



# IWSA NEWSLETTER

The Official Publication of the Indian Women Scientists' Association

Volume 48

Issue No. 2

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April – July 2021

## Webinars under the "Science and Our Life" Series

INDIAN WOMEN SCIENTISTS' ASSOCIATION  
www.iwsa.net  
12th Talk under IWSA's "Science and Our Life" Lecture Series

**Education is a Fundamental Right!**  
*Education of Children with disabilities*

By **Dr. Jayanthi Narayan**

Dr. Jayanthi Narayan is a retired Associate Professor and currently working as a Senior Professor at the University of Hyderabad. She has served as the Deputy Director of the National Institute for the Empowerment of Persons with Intellectual Disabilities, Hyderabad, Government of India.

on 10th April 2021 at 5pm  
Join <https://meet.google.com/ozx-dret-rjx>

10<sup>th</sup> April 2021

INDIAN WOMEN SCIENTISTS' ASSOCIATION  
www.iwsa.net  
13th Talk under IWSA's "Science and Our Life" Lecture series  
**Importance of Resilience during COVID times!**

By **Dr. (Major) Bishwadeep Paul**

Dr. (Major) Bishwadeep Paul is a retired Major in the Indian Army. He is currently working as a Director, Medical & Occupational Health at Procter & Gamble, India, Middle East & Africa.

on 8th May 2021 at 5pm  
Join us at - <https://meet.google.com/ozx-dret-rjx>

8<sup>th</sup> May 2021

INDIAN WOMEN SCIENTISTS' ASSOCIATION  
www.iwsa.net  
Celebrates National Technology Day with  
14th Talk under IWSA's "Science and Our Life" Lecture Series  
**OXYGEN FOR MEDICAL PURPOSES-  
A LIFE SAVING TECHNOLOGY FROM BARC**

Speaker: **Shri R.D. Sarda**  
Scientific Officer 2,  
Heavy Water Division, BARC

Chief Guest: **Shri K. J. Shanug**  
Associate Director,  
Chemical Engineering Group, BARC

on 14th May 2021 at 5pm  
Join us at <https://meet.google.com/ozx-dret-rjx>

14<sup>th</sup> May 2021

INDIAN WOMEN SCIENTISTS' ASSOCIATION  
www.iwsa.net  
16th Talk under IWSA's "Science and Our Life" Lecture Series  
**Evolution of Anaesthetist – A Peek into History of Anaesthesia**

by **Dr. Abhay Vaidya**  
MD (Anaesthesiology), FRCA, FRCR, PG Cert (Med Edu), MACadMED  
Tutor, School of Medicine, University of Central Lancashire  
Retd. Consultant Anaesthetist, National Health Service, UK

on 10th July 2021 at 7pm  
Join us at <https://meet.google.com/ozx-dret-rjx>

10<sup>th</sup> July 2021

INDIAN WOMEN SCIENTISTS' ASSOCIATION  
www.iwsa.net  
15th Talk under IWSA's "Science and Our Life" Lecture Series  
**Entrepreneurship:  
A silver lining**  
by **Saloni Gadbole**  
Co-founder & Director  
Occamy BioScience Pvt. Ltd.

OPPORTUNITY IS NO WHERE??  
NOW HERE!!!!

on 12th June 2021 at 5pm  
Join <https://meet.google.com/ozx-dret-rjx>

12<sup>th</sup> June 2021

INDIAN WOMEN SCIENTISTS' ASSOCIATION  
www.iwsa.net  
2nd Digital Celebration of  
World Environment Day  
JUNE 5, 2021  
3-5 pm

**ECOSYSTEM RESTORATION**

Presentations from all 11 branches and headquarter, exploring multitudes of ecosystems, meditations on our carbon footprint meter and a special child's perspectives of the living world to celebrate this special day.

Everyone is invited.

Environment Day Celebration  
5<sup>th</sup> June 2021

**ONLINE WORKSHOP**  
**Teachers' Training Workshop On  
School Level Space and Astronomy**  
MAY 1-2, 2021.

**WORKSHOP DETAILS**  
This is an online training for two days which will empower school teachers with effective teaching aids on Space and Astronomy related topics in classrooms. Workshop will cover selected topics in Space and Astronomy from national and state education board curriculum Class 7- class 10. Resource training will involve talks by the experts along with sessions on hybrid learning.

**REGISTRATION DETAILS**  
<https://anyurl.com/hByz7jic>

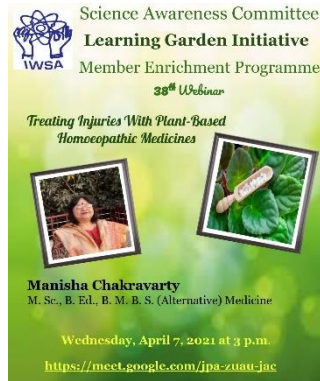
**CONTACT**  
[workshop@iwsa.org](mailto:workshop@iwsa.org)  
<https://iwsa.org/>

Presented By: IWSA  
In Collaboration With: VIGNAN PRASAR  
Knowledge Partner: SPACE GREENS

Workshop on Space and  
Astronomy  
1<sup>st</sup>-2<sup>nd</sup> May, 2021

## BRANCHES

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




Science Awareness Committee  
Learning Garden Initiative  
Member Enrichment Programme  
38<sup>th</sup> Webinar

Treating Injuries With Plant-Based Homeopathic Medicines

**Manisha Chakravarty**  
M.Sc., B. Ed., B. M. B. S. (Alternative) Medicine

Wednesday, April 7, 2021 at 3 p.m.  
<https://meet.google.com/jpa-zuau-jac>

**LG MEP:**  
**Dr. Manisha Chakravarty**  
7<sup>th</sup> April, 2021



Science Awareness Committee  
LEARNING GARDEN INITIATIVE  
Member Enrichment Programme  
39<sup>th</sup> Webinar

**Dr. Joyoti Mukherjee Goswami**  
Ayurveda Consultant

Wednesday, May 12, 2021 at 3 pm  
<https://meet.google.com/jpa-zuau-jac>

Ayurveda lays great importance on wellness. All the Ayurveda texts like Charak, Ashang and Sushrut start with the initial chapters on methods to maintain the health of the healthy. "Swasthya Swasthya Rakshanam" i.e. maintaining the health of the healthy is the first principle of Ayurveda. This session will highlight the simple changes that we can make in our diet and lifestyle to live healthier lives.

**LG MEP:**  
**Dr. Joyoti Mukherjee**  
**Goswami 12<sup>th</sup> May, 2021**



Science Awareness Committee  
Learning Garden Initiative  
40<sup>th</sup> Member Enrichment Programme

**Supriya Bose**  
Dietitian

Talk On: Plant based Food Sources for boosting immunity

Date: 16<sup>th</sup> June 2021 @ 3 pm

Online Platform: Google Meet  
<https://meet.google.com/jpa-zuau-jac>

**LG MEP:**  
**Ms. Supriya Bose**  
16<sup>th</sup> June, 2021



IWSA COMPUTER EDUCATION CENTRE PRESENTS  
ONLINE BANKING & CASHLESS TRANSACTION

Five days workshop for senior citizens  
Please Call 9820244614 For Registration

Dates: April 5-9, 2021  
Timing: 5 - 6 pm  
By Dr Sunita Mahajan & CEC team

Requirements: Desktop/Laptop/Mobile/Tablet/Internet connection/phone data

**Workshop on Online Banking and Cashless Transactions**  
5<sup>th</sup> -9<sup>th</sup> April, 2021



Computer Education Centre Presents  
Basics in Adobe Photoshop

4 days Online Workshop For One & All

Utilize Adobe Photoshop Work Area

Photoshop tools in the work Area Color Mode Basics

Crop & Transform Functions Using Filters

Register by Calling Mb: 9821634591  
Requirement: Just download adobe Photoshop 7.0

By Samita Vij

Layer Styles and Effects Text Type Tools

Coloring black and white photos

Photo manipulation Retouching Methods

Exporting in Photoshop & Many more

**Workshop on Basics of Adobe Photoshop**  
28<sup>th</sup> -31<sup>st</sup> May, 2021



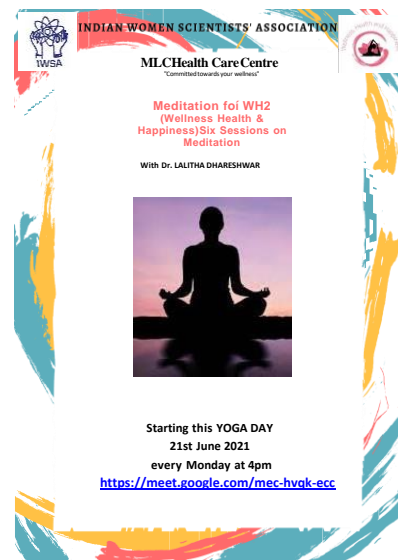
MLC Health Care Centre presents  
BE KIND TO YOUR MIND  
Mental Health Matters

Talk by Anita Dash

Self Care . Sleep to heal. Nutrition

May 17 @ 3 - 4 pm  
No Prior Registrations Needed. Please follow link to join

**Health Webinar "Be Kind to Your Mind" by Dr. Anita Dash,**  
17<sup>th</sup> May, 2021



INDIAN WOMEN SCIENTISTS' ASSOCIATION  
MLCHealth Care Centre  
"Committed towards your wellness"

Meditation for WH2 (Wellness Health & Happiness) Six Sessions on Meditation

With Dr. LALITHA DHARESHWAR

Starting this YOGA DAY  
21st June 2021  
every Monday at 4pm  
<https://meet.google.com/mec-hvqk-ecc>

**Meditation for Wellness and Health Six Sessions by Dr. Lalitha Dhareshwar starting on 21<sup>st</sup> June, 2021**



## From the Editor's Desk

**Dear IWSA Members,**

In this issue of Newsletter, you will find our regular features of reports from Popular Science Lectures, Science Awareness Programs, activities regarding Early Childhood Education, activities of Health Centre, Computer Centre, activities from various Branches etc. All the activities reported in this Newsletter have been conducted online due to COVID Pandemic. In our "Science and our Life" Lecture Series, four interesting lectures were held during the period April to July 2021. Under the "Member Enrichment Program" of IWSA, 3 lectures were held during this period and brief reports of the lectures are given in this Newsletter. Several Science Awareness activities like a Workshop on Astronomy for School Teachers, webinar on World Environment Day, Internship Programs for college students, were conducted during this period. We are glad to report all of these activities in this Newsletter.

This issue also brings the interesting online activities held at IWSA Branches at Hyderabad, Kalpakkam, Kolhapur, Nagpur and Roorkee. Dr. Sheela Donde, one of the Members of the Editorial Committee of IWSA Newsletter has written an interesting article about "Afforestation: A Climate Change Solution?". She has added a case study of Community Afforestation program organized by TCS-TIST conducted by Dr Laxmikant Naik from TCS, as reported in "Corporate Health Safety Environment" Journal, which gives the details of environmental and social benefits of such Community Afforestation Programs. We have also included another interesting article on "Advancement of Women in STEM: The Past, Present and Future" by Dr. Namrata, a sociologist and researcher on 'Women in Science' at IIT Kanpur. We have reported about some of the women achievers and also about two IWSA members, Dr. Asavari Rath, who received the DAE Scientific and Technical Excellence Award for the year 2019 and Dr. Umasankari, one of the editors of the book on "Physics of Nuclear Reactors", published by Academic Press in May 2021. Lastly, we have paid our homage to Dr. Sunila Mathur, who passed away on 17<sup>th</sup> April, 2021. She was President of IWSA during 1983-85 and responsible for starting the Kalpakkam Branch. We have given a brief account of her achievements and her valuable contribution to IWSA. I hope that all of you will enjoy reading about these reports and the scientific information content of this Newsletter.

With best wishes

**Shyamala Bharadwaj**

[shyamala.bharadwaj@gmail.com](mailto:shyamala.bharadwaj@gmail.com)

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### Editorial Board

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



## President's Message



Dear Members of IWSA,

This Newsletter is as usual filled with the information on the large number of webinars conducted by IWSA. There were interesting lectures under 'Science and Our Life' lecture series, Member Enrichment Programs (40<sup>th</sup> being the last of the series) and the BRNS supported lectures for colleges. It has indeed been an extremely busy period for IWSA members. The very first webinar in collaboration with Vigyan Prasar, Workshop for school teachers, on Space and Astronomy was organized on 1<sup>st</sup> and 2<sup>nd</sup> May 2021. All the sub-committees including the Learning Garden have done commendable work in this period.

Another very important component of our Science Education initiatives is the "Internship Program of IWSA" for college students. Through this, 54 students from Jai Hind college, Mumbai and one student from Flame University of Pune completed their internship with help from IWSA mentors.

Here, I would like to congratulate the achievers from IWSA, Dr. Umasankari Kannan and Dr. Asawari Rath, whose work has been covered in this issue. I would also like to express my deepest condolences on the demise of Dr. Sunila Mathur who was President of IWSA during the period 1983-1985.

This year's highlight among the green initiatives of IWSA was the installation of the 25 KW Solar electrical system, Tejomayee II. This installation together with the first phase of Tejomayee has brought down our electricity bills by 6 to 7 times.

For the first time in the history of IWSA, due to the COVID pandemic, e-mail ballot was exercised and this was followed by the election of the new Executive committee for the years 2021-2023 on the morning of 26<sup>th</sup> June 2021, just prior to the 48<sup>th</sup> Annual General Body meeting.

I am indeed very happy to welcome the new Executive Committee lead by our new President, Dr. Rita Mukhopadhyaya, at the helm of affairs of IWSA.

This period of the year was most exciting as we brain stormed to start preparations for our Golden Jubilee celebrations, commencing from June 2022 up to June 2023. There are huge tasks to be accomplished, to write the 50 year history of IWSA Headquarters and branches, fund raising, designing the Golden Jubilee logo, the launch of the Golden Jubilee Celebration Year during Environment Day Celebration in June 2022, followed by the year long celebration culminating in the Triennial conference at IWSA in June 2023 etc.

As I lay down my office as the President of IWSA on completion of my tenure 2019-2021, I would like to place on record the enormous contribution of the Executive Committee (2019-2021) members and I convey my heartfelt thanks to each and every one of them, including the members of the Board of Trustees and the administrative staff. Except for the first nine months of my tenure, the entire period saw us through the Covid pandemic. There were tough situations to be faced and financial crisis as the Day Care Centre, Nursery and Health Centre, together with other activities had to be closed. Our hostel continued to support the women who stayed behind and our hostel supervisors were our saviours. They did a commendable job. Together we have moved on and kept the flag of IWSA flying high. COVID has taught us several valuable lessons, one being, that when unity exists, we can together soar above and surmount any difficulty!

Regards and best wishes,  
**Lalitha Dhareshwar**

## **Indian Women Scientists' Association Committees (2021-2023)**

### **Executive Committee**

Dr Lalitha Dhareshwar	Past President	Chairperson GJC
Dr Rita Mukhopadhyaya	President	Co Convenor GJC
Dr Shyamala Bharadwaj	Vice President	Convenor NL
Ms Madhu Pahwa	Secretary	Convenor Hostel & DCC
Dr Suparna Kamath	Jt Secretary	Convenor Sc Awareness
Dr Paramjit Anthappan	Jt Secretary	Convenor Library
Dr Nootan Bhakal	Treasurer	Convenor Scholarship
Ms. Vijaya Tilak	Member	Coordinator Green Initiative
Ms. Bhuvaneshwari	Member	Coordinator Hall Maintenance
Ms. Tripta Tiwari	Member	Coordinator Vigyan Prasar Project
Ms Sukhvinder Sandhu	Member	Convenor Computer Edu. Centre
Ms. Priya Jacob	Member	Convenor Health Care Centre

### **Hostel and Daycare Committee**

Dr Devaki Ramanathan	Advisor
Ms Madhu Pahwa	Convenor
Dr Smita Kekatpure	Secretary
Ms Malathi Rao	Treasurer
Ms. Bhuvneshwari Ramnathan	Member
Ms. Chaya Kelkar	Member
Ms. Asha Khandkar	Member
Dr Lalitha Dhareshwar	Co-ordinator DCC
Ms. Anita Dash	Member
Dr Sangeeta	Co-ordinator Games
Dr Balwinder Sapra	Member
Ms. Kumud Balakrishnan	Member
Ms. Snehlata Bhavsar	Member
Dr. Maitrayee Paul	Member
Dr. Shyamala Bharadwaj	Member
Ms Sukhvinder Sandhu	Member

### **Building Committee**

Dr. Sunita Mahajan	Convenor	Co Convenor GJC
Ms. Chaya Kelkar	Secretary	
Ms. Bhuvaneshwari	Treasurer	Coordinator Hall Maintenance
Ms. Vijaya Tilak	Member	Coordinator Green Initiative
Ms. Vijaya Chakravarty	Member	Coordinator LGLiving Museum

Ms. Sakina Gadiwala	Member	Coordinator LGLiving Museum
All BOT members		
All Sub comm Convenors		
All EC Office Bearers		
Immediate Past President		
Dr. Niyati Bhattacharyya	Invitee	Immediate past Co-Convenor

#### **Nursery and ECCE Committee**

Dr. Sudha Rao	Advisor
Dr.. Anuradha Shekar	Convenor & Co-ordinator ECCE
Dr. Smita Kekatpure	Secretary & Co-ordinator Vigyan Prasar
Dr. Nootan Bhakal	Treasurer & Co-ordinator DRISHTI
Ms. Kadambari Vinchoo	Co-ordinator Nursery
Ms. Sushma Pradhan	Member
Dr. Medha Rajadhyaksha	Member
Dr. Saswati Ray	Member
Ms. Vijaya Chakravarty	Member
Dr. Dhanya Suresh	Member

#### **Staff Teachers**

Ms. Shahina Shaik  
ECCE  
Ms. Honey Thakkar  
Ms. Pratibha Haridas  
Ms. Payal

#### **Science Awareness Committee**

Dr. Surekha Zingde	Advisor
Dr. Suparna Kamath	Convenor
Ms. Vijaylakshmi Tilak	Secretary
Ms. Manashi Chakraborty	Treasurer
Dr. Surekha Zingde	Co-ordinator BRNS
Dr.. Srirupa Mukherjee	Co-ordinator GBL
Dr. Rita Mukhopadhyaya	Co-ordinator Internships
Dr.. Smita Kekatpure	Co-ordinator Skill Development
Dr.. Lalitha Dhareshwar	Co-ordinator Vigyan Prasar Projects
Ms. Tripta Tewari	Co-ordinator Vigyan Prasar Projects
Dr. Sweedle Shivkar	Co-ordinator Web Reporting

### **Healthcare Centre Committee**

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Ms. Priya Jacob	Convenor
Ms. Anita Dash	Secretary
Ms. Manashi Chakrabarty	Treasurer
Ms. Madhu Pahwa	Member
Dr. Sangeeta	Member
Dr. Jayashri Sainis	Member
Ms. Tripta Tiwari	Member
Ms. Snehalata Bhavsar	Member
Ms Ambika Janakiraman	Member
Dr. Rajeswari	Member
Dr. Nalini Bhat	Member

### **Library Committee**

Dr. Paramjit Anthappan	Convenor
Dr. Santhini Nair	Secretary
Ms. Vijaya Chakravarty	Treasurer
Dr. Darshana Salaskar	Member
Ms. Sushma Pradhan	Member
Ms.. Manashi Chakrabarty	Member
Ms Rama Prasad	Member

### **Scholarship Committee**

Dr. Nootan Bhakal	Convenor
Dr..Srirupa Mukherjee	Secretary
Dr. Smita Kekatpure	Treasurer
Dr. Sangeeta	Member
Dr. Yasmin Khan	Member

### **Newsletter Committee**

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Dr.. Lalitha Dhareshwar	Co-Editor
Dr... Susan Eapen	Member
Dr. Dhanya Suresh	Member
Dr.. Sheela Donde	Member
Dr.. Paramjit Anthappan	Member
Dr.. Smita Kekatpure	Member

# Reports from Head Quarters

## Science Awareness Programs

### A. “Science and Our Life” Series of Webinars

The following webinars were conducted through Google Meet platform during April to June 2021 under “Science and Our Life” Series.

#### 1. “Education is a Fundamental Right! Education of Children with Disabilities” by Dr. Jayanthi Narayan on 10<sup>th</sup> April, 2021

The 12<sup>th</sup> lecture of the series on “Science and Our Life” was held on 10<sup>th</sup> April, 2021 as an ON-LINE webinar, through Google Meet platform. Dr. Jayanthi Narayan, Special Educator, currently a visiting Professor at the University of Northampton, UK, spoke on “Education is a Fundamental Right! Education of Children with disabilities”.

Education of Children with disabilities has been a concern since ancient times, ranging from denying admission to schools, special schools, home based training to the current day practice of inclusive education. Right to Education Act (2009) and the Rights of persons of disabilities Act (2016) have brought about significant positive changes in the status of persons with disabilities. Early intervention and preschool education too have gained focus, leading to early attention to these children. Appropriate education demands teacher preparation, curricular adaptation and modified evaluation procedures to do justice to children with diverse learning needs. Technological development has brought about significant support to children with disabilities, such that even during the pandemics, arrangements for home learning for children with disabilities was made possible. What is needed is the awareness and empathy by the society in recognizing and accepting persons with disabilities as a citizen like any other human being with potentials, aspirations, and abilities to achieve if opportunities are provided. All they need is opportunities and not sympathy.

Before Dr. Jayanthi Narayan’s lecture, the participants were welcomed by IWSA Vice President, Dr. Rita Mukhopadhyay, who also gave a brief introduction to IWSA and its objectives. She also explained the objective behind the series (Science and Our Life) of lectures and the relevance of this special lecture. Dr. Shyamala Bharadwaj introduced the speaker and thanked the distinguished speaker for sparing her valuable time to speak about this important lecture about the education for all and especially for the persons with disabilities, who should be provided with equal opportunities and treated with empathy. Dr. Rita Mukhopadhyay conducted the question – answer session and gave the vote of thanks. About 56 participants attended the webinar.

You tube link for Dr. Jayanthi Narayan’s Lecture : <https://youtu.be/ejpHTKVKAK4>



## **2. “Importance of Resilience during COVID times” by Dr. Biswadeep Paul on 8<sup>th</sup> May 2021**

The thirteenth lecture of the series on “Science and Our Life” was held on 8<sup>th</sup> May 2021 as an ON-LINE webinar, through Google Meet platform. Dr. Biswadeep Paul, Director, Medical & Occupational Health at Procter & Gamble, India, Middle East & Africa spoke on “Importance of Resilience during COVID times”.

Dr. Bishwadeep Paul has been dealing with the pandemic in the forefront with his India & Regional Medical Team since February 2020, when it first appeared on the scene. During the pandemic, he has been instrumental in planning and preparing workplaces to safeguard the people & promote ‘health and wellbeing’ ...with ZERO fatalities to his credit. Over the past year he has realized that ‘RESILIENCE’ is the most important attribute to stay on course and overcome the challenges that we all face. He shared his experiences and real-life stories that helped the participants to understand the science behind the virus and the vaccine.

Before Dr. Paul’s lecture, the participants were welcomed by Dr. Triipta Tewari, who also introduced the speaker. Ms. Sukhvinder Sandhu compered the program and conducted the question – answer session. About 47 participants attended the webinar.

You tube link for the talk: <https://youtu.be/qj1fUPFYiu0>

## **3. "Oxygen for Medical Purposes - A Life Saving Technology from BARC" By Shri. K.C. Sandeep on 15<sup>th</sup> May 2021**

The fourteenth lecture of the series on “Science and Our Life” was held on 15<sup>th</sup> May 2021 as an ON-LINE webinar, through Google Meet platform. Shri. K.C. Sandeep, Senior Scientist, Bhabha Atomic Research Centre, Mumbai spoke on “Oxygen for Medical Purposes - A Life Saving Technology from BARC”

Oxygen is the ingredient, without which life cannot exist. We breathe-in oxygen from nature and we do not feel about its importance or scarcity. However, in the case of medical emergencies like Covid 19 pandemic, concentrated oxygen is required for life support. The conventional methods for medical oxygen production are Pressure Swing Adsorption (PSA) and cryogenic distillation, in which air is used as the feed. Pressure Swing Adsorption is a room temperature process, whereas the process is limited by the maximum achievable purity of oxygen. In cryogenic distillation of air, high purity of oxygen can be attained, but the plant operation needs to be carried out at cryogenic temperatures close to 77K. BARC has developed advanced alkaline water electrolyzer technology for the production of oxygen and hydrogen. The water electrolyzer system can provide high purity oxygen at operating temperature close to ambient. The possibility of CO<sub>2</sub>, CO, SO<sub>2</sub> and NO<sub>x</sub> in the oxygen gas stream when air is used as the feed, is completely eliminated in the present case. This system is highly compact and it can provide onsite production and supply of oxygen as per the demand. This can minimize the issues related to transportation of cylinders and cryogenic containers of oxygen during the present pandemic situation prevailing in the country, to a large extent.

Heavy Water Division, Chemical Engineering Group, BARC has indigenously developed advanced compact alkaline water electrolyzer technology. This technology has been demonstrated at various scales starting from 4 Nlph to 5000 Nlph of oxygen production. These systems are having proven performance track record of more than 5000 hours of continuous operation without deterioration in any of the evaluating parameters. The system efficiency and purity of oxygen is at par with international standards. The developmental efforts have resulted in the capability and competence of this technology for further scale up to industrial level and the technology has been transferred recently to industry for commercialization. The progress of different stages of development and future plans were presented in detail.

Before Mr. Sandeep's lecture, the participants were welcomed by IWSA President Dr. Lalitha Dhareshwar. She also gave a brief introduction of IWSA and SAOL. Shri. K.T. Shenoy, Associate Director, Chemical Engineering Division, BARC was the Chief Guest and appreciated the initiatives of IWSA in his address. The speaker was introduced by Dr. Shyamala Bharadwaj, Executive Committee Member, IWSA. Dr. Suparna Kamath compered the program and conducted the question – answer session. About 100 participants (limit of Google Meet) attended the webinar.

#### **4. “Entrepreneurship: A Silver Lining” by Ms. Saloni Godbole on 12<sup>th</sup> June 2021**

The fifteenth lecture of the series on “Science and Our Life” was held on 12<sup>th</sup> June 2021 as an ON-LINE webinar, through Google Meet platform. Ms. Saloni Godbole, Co-founder & Director Occamy BioScience Pvt. Ltd. spoke on “Enterpreneurship: A Silver Lining”.

The world economy is hit badly after the pandemic and the employment opportunities are severely impacted. In such a scenario, Entrepreneurship is the silver lining. In spite of looking for jobs, we should just create one for ourselves. Our Prime Minister too has given the mantra for Atmanirbhar Bharat, paving the way for an entrepreneurship culture. Though we agree to this, we are also confused about where and how to start. In this session, Ms. Saloni Godbole shared her experience of STARTing UP and how all of us can do it.

Before Ms. Saloni Godbole's lecture, the participants were welcomed by Dr. Paramjit Anthappan. She also gave a brief introduction of IWSA and SAOL. The speaker was introduced by Dr. Lalitha Dhareshwar, President of IWSA. Dr. Paramjit Anthappan also compered the program and conducted the question – answer session. About 76 participants attended the webinar.

You tube connection for Ms. Saloni's Lecture: [https://youtu.be/\\_IDn3tfwHq0](https://youtu.be/_IDn3tfwHq0)

#### **5. “Evolution of Anaesthetist: A peek into the history of Anaesthesia” by Dr. Abhay Vaidya on 10<sup>th</sup> July 2021**

The sixteenth lecture of the series on “Science and Our Life” was held on 10<sup>th</sup> July 2021 as an ON-LINE webinar, through Google Meet platform. Dr. Abhay Vaidya,

Tutor, School of Medicine, University of Central Lancashire, Retd. Consultant Anaesthetist, National Health Service, UK spoke on “Evolution of an Anaesthetist: A peek into the history of Anaesthesia”.

In this light hearted talk, Dr Abhay Vaidya described some of the milestones that led to the development of anaesthesia as a medical speciality in its own right. The surgeons can trace their ancestry to Sushruta, the ancient Indian physician who is often referred to as the ‘Father of Surgery’. However, for the anaesthetists, the earliest they can go back to is the late 18th / early 19th century when dentists and surgeons from the US and Britain started experimenting with various compounds used for recreational purposes to see whether these could be used during the surgery to alleviate pain and make surgery less stressful. In his talk, Dr Abhay referred to the development of spinal/epidural anaesthesia and later general anaesthesia with some self-parody. These developments not only helped to give surgeons time to carry out more challenging operations without the constraints of ‘focal’ and ‘thokal’ anaesthesia but also led to anaesthesiology developing as a medical speciality. Most importantly, these developments led to the possibility of many conditions being treated successfully under pain free conditions. Last but not the least, it led to improved patient care. Dr Abhay ended his talk emphasising the safety of anaesthetic during surgery.

Before Dr. Vaidya’s lecture, the participants were welcomed by Ms. Madhu Pahwa. She also gave a brief introduction of IWSA and Dr. Lalitha Dhreshwar briefed about SAOL. The speaker was introduced by Dr. Supriya Gajendragadkar. Ms. Madhu Pahwa also compered the program and conducted the question – answer session. About 31 participants attended the webinar.

You Tube Link for Dr. Vaidya’s Lecture: <https://youtu.be/MSg4ym1CiKc>

## **B. Popular Science Lectures held at Various Colleges**

### **1. “Career Opportunities in DRDO” at K J Somaiya Institute of Engineering and Information, Sion, Mumbai on 19<sup>th</sup> April, 2021**

A Popular Science Lecture on “Career Opportunities in DRDO” was organised at K J Somaiya Institute of Engineering and Information, Sion, Mumbai in collaboration with IWSA on 19<sup>th</sup> April, 2021. The speaker was Mrs. Yamuna Shivprasad, Scientist. Electronics Engineering, DRDO.

Mrs. Yamuna Shivprasad discussed about the various opportunities for students in the Defence Research and Development Organization (DRDO). This webinar helped the students to know more about DRDO and its various research activities and contribution in the COVID 19 pandemic. DRDO’s research opportunities on development for healthcare, agriculture, education, surveillance, education, security, etc were discussed in the webinar.

About 28 internal participants and 70 external participants attended the webinar.

## 2. “Applications of Radioisotopes in Healthcare with Emphasis on Radiopharmaceuticals” at Sophia College, Mumbai on 24<sup>th</sup> July, 2021

A Popular Science Lecture on “Applications of Radioisotopes in Healthcare with emphasis on Radiopharmaceuticals” was organized at Sophia College, Mumbai in collaboration with IWSA on 24<sup>th</sup> July, 2021. The speaker was Dr. Meera Venkatesh, Former Head, Radiopharmaceuticals Division, Bhabha Atomic Research Centre (BARC), Former Senior General Manager, Board of Radiation and Isotope Technology and Former Director of Physical and Chemical Sciences, at International Atomic Energy Agency (IAEA).

**Abstract:** Radionuclides made great impact in the history of nuclear sciences and have been put to various uses since more than a century ago, when the pioneering works by Madame Curie, and Henri Becquerel laid foundation to a new specialty in the world of science, followed by several major inventions through the decades that followed.

Radioactive nuclides or radioisotopes are unstable and undergo nuclear transformation by emitting energetic radiations ( $\alpha$ ,  $\beta$  or  $\gamma$  or any combination of these). The energy that these radiations carry and their unique interaction with matter are the basis for the numerous applications they have been used for.

Currently, majority of radionuclides are made artificially by transforming a stable nuclide into an unstable state and thus far over 2500 radionuclides have been produced artificially. The curiosity to use these fantastic radiations led to their exploration for use in various fields immediately after their production and last century has witnessed tremendous growth in the applications of radiation and radioisotopes, in diverse fields such as medicine, industry, agriculture, food preservation, water resource management, environmental studies etc. The impact of radiation and radioisotopes is very gratifying in healthcare.

Nuclear medicine is a specialty wherein radiolabelled molecules or ‘radiopharmaceuticals’ are used for diagnosis as well as therapy, especially in cancer patients. Diagnostic nuclear medicine procedures are available to image all the vital organs and their functions, as well as to delineate abnormal growth as in cancers. Therapeutic radiopharmaceuticals have established a niche role in treatment of certain disorders and a few cancers and are growing in volume and variety. As the action of radiopharmaceuticals is based on the bio-molecule used and its behaviour inside the body, nuclear medicine imaging is also known as ‘Molecular imaging’. Radiopharmaceuticals are the key reagents in the practice of nuclear medicine that enable precise targeting. Currently, nuclear medicine offers nearly one hundred procedures that are immensely helpful to a broad span of medical specialties ranging from oncology and cardiology to psychiatry due to which several millions of patients benefit annually, all over the world. Nuclear medicine is growing steadily with availability of a variety of radionuclides, targeting bio-molecules and the developments in this area are truly multi-disciplinary, with several areas such as molecular biology, biochemistry, radioisotope production, radiochemistry, organic/organometallic chemistry playing major roles. The strategy of personalized treatment through a

holistic combination of using two matched radiopharmaceuticals for diagnosis and therapy is known as 'Theranostics' and is gaining a lot of attention.

Dr. Meera gave an overview of radionuclides on health care with emphasis on the applications of radiopharmaceuticals. About 130 participants attended the webinar and the students interacted with the speaker through the Q & A session.

## **C. Workshop on Space and Astronomy on 1<sup>st</sup> and 2<sup>nd</sup> May 2021**

The subject of Astronomy and Space is progressively introduced and built up from the 7<sup>th</sup> standard to 10<sup>th</sup> Standard in their curriculum and this subject is closely linked with other subjects like atmosphere, weather conditions, pollution factors and sustainability. Hence an Online Teachers' training workshop for high school science teachers was held on Space and Astronomy on 1<sup>st</sup> and 2<sup>nd</sup> May 2021. This workshop was organised by Science Awareness Committee of IWSA in collaboration with Vigyan Prasara with Space Geeks as the Knowledge partner.

Space Geeks is a young start-up working in the domain of Space and allied areas. It is a group of young researchers who have come together to work in the field of Space, the ongoing 4<sup>th</sup> Industrial Revolution. Space Geeks aims to generate a passion for Space and aspires to connect everyone to Space by contributing in Space Education and Space Technology to generate opportunities and creating a talent pool to take up activities in the space and allied sectors. The three co-founders of Space Geeks are Dr. Chintamani Pai, Dr. Ankush Bhaskar and Dr. Virendra Yadav. Dr. Vaibhav Rawoot and Shri Hari Tejas Iyer are the two experts associated with Space Geeks. All the members of Space Geeks are highly qualified, working in specialised fields of Physics & Technology, and are pursuing Astronomy & Space teaching as a hobby.

Space Geeks organised the workshop to include talks and hands-on/hybrid learning sessions for Space and Astronomy related content introduced by various boards in the school syllabus. The workshop was organised with the aim of enabling school teachers to teach these contents effectively in classrooms and to ensure that Space and Astronomy related topics in the syllabus do not remain confined as just a syllabus for students to study from the exam point of view but can trigger excitement, interest and inspiration to take up STEM (Science, Technology, Engineering, Mathematics) careers.

**1<sup>st</sup> May 2021-** The program was compered by Ms. Tripta Tewari.

Dr. Lalitha Dhareshwar, President, IWSA, gave a welcome address. Dr. Devaki Ramanathan, Trustee & Convenor of Science Awareness Committee, gave an introduction to the workshop with a short brief on the Space Geeks. Dr. Arvind C. Ranade, National Co-ordinator of VIPNET clubs, Vigyan Prasara was the Chief Guest. He stressed the importance of Space education in the present times. The workshop began with a talk by Dr. Ankush Bhaskar on Solar System. This was followed by a talk



on Gravitation by Dr. Vaibhav Rawoot. The first day concluded after a hybrid session by Mr. Chintamani Pai and Mr. Hari Iyer, who demonstrated how many apps and games could engage the children's interest in space.

**2<sup>nd</sup> May 2021-** The program was compered by Dr. Smita Kekatpure.

Dr. Virendra Yadav gave a very informative talk on the Life cycle of Stars. This was followed by an engaging talk by Dr. Vaibhav Rawoot on Space Missions. There was another hybrid session conducted by Mr. Chintamani Pai and Mr. Hari Iyer demonstrating how various sites, apps and games could be used by teachers to teach children the basics of concepts like gravitation, escape velocity etc. The workshop concluded with a vote of thanks given by Dr. Suparna Kamath

There were around 118 registrations for the workshop. Around 60 teachers from various schools from Navi Mumbai, Chennai, Telangana attended the workshop and expressed their gratitude to IWSA and the Space Geeks for sharing their knowledge. The merits of the workshop were obvious from the highly positive feedbacks posted by the participants.

## **D. World Environment Day Celebration on 5<sup>th</sup> June 2021**

World Environment Day Celebration was celebrated on 5<sup>th</sup> June 2021 through Google Meet. Dr. Rita Mukhopadhyaya, Vice President, IWSA welcomed the participants, followed by remarks by President, Dr. Lalitha Dhareshwar about the World Environment Day celebration through online platform for the last two years. Dr. Nootan Bhakal gave introduction to the theme for the year 2021, viz., "Eco System Restoration". Speakers from various Branches of IWSA participated in this celebration. Following presentations were made by them:

1. **Societies Responsibilities on Ecosystem Restoration**  
Prof Capt Mithilesh Rathode – Amravati Branch
2. **Circular Economy Interventions for Sustainable Development**  
Dr. Venkat Mohan, Invited Guest Speaker
3. **Nature's Pharmacy**  
Dr. Padma Sasikumar – Kalpakkam Branch
4. **Ecorestoration and Conservation of Mangroves**  
Dr Niranjana Chavan – Kolhapur Branch
5. **Biomedical waste management**  
Dr. Seema Somalwar – Nagpur Branch
6. **Air pollution & its adverse effects**  
Ms Mythili – Nellore Branch
7. **ENV challenge with face mask**  
Dr. Shalini Kamakshi – Nellore Branch
8. **ANTARTICA-A nature's Treasure**  
Dr. Rupali Pal – IWSAHQ
9. **Children's activity corner:Ecosystem around my home.**

DAY CARE CENTER - IWSAHQ

**10. Carbon Footprint Meter: Time for giving back for restoration**

Ms. Madhu Pahwa – IWSAHQ

The program ended with vote of thanks by Dr. Shyamala Bharadwaj – IWSAHQ

## **E. IWSA – Flame University Student Internship Program June – July 2021**

An internship program with Ms. Aditi Naranja of Flame University, Pune was conducted as part of FLAME University's Developmental Activities Program. Students intern with NGOs to become sensitized about various socioeconomic issues and understand how civil society organizations work and the challenges they face. This internship with IWSA involved creating two learning modules on topics of Ecological Restoration and Food Preservation which are important and necessary for children to learn about. These modules were made in a way that they were a good hands-on learning experience for children across boards of examination, that was inclusive and accessible to children who are differently abled. The modules consist of one text document each, one video and an audiobook.

The internship consisted of the following modules:

- Made for 10 year olds /5<sup>th</sup> graders
- Adaptable as self-learning or teacher taught material
- Engaging in certain activities, fun facts and stories
- Inclusive, audio-visual to make it accessible to children who are differently abled
- Actionable, include small steps to take actions
- Have links and sources for further reading
- Glossary with key terms and explanations at a glance
- KASH: analysis for self-evaluation at the end of modules

The Learning outcomes can be summarized as:

**KASH Analysis-** Knowledge gained, Attitude changed, Skills developed, Habits acquired through this learning experience

**Knowledge-** food preservation, Ecological restoration and Miyawaki plantation

**Attitude-** Realised the importance of ecological restoration, become more appreciative of traditional food preservation methods

**Skills-** Interviewing skills, time management, simplifying complex concepts

**Habits-** Reducing food wastage, gifting plants, etc.

## **F. IWSA – Jai Hind College Student Internship Program 28<sup>th</sup> June – 28<sup>th</sup> July 2021**

IWSA conducted Internship Programs with 54 students of Jai Hind college during June – July 2021. The students were from FY, SY and TY B.Sc. degree courses of Microbiology, Botany, Biotechnology and Lifesciences subjects. They were divided into 10 teams. Five college faculty members along with 30 IWSA mentors from HQ and branches guided the students. The topics that were covered under the Internship Program were as follows:

1. Mangrove Eco restoration
2. Growing Microgreens at Home
3. Germination and Hydroponics
4. Integrated Science Quiz using Python
5. Biofertilizers and Biopesticides
6. Fermented Foods
7. Cloning Strategy using Snappgene
8. Biomethanation and Biocomposting at Home
9. Substrates for Cultivation of Mushrooms at Home
10. Scientific Timeline of COVID 19 in India

Jai Hind Faculty from each department, worked together with IWSA internship core team and mentors. Jai Hind online platform was made available for joint meeting e.g. orientation, mid term appraisal, report presentation, expert review etc. Special lectures by experts in the respective topics were organised to enhance the knowledge of the students. For example, Mr. Hemant Karkhanis, Associate Manager, Mangrove Department, Construction Business Unit, Godrej and Boyce Mfg. Co. Ltd took the students through a virtual tour of Mangroves through Zoom platform on 9<sup>th</sup> July, 2021. This helped the students to virtually observe the various species of mangroves, how to nurture them, how to preserve these mangroves etc.

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

## **G. Participation of IWSA in the Six-Day National Symposium on “Scope and Prospects of Chemical science” held during 26-31 July, 2021.**

SVKM's Mithibai College of Arts, Chauhan Institute of Science & Amrutben Jivanlal College of Commerce and Economics (Autonomous), Vile Parle, Mumbai organized a Six-Day National Symposium on “Scope and Prospects of Chemical Science” under the aegis of RUSA Center for Human Excellence during 26-31 July, 2021. IWSA participated on the 4<sup>th</sup> day and 6<sup>th</sup> day of the Symposium by organizing the following two lectures:

**1. Role of Chemistry in Toxicology by Dr. Prakash Kondekar, Honorary Director, Indian Institute of Naturopathy, on 29<sup>th</sup> July, 2021.**

**Abstract:** Food is essential component of living beings and so with Humans. In initial stages, human beings use to live in Jungles and use to have natural foods like fruits from trees and meat available from animals. Thereafter as use of fire known to humans, food chemistry came into picture followed by Toxicology. When talking about toxicology it is important to keep a few things in mind. Not everyone will respond to substances in exactly the same way. Toxicology uses the power of chemistry to predict what and how chemicals may cause harm and then shares that information to protect public health. The basic chemistry and its role in Toxicology were discussed in detail.

About 150 students attended the webinar and actively participated in the question and answer session and were eager to know from Dr. Kondekar about career opportunities in the field of toxicology.

**2. Introduction to IP and Career Opportunities in the Field of IP by Ms. Ankita Mathew, Senior Brand Protection Specialist, Navee, France on 31<sup>st</sup> July 2021**

**Abstract:** Intellectual Property is a property that arises from the human intellect. It is product of human creation. Intellectual Property comprises of two distinct forms - Literary and Artistic works and Industrial Property which includes patents, trademarks, designs, trade secrets, layout designs and geographical Indications.

About 140 students attended the webinar and actively participated in the question and answer session and were eager to know from Ms. Ankita about career opportunities in the field of Intellectual Property.

## **H. IWSA's Learning Garden**

Under the aegis of "Member Enrichment Program", IWSA's Learning Garden Members continued the organisation of lecture series during the period from April to July, 2021. A brief report of the webinars conducted through Google Meet platform under this program is given below. Most of these lectures can be viewed in "Indian Women Scientists' Association You Tube Channel"

1. On 7<sup>th</sup> April, Dr. Manisha Chakravarthy, a Homeopathy doctor, gave a talk titled, "Treating Injuries With Plant-Based Homeopathic Medicines." Ms. Vijaya Chakravarty gave the welcome address and Dr. Manashi Chakraborty introduced the speaker. Dr. Manisha Chakravarthy expressed her delight on giving this talk on 7<sup>th</sup> April, which happened to be "world health day" and dedicated her talk to the memory of Samuel Hahnemann, father of homeopathy, whose birthday falls on 10<sup>th</sup> April. After explaining the three basic laws of Homeopathy, she described the types of injuries and how to care for some common injuries successfully with plant-based Homeopathic medicines. She mentioned medicines from flowers like Arnica, Common Daisy, Marigold and

many other plants and their effectiveness for specific kinds of injuries, and even for motion sickness, dental shooting pain etc. She recommended seven must-have homeopathic medicines at home, which can effectively take care of pain, shock, trauma, which if reduced can help us handle those situations in a better way. The lecture was attended by 28 participants and was highly appreciated. It was compered by Ms. Tripta Tewari.

2. On 12<sup>th</sup> April, Dr. Joyoti Goswami, Ayurvedic Consultant, gave a talk titled “Ayurveda and Life Style”. The program was compered by Dr. Sweedle Shivkar and Dr. Srirupa Mukherjee introduced the speaker. The speaker talked about the importance that Ayurveda gives for wellness. All the Ayurveda texts like Charak, Ashtang, and Sushrut start with the initial chapters on methods to maintain the health of the healthy. 'Swasthasya Swasthya Rakshanam' i.e. maintaining the health of the healthy is the first principle of Ayurveda. The speaker highlighted the simple changes that we can make in our diet and lifestyle to live healthier lives. There were 43 participants and the lecture was found to be very useful and informative.
3. 40<sup>th</sup> lecture under LG-MEP was delivered on 16<sup>th</sup> June 2021. Introductory remarks were given by Ms. Vijaya Chakravarty. Founder member Dr. Sudha Padhye spoke about IWSA and MEP. This occasion of the 40<sup>th</sup> lecture was special with the release of MEP Booklet and a video presentation wishing Dr. Lalitha Dhareshwar adieu as President, IWSA. Glimpses of the 40 MEP webinars were shown by Ms. Sukhvinder Sandhu.  
The MEP lecture titled “Plant based food sources for boosting immunity” was delivered by Ms. Supriya Bose, a Dietitian. Ms. Vijaya Chakravarty introduced the speaker. The talk highlighted the classes of nutrients in plant based vegetarian food sources that boost our immune system. The various common food items in which these nutrients can easily be found was covered. The speaker talked about how an informed awareness in this matter enables us to choose the right food habits and to lead a healthy and happy life. The speaker emphasised that under the present circumstances, it is exceedingly important to develop a robust and resistant immune system for the body to safeguard it from deadly contamination. The lecture was attended by 52 participants and was well appreciated.

## **Nursery School and Education Committee**

1. Semester II for ECCE started from 15<sup>th</sup> April 2021.
2. Dr. Varsha Bhagat, Director, NMMC 'ETC' gave online lecture on ETC 'Special Education and Services' (Curriculum based) on Monday, 26<sup>th</sup> April 2021 from 3 pm to 4 pm. In fact, it was a virtual tour for ECCE students.
3. ECCE students attended interactive sessions at Arya Vidya Mandir Institute of Education on 16th, 20th, 26th and 27th April 2021 on "Learning Pre-Maths and Numeracy through play", "Miniature Clay Creations", "Enhancing Thinking and Literacy Skills in children" and "Happy curriculum in Preschool" respectively. All sessions were organized online.



4. On Thursday, 29<sup>th</sup> April 2021, Mrs. Sushama Padhye from Gram Mangal gave curriculum-based talk on “Gram Mangal- Innovative Approach to Early Childhood Education”
5. A Training session on “Common Accidents in Preschool” (Curriculum based) was conducted for ECCE students by Dr. Sushma Gangal on 10<sup>th</sup> May 2021 from 3pm to 4pm.
6. Four students joined the ADHD & LD courses.
7. Virtual tour was arranged to 'Daffodils Preschool', Thane on 29th May 2021 at 4:00 pm. All students participated.
8. All girls attended online story telling session for kids by Dr. Swati Popat Vats on 28 May 2021 at 5 p.m.
9. New batch ie. 26th batch of ECCE commenced from 1st. June 2021. Orientation programme for the new batch was organised on 1st June 2021. Dr. Nootan Bhakal introduced IWSA and its activities in details through PPT. Mrs. Rekha Pradhan spoke about ECCE course. At the end, students asked their queries which were answered by Mrs. Shaheena Shaikh. Sixteen students have taken admission so far.
10. All students and teachers attended Smt. Kamla Tai Kakodkar Memorial Lecture organized by SNTD, Mumbai on Saturday, June 5th, 2021 from 3 to 4 pm via Google Meet. The topic was "Brain and Behavioural Development in the early years". The lecture was very informative.
11. Unit test 2 for ECCE students was conducted online on 14th and 15th June 2021.
12. All students and teachers attended Smt. Kamla Tai Kakodkar Memorial session organized by SNTD on 16 June, 2021 on "Nutrition in the early years".
13. IT training for ECCE students started from 17 June, 2021 in Computer Centre at IWSA. There will be two batches, having classes on alternate days for 20 days.
14. A short term (30 hours) teachers' training course, “Shikshahn Setu” was conducted successfully in association with Vigyan Prasar during 27<sup>th</sup> May to 7<sup>th</sup> July 2021. Pre-Primary and Primary Teachers attended this this course and were immensely benefitted by the contents of the course which consisted of six modules.

The topics covered were:

- a. How the Child Learns
- b. Health, Nutrition and Safety
- c. Classroom Environment and Games
- d. Language Development through Music, Movement and Stories
- e. Mathematics made Fun and Easy
- f. Inculcating Scientific Temper and Love for Nature in Kids

## **IWSA’s Murli Laj Chugani Health Care Centre**

1. IWSA Health Centre organized a webinar on “Be Kind to Your Mind” by Dr. Anita Dash, IWSA Member on 17<sup>th</sup> May 2021. Covid 19 is an unprecedented crisis that has affected people across the globe. Bereavement, isolation, loss of income and fear, are affecting mental health of people, leading to insomnia, anger, anxiety, panic attack and even depression. It is important to learn the self- care strategies and get the care one needs

to cope. Lifestyle changes, like nutritious diet, exercise and developing hobbies, boost our mental health. Of course, our age-old Yoga and meditation are always associated with mental health as well as physical health. Good mental health fundamental to overall health and well-being. Dr. Anita Dash discussed about these important health care issues that one needs to pay attention to during the Covid 19 pandemic. The Question & Answer session was conducted by Dr. Smita. Kekatpure & the webinar ended with a vote of thanks by Mrs. Manashi Chakraborty. Forty four participants attended the webinar

2. A series of six lectures were delivered by Dr. Lalitha Dhareshwar, President, IWSA on “Meditation for Wellness, Health and Happiness” through Google Meet Platform. The first lecture was on International Yoga Day, 21<sup>st</sup> June 2021 which was compered by Mrs. Madhu Pahwa. A small video on dance yoga performed by IWSA members was played & all the participants of the webinar took part in the dance yoga from their homes which was followed by a lecture & meditation session by Dr.Lalitha Dhareshwar. Subsequent lectures were on 28<sup>th</sup> July, 5<sup>th</sup> July, 12<sup>th</sup> July, 19<sup>th</sup> July and 26<sup>th</sup> July, 2021.

We have been hearing and talking a lot about mental health during this pandemic. We now know how the resultant anxiety, insomnia, high blood pressure & negative thoughts have an adverse effect on our wellbeing. Meditation is said to be the best remedy to deal with all these problems. Scientific research on meditation have shown that regular practice of meditation is associated with structural & functional changes in the different regions of the brain. Further, regular meditation practice has been reported to slow down age-related thinning of the frontal cortex. Using modern technology like fMRI scans, scientists have developed a more thorough understanding of what’s taking place in our brain when we meditate.

Dr. Lalitha Dhareshwar elaborated on the various scientific principles on meditation and guided the participants about the correct practice of meditation during these six sessions on Meditation for Wellness, Health and Happiness”. Every session was attended by about 30-35 participants.

3. Dr. Nabha Deshpande, a trained and practicing physiotherapist, spoke about “Strength and Weight Training – Way to a Pain Free” life on 12<sup>th</sup> July 2021 through Google Meet Platform. She discussed about how weight training and muscle/bone strength play an important role in maintaining good health, especially as we age. Our overall strength and endurance increase which enables us to do varied activities. It reduces the risk of injury, helps us keep a healthy body weight and it improves, most importantly, our confidence with a feeling of wellness and happiness. The webinar was compered by Mrs. Manashi Chakraborty & the vote of thanks was given by Ms. Ambika Janakiraman. 36 participants attended the webinar.
- 4.

## IWSA's Satish Haware Computer Education Centre

To mark the celebrations of 30 years of CEC, workshops and events were conducted by CEC team as follows:

A six days online workshop on “**Online banking and Cashless Transaction**”, aimed at empowerment of senior citizens, was conducted from 5<sup>th</sup> to 10<sup>th</sup> April 2021. Dr. Sunita Mahajan, Dr. Paramjit Anthappan and Ms. Akhila Mahesh were the resource persons for the same. Theoretical and practical aspects of covered topics included requirements for online banking, usage of simple and convenient apps, Internet surfing, Net Banking login, different Net banking Options (Bill Payment, Money Transfer, etc.), Option for Online Banking, Changing password if forgotten or required, Importance of OTP, CVV number on Debit or Credit card (as security) and usage of these cards for Online Banking. The valedictory session on Security in Online Banking was conducted by an invited expert Ms Purobi Ghosh Mohan. It was a very successful workshop wherein 17 senior citizens availed the beneficial opportunity to learn and practise simulations and thereafter felt confident to use the online banking facility.

Another four days online workshop on “**Photoshop**” was conducted from 28<sup>th</sup> to 31<sup>st</sup> May 2021. The Resource Person of the workshop was Ms. Samita Vij, a computer faculty from Apeejay School, Nerul, Navi Mumbai. After the introductory session by Dr. Sunita Mahajan, Ms. Samita Vij, passionately conducted the entire workshop in a lucid manner, patiently clearing any doubts of the participants who were keen learners. A total of 19 participants attended the workshop. The age of the participants varied from 15 yrs. to 70 plus. The important resource materials to learn and practice the tools and techniques pertaining to Photoshop were shared to facilitate the process. Highlights of some important topics covered selection tools like feather and it's properties, importance of perfect mouse control, combining three images in one, use of super useful, non-destructive image editing tools that add colour, give shadows and tonal adjustments to the image, use of “Hues/Saturation” adjustment tool and it's application, juggling between multiple layers, placing one layer above the other, exploring and applying the various options and effects from the layers panel, use and applications of the Brush and elliptical marquee [with feather] tools and clipping masks. As per the participants feedback this workshop was rated as excellent, very good and enjoyable, along with positive suggestions for future endeavours.

# Reports from Branches

## Hyderabad Branch

### 1. Popular Science Lecture on “Transition from Academics to Industrial Product Development” on 14th May 2021

IWSA-Hyderabad, in collaboration with Aurora Degree and PG College, Hyderabad organized a talk by Dr. Gita Sharma, IWSA member, Prof & Director D Biopharma and Director, Research & Quality Control, Tapadia Diagnostics, Hyderabad. She spoke on “Transition from Academics to Industrial Product Development”, her journey from being an academican to successful product development in pharma industry and the development of the first recombinant DNA vaccine in the country. More than 100 participants, including students and faculty of Aurora college attended the interesting talk.

### 2. An Interactive Session on National Education Policy 2020 & Role of Teachers in an Increasingly Digital World” on 28<sup>th</sup> June 2021

IWSA-H in collaboration with Popsicles arranged an interactive session with Prof. L. Shashidhara, Professor of Biology at Ashoka University and renowned Developmental Biologist and Geneticist. The title of the talk was “National Education Policy 2020 & Role of Teachers in an Increasingly Digital World”. There were 28 participants which included mostly teaching personnel from colleges and a few members of IWSA-H. The event was organized by Dr. Rohini Chinta, IWSA member and Science Communicator.

## Kalpakkam Branch

### 1. Doctor's Talk on “Maintenance of Oral Hygiene during COVID Pandemic” on 28<sup>th</sup> April, 2021

Dr. Shoba Ranganathan, Dental Surgeon, DAE Hospital presented her talk on “Maintenance of Oral Hygiene during Covid Pandemic” on 28<sup>th</sup> April 2021. She highlighted the importance of oral hygiene especially during Covid 19 pandemic. She gave many important tips to keep one safe and healthy. About 100-120 people attended the talk through Vi-meet platform.

A prayer meeting was conducted for Mrs Sunila Mathur, founder member of IWSA (K) who passed away on 17<sup>th</sup> April 2021. A small condolence message was read by Dr. S. Padma, Convener IWSA (K)

### 2. Doctor’s Talk on “Lifestyles Diseases and Homeopathy” on 12<sup>th</sup> June 2021

Shri. P.A. Sasidharan, Retd., from IGCAR and Member, Kalpakkam Homeopathy Association delivered a talk on “Lifestyles diseases and Homoeopathy” on 12th June, 2021. Shri. Sasidharan showed different types of lifestyle disorders among men, women and children. He also pointed out how in today’s world luxury is causing harm

to our physical health. He suggested various ways to avoid the situation and to minimize the diseases related to lifestyle. He also mentioned the beneficial uses of homeopathy and its application in disease control. The talk was very informative and interesting. The lecture was followed by an active interactive session. As a token of our appreciation a small memento was presented to him. About 50 people attended the talk through online Google meet platform.

### **3. COVID 19 Relief Work on 26<sup>th</sup> June 2021**

IWSA, Kalpakkam branch continued the charity work of helping the village women by distributing provisions. Like last year, this year also some of the IWSA (K) members generously contributed to the charity work of distributing house hold items to needy people from neighbouring villages. Rice and essential groceries worth Rs. 1200 each were distributed to 25 families at Vengambakkam village near Kalpakkam. The distribution activity was carried out on 26<sup>th</sup> June 2021. IWSA members and research scholars volunteered to participate in distribution activity.

Since Covid 19 pandemic has made many people needy, IWSA (K) had initiated this work last year and due to request for more support from neighbouring villages and prompt support from our members we got motivation to continue this work. This charity work on behalf of IWSA (K) will be continued for one year.

## **Kolhapur Branch**

### **1. Gardening Course for Health and Happiness during 19<sup>th</sup> March to 29<sup>th</sup> June 2021**

Gardening for Health & Happiness, a three month online gardening course was conducted in association with Balasaheb Khardekar College, Vengurla on every Friday & Saturday of the month, where lecturers & demonstrators from the related field were invited to conduct lectures on various aspects of Gardening. Total 31 lectures were conducted. There were about 180 participants from all over the nation & 4 to 5 participants from Singapore, Dubai, Australia & US. It was a very successful activity. Participants were given online test papers and the first three ranks were felicitated. Participants were given participation certificates. Valedictory function was conducted at the end of the course.

Prof. Dr. Dhanashree Patil, HOD Dept. of Botany, Khardekar College, Vengurla. & Past Convenor, IWSA Kolhapur Branch was the course Coordinator, designed the 3 months program, coordinating with working team of lecturers & participants. Mrs. Deepali Taywade Patil, Proprietor, Shilp Eco Garden Centre, Kolhapur and Past Treasurer, IWSA Kolhapur Branch was the Course Treasurer, Assisting in Designing the program, coordinating & keeping track of each lecture & maintaining accounts of the course. Several students helped the coordinators by giving the technical support by creating the google link, recording the lectures, streaming the activity in you tube etc.



## **2. International Mangrove Day Celebration on 26<sup>th</sup> July, 2021**

On 26<sup>th</sup> July 2021, IWSA Kolhapur Branch celebrated International Mangrove Day by conducting a Webinar on Mangroves adaption, distribution & biodiversity for the first & second year students of M.Sc Botany, Shivaji University. Guest lecturer was Mr. Hemant Karkhanis, Associate Manager, Mangrove Department, Construction business unit of Godrej, Mumbai.

He explained about the importance of Mangroves, it's ecosystem, conservation & Distribution. He also showed the visual clips of Godrej Mangrove projects. There was an interaction session with students at the end.

Introduction to the webinar was given by Dr. Niranjana Chavan (IWSA Convenor) and vote of thanks presented by Dr. Varsha (IWSA member). About 75 students and a few faculty members participated in the webinar.

## **Nagpur Branch**

### **1. World Environment Day Celebration on 18<sup>th</sup> June 2021**

IWSA Nagpur Branch celebrated World Environment Day, an annual event of IWSA, on 18<sup>th</sup> June 2021. Dr. Shalini Dhyani, Senior Scientist, National Environmental Engineering Research Institute, Nagpur was invited as guest speaker to deliberate on "Reimagine, Recreate & Restore". Dr. Arati Saoji, Former Director, Institute of Science, Nagpur and Senior Life member of IWSA, presided over the event. Dr. Lalita Dhareshwar, President, IWSA Mumbai headquarter, Dr. Rita Mukhopadhyaya, Vice President, IWSA, Mumbai & all the executive members of IWSA, Mumbai Headquarter and Nagpur Branch were present on the occasion.

Program commenced with opening remarks by Dr. Pradnya Bhalerao, Convenor, Indian Women Scientists' Association, Nagpur Branch, Former Vice Principal LAD college Nagpur and Retired Principal Nikalas Mahila Mahavidyalay, Nagpur, where she briefed about IWSA's various initiatives.

Dr. Anuradha Gadkari, Founder member of IWSA , Nagpur Branch and former Scientist from NEERI threw light on IWSA's activities that utilizes its platform to create environmental awareness in general masses and in particular, students.

Dr. Rita Israni, Ex-convenor, Indian Women Scientists' Association, currently Scientific panel member, Spices & Culinary Herbs, FSSAI, New Delhi and former senior scientist Central Agmark Laboratory, Nagpur introduced the guest speaker.

Dr. Shalini Dhyani, Senior Scientist, National Environmental Engineering Research Institute (NEERI) in Nagpur, India deliberated on the topic "Ecosystem Restoration-Reimagine, Recreate & Restore", which is the theme of United Nation's World Environment Day 2021.

Dr Shalini Dhayani, has immense experience in landscape restoration and has put forth many Nature Based Solutions for Ecology Restoration. During her talk Dr. Shalini explained biodiversity inclusive impact assessment across India and stressed on how combined pressures of development and climate change are leading to degradation of the forest and landslides. Through her in-depth research, she has come up with the concept of Nature-based Solutions, a very scientific approach that can be applied to develop healthy and resilient ecosystems locally, nationally, regionally and globally. She emphasized on involvement of local people, utilizing their knowledge of their environment as a science-based restoration monitoring tool that can contribute to big data analytics for ecological monitoring. According to her, this framework will potentially help in sustainable land restoration by transformative changes for achieving the UN Decade on Ecosystem Restoration (2021–2030).

Dr. Arati Saoji, Former Director, Institute of Science, Nagpur and Senior Life member of IWSA, presided over the function. In her talk she addressed the adverse effects of deforestation leading to migration of wild animals to urban areas and associated threats. She stressed on developing conservation approach with sustainable use to restore degraded forest land

Dr. Rita Mukhopadhyaya, Vice President, IWSA, Mumbai interacted with guest speakers and suggested setting up collaborative projects of IWSA with NEERI in future for ecosystem restoration. Executive members from Mumbai & Nagpur branch actively interacted with Dr. Shalini Dhyani on the topic.

Dr. Seema Somalwar, Executive member, IWSA, Nagpur Branch and Principal, Nikalas Mahila Mahavidyalaya, Nagpur proposed vote of thanks.

All the IWSA members and Students of Nikalas Mahila Mahavidyalaya attended the program in large numbers. Total number of participants were 51.

## **2. Celebration of International Yoga Day on 30<sup>th</sup> June 2021**

Indian Women Scientists' Association, Nagpur Branch had organized 'International Yoga Day' on 30<sup>th</sup> June 2021 through a virtual medium. Dr. Pradnya Bhalerao, Convenor and Ex-Principal Nikalas Mahila Mahavidyalaya was present along with the Executive & Life Members of IWSA, Nagpur region who graced the event.

The Importance of Yoga and the practical demonstration of Yogasana was showcased by Miss. Gragee Limaye, a wellness coach and Certified Yoga instructor. She also explained simple Yogasana to do daily for a healthy life.

The program was conducted by Mrs. Prachi Lakhe, Executive Member IWSA, Nagpur region. Dr. Pradnya Bhalerao & Dr. Anuradha Gadkari, Ex- Convenor and founder member IWSA, Nagpur region also shared their words of wisdom on the occasion. Two certified yoga teachers from Bangalore and Mumbai also showcased their views on the importance of yoga. Several dignitaries and students attended the program.

The Program was a successful event and everyone carried home some valuable insights about yoga and healthy life given by Miss Gargee. At the end, the vote of thanks was proposed by Mrs. Prachi Lakhe and the program was concluded. About 35 participants attended the online International Yoga Day Celebration.

## **Roorkee Branch**

### **Workshop on "Learn & Enjoy the basics of ZENTANGLE ART" on 11<sup>th</sup> July 2021**

IWSA Roorkee organized a workshop on "Stress Management" through "Zentangle Art" for members of the Indian Women Scientists' Association. The artist, Mrs. Rashim Bhargava, a Certified Zentangle Teacher and a member of IWSA Roorkee conducted the workshop. She has a teaching experience of 3 decades and is Uttarakhand's first Certified Zentangle Teacher. About a dozen IWSA members participated in the workshop, including Dr. Rita Mukhopadhyaya (IWSAHQ), Dr. Dhanshree Patil from Kolhapur Branch, Dr. V. Saisha from Bengaluru Branch and Dr. Ritu Soni from Yamuna Nagar .

In these present times, especially when COVID related stress, depression and loneliness are playing havoc with the mental health of people, Art Therapy is a great stress buster. Zentangle is a meditative art form which everyone can do. No artistic abilities or background of art is required for people to enjoy the benefits of the art. It is easy to learn, relaxing method of creating beautiful abstract art with structured pattern, in very limited time and with minimum of materials. It is a "Meditative art form" developed by Maria Thomas and Rick Roberts (USA). It is a focused mindful activity which builds up the focus, creativity, confidence for those who do and surrounds them with positive, and happy feelings. All the participants thoroughly enjoyed the workshop and found it very relaxing and creative.

# Articles

## Afforestation: A Climate Change Solution?

*Dr. Sheela Donde, Former Vice Principal, and HOD, Department of Life Sciences and Biochemistry, St. Xavier's College (Autonomous), Mumbai; Former Visiting Faculty, IISER, Pune; INSA Teacher awardee 2013 [drdonde@gmail.com](mailto:drdonde@gmail.com)*

*God has cared for these trees, saved them from drought, disease, avalanches, and a thousand tempests and floods. But he cannot save them from fools.....John Muir*

The relevance of this statement today, in the context of global warming and climate change, cannot be undermined.

Over the last two decades, global agencies have been involved in raising awareness and concern, as well as taking measures to mitigate the effects of global warming and climate change [1,2]. The effects of greenhouse gases as major contributors to climate change, have been highlighted by world bodies at global conferences [3,4,5]; and the emphasis on the urgent need for combating global warming at an international, national, regional and local level has brought about international commitments, agreements, accords and laws. One of the most talked about methods for tackling global warming and reducing greenhouse gases, is by increasing forest cover by designing a “sustainable forest management strategy” at a global level [6,7,8].

The United Nations recognized its value when it launched its REDD+ program which gives developing countries money to protect forests rather than cut them down, and then enshrined the scheme in the Paris Agreement on climate change in 2015 [10]. Dr. Liu Zhenmin, Under- Secretary-General United Nations, Department of Economics and Social Affairs, stated “*Forests have already removed nearly one-third of human produced carbon dioxide emissions from the atmosphere. Through sustainable forest management, they could remove much more.*”

A definition of “Sustainable Forest Management” was developed by the Ministerial Conference on the Protection of Forests in Europe in 2009, and has since been adopted by the Food and Agriculture Organization of WHO [11]. It states: SFM is the management of forests according to the principles of “sustainable development,” which is keeping a balance between three main pillars of ecological, economic and sociocultural growth and sustenance.

Sustainable Forest management will provide wholistic and integrated benefits to all, ranging from reducing rural poverty, safeguarding local livelihoods, promoting cultural practices, protecting biodiversity and conserving ecosystems, which will largely contribute to mitigating the effects of climate change.

Forests prevent soil erosion, sequester water reserves, improve air quality by absorbing pollutants, reduce the risk of flooding, provide a source of timber, food, medicine, and jobs for people. Besides, forests provide habitats for many pollinators,

which are essential for sustainable food production (It is estimated that 75 percent of the world's leading food crops, representing 35 percent of global food production, benefit from animal pollination for fruit, vegetable or seed production). Above all, forests serve as 'sinks' for greenhouse gases, which are responsible for global warming.

**As a global commitment, India has signed the NDC (Nationally Determined Contribution to the United Nations Framework Convention on Climate Change) goals under the forestry sector: To create additional carbon sink of 2.5 -3 billion tonnes of CO<sub>2</sub> equivalent through additional forest and tree cover by 2030 [12].**

But, are reforestation and afforestation programs the solutions to reducing the impact of greenhouse gases on climate change? Global studies on the impact of reforestation and afforestation programs have shown:

**1) Protecting existing natural forests and reducing greenhouse gas emissions should be the primary focus:**

In a commentary published in *Nature* [13] on 2<sup>nd</sup> April 2019, Simon Lewis, a professor of global change science at University College London, Charlotte Wheeler, a forest researcher at the University of Edinburgh wrote, *"Although reforestation and afforestation programs can support local economies, plantations are much poorer at storing carbon than are natural forests, which develop with little or no disturbance from humans. The regular harvesting and clearing of plantations release stored CO<sub>2</sub> back into the atmosphere every 10 to 20 years. By contrast, natural forests continue to sequester carbon for many decades."* Mature, natural forests are 40 times better than plantations at storing carbon and six times better than agroforestry (where crops and useful trees are grown together).

**2) Reforestation of land, which implies planting trees where tree cover existed but is destroyed or diminishing, and Afforestation which involves conversion of bare or cultivated land, where there were no forests, into forest, are important secondary strategies for mitigating the effects of climate change.**

It is important to determine how much carbon is offset by planting a tree. **A typical tree can absorb around 21 kilograms of carbon dioxide (CO<sub>2</sub>) per year**; however, this figure is only achieved when the tree is fully grown - saplings will absorb significantly less than this. Thus 46 trees will absorb 1 ton of CO<sub>2</sub> each year, 1 million trees will absorb approximately 24,000 tons of carbon dioxide each year (equivalent to emissions of around 6000 cars) [14].

Humans release around 40 billion tons of CO<sub>2</sub> and other greenhouse gases every year. A 2019 study from the Swiss Institute of Integrative Biology suggested that planting **1 trillion trees** would dramatically reduce the amount of carbon in the atmosphere and significantly help stop global climate change [15].

However, evidence shows that reforestation and afforestation programs have not been as successful as projected. Studies on the impact of afforestation on sustainable

livelihoods in rural communities in India: Land Cover and Land Use Change (LCLUC – NASA program 2017-2020) have shown that **afforestation may increase the availability of timber and fuelwood while decreasing availability of fodder and some non-timber forest products [16]**. As a result, plantations may improve the livelihoods of some households while hurting others, particularly those dependent on non-forest resources produced on lands converted to plantation.

Secondly, for any afforestation efforts to be successful, saplings need to be in a fenced environment, protected from animals, and with a reliable source of water and nutrients for the first two-three years of their life. Ensuring that they survive, and obtaining regular data on their health and status is extremely important, and often overlooked. They also need to be trees that are native and, thus, well-adapted to the area. Non-native trees are the most susceptible to droughts, pests and other environmental hazards. Plantations in degraded lands require additional and continuous efforts in land restoration through mulching and composting.

- 3) Agroforestry could serve as a more promising strategy for increasing livelihoods.** Agroforestry integrates trees alongside crops to offset greenhouse gas emissions and could help achieve India's Nationally Determined Contributions to the United Nations Framework Convention on Climate Change [17].

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***The following is a case study of a Community Afforestation program organized by TCS-TIST conducted by Dr Laxmikant Naik from TCS, as reported in "Corporate Health Safety Environment" Journal***

**TCS-TIST Participatory Community Based Afforestation Program: Balancing Environment & Livelihood @ Tamil Nadu, India.** Published in "Corporate Health Safety Environment" journal

**1.0 Introduction:** Afforestation is an important climate change mitigation activity resulting into reduction of CO<sub>2</sub> through sequestration. Community based afforestation program significantly contributes to livelihood security. It also ensures long-term security to communities and benefit in terms of increasing the income from plantation of commercially important tree i.e. Teak wood (*Tectona grandis*) as well as interim collection of small branches, as a fire wood and taking intercrops thereby promoting sustainable livelihoods. Community based afforestation program has been successfully implemented through plantation of 10,000 Teak wood trees in Kanchipuram district of Tamil Nadu.

**2.0 Implementation of Project:** The project was implemented with effective coordination of Chennai based NGO- TIST (The International Small Group Tree planting) with local farmer communities. The cost of plantation of Teak wood saplings was sponsored by TCS. TIST had implemented various tasks such as coordination with farmers, identification of degraded farm land, formation of small groups, field visit and documentation as well as monitoring, evaluation and reporting to TCS.

**2.1 Discussion with local farmer communities:** The subsistent farmers of villages under the project were connecting through extensive network of TIST for effective implementation of the program. I also involved help of local village panchayat office, local leaders and local farmers. Experiences of farmers who had already participated in the schemes were also shared with the community so as to ensure participation of local community in the project

**2.2. Identification of degraded agricultural land:** Through extensive survey, and discussion with local people, TIST identified degraded agriculture land of 26 acres belonging to 10 subsistence farmers for the afforestation program. The land was distributed in 5 villages i.e. Vadasenthamangalam, Kulamanthai, Pallimettunagar, Erumaivetti, and Mariyanallur of Kanchipuram district of Tamil Nadu

**2.3 Formation of Small groups of farmers.** The farmers with small landholdings of degraded farm land were identified, extensive awareness was generated through discussions, trainings, expert talks and importance of teak wood plantation was explained. Small groups consisting of 2-5 farmers were involved in plantation.

**2.4 Provision of Teak wood sapling & plantation** Teak wood is a commercial timber crop, can survive in harsh environment i.e. it is drought resistant, is selected for restoration of degraded land. The saplings of teak wood were distributed and farmers were trained for plantation & caring techniques for successful survival of plantation. The entire expenditure towards purchase & distribution of Teak wood saplings was sponsored by TCS.

**3.0 Inaugural Plantation Ceremony & participation of associates in plantation activity** The Inaugural Plantation Ceremony of Community Based Afforestation Program was conducted with active participation & great enthusiasm by associates through Maitree & Ecology Club Chennai; strong support, great interest and motivation by Chief Guest, Mr Sai Krishnan, Global Head TT& H Chennai & presided over by Mr. Ram Kumar Head, HR Chennai; excellent arrangements, hospitality & coordination by TIST, on 28th June 2014 at Marianallur village, Thiruvannamalai District, Tamilnadu.

### **3.1 The highlights of Inaugural Ceremony**

- Total 96 associates from Maïtree & Ecology Club Chennai, 10 from HR, Admin & HSE, 38 farmers, 17 TIST officials & 11 local volunteers participated in the event.
- Mr Elumanali , Vice President of Marianallur village, Panchayat attended the function & welcomed the Chief Guest Mr. Sayee Krishnan
- Function started with welcome address by Mr Joseph Raxon, Chairman, TIST, followed by Chief Guest.
- Total 907 saplings of Teak Wood (*Tectona grandis*) were planted by associates.

**4.0 Major Outcome of the Project** The major environmental & social benefits of the project can be highlighted as below

### **4.1 Environmental benefits**

- Implementation of Community Based Afforestation program on 26 acres of degraded agriculture land will help the ecological restoration of degraded land into productive agricultural land.
- Plantation of drought resistant & low or no caring, commercially important species of teak wood *Tectona grandis* will help for fast restoration of degraded land. Besides this, being a deciduous tree, the litter fall will further enhance structure of soil.
- Plantation of trees will restore ecosystems through establishing various ecosystem services such as soil erosion, help in water retention and regulate the water cycle, act as a carbon sink which balances the carbon dioxide and oxygen in the atmosphere and facilitates in reduction of the Greenhouse Gases (GHG) effect, provide habitats for various insects, reptiles, birds & mammals & help to enhance biodiversity.

- The proposed Community Based Afforestation Program involves large scale plantation of timber species i.e. Teak (*Tectona grandis*) which is drought resistant and grows well in degraded land on or along the agriculture fields in Tamil Nadu. It is estimated that the carbon sequestered by Teak varies between 1 to 3 metric tons of carbon per hectare per year. As per the estimation it is expected that this afforestation program will sequester 1000 tCO<sub>2</sub> each year for coming 10 years.

#### 4.2 Social benefits

- A total 10 Farmer families will be benefitted by availability of 10,000 saplings commercial species of teak wood
- 10 Families involved in afforestation program.

#### Details of Villages benefited by Community Based Afforestation Program

SN	Village Name	Area (Acres)	No. of Families
1	Vadasenthamangalam	4	2
2	Kulamanthai	6	2
3	Pallimettunagar	5	2
4	Erumaivetti	2	1
5	Mariyanallur	9	3
	TOTAL	26	10

Protection of afforestation program of commercially important species of timber wood will result in cash of Rs. 70-80,000 per tree after 20 years. Besides, fuel wood generation due to branches cutting & converting degraded land into productive land due to litter fall is an added benefit.

- In order to encourage farmers for successful survival of afforestation program incentive scheme was formulated & implemented. The scheme includes provision of monetary benefits every year at Rs 2/tree/year, a good source of income to subsistent farmers.

The quarterly monitoring of plantation is done by TIST representative and growth of tree is ensured.

**5.0 Monitoring & evaluation of afforestation program** The TIST team had started visiting the plantation sites for monitoring (quantification), evaluation and audit by December 2014.

*Dedicated web site has been developed for TCS plantation groves and all information available at site [www.tist.org](http://www.tist.org) or <http://www.tist.org/i2/sponcenter.php?sponid=5>*



*Dr. Sheela Donde, completed her PhD in Molecular Biology from TIFR, Mumbai. She did her post doctorate at Carnegie Mellon University, USA. She was Vice Principal, and HOD, Department of Life Sciences and Biochemistry, St. Xavier's College, Mumbai and Visiting Faculty, IISER, Pune. She received recognition as INSA Teacher in the year 2013. Currently, she is a Volunteer teacher with eVidyaloka for teaching rural school children, and is a member of the Editorial Board of the IWSA Newsletter.*



*Dr. Laxmikant. P. Naik is a Senior Consultant, Environmental Sustainability, Health & Safety, TATA Consultancy Services, Yantra Park, Thane since 2008. More than 25 years' work experience in the field of Environmental Impact Assessment, Biodiversity Conservation, Health Safety & Environment. He has contributed significantly for various Awards received (more than 35 national & International Awards) by TCS in the field of Environmental Sustainability Health & Safety. A few of such awards are: Environment Excellence Award 2020 by Indian Chamber of Commerce, Golden Peacock Award for Energy Efficiency 2020 by GPAS Institute of Directors, SHE Excellence & Innovation Award 2020 by Confederation of Indian Industries (WR) CII-Green Business Centre Hyderabad. In-situ Conservation of Butterflies & Sarpa Kavu @ TCS projects received (Innovative Environmental Project & Most Useful Environmental Project Award) Environmental Best Practice Award, 2020.*

## **Advancement of Women in STEM: The Past, Present and Future**

*(Lecture delivered under IWSA-Roorkee Lecture Series, 18<sup>th</sup> September 2021)*

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### **Introduction**

Women's advancement in STEM (science, technology, engineering and mathematics) and utilization of their full potential is important from the point of view of 'gender equality', implying that equal rights, opportunities and responsibilities should not depend upon whether one is a man or a woman. Further, greater participation of women in STEM (henceforth, Wi-STEM) workforce will enhance India's global competitiveness in the knowledge economy. However, women's position in STEM is

unequal, although, it has not been static and has shifted with changes in the Indian socio-cultural context.

### **The Past**

In the Vedic period women had access to education; but, with the caste system becoming more rigid, women's position also declined. Manusmriti laid down that women and Shudras are unfit for learning. The 1820s British education surveys found no girls in schools [1]. Modern education, which was initially introduced for boys, was subsequently followed by girls who read the same curriculum. However, since the 1880s opinion grew for separate curriculum for girls and boys. 'Feminine subjects' were supposed to be relevant for girls' domestic roles, and included domestic science, needlework, music, grammar, literature, etc.; Physics, Chemistry and Math were 'masculine' subjects. The bias in curricula continued in the post-independence period in the secondary education boards of different states even as late as the 1970s [2].

Social prejudices related to treatment of Indian women by male doctors led to emergence of Medicine as the first career for Wi-STEM in the late 19<sup>th</sup> century. Women in scientific research emerged in the 1930-40s (e.g. Kamala Sohonie, Asima Chatterjee). Researchers of the time faced workplace and structural discrimination, for instance, the male colleagues in CV Raman's lab questioning academic credentials of their women colleagues; strict gender segregation in the lab; denying doctorates on flimsy grounds [3]. The earliest women engineers graduated in 1940s from the initially established engineering colleges (e.g. Guindy, Shibpur). Wi-STEM usually belonged to an upper caste, and upper and middle class [3], perhaps because this caste/class valued most the education of women at the time and, had access to higher education.

### **Change in the position of women in STEM since independence**

A considerable improvement in the position of women has occurred since Independence that has also enhanced that of Wi-STEM. There has been a decline in social evils such as, child marriage and purdah among the urban middle classes. Equal opportunities and equal pay for equal work are guaranteed by the Indian Constitution. There is an increasing acceptance of women professionals; increase in working couples in urban areas and greater egalitarian roles among the working couples at home; and, considerable emphasis on the education of girl [4]. This change is reflected in women's enrolments in STEM education (Table 1).

Table 1: Proportion of women to total enrolment in university education in STEM fields

	1950-51	2019-20
Science	7.1%	50% or more
Engg/technology	0.2%	28%
Medicine	16.3%	60%

Sources: [5, 6]

However, there is also a continuity in the socio-cultural context of Wi-STEM. A substantial proportion of Wi-STEM (as students and researchers) continue to be mostly

upper-caste, middle class (usually urban salaried) [4]. Women are ideologically considered as central to the domestic sphere and men to the 'public' (or economic) sphere. Segregation norms that discourage interaction among sexes continue to be strong among the upper castes [7]. Family continues to take decisions on education and marriage of their children.

Yet, the proportion of women enrolled in undergraduate sciences (B.Sc) has been rising (Table 1). Less job opportunities in science has made this stream unattractive for men. On the other hand, for women it is prestigious to do BSc than BA [8]. Although engineering is even more prestigious than science, the proportion of women in engineering is lower than in science. Degree in engineering requires resources for tuitions/coaching in classes (11-12) ; and, if unable to secure admission in government institutes (which is tougher), for the fees in private engineering college. Further, the intense preparation for engineering entrance exams calls for freeing up daughters from domestic tasks [4].

Yet, the increase in proportion of women in engineering is astounding. Engineering degree is attractive due to a higher probability of obtaining respectable jobs; with privatisation providing greater access to it. Urban families prefer a working bride; the earning capacity of daughter makes her independent and brings prestige to family which eases marital negotiations [4]. Proportion of women in medicine is even higher than in engineering, although, medical entrance exams are equally tough. Favoured for women historically, medical sciences fit with the stereotype of women's 'nurture' abilities. The career of a doctor (compared to engineering) offers flexible working hours, independent work through private practice, social prestige and good earning [4].

Gendered decisions in families are also reflected in the clustering of women in certain engineering branches. In computer science and engineering (CSE), proportion of Bachelors obtained by women is 45%; while, in mechanical engineering (ME) it is 5% [5]. Unlike in the USA, where computers have a masculine image, in India, jobs associated with computers are considered 'safe' for women as they are office-based and require only mental and not physical strength [9]. On the other hand, ME is perceived as requiring working with machines, masculine work culture, and a biased labour market.

'Leaky pipeline' implying that women drop out at every stage from education to careers in STEM does not apply to India; the pipeline widens from B.Tech to M.Tech in several engineering fields and then narrows in the doctorate, e.g. in CSE, women receive 45.8% of B.Tech degrees, 60% M.Tech, and 49% doctorates [5]. The prestige of a higher degree and possibility of teaching combine with an inability to find jobs after B.Tech due to gender bias in labor market, probably account for higher M.Tech degrees among women.

Issues of distance and safety of women in public spaces lead to opting for a college nearby which stunts career [4]. There are few women in institutes of national importance at all levels [5]. Parents tend to choose 'independence' (work-life balance



as primary) rather than 'success' for daughters, which might require sending daughters to unknown places, ignoring marital age [4]. This might account for few women doing postdocs (40% of men) [10]; or, going abroad for PhD and postdocs [11]. This affects women's quality of research experience and their candidature for recruitment in premier institutes in comparison to men when applying for job.

Overall, women's proportion of doctorates in STEM is about 40%; yet the proportion of women as researchers is only about 16%, while the world average is 30% [12]. There are few women faculty in STEM in prestigious institutes, e.g. about 11% women in the IITs; 27% in top universities [4, 13].

There are various reasons for a low proportion in research careers. Lack of quality of doctorates/research experience is one reason. Due to a lack of interaction with the advisor, peers and colleagues [4], women also lack networks that are required for exchanging information about available opportunities and for establishing credibility of a candidate in hiring. Institutes prefer to hire those below the age of 35 years at the entry level; the age usually coincides with marriage/childbirth, which might lead to a slackening of research, and delay in applying for jobs. Those who manage to apply with the right credentials, the selection committee might be biased, and question women more stringently and their ability to manage work role [4, 14]. Women doctorates might fail to find suitable jobs often landing teaching jobs in colleges or opt out of career altogether [15].

### **The Glass-Ceiling**

Women doctorates that acquire faculty positions in prestigious institutes, few are Professors or in leadership positions [4]. There have been no chairpersons of JEE/GATE. Only 3.2% of the total awardees since 1958 till 2020 have received the coveted Shanti Swarup Bhatnagar Award [16]; or, receive fellowships of INSA/INAE. This is due to invisible barriers or the 'glass ceiling'. The rules of recruitment and promotions in government labs/institutes do not discriminate against women. Yet, there is 'glass ceiling' propped up by three pillars, namely: Culture at the workplace; Lack of networking/contacts; and, lack of infrastructural support.

*Culture at workplace:* Since their inception, S&T institutes had predominance of men in numbers and powerful positions; hence, a culture has developed in which women find themselves on the periphery of the scientific community. For instance, there might be bias in task allocation: the charge of a section of a department may have always been handled by men and so a woman's capability to handle it is doubted [4]. Since women are usually in minority in departments (at times, even one), they might be ignored/side-lined at the meetings. Their mistakes get highlighted more and are often attributed to 'women' as a group [4]. There are assumptions at workplace such as, one needs to have full-time devotion to do 'good' science [4]; and that women (not men) have to expend time on the domestic roles. These assumptions deny opportunities to women at the workplace. Men usually think of male colleagues to assign important tasks in the department due to biases/assumptions [4].

*Lack of networking:* Networking with seniors/peers help in making godfathers/mentors; creates opportunities for collaboration; helps in exchanging professional information. Women lack networking; and are less incorporated in the old boys' networks as in the developed countries. Additionally, in India, norms discourage interaction of men and women, which enhance gender-based grouping [4]. Women do not prefer to stay beyond the office hours at the workplace and therefore, they miss out on interactions such as the evening tea when names of committee members might be decided. Internet aids in creating contacts abroad, however, women have fewer contacts within India and their departments [17]. Women tend to travel less and attend fewer conferences.

Thus, *workplace culture* denies opportunities to prove oneself creating a lower estimation of capability, reducing the chance of climbing up in organization. A *low interaction* within the institute implies lower contacts and lack of mentors which bring less opportunities and therefore a low credibility and lesser chances of moving up (Figure 1).

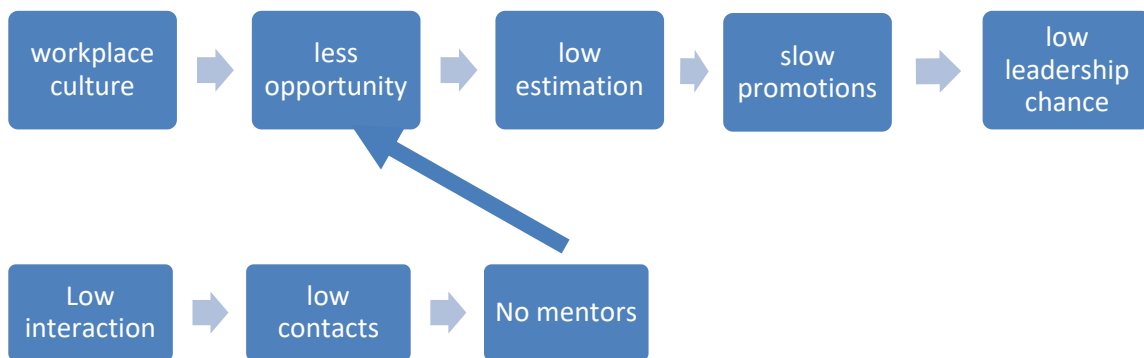


Figure 1

*Work-life balance structures:* Although mandatory to set up crèche (Maternity Benefit Act 2017), the rules have not been implemented everywhere. Support structures for children of different age-groups and for elderly care are lacking. Middle class families have access to domestic paid help, but relying on the usually untrained help is risky. Lack of such structures adversely affects recruitment of women due to the perception of dual-burden on women.

For the SC/ST women, the glass ceiling is thicker. Women doctoral students are more vulnerable to an advisor's frustrations because there are more severe costs to speaking out [18]; women scientists might face issues in getting students, in networking and committee membership [4].

The glass ceiling has considerable negative impact on research as evident in a particular increase in research activity of women academic scientists around their age in 50s [4, 19]. For men too, publications increase in their 50s, but the peak is around age 30 years [19].

Although there are more women awardees of SSB in the last 10 years than earlier; more appointments to leadership positions, such as Directorship of CSIR labs; and rise in fellowships; change is not visible at the recruitment and promotion levels in the prestigious institutes with some exceptions, such as, DAE led TIFR, NCBS [20].

### **The Change Agents**

*Women scientists* have been creating awareness through articles, websites and books. They run networking platforms and mentorship programs for women (e.g. Indian Women and Mathematics; IWSA). Women's participation in STEM empowers them in terms of ability to defy social pressures [4]. High-tech entrepreneurship offers a new career possibility for Wi-STEM through support of academic incubators [21]. *New types of research centres* with minimal hierarchy and greater internal interaction would create positive work environment [4].

*Men scientists could be significant change agents.* Since the 1990s there has been a growth of men's organizations and scholarship advocating gender equality. Of the 23 articles on women scientists' position in 'Current Science' (2010-2016), 8 have been authored by men scientists as sole author/first author [22]. More data/research on glass ceiling might help in convincing men and in taking them along.

### **Government Policy**

In the last few years, government has introduced policies that advance gender equality. GATI or Gender Advancement Transforming Institutions, announced in 2020, is the 1st policy to target institutes. Significantly, in GATI charter, government acknowledges gender inequality in organizational structures and systems. It is still in the pilot phase and the impact has yet to be seen.

Some policies are well-intentioned but might not have transformative value. Mobility Scheme strengthens the notion of women as the primary homemaker. DST's fellowships for women scientists with break in career do not lead to a permanent job once the fellowship period ends. India has one of the most liberal paid pregnancy leave (26 weeks) in the world and a 2-year Child Care Leave for women (and single men). The leave creates resentment among men perceiving them as 'facilities' for women; entitled to a 15-day paternity leave, men seldom avail those [4].

### **The way forward**

Perhaps, a 'family-care leave' would be more appropriate than the 'child care leave'. In Sweden, laws give parents 480 days leave per child which they can take at any time until the child is 8 years old. Both parents can share these days, although 60 days are allocated specifically to the father [9].

Greater inclusive measures at the recruitment level, e.g. higher age ceiling might enable women (and men) with unconventional career paths to use their potential; greater transparency of recruitment/promotion procedures will help eliminate inadvertent biases. Initiatives might be introduced to raise the quality of research

experience of women through fellowships abroad. The Indo-US fellowship for women (IUSSTF) targets this aspect; but more such measures are required.

Introducing an optional course on 'gender, science and technology' in engineering/science institutes might help to enhance awareness of gender issues among the future generation of scientists/engineers, and enhance research in this field.

Finally, dissemination of knowledge of how 'glass ceiling' works is required since 'forewarned is forearmed'.

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Dr. Namrata Gupta works on gender and science and engineering with a focus on women scientists in academia and research laboratories of India. Her research also includes the study of women engineering students, and women in STEM entrepreneurship. She has authored a book titled, 'Women in Science and Technology: Confronting Inequalities', published by SAGE (2020). She has several publications in international journals to her credit including those in collaboration with renowned international researchers. She is also a member of the Editorial Board of the SAGE journal 'Work, Employment and Society'.



Profile: <https://www.linkedin.com/in/namrata-gupta-99643721/>

# We Salute these Women Achievers

## 1. Subashini Iyer, India Born Engineer, overseeing new ambitious NASA project, Artemis

<https://blog.byjus.com/the-learning-tree/science-feed/meet-subashini-iyer/>

India-born Subashini Iyer, who works at Boeing as Launch Integrated Product Team leader has been overseeing the rocket core stage of NASA's ambitious project to send a spacecraft to the moon and beyond, to Mars. Subashini Iyer hails from Coimbatore, she pursued mechanical engineering from Anna University in Chennai, and pursued her Masters in Mechanical Engineering from Wayne State University, Detroit. She also holds an MBA in International Business from Nebraska University. She has been associated with NASA's new Space Launch System (SLS) for about two years. It will send astronauts aboard the Orion spacecraft nearly a quarter million miles from Earth to lunar orbit. Nasa will fly two missions around the Moon to test its deep space exploration systems. Artemis I is an uncrewed flight to test the SLS and Orion spacecraft together, followed by the Artemis II mission, the first SLS and Orion test flight with crew. NASA will land astronauts on the Moon by 2024 on the Artemis III mission and about once a year thereafter. In a recent interview Subashini Iyer mentioned that the role of her team from Boeing would be supporting NASA's at Kennedy Space Center with assembly integration and testing. They will also be monitoring data displays and providing support on launch day. Her journey is as inspiring as her achievements. *"If someone had told me in India that 25 years later I would be working at Kennedy Space Center as a senior manager for SLS, that would have been way beyond my dreams. But everywhere I went through my career, I always stretched a little higher beyond my level,"* she reflects, while talking about her journey in one of her interviews.

Artemis I is expected to be launched on March 12, 2022.

## 2. Nandivada Rathnasree (1963-2021): A passionate astronomy educator

<https://scroll.in/article/994687/nandivada-rathnasree-1963-2021-passionate-astronomy-educator-who-helped-many-reach-for-the-stars>

Nandivada Rathnasree who worked as director of the Nehru Planetarium and Science Museum in Delhi was a passionate astronomy educator and she launched several exciting programs, thus inspiring and mentoring several young students.

Rathnasree was born on November 26, 1963, in Hyderabad. After finishing her schooling at Kendriya Vidyalaya in 1981, she went to University College for Women in Hyderabad. She did her Master studies at Hyderabad Central University and graduated in 1986. She was theoretical astrophysicist Alak Ray's first doctoral student at Tata Institute of Fundamental Research. She was awarded a doctoral degree in 1992 for her work on binary stars. She later moved to study pulsars during her post-doctoral fellowship with radio astronomer Joanna Marie Rankin at the University of Vermont from 1992 to 1994. Here she carried out pulsar observations using the



Arecibo radio-telescope. Rathnasree was appointed director of the Nehru Planetarium in 1999 and held the position until her death on May 9, 2021, after a battle with Covid-19. In these 21 years of service, she was not only the torchbearer of astronomy education in India, but also a guiding light for astronomy communicators around the country.

She arranged various shows, interesting and imaginative programs, exhibitions etc. During Mahatma Gandhi's 150th birth anniversary celebrations in 2019, for instance, she organised "Bapu Khagol Mela", a year-long campaign during which she conducted astronomy outreach activities at many locations where the leader had lived. Even at short notice, she worked with unending passion to take any important astronomical event to the people. Rathnasree believed that astronomy outreach done at archeoastronomy heritage sites and archeoastronomy instruments had great potential. She conducted fieldwork to study astronomical instruments at four extant Jantar Mantar observatories in Delhi, Jaipur, Ujjain, and Varanasi. They had been built by Sawai Jai Singh II of Jaipur between 1724 and 1730 but had been abandoned after his death in 1743. Thanks to Rathnasree, they were redeemed as active centres for amateur positional astronomy. She made these gigantic instruments and their astronomy accessible to the public. She created an extensive body of work around these instruments and presented her research at several international conferences. She also served on the restoration committee of Jantar Mantar in Delhi. She had designed a show on astronomical references in William Shakespeare's work. The show started with a quotation from Julius Caesar: "I am constant as the northern star, / Of whose true-fixed and resting quality/There is no fellow in the firmament." She used that to indicate the Northern Star, Polaris, and built the story from there. She explained the entire night sky with Shakespearean sources. It was fascinating how she could ingeniously imagine different ways of astronomical storytelling. Rathnasree helped transform the way astronomy outreach was conducted in India. It was her untiring enthusiasm that made it possible for the astronomy community to communicate to a wider audience. In her immense body of work over the decades, she inspired two generations of astronomers and science communicators.

(Adapted from the article by Pranav Sharma, Nandivada Rathnasree (1963-2021): Passionate astronomy educator who helped many reach for the stars)

### 3. WOMEN SCIENTISTS who DARE

<https://www.archysport.com/2021/08/the-athletes-and-scientists-who-participated-in-the-tokyo-2020-olympic-games/>

Seven Women Scientists participated in the Tokyo Olympics: Quantum Physicists, Mathematician, Neuroscientist, Biologist, and Global Health expert from Harvard. The details are given below.

1. **Anna Kiesenhofer** (Austria) won the cycling route, without a professional coach. She has a doctorate in mathematics from the Technical University of Vienna and the University of Cambridge, UK. She works in research and teaching at the Technical University of Lausanne, in Switzerland.

2. **Hadia Hosny** (Egypt) finished an impressive career in badminton, but has two gigantic additions: she is a professor at the British University of Egypt, she has a master's degree in biomedicine from the University of Bath, UK, and a doctorate in pharmacology from University of Cairo and has researched and published articles on an anti-inflammatory drug used for various diseases. And she's a congresswoman in her country. Charlotte

3. **Charlotte Hym** (France), debuted in the "street skateboarding", when she gets off the board she is a doctor in neuroscience and her current job is to investigate the effect of the mother's voice on the development of motor skills in new borns.

4. **Gabby Thomas** (United States) was a bronze medalist in the 200 meters of athletics and is already a legend in the discipline for being the third fastest woman in history in that specialty.

Gabby studied Neurobiology and Global Health at Harvard University, is pursuing a master's degree in epidemiology and health management at the University of Texas at Austin, and her work focuses on the investigation of racial inequality in access to health services in USA

5. **Louise Shanahan** (Ireland) was preparing for Paris 2024 but managed to qualify for Tokyo in the 800 meters of athletics.

She is a graduate of Quantum Physics from the University of Cork, Ireland, and is pursuing her PhD at the University of Cambridge, England. She studies and develops devices to improve cancer diagnosis and treatment.

6. **Nadine Apetz** (Germany) is the first German boxer in an Olympics.

Nadine has a master's degree in Neuroscience from the University of Bremen and hopes to complete a doctorate at Cologne University Hospital.

Apetz is studying a technique called deep brain stimulation, which involves applying electrical or electromagnetic currents to certain areas of the "gray matter" of the brain with the goal to help Parkinson's patients.

7. **Andrea Murez** (Israel) is a swimmer who participated in 50, 100 and 200 meters freestyle and 4x100 mixed relays.

She is also a biologist at the Stanford University, US.

#### 4. **Kiran Mazumdar-Shaw: A Story of Success after Failures and Rejections**

(from <https://failurebeforesuccess.com/kiran-mazumdar-shaw/>)

Kiran Mazumdar-Shaw is an Indian entrepreneur, a self-made billionaire with a net worth of around 360 crores USD. She is the founder and chairperson of Biocon Limited and Biocon Biologics Limited, a biotechnology company based in Bangalore, India. In 2019, Forbes listed her as the 68th most powerful woman in the world. In addition, she was named EY World Entrepreneur of The Year in 2020. But this phenomenal success was achieved after a number of failures and rejections.

Born in Bangalore in 1953, she graduated with a bachelor's degree in Zoology from Mount Carmel College. She wanted to go to medical school but failed to obtain a scholarship. Her father, who was a master brewer at United Breweries suggested her to study fermentation science. She went to Melbourne University in Australia to study malting and brewing, and got trained to become a brew master, a very nonorthodox field for women. Mazumdar was the only woman in the brewing course and had topped the class. She graduated with a degree as a master brewer in 1975 and worked in Australia for a while. Mazumdar also worked as a technical consultant in Calcutta and as a technical manager in Baroda.

While looking for job opportunities in Delhi and Bangalore, she was told that she could not be hired as a master brewer in India because "It's a man's work." Eventually, she looked for jobs abroad and moved to Ireland. In Ireland, she met the founder of Biocon Biochemicals Limited who was looking for a partner in India. Mazumdar agreed to take up the job and worked as a trainee manager for a brief period of time.

After learning about the business in Ireland, Kiran Mazumdar-Shaw returned to India. In 1978, she started Biocon in the garage of her rented house in Bengaluru with a seed capital of Rs. 10,000. Initially, Mazumdar faced great difficulties because of her age and gender.. She had difficulty to get her first financial backing and recruiting people. Her first employee was a retired garage mechanic.. She faced many additional problems associated with building a biotech business in a country with bad infrastructure. However, within a year, Biocon became the first company to manufacture enzymes and export them to the U.S. and Europe. After a year of running her business Mazumdar bought a 20-acre property with plans to expand in the future. Today, the company manufactures pharmaceutical ingredients that are sold in over 120 countries across the globe. In 2004, Mazumdar started the Biocon Foundation. The foundation aims at health, education, and infrastructure, especially in rural areas of Karnataka which lack healthcare facilities. With hard work and determination, Kiran Mazumdar-Shaw proved that anything is possible. Even though she faced challenges as a woman, Mazumdar showed persistence and achieved her goals. She once said, "I managed to do things with a lot of common sense, a lot of determination, and a lot of foolish courage". Her success underlines that we should never give up and always believe in ourselves.



**Subhashini**



**Nandivada Rathnasree**



**Seven Women Scientists who dare**



**Kiran Mazumdar Shaw**

## **Women Achievers from IWSA**

**1. Dr. Asawari Rath Receives DAE Scientific and Technical Excellence Award (S&TEA) for the year 2019**



Dr. Asawari D Rath, from Advanced Tunable Laser Applications Facility, Beam Technology Development Group, BARC is one of the recipients of the **DAE Scientific and Technical Excellence Award (S&TEA)** for the year 2019 for her contributions in the field of **Laser Spectroscopy** and Photoionization Physics.

Dr. Rath's research primarily focuses on high resolution atomic spectroscopy and selective photoionization processes. Her investigations on impact of DC Stark effect, effect of laser polarizations on selectivity and ion yields in resonance photoionization played a key role in realizing enhanced product quality with high yield in laser based isotope selective photoionization processes. Dr. Asawari received the award on National Technology Day, 11<sup>th</sup> May, 2021.

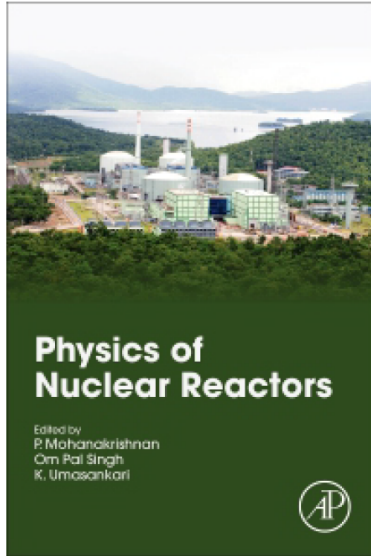
**2. Book on "Physics of Nuclear Reactors" Edited by Dr. Umasankari published by Elsevier Elsevier Inc. Imprint Academic Press in May 2021**



A book "Physics of Nuclear Reactors" has been published recently. This book is a ready **off the shelf and online reference book** for both practicing reactor physicists and those engaged in operation of nuclear plants. The book has been born out of the vast experience in India especially in the Department of Atomic Energy which has a very vibrant nuclear programme and associated training for the same. Reactor Physics has been an essential and important part of the manpower development. It is thus very timely that such an effort has been undertaken and it would be beneficial to graduate students in India and all over the world. HBNI has coordinated this huge effort in bringing together the editors, contributors, reviewers and the publisher.

The editors together with their team of expert contributors, combine their wealth of knowledge to guide the reader through a toolkit of methods for solving transport equations, understanding the basic principles and physics of reactors, developing reactor safety strategies and providing insight into experimental and operational physics aspects.





# Physics of Nuclear Reactors

1st Edition

☆☆☆☆☆ [Write a review](#)

**Editors:** P. Mohanakrishnan, Om Pal Singh, K. Umasankari

**Paperback ISBN:** 9780128224410

**eBook ISBN:** 9780128224427

**Imprint:** Academic Press

**Published Date:** 19th May 2021

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The subject has been gradually developed from nuclear physics, nuclear data, methods of solving neutron transport equation to fuel management, fuel cycle physics, reactor kinetics, regulatory and operational reactor physics, experimentation and shielding. The book also includes a chapter on advanced reactor systems, fusion and accelerators and a brief on the three major accidents.

**Publisher ::** Elsevier Inc. Imprint " Academic Press

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## Obituary



### Dr. Sunila Mathur (1942-2021)

Dr. Sunila Mathur was a woman with a strong scientific temper who believed in taking science to the masses through her work. She was an intelligent and dedicated scientist, a caring and perseverant daughter, wife, mother, grandmother, and a woman who personified strength, high morals, and culture.

Dr. Sunila Mathur was born into the family of an eminent scientist, Dr. Mata Prasad (FRIC), in Mumbai on 2 June 1942. She inherited her innate sense of scientific thinking from her early experiences of being a part of highly educated communities along with her father, who served in prominent positions at premier institutions in India. Sunila's mother, Sheila Mathur, hailed from an illustrious family in Allahabad, and participated in the Indian national freedom struggle in her younger days. Dr. Sunila Mathur was the youngest of five siblings, and her elder brothers worked for established organizations in India, and in the US.

Dr. Sunila Mathur was married in May 1965 to Dr. Pratap Kumar Mathur, a well-known Water Chemist in the Nuclear Technology realms, in May 1965, who served in senior positions at the Bhabha Atomic Research Center (BARC), Mumbai and Kalpakkam. She was blessed with a son, Sudeep Mathur in 1966, and a daughter, Sabina Mathur, in 1970. Her children and their spouses, as well as her three grandchildren, are well established individuals who continually contribute towards their chosen branches of science.

### EDUCATION

Dr. Sunila Mathur received her initial education in Mumbai, where her father was the Principal of the then Royal Institute of Science, Mumbai. Her higher secondary education was in Bhavnagar, where her father subsequently moved to set up the Central Salt & Marine Chemicals Research Institute (erstwhile Salt Research Institute) in 1953. She graduated from Madhav College, Ujjain, where her father was called upon to set-up the Vikram University in 1956, becoming its first Vice-Chancellor. Dr. Sunila Mathur completed her Master's Degree in Botany at Agra University in 1962. She then went on to obtain her PhD in "Plant Pathology of Gram Plant" in 1968, also from Agra University, working under the illustrious guidance of Dr. S.K.Chauhan.

## **ACHIEVEMENTS**

- Dr. Sunila Mathur served as the President of the Indian Women Scientists Association (IWSA) during 1983-1985, and was a key resource in the planning and execution of the IWSA Working Women's Hostel in Vashi, Mumbai.
- She was instrumental in the setting up of, and running of a Chemistry Laboratory for budding girl scientists (students) at the IWSA Head Quarters at Vashi, New Mumbai.
- Dr. Sunila Mathur worked at the grassroots level for many years spreading knowledge to the masses through exhibitions, posters, conferences, and working sessions. She worked hard to raise funds to finance the work done by IWSA.
- She moved to Kalpakkam in 1986, when her husband was transferred to head the newly set-up Water and Steam Chemistry Laboratory (WSCL) situated in the Indira Gandhi Center for Atomic Research (IGCAR), Kalpakkam. She used this opportunity to initiate the Kalpakkam Chapter of IWSA and spread her good work there.
- She got involved in the Nature Club activities at Kalpakkam and used her Botanical skills during this period. A model on Water Conservation created by her was used to create awareness of water problems and their solutions in the neighbouring villages of Kalpakkam.
- Dr. Sunila Mathur established the Indira Gandhi National Open University (IGNOU) center at Kalpakkam, and was the coordinator of this center for about 7 years. She motivated scores of people to advance their educational qualifications and improve their careers by taking IGNOU courses at Kalpakkam.
- Dr. Sunila Mathur was nominated to be a part of a Department of Science & Technology committee. Through this opportunity, she was able to receive grants for advancing the scientific education and work at IWSA.

## **OTHER INTERESTS**

Dr. Sunila Mathur was a well-rounded personality and excelled in many spheres of life. She learned Indian classical dancing, Bharatnatyam, as a child, and was well versed in many arts including music and painting. She was an expert in sewing, embroidery, knitting, and cooking. She participated in several social and cultural events, especially local plays. She was also a keen chess and carrom player, besides being an ardent reader. She had deep faith in the Supreme Being and studied the Bhagavad Gita passionately, life-long adhering to the principle of "performing one's duty without any expectation/attachment". Her inquisitive nature led her to constantly seek information and learn new things. Her modern outlook, supportive nature, happy temperament, and collaborative streak made her befriend hundreds of people in all locations she lived, remaining popular throughout her life.

## **LAST DAYS**

On retirement, Dr. Sunila Mathur and her husband moved to Indore in June 2001. In Indore, she maintained a keen interest in all facets of life and science, till she passed away on 17 April 2021, after a brief illness. She is survived by her husband, son & daughter, and their spouses, two grand sons and one granddaughter. Dr. Sunila Mathur's legacy lives on within her loved ones and her impact will be felt for generations.

# BRNS supported Popular Science Lectures held at Colleges in Mumbai and other activities at HQ

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Speaker: Ms. Yamuna Shivprasad  
Scientist,  
Counsellor (Defence Technology),  
High Commission of India, London  
-Get to know about the Indian Research and Development Organization (DRDO) and its measures.  
-Get introduced to various career Opportunities in DRDO  
Meeting id:  
Date: 19th April 2021  
Time: 05.00pm

19<sup>th</sup> April, 2021: Somaiya College,

**Popular Science Lecture**  
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Online Lecture on  
**Applications of Radioisotopes in Healthcare: with emphasis on Radiopharmaceuticals**  
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24<sup>th</sup> July, 2021: Sophia College

**IWSA-FLAME University**  
Student Internship Program  
June 2021- July 2021  
Final Project Presentation  
By  
**Ms. Aditi Narania**  
Prof. Jasmine Hsu  
Assistant Professor  
FLAME University  
Prof. Patki Sairaj  
Assistant Professor  
FLAME University  
Dr. Pratima Shastri  
Trustee, Ashadheep  
Retired HOD of Food technology  
dept, UDCT Nagpur College  
July 21, 2021 | 6:00 pm | @ Google Meet

Flame University Internship Program Final Presentation on  
21<sup>st</sup> July, 2021

**DEPARTMENT OF CHEMISTRY**  
IN COLLABORATION WITH  
**INDIAN WOMEN SCIENTISTS' ASSOCIATION**  
(Under the aegis of RUSA Center for Human Excellence)  
Presents  
**DAY 4 WEBINAR**  
OF  
**SIX DAY NATIONAL SYMPOSIUM**  
On  
'Scope and Prospects of Chemical Science'  
Webinar Title : Role of Chemistry in Toxicology  
Prof. (Dr.) Prakash Kondekar  
Honorary Director  
Indian Institute of Naturopathy  
Date: July 29, 2021 TIME: 4:00 - 5:30 pm Platform: MS Teams

29<sup>th</sup> July, 2021: Mithibai College

**DEPARTMENT OF CHEMISTRY**  
IN COLLABORATION WITH  
**INDIAN WOMEN SCIENTISTS' ASSOCIATION**  
(Under the aegis of RUSA Center for Human Excellence)  
Presents  
**DAY 6 WEBINAR**  
OF  
**SIX DAY NATIONAL SYMPOSIUM**  
On  
'Scope and Prospects of Chemical Science'  
Webinar Title : Introduction To IP and Career Opportunities In The Field Of IP  
Ms. Ankita Mathew  
Senior Brand Protection Specialist  
Navee, France  
Date: July 31, 2021 TIME: 4:00 - 5:30 pm Platform: MS Teams

31<sup>st</sup> July, 2021: Mithibai College

**Indian Women Scientists' Association (IWSA)**  
in collaboration with  
**SHIKSHAN SETU**  
Vigyan Prasar  
Presents  
**VIGYAN PRASAR**  
विज्ञान प्रसार

IWSA in collaboration with "VIGYAN PRASAR" is conducting a short term 30 hours course "Shikshan Setu" for Pre-Primary and Primary Teachers which is online. 6 modules of the course content are prepared by ECCE teachers.

27<sup>th</sup> May to 7<sup>th</sup> July, 2021



# Activities from IWSA Branches

**Popular Science Lecture**

**Organized by Indian Women Scientists' Association Hyderabad**

In association with  
**Department of Biochemistry, Aurora's Degree & PG College Chikkadpally, Hyderabad-20, Telangana**

**Webinar on "Transition from Academics to Industrial Product Development"**  
by **Dr. Gita Sharma**  
Prof & Director, D Biopharma (Rtd.)  
Director, Research & Quality Control, Tapadia Diagnostics, Hyderabad

On Friday, 14<sup>th</sup> May 2021, 10:00 AM

Session will be held through Microsoft Teams

Registration is Free Registration link: <https://forms.gle/HK57BNJzHw5xqbD6>

**SPEAKER**  
  
**Dr. Gita Sharma**  
Prof & Director (Rtd.)  
D Biopharma  
Director, Research and QC, Tapadia Diagnostics

**Popular Science Lecture on 14<sup>th</sup> May, 2021; Hyderabad Branch**

An Initiative of **POPSICLES** Popular Science & Common Tales

In Association with **IWSA**

28<sup>th</sup> June 2021  
06:00 - 07:30 PM

An Interactive Session on  
**National Education Policy 2020 & Role of Teachers in an increasingly Digital World**

with **Prof. L S Shashidhara**  
Renowned Developmental Biologist and Geneticist  
President, International Union of Biological Sciences (IUBS)  
Professor of Biology, Astoria University and IITSR, Pune

Organised by **Rohini Chintha**

Register at <https://forms.gle/qaxMwg7rQ6tAWR2d6> for Free  
\* Only for Undergraduate & Post-Graduate Teachers \*

**Interactive Session on National Education Policy 2020 on 28<sup>th</sup> June, 2021; Hyderabad Branch**

**Indian Women Scientists' Association Kalpakkam Branch**

**Doctor's Talk**

On The Topic  
**Maintenance of Oral Hygiene during Covid Pandemic**

**Dr. Shoba Ranganathan,**  
Dental Surgeon, DAE Hospital

Date: 28<sup>th</sup> April, 2021 Time: 14.00 hrs

Venue: Vi-Meet  
Meeting ID: 202104\_137  
Login Password: Fudc38gy

Recommended Browsers: Google Chrome (version 75 and above), Chromium (version 75 and above) or the latest Microsoft Edge

**All are cordially invited**

**Dr. Padma S Kumar**  
Convener  
**Dr. Anita Toppo**  
Secretary,  
**Dr. S.C. Vanitha kumari**  
Joint Secretary  
**Dr. M. Manohari**  
Treasurer  
**Dr. Puspalata Rajesh**  
Joint Treasurer  
**Members**  
**Dr. Veena Subramanian**  
**Dr. B Sasi**  
**Dr. Gurpreet Kaur**  
**Smt. Padmapriya Selvakumar**  
**Smt. K. Shivakamy**  
**Smt. Anusha Thati**  
**Dr. P. Vineetha**  
**Ms. Kar Adwitya**  
**Smt. D. Gomathi**  
**Smt. R.M. Nachammai**  
**Smt. V. Geetha Lakshmi**  
**Ms. Annie Jessila**  
**Smt. S. Rajeshwari**  
**Smt. T. Jayanthi**  
**Dr. S. Kalavathi**

**Doctor's Talk on Dental Hygiene 28<sup>th</sup> April, 2021; Kalpakkam Branch**

**Indian Women Scientists' Association Kalpakkam Branch**

**Doctor's Talk**

On The Topic  
**Lifestyle Disorders and Homeopathy**

**Mr. P. A. Sasidharan**  
Member, Homeopathy Association of Kalpakkam

Date: 12<sup>th</sup> June, 2021, Saturday Time: 18.30 hrs  
Venue: <https://meet.google.com/szz-vdqm-crc>

**All are cordially invited**

**Dr. Padma S Kumar**  
Convener  
**Dr. Anita Toppo**  
Secretary,  
**Dr. S.C. Vanitha kumari**  
Joint Secretary  
**Dr. M. Manohari**  
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**Smt. V. Geetha Lakshmi**  
**Ms. Annie Jessila**  
**Smt. S. Rajeshwari**  
**Dr. S. Kalavathi**  
**Smt. T. Jayanthi**

**Doctor's Talk on Homeopathy 12<sup>th</sup> June, 2021; Kalpakkam Branch**



**COVID 19 Relief Work on 26<sup>th</sup> June, 2021 ; Kalpakkam Branch**



**Gardening Course for Health and Happiness during 19<sup>th</sup> March to 19<sup>th</sup> June, 2021; Kolhapur Branch**



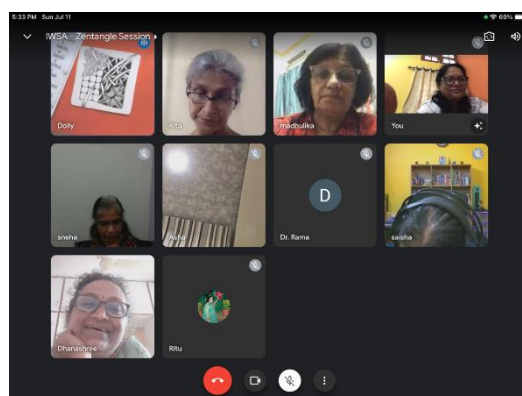
**International Mangrove Day Celebration on 26<sup>th</sup> July, 2021; Kolhapur Branch**



**World Environment Day Celebration on 18<sup>th</sup> June, 2021; Nagpur Branch**



**International Yoga Day Celebration on 30<sup>th</sup> June, 2021; Nagpur Branch**



**Workshop on Zentangle Art on 11<sup>th</sup> July, 2021; Roorkee Branch**



**Indoor Plants to Purify the  
Air in the Room**



**Tejomayee II Solar Panel  
Installation completed at  
IWSAHQ, Nov. 2021.**

**To**

**From**

**IWSA Head Office**

Plot No.20, Sector 10A  
Dr. Mar Theophilus Road, Vashi  
Navi Mumbai: 400703  
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Email: [iwsahq@gmail.com](mailto:iwsahq@gmail.com)  
Website: [www.iwsa.net](http://www.iwsa.net)