

Annual Report 2017-18

The Society for Promotion of Science and Technology in India came in to existence on Oct. 14, 2009. Since then, it has continued to grow steadily and to expand its activities mainly in Chandigarh and Haryana. The year 2017-18 was another exciting year during which the Society continued grow and build on its strengths. The five activities, namely Mobile Science Laboratory, Summer Schools in Science and Mathematics, How and Why Monthly Lecture Series, Lectures on Nobel Prizes and Stage Show in Science, have acquired the status of standing activities, i.e. regular and permanent in character. We have carried them forward and our support staff has also acquired the expertise to execute them with a high degree of finesse and quality.

The year 2017-18 was full of activities mainly due to the complete roll out of the Mobile Science Laboratory and a larger number of Summer Schools. The Society became more visible and the public started recognizing and appreciating its contribution to the popularization of science amongst the public and more specifically schools and colleges located in rural areas and small towns.

- 1. Income and Expenditure:** The total income of the Society during the year was Rs. 22,59,503.85. A sum of Rs. 13 lacs was raised by way of donations. A special campaign was also launched for raising funds for the Summer schools. The expenditure was Rs. 34,52,475.91. The deficit was made up by way of accumulated deposits, including the grant received from the Department of Science and Technology, Government of India.
- 2. Mobile Science Laboratory:** Circus of Science (Vigyan Ka Jantar-Mantar): Out of the originally sanctioned amount of Rs. 23,68,815, a sum of Rs. 18,95,052 was received in November, 2016. Out of this, a sum of Rs 2,28,837 was spent during Jan to March 2017. During 2017-18, the unspent balance of Rs.16,66,215 was carried forwarded from previous financial year. The entire grant was kept in the Society's savings account in the State bank of India. During the year 2016-17, the Society had earned an interest of Rs. 22,916 and Rs. 46,053 during the year 2017-18. The interest so earned is required to be adjusted against the balance grant. During the year, 2017-18, a sum of Rs.22,80,398 was spent. Thus, the total expenditure on the Lab against the DST funded project was Rs. 25,09,235. Several new experiments were set up and equipment such as virtual reality sets, drones and video camera were added. In addition, manuals of experiments have been made. During the year, the Lab interacted with about 23,000 students of ninety-five Government Sr. Sec. Schools, forty-two Government High Schools and six Government Middle Schools of Karnal district. In addition, it also visited nine Summer Schools and interacted with about eleven hundred students attending the Summer Schools. The project has concluded. The Society has submitted a proposal to the Department of Science and Technology (DST), Government of India, for grant for the next two years. The DST has in principle approved the project for two years. Some glimpses of the activities of the Mobile alab are given nbelow.



Microscopic observation of cells



Tests of Acids & Bases



Audio-Visual Session: Formation of Sun



Reversible Reactions



Outdoor Display



Van De Graf Generator



Drone Session



Virtual Reality Glasses

District Science Exhibition: A District Science Exhibition was organized by the Education Department at Govt. Sr. Sec. School (Boys), Karnal on 22.12.2018. Mobile Science Lab was deputed for equipment displays and demonstrations to the Science Exhibition. Around 300 students from all over the Karnal district participated with their projects and visited the Mobile Science Lab. Sh. Nishant Yadav, Additional Deputy Commissioner, Karnal also visited the lab

for a review. Teacher representatives from the Govt. Schools experienced various equipments from the mobile lab.



Mobile Science Laboratory at District Science Exhibition, GSSS (Boys), Karnal

3. **Earth Day 2017:** The Day was celebrated on April 22, 2017 at the T.I.T. Senior Secondary School, Bhiwani by SPSTI. The event was sponsored by the Ministry of Earth Sciences (MoES), Government of India. The MoES had also given grant to the Society for this purpose. The vent comprised of two activities - Poster competition among the students of class XI and XII and lectures by two eminent experts. The event was coordinated by SPSTI's Life Member, Prof. R. Baskar, under the directions and guidance of Sh. Dharam Vir, President of SPSTI.



टीआईटी स्कूल में बच्चों को सम्मानित करते हुए प्राचार्य व अन्य स्कूल स्टाफ सदस्यगण।

विद्यार्थियों ने चित्रों के माध्यम से पर्यावरण संरक्षण का दिया संदेश

जागरण संवाददाता, भिवानी: स्थानीय टीआईटी वरिष्ठ माध्यमिक विद्यालय में शुभ-विज्ञान मंत्रालय भारत सरकार एवं सीसागटी फोर प्रमोशन ऑफ विज्ञान एवं तकनीक हरियाणा के द्वारा विद्यालय में पृथ्वी दिवस मनाया गया। इस अवसर पर मुख्यअतिथि के रूप में कुरुक्षेत्र विश्वविद्यालय से प्रो. डा. आर. सी पटेल, गुरु जम्भेश्वर विश्वविद्यालय हिसार से प्रो. डॉ. आर भास्कर व इंदिरा गांधी राष्ट्रीय विश्वविद्यालय दिल्ली से प्रो. डा. सुष्मिता उपस्थित हुए। कार्यक्रम की अध्यक्षता प्राचार्य डॉ. डी. पी कौशिक ने की। कार्यक्रम का

शुभारंभ आए डी.पी कौशिक ने मा सरस्वती की प्रतिमा के सामने दीप प्रज्वलित करके किया। उन्होंने यहाँ कि पर्यावरण संरक्षण के लिए विद्यार्थी स्वयं भी जागरूक हो और दूसरी कमे भी जागरूक बनाए। इस अवसर पर विभाग के द्वारा पेड लगाओ पृथ्वी बचाओ विषय पर चित्रकला प्रतियोगिता कराई गई जिसमें मे प्रथम भूपेंद्र सिंह, द्वितीय प्रीति तंवर व तृतीय स्थान महेश्वर ने प्राप्त किया। सभी विजेता छात्रों को सम्मानित किया गया। इस अवसर पर प्रपक्ता एस.पी जोशी, अनिला हनुवासिया, सुखवीर सिंह, अनिल कुमार व लक्ष्मण गौड़ उपस्थित थे।



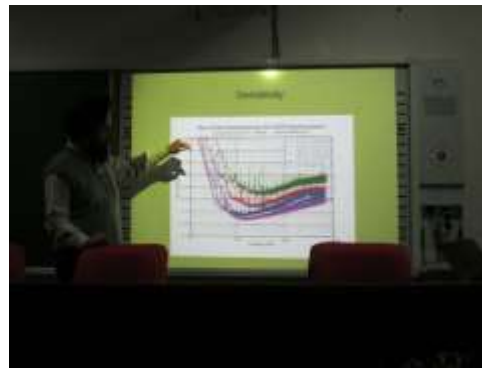
The Principal of T.I.T. Senior Secondary School, Bhiwani, Dr. D.P. Kaushik welcomed such initiatives of the SPSTI and expressed his willingness to collaborate with it for similar kind of activities. Prof. R. Baskar, Department of Environmental Science and Engineering, Guru Jambheshwar University of Science and Technology, Hisar, introduced and briefed the audience about the objectives of SPSTI, significance of the Earth Day celebrations and the important role played by Ministry of Earth Sciences, Government of India in this regard. Prof.

R C Patel from Kurukshetra University spoke on the evolution of the earth, plate tectonics and the importance of the study of earth system sciences. Dr. Sushmitha Baskar of the Indira Gandhi National Open University (IGNOU), New Delhi spoke on a few general environmental issues and the steps which could be taken by us to make a difference, so that sustainable development could be achieved. The event was covered by the local TV channel and the local media.

4. Science Day 28, 2018

The Society had received a grant of Rs. 15,000 from the Department for celebrating the Science Day in a school and a college. The Society had organized the following events:-

- a. February 23, 2018: GGS College for Women, Sector-26, Chandigarh: Prof. J. S. Bagla, Indian Institute of Science Education and Research, Mohali, gave a lecture on the Nobel Prize 2017 in Physics.



He also highlighted the concept behind the experiments and the difficulties faced by the researchers in conducting the experiments. The lecture was attended by the faculty and the students of the College.

- b. February 26, 2018, Government Senior Secondary School, Dhanas, Chandigarh: Prof. Keya Dharamvir, formerly of Panjab University, Chandigarh addressed the young students and teachers at the, on 'Life and Times of C. V. Raman'. She also performed a few experiments to demonstrate light scattering phenomena.



- c. February 28, 2018: she lectured at the Department of Chemistry and Center for Advanced Study in Chemistry. The title of talk was 'When Radiation Met Vibration – Raman and his Institutions'. She discussed the extraordinary experimental feat of the discovery of Raman Effect, in background of various types of light scattering. She presented vignettes from his life and the Institutions he built and was associated with. She opined that strong personality traits such as absolute faith in Science, supreme self-confidence and total sense of purpose saw him through the ups and downs of his long and illustrious scientific career. At both the places, the lectures were well received and there was considerable interaction.



5. **Summer Schools:** This is one of the flagships programmes of the Society. During the summer of 2017, nine summer schools were organized - eight in Haryana and one in Punjab for the students of Classes IX to XII, compared to six summer during the previous year. The Summer School in Punjab was held at Maur Mandi in association with another NGO, Maur Edu Welfare Society. All Schools were of four weeks' duration. The salient features are as follows:
- a. **Locations of Summer Schools:**
 1. **Haryana:** Dadawas (Pataudi Tehsil, Gurgaon), Gurgaon, Karnal, Kurukshetra, Narnaul, Panchkula, Palwal and Rewari.
 2. **Punjab:** Maur Mandi
 - b. **Mentors:** Sixty-five students (55 for Haryana and 10 for Punjab) of IITs, IISER Mohali, Punjab University, Central Universities, St. Stephen's College Delhi, NIT Kurukshetra and a State University of UP were engaged as intern-cum-mentors. Twenty-six were girls. The station-wise number of mentors is given in the Table-1. The important highlights were – (i) the mentors were from several States of India, including Kerala and Maharashtra and (ii) out of 65 mentors, 26 were girls.
 - c. **Methodology of Teaching during Summer Schools:** Broadly, the following strategy was adopted: -
 1. Emphasis on concepts and basic principles,
 2. Teaching through PPT presentation wherever possible,
 3. Problem solving,
 4. Doubt clearance sessions,
 5. Home-work and their timely correction,
 6. Short revision notes on important topics,
 7. Frequent tests – weekly as well as snap tests,
 8. Final test and prizes,
 9. Group exercises,
 10. Display of a few interesting experiments and short videos on science,
 11. Celebration of special days: Environment Day and International Yoga Day,
 12. Career Counseling: Mentors also valuable resource persons for options in higher education and careers.

- d. **Village Dadawas, Tehsil Pataudi, Gurgaon:** The Summer School was held at the BMB Public School Village Dadawas (Pataudi Tehsil, Gurgaon. This School primarily caters to the students of village Dadawas and adjoining areas and is mentored by Prof. Sagar Jain, US based NRI. Five students- four of University of Delhi (including three of St. Stephen's' College) and one of IIT Ropar- were engaged as Interns to teach and mentor the students of the BMB School. The entire expenditure was borne by the School's management directly.
- e. **Number of Students:** The Department of Education and District Education Officers of the district concerned were requested to sponsor good and willing students of Government Schools. While the number of students who applied was large, but 1,564 joined but 825 successfully attended them till end. 739 students left at different stages due several reasons. The district-wise number of students, who completed the Summer Schools, is given in Table-2. The reasons for drop outs were: - (i) late sponsoring of students by schools, (ii) shoddy selection process, (iii) poor fundamentals and slow pace of learning and (iv) family commitments. The students, who attended the Summer Schools for the entire duration, were committed and showed a considerable improvement.
- f. **Feedback:** Feedback was obtained from the Mentors as well as the students who completed the Summer Schools. The feedback was very positive and encouraging. The students wanted such camps of longer duration as well as short interactions at regular intervals during the year.
- g. **Expenditure:** The BMB School, Dadawas had met all the expenditure directly. The Summer Schools at Palwal and Narnaul were held in collaboration with the District Administration, which had funded them. The Summer School at Maur Mandi, Punjab was held in collaboration with another NGO, Maur Edu Welfare Society, which met all the expenditure. For the remaining four of eight Summer Schools, the SPSTI had raised the funds. The SPSTI had also met the expenditure on supervision, guidance, certificates and other such common items. In all, the SPSTI had spent a sum of Rs.9,06,109.00 lacs on the Summer Schools.
- h. **Visit to NDRI and e-Library:** The SPSTI arranged a visit of the students, who participated in the summer school at Karnal, to the National Dairy Research Institute, which is a recognized center of advanced studies in the disciplines of Animal Genetics and Breeding and Dairy Technology. The students also visited the e-Library, located at the Panchayat Bhawan, Karnal.



Visit of Summer School Students at e-Library, Karnal

6. **How and Why Monthly Lecture Series:** The Monthly Lecture Series is one of the standing activities of the Society. Efforts are made to hold such lectures as often as possible. However,

due to examinations and admissions, it has not been possible to hold lectures every month. During the year 2017-18, the following five lectures were held under the Monthly Lectures Series: -

a. **Title: When Radiation met Vibration - Life and Times of Raman**

Speaker: Professor Keya Dharamvir, formerly at Department of Physics, Panjab University, Chandigarh. Professor Dharamvir specializes in Condensed Matter Physics and Nanoscience. She did M.Sc. and Ph.D from Indian Institute of Technology, Kanpur and post-doc at the Imperial College of Science and Technology, London.

Date and Time: May 13, (Saturday), 2017, 10:00 AM.

Venue: Seminar Room, Department of Physics, Panjab University, Sector-14 Campus, Chandigarh.

Summary: The speaker traced the journey of only Indian Nobel Laureate in science, Sir C. V. Raman in the background of poor research infrastructure and limited number of scientific institutions before the Independence. Prof. Raman was a child prodigy and was deeply interested in physics but joined the civil services. As posted at Calcutta, he started working with the Association for Cultivation of Science and other institutions and started working on interaction of light and matter.

b. **Title: The Role of Polymers in Developing Society**

Speaker: Dr. Paramjit Singh, Former Professor of Chemical Engineering and former Registrar, Panjab University, Chandigarh.

Date and Time: August 18, 2017, 4:00 PM

Venue: Seminar Room, Department of Physics, Panjab University, Sector-14, Chandigarh

Abstract: Polymers are extremely fascinating materials of the present time. Ever since their invention in the nineteenth century and subsequent steady growth, there has been considerable growth in this area and now available many materials from this class available commercially for diverse applications with continued addition of more and more exotic members to the family. The first part of this talk related to some basic concepts of polymeric materials which are helpful in facilitating understanding the applications of a polymer. In the second part, he described the important applications in a few prominent commercial segments to highlight their role in our lives today. Environment and health related concerns were also discussed.

c. **Title: Conserving Energy and Protecting Environment for Congested Smart Cities**

Speaker: Prof. V. K. Jindal, former Professor of Physics, Panjab University, Chandigarh. He retired as Coordinator Nanoscience and Nanotechnology and Professor of Physics in 2010, and as reemployed and finally retired in 2015. He was also an Emeritus CSIR Scientist and now honorary Professor in Bio-Nano at Guru Jambheshwar University of Science & Technology, Hisar. Professor Jindal has served at Panjab University Chandigarh for about 4 decades.

Date and Time: September 16, 2017, 10:30 AM

Venue: Seminar Room, Department of Physics, Panjab University, Sector-14, Chandigarh

Summary: Electrical energy has become one of the most important facilities for any city in the world. India is no different. Prof. Jindal mentioned that one of the major are that consumes enormous energy is air conditioning of living and working spaces. To meet this demand, dirty and unclean sources of energy are also often employed and still falling short of meeting demand. The air conditioning of buildings and corridors is a great challenge not only because they are highly power consuming, but they bring in redistribution of heat by throwing out inside heat to outside with added large component due to inefficiency of air conditioners. Ordinary citizens have to face extra heat in the environment due to this air-conditioning of large spaces and volumes and is equivalent to “passive heating” like passive smoking. The talk will stress on limiting the volume of conditioning to cut down up to 90%

by way of limiting this to personal wear and garments which are modified using new and advanced materials based on thermoelectric effects. The thin internal body garment layer can be powered by plug in supply in offices or homes and on batteries in transit. Further all public spaces, offices, shopping and homes where all available volumes are being presently cooled and heated, this innovative idea will be personalized in terms of environment as well as cost. The future technology would be required to develop new nanotechnology-based materials with enhanced Peltier coefficient and heat sinks based on highly thermally conducting graphene based nano-composite fibres. Smart cities can enforce or encourage such comfort garments for friendly temperatures on the body and thus avoid extensive passive heating or cooling to retain natural climate. This will also do away with noisy compressors and chloro-fluorocarbons responsible for ozone layer damage.

d. **Title:** Nobel Prize in Chemistry 2017

Speaker: Prof. Sukesh Chander Sharma, Chairman, Department of Bio-Chemistry, Panjab University

Place: Seminar Room, Department of Chemistry, Panjab University

Date & Time: January 25, 2018, 3:45 pm

Abstract: (Ref. https://www.nobelprize.org/nobel_prizes/chemistry/laureates/2017/press.html) The Nobel Prize in Chemistry 2017 was awarded to three scientists, namely Professor Jacques Dubochet, University of Lausanne, Switzerland, Professor Joachim Frank, Columbia University, USA and Professor Richard Henderson, MRC Laboratory of Molecular Biology, Cambridge, UK *"for developing cryo-electron microscopy for the high-resolution structure determination of biomolecules in solution"*

This work would revolutionize biochemistry: We may soon have detailed images of life's complex machineries in atomic resolution. A picture is a key to understanding. Scientific breakthroughs often build upon the successful visualization of objects invisible to the human eye. However, biochemical maps have long been filled with blank spaces because the available technology has had difficulty generating images of much of life's molecular machinery. Cryo-electron microscopy changes all of this. Researchers can now freeze biomolecules mid-movement and visualise processes they have never previously seen, which is decisive for both the basic understanding of life's chemistry and for the development of pharmaceuticals.

Following these discoveries, the electron microscope's every nut and bolt had been optimized. The desired atomic resolution was reached in 2013, and researchers can now routinely produce three-dimensional structures of biomolecules. In the past few years, scientific literature has been filled with images of everything from proteins that cause antibiotic resistance, to the surface of the Zika virus. Biochemistry is now facing an explosive development and is all set for an exciting future.

e. **Title:** Stephen Hawking's Scientific Legacy - Black Holes and Singularities in Gravity

Speaker: Prof. Harvinder Kaur Jassal, IISER Mohali

Place: Seminar Room, Department of Physics, Panjab University, Chandigarh

Date & Time: March 31, 2018, 10:00 am

Abstract: Stephen Hawking's name needs no introduction. His contribution to our understanding of universe is well known not just to scientists but also to people at large. This talk will be about some of his seminal contributions to our present day understanding of singularities in gravitational collapse as well as black holes and information loss.

7. **Public viewing of Super Blue Blood Moon**

Date: January 31, 2018

Two places: (a). Rose Garden, Chandigarh and (b). Football Stadium, Karnal

The event at Chandigarh was supported by the Department of Science and Technology, Chandigarh and Karnal, by District Administration

Society for Promotion of Science & Technology in India (SPSTI) conducted public viewing of the much awaited and rare astronomical event, i.e. lunar eclipse on Jan. 31, popularly referred to as the Super Blue Blood Moon, at the Rose Garden, Chandigarh under the guidance of Professor Keya Dharamvir, SPSTI's General Secretary, and Karnal under the direction of Dharam Vir, President, SPSTI, with the assistance of two research scholars from Indian Institute of Science Education and Research Mohali at each place. There was a massive turnout of the public, especially children. Professor Keya Dharamvir also conducted several experiments to explain the phenomenon of eclipse and other concepts in Physics, which were appreciated by one and all.

At both the places, several senior officers including Shri Aditya Dahiya, IAS, Deputy Commissioner, Karnal and Santosh Kumar, Director, Science and Technology, Chandigarh along with several officers also visited the site and participated in the events. Encouraged by the public response, the SPSTI's President Dharam Vir had announced that such science-based public shows would be organized at several places in this region.



Public of Super Blue Moon Eclipse at Karan Stadium, Karnal



Moon-watchers at Rose Garden, Chandigarh, on Wednesday, 31st Jan



संस्थान के लोग रात में टेलीस्कोप से मंडारम देवता के लिए...

संस्थान के लोग रात में टेलीस्कोप से मंडारम देवता के लिए...

Public Viewing of Lunar Eclipse at Rose Garden, Chandigarh

8. **Jyotirgamya, Stage Science Experiments Show:** With the Mobile Science Laboratory, Circus of Science, a science show of exciting and eye-catching experiments was organized at the Dyal

Singh Public School, Panipat on 25.09.2017. There were two types of activities: (1) display of many scientific equipments, where students were encouraged to handle them and perform experiments and (2) several experiments were performed with the active participation of the students on the stage, which kept the school students and the teachers spell bound. The students were actively involved in the show. Prof. Keya Dharamvir was the leader of the team comprising the students of IISER Mohali and the Panjab University.



They also explained the principles behind each experiment, which was appreciated by most of the students. There was also a health question and answer session.

9. Encouraged by the response of the students as well as the public to the science-based activities, the Society has decided to expand its outreach programme in the State of Haryana.

A handwritten signature in blue ink that reads "Manan Vi".

President, SPSTI

Table 1
Institution-wise Number of Mentors

Schools	IITs	CU	IISERM	PU	BITS	Others	Total
Dadawas							
Boys	1	1	1		1	2	6
Girls							0
Gurgaon							
Boys		1	1		2		4
Girls	1	2					3
Karnal							
Boys	1	1					2
Girls	2	1		1		1	5
Kurukshetra							
Boys	2		1				3
Girls		1		3			4
Maur Mandi							
Boys	1	2					3
Girls	3	1		3			7
Narnaul							
Boys	2	2	2		1		7
Girls							
Panchkula							
Boys	2			2			4
Girls			2	2			4
Palwal							
Boys	1	1	1			1	4
Girls	1					1	2
Rewari							
Boys	2		1		1		4
Girls	1		1			1	3
Total	20	13	10	11	5	6	65
Boys	12	8	7	2	5	5	39
Girls	8	5	3	9	0	1	26

Table 2**List of Students Enrolled and Completed the Summer Schools**

Schools	FIRST DAY			FINAL		
	Boys	Girls	Total	Boys	Girls	Total
Dadawas	50	49	99	48	39	87
Gurgaon	180	120	300	64	47	111
Karnal	126	95	221	60	40	100
Kurukshetra	106	82	188	60	51	111
Maur Mandi	66	57	123	45	37	82
Narnaul	89	47	136	22	20	42
Panchkula	77	73	150	43	46	89
Palwal	84	108	192	55	70	125
Rewari	73	82	155	34	44	78
Total (All Schools)	851	713	1,564	431	394	825