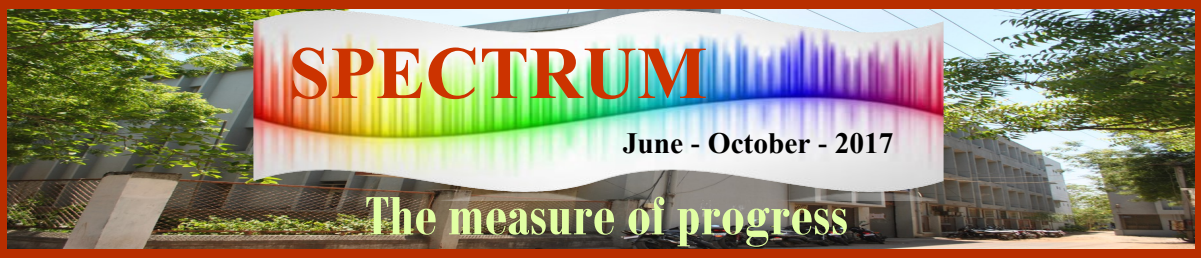
Charutar Vidya Mandal's
NATUBHAI V. PATEL COLLEGE OF PURE AND APPLIED SCIENCES



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From the Chief Editor's Desk

By: Dr. Basudeb Bakshi

Dear readers

Editorial team of college magazine SPECTRUM works to bring out its sixth issue of biannual publication. Our team of editors explore the scientific talent from the student population, which reflects and includes the diversity inherent to the academic and extra-curricular spaces in NVPAS.

Since 2014-2015, the College Magazine has functioned as an independent society Its main aim has been geared at focusing major events and notable achievements of the college, as well as writing articles and at highlighting the activities of student central committee. The magazine continues to expand its reach to achieve its vision of publishing the creative content regularly, and through rapid reporting about college events. The team hopes to move on this philosophy with same pace in future too.

I wish good luck to all my dear students for their forthcoming semester examination-2017. **Wish you all a very Happy Deepawali and Happy New year!!!**

IRIS PEN AIR 7

By: Jay Krishna Thakkar
M.Sc. IT—IX

The digital highlighter that types what you scan!

It cordless and easy to use digital pen in merely 0.06 lbs / 28gr of high-tech.

It copy and paste on the go text lines from books, magazines, school manuals to your smart phone.

Read aloud and translates simultaneously text lines into up to 40 foreign languages.

You highlight, it types

Simply slide IRIS Pen™ Air over printed text or numbers from newspapers, magazines, invoices, faxes, letters or any other type of document, and the text will automatically be retyped in your computer. It doesn't matter if you use Word, Excel, or any other text editing application or web-based editor. Anywhere you can type, IRISPen™ Air can type too!

Scan any kind of document

IRISPen™ Air is made to scan text on any kind of paper document. You can use it to scan text lines in books, magazines, newspaper, letters, faxes or even documents in a binder. The digital highlighter can also be used in many situations including scanning books at the library, translating menus at the restaurant or scanning barcodes from a bank transfer slip.

Small, Wireless & easy to use

IRISPen™ Air is very compact and fits well in hand. It only weighs 9 oz. and it is about the same size as a traditional highlighter. You can easily store it in a purse or even a pencil box and carry it along wherever you go. To start scanning, simply synchronize the pen with your computer, tablet or smart phone using the Bluetooth connection. The provided software and applications make it very easy to setup and use the pen in any situation.

You scan, it reads out loud and translates!

Let IRISPen™ Air do the reading for you! The digital highlighter features text-to-speech technology which turns any scanned text to audio for you to just relax and listen to. This option is great for children, visually impaired or even dyslexic people. Furthermore, IRISPen™ Air can also translate and read text out loud in 40 different languages – the perfect tool to practice your foreign accent anytime!

Scan CMC-7 barcodes

IRISPen™ Air is able to scan more than text, logos, signatures and small graphics. It can also scan and recognize MICR CMC-7 font barcodes, which are widely used to scan bank codes, account numbers, check numbers, check amounts, or check control indicators.

EFFECTS OF INTERNET ON GLOBAL WARMING

By: Darshit Shah

You've traded in your SUV for an economy car, your 60-watts for CFLs, and your garbage disposal for the added trouble of a compost bucket, all in the name of reducing carbon emissions and saving the world. But there's another global warming culprit you might not have considered: your computer. More specifically, the internet surfing that you do with that computer.

In 2009, Harvard physicist Alex Wisner-Gross calculated the carbon emissions associated with individual Google searches. Although negligible on their own, the cumulative effect of all that internet time is a "definite environmental impact" that has long gone overlooked. Think we're kidding? Take a look at some of the facts:

Every second someone is browsing a simple web site; roughly 20 milligrams of CO2 are generated. Comparably, an air-freighted orange generates 1kg, or one million milligrams, of carbon emissions.

35 billion minutes are logged online every month from users around the world, according to data compiled earlier this year by Go-Gulf.com.

According to anti-virus software firm McAfee, the electricity used to transmit the trillions of spam sent over the course of one year is equivalent to the amount of electricity needed to power more than two million homes. Simultaneously, the carbon output equates to that of three million cars!

The global IT industry generates as much greenhouse gas as the world's airlines according to research firm Gartner.

Although at first it may seem like a far out idea, the reality does make sense. Instead, your query is shot through massive data centre buildings that house thousands upon thousands of servers, each of which store some of the information available on the web. Each of those servers also requires a considerable amount of energy to function. The more data they have to filter through and subsequently transmit, the more energy is used, the more greenhouse gas emissions are generated.

All of this leads us to believe that our IT industry leaders play a pivotal role in the future of our environment and they need to take that responsibility seriously. All companies in America due to their efforts of green volunteer initiatives, energy efficient data centres.

FORECAST OF AN UNPLANNED CONSPIRACY AGAINST NATURE

By: Dharitri Ramanlal (PhD student)

It's a great challenge for a mother to narrate a beautiful story revolving around a captivating and mesmerizing world every night so that her child could have a pleasant and blissful nap. But what answers will she have for the questions, when the inquisitive child returns back after having witnessed the turmoil we have caused to the mother earth. Humanity has already reached a pinnacle where in few decades it wouldn't be surprising to witness the inflation on the oxygen cylinders which every man would compete for survival in the near future. The present environmental problems have their roots deeply entangled in the history which makes it trickier in finding a remedy for numerous problems we face at this instant. There is no doubt that resources have made man's life luxurious and full of leisure, but man has not lagged behind in taking undue advantage in exploiting them to the fullest. Every ecosystem has an intrinsic nature to balance its functioning but human mind interferes, it always has an urge for dominance which causes the uncalled-for changes in the rhythmic cycle of the environmental processes. We are facing a plethora of unwanted incidences which have recently surfaced due to the lack of waste management skills and our sheer ignorance in evaluating the aftermath of using foreign substances. It wouldn't be wrong in saying

'We voluntarily are investing in desert making stocks where no one wants to be acknowledged as a stakeholder'

Major content of newspaper clippings in recent times are loaded with news pertaining to unpredictable cloudburst causing water logging and damage to the property and livestock, unwarned drought-like situations effecting the quality of crops and making the farmers economically handicapped, frequent outburst of epidemics which increases the bacterial resistance welcoming mutant strains of bacteria which are very challenging to deal with, food poisoning by noxious substances with proves to be lethal in many cases, nuclear disaster, increasing cases of skin cancer due to exposure to harmful UV radiations penetrating through the atmospheric blanket of the earth due to ozone layer depletion, frequent recurrence of dengue and malaria whose larva breeds near the water puddles and heaps of waste which lies unmonitored at the corner of every second street in the society, demolition waste filling up the pits of landfill sites, respiratory disorders due to unfiltered noxious fumes coming out from the factory outlets, exponentially decreasing forest cover in the name of development and industrial revolution, continually declining number of wild animals causing imbalance in the subsequent tropic levels of the ecosystem, climate change resulting in sea level rise and extreme weather conditions which hinders with the normal hydrological and mineral cycles and many more are the repercussions of human induced activities. There are numerous applications through which people buy various commodities but such apps do not showcase its carbon footprint nor there are any options provided online for waste disposal or management of the thing once its purpose is served. Hence, there is an urgent call for people to get voluntarily engage in waste management practices to have a sustainable approach of development. The best weapon to deal with this current crisis is to clearly demarcate between '**wants and needs**' and making this principle a basic rudiment in a child's life by sowing its seeds from the very beginning which will not only grow into a sturdy tree but will also bear sweet fruits of sustainability. It's high time when we should quit the habit of mirroring others.

'It's always better to set an example instead of giving one.

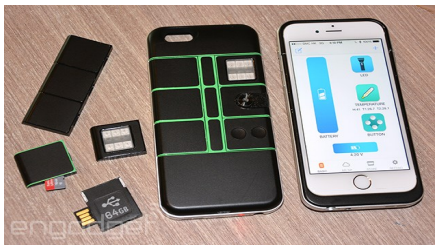
The present scenario requires in-depth analyses of all the actions by every individual with its future consequences. its reclamation value and energy required for its end-of-the-path treatment.

PROJECT ARA – MODULAR PHONES

By: Mr. Chirag Pansuriya

Project Ara was a modular smartphone project under development by Google. The project was originally headed by the Advanced Technology and Projects team within Motorola Mobility while it was a Google subsidiary. Google retained the ATAP group when selling Motorola to Lenovo, and it was placed under the stewardship of the Android development staff; Ara was later split off as an independent operation.

Tired of replacing your phone every six months or two years because of wear and tear or outdated technologies? That may be why you have been excited about Project Ara ever since it was announced. The concept is simple: treat a



phone like it is a lego toy. Assemble the phone according to the parts you need enhanced.

For instance if you are a photographer, you could focus on upgrading your camera or lens, or if you are a music lover, you can aim for better speakers and audio quality or longer-lasting batteries for uninterrupted listening time. Instead of buying a phone that may not have the feature you are interested in most, have more control with a Project Ara phone.

Project Ara not only lets you "upgrade" the hardware you need most, it also ensures that you don't have to change your whole smartphone just because one part is broken, which is essentially what forces most of us to change our phones in the first place anyways.

VIRTUAL REALITY

By: Asad Vohra
(TY BCA)

Virtual reality is a technology that is being used today. Virtual reality began its roots in Science Fiction in television shows such as Star Trek and in films such as The Matrix. Virtual reality is beginning to take over the gaming industry with new immersive technology allowing gamers to enjoy video games on a whole new level. Gaming is not the only industry that capitalizes virtual reality as the sports industry has used virtual reality for years to produce a new animated sport known as virtual horse racing.

Many technologies shown in fiction become something of realty as technologies are being tested and invented all the while. Some technology that has been created out of fiction includes:

- Robotics
- Space travel
- Communication devices

Virtual reality has been around for many years providing people with entertainment. This has taken the forms of animated beings or worlds that people experience.

Virtual reality was once the topic of fiction but now there is a way to experience stepping into an imagined world to enjoy the experience of virtual reality. While virtual reality has been around for many years, this is the first time that gamers have been able to experience the delight of virtual reality in their own homes.

Let's look at some of the most exciting developments likely to shape the future of this technology:

1. Probably one of the earlier adopters, Marriott Hotels in New York set up VR experience booths for newly-wed couples to experience various honeymoon locations in VR as well as with 4-D effects such as wind, mist, and even a motion platform. This was in September 2014. More and more businesses and clients are beginning to see how their marketing could be so much more immersive.

2. Releasing their first no frills cardboard "VR headsets" for smartphones just three months after Facebook's acquisition of Oculus in 2014, Google went on to release version 2 the year

3. But not just with Google Cardboard. Besides the Samsung Gear VR that's already out in the market, Google VR has also introduced "Daydream" — a stylish, fabric-covered headset that comes with their own controller, and powered by Daydream-ready smartphones. This will enable more users to interact with VR content — be it games or VR applications.

4. Speaking of applications, innovations in and around VR experiences are also proving to be more exciting! At the recent SIGGRAPH Asia 2016 event in Macau, an international VR showcase was hosted for the first time — with several academic institutions producing brand new, cutting-edge VR applications for testing and adoption. For the rest of us, these developments could mean that the next wave of cutting-edge innovations for VR could well be "invented" anytime — such as eye tracking and recognition, data collection in VR, VR payments, etc. While we are not quite into 2017 yet, avenues for VR experimentations in the new year already looks to be really promising — with possibly the world's biggest online VR hackathon "Global WebVR Hackathon" — taking place from now till the end of February.

'TRENDS AND TRANSITIONS IN BIO-TECHNOLOGY IN THE 21ST CENTURY'

By: Urlav Mahida

Humans have managed to evolve and emerged with new technologies since time immemorial. It has been a race with time to keep the human race on the verge of evolution, to survive with ease. With an epicenter of a technological revolution in this century, we have a chance to almost fundamentally transform our lives within the next decades more than we have in the past few centuries. With the amount of resources and information, it is safe to assume that our age-old knowledge about the nature, including our own human practices is to be revisited and reestablished. Likely we can assume that we are capable of radically altering the science behind our existence. Here are a few milestones we have seen so far in just the short time period of the beginning of this century.

The Human Genome Project – with the completion of this project, helping to successfully identify all the genes present in the human DNA. Decoding of such a vast informational source is sure going to open up new paths. So far, technology and resources created by this project already have a major input on research over a wide range of subjects. Moreover, another milestone was created by biotechnologists when the succeeded in decoding the entire genome of rice crop. During the last decade, it is noticeable that many species of plant are being preferred to grow entirely in-vitro and gradually helping to overcome difficulties in the agricultural sector. Also the use of biofertilizers and bio pesticides have helped farmers eradicate the problems with agriculture and as well the current pollution problem. New strains and modern agricultural practices have made farmers meet the growing demands of food and hunger crisis all around the world.

The next promising thing we have seen so far has been more of an engineering miracle but is the result of advancement in biotechnology; it is the frequent use of bionic arms and other equipment. It is a blessing for the less fortunate; apart from bionic limbs we have also successfully developed bionic eyes, pacemakers, wearable kidneys and portable pancreas, regrown bone structures and what not. The more astonishing part being the acceptance of these machines by people beyond its questionable efficiency and complicated installation procedures. New possibilities await at the horizon, seemingly a few people have managed to realize these possibilities. Zac Vawter being one of them has created a nervous system controlled limb that is fully functional. Many nations are continually researching to bring about a change and reorganize life. It won't be ambitious to imagine cyborgs walking among us by the end of this century.

Moreover assisted reproductive technology (ART) that is birth through in-vitro has now been a common practice although it was first performed way back in 1978 in UK. We have seen plant patents where any country can register a patent of a variety of a plant by removing, adding or altering a gene from the genome of a plant and developed nations like USA have promoted it at large since the beginning of the 21st century.

The Biotech Century could bring some or even most of these changes and many more into our daily lives, deeply affecting our individual and collective consciousness, the future of our civilization, and the biosphere itself. Here are some events we could witness just in a few generations, virtually, all the genes from humans and also from other flora and fauna. Helping to create genetic mutations, tens of thousands of novel transgenic bacteria, viruses, plants and animals could be released into the Earth's ecosystems for commercial tasks ranging from "bio-remediation" to the production of alternative fuels. As discussed before, cloning of animals and humans could become a common practice and replication finally replacing reproduction for the first time. Cloned animals and genetically modified stocks would help in meeting the demands of dairy and meat requirements. Regeneration of organs and cell structures might be achieved. With exponentially increasing modern techniques, artificial gestation and conceived test tube babies might be more preferable by the majority of mass, thus helping avoid the difficulties during prenatal period. Similar projects and ventures like the Human Genome Project may help people get a detailed genetic readout of themselves, helping them understand their biological features and predict potential disorders and diseases. Global agriculture could find itself in the midst of a great transition in world history, with an increasing volume of food and fiber being grown indoors in tissue culture in giant bacteria baths, at a fraction of the price that is being invested right now in the agricultural methods being carried on.

THINGS YOU NEED TO KNOW ABOUT CHEMISTRY

By. Dr. Ketul Patel
(Chemistry Dept.)

1. **Chemistry Is The Study Of Matter And Energy**
   Chemistry, like physics, is a physical science that explores the structure of matter and energy and the way the two interact with each other. The basic building blocks of matter are atoms, which join together to form molecules. Atoms and molecules interact to form new products through chemical reactions.
2. **Chemists Use The Scientific Method**
   Chemists and other scientists ask and answer questions about the world in a very specific way: the scientific method. This system helps scientists to design experiments, analyze data, and arrive at objective conclusions.
3. **There Are Many Branches Of Chemistry**
   Think of chemistry as a tree with many branches. Because the subject is so vast, once you get past an introductory chemistry class, you'll explore different branches of chemistry, each with its own focus.

Types Of Chemistry :

- **Agrochemistry**
- **Analytical Chemistry**
- **Astrochemistry**
- **Biochemistry**
- **Chemical engineering**
- **Cluster Chemistry**
- **Combinatorial**
- **Environmental Chemistry**
- **Food Chemistry**
- **General**
- **Geochemistry**
- **Green chemistry**
- **Inorganic Chemistry**
- **Medicinal Chemistry**
- **Nanochemistry**
- **Nuclear Chemistry**
- **Organic Chemistry**
- **Photochemistry**
- **Physical Chemistry**
- **Polymer Chemistry**
- **Solid State Chemistry**
- **Thermochemistry**

4. **The Coolest Experiments Are Chemistry Experiments**
   It's hard to disagree with this because any awesome biology or physics experiment could be expressed as a chemistry experiment. Many chemists say the lab component of chemistry is what got them interested in science, not just chemistry, but all aspects of science.
5. **Chemistry Is A Hands-On Science**
   If you take a chemistry class, you can expect there to be a lab component to the course. This is because chemistry is as much about chemical reactions and experiments as it is about theories and models. In order to understand how chemists explore the world, you'll need to understand how to take measurements, use glassware, use chemicals safely, and record and analyze experimental data.
6. **Chemistry Takes Place In A Lab And Outside The Lab**
   When you picture a chemist, you may envision a person wearing a lab coat and safety goggles, holding a flask of liquid in a laboratory setting. Yes, some chemists work in labs. Others work in the kitchen, in the field, in a plant, or in an office.
7. **Chemistry Is The Study Of Everything**
   Everything you can touch, taste, or smell is made of matter. You could say matter makes up everything. Alternatively, you could say everything is made of chemicals. Chemists study matter, therefore chemistry is the study of everything, from the smallest particles to the largest structures.
8. **Everyone Uses Chemistry**
   You need to know the basics of chemistry, even if you aren't a chemist. No matter who you are or what you do, you work with chemicals. You eat them, you wear them, the drugs you take are chemicals and the products you use in daily life all consists of chemicals.
9. **Chemistry Offers Many Employment Opportunities**
   Chemistry is a good course to take to fulfill a general science requirement because it exposes you to math, biology. In college, a chemistry degree can act as a springboard to numerous exciting careers, not just as a chemist. There are lots of reasons to get a degree in chemistry. You might study chemistry because you have a passion for science, love doing experiments and working in a lab, or want to perfect your analytical and communication skills. A degree in chemistry opens doors to many careers, not just as a chemist!

NATIONAL CADET CORPS

By : Dr. Ami H. Patel
(Biological & Environmental Sci. Dept.)

National Cadet Corps (NCC) is the world's largest uniformed youth organisation that imparts military training to over 1 million school and college students, on voluntary basis, it is a Tri Services Organization, comprising of Army, Navy and Air Force engaged in grooming the youth of country into disciplined and patriotic citizens. Its motto is ***"Unity and Discipline"*** and the aim of NCC is to inculcate the values of unity, team spirit, discipline, turning the cadets into dynamic youths for tomorrow, giving them a first-hand idea of defence life.

NCC is emerging as a major source of recruitment of officers for the armed forces. 25 per cent of cadets currently training to be officers at the Officers Training Academy, IMA and the NDA are from the NCC, and the figure is even higher for women cadets. The officers and cadets have no liabilities for active military services once they complete their course, but are given preference over normal candidates during selections based on the achievements in the corps.

The NCC was first started in 1666 in Germany. NCC in India was formed with the National Cadet Corps Act of 1948, raised on 15th July 1948. The origin of NCC can be traced back to the "University Corps", which was created under the Indian Defence Act 1917, with the objective to makeup the shortage of the army. In 1920, when the Indian Territorial Act was passed, the "University Corps" was replaced by the University Training Corps (UTC). The aim was to raise the status of UTC and make it more attractive to the youth. The UTC officers and cadets dressed like the army. It was a significant step towards the Indianisation of armed forces. It was rechristened in the form of UOTC, so the National Cadet Corps can be considered successor of University Officers Training Corps (UOTC) which was established by British Government in 1942. During World War II, the UOTC never came up to the expectations set by British. A committee headed by Pandit Hradaya Nath Kunjru recommended a cadet organization to be established in schools and colleges at National level. The National Cadet Corps Act was accepted by the governor general and on 15th July 1948 the National Cadet Corps came into existence. In 1948 girls division was raised in order to give equal opportunity to school and college going girls, NCC was given an inter-service image in 1950 when the Air was added, followed by Naval Wing in 1952.

One of our cadet Senior Under Officer Amit Bhatt was selected for the International cadet exchange programme with Singapore. It is a country to country exchange of cadets. They participate in NCC activities of the host country, to create an increased awareness and appreciation of each other's socio-economic and cultural realities. NCC has a vibrant YEP with 11 countries, as of now more than 100 cadets proceed abroad on YEP annually. Senior Under Officer Amit Bhatt also attended Republic Day Camp New Delhi. He passed C certificate exam with A grade and secured second position in vvnagar group and was first in the 2CTC unit. Cadets Kanishka Thakur and Shiksha Sharma also passed the C certificate exam with A grade, Kanishka Thakur secured third position in vvnagar and she was first in 4 Guj Girls Battalion.

Various Advantages Given to NCC Cadets:

* NCC cadets are given preference in recruitment of armed forces.
* NCC cadets are exempted from appearing the written exam for entry into defence. Directly eligible for ***SSB*** ***(*** *Service Selection Board)*
* There is some reservation for NCC C-Certificate holder in UPSC CDS and are given preference.
* Many industrialists give priority in jobs for NCC trained students.
* Central and state govt. also provides reservation of few seats or preference to NCC certificate holders in jobs and educational institutions.