IWSA NEWSLETTER

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XIV Triennial Conference at Hyderabad 11- 13 December 2019

Guests on the Dias during the Inauguration on 11th December, 2019

Audience at the Inaugural Session

Dr. Mahtab Bamji about IWSA, Hyderabad Branch

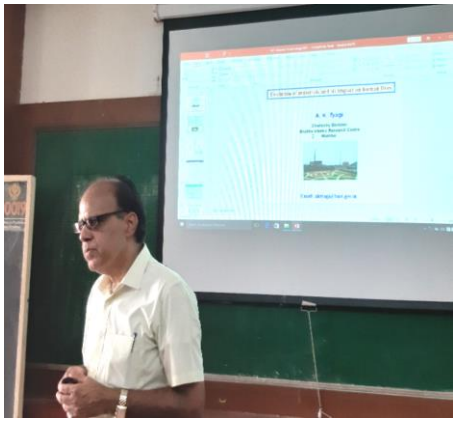
Keynote Address by Padmashri Prof. Rohini Godbole

Dr. N. Shyamala Rao being Felicitated

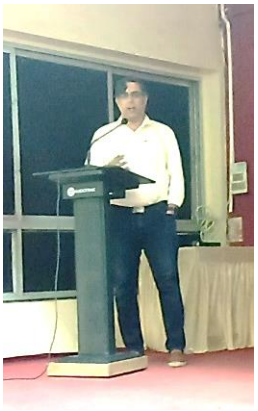
Dr. Mahtab Bamji being Felicitated

BRANCHES

Roorkee 1979, Hyderabad 1979, Pune 1980, Nagpur 1982, Kolhapur 1982, Delhi 1987. Kalpakkam 1987, Baroda 1988, Amravati 2010, Bengaluru 2018, Nellore 2018



Dr. A.K. Tyagi delivering lecture on Evolution of Materials at G.N. Khalsa College on 14th September 2019



Dr. C Subramaniam delivering lecture on Nanotechnology at M.D. College on 20th September 2019

Ms. Kavita Dixit delivering lecture on Use of Accelerators in Every Day Life at Fr. C. Rodrigues Institute of Technology on 5th October 2019

Dr. Sharmistha Dutta Choudhury delivering lecture on Molecular Spectroscopy at NMIMS (Deemd to be) University on 12th October 2019

Dr. Saji George delivering lecture on Bench to Bedside: Pharmaceutical Perspective at U.C. College, Cochin on 4th December, 2019

Dr. Chitra Seetharam Misra delivering lecture on Genome Editing at Dr. D.Y. Patil University, Navi Mumbai on 6th December, 2019

Dr. R.P. Singh delivering lecture on Smart Fabrics at SNDT Women's University, Mumbai on 17th December, 2019

From the Editor's Desk

Dear IWSA Members,

In this issue of Newsletter, besides our regular features of reports regarding Popular Science Lectures, Workshops, Activities of various Branches etc., we bring you the detailed report of the XIV Triennial National Conference on ""Women Led Science, Technology and Innovation" during 11- 13 December, 2019 conducted by Indian Women Scientists Association (IWSA), Hyderabad Branch. In our regular features of the Newsletter, you will find reports on the six BRNS Popular Science Lectures that were held between September to December 2019 in various colleges in Mumbai and Navi Mumbai. Besides these six lectures organised at IWSA Headquarters, there were two lectures, one held at Cochin with the help of Dr. Susan Eapen and another lecture organized by Bengaluru Branch. We bring you reports on other Science Awareness activities such as IARP Workshop on Beneficial Effects of Radiation and Indian Nuclear Energy Program and several activities of IWSA's Learning Garden that attracted school and college students to visit IWSA.

This issue also brings the interesting activities held at IWSA Branches at Baroda, Bengaluru, Kalpakkam, Kolhapur, Nagpur, Nellore and Roorkee. Dr. Pushpa Rao has compiled the contributions of some of the scientists who were awarded the Nobel Prizes this year (2019). We have reported about some of the women and girl achievers and their inspiring achievements. I hope that all of you will enjoy reading about these reports and the scientific information content of this Newsletter.

With best wishes

Shyamala Bharadwaj
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President's Message

The year 2019 has seen several activities conducted by IWSA on science awareness and Science education. The year started with some of the major events such as-the participation of IWSA in the Rotary Science Utsav in January attended by more than 400 school students. This was followed by the Mega event, the two day **Science Day celebration** in February with the display of school projects and 25 projects from Department of Atomic Energy. Another important event was the **IWSA- IARP Workshop on Beneficial Effects of Radiation and the Indian Nuclear Energy Programme on 14th September, 2019** attended by 80 college students and faculty.

The Hall mark event this year, was the **XIV Triennial Conference of IWSA on "Women Led Science, Technology and Innovation" from 11- 13 December, 2019.** Five scientific sessions with 20 invited talks and 60 Posters presented, the conference attracted considerable attention of local media and institutions. A detailed report is covered in this issue. This year saw the organizing of 22 Popular Science Lectures on varied topics at 10 different colleges, supported by BRNS, organized at Mumbai Head Quarters and the branches of IWSA.

In addition to this, there have been three Science Camps for school children, visits of school and college students to IWSA to learn about the various green initiatives and the most important recent addition of the Learning Garden, a botanical garden with fifteen sections including an arboretum with more than fifty trees. Continuing Science Education (CSE) is the motto of IWSA members, who are ever ready to learn. As every year several field visits were organized to industrial manufacturing units, scientific laboratories and botanical gardens to learn about new technologies and techniques.

There have been several community welfare activities, Health camps and lectures etc. The most laudable amongst them was- "Udaan II" workshop for the Byculla Jail women inmates by the group of teachers of IWSA's ECCE program. Through this program, the women have been empowered by awarding the Balsangopan Sevika certificates, in collaboration with TISS.

The branches of IWSA have been bubbling with various activities such as- Science camps for school students, lectures at colleges, short workshops, etc. The yearly Mathematics Olympiad VAMMO, conducted for the fourth time by Roorkee branch of IWSA with 700 participants is worth mentioning here.

On the whole, this calendar year of 2019 has been extremely satisfactory, with IWSA's mandate being achieved through its multitude of programs and more than 18,000 beneficiaries consisting of school and college students, teachers and faculty, scientists and public.

The New Year 2020 has also started extremely well, by organizing important activities, which would be covered in the next three issues of the Newsletter.

Wishing you all a very productive and satisfactory New Year 2020!

Best Wishes

Lalitha Dhareshwar
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Reports from Head Quarters

Science Awareness Programs

A. IWSA – BRNS Popular Science Lectures

1. BRNS Popular Science Lecture at Guru Nanak Khalsa College of Arts, Science and Commerce, Matunga, Mumbai on 14th September, 2019

Dr. A. K. Tyagi, Head, Chemistry Division, Bhabha Atomic Research Centre, delivered a popular science lecture on "Evolution of Materials and its Impact on Human Lives" on 14th September (Saturday) in association with Chemistry Department of Khalsa Guru Nanak College of Arts, Science and Commerce. Dr. Tyagi highlighted the vital roles that materials played in the growth of civilizations since prehistoric time, as evidenced by the fact that various stages of human evolution is marked by the materials they were using such as stone age, bronze age, iron age etc., and the present age of miniaturization, dominated by nanomaterials. He covered the major discoveries in the field of materials in the last few decades that has transformed technology and human lives such as superconductivity materials, fullerene, graphene, carbon nanotubes, blue emitting materials, Lithium compounds such as LiFe PO4, LiCoO2, used in Lithium ion batteries as few examples. One of the oldest and the most important functional material is carbon, and various methods of synthesis of activated carbon and graphene were covered with a particular emphasis on soft chemical techniques, easily possible in college laboratories. Characterization of materials involves characterization of composition, structure, purity, surface etc., the factors that alter their properties significantly. Dr. Tyagi brought out the advances and future excitements in material research, giving a glimpse of next generation materials such as sodium ion conductors, conducting polymers etc., which would make the electronics cheaper and flexible. The challenges in material development for solving specific problems faced in India, such as potable water, healthcare, waste management and material recovery, energy conversion, storage and saving were emphasized.

More than 100 TYBSc (Chemistry) students attended the lecture. Dr. Meeta Rakesh, Head, Chemistry Department, welcomed the speaker and the audience, Dr. Surekha Zingde (Trustee, IWSA) briefed the audience about IWSA and its activities and Dr. Dhanya Suresh (Member, IWSA) introduced the speaker. Dr. Paramjeet Anthappan (Member, IWSA) summarized the talk and encouraged the students to get a wide exposure by listening to such experts. The program ended with vote of thanks.

2. BRNS Popular Science Lecture at Maharshi Dayanand College of Arts, Science and Commerce, Parel, Mumbai-400012, on 20th September, 2019.

Dr. C . Subramaniam, Associate Professor, Department of Chemistry, Indian Institute of Technology Bombay, Powai, Mumbai 400076 delivered a lecture on "Nanotechnology: where small is exciting."

Can you squeeze the entire content of Encyclopedia Britannica on the tip of a pin-head? This was the challenge that Sir Richard Feynman posed to the scientific community in this talk titled "There is plenty of room at the bottom: An invitation to enter a new field of Physics". Dr. Subramaniam questioned whether sixty years after this visionary challenge, we are any closer to achieving this? This prophetic statement has today opened an entirely new, multi-disciplinary field of study called Nanoscience and Nanotechnology. He then spoke on how we can seek to provide answers (or directions) to this challenge and through that delve into the exciting work of science and technology that makes this possible. His talk then described about the properties of materials at this nano-dimensional scale, origin of such unique properties and methods to utilize such properties for real-time applications of societal benefits. He explained that the first step is to generate nanoparticles using physical and chemical techniques. Generation of nano particles increases the surface area of the material which in turn gives it unique properties. Dr. Subramaniam described methods to measure the size of the particles and characterize them with respect to their shape, surface properties, crystallinity and dispersion state, using electron microscopy and spectroscopy. He then gave examples of lithium ion batteries, super capacitors, faster computer chips and processors, pesticide removal etc all of which owe their origin to unique properties of materials at the nanodimensions.

The lecture was organized by the Research cell of the college. It was attended by 140 students and faculty. Dr. Subramaniam answered all the queries from the audience and further interacted with the students who had many more questions. Dr.Chhaya Panse, Principal of the College welcomed the audience, Dr. Surekha Zingde, Trustee IWSA informed about the activities of IWSA prior to the lecture. Dr. Paramjit Anthappan, member IWSA summarized the lecture and initiated the question-answer session after the lecture. Convener of the College Research Cell gave a vote of thanks.

3. BRNS Popular Science Lecture at Fr. C. Rodrigues Institute of Technology, Navi Mumbai on 5th October, 2019

On 5th October, 2019, a BRNS supported talk by Ms. Kavita Dixit, BARC Safety Council, on "Uses of electron accelerators for everyday life" was arranged at the Fr. C. Rodrigues Institute of Technology, Vashi, Navi Mumbai. Ms Kavita Dixit spoke about

how in the present days, electron accelerators have found a wide range of applications in the field of industry, medicine, food and security applications. Industrial applications include modifications in polymers, gemstone irradiation, paint curing, etc. In the field of medicine, electron accelerators are used for tumor diagnosis as well as therapy. Food preservation and sterilization are also important applications of electron accelerators, in the e-mode as well as X-ray mode. For the environment, electron accelerators are employed for treatment of flue-gas from thermal power plants and to reduce the harmful gases (SO_x, NO_x). Effluents from textile and paint industry, when irradiated with electrons, get converted to more soluble and less toxic forms. In the area of security, cargo-scanning systems use electron accelerators that produce high energy X-rays. This talk also focused on basic aspects of the electron accelerators, their types besides the above mentioned applications.

About 150 students of the first year engineering from the Electronics, Electronics and telecommunication streams attended the lecture along with ten faculty members and five IWSA members.

4. BRNS Popular Science Lecture at NMIMS, Vile Parle, Mumbai, on 12th October, 2019

Dr. Sharmishtha Dutta Choudhury from Radiation & Photochemistry Diviision, BARC, delivered a popular science lecture on “Understanding Molecular Spectroscopy: From Fundamentals to Applications” on 12th October (Saturday). This was arranged in association with Sunandan Divatia School of Science, NMIMS (Deemed-to-be) University, Vile Parle (W), Mumbai. The venue was Juhu Jagruti Hall, 1st Floor, Mithibai College Building, Vile Parle.

Dr. Dutta Choudhury covered the basics of light matter interactions, mentioned the different spectroscopic techniques using different regions of electromagnetic spectrum and their special applications, but focused mainly on the UV-Visible spectroscopy. The fundamentals of absorption spectroscopy was discussed along with the instrumentation and the molecular information that can be collected from such studies. She described the details of fluorescence emission based on Jablonskii diagram and explained its higher sensitivity as compared to absorption technique, which makes even single molecule spectroscopy feasible. Hence fluorescence spectroscopy is widely used in diagnostics as well as microscopy. She introduced the new age emissive materials such as semiconductor quantum dots, metal nanoclusters, carbon dots, green fluorescent proteins used widely for biological studies with variants available now in all colours. Fluorescence spectroscopy is a multiparameter technique, emission wavelength gives information on the location and microenvironment, fluorescence intensity measurements help in quantification and in sensing binding sites, fluorescence anisotropy studies give information on microviscosity and molecular motion, and fluorescence lifetime studies are useful in understanding the dynamics and molecular interaction. Some examples were also

discussed. The speaker covered the fundamentals of molecular spectroscopy and the students were also exposed to the latest developments in the field.

About 100 students, mostly MSc students of Chemistry and Biological sciences and TY BSc students from biomedical science attended the lecture. Dr. Sudeshna Chandra from NMIMS welcomed the speaker and the audience, Dr. Surekha Zingde (Trustee, IWSA) briefed the audience about IWSA and its activities and Dr. Dhanya Suresh (Member, IWSA) introduced the speaker. Dr. Paramjeet Anthappan (Member, IWSA) summarized the talk, highlighting the exciting technical developments in the field of spectroscopy which give deep insight into biological systems. The program ended with vote of thanks.

5. BRNS-Popular Science lecture at U.C. College, Kochi on 4th December, 2019.

An IWSA popular science lecture was conducted at UC College, Aluva, Kochi on 4th December 2019 at 10.30 am. Dr. Saji George, Distinguished Scientist and National Chair, Rajiv Gandhi Centre for Biotechnology, Thiruvananthapuram and CEO, BIONEST, Kochi spoke on 'Bench to Bedside, A Pharmaceutical Perspective'.

He said that drugs are molecules which can cure or alleviate diseases and are developed after extensive research and finally transferred for treatment of patients. New drug discovery is highly complex and money intensive process. World over, even though pharmaceutical companies are trying to consolidate to reduce the expenses towards drug development by mergers and acquisitions, cost of development is going up consistently. Global pharmaceutical R&D spend totalled $179bn in 2018 representing an increase of 6.5% on the previous year. Nevertheless, the proportion of R&D spends to pharmaceutical revenue falls quickly in subsequent years. This reduction in R&D spend along with improved output could be an indication that companies are investing now to improve their future R&D efficiencies.

Dr. George further explained the use of real-world data combined with machine learning techniques in addition to collaborative R&D programs, are a few of the initiatives being employed by companies to help them stay one step ahead in an era demanding more patient targeted drug development. Similarly, this reduction in R&D spend could be an indication that less revenue is being directed towards replenishing the pipelines. The lecture also covered the drug discovery process on an end to end basis. It takes almost 15 years for a new drug to hit the market which makes it very costly. Novartis has recently come out with a drug costing 2.1 million US Dollars. Bioinformatics can bring down the cost to a large extent, he observed.

Dr. George also made a small review of the opportunities available for students at BIONEST, Kochi to equip the student fraternity how to become a job provider than a job seeker after graduating from the college by nurturing the entrepreneurship within them. Dr. David Saj Mathew, Principal of the college and Rev. Thomas John, Manager, UC College spoke on the need for developing new drugs involving Bio-informatic tools. Dr. Susan Eapen spoke on IWSA's role in popularising science. Prof.

Shyam Mohan, HOD Biosciences welcomed the gathering and Prof. Sareen Sara George proposed the vote of thanks. About 125 students participated in the lecture and discussion that followed.

6. BRNS Popular Science Lecture at the School of Biotechnology and Bioinformatics, Dr. D.Y Patil University, Belapur, Navi Mumbai on 6th December, 2019.

Dr. Chitra Seetharam Misra, Scientific Officer, Gene Technology Section, Molecular Biology Division, BARC spoke on Genome editing. Dr. Chitra informed the audience the precise modification of the chromosome, in the form of deletions, insertions, or replacement in a living organism. There are various technologies that have been developed to bring about genome editing in organisms, such as meganucleases, zinc finger nucleases, transcription activator-like effector-based nucleases (TALEN) and the CRISPR-Cas technology. Each one has its own advantages and disadvantages that were discussed. The CRISPR -Cas systems are easy to engineer and apply and therefore have gained popularity in the last few years. While, these technologies have provided powerful tools, its also important to design stringent guidelines to discourage their mis-use. The ethics of employing genome editing technologies were explained in brief. Dr. Chitra, gave some examples of use of genome editing techniques.

The lecture was attended by 120 students and faculty. There was active discussion after the lecture. Prior to the lecture, Dr. Devaki Ramanathan, Trustee IWSA informed the audience about the activities of IWSA. Dr. Baktawer Mahajan, Ms. Tripta Tiwari, Dr. Surekha Zingde and Dr. Suparna Kamat from IWSA also attended the lecture.

7. BRNS-Popular Science lecture at PG Deptartment of Textile Science & Apparel Design SNDT Women's University, Mumbai on 17th December, 2019.

An IWSA-BRNS Popular Science Lecture titled "Climate Smart Agro-textiles" was delivered by Mr. R. P. Singh from the Synthetic & Art Silk Mills' Research Association (SASMIRA), Worli, Mumbai on 17th December 2019 at 1030 hrs at SNDT Women's University, Juhu, Santacruz West, Mumbai. Mr. Singh said that Agro-textiles for climate-smart farming include Smart Shade Net, Water Harvesting Net, Vertical Farming, Landscape Farming and Soil Erosion Control, Thermo-regulatory Crop Cover and Hermetic packaging Bags. Established in 1950, SASMIRA is under Ministry of Textiles, Government of India. India has 17% of global population but has only 4 % of geographical area and 4% of global water. Most of India's total arable area are already in use and the remaining land has serious soil and terrain constraints. With increase in population growth more food per hectare will be needed to feed the increasing population. It is very important to save water so as to save life. Chennai is an example of severe water scarcity.

Inspiration from Namibian Desert beetle and desert grass having rough hydrophobic surfaces which help in harvesting of fog water in nature was taken as a model in

designing (Bio-mimicry). High Density Poly Ethylene was developed for water harvesting from fog and a trial plant was set up in Nagaland. There was a significant increase in water collection using an Agro-textile developed my SASMIRA. SASMIRA has also developed Shade Net for protection of plants against intensive solar radiation. Energy coming from sun contains light and thermal energy. Conventional shade nets are effective in partially managing light energy and not thermal energy. SASMIRA has developed special nets which will improve the growth of plant like Fenugreek, Coriander and garlic. Solar Shade Net houses can be used to improve productivity of different vegetables. Thermochromic and photochromic crop covers capable of changing from colourless state to dark colour with increased light intensity as well as active packaging materials which are vapour permeable but will keep water droplets out were also developed.

Dr. Susan Eapen spoke about various activities of IWSA. Dr. Anshu Sharma, Head, Dept. of Textile Science and Apparel Design in her welcome speech appreciated the need for motivating students. About 45 students participated in the talk and discussion.

B. IARP Workshop on Beneficial Effects of Radiation and Indian Nuclear Energy Programme on 14th September, 2019

A workshop on “The Beneficial effects of Radiation and The Indian nuclear energy program” was jointly- organized by Indian Women Scientists’ Association (IWSA) and Indian Association for Radiation Protection (IARP) on the 14th of September, 2019 at the IWSA premises. This workshop was organized by IARP as a part of the ongoing Vikram Sarabhai Centenary year celebrations.

The workshop was attended by eighty students and faculty from various colleges of Mumbai and Navi Mumbai, such as- KBP college (Vashi), Somaiya college (Vidyavihar), SIES college (Nerul), St.Xavier’s college(Fort) and VES college (Chembur). Twenty members of IWSA also attended the workshop.

The inaugural session started with a brief introduction to IWSA by Dr. Lalitha Dhareshwar, President, IWSA. This was followed by Introduction of IARP activities by Dr. S. Murali, Jt. Secretary of IARP. There were four talks in the morning session. Smt. Rupali Karpe, BARC introduced the various types of Radiations Quantities, units and effects. Dr.S. Anilkumar discussed the “Principles of radiation detection.” Dr. Pramila Sawant, Secretary, IARP elaborated on the “Applications of radiation technology for peaceful uses, for mankind”. Dr. S. Murali, BARC, explained about the Indian “Nuclear Energy Programme.”

In the afternoon session, there were practical demonstrations on – Gamma Spectrometry, Half-life activity estimation and radiation safety measures. These were done through videos, models and kits by Shri Tej Ram Meena and Shri. Sanjay Patil.

A special lecture was delivered by Dr.K.P. Muthe on scientific career opportunities at the DAE establishments and their long-term benefits.

The Workshop concluded with the felicitation of the IARP members, a quiz session and an oral feedback session from the participating students and faculty. The program was highly appreciated by all the participants. Somaiya college has requested IARP members that they would like to organize the same workshop for their remaining students, who could not attend on this day. Participation certificates were distributed to participating students and faculty.

Indian Women Scientists' Association is thankful to IARP for conducting this workshop at their premises.

C. Carpentry Workshop for the Science Nurture Students on 23rd October, 2019

The aim of the workshop was to learn skills from one another. One of the students Mr. Mallinath has a good background of carpentry and he came forward to teach all the other students. Some of the basic carpentry tools and materials used in this work were:

1. Plywood of 3 mm thickness
2. Hacksaw
3. Table mounted Vise
4. Flat and round files
5. Sandpaper, geometrical instruments, paints etc.

All the students were taught how to use the vise, hacksaw, metal files and sand paper. They made small arrow shaped KEYCHAIN. Students were completely involved and engrossed with a feeling of developing something on their own. All the science nurture teachers were also present to help the students. The workshop concluded with a talent show of dancing and singing.

D. Visit of Students and Staff of MCT College, Airoli to IWSA on 19th December, 2019

On 19th December, 2019, about 30 students and 4 faculty members of MCT college of Teachers' training visited IWSA. President, Dr. Lalitha Dhareshwar explained about IWSA's motto and various initiatives with a presentation. This was followed by an interesting 'Question-answer session', where topics ranging from gender disparity, women empowerment and promoting scientific spirit were discussed. Dr. Devaki Ramanathan, Trustee IWSA, Dr. Nootan Bhakal, Ms. Sushma Pradhan, Ms. Dipti Yadav and others gave a brief introduction of themselves and the role they play in IWSA.

This was followed by a visit to the Learning Garden. Ms.Tripta Tewari welcomed the future teachers and stressed the important role they play in mentoring of children to be

better citizens of the world. She explained how butterflies act as environmental barometers. Dr Srirupa Mukherjee held the audience mesmerised with details of the colourful plant dyes. Ms. Tripta Tewari and Dr. Srirupa Mukherjee also discussed the role played by Mahatma Gandhi and Rabindranath Tagore in promoting environmental education.

Ms. Snehalata Bhavsar gave a 'history lesson' on the Maratha conquest of the South and the origin of tasty Sambhar. Ms. Ambika Janakiraman and Ms. Sukhvinder Sandhu walked them through the Basic Botany section and showed the intelligence of plants in coping with the changing environment. Ms. Malathi Rao spoke about how plants adapt to the harsh desert environment.

Refreshing drink of Tulsi Sudha, a memory booster and immunity builder, made from fresh Basil and Ginger and sweetened with jaggery was served to all.

E. IWSA's Learning Garden

(i) Visit to IWSA of students from Somaiya College Psychology Department on 21st September, 2019

Somaiya college Psychology students visited IWSA along with their Professor Dr. Atish Taukari on 21st September, 2019. Dr. Paramjit Anthappan welcomed the guests and gave a brief introduction about the rationale, scope, current status, diverse applications and significance of the Learning Garden.

Next, IWSA President, Dr. L. Dhareshwar mentioned about the initial visions of our founder members who felt the need to empower women through knowledge of science. She explained the different segments of IWSA and how students can get involved in these programmes. She explained the importance and impact of the Learning Garden initiative of IWSA and how people can be benefitted from this programme.

Ms. Vijaya Chakravarty outlined the psychological perspectives of landscapes. She spoke about psychiatrist, Carl Jung's view on how the 'sense of belonging' to one's natural surroundings promotes mental health and fosters creativity. She discussed Appleton's Refuge-Prospect theory and Naturalistic Intelligence theory put forward by Howard Gardener. Peace-evoking landscapes are disappearing in urban public spaces and there is a need for restorative places in today's stress-ridden contemporary life. She also discussed Jean Piaget's views on learning and how a sensory setting is an ideal ground for learning.

Dr. Bakhtwar Mahajan spoke about young Greta Thunberg and expressed the desire to have more promoters in the Brigade of Climate Change among the student fraternity.

Ms. Anita Dash gave a talk on Horticulture Therapy. She explained how gardening enhances both physical and mental well-being. It helps combat loneliness amongst elders and develops social skills amongst children. Flowers enhance the mood by releasing

happy brain chemicals like dopamine, oxytocin and serotonin. Sensory gardens according to Anita are very therapeutic for autism, dementia and several other mental disorders.

Dr. Atish Taukari spoke on how the toxic environment affects plants and they in turn act as barometers of environmental change. He felt counselling becomes more fruitful in conjugation with plants.

During the guided tour of LG several IWSA members---Ms. Tripta Tiwari, Ms. Malathi Rao, Dr. Smita Kekatpure, Ms. Manashi Chakraborty, Ms. Priya Jacob, Ms Snehalata Bhavsar, Dr. Srirupa Mukherjee and others explained in detail the various sections.

The proceedings of the day were summed up by Dr, Srirupa Mukherjee, EC member, IWSA. She highlighted all the salient points of the discussions and invited the students to partner with IWSA.

Sensory plants prepared at IWSA were given as mementoes to Somaiya faculty, IWSA founder member, Dr. Sudha Padhye and trustee Dr. Sunita Mahajan.

The programme ended with a vote of thanks from IWSA's Ms Malathi Rao and a student representative of Somaiya college. The students and faculty of the college expressed desire to do some collaborative projects on the effects of plants on human well-being.

(ii) Visit of students from Bharati Vidyapeeth on 25th October, 2019

On 25th October 2019, Architecture students along with their Professor, Tejaswini from Bharati Vidyapeeth, CBD visited IWSA. They were welcomed by our President Mrs Lalitha Dhareshwar. This was followed by a talk by Mrs Vijaya Chakravarty who welcomed the budding architects and shared some of her experiences with landscaping. As architects they will be called upon to be experts in different settings, so they need to build upon their knowledge and experience in various fields. She also discussed D. Laird's Sensory learning theory, Howard Gardener's Naturalistic Intelligence theory and Appleton's Prospect -Refuge theory.

Four students, Prasad, Tanvi Sawant, Deepti Mhatre and Prithviraj Patil all studying in 4th year of their architecture course presented their landscape designs for IWSA. They were introduced by their professor Mrs. Tejaswini.

Prasad's emphasis was on providing privacy to the hostel area and creating a commemorative space to IWSA's founders where their favourite flora could be planted. Tanvi Sawant suggested an area to be developed for children which would allow them free space. Deepti Mhatre laid emphasis on planting trees of different heights with water bodies filled with aquatic plants. Prithviraj Patil's presentation included seating arrangement near the badminton court, a pedestrians area and a stage for performances.

All the presentations were well appreciated by the members of IWSA and it was unanimously agreed that some of the suggestions would certainly be considered. A vote of thanks was given by Mrs. Madhu Pahwa. Mrs. Vijaya Tilak presented a potted sapling

to Prof. Tejaswini. Tea and biscuits were offered as refreshments. Potted saplings nurtured at IWSA were displayed.

(iii) Installation of Hydroponic Plants System at IWSA on 31st October , 2019

At a time when land is becoming scarce, urban farming is gaining popularity. To learn about the advanced methods of urban gardening and for a pesticide free produce, IWSA installed a low cost hydroponic system on 31st October, 2019.

This hydroponic kit can grow 12 plants at a time. Currently, spinach, mint, and Hadjod plants have been planted with the use of a nutrient solution. The seeds are first germinated in the cocopeat bags provided along with the kit and allowed to grow to a four leaf stage, after which it is transferred to the hydroponic trays making sure the roots are touching the solution and the temperature is cool enough.

A nutrient solution in the ratio of two parts of Blend, two parts of Calcium and one part of Magnesium sulfate is used. Every seven to ten days the water is changed and reused for other plants. A fresh solution is made and the electrical conductivity and pH of the solution is checked and recorded with use of EC meter and pH meter. A target reading of 1.2 EC and pH of 5.8 - 6.2 is maintained in their vegetative state. The system is continuously running with the use of a aerator. It has been notably interesting to observe the growth of these plants which needs continuous monitoring.

The hydroponics system along with EC and pH meters were procured from Urban Farms of Kharghar.

(iv) Visit of IWSA Members to Dapoli on 6th and 7th November, 2019

Ten green volunteers visited the Agricultural University at Dapoli (near Mahad) and a couple of nurseries to collect saplings for IWSA on 6th and 7th November, 2019. This is part of the phase- II program to collect invasive plants and other rare plants.

The following members of IWSA participated in this visit: Ms. Tripta Tewari, Ms. Vijaya Chakravarty, Ms. Madhu Pahwa, Dr. Srirupa Mukherjee, Ms. Manashi Chakraborty, Ms. Anita Dash, Ms. Sakina Gadiwala, Dr. Devaki Ramanathan, Ms. Ambika Janakiraman and Dr. Suparna Kamath.

On 6th November, 2019, the group visited the Agricultural University and purchased a few saplings and learned about the constellation nakshatra trees and Ayurveda section. Shri Nijasure, a free- lance consultant on farming techniques gave a talk with a Power Point projection on the nature of his work, its importance and the role played by him in advising developing private farm lands for best productivity and efficient land management schemes. His wife is a faculty in the Dapoli. Agriculture University and designs sketching books for children to increase their awareness about Nature and nursery creatures.

On 7th November, 2019, the IWSA members were taken on a guided tour by Shri Ashish Amrute, owner of Amrute Nisarga Sahavas Nursery. In this Nursery, a number of plant saplings, invasive types, rare types etc. were identified for buying for IWSA LG.

After this tour, the group visited the neighbourhood KOP's Nursery run jointly by Dr. S.M. Koparkar and his wife. This nursery was rich in different plants: fruits, spice, flower, ornamental, forest and medicinal plants. Dr. Kopkar distributed a flyer containing a well documented list of plants, exceeding 600 in number. The nursery was very well laid out with all plants marked and named. Again, a number of saplings were selected and bought for LG.

About 150 saplings in all were collected, loaded in the van and brought to IWSA. They are being replanted in pots and segregated to the appropriate sections.

(v) Visit of Sacred Heart School Students to IWSA Learning Garden on 23rd November, 2019

Students of standard 6 and 7 from Sacred Heart School, Vashi accompanied by their teachers, Mrs. Neena Francis, Mrs. Lenuta Yeigas and Mrs. Anjali D'Souza visited IWSA on 23rd November, 2019. It was quite remarkable that IWSA could arrange the entire program within a day's notice under the guidance of Ms. Madhu Pahwa. Seventeen students attended the program.

Ms. Madhu Pahwa welcomed the students and teachers and spoke about our founder members and their vision to empower women. She explained the different activities and science programs that we successfully conduct. After the address, students and teachers were taken for a guided tour by the LG members. Sections that come under the curriculum were explained in detail.

Keeping in mind the children's love for dinosaurs, Ms. Vini Sandhu explained how primitive plants survived till modern age while the mighty dinosaurs disappeared. Children were driven by curiosity in knowing how the plants could survive smarter than the animals which led to Ms. Madhu Pahwa explaining about modification of plant and leaves for survival and protection. She helped the students in identifying extra axillary and axillary buds that modify into thorns. Plants used in Ganesh Chaturthi and its contribution towards conservation were brought to light. Butterfly section excited the students and teachers equally as Ms. Tripta Tiwari shared some interesting facts and nectar foods as well as tips on attracting butterflies to the garden.

Indoor plants, sciophytes, orchids and ferns were of great interest to the participants. Dr. Smita Kekatpure talked in depth about its importance in environmental clean up and also about some of the air purifying plants. Role of sensory garden in stimulating all the five senses of the brain, wild food as health sustaining and bamboos in preventing soil erosion were highlighted by Ms. Priya Jacob. Other green initiatives of IWSA were shown and explained to them and they were taken around the arboretum section.

The program ended by thanking the teachers and students for their visit and teachers were gifted plants. A message to be good environmental mentors made the students happy and there was a great demand for the plant kits.

LG members unanimously thank Ms. Vijaya Chakravarty for her guidance and quick thinking and sharing valid points with the team to bring enthusiasm and encouragement to the students and teachers.

(vi) Participation of IWSA Learning Garden Members at Viswa Bharathi University Aluminus Celebration in Navi Mumbai on 8th December, 2019

Viswa Bharathi University Aluminus celebrated the 15th year of their association in Mumbai on 8th of December, 2019 at Urban Haat, CBD, Navi Mumbai. IWSA's Learning Garden members put up a stall named,' Gach Niye Gachomi' where they displayed several medicinal plants and spoke about the medicinal value of select plants in one to one interactions with the visitors. Three medicinal beverages--Gokarna sherbet, Hibiscus tea and Tulsi sudha were served complimentary.

Alternanthera sessilis, known as Sanchi shak in Bengali and which forms a part of the Choddoshak [14 leafy greens], an immunity booster served during Kali Puja stole the show along with Cissus quadrangularis [Had-Jod], the bone builder. Visitors loved the three natural beverages. Gokarna sherbet, a memory booster which also fights insomnia was a hit followed closely by the hot Hibiscus tea, which is both a relaxant and packed with anti oxidants and Tulsi sudha which fights coughs and colds, builds immunity and boosts memory. Luckily, concentrated beverages were taken, so many could get a second helping.

Dr. Rita Mukhopadhyaya, Vice-president IWSA enthralled the audience with dance and music. Ms. Madhu Pahwa, Ms. Tripta Tewari, Ms. Ambika Janakiraman, Ms. Manashi Chakraborty, Ms. Sushma Pradhan, Ms.Dipti Yadav and Ms. Vijaya Chakravaty manned the IWSA stall by turns.

Nursery School and Education Committee

Mrs. Seetalaxmi's lecture on Life Skills was organised on 4th September, 2019 for TOT students.

Teachers' day was celebrated by TOT girls on 5th September, 2019 with great enthusiasm. All the teachers and committee members were honoured.

Unit test was conducted from 19th September 2019 to 24th September 2019.

TOT girls visited Udyachal school, which works on play-way method on 10th October 2019.

For Diwali celebrations, parents of Nursery Children were invited for Diya decoration competition on 24th October, 2019. The winners were declared on the basis of best creative efforts. Participation of the parents in the activity aims at working together towards creativity, along with the child.

Local Inquiry Committee (LIC) from SNDT University visited IWSA for affiliation purpose. The LIC was very satisfied and affiliation for the year 2019-20 was granted.

Children's Day was celebrated by TOT girls and Nursery children on 14th November 2019. Nursery children visited Chimp Fit, a gym for children at Koparkhairne.

Prelims for Semester I were conducted from 2nd December 2019 to 6th December 2019.

University Exams for semester I were conducted between 16th December to 20th December 2019.

Paper assessment was done on 26th and 27th December, 2019 at SNDT University.

Christmas was celebrated by Nursery Children on 23rd December 2019.

IWSA's Satish Haware Computer Education Centre

Two students completed requisite number of training hours for MKCL-MS-CIT course and appeared for examination. Both could not clear the exam due to network connectivity issues at exam centre and will re-appear in the first week of February. Re-Exam fee for both has been paid.

Java Programming aligned for School curriculum of ICSE grade 9 and 10 regular classes are being delivered.

MS Office Automation and Smart Student skills program conducted for students of Science Nurture Program of Sainath School. Thirteen students of grade 7 and 8 were trained for 4 months as part of this program. A total of 13 sessions were conducted. Students presented part of their work and were evaluated for the same.

IWSA's Hostel and Day Care Committee

IWSA's Day care children celebrate all major festivals of India. These celebrations help children understand the diversity of cultures and participating in these activities enforces the spirit of unity in diversity.

1. Dandiya Party was organised on 5th October, 2019 to celebrate Dassera. Children were dressed in ethnic clothes and performed a group dance with sticks they decorated themselves. On the same day, Pajama Party was also organised. Pajama Party reinforces the importance of sleep. It is crucial to teach children the importance of sleeping. Songs and games entertained the kids. The children followed the sleep routine by 'washing up' and changing into their night wear. A nutritious dinner followed by story-telling helped relax the children and helped their imaginations to grow. The aim of the Pajama Party was to create a sleep routine, instil independence by getting ready for bed without parental help and to develop social ties with other children.

2. Maharashtra has over 350 forts, which are a tribute to the Marathas. Many of these are associated with Shivaji Maharaj. Day Care set up a mud fort decorated with figurines of people, animals and birds. Making Shivaji's fort during Diwali is a unique tradition among school children of Maharashtra. On 7th and 8th November, 2019, Day Care Children celebrated this tradition by painting diyas [lamps] and making Rangolis [floral decorations]. The music-dance session followed by tasty snacks kept the children enthralled.

3. For celebrating Christmas**,** a creche with Baby Jesus in a manger was set up on 26th December, 2019. This was surrounded by Christmas tree and Biblical Herbal plants. Children decorated the tree. Ms. Poornima Jacob and Priya Jacob taught the children to dance to Christmas carols. The party ended with refreshments.

IWSA's Pirojsha Godrej Foundation Library

The current library committee members have undertaken the task of visiting other public libraries in Mumbai including Maharashtra State Women's Council Library, The People's Free Reading Library, Maharashtra Mitra Mandal Library and Nehru Centre Library with the aim to trouble shoot some of our current challenges as well as to inculcate/adopt additional healthy practices to enhance the functioning and footfalls of our library. This would also enable us move towards higher orbit of progression grade category for the library in the near future. The current committee also decided to take up the following tasks: (i) installation of a CCTV camera to improve vigilance, (ii) preparation of a library manual guide, (iii) better user friendly signages and (iv) placement of a suggestion box.

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Reports from Branches

Baroda Branch

National Seminar on "Human Health: Need of the Hour" on 24th December, 2019

National Seminar on "Human Health: Need of the Hour" was organized by Indian Science Congress Association (Baroda Chapter) in association with Department of Botany, Faculty of Science, The Maharaja Sayajirao University of Baroda, Indian Society of Geomatics (Vadodara Chapter) and Indian Women Scientists' Association (Baroda Branch) on 24th December, 2019. This workshop was attended by Doctors/Health specialists, academicians and students working in the fields of Botany, Zoology, Pharmacy, Health and Nutrition, Medicine and Life sciences. Many Experts from reputed institutes like The Maharaja Sayajirao University of Baroda, Parul University, Ramnarain Ruia Autonomous College, Mumbai, etc. were invited to deliver lectures. Around ninety candidates participated in the workshop.

The first session of conference started with Welcoming and Opening Ceremony. Welcome address was given by Dean of Faculty of Science, Prof. Haribhai Kataria followed by introduction to the theme of the seminar by Prof. G. Sandhya Kiran. Presidential address was delivered by honourable Vice Chancellor Prof. Parimal Vyas. Key note address was by Dr. C. H. Buch who is a renowned doctor of Vadodara city. At the end of inaugural ceremony Dr. Rupal Shah thanked various sponsorers, dignitaries and students for their valuable presence and participation.

The following invited talks were delivered by eminent speakers:

Invited Talk -1	Dr. Tanuja Javdekar (Dean, Faculty of Medicine) "Prevention and Awareness of Breast Cancer and Cervical Cancer"
Invited Talk -2	Dr. Vikram Raut (Expert Transplant Hepatologist)
Invited Talk -3	Dr. Kiran Shinglot (Former Medical Officer, Health Centre, The Maharaja Sayajirao University of Baroda) "Health as a Scarce Commodity"
Invited Talk -4	Prof. Sunita Shailaja(Professor and Head, Department of Botany, Ramnarain Ruia Autonomous College, Mumbai) "Women's Wellness Through Nutrition and Polyherbs"
Invited Talk -5	Vaidya M. B. Patel (Dean, Faculty of Ayurveda, KJIT, Savli)"Health Care According to Ayurveda"
Invited Talk -6	Prof. Sarita Gupta (Professor and Head, Department of Biochemistry, The Maharaja Sayajirao University of Baroda) "Implications of Lifestyle and Environment on Diabetes and Infertility"

Students were encouraged to present their work in the form of oral presentation and poster participation. The posters were evaluated during the lunch time while oral presentations were conducted in session 3 after invited talks. Total 40 papers were received for oral and poster session, out of which 8 were for oral session while 32 were for posters session. Chair for oral session was Prof. Dolly Kumar (Professor and Head, Department of Zoology) and Co-Chair was Dr. Vaidehi Raole (Professor and Ex. Head, Faculty of Ayurveda, Parul University). Poster session was judged Dr. Padmanabhi S. Nagar (Asst. Prof., Department of Botany, The M.S.U. of Baroda) and Dr. Laxmipriya (Asst. Prof., Department of Biochemestry, The M.S.U. of Baroda). All the presentations and posters were evaluated meticulously and three best papers were selected from each session. The oral presentation was followed by panel discussion and valedictory function.

Bengaluru Branch

1. BRNS Popular Science Lecture at Indian Academy Degree College Autonomous, Bengaluru on 3rd September 2019

Indian Women Scientist's Association (IWSA), Bengaluru Branch, in collaboration with Departments of Biochemistry, Microbiology and Applied Genetics, Indian Academy Degree College Autonomous organized a BRNS popular science lecture on "Clinical and Translational Networks for Impactful Innovation" on 3rd September 2019. The resource person was Dr. Varsha Sridhar, Director and Co-founder, Molecular Solutions Care Health LLP, Bengaluru. The lecture was attended by Life Science faculty and Life Science students (B.Sc. and M.Sc.) (10 faculty and 120 students). Dr. Varsha talked about her journey from PhD and Post Doc to Entrepreneurship. She discussed about the motto of her company which is "Access to All". She talked about how her company started as a purely advanced molecular diagnostic lab about two and a half years ago, and has been co-evolving into an innovation and R &D center with multiple projects and dreams for many more. She discussed about the development of a tool for HIV diagnosis which was a clearly molecular biology based kit. She further discussed about how this product then evolved to include the social and clinical knowledge and networks to make innovations translational, scalable, and impactful. She also gave the students a lot of information on how to access resources to become an entrepreneur. The lecture was highly interactive. The faculty and students learnt a lot and enjoyed the lecture.

2. Workshop on "Basic Techniques in Biology" on 17th October, 2019

The purpose of the workshop was to reach out to the school students to help them appreciate Science in an enthusiastic way. With this aim, Departments of Biochemistry, Microbiology and Zoology, Indian Academy Degree College Autonomous (IADCA) and Department of Biotechnology, BMS College of Engineering in association with Indian Women Scientists Association, Bengaluru Branch organized a workshop on "Basic

Techniques in Biology" on 17th October 2019 for the 9th and 10th Std students of The Banyan School.

The main objectives of the workshop was to

- Provide an exposure to the basics techniques in Biology.
- Enable an appreciation for biology by giving them hands on sessions on different branches of Biology.
- Boost their passion for learning and inspire the students to take up Higher Education in the field of Science.

The workshop started with a brief introduction to IWSA by the IWSA member, Dr. E. Sheeba. This was followed by an interaction with the students by Dr. Jerome Xavier, Principal, IADCA on the students aspirations. Then there were laboratory sessions in the three participating departments.

The activities, in the Biochemistry department, was organized by Mrs. R. Malathi, Dr. Saisha, Mrs. Pratibha and the final year MSc Biochemistry students. The school students were shown different Herbarium specimens by the post-graduate students of Biochemistry department and they were enlightened about the purpose of using herbariums and the importance of every plant in the herbarium collection. They were then shown pollen grains and mosquito larvae under the compound microscope. The students were also shown the change of colour of the litmus paper when placed in an acid and a base. After these experiments, the Guest resource persons, Dr. Saisha and Ms. Pratibha showed a video on the use of a Foldoscope (A simple Microscope which is prepared from paper and is easily portable). Then, they demonstrated the use of a foldoscope to the school students. The students were also shown the mobility of different colored dyes in Agarose gel electrophoresis by Prof. R. Malathi.

Microbiology is one of the essential subjects with broader application in science and to our daily lives. Department of Microbiology gave a hands on session on experiments such as the types of microorganisms in the nature, observation of bacteria, fungi and algae after cultivation with suitable media, slide preparations (simple staining, grams staining, negative staining and endospore staining), morphology and motility of bacteria (bacterial shape, arrangement and movement). The resource person for this session was Dr. E. Sheeba from the microbiology department, IADCA.

Department of Zoology gave an exhibition of the various invertebrate and vertebrate specimens with a brief introduction of the different families of organisms. This was followed by hands on session on "Mounting of Obelia Colony". Students were fascinated by the splendid display of specimen and the hands on session. The resource persons were Prof. Sangeetha Annie George and Prof. B.S. Mary Stella from the Zoology department, IADCA.

Kalpakkam Branch

1. IWSA (Kalpakkam) - SACSE Program on 5th October, 2019

Indian Women Scientists' Association (IWSA) Kalpakkam Branch and Society for Advancement of Chemical Sciences and Education (SACSE) jointly organised Chemistry demonstration experiments and Quiz program on 5th October 2019 at Government Higher Secondary School Anaikkattu as well as at Government Higher Secondary School Vengampakkam. At the begining a written science quiz was organised to select five teams of two students each. SACSE members Dr. Ramanathan and Dr. Brahmananda Rao along with a Research Scholar, Swaroop S Kumar from the Chemical Sciences carried out demonstrations explaining oxidation and reduction reactions, colour change reactions and other fundamental principles. As it is always the case the students were awe struck watching the demonstrations. Following this there was a quiz program for the selected teams and the winners and runner up were identified and appreciated. A total of about 85 students participated and benefitted through this program.

2. IWSA (K) Members Meet Research Scholars on 26th September, 2019 with Chemical Sciences and on 30th September, 2019 with Physical Sciences

Members of IWSA (K) met the HBNI women research scholars of Physical and Chemical Sciences at IGCAR. The aim of the meeting was to initiate stronger professional and personal ties between the senior women scientists and the young research scholars with the specific aim to identify the reason and curtail the attrition rates among women research scholars. The event started with a questionnaire to the scholars. This was followed by a power point presentation by Dr. S. Kalavathi, Convener, IWSA(K). The presentation brought to light the current status of women in science across the globe especially in STEM, the way the personal and professional life of a woman is intimately tied and the facilities offered by governments presently and so on. There was a long discussion session after the presentation and it was highly interactive.

About 15 scholars from Chemical Sciences and 25 scholars from Physical Sciences participated in the event.

3. Mahatma Gandhi Jayanthi Celebration by IWSA (K) from 2nd October to 2nd November, 2019

Gandhi Jayanthi 150th year celebrations, was organised by IWSA (K) in association with Madras Atomic Power Station (MAPS), Kalpakkam on 2nd November, 2019 at GSO Auditorium, Kalpakkam Township. Gandhi Jayanthi, 150th year celebration, was stretched over the entire month of October 2019 and was organised for the homemakers of Anupuram and Kalpakkam townships. Drawing competition titled "Life of Mahatma Gandhi" was organised on 2nd October, 2019 at Atomic Energy Central School-3, Anupuram. Subsequently, there was Essay competition in English, Tamil and Hindi on the topic "Gandhiji - the man who inspired the world". A total of 37 essays (19 in English, 11 in

Tamil and 7 in Hindi) were received and evaluated by a panel of three judges. The event was concluded by organizing a quiz competition based on life and work of Mahatma Gandhi. Ms. Adwitiya Kar and Smt. Anusha Thati conducted the quiz. Eleven teams with three members each were given a screening test and the top scoring five teams were selected for the final quiz event to receive prizes.

This was followed by a valedictory function on 2nd November, 2019 where Veteran Gandhian, Mrs. Krishnammal Jagannathan, was invited as Chief Guest and presided by Shri. M Srinivas, Station Director, Madras Atomic Power Station (MAPS). Director, MAPS gave the presidential address after the formal welcome address by the convener Dr.S. Kalavathi and reading of the activity report by Secretary, Dr. Anita Toppo. This was followed by the address by 94 year old Mrs. Krishnammal Jagannathan who is still doing active social service. She recollected her experiences of working with Mahatma Gandhi and Vinobha Bhave during freedom struggle. This was followed by prize distribution by Mrs. Padmavathi Srinivas, to all the winners of drawing, essay and quiz competitions. Smt. Anusha Thati, EC member, IWSA (K) proposed the vote of thanks. The valedictory function was attended by about 80 people.

Kolhapur Branch

Biodiversity Awareness Program on 20th November, 2019

Biodiversity is the sum of all the different species of animals, plants, fungi, microbes and other organisms living on earth. India is one of the mega biodiversity centers in the world and has two of the world's 18 biodiversity hotspots located in the Western Ghats and Eastern Himalayas. The global biodiversity is sinking alarmingly day by day because of several factors. Concern of these aspects and recognising the severity of threat, an Awareness Programme was organised by IWSA, Kolhapur Branch and Botany Department of Shivaji University, Kolhapur for students of Garden course, 2019 in association with Garden Glub, Kolhapur.

A one day programme was initiated with the introduction of programme by Dr. Anjali Salvi. It was followed by a talk on Highlights of Biodiversity Conservation by Prof. Dr. Varsha Jadhav, Head, Department of Botany, regarding the contributions of the Department for saving such a wealth given by nature. The department has contributed towards in-vitro conservation of plant wealth. Prof. Dr. Niranjana Chavan, IWSA Convenor, Kolhapur Branch delivered a lecture on Conservation attempts - Ex- situ and In-situ conservation of rare, endangered species and methods for conservation.

The second session commenced after tea break. It was practical approach, i.e. field visit to Lead Botanical Garden, which is a live laboratory to study variety of wild plants. This was conducted by Dr. Manoj Lekhak and his team (experts in Plant Taxonomy). A group discussion was held to understand Biodiversity Conservation problems. In all, 41 students actively participated in the programme. The session concluded in the Lead Botanical Garden with feedback from students.

Nagpur Branch

1. Teacher's Day Celebration on 12th August 2019

Dr. Shweta Barahate, Assistant Professor, Department of Computer Science, Nagpur University delivered a talk on "Cloud Computing" on 12th August at Nikalas Mahila Mahavidyalaya. She explained how the availability of computer system resources are used by a user without actual direct involvement. Dr. Tapan Chakravorty retired director NEERI was present as chief guest of the function. He took keen interest in the presentation. All teacher members were felicitated on the occasion. Thirty participants attended this program.

2. Talk on Hygiene in Adolescent Girls and Safe Methods for Disposal of Sanitary Napkins on 27th August, 2019

A talk by Dr. Sadhana Rayalu, Principal Scientist, NEERI, Nagpur was organized for adolescent girl students of Somalwar High School Khamla, Nagpur. More than two hundred students from middle school and high school attended the program. In her talk Dr. Rayalu expressed concern over unhygienic methods of disposal of sanitary napkins. She explained the chemical nature of super absorbent polymers that are used in sanitary napkins. In her presentation she elaborated the process of degradation of this polymer which is a long time consuming process. With no knowledge of how to dispose them off, most women just throw them in the garbage bin which usually gets mixed up with dry, wet and hazardous waste. Apart from the fact that it cannot be recycled, the exposed sanitary napkin poses grave health risks for the waste collector. Also burning of sanitary napkins releases chemicals which are carcinogenic.

It is therefore important to adopt proper methods for disposal of menstrual waste. Dr. Rayalu and her team have developed various methods for proper disposal of sanitary napkins. They have developed containers with electric heater at controlled temperatures which does not cause release of carcinogenic gases. Another method involves disinfecting sanitary pad before disposal. This equipment is available at affordable prices and if properly used at homes and in public places could reduce a lot of environmental hazards.

The girl students and teachers indulged in good discussions with speaker and clearly understood methods for safe disposal of menstrual waste.

3. Program on Chemistry in Everyday Life on 14th September, 2019

A program for children of Pitale Shastri School, Laxmi Nagar was organized on 14th September, 2019 to make the students understand about chemistry in everyday life. Dr. Vaishali Meshram made a very interesting presentation on the topic. Children were amused by various chemicals and their interactions that happen around us day to day life. About 30 students participated in this program.

4. Celebration of World Food Day on 19th October, 2019

A talk by Dr. Asmita Thaokar, a certified Government Trainer on Food Safety was organized to celebrate World Food Day on 19th October, 2019. IWSA, Nagpur Branch organized this talk in association with Apang Mahila Balvikas Samiti, leading IT company Persistant Systems and Nagpur Mahila Club in the Auditorium of Persistent System. The program was well attended by about 40 members from all four organizations.

Dr. Thaokar explained in detail as to how a correct choice should be made regarding safe and nutritive food. She also explained about food quality, frozen foods and how diet plans should be made to stay fit. Ms. Mamata Karikar, Asistant Professor, Nikalas Mahila Mahvidyalaya conducted the program.

5. Children's Day Celebration on 4th December, 2019

A mega science quiz was organized to mark Children's Day. The event took place at Town Hall, Nagpur on 4th December, 2019. The quiz included enthusiastic participation from 15 schools of Nagpur Municipal Corporation. Teams were selected for final round based on their performance in a screening test. The quiz was conducted in six rounds that included direct question, identification of visuals and photos of scientist shown on screen, rapid fire rounds, solving mathematics puzzles. In the final round six teams were selected. Two best teams were presented trophies and gifts. All participating children were also given snacks. On this occasion, some children spoke about science and its importance to the society. For the prize distribution, education officer of NMC, Mrs. Preeti Mishrikotaka, Chairman, Education Committee of NMC, Mr. Dilip Dive and Deputy Chairman, Mr. Tabhane were present. The dignitaries expressed happiness over IWSA activity for NMC children. About 200 school children participated in this event.

Nellore Branch

1. Project on Air and Water Pollution to School Children on 18th November, 2019

IWSA, Nellore Branch conducted a project on "Air and Water Pollution" involving 8th Standard Students of Harivamsi English Medium School, Tirupati on 18th November, 2019. Dr. M. Neelima Raj, Assistant Professor, Department of Sciences, AIMS Institution, Peenya, Bangalore explained to the students about Air pollution and how it impacts the people from cities to villages. She described about the human activities in cities where we can find factories, power plants, automobile exhausts, burning of fire wood and making dung cakes in the villages. All these activities increase the carbon monoxide in the air and thereby decreasing the oxygen carrier capacity of the blood in the human respiratory system. Therefore, the man-made pollutants that are the most destructive, like greenhouse gases contribute to global warming and the destruction of the ozone. Carbon dioxide is one of the worst air pollutants, which is mainly emitted from power plants, cars,

planes and other vehicles and comes from burning fossil fuels. Another major air pollutant is methane, which comes from raising livestock, and CFCs (chlorofluorocarbons) which are used in aerosol products. The students were explained in detail how the air pollution can be linked to health problems like asthma and lung disease, as well as the deterioration of the ozone layer (which protects us from harmful UV rays) and the warming of the earth which may destroy the habitats of many animals. Governments are trying to encourage people to lessen air pollution by driving less, using public transport, use bicycles for short distance travel and limiting their energy consumption.

Next, she explained about Water Pollution. If water is cloudy, smelly and has garbage floating in it, then it is easy to know that it is polluted, but clear and clean looking water can be polluted as well with toxic chemicals. Polluted waters are not safe to drink or swim in and can cause illness even years after you have been exposed, or you can feel the effects indirectly by eating seafood that has been poisoned by its environment. Water pollution occurs naturally where oil and petroleum leak from underground into the ocean in what are called “Petroleum Seeps,” the biggest one being off the coast of California in Coal Oil Point Seep. Humans create water pollution by adding chemicals and oils to the water from factories, mining and oil spills from commercial tanker and throwing garbage into open waters from boats or onshore, and untreated sewage. Contaminants like asbestos can get into the water supply causing devastating health issues to those exposed.

2. **Project on “Kids Workout and Physical Education Games” on 4th December, 2019**

Dr. N. Haritha, B.P.T, MIAFT, conducted a project at Ratnam Racekids School, Nellore on "Kids Workout and Physical Education Games" on 4th December, 2019 to educate their 5th standard students regarding importance of exercises, sports and physical activity in their daily routine. About 80 Students participated in the programme with enthusiasm and enjoyed themselves very happily with both fun and learning. Dr. Haritha taught the following activities to the kids and explained the fun and health benefits (both mental and physical) and involved them in an interactive way.

Workouts:

(i) Eyes movements, Neck movement, Shoulder movement, Hip movement and Leg movements.
(ii) Funny game Exercises, like Leg Strength; full body involvement Exercises, like frog jumping;Crunches involving game activities.
(iii)Squats, jumping Jacks, squats with standing, spot jogging, mountain climbing, sit ups, cool down and all body stretches.

Daily routine to be followed involving all these activities.

Children enjoyed the session very much and promised to follow these workouts as their daily routine activities. Teachers expressed their willingness to make the children follow the daily routine explained.

3. Project on "Gastroenteritis and Importance of Hand Washing" on 29th December, 2019

IWSA Nellore Branch conducted a session on "Gastroenteritis and Importance of Hand Washing" at Municipal Corporation School at Nellore on 29th December, 2019. About 78 students participated in the session.

Nellore district has been witnessing many cases of gastroenteritis and washing hands is vital in preventing the spread of infection. This can reduce the risk of kids getting infected. Gastroenteritis is an inflammation of the lining of the intestines caused by a virus, bacteria or parasite. Viral gastroenteritis is the second most common illness. Students were taught the importance of hand washing. They were taught to make **handwashing a priority**. Washing hands is the best way to avoid the spread of germs or illnesses. It is essential to take the time to wash them properly. This includes using running water, lathering hands including under the nails, and scrubbing your hands for at least 20 seconds. The students were explained about the following key times when one is likely to get infected and spread germs:

1) **Before, during** and **after** preparing food
2) **Before** eating food
3) **Before** and **after** caring for someone at home who is sick with vomiting or diarrhea
4) **After** using the toilet
5) **After** blowing your nose, coughing, or sneezing
6) **After** touching an animal, animal feed, or animal waste
7) **After** handling pet food or pet treats
8) **After** touching garbage

4. Awards and Recognitions for Dr. Bindu Menon, Convenor, IWSA, Nellore Branch

Prof Bindu Menon, Neurologist and convenor of the IWSA, Nellore Branch was awarded the prestigious J J Rao oration from the Geriatric Society of India at the 16th International conference of Geriatric Society of India GSICON 2019 at Mumbai. She received this award from the Patron of GSI, Dr. Shankar and Secretary, Dr. O. P. Sharma on 14th September, 2019. Prof Bindu Menon delivered a lecture on "Stroke in Elderly" highlighting the challenges the elderly face in stroke.

Dr. Bindu Menon, Senior Consultant Neurologist at Apollo Hospitals, Nellore received the prestigious Fellowship of the Indian Academy of Neurology at Hyderabad on 3rd October, 2019. Dr. Bindu Menon received the fellowship from the President, Indian Academy of Neurology, Dr. Satish Khadilkar. The four-day global convention was attended by more than 2500 neurologists and neurosurgeons from all across the country including experts from around 18 countries across the world. The fellowship was conferred to 8 neurologists from the country and it is based on academic excellence, research activities, publications in journals and books, honors received and contribution to academy and the social activities

helping the society at large. Members present at the event were member of NITI Aayog, Dr. Vinod Paul, MD & CEO, KIMS Hospitals, Hyderabad, Dr. B. Bhaskar Rao, President, Indian Academy of Neurology, Dr. Satish Khadilkar, President, World Federation of Neurology, Dr. William Carroll, Secretary, Indian Academy of Neurology and Dr. Gagandeep Singh.

Roorkee Branch

1. **Workshop on Skill Mathematics was held in (i) Delhi Public School, Daulatpur Haridwar, on 15th October, 2019, and, (ii) Mount Litera Zee School, Haridwar on 13th November, 2019.**

Dr Rama Mehta, Ph. D. in Mathematics from IIT Roorkee, Retired Scientist, National Institute of Hydrology, Treasurer, IWSA Roorkee was the resource person. She conducted two sessions in both schools. The first session was for students of class 6 and 7 . The students of the class 8 and 9 participated in the second session. Each session was of around 60 minutes.

She used NLP (Neuro-Linguistic Programming) to understand Number System at a glance. She taught some easy, less time-consuming techniques for Addition and Multiplication. She also showed the Fun / Magic of Numbers in each session. Students immensely enjoyed all these sessions and demanded that such activities should to be conducted regularly.

The session was greatly appreciated by the Principal, faculty and students. About 90 students from Delhi Public School and 140 students from Mount Litera Zee School participated in the Workshop.

2. Workshop on 'How to Cope up with Hormonal Changes' for Boys and Girls was conducted on 19th November , 2019, in Mount Litera Zee School, Haridwar

School girls and boys are in the tender age of teens. They undergo hormonal changes and often face a situation where they do not understand the physical, emotional changes and personal hygiene. Many parents are unable to communicate with their children about such hormonal changes. To overcome such issues, the Indian Women Scientists' Association (IWSA) Roorkee has undertaken a project wherein a gynaecologist explained to the children about hormonal changes and how to cope up with such changes.

Mrs Manika Saraswat and Dr Indu Mehrotra, the IWSA Roorkee members, coordinated the activity along with gynaecologist Dr Aditi Gupta (MBBS, DGO). She is a leading gynaecologist of Haridwar. Two different sessions of 1hr each were done for school girls and boys of classes 6 to 9 as sessions 1 and 2. The topic was "How to

cope up with hormonal changes". The sessions started with a presentation followed by an open house with children. A very positive response was marked as children participated very actively in the session. The workshop was well appreciated by the school Principal with the commitment of doing it again in future. About 80 boys and 90 girls participated in this workshop.

3. **Vijaya Agarwala Memorial Maths Olympiad, VAMMO- 4**

IWSA Roorkee conducted for the fourth time the Vijaya Agarwala Memorial Mathematics Olympiad, VAMMO-4 on 29th December, 2019, successfully in the memory of Prof (Dr) Vijaya Agarwala, one of the founder members of IWSA Roorkee. The competition was organized for the children of classes 6th,7th,8th and 9th. The coordinators of VAMMO-4, Dr Rama Mehta and Mrs Manika Saraswat approached almost 30 schools of Roorkee and 20 schools of Haridwar. More than 1100 students from 21 schools of Roorkee and above 700 students from 14 schools of Haridwar confirmed their participation. Written objective examination for VAMMO -4 /2020 was held on 29th December 2019 successfully at (Greenway Modern School-1, Adarsh Nagar, Roorkee and Maa Saraswati School, Haridwar). Around 85 volunteers from CSIR-CBRI, IIT-Roorkee, teachers of various schools, professionals, personal friends rendered their unconditional help for invigilation and evaluation of the answer scripts. Without their generous support, it would not have been possible to conduct the event successfully. IWSA Roorkee is grateful to the Principal/Director of both the schools for their generosity.

Report on the XIV Triennial Conference of IWSA on "Women Led Science, Technology and Innovation" 11th – 13th December, 2019 Conducted by Indian Women Scientists Association (IWSA), Hyderabad Branch

XIV Triennial conference of IWSA, was held at ICMR- National Institute of Nutrition, Hyderabad, during 11th-13th December, 2019. The theme was **Women Led Science, Technology and Innovation.** Over 210 women scientists, and technologists (including some retired), research fellows and students, attended the conference.

Inauguration

The inaugural session was chaired by President, IWSA, **Dr. Lalitha Dhareshwar**. She spoke about the activities of IWSA in general and invited young scientists and students to join the association. At an international conference held in 1981, Smt. Indira Gandhi was the chief guest. Dr. Lalitha informed that Dr. Rohini Godbole the chief guest is the second IWSA member to get the Padma award. Late Dr. Kamal Randive, an IWSA founder member was awarded the Padma Bhushan.

Dr. K. Ratna, convener of IWSA Hyderabad branch welcomed the dignitaries and delegates on behalf of IWSA Hyderabad branch and spoke about the relevance of the conference theme. **Dr. R. Hemalatha**, Director, NIN, extended a warm welcome on behalf of NIN, and spoke about the importance of nutrition for health and well-being of women. **Dr. Mahtab S. Bamji** described the activities of IWSA Hyderabad branch and welcomed the contribution of the corporate sector, besides other government and non-governmental agencies, and requested the corporate sector to go a step further, and work for women's empowerment, through training and employment. In her keynote address, **Padmashri Dr. Rohini Godbole**, a renowned Particle Physicist from Centre of High Energy Physics, Indian Institute of Science, Bengaluru who was also the Chief Guest, discussed the **"Challenges of a life in Science**, **and how to handle them"**. She stressed the importance of scientific policy and society to help women take up a career in science. A career in sciences throws up different challenges from those in other fields, and urged the women to handle the problems with determination so that they can break the glass ceiling between studying science and practicing science. Dr. Vijayalakshmi Venkatesan, organising secretary gave the vote of thanks.

Invited speakers gave talks in the following themes in 5 sessions: 1. Health, Pharma and Biotechnology, 2. Agriculture, Food and Nutrition, 3. Physical, Chemical Sciences and Space Technology (2 sessions), 4. Environmental Sciences and Climate Change, and 5. Entrepreneurship and Innovation. There were 2 parallel sessions of Free Communications. These included selected free communication abstracts received in the area of 1. Biological and Environmental Sciences and 2. Physical and Chemical Sciences. Over sixty abstracts were presented through posters in a poster session. Mr. Nanik Gurnani awards were given to best oral presentation and best posters. On the last day there was a lively interactive session with students of classes IX, X and XI, where they asked questions and received answers from a panel of experts in different fields besides the audience.

Health, Pharma and Biotechnology

In the session I, on Health, Pharma and Biotechnology, **Dr Geeta Vemuganti** from School of Medical Sciences, University of Hyderabad, spoke about **"Stem Cell Research in Ophthalmology : Experience to Extrapolation"**. Stem cells play a major role in regenerative medicine including treatment of corneal damage. To translate basic work to therapy teamwork of clinicians, scientists, biomedical engineers is needed.

Dr. Prathama Mainkar, from CSIR-Indian Institute of Chemical Technology, Hyderabad, gave "**A perspective of Pharma industry in India"**. Health care in India has its origins in Ayurveda and Siddha. With expertise in reverse engineering, India has become a pioneer in Generic drug industry. She gave a perspective of how health care in India, changed in relation to pharmaceutical industry over centuries. Drug resistance is a major problem in therapeutic medicine. **Dr. Manjula Reddy**, from the CSIR-Centre of Cellular and Molecular Biology, Hyderabad spoke on **"Bacterial Cell Wall: Identification of a Novel Target for Development of Antimicrobials**" and discussed on the role of Peptidoglycan hydrolysis in bacterial cell wall synthesis, as an alternative drug target for the development of novel antimicrobial agents.

Agriculture, Food and Nutrition

The first speaker in the session on Agriculture, Food and Nutrition was **Dr. Rajeev Varshney**, ICRISAT, Hyderabad. He spoke on the topic **"Functional genomics driven by women scientists at ICRISAT"**. Genomics assisted breeding has helped to develop better crop varieties; ICRISAT's contribution being in chickpea, pigeon pea and groundnut. Women scientists among others at ICRISAT have played a major role in using functional genomics, transcriptomics and proteomics approach for developing better and high-yielding varieties of the above crops.

Dr. Sridevi Annapurna Singh from CSIR-Central Food Technological Research Institute, Mysore, described the **"Indian Traditional Foods, the science behind what we eat"** and effect of cooking methods like roasting, fermentation, steaming etc on nutrients. Importance of spices as source of health promoting nutraceuticals, and importance of foods as probiotics, which help to strengthen beneficial gut micro-flora, the second brain, was also mentioned.

Dr. Raja Sriswan Mamidi, from ICMR-National Institute of Nutrition, discussed the resistant problem of **"Undernutrition in India and the way forward"**. While parameters like stunting and underweight have shown some reduction over the years, acute malnutrition as judged by wasting (weight for height) has increased from 19.8% in 2005-06, to 21% in 2015-16, as indicated by NFHS surveys. *Poshanabhiyan* of the Government of India targets the problem of undernutrition in India which is among countries with highest prevalence of malnutrition.

Physical, Chemical and Space Technologies

Two sessions on Physical, Chemical and Space Technologies (Sessions III A and B), had 4 lectures and 2 special lectures- one on Challenges in Artificial Intelligence by Dr. Sameen Fatima, from College of Engineering, Osmania University; and another on Best Practices for Promoting Women Scientists in Indian Organisations , by Dr. B.Saha, M/s NACL Industries Ltd. Hyderabad.

In Session III A, **Dr. Sai Venkata Lakshmi**, from Advanced Data Processing Research Institute (ADRIN), spoke on **"Role of Women in Science and Technology"**. Women from Vedic times have contributed to science and technology, often not recognised. She gave examples of significant number of women in ISRO who have led space missions.

Dr. P Manjusree, from National Remote Sensing Centre, ISRO listed the numerous **"applications of space technology"**, and their societal benefits, and their continuing missions. Over the years Indian Remote Sensing Satellite Constellation has helped in operations like: Crop inventory, Water resources information system, Ground water prospects etc, helping urban and rural development.

In her talk on Artificial Intelligence (AI), **Prof. S. Sameen Fatima**, gave the genesis of **"AI and its Challenges"**. It was born in 1950 by proving theorems and winning mind games which were conceived as intelligent tasks. This was followed by problem solving and language understanding. With increasing computational skills, "Man machine war" began in 1997. Search engines which help to get the right information became available in 1996.

In Session III B, **Prof. K. Muralidharan**, School of Chemistry, University of Hyderabad spoke about **"Chemistry and Physics that saves life"**. He highlighted the need for understanding how basic chemistry knowledge is translated into useful products which we come across in our sophisticated life and the need for students to understand their uses.

Dr. R. Subasri, from the International Advanced Research Centre for Power Metallurgy and New Materials (ARCI), Hyderabad, spoke about **"Environment friendly organic-inorganic hybrid nanocomposite coatings for industrial applications"**. The advantage of such hybrid coatings is, they can bring synergy between the dissimilar properties of organic and inorganic components in a single material thereby generating multi-functional coatings in a single material deposition. These are also environment friendly materials.

In the special lecture on Best practices for promoting women scientists in India, **Dr. B. Saha** stressed the role played by women scientists in diverse fields from pharmaceuticals to space exploration, information technology, nuclear technology, and biological sciences in his talk on **"Best Practices of Promoting Women Scientists in Indian Organizations"**. Several organisations in India are trying to bridge the gender gap by many good practices. Several practices like support at work place through well-run crèche, housing, transport, giving visibility to women scientists through representation on committees etc and mentoring were mentioned. The implementation is a step in the right direction.

Environmental Science and Climate Change

In Session IV on Environmental Science and Climate Change, **Dr Sagar Dhara**, Energy and Energetics expert from Hyderabad, who is an activist in the area of environment made out a case wherein, **"South Asia will be one of the hardest hit regions by climate change"**. Already the global average temperature has increased by 1^0C over pre-industrial times. The southern countries are paying for more than 67% of the CO_2 emissions from the developed countries of the north. Worst affected will be low lying countries like Bangladesh and Maldives due to rise in sea level. Acute water shortage and flooding due to melting of glaciers will affect crop production etc. The need of the hour is a concerted effort by all countries to reduce carbon emission.

Entrepreneurship and Innovation

Dr. Anuradha Acharya, CEO of Map My Genome, spoke about **"Personal genomes and beyond for Indian population"**. Today, genomic data holds tremendous potential for health care, be it disease prevention, enhanced diagnosis, optimised treatment or optimal drug development. Population wide genomic data would help to identify biomarkers, specific for health conditions and traits via case control associations and bio-informatic studies. This information when integrated with data such as electronic health records, medical history and family history can be used for personalised medicine. Personalised medicine plays an important role in nutritional intervention and therapy (nutrigenomics) and therapeutics- drug response. It can also help to predict disease susceptibility. The importance of disease risk assessment using such data was emphasised through case control studies.

In a presentation on **"From research to start-ups", Dr. Deepti Ravula**, CEO, We-Hub, Government of Telangana, spoke about We-Hub, an initiative of the Government of Telangana to encourage women entrepreneurs by building eco-system and incubation centres. It intends to collaborate with corporate, government entities, industry and academia to encourage women and students to pursue entrepreneurial culture, by assisting them in setting up start-ups. Economic enablement also helps community development.

Young girls and women suffer two types of problems during menstruation-1) the belief that they are impure during menstruation and 2) protection during menstruation. Often unhygienic material is used. **Ms Swati Bedekar**, from Vatsalya Foundation, Baroda, spoke about the work done by the foundation, to tackle these problems. Awareness was created about the physiology of menstruation to make them understand that there is nothing impure about it and the taboos are unscientific. The problem of protection was solved by developing a biodegradable sanitary pad and making it a commercial venture, employing large number of women under an organisation SAKHI. **"Incinerators for Sanitary Pads"** which could work without electricity were installed in public places and a terracotta or concrete unit for burning the napkins- ASHUDHINASHAK, which can be installed in toilets was developed. Little ash generated can be used as manure.

Dr. D. Shailaja from CSIR –Indian Institute of Chemical Technology, Hyderabad reviewed some of the "**innovation and translational work by IICT".** Lot of innovative work done in India, remains unpatented and untranslated because it does not meet the requirement of industries. IICT has crossed this barrier through a business collaboration culture and developed friendly technologies in agrochemicals, pharmaceuticals, catalysts, lipids, coal, ceramics bio-fuels, polymers, coatings, and technology for environment and clean energy etc.

In a special lecture **Dr. Lakshmi Santhi**, Manager-Client Relations, Sci-Tech, Patent and Art Services, Hyderabad, discussed the **"importance of entrepreneurship for national development"**. Inventions, lead to patents, and entrepreneurship, often through start-ups. Patents help to get licenses and investments.

Interactive Session with School Students

On the last day forenoon, there was an interactive session with class IX, X and XI school students. Thirty children from 5 schools participated. Responses to the questions came from panel of experts in different disciplines as well as the audience. The questions included: 1. validity of String theory of Stephen Hawking for grand design and origin of universe. This theory alone cannot explain origin of universe. 2.Immortality of species. No species is immortal. 3. Lactose intolerance and its implications. Basis of lactose intolerance was explained. Lactose intolerance does not mean milk intolerance. 4. Loss of jobs due to Artificial intolerance. AI can replace some human tasks but jobs would be created in other ways. 5. Gene editing, is it ethical. It is a powerful technology involving CRISPR, but not sufficiently researched for trying in humans. China has tried it to make a person immune to HIV. There were a few other questions pertaining to nose bleeding, ways to improve height etc.

Valedictory Function

The interactive session was followed by the valedictory function where the Chief guest was, **Dr. AV Rama Rao**, former director, CSIR-IICT, Hyderabad and founder, C & MD M/s AVRA Laboratories, Hyderabad. He distributed the prizes for the poster and oral presentation sessions. In his talk he described **"the Contributions of Chemistry"** to agriculture, medicine, industry, space research. India has become one of the leading suppliers of in expensive generic drugs. Avra labs has played an important role in development of almost 50 drugs through contract research.

The concluding remarks and vote of thanks were given by Dr.C.B. Lakshmi, Co-convener, IWSA, Hyderabad Branch. Dr. CB Lakshmi thanked individually all those who contributed for the success of the conference. She also thanked all the institutions, companies and others who supported financially or in kind. Our thanks to the HQ team for their unstinted support throughout the preparations and conduct of the conference.

Concluding Take Home Messages

The conference brought out the diverse fields in which women scientists are involved (developing disposable sanitary pads to space science, modern biology, and chemistry) which is contributing to advancement of science and also improving the quality of life. The special challenges that women in science face need to be identified and supportive mechanisms put in place.

To translate basic research into therapy, a team effort involving scientists, physicians and others is needed and hence collaborative research is the need of the hour. The wealth of knowledge in ancient forms of medicine- Ayurveda, Siddha, and Unani medicine, need to be explored with scientific methods of validation. Drug resistance is a big challenge and more research is needed to combat it. India has shown the scope for reverse engineering in drug synthesis, for reducing the cost of production of life saving drugs.

Genomics assisted breeding has a huge scope for increasing the productivity as well as quality of crops. Malnutrition in India is a resistant problem and *Poshanabhyan* of the Government of India offers hope. Global warming is an emergency in which South Asia will be hardest hit. India needs to face the problem with determination and innovation. Considering the importance of personal genomics, India needs to generate more data on genotype phenotype correlation. More initiatives like We Hub are needed to facilitate translational research and entrepreneurship in general and for women in particular.

Greater interaction between scientist and students will help to get them interested in science, clarify their doubts, and fight myths that are in circulation and new ones added through social media like Whatsapp.

Nobel Prizes 2019

The 2019 Nobel Prize in Physics awarded for Cosmology and Exoplanet research

Three scientists have been awarded the 2019 Nobel prize in physics for groundbreaking discoveries about the evolution of the universe and the Earth's place within it. James Peebles, from Canada, has been awarded half of the prize for his theoretical discoveries about the evolution of the universe. The Swiss astronomers Michel Mayor and Didier Queloz share the other half of the prize for their discovery of the first planet beyond our solar system.

Peebles was rewarded the prize for laying a foundation for modern cosmology, including his realisation that faint microwave radiation that filled the cosmos 400,000 years after the Big Bang, contains crucial clues to what the universe looked like at this primitive stage and how it has evolved over the subsequent 13 bn years.

Dark matter and Dark energy are mysterious. Peebles who is the Albert Einstein Professor emeritus of science at Princeton University, is credited with developing the theoretical tools that allowed scientists to perform a cosmic inventory of what the universe is made from, showing that ordinary matter makes up just 5% of its known contents, with the rest being dark matter and dark energy.

Mayor and Queloz have been recognised for their joint discovery in 1995 of the first exoplanet, 50 light years away in the constellation of Pegasus. The planet, 51 Pegasi b, is a gaseous ball about 150 times more massive than Earth and has a scorching surface temperature of about 1,000C. The pair discovered the exoplanet using a sophisticated technique known as Doppler spectroscopy, which measures the tiny wobble of a star that occurs as the star-planet pair move around a common centre of gravity. This wobbling movement alternately blueshifts and redshifts the light from the star.

When Queloz and Mayor set up the search it was with low expectations of finding anything because any planets massive enough to create a measurable Doppler shift were expected to have such long orbits that the wobble would take years to detect. Surprisingly, though, they found a huge planet sitting extremely close to its host star, with an orbit of just four days and thus it took several years to convince the world that the finding was real.

Since then, astronomers have found more than 4,000 exoplanets in an incredible range of sizes, forms and orbits. Learning about these strange and varied worlds beyond our solar system has transformed understanding of how planets formed and given new focus to the question of whether there could be alien life out there somewhere. Queloz said the sheer numbers of planets made it hard to believe that ours was the only one to host life.

The study of exoplanets is perhaps the most vibrant field of astronomy. We now know that most stars are orbited by retinues of planets. There may be a billion planets in our galaxy resembling the Earth (similar in size and at a distance from their parent star where liquid water can exist). This takes us a step towards the fascinating question of detecting evidence for life on the nearest of these exoplanet.

The 2019 Nobel Prize in Chemistry awarded for work on lithium-ion batteries

Three Scientists; John B Goodenough of the University of Texas at Austin, M Stanley Whittingham of Binghamton University and Akira Yoshino of Meijo University have been awarded the Nobel prize for their extensive work in developing lithium-ion batteries. At 97 years old, Goodenough is the oldest laureate to receive a Nobel prize in any discipline.

Lithium-ion batteries have laid the foundation of a wireless, fossil fuel-free society, and are of the greatest benefit to humankind and have proved pivotal in the development of the high-tech world we inhabit.

Far lighter and more compact than earlier types of rechargeable batteries, and able to hold their charge for longer, they are found in everything from mobile phones to laptops and electric cars. The [electric car] batteries no longer weigh two tonnes, but 300 kg. The ability to store energy from renewable sources, the sun, the wind, opens up for sustainable energy consumption.

Lithium-ion batteries are one of the most influential pieces of materials science that influence the modern life of everyone on the planet.

Batteries work by turning chemical energy into electricity. A typical battery is made up of two electrodes, an anode and a cathode, which are usually separated by a liquid that can carry charged particles. Both electrodes are connected to an electrical circuit. When the battery is powering an electrical device, electrons travel from the anode to the cathode through the electrical circuit, while positively charged ions move through the electrolyte. In a rechargeable battery, energy can be put into the device to reverse this process.

While rechargeable batteries were around in the 1970s, they had drawbacks, not least in the amount of energy they could store. Lithium, it was thought, could be an answer since it is a very light metal and easily loses an electron. However, lithium's reactivity also made it tricky to harness. In the 1970s Stanley Whittingham tackled the problem when looking to develop approaches for fossil-free energy in light of the oil crisis. His device, the first functional lithium battery, used lithium metal in the anode and lithium ions tucked into titanium disulphide for the cathode. Unfortunately, when this battery was repeatedly recharged, it ran the risk of exploding. To improve safety, Whittingham combined metallic lithium with aluminium in the anode. Goodenough picked up the baton at the University of Oxford, and replaced the titanium disulphide in the cathode

with cobalt oxide – an approach that doubled the voltage produced. Yoshino used the cathode developed by Goodenough to create the first commercially viable lithium-ion battery in 1985, with the anode in his battery composed of lithium ions and electrons housed within a carbon material called petroleum coke. This made the battery much safer than that using lithium metal.

The upshot was a lightweight, compact battery that could be recharged many, many times – the bedrock of modern technology. The battery continues to be developed, not least to improve its environmental impact.

The 2019 Nobel prize in medicine awarded for Hypoxia research

Three scientists namely William Kaelin Jr at the Harvard University in Massachusetts, Sir Peter Ratcliffe at Oxford University, and Gregg Semenza at Johns Hopkins University in Baltimore, Maryland were awarded the Nobel prize for discovering how the body responds to changes in oxygen levels, one of the most essential processes for life. Their work panned out on how cells sense falling oxygen levels and respond by making new blood cells and vessels. Beyond describing a fundamental physiological process that enables animals to thrive in some of the highest-altitude regions on Earth, the mechanism has given researchers new routes to treatments for anaemia, cancer, heart disease and other conditions.

In their work that spanned more than two decades, the researchers teased apart different aspects of how cells in the body first sense and then respond to low oxygen levels. They established the basis for our understanding of how oxygen levels affect cellular metabolism and physiological function. The crucial gas is used by tiny structures called mitochondria found in nearly all animal cells to convert food into useful energy.

The scientists showed that when oxygen is in short supply, a protein complex that Semenza called hypoxia-inducible factor, or HIF, builds up in nearly all the cells in the body. The rise in HIF has a number of effects but most notably ramps up the activity of a gene used to produce erythropoietin (EPO), a hormone that in turn boosts the creation of oxygen-carrying red blood cells.

Thanks to the groundbreaking work of these Nobel Laureates, we know much more about how different oxygen levels regulate fundamental physiological processes. Oxygen sensing allows cells to adapt their metabolism to low oxygen levels: for example, in our muscles during intense exercise. Other examples of adaptive processes controlled by oxygen sensing include the generation of new blood vessels and the production of red blood cells. Our immune system and many other physiological functions are also fine-tuned by the O2-sensing machinery. Oxygen sensing has even been shown to be essential during fetal development for controlling normal blood vessel formation and placenta development.

The trio have greatly expanded our knowledge of how physiological response makes life possible. The role of HIF was crucial from the earliest days of life. If an embryo does not have the HIF gene it won't survive past very early embryogenesis. Even in the womb our bodies need this gene to do everything they do.

Oxygen sensing is central to a large number of diseases. For example, patients with chronic renal failure often suffer from severe anemia due to decreased EPO expression. EPO is produced by cells in the kidney and is essential for controlling the formation of red blood cells. Moreover, the oxygen-regulated machinery has an important role in cancer. Intense ongoing efforts in academic laboratories and pharmaceutical companies are now focused on developing drugs that can interfere with different disease states by either activating, or blocking, the oxygen-sensing machinery.

The work has led to the development of a number of drugs such as roxadustat and daprodustat, which treat anaemia by fooling the body into thinking it is at high altitude, making it churn out more red blood cells. Similar drugs aim to help heart disease and lung cancer patients who struggle to get enough oxygen into their bloodstream. More experimental drugs based on the finding seek to prevent other cancers growing by blocking their ability to make new blood vessels are being developed.

(Compiled by Dr. Pushpa Rao using the following links:)

https://www.nobelprize.org/all-2019-nobel-prizes/

https://www.theguardian.com/science/live/2019/oct/08/nobel-prize-in-physics-awarded-live-2019

https://www.theguardian.com/science/2019/oct/09/nobel-prize-in-chemistry-awarded-for-work-on-lithium-ion-batteries

https://www.theguardian.com/science/2019/oct/07/nobel-prize-in-medicine-awarded-to-hypoxia-researchers

We Salute these Women/Girl Achievers

1. A. Lalitha, India's First Women Electrical Engineer

From being a teen widow with a four-month-old daughter to care for, to becoming India's first woman Electrical Engineer, A. Lalitha's life is nothing short of an inspiration. Born on August 27, 1919, in Madras (Chennai) A. Lalitha was very good at studies and wanted to learn more about science and technology. Her father was a professor of electrical engineering, which piqued her interest in electronics. She was married at the age of 15 and her husband died when she was 18, and mother to a four-month-old daughter. At that time, societal norms prescribed shaved heads and a strictly restricted life in isolation for widows. But Lalitha decided to overthrow these outdated norms and break into the male bastion of engineering. She completed her electrical engineering degree from Alma mater, College of Engineering, Guindy (CEG), University of Madras. Lalitha represented India in "International Conference of Women Engineers & Scientists" in 1964.

(HTTPS://WWW.THEBETTERINDIA.COM/TOPICS/CHENNAI-2/)

2. Dr. Manjula Reddy of CCMB awarded Infosys Prize for Life Sciences

For her work on understanding the structure and synthesis of the bacterial cell wall which is critical for the development of new antibiotics, Dr Manjula Reddy, Chief Scientist at the Centre for Cellular and Molecular Biology (CCMB) Hyderabad, has been awarded the 2019 Infosys Prize for Life Sciences. Her work has revealed a critical step during cell wall synthesis.

The Infosys Prize is awarded annually to honour outstanding achievements of contemporary researchers and scientists across six categories: Engineering and Computer Sciences, Humanities, Life Sciences, Mathematical Sciences, Physical Sciences and Social Sciences, each carrying a prize of a gold medal, a citation and a cash prize of USD 1,00,000.

https://www.business-standard.com/article/news-ani/ccmb-scientist-manjula-reddy-wins-2019-infosys-prize-for-life-sciences-119110800180_1.html

3. Prof. Sunita Sarawagi of Indian Institute of Technology, Bombay awarded Infosys Prize for Engineering and Computer Science

The Infosys Prize 2019 in Engineering and Computer Science is awarded to Prof. Sunita Sarawagi for her research in databases, data mining, machine learning and natural language processing, and for important applications of these research techniques. The prize recognizes her pioneering work in developing information extraction techniques for unstructured data.

Prof. Sunita Sarawagi is Institute Chair Professor, Computer Science and Engineering, Indian Institute of Technology, Bombay.
www.infosys-science-foundation.com › prize › sunita-sarawagi

4. 85 -Year Old Devaki Amma wins Nari Shakti Puraskar

Devaki Amma was recently bestowed with the Nari Shakti Puruskar by the President of India for her enormous contribution to the environment. Devaki Amma's family has been working in the agricultural industry for generations. While the men ventured into corporate jobs, the women of the house handled the paddy cultivation. After her marriage, Devaki Amma joined her mother-in-law to cultivate paddy. But in 1980, she injured her leg severely and was told to avoid walking for a couple of years. That forced the family to discontinue the paddy cultivation as her mother-in-law was too old. However, her undying love for farming never faded and she planted one sapling in the backyard of her home three years after the accident.

Eventually, she started planting more saplings, and today, she has created a lush green forest over five acres of land in their property in the Onattukara region in Alappuzha district of Kerala. She has single-handedly nurtured the forest and uses greener options to sustain it. Her forest has a couple of private ponds, one wetland and close to 1,000 trees, which house exotic migratory birds like Amur Falcon and Emerald Dove.

Well-versed with the problems of global warming and environmental degradation across the world, Devaki Amma wants people to neutralise their carbon footprints. "Planting a tree is the most effective and feasible option. Our family has been cancelling carbon footprints by planting trees for four decades now," says this proud #EarthHero.

HTTPS://WWW.THEBETTERINDIA.COM/TOPICS/KERALA

5. Kavitha, First Girl Student to win President of India Prize

Kavitha Gopal, who graduated with a B. Tech degree in Computer Science and Engineering on Monday, created history by becoming the first girl student of the Indian Institute Technology-Madras to win the President of India Prize. At the Institute's 56th convocation, she received the prize and medals from Prime Minister Narendra Modi. With a CGPA of 9.95, she also bagged the Bharat Ratna M. Visvesvaraya Memorial Prize and the B. Ravichandran Memorial Prize for the highest CGPA in B. Tech CSE. She shared the first two prizes with Pradyumna Venkatesh Chari of B. Tech (Electrical Engineering). Ms. Gopal, who studied at the Atomic Energy Central School, Anupuram, and later at the Kendriya Vidyalaya, Kalpakkam, is currently employed at Google India, Bengaluru, as a software engineer.

https://www.thehindu.com/news/cities/chennai/in-a-first-girl-bags-president-of-india-prize/article29560538.ece

6. Odisha Girl nominated for International Children's Peace Prize

Subhasmita Tripathy, a Class VIII student of Upper Primary School in sea erosion- hit Pentha village (Odisha), was nominated for International Children's Peace Prize 2019 recently. The 13-year-old is one of the 119 child leaders from across the globe nominated for the prize. She has bestowed the honour for managing to bring 22 dropouts back to the school and provide support to continue their education with the help of villagers, school

authorities and social organisations. Subhasmita's noble work was supported by teachers. She first identified the 22 children who had dropped out of schools owing to various reasons and then convinced their parents to send them back to school, said headmaster of the school Biranchi Narayan Tripathy.

"We educated the children and their parents about the importance of education. Most of the dropouts were working in the fields with their parents and catching fish in the river and creeks near the village," said Subhasmita. The winner of the International Children's Peace Prize receives a study and care grant and a worldwide platform to promote his/her ideals.

https://www.newindianexpress.com/states/odisha/2019/sep/19/kendrapara-girl-nominated-for-international-childrens-peace-prize-2019-2035763.h…

India's First Woman Electrical Engineer, A.Lalitha, attending International Conference of Women Engineers in 1964

Dr. Manjula Reddy of CCMB, Winner of Infosys Prize for Life sciences

Devaki Amma Winner of Nari Shakti Puraskar

Prof. Sunita Sarawagi, IITB, Winner of Infosys Prize for Engineering and Computer Science

Kavitha, First Girl Student to get President of India Prize at IIT, Madras

Subhasmita Tripathy, Odisha School Girl Nominated for International Peace Prize

Workshop on Beneficial Effects of Radiation at IWSA HQ on 14th September 2019

Visit of Somaiya College Students (21-9-2019) and
Students of Sacred Heart School (23-11-2019) to IWSA's Leaning Garden

Field Visit to Dapoli by IWSA Members on 6th and 7th November, 2019

Visit of Students and Staff of MCT College, Airoli to IWSA on 19th December. 2019

Preparations for Diwali Celebration by Nursery Kids *on 24th October, 2019*

Children's Day Celebration by Nursery Kids on 14th November, 2019

XIV Triennial Conference
Sessions on (i) Health, Pharma and Technology, (ii) Agriculture, Food and Nutrition and (iii) Poster and Oral Presentations

Prof. Geeta Vemuganti

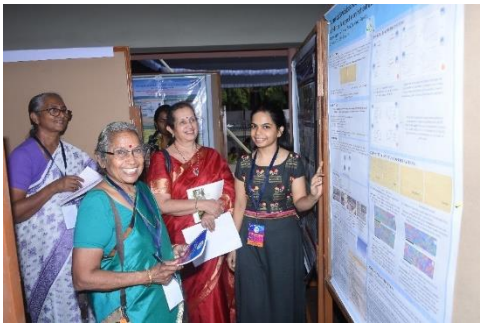
Dr. Prathama Mainkar

Dr. Manjula Reddy

Dr. Rajeev Varshney

Dr. Sridevi Annapurna Singh

Dr. Raja Sriswan



Poster Session

Free Communication Oral Session

XIV Triennial Conference
Sessions on (i) Oral Presentations, (ii) Physical and Chemical Sciences & Space Technology (Parts A and B), (iii) Environmental Science and Climate Change and (iv) Enterpreneurship and Innovation



Free Communication Oral Session

Dr. A. Sai Venkata Lakshmi

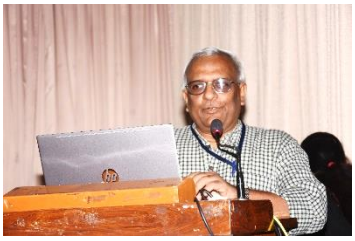
Dr. P. Manjusree

Dr. Sameen Fatima

Dr. K. Muralidharan

Dr. R. Subasri

Dr. B. Saha



Dr. Sagar Dhara

Ms. Anu Acharya

Ms. Deepti Ravula

Ms. Swati Bedekar

Dr. D. Shailaja

Dr. Lakshmi Santhi

XIV Triennial Conference
Interactive Session with Students and Valedictory Function

Panelists and School Children at the Interactive Session

Dr. A.V. Rama Rao, Chief Guest, Valedictory Function

At the Concluding Session

Activities from other Branches

National Seminar on "Human Health" Baroda Branch on 24th December, 2019

BRNS Lecture on "Clinical and Translational Networks for Impactful Innovation" on 3rd September by Dr. Varsha Sridhar organized by Bengaluru Branch

Workshop on "Basic Techniques in Biology" on 17th October, 2019 – an Outreach Program for 9th and 10th Standard Students by Bengaluru Branch

Demonstration of Chemistry Experiments and Quiz program for School Students Organized by Kalpakkam Branch on 5th October, 2019

Celebration of Gandhi Jayanthi with Veteran Gandhian Smt. Krishnammal Jagannathan on 2nd November, 2019 by Kalpakkam Branch

Participants of Biodiversity Awareness Program Organised by Kolhapur Branch on 20th November, 2019

Dr. Sadhana Rayalu Talking to Girl Students on "Hygiene in Adolescent Girls and Safe Methods for Disposal of Sanitary Napkins" on 27th August, 2019. Program Organized by Nagpur Branch.

IWSA Nellore Branch conducted a Session on "Gastroenteritis and Importance of Hand Washing" at Municipal Corporation School at Nellore on 29th December, 2019.

Dr. Bindu Menon, Convenor, IWSA Nellore Branch received the Fellowship of the Indian Academy of Neurology at Hyderabad on 3rd October, 2019.

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Workshop on Skill Mathematics at Mount Litera Zee School, Haridwar on 13th November 2019, organized by Roorkee Branch

Workshop on 'How to Cope up with Hormonal Changes' at Mount Litera ZeeSchool, Haridwar on 19th November 2019, organized by Roorkee Branch

Vijaya Agarwal Memorial Maths Olympiad, VAMMO- 4 on 29th December, 2019 organized by Roorkee Branch

To

From

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