



IWSA NEWSLETTER

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BRANCHES

Roorkee 1979 . Hyderabad 1979 . Pune 1980 . Nagpur 1982 . Kolhapur 1982
Delhi 1987 . Kalpakkam 1987 . Baroda 1988 . Lucknow 1997. Amravati 2010



Delhi branch organised lecture by
Dr Krishan Lal, President
Indian National Science Academy



Ms. Varsha Bhagat, Director, ETC, NMMC
Inaugurating Nursery Teacher's training course



Greetings and mementos presented to
Dr. Sindhu Joshi & Dr. Sudha Padhye



"Dahi handi" celebration



Raksha bandhan

From the Editor's Desk

The year has gone by and taking stock of happenings during this time is the norm. This issue covers the events managed by IWSA from May to December. That includes programs and various activities in the field of science education, running of Nursery school and training of teachers, holding lectures by scientists in colleges, environment awareness initiative and events attended by IWSA representatives.

Two of our Founder members, Dr. Sudha Padhye and Dr. Sindhu Joshi have entered the 81st year of their life and a small get together was arranged at IWSA to honour them. Ms. Anita Patil (BARC Hospital) conducted an interview session with them, which has been included in this issue for all the members to know how their compassion for fellow Women scientists led to the inception of IWSA.

Nine lectures were arranged in five different colleges across Mumbai. Dr. Rita Mukhopadhyaya gave two talks one on "DNA fingerprinting" and the other on "Junk DNA to Dark matter." These lectures accentuated the importance of Genome studies which hold so much potential in understanding the functioning of an organism.

This year Dr. Ewan Birney, a lead coordinator for the ENCODE project, which conducted a detailed analysis of Human genome have shown that 'the human genome is simply alive with switches, turning our genes on and off and controlling when and where proteins are produced'. Thus a much larger chunk of the genome turns out to be biologically active than previously predicted.

A genome six times the size of human's was sequenced this year, that of common bread (or Roti) wheat. It is likely to lead to many answers. Also Tomato genome sequencing has led to insights into evolution of colour of the fruit and fleshy nature which in future may lead to tastier and flavourful varieties.

The year saw many landmark achievements in science like the fundamental discovery of the Higg's Boson, which if proven could lead to the understanding of why all other particles have mass and shed light about our universe. In another landmark achievement a consortium of 80 research institutes, with 200 scientists have identified the sequence of thousands of microorganisms that reside on or

inside of humans. Researchers involved in this Human Microbiome Project (HMP) feel this will shed light on the nature of the role these bacteria and viruses play in maintaining health and how disturbance in this ecosystem can lead to disease.

The Nobels are the most prestigious prizes in the science world. In the field of medicine scientists have come closer to the understanding of how stem cells develop. Two scientists, from east and west and separated by a generation, demonstrated that adult cells can be changed to stem cells, raising the possibility of creating replacement tissue for people affected by crippling and degenerative diseases. By reprogramming human cells, scientists can now study diseases and develop methods for diagnosis and therapy. Ironically though, one of the recipients of this year's medicine prize, Prof John Gurdon's scientific ambition at school was branded "a waste of time" by his Biology teacher!

At IWSA we try to spread the message of environmental conservation by holding 'eco-friendly' activities. Holding a workshop for making Ganesh idols from eco-friendly materials was one such attempt. This year an estimate of global sea-level rise from melting ice at the poles showed that over the past two decades, it has added 11mm to global sea levels.

A towering figure in spaceflight, Neil Armstrong, the first man on the Moon (20 July 1969) passed away this year. His words after touching down on the lunar surface "one small step for a man, one giant leap for mankind" will live on. We at IWSA hope to continue our baby steps towards the overall goal towards science education and awareness for betterment of society.

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CONTENTS

From the Editor's Desk.....	1
President's message.....	2-3
News Reports from Head Office:	
Popular Science Lectures.....	3-4
Ecofriendly Ganesh workshop.....	4-5
New IT program.....	5
Techshiksha	6
Workshop for pre-primary teachers...6	
Seminar on "Latest Trends and Research in Early childhood".....	6
Excerpts of the interview of Dr. Sindhu Joshi & Dr. Sudha Padhye.....	6-9
Iwsa attended events.....	9
Nursery School Education Committee Report.....	9-10
News Report from Delhi Branch.....	10

Awards

INSA Award.....	10
DAE Awards.....	10-12
Nobel Prize.....	15-17

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President's message



Dr. Susan Eapen
President, IWSA

Dear Friends

Indian Women Scientists' Association (IWSA) is completing four decades since its inception and it is essential to take stock of our achievements. IWSA's objectives are to take science to the masses, inculcating scientific temper, creating a platform for women in science and to encourage more women to take up science. In the past decades, IWSA has taken giant leaps towards achieving these objectives. We have a headquarter building at Vashi, Navi Mumbai – a base from where we operate and it is high time that the ten branches also build their own premises in their own respective cities/towns. We have to design new programs to suit the changing life styles.

This year, IWSA is conducting a large number of workshops in the field of education – such as special training for pre-primary teachers, science nurture program for school children, popular science lecture in different colleges of Mumbai and Navi Mumbai, the Tech Shiksha science workshop on Sundays and National Academies' 14 days Refresher course for college teachers at post graduate level on "Advances in Plant and Animal Biotechnology". Our branches also have not lagged behind in conducting programs related to popularization of science among students. I take this opportunity to congratulate all the branches and urge them to spread their field of work to include teachers and common citizens. The visibility of IWSA has increased; it has spread its wings and illuminated the young innovative minds.

Science and Technology have contributed immensely towards the progress and well being of human kind in every possible way.

The discovery of the “Higgs boson” or “God particle” this year has become viral in media. The particle will provide mass and energy to the other sub atomic particles, thus answering the question as to how they achieved mass. Developments in the field of regenerative medicine and cell therapy give the hope of enhancing life span. Successes in discovery and clinical trials have to be translated into applications to improve human life. In our attempt to improve human life, we cannot afford to ignore the biodiversity which is dwindling and environment which is getting degraded. It is rightly said that if humans are not there on Earth, all the other species will flourish. Hence, when we work on advanced technologies, we should not ignore our plants, animals, micro-organisms and environment.

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IWSA News

News from Head Quarters

Popular Science – lecture programme

Board of Research in Nuclear Sciences (BRNS) supported activity for holding Popular Science lectures on biology and chemistry for college

On January 1st 2013, the pollution reduction commitments that the nations made as a part of Kyoto protocol will expire, thus leaving the planet Earth without any international climate regulation. The world body has to make a new international treaty for climate control. We on our part have to resolve ourselves to improve our record in conservation of ecological balance and avoid disastrous consequences by creating awareness on this subject.

I wish all of you success in your respective careers and urge you to find time to take scientific knowledge from laboratory to the country’s young and impressive minds, thereby kindling a fresh spark in scientific temperament among the youth in this country.

Susan Eapen

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students was conducted in different colleges in Mumbai and Navi Mumbai.

1. 9th August 2012

Dr. Rita Mulherkar, Senior Scientist of ACTREC, Navi Mumbai spoke on “Gene Therapy: A novel modality of treatment of cancer” at Padmashree Dr. D.Y. Patil University, Navi Mumbai. She spoke on how gene therapy can be used for treatment of cancer. The talk generated a lot of interest in the vast audience of students, lecturers and doctors. A large number of students from Karmveer Bhaurao Patil College also attended the lecture. Dr. Susan Eapen, President IWSA spoke on the various activities of IWSA, especially its efforts to develop scientific temper among students. The Vice Chancellor of Padmashree D.Y. Patil University, Dr. James Thomas, Dr. Jayshree Nadkarni (IWSA, Chairperson, Board of Trustees & Adjunct Professor D.Y. Patil University), Dr. Shubada Nayak (IWSA) and Dr. Asha Damodaran (IWSA) were present in the meeting. There was an active discussion, followed by refreshments. The programme was compered by Dr. Sunita Singh and vote of thanks was proposed by Dr. Arpita Gupta.

2. 1st September, 2012

Two popular science lectures were held at Sophia College for Women, Bhulabhai Desai Road, Mumbai by two senior scientists from BARC, Dr. Dimple Dutta and Dr. Rita Mukhopadhaya. The lectures were well received by students from chemistry and life sciences department and their

staff. Dr. Datta spoke on "Sonochemistry", which sparked a lot of interest in the audience. Dr. Mukhopadhaya spoke on "DNA finger printing" The subject of DNA fingerprinting was narrated through real life stories of genetic evidence produced in court of law in our country that assisted in pronouncing verdicts for famous cases in recent times. The international standards for establishing such DNA fingerprint data from victim and suspect's genetic material using CODIS markers was explained. Importance of studying polymorphic DNA markers with respect to humans, flora and fauna of geographical regions was also mentioned. Present status of our countries' DNA fingerprint compliant forensic research was discussed in the presentation. The talk generated lot of interest in this field of modern biology among the students, after which was followed by refreshments.

3. 8th September, 2012

Dr. S.F. D'Souza, Associate Director, BMG, BARC delivered a talk on "Radiation Technology in Agriculture" at Ramnarain Ruia College, Matunga (East), Mumbai. After the welcome address, Dr. Susan Eapen, President IWSA spoke about the various activities of IWSA and its efforts to reach out to students through popular science lectures funded by BRNS. A large number of students, research scholars and teachers participated in the programme and took part in the active discussion which was followed by tea. The talk could reach out to the students and they were motivated to take up scientific research. Dr. Behnaz Patel organized the programme at Ruia college.

4. 16th September, 2012

Dr. J.S. Melo of NABTD, BARC spoke on "Tailoring enzymes and cells for applications in Biotechnology" at SIES, Graduate School of Technology, Nerul (East), Navi Mumbai. Dr. Susan Eapen narrated the different activities of IWSA. The talk by Dr. Melo was followed by an active question answer session and students actively participated in the discussion. This was followed by tea.

5. 26th November, 2012

Dr. Dimple Datta, BARC delivered a popular science lecture on "Sonochemistry: An overview" in SIES college of Science and Arts, Sion, Mumbai. Dr. Susan Eapen, President IWSA spoke about the various activities of IWSA and its

efforts to reach out to young minds and urged the students to concentrate on scientific research. Dr. Srirupa Mukherjee proposed the vote of thanks. About 150 students participated in the programme, which was followed by refreshments.

6. 3rd December 2012

A popular science lecture titled 'Junk to Dark Matter: Story of repeated sequences in the Human Genome' was delivered by Dr Rita Mukhopadhyaya, Secretary IWSA, and Senior Scientist at the Molecular Biology Division, BARC, Mumbai. The lecture was arranged at the AV auditorium of Wilson College, at 10.30am. The audience comprised of post and undergraduate students from Zoology, Botany and Biotech departments and their faculties. The program began with an inaugural song presented by the student's band. Ms. Neha Elizabeth Koshy welcomed the gathering. Reference of holding on to the truth in the lyrics of the song made perfect beginning to the talk about the truth of DNA sequences in the lecture. Students and faculty enjoyed the interactive questionnaire session after the one hour talk. Dr Susan Eapen gave the introduction of IWSA and narrated the various facilities housed at Head quarters in Vashi. Dr Srirupa Mukherji gave the vote of thanks. A small video on "AIDS" was also shown. There was tea and refreshments after the talk.

7. 15th December, 2012

Two lectures were held at K.J. Somaiya College, Mumbai. The speakers were Dr. Celin Acharya, BARC who spoke on "Uranium bio-remediation" and Dr. S.F. D'Souza, Associate Director, BMG, BARC who spoke on "Increasing Agriculture Productivity using radiations". Dr. Kamal Marollia, HOD of Somaiya college organized the programme.

Activities conducted by IWSA

Eco- Friendly Ganesh Workshop

IWSA conducted a workshop on Eco Friendly Ganpati on 17th September 2012 from 2 to 5 pm at IWSA's ICICI Multi purpose hall, Vashi.

The workshop highlighted the use of clay, paper (origami) and paper pulp for making the Ganesh idol. "Use of these eco friendly biodegradable materials, help in avoiding the threat to aquatic flora & fauna. Plaster of Paris (POP), generally

used for making the idols, releases toxic metals in the aquatic system where the idols get immersed. These metals in turn, form organometallic complexes, which enter the food chain and lead to bioaccumulation having adverse effect on humans" said Dr. Sudha Rao, Vice president, IWSA.

Eco Friendly Clay Ganesh, disintegrates immediately on immersion, forms sediment which can be used for potting plants. Through this workshop the participants were made aware of the ecological harm caused by POP idols. They were urged to use small idols made of eco-friendly materials such as clay or paper pulp and painted with natural colours. Use of fresh flowers/leaves was encouraged for decoration, instead of thermocol and plastic.

IWSA's policy of Go Green is:

RECYCLE - Use Clay or Paper pulp

REUSE - Use CRYSTAL/WOODEN/BRASS IDOL

REDUCE – Size of the idol

REFUSE- Use of plastic/thermocol/loud music.

This workshop was conducted mainly to create an awareness of the advantages of making and using Eco Friendly Ganpati. It is very important to help, save and preserve our environment for future generations.

The workshop was open to the IWSA Members, IWSA Teacher trainees and general public from various fields, school students, young and old. There were about 100 people who attended the workshop.

Ms. Sunanda Nevase, Ms. Gargi Lagu, Ms. Vaishali Patil, Ms. Snehalata Bhavsar, Ms. Shaheena Shaikh, Ms. Ruchi Sood and Ms. Manisha Chand served as resource persons to teach how to make clay, paper mash & origami ganesh idols.

New IT Programme: "Developing Teachers for Excellence" by IWSA

In today's Digital era, computer literacy is a must for everybody, especially teachers. Need of the hour is to bring more interactivity, innovativeness and variety in teaching methodology.

With the objective of empowering teachers and increasing their creativity, IT Training Programme has been conducted by IWSA's Satish Haware Computer Education

Centre during 23rd July to 30th July 2012 by highly qualified computer teachers/experts.

The valedictory function for the workshop was held on 10th August 2012. Dr. Sunita Mahajan, Principal, MET's Institute of Computer Science was the Chief Guest for the function. She distributed the certificates to the students and address to the students regarding the importance of computer education.

The practical workshop "Developing teachers for Excellence" was highly appreciated during the feedback session from the participants, namely Mrs. Vini Ajay and Mrs. Pratibha Dongre. Hands on experience made them more confident in handling internet and its many functions for their lesson planning and increasing the creativity.

Various IT Skills such as online collaboration, Network knowledge, Advanced Word Processing, Spreadsheet skills, effective utilization of information from Internet and Best Practices were some of the areas covered in the workshop.

IWSA's Satish Haware Computer Education Centre has launched various new short term IT Packages especially designed for Homemakers, Self Employed Individuals, Senior Citizens, Teachers and students. For more information please contact IWSA, 9833825048/27897357/ 27661806.

IWSA-Techshiksha Science Club programme

Indian Women Scientists' Association in collaboration with Tech Shiksha conducted a series of Sunday Science workshop for school students of (6th, 7th & 8th Standard) Mumbai and Navi Mumbai at IWSA, Head quarters, Vashi. The objective was to encourage young scientist and innovator inside young children. The following workshops & science programmes were conducted.

1. Water Rocket
2. Hot Air Balloon
3. Astrophysics – Inclinator
4. Electromagnetism - - Build a Telegraph.
5. Basic Physics - Build a Robotic Arm, Build a Catapult
6. Aero - Build a Glider, Fly it High, in the sky, Fly a Hot Air Balloon, Build a Parachute.

Workshop for pre-primary teachers on “Low cost teaching aids & Teaching skills” on 24-25 November, 2012

‘Aarambh’ working in Turbhe Stores area with underprivileged children, ARWA an NGO having a ‘Day Care Center’ for about 120 children in Anushakti Nagar and ‘Streemukti Sanghatana’ having *Balwadis* for rag picker’s children, had nominated their teachers & staff members.

Four sessions were conducted. In the first session participants made puppets with used water bottles, empty cartons, brown paper bags, oil cans & paper plates.

Second session concentrated on Origami. They were taught to make pencil, tumbling toy, helicopter & other interesting teaching aids which can be used to create interest in children. Third session was on how to tell stories and how to teach action songs. They were taught how to make a story by cutting pictures from old magazine. They were also trained for making ‘age appropriate’ teaching aids according to their learning capacity, like old CDS as mobiles, used X ray sheets as worksheets, Mithai boxes as lacing patterns, picture talks, flash cards, kits for developing sensory organs using old rags. In the fourth session all the participants presented Puppet shows, stories on two themes: Ganesh & Diwali festival and showed their creativity using low cost material. The ‘hands on’ experience was appreciated by all the participants & they promised that they will practice the knowledge acquired to help attain overall development of children.

Ms. Shaheena Shaikh, Snehalata Bhavsar & IWSA’s trainees took special efforts to make the workshop successful & enjoyable.

Early Childhood Education (ECA) in collaboration with IWSA organized a seminar on “Latest Trends and Research in Early Childhood” on 1st Dec, 2012.

Ms. Asha Varma, coordinator from Children’s academy group of schools narrated how teacher’s training helps in effective handling of toddlers. She discussed dos and don’t in teaching skills to be used by teachers in order to support Early Childhood settings.

Prof. Rita Sonavat Dean, Dept. Human Development S.N.D.T. Women’s University talked extensively on parent’s involvement in pre-

school set-up. Parents and teachers should work together for holistic development of pre-school children since these are formative years.

Ms. Swati Popat, Director of Podar Institute of Education and President of ECA, India discussed in a very lucid manner how to plan a curriculum which is brain based and sustain the quality in pre-schools.

Dr. Kamini Rege, Nirmala Niketan College of Home Science reviewed the types of teaching aids, specially low cost, simple and its importance in Early Childhood Education,

There was a very good response from Navi Mumbai Pre-school teachers, about 85 teachers participated.

Excerpts of the interview of Dr. Sindhu Joshi & Dr. Sudha Padhye taken by Ms. Anita Patil (AP) from BARC Hospital

Q. The conceptual formation of IWSA took place in 1972, what were the aims & objectives?

A-Dr. Joshi -Dr. Kamal Randive, Dr. Shantu Gurnani & Dr. Shanta Gandhi were good friends. They had observed that many women were taking up the subject of science and were deciding to have a career in science. They thought it was time to have a professional body which can bring these women’s intelligence together and which can take up issues relating to them. Dr. Randive felt that being educated, in the field of science is a blessing for a woman. But although it’s a privilege, we should not just sit on an ivory tower of research in the laboratories, but use our knowledge for the benefit of women who are less privileged. Dr. Randive was a person of enthusiasm with a lot of ideas. She thought of bringing women from all disciplines of science, from different institutes together, so that their knowledge can be passed on. So when I was asked to join this organization I immediately said yes.

AP - Dr. Padhye would you like to add something

Dr. Padhye said “In 1971 I read a Marathi magazine in which I read an article by Dr. Sumati Bhide. She had written that she along with other colleagues would form an organization called *Vidnyan Bharati* for the spread of science. Since I knew that she lived close to my residence I thought let me go and meet her. During that time

my sister had come from London and she had voiced her ideas on how girls can take up science and allied subject. This gave me a push to go and meet Dr. Bhide. I was teaching Applied Physics in Nirmala Niketan College of Home Science at the time. I met Dr. Bhide and our friendship clicked in just one meeting. Dr. Sumati said that she would definitely come back to me when her ideas crystallized. Myself, Dr. Sumati Bhide, Dr. Randive & Dr. Shantu Gurnani, we all came together. We used to have brain storming session every month in each others' house and discuss what should be our objective, aims and how to go about it. We were all novices in founding an NGO. Our aim was taking science to masses. It took almost a year or so to do it. From my experience our friends, colleagues kept a distance from pure science like mathematics & physics. Most women chose biology over pure sciences. I firmly believe that you have to entice girls to study science.

Another objective was to encourage women who are already in science, to excel in their profession; become role models. Also to know what hurdles they were facing. Unfortunately because of this many women did not join in. At work place women were not given importance & responsibilities. The common perception was that women are already burdened with a lot of responsibilities at work and home. So we thought of doing something to reduce this burden on working women. We thought of ways in which women can be helped. Hence the idea of working women's hostel, a crèche etc. emerged. Slowly starting a nursery school for their children and later a computer training programme for needy women to help them learn how to work with computers was thought of. So there were the main 3-4 objectives of starting IWSA".

Q. During this journey from conception to actually starting as a NGO, working in one room at Indian Gymkhana to finally shifting to one's own building, you must have had varied experiences. Would you share a pleasant experience?

Dr. Joshi-"As Sudha said that we came together and began working on our idea. We used to meet at Cancer Research Institute (CRI), in Dr. Bhide's office or Dr. Randive's office on Saturday afternoon. Then we got a small room at Indian Gymkhana where we had no assistance. We had

to do everything ourselves, right from typing the notices, distributing them etc. Then we started feeling that we must have a place of our own, where we can have our own projects. None of us had experience of constructing a building. Sudha was very keen on that. Then in 1981 in the first Women's International Conference, we collected good amount of money. The conference earned name and fame too! It was inaugurated by the Late Prime Minister Mrs. Indira Gandhi, and many other ministers. We felt monetarily secure. Then we came across this fascinating news that the Government would bear 75% of the construction cost if an NGO wanted to build a working women's hostel that would encourage women to study & take up careers even away from their home. When I discussed it at IWSA, the reaction was why working women's hostel, this is not the objective of IWSA! But I felt that if we want women to take up science and also build their career then they need the facilities for it. So hostel is important. Then it was felt that it should be for working women scientists alone. I said that if you go to any government organization for help they will raise an objection. Secondly operating from Indian Gymkhana was becoming difficult day by day and we required a place of our own. If we built a hostel, then we could have our office there. We had lot of discussion, for & against, and finally we formed a building committee. I had the privilege to work as a head of that committee.

I could carry out the work only because of the constant support of two of my friends both not scientists. Mrs. Vidya Randive was a solicitor and Mrs. Saroj Apte who was BA, offered their help and I insisted that these women from other fields can also contribute. We could make them Associate members and Conveners of committees, but they cannot be in the Managing committee. Mrs. Vidya Randive helped us in making the bylaws. Another friend Pushpa Sanghavi a lawyer herself consulted her husband who was an expert in 'Constitutional law' and then the bylaws were formed". Once formed, our bylaws became very important as they were taken into consideration at the formation of "Third World Organization of Women in Science" of which IWSA has a membership. I was in that committee from 1978 to 1983 and find it creditable to have by laws like ours. Thanks to the team who made them, it served as a model for all the underdeveloped countries in the world.

Sudha said "About the plot, we- me, Sunita and Vidya used to go from pillar to post searching for the plot, those days. I used to drive, so I would joke, I can be a good taxi driver. We had varied experience during this hunt. But we were clear that we are not asking money for ourselves it was for the organization. During one casual conversation Sumati mentioned that Shradhanand Mahilashram had bought a plot at Navi Mumbai and they had given it back so we decided to go to CIDCO office. The MD of CIDCO, Mr. Mohani who was PS to Mr. Antulay, the then CM, instantly recognized us, as we had gone to him when Smt. Indira Gandhi came to inaugurate our conference. Another senior IAS officer Mr. Afzalpurkar had suggested we go to Navi Mumbai as the premiums were very high in south Mumbai. So it just worked and things fell in its place.

Now we had the plot and Dr. Vidya Randive, Ms. Sunila Mathur & Dr. Sudha Padhye they roamed from trust to trust and found out how much funds were available. We collected money and first built working women's hostel. It was inaugurated by none other than Mother Teresa, and it was a proud moment for us. We had bought a brick movement tickets in different denomination and collected money from small donors. In first phase we had hostel and office. Then we got a grant from ICICI and we could think of expansion. It was very important that we got a standing in DST, and other government organization. During this process we had many meetings, we had discussions among all the members, many times we openly disagreed, but the issue was resolved then and there. It was not carried forward. The friendship was nurtured and sustained and we proved that women can come together, work together and think for a common cause to do some concrete work for less privileged class who need it. And it is my wish that IWSA emerges as a strong organization".

Q. Starting an organization can be one thing but sustaining the motivation and carrying out the mission with perseverance is not easy. How did you all do it?

For undertaking any work there are two processes. One is a thought process. A woman is basically understanding in nature and when she wants to do something she will take everything into consideration. And when woman who is

trained in science undertakes any work, she thinks about why it is done, how it is done, the purpose it serves and how best it can be done? Secondly she is compassionate while interacting within a group, so she also thinks of how others feel about the agenda. If our interest goes hand in hand with everybody's interest then we don't get tired or fed up. We don't miss meetings since we take up certain work willingly, and give our own contribution by finding out ways by which it can be achieved best.

So when you want to have an active group with the initiative to expand work, we should be able to attract other people having similar initiative but very different interest (not vested interest!). Apart from their own individuality they should think of themselves as a contributory factor to the organization, they must think of ways by which their experience can help the organization grow further.

In many forums I used to come across graduate women who used to say that we are just housewives. I used to say that don't say I am just a housewife, because you are doing so many things. Apart from managing a house and job, you are teaching your children, you go to school for your children. And in our country all women do study science up to 10th standard and only some women pursue science after that. So I felt women can contribute in many ways in whatever expertise they have. It is alright to be a member of *Bhagini Mandal* to have an outlet for oneself and to propagate cultural activity. But do something for the betterment of the lot from low income group. Scholarships for girls by IWSA are given mainly to encourage them to study, and develop whatever talent they have. You can give talks for popularizing science, and write an article for the same purpose. Even if you are not practicing science, this can be done. This was my way to keep the women motivated.

Secondly during those days with the collaboration of SNDT Women's University I had a project to find out how many women are postgraduates in science from Mumbai University and how many of these are pursuing their career in science. I understood that there were many reasons for women not to pursue career e.g. their husbands getting transferred, children being young and no help at home. That was a trigger. So wanting to bring them together was a motivating factor. Even women who are career

oriented were brought in to explain what career they were doing in a simple language.

Q. Even with scientific thinking, logical thinking and rational thinking one can have compassion?

I have always lectured my colleagues that when one becomes over emotional then one cannot think rationally. One should think from other's perspective also. I have nothing against anyone. We have to give adequate returns to a person who works for an organization. What we have to do is to treat our organization as a training ground to give them opportunity to go out and work, they can make use of the training we have given them.

One can undertake any work. But compassion alone would not work. What can be useful is hard work and also monetary support. It has to be planned properly, so that the money, energy and efforts are used properly for the benefit of society within the societal norm. Sometimes it has to be done even against societal norms as women have suffered a lot on that account. So only when compassion is implemented properly it becomes meaningful.

Q. How did you balance home and career and yet do so many things?

All of us have heard from most of the working women that they could not have risen to the position they have if they did not have the co-operation of their family, husband, mother-in-law and children in that order. So of course I enjoyed their support too. But I was interested in so many activities social, science etc. that sometimes I did feel guilty about whether I was neglecting my family. My husband used to be busy from 7.30 am to 11 pm. So I thought that it was my duty to be with my children and mother in law.

This is a question asked to every working woman and rarely have I come across woman who never felt guilty. But women are getting more and more opportunities and they are becoming mentally strong also and they know the value of what they do and what they can achieve. Their targets, goals are very high. And the responsibilities of children, husband who is also competitive and elderly people at home can be a problem. Mother is a mother, and when she has her career a tussle is always going in her mind. Children have some delicate moments

when they need their mother, sometimes even a husband may need her support. So a working woman has to say that hers is a triple powered engine. And if she has to please all and please herself and not feel guilty then she has to find out how to do it. And be happy without carrying guilt. I think women can do it. A very loving and considerate approach can solve a lot of problems. Even if there is modest support from the family should be alright. There was a time when women would give up work after marriage or after child birth. Those days women would join back after 2-3 years after child birth. Now that so many women are educated and having to deal on so many fronts can lead to a chaos in our minds. But we know we can do it."

IWSA participated in following events

1. IMC-LW programmes "Style workshop with Priya Tanna, Editors – Vogue India
Dr. Susan Eapen, President IWSA was invited to attend a few programme conducted by Ladies Wing, Indian Merchants' Chamber. She attended a "Style Workshop with Priya Tanna, Editor – Vogue India on November, 2012 at Walchand Hall, IMC, Churchgate. The interactive – chat session on fashion and glamour with Priya Tanna was interesting. Her 4 assistants displayed dresses and accessories along with an audio visual to give a 'hands on' approach. Ms. Tanna stated that women's clothes had a powerful connection to their emotion and could add to their confidence. 'Right accessories enhance one's personality" she said .
2. Workshop on "Emancipation of women: Myth or Reality" 29th November, 2012
Dr. Susan Eapen, President IWSA attended this workshop on conducted by IMC-LW. Mr. Kabir Bedi, Bachi Karkaria and Dolly Thakkur were the panelist and moderator was Mr. Arvind Inamdar.
3. Dr. Susan Eapen was invited by Confederation of Indian Industry (CII) to deliver a talk on "Unusual careers: unusual women" at St. Xavier's College, Mumbai on 13th December, 2012.

Report by Nursery School Education Committee

Committee is proud to announce 100% results of TOT for the year 2011-12 (16th batch). The result

was declared on 18th May, 2012. Total 23 students had appeared for the exam, 12 trainees passed with 'A+' grade, 09 trainees with 'A' Grade and 2 with 'B' Grade.



Ms. Bhat Aditi Satyesh (85.33%)
First rank, English medium



Ms. Iyer Meenakshi Ravichandran
(85.33%)
First Rank English medium



Ms. Jadhav Ashwini Popat (79.73%)
First rank-Marathi medium

Inauguration of Diploma in Nursery/Creche teachers Training Course 17th batch (2012-13)

Inauguration of 17th batch (2012-2013) of Diploma in Nursery/Creche teachers Training Course was held on Monday, 18th June at IWSA's "ICICI" Multipurpose Hall. Chief Guest for the inauguration was Ms. Varsha Bhagat, Director, ETC, NMMC. Regular classes started from 19th June 2012. There are 16 kids in Nursery School & 20 students instead of 22 students in TOT. Upcoming programmes are as follows:

2nd Nov.: Story Telling Competition was organized. The prizes were given to:
1st prize: Ms. Debjani (flying machine)
2nd prize: Ms. Vini Ajay (The strongest Animal)
3rd Prize: Ms. Monika Sharma (naughty Barney),
Consolation prize: Ms. Shruti Mamamia (Thirsty Crow).

19th Nov.: Book Review Competition was organized by IWSA Library Committee. The prizes were given to:
1st prize Ms. Pratibha, 2nd prize was given to Ms. Monika and 3rd prize was given to Harsha.

26th Nov.: Nutrition competition was organised. The topic for the competition was "Desert – Sweet Dish for Toddlers. The Prizes were given to:

1st prize: Shivali (Ragi Barfi),
2nd prize: Ms. Shraddha (Coconut dream Delight),
3rd prize: Baked yoghurt .

News from IWSA Branches

Delhi Branch

Two lectures were organised at Delhi Branch.

1. In June 2012 a Lecture by Dr Ranjana Mehrotra, Senior Principal Scientist NPL, was organised. She spoke on "Cancer and Spectroscopy". The lecture provided insight into the technical aspects of diagnosis of various types of cancers. The information given was well received by the audience.



2. This year's Veena Memorial Lecture in continuation of our lecture series in memory of Mrs Veena Roonval, our ex-colleague in the Dimensional Metrology section of the Standards Division of National Physical Laboratory was organised on 3rd August 2012. The speaker was Dr Krishan Lal, President Indian National Science Academy and former Director, NPL spoke on "World of Crystals: Fundamental understanding to Applications. " He took the audience on a journey into the sparkling interior of crystals and their significant applications in today's high tech world. It was highly intriguing to the audience.

S. Mehtani

National Conference on Women Entrepreneurship through Science and Technology (WESAT 2012)

A three day National Conference on Women Entrepreneurship through Science and Technology was organized by Pratibha Shakti, Vidarbha Unit of Shakti at Nagpur during 31st August – 2nd September 2012. The conference was well attended by eminent speakers from various fields like science, engineering, technology, health (including Ayurveda, Yoga, Medical, Pharma etc.), handicraft, food technology, marketing, finance and many more. The conference was sponsored by CSIR and co organized by Maharshi Karve Stree Shikshan Sanstha.

Smt Sharayu Deshmukh, Founder of Delta Finochem, Nashik inaugurated the conference and the Vice Chancellor of Nagpur University delivered Presidential address. The key note address was delivered by Smt. Smita S. Mule, Principal AKRUTI Coordinator, Technology Transfer & Co-ordination Division, Bhabha Atomic Research Centre, who is also an IWSA life member. The Mayor of Nagpur and many other eminent personalities were on the dais.

Plenary sessions were arranged on the focal theme, Innovations for society. Padmashree Dr. Bhatkar, the architect of India's first super computer and founder director of C-DAC, Dr. Vijay Mallik, senior scientist from Bureau of Indian Standards, Dr. Bhaskarachari, senior scientist from National Institute for Nutrition, Central Council of Research in Ayurveda and Sidha and senior scientists from several other national institutes also delivered talks. On 2nd Sep 2012, Smt. Mule delivered detailed presentation on AKRUTI program of BARC, Advanced technologies developed by BARC for societal use especially in rural areas. She concluded by depicting "Cillage" – BARC-DAE Concept, for creating ideal work-living environment or city in a group of villages, wherein the best of city i.e., technology access & work opportunities shall exist like city and the best of villages i.e., pristine & ecofriendly ambience of village is retained.

Shakti, the organization that arranged this event, is a national movement for women inspired by Vijnana Bharti, with a commitment for empowerment of women through Science

and Technology at social, cultural, economical and intellectual level so that their inherent managerial skills are polished and they become the backbone of developing India. More details on the conference and on Shakti are available from the following sites:

<http://www.shaktibharath.org>; <http://wesat.org>; <http://wesat.org/media.htm>

AWARDS IN SCIENCE 2012

INSA Medal for Young Scientists (2012) – Dr. Pinky Agarwal



Dr Pinky Agarwal, who is currently a Staff Scientist at the National Institute of Plant Genome Research, New Delhi, has been selected for the INSA Medal for Young Scientists (2012), in recognition of her outstanding work on "Transcriptome Analysis During Rice Seed Development In Indica Rice And Characterization Of Seed-Preferential Genes/Promoters In Transgenic Systems".

Having a keen interest to explore the unknown, she always wanted to be a scientist. She received her B. Sc. Degree in Botany (Hon.) from Gargi College, Delhi University in 2001 and M. Sc. Degree from the Department of Plant Molecular Biology (PMB), Delhi University in 2003. She carried out her Ph. D work at the same department (PMB), under the guidance of Prof. Akhilesh K. Tyagi, in which she studied the transcriptome involved in the control of seed development in rice plant. Rice is the staple food of over 50% of the world's population and making it more nutritious could be one way to contribute back to the society. Since the edible part of rice is the seed/grain, the elucidation of the molecular aspects of seed development becomes important in order to manipulate the grain for betterment of its nutritional aspects. Moreover, the grain can be used for bulk production of desired proteins of medicinal/research/nutritional/commercial value. Her current research interests revolve around the above theme.

Her work has been published in reputed international journals of high impact factors and has been cited well, with a total citation of 397. In addition she has also co-authored three book chapters, published by national and international publishers. She also holds a patent titled: 'Nucleic

acid sequences from rice involved in seed development and uses thereof, along with Dr. Akhilesh K. Tyagi, and Dr. Sanjay Kapoor. Part of her work on C₂H₂ gene family has been submitted to "Rice Genome Annotation Project" of TIGR/JCVI (The Institute for Genome Research/James Craig Venter Institute), available online at : http://rice.plantbiology.msu.edu/ca/gene_fams/35_120.shtml and Microarray data files of rice seed development and young root are deposited in NCBI's GEO datasets with the series ID GSE6893.

In addition to her academic achievements, she has been actively involved in several extra-curricular activities, had been the president of Gargi College Botanical Society and also was awarded first prize for designing the logo of 'Gargi's Prakriti Vahini', an environmental society of Gargi College, New Delhi.

Along with Dr. Pinky Agarwal, two more young women scientists, **Dr Moushami Mallik**, presently a Humboldt Research Fellow in Max Planck Institute for Molecular Biomedicine, and **Dr (Mrs) Supriya Tiwari**, from Department of Botany, S.S.S.V.S. Government PG College, Chunar, Mirzapur (U.P.) were also awarded the prestigious INSA YOUNG SCIENTIST MEDAL this year (2012). Dr. Mallik has been recognized for her for outstanding work on the role of non coding *hsrw* RNA in *Drosophila melanogaster*, which shows the multiple regulatory functions of *hsrw* and Dr. Tiwari for demonstrating the impact of Tropospheric Ozone on vegetable crops and developing ameliorative solutions to minimize ozone injury in plants.

DAE Awards for Excellence in Science, Engineering & Technology 2011

Department of Atomic Energy has announced the awards for excellence in Science, Engineering and Technology for the year 2011. The contribution to the department's program from the group of women scientists and engineers is significant, which is reflected in the number of awards received by them, as listed below.

Homi Bhabha Science and Technology award



Dr. Archana Sharma from Accelerator and Pulsed Power Division received the prestigious

Homi Bhabha Science and Technology award for her excellent contributions for "Technology development in the Pulsed Power Electron Accelerator programme and its utilization for compact high power microwave sources for strategic applications". Her major contributions include in the design and development of a 1.5MV, 25kJ Marx generator used in KALI-5000 accelerator, one kilo Joule Marx based repetitive High Power Microwave (HPM) generator, and Linear Induction Accelerator (LIA). Her contributions accelerated and enhanced the pulse power programme for strategic applications in the department of Atomic Energy. Dr. Archana Sharma is a member of the Editorial team of IWSA.

Group Achievement Awards

Dr.(Smt.) Savita Kulkarni from RMC (Radiation Medicine Centre), BARC, received an award as the leader of the group from RMC & BRIT (Board



of Radiation and Isotope Technology) that developed a Polymerase Chain Reaction Kit specifically designed for the detection of clinical isolates of *M. tuberculosis* seen in Indian patients. This kit is a landmark

achievement in the Indian context, where the diagnosis of Tuberculosis is done using imported kits that are not adequately validated for Indian patients.

Dr. (Smt.) R. Vanaja from Board of Radiation and Isotope Technology (BRIT) received the



award as the leader of the group that made significant contribution for large scale manufacture of Cold kits for the formulation of injectable ^{99m}Tc (Technitium) radio-

pharmaceuticals. Their contribution resulted in the regular production and dispatch of twelve products to ~150 nuclear medicine centres in the country, benefiting more than 2,00,000 patients and earning of revenue of ~5 Cr per year to the department.



Dr. (Smt.) Balvinder Kaur Sapra, Radiological Physics and Advisory Division, BARC was awarded for her

excellent contributions in the activities, both experimental and theoretical, pertaining to nuclear and radioactive aerosols, and radon/thoron inhalation dosimetry.

Scientific & Technical Excellence Awards



Dr. Chandana Bhattacharya from Experimental Nuclear Physics Division (ENPD), Variable Energy Cyclotron Centre (VECC) was awarded for her outstanding contributions, as a nuclear physicist, in the experimental activities exclusively using Indian accelerators (Cyclotron and Pelletrons) and the results of which have been published in reputed International Journals.

Dr.(Smt.) Jyotirmayee Mohanty, Radiation and Photochemistry Division (RPCD), BARC received the award for her excellent research contribution in the areas of 'Fluorescence Spectroscopy, Supra-biomolecular Photochemistry and Nanomaterials'.



Young Scientist Awards



Dr. (Smt) S. Abhaya, Material Physics Division (MPD), Indira Gandhi Centre for Atomic Research (IGCAR) was awarded for her excellent research contribution in the ingenious application of *positron annihilation spectroscopy* to address problems on defects and phase transformations in the metal-silicides and reactor steels.



Dr. (Mrs.) Swathi Kota, Molecular Biology Division (MBD), BARC was awarded for her outstanding research studies relating to "*Biological Response to Gamma Radiation Induced DNA Damage and Repair mechanisms*".

Special Contributions Awards

In recognition of their significant contribution to the ongoing programs of the department, special contribution awards were given to:



Smt. Geeta P. Vaidya (Atomic Fuel Division),



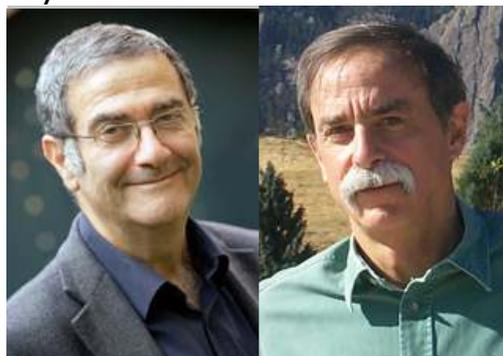
Dr.(Smt.) M. J. Kulkarni (Radiochemistry Division)



Dr. (Smt.) K. K. Pushpa (Radiation & Photochemistry Division) of BARC.

Nobel Prize – 2012

Physics



Serge Haroche

David J. Wineland

The Nobel Prize in Physics 2012 was awarded jointly to **Serge Haroche** from France and **David J. Wineland** from USA "*for ground-breaking experimental methods that enable measuring and manipulation of individual quantum systems*". Serge Haroche and David J. Wineland have independently invented and developed methods for measuring and manipulating individual particles without

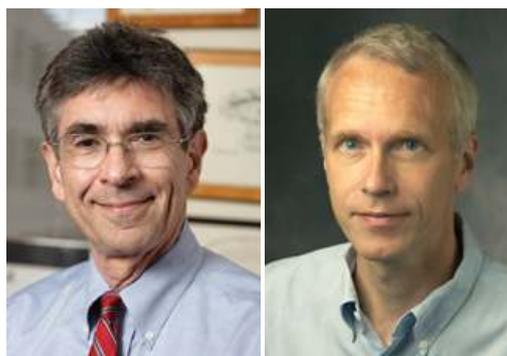
destroying them and preserving their quantum-mechanical nature, in ways that were previously thought unattainable. Serge Haroche, was born in 1944 in Casablanca, Morocco, and completed his Ph.D. in 1971 from Université Pierre et Marie Curie, Paris, France. Professor at Collège de France and Ecole Normale Supérieure, Paris, France. David J. Wineland was born in 1944 in Milwaukee, Ph.D. 1970 from Harvard University, Cambridge, MA, USA. He is a Group Leader and NIST Fellow at National Institute of Standards and Technology (NIST) and University of Colorado Boulder, USA.

Their work in the field of quantum optics leads to the direct observation of individual quantum particles. For single particles of light or matter the laws of classical physics cease to apply and quantum physics takes over. But single particles are not easily isolated from their surrounding environment and they lose their mysterious quantum properties as soon as they interact with the outside world. Thus many seemingly strange phenomena predicted by quantum physics could not be directly observed, and researchers could only carry out thought experiments that might in principle manifest these unusual phenomena. Through their ingenious laboratory methods Haroche and Wineland together with their research groups have managed to measure and control these very fragile quantum states. The new methods allow them to examine, control and count the quantum particles.

Their methods have many things in common. David Wineland traps electrically charged atoms, or ions, controlling and measuring them with light, or photons. Serge Haroche takes the opposite approach: he controls and measures trapped photons, or particles of light, by sending atoms through a trap. The field of quantum optics, which deals with the fundamental interaction between light and matter, has seen considerable progress since the mid-1980s. The ground-breaking methods of Wineland and Haroche have now enabled this field of research to take the very first steps towards building a new type of super fast

computer based on quantum physics. Perhaps the quantum computer will change our everyday lives in this century in the same radical way as the classical computer did in the last century. The research has also led to the construction of extremely precise clocks that could become the future basis for a new standard of time, with more than hundred-fold greater precision than present-day caesium clocks.

Chemistry



Robert J. Lefkowitz Brian K. Kobilka

The Nobel Prize in Chemistry 2012 was awarded jointly to **Robert J. Lefkowitz** and **Brian K. Kobilka**, both from USA, "*for studies of G-protein-coupled receptors*". The groundbreaking discoveries by Lefkowitz and Kobilka have unraveled the mystery of how cells sense their environment through tiny cell receptors, by revealing the inner workings of an important family of G-protein-coupled cell receptors. Robert J. Lefkowitz was born in 1943 in New York, completed M.D. in 1966 from Columbia University, New York. At present he is Investigator, Howard Hughes Medical Institute and James B. Duke Professor of Medicine, and Professor of Biochemistry, Duke University Medical Center, Durham, North Carolina, USA. Brian K. Kobilka, was born in 1955 in Little Falls, MN, USA., and completed his M.D. in 1981 from Yale University School of Medicine, New Haven, USA. He is Professor, Chair of molecular and cellular physiology and Hélène Irwin Fagan Chair in Cardiology, Stanford University School of Medicine, Stanford, California, USA.

The experiments and discoveries that lead to this Nobel Prize are part of a sustained

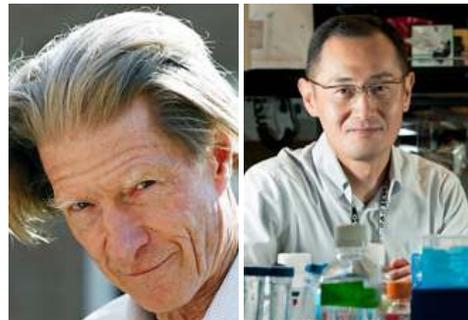
effort for a long time. Hormones such as adrenalin have powerful effects, e.g., increasing blood pressure and making the heart beat faster. Although scientists suspected that these hormones are sensed by some kind of recipient for such hormones on the cell surfaces, the actual nature of these receptors and how they worked remained obscured for most of the 20th Century. In 1968, Lefkowitz started using radioactive iodine isotope, attached to various hormones, to trace cells' receptors. He unveiled several receptors, including a receptor for adrenalin: β -adrenergic receptor. His team of researchers extracted the receptor from the cell wall and gained an initial understanding of how it works. The team achieved its next big step during the 1980s, when Kobilka, a member of his group, started the challenging task of isolating the gene that codes for the β -adrenergic receptor from the gigantic human genome. Through his creative approach the gene was isolated and the analysis of its code showed that the receptor was similar to that of rhodopsin, the light receptor in the eye, with seven spiral shaped strings that wind their way through the cell wall. This observation led to the discovery of a complete family of receptors that look alike and function in the same manner by interacting with G-proteins on the inside of the cell. Today this family is referred to as G-protein-coupled receptors. About a thousand genes code for such receptors, for example, for light, flavour, odour, adrenalin, histamine, dopamine and serotonin are known now and about half of all medications achieve their effect through G-protein-coupled receptors. However, researchers, with Lefkowitz and Kobilka in the lead, have found that these receptors are multifunctional; a single receptor can recognize several hormones on the outside of the cell. It is also known that they not only interact with G-proteins inside the cell, but also with others, for instance with proteins called arrestins. Hence, these receptors are now being referred as seven-transmembrane receptors (7TM) after their seven spiral strings.

These complex structures provide a basis for pharmacologic development of drugs with

high specificity, efficacy and few side effects. The biochemical strategies developed by Kobilka have already been adopted by other groups in order to produce crystals and solve high-resolution structures for a number of pharmacologically important receptors.

The studies by Lefkowitz and Kobilka are crucial for understanding how these receptors function. Furthermore, Kobilka and his research team achieved another break-through in 2011, by capturing an image of the β -adrenergic receptor at the exact moment that it is activated by a hormone and sends a signal into the cell. This image is a molecular masterpiece – the result of decades of research.

Physiology or Medicine



Sir John B. Gurdon

Shinya Yamanaka

The Nobel Prize in Physiology or Medicine 2012 was awarded jointly to **Sir John B. Gurdon** from United Kingdom and **Shinya Yamanaka**, from Japan, "*for the discovery that mature cells can be reprogrammed to become pluripotent*". These two scientists discovered that mature, specialised cells can be reprogrammed to become immature cells capable of developing into all tissues of the body. Their findings have revolutionised our understanding of how cells and organisms develop. Sir John B. Gurdon was born in 1933 in Dippenhall, UK. He received his Doctorate from the University of Oxford in 1960 and was a postdoctoral fellow at California Institute of Technology. He joined Cambridge University, UK, in 1972 and has served as Professor of Cell Biology and Master of Magdalene College. Gurdon is currently at the Gurdon Institute in Cambridge. Shinya Yamanaka

was born in Osaka, Japan in 1962. He obtained his MD in 1987 at Kobe University and trained as an orthopaedic surgeon before switching to basic research. Yamanaka received his PhD at Osaka City University in 1993, after which he worked at the Gladstone Institutes in San Francisco, USA and Nara Institute of Science and Technology in Japan. Yamanaka is currently Professor at Kyoto University, where he directs its Center for induced Pluripotent Stem cells (iPS cells) Research and Application. He is also a senior investigator at the Gladstone Institutes.

The embryo consists of immature cells, each of which is capable of developing into all the cell types that form the adult organism. Such cells are called pluripotent stem cells. With further development of the embryo, these cells give rise to nerve cells, muscle cells, liver cells and all other cell types - each of them specialised to carry out a specific task in the adult body. This journey from immature to specialised cell was previously considered to be unidirectional and a return from a specialised mature cell to an immature, pluripotent stage was thought to be impossible. In 1962, John B. Gurdon discovered that the specialisation of cells is reversible through a classic experiment, where the immature cell nucleus in an egg cell of a frog was replaced with the nucleus from a mature intestinal cell. This modified egg cell developed into a normal tadpole, showing that the DNA of the mature cell still had all the information needed to develop all cells in the frog and that the nucleus of a mature, specialised cell can be returned to an immature, pluripotent state. It initiated intense research and the technique was further developed, leading eventually to the cloning of mammals.

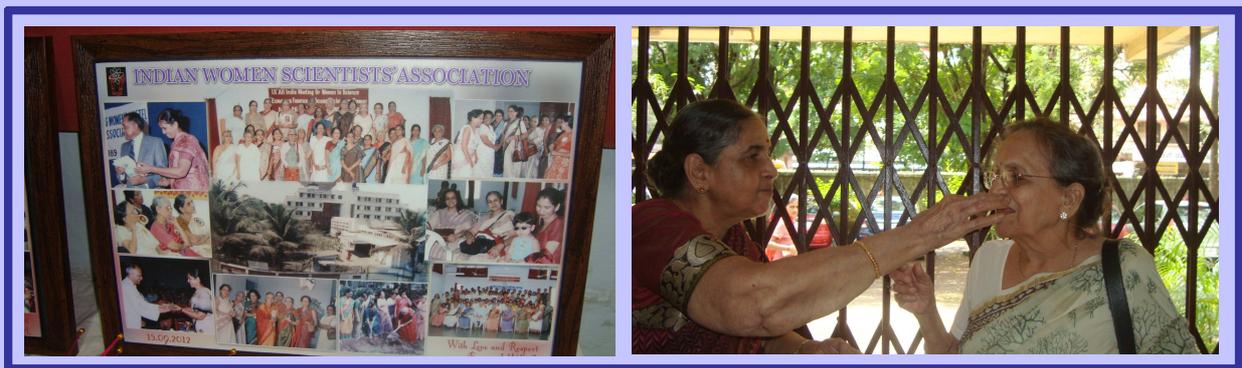
In 2006, more than 40 years later, Shinya Yamanaka discovered how intact mature cells (not nucleus) in mice could be reprogrammed to become immature stem cells. His research concerned embryonal stem cells, i.e. pluripotent stem cells that are isolated from the embryo and cultured in the laboratory. Such stem cells were initially isolated from mice by Martin Evans (Nobel Prize 2007) and Yamanaka tried to find

the genes that kept them immature. After identifying several of these genes, he tested whether any combination of these genes could reprogram mature cells to become pluripotent stem cells and successfully developed a simple combination of four genes together, that could reprogram the fibroblasts into immature stem cells. The resulting induced pluripotent stem cells (iPS cells) could develop into mature cell types such as fibroblasts, nerve cells and gut cells. The discovery that intact, mature cells could be reprogrammed into pluripotent stem cells was published in 2006 and was immediately considered a major breakthrough.

These groundbreaking discoveries have completely changed our view of the development and cellular specialisation. By reprogramming human cells, scientists have created new opportunities to study diseases and develop methods for diagnosis and therapy. iPS cells can also be prepared from human cells. Research during recent years has shown that iPS cells can give rise to all the different cell types of the body and these discoveries have also provided new tools for scientists around the world and led to remarkable progress in many areas of medicine.

(Contributed by Dr. Dhanya Suresh)

It is estimated that Earth is home to at least 8 million living species and since 2000, the number of mammals discovered each year only averages about 36. This year a new primate monkey that sneezes when it rains (*Rhinopithecus strykeri*) was discovered by scientists who were conducting a gibbon survey in the high mountains of Myanmar! A picture of it is included on the back cover of this issue. Hunters and villagers told the scientists that they could find this snub-nosed monkey by waiting until it rained and listening for sneezes in the trees.





Monkey that sneezes when it rains

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