



IWSA NEWSLETTER

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September - December 2018



Cancer Detection Camp at Manaswi. Kalamboli on 22nd November 2018.



Workshop on Health Management of your Golden Years, 20th - 23rd October and 27th - 29th November 2018.



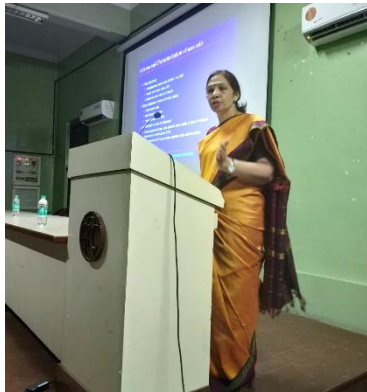
IWSA Stall at Rayat Vidnyan Parishad Conference, KBP College, Navi Mumbai, 29th - 31st December 2018.

BRANCHES

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



BRNS Popular Science Lecture by Dr. D. J. Biswas at K.J. Somaiya College of Science and Commerce, Vidyavihar, Mumbai on 6th September, 2018.



BRNS Popular Science Lecture by Dr. Chandra Viswanathan at Ramnarain Ruia College, Matunga, Mumbai on 12th December, 2018.



Eco Friendly Ganesha Workshop on 8th September, 2018.



Gandhi Jayanthi Celebration by Day Care children on 1st October, 2018.



Special Lecture by Dr. Sunali Khanna on Marie Curie on 17th November, 2018.

From the Editor's Desk



Dear IWSA Members,

In this issue of the Newsletter, you will find reports on the two BRNS Popular Science Lectures that were held between September and December 2018 in Somaiya and Ruia colleges in Mumbai and two in Bengaluru. You will find reports on other Science Awareness activities such as Workshop on Foldscope for school children, lectures on nutrition for adolescence girls, several interesting activities of IWSA's Learning Garden, participation in Rayat Vidnyan Parishad etc. This year's Ecofriendly Ganesha Workshop had participants from senior citizens, school children, special children from ETC and slum children from Arambh, which made this event a very special one. We bring you the reports about two workshops held on health management of your golden years and the cancer camp at Manaswi. The report about the two workshops on RNA Sequencing and Molecular Dynamics conducted by IWSA's Computer Centre tells you about IWSA's commitment to develop computational skills for the future scientists, i.e. M.Sc. and Ph.D. students.

This issue also brings the interesting activities held at IWSA Branches at Bengaluru, Delhi, Kalpakkam, Kolhapur, Nagpur, Nellore and Roorkee. You will find short articles about 2018 Nobel Prizes in Chemistry, Physics and Medicine. Another interesting feature which I have included in this issue is my meeting with Padmashri Smt. Krishnammal. You will find that this 92 – year old Gandhian lady is an inspiration for all of us. I am happy to bring out this article about her as our nation is celebrating 150th Birth Anniversary of Mahatma Gandhiji. I hope that all of you will enjoy reading these reports and the scientific information content of this Newsletter.

With best wishes

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Dr. Susan Eapen (Co-Editor)
Dr. Devaki Ramanathan
Dr. Dhanya Suresh
Dr. Nalini Bhat

President's Message



Dear IWSA Members,

This Newsletter is the last issue of 2018. This year we have added two new branches. Bengaluru Branch was approved in April 2018 and Nellore Branch was approved in November 2018. IWSA now has eleven branches which span from Roorkee in the North and Nellore in the South. Through our branches we look forward to strengthening our activities to meet the mandate of taking Science to Society. Much depends on the Conveners, Office bearers and members of all our branches in joining headquarters to shoulder this immense responsibility passed on to us by our Founder members. So dear members do make more efforts to organize activities relevant to your locales in the context of IWSA's mandate.

In the year April 2017 to March 2018, IWSA had reached out to 11000 recipients with activities from headquarters and our branches. I am looking forward to increasing this number with your support during April 2018-March 2019.

We have been conducting BRNS supported lectures from headquarter for several years. We had applied for funds to include our branches in this activity. This was approved. We have written to all conveners to avail this support and conduct lectures using the guidelines provided. So far we received requests only from Bengaluru, Kalpakkam and Hyderabad.

I am happy to inform you that the XIV Triennial National Conference of IWSA will be organized by our Hyderabad branch in December 2019. They will shortly come out with more information about the meeting. Do keep track of our website as we update the events as they unfold.

With Best Wishes for the New Year 2019

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Reports from Head Quarters

Science Awareness Programs

A. IWSA – BRNS Popular Science Lectures

1. BRNS Popular Science Lecture at K.J. Somaiya College of Science and Commerce, Vidhyavihar, Mumbai on 6th September, 2018

Dr. D. J. Biswas, Former Senior Scientist, Bhabha Atomic Research Centre, Mumbai, delivered a popular science lecture on “Lasers, Secure optical communication and butterfly effect”, on 6th September, 2018 at K. J. Somaiya college of Arts, Science and Commerce, Vidhyavihar, Mumbai. In his talk, Dr. Biswas gave an overview on lasers, starting with basic principle of stimulated emission, population inversion and further described the working of a laser. The most important and remarkable properties of lasers, directionality (low beam divergence) leading to a high degree of focusing, monochromaticity and coherence were explained in a lucid manner. The various types of lasers and their applications were also discussed. The difference in the operations of a continuous wave laser, a short pulse laser and an ultra-short pulse laser were also explained in this talk.

Lasers can be launched within optical fibers with suitable optical couplers and made to propagate for very long distances with very low attenuation. This has made it possible to use lasers extensively in optical fiber based communication.

Secure optical communication plays an increasing important role in organizations such as banking, industry, commerce, telecommunication as well as defence. Chaos (sometimes referred as butterfly effect) based communication has been a very attractive research field from last couple of decades due to its potential of providing secure communication. In this type of communication, the user message signal is transmitted using chaotic carrier signal and retrieved at receiver upon synchronization with transmitter. Chaos based communication is very hard to intercept, since it is very sensitive to the initial condition.

Prior to the talk, Dr. Lalitha Dhreshwar, Vice President IWSA and Dr. Shyamala Bharadwaj, Secretary, IWSA gave an overview of IWSA activities and urged the audience to take active part in various educational activities of IWSA. About 100 undergraduate and post graduate students of the Physics Department attended the lecture and participated in fruitful discussions with the speaker.

2. BRNS Popular Science Lecture at Ramnarain Ruia College, Matunga, Mumbai on 12th December, 2018

An IWSA – BRNS popular science lecture was delivered at Ramnarain Ruia College, Matunga, Mumbai on 12th December, 2018 by Dr. Chandra Viswanathan MD, PhD,

DTM, DPB, Independent Consultant (Regenerative Medicine), Mumbai on “Stem Cell Medicine: It’s going to work”.

Dr. Viswanathan said that even though the progress in the field of regeneration historically had advanced by fits and starts, as on date, we have collectively learnt a great deal about regenerative phenomena. Probably as important as what we do know is a clearer recognition of what we do not know and what needs to be done to intellectually understand regeneration and to realize its great potential for unmet medical needs. Regenerative medicine and emerging biotechnologies stand to revolutionize the practice of medicine. Advancements in stem cell biology have made the prospect of tissue regeneration a potential clinical reality. Currently, ethical and scientific issues continue to surround both embryonic and fetal stem cells and hinder their widespread implementation. While use of embryonic stem cells and induced pluripotent cells is therefore largely confined to basic research, both hematopoietic and mesenchymal stem cells obtained from various different adult tissue sources have been in use in clinical settings in few countries. Bone marrow is one such best studied source so far of blood forming and tissue forming cells. Multi-potent and self-renewing mesenchymal stem cells (MSCs), are adult stem cells of non-hematopoietic origin and possess the ability to differentiate into specialized cells.

Umbilical cord blood, as an alternate source for transplantation of hematopoietic stem cells has been established. These are adult stem cells that do not have any ethics related issues. Although, MSCs were traditionally isolated and characterized from the bone marrow, other sources like the umbilical cord, the umbilical cord blood cells, amnion/placenta, fat tissue, hair, teeth etc are also inexpensive sources of cells that are capable of forming many different cell types (i.e., they are “multipotent”). Phenotypic and functional studies from some of these alternate sources have demonstrated lot of similarities.

Recent demonstration of MSC migration to primary tumors as well as to metastatic cancer sites suggested that these cells may have an important role to play in tumor growth and disease progression. This tumor tropism characteristic of MSCs also indicates that these cells could be effectively used to deliver anti-cancer drugs to tumor sites in vivo. In fact, several studies have demonstrated that genetically modified MSCs can be utilized to target tumors and deliver oncolytic viruses and proteins that are cytotoxic to tumor cells. These unique biological properties of MSCs may have broad clinical applications ranging from regenerative medicine to cancer therapy.

Stem cell research is being pursued in the hope of achieving major medical breakthroughs. Scientists are striving to create therapies that rebuild or replace damaged cells with tissues grown from stem cells and offer hope to people suffering from cancer, diabetes, cardiovascular disease, spinal-cord injuries, and many other life style disorders. Both adult and embryonic like stem cells may also provide a route for scientists to develop valuable new methods of drug discovery and testing. They are also powerful tools for doing the research that leads to a better understanding of the basic biology of the human body.

Despite many challenges, stem-cell therapy remains one of the most important options for stimulating regeneration and reversing pathology in numerous clinical situations. A practical but important question is when to move from bench to bedside and on what basis. To date, the stem cell field has sometimes short changed controlled clinical trials in favour of moving quickly ahead. In the long run, this could prove to be counterproductive. When human experimentation slides imperceptibly into clinical treatment without the tedious intervening proof of concept steps, long term problems could arise.

The past and ongoing endeavour from researchers and various government bodies aims at cultivating transparency and adopting well regulated stem cell research programs. This alone will accelerate and foster scientific progress towards new stem cell based treatment by initiating discussion among leaders in ethics, public policy, health care and ourselves on how to meet the several challenges of our field. The talk gave an overview of the various advances made so far, followed by what can be expected in the near and distant future from this new field of medicine.

About 175 students attended the lecture. The lecture generated good enthusiasm among students, which led to an active discussion. Dr. Sunita Mahajan, Member, Board of Trustees, IWSA spoke about various activities of IWSA. Dr. Sudha Padhye and Dr. Marukh Joshi from IWSA also attended the programme. Dr. Susan Eapen, Member, Board of Trustees, IWSA and Prof. Jessy Pius, Botany Dept., Ruia College co-ordinated the programme.

3. BRNS Popular Science Lectures held at Bengaluru on 28th December 2018

IWSA's Bengaluru branch organized two lectures in the Seminar Hall of the Dept. of Biotechnology, RV College of Engineering, R V Vidyanikethan Post, Mysuru Road, Bengaluru-560059. About 70 participants including students, research scholars, faculty, industry person attended the lecture series. The participants were from various science and engineering colleges and university like BMS College of Engineering, BMS College of Women, Indian academy degree college, Dayanand Sagar college, RV College of engineering, Bangalore university, Padmashree institute.

Lecture 1 was delivered by Dr. Savitha, Centre for Nano Science and Engineering, Indian Institute of Science, Bengaluru. She spoke on "Techniques implied for nanomaterial characterization". Dr. Savitha gave an overview on various tools techniques and methodology available to characterize nanomaterials. Nanoparticles are microscopic particle with atleast one dimension less than 100nm and come in various forms such as Nanopowder, Nanocluster, Nanocrystals. The properties of nanomaterial varies with their sizes. Nanoparticles often have unexpected visible properties because they are small enough to confine their electrons and produce quantum effects. Selected optical extinction spectra and solution appearance of silver nanospheres between 10 and 100 nm in diameter (top) and silver nanoplates between 50 and 150 nm in diameter (bottom). Control over nanoparticle shape and size allows

the plasmon resonance to be tuned across the visible and near-infrared portions of the spectrum. There are Carbon-based nanomaterials as fullerene and CNT based, Metal NP's such as NP's of alkali and Noble metals, Ceramic NP's as Inorganic nonmetallic particles etc.

For biomedical applications physical properties such as size, shape, crystallinity, surface nature and area, state of agglomeration of nanomaterial are important. The other properties of nanomaterial are optical properties as absorption, scattering, plasmonic resonance, mechanical properties as hardness, elastic modulus, adhesion etc. Chemical properties such as High surface area, Nanomaterial catalysts are much more effective due to their higher surface energy, Electrical properties as Conductivity and resistivity, Conductivity of the carbon nanotube depends on the cross section and effect of shear forces, Magnetic properties depends on chemical synthesis method and agglomeration, magnetic metals. There are simple as well as advanced techniques available for characterizing nanoparticles. Simple techniques include Spectroscopic analysis, UV visible spectroscopy while advanced techniques such as DLS a measurements, Atomic absorption spectroscopy (AAS), Inductively coupled plasma mass spectroscopy Dark Field microscopy, Transmission electron microscopy (TEM) Scanning Electron Microscopy (SEM), X-ray photoelectron spectroscopy (XPS) are used for complete characterization of nanoparticles.

Lecture 2 was delivered by .Dr Geetha Balakrishna: Director, Centre for Nano and material Sciences (CNMS), Jain University, Bangalore. She spoke on "Quantum Dots-Nanotechnology" There are renewable and non renewable energy resources and sunlight is one of the prominent clean source of energy. It is economical as available abundantly in countries like India. Fluorescent nanocrystals are synthesised and characterized in CNMS via thin film depositions. Semiconductor quantum dots open new way to utilize hot electrons via impact ionization. these quantum dots are good alternative to conventional dyes in dyes synthesized solar cells. Non availability of the required size and high cost involved in synthesising quantum dots can be solved by using colloidal approach. This also allows control of their size, shape, structure, composition of material etc. Choice of the shell and coating has been explored as shell provides stability to nanocrystals and alters photophysical properties to some extent and coating confers properties to QD for its applications. Conventional nanocrystals synthesis has been made with new binary ligand and reuse solvent octo-decane for smokeless and clean synthesis procedure. The optimized effect of two ligands oleic acid and octa-decyl amine on nucleation rate and growth of cdSe nanocrystals was informed.

B. Workshop on Assembly and Use of Foldscope

On 7th September, 2018, as a part of SCIENCE AWARENESS activities of IWSA for school students, a workshop on "Assembly and Use of Foldscope" was conducted for the VIII and IX std students of two schools - Sainath English High School and the

NMMC school at Sector 15, Vashi. Ms. N. Prathibha, Assistant Professor, Dr. M. Rajyalakshmi, Professor and Dr. Saisha Vinjamuri, Assistant Professor, Department of Biotechnology, BMS College of Engineering, Bengaluru and members of IWSA-Bengaluru branch, along with other members of IWSA conducted this workshop for about 100 students. The workshop was part of a DBT project sanctioned to our IWSA members from Bengaluru. The students were taught the assembly of Foldscope, to prepare microscopic slides with various plant parts, and how to mount the slides on Foldscope and view the samples. Many students were excited to see a compact microscope which can be carried in pockets and which is available at an affordable price. They were amazed to know that they can easily explore nature not only in schools but wherever they travel if they carry the Foldscope with them.

C. Visit of IWSA members to TISS on 30th September, 2018

The following members from IWSA visited TISS to attend the Science camp organized by Vinimay Trust and Mumbai, Education, Research, Innovation and Training (MERIT):

Ms. Madhu Pahwa, Dr. Srirupa Mukherjee, Ms. Tripta Tiwari, Ms. Vijayalakshmi Tilak, Ms. Malathi Rao, Ms. Ambika Janakiram and Dr. Lalitha Dhareshwar on 30th September, 2018.

MERIT is a TISS project, under which High School Science is made interesting via practical demonstrations to students in Science Camps. They have made about 25 Science kits on various topics. The Science Camp at TISS had an interactive lecture on Solar System by Ms. Dhanya Vinod, followed by demonstration of 3D Printing. Different experiments in physics, chemistry and biology were also conducted.

The camp was attended by 10 students of Xth standard of Madhyamik Vidhyalaya, Mankhurd who reside in Chembur Children Home, Mankhurd and was supported by Vinimay Trust, an NGO which works for the welfare of children in the institutions under Children Aid Society.

D. Lectures on Nutrition for Adolescent Girls and Menstrual Cycle

Two lectures, one on “Nutrition for Adolescent Girls” by Ms Priya Jacob, Former dietician, MGM Hospital, IT Healthcare Documentator and another on “Menstrual Cycle” by Ms. Mangala Ghorpade, Nuclear Medicine Centre, KEM Hospital were organized on 1st October, 2018 in association with Rotary Club of Satellite City of Navi Mumbai. Mothers and adolescent girls from neighbouring schools were invited for the program.

Adolescence being critical and vulnerable time in a girl life, the objective was to focus on nutritional requirements during puberty and awareness of good food habits for a

productive healthy life. Key messages were highlighted including, foods which are to be given to the girls, equal distribution of food amongst family members and involving the family in meal preparations so that the girls are not burdened and neglected in nutritional needs at this crucial juncture. Issues related to adolescent years and nutritional deficiencies especially anemia were addressed. Motivation to participate in sports and other physical activities in building stamina and optimal height were put across.

Talk ended with interaction from the girls and mothers regarding their bodily changes and various strategies in promoting good health in women. Nutritional facts of various whole grains that can be incorporated in the daily meal were displayed. A quiz on “rate the plate” for nutrient content of various meals shown as pictures was part of the program.

Mayalu or Malabar spinach known for its nutrient dense properties was distributed to all. Blood samples were collected from the girls students with due permission from the parent to determine the iron status. These girls were also given clinical advice and a dental check up by our doctors in the IWSA Health care clinic.

Overall a collective participation from all members of IWSA as well as the audience helped in rendering nutrition education to the adolescent girls and mothers.

After Ms. Priya Jacob’s talk about “Nutrition for Adolescent Girls”, Ms. Mangala Ghorpade from Nuclear Medicine Centre, KEM Hospital spoke about “Menstrual Hygiene”. She elaborated on “What is Menstrual Hygiene” and emphasized the fact that the taboo about bad blood, dirty blood and feeling like it is sinful etc should be broken. She discussed about the different things used during menstrual cycle like pads, tampons, silica cup, soft cloth etc. and about the advantages and disadvantages about them. In her talk, she covered the following useful information for the young girls: (i) how often to change, (ii) how to clean private parts, (iii) different apps on mobile about menstruation, (iv) to track your date of menstruation and (v) about good touch and bad touch with demonstration.

E. IWSA’s Learning Garden

1. Visit by BARC Scientists to IWSA Learning Garden

On 25th October 2018, Dr. V. Salunkhe and his colleagues (Dr. H.A. Barbhuia, Mr. Himanshu Mishra and Mr. S.N. Manwatkar) visited IWSA. Dr. H.A. Barbhuia gave a presentation on the native trees and medicinal plants of India. He explained how biodiversity hotspots are defined and how India has 645 exclusive species of plants. Characteristics of about 35 different native trees and 30 different medicinal plants present in and around India were briefly explained. The Team then helped identify different native plants in the IWSA Learning garden. During this process many queries of the IWSA members regarding proper identification, nutrition, growth pattern and so on were answered. The walk through the garden was a learning experience with each person recounting their anecdotes with different plants. Interesting plants were

Wrightia tinctora, Kerosene plant, Sahdevi and Lia indica. The BARC team promised to continue to help in answering any further queries.

2. Visit of German Exchange Student and other students to IWSA's Learning Garden

German Exchange student Ms. Kareena Kaufman visited IWSA's Learning Garden on 19th October, 2018. Our Trustee, Dr Sudha Rao and Ms. Kareena together planted *Cnidocolus aconitifolius* (Tree spinach), Dr. Devaki Ramnathan and Ms. Kavua Pahwa (IWSA EC Member Ms. Madhu Pahwa's grand daughter) planted *Hibiscus sabdarifa* (Gongura). Kareena was happy to see the Iris and enjoyed tasting edible flowers and leaves from the garden.

Esha (who studies in Birmingham), granddaughter of IWSA member, Ms. Kumud Balakrishna planted *Sansevieria hahnii* (Mini mother in law's tongue), an air purifying plant which absorbs toxins and cleans air indoors on 26th October, 2018. She also planted *Nephrolepis exaltata aurea* (Golden fern). This plant is a good indoor air purifier and removes formaldehyde, benzene and other chemicals. Esha was fascinated by the caterpillars on the lemon plant and the butterflies in the garden. Both the children wrote to IWSA about their experiences in the garden.

3. Talks by IWSA Members about Learning Garden

The following talks were given by IWSA Members as a part of Learning Garden Activity.

(i)	5 th September, 2018	Ms. R. Bhuvaneshwari	"Indoor Plants"
(ii)	28 th September, 2018	Dr. Srirupa Mukherjee	"Lilies"
(iii)	8 th October, 2018	Ms. Malathi Rao	"Desert Plants"
(iv)	15 th October, 2018	Dr. Lallitha Dhareshwar	"Coastal Landscape"
(v)	13 th November, 2018	Ms. Sukhvinder Singh	"Modification of Roots"
(vi)	13 th November, 2018	Ms. Ambica Janakiram	"Charyophytes"
(vii)	19 th November, 2018	Dr. Shyamala Bharadwaj	"Siddha Medicine"
(viii)	1 st December, 2018	Ms. Madhu Pahwa	"Sciophytes"
(ix)	1 st December, 2018	Ms. Tripta Tiwari	"Butterflies in the Garden"
(x)	12 th December, 2018	Ms. Chhaya Kelkar	"Fungi"
(xi)	12 th December, 2018	Dr. Suparna Kamath	"Forests of India"

4. Visits of IWSA Members as part of Learning Garden Activity

- (i) Some of the Members of Learning Garden visited Oundh Bhushan's aquatic plant nursery on 9th September, 2018 and collected several plants of interest to the IWSA's Learning Garden.
- (ii) On 8th December, 2018, twenty members of IWSA visited Rani Baug to study the trees. Dr. C. Lattoo from Friends of Trees, took them around and explained in detail about the various trees. Baobab, Krishna Ficus, Andaman Paduak, Sita's Ashoka, Nagkesar, Fern tree, Divi Divi were some of the majestic trees found in Rani Baug.
- (iii) Mr. Anil Paranjpe from Veermata Jijabai Bhosale Udyan and Zoo spoke about the role of zoos in contemporary times. How they have evolved from entertainment

to conservation of rare species. Our members visited the Penguin colony. They also had a guided tour of the now renovated Bhai Daji Lad museum, which showcases the evolution of traditional arts in India. The textile exhibition was innovative and thought provoking.

5. Visit of Students of Bharati Vidyapeeth to IWSA's Learning Garden

On 6th December, 2018, Ms. Vijaya Chakravarty made a presentation on 'Landscape Design' to 3rd year students of architecture from Bharatiya Vidya Peeth, College of architecture. Landscape history, landscape elements, types of gardens and softscaping were discussed. The students will design a Learning Garden at IWSA as part of their curriculum. They spent considerable time studying the courtyards, front and back garden.

F.Participation of IWSA at the Rayat Vidnyan Parishad 2018

IWSA was given a stall at the three day Science Exhibition during the Parishad at KBP College, Vashi from 29th to 31st Dec, 2018. Following experiments were demonstrated-

1. Optical fiber communication based on the principle of total internal reflection, was demonstrated, using a laser to propagate through a stream of water. Prof. Nagarajan from CEBS had set up the Optical fiber communication system using a simple transmitter- receiver set. A poster was displayed in which the block diagram of a communication system was shown with a comparative table to highlight the differences between optical fibers and coaxial cables.
2. Diamagnetism of water was demonstrated in a simple experiment, in which, a small cup of water placed on top of a thermocol piece could be made to move on water surface using a set of 5-6 disk magnets. The diamagnetic nature of water generates dipoles aligned in an opposite direction to the applied magnetic field. This results in a repulsive force leading to the movement of the water filled cup. A poster to show the other types of magnetism (ferromagnetism and paramagnetism) was also displayed.
3. Safe disposal of Thermocol by dissolving in acetone was demonstrated. Beautiful and artistic models were made from the pulp.
4. An experiment 'Do plants have brains' was conducted with the help of a Mimosa (Touch me not plant). The electrical impulses were measured using an amplifier and an oscilloscope brought by Prof. Nagarajan from CEBS, who was mainly involved in this activity. It was highly appreciated by one and all.

Here, we would like to place it on record, that IWSA is grateful to the collaboration from Prof.R. Nagarajan from Centre of Excellence in Basic Sciences-, Mumbai, in the above experimental demonstration.

IWSA's Learning Garden display which was a major exhibit at the KBP Science Exhibition was a great success. Great pains were taken by the Garden members to

transport more than 50 potted plants to the venue and arrange them artistically, section wise. The highlights of IWSA Learning Garden display are as follows:

(i) IWSA showcased several 'wild food plants' under the theme ' Health and Nutrition '. Many IWSA members displayed recipes of these 'Forgotten Plants' along with botanical / nutritional / medicinal and other details.

(ii) Traditional conservation practices through Indian festivals was also showcased. The biodiversity and conservation connected with Ganesh Chaturthi was brought to light. The visitors could learn about the medicinal and other uses of these plants and how even the grass was given equal importance as the mighty mango tree. Poisonous, thorny plants along with the fragrant plants have an equal place in the ecosystem.

(iii) Butterflies act as 'Environmental Barometers'. They are sensitive to the slightest changes in climate, ecosystems, biodiversity etc. Creation of Butterfly gardens to prevent the extinction of different species of butterflies was explained. Several tips to attract butterflies were given.

(iii) Indoor Air purifying plants were displayed. Today, human beings spend more than 90% of their time indoors. Indoor air is more polluted than outdoors due to toxins and chemicals emitted by air conditioners, refrigerators, computers, paints, varnish etc. Studies conducted by several universities and environmental organisations show how some indoor plants can absorb these toxins.

(iv) A few fragrant and aromatic plants were exhibited. These plants help flavour food and control pests. Fragrance triggers memories and helps keep dementia and Alzheimer's at bay.

(v) A quiz 'Smell and Tell' was popular and many participated in it. Three prizes were awarded.

(vi) An experiment ' Do plants have brains ' was conducted with the help of a Mimosa (Touch me not plant). It was highly appreciated.

G. Other Activities

1. On 5th November 2018, IWSA invited our member, Ms. Snehalata's USA based grandchildren Nilraj Bhavsar and Keshav Bhavsar. They interacted with students of Science Nurture program of IWSA, who gave a power point presentation on Mars orbiter mission "Mangalayaan" which was successfully launched by ISRO on 5th November 2013. In its very first attempt, Mangalayaan was inserted into the orbit of Mars on 24th September 2014.

2. Society for Radiation Research (SRR), Mumbai in collaboration with IWSA arranged a Special Lecture by Dr. Sunali Khanna, Assistant Professor, Nair Hospital Dental College, Mumbai on "Life and Radiological Research by Marie Cure: A role Model for Women in Science" on 17th November, 2018 at 3:00 pm.

Nursery School and Education Committee

1. Eco-friendly Ganesha Workshop

Workshop on preparing ecofriendly Ganesha idol was held at IWSA Complex on 8th September, 2018. Several enthusiastic devotees of Lord Ganesha participated in this workshop and took home their hand made ecofriendly Ganesha. The aim was to promote the concept of “Green Ganesha” where the idols and decoration are put together with eco-friendly articles like seeds of vegetables and fruits. More than 100 participants including senior citizens, school children, special children from ETC, slum children from Aarambh, learnt to make the eco-friendly Ganesha. The idols were made of natural clay, painted with natural colours and decorated with dry leaves, shells etc. The participants were educated about the harmful effects of plastics and thermocol to the environment and were advised to immerse the idol in their garden to grow more plants and trees out of the seeds used in the idols.

2. Other Activities

- (i) Teacher’s Day was celebrated by the TOT students on 5th September, 2018. The students had organized an entertainment program for the teachers and committee members.
- (ii) The TOT Students visited Kilbil and ARWA (BARC Day Care Centres) for observation on 21st September, 2018.
- (iii) Prize Distribution for the 22nd Batch TOT students was held on 26th October, 2018. The Chief Guest was Dr. Vandana Chakrabarti, Director, Life Long Education and Extension.
- (iv) Mom and Me Activity was conducted in the Nursery on 16th October, 2018. The Nursery Children along with their mothers carried out several activities.
- (v) During the Pet Week 22nd Oct, the Nursery Children visited a Pet Shop.
- (vi) Ms. Pradhan attended a two day conference organized by Bal Shikshan Parishad on 17th and 18th Nov. 2018 at Pune.
- (vii) IWSA Nursery School started a second batch from the second term (19th November, 2018).

IWSA’s Murli Laj Chugani Health Care Centre

1. Workshops on Health Management of your Golden Years

In the present times, many of us senior citizens have to manage our health related issues between the husband and wife. Most often it is difficult to get support if one of us is in need of nursing or related assistance. Two workshops were conducted to inform and train the seniors on several routine and emergency procedures which take care of immediate needs. The workshops were also helpful for assisting friends, neighbours and relatives.

Each of the workshops was for three days. The programs were joint efforts of the Indian Women Scientists' Association (IWSA) and the faculty and nursing staff of MGM New Bombay College of Nursing, Kamothe. The program was open for men and women.

The nursing staff and students of MGM New Bombay College of Nursing at Kamothe, covered the following in both the workshops:

Checking of vital parameters, first aid management of injuries, bites and related, managing personal hygiene, positioning of an individual confined to bed, comfort devices, ambulation, management of fever, bowel movement, wound dressing and bandaging, first aid management of a fall/fracture and related, hot and cold applications, subcutaneous injection and emergency services. In the morning half, each day, there were lectures and in the afternoon there were demonstrations of the procedures.

In the first workshop held during 20th, 22nd and 23rd October 2018, there were two topics presented by the Nurses i) Aging and Mental Health; ii) Prevention and Management of Vitamin D and Calcium deficiency disorders. In the 2nd Workshop held during 27th to 29th November, 2018 two lectures were conducted i) Healthily the Elderly by Dr. Shefali Mehra, MGM New Bombay Hospital; Vashi, Navi Mumbai ii) Aging and Mental Health by Prof Susan Jacob, MGM New Bombay College of Nursing, Kamothe, Navi Mumbai. The highlight of the second program was demonstration of CPR by Sister Sarika Nair, one of the faculty from the nursing college. The first and 2nd lecture were attended by 20 and 12 participants respectively.

2. Cancer Camp

A cancer camp was organized at Manaswi, CIDCO's Resource Centre for Women at Kalamboli, Navi Mumbai on November 22, 2018. One hundred twenty women had registered, however only 97 showed up for the check up. The women were checked for breast, cervical and oral cancer by members of the Indian Cancer Society. The camp was financed by a donation from Ms Jyoti Nadkarni and Ms. Vinita Mantri in the memory of their parents Drs. Jayshree and Jagdish Nadkarni.

IWSA's Satish Haware Computer Education Centre

1. RNA-sequencing and Molecular Dynamics Workshop

The importance of learning to analyse and interpret present day high throughput sequencing technology (HTS) data (DNA, RNA & Protein) in biology, has been introduced by IWSA from 2017. This is an initiative to promote scientific curiosity and develop these computational skills among future scientists (MSc & PhD students), through a series of 'hands on training workshops' at the IWSA Computer Center, Vashi Navi Mumbai. Two workshops of 4 days each were held during 20-23 September, 2018 and 22-25 December, 2018. The primary requisite for accessing HTS data is to navigate Linux operating systems and for that the first 2 days were dedicated to learning and

practising commands for linux. The first workshop focussed on RNA sequencing data analysis using open source pipeline READemption, developed by Dr Konrad Forstner, Germany. The second workshop was based on protein dynamics where GROMACS open source software was used to perform molecular dynamics and perform critical analysis on protein data. Each pipeline was taught step by step to understand, process and analyse RNA data in the former and molecular dynamics simulation of proteins in the later. Both workshops concluded in scientific observation and interpretations shared by students based on their newly acquired skills. The second knowledge sharing initiative also supported the introduction of an upcoming science enthusiast group known as Lake Water Bioinformatics which helped in smooth conduction of the workshop. A total of 82 students have been trained so far.

Dr Bhaskar Badra, Scientist, Biofuels group, Reliance Industries, and Dr Kakoli Bose, Principal Investigator, Biophysics Lab, ACTREC, Kharghar delivered invited talks during the workshops. Both speakers emphasized the need for expertise in HTS data analysis and Molecular Dynamics simulation for the future workforce in industry and basic research.

2. Computer Course for High School Students

Eleven students of Sainath High School (IX std.) attended the Computer Course conducted by the Computer Center between 9th July 2018 to 22nd October 2018. The students learnt several computer skills related to word processing, spreadsheets, email management, data management etc. The students worked on several projects related to their curriculum and made a presentation of the projects on 26th November, 2018.

IWSA's Hostel and Day Care Committee

1. Day Care Children celebrated Dahi Handi on 3rd September, 2018 and Ganesh Chaturthi on 22-08-2018. Children made drawings of Ganapathi and coloured them.
2. Day Care Children celebrated Dussehra on 13th October, 2018 at 4:30 pm in IWSA Multipurpose Hall, by taking part in the Garba Dance. The Day Care Children made their own Dandya sticks using color paper. It was an enjoyable evening for all the participants and the audience.
3. On 14th of November at 4:00 pm a plantation event was arranged for Day Care children by Learning Garden Nurturers & Day Care committee to commemorate Chacha Nehru's birthday i.e. Children's day. The children and all other members and staff of IWSA who were present were equally enthusiastic in the program. Children wore their green T- shirts and green caps. Many seeds and some cuttings were planted in various pots. Their gradual progress after proper watering is being monitored every week and being chronicled. The best part of the program was the impromptu dances by the Day Care children. Not only the children but the elders too were equally excited with the program. Now all are looking forward to how well these plants grow!

Reports from Branches

Bengaluru Branch

1. Lecture on “Science Illustrations”

Departments of Biochemistry, Chemistry and Physics, IADCA, in collaboration with Indian Women Scientist’s Association (IWSA), Bengaluru Branch organized a guest lecture on “Scientific Illustrations” on 2nd November, 2018. The resource person was Dr. Ipsa Jain, Artist in Residence, Institute of Stem Cell Biology and Regenerative Medicine. The lecture was attended by faculty and MSc students of Biochemistry, Biotechnology, Microbiology, Chemistry and Physics Departments (16 faculty and 110 students).

Scientific illustration is an artistic way of synthesizing and representing scientific information so that it can be interpreted by a specific public. It is a visual approach to a scientific concept in an accurate, comprehensible and objective way. The illustrations are different based on the type of audience. The speaker gave many examples of illustrations in biology, physics and chemistry. Scientific illustrations, therefore, function as potent vectors of scientific concepts, theories and messages both within and outside of the scientific community. Their collective appeal can have an enormous impact on how science and research are perceived in the society. The lecture was interactive and both the faculty and students learnt a lot and enjoyed the lecture. The lecture was followed by an exhibition of the scientific art rendered by Dr. Ipsa Jain.

2. One day lecture Series on Characterization of Nano-materials

Indian Women Scientists Association (IWSA), Bengaluru Branch along with Department of Biotechnology, R V College of Engineering and B.M.S. College of Engineering, Bengaluru organized a one day lecture Series on Characterization of Nano-materials on 28th December, 2018 at Seminar Hall, Dept. of Biotechnology, RV College of Engineering, R V Vidyanikethan Post, Mysuru Road, Bengaluru-560059.

The program began with inauguration and felicitation of Dr Rohini Godbole, IISc, one of the senior most IWSA members in Bengaluru. Dr.Godbole delivered the Inaugural address on “Women in science”.. This was followed by Dr Savitha’s, (CeNS, IISc) talk on “Overview of various tools techniques and methodology available to characterize nanomaterials”. The partial sponsor for this event Mr Jayakumar, Director, COMTEK highlighted on the importance of optical fibres, their role in nanomaterial characterisation and its importance in other field of science and technology. Dr R Geetha Balakrishna, Centre for Nano & Material Science, Jain University, Bengaluru spoke on the work carried out in Jain University on nanomaterial and its characterization. She also mentioned various new technologies which have facilitated the characterisation process increased the pace of research in nanotechnology. Dr Uma V, Nano-Science & Technology, Mount Carmel, Bengaluru explained each technique in a very simple way to participants with several field and live examples. Dr Chandra Prabha MN, Dept. of Biotechnology, MSRIT, Bengaluru spoke about her work on synthesis of nanomaterial using biodegradable waste and its characterisation. She showed few videos of the synthesis procedure for better understanding.

About 70 participants including students, research scholars, faculty, industry person attended the lecture series. The participants were from various science and engineering

colleges and university like BMS College of Engineering, BMS College of Women, Indian Academy Degree College, Dayanand Sagar College, RV College of Engineering, Bangalore University and Padmashree Institute.

Delhi Branch

Workshop on Metrology and Nanotechnology

IWSA Delhi branch organised a workshop on Metrology and Nanotechnology, along with DPS Vasant Kunj on 29th November, 2018. More than 100 students of class XI attended the lectures. Dr Rina Sharma welcomed and spoke about the activities of IWSA. Dr Sakshi Dhanekar from IIT Delhi made a presentation on Indian Women Scientists. Following this, Dr Rina Sharma, National Physical Laboratory, New Delhi spoke on Metrology. She talked about Quality Infrastructure of India, Role of NPL as custodian of standards of physical measurements, SI Units and recent developments regarding new definitions, kibble balance etc. Dr Sakshi Dhanekar elaborated on nanotechnology including chip fabrication, nano dimensions and various applications of nanotechnology.

Kalpakkam Branch

Radiation Awareness Program

Radiation Awareness Program was organised by IWSA (K) in association with Indira Gandhi Centre for Atomic Research (IGCAR), Kalpakkam on 29th September 2018 at Convention Centre, Anupuram. Radiation Awareness Program 2018-19 was half day program organised for ladies of Anupuram Township to familiarise them with the radiation related activities going on in our centre. Madras Atomic Power Station (MAPS), Bhartiya Nabhikiya Vidyut Nigam (BHAVINI) and Environment Survey Laboratory (ESL) brought their exhibits and demonstrated their activities.

Dr. S. Kalavathi, Convener, IWSA-K welcomed the gathering. Dr. Anita Toppo, Secretary, IWSA-K, presented the activity report of IWSA-K and highlighted its objectives. Dr. R. Bhaskaran, Associate Director, Health Safety and Environment Group, IGCAR was the chief guest of the program. He highlighted the importance of conducting such a program for the benefit of people living in and near the township. Exhibition which was organized by BHAVINI, MAPS and ESL was formally opened by Smt. Indrani Bhaduri. The program was conducted in English and in Tamil as two sessions for the two batches of ladies. A total of 260 ladies participated in the program.

Morning session started with a technical talk in English given by Dr. Manohari, Scientific Officer, Radiation Safety Division, Health Safety and Environment Group, IGCAR.. The lecture was very interesting and many doubts raised by the women were answered. This was followed by an interactive session which was conducted by the senior scientists of Radiation Safety Division. There was a game session interspersed with questions from the audience. This was highly appreciated by the women as they volunteered to participate in the games which were indeed multiple ways of identifying if they had understood the lecture. This was followed by the session in Tamil. Lecture in Tamil was

delivered by Dr. R Mathiyarasu, Scientific Officer, Radiation Safety Division, IGCAR. His seasoned presentation was excellent with many examples from day to day activities. Tamil lecture was also followed by interactive session with games. English and Tamil lectures were followed by visit to the exhibition for all the ladies where they saw the model of MAPS, FBTR, fuel rod etc. displayed as different stalls of BHAVINI, MAPS and ESL. At the completion of the program Dr. Padma, Treasurer, IWSA (K) proposed vote of thanks.

Kolhapur Branch

Rally to Mark International AIDS Awareness Day

IWSA Kolhapur Branch participated in a rally organised by Dr. Dipali Shipurkar of CPR Hospital, AIDS Department on the occasion of International AIDS Day on 1st December, 2018. Several eminent personalities including Chairperson of Kirloskar Foundation, District Health Officer and Director of Savitri Phule Hospital participated in the rally. Gopal Krishna Gokhale College NSS, Youth Club, Jr. NSS, Indian Women Scientists Association Kolhapur, Shahaji College NSS, Vivekanand College NCC, Nursing College Ujalaiwadi, Shahu College and Mahaveer College. Members of CPR hospital took active part in the rally. The program consisted of an Oath, Songs and Speeches about AIDS Awareness. Total number of participants were 49.

Nagpur Branch

Celebration of World Food Day

Indian Women Scientist's Association, Nagpur Branch in association with Apang Mahila Bal Vikas Sanstha. organized a function for World Food day on 26th October, 2018.

At the onset convenor Dr. Pradnya Bhalerao welcomed the audience. The program was organized in accordance to the theme "Our action is our future, zero hunger by 2030" of food and agriculture organization of United Nations. The program focused on prevention of spoilage of food. Dr. Pratima Shastri, Director of Apang Mahila ani Bal Vikas Sanstha, in her introductory note informed that prevention of spoilage of food is not only about increasing food supply but also about maintaining good health and environment. Guest speaker Ms. Meghanga Pandit, Practising diet consultant, highlighted the importance of correct storage practices for handling of food. Dr. Renuka Mainde, wellness consultant, consulting dietician for Mahindra & Mahindra gave tips on converting food waste into manure.

In the second segment of the program an extempore competition for members of IWSA as well as Ashadeep was held. Topics for extempore ranged from grandma's recipe to the kitchen of 2030 passing through online food, "how I spoiled my recipe", square meal and many more. Participants enthusiastically shared their views on the topic. Nutri food sachets prepared by Apang mahila and Bal Vikas Sanstha were given to the 30 participants.

Dr. Lalita Sangolkar Retd. Deputy Director NEERI Nagpur and Dr. Renuka Maindej were the judges for the competition. Dr. Deepti Andhare conducted the proceedings and Dr. Punita Tiwari, Secretary, IWSA Nagpur, proposed the vote of thanks.

Nellore Branch

Project on Plastic and Environment

IWSA Nellore Branch presented a Project on “Plastic and Environment” to the students of Dr. K K R Gowtham School, Tirupati on 19th November, 2018. The project was presented by Dr.M.Neelima Raj, Assistant.Professor, Department of Sciences, AIMS Institution, Peenya, Bangalore and the participants were 8th, 9th and 10th standard students in three batches. The presentation started with how we can make changes in our everyday lives to reduce the heavy burden of plastic pollution in our natural places, our wildlife and our own health. While plastic has many valuable uses, we have become over reliant on single -use or disposable plastic- with severe consequences. Around the world, 1 million plastic drinking bottles are purchased every minute. Every year we use up to 5 trillion disposable plastic bags. In total, 50 percent of the plastic we use is single use. Nearly one third of the plastic packaging we use escapes collection systems, which means that it ends up clogging our city streets and polluting our natural environment. The students were given some specific ideas like bringing own shopping bags to the supermarket, ask to use non-plastic packing to food suppliers, pick up any plastic you see the next time you go for a walk on the beach, etc.. from which they can come up with new ideas in managing our city's plastic waste. The students were told how the process of plastic is being recycled referring to recovery of waste and scrap plastic and reprocessing it into useful product. Due to the fact that plastic is non-biodegradable, it is essential that it is recycled as part of the global efforts to reducing plastic and other solid waste in the environment.

At the end of the presentation, students gave their views by telling how proper management for disposal, reduction of usage of plastics and public awareness would bring a great difference in present situation.

Roorkee Branch

Workshop on “Hormonal Changes”

IWSA Roorkee Branch conducted a workshop on ‘How to cope up with the hormonal changes’ in Mount Litera Zee School in Haridwar on 27th December, 2018. Girl students from class 5 to 10 participated. Dr Vandana Grover, a leading gynaecologist (IWSA life member) interacted with the students. She discussed issues concerning hormonal changes, its effects and hygiene. Dr Grover responded to the queries raised by the participating girls.

Nobel Prizes 2018

(abridged from https://www.nobelprize.org/nobel_prizes)

The Nobel Prize in Chemistry 2018

The Nobel Prize in Chemistry 2018 was awarded with one half to Frances H. Arnold (California Institute of Technology, Pasadena, USA) "for the directed evolution of enzymes" and the other half jointly to George P. Smith (University of Missouri, Columbia, USA) and Sir Gregory P. Winter (MRC Laboratory of Molecular Biology, Cambridge, UK) "for the phage display of peptides and antibodies. This year's Nobel Laureates in Chemistry have been inspired by the power of evolution and used the same principles – genetic change and selection – to develop proteins that solve mankind's problems.

Frances Arnold (California Institute of Technology, Pasadena) is the fifth woman to receive Nobel Prize in Chemistry. Born in 1956, she graduated in 1979 with a B.S. degree in mechanical and aerospace engineering from Princeton University, where she focused on solar energy research. Later in 1985, she obtained PhD in chemical engineering from University of Berkeley and started biochemistry work in developing new enzymes which can catalyze chemical processes to produce new materials. Instead of the rational rebuilding of enzymes by inducing structural changes she used the "directed evolution" strategy, which is an iterative process of randomly mutating proteins. It requires inducing some randomness in the target enzyme within an organism like bacteria. The resulting mutated bacteria are screened to see which ones do the intended job the best. The winners are then cultured, and from their offspring, the best are selected, and then cultured, and so on. The principle is the same as evolution by natural selection, but made faster. In her seminal work in 1993, she engineered a version of subtilisin E that was 256 times more active in organic solvent DMF. She also used structure guided recombination of proteins and by now she has developed many enzymes that are useful in making biofuels, medicines and laundry detergent, among many other things, in many cases replacing toxic chemicals as catalysts. Once while addressing students she said, "We, and especially our leaders, have a lot to learn from how nature innovates, innovation comes straight out of diversity — of recombining different parts and recombining different experiences." The words of advice from Arnold, who has dealt with many challenging and tragic events in personal life, to young women who want a career in science or engineering are, "Don't leave this wonderful, fun work just for the men."

George Smith (University of Missouri, Columbia, USA) was born in 1941 and earned his PhD in bacteriology and immunology in 1970 from Harvard University. **Sir Gregory P. Winter**, born in 1951, obtained his PhD in 1977 from MRC Laboratory of Molecular Biology, Cambridge, UK, where he is continuing his research career.

In 1985, George Smith developed an elegant method known as phage display, where a bacteriophage – a virus that infects bacteria – can be used to evolve new proteins. Bacteriophages consist of a small piece of genetic material that is encapsulated in protective proteins. When they reproduce, they inject their genetic material into bacteria and hijack their metabolism, thus bacteria producing new copies of the phage's genetic material. His idea was to put together unknown gene

fragments with the gene for one of the proteins in the phage capsule. When new phages were produced, the new proteins from the unknown gene would end up on the surface of the phage as part of the capsule protein. Using an antibody, he was then able to fish the phage he had constructed out of many phages. Gregory Winter used phage display for the directed evolution of antibodies, with the aim of producing new pharmaceuticals. The first one based on this method, adalimumab, was approved in 2002 and is used for rheumatoid arthritis, psoriasis and inflammatory bowel diseases. Since then, phage display has produced anti-bodies that can neutralise toxins, counteract autoimmune diseases and cure metastatic cancer.

The Nobel Prize in Physics 2018

The first working model of an Ammonia Maser (Microwave Amplification by Stimulated Emission of Radiation) in 1954 by Charles Townes and J.P. Gordon paved the way to the invention of the first Laser (Light Amplification by Stimulated Emission of Radiation) in 1960 by T. Maiman. Research in the field of Lasers increased exponentially in the next four decades, leading to the development of some of the most powerful lasers in the world (eg, National Ignition facility in US, Laser Mega Joule in France, Laser Gekko of Japan and several others, including India). Today, lasers are routinely used in several fields. Commercial Lasers are being used in research, medicine, surgery, industry, communication, military weapons, engineering and so on. The list is endless.

The Nobel prize in Physics in 2018 has been awarded to three scientists, all of whom have spent their life time, working in the area of lasers.

The Nobel prize announcement is quoted as follows - The Nobel Prize in Physics 2018 was awarded "for ground breaking inventions in the field of laser physics" with one half to **Arthur Ashkin** "for the optical tweezers and their application to biological systems", the other half jointly to **Gérard Mourou** and **Donna Strickland** "for their method of generating high-intensity, ultra-short optical pulses." Arthur Ashkin is the oldest recipient of the Nobel Prize while Donna Strickland is the third woman to get Nobel Prize in Physics so far.

Arthur Ashkin invented optical tweezers that grab particles, atoms, viruses and other living cells with two laser beams focused from opposite directions. This new tool allowed Ashkin to realise an old dream of science fiction – using the radiation pressure of light to move physical objects. He succeeded in getting laser light to push small particles towards the centre of the beam and to hold them there. A major breakthrough came in 1987, when Ashkin used the tweezers to capture living bacteria without harming them. He immediately began studying biological systems and optical tweezers are now widely used to investigate the machinery of life.

This technique has made it possible to develop ultra-intense laser systems with peak powers exceeding Peta watts (10^{15} Watts). These laser systems are being used to accelerate charged particles to extremely high energies and to create exotic states of matter.

Such intense lasers can now reach focused intensities of more than $10^{19} \text{ W cm}^{-2}$ at high repetition rates. These lasers are capable of producing beams of energetic electrons, protons and γ -rays. Laser-driven accelerators, in which particles are accelerated by the electric field of a plasma wave (the wakefield) driven by an intense laser. They have demonstrated accelerating electric fields of hundreds of GV m^{-1} which holds a great promise for the future development of 'table-top' particle accelerators. Collimated electron beams with a high charge with more than 100 MeV energy, have been produced in laboratory scale experiments. These compact Laser-particle accelerators are used in a wide variety of fields, ranging from medicine and biology to high-energy physics.

Nobel Prize in Physiology or Medicine 2018

The Nobel prize in Physiology or Medicine 2018 was awarded to **Dr. James P. Allison** of USA and **Dr. Tasukuhonjo** of Japan for their ground-breaking work for unleashing the body's immune system to attack cancer. This led to the design and development of a new class of drugs, which brought hope to many patients who had run out of other options.

Cancer is caused by uncontrolled proliferation of abnormal cells with a capacity to spread to healthy organs and tissues. Although many treatment modalities like surgery, chemotherapy and radiation treatment are widely used, advanced cancer treatment is still a challenge.

The pioneering work of Dr. Allison and Dr. Honjo on T-cell immune check points namely CTLA4 and PD1 respectively revealed that these act as "brakes" on the immune system. They showed that inhibition of the check points allows T-cells to effectively eradicate cancer cells. The check point inhibitors include drugs such as IPILIMUMAB, NIVOLUMAB and PEMBROZLIZUMAB. However, some of these drugs are effective only for some type of cancers like cancer of lung, kidney, bladder, head and neck, skin cancer and for Hodgkin's lymphoma. The therapy called check point therapy cause severe side effects and are very expensive costing USD.100,000 a year.

Allison and Honjo have revolutionised our understanding of how the immune system recognises tumour cells and have created a paradigm shift in clinical oncology, which will alter cancer treatment in future. Patient's own immune system will thus prove to be the most effective strategy for the final defence against advanced malignancies.

(Compiled by Dr. Dhanya Suresh, Dr. Lalitha Dhareshwar and Dr. Susan Eapen)

Krishnammal Jagannathan – A Gandhian Lady and Social Worker par Excellence

As the nation begins to celebrate Gandhiji's 150th birth anniversary this year, I was fortunate to meet Padma Shri Smt. Krishnammal Jagannathan, a ninety two year old (Born in the year 1926) Gandhian lady at her residence at Chengapattu in Kancheepuram District of Tamil Nadu on 17th December, 2018.

Following are the excerpts from my talk with her:

Born into a landless family, Smt. Krishnammal completely devoted her life to uplift the condition of the landless poor in East Thanjavur in Tamil Nadu..

Though she had obtained university level education and got a job offer to work as the inspector of schools from the government of Tamil Nadu at the age of 22, she tore the certificates and threw them in the bin when she realized that her purpose of life was lying somewhere down South in east Thanjavur.

"Dalits or Adi Dravidars as I would like to call them are the sons of soil contributing to society through their produce. The hands that get dirty while striving to fill your plate of meal were considered impure and that is the reason Dalits were ill-treated servants of their own lands," said Krishnammal adding that Thanjavur particularly had a lot of issues as at least 50 bonded labourers would work under a greedy landlord. After she met Vinoba Bhave, who she considers as her guru in life, she devoted her life to Tamil Nadu on his advice.

She not only redistributed lands with patta in the name of women, she also inculcated political empowerment by forming Gramasabhas before the legal implementation of the 73rd amendment of the Indian Constitution.

She was a student at American College in Madurai during Mahatma Gandhi's visit to Madurai. She was asked to take care of Gandhiji's needs while he was in Madurai for three days, by her mentor late Dr. Soundaram Ramachandran who was the founder of Gandhigram Kasturiba Gandhi National Trust in Tamil Nadu. (Kasturiba Trust was formed to start centres in remote rural areas, especially to train young widows and deserted women as Arogya Sevikas in these centres. Gandhiji himself was the first chairman with head office in Indore and nominated Dr. Soundaram as the agent of this Trust in Southern India).

Smt. Krishnammal met Martin Luther King when he visited Gandhigram during war resisters conference. He stayed in Gandhigram and Krishnammal took him around the nearby villages. She proudly recollected those days when she made dosas for Martin Luther King

Her husband, Shri. Sankaralingam Jagannathan (Born in the year 1912) was a freedom fighter who had given up his college studies in 1930 to join Gandhiji's non-cooperation movement. He joined the Quit India movement in 1942 and spent three and a half years in jail before India got Independence.

In 1981, the couple founded LAFTI, Land for the Tillers' Freedom. LAFTI's purpose was to bring the landlords and landless poor to the negotiating table, obtain loans to enable the landless to buy land at reasonable price and then to help them work it cooperatively, so that the loans could be repaid. After the demise of Shri. Sankaralingam Jagannathan in the year 2013, Smt. Krishnammal continues to work for LAFTI and when I had visited her on 17th December, 2018, she had just returned from the districts of Tamil Nadu affected by the Gaja Storm and was involved in rehabilitating the victims.

More about Smt. Krishnammal can be read from the following link and other google search.

<http://kalamfanclub.com/krishnammal-jagannathan-the-person-who-fought-the-british-and-poverty-at-the-same-time/>

I also met Dr. Sathya, Smt. Krishnammal's daughter, who is head of Paediatrics Department at Chengalpattu Hospital. She had her education in India, Italy and Johns Hopkins-USA and has received many awards. Both mother and daughter are role models for women who wish to contribute to the society.

Smt. Krishnammal Jagannathan, was conferred the Padma Shri by the Government of India in the year 1989. She is one of the awardees of Alternate Nobel Prize in 2009 and was nominated for Gandhian peace award in 2015. Recently, she received the Tamil Nadu government's award for Best Social Worker for the outstanding work for women in 2017.

Following are the other awards recognitions given to her.

Awards and Recognitions

- Year 2008: Awarded with Right Livelihood Award along with four others which included her husband
- Year 2008: Opus Prize by the University of Seattle
- Year 1999: Summit Foundation Award from Switzerland Government
- Year 1996: Bhagavan Mahaveer Award for propagating non-violence
- Year 1988: Jamnalal Bajaj Award

All of us truly have a lot to learn from this great Gandhian Lady.

Dr. Shyamala Bharadwaj



**Dr. Shyamala Bharadwaj
with Dr. Satya and Smt.
Krishnammal at their
residence in Chengalpattu.**



Workshop on Foldscope conducted by IWSA's Bengaluru branch at IWSA-HQ on 7th September, 2018.



Bioinformatics Workshop on RNA Seq data Analysis on 20th -23rd September, 2018.



Visit of German exchange student Ms. Kaufman to IWSA on 19th October, 2018.



Day Care children celebrated Dahi Hundi on 3rd September, 2018.



Students of Bharati Vidyapeeth Peeth College of Architecture visit IWSA's Learning Garden on 6th December, 2018.



Exhibition of the scientific art by Dr. Ipsa Jain, after her lecture on “Scientific Illustrations” Bengaluru Branch 2nd November, 2018.



Inauguration of One day Lecture Series on “Characterization of Nano Materials”. Bengaluru Branch 28th December, 2018.



Workshop on Metrology and Nano Technology. Delhi Branch 29th November, 2018



Radiation Awareness Program Kalpakkam Branch 29th September, 2018.



Project on Plastics and Environment for School Children Nellore Branch 19th November, 2018.



Workshop on “How to cope up with Hormonal Changes” Roorkee Branch 27th December, 2018.



**World Food Day Celebration,
Nagpur Branch,
26th October, 2018**



**Rally held on AIDS Awareness Day
by Kolhapur Branch,
1st December, 2018.**

To

From

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