



IWSA NEWSLETTER

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January – April 2022

Webinars under the “Science and Our Life” Series

INDIAN WOMEN SCIENTISTS' ASSOCIATION
www.iwsa.net

22nd Talk under IWSA's 'Science and Our Life' Lecture Series
Supported by Board of Research in Nuclear Sciences

LIFESTYLES AND AGEING : PERSPECTIVES BASED ON THE SCIENCE OF INTEGRATIVE MEDICINE AND COGNITIVE NEUROSCIENCE




DR. KRISHNAMURTHY JAYANNA
Prof. & Dean,
Ramaiah University of Applied Sciences,
Bangalore

on 8th January, 2022 at 4pm
JOIN ON ZOOM-
MEETING ID-699 420 2891
PASSCODE- IWSA@VASHI

INDIAN WOMEN SCIENTISTS' ASSOCIATION
www.iwsa.net

23rd Talk under IWSA's 'Science and Our Life' Lecture Series
Supported by Board of Research in Nuclear Sciences

Ecosystem and Wildlife Diversity in India



Adithi Muralidhar
Scientific Officer
Homi Bhabha Centre for Science Education,
TIFR, Mumbai


12th February 2022
at 4PM

On Zoom-
Meeting ID-811 4939 2327
Passcode-SAOL@IWSA


INDIAN WOMEN SCIENTISTS' ASSOCIATION
www.iwsa.net

24th Talk under IWSA's Science And Our Life Lecture Series
Supported by Board of Research in Nuclear Sciences

Equity and Climate change



Dr Vasudevan Rajaram
Environmental Engineer
Founder/President of Midwest Engineers, Inc.,
Founder Tetra Tech India



The distribution of the world's 2.3 billion children has important implications for assessing the impacts of climate change-UNICEF

On Zoom-
Meeting ID-811 4939 2327
Passcode-SAOL@IWSA

Date & Time of Lecture-
12th March, 2022 at 7:30pm
Please join by 7:25 pm

INDIAN WOMEN SCIENTISTS' ASSOCIATION
www.iwsa.net

25th Talk Under IWSA's Science and Our Life Lecture Series

UNLOCKING THE SECRETS OF THE EARLY UNIVERSE WITH JAMES WEBB SPACE TELESCOPE

By



Dr. Hashima Hasan
Program Scientist for NUSTAR,
the Keck Observatory and ADCAR, and
Deputy Program Scientist for the James
Webb Space Telescope, NASA Headquarters,
Washington, D. C.



Dr. Prajval Shastri
Retired Astrophysicist
Indian Institute of Astrophysics,
Bengaluru



Mr. Chintamani Paji
Co-founder, Space Geeks,
Mumbai

JOIN WITH US ON ZOOM

Meeting ID: 811 4939 2327
Passcode: SAOL@IWSA

Saturday | April 9 | 2022
9:00 PM (IST) ONWARD

BRANCHES

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

Popular Science Talks in colleges

50 Popular Science Lecture
Organized by
Indian Women Scientists' Association
Vashi, Navi Mumbai

Supported by
Board of Research in Nuclear Sciences (BRNS) - DAE

In Association With
**Department of Biosciences,
Union Christian College, Aluva**

Lecture on
**Micro RNA: A Key Player in Gene Regulation and
Controlling Developmental Processes**



Prof. Anjan K. Banerjee
FNASc., FASc
Dean (R&D),
Indian Institute of Science Education and Research,
Pune, Maharashtra.

Saturday, 15th of January
10.00 AM Onwards

Zoom Advisor: **Dr. Susan Eapen**
090044 28381

YouTube Co-ordinator: **Dr. Sareen Sarah John**
094475 02758

50 Popular Science Lecture
Organized by
Indian Women Scientists' Association
Vashi, Navi Mumbai

Supported by **BRNS-DAE**
In association with
**G. N. Khalsa College of Arts, Science and Commerce
(Autonomous)**
Microbiology Department
Under Microbes 4-U Lecture Series

Topic
Precision Biology Inspired by Microbes

by
Dr. Rakesh Tuli
FNA, FASc, FNASc, FAAS
Former Director, CSIR-NBRI & DBT, NABI
& JC Bose National Fellow at Punjab University



Date and Time
Monday, 28th February 2022, 4.00 pm

Registration Details: <https://forms.gle/1BwM2EASTySPPTfE>
No Registration fees
Last Date of Registration: 25/02/2022

50 Popular Science Lecture
Organized by
Indian Women Scientists' Association,
Vashi, Navi Mumbai

Supported by **Board of Research in Nuclear Sciences (BRNS)-DAE**
in association with
Chilukak Suresha's
**Sir Sitaram & Lady Shantabai Patkar College of Arts and Science
and V. P. Varde College of Commerce & Economics**
An Autonomous College, Affiliated to University of Mumbai
Department of Microbiology and Biotechnology
Gurgaon, Mumbai

Webinar on
Scientific Writing

Speaker
Dr. Susan Eapen
Former Head, Plant Biotechnology
& Secondary Products Section
Bhabha Atomic Research Centre, Mumbai

Link for registration
<https://docs.google.com/forms/d/1715dM4Pq17y1fyjg/d1e7iCn1o5d6-64qj3c6v6>

Date & Time
Saturday, 9th March, 2022
11.00 am


All are cordially invited to join

50 POPULAR SCIENCE LECTURE
ORGANIZED BY
INDIAN WOMEN SCIENTISTS' ASSOCIATION,
Vashi, Navi Mumbai

Supported by **Board of Research in Nuclear Sciences (BRNS)-DAE**
In association with
**Department of Chemistry,
Smt. Kasturbai Walchand College, Sangli**

Webinar on
ROLE OF CHEMISTRY IN NUCLEAR ENERGY RESEARCH

by
Dr. Saswati Roy,
Former Director, Chemical Engineering Group,
Bhabha Atomic Research Centre, Mumbai 400 094



Day and Date
Friday, 11 March 2022, 11.00 am

Science Lectures for School Students

50 Science Lectures for School Students
Organized by
INDIAN WOMEN SCIENTISTS' ASSOCIATION
Vashi, Navi Mumbai

Supported by **Board of Research in Nuclear Sciences (BRNS)-DAE**
In association with
Sheth Chunilal Damodardas Barfiwala High School
D.N. Nagar, Andheri (W), Mumbai

Webinar on
Role of Chemistry in the 'Green' Revolution
by
Prof. Radha V. Jayaram
Institute of Chemical Technology, Matunga, Mumbai




On 4th February, 2022 at 11 AM

Join Zoom –
Meeting ID- 851 0275 8086
Passcode- 198632

50 Science Lectures for School Students
Organized by
INDIAN WOMEN SCIENTISTS' ASSOCIATION
Vashi, Navi Mumbai

Supported by **Board of Research in Nuclear Sciences (BRNS)-DAE**
In association with
**Maharashtra Education Society's
MES Vidya Mandir & Junior College**

Webinar on
Hematopoiesis, blood cell morphology and their functions
By
Dr. Shashikant G. Mahadik
Scientific Officer, Hematopathology Lab,
Tata Memorial Hospital, Parel
On 25th February, 2022 at 11:00 AM
Join at: 21, 22, Income Tax Colony,
Near Park Hill Road,
Agart, Sector 29, CBD Belapur,
Navi Mumbai, Maharashtra 400614



From the Editor's Desk



Dear IWSA Members,

In this issue of Newsletter, you will find our regular features of reports regarding Popular Science Lectures, Science Awareness Activities, Activities regarding Early Childhood Education, Computer Centre, Activities of various Branches etc. The activities reported in this issue are a mix of online as well as offline modes. In our "Science and our Life" (SAOL) Lecture Series, four interesting lectures were conducted during the period of January to April 2022 (All online). Thirteen popular Science lectures for college students (one offline) and six science lectures for school students (one offline) were held during this period. All these lectures were supported by BRNS. Visit of UNESCO team to IWSA, Science Day Celebrations, Vigyan Prasar activities, Internships for students, Scholarships for students are highlighted in this issue. As the Golden Jubilee Celebrations (GJC) are round the corner, a Logo for GJC was launched in January 2022. A Mural Competition was also conducted as part of the GJC where architecture students participated and prepared murals from waste materials on themes like of eco restoration, Women breaking the glass ceiling etc. We are glad to report all these activities in this Newsletter.

This issue also brings the interesting online activities held at IWSA Branches at Amravati, Baroda, Bengaluru, Hyderabad, Kalpakkam, Kolhapur, Nagpur and Roorkee. An interesting article on "Textiles to Sustain Our Future" by Dr. Suman Mudkur, Visiting Faculty, Department of Fibres and Textile Processing, Institute of Chemical Technology ICT, Mumbai, appears in this issue. We have reported about some of the women achievers who have been honoured by various awards like Padmashri, Nari Shakti Puraskar or recognition by Royal Society of Chemistry etc. 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

shyamala.bharadwaj@gmail.com

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Editorial Board

Dr. Shyamala Bharadwaj (Editor)
Dr. Lalitha Dhaireswar
Dr. Susan Eapen
Dr. Dhanya Suresh
Dr. Sheela Donde
Dr. Paramjit Anthappan
Dr. Smitha Kekatpure

President's Message



Congratulations to the editorial board members for their meticulous work of keeping records of the increasing numbers of public lectures introduced during the current period of publication of IWSA Newsletter. Members of science awareness sub-committee continues to increase database of lecturers for colleges, schools and SAOL series. They chose BIOMIMICRY for Science Exhibition and this event was fully handled ONLINE. On the same note kudos for being judged the best VIPNET Science Club and popularity of Chatshala among the participants from 28 schools of Mumbai and Navi Mumbai.

The New Year began with launch of the LOGO for IWSA's Golden Jubilee Celebrations (GJC) to be held at headquarters and eleven branches between January 2022 to December 2023. The chosen tag line LOOK BACK TO MOVE FORWARD AND SOAR ethos the spirit of the association and its mandates: Science Education & Awareness, Community Welfare, & Women Empowerment. Best wishes to Chairperson GJC, Dr Lalitha Dhareshwar for smilingly accepting the responsibility. Hyderabad and Kolhapur branches were the firsts to conduct programs under the banner of GJC. At the headquarters the first GJC event to be celebrated was a Mural Competition for students of architecture from Navi Mumbai. Winning teams were felicitated after unveiling their works of art from waste materials covering the themes of Ecological Restoration, Famous Indian Women who broke the glass ceiling, and Science for young and old. The murals have added to the beautification of the premises. The members of garden group took up another task of collating recipes of wild forgotten foods. The book is a timely contribution and value addition for the community that is waking up to the significance of sustainable foods to mitigate climate change.

Commissioning of the second phase of Tejomayee 2 solar panels was completed and soon we hope to go energy neutral. This task that was taken up by Ms Vijaya Tilak almost single handedly during the lock down period. Dr Nootan Bhakal and her team awarded IWSA annual scholarships to 26 applicants from total of 127 applications. We acknowledge donors who came forward with new scholarships in memory of their family members. Many of us are still continuing working from home except for a few physical meetings that were organised for showing our premises to guests from the UNESCO team, student visitors from TISS and RedDot foundation. For the first time we opened up to student volunteer services inviting them from neighbourhood colleges to begin with. Young enthusiasts easily spruced up the learning garden and day care facility bringing back the pre-covid look.

International Women's Day theme #Break The Bias and India's Azadi ki Amrut Mahotsav inspired many publications celebrating success of women in science. We feel privileged that our two senior most members Drs Sudha Padhye and Sunita Mahajan were featured in the UNESCO publication, Dr Susan Eapen featured amongst the first 75 women scientists of the world and few engineers were honoured in books published by INAE and Red Dot foundation.

Wishing our readers some more patience to continue with mask and other safe practises to keep away from SARS COV II infections. Once herd immunity sets in, we shall be able to get back to mask free meetings and begin more activities. Till then focus on nutrition and free hand exercises to stay fit both physically and mentally.

Dr. Rita Mukhopadhyaya
rita45@gmail.com

Reports from Head Quarters

Science Awareness Programs

A. IWSA – BRNS Popular Science Lectures for Colleges

1. Online BRNS Popular Science Lecture at VES College, Chembur, Mumbai on 20th January 2022

An IWSA – BRNS Popular Science Webinar on “World’s Most Radiation-resistant Bacterium: *Deinococcus radiodurans* and what can you do with it” by Dr. Sreekumar Apte, Distinguished Professor, School of Biological Sciences, UM-DAE Centre for Excellence in Basic Sciences, Mumbai, was conducted on 20th January 2022 at Vivekanand Education Society’s College of Arts, Science and Commerce, Chembur, Mumbai. Google meet virtual platform was used for the online lecture.

Abstract: The *Guinness Book of World Records* lists the Gram-positive, red/orange pigmented, non-pathogenic bacterium *Deinococcus radiodurans* as the world’s most radiation-resistant bacterium. Indeed, it can survive >10000-fold higher doses of ionizing radiations (X-rays or γ -rays), without being mutated, than what humans can withstand. It also survives extremes of other genotoxic environmental stresses, such as nutrient starvation, UV rays, and desiccation and can successfully re-assemble its completely shattered genome, thanks to its highly proficient and robust DNA repair system. The proteome of this microbe tolerates even far more higher radiation doses than does its genome. ***The question is what can one do with such a unique organism?***

Sequencing of its genome, sponsored by the U. S. Department of Energy in 1999, immensely accelerated both basic and applied research on this bacterium. The last two decades of research have revealed some fascinating aspects of its biology, especially somewhat unexpected facets of its DNA repair, novel mechanisms underlying its phenomenal radioresistance and the unique DNA damage-responsive gene expression and its regulation in this superbug. Extensive genetic engineering of this microbe has been carried out to develop bioremediation technologies for highly radioactive nuclear waste as well as for ambient conditions. Impressive applications can be developed using this microbe or its metabolites range from nanotechnologies to radioprotectors and vaccine development. The presentation highlighted some of these discoveries and discussed the future prospects.

Dr. Shantini Nair, Vice Principal and HOD, Microbiology Department and Event convener welcomed the gathering. Principal Dr. Anita Kanwar spoke briefly about the college and its activities. Dr. Surekha Zingde, Member Board of Trustees of IWSA gave a brief description of the various activities of IWSA. Dr. Susan Eapen introduced the speaker. Dr. Dona Joseph and Dr. Malay Shah handled the question answer sessions. Dr. Shwetha Patil compered the program and Mr. Suman Ganger, event coordinator proposed the vote of thanks. About 246 participants attended the online lecture.

2. Online BRNS Popular Science Lecture at Smt. Kasturbai Walchand College of Arts and Science, Sangli on 22nd January 2022

An IWSA – BRNS Popular Science Webinar on “The Application of Recombinant DNA technology” by Dr. Sorab Dalal, Scientist Officer ‘H’ & Principal Investigator, Tata Memorial Centre, Cancer Research Institute, Advanced Centre for Treatment, Research & Education in Cancer, Kharghar, Navi Mumbai, was conducted on 22nd January, 2022 at Smt. Kasturbai Walchand College of Arts and Science, Sangli. Google meet virtual platform was used for the online lecture.

Abstract: Recombinant DNA technology has transformed our ability to study biology, including the central dogma of molecular biology, and use this molecular information to design diagnostics and therapeutics. Recombinant DNA technology uses restriction enzymes to cut and paste together DNA sequences of interest. The recombined DNA sequences are placed into vehicles called vectors that ferry the DNA into a suitable host cell where it can be copied or expressed. In this lecture, the basic protocols that are used in Recombinant DNA technology including basic cloning strategies, converting RNA to DNA and various types of polymerase chain reactions were discussed. Thereafter, examples were given for their applications in the laboratory to study basic and translational research problems and in medicine either as a diagnostic tool or for the development of therapeutic strategies. About 101 participants attended the online lecture on google meet platform and about 49 participants watched through you tube.

3. Online Popular Science Lecture at Sophia College (Autonomous), Bhulabhai Desai Road, Mumbai on 22nd January 2022

An IWSA – BRNS Popular Science Webinar on Genome Editing by Dr. Chitra Seetharam Misra, Scientist, Applied Genomics Section, BARC, Mumbai was conducted at Sophia College (Autonomous), Bhulabhai Desai Road, Mumbai on Saturday the 22nd January, 2022 at 10.00 am. The online lecture was conducted through zoom platform.

Abstract: Genome/Gene editing is 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 mega nucleases, zinc finger nucleases, transcription activator-like effector-based nucleases (TALEN) and the CRISPR-Cas technology. The CRISPR -Cas systems are easy to engineer and apply and therefore have taken the world by storm leading to several advancements in therapy and biotechnology. The ‘how’, ‘why’ and ‘when’ of CRISPR-Cas discovery and applications was presented. Genome editing technologies are powerful tools, and therefore must be used with caution. The ethics of applying them was also brought forth and its importance discussed.

Principal Sr. Ananda Amritmahal spoke about Sophia College activities and praised IWSA for their wonderful work during the last 50 years. Ms. Tripta Tewari, Executive Committee Member, IWSA spoke about the various activities of IWSA. Dr. Susan Eapen introduced the Guest Speaker. Dr. Sree R. Nair, Asst. Professor of Life Science Department of Sophia

College co-ordinated the program. Students Ms. Anusuya Nair and Mr. Siddant Naicker handled the question and answer session after the talk. Mr. Navin Chawate proposed the vote of thanks. Ms. Asmita Mishra compered the program and Ms. Nilofer Khatri gave an introduction to the event. About 218 participants in Zoom virtual platform and 162 on YouTube were benefited by the program which was a grand success.

4. Online Popular Science Lecture at Vaze College of Arts, Science and Commerce (Autonomous), Mulund East, Mumbai on 29th January 2022

An IWSA BRNS Popular Science lecture in association with Science Association, Vaze College of Arts, Science and Commerce (Autonomous), Mulund East, Mumbai was held on January 29, 2022 at 11.30 am. Prof. Arvind Lali, Professor of Chemical Engineering, Former Head, DBT-ICT Centre for Energy Bioscience, ICT, Mumbai spoke on “Biofuels: Where and When”. The lecture was conducted online through Microsoft Teams Platform.

Abstract: India needs biofuels for two reasons: Energy security and Reduction in carbon emissions, the latter being a relatively less important issue with the country depending almost wholly on imported crude petroleum oil for its diesel, petrol and kerosene. Mandated to blend 20% biofuels in diesel and petrol, India today manages less than 3%. The only resource the country can use is its renewable and abundant natural wealth.

Despite being the largest agricultural country; with also second largest population and the largest cattle population, India is today ill equipped to turn its humongous waste into biofuel. Technology roadblocks have seemed unsurmountable across the world in the last three decades despite all the progress mankind has made.

The talk highlighted the innovation areas where intense and focused work must happen to make sure that India develops its own technologies to handle its own waste in a way that is a win-win path in all possible ways.

Principal Prof. Prita Nilesh Ph.D. welcomed the gathering and described the activities of the college. Dr. Suparna Kamath of IWSA spoke about the various activities of IWSA. Dr. Susan Eapen introduced the Guest Speaker and Ms. Shilpa Shirodkar proposed vote of thanks. The programme was compered by Ms. Veena Menon and co-ordinated by Dr. Sangita Radhakrishnan. About 219 participants benefitted from the program which was held on Microsoft Teams platform.

5. Online Popular Science Lecture at St. Xavier’s College, Mumbai on 3rd February 2022

An IWSA BRNS Popular Science lecture in association with Caius Research Laboratory & Women’s Development Cell, St. Xavier’s College, Mumbai was held on 3rd February, 2022. Dr. Anushree Patil, Scientist ‘E’ (Deputy Director), ICMR-National Institute for Research in Reproductive & Child Health, Parel, Mumbai spoke on “Polycystic Ovary Syndrome”. The lecture was conducted online through Zoom Platform.

Abstract: Polycystic ovary syndrome (PCOS) is a hormonal disorder common among women of reproductive age. Women with PCOS may have infrequent or prolonged menstrual periods or excess male hormone (androgen) levels. The ovaries may develop numerous small

collections of fluid (follicles) and fail to regularly release eggs. The exact cause of PCOS is unknown. Early diagnosis and treatment along with weight loss may reduce the risk of long-term complications.

- Women with PCOS are at increased risk for the development of infertility, impaired glucose tolerance, type 2 diabetes mellitus, dyslipidemia, hypertension, atherosclerosis and endometrial cancer. Polycystic Ovary Syndrome (PCOS) starts with puberty and ends with menopause and needs a multidisciplinary management for weight management, acne, hirsutism, psychological issues like anxiety depression, and infertility. Treatment is different at different stages of a woman's life based on the symptoms each patient has, and whether she wants to conceive or needs contraception. With the rising incidence of PCOS among adolescents and young women and its long term effects on reproductive health, diabetes and cardiovascular system it is important to have multidisciplinary management under one roof to improve the reproductive and health outcomes.

- Rising burden of PCOS with its long term metabolic complications can multiply the long term burden of non-communicable diseases (NCDs) in India. The key to reduce future health expenditure is to invest in prevention and early management of NCDs. ABHIYAAN PCOS is a multi-institutional group involving ICMR-NIRRH, KHS-MRC, TISS, and PCOS Society of India, addressing various dimensions of PCOS reaching out to women health care providers and program managers. A brief overview of PCOS and the work of ICMR-NIRRH in this area was covered, as PCOS is a flagship area of research at ICMR-NIRRH.

About 72 participants attended the online lecture through zoom platform.

6. Online Popular Science Lecture at DSPM's K. V. Pendharkar College of Arts, Science and Commerce (Autonomous), Dombivli on 12th February 2022

An IWSA BRNS Popular Science lecture in association with Department of Biotechnology, DSPM's K. V. Pendharkar College of Arts, Science and Commerce (Autonomous), Dombivli was held on 12th February 2022. Dr. Ashok Varma, Scientist, ACTREC, Kharghar, Navi Mumbai spoke on "Bioinformatics: Basics to Applications". The lecture was conducted online through Google Meet Platform.

Abstract: In the post genomic era, Structural Biology & Bioinformatics, help scientists to visualize position of each atom, molecule or molecular complex present in three dimensional environment. Protein structure provides information about how disease related molecules are oriented in the three-dimensions. Large number of data bases for genes and proteins provide novel opportunities to correlate the function of proteins from their structure. Accurately determined three dimensional structures of proteins help in elaborating the location of an active site and the position for the ligand at the protein-protein interface or at the bioactive core. In this lecture, Dr. Varma elaborated on how the tools of Structural biology and Bioinformatics can reduce the time needed to discover new inhibitors/drug-leads for the management of clinical conditions.

7. Online Popular Science Lecture at St. Teresa's College (Autonomous), Ernakulam, Kerala On 19th February 2022

On 19th February 2022 a one-day webinar was organized jointly by the Indian Women Scientists' Association, Vashi, Navi Mumbai in association with the Department of Botany and Centre for Research, St. Teresa's College (Autonomous), Ernakulam, Kerala. The topic of the Lecture was "Next Generation Sequencing and its applications".

The resource person of the webinar was Dr. Abhilash Nair. He was introduced by Dr. Susan Eapen, former president of IWSA. Dr. Nair is a senior researcher at Hi-LIFE, Faculty Biological & Environmental Sciences, University of Helsinki, Finland. Dr. Abilash Nair spoke on next generation sequencing and sequencing Platforms and principles of Roche/454, Illumina Genome Analyzer Thermo Fisher Scientific, Pacific Biosciences, Thermo Fisher Scientific etc. The talk on Next Generation sequencing provided a great insight to the students and research scholars which gave them a wider knowledge on various sequencing platforms and principles and their scope in the field of research. The talk was followed by a discussion session, in which the Dr. Nair answered the queries raised by the participants and cleared their doubts.

The webinar commenced with a silent prayer. Dr. Liza Jacob, Head of the Department of Botany welcomed the gathering followed by the felicitation by Dr. Alphonsa Vijaya Joseph, Vice Principal, St. Teresa's College. Dr. Rita Mukhopadhyaya, President, IWSA, made a presentation on the activities carried out by IWSA. The meeting was concluded by the vote of thanks by Ms. Merin Alice George, Guest Faculty, Department of Botany, St. Teresa's College (Autonomous), Ernakulam. The webinar was open to students, research scholars and faculty members of various institutions and was conducted through the online platform of google Meet. Out of 138 people who registered, 83 attended the session.

8. Online RNS Popular Science Lecture at GN Khalsa College of Arts, Science and Commerce (Autonomous), Mumbai on 28th February 2022

An IWSA-BRNS Popular Science Lecture was held at GN Khalsa College of Arts, Science and Commerce (Autonomous), Mumbai on Monday, the 28th February 2022 at 4.00 pm. Dr. Rakesh Tuli, former Director, CSIR-NBRI and DBT-NABI and JC Bose Fellow at Punjab University spoke on 'Precision Microbiology inspired by Microbes'. The online lecture was conducted through Google Meet platform.

The principles of life learnt from microbes; and their genes, proteins and pathways have guided the designing of improved life forms. Some of the recent findings in microbes have given tools, poised to give a steep jump to the way genomes will be engineered in future. Previously not thought-of tools have been designed for targeted correction of genetic defects in microbes, plants and animals. The most promising technique developed from microbes, and applied is the CRISPR-Cas system for genome editing. Efficient correction of genetic defects in animals, plants and human cell lines has been achieved. Precision genome engineering is poised to improve life forms and correct human genetic diseases, pathogenic infections and improve crops for food and nutritional security. The approach requires altering only a few nucleotides in the natural genes, rather than introducing foreign genes. It has been applied in our laboratory to wheat, potato, bananas, and tobacco. Elsewhere, the technique has been used for developing low cholesterol potatoes. Using bacterial CRISPR/Cas RNA-Guided endonuclease, HIV, papilloma virus and β -thalassemia have been eliminated from human cell

lines. Genetic diseases, like cataract and tyrosinemia have been corrected in mouse models. Microbes have provided a framework of diverse pathways and genes, for designing metabolism of interest to man, and to improve crop plants for nutrition and field performance. The early efforts on putting all the genes together to create synthetic functional genomes have been successful in creating the first near-artificial bacterium, wherein synthetic genome has been demonstrated to function well in the scaffold of a bacterium. The next big hope is to learn how to create an artificial cell or a complete bacterium. Microbes provide the simplest, and yet very complex model systems to unravel how to create synthetic organisms who could perform novel metabolic tasks, and to create tissues and organs that could provide therapeutic alternatives. The learnings from single cell microbes are now moving forward to communal and consortia, and to understand how the emergent properties become so different in complex life forms. The knowledge gained from microbes has led to learnings on how to create artificial tissues and organs to study, improve and create life.

Dr. Reena Mehra, Head of Microbiology Department, GN Khalsa College welcomed the gathering. Dr. Suparna Kamat from IWSA spoke about the various activities of IWSA. Dr. Susan Eapen introduced the guest speaker. Miss Dhanshree Amberkar compered the program and Mrs. Sukhatha Mullick proposed vote of thanks. About 185 participants thoroughly enjoyed the program and participated in active discussion after the talk.

9. Online BRNS Popular Science Lecture at Sir Sitaram & Lady Shantabai Patkar College of Arts and Science and V. P. Varde College of Commerce & Economics (Autonomous College), Mumbai on 5th March 2022

An IWSA-BRNS Popular Science Lecture was held at Sir Sitaram & Lady Shantabai Patkar College of Arts and Science and V. P. Varde College of Commerce & Economics (Autonomous College), Mumbai on 5th March 2022. Dr. Susan Eapen, Former Head, Plant Biotechnology & Secondary Products Section, Bhabha Atomic Research Centre, Mumbai spoke on "Scientific Writing". The online lecture was conducted through Google Meet platform.

Abstract: It is essential for undergraduate and post-graduate students and researchers in science to develop skills in scientific writing, which will help them in writing science project reports, thesis and manuscripts for publication in journals. Ability to communicate is crucial for success in science. Scientific writing is technical in nature which scientists do to communicate their research to others. Scientific writing requires precision and communication of correct facts. It follows a specific format with key sections—an introduction to a particular topic, statement of hypothesis to be tested, a description of methods, key results and finally a discussion which is explained in the light of available literature. It is important to include an abstract, 5-6 keywords and references. In this talk, Dr. Susan Eapen discussed in detail about how to write a project report, thesis and manuscript and how to get the manuscripts published in high impact factor journals.

About 76 participants attended the online lecture through google meet platform and about 429 persons viewed this lecture through you tube.

10. Online BRNS Popular Science Lecture at Smt. Kasturbai Walchand College, Sangli on 11th March 2022

An IWSA-BRNS Popular Science Lecture was held at Smt. Kasturbai Walchand College, Sangli on 11th March 2022. Dr. Saswati Roy, Former Director, Chemical Engineering Group, Bhabha Atomic Research Centre, Mumbai spoke on “Role of Chemistry in Nuclear Energy Research”. The online lecture was conducted through Google Meet platform.

Abstract: Chemistry is in the core of materials and deals with the substances of which, materials are made of. It tells us about the properties of substances and their reactions with others. Role of chemistry is therefore very important for all materialistic research related to atomic or nuclear research. An atom is made up of a positively charged nucleus surrounded by negatively charged electrons, in such a way which makes the atom electrically neutral. Atomic nuclei are composed of two kinds of fundamental particles, namely, protons and neutrons. A proton carries a single unit positive charge and has a unit mass. Neutron is an electrically neutral particle and slightly heavier than the proton. The number of protons present in atomic nucleus is called the atomic number of the element. The total number of protons and neutrons present in an atomic nucleus is called the Mass number of the element. The Atomic number defines the chemical nature of the element as the orbital electrons outside the nucleus determine the chemistry of the substance. There are different branches of chemistry including its large-scale implementation processes, known as chemical engineering. Dr. Saswati Roy discussed about the role of chemistry and its implementation in nuclear energy research. About 100 participants attended the online lecture and the students interacted with Dr. Saswati Roy to get more insight into the subject.

11. Online BRNS Popular Science Lecture at Institute of Chemical Technology, Mumbai on 19th March 2022

An IWSA BRNS popular science lecture in association with DBT-ICT Centre for the Energy Bio-sciences, Institute of Chemical Technology, Mumbai was held on Saturday, the 19th March 2022 at 10.30 am. The speaker was Dr. Anugya Bhatt of Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum, Kerala. She spoke on “3D Bioprinting: Dimensions to Life.” The lecture was conducted online through Google Meet Platform.

Tissue scarcity is a global issue due to the large gap between demand and supply, she said. The number of patients in need of the organ far outnumbers the available donors. To bridge this gap alternative approaches are needed. Tissues engineering based research pave the wave to reconstruct different tissues. However, conventional tissue engineering approaches failed to mimic the native 3 dimension orientation for cells. 3D Bioprinting, an emerging technology allows us to reconstruct tissue/organs in its native form. As the name suggests, 3D Bioprinting is an additive manufacturing process that uses 3D Bioprinter and biocompatible biomaterials to generate 3D tissues through layer by layer extrusion. The resultant tissues can be used to replace, repair, or reconstruct damaged tissue/organ in the human body and/or to fabricate 3D tissues for *in vitro* toxicological testing applications. Such material that incorporates cells and existing hydrogel biomaterial components to fabricate scaffold for 3D Bioprinting application is called bioink. Bioinks are generated from biocompatible polymers

that can be tuned for their printability, biodegradability, and better mechanical property. Dr. Bhatt also elaborated about 3D Bioprinting, history of 3 D printing, types of 3D Bioprinters, cell sources, hydrogel as bioinks, limitations and future directions.

Dr. Annamma Odaneth welcomed the audience and spoke about ICT and DBT-ICT Centre for Energy Biosciences. Dr. Rita Mukopadhyaya spoke about the various activities of IWSA and Dr. Susan Eapen introduced the speaker. About 74 participants enjoyed the program and participated in the discussion. Ms. Krutika Bhoir compered the program.

12. BRNS Popular Science Lecture at Rajiv Gandhi College of Arts, Commerce and Science, Vashi, Navi Mumbai on 22nd March 2022

An IWSA BRNS popular science lecture in association with Rajiv Gandhi College of Arts, Commerce and Science, Vashi, Navi Mumbai on 22nd March 2022. The speaker was Dr. Santoshi Prabhu, Scientific Officer G, Senior Consultant Obstetrician and Gynaecologist, BARC Hospital, BARC, Anushaktinagar, Mumbai. She spoke on “Reproductive System: Facts, Functions and Diseases”. The lecture was conducted offline at Rajiv Gandhi College, Sainath Educational Complex, Plot No. 16/17, Sector 10A, Vashi, Navi Mumbai.

Abstract: The human reproductive system consists of internal and external organs – in both genders – that work together for the purpose of procreation and play a vital role in the survival of the species. Hence, this is one of the important systems in the body. Dr. Santoshi Prabhu gave an overview of anatomy, physiology and common diseases affecting female reproductive system, their sequel, management and prevention.

About 60 participants attended the lecture and had an interactive discussion with the speaker.

13. Online BRNS Lecture at Rajaram College, Kolhapur on 30th March 2022

An IWSA BRNS popular science lecture in association with Internal Quality Assurance Cell, Rajaram College, Kolhapur on 30th March 2022. The speaker was Prof. Deepa Khushalani, Professor in Materials Chemistry, Department of Chemical Sciences, Tata Institute of Fundamental Research (TIFR), Mumbai. She spoke on “Nanomaterials for Harnessing Solar Energy”. The lecture was conducted online through Zoom Platform.

Abstract: Nanoscience involves the synthesis and the study of properties of structures which are on a size of 1-100 nm. Over the last few decades, this area of research has become overwhelming and it is important to understand the chemical and physical fundamental aspects that make nanomaterials truly unique. In this talk, Dr. Khushalani discussed some crucial aspects of nanomaterials, from both a chemical and physical perspectives. Moreover, it is well accepted now that concurrent to the increase in population, India’s rapid economic growth has forced us to recognize the challenge of energy supply as nation’s top priority. Over last two centuries, most of our energy needs have been fulfilled by fossil fuel sources. However, the adverse environmental effects arising from carbon dioxide and other pollutants that are released due to fossil fuel combustion necessitates the search for environmentally clean, renewable energy fuel sources. For the second part of Dr. Khushalani concentrated on exploiting solar energy – this can be done by either converting solar energy to an electrical impulse (i.e. electricity) using devices referred to as solar cells. Alternatively, we can use solar

energy to drive chemical reactions that allow us to 'store' this energy in a chemical form. This is a form of photocatalysis. I will discuss the aforementioned routes and how nanostructures can enable us to in making better, more efficient solar cells and also form better photocatalyst.

About 63 participants attended the online lecture and the students interacted with the speaker in a lively discussion.

B. IWSA – BRNS Popular Science Lectures for Schools

1. Online BRNS Popular Science Lecture St. Mary's Multipurpose High School & Junior College, Vashi on 6th January, 2022

An IWSA BRNS Popular Science Lecture at St. Mary's Multipurpose High School & Junior College, Vashi on 6th January 2022. The speaker was Dr. Mukesh Kumar Roy, Head, Natural Sciences, Indian Institute of Information Technology, Design & Manufacturing, Jabalpur. He spoke on "Fun with Physics".

Abstract: Physics is considered as a natural subject but unfortunately the teaching method is not as natural as it should be. To make physics as a lively, interesting and more observation based, Dr. Roy explained in his lecture how one can learn physics using household items. He emphasized on "to observe" not on "to see".

About 272 students from Std 8th linked through Microsoft Teams to listen to this lecture.

2. Online BRNS Popular Science Lecture at Rishi Valmiki Eco Scholl, Goregaon on 25th January 2022

An IWSA BRNS Popular Science Lecture was held at Rishi Valmiki Eco School, Goregaon on 25th January 2022. The speaker was Mr. Nikhilesh Iyer, Scientific Officer, BARC & Science educator, Asan Vigyan, Mumbai. He spoke on "Play and Learn Science: A collaborative nonzero sum approach".

Abstract: He started the lecture with a brief introduction to science as a philosophy. He then elaborated on the following topics:

Jigyasa map: Logical sequence for learning science, Map of Multi dimensions for learning physics, Play and learn Chemistry via card games, Easy to do home experiments.

About 73 students from Std. 8 and 9 listened to the lecture through Google Meet.

3. Online BRNS Popular Science Lecture at Sainath English High School, Vashi on 27th January 2022

An IWSA BRNS Popular Science Lecture was held at Sainath English High School, Vashi on 27th January 2022. The speaker was Dr. Rama Mehta, Retired Scientist, Brain Energizer & Memory Trainer, Roorkee. She spoke on "Skill Mathematics".

Abstract: Skill Mathematics is the combination of Vedic Math and Brain Retention Power. During this lecture, Dr. Rama Mehta elaborated on the following topics:

Magic with Numbers, Quick Multiplication & Division with skill techniques, Multiplication with Criss-cross techniques, Square and Square roots within seconds with Brain Retention power, Riddle.

About 91 students from Std 9 listened to the lecture through Zoom virtual platform

4. Online BRNS Popular Science Lecture at SCD Barfivala High School, Andheri on 4th February 2022

An IWSA BRNS Popular Science Lecture was held at SCD Barfivala High School, Andheri on 4th February 2022. The speaker was Prof. Radha V. Jayaram, Institute of Chemical Technology, Matunga, Mumbai. She spoke on "Role of Chemistry in the 'Green' Revolution"

Abstract: Over the last two centuries, advances in science and technology have made a tremendous and global impact on society. The quality of life has become much better than what it was in the past. Advances in modern medicine have improved life expectancy. Use of insecticides and fertilizers has increased food production. Transportation, communication and entertainment have become simple, easy and affordable.

However, these changes have not happened without an accompanying cost. While life on earth has become comfortable, the earth, water and air themselves have been immensely affected by the 'side effects' of excessive usage of resources and reckless disposal of waste. Accumulation of contaminants, pollution and hazards in chemical processes began to threaten the tranquility of the earth and the environment. Toxic wastes, hazardous procedures and pollution had reached such levels that warranted laws and regulations.

As a result, a new term called 'Green Chemistry' was coined in the last decade of the twentieth century to achieve chemical processes and products in an environmentally benign manner. The objective of green chemistry is to effectively utilize renewable raw materials, eliminate waste and hazardous reagents. Catalysis is a phenomenon that has become an integral part of the production of a myriad of chemicals. Proper choice of a catalyst can have tremendous beneficial impact on the efficient utilization of raw materials and energy, reduction in waste and hazard.

In this lecture, Prof. Radha Jayaram focused on achieving green chemistry goals by proper choice of catalytic processes in the manufacture of chemicals and management of the environment.

About 65 students attended the lecture on Zoom Platform.

5. Online BRNS Popular Science Lecture at Vishwajyot High School, Kharghar on 18th February 2022

An IWSA BRNS Popular Science Lecture was held at Vishwajyot High School, Kharghar on 18th February 2022. The speaker was Dr. K. V. Srinivasan, Senior Scientist, Low temperature facility, TIFR. He spoke on "The Science and Engineering of the very cold".

Abstract: Cryogenics is a vital requirement in various research areas, such as Condensed Matter Physics, Materials Science, Accelerator Physics, Biological Science, etc. Properties such as superconductivity, superfluidity, which occurs only at cryogenic temperatures.

In this talk, after introductory remarks regarding obtaining cryogenic temperatures, the methods of production, storage and distribution of liquid nitrogen and liquid helium were presented. The talk also covered techniques in achieving ultra-low temperatures along with a

glimpse on various applications of cryogenics such as Nuclear Magnetic Resonance Imaging (MRI) in medical diagnostics, Cryosurgery, Cryo-treatment of materials, Space Applications etc.

The talk also shed light on the research carried out at low temperatures in TIFR and the cryogenic set-ups in various laboratories.

About 35 students attended the online lecture on Zoom Platform.

6. BRNS Popular Science Lecture at MES Vidya Mandir, Belapur on 25th February 2022

An IWSA BRNS Popular Science Lecture was held at MES Vidya Mandir, Belapur on 25th February 2022. The speaker was Dr Shashikant G. Mahadik, Scientific Officer, Haematopathology Lab, Tata Memorial Hospital, Parel. He spoke on “Hematopoiesis, blood cell morphology and their functions”.

Abstract: Hematopoiesis is the production of all the cellular components of blood and blood plasma. It occurs within the hematopoietic system, which includes organs and tissues such as the bone marrow, liver and spleen.

It begins early in the development of an embryo, well before birth and continues for life. A stem cell can develop into any of type of blood cell – Red blood cells, white blood cells and platelets. All of these have their own characteristic morphology and functions. The identification and study of these cells is essential to identify various disease conditions.

About 90 students attended the lecture at the school Hall.

C.IWSA – BRNS “Science and Our Life” Series of Webinars

The following webinars were conducted through Zoom platform during January to April 2022 under “Science and Our Life” Series.

1. “Lifestyles and ageing: Perspectives based on the science of integrative medicine and cognitive neuroscience” by Dr. Krishnamurthy Jayanna on 8th January 2022

The 22nd lecture of the series on “Science and Our Life” was held on 8th January 2022 as an ON-LINE webinar, through Zoom platform. Dr. Krishnamurthy Jayanna, Prof. & Dean, Ramaiah University of Applied Sciences, Bangalore spoke on “Lifestyles and ageing: Perspectives based on the science of integrative medicine and cognitive neuroscience”.

Abstract: Today, more than ever in the past, we are discussing our lifestyles and their ramifications on health and wellbeing. 'Lifestyle Change' or 'Lifestyle Modification' has always been of high interest in field of medicine. While modern medicine provides standard recommendations related to nutrition and food habits, physical activity, sleep, etc., the traditional science of wellbeing namely Ayurveda, Yoga and Meditation provide complementary approaches to promote health and holistic wellbeing. What is the science behind the integrative Lifestyle?

How do we achieve integration in our day-to-day life?

Further, one starts experiencing cognitive decline in their middle age as observed through lapses in attention and memory giving an indication of what we refer to as 'Mild Cognitive Impairment'.

If not checked early enough through appropriate lifestyle changes, the consequences can be severe in the elderly. Dementia manifested through memory loss and psychological changes affect the quality of life of the individuals and their family members. How do we arrest cognitive decline? What is an ideal lifestyle that promotes both physical health and the brain health? Are there tools and training programs to address the lifestyles for a more graceful ageing? How does Integrative Lifestyle promote a more holistic and wholesome living? In this lecture Dr. Jayanna addressed some of these questions to understand and manage the situation by bringing about a lifestyle change.

About 98 participants attended the online webinar and there were 56 views on the You tube

2. “Ecosystem and Wildlife Diversity in India” by Ms. Adithi Muralidhar on 12th February 2022.

The 23rd lecture of the series on “Science and Our Life” was held on 12th February 2022 as an ON-LINE webinar, through Zoom platform. Ms. Adithi Muralidhar, Scientific Officer, Homi Bhabha Centre for Science Education, TIFR, Mumbai spoke on “Ecosystem and Wildlife Diversity in India”.

Abstract: India is a land of diversity, be it in terms of topography, climate, ecosystems, flora and fauna or even people and culture. From high mountains to lowland plains, from freezing cold to hot deserts, from dense rainforests to open grasslands, our country has it all. Each type of ecosystem supports a unique set of wildlife which range from majestic animals to the lesser-known critters. Through this webinar, Ms. Adithi exposed the participants to the diversity of ecosystems in India and some of the lesser-known fauna that it supports.

About 39 participants attended the webinar and 112 participants watched on the you tube.

3. “Equity and Climate Change” by Dr. Vasudevan Rajaram on 12th March 2022

The 24th lecture of the series on “Science and Our Life” was held on 12th March 2022 as an ON-LINE webinar, through Zoom platform. Dr. Vasudevan Rajaram, Environmental Engineer, Founder/President of Midwest Engineers, Inc., Founder Tetra Tech India spoke on “Equity and Climate Change”.

Abstract: Climate Change is affecting all communities around the world, and the people most impacted are the poor who face property damage and death in their communities due to drought, flooding, extreme temperatures, and other climatic events. It is ironic that the poor have not caused this climate extreme but face all the consequences. In this talk, Dr. Rajaram elaborated on what the individual, State and Central governments can do to mitigate these climate extremes and ensure that there is equity in the era of climate change. The principle of Climate Justice and Environmental Justice were presented, and examples were provided on how young people can work on these areas. A lot of challenges were placed in front of the audience on how they can become active in their communities to mitigate climate change and help with resilience in the poor communities.

About 31 participants attended the webinar.

4. “Unlocking the secrets of the early universe” by Dr. Hashima Hasan on 9th April 2022

The 25th lecture of the series on “Science and Our Life” was held on 9th April 2022 as an ON-LINE webinar, through Zoom platform. Dr. Hashima Hasan, Program Scientist for NuSTAR, the Keck Observatory and ADCAR, and Deputy Program Scientist for the James Webb Space Telescope, NASA Headquarter, Washington D.C., U.S.A spoke on “Unlocking the secrets of the early universe”.

Abstract: How did the first stars, galaxies, and planets form? How and when were the elements that form life formed? Are we alone in the Universe? The James Webb Space Telescope (JWST), a partnership of the National Aeronautics and Space Administration (NASA), European Space Agency (ESA), and the Canadian Space Agency (CSA), aims to attack these age-old questions that have intrigued the human mind. With its 6.4 m mirror, made of 18 hexagonal pieces which folded up like a Transformer to fit into the rocket for launch, JWST is 100 times more powerful than the Hubble Space Telescope. A five-layer sun shield designed to protect the telescope and its science instruments from the heat of the Earth and the sun unfurled in space. The science instruments have cutting edge technology. As the Universe expands, and the earliest stars and galaxies race away from us, the light from their birth, stretching into the infrared, is just reaching us. JWST is optimized to receive and analyze this infrared light. Launched on December 25, 2021, Webb is now in its parking orbit around the Lagrange point L2, 1.5 million km from Earth, where it will be cold enough to make infrared observations. In this talk, Dr. Hashima gave a brief overview of the science and technology of this remarkable observatory, and of plans for conducting science.

Highlights of this Webinar:

1. There were two Lead Discussants- Dr. Prajval Shastri, Astrophysicist (Retd. Scientist, IISC, Bengaluru) & Mr. Chintamani Pai (Co-founder Space Geeks) who initiated the discussions after the webinar.
2. This talk was the 25th in the series “Science and Our Life” Lectures
3. Mr. Srinivas Laxman (Son of Shri R.K. Laxman), Times of India correspondent attended the seminar and reported it in TOI.

About 66 participants attended the webinar.

D. A Braided River – Book by UNESCO Delhi about The Universe of Indian Women in Science

A team from UNESCO, comprising of Dr. Nimita Pandey, National Officer, STI Policy, UNESCO New Delhi; Mr. Sunil Singh Rawat, Film Director; Mr. Manoj Jhinkwan, Cinematographer and Mr. Rahul Kumar, Sound & Light artist; visited IWSA on 23rd February 2022, to photograph our premises to convey the work being done by IWSA for women in STEM. This was a sequel to our senior most members Drs. Sudha Padhye and Sunita Mahajan being interviewed for feature in a book on eminent women in STEM. This book was launched on **7th March 2022**.

The you tube link for the launch of this book is:

<https://youtube.com/watch?v=NG7-l4xwqsU&feature=share>

E. Lecture in Marathi as part of Azadi Ka Amrut Mahotsav and National Science Day on 28th February 2022

On 28th February 2022, on the occasion of National Science Day as well as “Ajadi ka Amrut Mahotsav” BARC and IWSA organized a talk by Dr. Asawari D Rath, Scientific Officer, BARC in Modern School, Vashi. The event was conducted in Marathi and was attended by ~ 120 Students of Modern School from 8th and 9th standard (Marathi medium). This talk in Marathi titled “Lesar chya prakashat” was focused on lasers, their working and applications which were explained in easy language covering day-to-day examples to sophisticated laser applications in R & D as well as industry. Shri. Kudavkar From Modern School coordinated and conducted the event.

F. Science Day Celebration at IWSA HQ on 27th February, 2022

This year the event was held online. The Science awareness Committee decided to hold a competition on the theme BIOMIMICRY, so that children learn to appreciate the fantastic solutions provided by nature and how they are almost always sustainable. This topic was aligned with the theme of Science day by **DST-** 'Integrated Approach in Science and Technology for a Sustainable Future'. A virtual platform for the young scientists was provided to innovate and exhibit their creations and their knowledge. The two categories under which entries were invited were:

Category A- **Idea**-In this category students would demonstrate working models/ projects of **their own innovative ideas using those found in nature** on the online platform provided by IWSA. A maximum of 3 Students per project with one mentor teacher or a parent would be taking part online from their school/ home. There were three subcategories-
Subcategory (i)-An Essay of about (not more than) 300 words -One Student only
Subcategory (ii)-Power Point presentation of 5 slides
Subcategory (iii) -A short 2-minute video on the working model

Category B- **Showcase**- In this category students would **demonstrate working models/ projects of any known application of Biomimicry**. Again, this category had three subcategories as in Category A.

Our member Ms. Priya Jacob helped prepare a beautiful video explaining a concept that was new to many a student, teacher and parent. We received 34 entries from 10 schools across the city including one entry from Govt. School, Mussorie, and others from Andheri, Goregaon to Dombivli, Vashi & Belapur. A girl from Mussorie sent a video. Three judges were appointed for evaluating the different categories. The judges were as follows- Dr. Saswati Roy-Former Head, UED, BARC, Dr. Asawari Rath-Scientist- Laser and Plasma Technology Division, BARC, and Ms. Nirmala Nair-Retired Science Teacher, Sacred Heart School, Vashi, all IWSA

members. The Judges decided that all the entries were fit for Category B- Showcase. There were 17 PowerPoint presentations, 7 Essays and 7 Video presentations. The culmination event for the contest took place on the 27th Feb. 2022 online from 9:30 AM. Ms. Sonam Ambe, an Architect, author and educator gave a short talk on Biomimicry. 11 prizes from various categories were announced. The winners were informed to come to IWSA campus on 12th March between 3-5 PM and collect their prizes and winners' certificates from the IWSA. 68 persons participated in the event.

G. Mural Competition

An all-Maharashtra Mural competition was held in IWSA in February, 2022 in collaboration with the Indian Institute of Architects, Navi Mumbai Chapter. The three themes given to the students were 1) Ecological Restoration, 2) Famous Indian Women who broke the glass ceiling, and 3) Science for young and old. The outdoor murals had to be made out of waste material. After two preliminary rounds which were held online, where students explained their concepts and the material used, the shortlisted 8 murals were executed by the students and brought to IWSA HQ at Vashi, Navi Mumbai from Pune, Kolhapur, Mumbai and Navi Mumbai.

The following Judges selected the prize winners: 1) Ar. Shekhar Bagul, 2) Ar. Kaushal Jadia, 3) Ar. Rita Deshmukh, 4) Ar. Gulshan Kumar, 5) Calligrapher Achyut Pallav, 6) Mural artist Shyam Chavan, and 7) Ar. Archana Patil. The prize winners were: 1st Prize Dr. Bhanuben Nanavati College of Architecture for Women, Pune; 2nd Prize LS Raheja College of Architecture, Mumbai; 3rd Prize Baliram Hirary College of Architecture, Mumbai. 5 consolation prizes were awarded.

The competition was organised by Dr. Lalitha Dhareshwar, Dr. Rita Mukhopadhyaya, Dr. Sweedle Shivkar and Ms. Vijaya Chakravarty under the Golden Jubilee celebrations, and the murals were unveiled on the Foundation Day of IWSA on 13h June, 2022.

H. Green initiative of IWSA

Tejomayee 2

Going Green, or looking for green energy sources has been practiced at IWSA since 1999. Earlier solar thermal panels were installed on the rooftop of IWSA buildings to provide hot water to 150 working women and students living in our hostels, and these are working robustly and efficiently even to date.

A grid connected Solar Photovoltaic (PV) system of 21kWp – Tejomayee 1, was installed at IWSA in December 2017 as a green energy source, to meet our growing demands of power and reduce the power bills. Power generated in the solar grid during daytime is exported to the MSEB grid, and that consumed after active generation time is imported from the grid. This is reflected in the electricity bills issued by MSEB. We have avoided releasing 60 tons of CO₂ by switching over to solar!

Based on the positive and encouraging results of the performance of Solar PV system Tejomayee 1, it was decided to install an additional 26.5kWp Solar PV system, that would complete the maximum permissible load at IWSA. Phase II solar project, Tejomayee 2, was

completed in the month of December 2021. Thus, the total solar power system installed at IWSA is 47.5kWp.

I. Swatchhata pakhwada on 8th March, 2022

Scientists from BARC visited and demonstrated the various methods and procedures for generating Wealth from Waste. They showcased new methods for dry leaf decomposition including the palm leaves using biological inoculum. About 50 students from nearby Rajiv Gandhi and KBP colleges were present on this occasion.

J. Activities in Collaboration with Vigyan Prasar

1) Publication of a book:

There are over 30,000 edible plants globally, yet only 20 species provide over 90% of our food, leading to food scarcity & nutritional deficiency. India has a rich diversity of edible plants. Today, most of this knowledge is forgotten and many of these plants are considered as weeds or 'poor man's food'. Many of them are linked to our scriptures, folk tales, Ayurveda, and Siddha medicinal systems.

The book — "**Wild Forgotten foods**" edited by Ms Vijaya Chakravarty and Dr Sweedle Shivkar, showcases traditional recipes [Choddoshak-kali puja, Pathila thoran--immunity booster, Ghotto Sheddo, Rishichi Bhaji -- Curry of the ancient see the scalesages etc] written by IWSA members and leading nutritionists across India, including a recipe on millets shared by Dr Mahtab Bamji, recipient of the Living Legend award by the International Union of Nutritional Sciences. The nutritional value of all the recipes have been analysed on 20 parameters by Dr Ratna Raje Thar and her team. This has been a great value addition to the book. The book has been appreciated by Dr Hemalatha, Diector National Institute of Nutrition, Hyderabad and Mrs Pande, President, Army Wives Welfare Association.

2) Each One Teach One Program for School Students:

This program is designed to bring together a college student mentor with a student from a school. The rationale behind the program is to motivate educated students to understand their moral and social responsibility of educating the less privileged students. The idea here is to encourage college students to learn teaching methodology, imbibe the value of inclusiveness, improve their communication skills and in turn understand the basics of various scientific concepts of Science and Technology.

The second batch of EOTO was held in the months of March – April 2022. IWSA facilitated in bringing together college mentor students and school students. 6 college student mentors from Mithibai College, and 6 college student mentors from Sophia College mentored one student each (12 school students) from 8th Standard, each such pair being supervised by one IWSA mentor. Thus there were 12 trios formed, each with a college mentor, mentee and IWSA mentor. The scope of work for the college mentor students was, teaching of Science and Maths to 8th Std students, monitoring their performance during the mentorship period,

assessing the impact factor etc. IWSA mentors were allotted to the groups to look after the proceedings. Mentors adopted very innovative teaching methodology including demonstrating of experiments practically.

Every session had a small test for the mentee to evaluate her/his understanding of the topic. At the end of the program, feedback was obtained from the college mentors, school mentees and IWSA mentors. It was observed that just in a matter of two months, there was a remarkable improvement in the grasping, understanding and expression of the mentee. A very pleasant bond was developed between the mentee and mentor.

K. Activities of VIPNET Science Club

1. Designing Parachutes on 12th January, 2022

The sixth activity of the IWSA- VIPNET Science Club (VP MH 0248) was held on zoom virtual platform. The session began with Ms. Tripta Tewari, introducing Ms. Megha S. Chougule, Project Scientific assistant from Homi Bhabha Centre for Science Education, Mumbai.

Ms. Megha slowly introduced the science behind parachutes and demonstrated using both PowerPoint slides and actually paper and threads how different parachutes can be designed. The students and teachers joined her in designing two types of parachutes. Ms. Megha slowly made the children infer which parachute landed gently and the reason behind this phenomenon. She then went on to explain how origami is helping scientists to design better parachutes.

All the 36 participants enjoyed this DIY activity!

2. A lecture on “Fact or Fiction? How do you know?” was held on 1st February, 2022

The lecture was conducted by an Instructional Designer, Ms Natasha Mujgule. Abstract: Students are increasingly seeking information, knowledge as well as support to further their studies through the internet. The internet provides a wealth of knowledge but is also prone to disinformation and this gets worse with each passing day. Every website out there makes sure it looks professional, polished, and credible. At the same time, fake news and misinformation have been posing an urgent challenge to students and citizens across the globe. Multiple studies have highlighted an average person’s difficulty in distinguishing reality from fiction, reliable information from a hoax. This brings to the fore the challenge of how students should think critically for evaluating online information. The objective of this session is to help students build digital fluency in evaluating online information through ‘Fact Checking’ strategies. <https://youtu.be/9DabtjQgFVc>

3. Meet our Inventors on 22nd April, 2022

In this online event two young students Mohsin Khan (Class VIII student) and Ajayraj Jadhav (Third year Engineering diploma student), showcased their inventions on how to make “Fruit Ninja” game using Java Script, and “Temperature Controller Alarm” using Arduino, respectively.

4. Chatshaala at Homelab on 9th March, 2022

The ninth activity of the IWSA- VIPNET Science Club (VP MH 0248) was held on zoom virtual platform. The session began with Dr. Sweedle Shivkar, introducing Dr. Arunan and Mr. Jaikishan Advani, from CUBE, Homi Bhabha Centre for Science Education, Mumbai. CUBE is a platform for collaborative science learning through doing. During the pandemic when teaching and learning was affected globally, CUBE community came up with an innovation of Home Labs to continue science experimentation and learning. Students from several parts of India are doing observations and experiments in their Home Labs and having evening discussions in online Chatshaala to collaborate and learn science. In this presentation, some of CUBE students will be presenting their Home Lab work on Model systems which are easily available around them, through which they can do experiments at home and study several areas like biological rhythm, animal behaviour, phenology studies, mosquito mapping-disease prediction and so on.

Thus, during the entire session, various students who were in-charge of different Home Lab experiments at CUBE presented their experiments and how they gathered data from students attached to CUBE from various parts of the country. The various experiments discussed were- circadian rhythms of Phyllanthus leaves, Flowering of Mango trees, Study of Fruit flies, Study of Earthworms, Study of different types of mosquitoes and their egg structures, Colonies of lactobacilli on Potato slices and many others. Total No. of Participants: 30

L. IWSA – SIES College Student Internship Program

IWSA conducted Internship Programs with 31 students of SIES College (Autonomous), Sion, Mumbai during 18th November –18th December 2021. The students were from SY B.Sc. (6) and TY B.Sc. (25) degree courses of Biotechnology. They were divided into 6 teams. Six college faculty members along with about 20 IWSA mentors from HQ and branches guided the students. The topics that were covered under the Internship Program included Carbon footprint and climate change (Group 1); Colouring of Food and Fabric using Plant-based Natural Dyes (Group 2); Use of plants to produce ethanol as alternative fuel for petrol (Group 3); Bioremediation of wastewater by microbes (Group 4); Yeast the magic behind the rising dough and the fizz in carbonated drink (Group 5); Evolution of microscopes with microbiology and biotechnology research (Group 6) and a Common Project of Simulation of Basic DNA Molecular Biology Techniques using Snapgene Software Program (all the six groups).

Dr. Akhilesh Chaurasia from Department of Molecular Cell Biology, Institute for Antimicrobial Research and Therapeutics, Sungkyunkwan University School of Medicine, Suwon, South Korea interacted with all the 31 students every Saturday and guided them to use the software Snapgene

to carry out six simulation studies on basic molecular biology techniques comprising of *Lactococcus lactis* integrated expression vector construction for steady and improved synthesis of Short-chain fatty acids; Identification and Validation of an Antivirulence Agent Targeting SlyA-regulated Virulence in uropathogenic *Escherichia coli*; Rapid and efficient genome editing in *Staphylococcus aureus* by using an engineered CRISPR/Cas9 system; In-silico design and simulation of genome-integrated orthogonal drug screening platform for the identification of antivirulence agent by targeting a master virulence regulator in *Vibrio vulnificus*; Developing a marker-less Cre-lox-based system for multiple gene deletions and genome engineering of *Lactobacillus lactis*; and Construction of Promoter-probe Vector for the Assessment of Divergent Promoters in Bacteria.

SIES Faculty from Biotechnology department, worked together with **IWSA internship core team and mentors**. SIES online platform was made available for joint meeting like orientation, weekly meets of mentors and students, midterm peer appraisal, report presentation, expert review and invited lectures.

Special lectures by experts in the respective topics were organized to enhance the knowledge of the students. These included **Dr. K. Shankari**, Center for Integrated Mobility Sciences (CIMS) National Renewable Energy Laboratory, California, USA, on “Pathways to Decarbonising Indian Transportation” on 27th November 2021; **Dr. Y.V. Nancharaiah**, Water and Steam Chemistry Division, Chemistry Group, Bhabha Atomic Research Centre, Kalpakkam -603102, Tamil Nadu on “Microbes in Wastewater treatment & Bioremediation” on 30th November, 2021; **Dr. Shovan Kumar Majumder**, Senior Scientist at Raja Ramanna Centre for Advanced Technology (RRCAT), Indore on “Optical Tweezers: The force of light in making revolution in micromanipulation” on 8th December 2021; and **Ms. Janjri Jasani**, Deputy Director, Centre for Environmental Research and Education (CERE), Mumbai on “Fundamentals of GHG Accounting and Reporting” on 10th December, 2021. **Dr. Abhishek Mule**, Infield application specialist from Eppendorf India Pvt. Ltd. gave one team of five students exposure to the industry.

All the six teams made poster presentations on their respective simulation studies of Basic Molecular Biology Techniques and their respective practical projects on the topics they interned on, during the final review. They also prepared detailed dissertation on their respective projects and submitted to the University of Mumbai towards partial fulfilment of the Degree of Bachelor of Science in Biotechnology for the year 2021-2022. Some groups also brought out some booklets based on the project carried out by them.

This internship program provided practical knowledge of the topics selected through observation-based learning, nurtured the scientific ethics into young minds, established the importance of mentor mentee relationship, encouraged the students to take up community work, inculcated social responsibility and sensitized the students to environmental issues.

M. Lectures by IWSA Members in various Colleges

1. HSNC University, Mumbai organised a Lecture Series on International Women's Day on 8th March 2022. Dr. Rita Mukhopadhyaya, President, Indian Women Scientists' Association (IWSA), delivered a lecture on "Recreate, Reimagine and Restore 2021-2030: UN Decade on Ecosystem Restoration".
2. Manjara Charitable Trust's College of Education and Research, Navi Mumbai organised a webinar to celebrate International Women's Day on 16th March 2022. Dr. Shyamala Bharadwaj, Vice President, IWSA was the Guest Speaker in this webinar. She spoke on the following three topics: (i) My Journey as a Scientist, (ii) Women and digital revolution and (iii) Guidance for Trainee Teachers about Integrating STEM Aspects in Curriculum
3. Dr. Lalitha Dhareshwar, Past President, IWSA was invited as Chief Guest by Sainath Education Society's H.B. B.Ed. College, Navi Mumbai for their seminar on cultural and language interface to commemorate Azadi ka Amrit Mahotsav on 29th & 30th March, 2022. at their college auditorium. She delivered a lecture on "Language and Culture Interface".

Other Activities at IWSA Head Quarters

A. IWSA launches its Golden Jubilee Celebration Logo on 2nd January 2022



Interpretation of GJC LOGO

The coloured waves or whirls are 'The Winds of Change' to which we have adapted and moved ahead. Yellow to Blue indicates an increasing order of frequency of light in a rainbow, yellow light having lower energy photons as compared to the blue light photons which are of higher energy. This signifies that IWSA aims for higher and higher goals as we soar ahead. The flying bird represents IWSA which uses the wave as a spring board to leap higher and soar ahead!

B. Scholarship Awards on 15th January

The Scholarship Awards function was held on 15th January, 2022, in the virtual mode. It was attended by the Chief Guest, Prof. Vasudha Kamat, currently Chairperson, Governing Board CEC, New Delhi and former Vice Chancellor of SNDT University, members of the Board of

Trustees of IWSA, the awards committee members, donors, the awardees and their family and well-wishers. In all there were 80 participants for the ceremony.

Dr. Rita Mukhopadhyay, President IWSA, welcomed the audience to this first event in the Golden Jubilee year of IWSA and highlighted the various activities carried out by the organization. She mentioned how the scholarships had been initiated and thanked the donors for their kind contributions.

The Chief Guest Prof. Kamat spoke about the New Education Policy 2021. She very lucidly explained how the NEP was planned to bring about a major transformation in the education system in India, bringing in more equity, flexibility and multidisciplinary in the system.

Dr. Nootan Bhakal, Convenor of the Scholarship and Awards Committee presented the awards by briefly describing the person in whose name the award was instituted and the name of donor, along with the amount of award and the name of the recipient. A total 127 applications were received from Maharashtra in 2020-21, and 26 awards and e-certificates were distributed. IWSA branches were encouraged to collect funds for instituting scholarships for deserving students outside Maharashtra.

C. IWSA congregation was held on 23rd February, 2022

The biggest congregation was held of all its Trustees, Executive Members and other committee members who collectively showcased the exemplary work and activities of various branches of IWSA. 2 Eminent senior scientist members, Dr Sudha Padhye and Dr. Sunita Mahajan were interviewed by UNESCO, on their contributions towards STEM teaching and learning. They will be featured in a book on eminent women in STEM, which will be released on 7th March 2022. The following committees Science lab, Nursery, Library, Garden, Office, Hostel etc showcased their various projects and activities to Dr. Nimita Pandey, a representative of UNESCO Delhi, along with her photography team.

D. Nursery School and Education Committee

A Science fair was held in IWSA on 25th February, 2022, as a group lesson by ECCE students. It was a grand success. Total 27 toddlers enjoyed it with their parents. A Workshop was held on making a "Self-portrait from waste" on 3rd March, and a Music and Movement Workshop was held on 11th March, by the ECCE teachers for the Nursery kids.

E. IWSA's Satish Haware Computer Education Centre

Introduction to Digital Locker on 10th February, 2022

In this lecture by Dr. Sangeeta, what is a Digital locker, and what are its advantages was explained. The step-by-step process to Open & Retrieve data from the Digi Locker was summarised, and its importance as a secure gateway for real time verification, and how it reduces administrative overheads was shown. Thirty persons attended this webinar.

Introduction to Design Thinking on 22nd February, 2022

Design thinking builds a mindset and gives a structure to solving complex problems. It provides tools to create an innovative mindset. This concept was very well demonstrated by Ms Harshada Kulkarni. The number of participants was 28.

Boot Camp on Introduction to Python from 4th - 8th April, 2022

This workshop gave an introduction to: Python language, Loops, File handling and List functions. 16 persons attended.

F. Hostel and Day Care

Republic day was celebrated on 26/01/2022 at IWSA premises. Various games were conducted and prizes were announced for various other activities. Prizes were distributed after the flag hoisting.

The Day Care Center opened on 4th April 2022, after the lockdown.

BOARD OF TRUSTEES

Dr. Sunita Mahajan	Chairperson
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Reports from Branches

Amravati Branch

1. Workshop on “Farming for Profit- Soil Building through Soil Testing and Micro-culture” on 1st January, 2022

The National Academy of Sciences, India (Mumbai Branch) in association with Bharatiya Mahavidyalaya, Amravati and IWSA Amravati branch, organised this one-day workshop at the Conference Hall, Bharatiya Mahavidyalaya, Amravati. The workshop was organised for giving guidance to farmers about the importance of soil and water testing, and how to use micro-culture according to the crops and soil texture. There were six technical sessions including two practical sessions for testing water and soil. About 100 people attended this event.

2. “Jagatic Suryanamaskar Day” (Sun Salutation) on 9th February, 2022

Pratibha Women's Studies Centre of Vidya Bharati Mahavidyalaya, Indian Women Scientists Association and Mahila Patanjali Yog Samiti, Amravati, jointly organized **Suryanamaskarse Rastravandana** on the occasion of *Rathasaptami* and 75 years of India's Independence, at Vidya Bharati Mahavidyalaya, Amravati ground, and on Cisco Webex platform. Shri. Rajeev Deshmukh, President of *Vande Mataram Yog Pracharak Mandal*, Amravati and Yoga Champion at Pondicherry was the chief guest and he explained about the scientific basis of *Surya Namaskar*. The entire group was energized with the practice of *Suryanamaskaras* followed by Deep Relaxation. The beneficiaries included 51 members (offline) and 129 members (online).

3. “Global Women’s Breakfast 2022: Empowering the diversity in Science” on 16th February, 2022

Global Women’s Breakfast was organized by the Department of Chemistry on virtual platform in collaboration with International Union of Pure & Applied Chemistry (IUPAC), Association of Chemistry Teachers (ACT), Mumbai and Indian Women Scientists’ Association (IWSA), Amravati Branch. Prof. Ranjana Aggarwal, Director, CSIR-National Institute of Science Communication and Policy Research, New Delhi was the chief guest/ keynote speaker. There were 5 resource persons to emphasize the theme of Global Women’s Breakfast 2022. Prof. Alka Agrawal, Dept. of Medicinal Chemistry, B.H.U. Varanasi spoke on “Role of Indian Women in Chemical Sciences”. Prof. Sangeeta Sharma, Dept. of Chemistry, H. N. Gujarat University, Patan talked about “Empowering Diversity in Science” and Prof. Uma Sharma, School of Chemical Sciences, Vikram University, Ujjain spoke on “Molecules to Material: Chemistry Research in 21st Century”. Prof. Neelima Gupta Dept. of Chemistry University of Rajasthan elaborated on “Computational Chemistry for Organic Chemistry” and Prof. Zeba Siddiqui, Dept. of Chemistry, Aligarh Muslim University gave a detailed account on “Green and Sustainable Chemistry”. Besides their own topic all the speakers touched upon the theme “Equity and Empowering Diversity in Science”. There were more than 200 participants from Rajasthan, Madhya Pradesh, Uttar Pradesh, Himachal Pradesh, Chhattisgarh, Bihar and Maharashtra, who had joined through Google meet and YouTube.

Baroda Branch

1. National webinar on “Trends in Life sciences” on 21st January, 2022

This webinar was organized by the Indian Science Congress Association, Baroda chapter in collaboration with Indian Women Scientists' Association, Baroda branch & Faculty of Science, The Maharaja Sayajirao University of Baroda. The keynote speakers, Dr. Chetna Sachidanand and Prof. Shweta Saran talked on the current trends in the life sciences. The talks were followed by 14 oral presentations by participants covering diverse topics of life science. To encourage the students a competition for best paper presentation was conducted. Two of the papers were selected as best papers. The webinar was attended by more than 100 participants from various parts of the country.

2. Talk on “ABCD of Success” on 26th March 2022

A talk entitled “ABCD of Success” was organized by Indian Women Scientists' Association, Baroda Branch in association with The Indian Science Congress Association, Baroda Chapter & Indian Society of Geomatics, Vadodara Chapter. The talk was delivered by Dr. Chaitanya S. Buch (MBBS, MD, and PGD in Cyberlaw), who is a private practitioner Certified for Hyperlipidemia and Obesity from AMA and Harvard University, USA and also Trustee of CC Buch Public Charitable Trust and member of Task Force Against Diabetes in India and Executive Council Member of Indian Society of Geomatics. Dr. Buch guided the students through his book ‘ABCD of Success’ and all the participants were given a free copy of his book ‘ABCD of Success’.

3. A talk on “Climate Change” on 30th March 2022

A talk on “Climate change” by Dr. Dharmendra Shah, Department of Botany, Faculty of Science, The Maharaja Sayajirao (MS) University of Baroda & The treasurer of IWSA-BB, was organized by Indian Women Scientists' Association (Baroda Branch) in association with Department of Botany, MS University of Baroda. The speaker enlightened them about the environmental issues which are pressing right now and what measures can be taken to mitigate climate change. More than 100 students & faculty members participated in the program.

4. Talk on “Inculcating Scientific Temper in Students: Need of the hour” on 31st March, 2022

A talk on “Inculcating Scientific temper in students: need of the hour” and Prize distribution ceremony of science fair was organized by Indian Women Scientists' Association (Baroda Branch) in association with Indian Science Congress Association (Baroda Chapter), Department of Botany, Faculty of Science, The MS University of Baroda, & ISG-Vadodara Chapter. The chief guest of the function was Prof. H. R. Kataria, Dean, Faculty of Science, The MS University. The program consisted of a welcome address by Dr. Usha Pandya, Convener, ISCA-Baroda chapter and talks by Prof. Prasanna S. Ghalasi, Dept. of Chemistry, and Mrs. Hemlata Pawaghadi, Convener, Indian Women Scientists' Association (Baroda Branch). This was followed by prize distribution to the winners of science festival – 2022 organised earlier, from 22nd Feb to 28th Feb 2022.

Bengaluru Branch

1. BRNS-DAE Popular Science Lecture on “IP as a tool of Empowerment” on 29th January 2022

The Department of Biotechnology, Dayananda Sagar College of Engineering, Bengaluru in association with Indian Women Scientists’ Association, Bengaluru Branch organized this lecture. The speaker was Dr. Lakshmi Santhi, Senior Manager with SciTech Patent Art Services Pvt. Ltd. The talk was on Invention and innovation, the route to higher productivity. Dr Santhi in length discussed about the differences between Invention and Innovation. She introduced the participants to Innovation taking through why Innovation, what is its importance and its evolution scenario. She also explained on what is open innovation and closed innovation model. Later went into details on patents. She discussed on the type of patents, what is importance and significance of patenting. Each concept was discussed by several live examples. The total number of registered attendees was 93.

Hyderabad Branch

1. Two day - International e-Conference on “Microbial Pathogenesis and Recent Advances in Diagnosis of Omicron” on 4th, 5th February, 2022

This Conference was organized by the Department of Microbiology, Palamaru University in collaboration with Indian Women Scientists’ Association (IWSA), Hyderabad and Microbiologists Society of India (MSI). Prof. C. Anjali Devi, Secretary, IWSA, Hyderabad gave the keynote address. Four talks were given by Prof. Sharmistha Banerjee, Central University of Hyderabad, on “Molecular Pathogenesis of Mycobacterium Tuberculosis, the Highly Contagious TB Causing Bacteria”; Dr. Ruksana Raihan Dept. of Microbiology US-Bangla Medical College, Head, Gazi Covid 19 PCR Lab, Director, Research and Development CBRT, Bangladesh “SARS Cov 2: Variants And Vaccines”; Dr. Gokul Shankar Sabesan, Manipal University College, Malaysia “COVID-19 Associated Mycoses- A Curtain Raiser”; and Prof. D.V.R. Sai Gopal, Vice Chancellor, Cluster University, Kurnool and Professor, S.V. University “Recent Trends in Diagnosis of Omicron”. Dr. Shanthipriya Ajmera, Palamaru University, was the convener of the conference.

The Conference was aimed at making aware of the mechanism of microbial (bacterial and viral) pathogenesis, their adaptations to the environment, the progress of the present COVID 19 pandemic to different forms or variants and associated mycotic infections, its diagnosis and administration of vaccines to control the pandemic. More than 200 people participated in the event.

2. Webinar on “Advances in Technology in Health Sector” and launching of the Golden Jubilee celebration of IWSA on 25th February 2022

This webinar was organised in collaboration with The School of Medical Sciences and School of Chemistry, University of Hyderabad. IWSA Hyderabad, had the privilege of organizing the launching of golden jubilee celebration of IWSA over all the centres of IWSA in India through this webinar.

The event witnessed a galaxy of eminent scientists from various fields. Prof. Geeta K Vemuganti, Dean, School of Medical Sciences and the organizing secretary introduced and welcomed the dignitaries, and Dr Ratna K. IWSA convenor-Hyderabad chapter, gave an informative talk about various IWSA activities. Dr. Lalita Dhareshwar spoke about launching the golden jubilee celebration of IWSA that will be held on 14th June 2022, and the importance of the IWSA LOGO captioned as “LOOK BACK TO MOVE FORWARD AND SOAR” that was launched on 2nd Jan 2022. Prof. B.J Rao, Vice Chancellor, University of Hyderabad gave a talk where he expressed his idea of gender neutrality in science.

Dr.Anuradha Sekaran, provided an insight on artificial intelligence, deep learning and machine learning and stated its development in speech recognition, decision making and visual perception. She also mentioned breakthroughs in deep learning, innovations in medical and biological engineering and pathology. Prof.Geeta K Vemuganti threw light on basics of stem cells, tissue engineering and reprogramming of somatic cells to pluripotent cells. She explained how various types of stem cells from pancreas, skin, liver, brain etc. are used in different fields like nephrology, orthopedics, dentistry, and finally the tracheal tissue engineering using cadaver tissue. Dr.Shilpa N Sawant, spoke about biosensors, types of biosensors- enzyme based, whole cell based and transducer based, transducer materials, and the portable electrochemical device and sensor they developed to detect cancer cells. Dr.Roomi Sinha, talked about the scope and challenges of laproscopy, and benefits of robotic surgery.

Dr. P. Manjushree explained her work and spoke about ISRO missions like: NAVIC and telemedicine; and “Bhuvan”- a geo-visualisation of COVID-19 patients. Dr.Priya Abraham, mentioned that NIV was the first in the league to publish the EM of Covid-19 virus, it's genome sequence and IF image. Dr. Gita Sharma, discussed the development of first-generation, second-generation vaccines until the development of third-generation vaccines such as DNA, and mRNA. Dr. Annie Hassan introduced molecular methods, RFLP, Sanger sequence for single gene variant studies, Cell-free DNA testing, DNA methylation, imprinting disorders. Dr Sudha Murthy, discussed how tissue sequencing and analysis remain the “gold-standard” for diagnosis and molecular profiling, and the numerous applications of liquid biopsy. Dr Sharmila Bhattacharya, gave an interesting talk on numerous unique “stressors” associated with space flights. She spoke on “Bio Sentinel” to anticipate the extent of DNA damage when living biological systems are exposed to radiations in space for an extended period of time beyond the Van Allen Belt.

Over 145 participants registered for this event and the online audience at any given time varied from 50-60.

Kalpakkam Branch

1. Science Demonstration competition for students on 28th February 2022

As a part of science day celebration, a science demonstration competition was conducted for students of 5 township schools (Young Scientist' Quest-2022) online. A total of 145 students participated with much enthusiasm and 130 science demonstration videos were received. The evaluation of these videos was carried out by a judges' panel of 12 IWSA members and winners were selected. All the participants won certificates and trophies. Group winners (26 students) received science books as prizes. Prize distribution was conducted in 5 schools.

Principals of the schools, teachers, students and IWSA members participated in the prize distribution ceremony.

2. National Science Day celebration on 28th February 2022

IWSA members attended the meeting at Raja Ramanna Auditorium, IGCAR, Kalpakkam and students and teachers joined the program online from townships. Dr. K. Sundararajan, Head, RCSSS, IGCAR delivered the invited lecture on the topic "RAMAN EFFECT". The lecture was received well by the students and members. Dr. Veena announced the results of the Science competition and Mrs. Jemimah Ebenezer briefed about the science video presentation. A presentation of 16 selected science videos from students was shown to the audience. Mrs. Sylvia, Science teacher from AECS-1, Kalpakkam gave her comments on the competitions. She appreciated IWSA's efforts to encourage the students and congratulated all the participants. Judges Mrs. Shivakamy and Mrs. Padmapriya commented on their experience during their evaluation of science videos.

3. Help to Village children on 5th March, 2022

IWSA members extended help to 50 village children to buy nutritious food items (Milk, Ragi powder, Jaggery) and materials for hygiene (Soaps, toothpaste etc.)

4. Felicitation to Mrs. Shanthi Rajendran on 21st March, 2022

IWSA Members felicitated Mrs. Shanthi Rajendran from Hall-3, SGTF for her sustained and dedicated co-operation for all IWSA activities, on her retirement from service on 31st March.

5. Technical Talk on 30th March, 2022

IWSA Technical Talk was conducted at CDO Seminar Hall, IGCAR. Mrs. Jemimah Ebenezer, shared the experience of her team work and photos at the sites of 3000 feet altitude where they experimented with their sensors. This project was in collaboration with the Defence department. The talk was well received by the members and colleagues. 30 students participated in this talk.

6. Women's Day programme on 7th April, 2022

IWSA Women's Day program was conducted at Sarabhai Auditorium, IGCAR. Dr. Padma S. Kumar, Convener, IWSA welcomed the chief guests and the audience for the program. Shri. Raghupathy, Distinguished Scientist, Director, EIG & RDTG, IGCAR presided over the function. Dr. Anita Toppo, Secretary, IWSA presented the Annual report of IWSA, Kalpakkam. Dr. G. Latha, Group Head, Ocean Acoustics, NIOT, Chennai spoke on the topic: "Acoustic monitoring of the Oceans and applications", and Dr. Rachna Dave, Entrepreneur, MicroGo, Chennai delivered a talk on the topic: "Journey of a scientist to an entrepreneur". Dr. M. Jayashree, MS, DAE Hospital and Mrs. Renuka Raghupathy also graced the occasion with their presence. About 230 colleagues participated in the women's day celebration. Dr. Vanithakumari, Joint Secretary, IWSA and Dr. Veena, EC member introduced the speakers. Dr. M. Manohari, Treasurer, IWSA gave vote of thanks. Women's day celebration was a great success because of the very good team work of all EC members and IWSA volunteers.

7. Farewell on 25th April, 2022

IWSA farewell was arranged at seminar hall, QAD for Mrs. Sivai Bharasi, CSTD, IGCAR and IWSA life member on her superannuation. 15 members participated in the farewell function.

Kolhapur Branch

1. Environmental studies Activity for junior college students on 10th January, 2022

PowerPoint presentation, demonstration and hands-on training on Environmental studies was conducted by Convener Deepali Taywade Patil at Shilp Eco Garden Centre, Kolhapur for the Environmental studies students of Chatrapati Shahu Maha Vidyalaya, Kolhapur. Students learnt the basics of gardening & planted 40 different plants like medicinal plants, aquatic plants, vegetables, climbers, fruiting plants, etc. Participants :35

2. Observation of World Wetland Day on 2nd February, 2022

IWSA Kolhapur branch members visited the coastal area in Vengurla, Sindhudurg on 2nd February 2022, on the occasion of World Wetland Day. A seminar was arranged at Balasaheb Khardekar college, Vengurla, where Dhanusha Kawlavkar (Senior Research Biologist) & Durga Thigale Mangrove Foundation guided the students on Subterranean Wetlands, ornamental fish culture & fish cage culture by ppt presentation and site visits. Mangrove safari was arranged for the participants. IWSA felicitated a group of Local Ladies who strive hard to conserve wetlands & the surroundings by presenting them cloth bags with printed IWSA logo. IWSA also felicitated and bought articles made from local people to promote their art. About 60 – 70 people participated in this.

3. Poster Presentation Competition on Science Day on 28th February, 2022

On National Science Day, the Faculty of Science, Dr. Tanajirao Chorage Arts, Commerce and Science College, Nandwal, Kolhapur in association with IWSA Kolhapur branch organized a Poster Presentation Competition for B.Sc I and II year students on the theme “Integrated Approach in Science and Technology for a Sustainable Future.” Students presented posters on various topics related to Mathematics, Biology, Chemistry & Physics under the guidance of College Principal, Dr. Mrunalini Desai (Secretary IWSA, Kolhapur) & staff members. Prof. (Dr.) N.S. Chavan inaugurated the event by paying respects to Dr. C.V. Raman and she gave various ideas regarding science projects to the students. Many senior faculties of various departments of Dr. T.C College were present and 57 students participated in this program.

4. Creative gardening workshop for R S Farms, Mumbai on 6th March 2022

IWSA Members Dr. Dhanashree Patil & Dr. Pramila Battase conducted a workshop at R. S Farms, Mumbai for a group.

5. Women’s Day Celebration on 8th March, 2022:

On the occasion of Women’s Day, IWSA Kolhapur branch members undertook various activities at Sangola, Vengurla, Sangamner, Nandawal & Kolhapur.

a) Sangola:

“Women and Environment” on 8th March, 2022

N.S.S. Committee, Women Empowerment Cell of Vidnyan Mahavidyalaya, Sangola and Indian Women Scientists' Association, Kolhapur branch jointly organized World Women's Day Celebration Program on the theme “Women and Environment”. The program was inaugurated by offering flowers to Great Savitribai Phule's photo and by lighting the lamp by all the dignitaries present on the dais. Chief Guest Miss. Sonam Jagtap, PSI Sangola Police Station, President of the function Prof. Mrs. Neeta Pawar, Hon. Sanstha Secretary Vitthalrao Shinde and Acting Principal Dr. Raghunath Phule addressed students about women empowerment in biodiversity conservation.

b) Nandawal:

“Self-defence techniques & benefits” lecture on 8th March, 2022

This was arranged for girl students at Dr. Tanajirao Chorage College, Nandawal.

कृपिभूषण, डॉ. तानाजीराव चोरगे शिक्षण व संशोधन संस्था, मांडकी-पालवण, ता. चिपळूण, जि. रत्नागिरी संचलित

डॉ. तानाजीराव चोरगे कला, वाणिज्य व विज्ञान वरिष्ठ महाविद्यालय,

नंदवाळ (जैताळ-फाटा), ता. करवीर, जि. कोल्हापूर.

भारतीय वैज्ञानिक महिला संघटना व राष्ट्रीय सेवा योजना यांच्या संयुक्त विद्यमाने आयोजित

आंतरराष्ट्रीय महिला दिन

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मांडले. तर **अध्यक्षीय भाषण** मा. श्री. डी. एम. दुर्गुळे (अध्यक्ष स्थानिक व्यवस्थापन समिती कनिष्ठ महाविद्यालय) सर
यांनी केले. तर आभार डॉ. व्ही. वी. नलवडे मॅडम यांनी केले. तर या कार्यक्रमासाठी सूत्रसंचालन प्रा.
प्रा. एम. यु. कानिटकर प्रा. यु. एम. पाटील यांनी केले. अशा रितीने आंतरराष्ट्रीय महिला दिन साजरा करण्यात आला.

c) Sangamner

International conference on “Nurture Nature to Strengthen the Future”

This was jointly organised by S. N. Arts, D.J. M. Commerce and B. N. Sarda Science College, Sangamner & Indian Women Scientists' Association

Dr. Durga Tambe, Mayor of Sangamner Nagarpalika inaugurated the program and she distributed seed balls prepared by college students and encouraged women for biodiversity conservation. Smt. Chetna Dung, Director of GOLD delivered a talk on financial literacy in women and their role in sustainable future. Mrs. Neelima Jorwar, Founder President of Rangandh NGO, guided the audience on the topic of Wild Food for Development of the Nation, highlighting the virtues of various endangered legumes and the need to preserve them and also the special role of women in doing this. More than forty women students and scientists from Sangamner region had registered for this conference of which seven presented their work related to the role of women in environment sustainability. The activities were attended by more than two hundred female students and female professors of the college. The audience took with them a new message for environmental conservation and sustainable development.

d) Vengurla

“Women and Environment” on 8th March

This theme was celebrated by IWSA Kolhapur Branch in association with Women Development Cell, Br. Balasaheb Khardekar College, Vengurla, Mangrove Foundation, Rotaract Club of Vengurla Midtown, Vengurla court and Vengurla Municipal Corporation and Homeopathy medical college.

Judge, Mrs. Kiran Patil inaugurated the function by offering flowers to National Tree of India, Banyan tree. Dr. Amitkumar, Chief Officer of Vengurla Municipal Corporation was the chief guest. President of the function Dr. V. A. Dewoolkar, Principal of Br. Balasaheb Khardekar college addressed women about empowerment through Nature conservation. Women from various fields were felicitated by IWSA, Kolhapur Branch. Lawyer Shradha Bawiskar talked about the laws for Women and safety. Writers, Singer Anagha Gogate; Soprts girl Apurva Parab; Yoga Master Sakshi Bowalekar; Rotract Club of Vengurla Midtown president Sahili Ninave; three scientists from Fruit Research Institute, CSIR, Vengurla, namely Dr. Supriya Rawal, Dr. Kadam and Dr. Deshmukh; Durga Thigale and Jagruti both from Mangrove cell were felicitated for their contribution to nation and society. These women are role models for girl students. Swamini Women Self-help group, Mandovi and Omsai Self-help group were also felicitated for their great work through Mangrove Safari for Mangrove conservation.

This was followed by an Entertainment program which included yoga dance, folk dance, Traditional dances from various states, group dances with theme of Women Empowerment and skits on theme of Women and Environment.

60 girls checked the Hb in the Haemoglobin check-up program arranged by the Homeopathy medical college group.

Girls presented a slide show on Mangroves and Wetlands. Mrs. Kubal presented work done

by Vengurla Nagarparishad regarding Cleanliness drive, which is appreciated all over the nation as the best Waste management system. The program was organized by girl students under the leadership of Miss. Mayuri Parab who dreams of becoming a gram sarpanch. Overall, it became a mega gathering of girls and women to express their thoughts about women development. Dr. Dhanashree Patil, Women Development cell chairman, coordinated the program.

e) International Conference ‘Nurture Nature to Strengthen the Future’, on 9th March, 2022

An international conference, was conducted virtually by IWSA Kolhapur Branch supported by IWSA Head Office in association with Sushiladevi Salunkhe Centre of Women’s Studies, Vivekanand College, Kolhapur (Autonomous), Dr. Tanajirao Chorage Arts, Commerce & Science College, Nandwal, Kolhapur, Botany Department, Shivaji University, Kolhapur, S.N. Arts, D.J.M. Commerce and B.N.S. Science College, Sangamner (Autonomus), Br. Balasaheb Khardekar College, Vengurla, Sangola Taluka Shetkari Shikshan Prasarak Mandal’s, Vidnyan Mahavidyalaya, Sangola, and Gopal Krishna Gokhale College, Kolhapur. The aim of the conference was to provide a common platform for women scientists, activists, students and researchers to express their knowledge towards protecting and restoring natural resources to save and strengthen these for future generations. The main objectives were 1. Invite environmentalists to discuss socio-ecological and economic aspects related to Nature restoration, 2. Understand women’s strength and engagement in agriculture development, forest management, water restoration, soil and biodiversity conservation, 3. Note traditional methods and co-relate them with modern techniques for nature conservation and 4. Felicitate environmentalists: the role models for our youth. The sub themes of the conference were 1. Women: Role in Environment management, 2. Space Technology for Societal benefits with respect to Environment, 3. Coastal Biodiversity conservation, 4. Water restoration, 5. Socio-ecological role of Women to Nurture nature, 6. Economics with respect to natural resource management, 7. Livelihood practices depending upon natural resources and 8. Women in Organic farming.

The Guest Speakers and their topics were Dr. Deepti Deobagkar from ISRO, on “Applications of Space Technology for Societal benefits with reference to Women and Environment”, Dr. Mrunalini Fadnavis, Vice Chancellor, Punyashlok Ahilyadevi Holkar Solapur University on “Socio-Economical Aspects related to Women and Environment for Sustainable Future”, Usha Thorat, Former Deputy Governor, Reserve Bank of India, on “Natural Resources & Implications for Rural Women”, Dr. Archana Thakur, Managing Director, Codon Bio Sciences pvt. Ltd., Goa, on “Agro and Agro Industrial Waste Valorization and Circular Economy”, Dr. Manisha Rajebhosale, Retina Screener Grader, North West London Diabetic Eye Screening Program, UK on “Opening New Opportunities: An Interdisciplinary Approach on Trending Crops in Global Market.”, Dr. Kavita Mathur, Wilson Textile College, North Carolina State University on “Evaluation of Antimicrobial and Antiviral Properties of Textile Surfaces”.

Nagpur Branch

1. Women's Day lectures on "Gender equality for a sustainable tomorrow" on 8th March

This was held at Nikalas Mahila Mahavidyalaya. Dr Seema Somalwar Principal of the college and Convener, IWSA, Nagpur gave introductory remarks. Dr. Anuradha Gadkari, the chief guest, addressed the students on the topic "Enriched womanhood", explaining how blessed it is to be a woman and urging women to discover their inner strength, talents and abilities and utilize them better. Dr. Saroj Desai, the guest of honour encouraged girl students to be strong and participative in all walks of life and said that women's struggle should not be against any one person but it should be against a wrong system. This was followed by short speeches, poems and skits. Total number of attendees was 275. The whole program was an excellent celebration of Womanhood.

2. BRNS - DAE popular science lecture on "Banana, the Kalpavriksha" on 15th March

A BRNS-DAE sponsored popular science lecture on "Banana, the Kalpavriksha" by Mr. Mragank Nema, Project Head, Gencrest Bioproducts limited, Jalgaon was at Nikalas MahilaVidyalaya. About 50 students attended this talk. Mr. Mragank Nema explained how apart from fruits, the crop generates huge amounts of biomass in the form of pseudostem suckers etc. and how it is used to generate yarn for woven fabrics and non-woven products used as components in automobiles, railway coaches and carpets in home furnishing, as paper, in enrichment of manure vermicompost, and even as edible products. The talk was followed by interaction with audience where absorption capacity, strength, feel and colour fastness etc. of such fabrics were discussed.

3. BRNS-DAE popular science lecture on "Role of Biotechnology in Civil Engineering" on 28th March

This BRNS-DAE sponsored popular science talk was delivered by Dr. Madhuvanti Latkar, Associate Professor at VNIT at Seth Kesarimal Porwal College, Kamptee. She explained how the growing concerns about sustainability have escalated the importance of bio-cementation techniques, the microbially induced calcium carbonate precipitation (MICCP), for strengthening and protecting construction materials. She discussed the recent advances in this field, where researchers have come up with different natural nutrients to grow ureolytic bacteria used for bio-cementation, so as to make the process economic. About 60 students attended this talk.

Pune Branch

1. One Day Webinar on "Women in Science and Technology", on 8th March 2022

A one-day webinar was organised to celebrate Women's Day. There were three speakers, Dr. Aparna Gunjal from Dr. D.Y. Patil, Arts and Commerce and Science College, Pimpri spoke on "Contribution of Women in Space Technology", Dr. Shilpa Mujumdar from Modern College of Arts and Science and Commerce, Shivaji Nagar spoke on "Contribution of Women in the field of Microbiology", and Vijeta Sharma, National PARAM Supercomputing Facility (NPSF), C-DAC spoke on "Emerging role of Women in the era of Supercomputing".

Roorkee Branch

1. BRNS-DAE popular science lecture on “Diabetes and Eyes” on 27th February,2022

The speaker was Dr Ashima Grover Sharma, MBBS, MS, DNB, from Dehradun, a Cataract, refractive and corneal transplant specialist. The talk focused on the effect of diabetes on the very sensitive organ Eye, how we can recognise the early symptoms, what we can do to prevent the damage to our eyes, when to visit the eye specialist, a brief summary on the way the eyes can be damaged leading to vision loss, and how it can be corrected if the treatment is started on time.

2. BRNS-DAE popular science lecture on “Stay Healthy and Fit by Lifestyle Management” on 19th April 2022

The lecture was organised at Roorkee College of Engineering in the hybrid mode. The speaker was Dr. Ajay Bhargava, MD (Medicine), senior consultant in Roorkee. The speaker explained in a very scientific and technical way as to how a number of diseases, e.g. high B.P., heart attack, diabetes, COPD, cancer, obesity etc. are developed due to the faulty lifestyle. There were 152 students of B.tech, B.Pharma and 32 faculty members in the audience and four IWSA members.

Article

TEXTILES TO SUSTAIN OUR FUTURE

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Abstract

Clothing and textiles have evolved. The source of textiles for clothing has shifted to the use of different synthesized polymers. The textile dyes and auxiliaries used in processing lead to pollution. Mass production and availability of cheap garments lead the fast fashion. Production and consumption exceeded without plans for end-of-life disposal. The environmental impact of fast fashion is seen in today's climate change. It has prompted a shift from fast to slow or sustainable fashion. Sustainable clothing is shifting from a recycling economy to a circular economy, where end-of-life waste can be utilized in the same production cycle or as a raw material for developing other products. The effort is directed to zero waste production. The textile industry directs efforts to optimize water, energy, and resources. Consumers are responsible for consumption, care in use, and disposal after use.

Keywords: Circularity, Durable, Sustainable fashion, Reuse, Textile processing

Introduction

Evolution of clothing and Textiles

Evolution of clothing since ancient times, from draped to tailored garments. Clothing in India is dependent upon the different ethnicities, geography, climate, and cultural traditions of the people of each region of India. Clothing in India also encompasses a variety of Indian embroideries, prints, handworks, embellishments, and clothing styles (1). References to *hiranya*, or cloth made of gold, were found in the ancient Vedic literature (c. 1500 BC) (2). The origin of Indian textiles can be traced to the Indus Valley civilization as early as the 5th millennium BC. The people of that civilization used homespun cotton for weaving their garments and used indigo to color their fabric [3]. An unstitched garment, the saree is traced to the Vedic civilization, evolving with cross-cultural influences of trade and confluences of techniques and patterns; the saree still has innovations in its production processes (4). Coloration using natural materials was also evident from the archeological findings and cave paintings depicting woven fabrics that were draped (5).



Fig. 1a. and 1b. Evidence of draped garments (5)

Textiles from natural to wood-based and synthetic man-made materials

We have depended on natural and synthetic fibers for our clothing needs. Natural Fibres from animal sources include Silk, Wool, Mohair, Alpaca, Cashmere, and other hair-bearing animals like Camel Hair, Horsehair, Yak, Bison, Goat, and Angora Rabbit. Natural fibers from plant sources include cotton, Linen, Jute, Hemp, Ramie, Pina, Coir, Sisal, Banana, and bamboo. The world wars resulted in a shortage of natural fibers. The need for alternate clothing sources arose. Rayons were developed as wood-based textile materials. Different types of wood were used to develop new regenerated cellulosic fibres. Later, synthetic fibers were discovered and commercialized. After 1941 polyester was commercialized, and many other synthetic fibers came into use (6).

Textiles

By accident, Sir William Perking found the first synthetic dye Perkin Mauve in 1856 (7). The dyes used for the natural fibers could not colour the synthetic fibers. Therefore, there arose a need for suitable dyes to colour the new fibers and chemicals to fix the colours. Synthetic dyes, therefore, came into existence. Several classes of dyes were developed for the colouration of textiles. Various chemicals were used to prepare the fabric for colouration and dyeing. The colouration of textiles can be done at the fiber stage, yarn stage, and fabric stage or garment stage. Textile wet processing has a lot of chemical inputs, energy, and water leading to pollution. The textile industry is the second most-polluting industry after the chemical industry.

Finishes applied

To enhance the feel and functional properties of the fabrics many other chemicals were used to improve the finish. Chemical Finishes improve feel, wearability, appearance, and functionality like crease-resistance, anti-microbial, hydrophilic, fire-resistant, easy-care, etc. Certain chemicals have now been found to harm human skin and pollute the environment. Emissions have polluted the air, landfills mount, and water pollution. Efforts are on to ban and restrict the use of harmful chemicals from the entire textile supply chain.

Fast vs. Slow Fashion

Affordability, Urbanization, and mass production of cheap products have resulted in the 'make, use, and throw' culture leading to the generation of waste clothing much before the end of life of the clothes. Online shopping has added to our consumption. In contrast, slow fashion

involves sourcing ethically manufactured clothing without harm to humans or the environment. The well-being of the workers, employees with fair wages, and safe working conditions are ensured. The raw materials selected are natural or nature friendly and resource-efficient. Local sourcing, local producing, and increased community involvement. Versatile clothing, classic (will not go out of fashion), high quality, durable, and long-lasting, even if it costs more than fast fashion.

Slow fashion promotes handmade craftsmanship, traditional techniques, and artisans. Usually, these may involve small-scale production at a lower speed and customized to individual orders (8).

Impact of disposal on the environment

Climate change, resource depletion, water pollution, air pollution, habitat destruction, and food insecurity are some of the negative impact areas of the textile industry. Landfills are mounting with waste, leading to toxic emissions that must be controlled. The only way to mitigate this problem is to look at how we make and use our clothes and home textiles.

New Waste Management Paradigm

Textile Waste Recovery has seen a paradigm shift in how textiles are made and processed. Optimizing processes, reducing waste, recovering materials from being reused in the next cycle or raw material for the next production cycle or as a raw material for manufacturing another product.



Integrated solid waste management hierarchy (9)

Traditionally in the waste hierarchy, most of the textile waste was discarded in the landfill. The new waste management paradigm aims at reducing and preventing waste at source (9). So, the designers and producers are responsible for carefully selecting raw materials that are easy to recycle. Secondly, the focus is on the recovery of waste at each point in the supply chain so, it can be reused, recycled, or converted to a better product, called upcycling. If the recovered material is unsuitable for reuse, it is composted or used as fuel by waste-to-energy transformation. The least preferred option is to discard it in the landfill.

Sustainable Initiatives in the Textile Industry

UN Sustainable Development Goals are the blueprint to achieve a better and more sustainable future for all. The Goals are interconnected and, in order to ensure a just transition that leaves no one behind, it is important that we achieve each Goal and target by 2030 (10).



UN Sustainable Development Goals (10)

Project Sustainable Resolution aims to contribute to the UN Sustainable Development Goals, especially SDG12, for responsible consumption and production. Several companies in India pledged to this SU.RE projects, like Shopper's Stop, Aditya Birla Retail, Future Group, Arvind Brands, Lifestyle, Max, Raymond, House of Anita Dongre, W, Biba, Westside, 109F, Spykar, Levi's, Bestsellers, and Trends (11). Many more joined to reduce the environmental effects of the textile industry by taking actions to shift a significant percentage of our supply chain to a sustainable chain by 2025 (12).

9 R s to Circularity

The Best way is to reduce our consumption. Reduce, Reuse, and Recycle have now added R's. The 9 R's is an extended waste hierarchy adapted from Cramer, 2014. It visualizes the opportunities to extend the life of a product and avoid the disposal of materials. Refuse, Rethink, Reuse, Repair, Refurbish, Repurpose, Remanufacture, Recycle and Recover (13).

Reduce

Waste minimization at the source without impacting product quality and manufacturing procedures. The textile industry is gearing towards using good housekeeping practices, identifying major sources of pollution and material balances, replacing chemicals with high toxicity with alternatives, and replacing chemicals with limited biodegradability. The use of environmentally friendly chemicals and reducing waste generation, where possible, are other sustainable practices.

Recycle

Pre-consumer waste from textile industries, garment factories, and tailoring units can be used in many ways. Although the effort is to reduce waste, some reclaimed fibers and yarns can be put back into the production cycle. Waste from knitwear units is used in the weft and coarse yarns in the warp to weave floor mats and rugs. Such products are seen in Tirupur, Ludhiana, and several other places. If the waste scraps are carefully collected and segregated by colour, there will be no need for colouring the recycled yarn. The scraps can be mechanically shredded to respun fibers into coarse yarns for home textiles like floor rugs, mats, durries, and bedcovers. Instead of spinning, the shredded fibers are converted to nonwoven for several

end-uses like carpet backing, insulation, etc. Bleached white fabric scraps can also be used for medical nonwoven.

Chemical recycling involves using synthetic materials that can be recovered, depolymerized, and spun into filaments for use in garments with recycled content. An example is the use of PET bottles that are converted into garments.

Post-consumer waste from discarded garments is repurposed to wear. For example, sarees are converted to wrap-around skirts, halter dresses, bags, or home textile products like *sujani* quilts, bedcovers, etc.

Fast fashion apparel retailer H&M started a conscious collection drive in 2014. Recycling garment waste for home textiles, recycling carpets to floor tiles, garden seats, and other moulded products.

Sustainable clothing Brands

Ethical and sustainable clothing brands like Levi's, Patagonia, Kotn, Alternative Apparel, Fair Trade, People Tree, Reformation, Monsoon, United by Blue, and many more have been betting against fast fashion. Several Sustainable Fashion Brands in India have emerged in recent years, like Fab India, Khadi Cult, Ethicus, The Jodi Life, Anokhi, The Label, Okhai, Doodlage, Ba no Batuo, No Nasties, IIII, and Nicobar. Each of their websites highlights the efforts made towards sustainable production of various products apart from apparel. This gives entrepreneurial opportunities to grow into successful Brands (14, 15).

Transitional and Circular Fashion Approaches

Environmental controls are driving textile industries from linear to circular economies. There are two approaches. One is the Transitional approach of reusing existing textiles through redesign services, second-hand, and leasing (rental) models. The other is the circular approach, where manufacturing finds possible ways to recover waste during production. Use the recovered waste as raw material in the same production cycle or the production of another product (16). There is also an opportunity to recover clothing disposed of by consumers and make it available as pre-owned and pre-loved clothing for purchase through Flea markets, Vintage stores, which are still prevalent in India (17).

The Statista Global Consumer Survey Report of August 2021 and June 2022 forecast that the demand for sustainable clothing in men's, Women's, and Children's apparel categories will increase (18). Sustainable Brands have used new production technology and practices.

Brands like H&M, Pantaloons, and Shopper's Stop have attempted to recover post-consumer clothing where consumers can exchange their waste clothing for vouchers. Such take-back schemes offer a point of collection of waste from the consumers.

North Face has a closed-loop system for the manufacture of Denali fleece jackets. The only regeneration system used carpet fluff and fishing nets from the oceans for Econyl Nylon 6 yarn supplied to sportswear companies. Reducing water consumption, reducing chemicals, reducing energy for fabric dyeing and finishing, and manufacturing new clothing are positive steps. To reduce the environmental impact, Nike Flyknit shoes and Nike Grind collections were the most sustainable innovations. Since 2016 approximately 71% of footwear and apparel products have contained recycled content.

Future of textiles

Transparency and Traceability competences

In the future, it will be possible to trace the origin of the garment in the supply chain from the farm stage to the manufacturing and the user. The process will require registration of the textile garment with a tracking code, a secret code, and a traceability code with all the garment information fed into the product data server. A label will be printed on the sleeve or any part of the garment. The authenticity of the product can be verified by scanning the label. If no information is found, then it is a counterfeit. The consumer will have access to the history of the garment while disposing of the garment. Consumers will have a greater responsibility for what they do with their apparel and home textiles. As consumers, we play an important role in how we demand, consume and dispose of.

Strategic Collection

There is a need for a more systematic way of disposing of our clothes regularly. NGOs, Corporate Companies, Designers, and National and International Brands have been in sustainable methods and practices in collection, reuse, redistribution, or remanufacturing. When it is impossible to utilize waste, incineration for energy is the only option.

Green Laundry

Green laundry to ensure the use of environmentally conscious laundry practices. Using lesser water and more eco-friendly alternatives to chemicals used as bleaches, detergents, softeners, etc. Dry cleaning solvents and their disposal can be challenging, so minimizing the number of times we dry clean. Thus, making washing a greener and more sustainable process. Green laundry is a new movement of environmentally conscious laundry practices with more sustainable processes. Laundry consumes essential resources like electricity, water, and laundry detergent. Our modern laundry equipment produces some pollution. Greenhouse gases are released to generate the electricity necessary to operate devices that produce wastewater as a byproduct. Waste includes detergent packets, fabric softener sheets, and other laundry products. Softeners, Dry cleaner, and Solvent.

Wellness textiles

Wellness textiles are available with an increasing demand for sustainable textiles; moving to natural fibers, natural dyes, herbal finishes, and eco-friendly finishes will be on the rise. Natural fibers like Banana, Linen, Bamboo, and other minor fibers are gaining popularity. Natural dyes extracted from plants, seaweeds, and insects are beneficial for coloration and other properties. Finishes are applied that active release ingredients absorbed by the skin and transported throughout the body for healing effects.

Conclusion

In conclusion, the textiles that will be produced in the future will have to be made so that we conserve resources for future generations. It is not even a hundred years since the commercialization of synthetic fibres, colourants, and chemical auxiliaries. The awareness of the harmful effects of chemicals drives the textile Industry to mitigate and use safe, environmentally friendly alternatives.

As consumers of textiles, we have a great responsibility in how we demand, consume, and dispose of textiles. The first step towards a sustainable approach is to extend the wardrobe. Efforts to repair, remove stains, reuse, and restyle the garments by wearing them differently, mix-matching, and giving them a different look. Remaking and remodelling will require time and money and involve creativity.

When it is time to pass on, consumers can find users through Thrift shops and sell online or on Apps like ThatsMyStore. Donation of clothes to NGOs like GOONJ, which has a nationwide network of collection centers for any waste used for disaster preparedness. Traditional waste collectors like Bartanwale or Bhandiwale, who collect from door to door, now wait at strategic places in the market and offer household items in exchange for clothes. The clothes get refurbished for the second-hand markets, thus making good quality and branded products affordable for the masses.

Rent and use of a clothes library are the different levels of circularity that will extend the life of our clothes. Apparel, footwear, and home textiles containing recycled content are getting certified and gaining consumer acceptance slowly but consciously. The future of textiles lies in how consumers demand, use, and dispose of end-of-life products.

References

1. Clothing in India.
https://en.wikipedia.org/wiki/Clothing_in_India
2. <https://vedicheritage.gov.in/vedic-heritage-in-present-context/metallurgy/>
3. Cotton- The Indian Heritage Textiles, Textile Value Chain May 26, 2021
<https://textilevaluechain.in/in-depth-analysis/cotton-the-indian-heritage-textiles/>
4. Iconic Saree Weaving Cluster of India.
<https://whc.unesco.org/en/tentativelists/5890/>
5. [Cave paintings](#)
6. Polyester, Encyclopedia.com Updated May 29, 2018. Accessed 7th September 2022.
<https://www.encyclopedia.com/sports-and-everyday-life/fashion-and-clothing/textiles-and-weaving/polyester>
7. The Mystery of the Victorian Purple Dye, Research Outreach November 5, 2019
<https://researchoutreach.org/articles/mystery-victorian-purple-dye/>
8. Fast vs. Slow Fashion, SANVT Journal, 21 April 2020,
<https://sanvt.com/blogs/journal/fast-fashion-vs-slow-fashion>
9. Clifford Fagariba & Shaoxian Song (2019), [Assessment of Impediments and Factors Affecting Waste Management: A Case of Accra Metropolis](#).
https://www.researchgate.net/publication/321533807_Assessment_of_Impediments_and_Factors_Affecting_Waste_Management_A_Case_of_Accra_Metropolis
10. UN SDG Agenda 2030.
<https://unemg.org/our-work/supporting-the-sdgs/the-un-sustainable-development-goals/>
11. Project SU.RE, 2019. <https://lakmefashionweek.co.in/home/sustainability#2019>
12. <https://cmai.in/project-su-re/>
13. Can One Achieve Sustainability By Embracing 9R's Of Circularity?
<https://www.fibre2fashion.com/industry-article/8485/how-can-one-achieve-sustainability-by-embracing-9r-s-of-circularity> Accessed in Dec 2019.
14. The nine levels of circularity Cramer, J. (2014) Milieu. Elementaire Deeltjes: 16 Amsterdam: Amsterdam University Press B.V.
15. Thompson, H. (2012). 'Remake it Clothes'. London: Thames and Hudson Ltd. Pp 006-165.
16. Karen K. Leonas, (2017), The Use of Recycled Fibres in Fashion and Home Products, in Muthu, s.S. (ed.) Textiles and Clothing Sustainability: Recycled and Upcycled Textiles and Fashion, VII <http://www.springer.com/978-981-10-2145-9>

17. Pasquale Marcello Falcone, Gulsah Yilan, and Pieggiuseppe Morone (2022). Transitioning towards Circularity in the fashion Industry: Some answers from science and future implications. In book: Circular Economy and Waste Valorisation. DOI: [10.1007/978-3-031-04725-1_4](https://doi.org/10.1007/978-3-031-04725-1_4)
18. <https://theconversation.com/the-planned-national-waste-policy-wont-deliver-a-truly-circular-economy-103908>

[Dr. Suman Mundkur is a Research Consultant, Academic Research Consultancy Services, that provides research and publication assistance to students, researchers, academicians and lifelong learners. She is a visiting Faculty for M.Tech students at ICT Mumbai. She delivers lectures at Amity University, National Institute of Fashion Technology NIFT, Mumbai and webinars. She has retired after 29 years of teaching experience as Associate Professor at the Department of Textiles and Apparel Designing, Sir Vithaldas Thackersey College of Home Science (Autonomous), S.N.D.T Women's University, Juhu, Mumbai. She is Researcher, Life Ambassador, India, for Cactus Communications, Seattle, USA, Hon. Secretary of the Home Science Association of India, Governing Body Member of Indian Fibre Society, Hon. Trustee, Society of Dyers and Colourists Education Charity (SDC EC) in India. She has Authored a book on 'Zeroing In On A Research Topic': Resources and Strategies for Selecting and Narrowing down a Topic, on Amazon Kindle. Soon she will be launching her next book on "Developing an Effective Research proposal".



Dr Suman was awarded for excellence in Research Category (Science and Technology) from Maharashtra at the 5th Faculty Branding Awards at Kolkata in July 2017. She was felicitated by Canara Bank in March 2018, for her contribution to the Textile industry. She has received the Women Researcher Award from REST Society for Research International in June 2020. She was felicitated by Kanara Saraswat Association on 26th November 2020. She was recognised as Researcher, Life Ambassador of the Month December 2021. She was granted the patent for 'Flexible Packaging blanket/Sheet and Method Thereof' in March 2022. She was awarded a Silver Medal by the Society of Dyers and Colourists UK at York in November 2022. She has 36 publications.]

Women Achievers

1. Prof. Sanghamitra Bandopadhyay (Padmashree)



Prof. Sanghamitra Bandopadhyay, Director, Indian Statistical Institute (ISI), Kolkata was announced as a Padmashree awardee in Jan 2022, and the honor was conferred upon her in March 2022 by the President of India.

Prof. Bandopadhyay, born in 1968, completed her B.Tech, M.Tech and Ph.D. in Computer Science from Calcutta University, IIT Kharagpur and Indian Statistical Institute respectively. She then joined the ISI as a faculty member in 1999 and became its first woman Director in 2015, now serving her second term.

Her research interests include computational biology, soft and evolutionary computation, bioinformatics, pattern recognition, data mining, artificial intelligence and machine learning. She has authored/co-authored several books and many articles in journals, book chapters, and conference proceedings.

She is the recipient of several honours and awards including Shanti Swarup Bhatnagar Prize in Engineering Science (2010), The third World Academy of Sciences (TWAS) prize for Engineering Sciences (2018), Infosys Prize (2017), JC Bose Fellowship, Swarnajayanti fellowship (2006 - 2007), INAE Woman Engineer of the Year award (academia), Humboldt Fellowship from Germany (2009- 10), young engineer/scientist awards from INSA, INAE and ISCA etc., to name a few. She is a Fellow of all the National Academies of Science, Engineering, The World Academy of Sciences (TWAS), International Association for Pattern Recognition (IAPR) and West Bengal Academy of Science and Technology. She is a member of the Science, Technology and Innovation Advisory Council of the Prime Minister of India (PM-STIAC).

<https://www.isical.ac.in/sanghamitra-bandyopadhyay>

https://en.wikipedia.org/wiki/Sanghamitra_Bandyopadhyay

<https://www.ashoka.edu.in/sanghamitra-bandyopadhyay>

2. Nari Shakti Puraskar conferred on 8th March 2022

The Nari Shakti Puraskar is an initiative of the Ministry of Women and Child Development to acknowledge the exceptional contribution made by individuals and institutions, and celebrate women as game-changers and catalysts of positive change in society.

Twenty-eight awards (14 each for 2020 and 2021) were presented to 29 women on International Women's Day, in recognition of their exceptional work towards the empowerment of women, especially the vulnerable and marginalized.

Among the awardees are **Vanita Jagdeo Borade**, the first woman snake rescuer, who founded a Foundation for nature and wildlife protection and promoting a pollution-free environment, Visually challenged social activist **Tiffany Brar** who has carried out exemplary

work for visually impaired rural women, Organic farmer **Ushaben Dineshbhai Vasava** who has contributed immensely in organic farming and in educating women farmers at the ground level, **Nivruti Rai**, Country Head, Intel India who has carried out excellent work in the field of technology, and empowered students to build Artificial Intelligence enabled Hi-Tech future for India.

<https://www.newindianexpress.com/nation/2022/mar/08/snake-rescuer-organic-farmer-entrepreneur---29-women-conferred-nari-shakti-award-2427750.html>

3. 75 women in STEAM announced by Government of India

On March 3rd at an event in New Delhi celebrating International Women's Day 2022 hosted by British High Commissioner, the Principal Scientific Adviser to GoI Prof. K. VijayRaghavan, His Excellency British High Commissioner Mr. Alex Ellis, Ms. Supreet K Singh and Ms ElsaMarie D'Silva from Red Dot Foundation announced 75 women in STEAM on March 3rd, 2022 at New Delhi. These 75 Women in STEAM will feature in the second edition of "She Is" Book series as part of celebration commemorating India's 75 years of Independence– Azadi ka Amrit Mahotsav. The list is given below.



Office of the Principal
Scientific Adviser to
the Government of India



British
High Commission
New Delhi

On the occasion of India's 75th Anniversary of
Independence, we are pleased to honour
75 Indian Women in the book -
She Is: 75 Women in STEAM

The announcement made on 3 March by
Principal Scientific Adviser Prof. K. VijayRaghavan
& His Excellency British High Commissioner Mr. Alex Ellis

Aditi Chaturvedi	Dr. Shamita Kumar	Radhika Bhalerao
Anandi Iyer	Durba Sengupta	Ranjani Viswanatha
Anjali Malhotra	Ekta Viiveck Verma	Rashmi Putcha
Anu Acharya	Gayatri Jolly	Rituparna Mandal
Anupama Kapoor	Geeta Mehta	Ruma Pal
Anushree Malik	Geeta Rai	Sanghamitra Bandyopadhyay
Apoorva Bedekar	Jiban Jyoti Panda	Shannon Olson
Archana Chugh	Kaitki Agarwal	Shelaka Gupta
Arti Kashyap	Karon Shaiva	Shilo Shiv Suleman
Azra Ismail	Kavita Gonsalves	Shilpi Sharma
Bijayalaxmi Biswal	Kiran Bala	Shital Kakkar Mehra
Bineesha Payattati	Kiran Manral	Shriti Pandey
Binu Verma	Ligy Philip	Shyamala Rajaram
Brinda Somaya	Madhavi Latha Gali	Simmi Dhamija
Chanda Nimbkar	Mitali Nikore	Sreedevi Upadhyayula
Cheryl Pereira	Monali Zeya-Hazra	Susan Eapen PhD
Deepti Gupta	Monalisa Chatterji	Swarnalatha J
Dr Darshana Joshi	Namrata Rana	Trupti Das
Dr Manisha Acharya	Nandita DasGupta	Upasana Ray
Dr Rakhi Chaturvedi	Neelam Chhiber	Vandana nanal
Dr Shubhangi Umbarkar	Neharika malhotra	Vanmala Jain
Dr. Archana Sharma	Nishima Wangoo	Varsha Singh
Dr. Bharti Singal	Padma Parthasarathy	Vishakha Chandhere
Dr. Kalpana Nagpal	Preeti Aghalayam	Yama Dixit

<https://www.psa.gov.in/article/she-75-indian-women-steam/3628>

Scholarship and Awards distributed

INDIAN WOMEN SCIENTISTS' ASSOCIATION
iwsa.net

IWSA SCHOLARSHIP AWARDS
2021-22

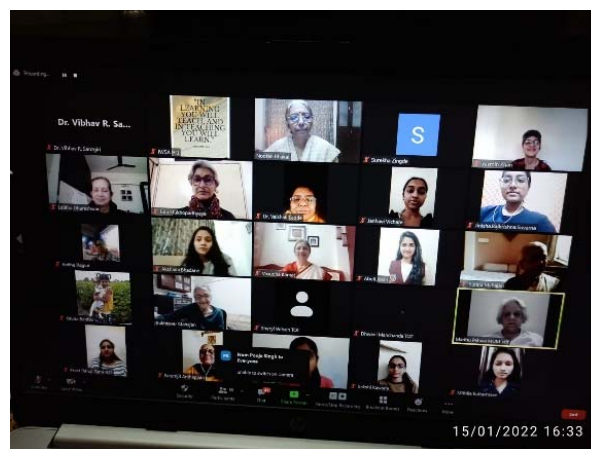
PROF. VASUDHA KAMAT
CHAIRPERSON,
GOVERNING BOARD
CEG, NEW DELHI

CHIEF GUEST

TOPIC
National Education Policy-2020
Transforming Indian Education System

SATURDAY, 15 JANUARY 2022
3-5 PM

ON ZOOM
MEETING ID-699 420 2891
PASSCODE- IWSA@VASHI



IWSA - VIPNET Science club

INDIAN WOMEN SCIENTISTS' ASSOCIATION
Science Awareness Committee In Collaboration with Vigyan Prasar

ACTIVITY NO 6
IWSA - VIPNET CLUB (UID- VP-MH0248)

Designing Parachutes
by
Ms. Megha S. Chougule
Project Scientific Assistant
Homi Bhabha Centre for Science Education, Mumbai

On 12th Jan., 2022
at 3 pm

On Zoom platform-
Meeting ID-812 97975773
Passcode : IWSA/VIP

INDIAN WOMEN SCIENTISTS' ASSOCIATION
Science Awareness Committee In Collaboration with Vigyan Prasar

ACTIVITY NO 7
IWSA - VIPNET CLUB (UID- VP-MH0248)

Fact OR Fiction? How do you know?
by
Ms. Natasha Mujgule

Instructional Designer,
Post graduate student at the University of Cote d'Azur, France
Short-term Visitor at Homi Bhabha Centre for Science Education,
Mumbai

Goals: Media Literacy, Design Education,
Scientific Thinking and Critical Thinking

On 1st Feb., 2022
at 5 pm

On Zoom platform-
Meeting ID-812 97975773
Passcode : IWSA/VIP

50 IWSA VIPNET SCIENCE CLUB

Meet our Inventors

On 22nd April 2022 at 4 pm on Zoom - Meeting ID-812 9797 5773 Passcode-IWSA VIP

Mr. Ajayraj Pandur Jadhav
Third year Diploma in Electrical Engineering
Will be showing:
1. Speed Dekh kar Power Gene
2. Temperature Controller fan alarm using arduino

Master Mohsin ChandMubin Khan
Student of 9th VIII
St. MARY'S HIGH SCHOOL (S.S.C.)
Mangalore
Will be showing:
How to make 'Fruit Ninja' Game using Java Script and HTML

50 INDIAN WOMEN SCIENTISTS' ASSOCIATION
Science Awareness Committee In Collaboration with Vigyan Prasar

ACTIVITY NO 9
IWSA - VIPNET CLUB (UID- VP-MH0248)

Chatshaala at HomeLab

On 9th Mar, 2022 at 4:30 pm

From CUBE program At Homi Bhabha Centre for Science Education, TIFR

On Zoom platform- Meeting ID- 812 97975773 Passcode - IWSA VIP

Dr. Arunan
Mr. Jankishan Advani

IWSA's Satish Haware Computer Education Centre

50 INDIAN WOMEN SCIENTISTS' ASSOCIATION
Computer Education Committee
Presents

what is digilocker? how to use it how to upload document in digilocker fully explained

Dr. Sangeeta, Ph.D.(Physics)
Former BARC Scientist

Block the Date: 10th Feb '22 Time: 7 pm

Google Meet id: **srw-yzkj-zpr**

Your documents anytime, anywhere

50 INDIAN WOMEN SCIENTISTS' ASSOCIATION

Computer Education Centre under the aegis of Member Empowerment Program, presents a talk on

DESIGN THINKING

22 February, 2022
05:00 PM

Harshada Kulkarni
Founder, EVE Healthcare LLP

Google meet id : **srw-yzkj-zpr**
OR
<https://meet.google.com/srw-yzkj-zpr>

50 INDIAN WOMEN SCIENTISTS' ASSOCIATION

Online talk on
"Recent trends in functions and services of public libraries"

Organised by
Phirojsha Godrej Foundation Library

Speaker:
PRASHANT VASANTRAO PATIL
District Library Officer

1ST MARCH 2022, TUESDAY
11.30 AM

50 INDIAN WOMEN SCIENTISTS' ASSOCIATION

Computer Education Centre under the aegis of Skill Empowerment Program presents

PYTHON BOOTCAMP

Maximize your learning with the industry trainer

4TH APRIL - 8TH APRIL, 2022
5 PM - 7 PM (ONLINE)

Resource Person
Shalini Mittal
IT corporate trainer | YouTuber | Founder of TechGatha

Participants will get a certificate

Get ready to code

Hostel and Day Care activities



IWSA celebrates Republic Day on 26th January 2022



Opening of Day Care Centre on 4th April 2022

Leaf painting by Day Care kids

Green initiative of IWSA

Tejomayee 1 and 2



**Solar System for electricity
21 KWp + 25 KWp**

Lectures for School Students



International Day of Women and Girls in Science
Neral, Navi Mumbai, 11th February 2022

Garden Based Workshops



Team from Kirti College on
World Earth Day 22nd April, 2022

Science Day celebration at IWSA HQ on 27th February, 2022



Indian Women Scientists' Association (IWSA)
Science Awareness Committee
Celebrates 'SCIENCE DAY' ONLINE
ON THE THEME
BIO-MIMICRY
JUDGES

Dr. Asawari Rath
Scientist, (Laser and Plasma
Technology Division), BARC

Nirmaala Nair
Science Teacher (Retd.),
Sacred Heart School

Dr. Saswati Roy
Director,
Chemical Engineering Group, BARC (Retd.)

Join in on Zoom
Meeting ID- 699 420 2891
Passcode- IWSA@VASHI
at 9:30 AM on 27th February, 2022

Sonam Ambe
SPEAKER
Architect, Writer, Educator



Swatchata Pakhwada



INDIAN WOMEN SCIENTISTS' ASSOCIATION
presents

Swachhata Pakhwada

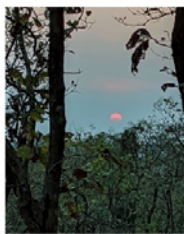
OFFLINE EVENT

Tuesday, March 8, 2022, 10am,

Lecture Workshop & Live Demonstration

Venue: IWSA, Plot 20, Sector
10A, Vashi, Navi Mumbai

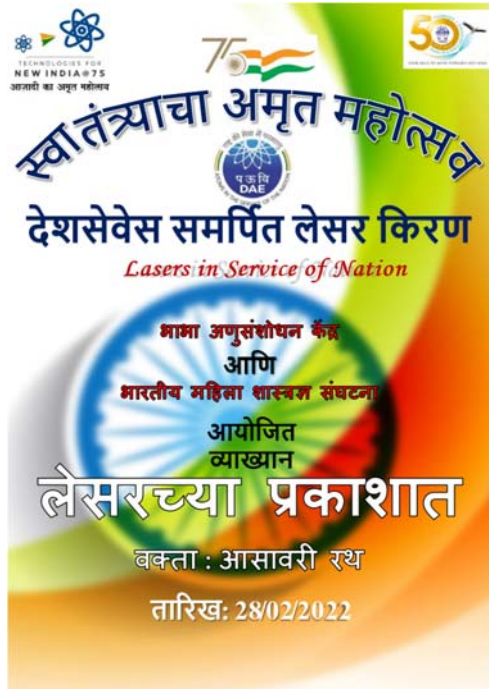
Contact: iwsahq@gmail.com, 27661806



Our Nursery Activities



Science Awareness Activities



UNESCO New Delhi Office
६ मार्च रोजी १२.३३ PM वाजता - ६

"Excuse me, but women are more logical. By managing our household and our work, we become natural programmers."-
Dr. Sunita Mahajan, Indian Women Scientists' Association (IWSA), Mumbai

On an average, women spend more time on household responsibilities and caregiving. COVID has further exacerbated this burden.

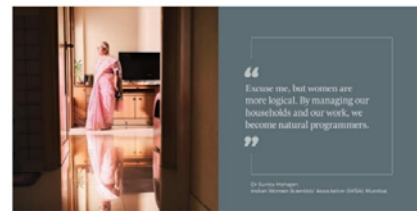
Despite the challenges, women scientists forged ahead with determination, defying gender stereotypes and accomplishing their scientific pursuits.

Read more about this in the UNESCO 2022 report, 'A braided river: The Universe of Indian Women In Science', which draws on the experiences of several women scientists and suggests gender sensitization programmes in primary, secondary, and higher education, as well as the establishment of support systems to assist women in their transition to professional careers.

Join us on 7 March!

UNESCO United Nations India Department of Science and Technology, Government of India

भाषांतर पहा



Each One Teach One Programme



INDIAN WOMEN SCIENTISTS' ASSOCIATION
SCIENCE AWARENESS COMMITTEE

&
VIGYAN PRASAR

Invite you to the
Valedictory Session of
their second batch of
EOTO College mentor
On 25th April 2022 at 3pm
At IWSA Multipurpose Hall
Vashi

Internship Programs with colleges



50
ANNIVERSARY
LOOK BACK TO MOVE FORWARD AND SHINE

SIES
College of Arts,
Science &
Commerce (Autonomous)
RISE WITH EDUCATION
NAAC REACCREDITED - A GRADE

IWSA-SIES STUDENT INTERNSHIP PROGRAM

18th November - 18th December, 2021

E-POSTER PRESENTATIONS

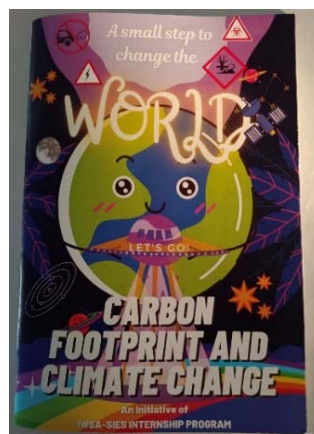
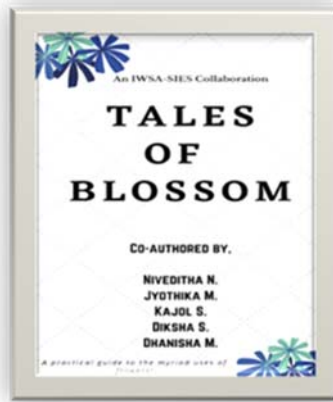
In association with
Indian Women Scientists' Association (Vashi) & Department of
Biotechnology at SIES College of Arts, Science & Commerce (Mumbai)

REVIEWERS

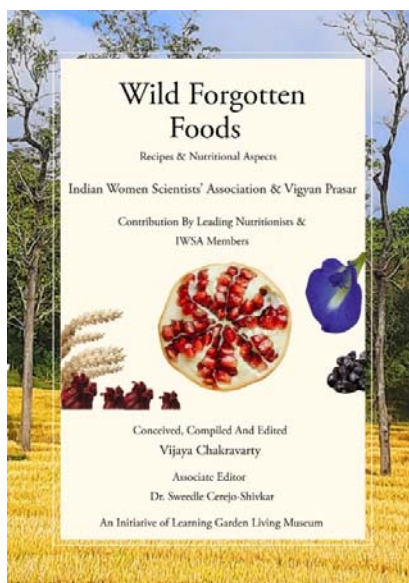
	DR. MOMNA V HEJMADI University of Bath, UK		DR. SHALINI SHARMA Principal, MIET, India
	MR. GIRISH SOMAN Nisarga Biotech, India		DR. BHASKAR BHADRA Reliance Industries Ltd, India

22 JANUARY, 2022
10.15 AM - 1.15 PM

CLICK HERE TO JOIN:
[HTTPS://TINYURL.COM/2VWYUKBW](https://tinyurl.com/2vwyukbw)



Book releases



Activities from our branches

Amravati Branch



Workshop on "Farming for Profit"



Prarthna Diware guiding farmers

विद्यार्थी वैश्विक मंडल, अमरावती संगठित
विद्याभारती महाविद्यालय, केंद्र, अमरावती
 प्रतिभा विभिन्न स्टडीज सेंटर, इंद्रिय विभिन्न साहित्य अकादमी व महिला पत्रिका विभाग समित, अमरावती
 संघ संस्कृत विद्यामने
 अंगणित
रथसप्तमी - जागतिक सूर्यनमस्कार दिनानिमित्त **मार्गदर्शक**

“सूर्यनमस्काराचे ऑनलाईन प्रात्यक्षिक”

दि. : ०९ फेब्रुवारी २०२२
 वेळ :- सकाळी ८ ते ९

कार्यक्रमाचे संपर्क साधण्याकरिता द्यावील लिंक :-
<https://www.whatsapp.com/channel/00299a66079494516a614a074>
 Meeting ID -> 25186709075 Password -> PWSCivsa

श्री. राजभाऊ देशमुख
 अंतरराष्ट्रीय योग्य

०९:०० पर्यंत
 ०९:०० ते १०:०० पर्यंत
 १०:०० ते ११:०० पर्यंत

IUPAC INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY
GLOBAL WOMEN'S BREAKFAST: GWB 2022
 Theme: "Empowering Diversity in Science"
 Promoted by Association of Chemistry Teachers (ACT)
 Organized by Department of Chemistry, Sant Gadge Baba Amravati University, Amravati & Indian Women Scientists' Association (IWSA), Amravati Branch

PROMOTERS **PATRON** **ORGANISER**

EMINENT SPEAKERS

Date: February 16, 2022 google meet -> <https://meet.google.com/GWR-OGQGL-E-MEET> Time: 12:00 Noon
 Registration link -> <https://forms.gle/7dLkXAKHNGCMF8> Youtube: <https://www.youtube.com/GWR-100-10-06>

Baroda Branch

Baroda chapter
Department of Botany, Faculty of Science, The Maharaja Sayajirao University of Baroda, Vadodara
 and
The Indian Science Congress Association (Baroda Chapter), In Association with Indian Society of Geomatics (Vadodara Chapter) and Indian Women Scientists Association (Baroda Branch)
 Cordially invites you for
A TALK ON ABCD OF SUCCESS
 On 26th March 2022 (Saturday), from 4:00 pm onwards
 -Speaker-
Dr. Chaitanya S. Bush (MD)

Prof. G. Sandhya Kiran
 Convener, ISG Vadodra Chapter, and Convener, ISCA Baroda Chapter, Convener, IWSA Baroda Branch

Prof. H. R. Kataria
 Dean Faculty of Science

Venue
 B-33 Lecture Hall, Department of Botany, Faculty of Science, The Maharaja Sayajirao University of Baroda, Vadodara

Baroda chapter
Department of Botany, Faculty of Science, The Maharaja Sayajirao University of Baroda, Vadodara
 and
Indian Women Scientists Association (Baroda Branch) In Association with Indian Science Congress Association (Baroda Chapter), and Indian Society of Geomatics (Vadodara Chapter)
 Cordially invites you for
A TALK ON CLIMATE CHANGE
 On 30th March 2022 (Wednesday), from 3:30 pm onwards
 -Speaker-
Dr. Dharmendra Shah

Ms. Hemlata Pawagathi
 Convener, IWSA Baroda Branch

Convener, ISG Vadodra Chapter, And Convener, ISCA Baroda Chapter

Prof. H. R. Kataria
 Dean Faculty of Science

Venue
 B-33 Lecture Hall, Department of Botany, Faculty of Science, The Maharaja Sayajirao University of Baroda, Vadodara

Bengaluru Branch

Popular Science Lecture (for College Students & Faculty)
 Organized by **INDIAN WOMEN SCIENTISTS' ASSOCIATION, Bengaluru Branch**
 Supported by Board of Research in Nuclear Sciences (BRNS)-DAE In association with **DEPARTMENT OF BIOTECHNOLOGY DAYANANDA SAGAR COLLEGE OF ENGINEERING**
IP AS TOOL OF EMPOWERMENT

Dr. P. Lakshmi Santhi,
 Sr. Manager - Client Relations, SciTech Patient A&T Services (P) Ltd., Hyderabad

Registration is Free
<https://forms.gle/7dLkXAKHNGCMF8>
<https://tinyurl.com/7yh36hwt>
 Saturday, January 29, 2022
 Time: 11:00 AM

Hyderabad Branch

Palamuru University, Mahabubnagar
 Welcomes you to the Two day - International e-Conference on **MICROBIAL PATHOGENESIS AND RECENT ADVANCES IN DIAGNOSIS OF OMICRON**
 February 4 - 5, 2022
 Online Mode

Organized by **The Department of Microbiology in collaboration with Indian Women Scientist's Association (IWSA) Microbiologists Society India (MSI) IQAC Palamuru University**

Website: www.palamuruuniversity.ac.in
 Email: microbiologists@palamuruuniversity.ac.in

Kalpakkam branch

Google-Meet Date: 28th February, 2022 (Monday)
Time : 3.30 PM

1. Speaker: Dr. K. Sundararajan
Head, RCSSS, MCMFCG, IGCAR
Topic: "Raman Effect"
2. Video Presentation
Science demonstrations by students
3. Announcement of winners
Science Demonstration Competition for students

Google meet link: <https://meet.google.com/yau-cmex-sfx>

IWSA members are welcome to join from
Raja Ramanna Auditorium



Science Demonstration competition



Dr. K. Sundararajan speaking on "Raman effect" Farewell to Mrs. Sivai Bharasi



Indian Women Scientists' Association
Kalpakkam Branch
Cordially invites you all to join the
International Women's day Celebration
On

Date : 07 April 2022 (Thursday)
Time : 10.45 hrs (High Tea at 10:30 hrs)
Venue: Sarabhai Auditorium,
HBB, IGCAR



Kolhapur Branch



Environmental studies Activity for junior college students



World Wetland Day



Poster Competition on the occasion of National Science Day, Nandwal

50 INDIAN WOMEN SCIENTISTS' ASSOCIATION
Kolhapur Branch

Reg. Regd. Act 1987 Reg. No. 19172 (Gen) & 19171
Soc. Public Trust Act 1925 Reg. No. 7, 2017 (Gen) & 19173
MS/Agri/01/MS/2017/2020

In Association with

- * Smt. Hanumanthi Sushiladevi Salunke Centre of Women's Studies, Vivekanand College, Kolhapur (Autonomous)
- * Dr. Janghoo Chavhan Arts, Commerce & Science College, Nandavli, Kolhapur.
- * Botany Department, Shivaji University, Kolhapur.
- * S. N. Arts, D.J.M. Commerce and B.N.S. Science College, Songamer (Autonomous).
- * B. Bhatnagar Khadker College, Yangaoli.
- * Sangola Tulko Shiksha Prasarak Mandal's, Vidyan Mahavidyalaya, Sangola
- * Gopal Krishna Gokhale College, Kolhapur

ORGANIZES

One Day Interdisciplinary International Conference (Virtual)
On
"Nurture Nature to Strengthen the Future"
Wednesday, 9th March, 2022.

LOOK BACK TO MOVE FORWARD AND SOAR

Deepali H. Taywade Patil Convener 9823354055	Dr. Musalini Desai Secretary 9402443204	Dr. R.B. Kumbhar Principal Vivekanand College, Kolhapur
Dr. Dhanshree Patil Event Co-ordinator 9144494840	Dr. Seema Gaikwad Co Convener 9911507230	Dr. B.T. Dongal HOD, Dept. of Botany VICE
Kalpna Sawant Event Secretary 9820011417	Dr. Alpana Chougale Treasurer 7268493134	Dr. Prabhha Patil 333 Centre of Women's Studies VICE



Nagpur Branch

50 Popular Science Lecture
Organized by
Indian Women Scientists' Association
Nagpur Branch
Supported by Board of Research in Nuclear
Sciences (BRNS)-DAE
in association with
Nikalas Mahila Mahavidyalaya, Nagpur

Lecture on
**Banana The Kalpvriksh,
Creating wealth from waste**

50 POPULAR SCIENCE LECTURE
Organized by
INDIAN WOMEN SCIENTISTS'
ASSOCIATION
NAGPUR BRANCH

Supported by Board of Research in Nuclear Sciences (BRNS) - DAE
In association with
Microbiology & Biochemistry Students Society (M.B.S.S)
KETH KESARIMAL PORNVALI COLLEGE OF ARTS AND SCIENCE AND COMMERCE,
KAMPTHE
LECTURE ON

"Applications of Biotechnology in Civil Engineering"
By
Dr. Manthavari V. Laxkar
Associate Professor
Department of Civil Engineering, VNIT, Nagpur
Monday 28th March, 2022
Time: 4.30PM

Roorkee Branch

50 IWSA Roorkee Lecture Series
Organized by
Indian Women Scientists' Association
Roorkee Branch, Roorkee

WEBINAR ON
"Diabetes and Eyes"
by
Dr. Ashima Grover Sharma
Cataract, refractive and corneal transplant specialist
[Currently @Abhilasha Eye hospital, Roorkee & Haridwar as consultant cataract, refractive and lasers].

Time & Venue: Sunday, 27th February, 2022 at 3:30 pm
Google Meet link: <https://meet.google.com/nhx-ntfe-wry>



Visit of UNESCO team on 23rd February, 2022



To

From
IWSA Head Office
Plot No.20, Sector 10A
Dr. Mar Theophilus Road, Vashi
Navi Mumbai: 400703
Tel: 27661806,
Email: iwsahq@gmail.com
Website: www.iwsa.net

Published by Dr. Rita Mukhopadhyaya, President, IWSA, Plot No.20, Sector 10A,Vashi, Navi Mumbai 400703.
Editor Dr. Shyamala Bharadwaj.