Khwarizmi Science Society Newsletter

Takveen | issue 2008

"I welcome you all to Takveen, to the Khwarzimic Science Society"

KHWARIZMI SCIENCE SOCIETY, established in 1997, is one of Pakistan's most active science societies, aimed at the popularization and facilitation of scientific learning.

Join the country's leading grass-roots science organization that promotes free mixing of ideas between students, teachers, scientists, journalists and the public. For membership details, visit our website or contact the Society Officers.

Strengths of the Khwarizmi Science Society

1. Inter-disciplinary
2. Multi-institution
3. Connecting people
4. Preparing students for careers in science, technology and medicine
5. Resource sharing
6. Developing a culture of science

I find great delight in presenting this first in-print issue of our Newsletter Takveen.

Takveen is an Arabic word. The Quranic statement, "Whenever We will anything to be, We but say unto it our word "Be" and it is" is a highly meaningful proposition and a fundamental import on several important values. First, is the value of ceaseless creation, a never-ending movement of development and growth in our universe. Second, is an invitation to exploration and partake in the universal development through patient observation, objective experimentation and evidenced argumentation. These values teach us the lesson of scientific pluralism, and help us escape from the welters of surrealism, extremism, unbalanced lifestyles, mental and social corruption and escapism itself.

At the Khwarizmi Science Society, we cherish all these "higher qualities". The Takveen is one evidence of our capacity to recollect our achievements and participate in the constant universal attitude of infinite motion.

Prof. Dr. Saadat Anwar Siddiqi

The Newsletter Takveen will be published annually. It will recount the Society's yearlong activities. It will publish articles contributed by Members and prominent scientists. It will acknowledge our sponsors and collaborators and also welcome new Members. Furthermore, it will highlight future events and projects.

I hope you will appreciate the hard work that is gone into maintaining an active profile aimed at science popularization in Pakistan. I hope you will join us as Members and contribute towards our cause.

Happy Reading.

Professor Saadat Anwar Siddiqi
President Khwarizmi Science Society

KHWARIZMI SCIENCE SOCIETY

Www.khwarizmi.org

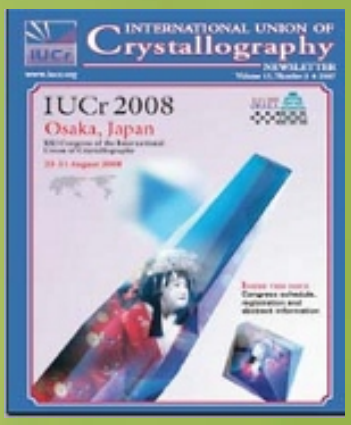
this issue

P2 Workshop on Crystal Structure

P3 Historian of Science visits Pakistan

P4 Celebrating Year of Astronomy 2009

P5 Round up of Popular lectures



The report on the National Workshop on Crystal Structure Determination was published in the International Union for Crystallographers (IUCr) Newsletter, Vol. 15, Issue No. 3, 2007.

SPEAKER'S VIEW POINTS:

" Dear Prof Siddiqi,
This is just to let you know how much I enjoyed my meeting with you and the opportunity to give a general lecture under Khwarizmi Society. It was delightful to see how so many people could be brought together on a working day to listen to science. This gives rise to hope and inspiration. The fact that the question-answer session went for almost 45 minutes speaks for the desire and the thirst for the discussion of new ideas in our younger generation. It was very impressive to see how almost everyone stayed till the very end.
All this should be a tribute to your initiative and tireless efforts on behalf of the Khwarizmi Society. As some one who has occasionally been involved in arranging seminars and conferences, I can truly appreciate how much energy and initiative is required to arrange such activities particularly when the infrastructure and the traditions are so weak".

Dr. M. Suhail Zubairy
Associate Director,
Institute for Quantum Studies,
Texas A&M University,
Texas, USA.

National Workshop on Crystal Structure Determination Using Powder XRD

(August 2007)

The National Workshop on Crystal Structure Determination using Powder X-ray Diffraction was a three-day intensive course for students of materials science, physics, chemistry, biology, metallurgy and engineering as well as researchers who are interested in using X-rays to determine crystal structures of powder samples. The topics covered included symmetry, lattices and structures, diffraction, structure determination and refinement. Furthermore, a beautiful aspect of the workshop was a sprinkling of Exotics topic in nano technology. Attended by more than 50 participants short listed from more than a hundred Applicants)from all around the country, the workshop was rated as an excellent learning and demonstration opportunity. The major sponsor was Bana International and Bruker and the speakers included Dr. Menges Goetz (Bruker, Germany), Dr. Saadat Anwar Siddiqi (Punjab University, Lahore), Dr. Falak Sher (PIEAS, Islamabad), Dr. Sabieh Anwar (LUMS, Lahore), Dr. Arshad Bhatti (COMSATS, Islamabad), Dr. Umair Manzoor (COMSATS, Islamabad) and Dr. N.M. Butt (Pakistan Science Foundation). The workshop got extensive coverage in the local press.

Participants came from PINSTECH, PUNJAB UNIVERSITY, PCSIR, ISLAMIA UNIVERSITY BAHAWALPUR, KARACHI UNIVERSITY, PIEAS, COMSATS, BZU MULTAN, UET LAHORE, NIBGE, JAMSHORO UNIVERISTY, NDC, PESAWAR UNIVERSITY.

Popular Lecture on

"Quantum Mechanics: Is Reality Really Real?"

(May 2008)

From elementary particles to superconductors, the nature of vacuum to the electronics industry, radioactivity and black holes, quantum mechanics has emerged as one of the most brilliant outcomes of the modern mind. But quantum mechanics is also riddled with paradoxes and counter-intuitive observations. For example, has cast doubts on the nature of "reality" itself! In this popular lecture that took place at the Punjab University on 5 May 2008, Dr. Suhail Zubairy, Pakistan's leading physicist, surveyed the attempts at reconciling quantum theory with reality. Attended by about 150 participants, the popular lecture turned out to be a thorough joy.

Does the Moon really exist whether we look at it or not?

REFLECTION OF A GHOST: Phys. Rev. A 77, 041801 (2008)

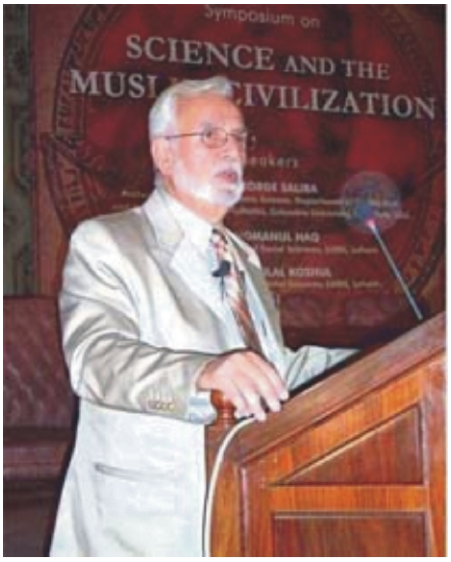
Historian of Science visits Pakistan

(November 2007)

Symposium on "Science and Muslim Civilization"

The Khwarzimi Science Society organized the symposium on Sunday, 4 November 2007 with the partnership of the Iqbal Academy Pakistan. The splendid auditorium, the large number of audience (approaching about 400), the elegant backdrop and the impeccable organization by the KSS volunteers all bespoke of a very high caliber event. The audience came from different disciplines, ages and institutional affiliations.

Dr. George Saliba's lectures were split into two parts. The first was 'Islam and the transformation of Greek science' and the second was 'Islamic science and the making of the European Renaissance'. The other speakers for the evening included Drs. Basit Bilal Koshul and Noman-ul-Haque from the Lahore University of Management Sciences (LUMS), Lahore.



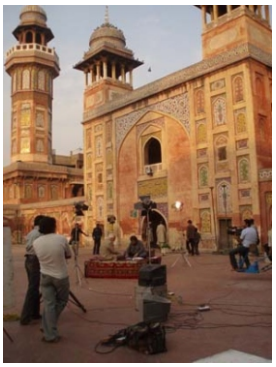
With the help of original Latain and Arabic manuscripts, Dr. Saliba demonstrated how the mathematical theorems and planetary models developed in the Islamic world were incorporated by Copernicus into his mathematical astronomy.

Popular Lecture on "Problems in the Historiography of Science" at the Government College University, Lahore

The Government College University (GCU) Debating Society, in partnership with the KSS, organized a lecture on the 'Problems in the Historiography of Science' on the morning of November the 3rd. In his lecture, Dr. Saliba presented certain 'myths' about Islamic science and showed, one by one, how these myths could not stand the test of logical cohesion, preserved documentation or historical evidences.

Visit to the Wazir Khan Mosque

Dr. Saliba visited the famous Wazir Khan Mosque in the heart of the Kashmiri Bazaar, itself the heart of inner Lahore. The mosque, often called the *'mole on the cheek of Lahore'* was built in 1642 by Wazir Khan, Governor of Lahore to the Moghul emperor Shah Jehan. The purple and burgundy tile work on the façade and the minarets, inlaid with meticulous craving for artistic and calligraphic perfection, presented a splendid contrast against the backdrop of the blue sky, suffused with the yellow of the sun. Video cameras, sound and light technicians and a busy direction team were assembled in the courtyard for a longish interview recording of the visiting scholar.



Visit of Prof Saliba to the Jamia Ashrafia

Jamia Ashrafia, established in 1947 is one of the country's premier centres of religious learning. Dr. Saliba summarized his work in eloquent Arabic, followed by a lively question and answer session.

He was also shown the texts in theoretical astronomy (*hay'a*) that were taught at the Jamia and all other madrasa institutions inside the country.

DONATIONS AND SPONSORSHIPS ARE WELCOME. SEE PAGE 8 FOR DETAILS OF HOW YOU CAN CONTRIBUTE.

The KSS inviting **Sponsorships** for the purchasing of a **Celestron CPC1100** GPS telescope with an **Millancam** Video Camera. This telescope is a real masterpiece and from one of the best company known for its high standards. This will be an advanced system with a very easy to align facility (uses built-in GPS receiver) and can be ready for observation in 5 minutes by a regular user. Even in a light polluted sky, such as in Lahore, an eyepiece can offer great views. But the most impressive thing would be our live video views of galaxies, star clusters, nebulae and solar system objects straight from the astronomical video camera. We can project it on a big screen for public gatherings. The lunar and planetary views promise to be absolutely magnificent.

Umair Asim with his telescope. (Executive Member of KSS)

FOR THE COMPLETE CALENDAR OF OUR YEAR-LONG ACTIVITIES, PLEASE VISIT THE WEBSITE: http://www.khwarizmi.org

Khwarizmi Science Society Celebrating the International Year of Astronmy

(August 2009)

The year 2009 is being marked as the International Year of Astronomy. With the support of international and national agencies, many countries are preparing for this mega celebration of a human understanding of the heavens! This year will commemorate the impact of astronomy and science on human life. It will help us understand the planet we tread and the forces of nature that shape our collective culture, civilization, thoughts and history.

In Pakistan, the Khwarizmi Science Society is also gearing up to be a part of this cosmic saga. We hope that through its public outreach, the KSS can excite young minds, children and teenagers into undertaking careers in science, technology, engineering and medicine.

It will help our citizens understand the role of science in their daily lives. The year-long activities will, hopefully, place the national consciousness into a global context, that we all share a common heritage. This over-arching canvas that holds within its folds, the clouds, the stars, the myriad constellations, the wandering planets, the suns and the vast expanse of nothingness, connects us across many ages and many different cultures, races and geographies. We realize that we are part of one whole. And we can transcend the artificial distinctions of race and color.

Planned Activities

1 The KSS is arranging "Meet the Skies" sessions in public locations such as parks and open and scenic spaces in suburban localities. We will offer spectacular views of our moon (craters of all sizes, lunar mountains and their shadows, frozen seas of lava); Saturn with its awe-inspiring rings; storms in the atmosphere of Jupiter with its Galilean Moons; surface features of the red planet (Mars) with its polar ice cap; ever changing phases of Venus and Mercury; dozens of Clusters of a million stars; cloudy nebulae where new stars and solar systems are being born; and galaxies, and island universes having billions of stars.

2 The KSS will organize a field trip to Baghan Wali, Pind Dadan Khan, Jhelum District at the site of the ruins of Al-Beruni's observatory. It will also collaborate with local groups and schools in remote villages of Pakistan to organize sky parties and astronomical viewing on their premises.

3 Throughout the year, the KSS will arrange workshops and public lectures in different parts of the country. The workshops will cover the following topics:

Identifying constellations and planets in the sky without any equipment; binocular astronomy; observational astronomy with small telescopes; astronomy on the internet; making a telescope.

Some astronomical images taken by the KSS Team

The perspective List of our speakers and their topics are given below.

Speaker	Topic
Dr Pervez Hoodbhoy Qauid-e-Azam University, Islamabad.	**The Usefulness of Extra Dimensions of Space-Time**
Dr Asghar Qadir NUST, Rawalpindi.	**Black holes and pulsars**
Dr Shaukat Godenya Tarleton State University, USA	**Observational Astronomy**
Dr Jameel-un-Nabi GIKI, Topi, NWFP.	**Stellar Physics**
Dr Salman Hameed Hampshir College, USA	**Observational Astronomy**
Umair Asim Farooqi Girls High School, Lahore	**Observational Astronomy**
Dr. Amir Iqbal, Washington University, USA	**Spacetime**
Dr. Yusuf Butt, Harvard Smithosonian Centre, USA	**Radio-astronomy**

Round-up of Popular Lecture

(Aug 2007 - Oct 2008)

Popular Lecture on **"Magnetic Resonance: From Brain Tissue to Chloroform"**

Nuclear Magnetic Resonance is a technique that exploits the spin of certain nuclei to obtain a tell-tale signatures of the molecules. This technique finds immense use in diagnostic imaging of human tissue. Dr. Sabieh Anwar, from LUMS, explored the origins of the NMR effect in a popular lecture on May 9, 2007 at the Punjab University Lahore .In addition to its medical uses, he also addressed other novel and esoteric applications.

May 9, 2007

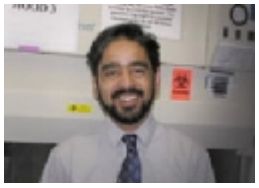
A seminar on **"DNA Hybridization on Surfaces"**

A lecture on "DNA Hybridization on Surfaces" was given by Fouzia Bano, SISSA International School of Advanced Studies, Trieste, Italy, Venued at the Centre for Solid State Physics, Punjab University, Lahore. She discussed the contribution of nanotechnology to biology and medicine in the controlled arrangement of DNA molecules on surfaces.

July 28, 2008

Popular Lecture on **"From Galileo to Darwin: A Story of Science-Religion Interactions"**

Dr. Salman Hameed, Hampshire College, Massachusetts, United States delivered a popular lecture at the Aiwan-e-Iqbal Complex, Lahore. The speaker discussed a number of skirmishes between science and religion, focusing on the Galileo trial and the evolution and intelligent design debate.



July 14, 2007

Seminar on **"Understanding Cell-Matrix Interactions from Fundamental to Thermodynamics Applications in Tumor Metastasis"**

Dr Muhammad Hamid Zaman, from the University of Texas at Austin, USA, discussed the effect of structural, mechanical and chemical properties of matrix on the cellular functions in the body. He also invoked that the cell-matrix interactions have traditionally been studied in the context of artificial 2D environments, which are far from in Halies conditions. In order to overcome the limited powers of observation in 2D, he discussed the use of high resolution and high throughput confocal microscopy.

August 8, 2008

Popular Lecture on **"Biomaterials for Tissue Engineering"**

A popular lecture was given by Dr. Hassna Ramay from School of Science and Engineering, Lahore University of Management Sciences, Lahore on "Biomaterials for Tissue Engineering" at the Punjab University. More than one hundred students and researchers participated in the lecture. The diversity of the fields of interest of the participants was in accordance with the interdisciplinary character of the topic of the lecture. The event was coverage by the Technobiz Magazine.

January 24, 2008

Popular Lecture on **"The Shape of Space: M-Branes and 11-Dimensional Geometry"**

Dr. Tasneem Zahra , Assistant Professor, School of Science and Engineering, LUMS delivered an attention-grabbing lecture at the Punjab University, Lahore. Dr. Tasneem emphasized the effect of charge on a mass in distorting the background in which it is placed. She said that the charge distorts the background in addition to the distortion produced by the mass itself. The idea of 11-dimensional geometry was also described.

November 27, 2008

Munnoo Bhai's Views

Munnoo Bhai is Pakistan's foremost columnist, journalist and dramatist. He writes his opinions about the KSS Symposium on Science and Muslim Civilization, published in the most widely circulating Urdu daily, "Jang" on November 8, 2007. The editorial column can be accessed at: http://www.khwarizmi.org/news/Munnoo_bhai.pdf. Furthermore, the writer presents a very interesting twist on the title of Prof. Zubairy's lecture on quantum physics, "Is Reality Really Real?" in his op-ed piece published in the same newspaper on April 29, 2008.

KSS in the Local Press

In the years 2007 and 2008, the KSS has enjoyed extensive coverage in the local press and science magazines. For example, Technobiz is a recently launched monthly science periodical that has already won wide readership and applause from various circles. **Technobiz** has featured reports of our popular lectures in 2007 and 2008. The HEC Newsletter **"News and Views"** has also generously written about the KSS. Some of our activities are also reported by private TV channels such as **Geo TV** and **AAJ TV**.

Maxwell's equations: The most important equations of all time?

Burhan Zamir Research Associate Department of Pyhysics University of the Pyas

One captivating aspect of physics is its dynamics and rapidly evolving nature. Exciting fields can become dated within a few years but at the same time, the strange hand of fate revives excitement in some old and well-established, solemn truths of physics.

Among physicists, Maxwell's equations take a place of equal importance as, for example Newton's equation, F=ma, Einstein's equation: $E=mc^2$, and Schrödinger's equation $H\psi=E\psi$. Yet, in the eyes of the general public, Maxwell does not enjoy the same fame as the other three physicists. This is somewhat surprising, because the applications of Maxwell equations have a far-reaching impact on society.

The 2007 Nobel prize in physics was awarded in the area of electromagnetism for "the discovery of giant magnetoresistance".

equations predict the existence of electromagnetic waves. Without knowledge and understanding of these Waves, we could not have the radio, radar, television, cell phones, global positioning systems, infrared and Bluetooth technologies and so on.

At the heart of all electric and magnetic phenemona, wedlocked in eternity as the famous "electromagnetism", lies a set of equations first fashioned by James Clark Maxwell.

Maxwell was the first to see that his Perhaps, the lack of fame of Maxwell's equations is due to the fact that they cannot be caught in a simple iconic equation like the three-letter $E=mc^2$. In modern textbooks, Maxwell equations are presented as four fairly elaborate vector equations, involving abstract mathematical notions such as the curl and the divergence.

$$\nabla \times \mathbf{E} = -\frac{\partial \mathbf{B}}{\partial t} \quad (1)$$

$$\nabla \times \mathbf{H} = \frac{\partial \mathbf{D}}{\partial t} + \mathbf{J}_f \quad (2)$$

$$\nabla \cdot \mathbf{B} = 0$$

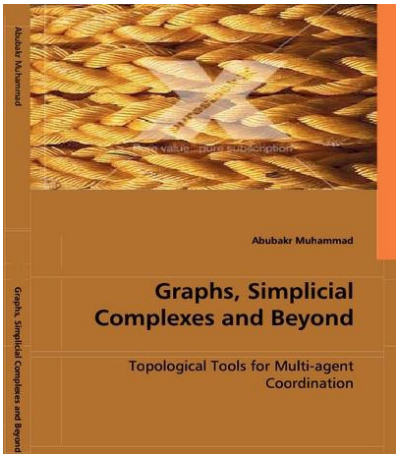
$$\nabla \cdot \mathbf{D} = \rho_f$$

The modern history of electromagnetism starts with the simple exposition of Coulomb's law and the magnetic law of Biot-Savart. At each stage in the development of electromagnetism, it was demonstrated how the subject could be defined on a more fundamental basis. This continued through the laws of Gauss and Ampere to the unifying partial differential equations of Maxwell.

Maxwell's equations are the mathematical recipes that describe the inter-relationship between electric and magnetic fields. Further, the equations tell us how these fields are created by electric charges, fields and electric currents. The equations are considered to be valid, even in the involved terrains of quantum electrodynamics where the electromagnetic fields are reinterpreted as "quantum mechanical oerators".

There is no single criterion for greatness and that a truly great equation ranks high in each of the criteria. These may include premises such as technicality, practicality, simplicity, applications and even historical relevance. Maxwell's equations are relatively simple, they daringly reorganize our perception of nature, unify electricity and magnetism and link geometry, topology and physics. They are essential to an understanding of the world around us. Last, as the first field equations, they not only showed scientists a new way of approaching physics but also took them on the first step towards a unification of the fundamental forces of nature.

Khwarizmi Science Society News



Dr. Abubakr Muhammad is amongst the pioneering Life Members of the KSS. His book "Graphs, Simplical Complexes and Beyond: Topological Tools for Multi-agent Coordination" grew out of his award-winning doctoral thesis at the Georgia Institute of Technology, United States. The book discusses the theoretical and mathematical foundation of complex, multi-agent systems such as swarms of robots. The book is published by VDM Verlag.

Syed Waqar Ahmed wins the prestigious Fulbright Scholarship enabling him to undertake a Masters Degree leading to Ph.D. His research area will be evolutionary biology. Currently, Waqar is a student at the Institute of Biochemistry and Biotechnology, University of the Punjab and an Executive Member of the Khwarizmi Science Society.

Shahid Atiq is a Life Member of the Society and a Ph.D. student at the Centre of Solid State Physics, University of the Punjab. Working with the President of the KSS, Dr.Saadat Anwar Siddiqi and collaborators at the Korea Advanced Institute of Science and Technology, the research group has discovered

Shahid Ramay (L), Professor Shin and Shahid Atiq

Enhanced magnetic saturation in nano-sized films of iron nitride grown on different substrates. The experimental results have demonstrated better control of magnetic properties of these nanostructures and could be useful in developing new spintronic devices for computing and data storage. The research has been published in the Applied Physics Letters (Volume 92, 222507, 2008).

ENGRO

Engro Chemical Pakistan is the country's leading manufacturer of fertilizer, petroleum, agricultural, food, energy and chemical products. Engro financially supported the KSS through a grant of Rs. 380,000 in connection with the organization of the Symposium on Science and Muslim civilization (page 2). Thanks to Mr. Tahir Jawaid, Director Human Resources Engro for championing this cause.

Rafiullah, our Executive Member, has been selected by the South Asian regional office of the Third World Academy of Sciences (http://www.twas.org) for a three months long summer fellowship. During this period, he will be working at the NMR Research Center, Indian Institute of Science, Bangalore, India where he will perform experiments on magnetic resonance. Recently, Rafiullah has completed his B.Sc. in physics from University of the Punjab.

The Khwarizmi Science Society is now registered with the **Pakistan Science Foundation (PSF)**. The PSF was established in 1973 to promote the popularization and financing of science in the country. This is good news for the KSS as it is now entitled to receiving financial support from this Government body. The Pakistan Science Foundation gave a grant of Rs. 50,000 to the Khwarizmi Science Society in connection with the events in November 2007 centred around the history of science. The website is http://www.psf.gov.pk.

ENSF THE EMERGING NATIONS SCIENCE FOUNDATION

The Khwarizmi Science Society and the Ital based **Emerging Nations Science Foundation (ENSF)** are signing a memorandum of understanding for increasing cooperation in science popularization activities. This memorandum will be signed by the President of KSS, Dr. Saadat Anwar Siddiqi and the Founder and CEO of ENSF, Professor Tahir Shah. Under the agreement, the KSS receives a grant of US Dollars 3500 for the celebration of the World Year of Astronomy 2009. The ENSF aims at promoting scientific exchange and technological research in the emerging countries of Asia and Africa.

How you can help us?

Joining the Khwarizmi Science Society as Life Member. Membership forms can be downloaded online or handed over in person to the Society officials.

Attending our outreach activities, public lectures, seminars and workshops and bringing your fiends and families along.

Volunteering for organizing as focal person in the Society Office.

Volunteering for assisting in the organization of science events.

Opening a new Khwarizmi chapter in your own institution

Visiting our website and subscribing to our mailing lists.

Spreading our word in the community.

Writing for Takveen and our online publications.

Scientific journalism of our scientific meetings.

Donating generously. Donations will help us further our mission of "enhancing a science culture in Pakistan". Cheques, pay orders and bank drafts can be sent to the Society's address (given below) or deposited directly into our bank account.

A/C No: 01820022822303
Swift Code: HABBPKKA
A/C Bearer: PRESIDENT KHWARZIMIC SCIENCE SOCIETY
Bank: Habib Bank Ltd.
Bank Address: New Campus Branch Lahore

Forthcomming Events

Celebrating the Big Bang Experiment

Popular lecture:
Pakistan and the LHC by Dr. Shaukat Hameed, Rector, GIKI Institute of Engineering Sciences and Technology (January 2009)

Popular lecture:
Grid Computing and the LHC by Dr. Ashiq Anjum, CERN (January 2009)

Popular Lecture:
Behind the Scenes from the Big Bang Machine by Dr. Hafeez hoorani (February 2009)

The Indus Dolphin

Popular lecture:
Threats and Conservation by Uzma Khan, Manager WWF Conservation,Pakistan (March 2009)

Funding and Donations

Mueen Sehdi (Kuwat)	19	Shahid Alvi (Saudi Arabia)	15
Jawad Aslam (Georgia)	10	Anonymous	9
Syed Ali Abbas (USA)	7	Sabieh Anwar (Pakistan)	9
Saadat Anwar Siddiqi (Pakistan)	5	Jawwad Zafar (Pakistan)	5
Arif Khan (Australia)	5	Sheraz-ur-Rehman (Pakistan)	5
Fraz Tajammul (USA)	5	Nauman Mufti (USA)	5
Jawad Mahmood (Germany)	4	**Total:**	**103,000**

Editorial Committee of Takveen

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