



RASAYANI

VOLUME 20
2020-21

FROM THE CHEMICAL SOCIETY OF MIRANDA HOUSE: RASAYANIKA

CONTENTS

MESSAGE FROM TEACHER-IN-CHARGE	01
MESSAGE FROM STAFF-ADVISORS	02
FROM THE EDITOR'S DESK	03
EDITORIAL TEAM	04
MESSAGE FROM THE PRESIDENT	05
NON-TEACHING STAFF	09
UNION MEMBERS	11
DIGITAL TEAM	12



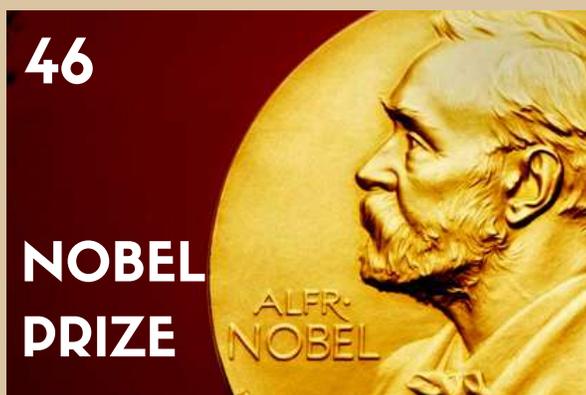
CHEMISTRY OVER THE YEARS 13



EVENTS AND ACCOLADES

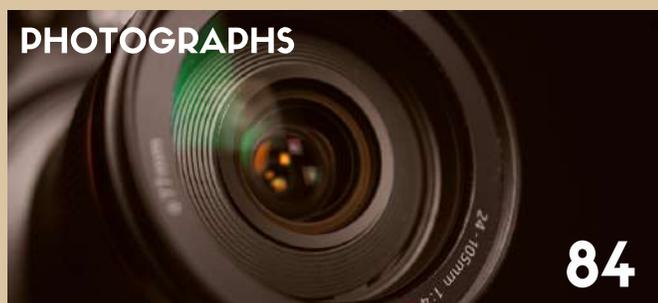
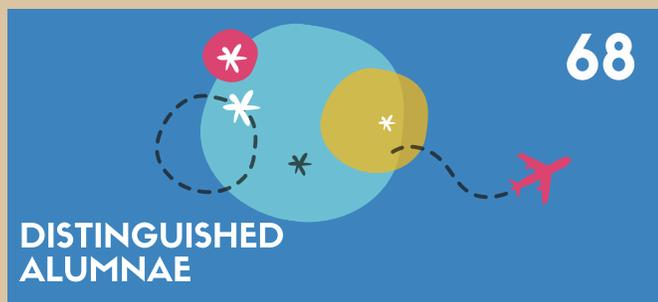
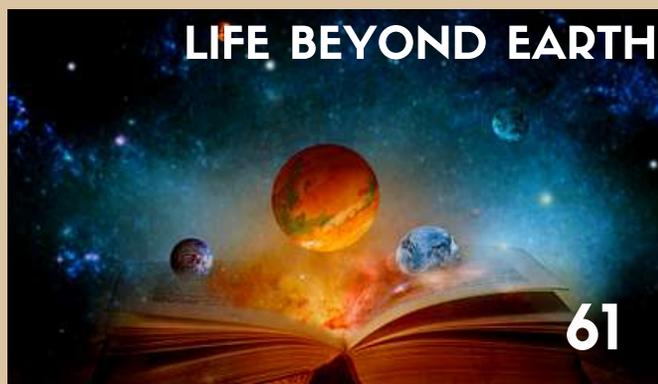
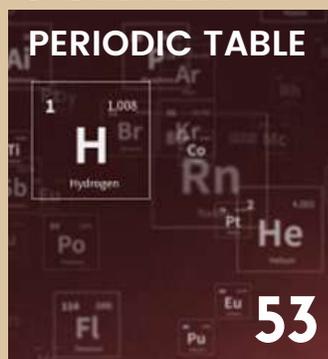
30-45

ANNUAL REPORT 2020-21	31
OUR ACHIEVERS	33
FRESHER'S PARTY 2021	35
TEACHER'S DAY 2021	36
CHEMISTRY-THE CATALYST FOR CHANGE (WEBINAR)	37
FAREWELL 2021	40
PRATIKRIYA (THE ANNUAL FEST)	41
LEARNINGS FROM THE CORONA PANDEMIC (WEBINAR)	43
IPR, PATENT AND CHEMISTRY (WEBINAR)	45



CARBON	56
RECENT ADVANCEMENTS	58
VIRTUAL LABS	59
DE-BROGLIE'S PRINCIPLE	63
WHAT'S MEME-ING	64
SKETCHBOOK	65
PUZZLES	67

CREATIVE CORNER 51



MESSAGE FROM THE TEACHER-IN-CHARGE

I feel privileged to write this note on the release of this issue of Rasayani- e-magazine of Rasayanika, the Chemical Society of Miranda house. Rasayani is more than just documentation of the events. This magazine manifests and conveys what Rasayanika, the chemical society stands for. It is about learning that supplements classroom knowledge. It's about learning outside of the classroom to augment classroom knowledge. It's all about highlighting things that we perform as a society all year long to emphasize the concept of experiential learning. This magazine is an annual dossier of moments and experiences. We can relive the past year by flipping through the pages of the magazine and can feel proud for building one more valuable year in our success story. For our students, this magazine acts as a platform to express their emotions, to put across their opinion and to share the findings. We have been passing through difficult times. The COVID 19 pandemic has impacted all spheres of human activity. Last year has been challenging with respect to teaching and learning environment with curricular and co-curricular activities moving to online platforms. The academic and student community has shown resilience to adopt to this new scenario. I feel proud to be part of this community. I wish all the best to staff advisors, student office bearers and the editorial team of the society. I congratulate them for the release of the current edition and hope to witness the same enthusiasm each year.



Dr. Sharda Mahilkar Sonkar
Teacher-in-Charge
Department of Chemistry
Miranda House

MESSAGE FROM THE STAFF-ADVISORS



It is a matter of great pride that the students of B.Sc. Chemistry (H) are bringing out Rasayani, the annual magazine of Rasayanika, the Chemical Society of Miranda House, this academic year. The main objective of Rasayani is to stimulate young minds and to bring out inquisitiveness, passion, and the thirst for acquiring knowledge in the various frontiers of sciences. It signifies the closure of the year-long journey of society's endeavours. It is the constant efforts and contributions of students which play an important role in apprising students' writing skills, originality, and unlocking new opportunities and creativity. It reflects the hidden talents and acquisition of new skills, knowledge, aptitude and, above all, right attitude that enhances each student's ability to

apply learning in many ways. We, the staff advisors appreciate and are overwhelmed to see the responses of the students in submitting the articles to the magazine. The magazine includes a diverse range of articles from college life, events, achievements, poetry, and scientific findings to personal experiences. The President of Rasayanika, Faguni Agrawal, has been very well-organized and diligent in carrying out her duties. The Vice President, Kalpana Mahala, and General Secretary, Garima have been supportive and have actively involved themselves in social activities. The Joint Secretary, Nikita Saharan has efficiently organized events on time. We would like to acknowledge the team for their efforts to complete the targets enthusiastically and energetically. We thank the Editorial board Raveena Kumari (III year), Renu Yadav (II year), Kritika Gaur (II year), Devershika Pandit (I year), and our talented Digital team Aditi Sharma (III Year), Muskan Singh (III year), Ekta and Vanshika from the first year for their hard work and dedication in bringing up this magazine. All of them have devoted themselves wholeheartedly to Rasayani, which is highly commendable. I thank the authors and the editorial board for effectively weaving the contributions. We thank all the faculty members and laboratory staff of the Department of Chemistry for their involvement and assistance in the Society activities. We are grateful to Dr Bijayalaxmi Nanda, the Principal, for her interest and immense support. We wish all the students, the best of luck for future endeavours and wish that each one of you grows from strength to strength to touch the lives of many people in our society and to become responsible individuals.

Dr. Deepti Rawat
Dr. Poonam
Staff Advisors
Department of Chemistry
Miranda House

FROM THE EDITOR'S DESK

“Tell me and I forget. Teach me and I remember. Involve me and I learn.”

- Benjamin Franklin

Dear Readers,

In these difficult and testing times, we are all navigating through uncertainty for ourselves, our loved ones and our community. We hope you are staying safe and healthy.

Our much-awaited 2021-22 edition of Rasayani, the annual magazine of Chemistry Department, Miranda House, is finally on course and we have made immense endeavours to bring you this edition filled with inspiration and information as intended. We feel honoured to be associated with Rasayani and today releasing it to see the light of the day.

As you flip through the pages, you will not only have a glimpse of the best that Rasayanika has to offer, but also the finest pieces of writing and design produced by our chemistry enthusiasts!

The above quote rightly goes along the lines of our experience of editing Rasayani. Compiling this edition has put our grey cells to intense activation and we hope it will help you increase your knowledge and creativity too. You are bound to be amazed by the creative corner, tickled by amusing memes, and puzzled by the games we have put for your cherish.

Now, it is the time to put an end to our discussions and debates over best fit layout and stuff, but to finally present you the magazine we have put our efforts in. So get ready to revisit the cheerful day of celebrations and absorb tons of knowledge.

Last but not the least, we would like to extend our sincere gratitude to the passionate staff advisors and all the members who contributed to the smooth fulfilment of the edition.

We are very proud of the work unveiled here by our imaginative, inventive minds who have made this issue possible, yet any error is deeply regretted. We hope our efforts bring you the willful knowledge and zeal!

Wishing you a very happy reading!

Thank You.

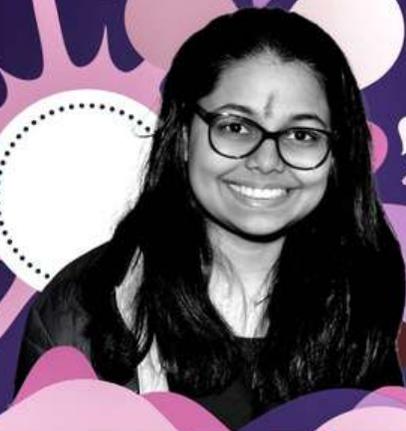
- EDITORIAL TEAM

EDITORIAL TEAM



RAVEENA KUMARI

THIRD YEAR



RENU YADAV

SECOND YEAR



KRIKA GAUR

SECOND YEAR



DEVERSHIKA PANDIT

FIRST YEAR

RASAYANIKA
2021-22

FROM THE PRESIDENT

Somewhere I did read a quote saying, “Your life does not get better by chance, it gets better by change”, and now I can firmly say, entering Miranda House was “the change” I had looked for! Being admitted in Chemistry Hons., I was a rightful member of the Chemical Society, Rasayanika, and then there came the day when I was elected as the president of the same. The day is memorable and so is the experience of serving Rasayanika as its president. I would say it was like adding more candles to the already nicely iced cake.

Each day has been rewarding as it promised, bringing new learning along with it. As an individual, it helped me to believe in myself, my actions and my ambitions. I learned the essence of being a leader and the ignored position of a learner. It was only after this that my skills improved in leaps and bounds. The post made me realise the sharp difference between sitting for an event and setting that event. Although, it was not a cakewalk all the time, at least not when things are confined to online platforms only. There were times I made mistakes, doubted myself, felt intimidated by the work. But as said before, the courage of overpowering these odds came from the society itself. And for this, I extend my greatest thanks to my fellow office bearers, Kalpana, Garima and Nikita, for always having my back and keeping me motivated. I am also grateful to all the people who cooperated with me throughout the journey. I owe my teachers for their invaluable guidance and support.

I must say the journey has been bittersweet, inherited with a little extra sweetness. It is my privilege to be a part of Miranda House, a part of Rasayanika, and to share a column in this edition of Rasayani today.

Thank you!

Faguni Agrawal

**PRESIDENT,
RASAYANIKA (2021-22)**





FROM THE PRESIDENT

The journey with the chemical society of Miranda House, Rasayanika, was conducive, engaging and memorable. The year was unique in its way as screens were part of any sort of interaction that we had last year.

I would like to thank all the teachers for inspiring us to be a better version of ourselves by motivating and guiding us throughout our journey and my friends and juniors who put desired and vital efforts into contributing to the causes of this society. Also, the office-bearers whose efforts were pertinent and commendable in making this journey flawless even if it was virtual.

I feel grateful that I was associated with Miranda House and Rasayanika.

You are now on a ship that sails you on a new voyage of opportunities and career establishments. Have the endurance and you will sail through it.

All the best!

Arju
PRESIDENT
RASAYANIKA (2020-21)

TEACHERS' TABLOID



DR. AMRITA T. SHEIKH



DR. MALLIKA PATHAK



DR. SHARDA SONKAR



DR. KALAWATI SAINI



MS. NUTAN RANI



DR. MALTI SHARMA



MS. ANITA



DR. SMRITI S. BHATIA



DR. DEEPTI RAWAT



DR. POONAM



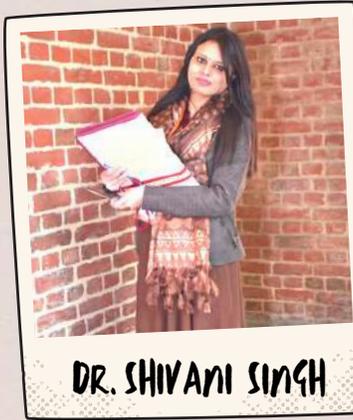
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DR. SUJATA SENGUPTA



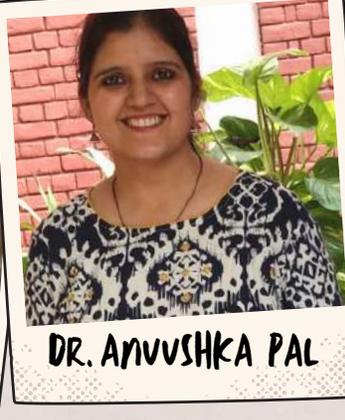
THANKS FOR
BEING OUR
MENTOR.



DR. SHIVANI SINGH



DR. MAMTA SETHI



DR. ANVUSHKA PAL



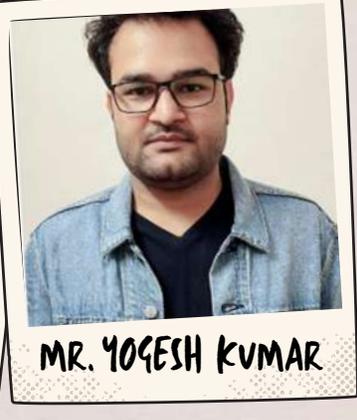
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DR. SHIVANI



DR. PREETI DROLIYA



MR. YOGESH KUMAR



NON-TEACHING STAFF



MR. VIJAY KUMAR



MR. RAVI KUMAR



MR. DEEPAK KUMAR



MR. DEVENDRA SINGH



MR. GAURISHANKAR



MR. SUNIL KUMAR



MR. HARKESH MEENA



MR. SUNIL KUMAR



MR. PRAKASH



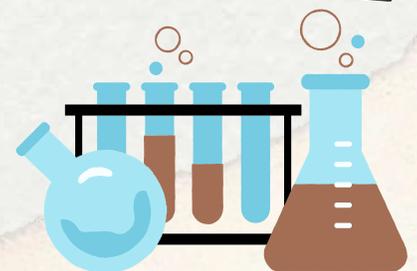
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MR. SUBASH CHAND



MR. AMIT





MR. SACHIN KUMAR



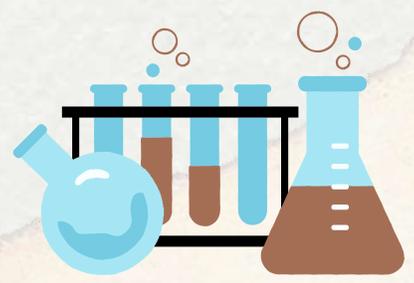
MR. PAVAN KUMAR



MR. SHASHI MOHAN



MR. RAJENDER



UNION MEMBERS



FAGUNI AGRAWAL

PRESIDENT
THIRD YEAR



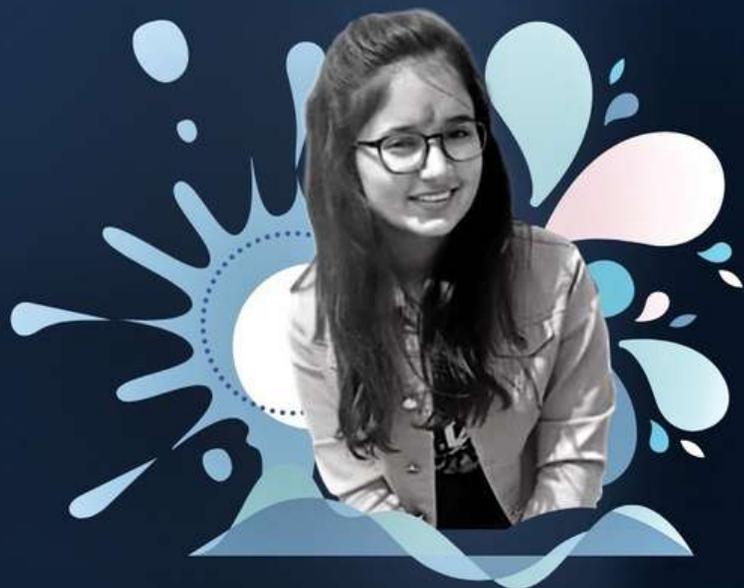
KALPANA MAHALA

VICE-PRESIDENT
THIRD YEAR



GARIMA

GENERAL SECRETARY
SECOND YEAR



NIKITA SAHARAN

JOINT SECRETARY
SECOND YEAR

RASAYANIKA

2021-22

DIGITAL TEAM



MUSKAN SINGH

THIRD YEAR



ADITI

THIRD YEAR



EKTA

SECOND YEAR

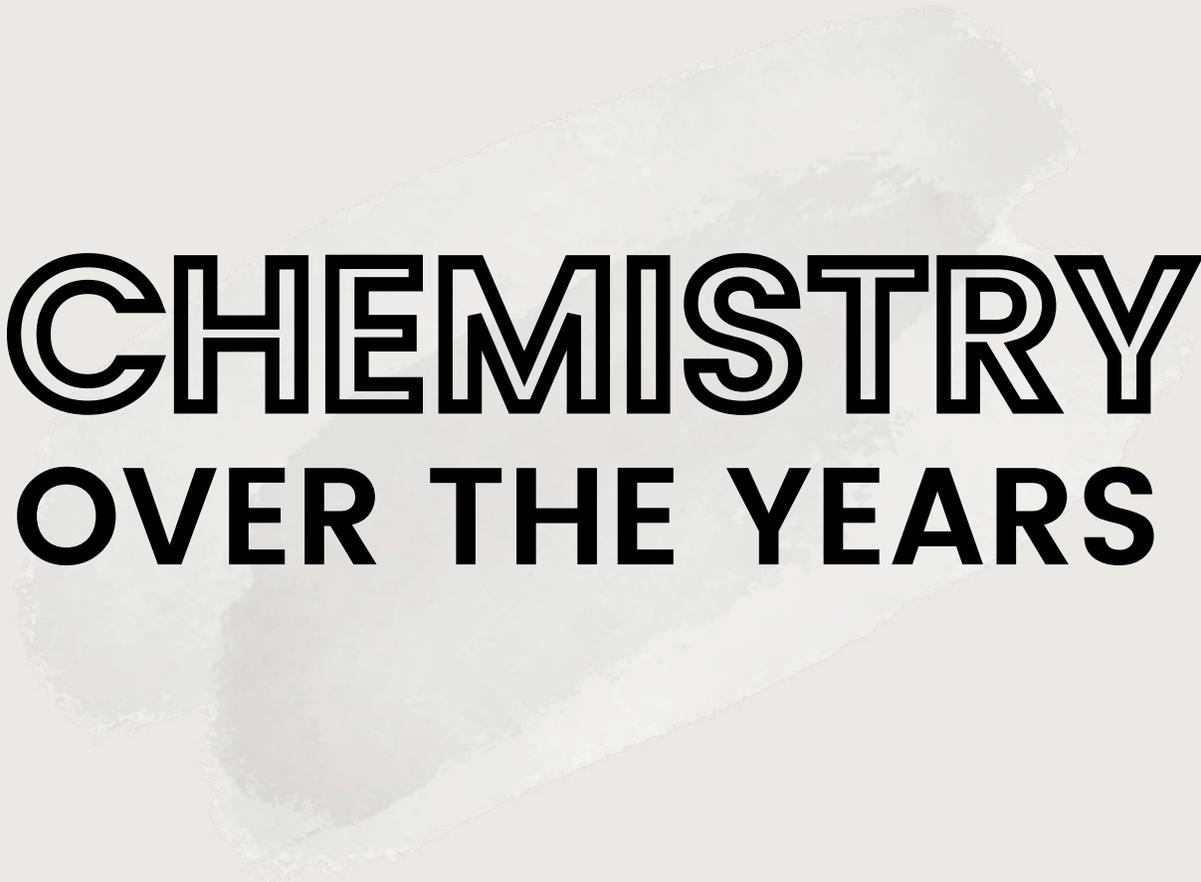
RASAYANIKA

2021-22



VANSHIKA THAKUR

SECOND YEAR



CHEMISTRY

OVER THE YEARS

NEW GENERATION OF PAINTS AND COATINGS

Paint is a generic name for a variety of products that contain a pigment suspended in a paste or liquid media such as oil or water. Coatings are applied in a light coating to various substrates such as timber, metals, or stone with a roller, a brush, or spray gun. Paint's basic function is to shield and preserve the surface on which it is applied, but it also serves as a decorative element. Paint and coatings have been around almost as long as humans have. When humans used to live in caves around 35,000 years ago, men adorned the cave walls with paintings made from natural substances such as chalks, clay and animal fatty products such as butter or grease. Paint and coatings have a global market worth \$86 billion in the twenty-first century.

With the clear up-gradation and advent of chemical technologies, in the future years, the diversification of coverings and their influence on society will be greatly expanded, with an impact far higher than that seen in the previous 100 years. While the first paints were produced in the 19th century, there has been a lot of progress since then, including the introduction of coil coating, synthetic binders, industrial water-based coatings, high solid paints, and powder coatings. In addition to their traditional purpose as ornamentation, coatings are now employed to protect metals as well as buildings from corrosion in the present times. As a result, all leading paint and coating companies are pouring money into research and development to develop materials that are compatible with and suitable for today's harsh environment. Mentioned below are certain current and future prospective technologies of paints and preservative coatings.



NANO MATERIALS IN PAINTS

Nanomaterials are now being employed to optimize the effectiveness of paints and to create new capabilities. Several nano-enhanced paints are already on the market. Because of their special structural qualities such as shape, size, and increased surface area, nanomaterials are projected to improve the present properties of paints. Nanoscale silicon dioxide and titanium dioxide are presently the most important nanomaterials in the paint industry, but silver, aluminium oxide, zinc oxide, copper dioxide, magnesium oxide, and cerium oxide are also being studied.

Nanomaterials can be inserted as loose powders, stabilised particles in a suspension/dispersion, or incorporated into masterbatches or granulate, resulting in the nanomaterial being securely entrenched in the paint matrices, depending on the type of paint and the intended functionality.

NANO SILICON DIOXIDE:

Nano silicon dioxide can improve paints' macro- and micro-hardness, as well as their abrasion, scratch, and weather resistance. Paints with outstanding abrasion qualities can be made by mixing nano silicon dioxide with polymeric resins. However, it reduces the paints' flexibility, which is required to fight the shrinking and swelling caused by changes in temperature and humidity.

NANO SILVER:

The antimicrobial capabilities of surfaces coated with nano silver-containing paint are great against bacteria and human infections. However, contrary to indoor paint, the bactericidal efficacy of nano-silver in exterior paints appears to be insufficient due to exposure to the elements.

NANO TITANIUM DIOXIDE:

Nano titanium dioxide is utilised in paint to take advantage of two of its best qualities: photocatalytic activity and UV protection. A paint's self-cleaning effect is caused by the combination of photocatalytic and hydrophilic qualities. The surface will no longer need to be cleaned on a regular basis because water and dirt will no longer adhere to it. However, studies have shown that using photocatalytic nano titanium dioxide in organic paints causes the binder to degrade when exposed to UV light. As a result, in organic facade coatings for UV protection, the rutile type is favoured.

MARINE COATING SYSTEMS

In both sea and freshwater conditions, marine coating systems are applied to vessels and coastal constructions. Marine coatings have unique functional characteristics that give enhanced protection against corrosion to the surfaces they are applied on. Corrosion and abrasion resistance are also provided by marine coatings. Antifouling paints are specialist paints that are put to the hull of the ship to slow down the growth of marine life in the undersea area, which can impact the vessel's performance and longevity. Aside from avoiding marine growth, the hull coating can also protect against hull corrosion, which weakens and degrades the metal. Antifouling paint, which is applied to the underside of ships' hulls, inhibits the spread of microorganisms that adhere themselves to the hull. Its self-polishing epoxy and biocide, including cuprous oxide and a booster biocide, help to keep biofouling organisms at bay. Following are the various coating systems: Enzyme-based coating systems, new biocide-free, two-component, fouling release coating. copper-free antifouling coating, self-adhesive /fouling-release coatings, nano antifouling coating.



PAINTS AND COATINGS WITH BIO-FUNCTIONAL PROPERTIES

Bio-based chemicals have been utilised in the formulations of solvent for paints instead of petroleum-derived compounds such as polyurethane, epoxy, paint/coating technologies due to the trend of utilising fewer damaging chemicals for the environment. Bio-based conjugate compounds, for example, are being employed in place of petroleum-derived polyols in the formulations of water-based polyurethane technologies under development. Bio-functional paints are becoming more popular as a result of global environmental trends.

SMART COATING

Over the next few decades, the most fascinating area of development in paints and coatings will be increased coating functionality and the development of so-called "smart coatings." These coatings can intelligently respond to external stimuli and can be categorised in a number of ways, including the functional elements of the coatings, their application, and production methods. These new coatings are expected to open up an array of different functionalities and play a vital role in the evolution of the paint and coating business. This includes changing the colour of our living room as the temperature changes, usage of temperature-sensitive windows in cars that can switch from heat adsorption during the winters to heat reflection in the hot summers, sensitivity to gas and electricity that allows them to change colour on instruction and warn of power outages or chemical spills, and the possibility of TV screens painted on to the walls using electrical conducting coatings. Self-healing coatings, for example, use reversible chemistry, encapsulation, a microvascular system, nanoparticles and monomers phase separation, and vacuous fibres to spontaneously repair themselves. However, the majority of these systems have significant chemical and mechanical restrictions, limiting their application in paints and coatings.

A PAINT THAT KILLS MICROBES WITH CUPROUS IONS

Following the covid-19 pandemic, the Environmental Protection Agency recently stressed the importance of supplementing efforts to develop paints and coatings that can combat SARS-CoV-2 with coatings and surface treatments that provide long-lasting effectiveness against viruses and other bacteria. Corning is a manufacturing firm that aimed to mark the use of copper in paints and coatings. Although elemental copper has a long-term antibacterial effect, big copper-clad surfaces are costly and unattractive in most settings. Corning created a copper-containing biphasic specific formula and worked to include it into a range of synthetic latex based dyes called Copper Armor to extend the disinfecting potential of copper toward a wider spectrum of surfaces including handrails, walls and other surfaces around the workplaces and homes. The goal was to design a material that retains copper's antibacterial properties while removing its metallic nature and appearance, allowing it to be used in a wide range of surfaces and materials. Cu^+ is the element's active antibacterial form. Paint created with the biphasic ceramic-glass copper material decreased counts of *Staphylococcus aureus*, SARS-CoV-2, *Klebsiella aerogenes*, *Escherichia coli* and *Pseudomonas aeruginosa* on the surface by 99.9%, matching the potency earlier marked by metallic copper using EPA.

ARE YOU BUYING IT RIGHT?

How often have you been to a fruit store and noticed the fruits lying on the shelves? Have you ever noticed why the same fruits, let's say apples, which grow on the same source i.e., a tree, have different appearances, tastes and prices?

The answer lies in the phenomenon of artificial ripening of fruits and vegetables (in case you take the example of a vegetable) as well. Modernization and globalization have made the lives of people much better and standardized as compared to those in the past. In this fast-paced and more competitive world, most individuals want to have the best of everything, be it branded clothes, accessories, daily essentials or even as basic a thing as food and in this race of wanting more and more, people are compromising with their most precious possession i.e., health. It is commonly recommended that in order to live a healthy life, we should consume an ample level of fresh fruits and veggies, which provide us with the essential vitamins and nutrients, particularly Vitamin A and C, that our bodies require. There is an increasing demand for fresh fruits and vegetables owing to the rising demand for a healthy lifestyle. To meet this demand and to make some profits, farmers/traders/vendors resort to the artificial ripening of fruits and veggies by using chemicals. Fruits and vegetables should always be allowed to grow naturally through a typical process, but to meet the requirement of a longer travel distance, they are artificially ripened. Artificial ripening is also used to meet the need for seasonal vegetables and fruits while lowering storage costs and all of this is done at the cost of the nutritional values of the fruits and veggies and the health of the masses as the chemicals used for carrying out artificial ripening are hazardous to health.

BASIC DIFFERENCE BETWEEN ARTIFICIAL AND NATURAL RIPENING OF FRUITS



Natural or organic ripening is a physiological process that transforms fruit into something palatable, edible, and nutritious. Fruits ripen in nature after reaching full maturity through a series of complex biochemical and physical events. The overall ripening variations related to the process are instantly recognizable whether fruits ripen "on the plant" or "after harvest". Fruits change colour, soften, and develop distinctive flavours and aromas as they ripen. Several factors, such as temperature and humidity, serve as catalysts during the ripening process. However, fruit ripening agents stimulate ripening and elicit colour changes in the scenario of synthetic ripening. Even though the appearance of artificially ripened fruits is found to be improved, the smell and taste are reckoned to be compromised, particularly when harvested fruits have been treated without regard for their maturity or ripening status. Furthermore, when the fruits are not mature enough, the amount of ripening agent needed to cause ripening will be much greater than the standard dose.

WHAT ARE FRUIT RIPENING AGENTS?



Ripening chemicals help fruits ripen faster after they've been picked before they're fully ripe. Unsaturated hydrocarbons, particularly gaseous compounds, such as acetylene and ethylene, are among these agents. Calcium Carbide (CaC_2), on the other hand, is the most often used chemical for artificial fruit ripening. These enzymes break down complex polysaccharides into simple sugars, which softens the fruit's peel. Moreover, the aforementioned are the commonly used artificial vegetables and fruit ripening agents:

CALCIUM CARBIDE

When hydrolysed, it produces acetylene, which causes the artificial ripening of fruits. Calcium carbide has been banned by the Food Safety and Standards Authority of India (FSSAI) under the Prevention of Food Adulteration (PFA) Act, 1954. It has been found to be carcinogenic (cancer-causing) and contains traces of phosphorous hydride and arsenic; yet, it is inexpensive and widely available. Calcium Carbide is commonly used in poor countries, even though it is banned in many countries, CaC_2 is commonly used in poor or under-developed countries.

ETHEPHON (2-CHLOROETHYL PHOSPHONIC ACID)

This chemical penetrates whatever fruit it is applied on and then, decomposes the ethylene present inside and hence, ripens the fruits as a result. Further, it is frequently thought to be superior to calcium carbide in terms of ripening time.

ETHYLENE

A very little concentration of ethylene in the air is enough to speed up the ripening process. According to recent research, ethylene affects the expression of numerous genes involved in fruit ripening. This enzyme, too, breaks down complex polysaccharides into simple sugars, which softens the fruit's peel.

RELATED HEALTH ISSUES CAUSED BY THESE CHEMICALS

Calcium carbide (a carcinogen), is known to have negative effects on the whole liver and other regions of the body, regardless of how much you consume. There are also residues of phosphorous and arsenic hydride in it. This has a number of short and long-term health consequences. Weakness, burning sensations in the chest and belly, thirst, diarrhoea, vomiting, burning of skin and eyes, irritation or difficulty swallowing, permanent eye damage, skin ulcers, and irritation in the throat, nose, and mouth are all early indications of arsenic or phosphorus poisoning. Soon after exposure to the chemical, sore throat, wheezing, shortness of breath and cough may ensue. A build-up of mucus in the lungs might occur with increased exposure. Peptic ulcers may develop as a result of long term exposure to the substance. In human beings, acetylene is indeed not immediately harmful if it is within allowed levels, but if it exceeds the permitted limits, inhalation can cause drowsiness leading to complete unconsciousness and can impair the nervous system by generating persistent hypoxia, or oxygen deficit. Headache, memory loss, dizziness, tiredness, mental confusion, mood swings, seizure, and cerebral oedema have all been documented as symptoms of carbide poisoning. Numbness in the hands and legs, cold and moist skin, general weakness and low blood pressure are some of the other side effects. Although the majority of instances of arsenic and phosphorus poisoning are diagnosed before they become lethal, pregnant women are especially vulnerable since the chemical residue in the fruit can cause miscarriage.

WHAT TO DO NEXT?

It is always recommended to consume seasonal and locally accessible fresh fruits and vegetables. Washing fruits and vegetables carefully with running treated water before eating, and peeling the skins of fruits and vegetables before eating are some of the steps that consumers should simply avoid ingesting dangerous chemicals. Because of the dangers they cause, these ripening substances should be outlawed, and the relevant authorities should respond promptly. Though there are standards and regulations in place for artificial ripening with chemicals, more laws are needed. In addition, natural ripening methods and materials should be investigated. Also, as everything changes, so does the season of fruits and so can the choices of a person in case of fruits change. Thus, next time you step to buy yourself some nutrition-packed veggies and fruits, make sure to choose wisely and appropriately as what really matters at the end of the day, besides our love for chemistry, is health.

**RAVEENA KUMARI
THIRD YEAR CHEMISTRY (H)**

CHEMICALS OF CONCERN FOUND IN FRAGRANCE PRODUCTS

Fragrance products can certainly make us and the things in our home smell delightful. Many folks relate the terms perfume and fragrance with alluring bottles of exquisite perfumes and colognes. Imagine yourself in a flower garden, a shady pine forest, a lemon grove on a summer day or, on a tropical island at sunset; the common thing among all these places is refreshing and fresh fragrance. We often think of only bright things when the topic of fragrance pops up. In this article, we will glance over the term fragrance, its history, and the “not so bright side” of the fragrance materials, especially when it comes to the health of a person.



WHAT IS FRAGRANCE?

The fragrance may be a term that refers to any substance or a combination of many substances intended to produce a scent or mask an odour. Fragrance can be obtained from both natural sources (plants, flowers, foods) and synthetically manufactured fragrances normally found in scented household materials. A created fragrance often consists of tens to several individual fragrance chemicals, but it is mostly, simply listed by the generic term “fragrance”.

THE HISTORY OF FRAGRANCE

The perfume was first brought to use by the Egyptians as part of their cultural and religious rites and rituals. A couple of primary methods of using the fragrance at the time were the incense’s burning and the usage of ointments and balms. Perfumed oils were put on the skin for either cosmetic or remedial purposes. During the Old and Middle Kingdoms too, perfumes were kept particularly for religious rituals like cleansing ceremonies. During the seventeenth century, perfume was extremely popular, especially in France. Then, the use of perfumes spread from being limited to the body to being used in household products, clothes, furniture and, so on, as people found natural scents in a variety of products as a medium to mark a symbol of status over others owing to the reason that the process of manufacturing natural fragrances was long, complicated and pricey. The expensive and rare nature of natural perfumes leads to the rise of man-made or in more casual terms, synthetic fragrances. Perfumery’s foundations as all of us know it today were laid by changing tastes and the introduction of present-day chemistry.

WHY IS THE FRAGRANCE A PROBLEM?

Many people associate the word, "fragrance", with something pleasant smelling, such as perfume. We don't often consider the fact that perfumes are chemicals. Fragrance chemicals are, basically, organic compounds that vaporize or volatilize into the air, that is the reason why we can sense and smell them. Fragrance may contain unknown chemicals that are hazardous to one's health.

There are around 3,000 fragrance ingredients declared by the International Fragrance Association (IFRA) to be currently in use in fragrance and exposure to such chemicals might even cause severe headaches; nausea; nose, throat, and eye irritation; loss of coordination; forgetfulness; other respiratory or neurotic symptoms.

Many of the aromatic ingredients are respiratory sensitizers and irritants that can exacerbate asthma attacks and sinus problems.

Some major classes of synthetic chemicals that are often used in fragrances and not labelled by manufacturers, and the adverse effects on health caused by them are following:

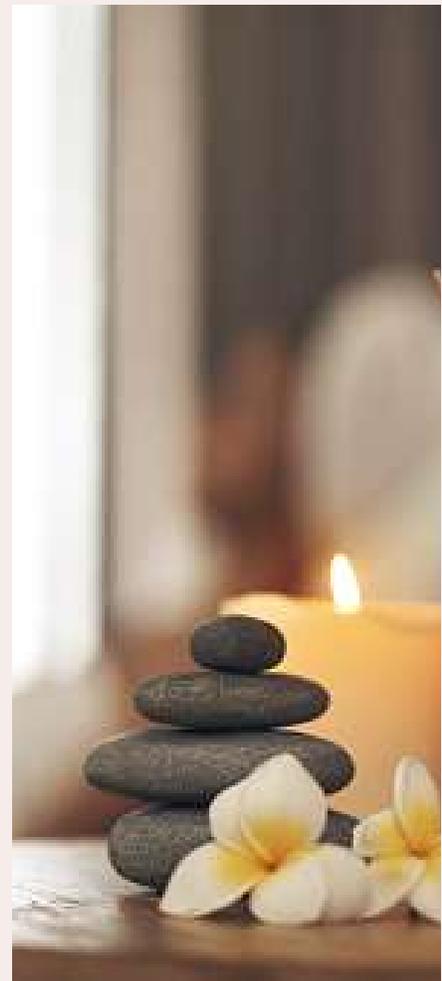
SYNTHETIC MUSKS

Artificial or in simple terms, synthetic musks are used as ingredients to impart a fragrance to cleaning and personal care products. The most widely used types of musks present in consumer products are nitro-musks (e.g., musk ketone and musk xylene) and polycyclic musks (e.g., galaxolide and tonalide). These synthesized chemicals get into the human body by absorption through the skin, inhalation of products, and consumption of foods such as crabs and fish that are exposed to these chemicals. Regular usage of musk-containing products showcases an adherence to a greater accumulation of these chemicals in the body and the environment. It is indicated by research that synthetical musks can bio-accumulate, are persistent and potential hormone disruptors, and may even weaken and break down the body's natural defences against toxic chemical exposure.

PHTHALATES

Phthalates are a group of chemicals used in fragrance, which do not actually contribute to an aroma like plant essences or musks do, but rather act as carriers and solvents for those chemicals that produce scent in a fragrance.

Several types of phthalates, including dimethyl phthalate (DMP), diethylhexyl phthalate (DEHP), dibutyl phthalate (DBP), di-isononyl phthalate (DINP), di-isobutyl phthalate (DIBP), and diethyl phthalate (DEP), are known constituents in fragrance. Endocrine disruption, reproductive and developmental toxicity, and cancer are principal health concerns related to phthalates used in fragrances.



BENZOPHENONE

Benzophenone is utilized as a fragrance intensifier or to stop products such as soaps from losing colours and scents. Benzophenone is associated with organ system toxicity and endocrine disruption, and experimental studies suggest that benzophenone may result in several kinds of tumours. Benzophenone derivatives like benzophenone-1 (BP-1) and oxybenzone (BP-3) have the potential for disruption of the endocrine system. Benzophenone is also listed among the list of possible human carcinogens which means that it is potent for causing cancerous cells' growth in living cell tissues.

ESSENTIAL OIL MIXTURES

Despite being "naturally derived," some essential oils are allergens, and their allergenicity is comparable to that of synthetic fragrance ingredients. Inhalation or skin absorption of allergens in aromas and fragrances can cause eye and skin irritation, as well as more serious consequences such as problems in breathing.



PARABENS

Parabens are chemical compounds derived from para-hydroxybenzoate (of Hydroxybenzoic Acid). These are used as pocket-friendly, man-made preservatives and microbial agents for an array of personal care, pharmaceutical, and food industry products, keeping them free from the growth of bacteria and fungus. Common compounds you may find on an ingredients list include methyl (E218), ethyl (E214), propyl (E216), and butyl (E209) p-hydroxybenzoate. Parabens are fat-soluble and absorbed into the body through the skin and the abdominal and intestinal tract. Parabens are xenoestrogens, which are synthetic compounds that mimic oestrogen despite chemical differences. Parabens stimulate cell proliferation in human breast cancer cell lines, according to research, with isopropyl and isobutyl parabens having the strongest proliferation effect. Parabens have also been involved in the occurrence of early puberty in children, disorders of the reproductive system, infertility and unintended effects during pregnancy. Exposure of females to isobutyl paraben during pregnancy has also been found to be related to behavioural changes and anxiety in their offspring.

And the list doesn't end here. Thousands of these kinds of ingredients are mostly present in fragrance products be it household cleaning products, perfumes, body care products, and so on, which are undoubtedly hazardous for humans, animals, and the environment as well. Thus, next time, when you have to buy yourself something safe and healthy, read the label carefully and make sure to avoid the products containing any of these chemicals.

THE TIMELINE OF DRUG DEVELOPMENT

While taking a small bead sized tablet, little did we understand the painstaking efforts required by it. The development in drug production is the quintessence of substantial growth in sciences. For millennia we have been taking medicines for one or another purpose. Back then, different plants and minerals were the only aid available to treat any illness. And not surprisingly the concept behind these was more religious than scientific. For years people used remedies on the basis of trial and error with an unclear idea of how the body works and how exactly the thing they are taking will cure the effect. For example- In mass numbers, people used opium to treat pain rendering them oblivious to its addictive nature. In the next hundred years, scientists started working in a range of areas, including chemistry, biology, pharmacology, and medicine, and this was the time modern pharmaceutical medicine was invented.



In the late 18th century, the study of the actions of drugs and how they exert their effects began to emerge. In the 1780s, William Withering was one of the first people to study and isolate the active ingredient in a herbal remedy. Friedrich Sertürner, a German scientist, in 1804 prepared a medicine by extracting the main active chemical from opium and named it morphine, after the Greek god of sleep. In 1820, Quinine, a cure for malaria came. In 1877 Paracetamol was invented and in the 1890s scientists first made aspirin from the bark of the willow tree. These are still used to treat headaches, fever and inflammation. The first life-saving antibiotic, penicillin, was accidentally discovered in a lab in 1928. In the decades that followed, scientists dedicated more time to learning how different compounds interact with disease-causing cells and organisms. In addition, they investigated how these compounds interact with the human body to ultimately determine if they can become new drugs.



So from mere knowledge derived from empiricism now the drug discovery has moved to year-long laboratory work and incalculable trials. The initials of a drug discovery included the screening of >100,000 compounds per day, applied to chemical “libraries” containing several million compounds. In this stage, only the compounds with one specific biological activity are refined which are further filtered to eliminate any less welcomed toxicable profile present. Considering the low success rate, R&D at any one time generally looks at many different substances in the pipeline.

With all the wondrous potential the pharmaceuticals have revolutionized life; they are associated with enormous costs and high risks. Furthermore, environmental impacts are a continuous concern. Also, the traditional drug development models are widely perceived as lengthy and unreliable in terms of success.

Thus nowadays scientists are indulged in discovering, developing, and manufacturing drugs in dramatically different ways. The advancing artificial intelligence allows them to go from screening millions of compounds to tens or hundreds of millions. The pathways behind the cause of any disease and patient response to a particular drug are now better elicited by Genomics. Collaboration, crowd-sourcing, data sharing and open-sourcing for drug development are some of the new strategies pharmacists are looking forward to. Undoubtedly with these advancements, the new era of drug development is barely inches away.

KRIKA GAUR
SECOND YEAR CHEMISTRY (H)



THE TIMES OF WAR



I NEVER SAW NO MIRACLE OF SCIENCE THAT DID NOT GO FROM A BLESSING TO A CURSE.

-Sting



The above quote is just perfect in the context of this article. World wars are the devastating sights of the curse that science can prove to be. The scare that these wars created in everyone's mind are something that can never be forgotten. People wanted peace but didn't strive for it. The hunger for power ate everything.

The year is 1914 when an international conflict went gruesome exposing the ugliest face of mankind. There were a lot of advances in the field of chemistry by the twentieth century. That advancement brought the era of chemical weapons. World War I can be considered as the dawn of chemical weapons. The three most significant chemical weapons that World War I introduced were Mustard gas, Phosgene and chlorine.

Bis(2-chloroethyl) sulfide, infamously known as mustard gas, was one of the

deadliest chemical weapons of WWI. Used by Germans against British and Canadian soldiers near Ypres, Belgium, in 1917 for the first time, this was called the dubbed King of the Battle Gases. It is also known as yperite as it was used in Ypres for the first time.

Hours after exposure, it causes irritation in the eyes and blisters on the skin. This gas caused temporary blindness to Hitler when he was a soldier. Its vapours cause chronic respiratory disease when inhaled and extensive breathing can even lead to death. It can even cause permanent blindness if exposure is for a longer time. Mustard gas caused the highest number of casualties during the war. Sulfur mustard vapour is heavier than air, so it settles down in low-lying areas. Not just the war with humans, it also waged a pretty dangerous war with nature.



It contaminated land and affected the biological activity of soil.

Another trojan horse of this war was phosgene. Unlike mustard gas, its effect was immediate. Formed by the oxidation of chloroform, this gas caused 85% of the total fatalities of the war. World War I ended with 1.3 million casualties caused by chemical weapons. This included 90,000 to 100,000 fatalities, primarily from phosgene. It was a stealthier weapon that ultimately led to death by suffocation.

Chlorine was another deadly weapon. It caused asphyxiation (lack of oxygen). Its greenish-yellow clouds led to a deadly massacre.

In 1975, Geneva Protocol was adopted by the League of Nations. The protocol bans the use of chemical and biological weapons. There were some flaws in that treaty. It did not prohibit the development, production and stockpiling of such weapons. Not abiding by the Geneva Protocol, Nazis used chemical weapons in their concentration camps. The USA used napalm and the herbicide Agent Orange during the Vietnamese war. The Chemical

Weapons Convention, 1993 rectified that major error of the treaty. Then, in 1997, the Disarmament Agreement banned the development, production, stockpiling, and use of chemical weapons.

Chemical Weapons Convention (CWC) came into force on April 29, 1997, and came with it the formal establishment of the Organisation for the Prohibition of Chemical Weapons (OPCW). Like this, the chemical war era came to an end. No one wants war. But, the greed and envy among humans make them take such a hideous path of destruction. A wise king indeed never seeks out war because he foresees the loss.

These incidents showed us that nice things turn evil into the wrong hands. Even knowledge. This awakens the old debate - "Is science a bane or a boon?"

RENU YADAV
SECOND YEAR CHEMISTRY (H)

SHIFTING TO NEW TREND PLASTIC

The introduction of polymers has changed the face of human civilization. And needless to remind how polymers abound in nature. Natural polymer like cellulose was known for a longer period of time, but over the last century, we have developed a number of synthetic polymers. Yes! Humans broke the constraints of nature and created something which was previously unavailable to them. Where the word 'polymers' means "of many parts," and are made of long chains of molecules, one of the most widely and profitably used polymers is plastic. The word plastic originally meant "pliable and easily shaped". And it refers to polymers with additives (such as pigments and stabilizers) that turn polymers into practical products.

No matter how ubiquitous plastic is, it is fairly one of the recent inventions. The history of plastic can be traced back to 1885 when Alexander Parkes created the first fully synthesized plastic by dissolving cellulose nitrate in alcohol, and camphor containing ether. The product so formed could be easily moulded when heated yet it retained its shape and firmness when cold. This was originally called Parkesine but due to its flammability and cost, it wasn't much popularized. Later John Wesley Hyatt produced Celluloid and Leo Hendrik Baekeland presented the first thermoset plastic, Bakelite. This was the inception of a plastic revolution. Since then plastic manufacturing continued insurmountably and the world witnessed the advent of synthetic resin, cellophane wrap, rayon fabric, polyethylene PVC (polyvinyl chloride), and many others.

In the words of author Susan Freinkel, "In product after product, market after market, plastics challenged traditional materials and won, taking the place of steel in cars, paper and glass in packaging, and wood in furniture."

But these unabated achievements didn't last long. The reputation of plastic was soon tainted by the environmental hazards it is associated with, and this mistrust got a voice in the 1960s when plastic debris was witnessed in oceans. The trouble with plastic intensified with people getting more and more environmentally conscious and as the last nail in the coffin the news of some harmful additives (like bisphenol A) in plastic deteriorating human health as they were suspected to enter the body via food and other means, the plastic manufacturing suffered.



But in absence of any other alternative to lightweight, affordable, stronger and insulating plastic, plastic continued to dominate the market. Considering its value, scientists are now inclined in developing more sustainable and safer plastics. Some of the new trends in plastic production are –

NANOCOMPOSITES

This combines nanotechnology with plastic engineering, to improve performance at the molecular level. Nanocomposites generally include materials characterized by high electrical conductivity, dimensional stability, and flame retardancy along with resistance to scratch, dent and heat, like nano talc, carbon nanotubes, and nanoclays. These are frequently used in the automotive and aerospace sector as well as in food packaging, electronics, military hardware and more.



BIOPLASTICS

Innovators are now interested in creating a greener, more environmentally friendly plastics. Eco-friendly bioplastics, which are based on polymer resins from plants instead of fossil fuels, are increasingly in demand. The attempts are made to develop plastic that could be decomposed by bacteria.

SMART SENSORS

Polymers are capable of manipulating their dimensions with environmental parameters such as temperature, amount of light, availability of water and so on. Such materials are of widespread use in the medical sector.

The plastic industry has stayed abreast of new developments while coming a long way ahead. However, the obsolete needs are bound to undergo modification with time, inevitable research and development are on the way to producing newer materials with better performance.

KRIKA GAUR
SECOND YEAR CHEMISTRY (H)

THE CHEMISTRY OF FASHION



From the preparation, pre-treatment, dyeing, printing, and refinement of fabrics, every step from a fibre to a fabric entails chemistry!

Crowning of the chemicals to the textiles can greatly improve their functionality, wearability, appearance, and overall quality.

Some chemicals which are the key components in the fabric formation process are-

- Formaldehyde- To make the textiles wrinkle and crease-resistant
- Azo dyes- To give color to the textiles without having to use a mordant
- Heavy metals- To produce the colour pigment of the textile dyes
- Organotin Compounds- For the prevention of unpleasant odour and damage during the transportation and storage of textiles
- Chlorobenzene- For dyeing, printing, and coating of textiles



EVENTS AND ACCOLADES

ANNUAL REPORT: RASAYANIKA

2020-21

UNION

President: Arju

Vice-President: Hitakshi Mathur

General Secretary: Vini

Joint Secretary: Neha Sharma

Despite the pandemic, the department union and faculty had managed to organize many interesting online events with renowned speakers. All the events conducted so far were quite a success. To guide the freshers regarding safe work with chemicals in the lab, a Bridge Course on 'Lab safety and handling of equipments' was organized online. A course that aims to bridge the gap between the laboratory practices at the school and college level. The students actively participated in the quiz, which was held at the end of the course on 10 December 2020.

"Rasayanika", the chemistry department of Miranda House organised a webinar on 'Learnings from Corona Pandemic', exhibiting a positive side of this unprecedented situation. The two-day National Webinar held on 24-25 September 2020 was chaired by Dr Adarsh Gulati and Dr Bani Roy. On 24 September, it started at 2:00 pm with the greeting speech of Dr Smriti, for Speakers, Principal, Chair (Dr Adarsh Gulati) and everyone else. Then we had the welcome address by Principal, Dr Bijaylaxmi Nanda. The speakers for Day 1st of the webinar were Professor Rita Kakkar and Dr Anil K. Mishra. Professor Rita Kakkar is Dean of Faculty of Sciences and Professor and head at Department of Chemistry, University of Delhi. She shared her delightful experience of the Pandemic for the next 50 minutes. She told us how this pandemic made her tech-friendly and self-sustaining. She shared that since the pandemic resulted in the complete lockdown for quite some time, made her do the things on her own which she had never done before. We had a great time, listening to her and being part of her journey of the Pandemic. After the wonderful enlightening session of Professor Rita Kakkar, we also got an opportunity to interact with her through the Q and A session which was moderated by Dr Kalawati, Dr Poonam and Dr Sujata followed by the expression of gratitude for Dr Rita Kakkar by Dr Adarsh Gulati. Our 2nd speaker for the day Dr A K Mishra, who is Additional Director and Scientist G at INMAS, DRDO, started sharing his learnings at around 4:15 pm. He shared his amazing experience of managing things from home and being active despite the home vibes. He even shared the problems he faced and then how he tackled them. We had the other enlightened session by him for the next 70 minutes, which ended with the Q and A session and vote of thanks. The day ended with the concluding remarks by Dr Adarsh Gulati at around 4:20 pm.

The 2nd day of the webinar was chaired by Dr Bani Roy and started at 2 pm with the welcome of the speakers, chair and everyone else by Dr Smriti. The Speakers for the day were Professor L S Shashidhara, Dr B S Balaji and Dr Suresh Kumar. Professor L S Shashidhara is the Dean of Research and Professor of Biology at Ashoka University. He made us part of his learnings by apprising us of his experience. The amazing session ended with the Q and A session followed by the vote of thanks. The 2nd Speaker of the day, Dr B S Balaji is Associate Professor, School of Biotechnology at Jawaharlal Nehru University, Delhi shared his thoughts about the Pandemic and ended with his illuminating answers. The 3rd and last speaker of the day was Dr Suresh Kumar, who is Associate Professor, University School of Biotechnology at GGS Indraprastha University, Delhi.

He shared his exciting experience of the Corona times and the things he learned which ended in an amusing productive session. Later, we had the concluding remarks by the chairs, Dr Bani Roy and Dr Adarsh Gulati. The two-day national webinar ended at around 5:00 pm on 25th September with the Vote of Thanks by Dr Amrita T Sheikh. On 29th September 2020, Founders' day of Miranda House was celebrated through online mode wherein a lot of Chemistry students illuminated the name of their department. Pooja Yadav was awarded "Dr Lakshmi Chand Dayawanti Memorial Award", Archana Kumari was awarded "Naunit Ram Ahuja Award", Saumya Tyagi was awarded "Dr Anita Tandon Award", Pooja was awarded "GK Dhingra Award", Rubal was awarded two prestigious "Anu Bedi Award" and "Miranda House Alumnae Association Awards". Two of our seniors Nikita Grover and Ankita Duggal were awarded first and second prize for "Pushpa Goyal Memorial Awards for Excellence in Chemistry" respectively. Nikita Grover also received "Academic Award for securing highest cumulative marks in University Examination semester 1 to semester 4". "Ved Jolly Resilience Awards for Motivated Scholars" was awarded to three Chemistry Students, one from each year - Shipli Yadav (1st year), Archana Kumari (2nd year) and Varnika (3rd year). One of our seniors Chetna was awarded the "Miranda House Golden Jubilee Awards" as well as the Certificate for the best volunteer of MH Environment Society, Vatavaran. A certificate was also given to Guddoy Tarishma for her outstanding contribution to the foreign students' society. On, the 5th of February 2021, the virtual freshers' event was conducted by the department union. The event started with a welcome speech given by the President of the Rasayanika and Teachers. Few games and competitions in poetry and dance were conducted for the juniors and the event came to an end with the declaration of Miss Freshers and Runner Ups. It was a very entertaining and refreshing event for everyone. On 12 February 2021, the Department of Chemistry, Miranda House organized an International Webinar on "Empowering Diversity in Science" as part of GWB- IUPAC where the keynote speakers were Dr Jyoti Marwah, Director of Mussoorie Fragrance and Flavours Institute and high-altitude Wellness Center from Aroma Tourism and Dr Shirin Ashraf, Scientist of MRC Centre for Virus Research, University of Glasgow. The feedback for the Webinar was incredibly great. For the first time, the annual festival of Rasayanika- 'Pratikriya', was conducted online. The festival majorly included three activities. The first one was 'Eureka' that was the 'Paper Presentation Competition'. Judges of this competition were: Dr Sunita Dhingra and Dr Adarsh Gulati. There was active participation from many students and finally, the four winners were chosen by the judges. Bhumika secured the first position, Anfas second and Sayantan third. A certificate of appreciation was given to Pooja Meena. The second activity was 'Poster Making Competition'. The honourable judges for this competition were: Dr Bani Roy, Dr Malti Sharma and Dr Saloni Bahri. All the participants gave their best to present their posters and 'Urfi Aaliya', 'Nishika Lalit' and 'Ojaswita Pant' managed to secure first, second and third positions respectively. The third and the last activity was 'Chem Hunt'. It was carried out in three rounds. The first one was 'Crossword' from which 10 participants went to the second round 'Chem Trivia', which filtered out 5 participants for the third and final round 'Lock and Key'. The winner of this game was Kalpana. This way Rasayanika tried its best to organise a very interesting fest despite being online.

OUR ACHIEVERS



KOMAL

- Dr. Lakshmi Chand Dayawanti Memorial Award
- Certificate of Appreciation for Professor Savitri G. Burman
Award of Excellence (Sciences)

SHWETA

- Dr. Anita Tondon Award

DIVYA SINGH

- NR Ahuja Award

RAVEENA KUMARI

- Prime Minister Rally 2021

SHILPI YADAV

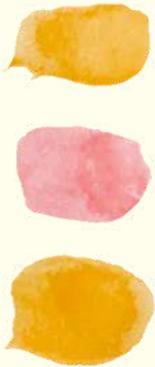
- Ved Jolly Resilience Award

PRIYA KUMARI

- Special National Integration Camp 2021
- Prime Minister Rally 2021
- Cheif Minister Rally 2020

REETIKA

- Mission Excellence Scheme (4 Lakh scholarship from Delhi Government)
- State Karate Championship 2020 (Gold Medal)
- All India University Games 2019-20, Taekwondo (Participation)
- Kai president Cup 2020 (Silver)
- World Karate Championship, Dubai 2021 (Participation)
- Paris Open 2022 (Participation)
- K1 Series A Spain (Participation)



REETIKA



RAVEENA



SHILPI



KOMAL



DIVYA



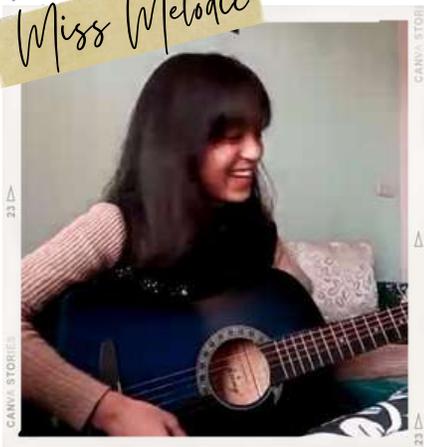
SHWETA



PRIYA



Miss Melodic



FRESHER'S PARTY

2020-21



Miss Mesmerizer



Miss Fresher

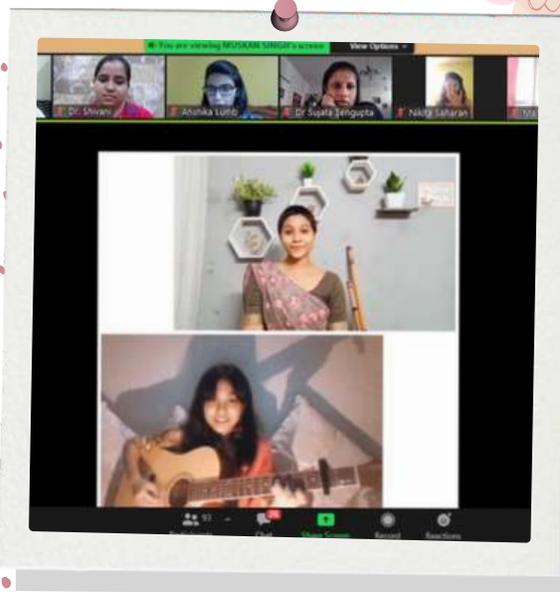
After spending an entire month in online admission hassle, the batch of 2020 wasn't anticipating their long-awaited college 'Freshers Party' to be held online. They were all excited and hoping for a grand celebration as soon as the college would open. But given the pandemic, it has to happen this way and so it did.

The day was the 5th of February, 2021, when even the slightest of doubts on the incompetence of an online event was busted and the batch was heartily welcomed to the department via a Google meet link. Yes! A google meet link, but no sooner it turned out to be the most fun meet ever. It was the day of joy, laughter, music, and enthusiasm at top of all. The dress code for the event was based on the beloved shows and film series namely, 'Harry Potter', 'Friends' and 'Tarak Mehta ka Ooltah Chashma'. The euphoric freshers could be seen beaming on their 3:4 screen.

The event started with a formal welcome note from Staff advisors. It was followed by several entertaining games and some dance performances. The newcomers were open to mimic the characters they have chosen to impersonate. They performed gracefully. Then the most exciting rounds for the title of Miss fresher were conducted and the selected candidates were grinded by quick-witted questions. The celebration was driven to its end with the announcement of winners of talent hunt entries, followed by the heart-stopping announcement of Miss Freshers and Runner Up.

'Devyani Ratwaya' was graced as Miss Fresher for the Year, Aqsha Naaz and Priya Pahal were 1st and 2nd Runner - Up respectively. A final vote of thanks concluded the event.

TEACHER'S DAY



Teachers leave no stone unturned when it comes to our future. The world's a better place with these veterans who are there to guide us at every misstep we take. September 5 was the day to express our gratitude to them. A day to tell them how much we respect them.

Teacher's day 2021 was an online event, thanks to the uptick that COVID 19 cases experienced. But, we tried our best to organise everything with that old spirit.

We had our virtual stage. Online games were organised by taking everyday games to another level - adding a tinge of chemistry. Gibberish was now called Chemgibberish, Tambola was Chembola and so on. The melodies left everyone mesmerised. Students also prepared a skit themed "Life in college, feat Google meet". The skit was animated and it highlighted how the pandemic has changed chalks and boards to pointers and presentations. In the end, astounding dance performances by our talented dancers concluded the event. All these aimed to make everyone forget that we are going through a period of horror. We tried to create a positive environment amidst the pandemic. Hopefully, the next time we all will be playing all these games under one roof, in our college.

Chemistry

THE CATALYST FOR CHANGE

Webinars, part of an international virtual conference, on the topic, “Chemistry – the Catalyst for Change”, were organized by the Department of Chemistry, Miranda House under the kind aegis of Dr Bijayalaxmi Nanda, (Acting Principal of Miranda House College, University of Delhi), on the 19th and 20th of February, 2021 at 2’o clock in the afternoon on each day online. There were four keynote speakers namely Dr Jyoti Marwah, Dr Nagendra Kaushik, Dr Ramesh Gardas and Dr Phalguni Rath. The first two speakers delivered their topics on the 19th and the latter two on the following day.

In the beginning of the webinar on day one, Dr Kalawati Saini from the department of chemistry gave a brief startup to the event by providing some introductory information. Further, Dr Amrita Tripathi Sheikh put forth a welcome note to all the attendees as well as the speakers. She beautifully acknowledged the achievements of guest speakers, gave a tempo to the start of the event and illustrated various activities and topics that were going to be mentioned by the speakers. Then, the host, Dr Kalawati Saini, highlighted the qualifications and educational work of the first speaker, Dr Jyoti Marwah.

Dr Jyoti Marwah, director of Mussoorie Fragrance and Flavours Institute and High Altitude Wellness Centre for Aroma Tourism. Dr Marwah spoke on the topic; “Empowering Communities: The Skill and Art of Making Natural Skin Care Products”. She talked of how and why the empowerment of communities was important and how it was brought to action through the production of aromatics and skincare products. A virtual tour was given by her to associate all her viewpoints on the cultural affinity focusing on goodness and therapeutic value of the plants. Moreover, glimpses of the making of some products were also displayed and the whole process was explained by her in a nutshell. Overall, the whole focus was centred on the cultivation, extraction, chemistry and benefits of natural end products, and how all those things were taught to countless people during the covid-19 pandemic. Following the talk by Dr Marwah, a short question and answer session was held in which she imbibed the information regarding the queries put forward by the attendees. Further, the second keynote speaker of the day, Dr Nagendra Kaushik, Associate Professor at Department of Electrical and Biological Physics, Kwangwoon University, Seoul was greeted and introduced by Dr Mallika Pathak. The accomplishments, awards and honours of Dr Kaushik were acknowledged by everyone.

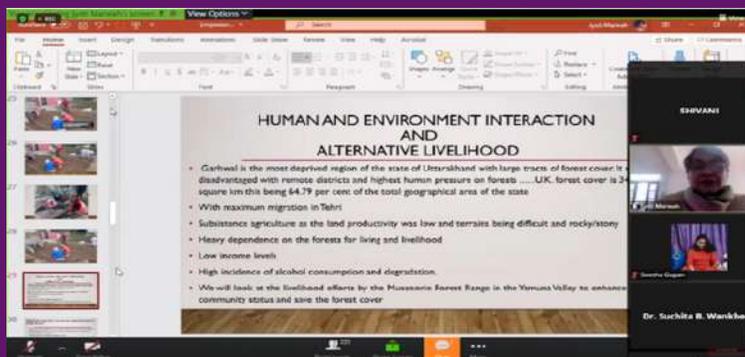
Dr Nagendra presented on the past, present and future of Plasma Medicine Technology. He began by introducing the basics of Plasma and its relation to cancer biology and treatment was then explained. Moving further, the plasma drug delivery and combination treatment strategies were discussed by him followed by the elucidation of basic immune modulation. Later, his part of the webinar was wrapped with a description of commercialization and future prospective of the plasma medicine technology. An endnote was given to day one with a question-and-answer session.

The webinar on day two began with some really alluring pictures of the award-winning front lawn of the Miranda House Campus. Following that, Dr Poonam from the faculty of Chemistry, Miranda House, kicked off the introduction of the first mainspring speaker, Dr Ramesh Gardas, Professor, Department of Chemistry, International Institute of Technology, Madras, expounding all his educational qualifications and respective accolades. Dr Ramesh Gardas's topic was as follows: Environmental Benign Solvents for Sustainable Developments in Chemical and Technological Applications. Sustainable development goals were discussed at first by Dr Gardas ensued by a discussion on the connection between chemistry and sustainability. The whole session was focused on the need to look for alternatives to volatile organic compounds and the need for searching for green solvents. Then, he briefly introduced ionic liquids, explained their applications and shared the recent advances and talked about the importance of a person's own interest in the topic. After that, a short Q-n-A session was held between Dr Gardas and all the participants of the webinar.

Next, it was the time for the second highlighted speaker of the day, Dr Phalguni Rath, Postdoctoral Researcher, Wellcome Centre for Human Genetics, University of Oxford, UK, to present his topic which was namely; CRISPR – Cas mediated genome engineering in human induced pluripotent stem cells. After being introduced and appreciated for all his breakthroughs in study and research by Dr Deepti Rawat, Dr Rath brought the scary parts of the latest advances in biology to light, which include editing of the human genome, and programming of human embryos was cited as an example. The stem cells were talked through, including their types, categories, formation, positioning, characteristics and techniques to determine them. Afterwards, genetic vaccines were discussed and genome engineering remained as the kingpin of the further webinar. Just like the previous sections, the end of that section was also succeeded by an interesting and final Q-n-A session.

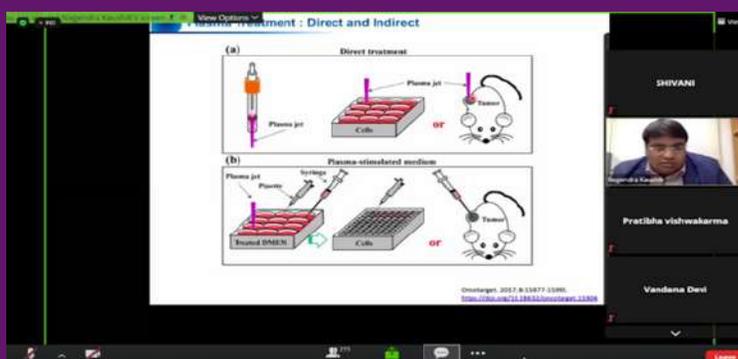
At the very end of the session all the main speakers, the faculty members of the Chemistry Department of Miranda House and all the student and teacher participants from different colleges and universities of India were given a vote of thanks and good wishes for being intact to the webinars and listening carefully to all the speakers. The importance of chemistry was summarized and the fact that how it brings all walks of life together marked an end to the International Virtual Conference.

CHEMISTRY – THE CATALYST FOR CHANGE (ORGANIZED ON 19-20 FEBRUARY 2021, 2:00 PM)



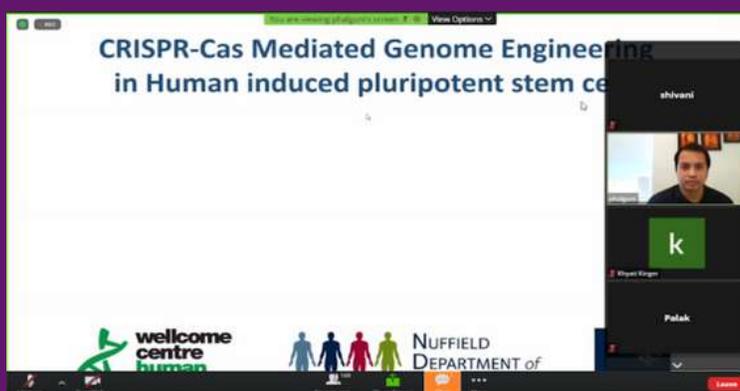
Dr Jyoti Marwah, director of Mussoorie Fragrance and Flavours Institute and High Altitude Wellness Centre for Aroma Tourism speaking on Empowering Communities: The Skill and Art of Making Natural Skin Care Products.

Dr Nagendra Kaushik, Associate Professor at Department of Electrical and Biological Physics, Kwangwoon University, Seoul presented on past, present and future of Plasma Medicine Technology



Dr Ramesh Gardas, Professor, Department of Chemistry, International Institute of Technology, Madras spoke on the topic: Environmental Benign Solvents for Sustainable Developments in Chemical and Technological Applications.

Dr Phalguni Rath, Postdoctoral Researcher, Wellcome Centre for Human Genetics, University of Oxford, UK, presenting on his topic namely; CRISPR – Cas mediated genome engineering in human induced pluripotent stem cells.



FAREWELL

They say "the two hardest things to say in life are hello for the first time and goodbye for the last" and it was unreal for the 2018-2021 batch to believe that they would be departing from college without properly meeting the people they said their first hello to. Missing their chance to roam around the corridors in sarees they had planned for years.

But then there it was – "Revoir" – The Online Farewell Party of Chemistry Department - to revive all such disheartened hearts and add unforgettable memories in their last days of graduation.

Revoir was on May 6, 2021, and the event was commenced with a speech from senior-most faculty Dr Amrita Tripathi Sheikh.

Memories were shared, enthralling melodies were played, and breathtaking dance performances left the audience, virtual though, fascinated! It was followed by several exciting games. The juniors also presented a fun play addressing Online Vs Offline Farewell. Different titles were apportioned in accordance with the talent hunt organised days before the actual celebration. The graduating batch then talked about their experiences, shared anecdotes, and a plethora of things they have learnt in Miranda. They also took moment to extend their sincere gratitude to the faculty and wishes for juniors.

The Rasayanika union also gifted an impressive personalized E - Calendar to each senior. Finally, with the motivating words from staff advisors and a vote of thanks from President, Rasayanika, the event was concluded.

The journey of the 2018-21 batch in Miranda House must have come to an end, but it was filled with a spirit of a new beginning.





Pratikriya

THE ANNUAL FEST



SCIENCE IS SIMPLY THE WORD WE USE TO DESCRIBE A METHOD OF ORGANIZING OUR CURIOSITY.



And what could be better to learn science in the most fun and interactive way than by bringing all the curious minds together?

The Chemistry Department of Miranda House organised its annual fest 'Pratikriya' on 13 April 2021. Owing to the pandemic, the fest was organised through online platforms only. However, the enthusiastic participants, intellectual jury members including superannuated faculty from Miranda House, and not to miss the equally energetic audience, added colours to the event and made it successful. Students from different colleges participated in various competitions conducted under the fest Pratikriya.

The event started with Paper Presentation Competition 'Eureka'. Each topic selected for the competition required extensive research connecting students to the realm of research in chemistry. The topics taken were –

- Nobel Prize in Chemistry 2020
- Role of Chemistry in Corona Pandemic
- Molecular modelling is changing the landscape of Drug Discovery
- Chemistry of Medical Diagnostics.

The detailed research-based reports presented by each participant were followed by insightful questions from the juries and the audience. This Q/A piece of the competition proved to be very knowledgeable for all and direction setting for the participants in particular.



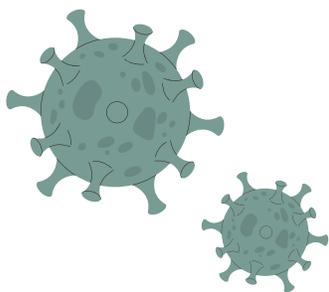
The next competition in line was Poster Making Competition, wherein participants served their artistic, creativity and knowledge of chemistry all at the same plate. Each informative and creative poster though spoke volumes in itself but the questions put to the participants by the judges during the presentation propelled many learnings, and corrected shortcomings if any. The topics chosen for the event focused on introducing the journey and beauty of chemistry along with pressing the importance and usage of chemistry in environment-related issues. And the topics were-

- Alchemy to present-day chemistry
- Ozone: Protector or Polluter
- SDG: 6/7/13 (any one of the three).

The final event in the league was ChemHunt. In simple terms, it was an engaging quiz based on chemistry, conducted in three rounds. The volunteers designed an ingenious activity for each stage having activities ranging from Crossword to chem trivia; it was a very light ending to the fest loaded with interesting knowledge of science.

As the fest was organised in online mode for the first time, it was sure enough to worry the union members for its success, but the supportive volunteers, participants and audience made the event impressively successful.

At last, the announcement of winners of each competition, and words of wisdom from the senior professors brought an end to the event.



LEARNINGS FROM THE

An exclusive two-day national webinar, “ Learnings from the Corona Pandemic” was organised by the Department of Chemistry, Miranda House, University of Delhi scheduled on 24-25 September 2020 with timings 2:00 pm - 5:00 pm for students as well as teachers of the college and other colleges/universities too to describe the impartations and learnings that the world experienced from the covid-19 pandemic. The sessions were presided over by faculty members of the Department of Chemistry, Miranda House, collectively, who commended the presence of all the invited eminent speakers namely Professor Rita Kakkar and Dr Anil K. Mishra, who spoke on day one, and Professor L S Shashidhara, Dr B S Balaji and Dr Suresh Kumar, who poured their hearts out on the day two. They also acknowledged the patronage of Dr Bijayalaxmi Nanda, Acting Principal, Miranda House, University of Delhi.

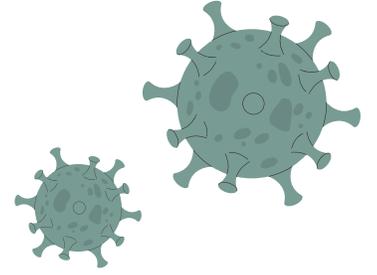
Day one started with an opening remark from the respected principal Dr Nanda followed by a welcome address from her to the key-note speakers for the day: Professor Rita Kakkar (Dean, Faculty of Sciences Professor and Head, Department of Chemistry, University of Delhi) and Dr Anil K. Mishra (Additional Director and Scientist ‘G’, INMAS, DRDO). Firstly, Professor Kakkar shared her experience of the corona pandemic, including how she and her team dealt with the situation managed the students who were still in the university and how she dealt with it at the personal level. She also shared the learnings that she was able to embrace because of all that happened. Further, Dr Anil Mishra facilitated his thoughts and experiences. He majorly talked about the immense efforts and work that he and his fellow researchers had to put in to develop a vaccine for the covid-19 and the pathways to take all the research work into practicality.

Following his talk was a question-and-answer session among all the attendees and the speakers. This was how the day one saw an end.

Furthermore, day two witnessed an inspirational beginning with an introduction of all the speakers for the day, Professor L S Shashidhar a (Dean of Research and Professor of Biology, Ashoka University), Dr B S Balaji (Associate Professor, School of Biotechnology, JNU) and Dr Suresh Kumar (Associate Professor, University School of Biotechnology, GGS Indraprastha University, Delhi). All three of them discussed the biological and technical aspects of containing the virus and developing some sort of methods of tackling its mutation.



CORONA PANDEMIC



In addition to it, it was mentioned that the biopharmaceutical industry had been at the frontline of the fight against the disease, with rapid research and development of vaccinations and medicines accounting for possible treatment of the virus. The psychological and functional aspects of the whole pandemic were also talked through by the orators. Then, similar to day one, a short question-and-answer session was held. The session ended with a vote of thanks to all the speakers for delivering treasurable inputs and also spreading awareness among the participants. Finally, Dr Bijayalaxmi expressed her gratitude towards the organizers, the guest speakers and all the students of the Miranda House College and various other college/universities, for attending such enriching sessions.



Hope & Faith

ARE AS CONTAGIOUS AS FEAR AND PANIC.
CHOOSE TO BE HAPPY EVEN IN THE DARKEST
TIMES.

IPR, PATENT AND CHEMISTRY

A webinar on the topic, "IPR, Patent and Chemistry", was organized by Rasayanika - The Chemical Society in collaboration with IQAC, Miranda House under the kind patronage of Dr Bijayalaxmi Nanda, (Acting Principal of Miranda House College, University of Delhi), on the 11th of August, 2021 at 1'o clock in the afternoon. The invited speaker, Dr Arun Kumar Maurya, Assistant Professor (In-charge IPR cell), Department of Botany, Multanimal Modi College, Modinagar, Ghaziabad, U.P., spoke on the basics of IPR, specifically, patenting in chemistry.

At the beginning of the webinar, the host and president of Rasayanika, from the department of chemistry gave a brief start to the event by providing some introductory information and putting forth a welcome note to all the attendees as well as the keynote speaker. She beautifully acknowledged the qualifications and achievements of the invited speaker, Dr Arun Kumar and summoned him to begin his talk. Before the main talk, Dr Bijayalaxmi Nanda, the principal, also addressed the speaker and all the attendees.

Dr Maurya's topic was as follows: IPR, Patent and Chemistry. Highlights of Intellectual's Property Right (IPR) were discussed at first by Dr Maurya followed by a discussion on the connection between chemistry and patenting. The whole session was focused on the ins and outs of patenting including what it actually means, its legislation and jurisdiction and its application in the various expertise of science. Then, he briefly talked about biopiracy and ended his talk with a short note on it. After that, a short Q-n-A session was held between Dr Maurya and all the participants of the webinar.

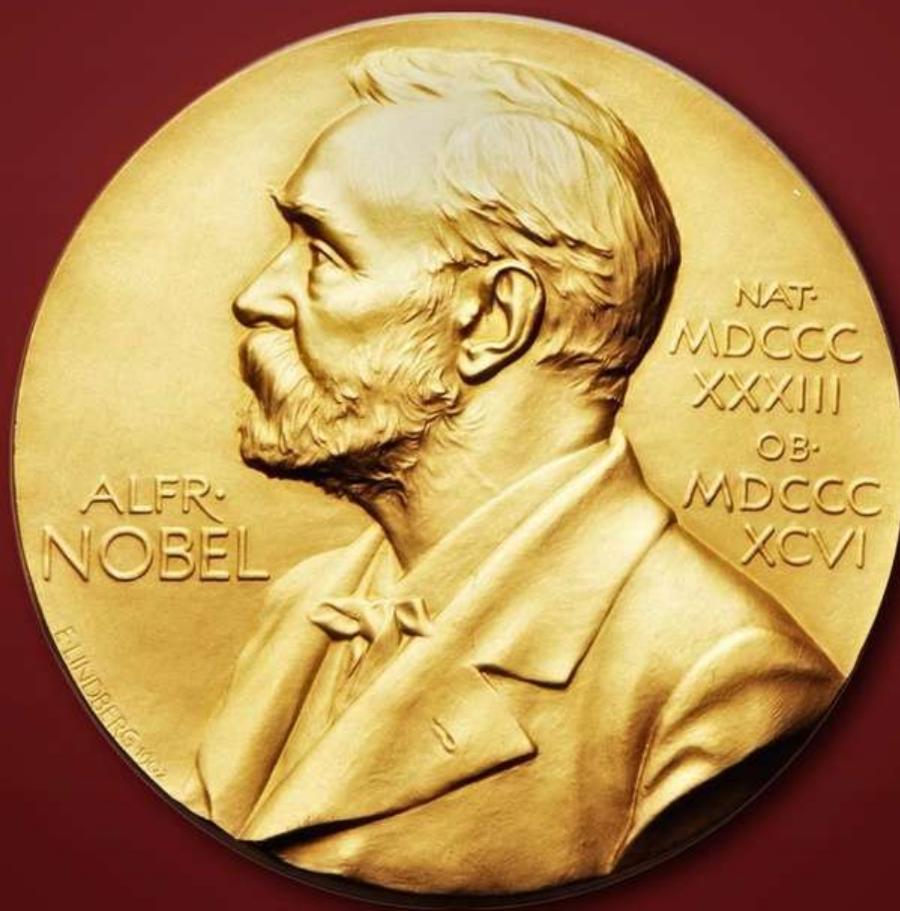
At the very end of the session, the hosts, all the faculty members of the Chemistry Department of Miranda House and all the students and teachers were given a vote of thanks and good wishes for being active and being filled with curiosity throughout the webinars and listening carefully to the speaker as well as the others. The importance of patenting in chemistry and what it has given to the world was discussed and the webinar was brought to an end with the final words of the host.



Dr Arun Kumar Maurya, Assistant Professor (In-charge IPR cell), Department of Botany, Multanimal Modi College, Modinagar, Ghaziabad, U.P.. put his heart out on the topic, "IPR, Patent and Chemistry".



Glimpses of the talk



THE NOBEL PRIZE

CHEMISTRY

2020 DEVELOPMENT OF A METHOD FOR GENOME EDITING



JENNIFER DOUDNA AND EMMANUELLE CHARPENTIER



THERE IS ENORMOUS POWER IN THIS GENETIC TOOL, WHICH AFFECTS US ALL. IT HAS NOT ONLY REVOLUTIONISED BASIC SCIENCE, BUT ALSO RESULTED IN INNOVATIVE CROPS AND WILL LEAD TO GROUND-BREAKING NEW MEDICAL TREATMENTS

-Claes Gustafsson



Jennifer Anne Doudna is an American biochemist who won the Nobel Prize in Chemistry in 2020 for her pioneering work in gene editing. She shared the prize with Emmanuelle Charpentier for "the development of a method for gene editing". Emmanuelle Charpentier is a French professor and researcher in microbiology, genetics and biochemistry.

ABOUT THEIR RESEARCH

Biotechnology can be a cure for every ailment in the future. We are watching this vision becoming a reality with every advancement in this field. Emmanuelle Charpentier and Jennifer Doudna's work on CRISPR-Cas9 —a method to edit DNA was a breakthrough in this field these days.

CRISPR GENE EDITING

CRISPR is a technique of genetic engineering to modify the genomes of living organisms. It stands for "clustered regularly interspaced short palindromic repeats". Palindromic sequences are similar to words like MALAYALAM. They are identical if read from either direction. Nucleases or "molecular scissors" tend to find these palindromic sequences to introduce a cleavage in the DNA. These molecular scissors cut the DNA at specific sites by exposing sticky ends for the foreign DNA to be inserted. The first restriction endonuclease (make cuts at specific positions within the DNA) to be isolated was Hind II. Today, more than 900 restriction enzymes are isolated from over 230 strains of bacteria.

CRISPR operon (a functional unit of DNA that functions under a single promoter) is originally an adaptive immune system of bacteria. CRISPR is a gene cluster that produces specific enzymes to kill the invaders like bacteriophages (viruses). These enzymes are called CRISPR associated proteins (Cas 9). What is so special about the new technique of genome editing is that it is simple and more effective. The earlier techniques, namely ZFN and TALEN, are more sophisticated and have limited targeting capacity. For a virus that does not integrate with the host genome, bacteria can produce enzymes based on its last exposure to the same virus as an immune response. After transcription, RNA produced by the CRISPR DNA cluster are:

- Cas9 mRNA
- Non-coding cr-RNA
- Non-coding tracr-RNA - sequence identifies the invader

The transcrRNA:crRNA duplex guided CRISPR Cas9 to cleave a specific site in the DNA. It is possible to synthesise the duplex as a single guide sgRNA. This sgRNA is a simple 20 nucleotide guide sequence to target CRISPR-Cas9 to virtually any gene of interest. CRISPR-Cas9-mediated induction can break any gene of interest in a wide variety of cells. This technique is also a step forward in studies of the functioning of protein synthesis.

Clinical trials are underway to treat inherited diseases like β -thalassemia and sickle cell anaemia using the CRISPR Cas9 technique

2021 DEVELOPMENT OF ASYMMETRIC ORGANOCATALYSIS



BENJAMIN LIST AND DAVID MACMILLAN



THIS CONCEPT FOR CATALYSIS IS AS SIMPLE AS IT IS INGENIOUS, AND THE FACT IS THAT MANY PEOPLE HAVE WONDERED WHY WE DIDN'T THINK OF IT EARLIER.

-Johan Åqvist



The 2021 Nobel Prize in chemistry was awarded to a duo of a German chemist, Benjamin List (Director, Max Planck Institute) and Scotland-born David MacMillan (Professor, Princeton University) "for the development of asymmetric organocatalysis". Organocatalysis is precisely a new ingenious tool for molecular construction.

ABOUT THEIR RESEARCH

For a long time, many researchers and chemists were acquainted with the availability of two types of catalysts only: metal and enzymes. Catalysts are substances vital for controlling and accelerating reactions without becoming part of the final product. For example, a trace of the enzyme ptyalin, found in human saliva, accelerates the hydrolysis of starch to glucose.

In 2000, the two scientists, Benjamin List and David MacMillan, independent of each other, developed a third type of catalysis, called asymmetric organocatalysis that builds upon small organic molecules. The organic catalysts contain a stable framework of carbon atoms, with attachments of more active chemical groups. These often contain general elements such as oxygen, nitrogen, sulphur or phosphorus. And thus unlike heavy metal catalysts, they are both environmentally friendly and cheap. Benjamin List demonstrated proline, an amino acid as an efficient catalyst with the potential of driving asymmetric catalysis. Of the two mirror images, it was much more common for one of them to be formed over another. David MacMillan also designed some simple molecules that could create iminium ion catalysts. One of these proved to be excellent at asymmetric catalysis.

SIGNIFICANCE

The major breakthrough with organic catalysts is their ability to process asymmetric catalysis. Until chemists could not conduct asymmetric catalysis, many pharmaceuticals contained both the mirror images of a molecule, one of which will be active, while the other may have unwanted effects. Using organocatalysts researchers can now make large volumes of different asymmetric molecules. Also, the multitudes of organocatalysts developed are cheap, stable and reduce wastage in their production and usage while being used for a variety of reactions.

Benjamin List and David MacMillan are the pioneers of advancing organic catalysts. New pharmaceuticals and various other specific molecules now can be synthesized much more efficiently. The toolbox available to chemists for designing new reaction pathways for organic molecules is expanded with the introduction of organocatalysis. Such improvements and discoveries as a consequence will indeed have a reduced environmental impact making chemistry a little greener.

CREATIVE CORNER



विज्ञान एक उपहार

विज्ञान हमारी श्रृष्टि का बहुमूल्य उपहार है
विज्ञान से ही चमका ये सारा संसार है

विज्ञान ही सभ्यता की सबसे बड़ी पहचान है
विज्ञान ने फूँकी कण कण में देखो जान है

इसने ही चांद सितारों की दूरी को नापा है
धरती में छुपे धन विज्ञान ने ही तो भांपा है

विज्ञान के ही कारण शक्ति का अनोखा मेल है
बिजली से चलता इंजन पटरी पे चलती रेल है

विज्ञान की वजह से सागर पे अपना राज़ है
पानी पे चलता विराट सागर के सर का ताज है

आकाश में उड़ते जहाज़ विज्ञान की ही देन है
नए अविष्कार करने को मानव रहता बेचैन है

पेड़ से गिरता फल सीधा धरती पर आता है
गुरुत्वाकर्षण बल से इसका सीधा सा नाता है

स्पेस में घूमें रॉकेट शक्ति का अनोखा राज़ है
एटम के फट जाने पर गिर जाती सभी पर गाज है

इठलाती नदियों पर बांधों ने कसी नकेल है
जीवन धारा से जुड़ना विज्ञान का ही खेल है

तूफानों की हस्ती को विज्ञान ने ही तो भांपा है
उनकी तीव्र गति को रिक्टर स्केल में मापा है

चंद्रमा पर नील का पहुंचना इसने ही किया सरल
नहीं रुकेगा जीवन जब तक विज्ञान में बल है

Harshita Raj
BSc Chemistry (Hons) 1st yr
Miranda House

PERIODIC TABLE

Chemistry was a little child,
who just laughed and cried
Matter known , Elements unknown,
talkin' about the times gone

Came the Lavoiser priest,
with 33 elements' list
Chemistry learnt them all,
whether big or small

Döbereiner proposed the triads,
With Li,Na,K playing cards
Newland's octaves, the series of eight,
arranged as per atomic weight

Works of Mendeleev were not less,
predicted the unknown elements
But' every theory had some flaws,
and Failed as per new laws

Periodic law of Henry Moseley,
acquainted us with atomic numbers
And then came the Periodic Table
with 7 periods and 18 columns

Now, Chemistry is an learnt adult
who teaches reactions and their product !!!

ISU

FIRST YEAR CHEMISTRY (H)

CHEMISTRY A CONFUSION



A problem throughout history,
Why hydrogen has halogen and group 1 property,
Still seems to be a mystery.

6.022×10^{23} is the Avogadro's Number,
Its derivation can make one go in deep slumber,
Chemistry is all about equations, numbers and exceptions,
Learning it can actually make a bright student to become future plumber.

Whether be Dalton's or Thomson's Model,
All revolve around confusion order,
We, students never got in depth idea,
Because teachers told that these concepts are much broader!!!

Nitrous Oxide is known as laughing gas,
What a pungent odour chlorine has,
All elements enjoy their uniqueness in the periodic table,
Being unaware that with time, the model lags.

Life had been good till organic chemistry arrived,
It made the entire world go upside down for which it had always strived,
None could save themselves from the threat of Chemistry,
Because, learning it sort of, took everyone's life (sarcasm) !!!!

Thus, Chemistry- A confusion!!!
It promotes the mystery of diffusion,
We don't know how many more elements are yet to be found,
Because its more difficult to comprehend than Optical illusion!!!

PUSHPANJALI KUMARI
BA HONS. SOCIOLOGY
FIRST YEAR

ASTROCHEMISTRY

Astrochemistry is interconnected with that of astrophysics and nuclear physics in characterising the nuclear reactions which occur in stars, as well as the structure of stellar interiors. It is the study of abundance and reactions of molecules in the universe, and their interactions with radiation. Why does astrochemistry seem really interesting? The formation, atomic and chemical composition, evolution and fate of molecular gas clouds is of special interest in the field of astrochemistry because it is from these clouds that the entire solar system is formed. The other significant fact about Astrochemistry is that it involves the use of telescopes to measure various aspects of bodies in space, such as their temperature and composition and the findings from the use of spectroscopy in chemistry laboratories can be employed in determining the types of molecules in astronomical bodies (e.g. a star or an interstellar cloud). The focus of astrochemistry is the investigation of chemical processes taking place in space, including molecular evolution and complexity.

KARIN OBERG IS THE FATHER OF ASTROCHEMISTRY (discovered the first complex molecule in protoplanetary disk)

- New interesting molecules in the interstellar gas and grain mantles
- Better understanding of relevant chemical processes including surface chemistry
- Much better understanding of heterogeneity and dynamics of individual sources, and stellar and planetary formation.
- More research on extragalactic sources.

It became sure that astrochemistry will make deal with some extraordinary discoveries in future that will make all of us experience a different aspect of our life.

NAVYATHA JENU J
FIRST YEAR CHEMISTRY (H)

CARBON

AN ATOM'S JOURNEY

When telling a story, one is inclined to begin at the beginning. In this case, the life story of a single atom of carbon, that beginning is an unfathomable 13.8 billion years distant - when our universe arrived with a Big Bang. To be more accurate, it is another 500 million years hence, when the intensely hot and dense early universe expanded and cooled enough to form its first elements - hydrogen and helium - great clouds of which formed our first stars. One such massive star burned hot and bright and as it neared its demise, got busy forming heavier elements. Here is where our hero enters the stage - a product of the fusion of three helium atoms. When this star finally explodes in a powerful and spectacular supernova, its elements are cast upon the solar winds to new places, full of purpose without intent. ON IS THE COSMIC RACE. Our carbon atom is swept along in a colossal tug of war between expansion and gravity, matter and antimatter, weaving a tapestry of high and low densities. It is part of an aggregating protoplanet that is held within the attractive force of a mid-size star, which itself is kept among billions of others like it - a galaxy. This galaxy, as well, maintains a fraternity of forces in the Laniakea supercluster. This will be the atom's neighbourhood for some time. THERE GOES ANOTHER STORY after this. And that story's principal article is one of many migrant seeds that now have been planted in a Goldilocks mantle.

Carbon's eagerness in forming bonds and help facilitate long molecular chains will prove crucial to building intricate structures. Our carbon atom forms just such an alliance with two oxygen atoms, making a molecule that we will see often: carbon dioxide. It dissolves in an iron-rich, incipient ocean. Later, this carbon dioxide and hydrogen mingle in a matrix of temperature and pH gradients: a confluence - for the development and replication of complex organic life.



Long dissolved and adrift in seawater, the carbon dioxide molecule now has risen to near the ocean's surface, where it will be put to good use by a coccolithophore. This unicellular phytoplankton will introduce carbon and oxygen to calcium. They will combine to form calcium carbonate, with which these algae build their protective platelets. They will live their lives in the sunlight zone, but their deathbed is the seafloor. Life evolves. Replication, selection and adaptive mutations in response to environmental stimuli produce astounding diversity. Here is where we find our universal traveller 70 million years ago, still in the form of calcium carbonate in a limestone cliff. Its head is now above water but will remain in relative stasis for millions more years, witness to the dinosaurs whose reign is nearly over.

One strain of carbon-based life on Earth-- humans and their early ancestors discovered ways, through clever use of tools and fire, to suit their purpose, cleaved limestone from the cliff with a pickaxe and burned in a kiln. The heat serves to separate our atom from some of its long-standing bonds. Still holding fast to two oxygen atoms, it is now, in the form of carbon dioxide, a gas, free to travel again. It is breathed in by a peregrine falcon-- fastest of Earth's animals, later expelling it.

Still comfortably grouped with two oxygen companions, having journeyed so far and long, our atom surrenders to the grip of a grape leaf's surface, and from here the adventure begins. Along with water and the energy of photons from the nearest star, our Sun, comes the splendour of photosynthesis.

After many more years being carried in currents of water and air, our intrepid atom once again settles, this time on a cedar tree and helps to build long molecular chains to form cellulose in these long-lived conifers.

The warmth of spring has awakened a cedar shoot moth larva from its winter home. It feeds on fresh shoots until the pupal stage, after three weeks of which a small grey moth emerges to summer light. Our atom is now a part of a long chain glucosamine helping make sense of that light as part of the moth's compound eye. Shortly after laying her eggs, the moth falls dead to the forest floor. Its slow decay sees more than one winter, but the microbes of the soil are relentless-- breaking down wrecks for parts.

WHAT DO ATOMS KNOW OF DEATH? They are on to the next job, our carbon helps nourish a growing sprout. The flower grows tall and its fragrance gains the attention of a worker bee. She drinks some sweet nectar, rich in sucrose, to which our carbon provides the backbone. The bee's digestive enzymes convert the watery nectar into thick, golden honey rich in fructose, some of which finds its way into a hot cup of morning lemon honey tea. In order to survive, a body needs to be attentive to all new visitors. Once ingested the simple sugar, of which our carbon is a part, passes inspection and eventually makes its way through the intestinal wall, where it enters the bloodstream and heads north-- to do a job which it has had no training but is perfectly suited. THIS CELL TAKES RESIDENCE IN A BRAIN'S NEUTRON.

It is my brain, and it is at a nerve terminus that sugar is eventually synthesized to the hormone acetylcholine, a neurotransmitter, facilitating my neurological function. It serves my consciousness, which guides my thoughts. It directs my choices toward their necessary motor function. The story is conceived, words are written; if not with a pen, a pencil (graphite our old friend!) right to the last mark. RIGHT HERE.

SUBARNA SETH.
FIRST YEAR CHEMISTRY (H)

SOME NOTABLE WORKS IN CHEMISTRY IN RECENT TIMES

Chemistry is the study of elements and compounds around us. It is an incredibly fascinating field of study and research as there is chemistry in everyday things we do- from cooking and cleaning to driving and even in your body that has a bunch of chemical reactions taking place right now as you are reading this article! Since everything around us is made up of chemicals, chemistry is one of the foundations of modern industrial economies.

Antoine Lavoisier, also known as the father of chemistry, paved the way for modern chemistry. Dmitri Mendeleev, John Dalton, Alfred Nobel, Marie Curie and so many other chemists from around the world have made remarkable inventions and it is because of these inventions that today we are able to make progress and find solutions to many of our problems. In recent times, advancements in the field of chemistry and other related sciences has made our lives easier. These range from using our phones to taking pain killers, from batteries to even bulletproof vests, these inventions impact us all.

Let's look into some inventions that are taking place recently. The entire world is going through a health crisis. We are in the middle of a pandemic with no end to it in sight. But still, with all the developments and progress we have made, we have been able to come up with vaccines in a quite short period. Many experts believe that using mRNA technology in vaccines provides greater immunity as they do not only produce antibodies as in the case of conventional vaccines but also immune cells which attack the virus doubly. But this is not something new. Scientists about 30 years ago began exploring this technology. Future mRNA vaccine technology may even allow one vaccine to provide protection against multiple diseases. This would definitely be a revolutionary discovery in the world of vaccinology.

One of the hot topics in today's world is the amount of waste we generate and how its mismanagement can lead to many environmental problems. Plastic wastes cannot be broken down easily and remain on earth for thousands of years. But chemistry may have solutions to our plastic trash problems. Researchers are finding better ways to handle the plastic waste. Some of these include converting plastic to a monomeric form which might replace fossil fuel as the feedstock for new materials. Other processes yield fuels or additives for other products. A new form of plastic recycling based on the catalytic hydrothermal reactor (CatHTR) platform, developed by Professor Maschmeyer and his colleagues at Licella. It converts plastic into usable products in 20 minutes with low energy usage and minimal greenhouse gas emissions. With such developments, one day chemists will be able to transform plastics from a liability into an asset.

Thus we can see that advancements in the field of chemistry and other related sciences have brought about major developments in the world and made our lives easier. Chemistry is quite literally the study of transformation and chemistry is just another word for magic!

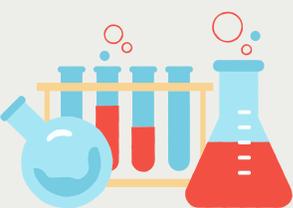
VIRTUAL LABS ARE BOOMING

Experimentation in a laboratory is fundamental in chemistry learning. Laboratory experience helps to elevate skills like understanding and following safety protocols, physical manipulations, making hypotheses and observations, problem-solving, taking accurate records, analysing results and time management. Theories or concepts are well supported by experiments and both always go hand in hand. Therefore, it is impossible to imagine learning chemistry without its practical knowledge in laboratories. However, the outbreak of pandemic in 2019 had made it really challenging for science aspirants to experience a real laboratory environment.



But, the advancements in Information and Communication Technology in recent times have given rise to new innovations known as a virtual laboratory, taking teaching to a next level. Science instructors hoped that computer simulations would be the panacea to provide students with a valid substitute for laboratory experiences. As computer technology has become more sophisticated, laboratory simulations have continuously improved and are successfully utilized to complement numerous science course curriculums. Many universities and schools around the world have started using virtual labs and simulations to keep up with the technological advancements in the era of digitalisation.

The virtual chemistry laboratory is an online simulation of a real chemistry laboratory that can range from 2D visualisations to advanced 3D simulations. The simulation platform is built upon actual experimental data and the most advanced models available. It includes multimedia elements, high-resolution visuals, audio instructions, interactive tutorials, and other elements to enhance learning and retention. Specifically designed to allow students to focus on cognitive processes rather than the equipment, promote active participation, allow experiments to be repeated in safer environments and learn from their failures by not having much simulation limitation, expense and safety constraints. Virtual labs provide boundaries to exploration that gently channel students toward instructional goals while allowing real science to take place.



PROS

- Offers more student guidance, immediate support, tracking and accountability. This flexibility provides an opportunity to create unique experiments for both individual students as well as the group of students and perform better research.
- One can perform experiments like preparation of the standard solution, titration, pH measurement, colorimetry, gravimetric analysis and much more with the convenience of altering the inputs, conditions, catalysts and compounds used in the experiment without worrying about the dangerous effects of these changes.
- Allows user to explore chemicals that are minute, expensive or hazardous and cannot be accessed in a normal situation. A wide variety of elements can be customised, but not limited to, chemical names, glassware, colours and state of matter.
- Provides a platform to visualise the 3D structure of a complex molecule from all angles and examine the rearrangements of the individual atom of the molecule as it undergoes the chemical reaction with great scrutiny.
- Help close the knowledge gap by allowing students to perform experiments at their own pace, anytime and anywhere. Also by providing equal opportunities to the deprived of students who might have never been able to introduce themselves to the real laboratory world.
- Provides a complete Learning Management System (LMS) around the virtual labs where students can avail themselves the various tools for learning including additional web-resources, videos, animated demonstrations and self-evaluation

CONS

- They require computer devices with high specifications in order to simulate the exact phenomena with full details and create a three-dimensional virtual lab
- Reduces the direct interaction between students and each other, and between students and teachers, given that the communication between them is electronically most of the time. One might have a feeling of isolation on prolonged use of virtual labs and attending online classes.

Though every computer technology has its pros and cons it is us, who as a user, need to decide how we make the best use of resources available in the course of evolution. Digitalisation is the way forward for the chemistry labs. However, leaders need to make sure they have well accounted for all the challenges and issues that the transition period will raise. If done well, benefits are immediately evident.

SHIKHA KADYAN
FIRST YEAR CHEMISTRY (H)



Life beyond earth...

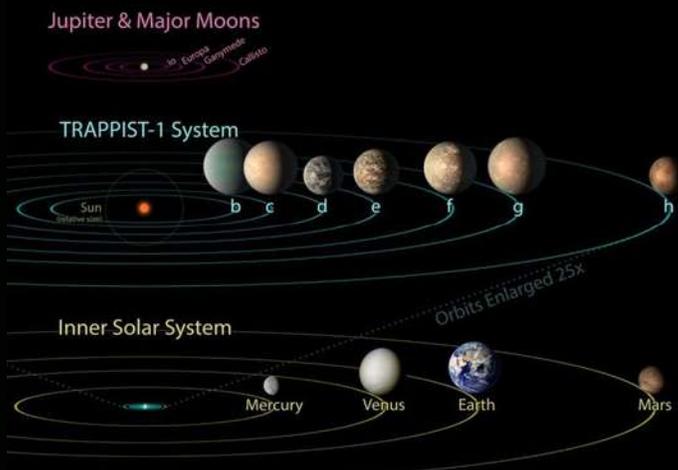
Have you ever looked up in the sky and ever wondered if there was another 'Earth' out there? What does it look like? Have researchers ever found anything like that? What factors decide whether we can live on earth or not?

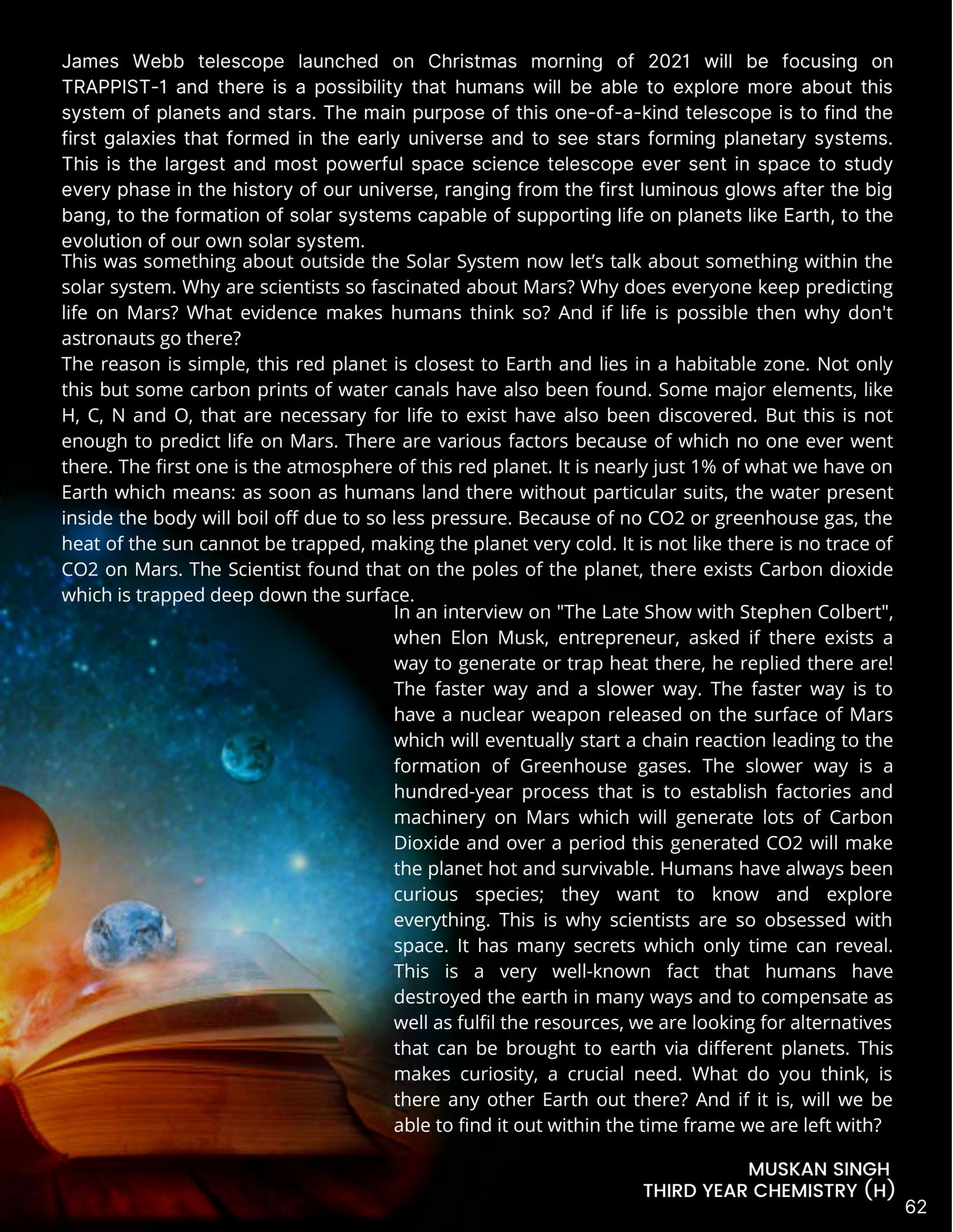
Let's answer these above questions first. Researchers and scientists have been working for years to find such planets. Planets that could resemble Earth i.e., an Earth-like planet having an Earth-like orbit about a sun-like star which has a thin atmosphere and water oceans. But we still haven't confirmed any such planet outside the solar system. For now, those so-called "exoplanets" are the handiest observed in fiction. However, with modern computers and telescopes, it might be possible to find such planets.

A planet to be habitable or to consist of life must be in a habitable zone. This habitable zone or Goldilocks zone is basically the area around a star where it is neither too hot nor too cold for liquid water to exist on the surface of surrounding planets. The nearest exoplanet to our Earth, Proxima Centauri B, is luckily in that Goldilocks zone and to add to that it even has a mass similar to Earth. This planet revolves around the star named Proxima Centauri which is a red dwarf star and much cooler than the sun, so the planets are comparatively nearer to its star in order to stay warm. But this closeness to its star locks the rotation of Proxima Centauri B and hence the one side of the planet always faces the star while the other always stays in dark. To understand it better, take it as if Earth is not rotating, one side of Earth will always face the sun making its morning and the other will always have night and the two faces will be divided by a circular line where it always be either sunset or sunrise. This is the case with the moon and so only one side of the moon is visible to us.

Now let's discuss the current and most hot topic in the Exoplanet system. On 22 Feb, 2017, NASA, in a press release made an astonishing announcement, the discovery of the most Earth-sized planets found in the habitable zone of a single star. They named it TRAPPIST-1. This system is just like our Solar system, a star in the centre, 7 rocky Earth-like planets revolving around with the potential for water on their surface.

By Feb,2018 the study of TRAPPIST-1 suggested that some of its planets may possess even more water than that present on Earth. By today, TRAPPIST-1 has become the most thoroughly planetary system ever known.





James Webb telescope launched on Christmas morning of 2021 will be focusing on TRAPPIST-1 and there is a possibility that humans will be able to explore more about this system of planets and stars. The main purpose of this one-of-a-kind telescope is to find the first galaxies that formed in the early universe and to see stars forming planetary systems. This is the largest and most powerful space science telescope ever sent in space to study every phase in the history of our universe, ranging from the first luminous glows after the big bang, to the formation of solar systems capable of supporting life on planets like Earth, to the evolution of our own solar system.

This was something about outside the Solar System now let's talk about something within the solar system. Why are scientists so fascinated about Mars? Why does everyone keep predicting life on Mars? What evidence makes humans think so? And if life is possible then why don't astronauts go there?

The reason is simple, this red planet is closest to Earth and lies in a habitable zone. Not only this but some carbon prints of water canals have also been found. Some major elements, like H, C, N and O, that are necessary for life to exist have also been discovered. But this is not enough to predict life on Mars. There are various factors because of which no one ever went there. The first one is the atmosphere of this red planet. It is nearly just 1% of what we have on Earth which means: as soon as humans land there without particular suits, the water present inside the body will boil off due to so less pressure. Because of no CO₂ or greenhouse gas, the heat of the sun cannot be trapped, making the planet very cold. It is not like there is no trace of CO₂ on Mars. The Scientist found that on the poles of the planet, there exists Carbon dioxide which is trapped deep down the surface.

In an interview on "The Late Show with Stephen Colbert", when Elon Musk, entrepreneur, asked if there exists a way to generate or trap heat there, he replied there are! The faster way and a slower way. The faster way is to have a nuclear weapon released on the surface of Mars which will eventually start a chain reaction leading to the formation of Greenhouse gases. The slower way is a hundred-year process that is to establish factories and machinery on Mars which will generate lots of Carbon Dioxide and over a period this generated CO₂ will make the planet hot and survivable. Humans have always been curious species; they want to know and explore everything. This is why scientists are so obsessed with space. It has many secrets which only time can reveal. This is a very well-known fact that humans have destroyed the earth in many ways and to compensate as well as fulfil the resources, we are looking for alternatives that can be brought to earth via different planets. This makes curiosity, a crucial need. What do you think, is there any other Earth out there? And if it is, will we be able to find it out within the time frame we are left with?

HOW DE – BROGLIE'S PRINCIPLE AND HEISENBERG'S PRINCIPLE REVOLUTIONIZED CHEMISTRY

Chemistry, the subject we all love, deals with the properties, composition and structure of the elements and compounds and the energy that is released or absorbed during the transformations they undergo. Chemistry is not only concerned with a subatomic domain but also with the properties of atoms and the laws which govern the processes they go through. Chemistry is also called central science as it provides a foundation for understanding both basic and applied scientific disciplines at a fundamental level. One of the most important discoveries of recent time, Heisenberg's uncertainty principle and De-Broglie's Wave-particle duality, not only revolutionized chemistry but also made a huge impact on how we study and visualize the physical world. It completely changed our understanding of subatomic particles as mere "particles" and shattered all the pre-existing, widely accepted theories related to Atomic structure.

Bohr's theory of the atomic model, particularly, got a fatal blow. "The uncertainty principle states that the more precisely the position of some particle is determined, the less precisely its momentum can be predicted from initial conditions, and vice versa". At first, this wasn't excepted by a majority of the scientists including one of the greatest physicists, Albert Einstein. We know with all the great discoveries, there are going to be a lot of controversies as well. It raised a lot of controversies because it puts a lot of classical physics into doubt. Secondly, the uncertainty principle holds good for all objects but this principle is significant for only microscopic particles.

Classical mechanics saw no chance at all to be applied to subatomic particles. Had it not been De-Broglie or Heisenberg, who would have thought that the same laws don't apply to macro and microscopic objects.

These principles introduced to the world a new branch of physics: "Quantum Physics" and laid the foundation of the quantum mechanical model of an atom. This is the beauty of chemistry, how principles given by chemists made a breakthrough not only in chemistry but also in physics. The uncertainty principle is very useful. It is at the heart of many things that we observe but cannot explain using classical physics. By classical mechanics' logic, the two charges opposite in nature shall collapse into a ball of particles but, we know this doesn't happen. The uncertainty principle explains this: if an electron gets close to the nucleus, we know its position but the error in its momentum would be very large. In this case, the electron could be fast enough to fly out of the atom altogether. This principle also explains alpha decay.

The strangest result of the uncertainty principle is what it says about vacuums. Vacuums are often defined as the absence of everything. But not so in quantum theory. There is an uncertainty in the energy involved in the quantum processes and the time it takes to complete them. Instead of position and momentum, Heisenberg's equation can also be expressed in terms of energy and time. This explains the vacuum according to quantum theory.

There have been a lot of great discoveries and we use them every day, one way or the other.



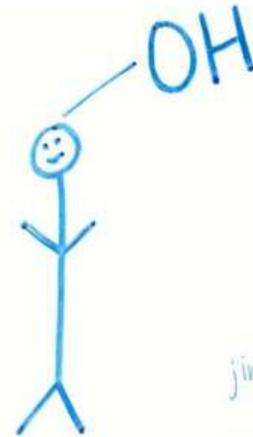
Me in winters :
become
hydrophilic



Me in summers :
become
hydrophobic

ANAMIKA YADAV

How to draw an Alcoholic man?



jineeb

SHINJINEE

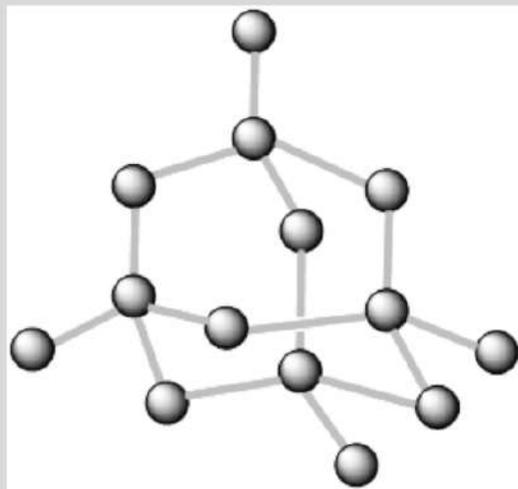


Hey, are you hard?

Yeah



Then show me..!



LIFE IS CHEMISTRY;

DILUTE YOUR SORROW
EVAPORATE YOUR
WORRIES
FILTER YOUR MISTAKES
BOIL YOUR EGO
"YOU WILL GET THE
CRYSTAL OF HAPPINESS"

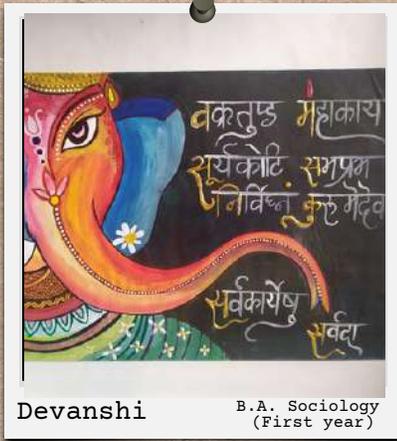


HARSHIT RAJ

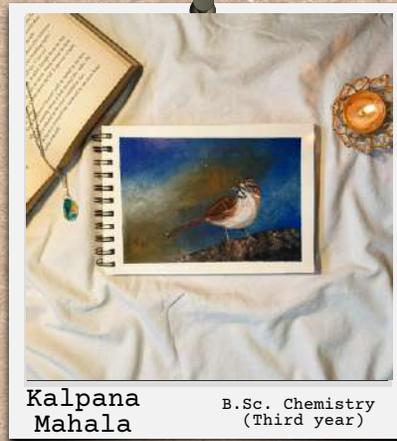




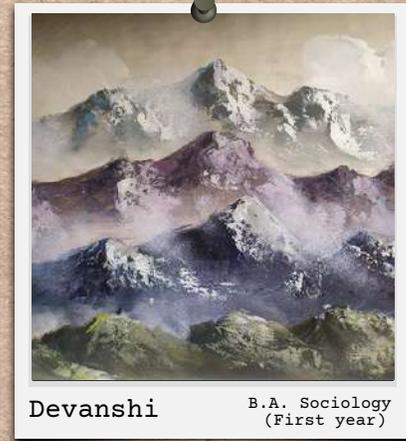
SKETCH



Devanshi B.A. Sociology (First year)



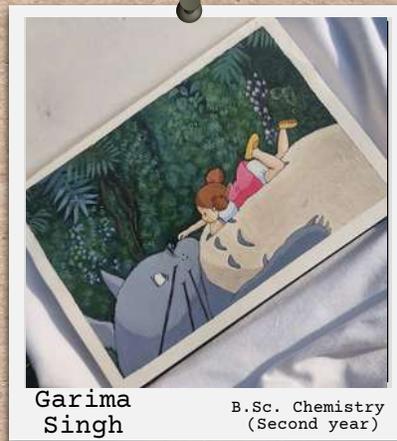
Kalpna Mahala B.Sc. Chemistry (Third year)



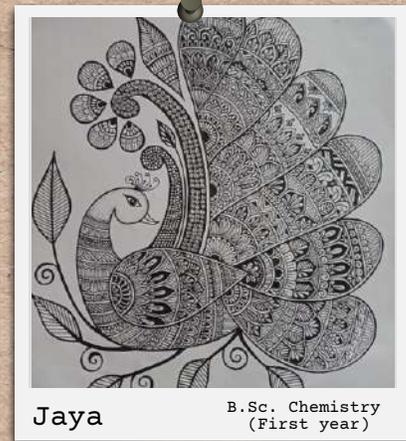
Devanshi B.A. Sociology (First year)



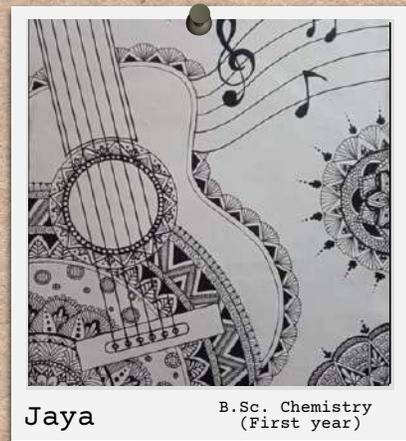
Garima Singh B.Sc. Chemistry (Second year)



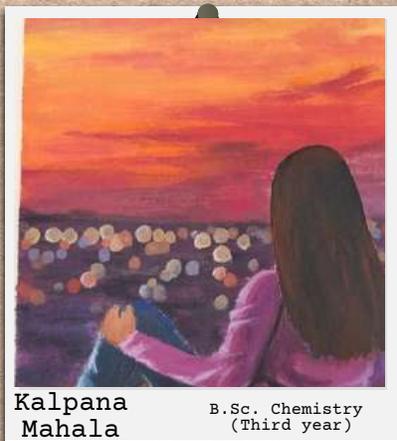
Garima Singh B.Sc. Chemistry (Second year)



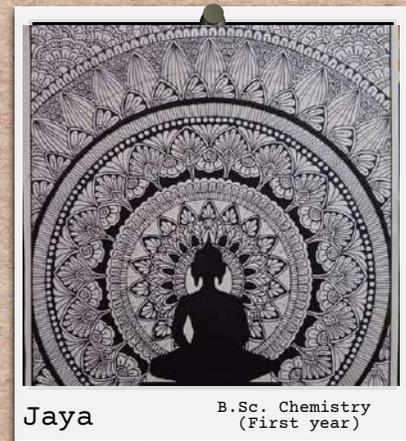
Jaya B.Sc. Chemistry (First year)



Jaya B.Sc. Chemistry (First year)

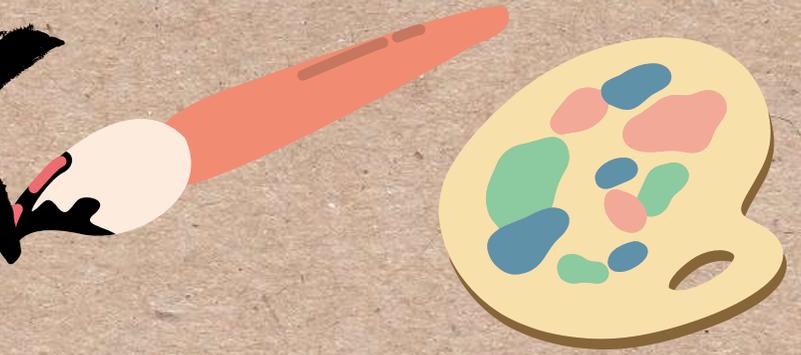


Kalpna Mahala B.Sc. Chemistry (Third year)



Jaya B.Sc. Chemistry (First year)

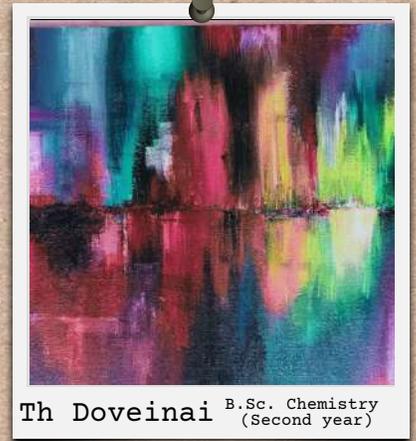
BOOK



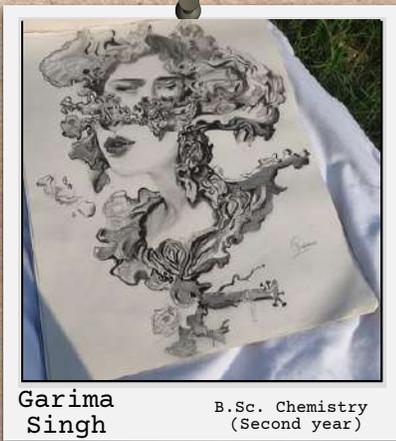
Th Doveinai B.Sc. Chemistry
(Second year)



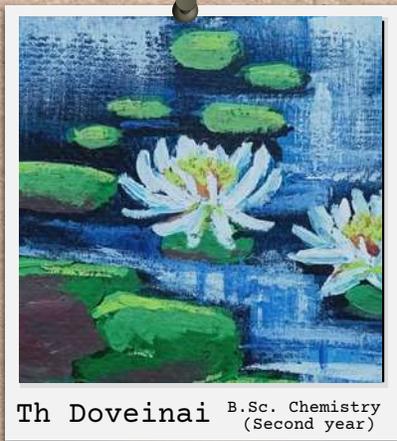
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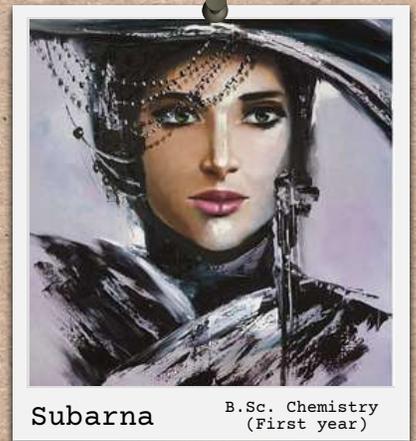
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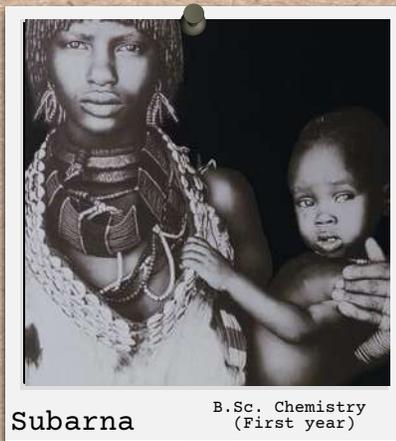
Garima Singh B.Sc. Chemistry
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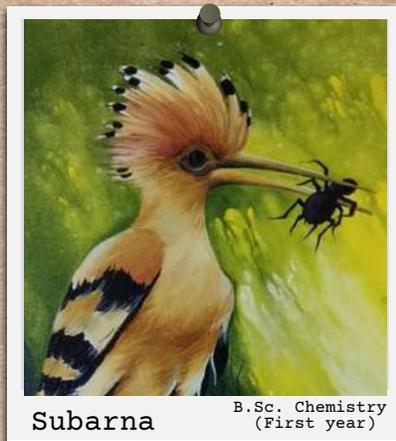
Th Doveinai B.Sc. Chemistry
(Second year)



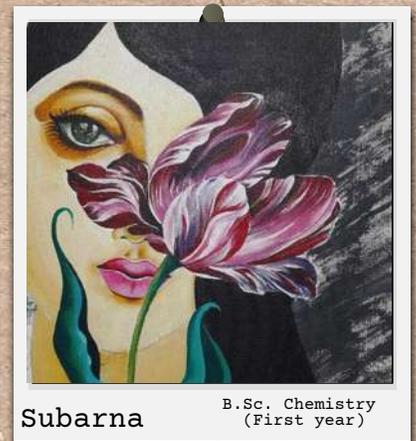
Subarna B.Sc. Chemistry
(First year)



Subarna B.Sc. Chemistry
(First year)

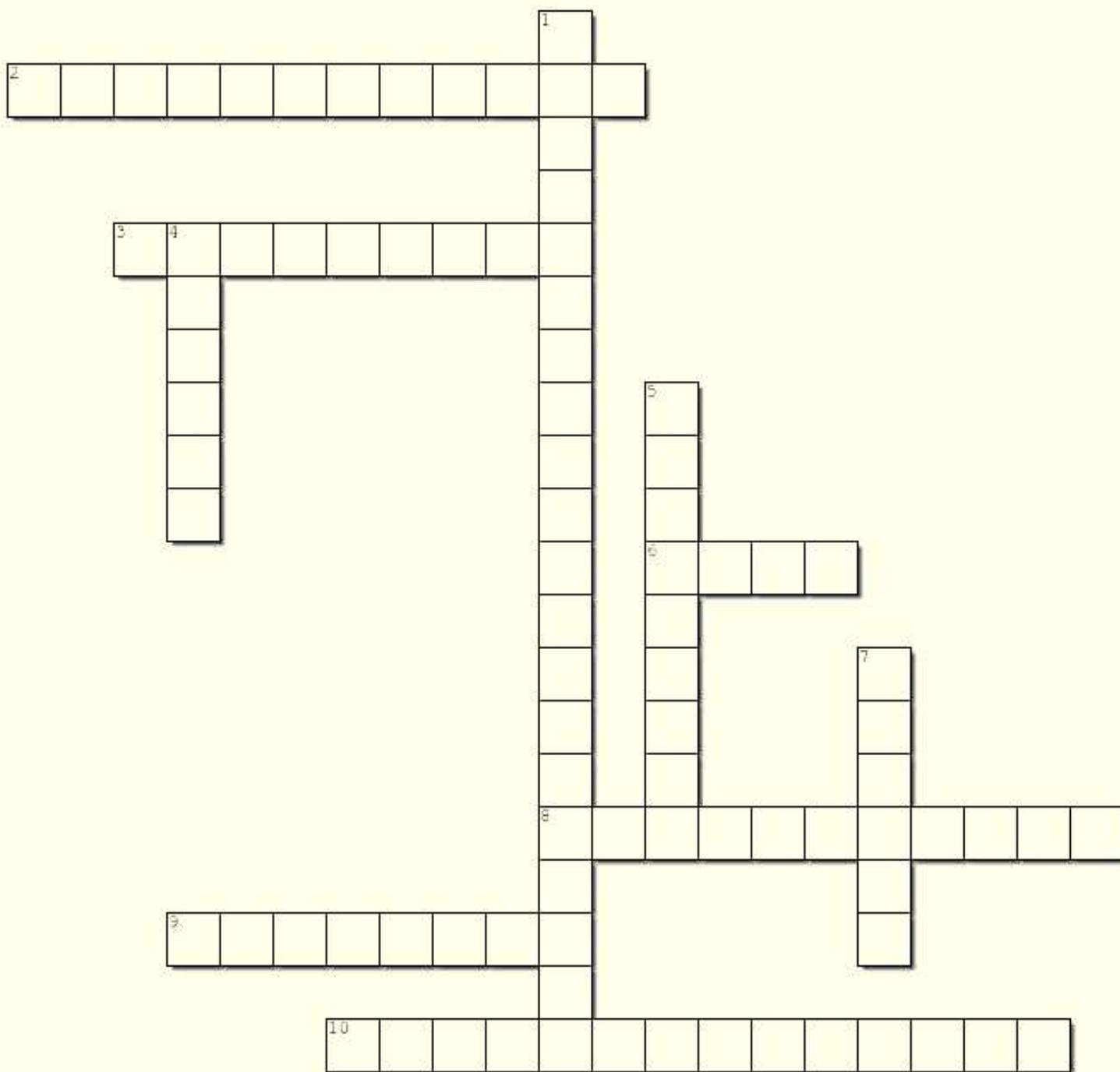


Subarna B.Sc. Chemistry
(First year)



Subarna B.Sc. Chemistry
(First year)

CROSSWORD PUZZLE



Across

2. Chemist who invented pasteurization
3. Substitute for platinum in jewellery
6. An element in periodic table that never form any stable compound
8. An element named after Albert Einstein
9. A super hard material, touted as the strongest material known to exist
10. Popularly known as Roman vitriol

Down

1. I Look like a football and graphite and diamond are my brothers
4. Used to give beautiful bright colours to dresses
5. The latest discovered element in periodic table
7. I am smaller than my parent atom and I am very optimistic



DISTINGUISHED ALUMNAE

A number of students after completing their post-graduation and PhD serve as college and university teachers and research scientists. Many complete MBAs and go on to become managers. Yet others become IAS officers, Air Force pilots, lawyers, computer professionals etc. Some students get extremely prestigious awards and scholarships to enable them to carry out postgraduate and doctoral studies abroad. Some alumnae who are pursuing/have completed PhD abroad are:

- Karisma Agarwal (2019), PhD, Georgetown University, Washington DC, USA
- Priyanka Jain (2019), PhD, Institute of Physiology, Albert Ludwig University of Freiburg, Germany
- Deeksha (2018), PhD, University of Arizona, USA
- Ojaswi Verma (2018), Rice University, Houston, Tx, USA
- Shaileyee Bhattacharya (2017), PhD Chemistry, Paul Scherrer Institut, Villigen, Switzerland
- Kriti Kapil (2017), PhD Chemistry, Carnegie Mellon University, Pittsburgh, USA
- Ishita Chandra (2017), PhD Chemistry, Michigan State University, East Lansing, USA
- Jyoti Aggarwal (2016), PhD Leadership Studies, University of Lynchburg, Virginia, USA
- R. Kartik Lakshmi (2015), PhD Biochemistry, University of California, San Diego, USA
- Gurpreet Kaur (2014), PhD Chemistry, University of Oslo, Norway
- Tenzin Tsering (2014), PhD Environmental Science, Lappeenranta University of Technology, Finland

MS. AKANSHA CHAUHAN

Senior Brand Manager
Tata Play (formerly known as Tata Sky)



There is a feeling you get when you walk into the grounds of Miranda House, a sense of belonging, a reassuring faith in yourself for having made it into this college and a sense of desire in your heart to follow your dreams. At Miranda, I met people from different cultures with different personalities. I believe all Mirandians have this innate sense of sisterhood that makes us bond with each other, help each other grow and at times, even push each other to do better. This courtesy of nurturing growth is fueled by our professors. They lead by example. They encourage you to do better not just academically but also through extra-curricular activities. There's a lot of opportunity on campus to get involved in inter-college competitions, clubs like theatre and drama and even sports, all providing multiple avenues for overall growth.



I will not go much into academics except that this is the place where I realized, you do well not by just cramming the text, you do well when you understand what you're studying. I believe my time in Miranda House prepared me well for my time in the real world. While the academic curriculum taught me, discipline, the other extra-curricular activities taught me how to face challenges in the real world.

I'll share my story with you. There are two reasons why I got interested in management studies. First, after I almost finished my tenure as the President of Rasayanika, I realized that I quite enjoy taking charge of projects and leading them to fulfilment. I loved the responsibility and the hard work I had to put into my work. Second, my immediate senior had just taken admission into a prestigious MBA college and I looked up the career prospects after that – brand management and marketing, advertisement, consultancy, investment banking, product management and the list goes on. It's also a good field to get into if one day you want to start your own business. To be very honest here, my love for project management and desire to travel (we need lots of money to travel), made me look at corporate job as an MBA graduate. I had 4.5 months to prepare after graduation for the CAT exam, it is the entrance test one has to take to get admission in most MBA colleges in India. This test is conducted by IIMs and is accepted across IIMs and most colleges, except XLRI which conducts its own test. The CAT entrance exam is usually followed by a group discussion and a personal interview. If you clear these, voila, you're through!

Here's my wisdom on how to prepare for CAT. Have a study plan. Follow it with discipline, keep testing yourself on a regular basis and always, always go through what was taught in class in the morning, again in the evening so your mind locks the concept. Revision is key. What you prepared 2 months ago, needs to be revised.

We're humans, we forget until we refresh our memory. As you approach closer to your exam date, get into the habit of taking mock tests during your final exam time slot. This way, your mind will get conditioned to work and perform by design when you actually give the test in your allotted slot on the D day.

After you clear CAT, you need to be prepared for group discussions and personal interviews. Reach out to your seniors and ask them to conduct mock interviews for you. Reach out to your peer groups and do mock group discussions. There are plenty of materials and groups online that can effectively guide you through the process. This might seem a lot, but trust me, you can do anything that put your mind to and is disciplined while you work towards your goal.

Remember not to target the top 20 colleges, but target the top 10 or maybe even the top 5. You're currently studying in the best college in the country, I am sure you can make it to a top 10 MBA college in the country.

Top MBA schools such as the old IIMs, not only prepare you for a successful corporate career, but they also jumpstart it by many years.

It took about 4.5 months to prepare for the exam, but if you are among those lucky ones who realize during your undergrad time that you want to do an MBA, you can still manage it along with your course load if you have a good and balanced study plan in place. Don't be hesitant to ask for help from experts.

Here are my two cents as parting words, while you focus on academics, try to participate as much as you can in extra-curricular activities, talk to people from different courses at college, make friends with people from different colleges – all of this will help in both your professional and personal growth.

Signing off.

Please feel free to reach out to me at akanshachauhan774@yahoo.com in case you have any queries.

PUNISHA KARDAM

Assistant Producer
India Today



Ohh my tryst with Miranda!!

Fondness doesn't develop overnight, it's brewed with time and not necessarily one likes the aura since the very beginning. But once you feel at home with the place there is nothing that can dilute the vehemence of emotion you carry within yourself. Such is the might of Miranda House. There is a sense of absorbance which deluge you as you grow with it. There is a subtle yet strengthening embrace in the green of its grass and red of the arcade. Yes, it's Bold and every person emanating from Miranda House in many aspects is Bold in accepting one's own self. That is exactly how it has moulded me and crafted me as an individual to dare or at least follow my hallow.



I was a little frightened and intimidated when I got admission in the Chemistry department at Miranda House, probably it was too prestigious for me to hold. But it was just a matter of a few days and you start reflecting your highest energy. Be it acceptance, be it evolution or be it concomitance of everything Miranda offers you. I love and cherish each and every breath of my journey as a Chemistry Hons. student where Miranda was my muse. Be it the jazz of societies or calmness of lawns, be it the buzz of corridors during lunch break or the chatter of fests and ever dynamic approach to incorporate more progressive initiatives consistently, every bit espouses life through 'gypsy at heart' vibe. During my all three golden years of graduation, I was fortunate to have always grabbed the opportunity to don the organisational cap. Being the chirpy beaver who likes to interact and take up initiatives, I manifested growth and strength in various responsibilities I got from class representative to that of the president of the department. The annual lecture, raising funds, organising educational trips, culminating departmental festival, all in all from decor to its final draft, imbibed in me genuity in all superlative forms. Genuine to accept and not bloat, authenticity and transparency in conduct, I feel short of words to express the gratitude I have for Miranda House. All this could only be engraved in my and many of my peers' souls through and through for we have been mentored by gurus as such. Though every teacher of mine has lifted me up from some blockade or the other, especially Amrita ma'am and Bani ma'am have been my two exemplary springs, to always look up to for strength, for practising transparency and mere exhibition of valour and clarity in their being.



After my cherished 3 years long journey at the Chemistry department of the college, I did my masters from science faculty, DU in 2020. But always having a keen interest in writing and fascination towards print and public presence, I went on to do a diploma of mass communication from IIMC, New Delhi in 2020 wherein I thoroughly enjoyed the course and got placed with the revered India Today Group media plex which has given me practical news sense and functioning of the most dynamic profiles and genre – media. It has made me realise the potency of media in shaping lives in and around us. Further on I just wish to value add in my surroundings with my existence, just how Miranda has added to mine.

For being proud of anything one doesn't need external accolades and badges, only your intimate admiration is enough and I am extremely proud and privileged to rightfully carry Miranda in my heart.

Gratitude

MS. PRIYANKA JAIN

PhD at the Institute of Physiology
Albert Ludwig University of Freiburg, Germany



My journey from a school pass out to a graduate was no less than a life of a hatched egg to a bird who flies fearlessly with her wings wide open and eyes ready to explore the world. As a hatching chick has to work hard for days to break through the shell so did I and many others to get into a college as prestigious as Miranda House. Miranda House was a red-bricked building as I stepped into this place.

A college from which I had boundless expectations. But as I stepped out from this place the college had turned into another home where the journey seems immortal. The expectations were not only fulfilled but also shaped into a lane of memories that could be cherished throughout life.

The most precious gift that this place gave me was none other than me - A changed me, a newer me, a me who actually knew how to dream big and had the audacity to fulfil it. This stupendous journey of mine was a complete blessing as well. The three years spent here were the years of learning, education, enthusiasm, exuberance, courage, spirit, competition and above all character. My journey of college like all others was an exciting roller coaster. It was loaded with gifts, surprises, ups and downs, achievements and criticism and all of it helped me learn to grow, learn to manage and most importantly learn to explore. Like a chick who puts in the immense effort and slowly learns how to fly, in a similar manner I learnt how to sail in spite of the challenging situations. I transformed into a more determined and stronger girl of which even I could not have thought of. From being a member of societies like MH Vatavaran, NSS to forming human chains at times of need during Tempest.

From meticulously working in labs with lab coats and safety glasses put on to preparing and organising Pratikriya, freshers and farewell, everything seems everlasting. From running from PAM to classes on time to chilling in lawns and discussing over coffee on different topics was a pleasure always. And finally, from the orientation day to the scribble day and then the semester exams this amazing pathway has left an indelible mark on my trajectory of life. The milestone of all had been the post of President of Rasayanika which not only enhanced my skills but me as a whole. Singly organising trips to planning and achieving success in various events. Balancing academic life with extra-curricular to make difficult decisions for the benefit of all was the thing that made me the independent and confident person I am today. Amidst this all, I formed strong bonds with my people, made good friends for life and a few critics who helped me to improve on myself. And above all the faculty members were a cherry on the top of the cake since they not only supported me but also acted as mentors at times of need and companions at times of my lows. They motivated me, pushed me and was always a delight to work with. They are a literal inspiration for not only me but for many. I am highly grateful to all of them for acting as pillars in life of students like me. Even the staff members also showed cooperation whenever we needed them to be it at labs, trips or events. Everything in total was a package worth experiencing.

Miranda will always carry a special place in my heart. For me, it is the epitome of emotion that could not be forgotten. It is a vibe, an aura that can only be felt and realised. I will forever miss every essence of this terrific journey of mine and will cherish it wherever I would be for giving me myself. Highly thankful and fortunate to be called as Mirandian for life and on.

Once a Mirandian will always be a Mirandian!

NIDHI CHOUDHARY

Scientific Assistant India Meteorological Department

On the first day of college, just like everyone, I was, both, excited and nervous. Excited about what all I would be able to do here and nervous about the thought of 'not being good enough. Along with excellent faculty and academic support system, Miranda House provided us with a platform to explore our true potential. So, I made a list of the fears/insecurities that I wanted to overcome and the qualities I wanted to cultivate. The list included a variety of things- doing well in academics, improving communication skills, overcoming fear of public speaking, learning new languages, being confident enough to try all sorts of hairstyles and outfits etc. The most important of these was to accept me and learn to be comfortable in my skin. Being attracted by the idea of happening life of members of various societies, I enthusiastically applied for almost all of them. And soon I realised that doing everything all at once wasn't practical. Thus, one by one I joined Anukriti(Hindi Dramatics), Jigyasa(Quiz) and MH Vatavaran. These societies along with helping me to gain confidence and versatility provided me with an opportunity to make friends outside the department and broadened my understanding of possible academic, career and life choices.

At Miranda, while trying to make the most out of available opportunities, I earned a mixed bag of successes and failures. However, today I am equally grateful for both. I got elected to some posts and got rejected for some roles. Over the years I have realised that judging the outcomes of our endeavours in binary of success and failure isn't justified. If we look closely, while navigating through the highs and lows of odyssey, we would realise that we've transformed and learnt a lot. Isn't that transformation a reward in itself? Overemphasising on results often discourages us from attempting something new, which in turn is detrimental to our growth. There have been instances where I have succeeded by chance and failed despite efforts. So, gradually, I inculcated a strong will to attempt and to value the process irrespective of the outcome. For instance, I wanted to apply for the college's excellence award given to third-year students which along with other things required students to write an essay on "My Aspirations". Though I didn't win the award, I diligently wrote the essay. And that essay still reminds me of the aspirations of the 21 year-old-me and inspires me to keep striving in that direction.





I am thankful for the wholesome experience I had during my graduation. The clarity of concepts and camaraderie developed while experimenting in labs was unparalleled. The bonds made there far outlast the colourful stains on our lab coats. Peer-to-peer learning has been very effective all along. The summer internships and interdisciplinary innovation projects were instrumental in introducing us to the world of research. The conducive environment provided by Miranda House as a whole helped me significantly reduce the list of my fears/insecurities and grow as a self-assured person. So, when I didn't achieve what I initially aimed for, I was equipped enough to channelise the learnings to become successful somewhere else. And as much as I am enjoying the journey, I haven't stopped aspiring for bigger things in life. Because that 21-year-old-writer of "My Aspirations" just won't allow that.

KRITI KAPIL

PhD Candidate (Carnegie Mellon University)

Eight years later, it feels surreal how vividly I still remember 9:00 am, July 1st, 2014, when I first walked into the portals of Miranda House, barely realizing how my life and personality were about to change in the next few years.

Getting down from an e-rickshaw at the gate, I recall being thrilled right away as the engraving read “Miranda House: established on March 7th, 1948”; March 7th, yes, I share my birthday with Miranda House. “How cool is that!” I exclaimed and barged into the mad rush of thousands of students who wanted to bag admission in the first cut-off. I heard the admission process has been digitalized now, lucky y’all. I am going to sound like a blabbering old woman if I say, ‘in our days, it was much harder, it took all day in the scorching Delhi heat, to get all your certificates verified, stand in long queues to pay tuition fees in cash.’ At 5 pm that day they took a headshot and printed the ID card, where I looked like a frog (so annoying, right? as a woman I hope you are getting me). Standing outside our admin office and patiently waiting were my lovely mom and dad, my constant cheerleaders. I gave them an assuring nod, and I guess they were proud of me (they didn’t say anything like that, though). Without wasting another minute, they dragged me to the cafeteria near MH Hostel, and boy, did I hog that day. What a day, indeed!

The next 3 years went by in a jiffy. I only recollect taking one million pictures/selfies during my first year, at every possible location on our lush-green beautiful campus. The following two years were rather eventful. Looking back, I believe it is incredible, how our professors dedicated much of their attention to building a robust environment for our overall growth both as scientists and as humans. I hope Mallika ma’am has an idea of how she continues to inspire feminism and a strong sense of self in me. I hope Adarsh ma’am has an idea that inspires humility and taught me to persevere regardless of the situation. I hope Anshika ma’am and Sharda ma’am realize that if it weren’t for them, I wouldn’t know how to wrap my head around chemistry and fall in love with it. I hope Bani ma’am knows that on the days I feel incapable, I remember her telling me that I can do anything I set my mind to. And most importantly, I hope Amrita ma’am knows that I have learned to never give up on myself because she never did. I recollect some very embarrassing memories when I made a complete fool of myself, and Amrita ma’am was stunned at how foolish I can be. I don’t blame myself; I was 17 and naive, still trying to figure out independence and the whims of adulthood.



But fortunately, I had Amrita ma'am's loving hand to rebuke me when needed (which was sadly very often) but be resilient to guide me no matter how hopeless I may have seemed. There is no doubt in my heart that I wouldn't be half as strong, meticulous, or ambitious if I did not grow up in Miranda. I think the days after graduating from Miranda felt rather easy. Not that my life during my masters at IIT Gandhinagar, magically became a bed of roses, but I was prepared for it. During my time at IIT, I felt very confident about the chemistry I had learned and about the person I became. It was only then that I realized, I had inadvertently developed attention to detail, efficiency, and solid work ethics. Open communication channel with the professors at IIT, trying to stay aware of the opportunities and motivated to put in as much work as it takes came very handy during my time at IIT, and then ultimately landed the Ph.D. offer from Carnegie Mellon University in Pittsburgh, US.

CMU is a great institution to be at. It is deemed No. 1 in the world for cutting-edge research in machine learning, artificial intelligence, and robotics. I work on polymer chemistry, biomedical applications of polymers to be precise. My supervisor Krzysztof Matyjaszewski is an esteemed professor, been nominated for the Nobel prize in chemistry for a couple of years now (I really hope he gets it, for my own sake!). Interestingly, he prefers we call him Kris. He says when we get on the table to discuss science, I am not some know-it-all scientist smarter than you, we are both equals, put forth your arguments and ideas with conviction after all no one in the world knows your research better than you. Although I don't agree with this, he literally saw in his dream and developed the technique for the controlled radical polymerization which the world today knows as "ATRP", of course, he knows it better than any person alive. The essence really is the mightier the tree becomes humbler it gets.

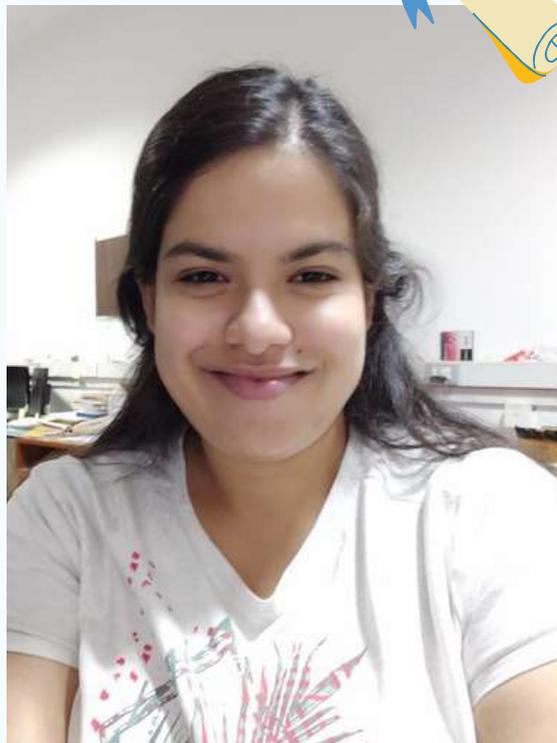
To conclude, If I had to tell something to my 17-year-old self at Miranda, it would be to believe in my calibre, believe that I have the potential to overcome all that life throws at me and there is no reason to settle for anything less than what I rightfully deserve. Sadly, more often than not, girls in India are brought up to be a push-over, we grow up imagining all the high boundaries that limit us from unleashing all the possibilities of what we can be! I would like you to believe when you graduate from Miranda, you will be ready to unlock new levels in life, keep going forward with your heart in the right place.

PS- I am just a phone call/email/DM away from my family at Miranda.

MANASWEE BARUA

Int. PhD student
JNCASR, Bangalore

Let me start by saying that my three years in Miranda House left a very impressionable mark on me, and still plays a very important role in making me the woman I am today. I believe it will be unfair to call it my most amazing experience because it was far from that. It was a concoction of a lot of experiences, be it staying away from home or making new friends, sharing space with them, taking baby steps into your career, and also emotionally developing into an independent woman. Miranda provided us with a platform wherein we could all grow individually and apart from having a great academic curriculum/environment, it also introduced us to role models in the form of our professors or the various dignitaries that the college had hosted through the years. To sum up, I had three very enriching years as a B.Sc. (H) Chemistry student in Miranda House.



After my graduation, I went on to enrol in the Integrated PhD program at JNCASR. I had a decent rank in IIT JAM and so I could directly sit for the interview in JNCASR, but apart from that they also organize their entrance exams. The interview was B.Sc. level, so the normal preparation for semester exams was good enough to clear it. My first experience at JNCASR was very different from Miranda's, to start with there were just five people enrolled in my course compared to ~85 batchmates during B.Sc. Plus, the Int. PhD is a very hands-on course wherein a lot of effort/time is put into lab work, and I would especially suggest this for anyone interested in pursuing research as a career. In my case, I was assigned under a professor with my research problem by the second semester and this course also has the option of switching labs/research groups between Master's and PhD which makes it easy for people willing to explore different research fields. Pursuing a PhD is a rollercoaster with some good days and some bad. We keep long hours and have to put in a lot of effort and time into it, read a lot and follow other people's research work, experiments might work out easily and we need to figure things out and solve our research problems. But at the end of the day, if you are interested in it, you will appreciate it thoroughly for sure.

MS. RAKSHA JAIN

Senior Materials Engineer
Sekisui Chemicals Co. Ltd., Japan



I am Raksha Jain, graduated in 2017 in Chemistry from Miranda House. I am currently working in Sekisui Chemicals Co. Ltd, Japan as a senior materials engineer. I always wanted to pursue pure science and contribute to research and development that directly impacted people's lives. The rigorous academic structure and environment of Miranda House helped me in building a strong academic foundation and skills required to be able to succeed in my career. Apart from academics, the plethora of opportunities provided by Miranda House (for instance innovation projects, science conferences and extra-curricular activities) further increased my research interest and hence I decided to pursue Masters. The solid academic foundation built by Miranda House helped me in achieving those extra points in the IIT JAM entrance exam which made me ALL INDIA RANK 1 in 2017. I decided to do my Masters from IIT Bombay which was my dream institution because of the sheer number of opportunities/career options this institution provides. In the two years of my masters, I maintained excellent CPI which gave me the opportunity of doing a summer internship at Indiana University, US. My summer internship made me realize that I wanted to pursue a career in corporate research and work on projects that directly impacted people's lives. In IIT Bombay, I actively took part in societies and held the important position of responsibilities that improved my soft skills required in the corporate world. During campus placement, I was able to get an offer from Sekisui Chemicals Japan. Working in Sekisui Japan was an astounding experience as I learnt a new language, new culture, Japanese style of working and developed my professional skills. In my journey till now I realized that learning never stops, it is a continuous process and one should be willing to learn at each and every stage of life. Build a solid academic foundation but don't rely on a degree alone. Actively participate in extracurricular activities and explore different opportunities to understand your interest and network in your field. Ask questions. Even when you aren't sure of the questions to ask. Let your advisor, an instructor or a peer mentor know when you need help. Have fun! Live it up! Be happy! Enjoy every moment!

MS. DEEKSHA SATYABOLA

Biodesign Centre for Molecular Design and Biomimetics
School of Molecular Sciences
Arizona State University



At Miranda House...Determined to do an Honors degree in Chemistry at Delhi University, my parents shifted for me to Delhi in mid-2015. In the beginning, I had no clue regarding the application process. For this, I talked to some neighbours who had studied at DU and referred to google. With plenty of information, I filled out the admission form. And to my surprise got accepted for the chemistry program at Miranda House at exactly the cut-off percentage :-). This decision was a crucial happening in my life because the experience, teaching atmosphere, and people I met here are going to stay with me forever. I got my first research experience as a DSKC summer intern working in a team of three. There are several societies at MH that allow us to explore the world beyond classrooms. I am indebted to the institution for building my confidence, broadening my horizon of thinking, and providing that initial push that brings me where I am today.



What Next?...

It was in the second year of my Bachelor's, most of my friends and batchmates had decided to sit for the IIT-JAM entrance. Excited to hear the success stories of seniors, I decided to do the same and started the preparation. The drill which began as a mere peer pressure turned into overwhelmingly long and healthy discussions on fundamental topics in Chemistry. And with time, it was clear to me that chemistry is what I want to stay with in the future. Finally, the doomsday of results came at the end of March 2018 placing me at IIT-Madras. It was both an exciting as well as a gloomy feeling because I had to shift 1300 miles away from home. Nevertheless, a curious girl in me wanted to continue chemistry.

Getting ready...!!

The curriculum at IITM was standard with a year-long master's project in the last two semesters. It was a bit hectic at the beginning with two exams a day consecutively, but we were used to quizzes at Miranda House, so I adjusted in no time. By the end of the second semester, I started gathering materials for GRE and TOEFL preparation (language and aptitude-based exams required for applying to the US). It was recommended that we have an internship or prior research experience before applying for a PhD abroad. Therefore, I decided to apply for the summer internships provided by the Indian Academy of Sciences. The internship (@IITKanpur) allowed me to explore the field of research intuitively and gain experience in writing articles and thinking about a problem critically.

Thereafter, I narrowed down my area of research as analytical and physical chemistry and applied for PhD programs in the US for this field. Days of PhD applications... As soon as the third semester started, I intensified the preparation of applications. Because we still had regular classes and a master's project, I used to prepare for the aptitude exams early morning, attend classes during the day and perform experiments in the lab in the afternoon. Looking back at my schedule now, I hardly believe I was so dedicated...(-)chuckles). By the beginning of November, I had given the required tests and selected my ambitious and safe universities in the US. Thereafter, I filled out the application forms for the universities by the end of the year. The decision on an application comes on a rolling basis from Jan to April. Today, I am pursuing my PhD in Chemistry and Biochemistry in the School of Molecular Sciences at ASU. During the whole application process, there were some key points that I noticed, which I want to share along with a step-by-step approach for preparation.

1. Familiarize yourself with the application process: Many students forget to carefully go through what is asked in the application. For instance, one may write a Statement of Purpose (SOP), but they forget to specifically address the questions asked by the reviewers which varies depending on the university. Maybe log in to the applications portal in early September and skim through it.
2. Choose the universities: It is recommended to divide the chosen universities into three categories. Ambitious, which you dream of going into, moderate, where you fit, safe, which you will get. This process keeps the assurance of acceptance and at the same time keeps the enthusiasm high. This may be a rough list, which can be tuned in the following months. Also, it is equally important to understand that ultimately our research interest matters more than a ranking of universities. One may get happy to get selected at a top university but fall in disappointment having a not conducive environment for his/her interest. Therefore, research interest should be considered a priority.
3. Give aptitude and language tests: Keep in mind that GRE and TOEFL are just additional requirements by the universities. They are not the only deciding factor in an application. And since they take time to prepare, begin the preparation early and get done with them.
4. Focus on the main application: Start gathering official transcripts of Bachelor's and Master's, pre-inform the professors for a letter of recommendation (LOR), and draft the SOP. Start early because there will be several editions to make further. Maybe consult a senior or professor whom you know to proofread the SOP and provide their suggestions on your application. Read some samples to get an idea of the standard and focus of an SOP because it is the only document that sketches our personalities to the reader. The trick is – it should be simple, lucid, and “unique”.

In the end, getting into a university abroad should not be the endgame for one. Being a second-year PhD, today I realize that if one is passionate about research, they will do good wherever they are. Miranda House has taught me to be an independent woman, if we do not have opportunities, we are capable to create one. Believe in yourself, you can be the next generation of leading scientists.

MS. ROHINI AGARWAL

Scientific Officer BARC

It is my pleasure to place on record the wonderful years I had under the auspices of the Chemistry Department at Miranda House, University of Delhi. My name is Rohini and I am a proud graduate student from the 2013-2016 batch. Later, I completed my post-graduation in chemistry from the Indian Institute of Technology, Delhi. I looked into the different opportunities in science and attempted to present myself in the best possible light. Currently, I am serving the Department of Atomic Energy, India as the scientific officer at BARC, Mumbai.

We all agree that College life is an important phase in a student's academic journey after numerous formative years of schooling. When I joined here, it was the first time that I left the comfort of living at home for shaping the future. I would always be grateful to the College for giving me multi-dimensional learning along with overall skill and personality development with the seamless mix of academics and extracurricular activities. The professors are dedicated experts in their respective subjects and are talented, committed and genuinely caring.

Walking in as a fresher with no direction and walking out at the conclusion of the 3rd year is probably the best transformation I could have ever experienced. I am thankful to all the faculty members of the college and the chemistry department for their continuous efforts and support. I cherish every moment spent at the campus. My graduation has been a very interesting and awesome journey and I feel blessed to be guided by the most committed, patient, knowledgeable and caring teachers from the chemistry department. I shall strive to make my institute proud at all times.

Once a Mirandian, Always a Mirandian.



MS. KARISMA AGRAWAL

PhD Student
Georgetown University

My journey from Delhi to DC has been one to remember.

It all started back in 2016 with me being super lucky to get a seat at Miranda House. I fell in love with our beautiful college the moment I stepped into it. I remember being nervous on the day of orientation because it was my first time being away from home, but the warmth of our teachers and seniors helped me ease in. And as my journey progressed, I started enjoying myself. I took on the role of a CR and became an active part of our department. In my second year, I became the General Secretary of Rasayanika and tried to fulfil all my duties with utmost dedication. Organizing fests, farewells and freshers added to my learning curve while also being fun. I remember shuffling classes between rooms 145 and 151 and running to labs in between. At the end of the day, relaxing on the science lawns with my friends was pure bliss. I met my two best friends there, who have now become my family. Besides academics, the festivals, competitions,

conferences, projects, clubs all helped shape my overall personality. To date, the three years at our college have been the most memorable of my entire academic journey. I owe my success to all the teachers at Miranda. They helped me be the better version of myself. The sound knowledge base I managed to build was entirely due to the tireless efforts of our teachers. Even today I manage to stand out in my entire cohort purely because of the start I got at Miranda. Leaving Miranda was very tough because I had built some lifelong friendships and my bond with the teachers only gets stronger even now.

I was offered MSc at IIT Hyderabad in 2019 and thus started the next phase of my academic journey. Here again, I was very lucky to find myself amid academic excellence and professional rigour. It was a steep learning curve but I did my college proudly. I took up as many activities as I could before the pandemic struck and we were back home. Online classes continued but I missed the lab so much. After 5 years of rigorous studies, I knew this was just halfway. So I decided to pursue a Doctorate and I went on to apply abroad. I got various offers including Cambridge University but keeping the financials in mind I opted for a fully-funded PhD at Georgetown University in Washington DC. Thus



began the international chapter of my life in the US. I am a part of the Swift Research Group and we work in areas of solid-state organic chemistry. I cannot say that it has been a cakewalk but each day offers a unique lesson, be it the lab or life in general. I am making the most of it by taking courses, performing the role of a TA while also focusing on my research. Miranda has been my launchpad so I am not done yet. I have many many milestones to reach. My fellow Mirandians, we are the fortunate ones so make the best of it. Alumnae of Miranda has always brought laurels and I hope all of you will reach for the stars. Dream big, achieve bigger !!
Remember we are always there for you. Good luck !'



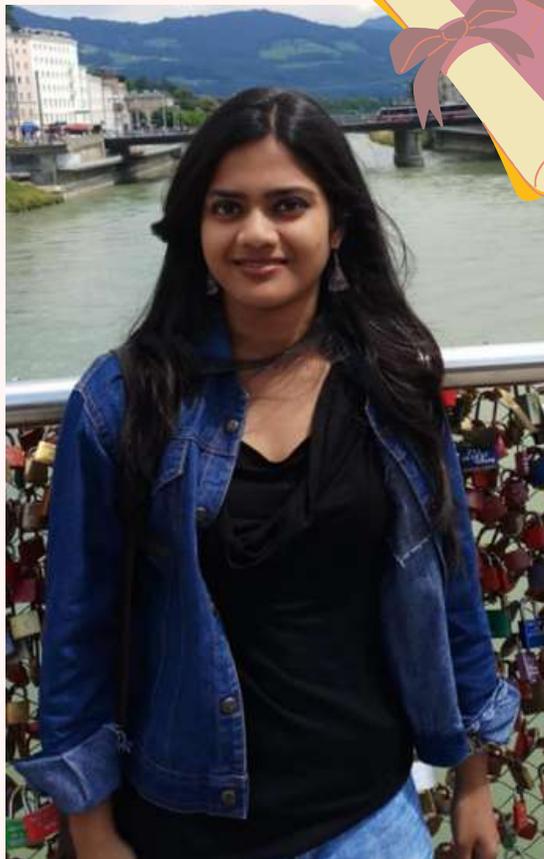
MS. SHAILEYEE BHATTACHARYA

PhD Chemistry

Paul Scherrer Institut, Villigen, Switzerland

Dearest Miranda House, As cliché as it may sound, you've completely changed my life. From a clueless starry-eyed teenager who stepped into your premises, you have made me evolve into a somewhat confident woman with a direction to sail through in life. Some things in life call you back with arms open wide and heart beating fast, some things in life know how to dwell right at the centre of your heart like a happy irreparable dent- you are that for me, and much more! The red-bricked structure had so many speculations attached to it when you first welcomed me into it. I remember the day crystal clear, July 4, 2014, it was. As soon as I saw you, I knew it was the beginning of a grand adventure. Seven and a half years later, I realize I couldn't have been more right- for you, indeed, were an incredible, terrific and priceless journey. You, in the true sense, are 'bold'- for you've evolved your people to grow fearless, opinionated and outspoken, and instilled in us the strength to mouth the same thoughts with the least filter.

You have imbibed in us, the Mirandians, the confidence to hold ourselves intact even in the direst of situations. Oh, my dear, there's just so much to talk about you- the flawless beauty of your lawns, the aesthetic appeal of your arcades, the peaceful elegance of your corridors buzzing with students and teachers... and the list goes on and on. As I sit down to write this, I cannot be grateful enough for all that you've done for me over the years. Miranda House, you've become a lot of my identity. You've given me countless opportunities and chances. You've made me strong enough to face the real world outside of your walls. You've shown me failures and how they can be used as a guiding light to stand tall again. Back in my college days when I was bombarded with questions about my future, I blindly relied on you for the answer- "you know I'm still so young and in college, I am sure I will eventually figure something out." You made me grow into a responsible and independent individual. Now, as I drift through my PhD life at Paul Scherrer Institute, Switzerland, I realize and humbly appreciate the importance of your wake-up calls, valuable teachings, and endless life lessons. Situations don't always favour me, and things don't always go my way. Sometimes, rather most times, tough critical decisions have to be made.



You've always let me figure my way out in the past, and you continue to be a stepping stone as I try to make better choices, act a bit smarter, and do things slightly differently than I did yesterday. And oh, the memories- a bucketful of them! You've given me some amazing people who have helped me shape my character into a better version of myself. The memories we have woven together are magical, for we have together lived through times that have been in some way made immortal. You gave me teachers who later filled in as my mentors- I know no words to thank them for their unending support and gracious help to date. I feel fortunate to have had such remarkable teachers who taught lessons both inside and outside of the classrooms, and prepared us not just academically but also for life. You gave me friends, the best of them, who have become the strongest support system to guide me through the darkest of tunnels as well as to cheer for me the loudest through all ups and downs.

You, Miranda House, are the best thing to have ever happened to me! So, here's to you, MH! I might be a slightly different version of the bewildered girl who used to sit on the benches of your classroom, but even if given a chance to go back into the past, I would not trade the time we spent together for anything in the world. I could not be prouder of my decision to come to you in the first place. Someone, on the very first day of my college, very rightly said, "Three years later, you are not going to leave from here just as a chemist, but you'll be leaving as a Mirandian."Indeed, you carry a Miranda of your own in your personality wherever you go.

Thank you for everything until we meet again.

Yours truly,

Shaileyee Bhattacharya

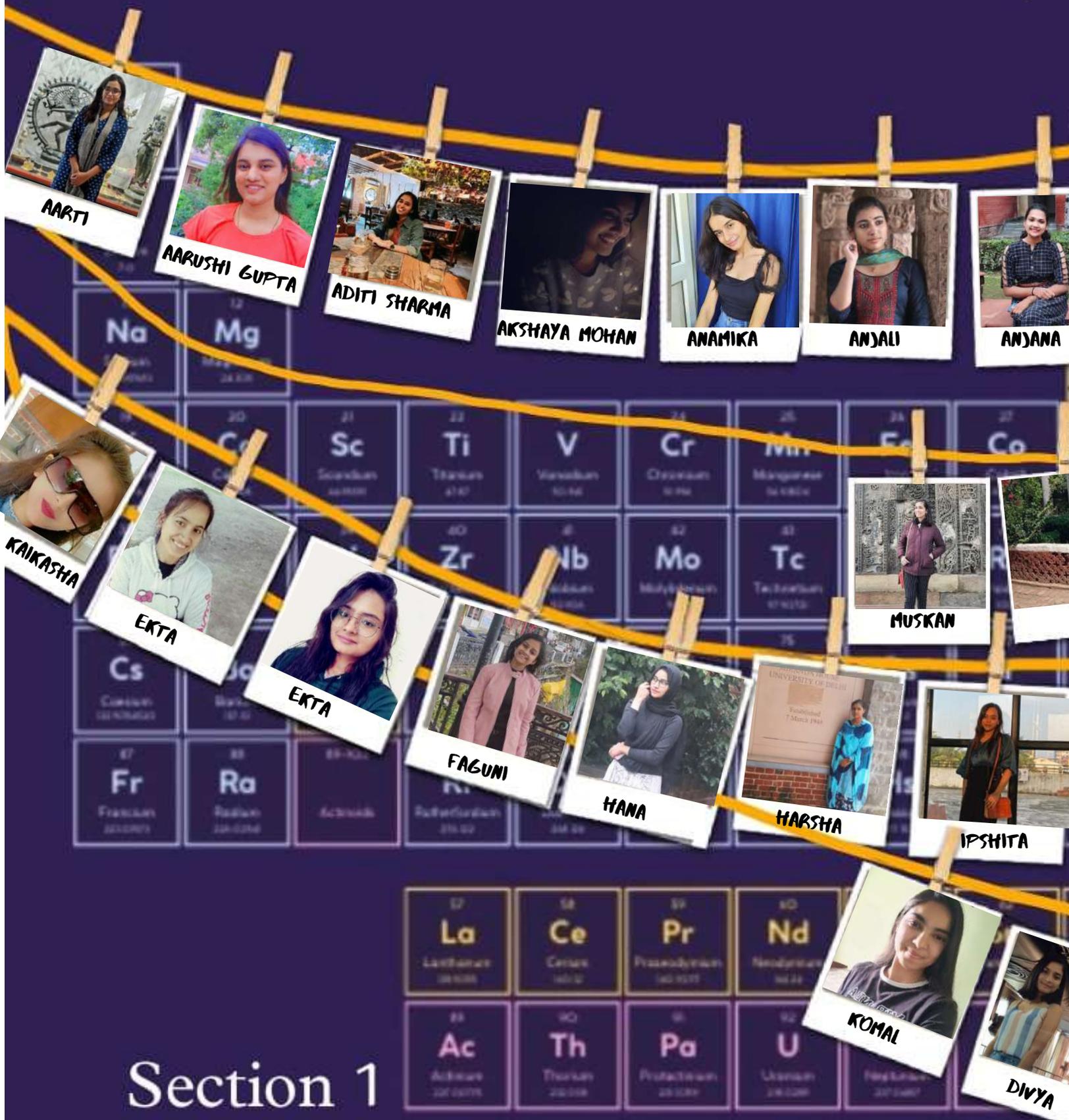
A forever Mirandian

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Section 1

CHEMISTRY DEPARTMENT

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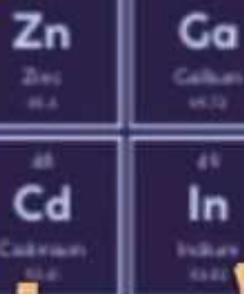
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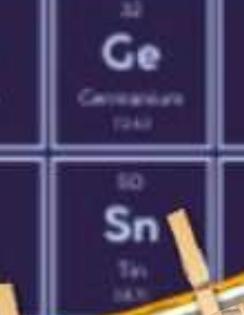
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DEVIKA PS



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SUPRIYA



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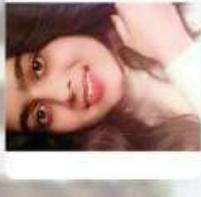
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KS NANDANA



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KAMINI



KAMINI



KARTHIKA



KOMAL



LAYA



MANSHA



MONIKA



KANCHAN



KHUSHBOO



KUNALI



LISHU



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KARTHIKA



KHUSBU



KUSUM



MAMTA



MONIKA



MUSKAN

FIRST YEAR Batch 2



NITIKA



POOJA



PREETI



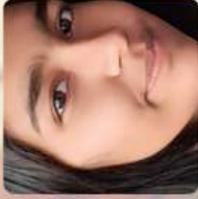
PALAK



POOJA



PRIYA



PALLAVI



PREETI



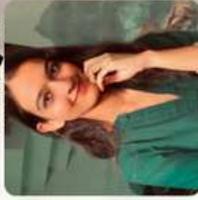
PRIYANGSHREE



RASHI



RENU



RASHI



RIMPY



REKHA



RITU



ROHINI



SADHANA



SAKSHI



SAKSHI



SALONI



SANJANA



SHIKHA



SHIMONA



SHINJINEE



KAJAL



TAMANNA



TWINKLE



SHIVANGI



SIYA



SNEHA



SHUBHANGI



SALONI



SNEHA



SOPHIYA



STUTI



SUBARNA



TANYA



TEJIKA



VANTIKA



VARSHA



SNEHA



SHABNAM



SURBHI



NISHA



SANJU



SAI DOLLY



NIKHITA



UJAWAL



NUTAN



SHILPA



SAJA K T



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RAVINA



TRISHNA



ROHIT



SONAM



SHREYA



VISHAKHA



TANU



NAMRATA



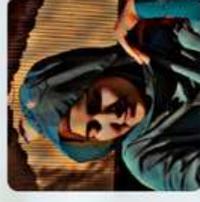
NAVYATHA



SULEKHA



NEHA



ZAHRA



VANSHIKA



RAHBA



PRIYANKA



SHATAKSHI



NANDANA



YASHMITA



SULEKHA



NIHBA



NANDANA



SNEHA P V



VISHAKHA



SHREYA



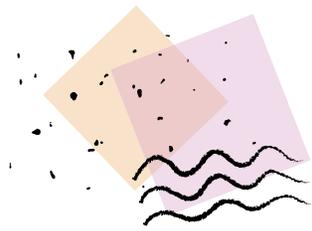
VANSHIKA



Once a Mirandian,



Always a Mirandian!!



Kasayanika



Kasayanika.MH