



PCST

# STI Voice

*Quarterly Newsletter*

Volume 1

No. 3, Jul-Sep, 2015

No. 4, Oct-Dec, 2015



Science



Technology

STI

Innovation



Pakistan Council for Science & Technology

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# STI Voice

## Quarterly Newsletter

Volume 1  
No. 3, Jul-Sep, 2015  
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### Editor in-Chief

Prof. Dr. Anwar-ul-Hassan Gilani (SI)  
Chairman  
Pakistan Council for Science and Technology (PCST)

### Editor

Prof. Dr. Farzana Latif Ansari (TI)



## Quaid's Voice

*My guiding principle will be justice and complete impartiality, and I am sure that with your support and co-operation, I can look forward to Pakistan becoming one of the greatest nations of the world.*

*Address to the Constituent Assembly of Pakistan  
August 11, 1947*

## Chairman's Voice



At the very outset I would like to express my sincere appreciation to Prof. Farzana Latif Ansari, Editor, STI Voice and other team members of PCST, for their efforts and dedication in making STI

Voice an effective platform of communication for the community of science and technology.

Science and Technology have become strong driving forces to facilitate sustainable development in countries around the world. Recently, the abilities of countries to access, comprehend, select, adapt, and use scientific and technical knowledge are increasingly becoming the detriment of material well-being and quality of life. Successful countries have grown their ability to innovate and learn by doing, by investing public funding to help finance research and development in critical areas. Unfortunately, Pakistan is not where it ought to be in terms of development of its human capital in science and technology, thus not fully ready to meet the growing challenges of the 21<sup>st</sup> century.

Hence, the situation demands emergency measures to develop S & T infrastructure, where the Government

and society work together to meet the challenges. In countries like USA, the Government share of R & D funding used to be two-third over 50 years ago, and today, the contribution of private sector (industry and community) has arisen to double (two-third). Similarly, in countries like Japan and Korea over three quarter of R & D funding comes from private sources. Most of the reputed universities in USA are now self-reliant and generate funds through academia-industry interaction and endowment funds from the community. This culture of private-Government partnerships has not developed in Pakistan, and negligible funding for R & D comes from private sector.

Pakistan Council for Science and Technology (PCST), being the secretariat of National Commission of Science and Technology, is doing efforts to formulate the agenda addressing this issue through policy development for bringing the academia-industry closer. This obviously would require incentives for industry to invest in S & T, as well as for scientists to develop collaborations with industry. In the developed countries, universities and R & D organizations provide platform to solve the problems of the industry and the Industry, in return, provides funds. Our research needs focusing on application and problem solving of our industry and farmers. For this purpose, we decided to use this

platform of STI Voice where a section is allocated to discuss the problems of the industry and farmers along with other research questions of socio-economic importance, with the scientific community, with the hope that a Master or PhD thesis research would address such problems with direct application.

Needless to mention that STI Voice offers separate columns for recognizing young scientist's achievements, information on funding and career opportunities and sharing updates on research of common interest with potential of application. Enjoy reading STI Voice.

**Prof. Dr. Anwar-ul-Hassan Gilani (SI)**

Chairman, PCST  
Editor in Chief

**ECNCST is set to meet on  
Mar 9, 2016**



The 6th Meeting of the Executive Committee of the National Commission of the Science and Technology (ECNCST) has been scheduled for 9th March 2016. The Pakistan Council for Science and Technology, in consultation with Ministry of Science & Technology and other stakeholders, has finalized the Agenda of the Meeting. The main focus of the Agenda is to significantly raise the status of science and technology, considered essential for the sustainable development of a country. It is noteworthy that ECNCST is a high-level forum chaired by the Federal Minister for Science and Technology, Rana Tanveer Hussain and Co-Chaired by the Deputy Chairman, Planning Commission, Prof. Ahsan Iqbal. The proposal approved by the ECNCST will form the Agenda for National Commission of the Science and Technology (NCST), which is headed by the Prime Minister.

**Editor's Voice**



As Editor my responsibilities will continue to highlight the role of science, technology and innovation (STI) as an integral part of our society and STI Voice will continue to be a vehicle for promoting fluent communication among all the members of academia, industry and stake holders. Consistent with the previous format and contents of STI Voice, this issue also contains news and articles related to current S&T issues, Voice of the Holy Quran and science and the Voice of a past, eminent scientist and scholar. An article on the Achievements of OIC scientists in 2014 has been included with reference to the OIC Summit to be held in November, this year. Although the meeting has been postponed, however, the article has been retained for the interest of our readers. We want interesting, high quality articles, general news and announcements in the field of S&T so that the newsletter would appeal to our readers and provide more relevant information to professionals within the scientific community. The members of S&T community are therefore, requested to contribute news and announcements and the editorial office looks forward to receiving their contributions in soft format along with good quality pictures as a picture speaks of a thousand words. The newsletter will continue to be available online on the PCST website ([www.pcst.org.pk](http://www.pcst.org.pk)). Please feel free to offer any suggestions for the improvement of STI Voice.

As Editor, I would like to take this opportunity to wish each and every member of S&T community a very happy, healthy and prosperous new year with a special wish that the year 2016 will bring peace to Pakistan.

Sincerely,

**Prof. Dr. Farzana Latif Ansari (TI)**

Adviser (Honorary), PCST  
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## The Quran's and Science Voice

﴿إِنَّ اللَّهَ لَا يَسْتَعِزُّ بِشَيْءٍ وَهُوَ غَافِقٌ لِمَا تُكْفِرُونَ﴾  
 ﴿فَتَعْلَمُونَ أَنَّ اللَّهَ يَعْلَمُ مَا كُنْتُمْ تُكْفِرُونَ﴾  
 ﴿بِهَذَا مَثَلًا يُضِلُّ بِهِ كَثِيرًا وَيَهْدِي بِهِ كَثِيرًا وَمَا يُضِلُّ بِهِ إِلَّا الْفَاسِقِينَ﴾

The Holy Qur'an 2:26

Indeed, Allah is not timid to present an example - that of a mosquito or what is smaller than it. And those who have believed know that it is the truth from their Lord. But as for those who disbelieve, they say, "What did Allah intend by this as an example?" He misleads many thereby and guides many thereby. And He misleads not except the defiantly disobedient.



### Common misconceptions

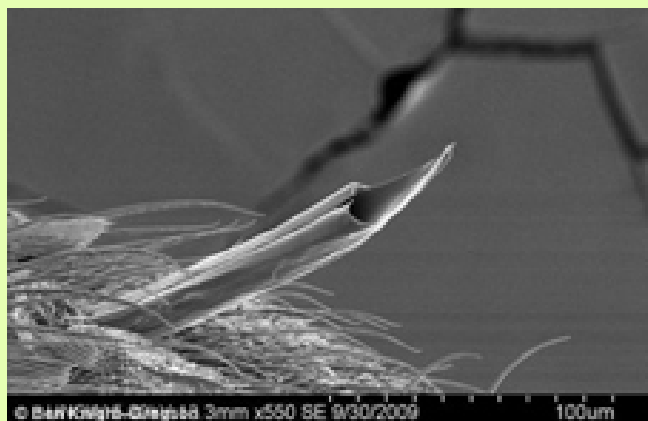
1. Contrary to a popular belief, a male mosquito never sucks any blood throughout its life, rather it obtains its nourishment from plant sap or nectar. The female mosquitoes, however, suck blood to supply the need for protein of the eggs during the egg-laying stage. It takes 3-4 days to digest the blood they suck. Then the bloodsucking operation is repeated. For female mosquitoes this cycle lasts to the end of the egg-laying phase.

2. A mosquito's bite does not hurt. It is the anticoagulant saliva that it injects to stop the blood clotting that causes inflammation and pain.

### Mosquito-inspired microneedle heralds the beginning of painless injections

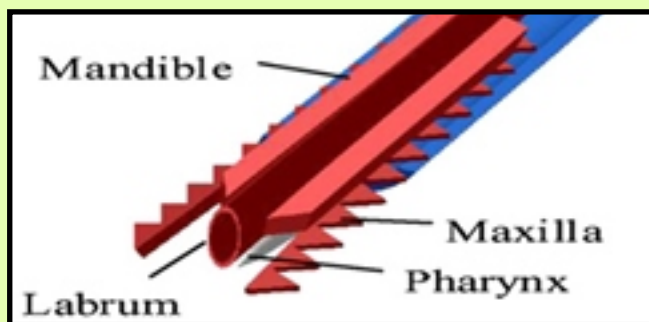
Japanese microengineers have created a minute, hypodermic needle of the size of a mosquito's bloodsucking mouthparts that uses the same mechanism as a female mosquito sucks blood through its unique jaws to pierce human skin. They etched slices of silicon dioxide into a jagged shape and bonded them together. There are two serrated shanks that form the outer surface of the needle. A central shaft then slides between them to inject or withdraw the sample. The needle is connected to a small reservoir that is equipped with an optical sensor to analyze samples. The new

needle has an inner diameter of around 25 microns and an external diameter of 60 microns as compared to a conventional syringe needle that has an outer diameter of around 900 microns. Further, the size of this needle is about the same size as a mosquito's mouthparts. Its size and the fact that it works by suction, makes it painless.



*A micro hypodermic needle for painless injections mimicking the mosquito's mouth parts.*

In contrast to previous microneedles, which were made of silicon dioxide, the new device is robust because it is made of stronger titanium and related alloys, which dramatically reduce the risk of its snapping during injections. The needle is also strong enough to penetrate as far as 3 millimeters into skin and reach capillary blood vessels. Its size compared to earlier models also means that surface tension effects are



*(A) Schematic of mosquito's proboscis,*

exploited further, and the same capillary flow that draws water up into trees helps draw blood into the microneedle. In this case, the sucking action is provided by a microelectromechanical pump, which works using a piezoelectric actuator attached to the needle. This needle can extract 5 microlitres of blood per second which is sufficient for measuring blood-sugar levels in diabetics using a glucose sensor that can be attached to the needle in a "wristwatch" design.

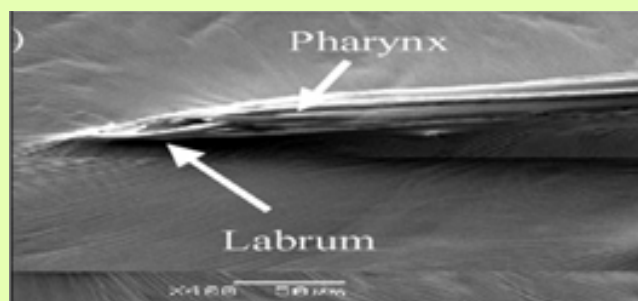
The mosquito sucks blood by flexing and relaxing certain muscles in its proboscis. This creates suction (or negative pressure) that draws blood into its mouthparts. A mosquito's

Initial bite is actually quite painless. The highly serrated proboscis touches the nerves of the skin at fewer points than a smooth surface like a needle. Much less contact area translates into much less pain. Current needles are relatively smooth cylinders that present large amounts of surface area to nerves, causing pain to the human subject. Far from being a simple needle-like apparatus that many may imagine, a female mosquito's mouthparts known as the proboscis are an intricate set of a complicated apparatus.



*A mosquito's snout under a microscope*

A female mosquito's proboscis is composed of several parts, which are labium, labrum, pharynx, two jagged shape maxillas, and two mandibles. A realistic imitation a silicon microneedle having both the three-dimensional sharp tip and the harpoon-like jagged shank is fabricated by employing electrochemical etching technique, making the three-dimensionally sharp tip with finely smooth surface. The combined needles comprising a central straight needle and two outer jagged needles are fabricated, imitating a labrum and two maxillas of the mosquito, respectively. The cooperative motion of the three needles imitating the mosquito's motion is realized by applying PZT actuators independently to all the needles. The effectiveness of inserting these needles cooperatively was confirmed also experimentally.



*(B) SEM image of the same.*

A large number of research groups have been investigating the development of medical devices for health and medical welfare. Among these various medical devices, a low-invasive needle for blood collection is strongly desired in

many medical treatments such as biopsy, transdermal drug delivery, neural interface, lancets for puncturing and bleeding diabetics. In particular, diabetics have to collect their blood for the glucose level measurement, which is indispensable for health monitoring. Their skin is punctured by solid metal lancet needle of straight shape to cause small bleeding, which is painful and fearful. A realistic mimicking of mosquito's proboscis model has proved to be a good model for painless insertion. In light of the foregoing, raising the following questions is quite logical.

1. How did the mosquito acquire the knowledge of giving a local anesthetic before an operation?
2. How did it learn that cutting into the living tissue of its victim causes pain and how did it develop a numbing technique to address this issue?
3. How did the mosquito know that blood coagulates and how did it acquire the knowledge of synthesizing an anticoagulant.
4. Is it pure coincidence that this fluid is to be found exactly where it is most needed in the cutting knives that will rupture the skin?
5. How can it be explained that there is an excellent mechanism in a tube that is 0.1 cm in length with a radius of approximately 0.01 cm found in a creature no more than a centimeter long, and that every mosquito without exception has always had such a system and knowledge?

The answer is obvious: The mosquito cannot be the genius with information on the chemical composition of the human body that evaluates this information and develops solutions in its own body. It is evident that such an intricate system can only be created by a Supreme Creator Who has the most detailed knowledge of the anatomy of both humans and mosquitoes.

The mosquito cuts tissue with a cutting system and during this process, the secretion poured into the wound from one of the cutters numbs the tissue and the victim is not even aware that his blood is being sucked. The secretion also prevents the blood from clotting and enables the blood sucking to continue. Eventually the mosquito's abdomen fills with blood equivalent to more than its own body weight.

The incredibly difficult "operation" that the mosquito carries out in the human body is a superior "design", the details of which are being unraveled by means of science today.

هَذَا خَلْقُ اللَّهِ فَأَرُونِي مَاذَا خَلَقَ الَّذِينَ مِنْ دُونِهِ ۗ بَلِ  
الظَّالِمُونَ فِي ضَلَالٍ مُّبِينٍ ﴿١١﴾

*This is the creation of Allah. So show Me what those other than Him have created. Rather, the wrongdoers are in clear error.*

(The Holy Qur'an , 31:11)

The duty of man, who can easily be defeated even by this little creature, is to see the signs Allah has created in different worlds and to acknowledge the might of his Lord.

Izumi H, Suzuki M, Aoyagi S, Kanzaki T. 2011. Realistic imitation of mosquito's proboscis: Electrochemically etched sharp and jagged needles and the cooperative inserting motion. *Sensor Actuat A:Phys.* 100(1): 115-123.

## Legendary Chairmen of PCST

### Prof. Dr. M. A Kazi (1928-1999)



Prof. Dr. M.A Kazi was born on Jun 25, 1928. He did his MSc from University of Sindh and PhD from University of London, UK. He joined University of Sindh, Jamshoro and remained there till he became Professor Emeritus, in

1989, where he also served,, as Director, Institute of Chemistry during 1962-1972. He was elected as the Fellow of Pakistan Academy of Sciences in 1972 and later served the academy twice as President during 1978-1984 and 1986-1988. He also had the honor to become the President, Islamic Academy of Sciences in 1987. Pakistan Council for Science & Technology had the honor to have him as its Chairman from 1980 to 1988. He remained Coordinator General, COMSTECH for 8 years during 1988-1996. Dr. Kazi served Pakistan in different capacities, for example, as Federal Secretary, Ministry of Education, Government of Pakistan (1977-1980), Chairman University Grants Commission (1973-1979), Secretary, Department of Education, Government of Sind, Karachi and Adviser to the President on Science & Technology (1972-1973). In recognition to his innumerable services at key positions in different government organizations, Dr. Kazi was conferred with UNESCO Medal, Iqbal Centenary Medal and Hamdard Foundation Plaque. He published a number of papers in local and international journals and worked as Editor and Co-author in different text books & laboratory manuals prepared by the Government. Dr. Kazi breathed his last in 1999. His services to the nation will be remembered in the years to come. May Allah Almighty rest his soul in eternal peace, aameen.



**Prof. Dr. Z.A Hashmi (1914-1990)**

Prof. Dr. Z. A Hashmi was born on Apr 13, 1914. He did his L.V.P (Hons) from Punjab Veterinary College, Lahore and Post-Graduate Diploma from Indian Veterinary Research Institute. He obtained his MSc from Michigan State University and started his career as Demonstrator in Chemistry and Pharmacology,

Punjab University College, Lahore.

Dr. Hashmi had the honor of being the Vice Chancellor of University of Agriculture, Faisalabad 1961-1969. He was elected as the Fellow of Pakistan Academy of Sciences in 1972. Dr. Hashmi served his country by holding key positions in different scientific and educational organizations, for example, as National Professor of Biology, Dean, Faculty of Biological Sciences, Member, Atomic Energy Council of Pakistan, Education Secretary to the Government of West Pakistan, Secretary to the Government of Pakistan in Ministry of Education and Scientific Research. He also served, Pakistan Science Foundation as the Founder Chairman and National Science Council (currently known as Pakistan Council for Science & Technology) as Chairman. Pakistan Council for Science and Technology had the honor of having him as Chairman for 5 years (1975-1980).

At international level, Dr. Hashmi was the Member of the United Nations Advisory Committee for the Application of Science & Technology to Development, Member of the United Nations Working Group on Food Production appointed by A-CAST and Member of the UN CAST Regional Group for Asia and the Pacific. He contributed over 70 research/professional publications and reports to the scientific community. Dr. Hashmi died in 1990 at the age of 76. His services to the nation will be remembered in the years to come. May Allah Almighty shower His blessings on him, aameen.

## Activities of Chairman PCST

### United Nations Regional Workshop

Prof. Anwar-ul-Hassan Gilani, Chairman, PCST, was invited to represent Pakistan at the regional workshop of the United Nations Economic and Social Commission for the Asia and the Pacific (United Nations ESCAP) held in Bangkok on Aug 6, 2015. He delivered a lecture titled "Contributions of Science, Technology and Innovation (STI) to the Three Dimensions of Sustainable Development", which was the 1st lecture of the program to set the ground for discussion. The theme of the workshop was "Harnessing Science, Technology and Innovation (STI) for Sustainable

Development", thus helping in understanding STI in the evolving sustainable development challenge as well as to develop the key concepts behind STI and draw linkages between STI and the sustainable development goals, identifying some of the key challenges in strengthening STI capacities in United Nations ESCAP Member States. The workshop was inaugurated by Dr. Shamshad Akhtar, Under-Secretary-General of the United Nations and Executive Secretary of ESCAP, Bangkok (Former Governor of State Bank of Pakistan), visible in the middle in this group photo.



The workshop highlighted the role of technology and innovation in development. The workshop participants deliberated and developed a consensus that while there is a strong link between the concepts of science, technology and innovation, it is important to clarify the interrelationships and stakeholders in order to arrive at coherent national and regional strategies and national policy frameworks which promote STI for sustainable development. In this context, the prevailing challenge is to develop and govern dynamic policies, institutions and processes that increase national capabilities not only to develop, access and adapt appropriate technological innovations, but also to leapfrog in new and emerging technology areas.

With regard to innovation and business, participants duly highlighted the role of small and medium-sized enterprises (SMEs) as a key driving force of the modern market economy due to their multifaceted approach to innovation, some of which famously originated in garages. To maintain SMEs innovation capability requires the promotion of advanced technology transfer and acquisition, and the conduct of the research and development. It is important for countries to align their innovation and technology development policy and strategy with their national development goal that results in concrete improvement in peoples living standards. Innovation is therefore a national requirement that needs the active cooperation of public and private sector.

It was agreed that in the Asia-Pacific region, STI can be used as an enabling mechanism to address priority developmental

challenges through developing technological solutions to these challenges. Some of the barriers to developing sound STI include weak and fragmented national STI policies, lack of STI statistical data and knowledge base for evidence-based policy making, poor STI mainstreaming in development policies and strategies, conventionally used top-down approaches for STI policy and planning, poor interlinking and networking among National Innovation System (NIS) components/stakeholders and limited access to intellectual property in core areas of sustainable development.

The workshop spotlighted the importance of the concept of NIS that refers to the complex and interactive web of knowledge flow and relationship between industry, government and academia and making them work systematically to sustain STI development efforts. The innovative performance of a country depends to a large extent on how these NIS actors relate to each other as elements of collective system of knowledge creation and use, as well as the technologies they use. Creating and implementing a responsive NIS requires a holistic policy design and formulation that fosters and encourages collaboration and partnerships among firms, and between public and private institutions. A focused area of the workshop was to develop linkages of a regional innovation system consisting of innovation clusters and Exclusive Export Zones to NIS. It can be an effective strategy to attract FDI, enhance competitiveness and absorb the technology acquired through transfer.

Regional and South-South cooperation (SSC) in STI has gained momentum in the recent years. Some of the potential areas of regional cooperation include pooling of financial and human resources, establishing exchange programs of students and professors among universities, joint cross-border research, networking of research institutions, joint R&D among businesses, establishment of cross-border or sub-regional science and technology parks and incubators, promoting free flow of information across countries, facilitating technology transfer among developing countries of the region through technology banks and fairs, etc. The regional STI capacity building can be part of Science Diplomacy or part of Overseas Development Assistance. ESCAP can promote research, regional cooperation and capacity building in trade, investment and energy required for development of STI through its existing programs such as the Asia-Pacific Trade Facilitation Forum, Asia-Pacific Business Forum and Asia-Pacific Energy Forum. Generally, the role of ESCAP in the area of STI can be articulated in fostering STI for sustainable development, strengthening technology transfer capacity, nurturing new and emerging technologies and promoting technology intelligence.

The participants identified important areas where governments can influence the development, promotion and utilization of STI to achieve their national development goals. These areas include education, R&D spending, R&D in private sector, entrepreneurship development and collaborations and partnerships. Another key area is mainstreaming open innovation in national STI policies that could be used to bridge the gap between innovation and industrial applications. Intellectual Property Protection (IPR) issues form a significant obstacle to technology transfer as well as to technology development which often relies on the analysis and reverse engineering of existing technologies; thus, another pivotal area for government intervention is IPR. Since STI is being considered as critical for countries to achieve the sustainable development goals (SDGs), mainstreaming of gender in the STI-driven sustainable development process becomes extremely important.

In short, given the scope of the challenges affecting all countries, no one country by itself will be able to find solutions and, therefore, cooperation among countries and all stakeholders at all levels is called for, both at the global and the regional level, in particular in the area of STI.

Other national and international platforms where the Chairman, PCST participated are the following.

1. Attended 2nd ACSE 2015 Annual Meeting on Trends in Academic and Scholarly Publishing in Asia, Dubai, UAE (Aug 13-15, 2015) as Guest of Honor.



2. Chief Guest at 1<sup>st</sup> All Pakistan DICE Health Innovation Exhibition 2015, Expo Center, Karachi (Aug 21-22, 2015). The event was organized by Dow University of Health Sciences in collaboration with PCST and DICE, USA.







3. Delivered a keynote lecture titled Integrative Medicine: An emerging approach for better Healthcare Outcome at the 4th International Molecular Biology and Biotechnology Congress and Conference on Life Sciences Research-2015, Isra University, Islamabad Campus (Sep 4-6, 2015).



4. Prof. Ahsan Iqbal, the Federal Minister for Planning, Development & Reforms was the Chief Guest whereas the Chairman, PCST was the Guest of Honor at National Conference on Building Knowledge-based Economy in Pakistan: Learning from Best Practices, Serena Hotel, Islamabad (Sep 9-10, 2015). The theme of the conference was to suggest recommendations to the Government to facilitate transformation of Pakistan's economy into a Knowledge-based-Economy.



5. Chief Guest in the Inaugural Session and delivered a plenary lecture titled Functional Foods for Healthcare at the 3rd International Conference on Emerging Trends on Bioinformatics and Biosciences, Muhammad Ali Jinnah University, Islamabad (Oct 3, 2015).



6. Rana Tanveer Hussain, Federal Minister for Science & Technology, (Chief Guest) presenting shield to Chair, PCST (Guest of Honor) at the Inaugural Session of the National Workshop on Textile Industry: Challenges and Opportunities towards Value Addition, National Textile University (NTU), Faisalabad (Oct 5, 2015).



7. Chief Guest at the Annual Prize Distribution Ceremony, Institute of Space Technology, Islamabad (Oct 6, 2015) and distributed the prizes to winner teams.



8. Guest of Honor at the Pakistan National Clean Tech Innovation Competition, Serena Hotel, Islamabad (Oct 14, 2015),  
Details of the event covered separately



9. Visited PINSAT, Preston University, Islamabad (Oct 12, 2015) and delivered an Invited Lecture titled Healing Power of our Food (photograph with Prof. N.M.Butt, Director of the Institute).



10. Represented Pakistan and acted as Panelist in the Discussion Session during 2nd Regional Workshop on "Harnessing Science, Technology and Innovation for Sustainable Development" United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), Asian Pacific Center for Transfer of Technology (APCTT), United Nations Conference Center, Bangkok (Nov 2-4, 2015).

11. Chief Guest at the Closing Ceremony of Visio Spark 2015, COMSATS Institute of Information Technology, Wah Cant. (Nov 7, 2015). This was a national exhibition of software, Quiz and Speed Programming competition and mobile application development with participation from all over the country.



12. Participated as the Fellow and Scientific Secretary of Pakistan Academy of Medical Sciences (PAMS) in the 17th Convocation Ceremony held at the University of Health Sciences, Lahore (Nov 13, 2015). The Governor of the Punjab was the Chief Guest of the event.



13. Mr. Baligh-ur-Rehman, Federal Minister of State for Education, was the Chief Guest whereas the Chairman, PCST and Mr. Aamr Mahmood, Chancellor, were the Guest of Honor at 11th Convocation Ceremony of Muhammad Ali Jinnah University (named currently Capital University), Islamabad (Nov 19, 2015).



14. Chief Guest at the Discussion Forum of ACSE Editors' Café held at Marriot Hotel, Islamabad (Nov 21, 2015). The theme of this forum was to improve the networking among editors and to discuss current challenges faced by Pakistani scholarly journals.



15. Guest of Honor in the Inaugural Session at DICE 2015 Mega Innovation and Entrepreneurship, University of Agriculture, Faisalabad (Nov 24-25, 2015), with Governor of Punjab as Chief Guest. He also delivered a keynote lecture titled Innovation and Entrepreneurship in Universities and R&D Organizations.





16. Chief Guest at the Inaugural Ceremony of the national symposium on Nanotheranostics: A New Concept in Imaging and Drug Delivery, NORI-PAEC, Islamabad (Nov 26, 2015).



17. Prof. Ahsan Iqbal, Federal Minister for Planning, Development & Reforms, was the Chief Guest whereas the Chairman, PCST was the Guest of Honor at the Closing Session of DICE Automotive 2015, held at NUST, Islamabad (Nov 26-27, 2015). The event was jointly organized by NUST and DICE Foundation, USA, with facilitation of PCST.



18. Chief Guest at the Opening Ceremony of ExclTe Cup 2015, Capital University, Islamabad (Dec 12, 2015). This event was organized to provide platform for students from different universities to display their innovations in the field



of IT. An admirable act of the host Institution was that it did not compete for 1st position (although competent) for giving chance to guest participants from other universities.

19. Invited Keynote Speaker at the Annual Event of OPEN ISLAMABAD FORUM 2015 held at 1969 Restaurant Shakarparian, Islamabad (Dec 19, 2015). The Islamabad Chapter of Organization of Pakistani Entrepreneurs (OPEN) organized the event with theme based on Iqbal's famous verse 'Apna Muqam Paida Kar'. Title of his lecture was: Swimming against the Tides.

20. Guest of Honor with Prof. Atta-ur-Rahman (UNESCO Laureate and former Chairman, HEC, and Chief Guest) at the DICE Energy 2015 held at the NED University of Engineering and Technology, Karachi (Dec 22-23). Prof. M Afzal Haque, VC, NED University is also in the picture.



21. Presented 'Pakistan's Country Report' in the Meeting of Scientists/Experts of ECO Member States to Prioritize Focus Areas for Research Funding under the S&T Fund of ECOSF as the Head of Pakistani delegation, Islamabad (Dec 28-30, 2015). He also delivered a keynote lecture titled 'Contribution of Science, Technology and Innovation (STI) to the Three Dimensions of Sustainable Development'.





### PCST Visited by the Federal Secretary, MoST

PCST became the first organization being visited by Mr. Fazal Abbas Maken, after assuming the charge of the office of Federal Secretary for Science and Technology on Jul 28, 2015. The honorable Secretary informed that he selected PCST for his first visit due to the fact that PCST is the apex body directly involved in formulating proposals for the Science and Technology Policy. Prof. Dr. Anwar-ul-Hassan Gilani, Chairman PCST welcomed the worthy Secretary and expressed his gratitude for selecting PCST for his first visit. The Chairman PCST gave a detailed presentation on the mandate and activities of PCST and it was informed that PCST is one of the oldest S&T organizations, established in 1961, even before the Ministry, with mandate to provide advice and assistance to the National Commission for Science and Technology (NCST) /Government on S&T Policy and Planning. Other major functions of PCST include collection and publication of data on nation-wide S&T statistics, Strategic planning of R&D through expert committees/think tanks, Scientometric and futuristic studies, regular evaluation of scientific research through bibliometric and peer review techniques



While briefing about the Research Productivity Award (RPA) and Directory of Productive Scientists of Pakistan (PSP), the Chairman PCST informed that PCST has become the referral point for assessment and evaluation of scientific output of researchers/ scientists due to the authenticity and validity of its data. For awarding Civil awards, President's medals etc. cases are also forwarded to PCST for verification of research output of scientists/ researchers. However, Funds allocation in respect of RPA has shown a continuous decrease from around Rs. 71 million in 2001-02 to Rs. 11.8 million in 2014-15. The Scientific community is disappointed by this sharp decrease in the award money which has resulted in decrease in the number of applicants as well as awardees for the RPA, hence, affecting the overall data of productive scientists. It was further highlighted that some recent Initiatives of PCST include PCST's newsletter and contributions to bridge the gap between academia-industry, Promoting and advocating demand-driven research for solving the problems of industry and society. Workshops are

also organized on national interest areas such as "Potential of Value Addition and Health Benefits of Indigenous Herbal Wealth and Functional Foods". It was also informed that PCST is collaborating with DICE and other partners such as University of Agriculture, Faisalabad, NED University of Engineering and Technology Karachi and Dow University of Health Sciences, Karachi for the promotion of innovation and commercialization in S&T.

In response to the Federal Secretary's concern for the long gap in holding the meetings of NCST and its Executive Committee (ECNCST), the chairman updated that PCST has already started working on the agenda for the next meeting of ECNCST and NCST and the draft agenda would be completed soon. The Chairman also apprised the Federal Secretary about the issues and problems of PCST such as shortage of manpower, problems in attracting and retaining competent manpower, absence of higher management posts in the council, etc. All these issues are adversely affecting the performance of PCST. In response to a comment of the Federal Secretary regarding the slow pace of technology development in Pakistan, the Chairman PCST proposed to establish centers of excellence in specialized fields of national importance in the country, on the pattern of HEJ Research Institute of Chemistry, Karachi. At the end, the Secretary MoST inaugurated the PCST's newsletter "STI Voice", and the Chairman presented the maiden copy of the PCST's newsletter to him and thanked for his courtesy visit.



## Activities of PCST

**One Day National Workshop on Textile Industry: Challenges and Opportunities towards Value Addition, Oct 05, 2015, Faisalabad.**

Pakistan's Textile Industry is largely export oriented, operating from the early years of our independence and currently accounts for more than half of country's exports. Globally we are ranked 4th in terms of cotton yarn production and 10th in terms of textile products export, which contributes around 8 percent to GDP. However, the world share of Pakistani textile and clothing decreased from 1.94% in 2011 to 1.81 % in 2012 (WTO). Pakistan intends to enhance its textile exports from about US\$ 20.6 billion up to US\$ 26 billion in the next five years through shifting to knowledge based products, as envisaged in our 'Textile Exports Vision 2020' and 'Pakistan Textile Policy 2014-19'. In South Asia, China is the leading player in textile sector and its textile sector is highly knowledge intensive and competitive at the global level. Bangladesh which has 19 institutes for specialization in textile related fields is fast capturing greater global market share by converting yarn and fabric imported from Pakistan into garments and its export is now comparable to India.

Realizing the importance of textile sector in economy, PCST and National Textile University (NTU), Faisalabad jointly organized a national level workshop on "Textile Industry: Challenges and Opportunities towards Value Addition" on Oct 5, 2015 at NTU. The workshop attended by more than 200 participants which provided a very useful platform to bring together experts from the industry, academia, R&D organizations and public sector to highlight the challenges faced by Textile industry and to explore opportunities to enhance Pakistan's share in the global textile market. The inaugural ceremony was graced by the Federal Minister for Science and Technology, Rana Tanveer Hussain who, while addressing the audience, highlighted the role of textile sector in the economy and ensured his full support in uplifting the textile industry. Prof. Dr. Arshad Ali, Rector NTU, presented the overview of the university and the potential to promote textile industry. Prof. Dr. Anwar-ul-Hassan Gilani, Chairman PCST and Ch. Muhammad Nawaz, the President FCCI (Faisalabad Chamber of Commerce and Industry) in their addresses, highlighted the importance of industry-academia collaboration necessary to support demand-driven research culture, improving productivity and maximize value-addition to be more competitive.

After the inaugural session, industrialists and representatives of the textile industry apprised the Federal

Minister for S&T about the issues and problems of the textile industry needing government intervention. The worthy Federal Minister assured the support of the government and his Ministry in solving the problems of the textile industry. Resultant to this workshop, the Government of Pakistan took some initiatives/reform program for the revival of textile industry. The inaugural ceremony was followed by technical sessions and discussion session in which experts from textile industry and academia shared their thoughts and suggestions on the effective revival of textile industry. A number of prominent speakers, with diverse backgrounds



Including, Mr. Ihsan Rehman Technical Director Sapphire Mills, Dr. Mushtaq Mangat, CEO Modemo Fabrics, Dr. M. Mohsin, Assistant Professor, UET (Faisalabad Campus), Ms Ismat Gul Khattak, Director General PNAC, Mr. Gundolf Klaehn, Project Manager GIZ Pakistan, Mr. Shahid Shahbaz, GM AA Spining and Dr. Mazhar Hussain Peerzada, Associate Professor, Mehran University, Sindh delivered talks on different topics related to workshop's





**First All Pakistan DICE Health 2015 Exhibition**

The Dow University of Health Sciences in collaboration with DICE Foundation (Distinguished Innovative Collaborative Entrepreneurship) and Pakistan Council for Science and Technology organized a Mega Exhibition & Competition in the area of Health Sciences, under the leadership of Prof. Masood Hameed Khan. The idea behind the event was to motivate academia, industry, government, entrepreneurs and expatriates to come to a common platform to showcase innovations and technologies, share knowledge and further collaborate with one another for the rapid development of innovative products and moving toward commercialization of health related innovative products, necessary for the economic development of the country.



A large number of teams comprising mainly young innovators from all over Pakistan participated and displayed their products and ideas, which included medical and diagnostic devices, process of economical water purification, Health supporting innovation software, health innovation posters and many more.

The DICE Health 2015 had three components; Exhibition, Competition, CME (Continued Medical Education) running

parallel during the event. Students from different regions of Pakistan participated and presented their Projects and Posters in the event. Initially 130 projects and posters were submitted and out of this 40 projects and 45 posters were selected for competition. After rigorous evaluation the Scientific Committee declared 3 winners for project competition, winners for poster competition and 7 special prizes for projects as per following details.

For project competition, 7 appreciation prizes, each of Rs 10,000, were also announced. Regarding Poster Competition, top 10 posters were awarded a cash prize of Rs 10,000 each. Chairman, PCST, inaugurated the exhibition as the Chief Guest and shared his thoughts and distributed the certificates to the winners.



**UNIDO Cleantech Award Ceremony**

United Nations Industrial Development (UNIDO) Pakistan in executing a Global Cleantech Program, which is a global competition aimed at promotion of Innovations in the area of Clean Technologies. The main aim of this competition is to foster innovations in Renewable energy, Energy Efficiency, Water Efficiency and Waste to Energy. In this regard, a call for awards was launched for this purpose to covert clean

**Results of Project Competition**

Name of University	Project Title	Position	Cash award (Rs)
NED University of Engineering & Technology	Mind controlled car alternative treatment for improving concentration.	1st	100, 000
NED University of Engineering & Technology	Wearable wireless oximeter gadget for intensive care patients.	2nd	50, 000
Hamdard University, Karachi	Development of efficient, portable and low cost brain computer interface system for stroke rehabilitation of domestic patients.	3rd	30,000



Technology innovations into viable businesses. Under this program, UNIDO supported and trained many Cleantech innovators nationwide who came up with many innovative ideas to address the challenges of energy, water shortage and clean technologies.

UNIDO Cleantech Awards Ceremony of Pakistan National Cleantech Innovation Competition implemented by UNIDO was held in Islamabad on Oct 14, 2015 in collaboration with Pakistan Council for Science and Technology. Mr. Ghulam Murtaza Jatoi, Federal Minister for Industries and Production, was the Chief Guest of the occasion. Speaking to the participants, the Minister emphasized the importance of clean technology and appreciated the role of UNIDO and its



partners in arranging this competition that will help provide a solution to energy shortage in the country. He reiterated the efforts of the Government for adopting the Sustainable Development Goals specifically SDG 9 to promote inclusive and sustainable industrialization. Prof. Dr. Anwar-ul-Hassan Gilani, Chairman PCST, being Guest of Honor, highlighted the role of PCST in fostering entrepreneurship development in Pakistan and the execution of Cleantech competitions besides expressing his interest in working with UNIDO in

future. The UNIDO Representative to Pakistan, Mr. Esam Alqararah, shared UNIDO's vision on the importance of renewable energy and its efforts to promote clean technologies in Pakistan. The award ceremony was attended by more than 150 participants from ministries, governmental institutions, international donor agencies, private sector stakeholders and GEF cell

This year the program supported 55 SMEs and Startups through a program of extensive mentoring, training and showcasing opportunities. Following is the detail of the UNIDO's awards.



Award	Category	Prize US \$	Team Name (No)	City	Title
National winner	Energy Efficiency	20,000	Project roshni (1511)	Karachi <a href="mailto:imran.moinuddin@nexdegree.com">imran.moinuddin@nexdegree.com</a>	Energy conservation & cost savings delivered
1 <sup>st</sup> Runner Up	Energy Efficiency	15,000	Zaheen Machines (1516)	Lahore <a href="mailto:osman.malik@zaheemachines.com">osman.malik@zaheemachines.com</a>	Optimizing natural gas, electricity and water usage through iot based automation
2 <sup>nd</sup> Runner Up	Waste to Energy	15,000	Tawanai (1547)	Lahore <a href="mailto:faisal.bashir@gmail.com">faisal.bashir@gmail.com</a>	Energy Management People
3 <sup>rd</sup> Runner Up	Water Efficiency	15,000	Bitsym Watersense (1550)	Islamabad <a href="mailto:saad@bitsym.com">saad@bitsym.com</a>	Symphoneering Green Imagination
Most promising women led team	Renewable Energy	15,000	Bolt Bike (1518)	Lahore <a href="mailto:aalyafiaz@yahoo.com">aalyafiaz@yahoo.com</a>	Burn calories, not carbon

### DICE 2015 Mega Innovation and Entrepreneurship Event

DICE 2015 Mega Innovation and Entrepreneurship event, organized by the University of Agriculture, Faisalabad in collaboration with PCST, DICE (USA) and British Council, was held on Nov 24-25, 2015. The objective of such mega event was to promote the entrepreneurship activities among students of various universities of Pakistan. In this event, more than 500 students from 50 universities participated from all over the Pakistan in addition to, executives from local industry. In inaugural session, the Governor of Punjab, Mr. Malik Rafiq Rajwana was the Chief Guest and Prof. Dr. Anwar-ul-Hassan Gilani (Chairman PCST) was the Guest of Honor. Distinguished guests both from industries and academia attended the event. In the Inaugural session, Prof. Iqar Ahmad Khan VC, UAF, Dr. Khurshid Qureshi, President DICE Foundation, USA, Mian Muhammad Adrees, CEO, Sitara Chemical Industries and President FPCCI, Mr. Murray Keelar, from British Council, Ms. Ina Lepel, the German Ambassador to Pakistan and Prof Asif Ali, Director ORIC, addressed the audience in addition to the address of the Chairman, PCST and Governor of Punjab.

The Chairman PCST presented a keynote lecture titled "Innovation and Entrepreneurship in Universities and R&D Organizations: PCST's Efforts & Initiatives" and elaborated the role of Science, Technology and Innovation (STI) in the sustainable development, which should address not only economic development but also the social and environmental aspects. He also stressed on the mandate of PCST, being the Secretariat of National Commission of Science and Technology (headed by Prime Minister) and current efforts in developing the Agenda of the forthcoming meeting including National Research Agenda. He also signified the role of PCST maintaining the data bank of research productivity of scientists

The Governor of Punjab in his address while highlighting achievement of Government, stressed on promoting education and health, and appreciated organization of such events providing platform for the students to show their talent in displaying innovative ideas.

Then the Chief Guest along with other dignitaries and business leads inaugurated Exhibition in the Expo Centre of UAF and



visited various stalls and encouraged the youth for putting up their innovative plans for business development; further detail of the projects and winners is available at PCST website.

### DICE Energy 2015 at NED University

NED University of Engineering and Technology in collaboration with DICE-USA and Pakistan Council for Science and Technology (PCST) organized "DICE-Energy 2015" on Dec 22-23, 2015. The theme of this event was energy and sustainability which included a symposium on energy, exhibition and award giving ceremony. It provided an opportunity to the academia and the industry to share innovative ideas and solutions to address the current energy scenario. The major objectives of DICE Energy platform were to help grow indigenous energy industry in Pakistan by providing a common platform for Academia, Energy Industry, Government and Expatriates to promote and collaborate on innovations related to energy sector, commercialization of innovations, energy engineering capacity building leveraging knowledge of expatriates around the world, providing access to Pakistan energy industry to international markets leveraging extensive expatriate network and to help Government of Pakistan in energy policy making. The event was inaugurated by Prof. Atta-ur-Rahman (UNESCO Laureate and former HEC Chairman) as the chief guest along with Prof. Anwar-ul-Hassan Gilani, Chairman PCST, as guest of honor. Distinguished guests from industries and academia also attended the event. Out of a total of 50 projects submitted by various universities of Pakistan, 32 projects were put on display. Four projects were selected by a panel of judges as the winners which included one each from Mechanical Engineering Department-NED University of Engineering & Technology, Mehran University of Engineering & Technology-Jamshoro, Electronics Engineering Department-NED University and Hamdard University, in the same order of merit.

Prof. M. Afzal Haque, VC-NED University and Mr. Ubaidur Rehman (Chair DICE Energy, USA), addressed the audience in addition to the address of the Chief Guest and Guest of Honor. Prof. Gilani in his speech highlighted the role of PCST in development of policy in Science and Technology being secretariat of the National Commission for Science & Technology, and that PCST regularly conducts foresight studies on different priority areas by engaging different think tanks and has formulated recommendations including for energy, which will be part of the Agenda for next meeting. PCST also maintains data of R & D indicators together with research output of productive scientists of Pakistan and that commercialization potential of research will be part of the new criteria of ranking scientists.

In his inaugural address, while appreciating efforts and initiative of organizers, Prof. Atta-ur-Rahman highlighted that in spite of world's 5th largest river system, we are using only 14% hydel power generation against potential of 46000 MW, while there is a huge potential of using coal resources in addition to untapped gas resources, and other alternate energy sources such as wind, solar, bio-fuel/fossil fuel and fuel cell technology. He further highlighted the scientific miracles at the global level and made a case that in the era of knowledge economy, countries cannot sustain economically without investing on science and technology.

The Chief Guest and other dignitaries then inaugurated the exhibition, visited different stalls and appreciated innovative ideas of students.



### Academia-Industry Interaction

As mentioned in the message of the Chairman PCST, this column has been introduced in STI Voice to bring both academia and industry closer for mutual interaction by inviting questions from the industry/farmers and identifying expertise in the scientific community for match making. PCST is already working on the inclusion of few key words in the profile of each scientist that describe the expertise of the scientist, in the forthcoming volume of Productive Scientists of Pakistan (PSP). This initiative, besides bringing the two groups together, will also ensure Government of Pakistan in

Implementing the Vision 2020. The questions identified by the industry will be acknowledged and the scientists who pick up any question to pursue research in this direction are requested to inform PCST for its record. Related to the same theme, a meeting was arranged by IRP in the Department of Chemistry, University of Management and Technology, Lahore, in collaboration with Pakistan Chemical Manufacturers Association. The industries namely MN Chemical, ShafiResoChem, Chem Tech, SITARA chemicals Olympia Chemicals shared the following demand driven projects for academic researchers.

Following were the topics of projects shared by industry speakers.

1. Preparation of activated carbon from coconut husk
2. Preparation of methanol from cheaper methods
3. Extraction of pure  $\text{CaCl}_2$ , which is lead and arsenic free
4. Anti-back staining agent in textile during dyeing
5. Method of extraction or recovery of  $\text{CaCl}_2$  during Solvex process from the waste
6. To improve the size of sodium carbonate crystals which can withstand 200 mesh
7. Epoxy resin
8. Cost effective process to obtain coke and its bi-products from coal pyrolysis
9. Production of acrylic monomers from acetylene
10. Designing and erection of pilot naphtha cracker
11. Pilot Plant Designing for polyethylene production.
12. Design process for ABS Resin (Acrylonitrile butadiene styrene rubber)
13. Diaminodiphenyl sulphonamide (DASA)

For further information, contact [rahmat@irp.edu.pk](mailto:rahmat@irp.edu.pk).

For the current issue of STI Voice, the following two questions have been identified by Chairman, PCST. The questions are open to academia for further perusal.

**Q1. Cotton** is one of the most important cash crop for Pakistan, which earns more than 50 % of our total foreign exchange through export. Unfortunately, cotton is the most vulnerable crop to pesticide attack, consuming nearly 80% of the pesticide in Pakistan and cotton growers are compelled switching to alternate crops. Hence, one of the major challenges for Agri scientists to come up with new pesticides and/or new cotton varieties, which are resistant to pests.

Neem (*Azadirachta indica*) is well known to be insect/pest repellent, while the solution/juice of Neem is being used by some organic farmers with some success to keep the pests away. Can this be experimented scientifically?



Q.2 Pakistan is amongst top 10 countries producing Almonds, which are known to possess multiple medicinal benefits including cardio-protection (value in heart diseases as detailed in Scientists' Voice for Society, yet imported almonds are flooded in Pakistan market. Question arises why we spend huge foreign exchange on import of almonds when there is no shortage of indigenous almonds, which are as good as imported American almonds in their cardio-protective effect (study conducted at Aga Khan University).

A small project for a Master degree thesis can be to know the reason for preference of buying imported almonds by the public. A survey from customers at different dried fruit shops using questionnaire with following options can be arranged:

1. Reception- Imported almonds are of better Quality than local almonds
2. Convenience Imported almonds are available in shelled form
3. Cost- Imported almonds are cheaper
4. Any other reason (please specify)

Information derived from this questionnaire would help to plan discouraging import of almonds. Further query regarding above two suggested studies can be addressed to Prof. Anwar Gilani at [ahgilani5@gmail.com](mailto:ahgilani5@gmail.com).

### STI Policy Voice

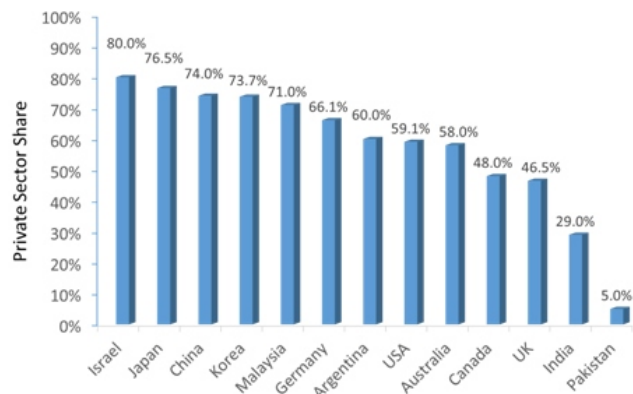
#### Encouraging and Engaging Industry and Civil Society in Patronage of R&D in Pakistan

Research and development (R&D) plays a major role in innovation, technical change, raising productivity, bring competitiveness, enabling firms to reduce costs of production, increasing economic growth and improving societal living standards. The current era, is recognized as the knowledge era, and the world is undergoing a new revolution 'the Knowledge Revolution' fueled by the rapid pace of scientific and technological advancements. In this age of competition and innovation only those countries can stay ahead in global race that could prioritize R&D, create enabling innovative and competitive environment and adapt cross-cutting technologies. Realizing the importance of R&D as crucial element for economic growth and sustainable development, advanced and some fast developing economies have made heavy investments in R&D and re-set their research agendas and development policies accordingly.

Participation of the private sector in R&D is a prominent feature of these countries. The private sector (industry & civil society) has increasingly assumed more responsibility in R&D

In these countries, while the state is playing a coordination role between governmental research institutions and their private counterparts. As a result, the private sector currently holds the principal responsibility for sponsoring R&D activities in many parts of the world. Higher number of patents from the private sector vis-à-vis its share of scientific publications also reveals the technical and industrial orientation of innovation systems in those countries. In Israel, share of the private sector in the total national R&D expenditure is about 80% while in Japan, the share of private sector is about 77%. Even in India, the share of private sector in the national R&D expenditure is estimated about 29% while in Pakistan share of private of private sector is only 5% (In Pakistan's case figure of 5% is a broad estimate as no real data is available).

Pakistan has been successful in establishment of a good S&T infrastructure in the form of a network of more than 160 Higher Education Institutions (HEIs) and more than 100 S&T/R&D organizations. However, in general, R&D activity in Pakistan was never linked with industry nor oriented to society. Resultantly, overall performance of national innovation system is not up to the mark or is at the lower end of the ladder when compared with other countries. Pakistan has very low ranking in the Global Innovation Index 2014 (134 out of 143 countries) and the Global Competitiveness Index 2014-15 (129 out of 144 countries).



#### Comparison of share of private sector in total national R&D expenditure of Pakistan with some selected countries.

Pakistan's R&D System that is mostly in the public sector has poor linkages with the public and private sector industry/firms. Therefore, the system is not responsive to the sectoral needs. R&D organizations, including HEIs, plan and carry out R&D activities of their own choice. There are hardly any programs and projects that are developed and executed in consultation and collaboration with the industries. It is, therefore, essential that viable links between researchers, industry and civil society may be established so that much

needed R&D support could be available to our industry and society.

Pakistan needs to increase its national R&D spending manifold, to be at par with the emerging nations, within a relatively short span of time. This is extremely difficult and if private sector and civil society is not involved in the patronage of R&D in the country it becomes even more difficult in fact near to impossible. Therefore, different mechanisms have to be adopted and different approaches have to be considered for encouraging and engaging industry and civil society in patronage of R&D activities in the country. Following mechanisms and approaches may be adopted to encourage and engage industry and civil society in patronage of R&D activities in the country

#### 1. Endowment Professorships/Chairs

Industry and civil society organizations or individuals, through an endowment fund, provide emoluments of persons with appropriate qualifications and experience who are employed by an institution (university or R&D organization), where they are involved in teaching and/or conducting research in specified fields. A successful local example in this regard is the Aga Khan University, where 'endowment professorships / chairs' exist in almost every department.

Universities in the US like Massachusetts Institute of Technology (MIT), Yale and Stanford all have endowments. For example, MIT's endowment funds in 2014 totaled \$12.4 billion, excluding pledges.

#### 2. Donations/Grants for Establishing / Upgrading Institutions

With the donations / grants from industry or civil society the 'centers of excellence' can be established. The institutes can be renamed on the donator's name as an acknowledgement of the donation. A prime example of this approach is the prestigious HEJ Research Institute of Chemistry, Karachi. The postgraduate Institute of Chemistry in the Department of Chemistry, University of Karachi (established in 1967) was upgraded with a generous donation by the leading philanthropist/industrialist Mr. LatifEbrahim Jamal on behalf of the HuseinEbrahim Jamal Foundation in 1976;the largest donation at that time in the history of the country. The Institute was accordingly named as "HuseinEbrahim Jamal (HEJ) Research Institute of Chemistry", the expansion of which has led to establishment of the International Center for Chemical and Biological

Sciences (ICCBS) which now has two sections namely, the H.E.J. Research Institute of Chemistry and Dr. Panjwani Center for Molecular Medicine and Drug Research. HEJ alone today, has one of the largest doctoral programmes in the country with over 280 PhD students. The main areas of research and development and training of students include natural product chemistry, protein chemistry, computational medicinal chemistry and plant biotechnology.

Another example could be the infrastructure of Aga Khan University and Hospital where majority of the buildings including Research centers (e.g. Juma Research Centre), university auditorium and lecture halls are through donations from the community.

#### 3. Endowment Grants to Institutions for Specific Activities

Industry and civil society organizations or individuals, provide endowment grant to a non-profit organization usually working in a specific area or specialized field of research. The non-profit organization may be a research institute (independent or affiliated to a university), center of excellence or specific laboratory in a specialized field. A crude example of this is the Natural Sciences Linkage Programme (NSLP) of the Pakistan Science Foundation, where R&D projects are being funded from the profit of an endowment fund received from the government of USA.

#### 4 Collaborative Research

Collaborative research is undertaken by a team comprising researchers from academia / public sector R&D organization and private industry. The project can be either funded by government, industry or a third party. Usually this sort of project runs for a specific period of time and it has pre-set targets.

The Carnegie Trust for the Universities of Scotland' under its 'Collaborative Research Grants Scheme' supports joint research projects that bring together researchers from more than one Scottish university to develop new lines of study or to advance significantly existing areas of expertise. The principal criterion for the award of grant is that the planned research is of excellent quality and is likely to be of benefit to two or more of the universities of Scotland (research consortium). The joint project must involve the active collaboration of researchers in at least two of the Scottish universities. Each university should specify a Principal Investigator, one of whom should act as the Lead Applicant. The duration of the project should normally be from 1 to 2 years, but can be up to a maximum of three years.



## 5. Sponsored Research/ Contracted Research

Since long, universities have been playing central role in solving problems of the industry and society. In the sponsored or contracted research, R&D organization (normally a university) enters into a contract with industry wherein responsibilities of both parties are fixed. Under the contracted research, industry fully sponsors the research project and university is responsible for undertaking the research activities to achieve the target as suggested by the industry.

## 6. Matching Grants

The concept is, in practice, in advanced and some developing nations whereby government funds 50% of the total amount and 50% is contributed by industry or civil society organization. Matching grant is conditional grant for the projects of applied nature. It is also important to mention here that government releases the amount to an R&D

organization/university only when the equal amount is received from the beneficiary (industry / society).

OECD countries have successfully implemented the concept of matching research funding. For example, the Florida High Tech Corridor Council Matching Grant Research Program (MGRP) rewards Florida-based high technology companies that partner with the University of South Florida researchers. Matching funds are available from \$10,000 to \$150,000 and require a private sector partner providing at least a 2:1 cost match investment (cash and in-kind). During the 2013-14, the University of South Florida Matching Grants Research Program awarded 21 new projects with 18 companies. The awards totaled US\$ 1,233,086 from the Florida High Tech Corridor Council with industry partners providing cash of US\$1,092,683. Additionally, industry sponsors provided US\$1,449,955 worth of in-kind support for a total investment of \$3,775,724 in the program. The match ratio was more than 2:1. The average total project value was US\$175,796 with an average award of US\$58,718. These projects supported 52 students and 32 faculty members.

## 7. R&D Tax Credit Incentive

This is a mechanism in which incentive of tax credit is provided to a firm for conducting R&D activities within the firm or sponsoring R&D activities outside the firm.

Many countries including advanced, newly emerged and fast emerging economies offer tax incentives to encourage R&D efforts leading to increased domestic business growth. For example, Australia provides a tax credit equal to 40% or 45% of eligible R&D expenditure, with any excess refundable to small and medium sized entities. China offers 150% super deduction for eligible R&D expenditures.

## 8. Fellowships/ Scholarships

Industry or civil society organizations or individuals may provide fellowships / scholarships (which may include fees for hiring R&D experts, grants for chemicals, equipment and stipends for students research etc.) for the M.Phil and/or Ph.D scholars at a higher education institution to conduct their research work on a topic which is of interest of industry or civil society organization or individual. Fellowships / scholarships may be provided through endowment funds or on the basis of 'one-time' donations. Higher education institutions link the award of student degrees with the successful completion of the task or goal of the industry/society.

This sort of fellowships/scholarships is offered by various national and international firms/ companies such as Procter & Gamble, Toshiba, Glaxo-Smith-Kline fellowships or scholarships.

## 9. Awards/ Prizes

Industry or civil society organizations or individuals may institute awards/prizes to be awarded on regular basis to individual researchers or organizations for their R&D achievements in a specific area.

The American Chemical Society (ACS)- a nonprofit organization chartered by the U.S. Congress, under its "The Heroes of Chemistry" programme recognizes scientists whose innovative work in chemistry and chemical engineering led to commercial products that benefit the world. Each year, Heroes of Chemistry are nominated by their respective companies to recognize their talent, creativity and innovation. In 2015, The American Chemical Society bestowed awards to six (6) teams of scientists from different companies for their achievements. To encourage and motivate research and innovation NUST also gives every year "Best Researcher Award" and "Best Innovation Award" amounting to Rs. 100,000/-each to young researchers and scientists.

(This document has been compiled by Dr.Tariq Bashir and Mr.Khalid P.Bhatti under the guidance of Chairman, PCST)

**Past Eminent Muslim Scholar's voice**

**Abu Ibn al-Hasan Ibn al-Haytham (965 to 1040)**

**"A journey of Science from Darkness into Light"**



**"If learning the truth is the scientist's goal then he must make himself the enemy of all that he reads".**

**Ibn al-Haytham**

When learning about the Muslim scholars of the medieval age, it is easy to be amazed by their brilliance, accomplishments, and contributions to the modern world. Each provided a lasting legacy that changed the world in their time and today. One such scientist, Al-Hasan Ibn al-Haytham, the great polymath who lived from 965 to 1040, distinguished himself in the field of Optics with long lasting impact. In view of the fact that 2015 is labelled as the International Year of Light and Light-based Technologies, Ibn Al Haytham is the top figure in the world in remembering contributions of the past scholars. Hence, we decided to include Ibn Al Haytham in this issue of STI Voice, which covers his biography and highlight his contributions and recognition by the world authorities.

Ibn al-Haytham was born in the Iraqi city of Basra during a creative period known as the Golden Age of Muslim Civilization. The culture of learning and advancement present in the Muslim world at that time had a great impact on him from an early age. He studied Islamic sciences and soon became the Mayor of the city of Basra. During this time, he continued to study, focusing on sciences and other empirical subjects. Later he moved to Egypt on the invitation of Caliph Al-Hakim to attempt his radical idea to dam the Nile. After a field visit, he declined to proceed with the project causing him to end up in what we now call -protective custody for 10 years. During those 10 years he got the peace that he wanted to pursue his research and dived into the study of light. Although what he studied and discovered was truly revolutionary, the way he researched was one of his biggest contributions i.e. the development of scientific method.

Using this revolutionary scientific method, Ibn al-Haytham delved into the field of optics and wrote his first ever 7-volume treatise titled "The Book of Optics"(Kitāb al-Manāẓir) and disproved the ancient Greek idea that light

comes out of the eye, bounces off objects, and comes back to the eye, thereby, explaining how did light enter the eye, was focused, and projected to the back of the eye. During this study, he used a dark chamber called "Albeit Almuzlim" (translated in Latin as "camera obscura") the device that formed the basis of photography. The translation of his book on optics had a huge impact on Europe as the European scholars were able to build the same devices as he did, and many important things such as eyeglasses, magnifying glasses, telescopes, and cameras were developed.

He was the first to study the phenomenon of the pinhole camera, the first to study the way light is affected when moving through a medium (water or gas) and also the first to calculate the depth of the earth's atmosphere, 1000 years before it was proven by spaceflight. He wrote numerous books on astronomy and pointed out the mistakes of the Ptolemaic model of how the stars and planets move and provided a more realistic view of the way the universe works. He completely refuted astrology as a scientific subject and noted that astrology directly contradicts one of the main ideas of Islam that God is the cause of all things, not astronomical bodies. Since he was also trained in the traditional Islamic sciences, he also wrote on how to use empirical methods to disprove a false prophet, and how to use mathematics to calculate the prayer direction towards Makkah.

He had a great influence on Isaac Newton, who was aware of Ibn al-Haytham's works. He studied the basis of calculus, which later led to the engineering formulae and methods used today. He also wrote about the laws governing the movement of bodies (later known as Newton's laws of motion) and the attraction between two bodies gravity. The list of his accomplishments and contributions goes on and on. The truly amazing thing is that he wrote over 200 books, but only around 50 have survived till today.

In recognition to his seminal contributions, both Alhazen Asteroid 59239 and the Alhazen Crater have been named in his honor.



**The Moon Alhazen**



**Logo of IYL 2015**



When Ibn al-Haytham's books were translated into Latin, he was not referred to by his name, rather by the Latinized form of his first name, initially "Alhacen" and later as "Alhazen" as the practice of changing the names of great Muslim scholars to more European sounding names, was common during the European Renaissance. However, the answer to the question as to how this ancient Muslim scientist cast his light into the 21st century, is not difficult today as the world is celebrating the year 2015 as the International Year of Light (IYL 2015) to mark the 1,000th anniversary since the appearance of the remarkable treatise on optics Kitab al-Manazir by the Arab scientist Ibn al-Haytham. The following two events are among those most remarkable.

1. As part of the International Year of Light and Light-based Technologies 2015, UNESCO hosted an international conference during Sep14-15, 2015 at its Paris Headquarters focusing on the accomplishments of the Islamic civilization in its Golden Age (VIII-XVth century) and the life and works of Ibn Al Haytham, whose pioneering Book of Optics was published around 1000 years ago in c. 1028. Renowned speakers in the history of science and international experts in research, technology and education presented talks over two days to provide decision-makers, scientists and the public with new historical insights and debate of the current trends and challenges of research and education in Arab and Islamic countries and other countries worldwide during Ibn Al-Haytham Conference.

2. Inspired by Ibn al-Haytham, a UK based organization "1001 Inventions" launched a global educational campaign produced with the King Abdul aziz Center for World Culture in Saudi Arabia and in partnership with UNESCO and the International Year of Light. Titled "1001 Inventions and the



**UNESCO Director General opening the conference "Islamic Golden Age of Science for actual knowledge-based society: The Ibn Al-Haytham example".**

World of Ibn Al-Haytham," the initiative uses the scientist's extraordinary life to raise awareness of the importance of intercultural dialogue through science diplomacy. It also aims to further instill pride in science heritage, promote social cohesion and encourage mutual understanding and respect through engaging under-represented communities



**The unveiling the statue of Ibn al-Haytham at IYL Opening Ceremony**

Speaking to 1001 Inventions, on Ibn al-Haytham's contributions to optics, art, and visual literacy, Prof. Charles Falco of optical sciences at the University of Arizona said, **"Visual literacy is not limited to the narrative and symbolic qualities of pictures and images, but it is also rooted in the scientific and cultural study of optics and the visual system... The genesis of this concept can be traced to the work of the 11th century Arab polymath, Ibn al-Haytham".**

IYL 2015 will be brought to an official close with a ceremony to be held in Mexico during Feb 4-6, 2016.

Incidentally, the current Chairman PCST (Prof. Anwar H Gilani) won Ibn-Hytham prize in 1997 based on a national competition jointly sponsored by Pakistan Academy of Sciences(PAS) and Trust Fund for Science, Education & Research in Pakistan, Saudi Arabia. This photograph with Dr. A.Q. Khan, President, PAS and Dr. MD Shami, Secretary General, PAS is at the occasion of award ceremony.



## Science, Technology and Development

PCST has been publishing a quarterly journal namely "Science, Technology and Development (STD)" since 1982. It has already been recognized by HEC and covers all fields of Science, Technology and Innovation studies. The guidelines, and editorial board has been revised, research papers are being evaluated by international experts. More importantly, PCST developed & launched an online Contact Management System (CMS) for improvement of the journal "Science Technology & Development" This has been possible by the collaboration with Asian Council for Science Editors (ACSE) which has facilitated and expedited the process of publishing. The online system (CMS) includes

- Online submission, publishing, editing and modification of content
- Improving visibility/circulation of the journal
- Indexing/Abstracting of the journal
- Handling unethical withdrawal of the manuscript during or after review process
- identification of potential reviewers and speeding up review process etc

## Productivity Award (RPA)

After reviewing and improving the criteria for the Research Productivity Award (RPA) and the directory of Productive Scientists of Pakistan (PSP) by a national level Review Committee, RPA for the current year has been announced through the electronic and print media. Please consult PCST website for further details ([www.pcst.org.pk](http://www.pcst.org.pk))

## STI indicators

Pakistan Council for Science and Technology is mandated to collect data on Science & Technology statistics and develop Science, Technology and Innovation (STI) indicators, which are provided to national and international organizations including the UNESCO Institute of Statistics (UIS). The data UIS are accessed and used by many international organizations involved in development studies. The data on S&T and R&D indicators are provided to UNESCO by PCST biennially in an aggregated form for the country. A fresh round of survey, in this regard, has been initiated to collect the information for the financial year 2014-15 from S&T as well HEI's of all provinces and the report to be completed within a couple of months.

## Scientist's Voice for Society



This column is dedicated to the innovative and applied work (of an individual scientist or team) which has got the potential of commercialization and has an impact on the economy of the country.

Current selection is based on the work of Prof. Anwar ul Hassan Gilani (Chairman, PCST) and his team in the field of Natural Products and Functional Foods. The other prominent member of his team in this study was Dr. Humaira Jamshed (indigenous PhD scholar, shown in the photograph). This study was co-supervised with Prof. Gilani by Dr. Fateh Ali Tipu and Dr. Romain Iqbal

### Almonds can prevent heart attack

Cardiovascular diseases (CVDs) continue to be the leading cause of global casualties, contributing to around one third of the deaths worldwide. Out of the estimated 17 million deaths per year, 80% are documented to be in developing countries. Where in the last 30 years, the incidence in high-income countries have reduced to half, CVDs are affecting twice as many lives in low- and middle-income countries including South Asian countries such as Pakistan, India, Bangladesh. In fact, South Asians are one of the highly susceptible populations for coronary artery disease (CAD, commonly known as Angina), thus more vulnerable to heart attack. For Pakistan, an estimated one out of four middle aged men is at a risk of developing CVDs.

The major atherosclerotic-CVDs include CAD (leading to heart attack) and cerebrovascular disease (leading to stroke). Atherosclerosis is the process in which, plaques build up in blood vessels, blocking the blood flow, lead to heart attack and dyslipidemia (disturbed lipid profile, or so called high cholesterol). This is one of the most common underlying cause of atherosclerotic-CVDs characterized by elevated serum triglycerides (TG), total cholesterol (TC) and low-density lipoprotein (LDL) complemented with sub-optimal high-density lipoprotein (HDL); the 1st three components are considered bad or harmful lipids, while the last one (HDL) is considered to be a useful or heart protective cholesterol.



Approximately 3539% of the population of the USA and 3340% of the UK has blood HDL- cholesterol below normal. In Pakistan, the prevalence of low HDL-cholesterol is reported to be as high as 6080%, which is an alarming figure.

Among the therapeutic options for dyslipidemia (disturbed lipid profile), there are a number of pharmaceutical medicines, but safety and tolerability issues limit their use in addition to high cost, yet with limited success in addressing the HDL, which is unfortunately major challenge in Pakistani patients. Hence, this PhD project was designed to prove the clinical efficacy of Almonds for its cardio-protective effect particularly addressing the HDL. For this purpose 1st an animal model was developed to test the efficacy and possible mode of action, followed by a clinical trial on cardiac patients with sub-optimal HDL

Interestingly, Almond supplementation showed promising results in improving lipid profile with some novelty raising HDL and improving endothelial function at distinctly low dose if taken in a traditional way (soaking overnight and taking empty stomach in the morning). A clinical trial conducted on 150 heart patients enrolled at the Aga Khan University Hospital revealed that Almonds supplementation at a dose of 10 grams/day (equivalent to 7-10 almonds) significantly improved lipid profile both at 6 weeks and 12 weeks of study. This is the 1st study in the world which showed beneficial effect of Almonds in raising HDL (useful cholesterol) thus showing potential of preventing heart attack. In addition, this study showed that a distinctly lower dose is required if almonds are taken in a traditional way (empty stomach after overnight soaking), thus saving a huge cost. Further, the indigenous variety of Almonds (named Talwar, being sword shape) was found as effective as imported American variety, thus making a case for saving foreign exchange, by cutting down import of almonds when Pakistan is ranked amongst top 10 almonds producing countries of the world.

This study was part of PhD thesis of Dr. Humaira Jamshed, who recently completed her degree at the Aga Khan University under the supervision of Prof. Anwar-ul-Hassan Gilani currently, Chairman, PCST, with following 4 publications from her PhD thesis including 2 in the Journal of Nutrition (top ranked journal in the field of Nutrition), with cumulative impact factor of around 11. The external examiner (Prof. Kevin Croft) at the time of Open Thesis defense commented that the quality of this thesis can be compared with that of any reputed university of the world. The details of her publication is given below:

1. Jamshed H, Arsalan J, Gilani AUH. Cholesterol-cholesterol-butterfat diet offers multi-organ dysfunction in rats. *Lipids in Health and Disease* 2014,13:194; <http://www.lipidworld.com/content/13/1/194>
2. JamshedH, GilaniAH. Almonds Inhibit Dyslipidemia and Vascular Dysfunction in Rats through Multiple Pathways. *The Journal of Nutrition* 2014; 144(11):1768-74; doi:10.3945/jn.114.198721.
3. Jamshed H, Gilani AH. Lower Dose of Almonds Exhibits Vasculo-protective Effect when Given in Empty Stomach. *International Journal of Pharmacology* 2015;11(2):122-29.
4. Jamshed H, Sultan, FAT, Iqbal, R, GilaniAH. A randomized controlled clinical trial showing HDL-raising efficacy of almonds in Coronary Artery Disease patients. *The Journal of Nutrition* 2015; 145 (10), 2287-2292;doi:10.3945/jn.114.207944.

### OIC Scientists' Voice - 2014

The very first verse of the Holy Quran urges human beings to read and throughout this book Allah encourages them for acquisition of scientific knowledge about the natural phenomena as signs of His creation.

وَسَخَّرَ لَكُم مَّا فِي السَّمٰوٰتِ وَمَا فِي الْاَرْضِ جَمِيعًا مِّنْهُ اِنَّ فِيْ ذٰلِكَ لَاٰيٰتٍ لِّقَوْمٍ يَّتَفَكَّرُوْنَ ﴿١٣﴾

"And He has subjected to you whatever is in the heavens and whatever is on the earth - all from Him. Indeed in that are signs for a people who give thought" (Al-Quran-45:13)

Muslims believe that doing science is an act of religious merit and a collective duty of the Muslim community for the wellbeing of humanity. It appears that the year 2014 was a fruitful year from a scientific point of view for Muslim scientists and Muslim countries as they made quite breakthrough discoveries during this year. The following is a highlight of some of these scientific achievements, in alphabetical order, made by the OIC scientists in 2014.

### Engineering



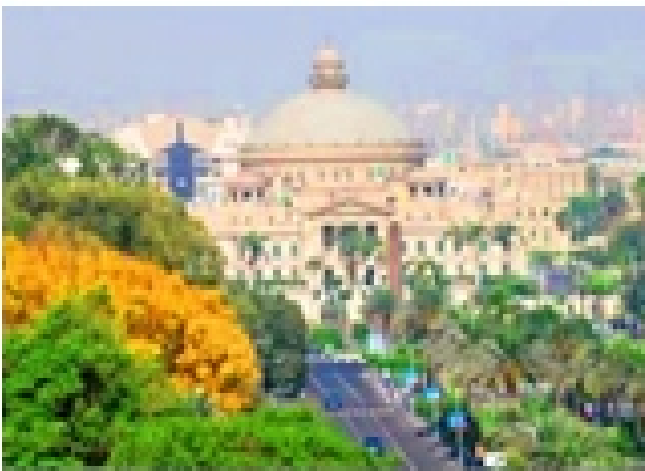
The Moroccan engineering scientist Rachid Yazami became a co-winner of 2014 Draper Prize by the US National Academy of Engineering

for pioneering and leading the groundwork for today's lithium ion battery.

## Education

### Muslim countries ranked in top 20

According to the United Nations Educational, Scientific and Cultural Organization (UNESCO), four Muslim countries were ranked in the top 20 destinations all over the world for international students. Malaysia, Emirates, Egypt, and Saudi Arabia respectively made it in the top 20 with a total of 213,364 foreign students studying at their territories and in their institutions. The Southeast Asian country of Malaysia topped the Islamic list being the 12th worldwide with 63,625 foreign students, exceeding Asian powers like South Korea and Singapore.



Three Malaysian academics, Prof. Dr. Saidur Rahman from Universiti Malaya's (UM) Department of Mechanical Engineering, Prof. Dr. Ishak Hashim from Universiti Kebangsaan Malaysia's (UKM) School of Mathematical Sciences and Prof. Dr. Abdul Latif Ahmad from Universiti Sains Malaysia's (USM) Department of Chemical Engineering are among the world's leading scientific minds of the year 2014 according to a report by a business firm Thomson Reuters.



The World's Most Influential Scientific Minds

## Genetics

Scientists co-led by the Egyptian geneticist Dr. Sherif El-Khamisy at the Center of Genomics (CG), Zewail City of



Science and Technology (ZC) in Egypt, identified the first defect in a genetic pathway for individuals who suffer impaired neural function.

A team of researchers led by the Iranian computational biologist, medical geneticist and evolutionary geneticist



Pardis Sabeti trained doctors from the Muslim countries Nigeria, Senegal and Sierra Leone to use a sequencing and diagnostic technology

to improve tracking Ebola virus's mutations.



Dr. Teepu Siddique, a Pakistani neurologist succeeded with his team in discovering one of the causes of Amyotrophic lateral

sclerosis (ALS).

The Moroccan geneticist Dr. Ismahane Elouafi was named



among the 20 Most Influential Women in Science in the Islamic World under the Shapers category, and the CEO-Middle East Magazine has listed her

among the World's 100 Most Powerful Arabophone Women in the Science category.

## Mathematics



An Iranian mathematician became the first ever female winner of the celebrated Fields Medal. In a landmark hailed as "long overdue", Prof. Maryam

Mirzakhani was recognized for her work on complex geometry.





A well known Kazakhstani Muslim scientist Mukhtarbay Otelbayev, a professor at the Eurasian National University's Department of Methods of Mathematical SimulationS, proves the existence of a solution to Navier Stokes Equation which is deemed to be one of the hardest in the world.

**Medicine**

A Kashmiri molecular neurotherapist and stem cells professor **Dr. Khalid Shah**, has successfully discovered a brain cancer treatment. He achieved this via prompting stem cells to kill brain cancer.



Two Egyptian scientists **Akram Amin Abdel latif** and **Hanaa Gaber**, at Technische Universität München (TUM), Germany, created space-based crystals of two proteins of the Hepatitis C virus.



The crystals which were developed in space can help in innovating new drugs to fight the virus.

The world renowned Iranian scientist in neurological surgery **Professor Majid Samii** has garnered the 2014 Golden Neuron Award announced during a ceremony held at the biannual meeting of the World Academy of Neurological Surgery in Vienna on October 11. The Iranian neurosurgeon and medical scientist, Samii is renowned worldwide for his life trajectory especially for his work in the Project Africa 100.



Award announced during a ceremony held at the biannual meeting of the World Academy of Neurological Surgery in Vienna on October 11. The Iranian neurosurgeon and medical scientist, Samii is renowned worldwide for his life trajectory especially for his work in the Project Africa 100.

Scientists in the Muslim country of Bashkortostan are developing a technology to make monoclonal antibodies specific to fight the Ebola virus.



**Bashkortostan** succeeded in obtaining a license from the Swiss pharmaceutical company, Novartis, to start producing a cure for one of the types of Leukemia.

**Space**

A young female Kazakh inventor **Nazifa Baktybayeva** created a real in-orbit satellite that allows Kazakhstani students to conduct research based on materials obtained from space.



This invention wasn't Nazifa's first one as in 2012 she created a model of a Venusian spacecraft that was fabricated using parts of her own old computer, headphones, a DVD disk, an umbrella and even a hanger and she calculated the craft's trajectory.

The European space probes **Rosetta and Philae** didn't only have Egyptian names to commemorate the Egyptian Civilization's contributions to humanity, but four Egyptian scientists have also worked in this historic space mission. A 4-billion-mile journey ended in 2014 when Rosetta reached Comet 67P.

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Egyptian students were ranked internationally among the top 10 teams of space engineering youth groups that participated at the University Rover Challenge (URC), in USA.

This article was compiled at the occasion of the proposed OIC Summit that got postponed, however, the article has been retained for the interest of the readers. All the information presented in this article has been taken from different web sources

**Dummies for babies**



Giving dummies to babies can slow their ability to talk, research suggests. The study also indicates that toddlers who suck their thumbs are also at a greater risk of delayed speech development.

Science news latest  
Oct 13, 2015

### A Bibliometric Analysis of Pharmacy/Pharmacology Research in Pakistan



Research is fundamental for the socioeconomic development of a country. Pakistan is making serious efforts to contribute towards knowledge production, transmission and transfer realizing the importance of scientific research. Although this share is modest but there is a

rapid growth in scientific research activities in the country during the past decade and the quantity and quality of articles published in peer reviewed scientific journals is constantly increasing. This increase is mainly a result of the initiatives and inducements of the Higher Education Commission and the annual grant of award (RPA) from the Pakistan Council of Science and Technology to active scientists, on the basis of their research productivity, particularly on publications in ISI-indexed Journals<sup>1</sup>. It is difficult to quantify the scientific research directly but different bibliometric indicators are increasingly employed to measure the quantity and impact of scientific publications.

Recently a study has been carried out at PCST to reveal the contributions of Pakistani scientists in the area of pharmacology/pharmacy research. This study evaluates research carried out in Pakistan during 1975-2014 in the fields of pharmacy and pharmacology using different bibliometric indicators. The data have been retrieved from online database of the ISI Web of Science. The global share of Pakistan in the publications in the fields of pharmacy and pharmacology is only 0.25%. The volume and quality of research in pharmacology and pharmacy revealed a positive trend in Pakistan from 2005 onwards, as measured by the number of articles published in ISI-indexed journals. The average annual growth rate is 29.29% for publications and 34.22% for citations. If compared with Asian countries, 27 countries including Pakistan are ranked in top 100 publishing countries in the field of Pharmacology /Pharmacy by Web of Science. Out of those 27 countries, Pakistan holds 13th rank and still needs concrete measures to increase research productivity and visibility of researchers in the field of Pharmacology /Pharmacy. The study has been published in the International Journal of Pharmacology<sup>2</sup>.

1. Saima Nasir and Jamila Ahmed, 2013. Incentives Matter: The Role of Research Productivity Award in Increasing Scientific Output of Pakistani Scientists. *Sci. Technol. Develop.*, 32 (3): 251-256.

2. Saima Nasir, Jamila Ahmed, Mudassir Asrar and Anwar-ul-Hassan Gilani. 2015. A Bibliometric Analysis of Pharmacy /Pharmacology Research in Pakistan. *International Journal of Pharmacology* DOI: 10.3923/ijp.2015.766.772

Dr. Saima Nasir

Senior Research Officer, PCST

### Young Scientist's Voice

Born in a small village of Sialkot, **Dr. Muhammad Farooq**, received his early and higher secondary education from



Sialkot and then moved to University of Agriculture, Faisalabad (UAF) from where he got B.Sc. (Hons), M.Sc.(Hons) and PhD degrees with distinction. The title of his PhD thesis was "Assessment of physiological and biochemical aspects of pre-sowing seed treatments in transplanted and direct seeded rice"

Dr. Farooq started his professional career as Scientific Officer in Pakistan Council of Agricultural Research (PARC) but soon he left to join UAF as lecturer. Currently, he is working as Associate Professor in Agronomy at UAF besides holding the positions of Adjunct Associate Professor at the University of Western Australia, Adjunct Professor at the Dankook University, South Korea, and Visiting Professor at King Saud University in Riyadh, Saudi Arabia. He had also been working at International Rice Research Institute, Los Banos, Philippines, and Centre of Environment and Life Sciences, CSIRO Plant Industry, Perth, Australia.

He is the author of 5 books, 24 book chapters 195 research papers in in peer reviewed journals besides having a number of conference presentations. He is a recipient of several national and international research grants.

His total impact factor is 245, and his total author citations report (ACR) on Scopus, ISI and Google exceeds 5,000 with 39 h-index up to September 4,, 2015. He is an active member of several national and international professional societies. He is also Secretary, Asian Allelopathy Society; Secretary, Pakistan Society of Agronomy, and Secretary, Pakistan Allelopathy Society.



Dr. Farooq is the recipient of fellowships from Japan International Research Centre for Agricultural Science (2007), Australian Endeavour Awards (2010), and Alexander von Humboldt Foundation (2011). He is regular recipient of Research Productivity Award from Pakistan Council of Science and Technology since 2007, and recipient of UAF-top cited article awards since its inception. He also received 'Best Young Research Scholar Award-2012' from Higher Education Commission of Pakistan. He is also is Young Affiliate Fellow of The World Academy of Sciences. Dr. Farooq is member of the Editorial Boards of four international research journals.

His research in crop physiology, agronomy and allelopathy spans more than ten years. His publications in these fields are considered as key papers and are widely cited. His research, on crop water relations and adaptation to dryland environments, has provided a fundamental understanding of the response of crops to water deficits, temperatures and nutrient deficiencies. He has also optimized and developed several seed priming and enhancement techniques for improving crop performance under less than optimum field conditions, and for delivery of micronutrients. He is among the pioneers in exploring naturally occurring phenomenon 'allelopathy' for non-chemical weed control in a range of field crops. He has appraised and optimized water-saving rice production systems. Panicle sterility is a major issue in aerobic rice culture; he found that boron nutrition may help improving the panicle fertility in aerobic culture. In recognition to his outstanding research work in agriculture and its strong impact in the scientific and social development, he has been awarded the COMSTECH Young Researcher Award 2015 for Excellence in Science and Technology.

### Staff's Voice

Prof. Dr. Farzana Latif Ansari, Adviser (Honorary), PCST, participated as a plenary speaker and delivered a lecture titled Pakistan on the Road to Computational Chemistry in a 2 Days International Conference on Recent Trends in Chemistry at Allama Iqbal Open University, Islamabad during Oct 5-6, 2015.



□ She delivered a lecture titled Linguistic Miracles in the Holy Quran at Siddiq Public School, Rawalpindi (Oct 28, 2015)



- She represented PCST as Executive Editor of the PCST journal, Science, Technology and Development at ACSE Editors Café at Marriott Hotel, Islamabad, organized by the Asian Council of Science Editors on Nov, 21, 2015.

□ Dr. Tariq Bashir spoke on the “National Conference on Building Knowledge-based Economy in Pakistan: Learning from Best Practices” organized by the Islamabad Policy Research Institute (IPRI) and Hanns Seidel Foundation (HSF), Germany (Pak Office) held in Islamabad Sep 9-10, 2015.



□ Dr. Saima Nasir, Editor, PCST journal Science, Technology and Development attended 2nd Annual Meeting of the Asian Council of Science Editors on Aug 13-14, 2015 at Metropolitan Palace, Dubai, UAE. The theme of the meeting was Trends in Academic and Scholarly Publishing in Asia. The meeting was a cosmic gathering of Editors, Editors in Chief, Vice Chancellors, Professors and Early Career Researchers belonging to different countries including Pakistan, Malaysia, Qatar, Venezuela, India, Sri Lanka, Egypt, Iran, Turkey, UAE and UK and thus provided a vibrant forum for sharing of ideas and expertise.





## Speakers' Voice at PCST

- Mr.Tariq Mahmood Ali delivered a lecture titled Sirat-i-Mustaqeem at PCST on Jul 9, 2015.
- Prof.Dr.Farzana Latif Ansari, Adviser, PCST, delivered a lecture titled Miracles in the Miracle during Ramadan Lecture series at PCST library on Jul, 15, 2015.



- Dr.Ghulam Jallani, Director, Directorate of Vegetables, National Agriculture Research Council, Islamabad delivered a lecture titled Kitchen Gardening at PCST on Sep 30, 2015. The Chairman, PCST also delivered a lecture titled Healing power of food on the same occasion.



## Funding Opportunities

### HEC Research Grants (NRPU)

To meet the current challenges of researchers working in local universities/DAIs of Pakistan and to promote the R&D in the country, HEC has initiated National Research Program for Universities (NRPU) to provide research grants, in all disciplines of Science, Engineering and Technology, Social Sciences, and Humanities, to a maximum of Rs. 20.00 million. The amount to which a researcher is eligible is conditional with his impact factor. The applicant should be a full time faculty member of a university and should have an advanced academic degree and relevant research experience. For further details, visit, [www.hec.gov.pk/InsideHEC/Divisions/RND/ResearchGrants/NRPU/Pages/NRPU.aspx](http://www.hec.gov.pk/InsideHEC/Divisions/RND/ResearchGrants/NRPU/Pages/NRPU.aspx)

### PSF Research Support Program

The promotion of scientific research and related activities is the major objective of Pakistan Science Foundation, which provides funding for research projects in all areas of Natural and Social Sciences, Engineering and Medical Sciences. The Foundation provides grants to universities and other R&D organizations for projects undertaken by individuals or groups of scientists. Projects proposals, submitted to the Foundation, are evaluated initially by Subject Experts in the

Relevant fields and then by the PSF Technical Committees which recommend the projects for approval on the basis of technical merit and relevance to the socio-economic needsof the country. For further details, visit [www.psf.gov.pk/researchSupport.aspx](http://www.psf.gov.pk/researchSupport.aspx).

## Funding Opportunities in Germany

### 1. Finding a Research Institute

The following platforms help you in finding a research institute that may match your research interest:

[www.research-in-germany.de](http://www.research-in-germany.de);

[www.bmwi.de/EN/root.html](http://www.bmwi.de/EN/root.html), [www.research-explorer.de](http://www.research-explorer.de), [www.mpg.de](http://www.mpg.de),

[www.helmholtz.de/en/research/energy/www.zef.de](http://www.helmholtz.de/en/research/energy/www.zef.de)

### 2. Funding of PhD-research, postdoc and advanced research

The German Academic Exchange Service (DAAD) offers you a scholarship database that covers funding of DAAD as well as of other funding organizations: [www.funding-guide.de](http://www.funding-guide.de). You may also find the funding database of the Research in Germany Portal useful: <http://www.research-in-germany.org/en/research-funding/funding-programmes.html> Some universities and non university research institutes run their own funding programmes or offer paid PhD positions. HEC scholarships are also very good options.

### 3. Postdoctoral Researchers International Mobility Experience (P.R.I.M.E.)

The German Academic Exchange Service (DAAD) offers a new funding programme - co-financed by the Marie Curie Programme of the European Commission - for outstanding postdoctoral researchers from all disciplines and nationalities: „Postdoctoral Researchers International Mobility Experience“ (P.R.I.M.E.). The funding consists of salaries instead of scholarships. Funding is provided for 18 months, in which 12 months have to be spent abroad and 6 months (re-integration phase) at a German university. The re-integration phase is mandatory. The German university administrates the salary during the whole funding period. Further information: [www.daad.de/prime/en](http://www.daad.de/prime/en)

### 4 Energy Research

Germany is a leading country both in energy research and in the development of energy technologies. The German Government as well as the European Union in recent years has allocated considerable funds for the research on renewable energy systems. Qualified Pakistan researchers of all academic levels are welcome to join German research institutes for PhD, PostDoc or advanced research in order to cooperate in fighting a global problem.

## CAS-TWAS Fellowships 2016

CAS-TWAS Fellowship for Students from all over the world including 60 from developed countries to pursue PhD studies in China has been announced, Deadline Mar 31, 2016.

For further detail, visit <http://scholarship-positions.com/cas-twas-presidents-phd-fellowship-programme-china-2015/2014/11/05/#ixzz3vMFhUOQm>

### EU Horizon 2020 Program

Horizon 2020 Funding calls for proposals in different areas such as Coal & Steel, COSME, 3rd Health Program, Consumer Program, Justice Program etc. For further details follow the link, <Http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/index.html>.

## Announcements

### 5th Annual Innovation Summit

The academia and industry are invited to display their innovative products and solutions in the innovation Expo to buy or sell technology and win Innovation awards. 5th innovation summit has been scheduled on Mar 2-3, 2016 in Punjab University, Lahore. The summit will provide the Industry an opportunity to get business solutions, new technologies, interact with scientists and meet 100s of university graduates as their future team. Moreover, the Academia, can sell their technologies, find industry partners, explore relevant research areas, present projects in sessions and meet 100s of experts of their own areas. For further details, visit <http://www.irp.edu.pk/summitpu/>

### Policy Workshop for Applied Research

Pakistan Council for Science and Technology offers annual Policy Workshop for Applied Research. The next workshop is on Policy for Commercialization of Research to be held on Mar3, 2016 in Punjab University, Lahore. The contact person from PCST is Dr. Tariq Bashir for further details contact [drtariqbashir@yahoo.co.uk](mailto:drtariqbashir@yahoo.co.uk).

### Light exposure linked to weight gains in kids

“Factors that impact on obesity include calorie intake, decreased physical activity, short sleep duration and variable sleep timings. Now light can be added to the mix” says Cassandra Pattinson. She studied 48 children aged 3-5 from 6 Brisbane childcare centers over a 2 weeks' period, measuring each child's sleep, activity and light exposure along with their height and weight to calculate their BMI. Surprisingly, physical activity was not associated with the BMI of



children but sleep timing and light exposure was. This is the first time light has been shown to contribute to weight in children who are more exposed to artificial lighting tablets, mobile phones and television, than any previous generation. The findings are a significant breakthrough and a world-first.

(courtesy ACE News, Nov, 2015)

### International Women's Day

Department of Biochemistry, Quaid-i-Azam University, Islamabad, is organizing a one day conference on Mar 8, 2016 with the title ISESCO Women in Science Conference on **Contribution of Pakistani Women in Scientific and Social Development.**

ISESCO Women in Sciences (ISESCOWINS2016) is a multi-disciplinary conference which provides female researchers from diverse research a forum to present their work to a multidisciplinary audience. The conference consists of three technical sessions: Biological Sciences (BS), Natural Sciences (NS) and Social Sciences (SS). As the conference is potentially of interest to a wide range of researchers throughout the country, the organizing committee has set up an online abstract submission system to streamline the processes of abstract submission, peer review and preparing the conference proceedings. The Program Committee will organize a review of abstracts for oral or poster presentation. Abstract submission deadline: Feb 20, 2016

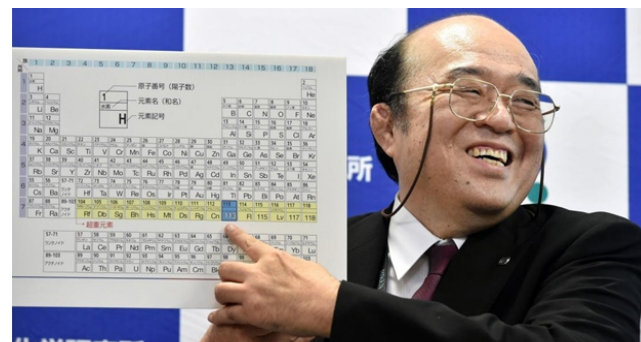
Registration fee, Rs. 300/-.

Last date for submitting the registration fee, Feb 29, 2016.

All female scientists are encouraged to send their abstracts till 20th February 2016.

### Periodic Table finally has a Full 7<sup>th</sup> Row

“To scientists, this is of greater value than an Olympic Gold Medal,” Ryoji Noyori-Nobel Laureate in chemistry, Four new elements have been added to the periodic table, finally rounding out the chemical table's seventh row. The International Union of Pure and Applied Chemistry (IUPAC) verified the new elements last week, which were discovered by scientists in the US, Japan and Russia. “The chemistry community is eager to see its most cherished table finally being completed down to the seventh row,” says Professor Jan Reedijk, President of the Inorganic Chemistry Division of IUPAC. The man-made elements, which have not yet been officially named, are being temporarily called Element 113, Element 115, Element 117 and Element 118. They are the first to be added to the table since 2011 and were discovered by slamming lighter nuclei into each other and tracking the decay of the radioactive super heavy elements.



Kosuke Morita, RIKEN group Leader at the Riken institute, Wako, Saitama Prefecture showing the 113 atomic element number.

# Periodic Table with 7<sup>th</sup> Row Complete

**Periodic Table of the Elements**

1 IA 11A <b>H</b> Hydrogen 1.008	2 IIA 2A <b>He</b> Helium 4.003																	18 VIIIA 8A <b>Ne</b> Neon 20.180					
3 <b>Li</b> Lithium 6.941	4 <b>Be</b> Beryllium 9.012																	9 VIIA 7A <b>F</b> Fluorine 18.998					
11 <b>Na</b> Sodium 22.990	12 <b>Mg</b> Magnesium 24.305																	17 VIIA 7A <b>Cl</b> Chlorine 35.453					
19 <b>K</b> Potassium 39.098	20 <b>Ca</b> Calcium 40.078																	35 <b>Br</b> Bromine 79.904					
37 <b>Rb</b> Rubidium 85.468	38 <b>Sr</b> Strontium 87.62																	53 <b>I</b> Iodine 126.904					
55 <b>Cs</b> Cesium 132.905	56 <b>Ba</b> Barium 137.327																	85 <b>At</b> Astatine 210					
87 <b>Fr</b> Francium 223	88 <b>Ra</b> Radium 226																	118 <b>Uuo</b> Ununoctium [294]					
		3 IIIB 3B <b>Sc</b> Scandium 44.956	4 IVB 4B <b>Ti</b> Titanium 47.88	5 VB 5B <b>V</b> Vanadium 50.942	6 VIB 6B <b>Cr</b> Chromium 51.996	7 VIIB 7B <b>Mn</b> Manganese 54.938	8 VIII 8 <b>Fe</b> Iron 55.845	9 VIII 8 <b>Co</b> Cobalt 58.933	10 VIII 8 <b>Ni</b> Nickel 58.693	11 IB 1B <b>Cu</b> Copper 63.546	12 IIB 2B <b>Zn</b> Zinc 65.39							31 IIIA 3A <b>Ga</b> Gallium 69.723	32 IIIA 3A <b>Ge</b> Germanium 72.64	33 IIIA 3A <b>As</b> Arsenic 74.922	34 IIIA 3A <b>Se</b> Selenium 78.96	35 IIIA 3A <b>Br</b> Bromine 79.904	36 IIIA 3A <b>Kr</b> Krypton 83.80
		19 <b>Al</b> Aluminum 26.982	14 <b>Si</b> Silicon 28.086	15 <b>P</b> Phosphorus 30.974	16 <b>S</b> Sulfur 32.06	17 <b>Cl</b> Chlorine 35.453	18 <b>Ar</b> Argon 39.948							49 IIB 2B <b>In</b> Indium 114.818	50 IIB 2B <b>Sn</b> Tin 118.71	51 IIB 2B <b>Sb</b> Antimony 121.757	52 IIB 2B <b>Te</b> Tellurium 127.6	53 IIB 2B <b>I</b> Iodine 126.904	54 IIB 2B <b>Xe</b> Xenon 131.29				
		27 <b>Co</b> Cobalt 58.933	28 <b>Ni</b> Nickel 58.693	29 <b>Cu</b> Copper 63.546	30 <b>Zn</b> Zinc 65.39							67 IIIB 3B <b>Ho</b> Holmium 164.930	68 IIIB 3B <b>Er</b> Erbium 167.26	69 IIIB 3B <b>Tm</b> Thulium 168.934	70 IIIB 3B <b>Yb</b> Ytterbium 173.054	71 IIIB 3B <b>Lu</b> Lutetium 174.967							
		21 <b>Sc</b> Scandium 44.956	22 <b>Ti</b> Titanium 47.88	23 <b>V</b> Vanadium 50.942	24 <b>Cr</b> Chromium 51.996	25 <b>Mn</b> Manganese 54.938	26 <b>Fe</b> Iron 55.845	27 <b>Co</b> Cobalt 58.933	28 <b>Ni</b> Nickel 58.693	29 <b>Cu</b> Copper 63.546	30 <b>Zn</b> Zinc 65.39							81 IIIB 3B <b>Tl</b> Thallium 204.383	82 IIIB 3B <b>Pb</b> Lead 207.2	83 IIIB 3B <b>Bi</b> Bismuth 208.980	84 IIIB 3B <b>Po</b> Polonium [209]	85 IIIB 3B <b>At</b> Astatine [210]	86 IIIB 3B <b>Rn</b> Radon 222
		37 <b>Rb</b> Rubidium 85.468	38 <b>Sr</b> Strontium 87.62	39 <b>Y</b> Yttrium 88.906	40 <b>Zr</b> Zirconium 91.224	41 <b>Nb</b> Niobium 92.906	42 <b>Mo</b> Molybdenum 95.94	43 <b>Tc</b> Technetium [98]	44 <b>Ru</b> Ruthenium 101.07	45 <b>Rh</b> Rhodium 102.906	46 <b>Pd</b> Palladium 106.42	47 <b>Ag</b> Silver 107.868	48 <b>Cd</b> Cadmium 112.411	49 <b>In</b> Indium 114.818	50 <b>Sn</b> Tin 118.71	51 <b>Sb</b> Antimony 121.757	52 <b>Te</b> Tellurium 127.6	53 <b>I</b> Iodine 126.904	54 <b>Xe</b> Xenon 131.29				
		57 <b>La</b> Lanthanum 138.905	58 <b>Ce</b> Cerium 140.12	59 <b>Pr</b> Praseodymium 140.908	60 <b>Nd</b> Neodymium 144.24	61 <b>Pm</b> Promethium [145]	62 <b>Sm</b> Samarium 150.36	63 <b>Eu</b> Europium 151.965	64 <b>Gd</b> Gadolinium 157.25	65 <b>Tb</b> Terbium 158.925	66 <b>Dy</b> Dysprosium 162.50	67 <b>Ho</b> Holmium 164.930	68 <b>Er</b> Erbium 167.26	69 <b>Tm</b> Thulium 168.934	70 <b>Yb</b> Ytterbium 173.054	71 <b>Lu</b> Lutetium 174.967							
		87 <b>Fr</b> Francium 223	88 <b>Ra</b> Radium 226	89-103 <b>Ac</b> Actinide Series	90 <b>Th</b> Thorium 232.038	91 <b>Pa</b> Protactinium 231.036	92 <b>U</b> Uranium 238.029	93 <b>Np</b> Neptunium 237.048	94 <b>Pu</b> Plutonium 244.064	95 <b>Am</b> Americium 243.061	96 <b>Cm</b> Curium 247.070	97 <b>Bk</b> Berkelium 247.070	98 <b>Cf</b> Californium 251.083	99 <b>Es</b> Einsteinium 252.083	100 <b>Fm</b> Fermium 257.095	101 <b>Md</b> Mendelevium 258.10	102 <b>No</b> Nobelium 259.101	103 <b>Lr</b> Lawrencium [260]					

Lanthanide Series

Actinide Series

Alkali Metal

Alkaline Earth

Transition Metal

Semimetal

Nonmetal

Basic Metal

Halogen

Noble Gas

Lanthanide

Actinide



