

# Clean Cut Quarterly

NJARNG Sustainability Newsletter

*In collaboration with Rowan University*



FALL 2018 Volume 4 - Issue 2

## *Energy Action Month*



Learn  
more on  
page 2

### Going Geosynthetic



Read more on **Page 4!**

### 3D Printing Buildings



Exciting New  
Technology on **Page 6!**

### The Great Pacific Garbage patch



Learn about where it  
came from on **Page 7!**



## October is Energy Action Month!



**By: Abigail Goger**

Energy Action Month is an initiative by the US Department of Energy to bring attention to the consumption of energy and water resources, highlight the importance of energy conservation and inspire people to create a more sustainable society.

Education is a big part of Energy Action Month, it's fundamental mechanism to creating change. Many organizations like schools, businesses and nonprofits take part in Energy Action Month by creating educational campaigns, the Military follows a similar approach.

This year the Air Force have championed the slogan "Protect the Power" to encourage the airmen to practice good energy and water habits in their everyday lives.

The Army's focus for this year is the idea that "Energy Resilience Enables Army Readiness". Energy Resilience is the ability to adapt to changing conditions and recover from deliberate attacks. In Order to become more resilient the Army is making a conscious effort to reduce their energy needs and diversify where how that energy is produced.



U.S. Air Force

MISSION ASSURANCE THROUGH

**ENERGY  
ASSURANCE**



Both of these initiatives can be related to The Army National Guard. The Guard can be called into action at a moments notice after months of down time. Employing multiple energy alternatives and moving away from fossil fuels is a great way to ensure that no matter what the circumstances are The Guard will be mission ready.

In addition, creating energy conserving habits and implementing them in everyday life can add up to big saving economically. The military has already saved millions by embracing sustainable energy and creating a more efficient infrastructure. These efforts free up resources to be used on more rewarding endeavors like medical research and technological advancements.



Sometimes these big intuitives can make it feel like there's not much you can do to help but, that couldn't be further from the truth. Many small improvement add up to huge gains as a whole. You can do things like taking shorter showers, only running full loads of laundry, fixing leaky faucets, unplugging appliances or installing smart power strips to save energy when the appliances are not in use. You can also use LED light bulbs, air dry clothing and using a programmable thermostat to take some load off your heating and cooling units.

At the end of the day we are all responsible for the way we consume resources. Energy Action month is here to remind us of the importance of that. If your interested in more information below are links to Learn more about what changes you can make

[Water Conservation Tips](#)  
[Energy Saving Tips](#)

Some notable steps that have already been taken can be seen in Fort Irwin, California where they only average about 4.2 inches of rainfall a year thus, making water conservation a must. They have worked to identify leaks, installed water meters in order to track the water consumption of each fawcett on the base and implemented water-recycling systems.

The Navy also took steps by deploying “the great green fleet” back in 2016. The ships run on alternative fuels like nuclear power and biofuel. The idea behind the fleet is to increase operation flexibility in their ships.

### THE EASY ENERGY ACTION PLAN

10 SIMPLE WAYS TO USE ENERGY WISELY

<b>1</b>	Turn off lights.	<input type="checkbox"/>
<b>2</b>	Use energy-saving light bulbs.	<input type="checkbox"/>
<b>3</b>	Shut off computers.	<input type="checkbox"/>
<b>4</b>	Use “smart” power strips.	<input type="checkbox"/>
<b>5</b>	Turn off entertainment devices when not in use (TV, game systems, etc.)  OFF	<input type="checkbox"/>
<b>6</b>	Use natural light, heat and cooling.	<input type="checkbox"/>
<b>7</b>	Unplug your phone charger when not in use.	<input type="checkbox"/>
<b>8</b>	Talk to your parents about ENERGY STAR® appliances.	<input type="checkbox"/>
<b>9</b>	Talk to your parents about programmable digital thermostats.	<input type="checkbox"/>
<b>10</b>	Talk to your parents about Home improvements (windows, doors, roofs, etc.)	<input type="checkbox"/>

LoseYourExcuse.gov

# Going Geosynthetic!

**By: Grace Watson**

Sustainability is a main focus for engineers these days because we need to do everything in our power to make sure that the planet is fit for the future. Geosynthetics are a form of material made from polymers that have a wide array of uses in infrastructure since they are made of polymers like polypropylene, polyester, and polyethylene. They all can help in construction, preserve water and control drainage, and improve the life-span and strength of materials.

## Geotextiles:

- Woven, needle-punched, or hand woven fabrics
- Uses:
  - Soil layer separation
  - Drainage/filtration
  - Reinforcement /protection of the Earth



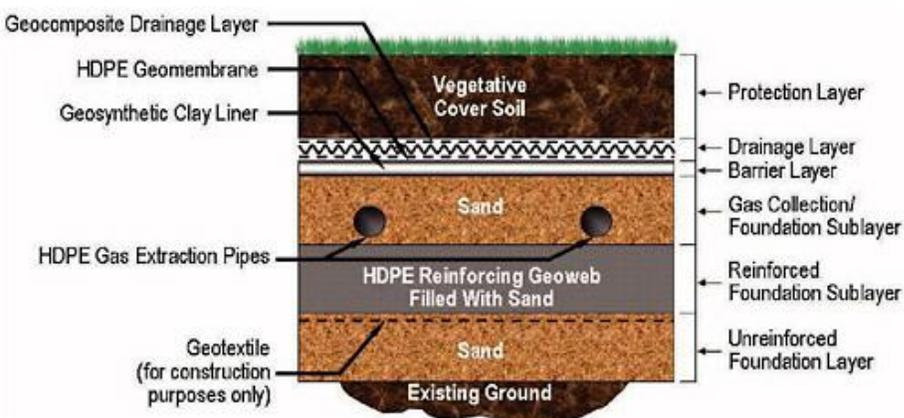
## Geomembranes/geo-clay liners:

- Thin sheets of polymer
- Uses:
  - Water containment
  - Waterproof layer beneath asphalt



## Geogrids:

- Sheets of polymer with holes
- Uses:
  - Reinforcing soil and waste
  - Allow soil to retain chemical properties
  - Prevent erosion while supplying stability



Pictured left: Cutaway showcasing geocomposites, geomembranes, geo clay liners, geo pipes, and geotextiles.

Keep reading onto page 5!

**Geonets:**

- Constructed like an ultra thin net
- Fused to geomembranes or geotextiles
- Uses:
  - Drainage in soil and waste piles
  - Drainage in retaining walls or slopes

**Geofoam:**

- Expanded/extruded polystyrene
- Uses:
  - Fill beneath parking lots, highways, or bridges
  - Thermal insulation
  - Drainage

**Geopipes:**

- Perforated or solid wall
- Uses:
  - Drainage of liquids
  - Gas collection at landfills

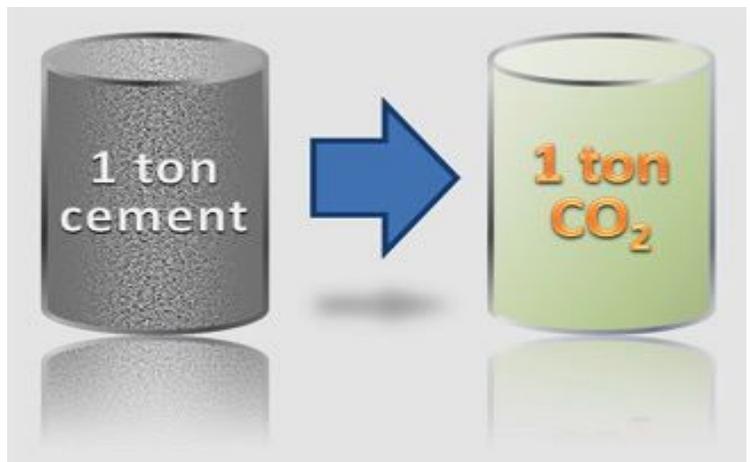


There are numerous economical and ecological benefits from Millions could be saved by partially or entirely replacing normal materials as well as increasing lifespans of materials and projects by tens of years. Transportation of geosynthetics is much faster and easier as they come in rolls, which saves time and also the atmosphere from significantly less carbon emissions from transportation exhaust. The U.S. Army Corps of Engineers (USACE) was actually one of the first agencies to use geosynthetics. "Both the St. Charles and Jefferson levees were loaded (filled by the storm) during Katrina and performed exceptionally. They were stable and the geosynthetic was inherent to their strength," said John Bivona, Deputy Chief, Engineering Division, New Orleans District, U.S. Army Corps of Engineers." The USACE continues to use geosynthetics as represented in Section 130 of the Water Resources Reform and Development Act of 2014.

# 3D Printing Buildings with Concrete

## Recent Breakthroughs

In August of 2018, the United States Marines conducted an experiment involving the viability of continuously 3D printing a sleeping barracks on-site. The experiment proved successful as seen in the picture to the left. The completion of the barracks took around 40 hours ( compared to the 5 days it would normally take to construct a barracks) in conjunction with the supervision of many members from the Navy Seals and Marines. The unique aspect about the barracks that the marines produced is that it was the world's first implementation of an on-site continuous 3D printed building. As seen above, the building was quite literally printed from the ground up in 40 hours. No prefabrication of building panels was required, and the structure was successfully printed. The building was only 500 sqft., though if the technology was improved and the method refined, the marines claim that they could easily print the barracks in less than a 24-hour period.



## Why does this Matter?

The option of being able to construct a concrete building within a 24-40 hour period is monumental for those seeking shelter in a natural disaster area. Sturdy buildings made from concrete can be quickly made using this method. This technology applies to those who are victims from a natural disaster and those aiding with relief for those victims. Not only will the construction of buildings be expedited, but it will also decrease the amount of Co<sub>2</sub> produced from cement. Cement is an ingredient of concrete and produces 5% of Co<sub>2</sub> in the world. By using the most efficient amount of concrete, the amount of Co<sub>2</sub> produced could be mitigated and lower the amount of Co<sub>2</sub> produced when constructing buildings.

### Sources:

<https://www.marines.mil/News/News-Display/Article/1611532/mcsc-teams-with-marines-to-build-worlds-first-continuous-3d-printed-concrete-ba/>

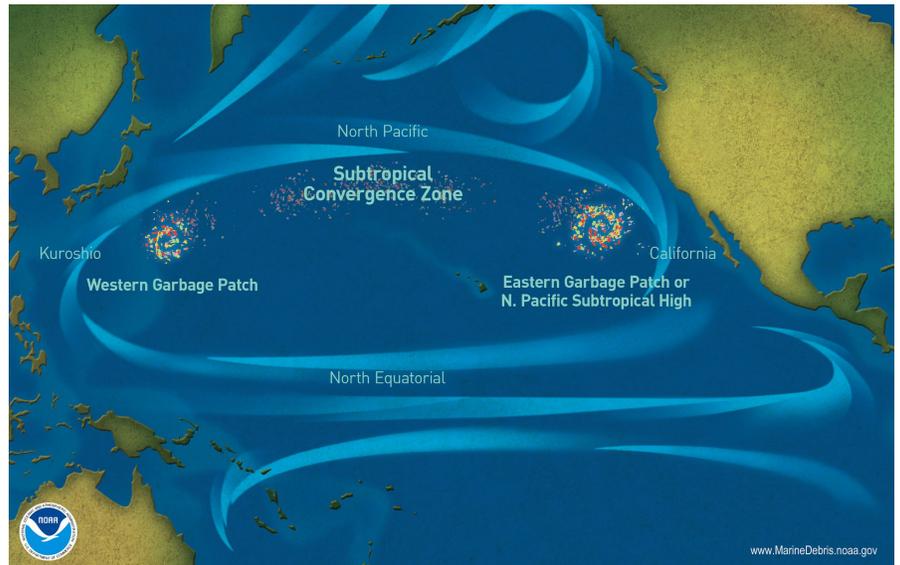
<https://blogs.ei.columbia.edu/2012/05/09/emissions-from-the-cement-industry/>



# The Great Pacific Garbage Patch

By Chris Rovelli

The Great Pacific Garbage Patch is a large area of garbage floating in the Pacific Ocean. It is held together by the ocean currents in the North Pacific Subtropical Convergence Zone, which constantly keep the trash in circulation. When trash is left lying on the ground, it will stay there until either someone picks it up, or nature moves it. If left to nature, the trash will get collected by rain water run off, and over time will be deposited into the nearest river. From there, the trash will be carried downstream until it reaches the ocean, where ocean currents will carry it in an endless cycle.



(Photo: NOAA)



(Photo: Shutterstock)

The Garbage Patch is made up of non biodegradable waste accumulated over centuries, such as plastics. These plastics break apart into tinier and tinier pieces as time goes on through a process known as photodegradation. About 80% of this garbage comes from land based activities in western United States, Japan, Hawaii, and the Philippines. The other 20% comes from waste produced by fishing boats, cargo ships, and other aquatic based activities.

One major misconception about The Garbage Patch is that it is an island of floating garbage, when in actuality it is a cluster of tiny pieces of microplastic that float just below the surface, along with the occasional large piece of debris. Some examples of large pieces of debris found in the Garbage Patch include fishing nets, clothes, shoes, and cans.

The harmful effects The Great Pacific Garbage Patch has on the ocean ecosystem cannot be understated. Birds can mistake small plastic pellets for fish eggs, which can cause serious internal damage if ingested which will lead to death. Seals can get tangled in the multiple fishing nets discarded over the years, causing them to drown. Sea turtles can mistake plastic bags for jellyfish. The pollution can even affect the algae and plankton in the area, which can drastically affect the entire food web.

Cleaning up the Great Pacific Garbage Patch is no easy task. Debris can float several feet below the surface, and the microplastics can be so small that using a strainer fine enough to collect them will result in catching most of the sea life that dwells in the area.

It is also a very expensive proposal, and since the Garbage Patch is so far away from any countries' coastline, no country will claim responsibly or provide the funding to clean it. Several groups are proposing profitable ways to clean the garbage patch, but until these ideas receive the necessary funding the best way we can clean the garbage patch is to reduce the amount of garbage we produce and recycle whenever possible.



Please hold onto that wrapper until you find a garbage, don't just toss it on the ground. Consider buying a second waste bin for recyclables if you do not own one already. Small steps like this can go a long way towards preventing the garbage patch from growing any larger.

Sources:

<https://www.nationalgeographic.org/encyclopedia/great-pacific-garbage-patch/>

<https://blog.marinedebris.noaa.gov/garbage-patches-explained>

# Meet The Energy Interns



## Abigail Goger

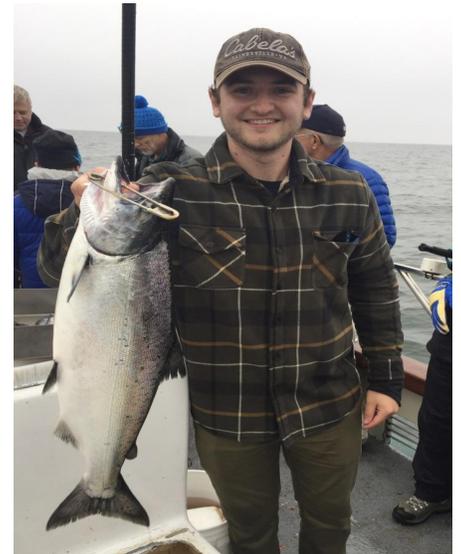
*Civil & Environmental Engineer, Junior*

Loves surfing, snowboarding, rock climbing and anything outdoors. Soccer fanatic and Co-writer of the blog [Lost Girls Living](#). Aspires to one day see the world.

## Remo DiSalvatore

*Civil / Environmental Engineer (Junior)*

Enjoys outdoor activities such as fishing, biking, hiking, shooting, etc. Loves animals and traveling. Hopes one day to do work on the Pacific Garbage Patch and/or alternative forms of energy.



## Grace Watson

*Civil & Environmental Engineer, Junior*

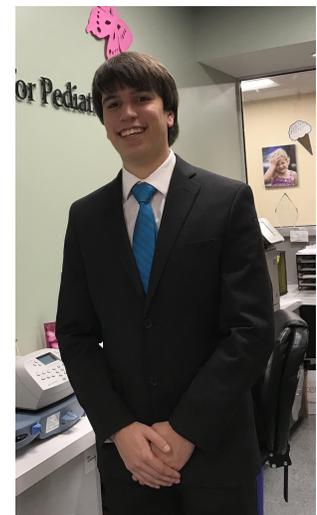
Partakes in hiking, photography, music, video games, and all things beach related. Hopes to continue my passion of travelling by road tripping across the United States.



## Chris Rovelli

*Civil and Environmental Engineer, Junior*

Enjoys activities such as relaxing on the beach, bicycle riding, traveling, and unwinding with the occasional video game. Wants to greater understand how our actions affect the environment and what can be done to fix it.



# Meet The Grad Students



## **Ryan Loeh**

*Graduate Student, Civil and Environmental Engineering*

Received his Bachelor's Degree in Civil Engineering from Rowan University in May of 2018, while also achieving a minor in Mechanical Engineering and being an active member of the Honors Concentration. Now pursuing a Master's Degree in Civil Engineering while working with the NJARNG BIM Team. Enjoys fishing, kayaking and playing soccer in his spare time.

## **Nicholas Nocco**

*Graduate Student, Civil and Environmental Engineering*

Graduated with a Bachelor's Degree in Mechanical Engineering from Rowan University in May 2018, with a concentration in Automotive Engineering. Currently working alongside the NJARNG Energy Audit teams while pursuing his Master's Degree. Competed for Rowan University's Cross Country and Track & Field teams for 4 years receiving Academic All-American honors twice, and now helps out as a volunteer assistant coach.



# NJARNG Energy Team

*Want to know more?*  
Contact Us!

***Samantha Valentine***

NJARNG Energy/BIM/BUILDER Intern Program Manager  
valentines@rowan.edu



***Vernon Hicks***

DMAVA-Rowan Intern Programs Coordinator  
vernon.hicks@dmava.nj.gov



***Kathleen Mullins***

NJARNG Facilities Management Intern Program Manager  
mullins@rowan.edu



**Rowan University**  
HENRY M. ROWAN  
COLLEGE OF ENGINEERING