggest contribution was making sure the project would work in context of culture. Going to Ecuador had helped me be more culturally sensitive, and I applied the knowledge I learned there.

## What was one of the most memorable parts of the trip?

Exploring the town as a design team while doing our needs assessments and collecting data like the high school's water consumption rates. I also remember sitting on the wall of the Portobelo fort at sunset for Gautham's birthday and enjoying the relaxing moment.

## Did you know any Spanish before the program?

Yes, but I needed lots of practice. During the program, I learned more words, especially technical vocab.

## How does the program fit in your career plans?

I am interested in sustainable engineering design as part of teaching the DeCal course. The program helped focus my idea of what design really is and enabled me to teach others. I am planning on going to medical school, but long term I am interested in making devices. This program helped make design more real and concrete for me.



Neil Ray teaches a water filtration lesson with Vincent Liu at the Portobelo Colegio as part of the Program in Sustainable Design.

## We are looking for future trip leaders!

Do you enjoy adventure while making a positive impact? We lead 10-14 day courses in identifying key problems, developing solutions, and executing them using an education-based approach and local labor and materials. Future Scientist is expanding the number of trips we do each year and we need your help!

We are looking for motivated and creative trip coordinators with community-based project experience, proficiency

communicating in Spanish, and a love for teaching. Applicants should also have a great sense of adventure and exploration.

If you are interested in learning more about being a trip leader for Future Scientist, contact us at [contact@futurescientist.org](mailto:contact@futurescientist.org).

We look forward to hearing from you!

## ".. real learning and eye-opening experience..."

Future Scientist  
Offers Many  
Thanks To:

Chris Beck  
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Sherman Teichman  
Institute for Global  
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Donna Riley  
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UC Berkeley

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Interested in taking part in Future Scientist's Program in Sustainable Design this January in Portobelo, Panama? Visit [FutureScientist.org](http://FutureScientist.org) to learn more and apply!

Application deadline is **November 1st** with Rolling admissions.