# BIOLINK

## SUSTAINABLE ENVIRONMENT

DEPARTMENT OF LIFE SCIENCES

Commander Butterfly - Haneesh KM

## FROM THE DEAN OF SCIENCE, DR. SURENDRA KULKARNI

The Department of Life Sciences occupies a strategic position at CHRIST, with opportunities to collaborate with multiple disciplines, for a wide variety of activities, in the University and the Society. In academics, the Department has taken a quantum jump by introducing Masters Program during this academic year, offering three specializations, viz. Botany, Zoology and Biotechnology for Masters degree.

In co-curricular activities, the department continues to publish books on relevant topics, the recent one being “Butterflies of Christ University Main Campus”. The participation of students and faculty members, in ‘Green Army’, for activities related to Environment, is a testimony to the department’s multi-dimensional contributions to the society. Overall, the department has made significant strides towards nurturing the budding scientists of tomorrow, through innovative seminars, invited guest lectures, etc.

This Newsletter, “Biolink”, is an annual publication from the Department of Life Sciences, compiling the students’ contributions to Science, through the media of art, humour and prose. The quality of this Newsletter is a result of relentless efforts by the Editorial Board that consists of both students and faculty members.

We hope the readers will find it informative as well as intellectually stimulating and creatively satisfying.

# FROM THE EDITOR'S DESK

**The doomsday clock shows a minute to midnight.**

Midnight is the catastrophic event that could spell extinction - not only for the environment, but also for us. The dangerous pace that humans have embarked on as a species, in the relentless pursuit of 'greatness', could very well be the end of us all. Resources are depleting at an alarming rate and one must wonder what will be left of our world as we know it.

The only way to reverse these order of events or at least mitigating them would be by adopting a model of creating a Sustainable Environment. An environment in which we all do our bit to use resources in a sustainable manner, keeping in mind the needs of future generations.

Thus, this year at 'Biolink', we have decided to have a theme centered around the idea of a 'Sustainable Environment'. We hope this makes you ponder and innovate with new ways to help save our planet - for us and for the future generations to come.

Until then, see you next year and happy reading!

## THE BIOLINK TEAM

**Staff Editors**
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**Team Members**
Rubina Rajan (6CBZ)
Shruthi Giridharan (4BCZ)

## THE FINAL TALE

ALFIA NIRGUNI SAINI, 2BCZ

When every stream has run its course,
and every flower gone.
The sun will still shine on with force,
The wind will still blow on.

Yet, to see these wonderful things
we will not be able.
The land trod upon by ruined Kings
now part of ancient fable.

Memories of our teeming lives
will linger in the street—
The land we cut up with our knives
and gnashed up with our teeth.

There will be nobody there
commemorating violence.
Death has stripped life's kingdom bare
and now there's only silence.

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# THE ROLE OF SUSTAINABILITY IN PRESERVING THE EARTH'S FUTURE

AAROHI MALAGI, 4CBZ

Around 30,000 years ago, for the first time in our planet's history, an unassailable threshold was passed. The advent of agriculture and domestication allowed us to settle down and colonize a vast array of ecosystems such that we are now actively changing and shaping ecosystems at the expense of consuming insurmountable amounts of energy from nature, leading to an imbalance in resource allocation. This imbalance in energy allocation led to an acute decrease in bio-diversity, with a further increase in instability of all the natural systems that we depend on for energy needs. In this regard, saving the environment is ultimately a self-serving motive for human development.

In our journey to the top of the food chain our numbers have grown and so has our appetite for more efficient "innovations". What started out as agriculture and animal husbandry has now reached soaring heights in the form of mega food factories and food farms. Despite all this, an inescapable irony afflicts humankind: deaths due to hunger and malnutrition in societies all around the world is rampant.

We now realize the need for conservation more than ever. However, an important aspect of conservation is realizing that advancement of any kind, be it technological, social or otherwise, needs resources; resources which we can only get from nature. Therefore the time is ripe to strategically save our home while guarding our own interests as a civilization. Various experts studying the issue have come up with a concept which hopes to achieve this goal through a model of sustainable development through conservation. It needs to be achieved with a multi-dimensional approach. An approach which involves roping in various organizations of different faculties such as religious, legal, environmental, social, agricultural, educational, governmental, policy-making, banking, industrial, scientific and any other organization which can help with spreading the message of the need for conservation and its further execution in a cogent manner. However, one cannot talk about sustainable development without mentioning its fundamental flaw; sustainability banks itself on the concept of using lesser natural resources than what we give back, this nevertheless doesn't apply to non-renewable resources. Therefore, we should realize the limitations of any concept and accept the fact that there is no win-win scenario in situations which involve conservation. Essential sacrifices on our behalf have to be made to repair the damage caused by human interference in order to preserve both nature and man.

# DON'T BURST THIS NANOBUBBLE!

# A POSSIBLE CURE FOR ENVIRONMENTAL DESTRUCTION

GN AKSHAY, 6BCZ

Man's appetite for fast energy hasn't died and it never will. Fossil fuels remain the single largest source of available energy and power plants contribute as the largest wholesale emitters of carbon dioxide.

Now, why is this so problematic?

Carbon dioxide is continuously cycling among the earth, plants and animals, the atmosphere and the ocean's surface, with the deep ocean serving as a gigantic long-term reservoir. However, society has pushed atmospheric carbon dioxide levels from 278 parts per million at the start of the industrial revolution to 392 parts per million today, a 40 percent increase.In the meantime, those extra $CO_2$ molecules will slosh around from earth to atmosphere to upper ocean and back, absorbing energy, acidifying the seas and changing the planet in profound and potentially unwelcome ways. In other words, $CO_2$ emitted today will still be impacting the planet for hundreds of years.

The project, from **Lawrence Livermore National Laboratory**, combines an old time-tested idea with a new high-tech idea: put baking soda in tiny, permeable **nanobubbles**, and then use the bubbles to absorb emissions from power plants directly at the source. The bubbles are tiny and can be packaged and replaced in arbitrary volumes, whatever is easiest for handling. Because the bubbles, made of a synthetic polymer, are permeable to gas but not to liquids, they function with no chance of messy spills. Rather than raw baking soda, they are filled with an aqueous sodium carbonate solution. The tiny size of the spheres also improves the efficiency of the solution. The nanobubble system is not yet in use in any plants but the flexible nature of the bubbles may yet result in unexpected venues where they could be used to help sequester $CO_2$ emissions.

## GRAPHENE AS AN ENERGY SOURCE

### ABDULLAH MAYET, 6BCZ

Graphene is a single layer of carbon atoms arranged like a sheet, having unusual properties of being one of the strongest materials and also an efficient conductor of heat and electricity.

Physicists at the University of Arkansas made a startling discovery when they observed ripples of movement on a graphene sheet. These ripples seemed to be occurring in a coordinated fashion, as a result of tandem vibrations of atoms of the graphene sheet. These movements are called *Levy flights*.

Each ripple measured 10 nanometers X 10 nanometers, yet could produce 10 picowatts of power.

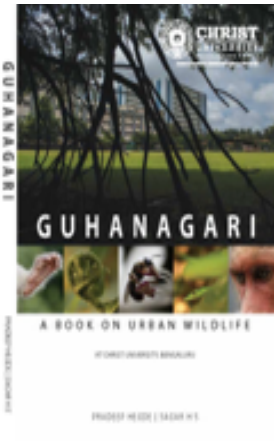
Initially, scientists couldn't make sense of the results obtained from the scanning tunnelling microscope (STM). But the series of images obtained when viewed at different time scales revealed a more meaningful pattern.

Now, these vibrations can be converted into energy using nanotechnology. These scientists did just that, by making a nano-generator that converts these tandem vibrations to harvestable energy. Thibado has devised a generator to harvest this vibrational energy which involves placing a layer of graphene between two negatively charged electrodes, when the graphene layer flips up and down, it creates alternating current. This is called a Vibrational Energy Harvester (VEH)**.**

This could be a potential source of clean, green energy involving no emission whatsoever. Moreover it also has the potential to be used in the field of medicine as "bio-implants", as it is minute and self-sustaining. This technology also works on room temperature, transforming the environment allowing any object to send receive energy. In the long run there will be efficient energy production and no pollution.

While this unique application of graphene is new and has yet to be fully proven, Thibado and his team will continue to explore the unique material's potential as a clean, unlimited energy source.

## BOOKS RELEASED BY THE GREEN ARMY


# ALUMNI TALK

**AISHWARYA UJJINI**
Batch of 2013
Currently pursuing - MSc in Biomedical and Molecular Sciences Research
Where - King's College London

The theoretical knowledge at Christ had a strong base and because the topics that were covered were vast, I had an edge over other Indian and international students in the UK. I always thought the workshops and mandatory internships were brilliant, because they let you know your options before you decide your career. However, the practical knowledge was lacking and since independent study is the preferred style of learning in the UK, I found it to be a drastic change. Although it's easy enough to adapt, I would recommend a course that is designed to be interactive but allows you to learn independently. Additionally, plagiarism checks should be done more seriously, as in the UK, they are very strict about it and anything beyond 20% can led to expulsion or a disciplinary hearing.

**NISSHTHA KHATTAR**
Batch of 2013
Currently pursuing - M.Des in Graphic Design
Where - MIT Institute of Design, Pune

The research aspect of my degree helped me in my design research, during the design process. Changing streams is quite easy and can in fact give you a special advantage and edge over the others.

**ANAMIKA GAUR**
Batch of 2013
Currently pursuing - MSc in Molecular and Cellular Life Sciences (Before Masters - Research Assistant in the Molecular Medicine group at the International Centre for Genetic Engineeering and Biotechnology (ICGEB), Delhi)
Where - Utrecht University, Netherlands

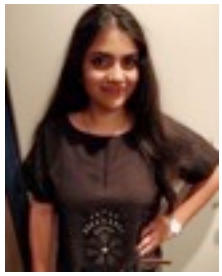
The combination of core chemistry concepts with biotechnology was beneficial as it made my foundation strong from not only a chemist's but a biologist's perspective as well. Although the practical skills attained didn't give me enough confidence, it definitely highlighted the dynamics of being in a laboratory. The 'good lab practices' were painful during the practical hours but they're now instilled in me and have made me a more responsible researcher.

**ARJUN MENON**
Batch of 2014
Currently pursuing - Project Assistant with the Centre For Wildlife Studies
Where- Nagaland, India

I found our coursework helpful but I wish we had more fieldwork.

**ADITI KANDLUR**
Batch of 2013
Currently pursuing - MSc. in Molecular Biology and Human Genetics (Currently part of an exchange program - 2nd year MSc in BioHealth Engineering)
Where - Manipal Academy of Higher Education, Manipal (Exchange program with Université Grenoble Alpes, France)

In addition to a widened knowledge base, Christ taught us management, people skills and other necessary life skills. It is so important to get exposure to as much of the outside world as possible - it'll help in so many ways!



**PRIYANKA REDDY**
Batch of 2013
Currently pursuing - MSc. Nutrition and Food Technology
Where - Vydehi Institute of Medical Sciences and Research Centre, Bengaluru

I wouldn't be able to understand anything of what I'm studying now, if my basics weren't good. Teachers at Christ taught me how to study effectively.

**CAROL JAMES**
Batch of 2013
Currently pursuing - MSc. in Microbiology
Where - St. Joseph's, Bengaluru

The syllabus was very good and informative, but there weren't enough practical hours and I couldn't improve lab skills.

**ALJO ANAND**
Batch of 2013
Currently pursuing - MSc. Chemistry
Where - Christ (Deemed to be University)

I learnt about various topics and fields thanks to Christ. I feel that the syllabus could be upgraded with more relevant and current topics.

Additionally, students should be trained to do individual research from first year itself, and more hours/importance should be given for research.

**NIDHI GIRISH**
Batch of 2014
Currently pursuing - MSc. Biotechnology
Where - Christ (Deemed to be University)

The course was extremely beneficial, especially the triple major combination.

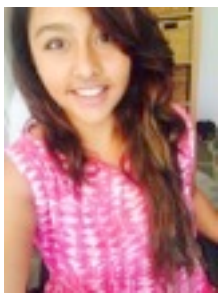
**AATRAYI DAS**
Batch of 2014
Currently pursuing - Internship at WWF India
Where - Assam

I took a year off to consider my options in life sciences and/or other fields. Now that I have graduated and I am preparing for entrance exams, I realise that overall, the topics have been covered in the syllabus. It would have been nice if we were given time off to prepare for entrance exams as the schedule at Christ is too hectic to properly do so.
Christ truly builds you up for life. It made me slog (not enough) and tested my patience. More importantly, it helped me grow as a person and handle all situations without throwing a tantrum. We are Christites after all!

**DRUPAD DURGAIAH**
Batch of 2014
Currently pursuing - MSc. Advanced Biotechnology and Biochemistry
Where - Australian National University

The seminars and extracurricular activities helped to strengthen my resume! Personally, the research projects helped me gain practical skills and field experience, which helped me to apply for foreign universities without any problems. Christ has molded me to tackle any situation with a smile!

**VARSHA BALU**
Batch of 2013
Currently pursuing - MRes. In Marine Biology and Ecology
Where - James Cook University, Australia



Life Science at Christ gave me a lot of in-depth knowledge of my subjects, however, in terms of practical knowledge and application of theory, I personally felt that I was not prepared in terms of what is expected of science undergraduate on a global scale. Additionally, basic statistical programs are a mandatory skill for graduates here and I would've loved to learn that during my time at Christ.
Having done my undergraduate study at Christ with 6 hours of class, several CIAs and homework, my coursework and study for masters was never intimidating!

# AN ANSWER TO ALL YOUR HIRING QUESTIONS

Stemming from Biocon, India's largest biopharmaceutical company founded by Kiran-Mazumdar Shaw, **Syngene International Ltd.** is India's largest contract research organization. Incorporated in 1993, Syngene has state-of-the-art research facilities in a variety of departments in biology and chemistry for integrated drug discovery and development. Over the last 20 years, Syngene has successfully offered their service to over 290 clients, including start-ups, large pharmaceutical, biotechnology, chemical, nutrition and animal health companies all over the world. In 2015, Syngene became listed on the BSE (Bombay Stock Exchange) and NSE (National Stock Exchange) of India. In 2016, they crossed an annual turnover of 10,000 million rupees.

**Dr. Manoj Nerurkar** is the Chief Operating Officer of Syngene International Ltd. He holds a Ph.D. in Pharmaceutical Chemistry from the University of Kansas and a degree in Business Administration from the Wharton School, University of Pennsylvania. He has over 20 years of experience in pharmaceutical development and has been instrumental in terms of both strategic leadership and operational management in underpinning Syngene's growth and evolution over past several years.

**The editorial team spoke to Dr. Nerurkar to gain insight on the hiring process in a client research organization and to find out what an ideal candidate needs, to work in a top research company.**

**What do you look for in an ideal candidate?**
The right educational background is necessary, with experience (if it's not an entry level position). During interviews, we look for candidates who are truthful, especially if they do not know the answer to a question. Ideal candidates should also be able to clearly explain a concept. It's also very important to have the right attitude to learn, to be enthusiastic and to demonstrate real interest in joining.

**Is there some sort of preference between a BTech/MTech graduate or a BSc/MSc graduate?**
Candidates often try to overstretch themselves to give answers when they don't know. As recruiters, we prefer candidates to be honest and to admit that they don't know something. Additionally, we often see that candidates don't listen to the entire question and start answering.
Many candidates have unclear answers without proper flow of thoughts.
Candidates make claims but are not able to give examples to back them up, which often happens when candidates are asked what their strengths are but cannot give examples or incidents that support the adjectives they have used.
We often see extremely unprofessional resume that have grammatical and spelling errors, unclear information, sloppy formatting, etc.

**What do you look for in a resume?**
It's important for your resume to be well edited. Ensure that your resume is devoid of grammatical or spelling mistakes and that the formatting of your resume is consistent and professional.
The information that you include in your resume should be complete. Make sure that there's a logical flow to it and that you also include any unique skills/strengths that you may have.
Additionally, ensure that your references are from reputed personalities that are relevant to back up your skills and work ethic.

**How important is research experience?**
Having research experience is always a plus, but it's not necessary for entry-level positions. More importantly, a candidate needs to demonstrate that he/she can think logically and systematically.

**What is something that you wish all candidates knew?**
All candidates should know the fundamentals of science and why they do what they do.
Theory or practical knowledge - which one is more important?
The right balance of both theory and practical knowledge is necessary. They are complimentary to each other and are not mutually exclusive.

**Do Biocon or Syngene have any training programs for students?**
Biocon offers their Biocon training academy that prepares students for industry. Graduates from this academy are placed in Indian industries.
Syngene has a training academy for 6 months, which prepares students before they are absorbed in.
Both Syngene and Biocon provide internships to students, allowing them to gain research experience.

**Do you usually hire science students for work in other fields (administration, HR, business, etc.)**
Not usually when it comes to freshers.

**How do you feel about an MBA in Biotechnology?**
It depends on the career interest. It doesn't make sense for freshers who want to join science. It's good to gain some industry experience and then get an MBA. It gives you the right perspective.

# MICROBES FOR A SUSTAINABLE ENVIRONMENT

**SAMSKRATHI A SHARMA, 2BCZ**

Microbes are used for a variety of industrial applications like production of antibiotics, alcohol, wine, beer, bread, curdling and even decomposition. But, how about bacteria that mediate plastic degradation, generation of electricity and fuel, and synthesis of various chemicals?

Hydrogen is usually formed as a byproduct of metabolic processes in many bacteria. The 3D crystal structure of photosystem II from the cyanobacterium *Thermosynechococcus elongatus* provides a detailed view of the water-splitting apparatus that could be used as a basis to produce hydrogen from water.

In Microbial Fuel Cells (MFC), the anode and cathode are separated by an ion exchange membrane, and a solution consisting of organic matter and microbes is used as fuel. The cathode is exposed to air on one side, and the solution containing the biodegradable substrate is present on the other side. The anode chamber containing the bacteria is sealed off from oxygen. The electrons and protons released travel thereby producing electricity.

It maybe interesting to note that *Shewanella oneidensis* and *Geobacter sulfurreducens*, produce electrically conductive appendages (called bacterial nanowires) under anaerobic conditions. These nanowires facilitate direct transfer of electrons to the anode, hence greatly increasing efficiency and reducing significant costs. Sometimes, both hydrogen and electricity is formed as byproducts of the same metabolic pathways.

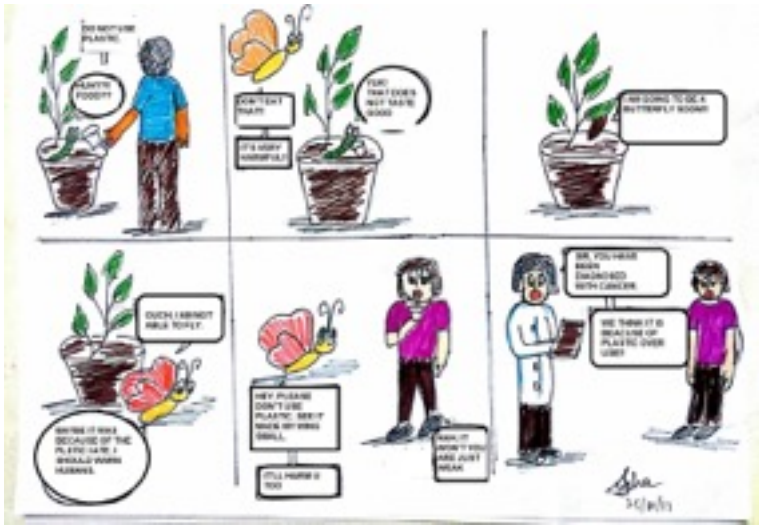
Microbial electrosynthesis (MES) is a process in which electro-autotrophic microbes use electrical current as electron source to reduce $CO_2$ to multi carbon organics. The net outcome is that renewable energy is stored in the covalent bonds of organic compounds synthesized from greenhouse gas.

Hey, then what's the fuss about? Why don't we implement this save our world? All the techniques mentioned above are excellent sources of clean and sustainable energy. Just some tweaks and we'd be good to go. These alternative sources can help us make the best out of our waste and use our resources in a sustainable manner.

# CATERPILLARS THAT EAT PLASTIC

ARINDAM PAL, 6BCZ

Recently, there have been some caterpillars that are suspected of nibbling through polyethylene plastic, which are thought to harbour a diverse community of digestive bacteria. This was reported by the researchers on November 13 at the annual meeting of the Society of Environmental Toxicology and Chemistry North America.



CARTOON BY SNEHA SRIVATSA, 6BCZ

Polyethylene is an extensively used polymer for the production of plastic bags and other packaging materials. However, it remains around in landfills for decades, perhaps even centuries. Recently, scientists have identified several species of caterpillars that apparently eat and digest the plastic, thereby degrading it into simple units. But it isn't wise and practically inefficient to dump old shopping bags into cans of caterpillars. So, to figure out more about the insects' secrets, researchers fed polyethylene to the larvae of pantry moths, *Plodia interpunctella*, and then looked at the bacteria in the caterpillars' guts. Caterpillars that were fed a control diet of bran and wheat had more prevalence of *Turicibacter*, a group of bacteria commonly found in animals' digestive tracts. But the caterpillars that munched on the plastic had a much more diverse variety of bacterial and fungal community. Specifically, they had high levels of a few types of bacteria such as *Pseudomonas*, *Rhizobiales* ,*Tepidimonas* and Methylobacteriaceae. It has been shown that some of the species of bacteria have proven to colonize and help degrade plastics in the ocean as reported by study co-author Anisha Navlekar of Texas Tech University in Lubbock. As a result, we can clearly see a commensal behaviour between the caterpillar and the bacteria. It is about time that we find more such species to go ahead in the path of degradation of plastic.

# PLASTIC FROM BACTERIA

PALLAVI SENGUPTA, 6BCB

The use of a large number of non-biodegradable plastics have posed a severe threat to the environment. These non-biodegradable petrochemical plastics accumulate in the environment at the rate of 25 million tons per year. These plastics also reach the water bodies like lakes, ponds and even oceans, contaminating the water and even affecting aquatic life. There have been many cases where loads of plastic was found in a whale's stomach or a straw was stuck inside a turtle's mouth, making it difficult to breathe. Hence, to combat this problem, scientists have discovered PHB or polyhydroxybutyrate which is a biodegradable plastic and has the same mechanical properties as that of non-biodegradable plastic. It has been found that there are a few bacteria which produce this PHB. Such bacteria have been cultured in labs, following which PHB is isolated and produced at a large scale.

PHB is a polyester produced by some bacteria under unfavourable conditions like lack of essential nutrients, extreme temperatures or excess of a particular carbon source. This polyester acts as a substitute for the essential nutrient or helps the bacteria to survive in the excess of carbon source. The polymer is primarily a product of carbon assimilation either from glucose or starch and is employed by the micro-organisms as a form of energy storage. It occurs in both Gram-positive and Gram-negative bacteria. The amount of polymer produced depends on the type or species of bacteria. Microbial biosynthesis of PHB starts with the condensation of two molecules of acetyl CoA to give acetoacetyl CoA which is reduced to hydroxybutyryl CoA. This compound polymerises to PHB. A few bacteria that produce PHB are *Pseudomonas aeruginosa, Bacillus subtilis, Bacillus megaterium* and *Ralstonia eutropha.*

# CORPORATE RESPONSIBILITY FOR A SUSTAINABLE ENVIRONMENT

VEMURI SAI GAYATRI, 4BCB

Most articles and awareness programs about climate change tend to focus on the individual's impact on the environment. Segregate your waste, they say. Cycle to work. Don't leave the tap on while brushing your teeth. These are good habits, but the information being supplied is incomplete. A PowerPoint presentation shown routinely at work will mention 'industries' as a reason for pollution, then move on to why your bathing habits are causing climate change. They don't mention which industries are the worst offenders or the legal and economic constraints against them. They don't tell you some of your favourite brands are probably dumping tonnes of chemical waste into water bodies while you read this.

The 'why's of this silence are a subject for another time. What is important right now is the fact that the majority of adults worldwide have a deplorably minimal knowledge of how corporates affect the climate. The 2017 Climate Survey: Evaluating Progress on Climate Change, conducted by GlobeScan and SustainAbility asked global sustainability experts representing business, government, NGOs and academia to evaluate progress made by the global community on addressing climate change and on the Paris Agreement of 2016. It was found that 55 % of sustainability experts surveyed believe that global climate progress will not occur fast enough to avoid the worst impacts of climate change and 30 % think that at least some progress has been achieved on the Paris Agreement goals. Experts cite slow or lack of global government action and oversight as the biggest barriers to effective implementation of the Paris Agreement. Continued focus on economic growth at the cost of other priorities is also viewed as a major roadblock. Experts named Unilever and Tesla as global corporate leaders in addressing climate change. The top ten also includes Apple, Google, GE, IKEA, Patagonia, Interface, and Walmart.

Greenhouse gas emissions are a fairly good indicator of a company's impact on the climate. The Carbon Majors Database stores greenhouse gas (GHG) emissions data on the largest company-related sources of all time. The CDP Carbon Majors report of 2017 report was the first in an ongoing series of publications aimed at using this database to highlight the role that corporations can play in driving the global energy transition.

In the 28 years since 1988, more than 833 billion tonnes of carbon dioxide have been emitted, compared with 820 billion tonnes in the 237 years between 1988 and the birth of the industrial revolution. Half of global industrial GHG emissions can be traced to just 25 corporate and state producers. The highest emitting companies since 1988 that are investor-owned include: ExxonMobil, Shell, BP, Chevron, Peabody, Total, and BHP Billiton. Key state-owned companies include Saudi Aramco, Gazprom, National Iranian Oil, Coal India, Pemex, and CNPC (PetroChina). The 100 companies studied in the report accounted for 71% of global industrial GHG emissions. At present, investors in fossil fuel companies carry influence over one fifth of industrial GHG emissions worldwide.

Even companies that advertise themselves as being environment friendly may not necessarily be so. Indeed, there is a term for misleading customers about this: greenwashing – the corporate practice of making diverting sustainability claims to cover a questionable environmental record. Advertisements usually include showing employees cuddling fluffy animals and encouraging consumers to engage in some ostensibly 'green' activity like reusing their bags or bottles.

Meanwhile, the same companies continue to follow practices that lead to large scale pollution of the atmosphere, water, and local ecosystems. They continue to sell billions of dollars per year worth of environmentally damaging products. The Guardian, an independent reporting site, has covered this particular issue at length.

It is important for legal constraints to tighten around the private sector. Forcing companies to go public with their impact on the environment would go a long way towards ushering in sustainable corporate practices. The 'woke' consumers of this century are far more likely to prefer environment friendly products over others, and investors go where public interest lies. But for this to happen, the people must first be conscious of corporate responsibility for the environment.

A graph saying a particular country is the worst polluter in the world is not going to change anything unless people know who or what exactly is causing their nation to have horrendous statistics. If not, the numbers will remain just that: numbers. And they will continue to rise. Industries, with their gigantic impact on the planet, must be held accountable for their actions.

It is, to paraphrase the tweet that inspired this article, time to stop guilting the average person into believing that climate change is their personal responsibility for not taking 15 second showers and leaving the lights on during Earth hour. These things are good and helpful. But they will be fundamentally pointless if responsibility is not laid at the feet of those whose actions have consequences far outstripping the benefits of well-meaning personal habits. Awareness produces questions and questions produce actions. We need to educate ourselves. We need to ask: Who is doing this? Why? Do they have better alternatives? And most importantly - who is going to make them change?

## THE WORLD OF EDIBLE CUTLERY

**HARSHADA H, 4BCZ**

Did you ever think you could eat your cutlery too?

Well, edible cutlery is now available in your nearest market, to provide an effective alternative to disposable cutlery.

Plastic contains chemical complexes, several of which are neurotoxic and carcinogenic. These leach into food. In fact, even the so-called 'food grade' cutlery has permissible levels of leaching of 60 parts per million (PPM). When you know that the substances that leach into your food can cause cancer and have a fatal impact on your nervous system, why should you even allow one part of a million?

On the other hand, edible cutlery is made from healthy, nutritious, edible substances. This cutlery is made of jowar (a millet grain), blended with rice and wheat. They do not contain preservatives/ chemicals/fat/plasticizers/emulsifiers/artificial colours or milk products except salt for taste. They can also be made of other grains that are easily available in the local region. These spoons come in different flavors – plain, sweet and savoury. These spoons, if thrown away in moist soil or water, disintegrate within three days.

These spoons are available online for sale. As of now these spoons are a bit expensive, but once it becomes common amongst the general public, the cost is bound to reduce. This is one of the most effective ways to save the earth from being polluted any further. These cutlery should be promoted and made easily accessible to the public. Afterall, It's 100% Natural, Biodegradable, Vegetarian and even Vegan.

So, come! Let's join hands to promote edible cutlery and save mother nature from being degraded any further.

## MY INVISIBLE TEARDROPS

**EPSITA MUKHERJEE, 4BCB**

I started my journey from the mountain highest,
The one, you know proves to be greatest-
Through small and glistening rocks I peeped,
My quality here was the best indeed!
Slowly I got my flowing speed,
Having innocence like a very little seed.
I flowed through the innumerable cities,
Those creatures treated me like their deities!
Worship and prayer to me made me happy,
My banks had many flowers, especially poppy.
But this did not stay permanent,
As my water turned black from translucent.
The daily acto cities of those creatures made me think,
After they continued to treat me as a sink-
Of all waste and trash around,
Do you do this because I have no sound?
You bathe your cows and ox here;
You can are dead creatures too,floating, on coming near!
My purity has been culminated into hazard,
Would you do it if it was your own yard?
Those creatures have stopped worshipping me now,
Yet they will not accept their fault and bow.
Though my year droplets are invisible to you,
Yet once you will realise that if you save Ganga, I will greatly save you too!

# DEPARTMENTAL ACTIVITIES 2017-2018

**Guest Lecture on the Demise Of Arctic Ice by Dr. Vishnu Nandan**
**Feb 2018**

**Alumni Guest Lecture by Ms. Shailaja Seetharaman, followed by Panel Discussion on Areas of Higher Education**
**Jan 5, 2018**

**Telemedicine In Space By Dr Thais Russomano, Faculty, Department of Life Science and Medicine, King's College, London and Director of Innova Space**
**Dec 13, 2017**

**Inauguration Of PG Life Science Lab**
**Dec 4, 2017**

**Guest Lecture on the Applications of Biotechnology in Medicine by Dr Sreesha P Srinivasa, Associate VP of Biocon Ltd, Bangalore**
**Dec 4, 2017**

**Guest Lecture on Careers in the Life Science Sector by Dr. Kshitish Acharya, Founder/Director, Shodhaka Life Sciences Ptv. Ltd.**
**Nov 29, 2017**

**Life Science Fest, Jeevotsav**
**Aug 23, 2017**