NES RATNAM COLLEGE
OF ARTS, SCIENCE & COMMERCE

Bhandup(W), Mumbai - 400078

'A' GRADE
NAAC Re-accredited

DEPARTMENT OF CHEMISTRY

presents

IGNITE 21-22

INTERNATIONAL YEAR OF SCIENCE & TECHNOLOGY 2022

"All the world is a laboratory to the inquiring mind."

www.ratnamcollege.edu.in

Dr. R. Varadarajan

Founder President

Jational Education Society & Saraswathi Vidya Bhavan Group of Institutions, Mumbai

He started his educational voyage with 7 children in 1963 in an ndeveloped suburb of Bhandup when he was only in his teens and just ompleted with school education. Even as he taught students, he empowered imself with graduate, postgraduate and doctorate degree. He was conferred pon the Ph.D degree by Dynora University, Italy.

oday, under his able leadership NES and SVB, its sister trust; have bloomed nto a bouquet of 62 educational Institutions spread over 6 complexes, roviding quality education to 42780 students with a teaching faculty of over 285. These institutions are at Dharavi, Bhandup, Mulund, Dombivili, Parel nd Dawdi (Thane) and offer education from pre-primary to doctorate level in he fields of Arts, Science, Commerce, Management, Foreign Languages, eacher's Education, International curriculum, Pharmacy Education, Music, lance and Technology. NES also runs a school for the hearing impaired and ne for slum children of Dharavi. NES Ratnam College is one of the flagship rands of the NES & SVB Group.

n recognition of his long and outstanding contribution to education field for ive and a half decades, Dr. R. Varadarajan and his institutions have been onoured with various Awards and Recognition.

??? WHAT'S INSIDE ???

IGNITE 2021-2022

Life is Chemistry
Dilute your sorrow
Evaporate your worries
Boil your Ego
You will get the "Crystal of Happiness"....

"Ignite" is a brain child of Department of Chemistry of NES Ratnam College of Arts, Science & Commerce. The writings of the students for the yearly magazine, amply bring out the depth of talents lying deep within them. These are symbolic expressions of the tremendous potential that may flower forth into them being potential writers and their choice of writings is down to earth. It covers areas varying from science to literature, historical to social, thereby exhibiting both their all-round interest as well as their quest for all-round development.

We give special attention to students to develop their inter and intra-personal skills through various programs, which kindles their imagination. As long as ideas are expressed and thoughts kindled we can be sure of learning. Our management is always, vigilant in constantly equipping the institution to attain its vision and mission. The variety and creativity of the articles in the magazine pages represent the talents of students.

On behalf of the Chemistry Department, we had taken an initiative to boost up your mind through different interesting contents.

FROM PRINCIPAL DESK

To pen the foreword of the annual magazine "Ignite" of Chemistry Department of NES Ratnam College, I indeed was engrossed in a deep reflection on education itself. The purpose of an educational institution is to impart education for life. John Dewey, an eminent philosopher and educator said, "Education is not preparation for life; education is life itself. NES Ratnam College is a replica of this value. Education is Life. Children of our society are invited to live their lives in this institution. We are here only to cater to their needs; physical, emotional, intellectual and spiritual. A healthy body, a reflective mind and a gracious heart is the key to a vibrant life. Life will educate them. In the journey of life of these children we have an excellent group of dedicated faculty to hold their hands and guide them, to help them in their hardships, to rejoice in their successes, to enable them to reach their destination: where a new journey of life will commence. The values inculcated in them in this institution would generate such confidence and potential that in their new journey as young and responsible adults, they would only tread the paths of success, peace and happiness. Thus, bringing a change and reforming society.

NES Ratnam College has been enlivening and enlightening society since its inception. We hereby pledge to shoulder the responsibility of spreading this radiance of success, peace and happiness among humanity.

Dr. Mary Vimochana
Principal
NES RATNAM COLLEGE
Bhandup(W), Mumbai

Dr. Vimochana

NES RATNAM COLLEGE OF ARTS, SCIENCE & COMMERCE

MAGAZINE COMMITTEE (2021 - 2022)

"Chemistry must become the astronomy of the molecular world""

EDITORIAL DESK

ARATRIKA ROY
TYBSC (CZ)
CHIEF EDITOR

SUJAY RAM PATIL
TYBSC (CZ)
CO-EDITOR

COMMITTEE MEMBERS

SRUSHTI RANE
TYBSC (CB)

SANJEET RANE
TYBSC (CB)

SANSKRITHI SHETTIGAR
TYBSC (CZ)

ACKNOWLEDGEMENT

We would like to thank our Honourable President Dr. R Vardarajan, our Principal Dr. Mary Vimochana and Vice - Principal Dr. Vinita Dhulia for giving us this golden opportunity, to frame our Chemistry Annual Magazine "IGNITE" of the academic year 2021-22. It is the first platform for the budding talents to exhibit their literature skills.

I would also like to extend my sincere gratitude towards our Chemistry Head of the Department Dr. Phebe Kingsley and our respected professors Dr. Medha Sundarajan, Dr. Jayasree Gopalakrishnan, Dr. Kiran Upar, Mr. Ramraj Sutar for their kind cooperation and encouragement which helped us to enrich the magazine and make it more attractive.

I would also like to thank our chemistry non-teaching staffs, for their constant support throughout the process of framing "IGNITE".

Thank You

UNITED NATIONS PROCLAIMS 2022 AS THE INTERNATIONAL YEAR OF BASIC SCIENCES FOR SUSTAINABLE DEVELOPMENT

IMPORTANCE:-

The importance of technological development and scientific research has never been felt more than now, as the pandemic takes over the globe. It is only because of technology, that we have been able to conduct daily affairs, produce vaccines, work, study or even socialize. The communication systems backed by technology has allowed for seamless collaboration, thus aiding in effective tackling of the pandemic. In the absence of scientific development and technological support, the world would have been at a standstill at the time, and the damage caused by COVID-19 would have been much greater than it is today. Against this backdrop, the United Nations (UN) has declared that the year 2022 will be dedicated to basic sciences, with a focus on how scientific research can propel sustainable development and improve the quality of life across the world.

BASIC SCIENCE AND UN SDGS:-

For advances in areas like medicine, agriculture, water resources, energy, and the environment, basic science research is essential. These same areas cover the spectrum of the UN sustainable development goals as well. While all the goals require scientific inputs to varying degrees, some goals, such as health and well-being, affordable and clean energy, and climate action, are directly linked to scientific advances.

SUPPORT FOR IYBSSD IN INDIA:-

The Indian supporters of IYBSSD 2022 are the Indian Academy of Sciences, the Indian National Science Academy, the Indian Institute of Science Education and Research (IISER), Kolkata; and the Gujarat Council of Science and Technology, Government of Gujarat. UNESCO will be the lead agency. It will collaborate with its partner organizations to put together activities, using voluntary contributions, throughout the year with the intention to raise awareness about the importance of basic sciences. This will also help facilitate engagement between scientists and various stakeholders, such as politicians, diplomats, policymakers, groups and associations, and individuals.

UNITED NATIONS PROCLAIMS 2022 AS THE INTERNATIONAL YEAR OF BASIC SCIENCES FOR SUSTAINABLE DEVELOPMENT

IYBSSD2022
International Year
of Basic Sciences
for Sustainable Development

Christopher Brett, IUPAC President and a member of the IYBSSD Steering Committee, said:-

"The proclamation of the International Year of Basic Sciences for Sustainable Development is the culmination of a process in which IUPAC, as a founding partner of IYBSSD, has been involved since the beginning. It will give a unique opportunity for promoting the basic sciences and their importance, emphasizing the crucial role of chemistry and Chemistry's interdisciplinary nature at the cutting edge of fundamental research through to education and outreach. During IYBSSD, extra impetus will be given to IUPAC's activities linked to IUPAC's Global Women's Breakfast and the IUPAC Periodic Table Challenge, and to fomenting the realisation of regional and national activities through our National Adhering Organisations, Associated Organisations, Company Associates, and other organisations promoting the basic sciences and chemistry. IUPAC is very much looking forward to the international year."

THE CENTRAL SCIENCE – CHEMISTRY

TULIKA SINHA - TYBSC (PHYSICS)

Science basically is about understanding the principles of universe, the reason behind the various existing phenomena and the characteristic of every particle. This broad study is carried out in various branches to ensure a detailed system of observation and analysis so as to not miss out any intricate point which may lead to the failure of the entire study as a whole; since the universe is a complex concept with intricate webs of fundamentals. This leads to the core branches of science namely Physics, Chemistry, Biology and Mathematics along with several interdisciplinary branches, Chemistry being central to all.

Now since the Universe, the nature and the life itself is complex and depends equally on many fields and factors; each branch of science is inevitably interdependent and connected to each other. Study and practice of one by isolating the others is impossible. However be it whichever branch or whichever field of science you are working on, Chemistry is bound to come into the picture.

Oxford defines chemistry as the branch of science that is concerned the substances of which matter is composed, the investigation of their properties and reactions, and the use of such reactions to form new substances. Physical, Analytical, Organic, Inorganic and Bio-Chemistry are the five major branches of this subject.

Now the reason why chemistry is central to science as a whole is because it deals with matter of all forms and in all possible situations. Matter is a proof of existence, it's the soul of every single system as without matter there's no universe, it's just vacuum. Hence the study of Chemistry is given great importance as that forms the building block of our knowledge for every domain.

For instance, Physics when explaining matter as a substance and energy needs to depend on Chemistry to have theories in place. Then in the case of Biology the influence of Chemistry is immense and intricate. Biology deals with life and its processes which again is all brought down to matter. Moreover life is a combination of chemical processes and hence a separate branch of biochemistry gets introduced just to address those aspects

Thus from a subjective perspective we can establish a broad relation of Chemistry with each and every logical phenomena. And hence the interdisciplinary nature of science is truly the key behind making the fundamentals of the world (and the universe as a whole) complete.

GREEN SYNTHESIS OF METAL NANOPARTICLES

DHIVYA MAHALAKSHMI

SYNOPSIS:-

INTRODUCTION :-

Nanoparticles having dimensions in range of 1-100nm act as bridge between bulk materials and atomic or molecular structures. They possess remarkable and interesting properties owing their small size, large surface area with free dangling bonds and higher reactivity over their bulky cousins. Since 19th century, scientists have been well aware of the ability of biological entities to reduce metal precursors but the mechanism was still unexplored. The process of efficient green synthesis utilizing natural reducing, capping and stability agents without use of toxic, expensive chemicals and high energy consumption have attracted researchers towards biological methods. It is now time to learn about the secrets that are present in nature and its natural products which leads to advancements in the synthesis process of nanoparticles. The first question related with production of green nanoparticles is "why are biologically synthesized nanoparticles so interesting and gaining importance now-a-days?" The unique properties of nanoparticles synthesized by biological methods are preferred over nanoparticles produced by physiochemical methods. But these methods are more capital extensive with many problems including the use of toxic solvents, generation of hazardous byproducts and the imperfection of the surface structure. Despite a great deal of research in nanotechnology using physiochemical approaches, synthesis of silver and gold nanoparticles are widely exploited using green synthesis. However, a relatively modest number of studies have attempted to elucidate the biosynthesis and potential applications of metal nanoparticles. This essay presents an overview on biosynthesis of metal nanoparticles with an emphasis on their applications in biotechnology.

ADVANTAGES OF USING NANOPARTICLES :-

Because of their small size, nanoparticles can penetrate through smaller capillaries and are taken up by cells which allows efficient drug accumulation at target sites. Nanotechnology can actually revolutionize a lot of electronic products. The areas that are benefited by the continued development of nanotechnology when it comes to electronic products include nano-diodes, nano-transistors, plasma displays, quantum computers and many more. It also finds its development in energy sector. There are more advantages of nanoparticles over their production and their drug delivery process. Nanoparticles are fairly easy to prepare so that they are used in drugs. Nanoparticles increased the therapeutic efficiency as well as bioavailability. Nanoparticles do not show any problem in large scale production and sterilization but they only avoid organic solvents.

GREEN SYNTHESIS METHODS :-

The biological method, which is represented as an alternative to chemical and physical methods provides an environmentally friendly way of synthesizing nanoparticles. This method is not expensive, harmful and does not require toxic chemicals. Synthesis can be done in one step using biological organisms such as bacteria, yeast, actinobacteria, molds, algae and plants or their products. Because of rapid development, affordable culturing costs and easy control and manipulation of growth environment, bacteria are clear targets in production of nanoparticles. Synthesis can be done as extracellular or intracellular by employing microorganisms. They breakdown the metallic salts into nanoparticles by the pigment proteins, fats, carbohydrates and secondary metabolites they contain. The extract of microorganisms that exists in aqueous medium at a certain temper...

Time Dependent Extraction Of Caffeine From different Indian Brands of Black Tea By Using UV-Visible Spectrophotometry

- *Manjusha Arvind Chorge*

ABSTRACT:-

Tea is the most commonly and widely used soft beverages in household. It acts as a stimulant for central nervous system and skeleton muscles. The main stimulant factor present in tea is "*caffeine*".

In this study, caffeine is determined by different kinds of Indian brands of tea by using U.V/visible spectrophotometry.

Synthesis Of [BBIM] Bf4 Ionic Liquids and its use as Electrolyte in Dry Cell & amp; Aluminium-Iron Battery

- *Pranjal L. Chaubey*

ABSTRACT:-

Ionic liquids (ILs) are liquids consisting entirely of ions and can be further defined as molten salts having melting points lower than 100 °C. One of the most important research areas for IL utilization is undoubtedly their energy application, especially for energy storage and conversion materials and devices, because there is a continuously increasing demand for clean and sustainable energy. In this article, various application of ILs are reviewed by focusing on their use as electrolyte materials for Al-Fe batteries and non-humidified fuel cells and as carbon precursors for electrode catalysts of fuel cells and electrode materials for batteries and super-capacitors. Due to their characteristic properties such as non-volatility, high thermal stability, and high ionic conductivity, ILs appear to meet the rigorous demands/criteria of these various applications. However, for further development, specific applications for which these characteristic properties become unique (i.e., not easily achieved by other materials) must be explored. Thus, through strong demands for research and consideration of ILs unique properties, we will be able to identify indispensable applications for ILs.

Ionic liquids as electrolytes for energy storage devices is a promising field. Here, the various approaches of how ionic liquids can be modelled are discussed along with how the modelling connects to experimental results. Recent theoretical developments are highlighted along with extended discussion of what molecular dynamics simulation options are now available and what key results can be extracted.

Synthesis, Solvatochromic Performance and pH Sensing of Novel Hydrazone Dyestuffs

- Ayesha Rais Ahmed Khan

ABSTRACT:-

New tricyanofuran intramolecular charge transfer dyes comprising the hydrazone group were prepared and fully characterized in order to study their possible solvatochromism, dyeing ability, and antimicrobial activity. The preparation of the hydrazone dyes was achieved in relatively good yields starting from different aromatic amines. The hydrazone functional group was presented via the azo-coupling reaction of the tricyanofuran compound by the properly substituted diazonium chloride. Chemical structures of the prepared hydrazones were confirmed via nuclear magnetic resonance spectroscopy (1 H- and 13C-NMR), Fourier-transform infrared spectroscopy (FT-IR), and elemental analysis (C, H, and N). The UV-visible absorption spectra of the produced sensor colorants displayed interesting solvatochromism in solvents with a different polarity, which was found to be affected by the substituents bonded to the aromatic hydrazone moiety. The pH molecular switching was investigated through tuning the intramolecular charge transfer stimulated by the reversible deprotonation/protonation process. The produced disperse dyestuffs were employed for dyeing polyester fibers to introduce acceptable color strength and colorfastness properties.

Synthesis and Characterization of ZnO Nanoparticles and its uses in sunscreen

- Tehseen Fairoz Mahate

ABSTRACT:-

Nano is an advanced technology which in recent years has had numerous applications in different fields such as industry, biotechnology, energy, environment and etc. Zinc oxide is an essential ingredient of many enzymes, sun screens, and ointments for pain and itch relief. Its microcrystals are very efficient light absorbers in the UVA and UVB region of spectra due to wide band gap. In this paper, ZnO nanoparticles were synthesized by simple method of precipitation sounds more plausible. ZnSO4 and NH4OH were used as precursors to yield ZnO powders. The synthesized ZnO nanoparticles were characterized by scanning electron microscopy (SEM). This test has also shown the high crystallinity of the ZnO nanoparticles. As SEM analysis revealed, the morphology of ZnO nanoparticles to be flake like shapes with the mean particle size of 30 nm. Finally, the analysis of the synthesized Nano sample by using percentage of EDX has indicated that the purity of ZnO was quite high.

STUDENT ACHIEVEMENTS 2021 – 22

"All our dreams can come true if we have the courage to pursue them"

Miss. Shalini Swami
TYBSC - CHEM
QUALIFIED IIT JAM 2022
AIR - 1634

RASAYAN 2021

-K.J SOMAIYA COLLEGE OF ARTS, SCIENCE & COMMERCE

Miss. Aratrika Roy
TYBSC - CZ
I Prize ~ Brain-O-Philia

Master Sujay Ram Patil
TYBSC - CZ
II Prize ~ Arte'Pharma

ACHIEVEMENTS

SCI-TREK CHEM-INTRA FEST 2022

CHEM SPEAK

1)	SHIVANSHU SINGH	SYBSC - PHYSICS	I PRIZE
2)	ARATRIKA ROY	TYBSC - CZ	II PRIZE
3)	NIDHI DUBEY PINJAR MOHAMMED OWAIS	SYBSC - CZ SYBSC - CB	III PRIZE

CHEM PPT

1)	SRAJANA SATUMANE	TYBSC - CZ	I PRIZE
2)	MANSI PARAB SHALINI SWAMI	SYBSC TYBSC - CHEM	II PRIZE
3)	NIDHI DUBEY ALBIN MATHEWS JOY	SYBSC - CZ FYBSC - CBZ	III PRIZE
4)	SHUBHAM GAWDE	TYBSC - CHEM	CONSOLATION

CHEM MASTER

1)	SHALINI SWAMI	TYBSC - CHEM	I PRIZE
2)	ARATRIKA ROY	TYBSC - CZ	II PRIZE
3)	SHIVANSHU SINGH SANA SIDDIQUI	SYBSC - PHYSICS SYBSC - CZ	III PRIZE

CHEM ART

1)	HARSHALATA ABHINAVE	SYBSC	I PRIZE
2)	ARADHANA YADAV	TYBSC - CHEM	II PRIZE
3)	SUJAY RAM PATIL	TYBSC - CZ	III PRIZE

CHEM MODEL

1)	HARSHALATA ABHINAVE	SYBSC	I PRIZE
2)	NAZISH KHAN	TYBSC - CHEM	II PRIZE
3)	SHALINI SWAMI	TYBSC - CHEM	III PRIZE

ACHIEVEMENTS

SCI-TREK CHEM-INTER FEST 2022

CHEM WIZARD

1)	ARATRIKA ROY	TYBSC - CZ	I PRIZE	NES RATNAM COLLEGE
2)	ADESH ANAND DALVI	TYBSC - PHYSICS	II PRIZE	NES RATNAM COLLEGE
3)	AAYESHATHUL HUMAIRA	SYBSC	III PRIZE	JAMAL MOHAMMED COLLEGE

CHEM SPEAK

1)	TULIKA SINHA	TYBSC - PHYSICS	I PRIZE	NES RATNAM COLLEGE
2)	NIDHI DUBEY	SYBSC - CZ	II PRIZE	NES RATNAM COLLEGE
3)	AASHI SHARMA	SYBSC	III PRIZE	GURU NANAK KHALSA COLLEGE

CHEM PPT

1)	DHIVYA MAHALAKSHMI	MSC - CHEM	I PRIZE	ALAGAPPA UNIVERSITY
2)	TULIKA SINHA	TYBSC - PHYSICS	II PRIZE	NES RATNAM COLLEGE
3)	NIRAJ WAGH	TYBSC - CHEM	III PRIZE	VES COLLEGE

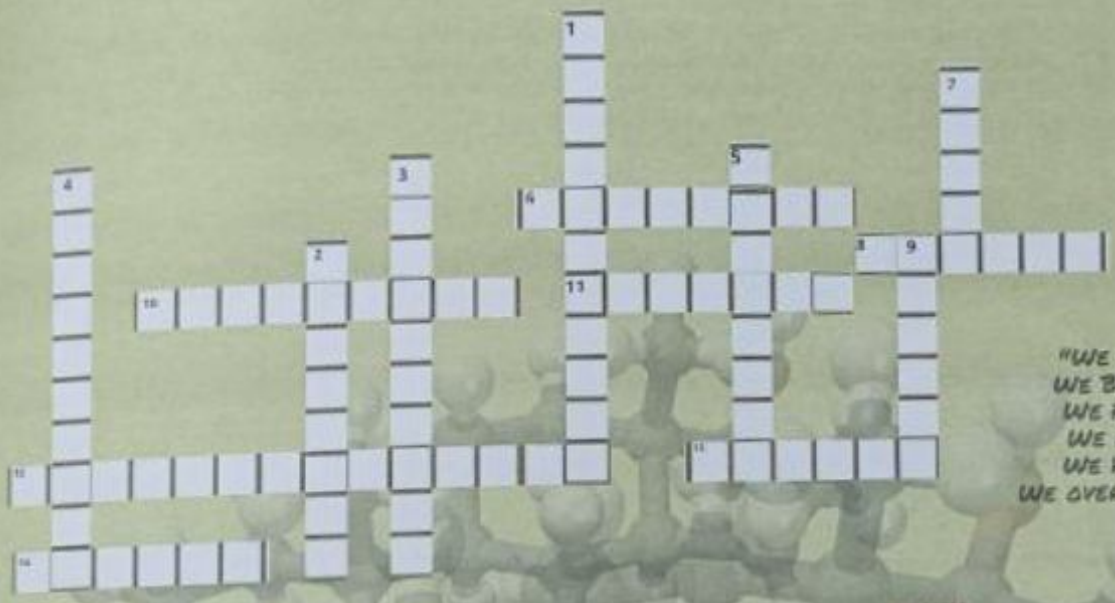
CHEMWORD

1)	ARATRIKA ROY	TYBSC - CZ	I PRIZE	NES RATNAM COLLEGE
2)	ADESH ANAND DALVI	TYBSC - PHYSICS	II PRIZE	NES RATNAM COLLEGE
3)	DEVASHREE BHOSALE	FYBSC	III PRIZE	V.G VAZE COLLEGE

CHEM COMPOSE IT

1)	ESSAY	HRISHI JADHAV	TYBSC - CHEM	I PRIZE	GURU NANAK COLLEGE
		DHIVYA MAHALAKSHMI	MSC - CHEM	II PRIZE	ALAGAPPA UNIVERSITY
2)	MEME	AAYESHATHUL HUMAIRA	SYBSC	I PRIZE	JAMAL MOHAMMED COLLEGE
		SANIYA UMAR KHAN	FYBSC	II PRIZE	ABHINAV COLLEGE
		ARATRIKA ROY	TYBSC - CZ	III PRIZE	NES RATNAM COLLEGE
3)	PAINTING	BALAKRISHNAN A.	MSC	I PRIZE	JAMAL MOHAMMED COLLEGE
4)	POSTER	SHABISTAN SAJID URANKAR	FYBSC	I PRIZE	MAHARASHTRA COLLEGE
5)	POEM	NAMDEV GAUTAMRISHI	FYBSC	I PRIZE	SIWS COLLEGE
		VAISHNAVI BANDARI	FYBSC	II PRIZE	GURU NANAK COLLEGE
		SHABISTAN SAJID URANKAR	FYBSC	III PRIZE	MAHARASHTRA COLLEGE

FUN SECTION



"WE FAIL,
WE BREAK,
WE FALL,
WE RISE,
WE HEAL,
WE OVERCOME..."

ACROSS

6) Bond formed between atoms when atoms share electrons to fill the outer shell of electrons.
8) Element that has the capacity to share four electrons.
10) Carbon chain that is filled up with the maximum number of hydrocarbons.
11) Organic compound containing a hydroxyl group.
12) Small molecules joining together to form much longer molecules.
13) Hydrocarbon which contains only single bonds.
14) Chemical with the same molecular formula but different arrangement of atoms.

DOWN

1) Chemical compound containing carbon and hydrogen.
2) Formed in the reaction between an alcohol and carboxylic acid.
3) The ____ group determines the main chemical properties of an organic compound.
4) Compounds that have the same functional group and similar chemical properties.
5) The simplest alcohol ____
7) Breaking down long chained hydrocarbons.
9) Hydrocarbon with one or more double bonds.

CAN YOU SOLVE THIS "VIRAL RIDDLE"?

I'm in your kitchen pantry, waiting for you to wrap me over something.
What am I?

WOLF PRIZE IN CHEMISTRY 2022

The Wolf Prizes are international awards honoring scientists and artists "for their achievements in the interest of mankind and friendly relations among peoples".
The scientific categories of the prize are medicine, agriculture, mathematics, chemistry, and physics.

Bonnie L. Bassler

She is awarded the Wolf Prize for her work in elucidating the role of chemical communication between bacteria. She has made important discoveries revealing how quorum sensing is used by bacteria both for virulence & for communicating across species.

Carolyn R. Bertozzi

She is awarded the Wolf Prize for pioneering biorthogonal chemistry and for understanding the glycocalyx and its roles in both health and disease, allowing for bioimaging, chemoproteomics, and in-vivo drug delivery.

Benjamin F. Cravatt III

He is awarded the Wolf Prize for developing activity-based protein profiling, which is a powerful and widely used chemical proteomic strategy to characterize enzyme function in native biological systems.


DEPARTMENT OF
CHEMISTRY
अद्ययावत उपकरण केंद्र
Central Instrumentation Facility

~ BATCH OF TYBSC 2021-22