ASSOCIATION OF CHEMISTRY TEACHERS

NEWS LETTER

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Promoting Excellence in Chemistry Education

Association of Chemistry Teachers
News Letter, January - April 2022

Contents of the News Letter : Issue - 22

From Editorial Desk

Prof. Wasudeo Gurnule
Editor
Kamla Nehru Mahavidyalaya,
Nagpur, Maharashtra.

We are happy to inform that the contributions of ACT ranges from International Olympiads, organizing seminars, science exhibitions, workshops, expert invited talks, innovating conceptual science experiments, conferences, talent search examinations, training faculty and students etc. We are bringing in the present issue of the newsletter with the reports on the ACT activities, trends in chemistry and scientific news. We have included one scientific article in the present issue. We have also included reports on National and International Chemistry Events. Reports on National Science Day Celebrations were also given briefly.

We invite good suggestions and better contributions from the readers to get best output of the future issues. We welcome you all to participate in the second research convention. This issue also contains the reports of ACT Research Convention-2021 and Global Women Breakfast GWB-2022 organized by different zones.

I take this opportunity to say many, many thanks to all my Editorial Board Members for their whole hearted co-operation extended to me.

With warm regards to one and all

Members of Editorial Board

Honorary Members of ACT

We have great pleasure in bringing the updated list of honorary members of Association of Chemistry Teachers, who are sources of inspiration, guidance and support in activities of ACT.

The editorial board of ACT News Letter is proud of the academic achievements of these legendary honorary members.

Bharat Ratna Prof. C.N.R. Rao, FRS
National Research Professor : Linus Pauling Research Professor,
Jawaharlal Nehru Centre for Advanced Scientific Research, Jakkur, Bengaluru - 560 064
E-mail : cnrrao@jncasr.ac.in

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Former Director, Institute of Chemical Technology, Mumbai - 440 019.
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Padma Vibhushan Dr. R.A. Mashelkar, FRS
CSIR Bhatnagar Fellow;i Former Director General, CSIR, New Delhi.
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Padma Shri Prof. Jai P. Mittal
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ACT RESEARCH CONVENTION 2021

Activity -1

Title of the Event	:	**Appreciation of Research Papers (AORP-21)"**
Date	:	7 January 2022
Organizing Institution	:	North-East Zone, Assam
Convener	:	Dr. Sanchay Jyoti Bora

Appreciation of Research Papers (AORP-21)

Organized by

Association of Chemistry Teachers (ACT), North East Zone

Association of Chemistry Teachers (ACT), North East Zone organized a national event on "**Appreciation of Research Papers (AORP-21)**" for UG and PG students in connection with the **ACT Research Convention 2021,** on 7th January 2022. The key objective of this event was to motivate the UG and PG students for participating in various research activities, through which they can develop their transferable skills with broad applications, including critical thinking, problem solving, communication, collaboration and independence.

A galaxy of teachers, PG and UG students virtually participated in the online event. The inaugural programme was chaired by Prof. Brijesh Pare, President ACT, Mumbai, Prof. Damodar Prabhu, General Secretary, ACT, Mumbai, Prof. Rakhee Gupta, National Coordinator, ACT Research Convention 2021. **Prof. Upasana Bora Sinha, from Nagaland University and Prof. Rajesh Chakarabarty from Rajiv Gandhi University, Arunachal Pradesh were present as the resource persons in the event.** The programme started with the Welcome Speech by Dr. Gitimoni Deka, Secretary, ACT North-East Zone.

More than 60 participants across the country have registered for AORP-21 and submitted their abstracts, out of which 44 were selected for oral presentation through the online platform. The paper presentation competition was conducted under two categories, UG and PG category. Seven students from each of the categories have been awarded appreciation certificates for their superb presentations. They were also provided with some popular science books along with the certificates. All the attended participants were awarded with E-certificates. The webinar come to an end with the vote of thanks by Dr. Nripendra Nath Talukdar, Vice President, ACT North East Zone.

Activity - 2

Title of the Event	:	**4 Minute Research Pitch**
Date	:	15-16 April 2022
Organizing Institution	:	The Department of Chemistry, (deemed to be University), Jaipur and Govt. Madhav Science College, Ujjain Convener

The Department of Chemistry, IIS (deemed to be) University, Jaipur organized a two-day National Event "4 Minute Research Pitch" on 15 and 16 April 2022 in collaboration with Association of Chemistry Teachers, Mumbai and Madhav Science PG College, Ujjain with a aim to introduce the young researchers with the different facets of research. 71 participants presented their research work including 37 Research Scholars, 14 Faculties, 8 Undergraduate and 12 Postgraduate students.

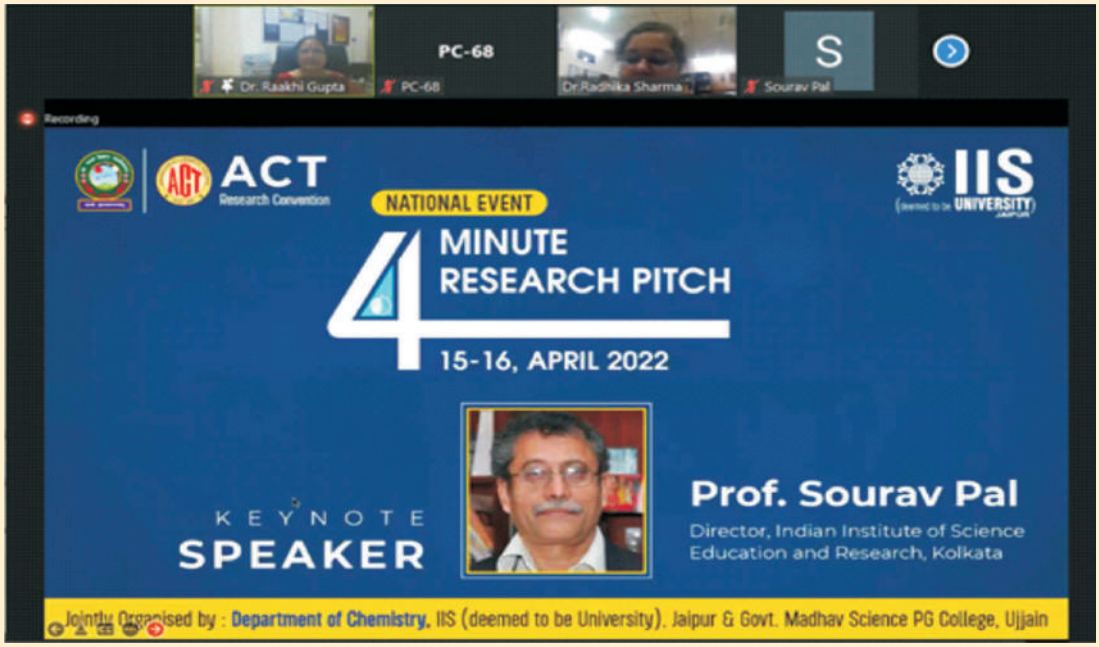
The event commenced at 2:00 PM on 15 April 2022 with the inaugural session seeking the blessings of almighty followed by lighting up the lamp. Chief Patron Dr. Ashok Gupta, Chancellor, IIS (deemed to be University) extended a warm welcome to all the resource persons and participants. Dr. Raakhi Gupta, Registrar IIS (Deemed to be University) and National Convenor, ACT's Research Convention 2022 acquainted the participants with the genesis of research convention and shared with all the aims and objectives of the 4-minute research pitch.

Thereafter Prof. T.N. Mathur, Vice Chancellor, IIS (deemed to be University) shared his thoughts on the need of such activities to strengthen the research in different institutions.

Professor D.V. Prabhu, General Secretary, Association of Chemistry Teachers shared the establishment, two-decade long history and evolution of Association of

Chemistry Teachers along with its manifold National and International activities and events that have become the association's substantive programs. He further shared details of the upcoming National Convention of Chemistry teachers scheduled to be held in Indore from 13th to 15th October 2022 under the convenorship of Prof. Ashutosh Gupta.

Dr. Arpan Bhardwaj, Patron of the Event and Principal, Govt. Madhav Science PG College, Ujjain shared with all the details of the implementation of the National Education Policy by Madhya Pradesh. The keynote address was delivered by **Prof. Sourav Pal,** Director, Indian Institute of Science Education and Research, Kolkata.



The inaugural session was followed by three technical sessions spread over two days. The first technical session included oral presentations by 29 research scholars. The candidates presented their original research work in 4-minutes time schedule.

The second and third technical sessions included one invited lecture and presentations by Undergraduate, Postgraduate students and Faculty members respectively. The Speaker for the second technical session was **Prof. P. K. Chattaraj,** IIT, Kharagpur. He delivered his lecture on the topic **"Structure of dynamically stable molecule and fluxional behavior of boron clusters".**

The lecture was followed by, 13 presentations made by the UG and PG students which were evaluated by- 10 faculty members from all over India also shared their research findings.

After the presentations, Prof. **R. K. Bansal** Department of Chemistry, IIS (deemed to be University), Jaipur appreciated the presenters and thanked all for their constant and enthusiastic presence. At the end the results were announced by **Prof. R. K. Bansal** which are as follows :

Category-Research Scholar

Position	Presentation Number	Name	Topic
I	R 32	**Jyoti Kuntail** IIT-BHU	Computational and experimental investigations on Fenton and Photo-Fenton reactions over magnetite and its composites
II	R 37	**Manoj Kumar Saini** Banaras Hindu University	Catalytic Cycloisomerization of enyne diesters derived from2-Propargyloxyarylaldehydes
	R 24	**Chandani Mathur** IIS (Deemed to be University), Jaipur	Synthesis and Characterization of New Imidazo[1,2-a] pyridine based Cross Conjugated Mesomeric Betaines
III	R 25	**Nosheen Beig** IIS (Deemed to be University), Jaipur	Facile Synthesis of (N-Heterocyclic Carbene)-Cu(I) complexes under microwave conditions and their application in A3 reaction

Category-Undergraduate Student

Position	Presentation Number	Name	Topic
I	U 7	**Chinmay Rakesh Shukla** Amity University of Nanotechnology, Amity University, UP	Computational and experimental investigations on Fenton and Photo-Fenton reactions over magnetite and its composites
II	U 6	**Savitha N** PSG College of Arts and Science, Coimbatore, Tamil Nadu	Electronic and geometrical structure, stability and applications of Psilocibin, Psilocin and their derivatives-A Computational Study

Category-Postgraduate Student

Position	Presentation Number	Name	Topic
I	P 11	**Prajapati Jinal Nareshbhai** Uka Tarsadia University, Bardoli	An Eco-friendly approach to produce Silver Nano Particles
II	P 2	**Muskan Jain** Kanoria PG Mahila Mahavidyalaya, Jaipur	Graphene Oxide: Sustainable future for novel water filtration

Category-Faculty

Position	Presentation Number	Name	Topic
I	F 9	**Ravi Kanta Bera** Indian Military Academy, Dehradun	Cu (II) selective electrochemical sensors based on neutral receptor as electro-active material
II	F 13	**Anita Sudhaik** Shoolini University, Solan, Himachal Pradesh	Peroxymonosulphate-mediated metal-free pesticide photodegradation and bacterial disinfection using well-dispersed graphene oxide supported phosphorus-doped graphitic carbon nitride
III	F 2	**Dr. Mustaqeem Mohammed Abbas** Royal College of Arts, Science and Commerce, Thane, Maharashtra	One pot synthesis of some novel oxygen containing heterocycles by using Nano catalyst

Prof. Brijesh Pare, President, Association of Chemistry Teachers shared that this Research Convention is the first of its kind which has been designed and executed for the Post Graduate students, research scholars and faculty members. He also congratulated to all the winners of the event in different categories.

Thereafter, the concluding remarks were presented by **Prof. Pradeep Bhatnagar**, Dean, Faculty of Science IIS, (deemed to be University), Jaipur in the Valedictory Session. This session ended with report sharing and a formal vote of thanks to all the resource persons and participants proposed by **Dr. Trapti Gupta**, organizing secretary of the National event.

National Science Day Celebration

National E- Poster Presentation Competition
Department of Chemistry, BJS ASC College, Wagholi, Pune

In India, during the Covid–19 pandemic situations, the educational stakeholders had to struggle a lot in completing teaching and learning process. In particular, the students had to overcome various learning difficulties in an online mode of education. The students were able to get marks in practical examinations without practical skill associated with the experiments and understanding the scientific concept. The teachers had also faced many problems in delivering the proper knowledge to students.

To enhance the presentation skill of students in delivering the gained knowledge, the National level E Poster presentation competition was organized by Association of Chemistry Teachers (ACT), Mumbai in collaboration with Department of Chemistry, BJS ASC College, Wagholi, Pune. Through such theme-based activity, the students can read and understand the applications of Chemistry. It also helped the student to be in flow of teaching and learning process. With this concept, the proposal of National level E Poster presentation competition was prepared.

The National E Poster Presentation Competition was scheduled to conduct in three levels. Junior (JR), Undergraduate (UG) and Postgraduate (PG).

Conveners :

1) **Dr. Sudesh Ghoderao,** Member EC, ACT and RNC, Arts, JDB Commece and NSC Science College, Nashik Road, Nashik

2) **Dr. Sanjay Gaikwad**, BJS College, Wagholi, Pune

Coordinators:

Junior level : Dr Yogendra Kumar Kothari, Govt Higher Secondary School, Ujjain
UG level : Prof. Sarita Deokar, KVN Naik ASC College, Nashik
PG level : Dr Dinesh Gaikwad, BJS ASC College, Wagholi, Pune

The themes given for the different level are as

Themes (1st Level) - Uses of Chemistry in daily life, Beauty of Chemistry, Kitchen Chemistry
Themes (2nd Level) - Future Sources of Energy, Carbon Credit, Chemistry for Green world
Themes (3rd Level) - My Innovation in Chemistry, Uses of Nano Material in Daily life, Biomass – Career in Chemistry, Chemo informatics.

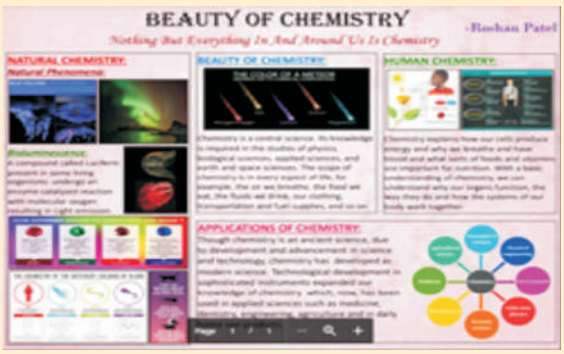
Prize distribution ceremony

The prize distribution program was organized on 28th February 2022 on the occasion of National Science Day during 2:30 PM to 3:30 PM. Dr Sanjay Gaikwad gave introductory remarks of the conducted competition. Dr Yogendra Kothari, Prof. Sarita Deokar and Dr Dinesh Gaikwad the coordinators of each level briefed about the response in each category. Major Dr Ashok Giri, Principal of BJS ASC College, Wagholi, Pune has guided the students. Prof. Brijesh Pare, President, ACT has also guided the students on this occasion. Dr Sudesh Ghoderao, Member, EC, ACT gave the information of ACT and its activities to the audience. The result was announced and at the hands of Prof Brijesh Pare, Major Dr Ashok Giri and Dr Sudesh Ghoderao Certificate of Merit was given virtually. The cash prizes were deposited in the bank account of respective awardee. Dr Dinesh Gaikwad has proposed the vote of thanks and Prof. Sarita Deokar has compered the entire program.

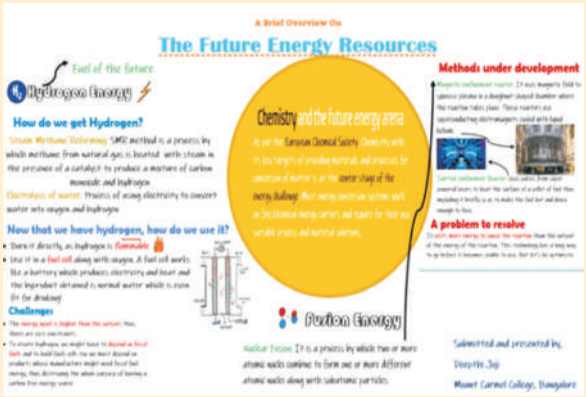
The results of the National e-Poster Presentation Competition:

Students Class level	No. of registered students	Actual number of posters and video received	Prize	Name of Student	Name of College and State
JR (11th and 12th Class	111	63	I	Roshan Patel	Silver Crest Jr College, Sinhgad Road, Pune. Maharashtra
			II	Yash Atul Deore	Karm. A. M. Patil Secondary And Higher Secondary School, Pimpalner Tal. Sakri (Dhule) Maharashtra
			III	Sanjula S	Demonstration School, Karnataka
Under Graduate	538	249	I	Sowmya P	Thyagarajar College Of Arts And Science, Madurai, Tamil Nadu
			II	Joji Deepthi	Mount Carmel College (Mcc), Bengaluru, Karnataka
			III	Harinkhede Tanuja Khupchand	K.V.N. Naik College, Nashik, Maharashtra
Post Graduate	131	61	I	Bhave Shyamal Namdeo	Dhule Wadi, Ramtek pura, Anjangaon Road, Akot, Maharashtra
			II	D.Sumithra	Sri Paramakalyani Centre of Excellence in Environmental Science MS University Alwarkurichi,Tamil Nadu
			III	Vasanth	Nehru Memorial College, Puthanampatti, Trichirapalli (DT),621007 Tamil Nadu
Total	**780**	**373**			

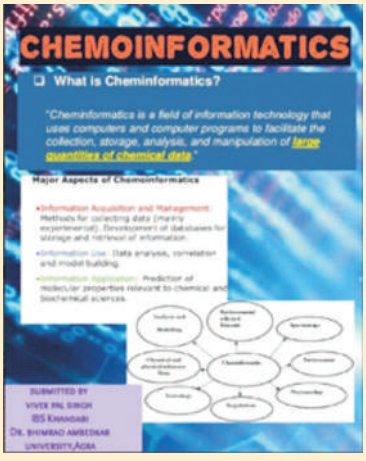
JR Level



UG Level



PG Level



Global Women Breakfast - 2022 Activities

Department of Chemistry

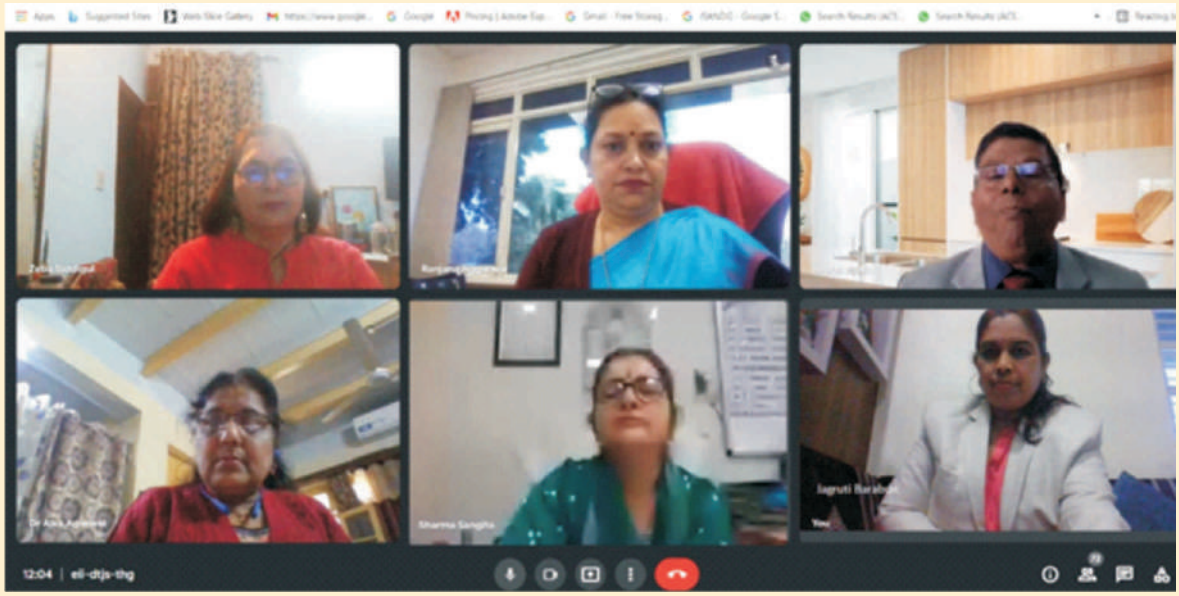
Sant Gadge Baba Amravati University, Amravati

On February16, 2022, an Event Global Women's Breakfast was organized by Department of Chemistry on virtual platform in collaboration with International Union of Pure & Applied Chemistry (IUPAC), Association of Chemistry Teachers (ACT), Mumbai and Indian Women Scientist's Association (IWSA), Amravati Branch. More than 200 participants from different part of country like Rajasthan, Madhyapradresh, Uttarpradesh, Himachal Pradesh, Chhattisgarh, Bihar and Maharashtra, had joined through Google meet and YouTube.

Dr. D. V. Prabhu, General Secretary, Association of Chemistry Teachers (ACT), Mumbai was the chairperson for the program and **Prof. Ranjana Aggarwal**, Director, CSIR-National Institute of Science Communication and Policy Research, New Delhi was the chief guest and Keynote speaker. To emphasize the theme of Global Women's Breakfast- 2022,'Empowering the Diversity in Science, Guest of honour and resource persons were:

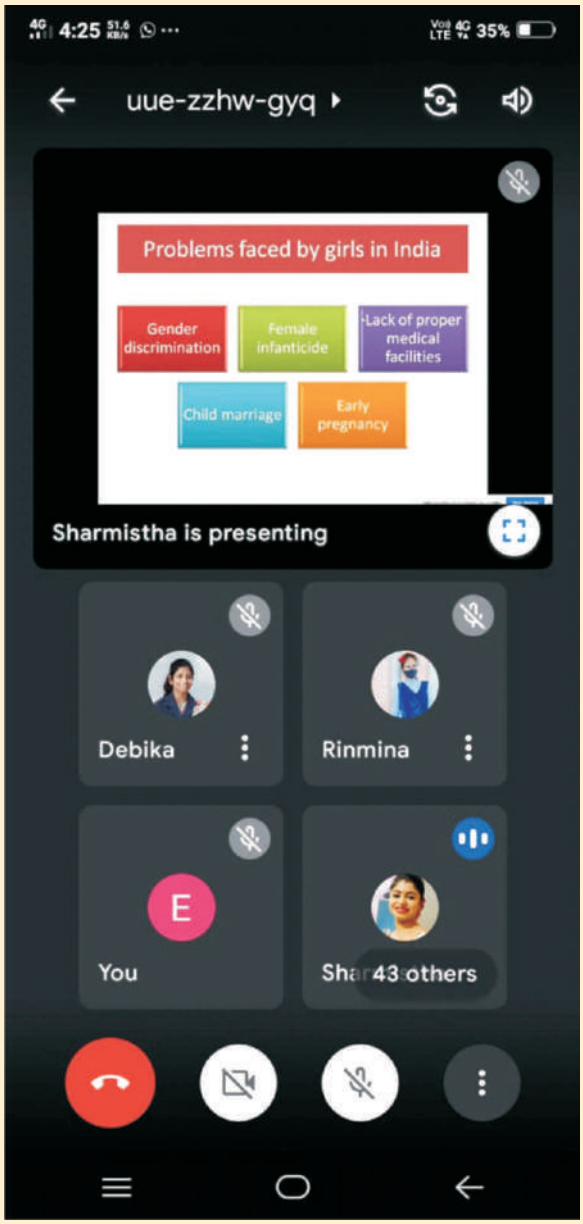
1. Prof. Alka Agrawal , Department of Medicinal Chemistry, B.H .U., Varanasi
2. Prof. Sangeeta Sharma , Department of Chemistry H. N. Gujarat University, Patan
3. Prof. Uma Sharma , School of Chemical Sciences, Vikram University, Ujjain
4. Prof. Neelima Gupta, Department of Chemistry University of Rajasthan, Jaipur
5. Prof. Zeba Siddiqui, Department of Chemistry , Aligarh Muslim University Aligarh

The program was successfully organized under the guidance of Prof. A. S. Aswar and Dr. J. M. Barbade, Department of Chemistry, Sant Gadge Baba Amravati University, Amravati and Prof. Brijesh Pare and Dr. D. V. Prabhu ACT, Mumbai.



Barnagar College, Sorbhog, Assam, India

Theme of the event: Empowering Diversity in Science



As we know that the IUPAC Global Women's Breakfast (GWB) event is an event that happens on a single day in February of each year in conjuction with the U.N. Day of Women and Girls in Science. The aim of this event to celebrate the accomplishments of Women in Science and to inspire students to pursue career in science. In 2022, IUPAC has decided to celebrate the GWB event on 16th February' 2022 worldwide. The theme for GWB-2022 is "Empowering Diversity in Science". The Barnagar College had organised the GWB-2022 event on the same aforesaid theme on virtual platform Google meet. The resource persons invited for this event are two accomplished woman of Barnagar College which is Dr. Sharmistha Chakravarty, Assistant Professor, Dept. of Zoology, Barnagar College and Dr. Debika K. Banik, Assistant Professor, Dept. of Physics, Barnagar College. The inaugural talk was delivered by our respected principal Dr. Biren Kumar Chakravarty. After that, welcome address was delivered by Dr. Diganta Bhuyan, Organiser cum HOD, Dept. of Chemistry, Barnagar College. The first talk was delivered by Dr. Sharmistha Chakravarty followed by the talk of Dr. Debika K. Banik. The vote of thanks was given by Dr. Rupam Borah, Assistant Professor, Dept. of Chemistry, Barnagar College. The event was suceesful as more than 90 students with a higher percentage of girl students are present from B.Sc science stream. We believe that this event will motivate the students, especialy girl students to persue their career in science.

Department of Chemistry and Internal Quality Assurance Cell (IQAC) of Gokhale Education Society's

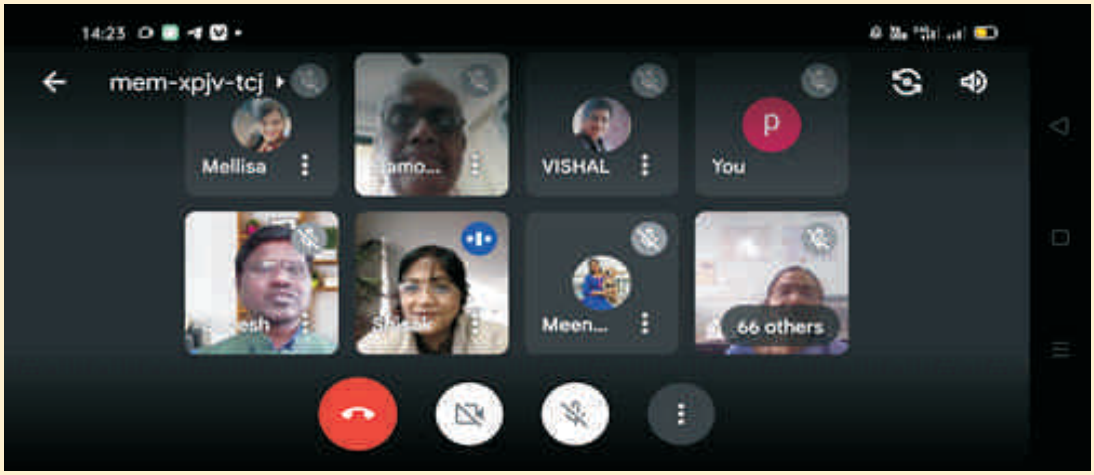
RNC Arts, JDB Commerce and NSC Science College, Nashik Road, Nashik

In collaboration with
Association of Chemistry Teachers (ACT),
Homi Bhabha Centre for Science Education (TIFR), Mumbai on
IUPAC Global Women's Breakfast on Emerging Diversity in Science
16th February, 2022

Dr Sudesh Ghoderao, Member of the Executive Council of ACT and Convener of the webinar welcome the resource person, Prof. Dr Upasana Bora Sinha, Dept of Chemistry, Nagaland University, Nagaland. He has also welcomed Prof. Brijesh Pare, President, ACT, Prof D. V. Prabhu, General Secretary, ACT, Prof. Dr Manjusha Kulkarni, HOD, Chemistry and Incharge Principal, Dr. K.C.Takale, Coordinator, Science faculty and the members of organizing committee and the participants of the webinar. He has briefed with the power point slide show the theme of the webinar and the aims and objectives of the International Union of Pure and Applied Chemistry (IUPAC), the organizers, of the global event - Global women's Breakfast - Emerging Diversity in Science.

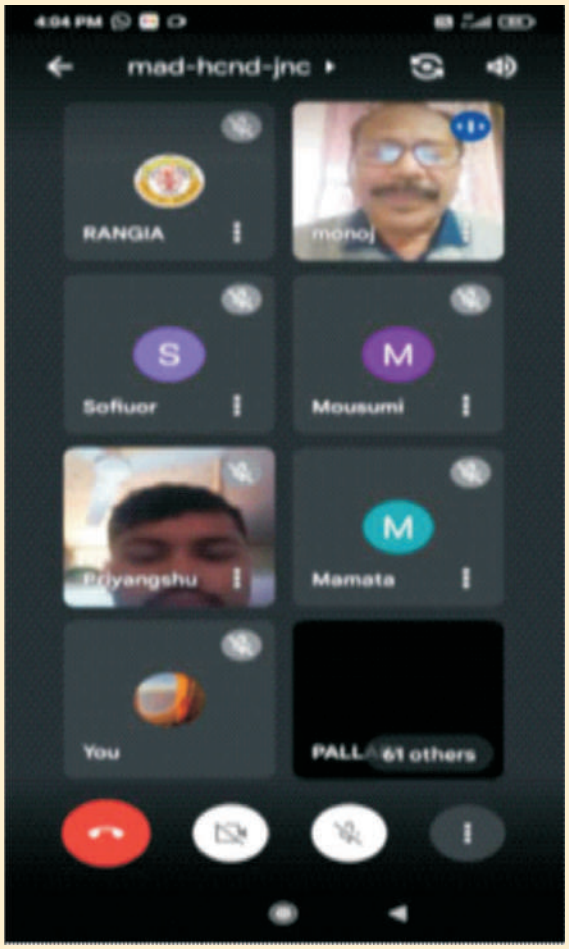
The speaker for this session was Prof. Dr Upasana Bora Sinha, Dept of Chemistry, Nagaland university, Nagaland who guided on the topic titled "Towards greater participation of women in STEM research – setting the agenda". She said that women scientist must understood the importance of the soft skills required and try to acquire them for a successful life. The time management, social networking, communication skills and team work are of much importance.

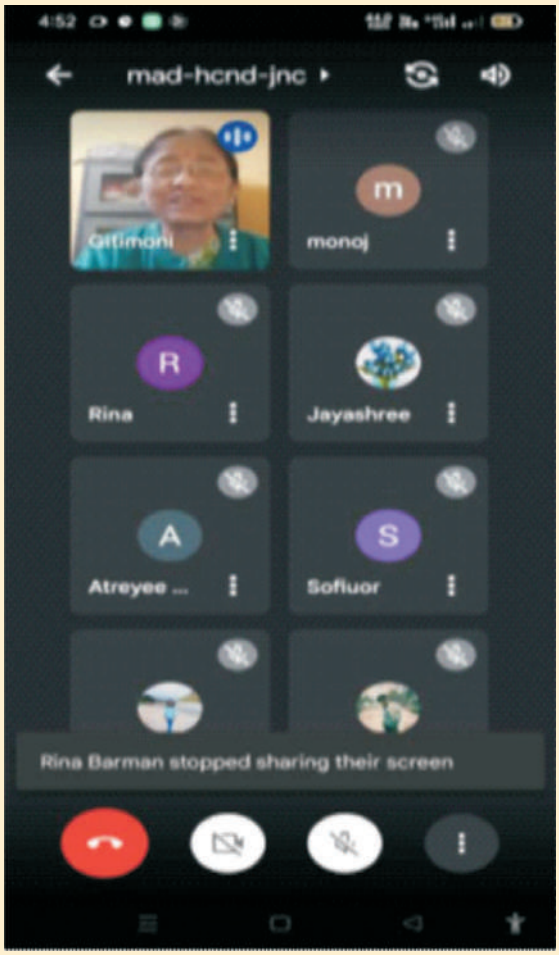
At the end of webinar, Prof. Vishal Mane has expressed vote of thanks towards resource person Prof Dr Upasana Bora Sinha of Nagaland. He also expressed thanks to collaborators of the webinar Prof Brijesh Pare and Prof D V Prabhu of ACT. He also expressed thanks to organizers of webinar Prof Dr Manjusha Kulkarni, Dr K C Takale, Dr Sudesh Ghoderao and management of college.



Rangia College, Assam, India

On the celebration of the international event on Global Women's Breakfast 2022, a webinar was organized by IQAC, Rangia College in collaboration with Association of Chemistry Teachers(ACT) under the patronage of Dr. Brajesh Pare, President, ACT, and Dr. D. V. Prabhu, General Secretary, ACT, on 16th February 2022 at 4 p.m. The webinar started with the inaugural speech delivered by Dr. Brajendra Saikia, Principal, Rangia College. He briefly delineated the topic of the webinar which was “Empowering Diversity in Science”. The resource persons, Dr. Rina Barman, Associate Professor, and Dr. Gitimoni Deka, Associate Professor, Rangia College brought into focus the gender disparity in the field of science with the help of statistics. The webinar was conducted by Dr. Monoj Kr Singha, Coordinator, IQAC, Rangia College.





Department of Chemistry, Nalbari College Nalbari

The 'GLOBAL WOMEN'S BREAKFAST' event was conducted through online mode from 11:00 am onwards. The meeting was hosted by the convener and started with a brief introduction about the event. The Principal, Nalbari College, Dr. Kamal Nayan Patowary Sir gave an inaugural speech followed by the welcome address given by the HoD, Dept. of Chemistry and Co-ordinator, IQAC, Dr. Dhiraj Talukdar Sir.

The resource person of the event **Prof. Mausumi Ganguly madam** from the Department of Chemistry, Cotton University gave a very fruitful and elaborative lecture on the topic **'Empowering diversity in Science'.** Prof. Ganguly madam is one of the eminent women leaders in Chemistry representing the entire north east. She urged our students, especially the girls to give their best to break-up the **glass ceiling** that is still prevailing in educational hierarchy. After the talk an informal discussion was held among the participants, faculty members with the speaker madam. Students' participation till the end leads to successful completion of the GWB-2022. The event was ended by the vote of thanks given by the convener.

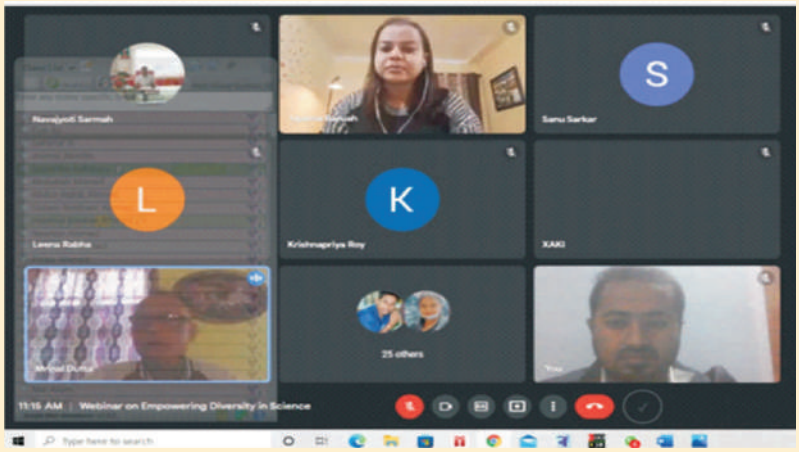
Department of Chemistry,

Pandit Deendayal Upadhyaya Adarsha Mahavidyalaya, Amjonga, Goalpara

on

Empowering Diversity in Science

The event was started sharply at 11 AM. Started with welcome address by Dr. Mukul Kalita (Coordinator), Assistant Professor, Department of Chemistry, Pandit Deendayal Upadhyaya Adarsha Mahavidyalaya, Amjonga, Goalpara followed by inaugural Speech of Dr. Navajyoti Sarmah, Principal, Pandit Deendayal Upadhyaya Adarsha Mahavidyalaya, Amjonga, Goalpara. The event was anchoring by Coordinator of the Event. There were two speakers for the event. The first speaker was Dr. Mrinal Kumar Dutta, Associate Professor, Department of Civil Engineering. Jorhat Engineering College. He is a popular teacher and also associated with different social activities. He delivered lecture by using power point presentation on the topic **"Empowering Diversity in Science"** with different examples, the difficulties faced by women in science education and how it can be eliminated the gap from the society and what types of measures should be taken are elaborately discussed. His deliberation was ended with interaction with participants and was ended at 12.20 PM. The second speaker was Dr. Gitimoni Deka, Associate Professor, Department of Chemistry, Rangia College. She is an **Anupam Sinha Best Chemistry Teachers awardee (Under Graduate category) in 2015.** She delivered lecture on "**Empowering Diversity in Science**" with participants. She explained how rural women facing problems in getting science education especially higher education and what kinds of measures we should take to remove the differences in society were discussed. She encourages all student participants to pursue higher education in science and empower ourself. The lecture was ended with fruitful discussion with both speakers and participants. At the end, the event was concluded with vote of thanks by Dr. Upama Baruah (Co-Coordinator), Assistant Professor, Department of Chemistry, Pandit Deendayal Upadhyaya Adarsha Mahavidyalaya, Amjonga, Goalpara.



Department of Chemistry,

Kamla Nehru Mahavidyalaya, Nagpur

The Department of Chemistry, Kamla Nehru Mahavidyalaya, Nagpur, Association of Chemistry Teachers (ACT), Mumbai and Department of Chemistry, Department of Chemistry, Kalasalingam Academy of Research and Education (KARE), Krishnankoil in collaboration with IUPAC, organized an International Webinar on "**Empowering Diversity in Science**" on 16th February 2022. Around 4275 delegates including Professors, Scientists, Industrialists, Faculty Members, Research Scholars and Students from 30 countries actively Registered in this mega event.

The Chief Guest of the Inaugural function, **Dr. Bipul Saha**, Former Directro, R & D NACL Industries Ltd. Hyderabad, IUPAC Bureau Member. inaugurated the webinar and in his inaugural address, he mentioned "the activities of the IUPAC and objectives of organization of Global Women Breakfast.". The Guest of honor **Dr. Smeetaa Wanjarri**, Treasurer of Amar Sewa Mandal, Nagpur address the gathering on an important topic of Diversity in Chemistry Science. President of Inaugural programme **Prof. D. V. Prabhu**, General Secretary of ACT addressed the gathering on this occasion. Prof. Prabhu explained the objectives of ACT and impotence of collaboration with IUPAC.

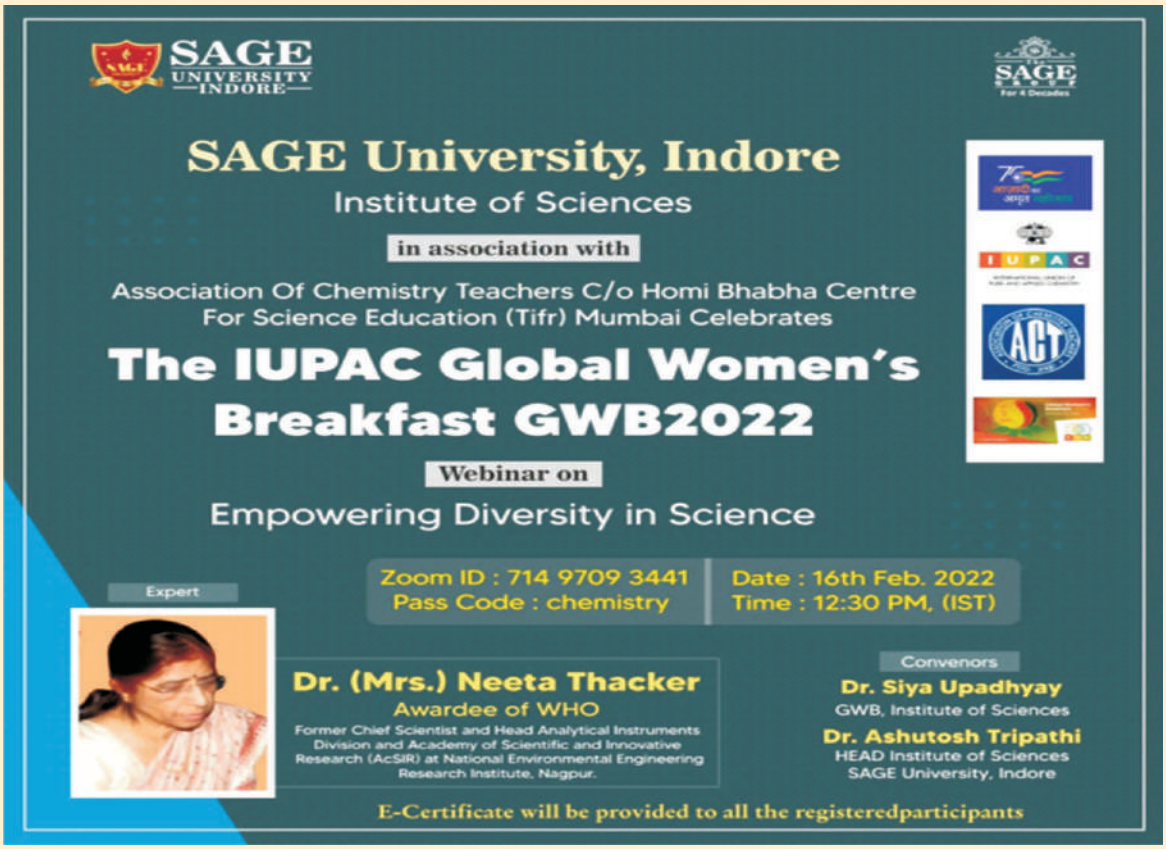
Prof. Gladys Cherisse J. Completo, ***Professor of Chemistry, University of the Philippines, delivering Invited Talk***

Earlier, Dr. Wasudeo Gurnule, Convener of International webinar, welcomed the gathering and explained the theme of this international Webinar, GWB-2022. This Webinar was Inaugurated by the **Dr. Bipul Saha**, Former Director, R & D NACL Industries Ltd. Hyderabad, IUPAC Bureau Member**, Prof. D. V. Prabhu**, General Secretary of Association of Chemistry Teachers, Chairman of Inaugural function. **Prof. Gladys Cherisse J. Completo**, ***Professor of Chemistry, Institute of Chemistry, University of the Philippines Los Baños,***

Laguna Philippines, **Prof. L. Gomathi Devi, Hon'ble Vice-Chancellar, Maharani Cluster University, Bangluru,** Prof. **Dalila HAMMICHE, Ageria Prof. M. Swaminathan**, **Dr. Dilip Badwaik**, Principal of Kamla Nehru Mahavidyalaya, Nagpur and **Dr. Wasudeo Gurnule**, Convenor of Webinar was present on this occasion.

This webinar was conducted under the guidance of **Dr, Suhasini Wanjari**, President of Amar Sewa Mandal and MLC **Adv. Abhijit Wanjarri**, Secretary of Amar sewa Mandal. Principal **Dr. Dilip Badwaik** gave introductory remarks of international webinar. In Technical session Eminent speakers was **Prof. Gladys Cherisse J. Completo,** ***Professor of Chemistry, Institute of Chemistry, University of the Philippines Los Baños, Laguna, Philippines,*** gave a talk on '**Diversity in Chemistry Research: From Sugars to Glycoconjugates', Vice Chancellor of Maharani Cluster University, Bangalore, Prof. L. Gomathi Devi** , gave a talk on '**Surface Plasmonic Resonance Effect for Efficient Photo-catalysis',** Prof. **Dalila HAMMICHE**, Laboratoire des Matériaux Polymères Avancés, Université Abderrahmane Mira-Bejaia, Route de Targa Ouzemour, Algérie, gave a talk on **"Chemical Treatment effect on Composite Material Properties".**

SAGE University, Indore



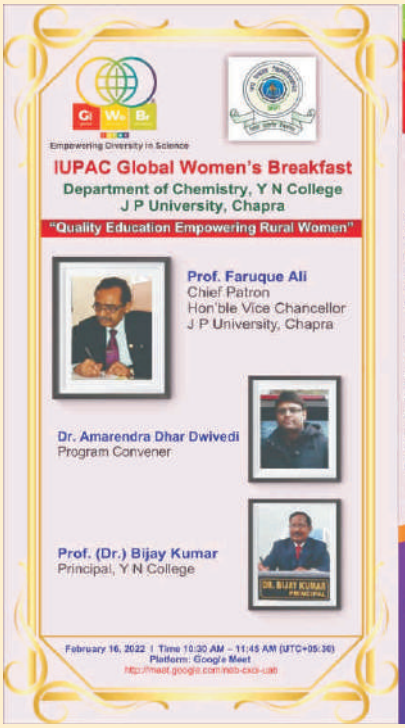
SRM Institute of Science and Technology

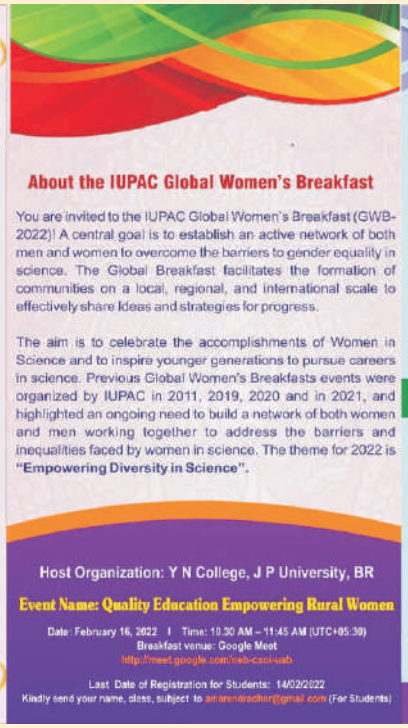
Ramapuram Campus, Chennai

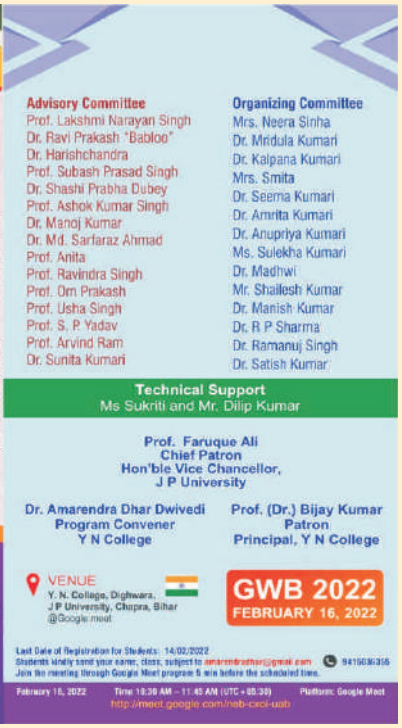
Ram Krishna Dwarika College & J.D. Women's College

(Constituent Units of Patliputra University, Patna)

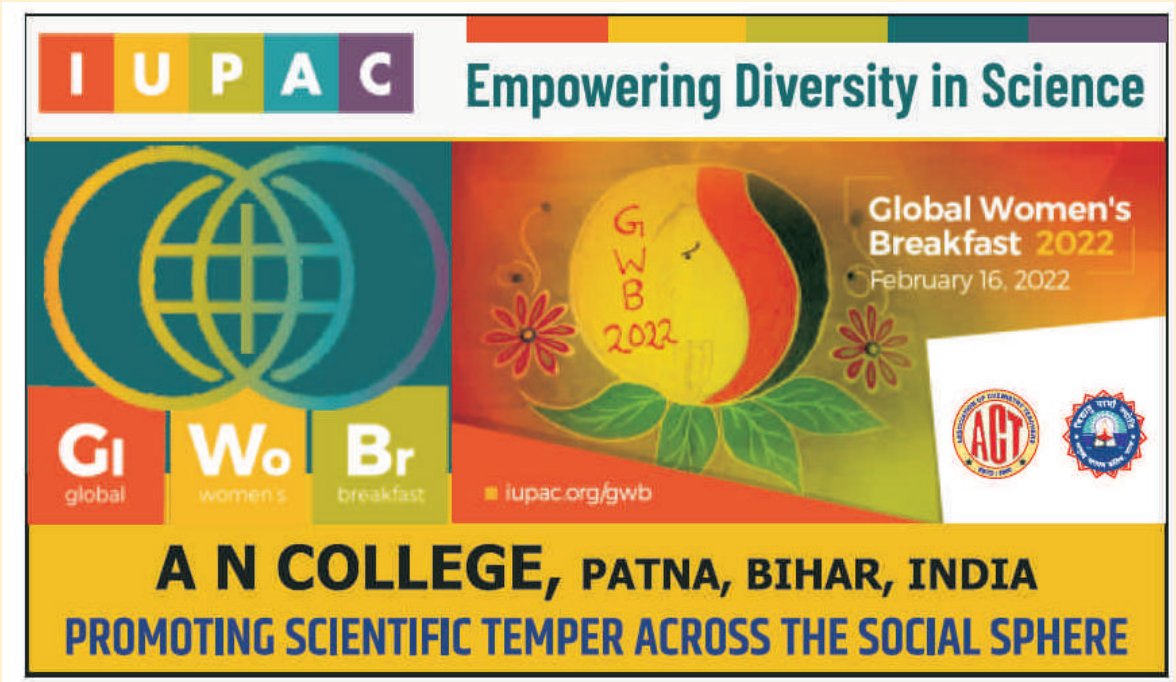
Department of Chemistry,
Y. N. College, J. P. University, Chapra

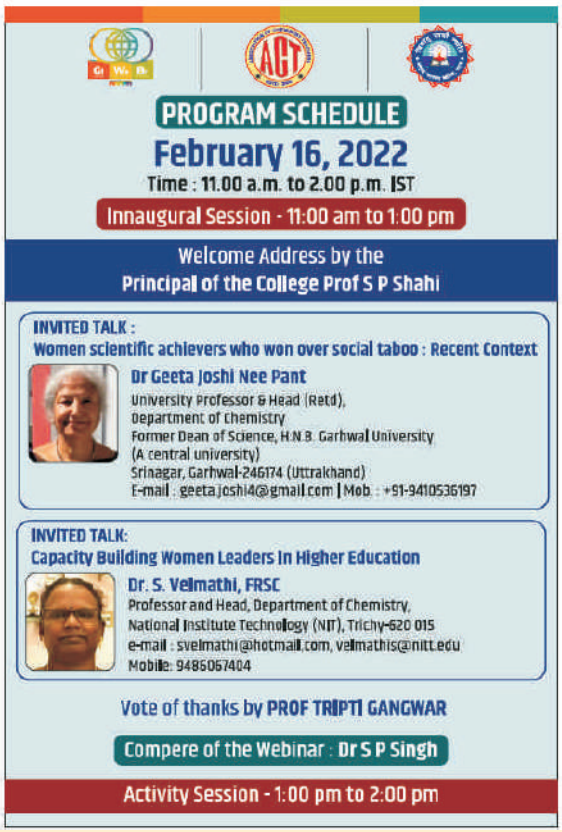


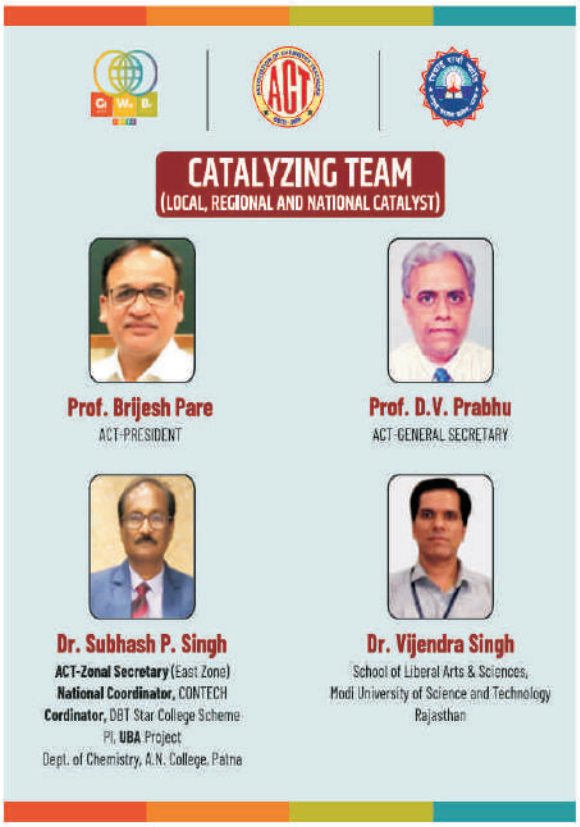




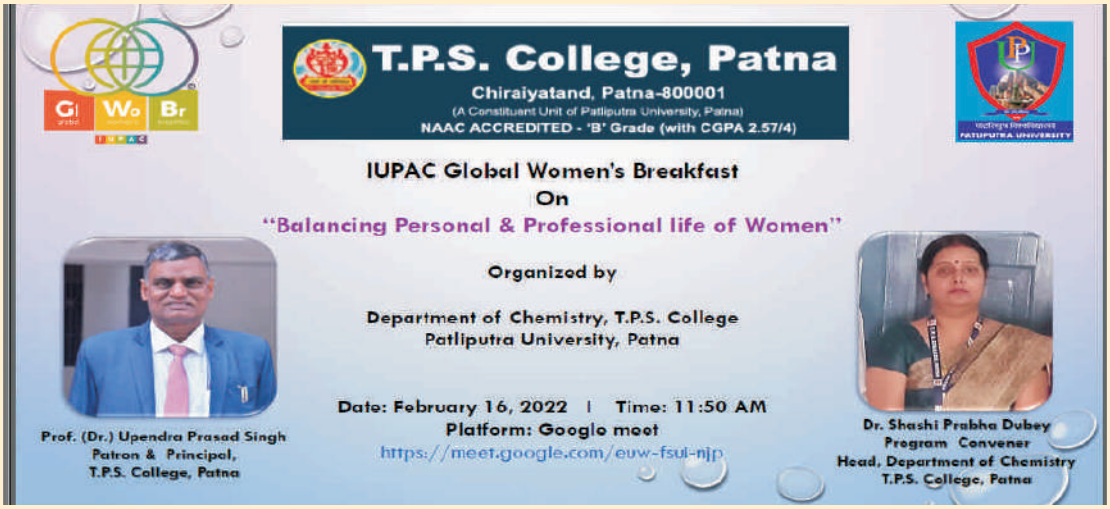
A. N. College, Patna, Bihar







Department of Chemistry,
TPS College, Patna



Jagdam College, Chapra, Bihar

Program Convener

Dr. Raman Kumar Singh

Assistant Professor, Department of Chemistry, Jagdam College, Chapra, Bihar (India)

"Women in the field of Medicinal Chemistry"

Speaker: Dr. Shachi Mishra

Assistant Professor, P.G Department of Chemistry, Jai Prakash University, Chapra, Bihar (India)

"Women in Science: Current Scenario and Challenges"

Speaker: Dr. Rajshree Singh

Assistant Professor, Department of Chemistry, Jagdam College, Chapra, Bihar (India)

Speciality Chemicals in India – An Overview

Dr. Mannam Krishna Murthy
Varsity Education Management Ltd.,
Ayyappa Society Main Road,
Madhapur, Hyderabad – 500 081.

Bulk chemicals are those made on a very large scale in order to satisfy Global needs. These are sometimes referred to as commodity chemicals or heavy chemicals. Examples include sulphuric acid, nitrogen, oxygen, ethylene, propylene, ammonia, sodium hydroxide etc.,

Fine chemicals are those made in small, limited quantities. These are sometimes referred to as speciality chemicals. Manufacture of these chemicals use many small and complicated steps like chemical synthesis, extraction, hydrolysis, catalysis, biotechnology etc.

The definition of speciality chemicals varies widely across the industry. These may be considered as chemicals which are used in low quantities and are targeted towards specific end-use applications. Speciality chemicals, by virtue of being high value, specialized products command higher margins than most bulk products.

Speciality chemicals can be sub-divided based on end-user industries. In addition to end-use driven segments, there are a few categories of specialty chemicals which are used across several end-user segments for similar applications.

Figure 1 : Nine segments of speciality chemicals

The nine segments that we have covered cumulatively constitute a market of about 15 hundred billion rupees in India and are expected to grow further in future

Agrochemicals

Over the last few decades, agrochemicals has played a vital role in improving agricultural productivity, necessitated by a growing population base and the resultant demand arising from the need to achieve food sufficiency. These fundamental factors will continue to drive growth in the agrochemicals industry going forward. While agrochemicals is a generic term referring to a broad range of chemicals used in crop protection, synthetic fertilizers, hormones and as growth agents.

Agricultural productivity has been a key concern globally, driving significant research efforts across the various aspects, including crop protection chemicals. Agrochemicals can be classified as insecticides, fungicides, herbicides and other pesticides

The Indian domestic agrochemicals market provides long term growth opportunities. India is also emerging as a major exporter of generic agrochemicals which is likely to further strengthen with a significant number of agrochemicals.

Polymer Additives

Polymer additives are substances added to plastic resins to form process ready polymer compounds or to modify or impart specific changes to their property. The result of introducing an additive into a compound can vary from enhancing its properties to merely changing its colour. Additives can also be used to improve the characteristics of polymers such as strength, lustre, durability or heat sensitivity. Polymer additives comprise less than 1% of the total weight of the end product.

A major challenge faced by plastics segment is environmental impact - a lot of effort is concerted globally on recycling. Addition of fillers and certain colorants may adversely impact the recyclability of plastics. Certain additives, however, help retain properties of the plastics during recycling process. Recycling of plastics, however, is still at a nascent stage in India.

S.No.	Segment	Applications
1	**Plasticizers**	wire and cable insulation, construction, flooring and carpets, automotive, household, medical
2	**Heat stabilizers**	wires and cables, engineering plastics, white goods
3	**Antioxidants**	engineering plastics, automobile, water treatment, corrosion inhibitors
4	**Others**	construction, automobile, white goods, adhesives, engineering plastics

The Indian polymer additives market accounts for only about 1% of the global market and the growth opportunity has not materialised in full. The model of usage and application of polymers in developed countries suggests that there is a huge market potential in India for similar applications.

Textile chemicals

Textiles require a range of treatment processes before reaching the end-user. Textile chemicals are specialty chemicals used during dyeing and processing of textiles to impart desired properties to the end product.

The Indian textile chemical industry is highly fragmented and largely unorganised. The three main applications for textile chemicals are home furnishings, apparels and industrial uses.

The various types of textile chemicals include coating and sizing chemicals, colorants and auxiliaries, finishing agents, surfactants, de-sizing agents, bleaching agents and yarn lubricants.

Stages of Textile Processing	Sizing chemicals Sizing chemicals and textile waxes are applied to the yarn to avoid yarn breaks during weaving. This helps achieve high weaving efficiency and good fabric surface appearance
Dyeing	Chemicals are applied to increase process safety, efficiency and reproducibility for production, so as to achieve optimum dyeing results
Printing	Pigments and inks are applied to impart the desired colour to textile
Finishing	Completes the fabric's appearance and gives it the "final touch" Special effects are produced during this process, such as wrinkle-free, easy-care, shrink resistance or a gloss effect (chintz)
Coating	Increases the performance, durability and softness of the textile

A large domestic demand for textiles, growth in branded apparel, strength in exports and opportunities for technical textiles, together provide a large and growing market for textile chemicals.

Construction chemicals

Construction chemicals are specialty chemicals used in construction projects (residential, industrial and infrastructure) to increase the structural life or strength, impart additional protection against environmental conditions or to reduce the quantity of raw material required.

The global construction chemicals market has witnessed the emergence of China as a leading consumer over the last decade. The Indian construction chemicals market has quite a few domestic companies, but only a handful have been able to create strong consumer brands of scale. The major product categories in construction chemicals are : concrete admixtures, waterproofing chemicals, adhesives and sealants, flooring chemicals, repair and rehabilatation chemicals.

The most significant challenge faced by Indian construction chemical players is the pressure on profitability. Small scale construction projects are highly price-sensitive as the builders involved in such projects are focussed on short term returns rather than long term sustenance.

Flavours and Fragrances (F&F)

Flavours and fragrances are small but significant constituents of food, beverage and FMCG products respectively. They are directly involved in creating a sensorial connection between the product and its consumer, often contributing to a strong brand recall.

All F&F blends use a large number of ingredients, which can be either natural or synthetic, depending on the source and manufacturing process. India is strongly positioned as a leading natural F&F ingredients supplier to the global market, catering to 60% of the global spice oleoresin demand. With a large growing demand and the resultant opportunities for Indian manufacturers, the market for F&F and ingredients is set to serve up a spicy fare.

Flavors and fragrances can be derived from a variety of sources of raw material. Essential oils are distilled from various herbs and spices like mint, rosemary, eucalyptus and others, whereas aroma chemicals are derivatives of organic or inorganic aromatic compounds, which are in turn derived from petrochemicals or from natural sources. The ability to secure a consistent raw material supply is a key advantage for Indian players using natural ingredients, the only challenges being seasonality and variation in yields of natural raw material.

Indian players in the natural ingredients market will continue to have an advantage in terms of their proximity to the raw material supply.

Personal care ingredients

Personal care products cover a diverse array of products we use in our daily life, including skin care, hair care, cosmetics and oral hygiene products. It represents a large market, dominated by multinational companies with some of the most recognizable brands globally.

While brands are known to all, there is less awareness of the chemistry behind these products or the ingredients constituting them. Ingredients used for personal care products can either be undifferentiated bulk chemicals (waxes, solvents, etc.) or specialty chemicals.

The domestic personal care market presents an interesting opportunity area for active ingredient manufactures. The increase in penetration of rural market will drive the growth of personal care products in the near future. In the urban market premiumisation trend is evident which provide greater market opportunity for high margin active ingredients.

Ingredient name	Chemical used as	Chemical used in
Triclosan	Anti fungal agent	Shampoos and soaps
Hexylresorcinol	Anesthetic, antiseptic and anthelmintic agent	Skin care products including anti ageing creams
Saccharomyces ferment lysate filtrate	Skin conditioning agent	Anti ageing and moisturizing creams
Pro-Cysteine	Anti ageing, and depigmentation agent	Skin whitening creams
Zinc pyrithione	Anti bacterial agent	Anti dandruff shampoos
Piroctone olamine	Anti fungal agent	Anti dandruff shampoos
Minoxidil	Vasodilator	Hair loss prevention products
Hyaluronic Acid	Anti ageing agent	Anti ageing products
Ethylhexyl triazone	UV agent	Sunscreen

Surfactants

Surfactants or surface active agents are organic compounds that lower surface tension between two liquids or between a liquid and a solid. Functionally, they are used to improve cleaning efficiency, emulsifying, wetting or dispersing actions, solvency, foaming/de-foaming and lubricity of cleaning agents and other products.

Unlike most other segments mentioned in this report, surfactants are not aligned to any particular end-user industry. They find application across a wide array of industries, including home and personal care, textile, water treatment, agrochemicals flavours and fragrances. Surfactants are used most ubiquitously as basic cleaning agents in consumer products such as detergents, shampoos, body washes and toothpastes.

The systemic shift to eco-friendly products is happening as some of the traditional surfactants are known to be toxic to animals, ecosystems and humans, and can increase the diffusion of other environmental contaminants. As a result, there are proposed or existing restrictions on use of some synthetic surfactants.

A surfactant owes its properties to its chemical structure, which comprises a hydrophilic head and a tadpole shaped hydrophobic tail. Surfactants are also often classified by the composition of their head as : anionic, non-ionic, cationic and amphoteric.

Demand for surfactants in India is expected to grow at more than twice the global rate. The segment is expected to witness solid growth, however, profitability would continue to remain challenged in the near term.

Water chemicals

Water treatment chemicals are used to add some specific properties to water or alter the physical or chemical properties of water for domestic, commercial and industrial applications. In some developing countries, chemical water purification is conducted at household level to provide safe drinking water. In developed countries and urban centres of developing countries, this is generally done at the municipal level by civic authorities or by water management organizations.

The industrial applications of water treatment chemicals largely entail waste water management, enhancing efficiency of industrial equipment by minimizing corrosive and other adverse impacts of water. Based on their action, water chemicals are further classified into coagulants, flocculants, biocides, disinfectants, algaecides, defoamers, neutralizing agents, oxidants, oxygen scavengers, pH adjusters, boiler water chemicals, resin cleaners and scale inhibitors.

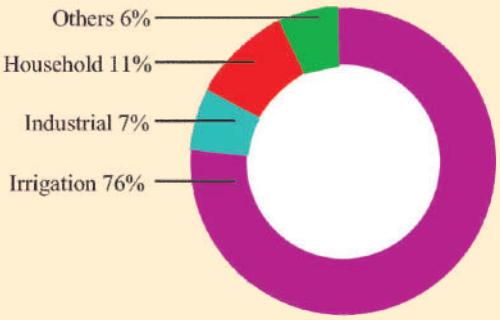


Figure 2 : Sector wise water consumption in India

Dyes and Pigments

The most common application of dyes is as colorants for textiles. They are also used in a variety of end applications including but not limited to paper, adhesives, art supplies, food and beverages, ceramics, construction, cosmetics, glass, paints, plastics and soap.

Pigments predominantly find application in paints and coatings, automotive finishes, emulsion paints and distempers. They are also used in printing inks, polyester textiles and plastics like PVC, rubber and synthetic polymers and nylons, cosmetics and paper.

The key differences between dyes and pigments are their size and solubility - dyes are soluble while pigments form a suspension – this results in a difference in applications and process of application.

Dyes can be classified as : azo dyes, acid direct dyes, disperse dyes, ingrain dyes, solvent dyes, reactive dyes, sulphur dyes, vat dyes. Pigments are mainly classified as : organic pigments and inorganic pigments

There is significant re-organisation taking place in the dye and pigment industry globally. A short to medium term boom for the Indian dye and pigment industry is expected as Indian companies fill in shortages caused by Chinese plant shut downs. The benefits would largely be reaped by scaled up players who are compliant with international environmental and quality standards.

Key success factors

Low cost labour and raw material availability have been the advantages enjoyed by Indian manufacturing companies traditionally. Increasingly, though, specialty chemicals companies are focusing beyond these traditional cost advantages. In agrochemicals, for instance, the focus is largely on branding and distribution. Product development capabilities have become increasingly important across segments and account for the difference between top and bottom performers. Surfactants, personal caring rediants, flavours and fragrances are areas where scale and operational efficiency are still the success factors.

Globally, specialty chemicals are driven by extensive product research, development and innovation, which is a significant differentiator over the commoditized chemical industry. The scenario is now more intensified in Indian fine chemical industry, mainly as import substitution and export earnings.

Academic Participation of ACT Members

1. Prof. Wasudeo Gurnule, Secretary of ACT West Zone, delivered a Talk as Key Note Speaker on "Materials for the Benefit of Man Kind", in Science Day Celebration organized by Kalinga University, Raipur, on 26th February 2022.

2. Prof Mannam Krishnamurthy, Secretary of ACT, South Zone, delivered a talk on Improving Battery Performance with cutting Edge 3D Chemistry Modelling and Simulation, in Chemistry World Webinar on 27th April 2022.

3. Prof. Wasudeo Gurnule, Secretary of ACT West Zone, delivered a Talk on "Nanoscience and Its Impact on Society" in International Conference on the Ancient Indian Knowledge for Holistic Development organized by Department of Chemistry, Dr. C. V. Raman University, Kota Bilaspur CG, on 28-29th January 2022.

4. 1.Prof. M. Swaminathan, EC Member of ACT, South Zone, delivered a talk in Webinar on Wisdomized Physics Embedded Chemistry, organized by Department of Humanitites and Science, Panimalar Engineering College, Autonomous, Affiliated to Anna University, Chennai, on 21st October 2021.

News, Views & More

Scientists Use Apples To Remove Nanoplastics

Ecosystems are known to accumulate microplastics, and the breakdown of microplastics produces nanoplastics. Nanoplastics are plastic particles that are smaller than 100 nm that disperse in water in a colloidal state. Although nanoplastics may be more common than microplastics, their small size makes them difficult to thoroughly investigate and evaluate. However, nanoplastics have been discovered in zebrafish in a number of organs, including the brain, which may be a sign that they can pass the blood-brain barrier.

Ninety percent of microplastics in urban areas are removed during the sewage treatment process. Microplastics are known to bond to biopolymers in the ocean and sink to the bottom.

Therefore, the research team at Shinshu University under the direction of Professor Hiroshi Moriwaki of the Department of Applied Biology, Faculty of Textile Science and Technology, proposed employing pectin, a biopolymer to attach to nanoplastics with the aid of iron or aluminum. They discovered that by employing coagulating sedimentation with pectin and iron with filter paper, they were able to remove 95% of the nanoplastics within the first 24 hours. The use of pectin was inspired by the abundance of apples in the prefecture of Nagano where Shinshu University is based. More information can be found by reading the paper which was published in the Journal of Environmental Chemical Engineering.

Chemist who developed ways to synthesize and depict bioactive products

David (Dave) Evans discovered reactions that he applied to the synthesis of biologically active natural products as potential drug therapies, including, antibiotics and anti-cancer agents. His contributions changed how researchers make complex natural molecules and design drugs. He has died, aged 81.

Evans was a devoted educator who invested enormous effor in scientific communication. In the mid-1980s, he recognized that students and researchers faced challenges in producing graphics for oral presentations, manuscripts, theses and grants using drafting pens and templates. Evans made the connection between the graphics capabilities of the Macintosh computer and the graphics heavy nature of organic chemistry. Along with his wife Sally and graduate student Stewart Rubenstein, he developed ChemDraw. Organic and inorganic chemists around the world. In academia and industry, now consider this chemical-strucutre-drawing software essential. By transforming how organic chemistry is presented and taught. Evans influenced successive generations far beyond the walls of his institutions.

David A. Evans
(1941- 2022)

Evans was born in Washington DC. He earned a scholarship to Oberlin College, a small Ilberal arts university in Ohio. There, the chemist Norman Craig engaged him in his research on small organic molecules. Evans forged a life-long friendship with Craig and remained dedicated to Oberlin. He often stared the story that he had cut the grass at the Craigs' home one Saturday so that Craig could do some glass blowing to make equipment for an experiment of mutual interest.

those early studies shaped Evans's approach to problems in organic chemistry throughout his career. He combined an intuition for chemistry with a determination to understand and organs and selectivity of reactions.

Evans began his doctoral studies at the University of Michigan in Ann Arbor and completed his PhD at the California Institute of Technology in Pasadena. He accepted his first faculty position in 1967 at the University of California. Los Angeles, later becoming a full professor. There, he began to study rearrangement reactions, in which the number and type of atoms remain the same, but their connectivity changes. Rearrangement processes are desirable in organic synthesis because many of them proceed through well organized transition states that make in possible to plan the synthesis of complex

molecules. Evans and Kurt Mislow at Princeton University in New Jersey both reported studles on an atomic bond rearrangement that became useful in the synthesis of hormones and natural toxins.

Evans also discovered a remarkable way to accelearate a rearrangement reaction that simultaneously makes and breaks carbon-carbon bonds while controlling stereochemistry, known as the Evans anionic oxy-Cope reaction. Arthur Cope first reported on this reaction in the 1940's, but it required temperatures in excess of 200^0C. Evans identified starting materials that allowed the reaction to occur under much milder conditions, widely applicable in organic synthesis. One of several named reactions associated with Evans, it became the subject of intense investigation in an effort to understand the origin of its acceleration rate.

Evans returned to Caltech in 1974 and remained these until 1983. During this period, he made what are viewed as his most impactful discoveries, which fuelled decades of further work. The aldol reaction had been known since 1869, but a practical way to control the relative and absolute stereochemistry was missing. Evans demonstrated that the use of boron created highly organized transition states that overcame these limitations. He invented an 'auxillary' as a chiral agent, prepared from a readily available amino acid, interaction of teh boron enolate with an aldechyde creates motifs found in many natural products with biological activity. Academia and industry embraced this methodology to make natural products and therapeutics of commercial interest.

Evans's last academic stop was at Harvard University in Cambridge, Massachusetts, where he was breifly chair of the chemistry department. His group revealted the full synthetic potential of the Evans auxiliary during this period, preparing numerous complex natural products. They also made major contributions to asymmetric catalysis. These syntheses rackled thorny assemblles of stereochemically complex components. Among the most significant contributions were total syntheses of the antibiotic vancomycin and the anti-cancer agents bryostatin 2 and spongistatin 2.

Evans put the same level of effort into his lecture notes as into his scientific conference presentations. He made those notes available to the chemistry - education community, which adopted and modified them, Influencing the teaching of subsequent generations. For years, he kept a database of reaction mechanisms and synthesis problems on a publicly available website; this came to be used worldwide. He trained many scholars, including postdoc David MacMillan, who received a share of teh 2021 Nobel Prize in Chemistry for his work on asymmetric catalysis of organic molecules. Evans's first female doctoral graduate, Ann Weber, became a vice-president of lead optimization at the US-based pharmaceutical company Merck and is recognized for her role in the discovery of the diabetes medication Januvia (sitagliptin).

Dave Evans had an uncanny appreclation of chemistry's overarching synthetic challenges, and he was supportive in framing a problem in such a way that the creativity of each individual was best expressed and harnessed. He leaves behind some of the finest synthetic sequences ever devised for making nature's most complex naturally occuring bioactive molecules.

List of ACT Life Members During January to April 2022

Sr. No.	Names	LM No.	Institution
1	Dr. Tapas Kumar Adalder	2393	Dept. of Chemistry, (UG & PG) Jhargram Raj College, Jhargram, West Bengal- 721507
2	Mr. Sameer Saurav	2394	Dept. of Chemistry, ANS College, Nabinagar, Aurangabad, Bihar, Uttar Pradesh- 824301
3	Dr. G. Dayana Jeyaeela	2395	Shrimati Indira Gandhi College, Tiruchipalli, Tamil Nadu- 620002
4	Dr. Richa Saxena	2396	M.J.S Govt.P.G College, BHIND, Madhya Pradesh- 477001
5	Dr. Mamta Rani Kaushik	2397	Dept. of Inorganic Chemistry, K.R. (PG) College, Mathura, Uttar Pradesh- 281001
6	Dr. Mamta Rani Kaushik	2398	Dept. of Chemistry, University of Kalyani, Kalyani, Nadia, West Bengal- 741235
7	Dr. Supriya Biswas	2399	Dept. of Applied Chemistry, SSTC, Bhilai, Chhattisgarh- 490020
8	Mr. Sandip Vinayakrao Dautpure	2400	Shri. Shivaji Science & Arts College, Chikhali, Dist., Buldhana, Maharashtra- 443201
9	Mr. Praveen Kumar	2401	03/09, Kudi Bhagtasni Housing Board, Basni, Jodhpur, Rajasthan- 342005
10	Dr. Rupali Ajesh Gulalkari	2402	Bharatiya Jain Sanghatna's Arts, Science & Commerce College, Wagholi, Pune- 412207
11	Prof. Dr. Manash Das Gupta	2403	Dept. of Chemistry, University of Science Technology, Technocity, Khanapara, Baridua, 9th Mile, Ribhoi, Meghalaya- 793101
12	Dr. Diganta Bhuyan	2404	Dept. of Chemistry, Bannagar College, Sorbhor, Assam- 781317
13	Dr. Mukul Kalita	2405	Dept. of Chemistry, Pandit Deendayal Upadhyaya Adarsha Mahavidyalaya, Amjonga, Goalpara, Assam- 783124
14	Mr. I. Ravi Kanth	2406	S/o Sundarrao, Valaparla (P.O), Martur, Dist. Prakasam, Andhra Pradesh- 523260

List of ACT Life Members During January to April 2022

Sr. No.	Names	LM No.	Institution
15	Raffiunnisa	2407	Aditya College of Engineering, ADB road, Surampalem, AP- 533437
16	Dr. Manjul Gondwal	2408	Dept. of Chemistry, Laxman Singh Mahar Govt. PG College, Pithoragarh, Uttarakhand- 262502
17	Dr. Bhanu Pratap Singh Gautam	2409	Dept. of Chemistry, Laxman Singh Mahar Govt. PG College, Pithoragarh, Uttarakhand- 262502
18	Dr. Ranjit Kumar	2410	Dept. of Chemistry, Faculty of Science, Dayalbagh Educational Institute.Dayalbagh, Agra, U.P- 282005
19	Mrs. Chandan Maurya	2411	Navyug Kanya Mahavidyalay, Luckow, Rajendra Nagar, Lucknow(UP), 226 004
20	Dr. J. Rosaline Vimala	2412	Holy Cross College, (Autonomous) Trichy, Tamilnadu, India - 620 002
21	Dr. M, Stelca Bharathy	2413	Holy Cross College, Trichy, Tamilnadu, India - 620 002
22	Dr. A. Agila	2414	Holy Cross College, Trichy, Tamilnadu, India - 620 002
23	Shikha Mishra	2415	A.N.D.N.N.M.M., Harsh Nagar, Kanpur - 208 001
24	Dr. Nabajeet Barman	2416	Department Chemistry, Rangia College, Rangia, Kamrup, Assam - 781 354
25	Dr. Dnyabeswar Daulatrao Lokhande	2417	K.P.G. Arts, Commerce & Science College Igatpuri, Dist. - Nashik
26	Shaikh Samin Anis	2418	K.V.N. Naik College, Nashik - 422 002

L.M./IM No.:_____ Receipt No._____

ASSOCIATION OF CHEMISTRY TEACHERS (ACT)

Homi Bhabha Centre for Science Education
Tata Institute of Fundamental Research
103, NIUS Bldg.,V.N. Purav Marg,Mankhurd, Mumbai-400 088.
(Regd.No. Maharashtra Government, Mumbai 922,2010 G.B.B.S.D. dated 08/04/2010)
Website:www.associationofchemistryteachers.org

Date:_____

To,
The General Secretary,
Association of Chemistry Teachers,
HBCSE(TIFR), Mumbai-400 088.

Dear Sir,

I/We wish to take the Life/Institutional Membership of A.C.T.
[Fees: Life Rs.1500/- and Institutional (one time payment) Rs.15,000/-]
A cheque/Demand Draft No._____ dated _____ of Rs._____
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1. Name :_____
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   Mobile: Landline: Email:
8. Area of teaching/research interest:_____
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I am aware of the objective, rules and regulations of ACT and shall abide by them.

Place_____ Yours sincerely,
Date:_____

(Signature)

All correspondence should be made to the General Secretary, Association of Chemistry Teachers, 103, NIUS Bldg., Homi Bhabha Centre for Science Education (TIFR), V.N. Purav Marg,Mumbai -400 088.

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