FELICITATION

of

INTERNATIONAL OLYMPIAD MEDALLISTS, 2019 in the sciences and mathematics

Friday, December 20, 2019

SCIENTIFIC PROGRAMME: 09.30 to 11.30 hrs
Expository lectures by eminent scientists

AWARD CEREMONY: 12.00 to 13.30 hrs

An event organized by HBCSE (TIFR) in association with
the Infosys Foundation & the TIFR Endowment Fund.

Homi Bhabha Centre for Science Education
Tata Institute of Fundamental Research
V. N. Purav Marg, Mankhurd, Mumbai – 400 088
http://www.hbcse.tifr.res.in

OLYMPIADS IN MATHEMATICS, SCIENCES AND INFORMATICS

The International Olympiads in Mathematics, Physics, Chemistry, Biology, Astronomy, Astrophysics, Junior Science, Earth Science and Informatics are annual academic competitions to stimulate and challenge bright young pre-university students. The aims of the International Olympiads are to promote academic excellence and also to foster friendship among students and teachers of different countries. India started participating in International Olympiads in Mathematics from 1989, in Physics, Chemistry, Biology, Astronomy and Informatics about a decade later, followed by participation in the Earth Science and the Junior Science Olympiads. India has hosted the International Mathematical Olympiad (1996), International Chemistry Olympiad (2001), International Astronomy Olympiad (2006), International Biology Olympiad (2008), International Earth Science Olympiad (2013), International Junior Science Olympiad (2013), International Physics Olympiad (2015) and International Olympiad on Astronomy and Astrophysics (2016).

Homi Bhabha Centre for Science Education (HBCSE), Tata Institute of Fundamental Research (TIFR) is the nodal agency for implementing the Olympiad programme in Mathematics, Physics, Chemistry, Biology, Astronomy and Astrophysics, and Junior Science. The Olympiad programme in the five science subjects mentioned is overseen by a National Steering Committee. The Indian Olympiad programme typically involves three stages of selection. The first stage selects a few hundred students from among tens of thousands who appear for the preliminary examinations all over the country. The first stage of the science Olympiads is carried out by the Indian Association of Physics Teachers (IAPT) with support from teacher associations of chemistry and biology. In the mathematics Olympiads carried out by HBCSE under the aegis of National Board of Higher Mathematics (NBHM), the first stage is carried out by the Mathematics Teachers' Association, India (MTAI) and the second stage is decentralised.

The higher stages in the five science subjects and mathematics are carried out by HBCSE with support from teachers and scientists nationwide. The second stage (third stage for mathematics) is the Indian National Olympiads – the most challenging contests in mathematics and sciences at the pre-college level held in the country. Between 35 and 50 national Olympiad winners in each subject undergo training and testing every summer at HBCSE, after which the Indian teams are selected to represent the country at the International Olympiads. The Informatics Olympiad Programme is carried out by the Indian Association for Research in Computing Science (IARCS). The Earth Science Olympiad Programme is carried out by the Geological Society of India (GSI). The Junior Astronomy Olympiad is under the supervision of the National Council of Science Museums (NCSM). The Informatics Olympiad training camp is held at The International School, Bengaluru. The Earth Science Olympiad camp is held at Bengaluru or Chennai, while the Junior Astronomy Camp is held at the Nehru Science Centre, Mumbai.

The Science Olympiad Programme in India is funded by the Board of Research in Nuclear Sciences (BRNS) of the Department of Atomic Energy (DAE), the Department of Science and Technology (DST) and the Ministry of Human Resource Development (MHRD). The Mathematics Olympiad Programme is funded by NBHM (DAE) and MHRD. The Astronomy Olympiad Programme is funded by the Department of Space (DOS), DAE, and NCSM. The Informatics Olympiad is funded by Indian Association for Research in Computing Science (IARCS), Sasken Technologies Ltd, TCS iON (a division of Tata Consultancy Services), CodeChef (a not-for-profit educational initiative by Directi) and

Chennai Mathematical Institute. The Earth Science Olympiad Programme is funded by the Ministry of Earth Sciences (MoES). The Junior Science Olympiad programme is funded by MHRD and by HBCSE (TIFR) through its Plan funds.

Indian students have been doing consistently well at the International Olympiads. The performance of the teams in 2019 was: Physics (2 Gold, 3 Silver); Chemistry (2 Gold, 1 Silver, 1 Bronze); Biology (3 Silver, 1 Honourable Mention); Mathematics (1 Gold, 4 Silver, 1 Honourable Mention); Astronomy (Jr.) (1 Gold, 1 Silver, 1 Bronze); Astronomy and Astrophysics (1 Gold, 3 Silver, 1 Bronze); Junior Science (6 Gold); Informatics (1 Silver, 1 Bronze); Earth Science (3 Gold, 4 Silver, 3 Bronze). Out of the 41 students who were sent to various Olympiads, 37 won either a gold, silver or bronze medal. Our Olympiad students are comparable with the best in the world and we are justifiably proud of them.

ACKNOWLEDGEMENTS

In 2002, Infosys Foundation instituted awards to Indian medalists in the International Olympiads. The awards consist of a cash prize of Rs 15000, the grant for which has been given to the TIFR Endowment Fund. HBCSE (TIFR) expresses its deep gratitude to Smt. Sudha Murty, Chair, Infosys Foundation for her spontaneous and generous response to the Institute’s request for this support. We also thank the TIFR Endowment Fund for their proactive interest in the Olympiad programme.

The Government of India has been generously supportive of the Olympiad programme through its various agencies as listed above. We are thankful for this support and for the support for the Informatics Olympiad by the agencies listed. Finally, it is a pleasure to thank the Indian Association of Physics Teachers, the Association of Teachers in Biological Sciences, the Association of Chemistry Teachers, the Mathematics Teachers' Association (India), Indian Physics Association, National Council of Educational Research and Training, IARCS, GSI, NCSM and the large number of scientists and teachers from different institutions across the country for their enthusiastic collaboration in this exciting activity.

K. Subramaniam
Chair, National Steering Committee
Science and Astronomy Olympiads.

Morning Session **Expository Lectures by Eminent Scientists** **Lecture 1 (9:30 to 10:30 hrs)** **Prof. G. Ravindra Kumar** **Tata Institute of Fundamental Research (**TIFR), Mumbai	

Extreme Light and Extreme States of Matter

High intensity, ultrashort light pulses can excite matter to high temperature at high density and are therefore revolutionizing science in amazing ways. They provide great opportunities for doing experiments in the lab that help us study matter pushed to extreme conditions – the kind that pervades most of the 'visible' universe. They also enable novel technologies in particle acceleration and hard x-ray electromagnetic radiation as well as high energy electron and ion sources – all on a table top.

This talk will begin with simple concepts of light-matter interaction (linear regime), move to nonlinear optics at moderately high light intensities and then to 'extreme' optics at ultrahigh intensities. For illustration, we will look at results of some experiments performed at TIFR – creation of gigantic magnetic fields, ultrafast plasma dynamics, passage of relativistic particles through dense, hot matter and its consequences in terms of MeV ion production, ultrafast hard x-ray emission, laser fusion, etc.

Gerard Mourou and Donna Strickland won half the Nobel prize in physics in 2018 for the invention of chirped pulse amplification that made ultrahigh power laser, femtosecond laser pulses.

About the Speaker

G. Ravindra Kumar obtained his Ph.D. in 1990 from IIT Kanpur. He has been at TIFR since 1992 and is presently a Senior Professor in the Department of Nuclear and Atomic Physics. His areas of interest are experimental studies of high intensity laser pulse interaction with matter, creation and understanding of extreme states of matter and nonlinear optics. His area of study has implications for many branches of physics including plasma physics, astrophysics, condensed matter physics and optical sciences.

He was elected a Fellow of the Indian Academy of Sciences in 2004 and of the Indian National Science Academy in 2008. He received the B.M. Birla Prize for Physical Sciences in 2000, the S S Bhatnagar Prize for Physical Sciences in 2003, a DAE Outstanding Investigator award in 2005, a J C Bose Fellowship in 2010 and the Infosys Prize in Physical Sciences in 2015. He is a Distinguished Alumnus of BITS, Pilani and IIT Kanpur. He has been on the International Committee on Utrahigh Intensity Lasers (ICUIL) since 2008 and is currently the Co-Chair. He is a life member of the American Physical Society, the Plasma Science Society of India and the Indian Laser Association. He is a member of the Optical Society of America.

Details of his work can be accessed at www.tifr.res.in/~uphill.

Lecture 2 (10:30 to 11:30 hrs) **Prof. Gagandeep Kang** Executive Director, Translational Health Science Technology Institute (THSTI)	

Developing and using a rotavirus vaccine in India

Rotavirus infects nearly all young children, causing dehydrating gastroenteritis in approximately 1 in 50 children. Untreated dehydration kills, so several hundred thousand children die every year. A rotavirus vaccine based on a neonatal strain was developed in the US and India over nearly 30 years and licensed in 2014 as Rotavac, made by Bharat Biotech. A second vaccine licensed from the US, was developed in India and Africa and licensed in 2017 as RotaSIIL, made by Serum Institute Pvt. Ltd. We evaluated both vaccines in the clinic and the laboratory and conducted several other studies to characterize the performance of rotavirus vaccines. Both India vaccines are now WHO pre-qualified and in use in the national immunization programme. Because of the small size of the pre-licensure clinical studies, there were concerns about how the vaccines would perform with real world use. We have generated new data for one vaccine and are embarking on a study of the second vaccine. Much done, but still a lot to do.

About the Speaker

Professor Kang is the Executive Director, Translational Health Science Technology Institute (THSTI), an autonomous institute of the Department of Biotechnology. Prior to joining DBT, Prof. Kang was Professor and Head of the Wellcome Trust Research Laboratory, and the Division of Gastrointestinal Sciences at the Christian Medical College (CMC) in Vellore.

Professor Kang has built a strong inter-disciplinary research program that has demonstrated the complex relationships between infection, gut function and physical and cognitive development. Based first at an outstanding medical college and now at the THSTI, she has established a strong training program for students and young faculty in clinical translational medicine aiming to build a cadre of clinical researchers studying relevant problems in India.

With over 350 publications, she is internationally recognized for her contributions to biomedical research. She serves on or has served on the scientific advisory committee of several national and international institutions, including the Wellcome Trust, UK, the DBT-Wellcome Trust India Alliance, the International Vaccine Institute, International Center for Genetic Engineering and Biotechnology and the World Health Organization.

Afternoon Session (12:00 – 13:30 hrs.)

Address & Award distribution by

Prof. Srikumar Banerjee
Sr. Professor and Chancellor,
Homi Bhabha National Institute

About the Chief Guest

Dr. Srikumar Banerjee received his B.Tech (Hons) and Ph.D from IIT Kharagpur. He was Director, Bhabha Atomic Research Centre from 2004 to 2010 and served as Chairman, Atomic Energy Commission, Secretary, Department of Atomic Energy during 2009 - 2012. He has been awarded the Shanti Swaroop Bhatnagar Prize for Science and Technology (1989) and Padma Shri in 2005. He is a Fellow of INSA, IASc., INAE, NASI and TWAS. Currently he is Chancellor, Homi Bhabha National Institute.

INDIAN DELEGATION TO THE 60th INTERNATIONAL MATHEMATICAL OLYMPIAD 2019

The following team represented India at the 60th International Mathematical Olympiad held at Bath, United Kingdom during July 11 – 22, 2019.

Sr. no.	Students	Medals	
1	Pranjal Srivastava National Public School, Bengaluru	Gold	
2	Bhavya Agrawalla Chhatrapati Shivaji Public School, Indore	Silver	
3	Anubhab Ghosal Bodhicariya Senior Secondary School, Kolkata	Silver	
4	Ojas Mittal Siddhant World School, Lucknow	Silver	
5	Ritam Nag South Point High School, Kolkata	Silver	
6	Soumil Aggarwal Hope Hall Foundation School, New Delhi	Honourable Mention	

Leaders and Scientific Observers

1	Prof. C. R. Pranesachar, Retd., Homi Bhabha Centre for Science Education, Mumbai	Leader	
2	Prof. Vinayak Sholapurkar, Department of Mathematics, S.P. College, Pune	Deputy Leader	
3	Dr. Tejaswi Navilarekallu Logarithm B.V., Netherlands	Scientific Observer	
4	Prof. Ravindra B. Bapat Indian Statistical Institute, New Delhi	Scientific Observer	

INDIAN DELEGATION TO THE 50th INTERNATIONAL PHYSICS OLYMPIAD 2019

The following team represented India at the 50th International Physics Olympiad held at Tel Aviv, Israel during July 7 – 14, 2019.

Sr. no.	Students	Medals	
1	Nishant Abhangi Disha Delphi Public School, Kota	Gold	
2	Archit Bubna Amity International School, New Delhi	Gold	
3	Dhruv Arora Shri Agrasen Vidyalaya, Indore	Silver	
4	Harshvardhan Agarwal Jankidas Kapur Public School, Sonipat	Silver	
5	Kaustubh Dighe Disha Delphi Public School, Kota	Silver	

Leaders and Scientific Observers

1	Prof. Anwesh Mazumdar Homi Bhabha Centre for Science Education, Mumbai	Leader	
2	Prof. J. P. Gadre (Retd.) MES Abasaheb Garware College, Pune	Leader	
3	Prof. Amol Dighe Tata Institute of Fundamental Research, Mumbai	Scientific Observer	
4	Dr. Vijay Soman S. M. Mohta College, Nagpur	Scientific Observer	

INDIAN DELEGATION TO THE 51st INTERNATIONAL CHEMISTRY OLYMPIAD 2019

The following team represented India at the 51st International Chemistry Olympiad held at Paris, France during July 21 – 30, 2019.

Sr. no.	Students	Medals	
1	Dhyey Sankalp Gandhi Disha Delphi Public School, Kota	Gold	
2	Mudita Goyal Disha Delphi Public School, Kota	Gold	
3	R. Muhender Raj MB International School, Kota	Silver	
4	Madhav Mittal Cambridge Court High School, Jaipur	Bronze	

Leaders and Scientific Observers

1	Dr. Sujata Kale (Ret.) MES Abasaheb Garware College, Pune	Leader	
2	Dr. Dimple Dutta Bhabha Atomic Research Centre, Mumbai	Leader	
3	Dr. Ankush Gupta Homi Bhabha Centre for Science Education, Mumbai	Scientific Observer	
4	Dr. N. Manoj Cochin University of Science & Technology, Kochi	Scientific Observer	

INDIAN DELEGATION TO THE 30th INTERNATIONAL BIOLOGY OLYMPIAD 2019

The following team represented India at the 30th International Biology Olympiad held at Szeged, Hungary during July 15 – 21, 2019.

Sr. no.	Students	Medals	
1	Hardik Gupta Navjeevan Adarsh Public School, Delhi	Silver	
2	Arunangshu Bhattacharyya Disha Delphi Public School, Kota	Silver	
3	Suryadeep Mandal Dav Model School, Durgapur	Silver	
4	Akshay Gupta MAA Bharti Sr Sec School, Kota	Honourable Mention	

Leaders and Scientific Observers

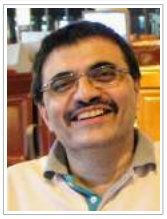
1	Prof. Ujwala Bapat (Retd.) St. Xaviers College, Mumbai	Leader	
2	Prof. Rekha Vartak Homi Bhabha Centre for Science Education, Mumbai	Leader	
3	Dr. Kiran Kondabagil Indian Institute of Technology Bombay, Mumbai	Scientific Observer	
4	Dr. Rambhadur Subedi National Institute For Research in Reproductive Health, Mumbai	Scientific Observer	

INDIAN DELEGATION TO THE 13th INTERNATIONAL OLYMPIAD ON ASTRONOMY AND ASTROPHYSICS 2019

The following team represented India at the 13th International Olympiad on Astronomy and Astrophysics held at Keszthely & Heviz, Hungary during August 2 – 11, 2019.

Sr. no.	Students	Medals	
1	Chirag Falor Pragati Public School, Delhi	Gold	
2	Hemansh Alkesh Shah Dnyan Ganga Education Trusts Jr College, Thane	Silver	
3	Madur Adarsh Reddy Narayana CO Campus, Madhapur	Silver	
4	Prashant Gokhale Vidya Niketan Junior College of Commerce and Science, Mumbai	Silver	
5	Sai Teja Varanasi Narayana College, Hyderabad	Bronze	

Leaders and Scientific Observers

1	Prof. Yogesh Wadadekar National Centre for Radio Astrophysics, Pune	Leader	
2	Dr. Sanved Kolekar UM-DAE Centre for Excellence in Basic Sciences, Mumbai	Leader	
3	Mr. Pritesh Ranadive Homi Bhabha Centre for Science Education, Mumbai	Scientific Observer	
4	Mr. Kumar Ayush Goldman Sachs, Bengaluru	Scientific Observer	

INDIAN DELEGATION TO THE 13th INTERNATIONAL EARTH SCIENCE OLYMPIAD 2019

The following team represented India at the 13th International Earth Science Olympiad held at Daegu, Republic of Korea, during August 26 – September 3, 2019.

Sr. no.	Students	Medals	
1	Anuj Jain, Disha Delhi Public School, Kota	1 Gold 1 Silver 1 Bronze	
2	Tejas Kumar, Jayshree Periwal High School, Jaipur	1 Gold 1 Silver	
3	Varnan Dewangan, Krishna Public School, Raipur	1 Gold 1 Bronze	
4	Teesta Solanki, Abhinav Senior Secondary School, Udaipur	2 Silver 1 Bronze	

Leaders and Scientific Observers

1	Dr. Hema Achyuthan Institute of Ocean Management Anna University, Chennai	Leader	
2	Dr. K.S. Godhavari Geological Society of India, Bengaluru	Leader	
3	Dr. Jagvir Singh Ministry of Earth Sciences, Government of India, New Delhi	Scientific Observer	
4	Mr. Ashok Saha Ministry of Earth Sciences, Government of India, New Delhi	Scientific Observer	

INDIAN DELEGATION TO THE 24th INTERNATIONAL ASTRONOMY OLYMPIAD 2019

The following team represented India at the 24th International Astronomy Olympiad held at Piatra Neamț, România from October 18 – 27, 2019.

Sr. no.	Students	Medals	
1	Dhananjay Raman, Bal Bharati Public School, New Delhi	Gold	
2	Josyula Venkata Aditya, Narayana CO School, Madhapur	Silver	
3	Hithysh L Kanth, Delhi Public School Bangalore South, Bangalore	Bronze	

Leaders and Scientific Observers

1	Dr. Kanchan Kumar Chowdhury, National Council of Science Museums, Kolkata	Leader	
2	Shri Munikumar Balaji Minnal, Regional Science Centre, Tirupati	Leader	
3	Shri Bharat Bhusan Shrivastava, National Science Centre, Delhi	Scientific Observer	

INDIAN DELEGATION TO THE 31st INTERNATIONAL OLYMPIAD IN INFORMATICS 2019

The following team represented India at the 31st International Olympiad in Informatics held at Baku, Azerbaijan from August 4 - 11, 2019.

Sr. no.	Students	Medals	
1	Adhyyan R Sekhsaria Dhurubhai Ambani International School, Mumbai	Silver	
2	Rajarshi Basu Bodhicariya Senior Secondary School, Kolkata	Bronze	

Leaders and Scientific Observers

1	Prof. Madhavan Mukund Chennai Mathematical Institute, Kelambakkam	Leader	
2	Prof. K Narayan Kumar Chennai Mathematical Institute, Kelambakkam	Deputy Leader	

INDIAN DELEGATION TO THE 16th INTERNATIONAL JUNIOR SCIENCE OLYMPIAD 2019

The following team represented India at the 16th International Junior Science Olympiad held at Doha, Qatar during December 3 – 12, 2019.

Sr. no.	Students	Medals	
1	Arnav Aditya Singh National Public School, Bengaluru	Gold	
2	Atharv Shivram Mahajan Disha Delphi Public School, Kota	Gold	
3	Krishna Sharma Disha Delphi Public School, Kota	Gold	
4	Mahit Rajesh Gadhiwala Scholar English Academy, Surat	Gold	
5	Manpreet Singh K R Mangalam World School, New Delhi	Gold	
6	Priyanshu Yadav Arihant Public School, Kota	Gold	

Leaders and Scientific Observers

1	Dr. Chitra Joshi (Retd.) Ramnivas Ruia College	Leader	
2	Dr. Vinayak Katdare (Retd.) Ruparel College	Leader	
3	Shri Vikrant Ghanekar Homi Bhabha Centre for Science Education, Mumbai	Leader	

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