

DST-INSPIRE INTERNSHIP SCIENCE CAMP - 2012



Department of Science & Technology
Govt. of India

In association with



Jagadis Bose National Science Talent Search
Govt. of West Bengal

Science Camp Entitled:

“Exciting World of Science”

July 10 – 14, 2012

At JB Centre of Excellence for Student – Scientists



Jagadis Bose National Science Talent Search,

1300, Rajdanga Main Road, Kasba, Kolkata – 700 107

Phone : 2441 7542, 2442 8270 Fax : (033) 2442 8267

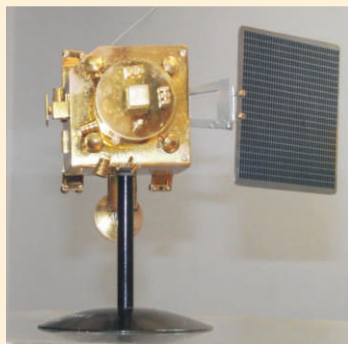
E-mail: jbnsts@gmail.com / jbnsts@vsnl.com; Website : <http://www.jbnsts.org>

About JBNSTS

Jagadis Bose National Science Talent Search (JBNSTS), Kolkata was conceptualized in 1958 by visionaries such as Dr. B C Roy, Sir J J Ghandy and others to commemorate the Birth Centenary Celebration of India’s first modern scientist, Acharya J C Bose. The program was inaugurated by Pandit Jawaharlal Nehru. JBNSTS is an autonomous institute promoted by the Department of Higher Education, Government of West Bengal. It is administered by a Governing Body with representatives from the State Government, academia and industry. Since 1961, JBNSTS is awarding the prestigious Jagadis Bose Scholarships to selected group of undergraduate students of science, engineering and medicine.



In the last five decades, JBNSTS has grown to become a premiere institute of non-formal science education in the eastern and northeastern States of India with the objective towards pursuit of excellence through motivation, identification and nurture of young talented science students. It helps students to realize the importance of excellence in the scientific world and try to cultivate this in their own lives as students of science. JBNSTS also encourages students towards the learning of basic sciences and inculcates scientific spirit in the minds of young high school and undergraduate students. Focus has been given on unconventional and dynamic methods of non-formal accelerated learning through “out-of-class” activities, which have led to the recognition of intellectually sensitive and inquisitive minds. Since 2004, JBNSTS has launched an innovative middle school science Teachers Training Program which has brought into its ambit motivated teachers from the districts of West Bengal. JBNSTS has developed science kits and distributed to the teachers for demonstrating scientific principles to the middle school students in the classroom. The financial support for most of the activities of



JBNSTS is provided by the Department of Higher Education & Department of Science & Technology, Government of West Bengal. In addition, Council of Scientific & Industrial Research (CSIR), Department of Science & Technology (DST), Government of India & Industries also collaborate with JBNSTS activities.

About DST-INSPIRE Program

Innovation in Science Pursuit for Inspired REsearch (INSPIRE) is an innovative programme being implemented by the Department of Science and Technology (DST), Govt. of India. The basic objective of INSPIRE is to communicate to the youth of the country the excitement of creative pursuit of science, attract talent to the study of science at an early age and thus build the required critical human resource pool for strengthening and expanding the Science & Technology System and Research & Development base. Under the INSPIRE project ‘Scheme for Early Attraction of Talents for Science’ (SEATS) is a program to inspire talented Science students (*top 1% performers in class-X board examination*) into basic science streams.



A striking feature of the programme is that it does not believe in conducting competitive exams for identification of talent at any level. It believes in and relies on the efficacy of the existing educational structure for identification of talent and builds on opportunities that can be derived within the systems.

Science camps are a great way for children to explore the principles and methods of scientific research and strive to get young people interested in science at an early age. They are based on concepts of facilitated self-learning, holistic education, group activities, exchange of cross-cultural ideas, motivation towards independent thought and action and forming life-long friendships with similar minded people and established scientists. Leadership, passion and appreciation of the nature around us are invaluable characteristics for future scientists, and the Science Camp activities strive to encourage these traits.



Organizing Committee



Academic Committee:

Prof. (Dr.) Papiya Nandy, Hony. Director, JBNSTS
Dr. Paromita Roy, Dy. Director, JBNSTS
Dr. Abhijit Kar, Scientific Officer, JBNSTS
Dr. Smarajit Manna, Student Advisor, JBNSTS

Camp Coordinators:

Shri Joydip Das, Asst. Director (admin), JBNSTS
Shri Dipankar Sarkar
Shri Prasenjit Chakraborty
Ms. Sucharita Kundu

Mentors

Prof. Abhijit Chakrabarti
Vice Chancellor
Jadavpur University, Kolkata

Dr. Bichitra Kumar Guha
Professor & Dean
Faculty of Basic & Applied Science
Bengal Engineering and Science
University, Shibpur, Howrah

Dr. Ashesh Nandy
Centre for Interdisciplinary Research
& Education, Kolkata

Dr. Parimal C. Sen
Senior Professor and Head
Division of Molecular Medicine
Bose Institute, Kolkata

Shri Goutam Biswas
Dept. of Computer Science and
Engineering
Indian Institute of Technology,
Kharagpur

Dr. Samita Basu
Chemical Science Division
Saha Institute of Nuclear Physics
Salt Lake, Kolkata

Dr. Sujan Kumar Sengupta
Associate Professor
Indian Institute of Astrophysics
Bangalore

Shri Samar Bagchi
Science Communicators' Forum, Kolkata

Dr. Pradipta Bandyopadhyay
Professor, Stat-Math Division
Indian Statistical Institute, Kolkata

Dr. Subhrangsu Aditya
School of Bio Science & Engineering and
School of Cognitive Science
Jadavpur University, Kolkata

Dr. G. P. Das
Senior Professor
Indian Association for the Cultivation of
Science
Jadavpur, Kolkata

Dr. Manju Ray
Emeritus Professor, CSIR
Bose Institute,
Kolkata

Dr. Anirban Ganguly
162A/66/1, Lake Gardens
Kolkata

CAMP RULES

Welcome to the Science Camp “EXCITING WORLD OF SCIENCE”

Here you will have a unique experience of learning science through active interaction with great scientists and be encouraged to share your ideas with others. No test/grade – only learning science in a different way.

Please note the following points carefully:

1. The camp hours are from **09:30 a.m. to 5:00 p.m.** You are to attend all the sessions in your school uniform. **MOBILE PHONES MUST BE KEPT IN SWITCH OFF MODE DURING ALL ACADEMIC SESSIONS.**
2. You are required to submit an attested copy of your Xth Standard Board Examination Mark Sheet, held in 2012, during the morning registration on **11th July, 2012** at registration desk.
3. You are required to fill up the STUDENT'S INFORMATION SHEET & FEED BACK SHEET and submit it on **14th July, 2012 at registration desk during afternoon registration.**
4. Travel bills (bus, auto and / or train fare only) are to be submitted on **13th July, 2012 during 9.30 a.m. – 10.00 a.m. (during morning registration).** Your reimbursement will be made on **14th July, 2012 between 01.00 p.m. to 02.00 p.m.**
5. All students of the Science Camp will receive the library membership of British Council Library (BCL) for the next one year. During that period you will be able to borrow book(s) from BCL and search /read books online. You will be given a registration form (**10th July, 2012**) for the library membership which you need to fill up and submit to us on **11th July, 2012 at registration desk during afternoon registration.** Your membership card will be given to you on **14th July, 2012.**
6. All the participants will be divided into groups. There will be a group leader for each group *selected by group members of each group.* A very interesting contest awaits for you on **14th July, 2012.** On that day each group will be provided with some drinking straws, cello tape, threads, sheets of Newspaper and TWO raw eggs. The challenge is to construct an arrangement with these materials and put one whole raw egg in it in such a way that when the whole thing is dropped from a certain height and hits the concrete ground, the EGG WILL NOT BREAK! And oh, yes! There will be a prize for the best contraption!
7. You will not be given any home work, but you are expected to interact freely with the experts, your group members and other groups. On the last day i.e. **14th July, 2012** you will receive the Participation Certificate.



Name of the participating schools:

- Khalsa Model S. S. School, Kolkata
- Don Bosco High School, Liluah, Howrah
- B.D.M. International, Kolkata
- Modern English Academy, Barrackpore
- The Future Foundation School, Kolkata
- Salt Lake School, Kolkata
- Vivekananda Mission School, Kolkata



- Rahara R.K.M. Boy's Home High School, Kolkata
- Loreto House, Kolkata
- Ashoke Hall Girls' H.S. School, Kolkata
- Barrackpore Govt. High School, Barrackpore
- La Martiniere for Girls', Kolkata
- The Modern Academy, Kolkata
- Pratt Memorial School, Kolkata

BRIEF INTRODUCTION TO THE EXPERTS

DR. PAPIYA NANDY

Prof. Papiya Nandy received her Masters degrees in Physics from University of Calcutta and University of California at Santa Barbara and Ph.D. on Liquid Crystals from Kent State University, USA. Her post-doctoral work was in Experimental Biophysics from Max Planck Institute, Göttingen, Germany. Later she was Associate Professor of Physics in University of Ulm, Germany. She joined Physics department in Jadavpur University and besides teaching for more than 35 years in the Science and Engineering faculties, she was and still is in charge of several research projects. Her field of research encompasses membrane biophysics, numerical analysis of DNA and protein sequences and application of Nanomaterials in ceramics and bio systems. She has more than hundred research publications in peer reviewed journals and 3 patent awards. She has guided 12 Ph.D. Thesis and 20 Masters Thesis. She is currently the Emeritus Fellow of Jadavpur University and the Hony. Director of JBNSTS, of which she is a scholar from the first batch in 1960. Here her objective is to make JBNSTS a vibrant and dynamic institute and to motivate, identify and nurture young talented science students and establish the base of Scientific enquiry and culture of tomorrow.

PROF. ABHIJIT CHAKRABARTI

Prof. Chakrabarti presently is the Vice Chancellor of Jadavpur University, Kolkata. He was the Professor, Dept. of Electrical Engineering at Bengal Engineering and Science University, Shibpur, Howrah. He has a number of research publications in national and international journals.

DR. BICHITRA KUMAR GUHA

Dr. B.K. Guha, Dean of the Faculty of Basic and Applied Sciences, Bengal Engineering and Science University has been a topper throughout his academic carrier. As a student of Presidency College, he topped the B. Sc (hons) Examination and has been a recipient of Gold Medal from the Calcutta University. He did his M.Sc. and M. Phil from Delhi University and Ph.D. from Calcutta University. His main area of research is Electronic Ceramic Materials. His original work on development of the technology for chemical processing of ferroelectric materials has been acclaimed all over the globe. He has a number of research publications and books to his credit and is guiding several students leading to Ph.D. Degree.

DR. ASHESH NANDY

Dr. Ashesh Nandy is currently associated with Center for Interdisciplinary Research and Education, Kolkata. He is a member of the Condensed Matter Physics Research Centre, Jadavpur University. He did his B.Sc. and M.Sc. in Physics from Calcutta University and received his Ph.D. from University of California, Santa Barbara, USA. He was a postdoctoral fellow of Syracuse University, U.S.A, Max plank Institute, Goettingen, Germany. He was associated with the Computer Division of Lipton India Ltd and IICB, Kolkata, School of Environmental Sc., Jadavpur University as Visiting Scientist. He was a recipient of several scholarships: Earle C Anthony Fellowship from University of California, Max Plank institute fellowship and is a JBNSTS scholar of first batch. His current research interest focuses on bioinformatics.

PROF. PARIMAL CH. SEN

Professor Parimal C. Sen did his masters in Organic Chemistry and Ph.D. in Analytical Chemistry from Calcutta University. He carried out his Post Doctoral Research at State University of New York and University of Minnesota, USA in the field of Enzymology. Returning back in India he joined Bose Institute in the Department of Chemistry in December 1983. He has served as Chairman in the Dept. of Chemistry for three terms. He was also worked as Visiting Professor at Cornell University during 1989-1991. At present he is a Senior Professor and Head of the Division of Molecular Medicine at Bose Institute, Kolkata (since 2008). He is also a Fellow of the National Academy of Sciences. He is the recipient of “*Prof. P.A.Kurup Endowment Award*” from the Society of Biological Chemists and “*Prof. R.C.Shah Memorial Award*” from Indian Science Congress Association. His major research interest is drug – protein and protein-protein interactions and their role in the regulation of ion transporting enzymes and protein kinases (cell signalling) under different path physiological conditions in order to develop drug against specific diseases like cancer, diabetes etc.

SHRI GOUTAM BISWAS

Shri Biswas is associated with Department of Computer Science and Engineering, Indian Institute of Technology, Kharagpur. He has conducted several seminars on the topic “Mathematics Beyond Curriculum” with his own effort in different schools of West Bengal. He is known by his students as an inspirational and excellent teacher.

DR. SAMITA BASU

Dr. Samita Basu is Professor at Chemical Sciences Division, Saha Institute of Nuclear Physics, Kolkata. She did her Ph. D. from Indian Association for the Cultivation of Science. Her Research Interests are Photochemistry in homogeneous (solvent) and heterogeneous (micelles, reverse micelles, vesicles) media, mainly on Electron Transfer & Hydrogen abstraction and Interaction between small drug-like molecules with protein and DNA using several spectroscopic techniques.

DR. SUJAN KUMAR SENGUPTA

Dr. Sengupta is presently the Associate Professor of Indian Institute of Astrophysics, Bangalore. He did his B.Sc. & M.Sc. in Mathematics from Burdwan University in 1989 & received his Ph.D. from Bangalore University in 1997. Then he joined Mehta Research Institute, Allahabad as Visiting Fellow. During 1998 – 2000, he was associated with Dept of Physics and Astronomy, Vanderbilt University, U.S.A. as Research Associate. Since 2000, Dr. Sengupta held different positions at Institute of Astrophysics, Bangalore. His present research interest lies on Theory and Observation of Brown Dwarfs, Extra-solar Planets & Neutron stars and low mass binary stars. In his academic career he has received several prestigious awards and also he is the member of International Astronomical Union (IAU), Astronomical Society of India (ASI) & Indian Association for General Relativity and Gravitation (IAGRG).

SHRI SAMAR BAGCHI

Shri Bagchi is the former Director of National Council of Science Museums of India and other 5 science museums in eastern India were also under his jurisdiction. He is connected with a lot of science popularization & educational institution as effective board member. He has organized the popular science quiz program “Quest” in Doordarshan from 1983 – 88. He has got National Award for his contribution in Science Popularization through Mass Medium in 1992. He is the member of executive community and National Council for Science and Technology Communication, Department of Science & Technology, New Delhi. He is also an Environmental & Social activist in West Bengal.

DR. ANIRBAN GANGULY

Dr. Anirban Ganguly did his MBBS from R G Kar Medical College and Hospital, Kolkata and did his Internship and House-staffship from the same college. Then he joined in NICED as Senior Research Fellow in a project on Swine Flu. He is a JBNSTS Scholar of Batch 2003 and he is associated with several programs of JBNSTS.

DR. SUBHRANGSU ADITYA

Subhrangsu Aditya, M.B.B.S., senior JBNSTS scholar (1995) is currently pursuing his research at School of Bio Science & Engineering, Jadavpur University. Besides, he is associated with School of Cognitive Science (formerly Center of Cognitive Science), Jadavpur University as a research assistant and guest faculty for the M. Phil. course in Cognitive Science. He is also associated with various workshops, seminars and other activities conducted by Center for Counselling and Studies in Self-Development Skills, Jadavpur University (CCSSS-JU). He is an associate member of SAMIKSHANI Centre for Psychoanalytical Studies and Mental Therapy (since 2009). He has publications in various international journals (such as *International Journal of Artificial Intelligence and Soft Computing*, 2012; *International Journal of Computational Vision and Robotics*, 2009) and conference proceedings (such as *2010 IEEE Students’ Technology Symposium; International Joint Conference on Artificial Intelligence: IJCAI – 07, 2007; International Workshop on Spatial Issues in Language and Vision: SLIV - 05, 2005*) and book chapters (such as “Ethical Issues in Mental Health Services from Consumers’ Perspective” published in the book *Ethical Issues in Mental Health Services*, 2009; “Determinants of Perception: A Neurophysiological Perspective” published in the book *Determinants of Perception*, 2009). He participated as a resource person in the UGC Sponsored Refresher Course “*Art and Science of Mechatronics and its Application in Robotics*” held at Electrical Engineering Department, Jadavpur University. He was invited to present a paper entitled “Protecting Children in Cyberspace” presented at the *Institute of Engineers (India)*, West Bengal State Centre, on the *World Telecommunication and Information Society Day*, May 17, 2009. His current areas of interest are Cognitive Neuroscience, Artificial Intelligence, Bio signal processing, Psychological Counselling, Stress Management, Cyber-relationship, Jealousy etc.

Dr. GOUR PRASAD DAS

Dr. G.P. Das is a condensed matter physicist working as a senior professor in the Indian Association for the Cultivation of Science in Kolkata. His research interests span a wide cross-section in the area of solid state physics and materials science, particularly on electronic structure of alloys, interfaces, clusters, and nanostructured materials. More recently he has been working on hydrogen storage and spintronics materials. After graduating from Calcutta University he had obtained his Ph.D. in Physics from Bombay University. He did his post-doctoral research in the Max Planck Institute for Solid State Research in Stuttgart. He served as visiting scientist in several institutes abroad such as Max Planck Institute Stuttgart (Germany), Virginia Commonwealth University, Richmond (USA), Institute of Materials Research, Sendai (Japan). He is recipient of the Materials Research Society of India (MRSI) Medal for the year 2000. Prof. Das has authored and co-authored a large number of research papers as well as review articles in international journals and has also written several book chapters. He has delivered several popular level scientific lectures to students. He is a mentor of the INSPIRE programme of the Department of Science & Technology.

PROF. MANJU RAY

Dr. Manju Ray is presently the Emeritus Professor, CSIR at Bose Institute, Kolkata. She has a long association with the Department of Biological Chemistry, IACS, Kolkata. She did her M.Sc. in Physiology in 1969 and Ph.D. in Biochemistry in 1975 from Calcutta University. In her academic career, she has received several awards/fellowships like INSA Young Scientist Medal in Biological Science in 1975 and Shanti Swarup Bhatnagar Prize in Biological Science in 1989. Her current research interest includes Molecular Enzymology and Cancer Biochemistry. Her future plan focuses on development of anticancer drug and understanding of differentiation process of cells.

DR. ANIRBAN GANGULY

Dr. Anirban Ganguly did his MBBS from R G Kar Medical College and Hospital, Kolkata and did his Internship and House-staffship from the same college. Then he joined in NICED as Senior Research Fellow in a project on Swine Flu. He is a JBNSTS Scholar of Batch 2003 and he is associated with several programs of JBNSTS.

“Exciting World of Science”

Day to Day Program

Day 1 : Tuesday, July 10, 2012

- 09:30 a.m. – 10:00 a.m. Registration
- 10:00 a.m. – 11:00 a.m. Welcome Address by the Director, JBNSTS and Orientation
- 11:00 a.m. – 12:00 noon **Inaugural Lecture**
Prof. Abhijit Chakraborty, Vice Chancellor, Jadavpur University, Kolkata
- 12:00 noon – 01:00 p.m. **“Development of Scientific Methods : Rationality and Experimentation”**
Dr. Bichitra Kumar Guha, Professor & Dean, Faculty of Basic & Applied Science, Bengal Engineering and Science University, Shibpur, Howrah
- 01:00 p.m. – 02:00 p.m. Lunch & Interaction
- 02:00 p.m. – 03:30 p.m. **“How to choose your career?”**
Dr. Subhrangsu Aditya, School of Bio Science & Engineering and School of Cognitive Science, Jadavpur University, Kolkata
- 03:30 p.m. – 04:00 p.m. **Interactive Session**
- 04:00 p.m. – 05:00 p.m. **“BCL Forum”**
Ms. Aparna Bhattacharya, Manager Projects Library Services East India, British Council Library

Day 2 : Wednesday, July 11, 2012

- 09:30 a.m. – 10:00 a.m. Registration (**Submission of attested copy of Xth Standard Board Examination Mark Sheet**)
- 10:00 a.m. – 11:00 a.m. **“Ethics, Integrity and Morality in Science – Influence on the Society”**
Dr. Parimal C. Sen, Senior Professor and Head, Division of Molecular Medicine, Bose Institute, Kolkata
- 11:00 a.m. – 01:00 p.m. **“What Computers Cannot Do”**
Shri Goutam Biswas, Dept. of Computer Science and Engineering, IIT, Kharagpur
- 01:00 p.m. – 02:00 p.m. Lunch & Interaction (**Submission of filled-in BCL Membership Form**)
- 02:00 p.m. – 03:30 p.m. **“Electrons in Molecular Orbitals: Absorption and Emission ”**
Dr. Samita Basu, Chemical Science Division, Saha Institute of Nuclear Physics, Salt Lake, Kolkata
- 03:30 p.m. – 05:00 p.m. **“Exoplanets: The Worlds Outside Our Own World”**
Dr. Sujan Kumar Sengupta, Associate Professor, Indian Institute of Astrophysics, Bangalore

Day 3 : Thursday, July 12, 2012

- 09:30 a.m. – 09:45 a.m. Registration at Science City, Kolkata
- 10:00 a.m. – 01:00 p.m. **Educational Visit to Science City**
- 01:00 p.m. – 02:00 p.m. Lunch & Interaction
- 02:00 p.m. – 04:30 p.m. **Continuation of Educational Visit to Science City**

Day 4 : Friday, July 13, 2012

- 09:30 a.m. – 09:45 a.m. Registration (**Submission of Travel Bill**)
- 10:00 a.m. – 01:00 p.m. **“Demonstration of Science Experiment”**
Shri Samar Bagchi, Science Communicators' Forum, Kolkata
- 01:00 p.m. – 02:00 p.m. Lunch & Interaction
- 02:00 p.m. – 03:30 p.m. **“Why Mathematics?”**
Dr. Pradipta Bandyopadhyay, Professor, Stat-Math Division, Indian Statistical Institute, Kolkata
- 03:30 p.m. – 05:00 p.m. **“The Process of Science”**
Dr. Ashesh Nandy, Center for Interdisciplinary Research and Education, Kolkata

Day 5 : Saturday, July 14, 2012

- 09:30 a.m. – 10:00 a.m. Registration
- 10:15 a.m. – 11:30 a.m. **“Graphene: The Latest Marvel in Carbon Nanoscience”**
Dr. G. P. Das, Senior Professor, Dept. of Material Science, Indian Association for the Cultivation of Science, Kolkata
- 11:30 a.m. – 01:00 p.m. **“Understanding the basis of malignancy: Killing of Malignant cells specifically by depriving Adenosine-Triphosphate (ATP), the Biological Energy Coin”**
Dr. Manju Ray, Emeritus Professor, CSIR, Bose Institute, Kolkata
- 01:00 p.m. – 02:00 p.m. Lunch & Interaction (**Submission of Information cum Feedback sheet during afternoon Registration, reimbursement of Travel Bill and BCL Card Distribution**)
- 02:00 p.m. – 04:00 p.m. **Egg Dropping Contest**
- 04:00 p.m. – 05:00 p.m. **Science Quiz : Dr. Anirban Ganguly**

A DST-JBNSTS Science Camp

“Exciting World of Science”

(10th – 14th July, 2012) JB Centre of Excellence for Student-Scientists,
1300, Rajdanga Main Road, Kasba, Kolkata 700 107

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Stamp-size
Photograph
here

Student's information sheet

Name of the student (in block letters):

Permanent address:

Contact Number: Landline -

Mobile -

E-mail (mandatory):

School's name (in block letters) & Address with pin code, phone no & email-id:

Percentage of marks obtained in the 10th standard Board examination held in 2012:

Percentage of marks obtained in science subjects:

Favorite subject:

Who is your role model in science?

Would you like to pursue a career in science?

What is your expectation from a science camp?

स जीवति मनो यस्य मननेन हि जीवति

Have you heard about JBNSTS before the camp? How?

Signature of Student

“Exciting World of Science”

(10th – 14th July, 2012) JB Centre of Excellence for Student-Scientists,
1300, Rajdanga Main Road, Kasba, Kolkata 700 107

Feedback sheet

Name of the student (in block letters):

School's name (in block letters) & address with pin code, phone no. & email-id:

What is your opinion about this science camp? Which of the sessions have you enjoyed more and why? How does it motivate you to pursue your future?

Your comments on how the science camp could have been made better?

स जीवति मनो यस्य मननेन हि जीवति

Signature of Student