ecomagineering

Careers in Engineering and Science

Win 25 Million Bucks!

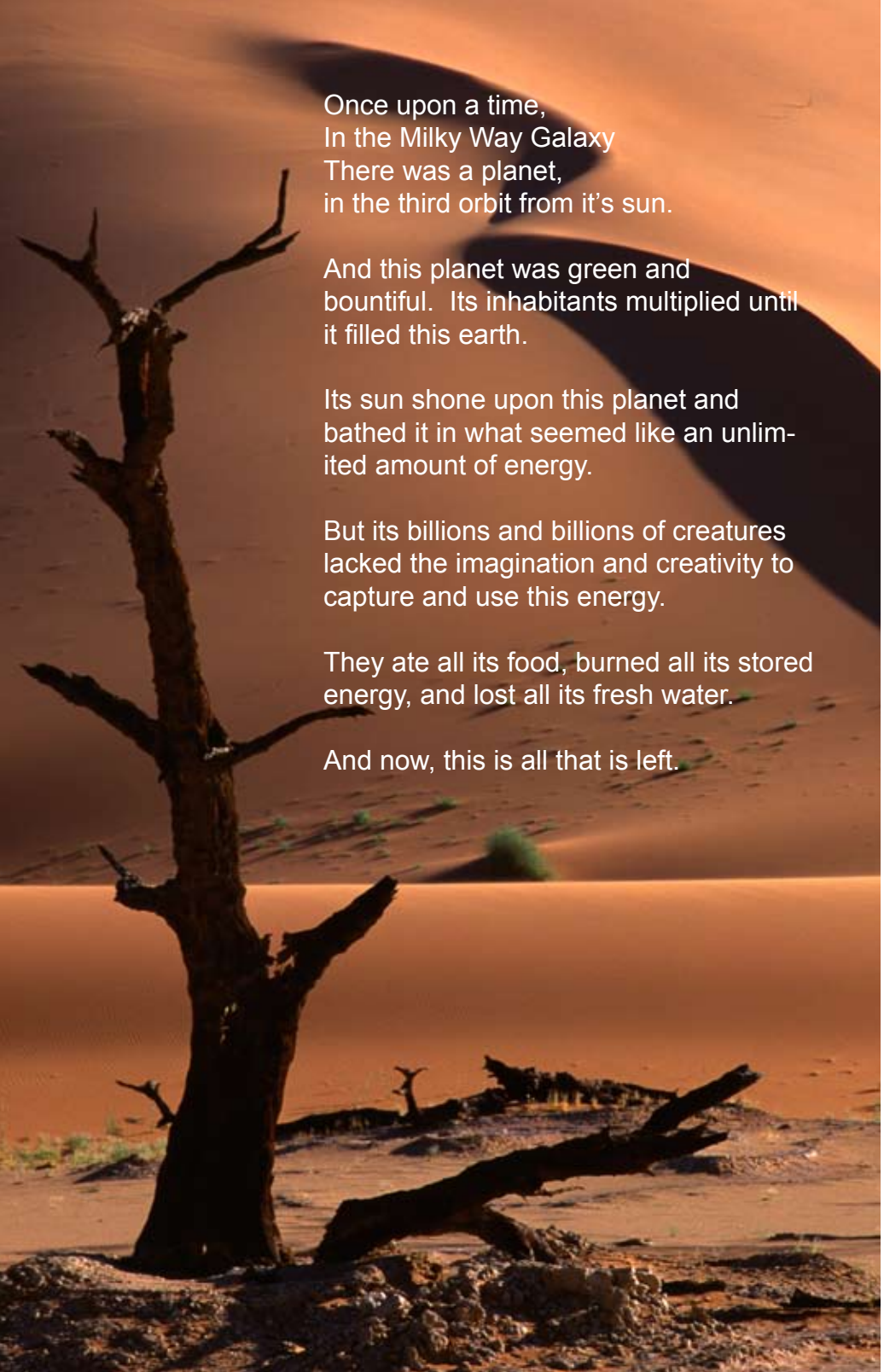
Women in Engineering

The Environment

FIRST Robotics

Saving Nemo

And More…



Once upon a time,
In the Milky Way Galaxy
There was a planet,
in the third orbit from it's sun.

And this planet was green and bountiful. Its inhabitants multiplied until it filled this earth.

Its sun shone upon this planet and bathed it in what seemed like an unlimited amount of energy.

But its billions and billions of creatures lacked the imagination and creativity to capture and use this energy.

They ate all its food, burned all its stored energy, and lost all its fresh water.

And now, this is all that is left.

Sustainability - sus·tain'a·bil'i·ty n. -

1: Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

2 a : of, relating to, or being a method of harvesting or using a resource so that the resource is not depleted or permanently damaged <sustainable techniques> <sustainable agriculture> b : of or relating to a lifestyle involving the use of sustainable methods <sustainable society>

All creatures need a decent habitat to live in.

We all need clean safe water.

We need to have fresh clean air.

People want better schools for their children.

We need safer and more efficient ways to travel.

We need to have reliable communications

We need to have a safe secure country.

In your lifetime the earth will be supporting 10 BILLION people.

That is 10 times more people than existed when Lewis and Clark ventured on their Journey of Discovery.

The reality of today's world is that we all face real constraints and difficult choices

All of us must work to improve the sustainability of the world.

In every activity that we are engaged, we must personally, and professionally strive to leave the world a better place. Cleaner water, fresher air, healthier soil, and a greater compassion to our fellow man and to our surroundings.

The development and usage of our earthly resources must be done in a more efficient and environmentally sensitive manner.

It is your responsibility to learn to live "sustainably".

planet earth

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ecomagineering

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Contents

Sustainable Water

Having enough clean water to drink, cook, bathe and even wash a car is unimaginable in many parts of the world. Only few people like this man in Ethiopia have access to clean wells.

Safe Clean Water

Engineers working with Water

When is the last time you got sick from “bad” water? For many of us it is unheard of to have bad water. Yet for many people in the world, finding clean safe water is a daily struggle in their fight for survival. Worldwide, an estimated 40 billion work hours are spent each week obtaining water. In Africa and other regions, the job frequently falls to girls and women, meaning that little time remains for them to attend school and get a vocational education.

Stefan Augustin Develops Portable Water Device - An ingeniously simple way to produce drinking water is provided by the Watercone ® (small picture), invented by German industrial designer Stefan Augustin and tested by the Care Deutschland aid organization in Yemen. The cone, made of Makrolon® plastic from Bayer MaterialScience, is simply floated on a puddle of salty or dirty water, or even placed on dew-laden soil. The water evaporates in the sun, condenses on the inside of the cone and collects in a trough. Turn the Watercone® upside down, and the purified water can be filled into containers.

Rutgers Engineering Students Help Bring Clean Water to Eastern Kenya
These Rutgers students spent three weeks in Kenya this summer volunteering with Rutgers’ chapter of Engineers Without Borders. This team worked to create systems to supply clean healthy water to the local residents. Additionally they worked on solar technologies to help with cooking in order ro reduce local environmental impact.
EWB - Engineers Without Borders is an engineering organization dedicated to Building A Better World, One Community At A Time.

Sustainable Rivers Project - The Nature Conservancy and the United States Army Corps of Engineers in July 2002 formed a partnership to restore and preserve rivers across the country. Under the Sustainable Rivers Project, the Conservancy and the Corps will work together to improve dam management in order to protect the ecological health of rivers and surrounding natural areas while continuing to provide services such as flood control and power generation.
Civil and Environmental Engineering in Action.

Sustainable Agriculture

About one in every eight people in the world is either hungry or undernourished.

Particularly in Africa and Southeast Asia, tens of thousands of infants and mothers die each year due to iron or vitamin deficiency.

During the next 50 years, the world's population will increase by 50%, to almost nine billion people (source: World Bank).

During the same period, the availability of fertile soil and clean water is expected to decline substantially.

There is an urgent need to ensure that there are adequate quantities of food of acceptable quality from local production.

Healthy Food

Engineers working with Food

There are literally hundreds of different engineering and scientific jobs in the food related industries.

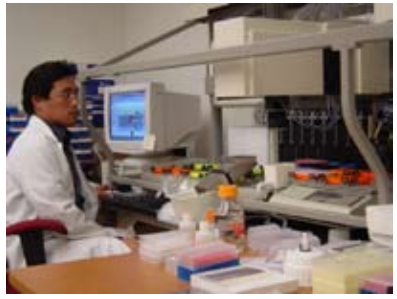
Every major field of engineering is involved with developing new ways to grow, harvest, process, and distribute food to billions of customers.

Natural Pesticides -

Using organisms such as *Bacillus thuringiensis* that occur naturally, scientists derive pesticides that do not harm the environment or consumers.

Using natural pesticides improves every creatures quality of life, well almost. The bug trying to eat your corn doesn't fare too well.

Natural pesticides do not hurt these young birds.



Robotic DNA Analysis -

Robotic DNA analysis is used to analyze different strains of food in order to help researchers crossbreed corn into new varieties with desirable properties.

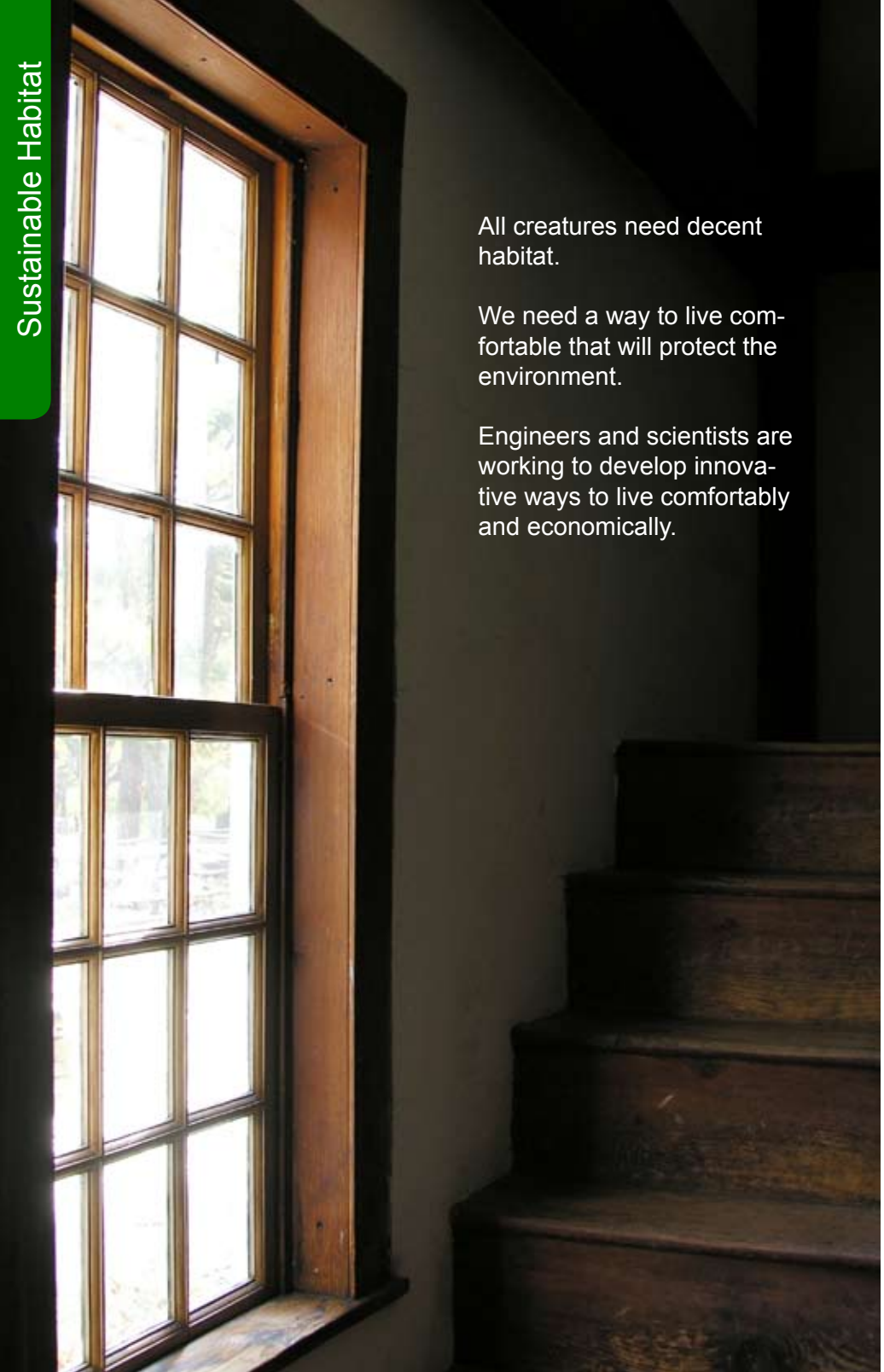
Incidentially, robotic DNA analysis is used to improve the efficiency of forensic analysis in crime laboratories at police investigative agencies.

Pictured is a researcher at the University of California performing DNA analysis.

More Efficient Farms -

Recently John Deere set new records for fuel efficiency and engine performance. This machine, the new 8430 Tractor, as tested, delivered an 8.8 percent improvement in fuel efficiency compared to its predecessor. Similarly, their competitor Caterpillar delivers their ACERT technology that delivers outstanding improvements in fuel efficiency and air quality. These two companies are leaders in engineering development.

Sustainable Habitat



All creatures need decent habitat.

We need a way to live comfortable that will protect the environment.

Engineers and scientists are working to develop innovative ways to live comfortably and economically.

Comfy Cribs

Engineers getting comfortable at home

The Home -
Your home and most of it's contents and surrounds were created with the involvement of an engineer. The textiles, the building materials, the insulation and the appliances and obviously the electronics. The clean water, the streets and sidewalks and even the food you eat was produced with the help of engineers. Without engineering your home and your life would be very very different..

Our Home -
Nearly everything in your home was created with the involvement of an engineer.

The textiles, the building materials, the insulation and the appliances and obviously the electronics.

The clean water, the streets and sidewalks and even the food you eat was produced with the help of engineers.

Their Home -

Our fuzzy little friends in the need decent habitat too.

Engineers and scientists are working to develop solutions to our needs that are compatitable with the needs of nature.

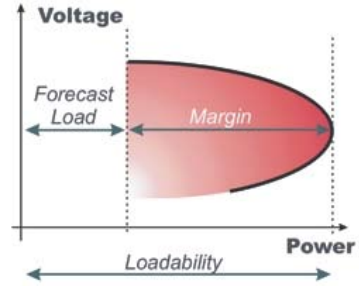
In recent decades, much has been done. However much still needs to be done as much of the planet isn't living harmoniously with nature.

Electric Power -

One of the most important engineering achievements ever is the production and distribution of electrical power.

Most people take electric power for granted, or at least until the lights go out.

Engineers are working to develop new methods to produce clean safe economical electric power.



Sustainable Forests

Covering less than 2% of Earth's surface, rainforests are home to more than half of the world's plants and animals.

About 4.6 billion people depend for all or some of their water on supplies from forests.

More than 1 billion people living in extreme poverty around the world depend on forests for their livelihoods.

Forests regulate and purify 57% of total water runoff around the globe, providing life-giving fresh water to people.

Global wood consumption is projected to increase 50% by the year 2050. A survey of two-thirds of the world's tropical forests found that less than 5% are being managed in a sustainable way. If steps aren't taken to protect them, rainforests around the world could disappear within 40 years.

In the United States, the conversion of forests to developed use reached a million acres per year in the 1990s. By 2050, an additional 23 million acres of forest may be lost.

Forests continuously recycle carbon dioxide into oxygen. Deforestation contributes between 20% and 25% of all carbon pollution causing global climate change.

Trees and plants absorb carbon from the atmosphere; destroying them releases carbon.

Cutting down and burning a one-foot-diameter tree releases one metric ton of carbon into the atmosphere, the equivalent of the emissions produced when driving 1,350 miles in a large sport-utility vehicle.

Conserving Forests

Forest Management and Forestry Products

The need for fiber - Engineers, scientists, foresters and other professionals work to advance technologies critical to forest production and management, and forest products manufacturing.

The Bad Fire -

Every day thousands of acres are burned somewhere on Earth. Around the world, an area half the size of China burns in an average year, more than half of U.S. forests and rangelands have altered fire dynamics.

Until recent times, forests burned naturally and frequently. Practices that were common in the 20th century have led to the unnatural destruction and erosion of forests and their habitats. This has led to a proliferation of destructive and unnatural wildfires.

The Good Fire -

Industry professionals work to promote the type of naturally cool fire as show on the left.

This fire is the type that naturally occurred for thousands of yars in many parts of the world. The work of engineers can directly and indirectly help to restore ecosystems to their natural state.

Low Impact Forestry Management -

Conventional logging causes profound damage to the forest. Engineers have developed the technology to perform low impact logging environmentally friendly logging. It helps to maintain the form and function of the forest close to their original condition. Maintaining its form means minimizing damage to the forest and, in consequence, to the residual commercial trees. If its form is maintained, the forest can continue to exercise its functions: protecting the soil against erosion, maintaining water quality, protecting biodiversity, and so on.

Sustainable Climate

Global deforestation accounts for 25 percent of annual carbon dioxide emissions.

Extreme climate events pose a major threat to human populations.

Heat waves caused more than 20,000 deaths in Europe and more than 1,500 deaths in India during 2003.

The world's average surface temperature rose by about 1°F in the 20th century. The five hottest years have all occurred since 1997 and the 10 hottest since 1990.

Climate change, more commonly known as global warming, is caused by the emission of heat-trapping gases such as carbon dioxide produced by vehicles, power plants, industrial processes and deforestation.

Record-high seawater temperatures in 1998 may have killed as much as 10% of the world's corals.

As heat-trapping gases build up, they act like a big blanket, over-heating the planet and threatening our health, our economy and our environment.

Protecting the Climate

Engineers working to help the climate

Engineers are working in many fields to find ways to protect the climate. Primarily these effort lead to methods to reducing demand for energy-intensive goods and services, increasing efficiency in energy use, avoiding deforestation, and switching to low-carbon technologies for power, heat, and transport. They also work to reduce harmful emissions from industrial and consumer activities.

Carbon Dioxide - CO2 -

The crucial factor in halting climate change is reducing levels of carbon dioxide in the atmosphere. It may be invisible, odourless and tasteless, but this gas stops heat escaping from Earth to space - warming our world way beyond what's normal and affecting our climate. By burning fossil fuels to power factories, cars and homes, we add to the build-up of carbon dioxide. Engineers work to develop technologies that will reduce the amout of carbon emitted into the atmosphers.

The source of energy- Nearly all of the energy that we use originated from the sun. Whether is is fossil fuels like coal and oil, firewood, biofuels, peat, etc, it origiinally originated with the sun. When you turn on a table lamp, the light and heat that it emits is most likely the light and warmth of the sun that was captured 100 millions years ago and stored in what is known as fossil fuels. The consumption of fossil fuels is the primary contributor to climate change. Our supply of sunshine will run out eventually - but not for another 4.5 billion years.

Air Protection -

Industry has made significant progress during the past several decades in reducing air pollution and in the reductions of harmful gasses into the atmosphers. Atmosphere damaging gasses like CFCs have been outlawed and more friendly products have been developed. These products were used in common hairsprays and air conditioners. Chemical Engineers and Civil Engineers work to reduce and eliminate air and water pollution.

Sustainable Oceans

Once considered a limitless and inexhaustible resource, the oceans of the world are increasingly in jeopardy.

Pollution, overfishing and warming brought on by global climate change are altering key ecological functions necessary for providing us with food and medicine, protecting coastlines and filtering pollutants.

Oceans cover 70 percent of the Earth's surface -- yet are perhaps the most unprotected ecosystem on our planet.

The marine environment's benefits to society greatly exceed their direct uses.

In addition to providing the fish and seafood that millions of people depend on for food, they are the source of antiviral medicines like those derived from marine sponges, and products used to fight cancer or in bone grafts.

Mangroves shield coastlines from storms; seagrass beds filter pollutants from water and protect against erosion and flooding; reefs and kelp forests act as natural breakwaters for coastlines; and all three serve as nurseries for fish and shellfish.

Demand for basics such as housing, food and income is damaging ecosystems and depleting marine resources.

Around the world, unsustainable fishing practices, including the poisoning and dynamiting of coral reefs, trolling sensitive areas, and the loss of critical nursery areas are exacerbating the problem.

Equally damaging are the effects of pollution resulting from land-based activities such as dredging, paving, mineral extraction, deforestation and unsustainable agriculture.

Saving Nemo

Oceans and FIsheries Management

The need for sustainability - Much of the worlds population lives near coastal waters. Man's intrusion and modification of coastal ecosystems frequently harms ocean life. Engineers, scientists, governmental and non-gonvernmental organizations are working to reduce or eliminate sources ocean pollution and other harmful effects of man.

Oceans Conservation -
The Ocean Conservancy is an advocate for sustainable oceans. They work in for major areas to conserve the oceans. First, they work to improve and protect fisheries. Secondly, they work to reduce the human effects on the ocean, by reducing bycatch, elimination debris, and protecting of nesting grounds for turtles. Thirdly they are working to designate conservation areas, similiar to national parks. Last, they are work to reform government to implement laws and policies that will create a sustainable ocean.

Conserving Coral Reefs and Providing Jobs - Researchers from Georgia Institute of Technology are collaborating with the villagers of the Fiji Islands to develop methods to explore, protect and generate income for the islanders from their shallow fringing coral reef. Instead of breaking off pieces of live coral reef substrate – called "live rock" – for sale to the saltwater aquarium industry, villagers planted a crop of synthetic rock that becomes naturally covered by desirable species. This prevents the destruction of natural coral for economic purposes.

Spawning Aggregations - It is one of the secrets of the sea—the mysterious places where teeming masses of fish gather to mate at the same time each year. To people who depend on the sea for their food and income, these predictable mating dances, called spawning aggregations, seem like vast cornucopias of limitless fish—but their abundance is an illusion. The scientists of the Nature Conservancy's Marine Initiative is working with government, non-government and fishing industry partners to manage and protect fisheries.

Sustainable Wetlands

The United States is losing more than 80,000 acres of wetland habitat annually. That's more than seven football fields each day!

Protecting the Climate

Estuaries, Conservation and Protection

The need for some real imagination - Much of the worlds wildlife owe it's existence to the the presence of healty wetlands. Citizens and scientists are working to conserver and restore existing wetland habitats. Engineers, scientists and others work to develop strategies to preserve wetlands and support human co-existance.

Tillamook Estuaries - Native oysters are poised for a comeback in Netarts Bay, thanks to a local partnership, the Nature Conservancy and a grant from the National Oceanic and Atmospheric Administration. Historically found from the shores of Alaska to San Francisco, the Olympic oyster (Ostrea conchaphila) has declined due to pollution and other negative impacts on West Coast bays and estuaries.

Great Bay Estuaries -

Great Bay is a delicacy of nature, one that can only result from a 5,000-year-old recipe mixing fresh water from seven rivers and numerous creeks with salt water from the Atlantic Ocean and the Gulf of Maine. Added in are salt marshes, rocky shores, scattered ponds, rich forests and eelgrass beds.

Great Bay is visible proof of why estuaries are celebrated as one of the most productive environments on Earth.

Prairie Pothole Region - Spanning the U.S. and Canadian border, the Prairie Pothole Region forms the core of what was formerly the largest expanse of grassland in the world. Glaciers receding at the end of the last Ice Age left behind millions of shallow wetlands-so-called prairie potholes-speckled in an endless sea of grass. Over 70% of the wetlands in the Prairie Pothole Region have been drained or severely degraded, and the destruction continues.

Sustainable Architecture and Buildings

This is a hot topic for the 21st century. Engineers and Architects are working to develop buildings that are green. Not the color green, but environmentally friendly. This buildings use less energy, possibly even producing more energy than they use. They use less water, are healthier, and have an overall smaller environmental "footprint" than their predecessors. One way to greenness is longevity. Pictured at left is the Cologne Cathedral. It was started in 1248 and finished in 1880.

What is LEED®?

The Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ is the nationally accepted benchmark for the design, construction, and operation of high performance green buildings.

LEED promotes a whole-building approach to sustainability by recognizing performance in five key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality.

Engineers and Architects are working to implement LEED.

City of Seattle Justice Center -

This building is a 14 story judicial center in the dense urban setting of downtown urban Seattle Washington. It has a number of environmentally green features.

For example, the principal roof areas of the building are designed with a "green" roof with drought-resistant and low-maintenance plants. This concept inherently adds an insulating layer of soil and removes solar heat gain through photosynthesis. It absorbs and stores rainwater and filters pollutants out of the air while returning some oxygen to the atmosphere.

A water harvesting system collects rainwater and stores it for later reuse. Harvested rainwater is used to irrigate plants as needed and to charge the water feature in the landscape design. Using harvested rainwater reduces the building's use of municipal potable water.

Sustainable Factories

Low Imipact MFG

Reduced Impact Green Manufacturing

Engineers, scientists and others work to develop technologies and strategies to create more environmentallly friendly manufacturing processes.

They develop methods to save energy consumption, reduce material usage, and properly handle and recycle manufacturing wastes. A major engineering and business challenge of the future is the design and implementation of large scale “green” processes and methods.

Remanufacturing -

Caterpillar has found a win-win situation in remanufacturing. CAT remanufactures engines and other components used in their products. This reduces the cost of providing solutions to their customer and improves their profits. Not only is it good business, but is much greener than manufacturing new components from scratch. It uses less metal, less energy, less time and less money.

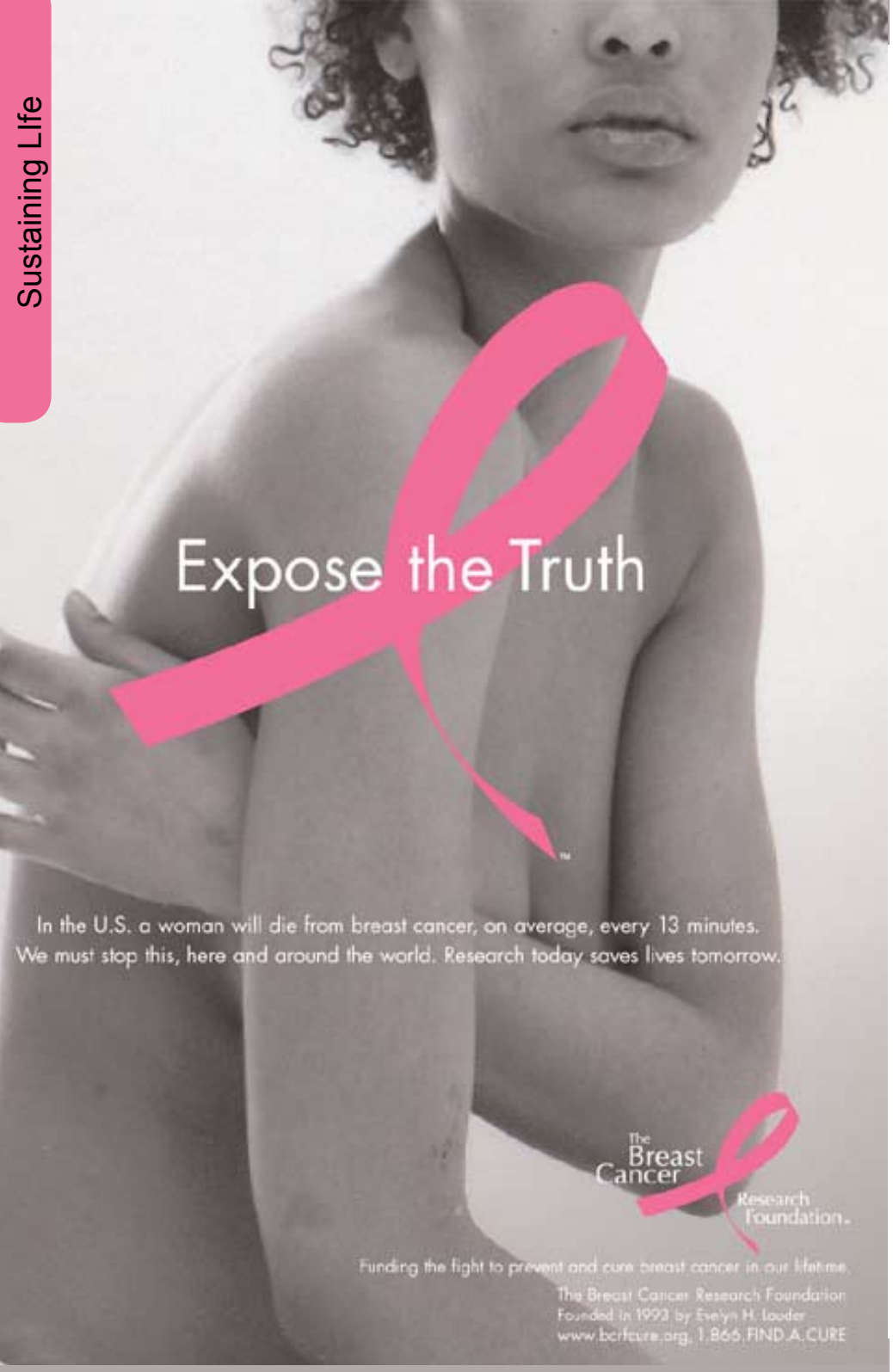
CAT factory at left and engine at right.

Kameyama Japan -

The Kameyama Plant in Japan was recognized for its outstanding environmental sustainability management by being chosen from among 125 applicants for the highest honor, the Sustainable Management Pearl Award, in the 2004 Japan Sustainable Management Awards* (sponsored by the Japan Sustainable Management Awards Committee and Mie Prefecture). Amoungst other features, it recycles it’s water 100% and self generates 48 Million Watt Hours of electricity a year from solar energy.

Texas Instruments -

TI’s newest semiconductor fabrication plant in Richardson, Texas, will require 20 percent less energy per unit of production. “The biggest energy savings come from an efficient cooling system, which will circulate chilled water through the plant for air conditioning, dehumidification and equipment cooling while collecting excess heat to produce hot water and, when necessary, warm the facility. The innovative heat-recovery system replaced four out of the six boilers that normally would have been required for heating.



Finding a Cure

Engineers, scientists and others work to develop new and more effective methods to diagnose, and cure diseases.

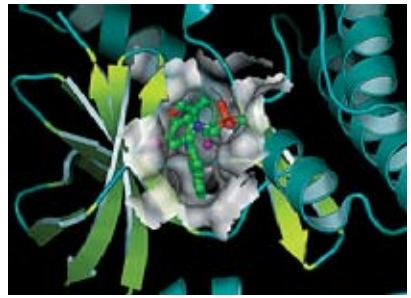
Most engineering disciplines work directly or indirectly to expand the frontiers of medicine. These advances allow doctors to diagnose diseases with a minimum of discomfort. Only a few years ago, this level of diagnostics was unheard of. Other advances are related to new technologies that allow the patient to recovery more quickly after surgery.

Cancer Diagnosis -

Cancer diagnostic tools don't fall out of the sky. It takes a small army of engineers and scientists across multiple disciplines to develop the facilities required to diagnose and treat cancer and other diseases.

Here is a sampling of the disciplines working in this field:

Physicists	Chemists
Electrical Engineers	Mechanical Engineers
Chemical Engineers	Biomedical Engineers
Computer Engineers	Nuclear Engineers

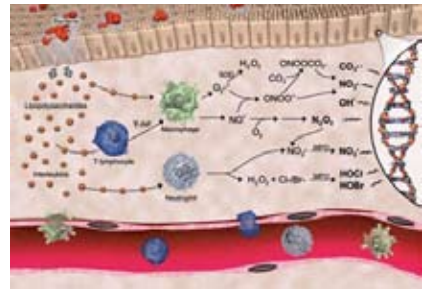


A Trojan Horse -

Glaxo Smiths Cline's "Tykerb" sneaks inside cancer cells before waging its attack on two HER receptors.

Researchers are developing new classes of drugs that act as warriors in the battle to cure cancer.

With the range of treatment options opening up, that in just a few years, breast cancer could be treated with less chemotherapy and getting less toxicity.



Cancer Research -

The Biological Engineering Division at MIT is performing research that may help scientists better understand the chemical associations between chronic inflammation and diseases such as cancer and atherosclerosis. The work could lead to drugs that break the link between the two.

Biological & Chemical engineers working for the cure.

graphic/ Jeff Dixon

Meeting our needs for energy

So Why do we even need energy?

Energy is needed to operate every device that has ever been created. It is needed to heat and cool your home, cook your food, and transport you every where you have ever been.

You even need food energy to get up and walk. It is needed to produce your food and most everything you have ever owned.

Without plentiful supplies of economical energy, life as you know it would cease to exist.

fossil fuels Over 100 million years ago, plants covered much of the land mass on earth.These plants, like corn today, collected energy from the sun, water and carbon dioxide from the atmosphere, and by photosynthesis stored the suns energy, it's light and warmth in the plant matter. Over time, these plants "cooked" until they converted into coal or petroleum oil. Today, we "mine' fossil fuels for our consumptions. One day, it will all run out.

Fossil fuels is a reservoir of energy collected from the sun.

wind energy The sun bathes our planet with light and radiation. All of the energy is collected by the earth and some of it is re-radiated back to outer space by natural processes.

Somewhere in the thermal physics of all this energy striking the earth, it causes the wind to blow.

We are developing wind turbines to collect energy from the wind and produce electricity.

Wind energy is the collection of energy from the sun.

biomass Burning wood in a campfire is man's oldest form of using fuels for heat and light. It is the original biofuel.

When we have a campfire or use wood for heat and/or light, the warmth and light of the sun that was collected while the plant was growing, is released.

Biomass is a reservoir of energy collected from the sun.

solar energy You can collect solar energy to produce warm air, warm water, or PV, photovoltaic electricity. For this discussion, electricity is the method used to transmit energy from one place to another. If you do not use or store electricity when it is created, then you lose it. USE it or LOSE it. That is the way it is. What do we do with this energy? Store it chemically in a battery, or split water and create and store hydrogen.

Solar energy is the collection of energy from the sun.

biofuels We are terribly dependent on fossil fuels. Making matters worse, much fossil fuels of the petroleum oil type isn't very plentiful in the US.

A major trend today is to start using oil substitutes derived from plants such as corn, canola, and other plants.

Biofules collect energy from the sun, water and carbon dioxide from the atmosphere, and by photosynthesis stored the suns energy, it's light and warmth in the plant matter.

Biofuels is a reservoir of energy collected from the sun.

hydrogen Both electricity and hydrogen are energy conveyors. It is a way we transport energy. Gasoline is also an energy conveyor. It conveys energy from the sun of 100 millions year ago to be used now.

Gasoline, diesel fuel, and hydrogen are also places to store energy. They are little energy piggybanks. For the practical purpose of energy independance, electricity isn't storable. It has to be converted into another form.

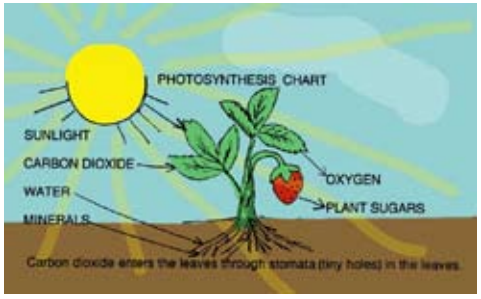
Hydrogen is a place to **store** energy from the sun.

Sustainable Energy

Win $ 25,000,000

Recently Sir Richard Branson of jolly old England was inspired to offer a prize to develop a method to remove carbon dioxxide from the atmosphere.

Reduction -



Sunlight, water, and carbon dioxide combine using a process called photosynthesis to form molecules that store energy. The energy is stored in sugars, starches, oils, etc. A chemist calls the process 'reduction'. Reduction is the opposite of oxidation. All life relies on energy stored through this reduction processes. It is the process that produces our food and oer time our sources of oil and coal.

Factoid - This reduction process removes CO2 from the atmosphere. (hint: this is a big clue to winning the prize)

Oxidation -

When sugar, starch, oil, etc is burned, the process is called 'oxidation'. Oxidation is the reverse of 'reduction'. The process above is reversed. Energy is released in the form of heat. The water and carbon dioxide captured is then released into the atmosphere.

Factoid - This oxidation process inserts CO2 into the atmosphere.

Mega Factoid - Quickly releasing CO2 today that was captured over millions of years long ago, is the primary source of excess CO2. Excess CO2 is one of the major cause of modern day atmospheric change, commonly called global warming.

The Virgin Energy CO2 Challenge

A really great way to handle CO2 is to protect nature, our forests, and streams. Natural habitat is nice to look at also.

To learn more about nature conservance, visit: www.nature.org

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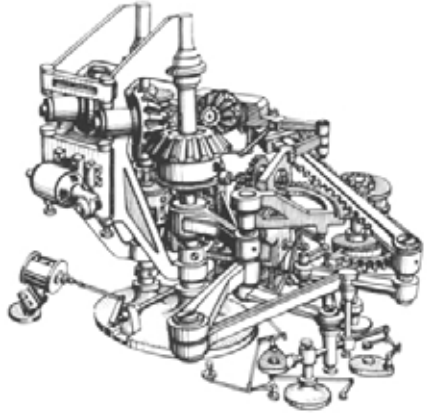
The Kell Challenge -



What if we could solve 2 problems at once.

For example:

When solar energy is collected using solar panels, for many reasons it is difficult to store large amounts of energy for later use or for portable use, such as in an automobile.

What if you could build a mechanism that emulates natural photosynthesis.

What if this mechanism could collect energy from the sun, CO2 from the atmosphere, and water, and combine it to form an oil.

What if this mechanism could collect solar energy that is falling on the roof of your home and school and store it in the form of an oil.

If you could do this safely, economically, and reliably it would be worth 25 trillion dollars. It would simultaneously solve the CO2 problem, the fossil fuel problem, and empty Sir Richard's bank account.

Your assignment -

Your task is to build a solar panel that performs artificial photosynthesis. This panel will cover the roof of your home. It will collect sunlight and combine it with water and CO2 from the air to produce an oil similiar to vegetable oil. The minimum goal is to collect 1 pint an hour of oil (net) off the roof of an average home.

That is all you have to do!

The CO2 prize was inspired in part by the longitude prize of the 18th century, the X-prize of contemporary times, and in part by other unamed sources.

What do scientists do?

Scientists figure out the how and why of the physical and biological universe.

Philosophy -

Once upon a time, we called people that studied science, in particular physics, “natural phlosophers”. They studied non-supernatural, scientific descriptions of how the universe works. Describing the earth as resting upon an infinite stack of turtles doesn’t work or upon 4 elephants at each corner of the world doesn’t cut it.

Today we call these fields physics, chemistry, and so on..

Physicists, Chemists, and others

They study the physical nature of the universe. They answer questions like why does an apple fall when dropped, how hydrogen bonds with oxygen to form water and how airplanes can fly.

They also work with engineers, doctors, and other scientists to help derive solutions to our technical problems.

Biologists, and other life scientists

They answer questions like “why does stinky stink” and how does life propogate itself. They work to understand how bread rises and how cheese gets cheesy. Why trees grow upward and roots grow downward and processes like photosynthesis.

They work to understand life all over the planet. Some to these discoveries lead to innnovations in treating diseases and protecting the environment.

What do engineers do?

Engineers solve problems. Generally they use their skills of analysis, design, and imagination to solve problems. Typically these problems are of a technical or technical related nature. Their work is the bridge between a scientific discovery and the implementation of the science in a product.

Identify a Problem !

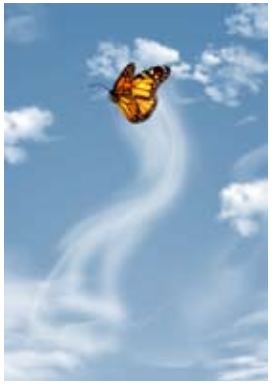
Look at every man made thing in your life. Imagine where it may have come from and how it came into existance.

Most technologies came into existance in order to make our lives more comfortable, or to fufill some human desire. Things like air-conditioning and your portable music device.

What If ?

What if? What if you can take your creativity, your scientific knowledge, your imagination, and create a solution that will make someones life a little easier, a little safer, a little cleaner.

Engineers get to be very creative. Think of engineering as a from of science based art. Leonardo di Vinci was a great artist with the inventive mind of an engineer.



ecomagineering at work

It is a new world. It isn’t enough to simply invent technical solutions to problems. Engineers today have to use their imagination to create solutions to help man, help nature, and help preserve the environment.

Engineering FAQ's

Are all Engineers geeks?

Fact: Being a geek or a nerd is a personal choice. The fact is you can look around and find plenty of examples of geekiness in other professions. No, being a geek isn't necessary.

Doesn't Engineering require a lot of math?

Fact: Many practicing engineers do little more than addition and subtraction. Intensive math is typically done by high powered computer programs.

Why do I have to do all this math?

Fact: In many ways, learning to practice engineering is similar to learning to practice medicine. You are required to learn a lot of stuff, plus you learn how to really analyze a problem. You can't learn to be a real engineer unless you really do the math. Trust us, really.

Do engineers spend all their time building gadgets?

Fact: Many engineers never touch a gadget. Engineering is way more than that. Solving problems doesn't always involve building a gadget.

If engineers are not spending all their time building gadgets, then what are they doing?

Fact: Engineers solve problems. Primarily these are technology related problems, but not always.

Isn't Engineering school is hard?

Fact: If you get accepted to an engineering university, then your intelligence is probably not in question. The next major factor is your willingness to lead a balanced life. If you are willing to work hard and balance that with playing hard, then you can have a rewarding college experience.

Is Engineering school is nothing but study?

Fact: The key is balance. Work hard and play hard. Get involved in intramural sports, even if you are not athletic. Join a music program if you play an instrument. Form a study group that also doubles as a social group. Explore new ways to express yourself and get connected to the university. If you don't attend sporting events in high, then you definitely should attend in college. It is a great way to blow some steam.

What are some good attributes of engineers?

Fact: Analytical skills, imagination,, communication skills, teamwork, integrity, social and environmental consciousness, attention to detail, having a balance view of the world, just to name a few.

What is the most important skill?

Fact: Imagination.

It's Everywhere

Engineering and Science is everywhere. Most people fail to see it, even though it is in front of their eyes.

These engineers and scientists enable technologies that provide safe comfortable homes, nighttime sports and shopping, and durable roads.

They provide solutions for supplying clean safe water and plentiful supplies of food.

They solve problems that provide ever improving solutions for allowing man and nature to coexist.

Today, you can travel more quickly, safely, and efficiently that anyone in history due to engineering of transportation.

The average person can live more comfortably and safely today than ever before.

Robotic Surgery

Vaughn A. Starnes, M.D., is Hastings Professor and Chairman of the Department of Cardiothoracic Surgery, and the Director of Cardiothoracic Residency Training Program at the Keck School of Medicine.

Aside from teaching, Dr. Starnes's conducts many surgeries; most of which concern the heart and lungs. Many of his surgeries are performed using the da VinciTM Surgical System. This system enables him to operates while seatting at a console viewing a 3-D image of the surgical field. He manuvers the machine by using the instrument controls below the display as if he were performing the surgery with his own hands.

Crime Scene Investigator

Gil Grissom is a Crime Scene Investigator in the CBS television show CSI: The job of a crime scene investigator is to evaluate the scene of a crime using various types of scientific equipment and reasoning, and after compiling their findings, they are responsible for compiling detailed reports for law enforcement agencies. About 70% of a CSI's time is spent at the crime scene processing and transporting evidence. Because of the conditions of their job, they must be in good physical condition, and they carry a form of firearms at all times. Crime Scene Investigators spend a great amount of time using different forms of science to achieve their goal of solving the crime.

Astronaut

Astronaut Marsha Ivins graduated from the University of Colorado with a major in space technology. Directly after her graduation, she began to work at NASA's (National Aeronautics and Space Administration) Lyndon B. Johnson Space Center. From the time of the end of her training in 1984, Ivins worked in the areas of Orbiter safety, functional security, space electronics, and avionic software. Since has began her work with NASA, Marsha has spent over 1,300 hours of space time over the course of five space missions.

Environmental Safety

Four billion people globally suffer from chronic waterborne disease, and an estimated 13 million children die annually of diarrhea — conditions linked to a lack of adequate sanitation. Recently, Georgia Tech's All-American wide receiver Calvin Johnson worked with a group of researchers to develop a durable solution to solving this problem. The group Johnson worked with designed an inexpensive dry latrine system that uses the sun's rays to safely transform bacteria-laden waste into fertilizer. Using hot sunlight to kill pathogens. Cool.

Calvin Johnson, Student and Athlete,
Building Construction, Georgia Tech

Toy Story

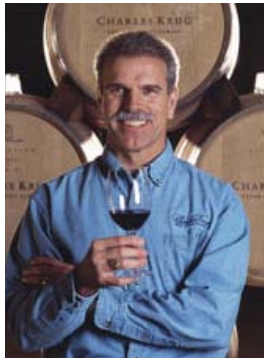
"When I was in high school I read this book called 'The Art of Animation', by Bob Thomas. It's all about the Walt Disney studio and the making of Sleeping Beauty. I read this and it dawned on me - wait a minute, people do animation for a living?" John Lasseter was the director of the popular Pixar movie, Toy Story. Toy Story was the first feature-length completely computer-animated movie released by Disney. His craft is known as an animator. As an animator, John creates 3D animation, or the technique of creating an illusion of movement by using computers. Many common movies today are produced through computer animation such as Bug's Life, Finding Nemo, and Cars, and the job field continues to grow.

Air Sterilization - The Bio-Blower

"Going to the hospital is the fourth biggest killer in this country,"

"We input one million live, active spores of a thermally resistant bacterium into the BioBlower and only one live spore comes out,"

A group of mechanical engineers at the University of Buffalo has developed a system to defeat pathogenic spores on a large scale. This device can eradicate greater than 99.9999 percent of the spores of an anthrax surrogate in an airstream, according to the researchers. This machine could potentially purify the air for an entire hospital, transforming the facility into a sterile isolation unit.



Wine Making

There is no name in California winemaking more steeped in tradition than “Mondavi,” yet at the Charles Krug Winery in St. Helena, Calif., co-proprietor Peter Mondavi Jr. is not resting on any laurels. Under his guidance the winery is making major changes, not only in the way it grows grapes but also in the grapes it grows. At this family-owned winery, Peter Mondavi Jr. is focusing on Bordeaux reds and is integrating some high-tech engineering into what remains a fine and traditional art.

He received his BS Mechanical Engineering, a MS Industrial Engineering & Engineering Management and an MBA from Stanford University

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Screen Actress and Engineer

Hedy Lamarr and composer George Antheil received U.S. patent #2,292,387 for their Secret Communication System. This early version of frequency hopping used a piano roll to change between 88 frequencies and was intended to make radio-guided torpedoes harder for enemies to detect or jam. After 1962 the military took this idea as a basis for a secret method of communications using spread sprectrum. It took electronics technology a long time to catch up with the concept. Lamarr’s frequency-hopping idea served as the basis for modern spread-spectrum communication technology used in devices ranging from cordless telephones to WiFi Internet connections. In 1997, the two of them received an EFF Pioneer Award for the invention.

Basketball

Charmin Smith of Stanford University is the womens basketball coach.

She has appeared in three Final Four rounds of the NCAA Tournament as a player and is an assistant coach for the highly ranked Cardinal women’s team. In the interim she spent several years playing in the WNBA, two years working for the NBA and a year as an assistant coach for the Boston College Eagles.

She is a bonafide Civil Engineer and uses the skills she learned as a student and engineer to build and manage teams, solve problems and promote the growth and capabilitis of the Stanford Womens Basketball Team.. She received her Civil Engineering from Stanford University.

Meterology

Dr. Heidi Cullen is the climate expert at The Weather Channel Dr. Cullen, a scientist of international standing in climate research on the staff of The Weather Channel, is helping to build the company’s climate program through the development of new products and the strengthening of relationships within the scientific community. She appears on-the-air in special reports and documentaries such as “Extreme Weather Theories” where she examined global warming and possibilities of significant changes in the world’s climate. She received a B.S. in Engineering/Operations Research from Columbia University in NYC and went on to receive a Ph.D. in climatology and ocean-atmosphere dynamics at the Lamont-Doherty Earth Observatory of Columbia University.

Student

I am Amanda Andrikopoulos, a junior in industrial engineering. I am from Billings, MT. When I came to Montana State University, I didn’t know what I wanted to do with my education. I started in general engineering because I like challenges and heard that engineering is one of the most difficult and demanding majors. However, I wanted to major in everything—psychology, physics, calculus, sociology, and English. My advisor at the time was an industrial engineer and he steered me toward IE. The field fits me well because it involves the social sciences and the physical sciences, as close as I can come to really majoring in everything. In my free time, I play the violin. I have played for over 10 years and in high school, played in the Billings Symphony.

Radiology

Sonny Patidar, M.D. is a board certified radiologist working at Massachusetts General Hospital. As a physician of medical imaging, or radiologist, he uses digital imaging to examine areas of the body that are not visible externally. These images are used to diagnose and examine diseases as well as in research to understand many processes in living organisms. Along with medical practices, the process involves solution to inverse mathematical problems. This states that they find out the cause of a problem from the effect. Many different aspects of math and science are combined in this field of medicine. He received his Electrical Engineering from Boston University

Ooh Rah

Rear Admiral Richard Barror is the Chief Engineer of the U.S. Public Health Service Commissioned Corps. The corps is one of the federal government's seven uniformed services and has an inherently humanitarian mission across the country and around the globe. Responsible not only for environmental health and hospital construction, but also disaster and terrorism response, Public Health Service engineers have been on the scene to help people weather some of the most significant emergencies in recent memory. Admiral Richard Barror graduated with a degree in Civil & Environmental Engineering from Stanford University.

Houston, We have a Problem

Phil Engelauf is the chief of the flight directors at NASA, meaning that the people on the ground responsible for directing space shuttle and International Space Station missions report to him. If you haven't already, you can see the job depicted in Ed Harris' portrayal of Gene Kranz in the 1995 movie *Apollo 13*. Phil Engelauf, MSAA, Stanford University

Washington, We have a Problem

At present, only about 2 percent of cargo containers that cross U.S. borders are searched or inspected.

"Our X-ray systems will X-ray...large cargo coming into the country, to look for contraband and weapons of mass destruction. Right now, very few companies have the technology to do that."

Nuclear Engineer Dolan Falconer is a cofounder of an Atlanta based company called ScanTech. Their technology uses radiation scanning technologies to search for things that are not helpful to society. Falconer has a BS and MS degree in Nuclear Engineering from Georgia Tech.

Cancer Detection

University of Michigan Professor Joerg Lahann and graduate student, David Peng, are developing a device detect cancer by testing your breath

Theoretically, a woman could breathe into an over-the-counter device and cancer-indicating metabolites would be attracted into the nanopockets, thus causing the pored surface to fill and become dense. Then, an electrical charge would be applied so that the straight particles would bend, thus ejecting the metabolites so that multiple tests could be done in the same device.

Chemical Engineering at the University of Michigan

Working to Cure Cancer

Dr. Julie Gralow is a breast cancer specialist and academician. Her time is split between patient care, education, and clinical research. She is the principal investigator on several clinical trials related to breast cancer prevention and treatment, and is committed to patient education, outreach and wellness. She is co-author of "Breast Fitness: An Optimal Exercise and Health Plan for Reducing Your Risk of Breast Cancer".

Julie Gralow, MD
Biologic Sciences, Stanford University
MD, UCLA

Engineering to Cure Cancer

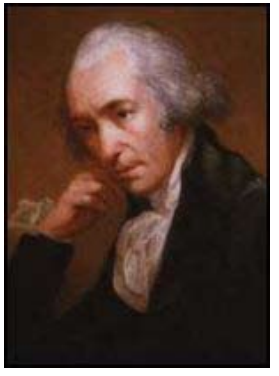
Katherine Ferrara , professor and chair of biomedical engineering, at UC Davis has been developing sensitive methods to image bubbles with ultrasound as they move into the capillaries of breast and prostate tumors. This will non-invasive methods to accurately map tumors. If you can map a tumor, then you can determine if all the cancer has been killed or removed. Katherine received here Ph.D in Electrical Engineering and Computer Science from the University of California, Davis.

Scotty the famous Scot

Scott, known as “Scotty” as well as “the miracle worker” to his longtime comrades James T. Kirk and crew, was the chief engineer aboard the original U.S.S. Enterprise and its successor craft who resurfaced 75 years after his presumed loss en route to the Norpin Colony in 2369 — perhaps his biggest miracle of all. Bullish on his Scottish ancestry, he wears ceremonial kilts with his dress uniform, plays the bagpipes and is renowned for his love of Scotch and his beverage collection from all parts of the galaxy.

Although Scotty was never married, he became involved with fellow crew member Mira Romaine in 2269 until she was transferred to Memory Alpha soon afterward. In later years Uhura expressed an interest in romance, but they never got together seriously. From the fictional television series “Star Trek”

Watt the Scot



A Scottish instrument maker, mechanical engineer and inventor, who contributed to the Industrial Revolution with his improvements of the steam engine. James Watt was born on January 19, 1736, in Greenock, Scotland. At the age of 17, while becoming intrigued with Thomas Newcomen’s steam engine, he decided to become a maker of mathematical instruments. Later he became interested in improving the Newcomen-Savery steam engine. James Watt was sometimes mistaken by the actual creator of the steam engine. This was due to the great contributions he has done on the development of this device. The Watt, the electrical unit (or unit of Power), was named in his honor. Besides being an inventor and a mechanical engineer, Watt was also a civil engineer.

Who Is Scottie Mayfield?

Scottie Mayfield is the president of Mayfield Dairy Farms and the fourth-generation Mayfield to run the family business. It all started in the 1920s with T.B. Mayfield, Jr., who passed the business on to his sons Tom and Scott Mayfield, who then passed it on to their sons, Rob and Scottie. Rob is currently vice-president of Mayfield. Scottie has worked at Mayfield Dairy since 1961 and has served as president since 1995. If Scottie looks familiar to you, that’s because he is the star of the Mayfield television commercials. Look for Scottie and his signature bow-tie on television and in newspapers very soon! Scottie graduated with a degree in management from Georgia Institute of Technology.

Roads?
Where we’re going, we don’t need roads.

This is Dr. “Doc” Lathrop Brown, inventor of time travel, made possible by his invention of the flux capacitor. From the popular fictional hollywood movie, “Back to the Future”. Getting “Back to Reality”, Hollywoods depiction of real engineers and scientists isn’t very accurate. They do get to be creative and inventive, but otherwise live lives as humdrum normal people with spouses, children, and a pet dog.

One Potato, Two Potato

Sommer Gentry, an applied mathematics professor at the U.S. Naval Academy, has been interested in applying optimization to scientific and medical problems since she was a student at Stanford. she co-developed The “Optimized Match” system they developed to increase the number of kidney transplants was published last year in the *Journal of the American Medical Association*. Now the couple is advocating a national registry that can find the maximum number of potential matches. She received a degree in Math and Computational Science, Operations Research from Stanford University.

Wind Energy

Jennifer Hornemann graduated from Nacogdoches High School in 1995. She graduated with a B.S. in Physics from Stephen F. Austin State University in 1999 and a M.S. in Chemical Engineering from University of Arkansas in 2000. In 2001, she started with GE as a design engineer at the Gas Turbine facility in South Carolina. In 2003, she transferred to GE Wind Energy in California to work as a field engineer. Currently, she continues to work part-time for GE as a project engineer while attending MSU full-time to complete a PhD in Chemical Engineering.

Project Management

I am the construction manager for the Woodrow Wilson Bridge Project, which will carry Interstate 95 and I-495 traffic across the Potomac River just south of Washington DC. The massive, $2.4 billion project is currently the largest active public works project in the nation. It is so large that it was the subject of a recent Discovery Channel "Extreme Engineering" documentary. This is "extreme project management". Jim Ruddell received his Civil Engineering degree from Stanford University

Education and Management

Douglas R. King is president and CEO of the St. Louis Science Center, one of the nation's biggest science museums. More than a million visitors come to the free museum each year to learn about life sciences, aviation and other topics in science and technology. Ultimately, he has launched himself on a different mission: promoting science education and careers. There are a lot of ways for young scientists and engineers to reach for the stars. Douglas R. King has a BS in Engineering from Stanford University

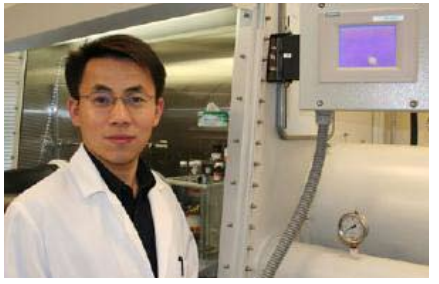
Sports Engineering

Karin Carter is a materials designer on the Advanced Innovation Team in Nike's apparel division near Portland, Ore. Her job is to look around the world for materials and to conceive how they could make cool products, either because they offer a performance benefit to an athlete, enhanced environmental sustainability or, ideally, both. Whether with lasers or scissors, she literally works at the cutting edge of sports fashion.
Karin Carter,
Product Design Engineer, Stanford University

Pixar Animation

He is a cofounder of Pixar studios with recognition awards from National Acaden Engineering and the Academy Awards for innovations in digital graphics, and animation technologies. career straddled the worlds of art and engineering as he made his way from studying parallel computing at Stanford to pioneering computer graphics at Xerox PARC, to working for George Lucas, and then founding Pixar. Alvy Ray Smith received a degree in Electrical Engineering Stanford University

Nanotechnology



Assistant Professor Jianjun Cheng is a researcher at The University of Illinois at Urbana-Champaign. The nanotechnology his team is working on will allow doctors to release cancer-killing drugs inside tumors, while leaving the rest of the body unscathed. Cheng received his BS in chemistry from Nankai University, China, and his MS in chemistry from Southern Illinois University and a PhD in materials science from the University of California, Santa Barbara.

The Yellow Line

As Chief Scientist of Sportvision, Rick Cavallaro is involved in all of the company's technology functions, including research & development, testing, television field operations and project management. Rick has led and/or contributed to the development and deployment of enhancements for every major sport on every media platform. In other words, Sportsvision puts down the yellow line. Rick currently holds 20 patents in the area of computer enhancement of live sporting events, as well as a B.S. in Aerospace Engineering from Ga. Tech and an M.S. in Dymanics and Controls from U.C.L.A.

Name: George P. Burdell
(Buzz the Mascot is pictured)
Major: Most Enginering Georgia Tech, 1930

George P. Burdell is a fictitious student officially enrolled at Georgia Tech in 1927 as a practical joke. He remains enrolled today. The credit for the origins of Burdell go to William Edgar “Ed” Smith, BS 1930. George P. Burdell was born when Ed received two enrollment forms for Georgia Tech. The exact origin of George Burdell’s name is still hazy, but Smith said that he originally intended to enroll his high school principal, George P. Butler. He decided against it and changed the last name to Burdell.

After being enrolled, Burdell signed up for all the same classes Smith did. And Smith would do everything twice, changing it slightly to avoid professors catching his sham. When he had a test, he would take it twice and then turn it in under both names

By 1930 George had earned his bachelor’s, and only a few years later received his master’s degree. He became an official alumnus, even though he has remained an active student ever since.

George P. Burdell was listed on MAD Magazine’s board of Directors from 1969 until 1981. Also, when TIME magazine was attempting to select their person of the year for 2001, George Burdell was the leading candidate (holding at least 57% of the votes) until the magazine removed him from the running.

He is a campus icon, and his name is revered among the students on campus. Incoming freshmen are introduced to him as one of the greatest alumni to graduate from the school. To this day, stories fly around campus of where George will appear next. George P. Burdell is often paged by students during football away games at rival universities. Georgia Tech students or alumni often use his name as an alias when they do not want to disclose their real name.

Name: Megan Clarke
Major: Electrical Engineering, Clemson University, ‘06

Megan Clarke entered Clemson because of it’s good reputation for engineering. She decided on electrical engineering her freshman year, because as she said, “We had to build a robot that could navigate a track and pick up golf balls for my Honors engineering class. I wired the breadboard used in the controls of the robot. It was very satisfying to accomplish something real as a freshman.”

Megan’s desire to accomplish things was just beginning. She became involved with research while still an undergraduate. For Megan, research “was definitely one of the best experiences I had as an undergraduate.” She explained her reasoning for this - “Most of the ECE curriculum is planned, and unless you decide you want to go into circuits or electronics, there is not a lot of in depth expansion on outside topics. If you find you are interested in an area outside of those, or even within those, research is a great way to get into the material more and see if that really is where your career path may lead. It is also a great way to get to know a faculty member outside of the classroom and maybe even determine if they may potentially be a good advisor in graduate school should you choose to continue your education.”

Megan will always have many memories of her undergraduate years at Clemson and will likely make many more during her time as a graduate student. “Some of my best times as an undergraduate were spent on the top floor of Cooper (library) studying, laughing, joking, and hanging out with my ECE friends. The work is always more fun if you have a great group of people to help you get through it.”

Universities

Name: Ginger Moored
Major: Aerospace Engineering, University of Virginia (‘02)

At age 20, as an aerospace engineering major from Elkton, Va., Ginger Moored was one of the first Science and Technology Policy Washington, D.C., interns. During her internship with the U.S. State Department, she researched civilian space travel, summarizing potential issues of a prospective space travel industry: Are there going to be ownership rights? Jurisdiction issues? Will new laws be needed?

Following graduation, Moored returned to D.C. to teach high school physics with Teach for America. “Every day I’d see how much poverty affected my students,” she recalls, reflecting on her ongoing interest in social inequalities.

Her education-especially the internship-reinforced her belief that “policy serves as a vehicle for change.” She’s now enrolled in a two-year master’s degree program in public policy at Princeton University, and hopes to work in urban community development.

UNIVERSITY of VIRGINIA

My name is Sydney Arthur and I grew up in Bozeman, MT. This is my 3 rd year in Civil Engineering. The reason I chose Engineering was because I love Montana’s mountains and streams and wanted a Job that would let me stay here while still making a decent living. Also, I would rather work problems out, then reading boring textbooks.

I am not going to lie to you and say it has been great. It has been hard, and it will be hard for you. The hardest thing for me was not letting a grade be the determination of my worth as a person. Sometimes as women we take it personal. A 50% on a test does not mean you are a below average person. You can still be an incredible women no-matter what number your professor puts on your test. Rise to the challenge, and you will receive the reward you deserved in the end for your hard work.

My advice to you: don’t over load on credits (take your time), and get involved on your campus. Get involved in study groups and tutoring sessions, they really help because you realize you are not alone and your questions do have answers. Also, in extracurricular activities you will gain leadership qualities, and you will have a support team to hold you accountable when you want to give up. It’s college, so have fun and grab hold of the opportunities that you only have in that college environment (join organizations, study abroad, hike a mountain, take a fly fishing class).

MONTANA STATE UNIVERSITY

FIRST Robotics

FIRST®

For Inspiration and Recognition of Science and Technology

"... to create a world where science and technology are celebrated....where young people dream of becoming science and technology heroes..."

Dean Kamen, Founder

FIRST LEGO League

The FIRST LEGO® League (FLL) introduces children, ages 9 to 14, to the fun and excitement of solving real-world problems by applying math, science, and technology.

FLL engages teams in authentic scientific research and hands-on robotics design using LEGO MINDSTORMS® technologies and LEGO bricks.

Teams compete in a friendly, FIRST-style robotics event specially designed for their age group.

FIRST Vex Challenge

The FIRST Vex Challenge (FVC) is an intermediate-level robotics competition targeted toward high-school aged students.

It offers the traditional challenge of a FIRST competition but with a more accessible and affordable robotics kit.

The ultimate goal of FVC is to reach more young people with a lower-cost, more accessible opportunity to discover the excitement and rewards of science, technology, and engineering.

FIRST Robotics Competition

The FIRST Robotics Competition is an exciting, multinational competition that teams professionals and young people to solve an engineering design problem in an intense and competitive way.

The program is a life-changing, career-molding experience—and a lot of fun.

In 2007, the competition will reach over 30,000 high-school-aged young people on over 1,300 teams in 37 regional events.

www.usfirst.org

Get Involved

www.usfirst.org

Gracious Professionalism

A Study in Integrity

Robert Tyre "Bobby" Jones Jr. was one of the greatest golfers who ever competed on a national and international level. Until John Glenn, he was the only person ever to receive two ticker tape parades in New York City, the first in 1926 and the second in 1930. Jones was not only a consummately skilled golfer, but he also exemplified the principles of sportsmanship and fair play. Bobby Jones was one of the founders of The Masters Tournament, first played at Augusta in 1934. From the time he win the US Open in 1923 through his 1930 victory in the U.S. Amateur he won 13 Major Championships (as they were counted at that time) out of twenty attempts, ranking him behind only Jack Nicklaus' 20 wins and Tiger Woods' 15 wins (if you count their US Amateur championships). Jones was the first player to win The Double, both the US Open and The Open in the same year (1926). He is still the only player ever to have won the Grand Slam, or all four major championships in the same year. He represented the United States in the Walker cupfive times, winning nine of his ten matches. He also won two other tournaments against professionals: the 1927 Southern Open and the 1930 Southeastern Open.

In the beginning of his amateur career, he was in the final playoff of the United States Open. During the match, his ball ended up in the rough just off the fairway, and as he was setting up to play his shot his iron caused a slight move of the ball. He immediately got angry with himself, turned to the marshals, and called a foul on himself. The marshals discussed among themselves and questioned some of the gallery if anyone had seen the foul. Their decision was that neither they nor anyone else had witnessed any foul, so the decision was left to Jones. Bobby Jones called the foul on himself. The marshal announced that Bobby Jones commanded an extremely high level of integrity, and that he was to be highly commended for this. Jones replied, "Do you commend a bank robber for not robbing a bank? No you don't. This is how the game of golf should be played at all times." Jones would lose the match by one stroke. The United States Golf Association's sportsmanship award is named the Bob Jones Award. For more information visit www.bobbyjones.com. From Wikipedia, the free encyclopedia.

Robert Tyre "Bobby" Jones Jr,
BS Mechanical Engineering, Georgia Technology,
BS Literature, Harvard University
Emory University Law

Recycling

The Call2Recycle program collects used cellular phone and rechargeable batteries to benefit the environment and charitable organizations. Call-2Recycle recycles Nickel Metal Hydride (Ni-M H), Nickel Cadmium (Ni-Cd), Lithium Ion (Li-ion), and *Small Sealed Lead (Pb) batteries found in cellular and cordless phones, cordless power tools, laptop computers, PDAs, two-way radios, camcorders and remote control toys. Alkaline, lithium or non-rechargeable batteries are not accepted for recycling.
All cell phone makes and models are also accepted for recycling.

Visit **www.call2recycle.com** to find drop off location near you.

Emas National Park, Brazil
© Scott Warren

Recycling

Kell High School Robotics TEAM #1311

Interstate Batteries and Kell Robotics TEAM #1311 is pleased to announce a pioneering recycling program for the sealed lead acid batteries used in the FIRST robotics program. Interstate Batteries will accept sealed lead acid batteries used in the FIRST robotics program at no charge. These batteries will be recycled in an environmentally sound manner. This is another way that you can help the environment.

Rules and Regulations: Interstate Batteries will accept sealed lead acid batteries used in the FIRST robotics program at no charge.

These batteries must be delivered one of the 300+ Interstate Batteries distributors (not dealers) .
To find the distributor nearest you go to:

http://www.interstatebatteries.com/www/distributors/us_distributors.asp

The Human Element

Who has built more than 200,000 houses, providing for more than 1 million people, in nearly 100 countries around the world?

Who provides low cost no-profit loans to help deserving people buy clean decent shelter?

Who helps all people, regardless of race, religion, ethnicity, or any other difference to obtain decent shelter?

Habitat for Humanity®

Get Involved Now !

Donate
Your Gift of funds helps families around the world build decent shelter.

Volunteer
Working with Habitat locally helps families in your community. Goto www.habitat.org/local for information about your area.

Travel
Volunteer around the world to help families build houses and hope.

Habitat for Humanity serves homeowners selected on their need for housing, their ability to repay their mortgage and their willingness to work in partnership with Habitat. Habitat does not discriminate on the basis of race, religion or national origin.

www.habitat.org

Habitat for Humanity Youth Programs

Habitat for Humanity Youth Programs has programs that are for three age levels.
These age levels are:
Ages 5-7: Habitat Trekkers
Ages 8-13: Habitat Street Team
Ages 14-25: T^2 (Today and Tomorrow)

Act! Speak! Build! Week is a worldwide, student-initiated week of advocating for affordable housing. The program empowers young people to educate themselves and their communities and to move people to social action.

Campus Chapters are a student-run, student-initiated organization that partners with a local affiliate to: build or rehabilitate houses in partnership with Habitat affiliates and works to promote the mission Habitat for Humanity.

Collegiate Challenge is a weeklong service program that provides high school and college students (ages 16 and older) with the opportunity to spend their school breaks working with more than 250 Habitat affiliates throughout the United States.

The International Youth Programs team works with young people and Habitat for Humanity national organizations all around the world.

The Summer Youth Blitz is a unique service experience for a diverse group of youth from high schools and youth organizations around the United States. This program involves youth from various backgrounds who come together to work on a Habitat home. They also participate in evening activities that center on tolerance, the cycle of poverty, peer leadership and issues of social justice.

Habitat for Humanity Youth Programs

The Youth United community youth together to fully sponsor and build a Habitat home with a local family. The youth are the leaders, planners, fund-raisers, public relations specialists and builders.

How can youth under 16 get involved? Through Habitat for Humanity, young people of all ages have the opportunity to put faith into action, work in partnership with a diverse group of people and make a positive difference in their own communities.

Although Habitat for Humanity's safety requirements prevent people under the age of 16 from participating in general construction activities, there are many different ways that younger youth can participate.

Contact your local affiliate to find out about local opportunities for youth volunteers. You can find the contact information for the Habitat affiliate nearest you online at www.habitat.org/local

www.habitatyouthprograms.org

Democratic Republic of Congo (formerly Zaire):
Bricks for this house are made from a Cinva-Ram press, which compresses a mixture of cement and dirt or clay in a metal box to form bricks. The bricks dry in the shade for about two weeks. Spaces are left above both the interior and exterior walls to improve ventilation.
Average house cost: $2,545 (U.S.)

Papua New Guinea:
Due to heavy rains, houses are built on stilts to keep the house dry. The area under the house is used for storage, community gatherings and livestock. Concrete is expensive and not widely used in PNG, so wood is treated to prevent decay and termite infestation.
Average house cost: $2,304 (U.S.)

Habitat Homes from Around The World

Guatemala:
Houses made of hollow concrete blocks are designed to resist earthquakes. Steel rods reinforce the wall every meter. The spaces around the rods are filled with concrete. Horizontal rods are run through U-blocks at the foundation, window sill and top. The window coverings and door in this photo are wood; however, metal is used in some areas where wood is more expensive.

India:
Meals and socializing occur on the porch. The high entry step is believed to keep snakes from entering, and the bars on the windows protect from thieves and monkeys. Houses are built of fired bricks for walls and steel-reinforced concrete roof slabs. Some houses are made with hollow-core concrete blocks and tile roofs.
Average house cost: US$1,793 (U.S.)

Kell High School Robotics Team #1311 Teams Up With General Electric and Habitat

Catherine White is a hard worker. Even though she is physically challenged, she works at the local VA hospital as a switchboard operator. After being turned down by several conventional mortgage companies, she approached Habitat to ask for help to purchase a home. After a rigorous approval process by Habitat, she was approved for a no-interest loan to purchase a Habitat home. The price of the home is reduced because of the sweat equity Catherine and the volunteers.

This major volunteer work on this house came from General Electric employees in the Atlanta area. The Kell robotics students teamed up with the GE employees and got to work. On the first day the Kell students arrived at the site, there was a good deal of apprehension about how to go about building a house. This quickly evaporated as the groups split up and teamed up with experienced task leaders.

The day had been running smoothly which left everyone anxious to return to work. However, as the team headed back, a new challenge arose as the mercury heading toward the 100º mark. Undeterred the days tasks was completed. The floors were laid, the cabinets hung, the walls coated, and the day slowly came to an end.

When Kell traveled to the site for the second time, spirits were high. This would be the last day of the build and everyone was ready to see all of the aspects of their hard work come together. The day would consist of tying up all of the loose ends of the home; from the painting to the caulking to the minor landscaping left outside.

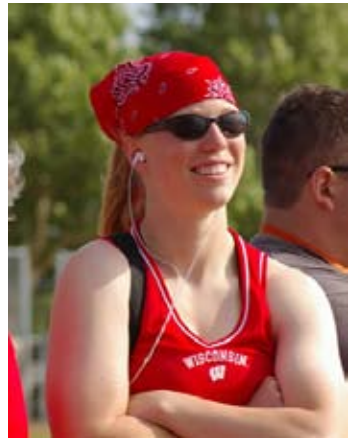
At the end of the experience, one person had gained a home, and all of the individuals that partook in the experience gained something of their own. With the knowledge and satisfaction of their contribution, the Kell Robotics Team hoped that they would be able to continue making their lasting mark on the world around them. They had changed someone's life and gained an uplifting knowledge that if they worked towards something, they could change the world one person or community at a time.

"It was great experience for all of us and we were very happy to help out. It was a reminder that there are many other people in similar situations and that they always needed someone to help them." –Frank Grant Jones III

Concrete Canoe Racing

Who says engineers don't know how to have fun. Each year college students participate in an annual concrete canoe competition sponsored by ASCE, the American Association of Civil Engineers.

The New Mexico State University Concrete Canoe Team



University of Wisconson

Kelly Austin of the University of Wisconsin - Madison is a force to be reckoned with. Once you wipe that silly little grin off her face it's all grit and gusto. She aims to bench twice her weight this year, and have a cross bow that pretty much tears the bow of the canoe off. Watchout!

Circular Kinematics at MIT

Amazing paddling by the crew of University of California

Monarch Butterfly

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Return it to a Guidance Counselor,
Or Teacher when you are finished.