



ELEKTOR

S V COLLEGE OF ENGINEERING

CONTENTS

ARTICLES

CURRENT EEE

MEGA MINDS

E-NEWS

IGNITE YOURSELF

EDITORIAL BOARD

Dr. P.SELVA RAJ

Mr. P.VINOD KUMAR

DESIGN DEPARTMENT

VISHNUVARDHAN

K HEMANTHKUMAR

N PUNEETH KUMAR

THOTA GIRESH

Vision of the Department

To prepare the learners globally competent, dynamic and multi talented young leaders with skill set & knowledge in Electrical and Electronics Engineering field with a focus on higher education, professional practice, research and technical consultancy competence ethical concern.

Mission of the Department

- ◆ To prepare the learners professionally deft and intellectually adept in the field of Electrical and Electronics Engineering with an excellent infrastructure, core values and qualified & experienced teaching faculty.
- ◆ To inculcate skill, knowledge and behavior to cater the dynamic requirements in the field of Electrical and Electronics Engineering.
- ◆ To motivate and prepare the learners for career guidance, placements and higher education with a focus on MoUs with premier institutes and industries.

Program Educational Objectives (PEOs)

PEO1: Solve challenging technological issues in the field of Electrical and Electronics Engineering for the betterment of the living standards of the society as valuable and productive engineers.

PEO2: Improve the efficiency and effectiveness of the existing methodologies by adapting out-of-the-box rationalized thinking.

PEO3: Function ethically and communicate professionally as a team member within multi-disciplinary teams.

PEO4: Continue the process of lifelong learning to cater the dynamically changing requirements in the field of Electrical and Electronics Engineering.

Strengths of the Department

1. In every semester Department of EEE conducts minimum of two workshops and there guest lecturers in the recent trends in Electrical Engineering to bridge the gap between Academics & Industries, and the students will be guided to do their Major & Minor projects on the same topics.
2. Every faculty member of the department attends a minimum of one faculty development program in every academic year. And most of the faculty members register for NPTEL online courses.
3. Department publishes a newsletter in every six months, which includes the activities that were done in the past two months; fortnight wall magazines based on recent advancements in the field of electrical engineering prepared by students

Message from Principal

“The mind is not a vessel to be filled, but a fire to be kindled.” Said Plutarch.

I congratulate the staff and students of all faculties who used various mediums of expression to present their ideas. As long as our ideas are expressed and thoughts kindled we can be sure of learning, as everything begins with an idea. I appreciate every student who shared the joy of participation in co-curricular and extracurricular activities along with their commitment to curriculum. That little extra we do, is the icing on the cake.

Do more than care – help
Do more than dream – work.
Do more than forgive – forget
Do more than be fair – be kind
Do more than believe – practice
'Do more than belong – participate

Just as our mother earth gives us more and more, ELEKTOR will enable our learners to give and get a little more of learning.

Happy Reading!

Dr. N. Sudhakar Reddy, Principal

Message from HOD

It gives me immense pleasure to pen a few words as prologue to the technical magazine ELEKTOR of the EEE department. This issue is designed to present the write-ups regarding topics related to electrical engineering, self development and the scientists introduction etc which makes the issue resourceful and informative. I congratulate all the contributors all the contributors and also the editorials board for bringing out such a nice issue.

Happy Reading.

Dr. K. Sudheer, HoD, Dept. of EEE

ARTICLES

SOLAR BALLOON

Cool Earth created an innovative way to harness the sun's energy. Instead of large expensive solar panels or costly concentrating mirrors, the company is using balloons made of metalized plastic films. Half of the balloon is transparent, letting the light in to be concentrated into a small high-efficiency solar panel by the concave interior.

Each is two meters across and, depending on the source, estimates vary from 500 watt to 1 kilowatt. They are supported by cables, leaving the ground below clear and limiting environmental impact. This breakthrough solar technology can ultimately produce enough clean energy to address the global energy crisis.

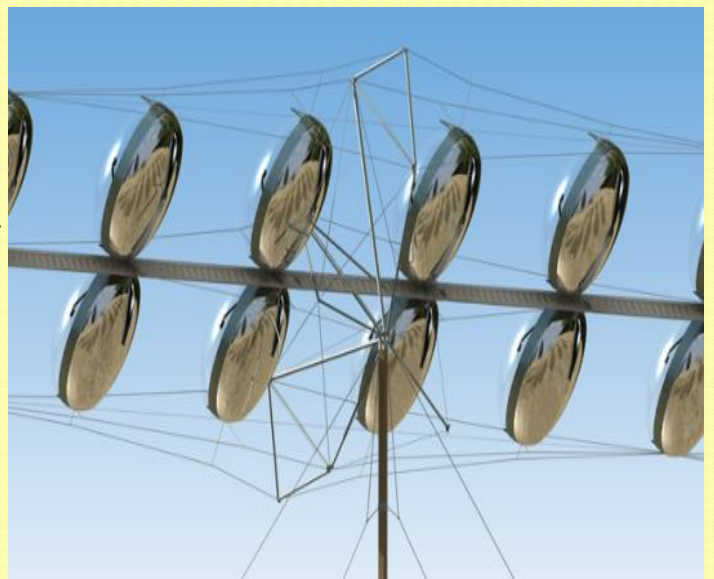
This patented concentrated photovoltaic (CPV) technology dramatically reduces the cost and time to develop solar power plants capable of generating massive amounts of clean energy at prices competitive with fossil fuels.



Cool Earth Solar Getting Started on an Idea

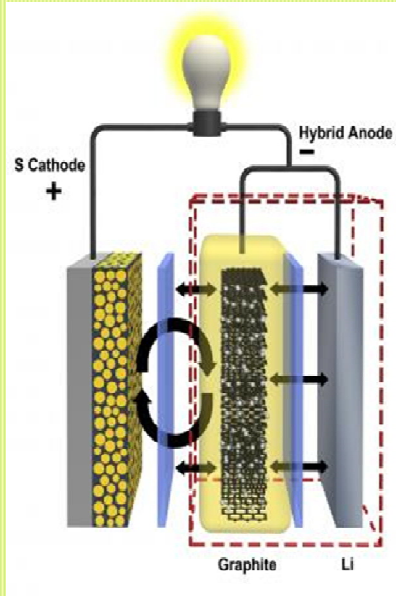
The team didn't want to just take a product that's already out and improve it or tweak it and try to make a lot of money by going just one step further. Instead, they wanted to solve a major problem shared by everyone on earth.

They focused the majority of their brainstorming time coming up with how to define the problem. They wondered, is it green house gases? Is it energy security? Is it electricity demand? Looking at overarching problems and figuring out what is really needed helped them to develop the technology.



Battery development may extend range of electric cars:

A "hybrid" anode developed at the Department of Energy's Pacific Northwest National Laboratory could quadruple the life of lithium-sulfur batteries. Nature Communications published a paper today describing the anode's design and performance. "Lithium-sulfur batteries could one day help us take electric cars on longer drives and store renewable wind energy more cheaply, but some technical challenges have to be overcome first," said PNNL Laboratory Fellow Jun Liu, who is the paper's corresponding author. "PNNL's new anode design is helping bringing us closer to that day."



Today's electric vehicles are commonly powered by rechargeable lithium-ion batteries, which are also being used to store renewable energy. But the chemistry of lithium-ion batteries limits how much energy they can store. One promising solution is the lithium-sulfur battery, which can hold as much as four times more energy per mass than lithium-ion batteries. This would enable electric vehicles to drive longer on a single charge and help store more renewable energy. The down side of lithium-sulfur batteries, however, is they have a much shorter lifespan because they can't be charged as many times as lithium-ion batteries.

FLYING ELECTRIC CAR:

A **flying car** in science fiction and fantasy is a personal aircraft that would provide door-to-door aerial transportation (e.g., from home to work or to the supermarket) as conveniently as a car but without the requirement for roads, runways or other specially-prepared operating areas. Such aircraft would lack visible means of lift (unlike fixed-wing aircraft and helicopters) so that they could be operated in urban areas and close to

buildings, people and other obstructions. The term "flying car" has also been used to refer to roadable aircraft and hovercars. Here we are, less than a month until the turn of the millennium, and what I want to know is, what happened to the flying cars? We're about to become Americans of the 21st century. People have been predicting what we'd be like for more than 100 years, and our accoutrements don't entirely live up to expectations. (...) Our failure to produce flying cars seems like a particular betrayal since it was so central .



As a result, flying cars have also been referred to jokingly with the question "Where's my flying car?", emblematic of the supposed failure of modern technology to match futuristic visions that were promoted in earlier decades.

ORGANIC LIGHT EMITTING DIODE (OLED)

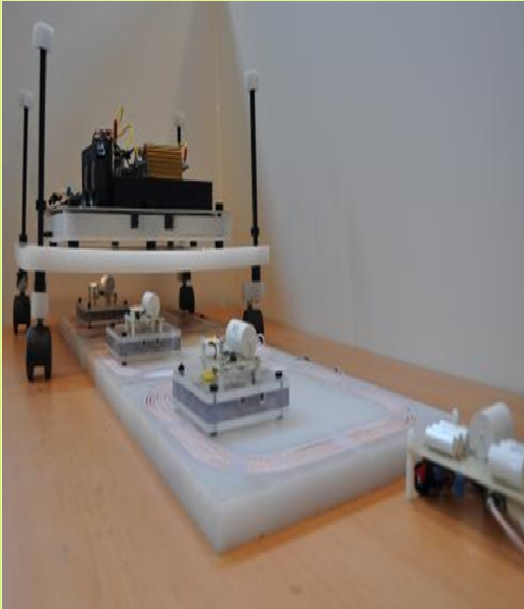
Organic light-emitting diodes (OLEDs) operate on the principle of converting electrical energy into light, a phenomenon known as electroluminescence. They consist of emissive electroluminescent layer comprised of a film of organic compounds (carbon, hydrogen and oxygen). In its simplest form, an OLED consists of a layer of luminescent material sandwiched between two electrodes. When an electric current is passed between the electrodes, through the organic layer, light is emitted with a color that depends on the particular material used. When OLEDs are used as pixels in flat panel displays they have some advantages over backlit active-matrix LCD displays - greater viewing angle, lighter weight, and quicker response. Since only the part of the display that is actually lit up consumes power, the most efficient OLEDs available today use less power. Based on these advantages, OLEDs have been proposed for a wide range of display applications including magnified micro displays, wearable, head-mounted computers, digital cameras, personal digital assistants, smart pagers, virtual reality games, and mobile phones as well as medical, automotive, and other industrial applications.

New approach advances wireless power transfer for electric vehicles

We've made changes to both the receiver and the transmitter in order to make wireless energy transfer safer and more efficient," says Dr. Srdjan Lukic, an assistant professor of electrical engineering at NC State and senior author of a paper on the research.

The researchers developed a series of segmented transmitter coils, each of which broadcasts a low-level electromagnetic field. The researchers also created a receiver coil that is the same size as each of the transmitter coils, and which can be placed in a car or other mobile platform.

The size of the coils is important, because coils of the same size transfer energy more efficiently.



The researchers modified the receiver so that when it comes into range and couples with a transmitter coil, that specific transmitter coil automatically increases its current – boosting its magnetic field strength and the related transfer of energy by 400 percent. The transmitter coil's current returns to normal levels when the receiver passes out of the range of the transmitter.

These modifications improve on previous mobile, wireless power transfer techniques.

One previous approach was to use large transmitter coils. But this approach created a powerful and imprecise field that could couple to the frame of a car or other metal objects passing through the field.

Electricity helping the Blind navigate:

The development has the potential to guide blind people in places like hospitals, offices, schools and shopping centers. It is synchronized with, previously designed, virtual maps of [indoor environments](#) that are



inserted in a memory. According to Alfredo Victor Mantilla Caeiros, professor at the Department of Mechatronics in Mexico City's Campus, the device can be calibrated according to the characteristics of each person. For example, he explained, it can be adapted to the length of the legs or the average size of the steps.

The device looks like a belt, but in reality is a system known as "inertial navigation".

"In addition, technology is overall complemented by geo-positioning systems (GPS) and ultrasonic sensors to detect objects that were not anticipated in the route," said Mantilla Caeiros. The specialist at Tec de Monterrey specified that electrical stimuli arrive at the time the person has to turn left or right to reach its endpoint.

When questioned about the advantages the device has against other auxiliary tools, the specialist said



that with this technology there is no interference to other senses (touch, hearing) that the [blind person](#) needs to develop accurately. The researcher also commented that other systems

that only employ GPS or radio frequency technologies are not accurate enough to locate people in places like offices or schools.

Using a sensitive optical system to analyze gases dissolved in samples extracted from transformer oil:

Abstract:

Transformers are essential components of a power transmission and distribution system. Their condition is critical to the safety and reliability of the system. Thermal and electrical faults that develop in an oil-filled power transformer are always associated with the formation of dissolved gases in the oil, including carbon monoxide (CO), carbon dioxide (CO₂), methane (CH₄), ethylene (C₂H₄), acetylene (C₂H₂), ethane (C₂H₆), and hydrogen (H₂). Using dissolved gas analysis (DGA), it is possible to distinguish different types of faults such as overheating, partial discharge, and arcing. Following several decades of testing and monitoring oil-filled transformers, DGA has been accepted worldwide as an effective diagnostic method for the detection of incipient transformer faults.

A comparison of the voltage withstand properties of ester and mineral oils:

Abstract:

The growing price of mineral oils (MOs) over the last 15 years, and environmental and safety concerns, have promoted research on alternative insulating fluids. Ester oils (EOs), which were used initially in transformer insulation [1], have again attracted attention; both synthetic and natural liquids have been investigated thoroughly in the search for suitable substitutes for MOs. EOs have interesting properties [1]. Their most attractive properties are those concerning flammability; depending on their chemical structure, their fire points are 100°C to 200°C higher than those of MOs, which ensures that fires are less likely in EO-filled transformers. They are also biodegradable, a property that has favored their use in environments where oil spills cannot be easily confined, e.g., traction and off-shore transformers. They are also much more hygroscopic than MOs, a property which favors drying of solid insulation, thus ensuring that depolymerization of cellulose is slowed down. This

improves the long-term mechanical stability of transformer solid insulation.

A novel method of wind energy generation-the electrostatic wind energy

Abstract:

Since ancient times humanity has been harnessing the power of the wind in various forms, such as discovering the planet in sailboats, creating living space in the Dutch polders, or providing bread by flour-grinding windmills. Since 1887 wind has also been used to generate electricity as the shift to renewable energy production is being made [1]. In order to fulfill the long-term carbon emission goals set by, for example, the EU for 2050, the share of renewable energy (wind, solar, hydro, biofuels) needs to increase substantially [2]. Of these various means of renewable energy, wind energy is still the largest part. Therefore, wind farms, both decentralized and bulk, are being constructed. In 2010 wind energy constituted 2.5% of the global electricity production [3]. The article explores a novel method of wind energy generation using an electrostatic wind energy converter or EWICON.

The hidden threat to HVDC polymeric insulation at design field: Solitonic conduction

Abstract:

While HVDC assets are impetuously expanding worldwide, the design of HVDC polymeric insulation systems still contains unknowns. It has been ascertained that space charge plays a fundamental role in DC insulation reliability because of modifications it may induce in the (Poissonian) electric field distribution, especially when heterocharge is formed during voltage application. Heterocharge (charge close to an electrode of opposite polarity to that of the electrode) can increase the electric field at the interface between electrode and polymer, thereby enhancing injection from the electrode. This can cause so large a field concentration as to increase the conductivity abruptly and lead to insulation failure due to the electrical discharge process called, usually, thermal instability breakdown

Device development and pulse performance of super-12 Si SGTO

Abstract:

The U.S. Army Research Laboratory (ARL) has conducted research on silicon super gate turn-off thyristors (SGTOs) for high action pulse switching required for survivability and lethality systems. The silicon SGTO designed by Silicon Power Corporation (SPCO) was evaluated to determine its stable, repeatable peak pulse current capability at wide and narrow pulse-widths. The Si SGTO design has a 3.5 cm^2 chip area with a 2.0 cm^2 mesa area and it is rated for 7 kV forward blocking and a continuous current rate over 100 A with adequate cooling.

A ThinPak lid and high voltage silicone gel compound was used in packaging the SGTOs. The purpose of the ThinPak lid was to eliminate wire bonds and other parasitic elements such as stray inductance and bond resistance associated with conventional packaging. ThinPak technology improves device reliability by reducing thermal, electrical, and mechanical stress that the die is subjected to during high pulsing conditions. This work highlights the device optimization that SPCO has since made on the Si SGTO to improve the device pulsing performance.

GaAs/AlGaAs electrooptic modulator with novel electrodes and bandwidth in excess of 40 GHz:

Abstract:

This abstract reports the **latest** results of our ongoing effort on GaAs/AlGaAs traveling wave Mach-Zehnder electrooptic modulators. Previously we reported $>40 \text{ GHz}$ **electrical** bandwidths but with rather large on/off voltage V_{sub}/π . By introducing a completely different electrode design we have reduced the V_{sub}/π from 28 V to 10 V while keeping the measured bandwidth $>40 \text{ GHz}$. Furthermore the new design reduces the microwave loss, which determines the bandwidth, from 4.6 to 3.2 dB/cm at 35 GHz. Additionally, this new electrode geometry has the potential for further V_{sub}/π reduction while maintaining low loss.

Power modulators and repetitive pulsed power:

Abstract

We are pleased to present this fourth special issue of the IEEE Transactions on Dielectrics and Electrical Insulation (TDEI) on Power Modulators and Repetitive Pulsed Power. A call for manuscripts for this volume was issued in TDEI and in conjunction with the 2012 IEEE International Power Modulator and High Voltage Conference (IPMHVC), which was held in San Diego, CA, USA during June 3-7, 2012. This meeting has emerged from a long tradition of jointly held International Power Modulator Symposia and High Voltage Workshops which eventually merged into a single conference for the first time in 2010 and again in 2012. The IPMHVC provides a forum for researchers and practitioners, who are engaged with the science and technology of power modulators and repetitive pulsed power as well as closely interrelated research on high voltage questions and developments, to meet and exchange ideas and the latest advances in these fields. There has been a strong and growing international interest in these topics, as is indicated by participants from 26 different countries and a steadily increasing number of abstract submissions, which exceeded 300 at this most recent IPMHVC.

An Effective Illumination on streets

This paper mentions the dependence of effectiveness in street lighting upon municipal appropriations and efficient lamps, but discusses more particularly those aspects of effectiveness which are dependent upon skilful utilization of the light to produce the most effective illumination. There are included a classification of streets, a statement of the objects of street lighting and the elements of vision under street lighting conditions. The paper emphasizes three considerations which are sometimes neglected in street lighting discussions; namely, the silhouette effect, specular reflection from street pavements, and glare. The remainder of the paper is given over to a presentation of the variables upon which the effectiveness of street illumination depends, and upon the influence which each feature of the installation exercises through these several variables in street lighting.

**HEMANTH
16BF1A0237**

Mega Minds

William Gilbert (1544-1603) :

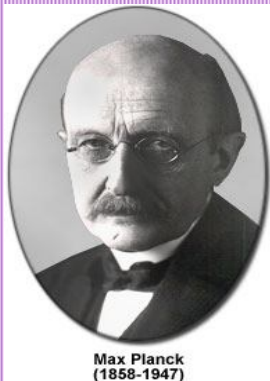
William Gilbert was an English physician and natural philosopher who wrote a six-volume treatise that compiled all the information regarding magnetism and electricity known at the time. Entitled *De Magnete, Magneticisque Corporibus, et de Magno Magnete Tellure* ("On the Magnet, Magnetic Bodies, and the Great Magnet of the Earth"), the work included descriptions of many of Gilbert's own experiments and the conclusions he drew from them, as well as data that had been previously obtained by others. In *De Magnete*, Gilbert established much of the basic terminology still used in the field of electromagnetics, including electricity, electric attraction and force and magnetic pole.



William Gilbert
(1544-1603)

Max Planck (1858-1947) :

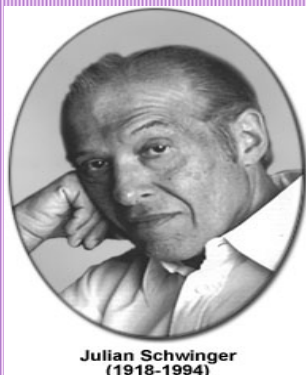
In a career that lasted seven decades, Max Planck achieved an enduring legacy with groundbreaking discoveries involving the relationship between heat and energy, but he is most remembered as the founder of the "quantum theory." Just as Albert Einstein forever changed the perception of relationship between space and time with his "theory of relativity," Planck did the same for knowledge of atomic and subatomic processes.



Max Planck
(1858-1947)

Julian Schwinger (1918-1994) :

Theoretical physicist Julian Schwinger used the mathematical process of renormalization to rid the quantum field theory developed by Paul Dirac of serious incongruities with experimental observations that had nearly prompted the scientific community to abandon it. For this achievement, which firmly established quantum electrodynamics (QED)

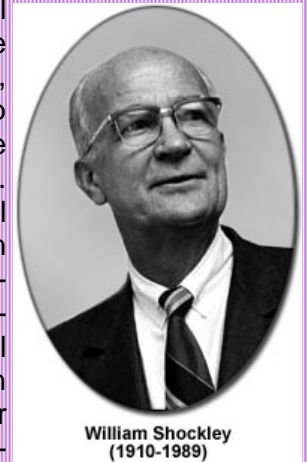


Julian Schwinger
(1918-1994)

as an accurate predictor of the interactions of charged particles, Schwinger won the Nobel Prize in Physics in 1965. Physicists Richard Feynman and Sin-Itiro Tomonaga, who similarly refined QED theory at about the same time as Schwinger, shared the award with him that year.

William Shockley (1910-1989)

William Bradford Shockley was head of the solid-state physics team at Bell Labs that developed the first point-contact transistor, which he quickly followed up with the invention of the more advanced junction transistor. He shared the 1956 Nobel Prize in Physics with John Bardeen and Walter Brattain for his work on these projects. When Shockley left Bell Labs to establish his own company, he set up shop near Palo Alto, California. His research there focused upon developing silicon-based semiconductor devices, making him the first to introduce silicon into the area now known as Silicon Valley.



William Shockley
(1910-1989)

Carl Edwin Wieman (1951-Present) :

Carl Edwin Wieman is one of three physicists credited with the discovery of a fifth phase of matter, for which he was awarded a share of the prestigious Nobel Prize in 2001. The recognition capped a distinguished career that began deep in the Oregon woods in a home without central heating or a television.



Carl Edwin Wieman
(1951-Present)

**PUNEETH
16BF1A0260**



Ultra sensitive biosensor from molybdenite semiconductor developed

Date: January 5, 2014

Source: University of California - Santa Barbara

Summary: Researchers have demonstrated an atomically thin, ultrasensitive and scalable molybdenum disulfide field-effect transistor based biosensors and establish their potential for single-molecule detection.

Cost-effective, high-performance micropumps for lab-on-a-chip disease diagnosis

Date: February 24, 2014

Source: Penn State Materials Research Institute

Summary: Researchers have demonstrated an acoustofluidic pump powered by a piezoelectric transducer about the size of a quarter. This reliable, inexpensive, programmable pump is a crucial feature for lab-on-a-chip devices that could make the diagnosis of many global life-threatening diseases easy and affordable

Breakthrough for carbon nanotube solar cells: Twice as efficient as current models

Date: March 13, 2014

Source: Northwestern University

Summary: Lighter, more flexible, and cheaper than conventional solar-cell materials, carbon nanotubes (CNTs) have long shown promise for photovoltaics. But research stalled when CNTs proved to be inefficient, converting far less sunlight into power than other methods. Scientists have now developed a carbon nanotube solar cell that is twice as efficient as its predecessors.

Wind energy cuts the electricity bill

Date: September 3, 2014

Source: University of the Basque Country

Summary:

The promoting of renewable energy is at the heart

of the current debate on energy policy. From an economic perspective, the question focuses on determining the cost of the feed-in tariff systems. A new study tackles this question empirically, and concludes that wind energy continues to produce greater savings than what its incentives amount to, while photovoltaic solar technologies are still in the development phase.

Lithium-ion batteries: Phenomenon of 'lithium plating' during the charging process observed

Date: April 3, 2014

Source: Technische Universitaet Muenchen

Summary: Lithium-ion batteries are seen as a solution for energy storage of the future and have become indispensable, especially in electromobility. However, when metallic lithium forms and deposits during charging it can lead to a reduced battery lifespan and even short-circuits. Scientists have now managed to peer into the inner workings of a battery without destroying it.

Scientists create renewable fossil fuel alternative using bacteria

Date: June 20, 2014

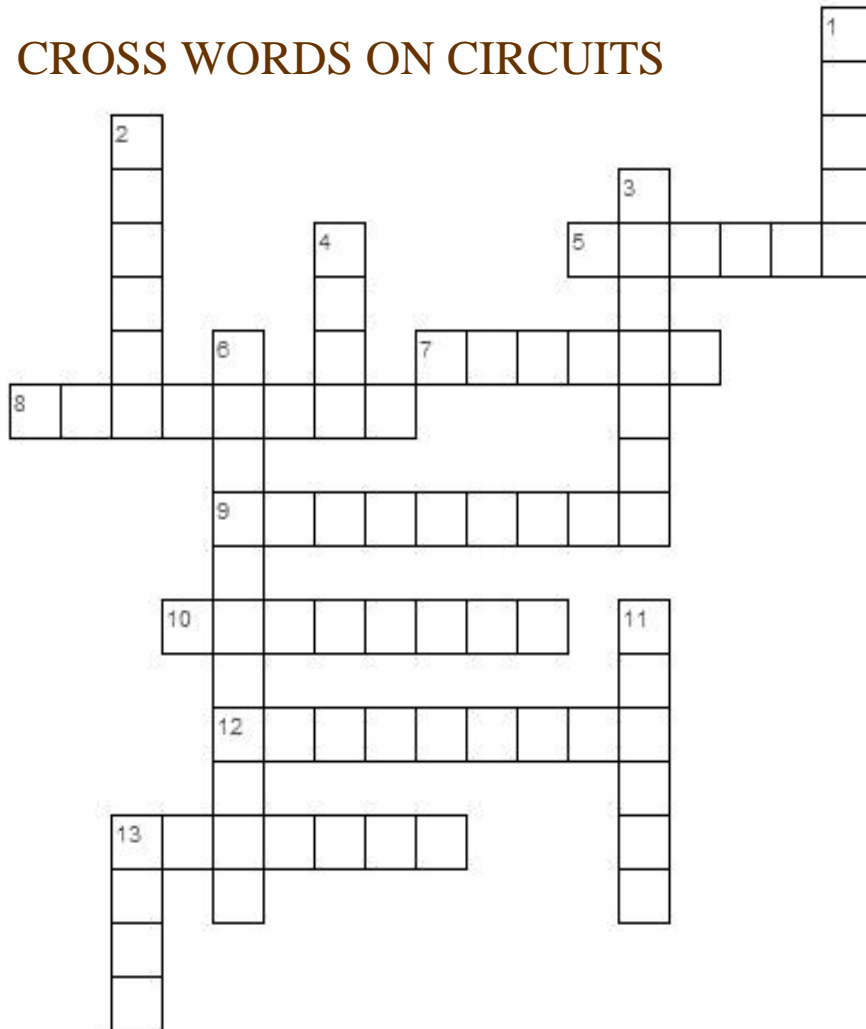
Source: Imperial College London

Summary: Researchers have engineered the harmless gut bacteria E.coli to generate renewable propane. The development is a step towards commercial production of a source of fuel that could one day provide an alternative to fossil fuels. Propane is an appealing source of cleaner fuel because it has an existing global market.



IGNITE YOURSELF

CROSS WORDS ON CIRCUITS



Across

- 5 bulbs shining less
- 7 This controls everything
- 8 side by side circuits
- 9 Anything in a circuit
- 10 bulbs shining more
- 12 Beware of the teeth
- 13 There can be no power without this

Down

- 1 This should move things
- 2 No honey from this
- 3 Power flows around this
- 4 thin wire which breaks if power is too much
- 6 The name of the energy
- 11 components one after the other
- 13 Throws some light on the subject

SAI KEERTHI
16BF1A0217

