



IWSA NEWSLETTER

Volume 49

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May – August 2022



BRNS Talk in R.D. and S. H. National College and S.W. A. Science College, Bandra (W), Mumbai on 29th Aug 2022



GeoBhumi Soil Moisture Management Sensor + Solar Panel installed at IWSA on 10th June 2022



Cancer Detection Camp at Punjab Heritage Bhavan, Belapur, Mumbai on 26th June 2022



International seminar, "One Earth" Rebalance Energy to Sustain, on 14th June 2022.



Kolhapur Branch- International Mangroves Day Celebration



Kalpakkam Branch – Workshop on Nuclear Technology

BRANCHES


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

Webinars under the "Science and Our Life" Series



INDIAN WOMEN SCIENTISTS' ASSOCIATION
26th Talk under IWSA's Science And Our Life Lecture Series
Supported by Board of Research in Nuclear Sciences

**THE FUTURE OF WATER
WATER FROM AIR**
Developed by a Woman Cricketer and an Entrepreneur



Durga Das
Founder and CEO
AERONERO

Join in on Zoom -
Meeting ID-811 4939 2327
Passcode-SAOL@IWSA

Date & Time of Lecture-
14th May, 2022 at 5:00pm
Please join by 4:55 pm



INDIAN WOMEN SCIENTISTS' ASSOCIATION
27th Talk under IWSA's Science And Our Life Lecture Series
supported by Board of Research in Nuclear Sciences-DAE

MACHINE LISTENING FOR MUSIC APPLICATIONS




Prof. Preeti Rao
Department of
Electrical Engineering,
I.I.T. Bombay
Powai, Mumbai

Date 9th July 2022
Time 5pm
Zoom -
Meeting ID:876 1081 3449
Passcode:SAOL@IWSA

26th SAOL on 14th May

27th SAOL on 9th July



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

Supported by Board of Research in Nuclear Sciences-DAE

In association with
All Science Departments,
Bhavan's College, Andheri (W), Mumbai

Webinar on
"Extra Cellular Vesicles: What are these, Why
they are important, How do we study them?"
by
Dr. Vivek Tanavde
Associate Prof. Biological and Life Sciences,
School of Arts and Sciences, Ambedkar University, Ambedkar

Saturday, 20th August, 9.30 am

Session will be held through - Google Meet Platform - <https://meet.google.com/vgp-hrvv-kjr>

All are cordially invited to attend
Registration is Free. Click here to register - https://docs.google.com/forms/d/e/1FAIpQLSc0F5C719haGy9pC3R9pE1-fpUWNI83C0hZpZ2bd5Uv1wv8m0wq-ef_link



INDIAN WOMEN SCIENTISTS' ASSOCIATION
28th Talk under IWSA's Science And Our Life Lecture Series
supported by Board of Research in Nuclear Sciences-DAE

**Bridging the Micronutrient Gap
with Forest Essentials**

Speaker -

Dr. Ratnaraje Thar
Research Director, College
of Home Science, Nirmala
Niketan, Mumbai...
& many more such!

Lead Discussant -

Ms. Anshu Jain
Founder, Nutritionist &
Associate Prof. POSHAN

Date: 13th August 2022 Time- 5pm
Zoom -
Meeting ID-976 1081 3449 Passcode-SAOL@IWSA

BRNS sponsored talk, Bhavan's
College, Mumbai

28th SAOL on 13th August 2022



OUR PANELISTS

- Prof. Hareendran Chavan
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Department of Biotechnology
Sri Jayawade Institute of Technology
- Dr. Vaidya Anand
Chief Technology Officer
Sensitech, Inc.
Pune
- Dr. Sushree Bhandari
Head of Biotech Research
Bioinformatics
Genomics
Shri Parvati, Bhub.
- Dr. Ganesh Subramanyam
Director
Center for Sustainable
Agriculture
The Institute of Bio-Science
Israel

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- Keynote Speaker
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Director & Chief
Technology Officer
Covance India
- Prasanna Kumar Srinivasan
President
Food Systems 2021
New York
- The Honorable
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Shri Shantaram Foundation
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"Water Warrior"
Head Water Initiative SAH
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IISc, Delhi
- Dr. Vinod Nigam
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School of Nuclear Sciences,
IITM, Mumbai
- Dr. Anand Kumar
Associate Professor
IITM, Bangalore

WORLD ENVIRONMENT DAY 2022
CELEBRATE
WORLD ENVIRONMENT DAY 2022
ONE DAY INTERNATIONAL SEMINAR
**One Earth
Rebalance Energy to
Sustain**

शुद्ध वातावरण One Earth One Family
Tuesday, June 14, 2022, 10 am - 7pm
Venue-IWSA, Plot 20, Sector 10A, Vashi,
Navi Mumbai
(Hybrid meeting on ZOOM)

Register at -
<https://forms.gle/5D55K2Z293A3m6d8>
Contact us: iwsga@gmail.com
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Visit us: <https://iwsga.net>
Registration
Association of Women Scientists (IWSA) 2022-23
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World Environment Day 2022
One Day International Seminar
on 14th June 2022

Refresher course for school teachers
3rd May to 6th May 2022

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, Library, Health Centre, Activities of various Branches etc. The activities reported in this issue were mostly conducted in offline mode barring a few which were conducted online. In our "Science and our Life" (SAOL) Lecture Series, three interesting lectures were conducted during the period of May to August 2022 (All online). Four popular Science lectures for college students (one online and three offline) were held during this period. All these lectures were supported by BRNS. Internship programs for college students, VIPNET Activities, Refresher Course for School Teachers, Cancer Detection Camp and Yoga Day Celebrations are some of the educative and community-oriented programs reported in this Newsletter. The yearlong activities of Golden Jubilee Celebration of IWSA began on 13th June 2022, with Founder's Day Celebration. The program started with Vriksharopan and ended by launching of IWSA's Golden Jubilee Signature Perfume, "I50". On the following day we had the One Day International Seminar on "One Earth" – Rebalance Energy to Sustain. I am sure the readers will enjoy reports on these events.

This issue also brings the interesting activities carried out at IWSA Branches at Kalpakkam, Kolhapur, and Nagpur. The article on "Fantastic Journey of Sporozoites" by Dr. Aditya Patra, Max-Planck Institute of Biophysics, Germany, and Prof. Shobona Sharma, INSA Honorary Scientist, Institute of Chemical Technology ICT, Mumbai, appears in this issue. They have discussed the reason behind the absence of effective vaccine for controlling malaria based on the research carried out by them at TIFR. We have reported about four women achievers – President of India, Smt. Droupadi Murmu, Dr. Kalaiselvi, the first woman director General of CSIR, Dr. Marilyn Fogel, the "Isotope Queen" who passed away on May 11, 2022, and Dr. Cecilia Payne (1900 -1979), who is remembered for her inspiring work on the discovery of what the universe is made of. We have highlighted how Dr. Payne lacked the recognition and was treated lowly by the scientific community during her career as a woman scientist but got the due recognition for her work in due course of time. We have also paid our homage to Ms. Vidya Ranadive by remembering her contributions to IWSA activities during its formative years. Ms. Vidya Ranadive passed away on 20th August 2022 at the age of 98 years. I hope that all of you will enjoy reading about these reports and the scientific information content of this Newsletter.

With best wishes

Shyamala Bharadwaj

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President's Message



I welcome all our readers who joined online for the multiple lectures held during this period of publication including the one day International Conference titled ONE EARTH - Rebalance Energy to Sustain, held on June 14, 2022. The conference marked the first event into the Golden Jubilee year celebrations of IWSA, (1973-2023).

The 49th founders day which fell on June 13, 2022 had a memorable impact on conservation of biodiversity. 'Vriksharopan' through music and dance procession, creation of a unique signature fragrance named I50 by our member Ms Jyoti Marwah, fine pine needle casings made by women of forest department from Dehradun, Uttarakhand, exhibition of endangered animal and bird photos captured by women wildlife photographers of Navi Mumbai, unveiling the prize winning "Thematic Murals" created from recycled material were all thought provoking presentations.

Celebration of 'Yoga for Humanity' on the Yoga day, world Mangrove day, coverage of various topics through the interactions on VIPNET classes, an article on 'Malaria' and stories of forgotten women scientists have been put together beautifully in the News Letter.

Congratulations to all members for their meticulous planning, execution, record keeping and reporting of all the activities.

Let us bring back the confidence of good health and safely tread onto the post pandemic period with opening up of public activities. Best wishes for IWSA Golden Jubilee Celebrations.

Dr. Rita Mukhopadhyaya

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Reports from Head Quarters

Science Awareness Programs

A. IWSA – BRNS Popular Science Lectures for Colleges

1. Popular Science Lecture on 12th August, 2022 at Sophia College, Mumbai,

An IWSA – BRNS Popular Science on “From Laboratory Chemistry to Device Fabrication” by **Dr. Ruchi Anand**, Prof. Department of Chemistry, IITB, Mumbai. was conducted on **12th August 2022** at Sophia College, Mumbai. Lecture was conducted onsite at the college.

Abstract: Clean drinking water is essential for all life. However, due to environmental pollution via industries and human population clean water is becoming a scarce. Our research centers on the detection of pollutants that are part of effluent from oil and dye industries etc. that pollute our rivers. This lecture focused on how understanding of basic chemistry was important to understand molecular mechanism, a prerequisite for developing selective, sensitive environmental pollution-based sensors. Examples based on the speaker’s own research and some outside demonstrated how understanding of basic chemistry and implementing it judiciously helped in development of biosensors for water pollution applications. Here, enzymes were used to selectively probe aromatic pollutant levels in both industrial and drinking water. Using understanding of molecular structure, we were able to convert phenol sensors to a plethora of other sensors such as benzene, toluene xylene, ethylbenzene etc. These compounds are difficult to sense as they lack functional groups therefore using shape complimentary approaches, we were able to tailor pockets of the enzyme to recognize these compounds specifically. This research has moved into application and the group is now able to make devices that sense phenol and many other aromatic pollutants selectively down to ppb levels. By an amalgamation of enzyme engineering, chemistry and nanoscience, sensors and devices have been developed which can eventually reach society. Detection of pollution has great societal importance and the main point focused on was how a strong foothold in basic chemistry principles is essential for translation of ideas and development of industrially viable outputs.

The lecture was attended by 62 participants consisting of students, faculty and IWSA members.

2. Popular Science Lecture on 16th August, 2022 at Union Christian college Aluva, Kochi

An IWSA – BRNS Popular Science Talk on “**Neuroplasticity: potential for lifelong brain development**” by **Dr. B. Chakrapani**, Director, Centre for Neuroscience, Asst. Prof. Department of Biotechnology, Cochin University of Science and Technology, Kochi. was

conducted on 16th August 2022 at Union Christian college, Aluva, Kochi. Lecture was conducted onsite at the college.

Abstract: The talk was intended to enlighten the audience with the basic architecture of the brain, core concepts of learning and memory, and how the concepts in Neuroscience could be applied to reduce stress, enhance attention and improve memory. The presentation was also intended to train the audience with some 'brain exercises' that might enable them to understand the concept of brain plasticity. Brain plasticity (or the ability of the brain to shape itself) was discussed with the concept of learning and memory.

The lecture was attended by 135 participants consisting of students, faculty and IWSA members.

3. Popular Science Lecture on 20th August, 2022 at Bhavan's College, Andheri, Mumbai

An IWSA – BRNS Popular Science webinar on “**Extra Cellular Vesicles: What are these, why they are important, how do we study them**” by **Dr. Vivek Tanavade**, Associate Prof. Biological and Life Sciences, School of Arts and Sciences, Ahmedabad University, Ahmedabad was conducted on 20th August 2022 at Bhavans College, Andheri, Mumbai. The lecture was held online through Google Meet.

Abstract: How do cells that are not physically connected to each other communicate with one another? Cytokines are secreted by cells to modulate behaviour of neighbouring cells. But what about other biomolecules like DNA and RNA? Extracellular vesicles (EVs) are couriers that are sent by various cells containing a cargo of DNA, RNA and proteins. They are found in various body fluids like blood, urine, saliva, milk etc. They enable a cell to communicate with another cell and influence its RNA and protein synthesis even when these two cells are far away. EVs are not only important for understanding cell to cell communications. Increasingly, they are also being used to understand the regulation of cellular functions like cell differentiation, diagnoses of diseases like cancer and as therapeutic agents to treat diseases. The EV space comprises of many different types of vesicles like exosomes, microvesicles, micelles etc. This talk aimed to demystify some of the concepts pertaining to extracellular vesicles. It helped to understand what are EVs, how to identify EVs, isolate them and study their cargo. The role of EVs in disease diagnosis (especially liquid biopsies), as well as therapeutic applications of EVs and their advantages in therapy were also discussed.

About 100 participants consisting of students, faculty and IWSA members attended the webinar.

4. Popular Science Lecture on 29th August 2022 at RD and SH National College & SWA Science College, Bandra, Bhavan's College, Andheri, Mumbai.

An IWSA – BRNS Popular Science Lecture on “**Wild Vegetables and Ayurveda**” by **Dr. Vikrant Jadhav**, Managing Director, Sushila Ayurvedic Research Centre, Nashik was conducted at Department of Botany & Dhanwantari Medicine Plant Garden, RD and SH

National College & SWA Science College, Bandra, Mumbai. The lecture was held onsite at National College.

Abstract: Man has been using wild edible plant from ancient time as they are a rich source of protein, lipids, carbohydrate and other essential elements required for the body function, proper supplementation of all necessary vitamins, minerals and other compounds is require for better health.

The active constituents in these wild plants act as lead molecules for development of many new drugs and nutritional supplements. This present session focused on medicinal property of some non-cultivated green leafy vegetables from Maharashtra. Information was collected from available literature study as well as personal experience.

About 120 participants consisting of students, faculty and IWSA members attended the lecture.

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

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

1. “The Future of Water, Water from Air” by Ms. Durga Das on 14th May 2022

The 26th lecture of the series on “Science and Our Life” was held on 14th May 2022 as an ON-LINE webinar, through Zoom platform. Ms. Durga Das, Woman Cricketer, Founder & CEO of AERONERO spoke on ““The Future of Water, Water from Air”.

Abstract: There are several methods to extract water from humidity but the most common and most efficient so far is by condensation - cooling the air below its dew point. The other methods are by exposing the air to desiccants or pressurizing the air. The extraction of atmospheric water may require a significant input of energy. Some AWG methods are completely passive, relying on natural temperature differences, and requiring no external energy source. Biomimicry studies have shown the desert beetle has the natural ability to perform this task. Drinking quality water can also be generated by the rooftop solar hydro panels from the air using the solar power and solar heat during daylight time.

About 33 participants attended the online webinar.

2. “Machine listening for music applications” by Prof. Preeti Rao on 9th July 2022

The 27th lecture of the series on “Science and Our Life” was held on 9th July 2022 as an ON-LINE webinar, through Zoom platform. Prof. Preeti Rao, Department of Electrical Engineering, I.I.T. Bombay Powai, Mumbai on “Machine listening for music applications”.

Abstract: Many are familiar with computer vision in the field of artificial intelligence and its burgeoning applications in robotics, drones and manufacturing. Less known, but equally fascinating, is the field of computer audition or machine listening. Apart from its vast

practical utility, the understanding by machines of speech and music helps to access the most highly evolved of human behaviours. How computers decode sound and the associated complex auditory patterns to obtain insights that contribute, in particular, to our understanding of music across cultures was discussed.

About 23 participants attended the online webinar.

3. “Bridging the Micronutrient gap with Forest essentials” by Dr. Ratnaraje Thar on 13th August 2022

The 28th lecture of the series on “Science and Our Life” was held on 13th August 2022 as an ON-LINE webinar, through Zoom platform. Dr. Ratnaraje Thar, Research Director, College of Home Science, Nirmala Niketan, Mumbai spoke on “Bridging the Micronutrient gap with Forest essentials”.

Abstract: (pointers of the talk)- Talked about the recipes from the book:- Promotion of and Product development using the forest essentials;- Doorstep delivery of micronutrients: Microgreens;- Superfoods from your own pantry. Diminishing agricultural yields require more land for cultivation, resulting in deforestation and loss of biodiversity. In this scenario it will be a challenge to feed the 9.7 billion people in 2050 as projected by UNESCO and will nullify its attempts to eradicate hunger by 2030. There is thus a growing need to bring back the traditional, wild foods which are rich in nutrients to take care of the Hidden hunger (Hunger for micronutrients) in the diet of Indians across classes. These wild foods are hardy, resilient to climate change and require very little inputs of fertilizers and pesticides. They are water-wise and locally available. (Extract from the preface for the book- Wild Forgotten Foods-under IWSA- Vigyan Prasar Project by Ms. Vijaya Chakravarty, Coordinator IWSA's Learning Garden).

About 29 participants attended the online webinar.

C. IWSA – Student Internship Program

1. Bhavans College Internship Program 12th May to 25th June 2022

Students from Bharathiya Vidya Bhavan's M.M. College of Arts, N.M. Institute of Science, N.M. College of Commerce, Bhavan's College (Autonomous), Andheri (West), Mumbai – 400 058 (38 interns) carried out the following projects under the guidance of mentors from college faculty and IWSA members.

1. Rapid composting of Dry leaves
2. Mushroom Cultivation
3. Fungal Bioinformatics

Besides hands on training and experimentation at IWSA premises and Bhavan's College, the students attended online guest lectures by experts in the field. They also visited K.B.P College, Vashi and IIT, Bombay for PCR demonstration and lab tour. They have brought out the following two booklets on the topics of their projects:

1. Ecstasy of the fungal world
2. Molecular biology & its journey via techniques

The Summary of Booklet 1: The booklet “Ecstasy of the fungal world” is based on the fungal world, and their existence among us. The booklet talks about different characteristics of the fungus, especially the Mushrooms we commonly see growing around during the rainy seasons. Locally they are called in many names like (Dog’s umbrella) or कुरकुरमुत्ता in Hindi. The world of fungi is very curious to learn, as they play a very important role in our day to day lives, from nutrition, antibiotics to degrading a variety of compounds, they have it all. It is also interesting to know that not all mushrooms are good, and some of them are poisonous, capable of causing diseases. The booklet has tried to encompass all of this under one umbrella, using different pictures, illustrations & certain facts about fungi.

The Summary of Booklet 2: The other booklet “Molecular biology & its journey via techniques”, Molecular biology being an advanced field of biology, where we deal with DNA the genetic material & study it using modern technologies & techniques. It goes without saying that there would be a lot of technicalities involved, and most of it has been well articulated in this booklet in the form of a story. The character Lucas is a fungal spore, who seems to have lost his way end’s up meeting a molecular biologist Dr. Sam, who together with his colleagues uses different methods of molecular biology viz, DNA extraction, PCR, Gel electrophoresis & finally sequencing of the DNA to find the identity of Lucas & helping him find his parents. The crux of this booklet is to spark curiosity of the reader towards molecular biology and help them get a brief idea about the concepts involved.

2. Socio-Economic relationship between Mangroves and Local Livelihood – Internship Project by a student from Symbiosis School of Economics 1st June 2022 to 31st July 2022

Ms. Pratiti Dey, a M.Sc. (Economics) student from Symbiosis School of Economics, carried out an internship project on “Socio-Economic relationship between Mangroves and Local Livelihood – Internship by a student from Symbiosis School of Economics” from 1st June 2022 to 31st July 2022, under the guidance of the following IWSA members:

Dr. Rita Mukhopadhyaya, Dr. Paramjit Anthappan, Ms. Vijaya Chakravarty, Dr. Niranjana Chavan, Dr. Sweedle Shivkar, Dr. Yasmin Khan and Dr. Donna Joseph.

Abstract

Wetland belts in the Mumbai Metropolitan Region (MMR) are important to the coastal region of Maharashtra. This involves the central city, the suburbs and the satellite city known as Navi Mumbai. Being a peninsula, it is under perpetual threats of flooding. Urban wetlands are fast depleting, as a significant part of the development has been carried out by clearing out natural swamps, marshes with landfills. It is the Mangrove forests that form the natural barriers for protecting wetlands from the onslaught of the sea. In addition, they provide

several other features like maintaining the Ecosystem of the shorelines, stabilizing pollution levels of water, air, land, aiding the local population in their economic activities. Primarily it is the fisher folks who depend on the wetlands for fishing which is an important source of their livelihood. Over time with global exploitation of the waters, climatic changes in ocean temperatures, cyclones, tsunamis, and several other factors that affect sustainability, their lives are in danger. They are forced to look beyond and move on with the changes of time. This in turn will impact the larger economy of the state, the country. The work associated with this internship is based on primary and secondary data on wetlands and mangroves related activities of the coastal human population. Primary data includes on-ground visits to mangrove sites and conversations with the locals. Secondary data includes resources from government, non-government sources and several articles published in past years. It seeks to address the question of the importance of preserving shoreline and creek belt of mangroves and highlight the relationship between mangroves and the local economy. This work has brought out the future prospects along the lines of eco-tourism, redeveloping wetlands for migratory birds, increasing knowledge for technical fishing, and setting up mangrove nurseries to restore lost species. Finally, all of this should help induce social welfare with employment generation ensuring economic welfare.

D. Refresher Course for School Teachers 3rd May 2022 to 6th May 2022

The Indian Women Scientists' Association (IWSA) in its Golden Jubilee year, organized several Science Education initiatives, including Science Exhibitions, talks, science camps, DIY activities through IWSA- VIPNET club etc. throughout the year.

The Science Awareness committee of IWSA organized a four-day (3rd to 6th May 2022) Teachers' Training Refresher Course for School teachers who are teaching Science and Mathematics for standards 7 to 10.

It has been observed that there are several training courses organized by colleges and institutions for the college faculty. However, the number of such courses for the school teachers is very limited. Considering the upgradation of Science and Mathematics curriculum for high schools, the necessity for such a refresher course was felt by several teachers. The course flyer was circulated to several schools and nine teachers registered from nearby schools. As this was the first School Teachers' Refresher Course conducted by IWSA, the small number helped in establishing a close interaction between the teachers and resource persons.

This four-day course was designed such that the subjects of Physics, Chemistry, Biology and Mathematics were covered on consecutive days. The morning sessions consisted of two lectures on different unique methodologies of teaching Science and Mathematics by some of the best resource persons in the fields. The newly introduced chapters of the curriculum were also included. Though these lectures touch upon several topics of the syllabus, emphasis was laid on how to strengthen the basic concepts and inspire.

The laboratory sessions were designed slightly at a higher level, so that the teachers understood the concepts aided by hands on techniques. It was also suggested that very interesting demonstrations can be done using simple components available at home or even toys.

On the first day, the keynote address was delivered by Ms. Sangeeta Sohni, President's National Best Teacher Awardee in 2020 and a senior teacher at the Atomic Energy Schools. She gave an insightful talk on how to make Chemistry interesting and clear the basic concepts by using simple toys. The next session on chemistry was conducted by Dr. D. V. Prabhu, Retired Head, Dept of Chemistry, Wilson college, President of the Mumbai Branch of Indian Chemical Society and an active member of Bombay Association for Science Education (BASE). He has been a member of the DAE appointed National Steering Committee for organizing Science Olympiads in India and was the Delegation Leader of the Indian teams to International Chemistry Olympiads held at Mumbai (2001). He spoke on Chemical Kinetics with simple examples and the role of catalysts. He gave a glimpse of Green Chemistry with green catalysts which is an emerging branch of chemistry, especially considering the efforts put by governments and organizations on sustainable environment, all over the world.

The afternoon Lab session was conducted by Ms. Sujata Haralkar, Retd. Chemistry teacher, Siddharth College of Arts, Science and Commerce, Fort, Mumbai. She conducted a very interesting session on how to find the equivalence point of the acid base titration thermometrically. Generally, when we carry out an acid-base titration, we know that we can determine the end point with the help of a proper indicator. Suppose an indicator is not available, you can still determine the equivalence point of a neutralization titration since these reactions are exothermic in nature. She also showed how to determine the atomic weight of a metal using a very simple experiment.

On the second day, chapters on Physics - Refraction of light, gravitation, laws of motion and conservation of energy were covered by Ms. Lalitha Ramaswami, Retired teacher from Atomic Energy Central School and President's National Best Teacher Awardee. This was followed by a talk by Mr. Zohar Attari explaining the impact of graphs while teaching physics. The afternoon lab session was conducted by Prof. R. Nagarajan, Emeritus professor at the Centre of Excellence in Basic Science, DAE. He demonstrated the very interesting equipment of PhET, which helps in demonstrating Interactive Simulations for Science and Mathematics. Next, he demonstrated an experimental kit "expEYES" (Experiments for Young Engineers and Scientists) an inexpensive open-source hardware and software for experiments in Physics, particularly, electricity and electronics, developed by Prof. B.P. Ajtith Kumar, (formerly at Inter-University Acceleration Centre, New Delhi under a project of UGC (www.expeyes.in)). The kit works with a PC, laptop, Tablet. The kit has 16 school level experiments in electricity, 7 experiments on higher level Electrical experiments, 13 experiments in Electronics, 3 experiments in Sound and 5 experiments in Mechanics and Heat. Thus, a variety of electrical components such as, resistors, capacitors and inductors, bread boards, digital multi-meters and how a circuit for an experiment can be quickly wired and tested can be shown. Mr. Chintamani Pai, PhD scholar from University of Mumbai, Co-Founder of an entrepreneur group called 'Space Geeks' demonstrated a very interesting microscope set up using a laser pointer focused on a drop

of muddy water. The microscope can show the living organisms within the drop of water. Mr. Attari and Ms. Ramaswami demonstrated certain DIY experiments that clarify the basic concepts of mechanics and light respectively. Dr. Lalitha Dhareshwar and Dr. Devaki Ramanathan also showed simple experiments using laser light.

On the 5th of May, lectures on Biology were taken up by Dr. Shashibhal Pandey, Vice Principal and Associate Professor in Zoology, Smt. C.H.M. College, Ullhasnagar. He informed the rapt audience about quite a few amazing facts in the animal and plant kingdom which were quite unique and outstanding and encouraged the teachers to mould the children's minds such that they looked out for more such anomalies in nature. Ms. Jyoti Shiddanagoudar spoke on the new topics introduced in the syllabus, namely- introduction to biotechnology and heredity. Organic farming, herbarium, comparison between hybrid seeds and normal seeds were explained. The lab sessions included demonstrations on extraction of DNA from banana, and DNA finger printing basics were explained. Extraction of enzymes, presence of stomata and conductive tissues like xylem bundles from easily available materials such as- fruits and vegetables was also demonstrated. Simple projects that would make the students learn and remember diagrams were shown.

Mathematics chapters were covered on 6th May, where, Ms. Vimala Nandakumar, Former teacher of Atomic Energy schools, Chairperson of Shaktii Girls' Education Trust, with a 50-year experience in teaching mathematics at middle and high school level. She was able to demonstrate how to make Set theory concepts using classification in biological kingdoms. Concepts of compound interest was made easy for the students by using simple and interesting worksheets.

Dr. Bakhtaver Mahajan emphasized the need to present the bigger picture of imminent dangers of Climate change to the students. The students and the teachers can observe and help gather data which will help solve environmental problems in a very scientific manner. The students must be made aware and coaxed to contribute towards salvaging the damages done by mankind before it is too late.

The training course ended with the valedictory session in the afternoon. The valedictory address was delivered by Dr. Saramma Mathews, Professor at the Pillai College of Education and Research. She introduced the teachers to a captivating deliberation on the nuances of NEP 2020 and in what ways we can impart holistic education to school students.

The program ended with distribution of certificates to the participants and a vote of thanks. Very positive feedback has been given by the participating teachers, which have encouraged IWSA to conduct similar refresher courses in the future.

E. One Day International Seminar "One Earth" Rebalance Energy to Sustain on 14th June 2022

IWSA celebrated World Environment Day on 14th June 2022 by organising a one-day International Seminar on ""One Earth" Rebalance Energy to Sustain. In Sanskrit in the

Vedic literature, we find the term **वसुधैव कुटुम्बकम्** or **Vasudhaiva Kutumbakam** translating to One Earth One Family!

This conference was organized jointly by Indian Women Scientists' Association (IWSA) and South Indian Education Society's School of Business Studies (SISSBS) College of Management Studies (SIESCOMS) as a part of the yearlong Golden Jubilee celebrations of IWSA. The Chief Guest of Inauguration Session, Dr. Bigyan Verma, Director at SIES College of Management Studies, Navi Mumbai spoke on "Role of Corporates and NGOs in management of a sustainable Environment". Dr. Anuradda Ganesh, Chief Technical Advisor of Cummins India delivered the Keynote Address on "Vasudhaiva Kutumbakam"—World, the one Family and the one Mother Earth, Vasundhara.

In Session 1, there were three speakers,

1. Dr. Paresh Sheth -CEO MNC, Investment Bank, Adviser European Impact Fund, Director CASI, New York on "Environmental Social Governance (ESG)- the new working order" (Online)
2. Dr. Shyamala Mohan, founder of Shri Shashwat Foundation on "Shashwat Jal" (Offline)
3. Dr. Seema Mishra, Director, IIEM, SIES, Nerul on "Urban Heat Island" (Offline)

In Session 2, there were three speakers followed by screening of some documentaries on protection of environment.

1. Ms. Kalpana Ramesh, "Water Warrior", Head-Water Initiative-SAHE on "The Challenge of Water Conservation" (Online)
2. Dr. Vivek Polshettiwar, Associate Professor, School of Natural Sciences, TIFR, Mumbai on "Nano catalysts to Combat Climate Change" (Offline)
3. Dr. Jaishri Sanwal, Geodynamics Unit, JNCASR, Bengaluru on "The Mighty Himalayas: Land, People and Environment" (Online)

This session was all about *rebalancing the resources: water, air & land*.

The last session was a Panel Discussion where the following speakers spoke for 20 minutes each. There were discussions among the Panellists and the audience on the topics initiated by the Panellists. The Panellists also actively participated in the Q & A session with the audience.

1. Dr. Niranjana Chavan - Retd. From Department of Botany, Shivaji University on "Eco restoration of mangroves" (Offline)

2. Dr. Sueli Ivone Borrelly - Nuclear & Energy Research Inst., Radiation Technology, Center, São Paulo, Brazil on “Ionizing Radiation Applied for Environmental Remediation” (Online)
3. Dr. Vaibhav Vaidya, Chief Technology Officer, Simusolar Inc., Tanzania on “How India pioneered the future of distributed individual solar power” (Online)
4. Dr. Elaine Solowey, Director, Center for Sustainable Agriculture, The Arava Instt. for Env. Studies, Israel on “Sustainable Agriculture” (Online)
5. Dr. Jitendra Singh, ACE Environmental Safety, NPCIL, on “Environmental Stewardship Program of NPCIL” (Offline)

F. VIPNET Activities

Following are the activities of the VIPNET Science Club (VP-MH 0248), held online, on zoom platform, during the period May to August 2021 and all these programs were for the benefit of VIPNET members from Maharashtra (Students and Teachers) and IWSA Members:

1. ACTIVITY-10

Title: Science in Design: A guide to choosing a career in design

On 12th July 2022 at 4 pm, the tenth activity of the IWSA- VIPNET Science Club was held. The session began with Dr. Sweedle Shivkar, introducing Architect Sonam Ambe, Chief in Pedagogy from ACEDGE. Ms. Sonam introduced the concept of habitat and homes and explored them in the natural and man-made world. She also looked at the possibilities for a career in design.

All the children and teachers were excited to know about this field.

Total number of participants: 30

2. ACTIVITY-11

Title: A glimpse of 21st Century skills

On 9th August 2022 at 4 pm, the eleventh activity of the IWSA- VIPNET Science Club was held. Ms. Parnashree Kittad, a student of std 8 from New Horizon School, Panvel, introduced speakers- Ms. Megha Chougule and Ms. Disha Dbritto. Megha and Disha defined creativity and then gave the children many activities to do. This served as a lubricant for all, and young and old alike joined in. Everyone was clamouring to show their creation. Disha and Megha promised to come back with another exciting session and Parnashree thanked them profusely on behalf of the audience.

Total No. of Participants: 30

Community Welfare Programs

A. Nursery School and Education Committee

The ECCE Batch commenced in June 2022. The current Batch strength is 15 students. Besides Theory Classes, Practical Sessions were conducted for the trainees.

Trainees were taught to make Ganesh idols both from clay as well as paper on 13th August 2022. Trainees were taught different techniques to use crayons while doing artwork.

Award and Prize distribution ceremony for the 2020-21 Batch was held on 20th August 2022.

B. IWSA's Satish Haware Computer Education Centre

1. Mr. Subrato Mandal Executive Director, Konzeptogen (A Pune based company) donated the Geobhumi sensor to IWSA. The technology of Geobhumi was developed by Prof. T. Kundu of IITB. This sensor has been successfully installed by Mr Prasad Gokhale, Staff Hardware Engineer, NXP Semiconductors, Pune in IWSA's front garden on 10th June 2022. All data shall be monitored by IWSA Computer Committee. This sensor shall monitor four parameters including soil moisture, soil temperature, air humidity and air temperature. The sensor device has probes embedded in soil and is linked to a solar panel. The recorded data is sent to a mobile app for storage and analysis.

For more information kindly follow the link <https://youtu.be/txpLf5g91g>

2. Basic Computer Course was organised for 15 days in the month of May 2022.

3. Bioinformatics workshop was conducted with **33 students** for one day on 11th July for Bhavan's College students.

C. Hostel and Day Care

1. Independence Day was celebrated on 15th August 2022 at IWSA premises. One of the hostelites, Ms. Sejal Mhatre recited the following beautiful poem about IWSA.

पहले दिन वह रात में रोना

और फिर हर दिन कुछ अनमोल यादें लेकर सोना

रोज सुबह 9:00 से पहले का स्वादिष्ट नाश्ता

वह मैस की आंटियों संग खाने में बना प्यार का रिश्ता

यह हमारी अनुशासन प्रिय वार्डनस
जिनके दिल में है प्यार ,चिंता, आश्रय, उत्तेजना का सुंदर गार्डन ।

धन्य है हम उनके यह अविस्मरणीय सफर जो पाया
शुक्रिया सभी मेंटर्स को, जो आपने हमें जीने का नया तरीका सिखाया
और हर मोड़ पर गलती का एहसास कराया
हर बेटी के परो को दिया है उड़ने का सहारा
आप सभी ने हर मोड़ पर प्यार ही प्यार है बहारा ।

हॉस्टल तो सिर्फ नाम है
यह तो हमारे सफलता की सीढ़ी का पहला धाम है
जहां सभी का अलग काम है
लेकिन सफलता ही सबका अंजाम है ।

बिकॉज इट्स अवर हॉस्टल
है यह हमारे उड़ान खुशियां और परिवार का निवास
जहा है हर एक भगवान का वास
मिले हमें ढेर सारा प्यार

2. The Day Care Children celebrated Janmashtami at IWSA premises on 19th August 2022. The children played Dahi Handi and they listened to stories on Lord Krishna from the Nursery teachers.

3. The Day Care Children prepared eco-friendly Ganesha idols under the guidance of Day Care supervisors on 27th August 2022, ahead of Ganesh Chaturthi Festival.

D. IWSA's Pirojsha Godrej Science Library

Installation of e granthalaya 3.0 software on library computer through LAN in conjunction with IWSA Computer Education Centre was completed on 5th July 2022.

Thus, IWSA Library has gone digital in addition to the collection of more than 6000 books consisting of books for children, women who broke the glass ceiling in science and technology, leaders, and motivators.

IWSA publications- books authored by IWSA members, internship Proceedings and booklets and books in English, Marathi and Hindi are part of the IWSA Library.

E. IWSA's Murli Lal Chugani Health Care Centre

1. Cancer Detection Camp 2022

IWSA's-MLC Health Care Centre and MGM New Bombay of Nursing, Kamothe jointly organized a free Cancer Screening & Awareness Camp in Belapur on 26th June 2022 at Punjab Heritage Bhavan, Belapur between 10:00 am to 4:00 pm. The camp was conducted in collaboration with Indian Cancer Society (ICS) and MGM Nursing students under the supervision of their faculty, Ms. Vandana Kumbhar and IWSA members visited the area and made the community aware of the camp apart from inducing them to attend the screening facilities. The targeted beneficiaries were about 50 men and 50 women from lower socioeconomic strata.

Highlights of the camp:

After registration following tests were conducted:

- Complete oral examination for oral cancer.
- Complete physical examination.
- Comprehensive gynaecological examination.
- Clinical breast examination.
- VIA test

Above examinations were conducted by the ICS Medical team that comprised of a gynaecologist Dr. Jyoti Taskar, surgeon, Surgeon, ENT specialist, Dr. Hiranandani and technicians with the support of MGM Nursing college, Kamothe. Blood for CBC was collected by the nursing college students and analysed by the pathology laboratory of MGM Medical College. Investigations showed no suspected cases.

The camp could not complete 100 registrations because participants did not have a valid document of identity as per ICS requirements. Examinations were done on 41 males and 42 females.

Impact of the camp:

Local organisations and members of Punjabi Culture & Welfare Association visited the camp and appreciated the efforts undertaken by the entire team.

The camp is being conducted annually by IWSA MLC Health Care Centre through kind donations received from Ms. Jyoti Nadkarni in the memory of her parents, Dr. Jayashree Nadkarni and Dr. Jagdish Nadkarni. The program helped IWSA meet one of its mandates of Science for Society.

2. Yoga Day Celebration on 29th June 2022

IWSA MLC Health Care Centre organized a yoga day programme on 29th June 2022 to mark International Yoga Day. The event focused on this year's theme Yoga for Humanity. Students of Sainath School, members of Dignity Foundation, IWSA members and staff participated in the session.

The session was conducted by yoga instructor, Ms. Sharmila Gokhale, who gave a talk on the purpose of practising yoga in daily life. She conveyed the message of keeping the mind, body and soul healthy and pure by maintaining a harmonious connection between the three. To achieve this, she emphasized the regular disciplined practice of Shuddhi kriyas, asanas, pranayams, and dhyana in yoga.

The session addressed the true meaning of Yoga for Humanity which is to first focus on "me the being". Bring peace to the individual in me by being kind and compassionate and reflect that pure energy to other surrounding beings irrespective of age, gender, colour, caste or religion. Speaker shared simple yogic techniques such as Prandharana and Sakshibhav that will help to keep the mind calm and pure. Performing RAT (Receive, Accept, Transfer) through yogic practice to combat and shield from React, Absorb, and Torture will help individuals learn to survive in the changing environment or situation.

Participants took part in various breathing techniques and a few asanas that were demonstrated. The session was followed by a brief talk by dentist Dr. Raichel Thomas who advised the students on healthy eating and tips to control sugar cravings. She added the importance of timely check-ups to maintain good oral hygiene.

The programme ended with a display of a yoga dance video and the participants joined in the rhythmic dance with much enthusiasm. A vote of thanks was proposed to all who participated and helped in conducting this event. The program was attended by 54 participants.

F. Workshop on Home Cultivation of Oyster Mushrooms on 1st May 2022

This activity was conducted under the aegis of IWSA's extended community awareness program in collaboration with Rotary Club of Satellite City. It was conducted on 1st May 2022 at IWSA's Multipurpose Hall. Besides training by commercial expert Mr. Anand Shinde, this workshop was inclusive of take away mushroom seeded poly bags by participants for home nurture and monitoring on a created WhatsApp group for 5 weeks till the emergence of first harvest of oyster fruiting. The workshop could provide entrepreneurship skills to inhouse staff and empower them.

The activity was well appreciated by one and all for the training, nurturing guidance tips provided for experiential home grow during the cultivation stages and valuable lessons learnt for surpassing challenges to obtain abundant harvest! Another outcome included involvement of student volunteers for technical assistance during the workshop. This has resulted in one such student becoming an entrepreneurial trainer. Total outreach of the program was 34.

Other Activities

A. Celebration of Foundation Day on 13th June 2022

Half a century has rolled on in time since Indian Women Scientists' Association (IWSA) was conceptualized on 13th June 1973, nurtured, and grown into a fully developed tree with eleven branches, in India, achieving its objectives and mandates.

This was possible mainly due to the vision and the dream of twelve committed and distinguished women in science, who laid the foundation of IWSA in 1973. Their dream has been realized by the untiring efforts of hundreds of volunteers, who have time and again, given their unstinted support to bring IWSA to its present stature. The present member strength exceeds 2000.

Thus, 13th June 2022 marks the beginning for the yearlong activities planned at the Head Quarter and its eleven branches. Our GJC logo tagline reads "Looking back to move forward and soar" which reflects the ethos of IWSA in all the work that is undertaken. The celebration of Founder's Day began on 13th June 2023 began with Vriksharopan.

A century ago, Nobel Laureate Rabindranath Tagore started a unique 'Vriksharopan' festival at Sriniketan to value restoration of ecosystem and living in harmony with nature. This helped to bring the community together for the cause. At IWSA, the saplings were carried in a flower bedecked palanquin as in honour of the supreme. Invocation of energies from air, water, soil, sky and fire to support life were narrated from the Upanishads. A dance troupe led by famous dancers Ms Priyanki Gupta and Ms Sukanya Sengupta danced in IWSA's garden as the palanquins with saplings were taken to IWSA's Multi-Purpose Hall. Songs written by Tagore describing the relationship of nature and mankind were the theme of the dance. Here the Saplings were symbolically nurtured by IWSA's Founder Member Dr. Sudha Padhye and the present Trustees Dr. Sunita Mahajan, Dr. Bakhtaver Mahajan, Dr. Sudha Padhye, Dr. Devaki Ramanathan and Dr. Surekha Zingde.

Founder Members Dr. Sudha Padhye and Dr. Lalit Narurkar were felicitated, and they shared their experiences of formation of IWSA on 13th June 1973 and IWSA's journey for the past fifty years. Dr. Sudha Padhye expressed her satisfaction when she recounted the past fifty years journey. She observed that IWSA has pursued several educational initiatives which have served to ignite many minds to pursue careers in science. Women

have been empowered through courses which have imparted skills in many areas, most importantly emphasizing a scientific way of thinking while leading one's life.

"Nature & Biodiversity" photography exhibition by women was inaugurated by Mr. Sanjay Monga, Naturalist, Writer and Photographer, Mumbai.

Ms. Jyoti Kawade, Assistant Director, Town Planning, NMMC & PMC unveiled the "Thematic Murals" which were made by Architecture Students for the Mural Competition using recycled materials. The murals were based on the themes, 1) Ecological Restoration, 2) Famous Indian Women who broke the glass ceiling, and 3) Science for young and old.

Ms. Marja Einig, Deputy Consul General, Federal Republic of Germany attended the golden jubilee celebration function as a special guest. She talked about German Chancellor Fellowship programs, Fellowships from Alexander von Humboldt Foundation. She encouraged more women scientists to make use of these fellowship programs.

The grand finale of the Foundation Day Celebration was launching of IWSA's Golden Jubilee Signature Perfume, "I50" by Dr. Niyati Bhattacharya, former Chairperson, Board of Trustees, IWSA. Dr. Jyoti Marwah, an Aromatherapist and Director of **Mussoorie Fragrance and Flavours Institute** had specifically designed the signature perfume "I50" for the IWSA Golden Jubilee Celebrations in 2022 – 2023. The special case of the perfume was made from dried pine needles, which enabled women employment in Dehradun Forest area. As a token of appreciation, Ms. Alok Kohli, Forest Ranger from Mussoorie Forest Division, Govt. of Uttarakhand attended the launch of I50.

B. Visit of TISS Students to IWSA for an Orientation Program on 8th August 2022

TISS MA students visited IWSA campus along with their field supervisor, Dr. Penelope Tong on August 8, 2022. A feedback survey form was created to gather information on their understanding of the orientation program as well as to improve on our performance. Twenty one students attended the program.

Reports from Branches

Kalpakkam Branch

1. Technical Talk - Dr. Abha Bharti, Co-founder, Cerra Tattva InnoTech. One Technical talk was arranged on 30th June 2022 at Raja Ramanna Auditorium, IGCAR. Dr. Padma, Convener welcomed the participants, Dr. Veena spoke about IWSA and Dr. Gurpreet introduced the speaker. The speaker, Dr. Abha Bharti, Co-founder, Cerra Tattva InnoTech, IITM Research Park, Chennai gave an excellent lecture on "Advancement of Non-oxide Technical Ceramics Towards India's Strategic Self-reliance". Mrs. Jemimah presented a memento to the invited speaker. Dr. Manohari, Treasurer proposed the vote

of thanks. The talk was followed by an interactive session. About 30 participants attended this talk.

2. Annual GB Meeting

The Annual General Body Meeting was held at Raja Ramanna Auditorium, IGCAR, Kalpakkam on 30.06.2022. Dr. Padma welcomed the IWSA members and Dr. Vanithakumari, Joint Secretary presented the annual activity report. The Auditor's report and Accounts statement were presented by Dr. M. Manohari, Treasurer. The AGBM was attended by 25 members.

3. Workshop for College faculty

As a part of the IWSA Golden jubilee Celebrations, one workshop on the theme "Nuclear Technology for the Society" was conducted by IWSA (K) in association with Society of Heating, Refrigerating and Air Conditioning Engineers (ISHRAE), Kalpakkam and Indian Institute of Welding (IIW), Chennai branch on 17th August, 2022 at the auditorium, GSO (General Service Organisation), Kalpakkam township. In this workshop 40 members of faculty from 16 Educational Institutions and 37 members of IWSA, ISHRAE and IIW participated. Dr. Padma S. Kumar, Convener, IWSA, Kalpakkam branch welcomed the gathering and Mr. Ravi, President, ISHRAE briefed about the workshop. The inaugural address was given by Dr. Kitheri Joseph, Associate Director, MC&MFCG, IGCAR. In this workshop, seven eminent scientists delivered talks in the following topics in two technical sessions:

1. Nuclear Power for the society by Mrs. R.M. Nachammai, SO/H, Madras Atomic Power Station (MAPS)
2. Applications of Ion accelerators by Dr. S. Amirthapandian, SO/G, ARDS, MSG, IGCAR
3. Wireless Network Sensors for Nuclear Facility by Mrs. Jemimah Ebenezer, Head, WNS, IGCAR
4. Radiations in service to the society by Shri. R. Mathiyarasu, Head, HPS, IGCAR
5. Chemistry in Nuclear Reactors by Dr. A.L. Rufus, Head, RDCSS, WSCD, BARC Facilities
6. Nuclear isotopes in Cancer treatment by Dr. Debasis Saha, RCD, IGCAR
7. Air conditioning and ventilation in nuclear facilities by Mr. Biswanath Sen, Head, ACVSD, IGCAR

All the lectures were very informative and interesting and well received by the audience. The scale down models on nuclear installations and protective gears from MAPS and radiation monitoring instruments from Environmental Survey Lab. (ESL) were displayed in the workshop. Staff from MAPS and ESL demonstrated the functionality of them to the faculty members.

Mrs. Vanaja Nagaraju, Associate Director, ESG, GSO, Kalpakkam presided over the valedictory function. There was a feedback session and many of the participants appreciated the workshop and the hospitality received. Certificates were distributed to the participants of the workshop. Dr. Anita Toppo, Secretary, IWSA, Kalpakkam proposed the vote of thanks.

About 93 participants attended this workshop.

Kolhapur Branch

1. Health Checkup Activity on 5th May 2022

Health awareness by checkup of BP, Sugar, breast examination & Colposcopy was done by Ex. Convener Dr. Radhika Joshi's hospital for the members of IWSA as well as others.

Number of participants: 12

2. Distribution of Cloth Bags on 11th May 2022

Distribution of Cloth bags with Save Wet lands & IWSA Logo at Vengurla, Sindhudurg. IWSA Ex Convener Dr. Dhanashree Patil along with Dr. Dhanusha Kawalkar distributed cloth bags to create awareness on Plastic free environment & save Wetlands in Vengurla.

3. Online Session on Dry flower arrangement skill on 25th May 2022

As part of the Flower festival Series, an online lecture and demonstration on dry flower arrangement was conducted. The guest speaker was Artist Sangita Sawardekar. The introduction of the speaker was given by Dr. Dhanashree Patil. The Vote of thanks was given by Convenor Deepali Taywade Patil.

Number of Participants: 66.

4. Participation of Kolhapur Branch in One day International Seminar and Foundation Day Celebrations at IWSA Headquarters 12th to 13th June 2022

Four members of Kolhapur branch attended the one-day international Seminar "One earth" organized by IWSA head Office at Vashi, Navi Mumbai.

Ex Convenor Dr. Niranjana Mulik was one of the Speakers where she gave information on different species of Mangroves & importance of its conservation.

Dr. Dhanashree Patil spoke on Olive Ridley Turtles, its conservation and presented a documentary on active role of Women in Conservation of Wetlands, Mangroves & Eco tourism in Sindhudurg District.

5. Online Session on Ikebana, Japanese Flower Arrangement on 25th June 2022

In continuation of the Flower festival Series, an online lecture and demonstration on Ikebana, the Japanese Flower Arrangement techniques was conducted. The guest speaker was Mrs. Sujata Pandit. The introduction was given by Dr. Dhanashree Patil. A vote of thanks was given by IWSA Ex Convener Kalpana Sawant.

Number of Participants: 46.

6. Celebration of International Mangrove Day on 26th July 2022

On the occasion of International Mangrove Day (26th July 2022) to conserve the ecosystem of Mangroves, IWSA Kolhapur Branch in association with Inner Wheel Club of Kolhapur Heritage planted 5 Species of Mangroves in 'Nakshatra Van' under the guidance of our Ex-

Convenor Dr. Niranjana Chavan. She also explained the nature and importance of Mangroves to all the members present there.

7. Annual General Body Meeting 6th August 2022

A review on year the gone by, treasurers report & upcoming projects were discussed at the AGM. Members were felicitated for their active participation in the activities throughout the year.

Number of Participants: 16

Nagpur Branch

1. International Yoga Day on 22nd June 2022

IWSA, Nagpur region had organized 'International Yoga Day' on June 22, 2022 at Sanghamitra hall, Civil Lines Nagpur. Dr Arati Sawaji, IWSA life member and yoga expert demonstrated Asana. She also explained simple Yogasanas to be performed every day for a healthy life. The program was conducted by Dr. Dipti Andhare, Executive Member IWSA, Nagpur region. Dr. Anuradha Gadkari, Ex- Convenor, IWSA, Nagpur region also shared words of wisdom on the occasion. Dr. Seema Somalwar expressed vote of thanks. The Event received a very good response of about 40 participants and everyone carried home some valuable insights about yoga and healthy life given by Dr. Sawaji. Apart from IWSA members some women from surrounding areas and few rotary club members also attended the program.

2. Annual General Body Meeting (AGBM) on 16th July 2022

The annual General body meeting was held on 16 July 2022. The meeting was held on an online platform, the google link. At the general body meeting the new report was presented by Secretary Mrs Prachi Lakhe. The audited statement was presented by Dr Bharat Bharati Ganu, executive member. It was informed to the members by the convenor Dr Seema Somalwar that Indian Woman Scientists' Association (IWSA HQ) has completed 50 years of its foundation and Nagpur branch has also completed 40 years of its foundation. So, a program to celebrate birthdays happy moments should be organised. There were many suggestions on how and what kind of a program can be organised. It was decided that such a program can be finalised in a separate meeting. The meeting ended with a vote of thanks by the Secretary Mrs Prachi Lakhe. About 35 members attended the AGBM.

3. Environment Day Celebration on 6th August 2022

Environment Day was celebrated at Kalakunj Hall Civil Lines Nagpur. On this occasion Dr. Nanda Jichkar, ex-Mayor of Nagpur was the expert speaker and chief guest. She appraised the gathering about Smart city concept. She explained various developmental activities in Nagpur such as traffic monitoring systems deployed at various signals, construction and improvement of roads, plantation of trees along the roads, improved drainage systems,

waste disposal system etc. She emphasised on conscious utilisation of infrastructure by the citizens.

A drawing, essay and poetry competition for children of different age groups was organized by IWSA earlier in June 2022 on the theme “Dreams/Challenges of a smart City”. This competition received good response and children participated in good numbers. Cash prizes were given to the winners in each category by the Chief Guest Dr. Nanda Jichkar. Program was conducted by Mrs. Asmita Duragkar our life member. About 30 participants attended this program.

OBITUARY

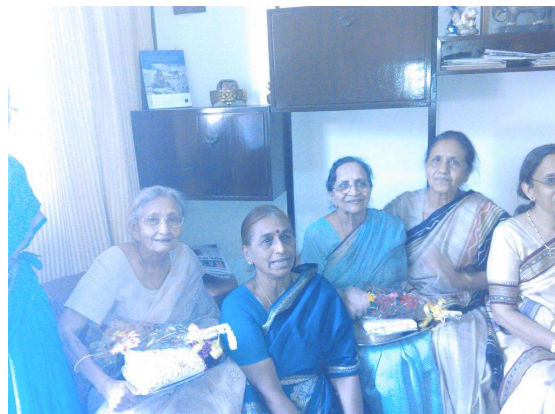
Mrs. Vidya Vasant Ranadive (11 June 1924 -20 August 2022), wife of late Dr. Vasant Ranadive, (founder of Sushrusha Coop. Hospital, Dadar, Mumbai), was a Solicitor by profession.



She was past President of WGU Colaba, Joint Hon. Secy. IFUWA, Trustee and Vice Chairman of Women’s India Trust. She was Associate Life member of IWSA, Hon. Secy. of IWSA Building Complex and the Fund-raising committee & Co-convenor of IWSA’s JMM Working Women Hostel committee. She was a member of IWSA’s constitution drafting committee and the committee for drafting the Hostel rules. She took active interest in all IWSA activities. Mrs. Ranadive was a soft spoken, gentle, and motherly person.

Her contributions to IWSA will be remembered forever.

May her soul rest in peace.



Senior IWSA members with Mrs. Vidya Vasant Ranadive on the occasion of her 90th Birthday

Article

The fantastic voyage of malaria sporozoites; does the surface circumsporozoite protein help in resisting the frictional forces experienced by sporozoites?

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Introduction:

The caller woman asked us very anxiously “I have been running fever for the last three days and have now been diagnosed with falciparum malaria. I live in a house that has nets on doors and windows. I can’t imagine how mosquitoes found me! What should I do now?”

We are not medical doctors, but are engaged in research on malaria biology, and are faced with such questions very often. Malaria remains a major scourge throughout the tropical world. Despite nearly 140 years of identification of *Plasmodium* species as the causative agent for malaria, this disease is not quite under control, let alone the dreams of eradication. The mosquito menace continues to spiral, spreading other diseases as well, and as yet there is no sight of an effective malaria vaccine.

However, usage of antimalarial drugs has been an effective means of control. Many antimalarials have been developed against malaria, the most important being chloroquine and artemisinin. The inevitable ability of the parasites to develop resistance to these drugs has raised the importance of a) drug combinations and b) development of new drugs and novel targets. In response to the spread of parasite resistance to chloroquine and other antimalarials such as pyrimethamine and sulfadoxine, artemisinin-based combination therapies (ACTs) have been recommended by WHO for treatment of uncomplicated malaria. The use of ACT has been an important part of the remarkable decrease in malaria globally. Yet, about 250 million cases of malaria world-wide and nearly 600,000 deaths, mainly of African children, occur per annum¹.

Why do we have no effective malaria vaccine at present? As with most parasitic diseases, *Plasmodium* moves from tissue to tissue and changes its shape and surface proteins, so that the immune system is fooled to a great extent. Sporozoites, the infective stage of the parasite, are introduced by the female *Anopheles* mosquito into the vertebrate

host, and therefore constitute the natural target to generate a vaccine and prevent the disease. In the 1960s, a series of experiments by Nussenzweig, Vanderberg and Most systematically established that irradiated sporozoites do confer protection to the respective vertebrate host². There were hunts for protective antigens of the sporozoite, and the circumsporozoite protein (CSP) was identified. CSP forms about 70% of the membrane protein and densely coat the surface³ and remains the most effective vaccine candidate. Now, after 35 years of clinical development, the RTS, S/AS01 vaccine, using part of CSP, is the only one to have undergone Phase 3 clinical trials. Unfortunately, the efficacy is just about 30-40%, and several issues remain with this vaccine. In order to develop effective immunity against the disease, we need to understand the biology of the sporozoites, its surface structure and the host immune response to the sporozoites, better.

Sporozoites - their motility and the infection process:

How do sporozoites originate? The developing oocysts in the mosquito gut produce sporoblasts; mature oocysts rupture and release sporozoites into the haemolymph. Sporozoites undergo an unusually long journey following their egress from oocyst. Within mosquito hemocoel, they migrate to the salivary glands and wait for transmission. In the mammalian host, the sporozoites are largely introduced into the skin, where they undergo a gliding motion⁴. They then traverse through the cells of the dermis, tissue matrices, and vascular endothelial cell junctions into the blood stream prior to their selective arrest in liver cells. The random entry and exit of sporozoites through cells is a non-passive process that activates the sporozoite motility in the presence of albumin and is critically time dependent⁵. Intravital microscopy has revealed that the sporozoites move fast in the blood flow (1-3 μ m/s) and can be seen to squeeze through Kupffer cells, endothelial cells and hepatocytes^{5,6} and clearly spend great energy towards effective migration and homing. The motility of sporozoites is fuelled by an acto-myosin molecular motor present in the cortical region of the sporozoite, underneath the plasma membrane. Multiple components such as gliding associated proteins, adaptor proteins, and the thrombospondin-related anonymous protein (TRAP) act in concert to facilitate a substrate-dependent gliding motility⁷. Considering the high speed of sporozoite migration in vivo, and the requirements to squeeze through cell junctions, it is likely that the sporozoites experience considerable frictional and drag forces. However, the factors that could cushion the frictional forces and make the sporozoites flexible are not known. Could the abundant CS protein on sporozoite surface confer such flexibility?

Indispensability of CSP for the sporozoites and a structure-function correlation:

CSP is the major surface protein on sporozoites, and in all species of Plasmodia, they exhibit the same structural organization with a unique species specific central repeat region (Figure 1). CSPs from different Plasmodium species do not exhibit sequence homology except in two small regions, I and II, which play a role in vector and host receptor recognition, respectively. The C-terminal region is homologous to the thrombospondin type-1 repeat (TSR) superfamily. It is observed that the diverse repeat regions of CSPs from all species of Plasmodium are immunodominant, and could be involved in immune evasion^{8,9}.



<u>Species</u>	<u>Repeat sequence</u>	<u>Number</u>
<i>P. falciparum</i>	NANP	43
<i>P. knowlesi</i> (H)	GQPQAQGDGANA	12
<i>P. knowlesi</i> (N)	EQPAAGAGG	16
<i>P. berghei</i> (ANKA)	PNDPPPPN	8
<i>P. yoelii</i> (17XNL)	PPQQ	8
<i>P. vivax</i>	APGANQ(E/G)GGA	11

Figure 1. Schematic representation of the CS protein. In the lower panel the amino acid sequences and the number of repeats for different species of *Plasmodium* are shown.

In general, a knock-out (KO) of a gene addresses the function of the corresponding coded protein in an organism. CSP was the first KO generated in the malaria parasite. It was observed that the sporoblasts were vacuolated and defective within the KO oocysts, showing that CSP is structurally indispensable for the formation of a sporozoite¹⁰. In an attempt to further appreciate the structure-function aspects of CSP, several deletion mutants have been generated that lacked the N-terminus, the central repeat region and the canonical GPI anchor sequence. With an exception to N-terminal domain deletion, other mutants resulted in defective sporoblasts. The N-terminal deletion mutant yielded sporozoites, but they failed to migrate and infect hepatocytes effectively¹¹.

The crystal structure of *Plasmodium* CSP is not available as yet. Earlier studies have postulated a super-helical structure for the repeat regions¹². However, using single-molecule force spectroscopy (SMFS), we have recently demonstrated that the repeat regions of CSP are heterogeneous and largely unstructured¹³. This study also shows that the CSP molecules exhibited two major conformational populations¹³, possibly indicating the open and collapsed forms. Based on our recent work using recombinantly expressed CSP and SMFS¹³, we hypothesized that the densely coated CSPs provide a structurally pliable cushion cover on the sporozoite surface that may lower the stiffness of the cells, providing lubrication and easing cell motility and traversal.

To test this hypothesis, an approach to manipulate CSP levels on the sporozoite surface would be ideal. However, it is not practically feasible, as abrogation of normal levels of CSP affects their structural integrity, yielding hypomorphs. Therefore, in order to assess the contribution of varying levels of surface expressed CSP towards stiffness and motility *in vivo*, we used an amoebic stage of the cellular slime mold *D. discoideum* as a model system. In our recent study, using a combination of an atomic force microscope (AFM) and video microscopy,

we successfully measured respectively the stiffness (Young's modulus) and motility of the amoebic cells expressing on its surface, either the full length CSP or its deletion variants¹⁴. Further, we compared the stiffness of the CSP-expressing *D. discoideum* cells with *P. berghei* sporozoites and observed the values to be in the same order, at about 1 kilo Pascal. We also observed a direct correlation between surface levels of the full-length CSP and a reduction in stiffness, along with an enhancement in the motility of the cells.

It has been documented that there is a correlation between cell stiffness and motility¹⁵. Several cancer cells, in particular those exhibiting metastasis, become several-fold softer when measured by various methods, including AFM¹⁵. Like metastatic cancer cells, the *Plasmodium* sporozoites also undertake long journeys through tissue matrices and cell junction barriers. Does CSP play a role in cell motility? The strongest evidence that CSP is involved in motility comes from studies using anti-CSP antibody treatments. Using anti-CSP antibody inhibition studies and through the release of the CSP using GPI-PLD on *D. discoideum* cells expressing various domains of CSP, we showed that the increased motility of the CSP-expressing *D. discoideum* cells could be specifically attributed to CSP¹⁴.

While most of the zoite forms of other parasites need to glide to their target host/vector cells over a short distance, the *Plasmodium* sporozoites undergo a long and penetrative journey starting from the mosquito mid-gut to the vertebrate liver cells⁵. CSP is uniquely present in a huge abundance only on the surface of *Plasmodium* sporozoites. Based on our findings that CSP correlates with flexibility, we postulate that the surface expressed CSP may be important for *Plasmodium* sporozoites for shielding and cushioning the sporozoites through considerable friction and drag forces, as they move through different cellular barriers. An elucidation of the structure of CSP-coated cell-membrane, and conditional mutants that allow CSP-levels to be altered post host infection, are required to shed further light on the molecular mechanism of the contributions of CSP towards enhanced cellular flexibility and motility.

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Dr. Aditya Patra embarked on his academic journey as a master's student under the mentorship of Prof. Shobhona Sharma at the Tata Institute of Fundamental Research, Mumbai. During his master's project, he had the unique opportunity to study the major surface protein of the sporozoite stage, the circumsporozoite protein (CSP). His efforts yielded new insights into the structural and mechanical properties of CSP, illuminating its significance in enhancing sporozoite elasticity and motility.

Driven by his curiosity, Dr. Patra became captivated by the multifaceted world of membrane receptors and their pivotal roles in cellular processes. To further his exploration, he joined as a PhD student under the guidance of Prof. Michel Hartmut at the Max-Planck Institute, to study the structural and functional properties of membrane receptors. His research findings on GPCRs during his PhD will aid the field of pharmacology to develop effective drugs with better selectivity and minimal side effects. Dr. Aditya Patra finished his Ph.D. in June 2023 from the molecular membrane biology department from Max Planck Institute of Biophysics, Frankfurt-am Main. Now he is a guest researcher over there.



Shobhana Sharma, FASc, FNA, has performed extensive research work on molecular biology and immunology of malaria and is considered an expert on the subject. She has over 120 publications in peer reviewed journals, which include Science, Journal of Immunology, PloS Pathogens and Journal of Biological Chemistry. She has also 3 filed patents, and is currently working with ICT scientists towards anti-malarial drug delivery. She has mentored about 30 Ph. D. and M. Sc. students, who have carried out the legacy of being successful scientists all over the world.

Shobhana Sharma earned her PhD degree in the year 1981 in Molecular Biology, from Tata institute of Fundamental Research, Mumbai, India. She received several awards during her student days which include National Science Talent Scholarship for nine years and Prof. Seshadri Prize for first rank in B.Sc. Chemistry (Hons), Delhi University. For her research work she has received many awards such as : Award for excellence in Molecular Aspects of Vector Borne Diseases; Wisitex Foundation Award Vigyan Ratna in Science; and Pratima and Sucharu Chakrabarty Stree Shakti Science Samman. Shobhana Sharma has been elected a Fellow of the Indian Academy of Sciences, Bengaluru, and Indian National Science Academy, New Delhi. She has contributed as a member of several Scientific Advisory Committees and Governing Bodies. Recently she featured as one of the 75 'Vigyan Vidushis' of India.

She has also been involved in 'Women in Science' Activities, and has delivered talks and articles on 'Ethics in Research'.

Women Achievers

Smt. Droupadi Murmu, President of India



Smt. Droupadi Murmu was sworn in as the 15th President of India on 25 July, 2022. Previously, she was the Governor of Jharkhand from 2015 to 2021. She has devoted her life to empowering the downtrodden and the marginalised sections and deepening the democratic values.

Born in a Santhali tribal family on 20 June, 1958 at Uparbeda village, Mayurbhanj, Odisha, Smt. Murmu's early life was marked by hardships and struggle. On completion of primary education from the village school, she went to Bhubaneswar on her own initiative to continue her studies. She earned the degree of Bachelor of Arts from Ramadevi Women's College, Bhubaneswar and became the first woman from her village to receive college education.

From 1979 to 1983, Smt. Murmu served as a Junior Assistant in the Irrigation and Power Department,

Government of Odisha. Later, she served as an honorary teacher at Sri Aurobindo Integral Education Centre, Rairangpur, from 1994 to 1997.

In 2000, Smt. Murmu was elected from the Rairangpur constituency as a Member of the Legislative Assembly of Odisha and continued to hold the post till 2009, serving two terms. During this period, she served as Minister of State (Independent Charge), Department of Commerce and Transport in the Government of Odisha from March 6, 2000 to August 6, 2002 and as Minister of State (Independent Charge), Department of Fisheries and Animal Resources Development, Government of Odisha from August 6, 2002 to May 16, 2004. In both assignments, she introduced innovative initiatives and people-oriented measures.

Armed with her administrative experience, she took several efforts to spread education in tribal societies, became associated with several tribal socio-educational and cultural organisations of Odisha, and carved a special identity for herself. For her services as a legislator, she was awarded the Pandit Nilkanth Das – Best Legislator Award in 2007 by the Odisha Legislative Assembly.

Smt. Murmu was appointed the Governor of Jharkhand on 18 May, 2015. She was the first woman tribal Governor of a tribal-majority State, and she received wide appreciation for upholding the values of the Constitution and supporting the rights of the tribal communities.

In 1981, Smt. Murmu married (late) Shyam Charan Murmu, who was an officer in a bank. She has a daughter, Smt. Itishree Murmu, and son-in-law, Shri Ganesh Hembram (who is a rugby player). She faced many tragic personal losses, one 25 year old son died in 2009, another son in 2013, followed by loss of her younger brother, mother and husband in the subsequent months. She recovered by changing her life, becoming a follower of Brahmakumaris, and adopting Sahaj Yoga and meditation. The spiritual bent of life not only helped her survival, but stabilized her too. She is an avid reader and has keen interest in spirituality.

As President of India, Smt. Droupadi Murmu has travelled widely across the country. She has also travelled abroad to enhance India's global outreach and footprint. President Droupadi Murmu became the first Indian to receive Suriname's highest distinction, "Grand Order of the Chain of the Yellow Star" and she dedicated this honour to the successive generations of the Indian-Surinamese community. Murmu was also associated with several tribal socio-educational and cultural organisations of Odisha.

<https://presidentofindia.nic.in/Profile>, <https://www.britannica.com/biography/Droupadi-Murmu>

Kalaiselvi, Director General, CSIR (Council of Scientific and Industrial Research)

Nallathamby Kalaiselvi, who is a senior electrochemical scientist, has taken charge as the director general of the Council of Scientific and Industrial Research (CSIR) on 5th August 2022. Kalaiselvi, who was the director of the CSIR-Central Electrochemical Research Institute at Karaikudi is the first woman to become the Director General of CSIR, which is a consortium of 38 state-run research institutes across the country. She will also hold the charge as secretary, Department of Scientific and Industrial Research.

Known for her work in the field of lithium ion batteries, Kalaiselvi had risen through the ranks in CSIR and had broken the proverbial glass ceiling by becoming the first woman scientist to head the Central Electrochemical Research Institute (CSIR-CECRI) in February 2019.



Hailing from Ambasamudhram (born in 1967), a small town in Tirunelveli district of Tamil Nadu, Kalaiselvi did her schooling in Tamil medium, which, she said, helped her grasp the concepts of sciences in college. She obtained her Bachelor's degree in Chemistry from Government Arts College, Tirunelveli affiliated to Madurai Kamaraj University. She obtained her Post Graduate Degree in Chemistry from Government Arts College, Coimbatore and did her PhD at Annamalai University, Chidambaram.

Kalaiselvi's research work of more than 25 years is primarily focused on electrochemical power systems and in particular, development of electrode materials, and electrochemical evaluation of in-house prepared electrode materials for their suitability in energy storage device assembly. Her research interests include lithium and beyond lithium batteries, supercapacitors

and waste-to-wealth driven electrodes and electrolytes for energy storage and electrocatalytic applications. She was involved in the development of practically viable Sodium-ion/ Lithium-sulfur batteries and supercapacitors.

She not only contributed to the Mobility Mission Concept Note that the Ministry of New and Renewable Energy (MNRE) started, but also played a key role in and oversaw the efforts of CSIR-CECRI in the compilation of the Technical Report on National Mission for Electric Mobility (NMEM). She has more than 125 research papers and six patents to her credit.

<https://www.dnaindia.com/science/report-meet-nallathamby-kalaiselvi-the-first-woman-to-lead-india-s-top-scientific-body-csir-2974736>



Obituary

Marilyn Fogel, 'isotope queen' of science

Marilyn Fogel, a scientist dubbed as the "isotope queen" for illuminating fundamental scientific questions through analysis of atomic isotope ratios, died on May 11, 2022 at her home in Mariposa, California. She was 69. She helped develop the field of biogeochemistry and showed its power in making discoveries about nature, ecology, the long-term history of living things and the possibilities of life on other worlds.

Dr. Fogel spent much of her career at the Carnegie Institution for Science in Washington, where she pioneered the use of

isotope ratios in the relatively new field of biogeochemistry. She helped show the value of knowing stable isotope ratios and of blending biology, chemistry and geology in the study of nature, ecology, the long-term history of living things and the possibilities of life on other worlds.

Important aspects of her work involved mastery and development of precision techniques to measure quantities on the atomic scale. Major part of her research involved field work that included expeditions to far places under hazardous conditions. “Consistently innovative, world-class studies across wide-ranging fields are a hallmark of her career, with a diversity of research questions that is unique among the leading biogeochemists and isotope ecologists in the world,” said Gordon Love, chair of UCR’s Department of Earth and Planetary Sciences. “The impact and breadth of Marilyn’s research are extraordinary.”

<https://news.ucr.edu/articles/2022/05/17/remembering-isotope-queen-marilyn-fogel-pioneering-scientist-beloved-mentor>

- Inputs from Dr. Bakhtaver Mahajan

Unsung heroine: The life of Cecilia Payne-Gaposchkin (1900 – 1979) and her contributions in astronomy

“Since her death in 1979, the woman who discovered what the universe is made of has not so much as received a memorial plaque. Her newspaper obituaries do not mention her greatest discovery. Every high school student knows that Isaac Newton discovered gravity, that Charles Darwin discovered evolution, and that Albert Einstein discovered the relativity of time. But when it comes to the composition of our universe, the textbooks simply say that the most



abundant atom in the universe is hydrogen. And no one ever wonders how we know.” In the commissioning function of the portrait of Cecilia Payne-Gaposchkin in the University Hall of Harvard, Jeremy Knowles, the Dean of the Faculty of Arts and Sciences, told the audience in his dedication speech. This honouring of the

British-born American astronomer and astrophysicist took place in 2002, 23 years after her death in 1979.

There is a complete lack of recognition of Cecilia Payne, even today, for her revolutionary proposal that stars were composed primarily of hydrogen and helium in her doctoral thesis in 1925. This lack of recognition was nothing new in her life, or in the lives of limited number of women in the largely male-dominated scientific community of that time.

Cecilia Helena Payne was one of the three children born in Wendover, Buckinghamshire, England, to Emma Leonora Helena (née Pertz) and Edward John Payne, a London barrister, historian, musician and an Oxford fellow, who died when she was 4 year old. Initially she was not able to study Mathematics or Science, her favourite subjects in the school, and was advised to learn music. But she won a scholarship that paid all her expenses at Newnham College, Cambridge University, where she initially read botany, physics, and chemistry. She got more interested in Physics and astronomy and dropped botany after her first year. She completed her studies, but was not awarded a degree because of her sex; Cambridge did not grant degrees to women until 1948!

She realized early during her Cambridge years that in UK a woman had little chance of advancing beyond a teaching role, and no chance at all of doing research and getting an advanced degree. She met Harlow Shapley, the new director of the Harvard College Observatory in US, who offered her a graduate fellowship, which encouraged women to study at the observatory. In fact, at that point of time, there were many women working in the observatory. Before modern devices such as laptops and mobile phones were invented, a "computer" was a person who did calculations. The meticulous analysis of massive astronomical data could be done by women with patience and at much lower wages as compared to men! At the Harvard College Observatory, between the late 19th century and early 20th century, several dozen women were "human computers" who helped lay out some of the fundamental assumptions of astronomy. Shapley persuaded Payne to write a doctoral dissertation, and so in 1925 she became the first person to earn a PhD in astronomy from Radcliffe College of Harvard University. Her thesis title was *Stellar Atmospheres; A Contribution to the Observational Study of High Temperature in the Reversing Layers of Stars*. There were already many achievements accomplished by women from this observatory earlier in the century, but with Payne's PhD women entered the mainstream.

Meghnath Saha had computed mathematical formulas that predicted where different lines would appear in a spectrum as a function of temperature. Cecilia Payne used Saha's equations as a starting point for her doctoral thesis at Harvard, convinced that if she could identify spectral lines and mathematically describe their intensity, she could develop a system for precisely measuring the temperatures of stars. Her work established the first temperature scale for stars based on their classifications and spectral appearances. She further extended her work to measure the abundance of elements in the stars, including sun. Most of the heavier elements in the periodic table seemed to have similar abundances in stars to that on Earth, but the two lightest elements, hydrogen and helium, were wildly different. Hydrogen, in fact, appeared to be a million times more abundant in stars than it was here on Earth. Payne included this result in her thesis. However, when Payne's dissertation was reviewed, astronomer Henry Norris Russel dissuaded her from concluding that the composition of the Sun was predominantly hydrogen because it would contradict the scientific consensus of the time that the elemental composition of the Sun and the Earth were similar. Payne had to

consequently describe her results as "spurious". She included a caveat in her write-up that the hydrogen abundance was "almost certainly not real". After few years her thesis was praised by others as brilliant and Russell also realized she was correct when he derived the same results by different means. In 1929, he published his findings in a paper that briefly acknowledged Payne's earlier work and discovery, including the mention that "[t]he most important previous determination of the abundance of the elements by astrophysical means is that by Miss Payne [...]". Nevertheless, he was generally credited for the conclusions she reached. Accepted ratios for hydrogen and helium in the Milky Way Galaxy are ~74% hydrogen and ~24% helium, confirming the results of Payne's calculations from 1925.

Payne married Russian-born astrophysicist Sergei I. Gaposchkin in 1934, and remained scientifically active throughout her life, spending her entire academic career at Harvard, working with her husband and others on various aspects of stars and astronomy. When she began, women were barred from becoming professors at Harvard, so she spent years doing less prestigious, low-paid research jobs. Nevertheless, her work resulted in several published books, including *The Stars of High Luminosity* (1930), *Variable Stars* (1938) and *Variable Stars and Galactic Structure* (1954). Shapley, her mentor in Harvard, had made efforts to improve her position, and in 1938 she was given the title of "Astronomer." On Payne's request, her title was later changed to Phillips Astronomer, an endowed position which would make her an "officer of the university"; in order to get approval for her title, Shapley had to assure the university that giving Payne-Gaposchkin this position would not make her equivalent to a professor! But he privately pushed for the position to be later converted into an explicit professorship as the "Phillips Professor of Astronomy".

Much later, in 1976, she won the Henry Norris Russell prize for a lifetime of excellence in astronomical research from the American Astronomical Society. In her autobiography, Payne-Gaposchkin reflected on Russell's initial rejection of her work: "I was to blame for not having pressed my point. I had given in to Authority when I believed I was right." While accepting the Norris Russel Prize, Payne spoke of her lifelong passion for research: "The reward of the young scientist is the emotional thrill of being the first person in the history of the world to see something or understand something. Nothing can compare with that experience. The reward of the old scientist is the sense of having seen a vague sketch grow into a masterly landscape." Her words, "there is no joy more intense than that of coming upon a fact that cannot be understood in terms of currently accepted ideas" reveals how the pure joy of inquisitive research had motivated and guided her to work untiringly, in spite of lack of recognition or lowly treatment in the scientific community. In that generation or society which believed women were not physically capable of understanding scientific concepts, Cecilia Payne's work and books became a great inspiration to many younger women.

- (Inputs from Dr.Meera Venkatesh)

<https://www.space.com/34675-harvard-computers.html>

https://en.wikipedia.org/wiki/Cecilia_Payne-Gaposchkin

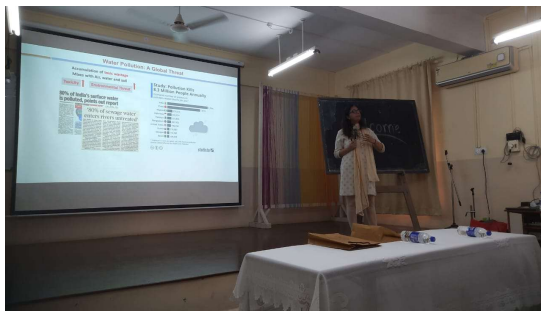
<https://www.harvardmagazine.com/2020/04/feature-vita-cecila-payne-gaposchkin>

Science Awareness Activities

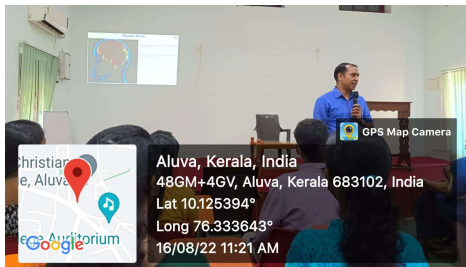
BRNS Talks



R. D. and S. H. National College and S.W. A. Science College, Bandra (W.), Mumbai



Sophia College, Mumbai



UC College, Aluva

International seminar, "One Earth" Rebalance Energy to Sustain, 14th June



Four-day (3rd to 6th May 2022) Teachers' Training Refresher Course for School teachers



IWSA - VIPNET Science Club

INDIAN WOMEN SCIENTISTS' ASSOCIATION
 Science Awareness Committee In Collaboration with Vigyan Prasara
 ACTIVITY NO. 10
 IWSA - VIPNET CLUB
 (UID- VPMH0248)

Science in Design:
 A guide to choosing a career in design

Sonam Ambe
 Chief In Pedagogy- ACEDE

On 12th July, 2022 at 4 PM
 On Zoom
 Meeting ID-812 97975773
 Passcode-IWSA VIP

INDIAN WOMEN SCIENTISTS' ASSOCIATION
 Science Awareness Committee In Collaboration with Vigyan Prasara
 ACTIVITY NO. 11
 IWSA - VIPNET CLUB (UID- VPMH0248)

A glimpse of 21st century skills

Megha S. Chougule
 Project Scientific Assistant
 Homi Bhabha Centre for Science Education, Mumbai

Disha Dbritto
 Project Scientific Assistant
 Homi Bhabha Centre for Science Education, Mumbai

BE CREATIVE
 "Think outside the box"
 Problem Solving
 Innovation
 Research

On 9th Aug., 2022 at 4 pm
 On Zoom
 Meeting ID-812 9797 5773
 Passcode-IWSA VIP

IWSA – Internship Program



Bhavan's College -12th May to 25th June

IWSA – Symbiosis School of Economics
Student Internship Program

REVIEW MEET

Title - An attempt to estimate the socio-economic relationship between Mangroves and Local Livelihoods (Navi Mumbai)

Thursday, 14th July 2022 Time - 7:30 pm onwards
 Google meet link - meet.google.com/wzd-eeje-gsp

Ms. Prati Dey
 Intern & Volunteer - IWSA's Foundation Day Traditional Ecorestoration Project Booklet

REVIEWERS

Dr. Sadhana Phadnis
 Former HOD - Economics
 Jhunjhunwala College, Mumbai

Dr. Suchandra Dutta
 Professor Angiosperm
 Taxonomy - R.D. National College, Mumbai

Dr. Sarita Kumari
 Professor HR/OB & Economics
 SIESCON'S, Navi Mumbai

Ms. Savita Rajiv
 Founder - Springs Innovations,
 #IdeasKiRahbala
 Co-founder - StartUpGreen

Symbiosis School of Economics 1st June to 31st July

IWSA's Satish Haware Computer Education Centre



Installation of Geobhumi sensor on 10th June 2022

Workshop on Home Cultivation of Oyster Mushrooms on 1st May 2022

INDIAN WOMEN SCIENTISTS' ASSOCIATION
in collaboration with
ROTARY CLUB OF SATELLITE CITY
PRESENTS
**Community Awareness Program on
Home Cultivation of Oyster Mushrooms**

Date: Sunday, 1st May, 2022 Time: 9.00 am – 12.30 noon



**Introductory Basics for Home Level Mushroom
Cultivation Process**
by Anand Shinde (Shinde Mushrooms Consultancy Centre)

Topics we will discuss
Room & Farm structure
Substrate preparation
Grass sterilization (for chemical free mushroom)
Mushroom Bed making (practical) knowledge
Oyster (Shingii) Mushroom cultivation knowledge of 4 different varieties
Grey, White, Pink, Blue
Mushroom beds incubation & crop harvesting method
Brief details of milky mushroom production
Brief details of seeds (SPAWN) making at home.

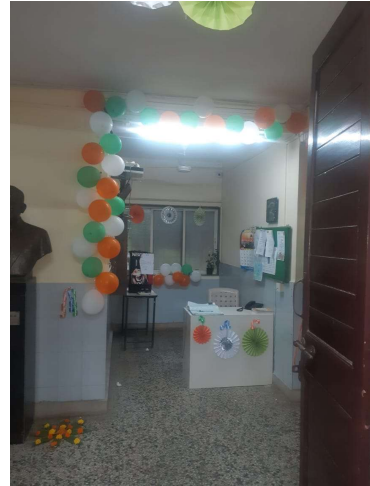
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Venue: IWSA, Plot No. 21, Sector 10A, Vashi, Navi Mumbai
iwsahq@gmail.com Contact 022 27661806



Mr. Anand Shinde, the organiser





Celebrations – Janmashtami and Independence Day

Nursery and ECCE Activities



Prize Distribution function for ECCE students Ganesh Idols made by ECCE students



Independence Day and Janmashtami celebrations

Activities of IWSA's Murli Lal Chugani Health Care Centre



Cancer Detection Camp on 26th June at Punjab Heritage Bhavan, Belapur, Navi Mumbai



Yoga Day Celebration on 29th June 2022

Foundation Day and World Environment Day Celebrations (13th & 14th June)





Acknowledgements

Hindi translation of Tagore songs: Sri Daualal Kothari, Kolkata, WB.
 Music arrangements: Rabindra Sudha, Bhilai, Chattisgarh. A nonprofit trust teaching & performing Tagore songs in hindi.
 Singers: Sri Bishwajit Sarkar, Ms Sanchaita Roy, Sri Ritesh Singh, Ms Mou Roy, Ms Anindita Ganguly
 Tabla: Sri Ranadeep Banerjee, Percussionist: Sri B.D.Amos
 Dancers: Ms Sukanya Sengupta, Ms Priyanki Gupta and troupe, Ms Bidishaa Haldar, Ms Kaushiki Mitra, Ms Sanjna Sen, Ms Ayurvi Pensalwar, Mumbai
 Recitation: Ms Pratiti Dey, Ms Tripta Tiwari, Dr. Shyamala Bharadwaj
 Translation & Narration: Dr Srirupa Mukherjee
 Panchbhootas: Kaiballya, Arohi, Prisha, Tanishka, Ruhi

Stage Decorations: Snehalata Bhavsar, Sudha Mehta, Manisha Sarkar, Manisha Chand, Sangita Chavan
 Light & Sound: Sri Mayuresh Gavand
 Brochure design and layout: Ms. Pratiti Dey
 Assistance: Ms. Vijaya Chakravarty, Drs. Srirupa Mukherjee, Maitrayee Paul, Rita Mukhopadhyaya
 Paalki Bearers: Mayur Jadhav, Amot Lotankar, Vinod Joshi, Mayuresh Gavand, Amit Yadav

Special Mention: *Dr. Sudha Padhye*, Founder member of IWSA

Heartfelt gratitude to Homi Bhabha Heritage Garden, BARC for gifting us with saplings

Vriksharopan

Festivals play an important role in our lives. A century ago Noble Laureate Rabindranath Tagore started a unique 'Vriksharopan' festival at Sriniketan to value restoration of ecosystem & living in harmony with nature. As part of the cooperative movement this helped to bring the community together for the cause. The saplings are carried in a flower bedecked palanquin as in honour of the supreme. Invocation of energies from air, water, soil, sky and fire to support life are narrated from the Upanishads. He wrote songs for this festival describing the relationship of nature and mankind. The sapling representing all living beings is welcomed in our lives with an oath to flourish as cohabitants. Today, the Learning Garden - Living Museum of IWSA attempts to create community awareness for saving our planet.

1. Maru vijayer ketan udao

Let us celebrate victory of greening the deserts by plantation. Let every speck of dust be soaked in the love showered by the elements of nature. As the parched land becomes full of life force with the onset of rains, poet urges all energies to assist the plants to grow and fulfil their promises of bringing back abundance to the earth. Beaming with flowers and fruits they bring respite to all living beings including humans. Plants capture energy from the sun to maintain the biosphere. Food chain is completed. This in turn ushers happiness to celebrate our lives in oneness with nature.

2. Aay aay amader angane

The saplings are invited to take roots in human dwellings and bring the blessings of heaven in the form of rains. Like our children the young plants playfully sway their branches, swish their leaves, and grow up with our tender love and care.

3. Vyom vyom mae

Onset of rains after prolonged summer brings respite to the parched earth. The ever changing canvas of the sky signals assurance of rain showers. The earth is awakened to fulfill the cycle of life, the carpet of green cover promises of much abundance showered by the universe

4. Mera mon udta jaye

In oneness with the clouds the mind floats aimlessly to be immersed by the universe. It so wishes to fly on the wings of the swans to the lands of unknown bliss.

5. Aaj jhara jhara jharte

When it rains incessantly, nature rejoices with spurt of life. Music of the rains, streams, rivers, breeze, mesmerize the mind. Deep within there is a call to liberating oneself with nature in ecstasy.

6. Shaona gagane ghor ghana ghata

A densely dark, thunderous & stormy night is best pictured in this song from 'Bhanusingher Padabali'. Narrated in 'Brajabuli' from his early writings the poet equates divine love of man and nature to that of Radha and Krishna! Fearless of all barriers it is a surrender to the eternal truth of unification with the creator.

7. Kon puratan praner tane

This final song signifies the very essence of life. It begins from the soil and shall sublime in its lap. The periodic cycles of seasons equate with cycles of human emotions. Our sensitivity to petrichor is ingrained, the reflections from fresh grass and saplings of paddy against the rain clouds bring renewed hopes of prosperity and fulfillment to the human minds.



The concept of Vriksharopan, a unique celebration



Showcasing the Stages in the Creation of 50 Perfume @ Signature

We have made it 100 percent natural and safe for use by all age groups including children and to make it a cross gender perfume – from early farm collection of plant material to extraction and distillation to procure our own essential oils, shade drying, making oil pomade and serums and blending with the appropriate essential oil we have obtained the perfect perfume note.



Journey of 50, the signature golden jubilee perfume and the pine casing



Dr. Jyoti Marwah with the Uttarakhand Forest Ranger, Ms. Alok Kohli



Dr. Niyati Bhattacharyya releasing the signature perfume



Deputy Consul General, Federal Republic of Germany, Ms. Marja Einig

Activities from our branches

Kalpakkam Branch



Workshop on Nuclear Technology



Technical Talk on 30th June

Kolhapur Branch



Distribution of cloth bags on Save Wetlands



Kolhapur Branch

International Mangroves Day 26th July

Nagpur Branch

NAGPUR BRANCH

June 22 2022

Aug 6 2022

International Yoga Day:
Participants: 40

Environment Day Celebration:
Participants: 30

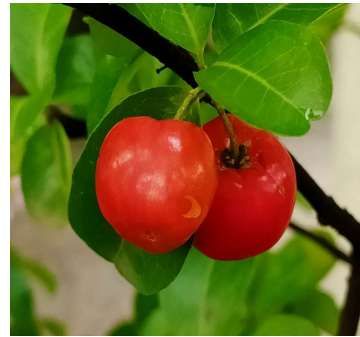
From IWSA's Learning Garden



Morning Glory
Evolvulus Glomeratus



Common Leopard
July 23, 2022



Cherries

To

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