



A quarterly bulletin of the
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Editor :
Aseem Paranjape
(aseem@iucaa.in)

Editorial Assistant :
Manjiri Mahabal
(mam@iucaa.in)

Available online at <http://ojs.iucaa.in/>

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Workshop on Aspects of Gravity and Cosmology

An international workshop on Aspects of Gravity and Cosmology was organised at IUCAA, during March 7 - 9, 2017, covering a broad range of topics in classical and quantum aspects of gravitation and cosmology. The lively and eclectic academic programmes covered topics as diverse as emergent gravity, cosmo-biology, including a historical survey of observational cosmology, as the subject progressed from the early days of IUCAA up to the latest results,



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involving some of the large surveys currently in operation, such as the Dark Energy Survey and the search for cosmological neutral hydrogen.

Along with the academic programmes, one session concentrated on issues in Public Outreach in Science, including talks on

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National Science Day 2017

On February 28, 2017, it was revealed that IUCAA Science Day celebrations was just as popular, be it a Sunday or a weekday! The celebrations of National Science Day (this time mid-week on a Tuesday) attracted numerous groups of students from in and around Pune, and as far as Parbhani (about 10 hours bus journey to Pune). On this occasion, around 6,000 people visited IUCAA in the day session, and breaking all previous records, a record-breaking 1,800 odd people attended the sky watching session at night! This really shows the hunger of the masses to associate better with science and scientists.

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variety of issues, the highlight being a stirring talk by Professor Jayant Narlikar on the battle against astrology. An enthusiastic update on IUCAA's science popularisation activities was given by Sonal Thorve.

This workshop was also timed to coincide with the 60th birthday of Professor T. Padmanabhan, one of the most distinguished faculty members of IUCAA. Many of the invited speakers were his colleagues, collaborators, and current and former students, and the schedule was chosen such that the areas to which he has

extensively contributed, including classical and quantum gravity, as well as public outreach, were among those covered. A session was organised bringing together many old friends of IUCAA, as well as some first-time visitors, to pay tribute to Professor Padmanabhan's achievements.

The coordinators of this workshop were Aseem Paranjape (IUCAA) and Tirthankar Roy Choudhury (NCRA, Pune). The sessions of the workshop have been video-recorded, and will be made available on the IUCAA network in due course.



Congratulations to ...

Ajit Kembhavi, on being awarded the *Raja Ramanna Fellowship - TRACK I*, by the Department of Atomic Energy, Government of India.

National Science Day glimpses...



For the open day, people were welcomed and guided by the IUCAA staff members in the main campus of the institute. It was adorned by the scale-models of different astronomy projects of public interest, like LIGO - India, Aditya - L1 and AstroSat. A number of spectacular posters, designed and presented enthusiastically by the research scholars of IUCAA, made people aware of the on-going research and new developments in the subject. Apart from these, the Foucault pendulum, the statues of great scientists, demonstrations of Laser Interferometry, IFU and Polarisation, Radio Astronomy attracted a large number of people.

Informative videos on the scales of the universe were screened by Atreyee Sinha and Pranjupriya Goswami, which kept the public rooted in the Chandrasekhar Auditorium during the morning. In parallel, events like Science Toys demonstrations, co-ordinated by Ashok Rupner, demonstrations of Telescope Making, co-ordinated by Tushar Purohit, and the display of the top entries in the model making competition, kept people magnetized in the Science Park area throughout the day.

In the afternoon, there was a live interaction with scientists, in which Jayant Narlikar and Somak Raychaudhury, eloquently answered several astronomy related questions from the public. This was coordinated by Samir Dhurde. It was a great pleasure to note that school students asked wonderful thought provoking questions regarding our universe. Along with the chock-full auditorium, some viewers enjoyed the live webcasting of the sessions online.



Sujan Sengupta (IIA, Bengaluru) delivered a special lecture, titled, "Trappist 1 and other Exo-planet Worlds", where he shared the latest information about the recent and very exciting discovery of Trappist 1 (an ultra-cool dwarf star) system. The process of Indian contributions to understanding planetary systems and bodies other than Solar system was also shared. Special talks were given on LIGO - India by Sanjeev Dhurandhar, on Aditya - L1 by Durgesh Tripathi, and TMT - India by A.N. Ramaprakash and Samir Dhurde. An evening lecture on the 2016 Physics Nobel Prize, titled, "Topology Matters" was delivered by Sunil Mukhi (IISER, Pune). The crowds thoroughly enjoyed these.

As per the tradition, there were also events for school students prior to the open day. IUCAA Public Outreach personnel conducted a science quiz along with essay writing, and drawing competitions for the rural students of the Ambegaon Taluka on February 4, 2017. Shabbir Shaikh and Pranoti Panchbhair enthusiastically encouraged students from 30 rural schools, who competed at the venue generously provided by the New English School, Landewadi. A major help also came from the IUCAA Girawali Observatory staff, Nilesh Pokharkar, along with others.

About 500 students from classes 8 to 10, from 65 schools in Pune city responded to IUCAA's invitations, and participated in another set of inter-school competitions. On February 18, fifty two student teams presented very novel science models made by them in a newly introduced competition this year. On February 25, other students took part in the drawing, essay, poetry and science quiz competitions. Shamin Padalkar (TISS, Mumbai) gave an interactive talk to the teachers, who accompanied the students. After the finals of the exciting quiz competition, all winning students, including the students from the rural schools, who were specially invited to IUCAA, received their prizes from Somak Raychaudhury (Director, IUCAA). All the students were enthused and also very happy to have a chance to interact with the IUCAA scientists during these National Science Day celebrations.

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Winning Drawings

FROM CITY SCHOOLS



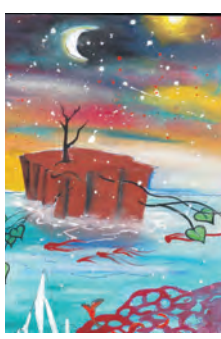
1st Prize

Avinash Anil Murkute
Non-conventional sources of energy



2nd Prize

Yash Vijay Khadke
The view of the sky on an exo-planet



3rd Prize

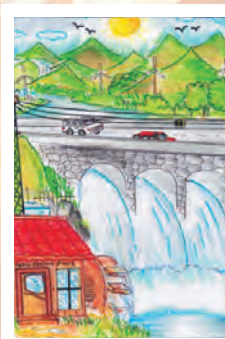
Manasi Salil Kolhatkar
The view of the sky on an exo-planet

FROM RURAL SCHOOLS



1st Prize

Kalashri Bhanudas Borhade
Collision of two galaxies



2nd Prize

Tanmay Prashant Wable
Non-conventional sources of energy



3rd Prize

Nirmitee Yatin Hule
Types of telescopes

THE LIST OF PRIZE WINNERS FROM RURAL SCHOOLS OF NATIONAL SCIENCE DAY COMPETITIONS, HELD ON FEBRUARY 4, 2017

Science Quiz:

1st: Niraj Tanaji Karande, Jitesh Shivaji Mahale, and Sonal Rajaram Kather, from New English School, Landewadi.

2nd: Pitambar Nareshwar Pande, Ajinkya Rajendra Mohale, and Ghanshyam Nareshwar Pandey, from New English Medium School, Ghodegaon.

3rd: Anushka Vijay Gawade, Anuja Sharad Gawade, and Akshada Baburao Thorat, from Hirkani Vidyalay, Gawdewadi.

Essay Writing:

1st: Priyanka Bharat Lande, from Shri Shivajirao D. Adhalrao Patil Vidyalaya, Landewadi.

2nd: Salma S. A. Shaikh, from Nalanda English Medium School, Manchar.

3rd: Srushti Sudarshan Awate, from New English Medium School, Ghodegaon.

Drawing:

1st: Kalashri Bhanudas Borhade, from Shri Shivajirao D. Adhalrao Patil Vidyalaya, Landewadi.

2nd: Tanmay Prashant Wable, from Mahatma Gandhi Vidyalaya, Manchar.

3rd: Nirmitee Yatin Hule, from Nalanda English Medium School, Manchar.

THE LIST OF PRIZE WINNERS FROM PUNE CITY SCHOOLS OF NATIONAL SCIENCE DAY COMPETITIONS, HELD ON FEBRUARY 25, 2017

Science Quiz:

1st: Chahel Singh, Akshat Joshi, and Aarya Kamat, from Delhi Public School.

2nd: Swarang Sarang Joshi, Om Suneel Godbole, and Chinmay Makarand Pimpalkhare, from Sevasadan English Medium School.

3rd: Shreyas Yogesh Dixit, Tanmay Nilesh Darak, and Akhil Ashish Atre, from Jnana Prabodhini Prashala.

Essay: Marathi

2nd: Anand Suhas Devsingkar, from Modern High School for Boys (Marathi Medium).

(There were no Marathi Essays worth for the first and third prizes)

Essay: English

1st: Mauli Kaushik, from St. Mary's School.

2nd (Jointly): Rushikesh Sunil Patade, from Bharatiya Vidya Bhavan Paranjpye Vidya

Mandir; and Soumil Shailesh Karkhanis, from Jnana Prabodhini Prashala.

3rd: Sumant Ravindra Chopde, from Muktatangan English School.

Drawing:

1st: Avinash Anil Murkute, from Modern High School for Boys (Marathi Medium).

2nd: Yash Vijay Khadke, from R.M.D. Sinhgad Spring Dale School.

3rd: Manasi Salil Kolhatkar, from Bharatiya Vidya Bhavan Paranjpye Vidya Mandir.

Poetry: English

2nd (Jointly): Nishtha Shukla, from Air Force School; and Swatej Sachin Joshi, from Loyola High School.

3rd: Abhipsa Harshbardhan Dash, from Vidya Pratishthan's English Medium School.

(There was no English Poetry worth for the first prize)

Poetry: Marathi

2nd: Apurva Nilkanth Shinde, from Mahilashram High School.

(There were no Marathi Poetries worth for the first and third prizes)

Model Making:

1st: Shreshthi Sunil Datir, Vaibhavi Santosh Panse, and Sanskruti Ashok Pawar, from A.W. Sindhu Vidya Bhawan.

2nd (Jointly): Ritesh Shashikant Kamble, Karushankat Mahendra Raut, and Mayur Amol Pawale, from Chetan Dattaji Gaikwad Vidyalaya; and Rohit Ketan Deval, Neil Ashish Yardi, and Anish Atul Vaidya, from Sevasadan English Medium School.

3rd: Shreyas Sharad Wetel, Atharva Shailesh Bhunje, and Atharva Dhananjay Nangare, from Vidya Pratishthan's English Medium School.



Training School on Optical Astronomy with Large Telescopes



As a part of the Thirty Metre Telescope - India (TMT - India) project, a Training School on Optical Astronomy with Large Telescopes was organised at IUCAA, during January 16 - 27, 2017. This school was aimed at introducing various modern astronomical techniques used in present day 8 m class telescopes, TMT and its first generation instruments to Ph.D. students from different Indian research institutes and university departments. There were about 30 students participated in this school. The programme had two parts: (i) Basic lectures on different astronomical topics in the morning, and (ii) Hands-on-sessions in the evening. Researches from ARIES, IUCAA, IIA, PRL and TIFR and members of the MICHl team gave lectures, and provided projects for the hands-on-sessions. Students were divided into 6 groups and did projects based on (i) MID-IR observations with Subaru, (ii) High resolution spectroscopic observations using UVIS and X-Shooter in VLT, (iii) Long slit spectroscopic observations with SALT, and (iv) Understanding the Adaptive Optics techniques in the



laboratory. At the end of the school, students made short presentations of their projects. The project sessions were handled by Hum Chand (ARIES), A. N. Ramaprakash (IUCAA), R. Srianand (IUCAA), Ravi Joshi (IUCAA), and Itsuki Sakon (University of Tokyo). The workshop was funded by India TMT Coordination Centre (ITCC), and coordinated by R. Srianand, Neeraj Gupta and A. N. Ramaprakash.

Workshop on Statistical Analysis in Cosmology

The Workshop on Statistical Analysis in Cosmology was conducted at the Department of Physics, Cochin University of Science and Technology, Kochi, during January 12 - 14, 2017. Statistical analysis becomes an integral part of both cosmology and astrophysics. This workshop intends to give the basics of statistical methods adopted in cosmology. The lectures covered: Statistical techniques in CMB - Early

universe, Large scale structure formation, Dark energy problems, CAMB, COSMOMC, etc. The speakers includes: Ujjaini Alam (ISI, Kolkata), K. Indulekha (M.G. University, Kottayam), Moncy V. John (M.G. University, Kottayam), Aseem Paranjape (IUCAA), Niladri Paul (IUCAA), Mohemmad Sami (CTS, JMI, New Delhi), Shabbir Shaikh (IUCAA), and Tarun Souradeep (IUCAA). There were 75 participants, including about 30 from outside the state of Kerala. The participants were mostly research scholars and young faculty members working in the area of cosmology. Discussions mainly concentrated on the importance of statistical analysis in this area and the use of different statistical packages. Tarun Souradeep and Titus K. Mathew (Department of Physics, CUSAT) were the coordinators of the workshop.



Topical Course on Computational Statistics and Astro-Statistics



A Topical Course on Computational Statistics and Astro-Statistics was held at IUCAA, during January 2 - 10, 2017. The course given by Coryn Bailer-Jones (MPIA, Heidelberg, Germany) comprised of lectures and computer-based exercises. U.C. Joshi (formerly of PRL, Ahmedabad) helped the participants with some of the coding in R. There were about 45 outstation and 5 local participants. Most of them were Ph.D. students. The course focused on the probabilistic (Bayesian) approach to modelling data, and was based on Bailer-Jones' upcoming book, "Practical Bayesian Inference", to be published by the Cambridge University Press in mid 2017. On the first two afternoons, some of the participants have presented statistical problems in their Ph.D. work. The course was very useful to the participants, and should help them in their on-going research. Ranjan Gupta (IUCAA) was the coordinator of the course.



The Workshop on Stellar Astrophysics was conducted at the Department of Physics, Christ University, Bengaluru, during February 2 - 4, 2017, sponsored by IUCAA. P. Sreekumar, Director, Indian Institute of Astrophysics inaugurated the workshop, and chaired by Rev. Thomas C. Mathew, Vice-Chancellor, Christ University, who gave the presidential address.

Workshop on Stellar Astrophysics

The first talk of the workshop was given by P. Sreekumar on X-ray imaging in astrophysics, followed by H. P. Singh (Delhi University) on Parameters of stars through observations. In the afternoon, Ranjan Gupta (IUCAA) introduced the participants about Telescopes and observations, followed by the talk by Jayant Murthy (IIA) on Interstellar extinction.

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The second day of the workshop was mainly concentrated on Stellar structure and evolution with two talks by Annapurni Subramaniam (IIA) and another by Anupama G. C. (IIA). These talks explained the process of star formation, evolution of a star in the Main Sequence, and finally the different types of death a star would undergo. The final talk of the day was on Astronomy outreach activities in the era of mega-projects by Joe Jacob (Newman College, Kerala). He introduced the participants to the new existing/upcoming mega-projects like TMT, SKA, LIGO-India, etc. He insisted on the involvement of students and researchers into outreach activities, so that we have enough manpower to build new projects, and enjoy the benefits of such mega-projects.

Third day of the workshop had one talk on Star formation in galaxies by Mousumi Das (IIA), followed by a talk on Black holes by Tarun Deep Saini (IISc). The workshop was mainly intended for young researchers, graduate and post-graduate students, and there were 70 participants, of which 21 were outstation. The feedback received from them suggested that the conference was greatly a success. Paul K. T. (Christ University) and Ranjan Gupta were the coordinators.

Public Outreach Activities at IUCAA

Space Olympiad



As a part of the National Science Day celebrations, FISAT (Angamaly, Kerala) organised a Space Olympiad, during January 27 - 29, 2017. Sonal Thorve and Jyoti Hiremath were invited to represent IUCAA Scipop to conduct science toys demonstrations and sky-watching sessions. About 500 students from different schools in and around Kochi enjoyed the first ever view through a telescope. The IUCAA Resource Centre at the Cochin University of Science and Technology, helped by providing the telescope available.

Education and Science Communication

On January 24, 2017, Rohit Gupta (a free lancer) "Compasswallah", presented an informal slideshow/ talk in MVS, IUCAA on his work as an independent historian of science and mathematics.



Hands-on Activities in Mathematics and Science

This Hands-on Activities was held at Mukhtangan Vidnyan Shodhika, IUCAA, during January 30 - February 4, 2017, with the support from the Tata Trusts, Mumbai. The main objective was to popularise science in tribal areas. There were 26 participants from Eklavya, Bhopal, Madhya Pradesh; Shikshasandhan, Karrtavya, Jagruti and Sevajagat organizations from Odisha. Recently, these organisations have run five mobile science laboratories in tribal areas. The participants felt that the resource materials supplied to them were very useful, and they were thankful to IUCAA for the facilities provided, and the Tata Trusts for the support. In future, the participants have requested to conduct such workshops in other tribal areas.

Astro-Fest and Outreach



Somak Raychaudhury presented IUCAA's role in Astronomy Education and Outreach, at the annual meeting of the Astronomical Society of India (ASI), held at Jaipur, during March 6 - 10, 2017. Samir Dhurde (IUCAA) helped to organise the Rajasthan Astronomy Festival on this occasion. Several events like Teacher training workshop, Astro-photography competition and exhibition, Deep sky rangoli, and special public-astronomer interactions were organised at the world-famous Jantar Mantar, during the week. These activities were carried out as an effort of the Public Outreach and Education Committee of the ASI.

Workshop on Basic Astronomy and Telescope Making

To inculcate interest in Astronomy among the students of IISER, Kolkata, a workshop was organised during March 24 - 27, 2017, by the Centre of Excellence in Space Sciences - India, and the International Society for Optics and Photonics (SPIE), in association with the Public Outreach Programme of IUCAA. About 25 participants assembled their own 4-inch reflecting telescope under the guidance of Samir Dhurde and Tushar Purohit. They also gave talks on basic astronomical observations and making of telescopes. Other resource persons included



Public Talk

On February 14, 2017, Roberto Trotta (STFC Public Engagement Fellow, Imperial College, London), in association with the British Council, Pune, gave a public talk on Why society needs astronomy and cosmology?

Chirantan Neogy and Rajesh Nayak. The coordinators were Dibyendu Nandi, Ayan Banerjee, and their enthusiastic students. Public events were also organised, including a sky-watching, which was conducted using the same telescopes made during the workshop.

Other Regular Events

The Public Outreach groups have conducted 15 Science Toys workshops, 5 Basic Astronomy workshops, 6 campus visits, and 5 sky-watching programmes with an approximate reach to about 2,500 people.

The mobile planetarium (Taramandal) was given out to volunteers from two different organisations trained by IUCAA, thus reaching to about 2,000 people.

Second Saturday Lectures

January: Samir Dhurde, and Ashok Rupner (both from IUCAA) on Science with your Bicycle.

February: Shantipal Ohol (Government College of Engineering, Pune) on School level Robotics.



Farewell ...

Arunima Banerjee, has joined the IISER - Tirupati, as a Faculty Member.

Varun Bhalerao, has joined the IIT - Bombay, Mumbai, as an Assistant Professor.

Sourav Bhattacharya, has joined the IIT - Ropar, Punjab, as an Assistant Professor.

Anuradha Gupta, has joined Pennsylvania State University, USA, as a Post-Doctoral Fellow.

Nagendra Kumar, has joined the IISc, Bengaluru, as a Research Associate.

Kamakshya Prasad Modak, has joined the Brahmananda Keshab Chandra College Kolkata, as an Assistant Professor in physics.

Main Pal, has joined the Physical Research Laboratory, Ahmedabad, as a Post-Doctoral Fellow.

Nidhi Pant, has joined the University of Western Cape, Cape Town, South Africa, as a Post-Doctoral Fellow.

Colloquia

10.01.2017 Frank Wuerthwein on *Global science via the open science grid*.

06.02.2017 Luis C. Ho on Supermassive black holes: Impact on *galaxy formation and evolution*.

21.02.2017 Romesh Kaul on *A quantum gravity induced non-decoupling problem: Violation of Lorentz invariance*.

23.02.2017 Rustom Mody on *Introduction to functional programming*.

02.03.2017 Girish Kulkarni on *Revealing 13 billion years of thermal evolution of the universe*.

Seminars

01.02.2017 Projjwal Banerjee on *Did a low-mass supernova trigger the formation of the solar system? Clues from stable isotopes and ^{10}Be* .

07.02.2017 Luis C. Ho on *The Bhole project*.
08.02.2017 Debanjan Bose on *Highlights from Icecube neutrino observatory*.

15.02.2017 Roberto Trotta on *Measuring the expansion history of the universe with supernovae type Ia: Successes and pitfalls*.

15.02.2017 Arianna Cortesi on *Recovering the origin of Lenticular galaxies from stellar kinematics and multi-wavelengths surveys*.

15.03.2017 Bidya Binay Karak on *Rotation andagnetism in magneto-hydrodynamics simulations of solar and stellar convection zones*.

Visitors

(January - March 2017)

Anu Abraham, Jilin Raichel Abraham, Oluwashina Adegoke, Sumit Kumar Adhikari, Chaitanya Afle, P.C. Agrawal, Shubham Rajiv Agrawal, Asif Iqbal Ahangar, D.V. Ahluwalia, Bobomurat Ahmedov, Md. Sabir Ali, Muhammed Amir, Rahul Kumar Anand, Aiswarya Andavan, Sujit K. Andia, Arun Kumar Aniyan, G.C. Anupama, Bharti Arora, Jagdish Arora, Manoj B, Amrutha B. M., Bhargavi B.M., Kiran Baganali, Manjari Bagchi, Jasjeet Bagla, Kalyani Bagri, Coryn Bailer-Jones, Bidisha Bandyopadhyay, Tanwi Bandyopadhyay, Projjwal Banerjee, Rabin Banerjee, Sarmistha Banik, Sudhanshu Barway, Tomaso Belloni, Swetha Bhagwat, Bharat, Naseer Iqbal Bhat, R.C. Bhatt, Angana Bhattacharya, Sourav Bhattacharya, Maitraya Kanta Bhattacharyya, Anirban Bhowmick, Yashpal Bhulla,, Swagatika Bhuyan, K.G. Biju, Suparna Biswas, Chinmay Borwankar, Debanjan Bose, Mridusmita Buragohain, Sumanta Chakraborty, Supratic Chakraborty, Nand Kumar Chakradhari, Susmita Chakravorty, Sireesha Chamarthi, Goutami Chattopadhyay, Indranil Chattopadhyay, Surajit Chattopadhyay, Manojendu Choudhury, Sourav Roy Chowdhury, Arianna Cortesi, Jamie Court, Lavanya D.R., Deepak Damodaran, Abhishek Das, Amit Das, Subinoy Das, Santosh K. Dash, Tamara

Davis, Debabrata Deb, Ujjal Debnath, Jesley Devassy, Jishnu Dey, Mira Dey, Sagar Dey, Subhrata Dey, Karishma Dhanmeher, Vir K. Dhar, Payaswinee Dhoke, Suresh Digal, Tevian Dray, Anuj Dubey, Basudev Dutta, Jibitesh Dutta, Saili Dutta, Sunu Engineer, Savithri Ezhikode, Aparna Francis, Sindhu G., Taparati Gangopadhyay, Gurudatt Gaur, Gaurav, Agnes George, Asha George, Blesson George, Lijo Thomas George, Merin George, Akash Daniel Georgi, Abhirup Ghosh, Joyee Ghosh, Shounak Ghosh, Sushant G. Ghosh, Tanay Ghosh, Gourab Giri, Pranjupriya Goswami, Umananda Goswami, Sarbari Guha, Ajesh Gulati, Anshu Gupta, Anuj Gupta, Shashank Gurumath, Prithish Halder, Chitra Harikumar, M.K. Haris, David Hilditch, Luis C. Ho, Honey, Tanvir Hussain, Asif Iqbal, Md. Sayeedul Islam, Bala Iyer, Joe Jacob, Dhairyashil Jagadale, Sandhya Jagannathan, Priyanka Jalan, Atul James, Jaimson T. James, Sharda Keshav Jogadand, Reju Sam John, Nathan Johnson-Mcdaniel, Jephin K Jose, Rosmy Jose, Reetika Joshi, U.C. Joshi, Greeshma K., Navyashree K., Anusree K.G., Paul K.T., Rachel Kalpana Kalaiman, Nandita Kalita, Sanjeev Kalita, Asha Kanade, Bhaskar Kanseri, Bidya Binay Karak, Pradip Karmakar, Adarsh Kashyap, Romesh Kaul, Snehal Khandale, Rukaiya Khatoon, Rubinur Khatun, Theresa Kiran, Ram Kishor, Ioannis Komis, Dawood Kothawala, Badri Krishnan, Srinivasan Krishnan, Girish Kulkarni, Ajai Kumar, Anup Kumar, Atmjeet Kumar, Rahul Kumar, Shibesh Kumar, Sumit Kumar, Puja Kumari, Sathyanarayanan Kuzhikkatt, Sibasish Laha, Ofer Lahav, Albert Lazzarini, Charles Lineweaver, Kinjalk Lochan, Anto Lonappan, Donald Lynden-Bell, Ruth Lynden-Bell, Aravind M., Mamatha M., Sreelakshmi M., Manju K. Majhi, Shiva

Kumar Malapaka, Manzoor A. Malik, Sunil Malik, Manas K. Mallick, Arun Mangalam, Sujay Vivek Mate, Delna Mathew, Keerthana K. Mathew, Ayesha M. Mazarbhuiya, Andrew Melatos, Molla Mengesha, Meera, Chandra Kant Mishra, Manis K. Mishra, Pabitra Mishra, Priti Mishra, Sapna Mishra, Anupama Mohanan, Abhisekh Mohanty, Abhisek Mohapatra, Ashutosh Mohapatra, Kunal Mooley, Anupreeta More, Ankan Mukherjee, Sajal Mukherjee, Sargam Mulay, Sanjay Mund, Pavana Muralimohan, Pramod G. Musrif, Ganesh N., Jerin Mohan N.D., Sachindra Naik, K. Rajagopalan Nair, Remya Nair, Athul Nakulan, Mayank Narang, D. Narasimha, Rajalakshmi Narayanan, Nilam Navale, Manguli K. Nayak, Ali Nayeri, Mama Niharika, Angel Priyana Noel, Devendra Ojha, Mahesh P.K., Archana Pai, Barun Kumar Pal, Sanchita Pal, Vaidehi Sharan Paliya, Bibhudatta Panda, Biswajit Pandey, Mahadev Pandge, P.N. Pandita, Uma Papnoi, Krishna Mohan Parattu, Taniya Parikh, Rohankumar Maheshbhai Patel, Ashok Pati,

Snehalata Patra, Devraj Pawar, Pramod Pawar, Ravindra Pawase, Reynier Peletier, Ninan Sajeeth Philip, Khun Sang Phukon, Nagamanipoloji Pologi, Anil Prabhakar, Gouri Pradhan, Pragati Pradhan, Ved Prakash, Pramod, Prasanth, Hemanth Pruthvi, Frederick J. Raab, H. V. Ragavendra, Majidul Rahaman, Archita Rai, Binay Rai, Ramij Raja, Sabareesh Geetha Rajasekharan, N.R. Shankar Ram, Mansi Ramdas, Akshay Rana, Shubham Ranasubhe, N. Kameswara Rao, Sneha Rao, Bhrugu Rath, Katherine Rawlins, Saibal Ray, R. Rayappa, Anthony Readhead, B. Eswar Reddy, David Reitze, Amit Reza, Surabhi Sachdev, R.D. Sahay, Sunder B. Sahayanathan, Lekhram Sahu, Pradip K. Sahu, Gautam Saikia, Itsuki Sakon, Anuradha Samajdar, Ananta K. Samanta, Prasant Kumar Samantray, M. Sami, Sumati Sampemane, Sanjay, Shishir Sankhyayan, Pitambar Sankua, Arnab Sarkar, Sudipta Sarkar, Pranjal Sarmah, Saroj, Abhilash Sarwade, Hia Sen, Anand Sengupta, T.R.

Seshadri, Shiv Sethi, Zahir Ahmad Shah, R. Shankar, S. Shankaranarayanan, Aishawnniya Sharma, Ajay Sharma, Ramkishor Sharma, Anvar Shukurov, Avinash Singh, Gaganpreet Singh, K.P. Singh, Manju Singh, R.P. Singh, T.P. Singh, Monika Sinha, Tirthendu Sinha, Satish Sonkamble, S. Sriram, L. Sriramkumar, Annapurni Subramaniam, Ravi Subrahmanyam, S. Sudhagar, Vivishek Sudhir, Mutsumi Sugizaki, Pradeepta Sundaray, Avinash Surendran, Abinaya Swaruba, Swetha Thakkalapally, Sivarani Thirupathi, Shiva Thorat, Srishti Vinutha, Pranjal Trivedi, Roberto Trotta, Vinutha Tummala, Mizuho Uchiyama, Rashmi Uniyal, Gayathri V., Prajwal V.P., S.R. Valluri, Vasudha Varadarajan, Ashlin Varghese, Josin Varghese, Hum Chand Varma, Vasundhara, Samip Velani, Mahendra Verma, R.G. Vishwakarma, Viswanatha, Naveel Wani, Urjit Yajnik, and Andrzej Antoni Zdziarski.

Visitors Expected

April 2017

Raghavendra Chaubey, Banaras Hindu University, Varanasi; Joe Jacob, Newman College, Thodupuzha; Pravir Kumar, IISER, Bhopal; Rajesh Kumar, D.D.U. Gorakhpur University; Surhud More, Kavli Institute for Physics and Mathematics, Japan; Marcello Musso, MPA, Garching, Germany; Hasti Nateghi, Shahid Bahonar University of Kerman, Iran; Nilam Navale, Dayanand Science College, Latur; Mahadev Pandge, Dayanand Science College, Latur; Abhishek Parida, Jamia Millia Islamia, Delhi; S. Patnaik, Jawaharlal Nehru University, Delhi; Sanjay Puri, Jawaharlal Nehru University, Delhi; Rajesh S. R., S. D. College, Alappuzha; Sathyanarayanan, Amrita University, Kollam; Shiv Sethi, Raman Research Institute, Bengaluru; H. Sharma, Jawaharlal Nehru University, Delhi; Anjani Kumar Shukla, Banaras Hindu University, Varanasi; and Mahendra Kumar Verma, Pandit Ravishankar Shukla University, Raipur.

May 2017

Varun Bhalerao, IIT, Bombay, Mumbai; Ritabrata Biswas, University of Burdwan; Mary Bosco, Newman College, Thodupuzha; Ritaban Chatterjee, Presidency University, Kolkata; Suchetana Chatterjee, Presidency University, Kolkata; Ujjal Debnath, Indian Institute of Engineering, Science and Technology, Howrah; Sandip Dutta, University of Burdwan; Shivappa Gudennavar, Christ University, Bengaluru; Bhola Ishwar, B. R. A. Bihar University, Muzaffarpur; Dhairyashil Jagadale, Hyper-Ions Research Labs, Pune; Kanti Jotania, The M. S. University of Baroda, Vadodara; Ram Kishor, Central University of Rajasthan, Ajmer; Badri Krishnan, AEI, Hanover, Germany; Sumeet Kulkarni, IISER, Pune; B. S. Kushvah, Indian School of Mines, Dhanbad; Titus Mathew, Cochin University of Science and Technology, Kochi; Bivudutta Mishra, BITS-Pilani, Hyderabad; Sagnick Mukherjee, Presidency University, Kolkata; K. Rajagopalan Nair, Cochin University of Science and Technology, Kochi; Jayanta Narayan Pati, Hindol College, Dhenkanal; K. D. Patil, B. D. College of Engineering, Wardha; B. C. Paul, North Bengal University, Siliguri; Devraj Pawar, R. J. College, Mumbai; Anirudh Pradhan, G.L.A. University, Mathura; M. Xavier James Raj, Vikram Sarabhai Space Centre, Thiruvananthapuram; Saibal Ray, Government College of Engineering and Ceramic Technology, Kolkata; Luciano

Rezzolla, University of Frankfurt, Germany; Ketan Rikame, IISER, Pune; Agniva Roychowdhuri, Presidency University, Kolkata; B. S. Sathyaprakash, Pennsylvania State University, USA; Peter Saulson, Syracuse University, USA; Leo Singer, NASA Goddard Space Flight Centre, USA; Varun Srivastava, IISER, Pune; Arun Thampan, St Joseph's College, Bengaluru; Kapil K. Tirpude, IISER, Pune; Rishikesh Dutta Tiwary, Indian Institute of Technology, Dhanbad; and S. K. Tripathy, Indira Gandhi Institute of Technology, Sarang.

June 2017

Saiyad Ali, Jadavpur University; Subenoy Chakraborty, Jadavpur University; Rudrani Kar Chowdhury, Presidency University, Kolkata; Priya Hasan, Maulana Azad National Urdu University, Hyderabad; Deepak Jain, Deen Dayal Upadhyaya College, New Delhi; Anwesh Majumder, Presidency University, Kolkata; Nairwita Mazumder, Washington State University, USA; Amit Pathak, Tezpur University; Tathagata Saha, Presidency University, Kolkata; Anjan Ananda Sen, Jamia Millia Islamia, Delhi; Somasri Sen, Jamia Millia Islamia, Delhi; and T. Seshadri, University of Delhi.

Long Term Visitor

Shamin Padalkar, Tata Institute of Social Sciences, Mumbai; and Rajesh Kumble Nayak, IISER, Kolkata.

Hello friends,

We all know that unity is strength, and some birds around us remind us of this. Large grey Babblers (*Turdoides Malcolmii*) are one of those. Always found in group and making loud calls, "Ke Ke Ke", keeping all birds alert against predators like Shikra, Falcons, etc.

In size, this bird is comparable to common Myna, about 25 - 30 cm in length. It has a light brown body with grey forehead; tail is long with whitish feathers, and iris yellow. Males and females are alike.

Umesh Vaghela, a well known birdwatcher and friend of mine told me that it was a common misconception that these birds were seen in a group of seven, which gives them the name "Saatbhai" (seven brothers). In northern India, all brothers live together, so "Saatbhai", while in southern India, sisters are married in the same family, so "Saatbaya or Saat bahini" (seven sisters), but actually the group size varies from 5 to 12, and even a group of 20 - 40 has also been observed. Further, this group consists of males and females together, and so calling them seven brothers or sisters is illogical.



Large grey Babblers are well distributed in Indian subcontinent, except some parts of South India. They are mainly found in open areas, like dry scrub forest and cultivated land. They are Least Concerned in the IUCN list.

Babblers mainly feed on insects, seeds and berries. They breed throughout the year, mainly during March to September. They build shallow cup like nest on thorny shrubs using twigs and grass. Female lays 3 - 4 eggs, blue in colour. Both the male and female play equal role in building nest, incubation and raising chicks. The nest could be used by multiple females to increase the security. Even though care is taken, their nests are parasitized



▲ Photo Courtesy: Umesh Vaghela

Call for a Bird Photo: Paniveni Udayashankar, one of the Visiting Associates of IUCAA, has sent her second contribution for this article, which is a very beautiful bird, African Paradise Flycatcher (young male). Its Indian species can also be seen in Pune, in dense forest like Sinhgad Valley or sometimes in S.P. Pune University campus. The adult male has a beautiful long tail.



Readers of Know Thy Birds are invited, hereby, to submit bird photographs of birds taken by you. Selected photos will be published in this article with due credit. Please mail your photos to cvr@iucaa.in (Please mention "photos for KTY" in subject.)

Wish You A Very
Happy Birding

Khagol (the Celestial Sphere)
is the quarterly bulletin of



We welcome your responses at the following address:

IUCAA, Post Bag 4, Ganeshkhind, Pune 411 007, India.
Phone : (020) 2569 1414; 2560 4100 Fax : (020) 2560 4699
email : publ@iucaa.in Web page : <http://www.iucaa.in/>