

Dr. Salam: An asset of Pakistan

Weekly
TECHNOLOGY
Times

Pages: 8 Vol: IX Issue No: 05

January 29 — February 04, 2018

www.TechnologyTimes.Pk

January 29, 1926 — November 21, 1996

Photo: Dr. Pérez-Hoodbhoy Interviews
Dr. Abdus Salam for FTI in 1989

Remembering the first Pakistani to win a Nobel Prize: Dr. Abdus Salam

By W. Bokhari

I never met Abdus Salam, but at the Abdus Salam International Center for Theoretical Physics (AS-ICTP), where we all convened a year after his death, his presence in spirit was undeniable. We were all there, the “extended family of Salam”, to pay homage to a person who influenced us in different ways: scientists from all around the world who had worked with Salam and who knew Salam as one of the architects of the fundamental laws of physics, scientists from the Third World in particular for whom Salam was like a father figure who helped the spread of science and knowledge in their countries, bureaucrats and government officials with whom he successfully negotiated the inception and funding of AS-ICTP against impossible odds, policy makers who were guided by his far reaching visions for education and development, members of the local government of Trieste who wanted to celebrate the life of their world-famous “adopted” citizen and even the president of Albania, a physics professor, who came to share his experience of Abdus Salam with us. And then there were people like me who understood modern physics in terms of the Electroweak Theory of Salam, Glashow and Weinberg, but never got a chance to work with him. We were attracted by the continuing legacy of Salam -specialized talks on a wide spectrum of research problems at the forefront of physics.

All of us knew that Salam was one of the greatest scientists of this century, but not all of us

really appreciated the full extent of his genius. As the conference went along, we were amazed at his versatility and sheer energy. His old colleagues at Imperial College recalled that he was a full-time contributor to the department, supervising five or six students, meeting with them almost daily, and constantly working on new ideas and writing papers. He was a prodigiously productive physicist and a demanding advisor to his students. What they did not realize was that Salam, at the same time, was also the science advisor for President Ayub Khan and was deeply immersed in policy making for Pakistan. During those days, he went on to establish the Pakistan Atomic Energy Commission and SUPARCO to name just two. Later on, he also became actively involved in founding an international center for science and technology. Lobbying for what is now AS-ICTP was not easy. He had to deal with procuring funding and support for a project that was deemed unnecessary by many of his Western scientific peers. Some of them actively opposed the idea citing reasons that were blatantly racist. But in the end, the Center was established, and has for more than three decades now, been an unparalleled forum for exchange of ideas and cultures.

As the conference drew to a conclusion, I spent a day in the office of Abdus Salam, going through his collected papers, his books, various news clippings about his life and the letters of condolence sent by people from all across the globe upon his death.

His scientific papers traced the historical route taken by modern physics, which to me was not surprising. He had worked on and made seminal contributions to many key concepts of particle physics -renormalization, parity violation, electroweak unification, supersymmetry, leptoquarks, grand unification and superstrings. His Nobel Prize recognized only one of these: electroweak unification. To call his mind “fecund” would be an understatement -his papers are an irresistible flood of ideas. Many of his colleagues recalled the contagious excitement of Salam whenever he had a new idea, which was very often, probably too often for some. There were no barriers to his mind, Salam was a perennial learner and an ardent student until the sunset of his life. Miguel Virasoro, who succeeded Salam as the director of AS-ICTP, went to visit Salam not long before he died. Salam was very sick, and had extreme difficulty expressing himself. Virasoro decided to tell Salam about his own latest work, not sure whether Salam in his condition would be able to appreciate it. However, as Virasoro spoke, he could see the expressive eyes of Salam reacting to all that he was saying. Once he was done, Salam mustered all of his strength, and said, “But what about gravity?” Even his debilitating terminal illness could not tarnish his exceptional ability to see through to the heart of a problem.

His collection of books en-

Continued on page 4

A belief in unity: The life of Abdus Salam



Tasneem Zehra Husain

The name lay waiting, until he was born and all his life, Abdus Salam wore it as a mantle. Almost nine decades ago, Mohammad Husain, a school teacher in Jhang, had a dream that his unborn son would go on to do great things and serve God. In gratitude, he decided to name this child Abdus Salam – the servant of peace.

The choice was inspired, for Abdus Salam was truly a messenger of peace and unity wherever he went. He was able to see the deep, underlying similarity between apparently disparate forces of nature, just as clearly as he could see through the layers of political and religious dogma, to the common bonds of humanity that unite us all.

In his 70 years on this planet, Salam worked tirelessly to reveal beautiful hidden structures – both mathematical and social

– and bring together theories and people who were needlessly left apart.

He credited this attitude to his faith, and said his emphasis on symmetry was something he had inherited from the culture of his religion. “The belief in unity, in there being one simple cause for [all] that we see, has a basis in my spiritual background,” he said.

Abdus Salam was born, on 29 January 1926, into a family of modest financial means, where education was valued highly. His parents encouraged, and delighted in the young boy’s curiosity, and in that sparse but supportive atmosphere, Salam began to blossom.

In his later years, he used to tell a story about when he was five and so engrossed in reading a book that he did not notice the cat running away with his dinner.

Continued on page 5

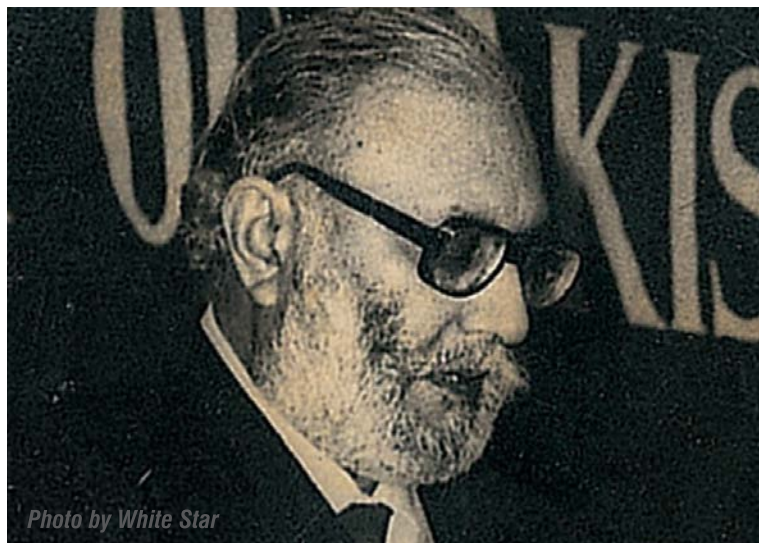


Photo by White Star



PAKISTAN'S ONLY NEWSPAPER ON SCIENCE AND TECHNOLOGY

Executive Editor A. M. Zaidi

Editor SAMZ Paras Ali

Incharge Editorial Section Hina Rasheed Baloch

Incharge Web Section Sayyed Shozib Abbas

Bureau Chief Karachi Syed Ali Raza

www.technologytimes.pk

E-mail: info@technologytimes.pk

Head Office

Suite 5, G Floor, Khudadaad Heights
Margalla Avenue, E-11, Islamabad
Phone: +92 316 532 77 03

Bureau Office

C-89, Sherton Heights
Abul Hassan Isphahani Rd, Karachi
Phone: +92 333 57 55 926

Volume IX — Issue 07

No. 8444/2 (100) Press - 2009

Published by S. A. Mustafa Zaidi Paras Ali

for "Foundation for Comprehensive Social Development (FCSD)"

Menace of e-waste and impending challenges



RELIABLE MANAGEMENT of electrical and electronic waste is becoming a miserable problem for a lot of countries around the world. Specially developing countries facing the menace of e-waste. It is studied by the International Telecommunication Union, the UN University and the International Solid Waste Association that the world generated 44.7 million tons of e-waste in 2016 which is eight percent higher from two years earlier; and expected to rise 52.2 million tons by 2021. Asia accounts for largest e-waste producer region with 18.2 Mt, Europe 12.3 Mt, the America 11.3 Mt, Africa 2.2 Mt, and Oceania 0.7 Mt. But, when it comes to e-waste per inhabitant: Oceania (largely Australia and New Zealand) is top on the generator list with 17.3 kg/inh, followed by Europe 16.6 kg/inh, America 11.6 kg/inh, Asia 4.2 kg/inh, and Africa only 1.9 kg/inh. The top five countries on kg/capita list are: Germany 22.8, France 21.3, US 19.4, Italy 18.9, and Japan 16.9. Most of e-waste is generated from non-Asian countries, but, Asia is the largest dumping ground for e-waste. However, volumes varied greatly between Asian sub-regions while the inhabitants of Brunei, China, Hong Kong and Singapore produced, on average, more than 18 kg/inh, those of Afghanistan or Nepal hardly produced any. According to some study findings Pakistan generated 317 kilo tons in 2015, that is 1.76 kg/inh, but those are estimated figures, the actual situation is seems far above. Improper handling of e-waste is a major reason to harm the environment and human health because of its toxic components. Several countries around the globe are now struggling to deal with this emerging threat. Whereas in Pakistan, condition is opposite as one can hardly find reliable data, inventories and research studies related to e-waste issues in the context of environmental and human health. Karachi, Lahore, Gujranwala, Rawalpindi and few other cities are involved in the dismantling of e-waste, which is known as recycling, instead, it is causing environmental and health pollution. The labour involved in e-waste dismantling are observed as victims of deadly diseases because of unhealthy working environment. As of other developing countries, in Pakistan, e-waste is managed by lower class and untrained workers and recycled with backyard techniques at the cost of the health of worker and the environment. There is no proper system to recycle and dispose e-waste in Pakistan. There is a need to develop platform to address existing circumstance of e-waste in Pakistan with the attention on characterizing the real e-waste recycling sites, present and future domestic age of e-waste, and talks about different difficulties for e-waste management. There is need of policy arrangement interventions and conceivable measures to be taken at legislative level and should discuss to avoid the expanding issue of e-waste in the country. It is critically need to improve the current knowledge base, which should build upon the research experience from other countries that have experienced similar situations in the past. In a nutshell, to eradicate the existing problem of e-waste there is need to establish more effective strategies for e-waste management in Pakistan, government should evolve a system from where it can check the suitability of used electronic items. And, there is a dire need to determine the damaging impact of e-waste processing on public health and environment. A separate fund is also desired to educate workers in the industry and law enforcing agencies regarding the hazards of e-waste for providing safe environment to our next generation.



Sara Ehsan

Workout key to healthy lifestyle

Health is a very important element of our life because a person who has a good health may enjoy happy and healthy life. Workout plays very important role in keeping a person healthy by controlling fitness level of the body. Exercise and healthy diet are keys of healthy

Workout key to healthy lifestyle

Sara Ehsan

Health is a very important element of our life because a person who has a good health may enjoy happy and healthy life.

Workout plays very important role in keeping a person healthy by controlling fitness level of the body. Exercise and healthy diet are keys of healthy life. Doing exercises regularly and follow a proper healthy diet plan are very important for spending long healthy life along with happiness.

In the modern era of busy schedule, it is difficult to spare time to follow proper routine of exercise. Many people excuse that "I don't have enough time" for this. Daily workout is equally important for every one regardless age and gender e.g. children, teenagers and elders. All may improve their health, enjoy energetic life and have fun by including physical activity in their daily lives. There are many different types of diets and exercises specify for each part of the body as well as people belongs to different age groups.

Different types of workouts are available such as Gym, good place for performing exercises at home or gym saloons. Balls are very effective and useful workout in various exercises, running, swimming, gardening, bikes, nautilus machines, treadmills and weights. Exercise machines and equipments play important role in making workouts as successful and effective.

To obtain maximum satisfaction and results from workouts, make as a regular habit, find right and appropriate exercise or physical activity, having sufficient willpower to follow exercise routine, use different tactics, make possible to do exercises in early morning and try to set goals and benefits that you are looking to achieve from exercise routine. Start by doing simple walks then perform exercises and slowly and gradually increase time duration. Right selection of workout is important to make it enjoyable and be motivated to exercise regularly for achieving successful results. Remember that your body needs movements just like a car or a bike needs to keep working properly.

Some factors should be con-



sidered while choosing a diet and exercise program which includes weight, cholesterol level, body mass index (BMI), heart rate, metabolism, hormonal levels, history of disease, and blood pressure. It is very important to consult and follow the guidelines of physician or a licensed nutritionist or fitness trainer.

Workouts have number of benefits on our health as well as our life in following ways:

- Reduce risk of a heart attack, keeps heart strong and function more efficiently
- Make body stronger and more capable to fight against countless viruses
- Help in reducing and controlling blood pressure, diabetes and cholesterol level
- Reduce the risk of stroke, osteoporosis and breast cancer
- Strengthen bones, joints and muscles
- Improves circulation of blood
- Help you feeling younger.
- Improve mental health and mood
- Remain fresh and active for whole day
- Enhances quality of sleep.
- Keeps you strong, mobile and less dependent on others
- Help in achieving and maintaining ideal weight
- Burns extra body fats and calories to lose weight more

effectively

- Increased self esteem
- Helps keep the brain sharp well in old age as well
- Increase strength, stamina and metabolic rate during whole day
- Enhances immune system.
- Help in reducing stress, anxiety and depression
- Improves posture or body shape.
- Provide excellent option to meet new people, whether at a gym or walking in parks

Life without doing daily exercises is worthless. If you don't doing exercise daily, have worst effects on our body as well as life. It dramatically increases the risk of dying from a heart attack, stroke, high cholesterol or blood pressure. Muscles of the body tend to get flabby. Bones become fragile. Heart muscle becomes soft and unable to respond in stressful situations. You can't maintain body weight and body posture. People are unable to spend healthy and can't enjoy the real colors of life.

I believe that, trend of doing workouts and eating healthy food is out dated. People need to wake up, and spare some time to do exercise from busy routine of their daily life because Good health is very precious thing that Allah blessed us. So we have to take care of it.



M. Wajid Javed

Significance of Bt for food security and its future standpoint

Food security has become a key problem for increasing human population not only in developing or underdeveloped countries but also in developed countries. It has appeared as a serious threat to the whole world



Significance of Bt for food security and its future standpoint

Muhammad Wajid Javed, Muhammad Hamid Javed, Dr. Jam Nazeer Ahmad, Dr. Samina Jam Nazeer Ahmad, and Samia Sabir

Food security has become a key problem for increasing human population not only in developing or underdeveloped countries but also in developed countries. It has appeared as a serious threat to the whole world because food security, by definition (i.e. providing ample and healthy food to all human beings without any discrimination of colour, creed, area, country, race, religion etc.), not difficult but also at the same time seems to be almost impossible to meet. A wide range of possibilities and availabilities are being employed to reduce food crop losses to fulfill the future needs of population explosions. One of them is to mitigate the pest problems either of pathological or insect based combats. For the management of insect pests issues, *Bacillus thuringiensis* (Bt) is an important tool beginning from the start of 20th century till now.

Bacillus thuringiensis (Bt) was a splendid discovery made in about 1900s by a Japanese scientist named Ishiwata from diseased effected silk moths. The bacterium noted as *Bacillus soto* was not taken much attention and gradually was separated by German scientist Berliner in 1909 from diseased Mediterranean flour moth. Use of Bt for pathological management of insect pests was forecasted by Berliner on considering the disease producing ability of bacterial spores in flour moth, so his effort and predictions must be appreciated in the present long run use of Bt in the present scenario. In 1920, Bt was used for the control of European corn borer. Very first industrial product of Bt was manufactured in France with the brand name of Sporeine in 1938. In 1950, it became evident that the insect killing characters of Bt are actually due to its crystals formed in sporulation process.

Until now, there was a remarkable range for the discoveries of Bt serotypes and recorded up to 45. Formerly, it was regarded that Bt is injurious to only lepidopteron pests (moths and butterflies) but in 1977 a discovery of Bt strain, *Bacillus thuringiensis* subsp. *israelensis* from pond by Goldberg and Margalit also revealed Bt toxicity to diptrons (mosquitoes and blackflies mainly). Similarly, in

1983, another discovery by Krieg et al. made possible the control of coleopteran insect pests (e.g. Colorado potato beetle) in the form of Bt strain, *Bacillus thuringiensis* subsp. *tenebrionis*.

A number of Bt characteristics including easy rearing in culture media, spores viability for years and germinating ability has made it ideal for commercial propagation of insect control device. Crystal protein genes of Bt has extra importance in pest control.

Production of such plants resistant to insect pests and expressing the gene of resistance from seed level to the complete plant was one of the earlier biotechnologist and plant breeders' effort. Initially Bt was introduced in tomato and tobacco plants with the assistance of *Agrobacterium tumefaciens*. Cotton varieties were also developed by constructing their base on Bt. Bt cotton, still marketed with a huge profit earning, have rendered control for chewing insects mainly bollworms of notorious status as *Helicoverpa armigera*, *Pectinophora gossypiella* and *Earias* spp. Hence, saving about 35-70% boll loss against these insect pests.

In the same fashion, including Bt vegetables, Bt corn has also made to save the loss majorly due to European corn borers which may moves up to US\$800-900 million annually. Investigations are being carried out for further developments in this regard.

Bacillus thuringiensis has a better potential to cope with the challenge of food security and to have more food for more population demands. This step is successfully being undertaken and occupied by the employment of transgenic plant varieties inclusive Bt. But there is a virtual and sometimes actual threat is debated regarding the action and effect of Bt on higher animals including humans. The danger or threat is that "what will be happen if the effect of Bt will be same on man as on insects?" and also "the use of bacteria-based food and then its presence in human body subsequently may cause the resistance against antibiotics in man dwelling bacterial pathogens leading to improper or no cure of bacterial diseases in man".



Bacillus thuringiensis has a better potential to cope with the challenge of food security and to have more food for more population demands. This step is successfully being undertaken and occupied by the employment of transgenic plant varieties inclusive Bt. But there is a virtual and sometimes actual threat is debated regarding the action and effect of Bt on higher animals including humans

are worthy to mention and important to comprehend and investigate. In case of first danger, there is no chance of its occurrence in higher animals including man due to acidic pH of food canal. Bt endotoxins are activated mainly in alkaline pH existed in the gut of insects (for moths and

and activation pH for Bt crystals if >9.5) and not human beings. There is more chance and probabilities of occurrence of latter threat of antibiotic resistance but it can be avoided by using Bt in the form of spray rather than incorporating it in food materials in plants which may directly incor-

In short, Bt (*Bacillus thuringiensis*) has an eminent position in food provisions on sustained basis directly or indirectly. There is a dire need to further exploit its potential and hidden capabilities for food securing purpose in order to make every person a happy, healthy and hunger free.

From page 1: Remembering the first Pakistani to win a Nobel Prize: Dr. Abdus Salam

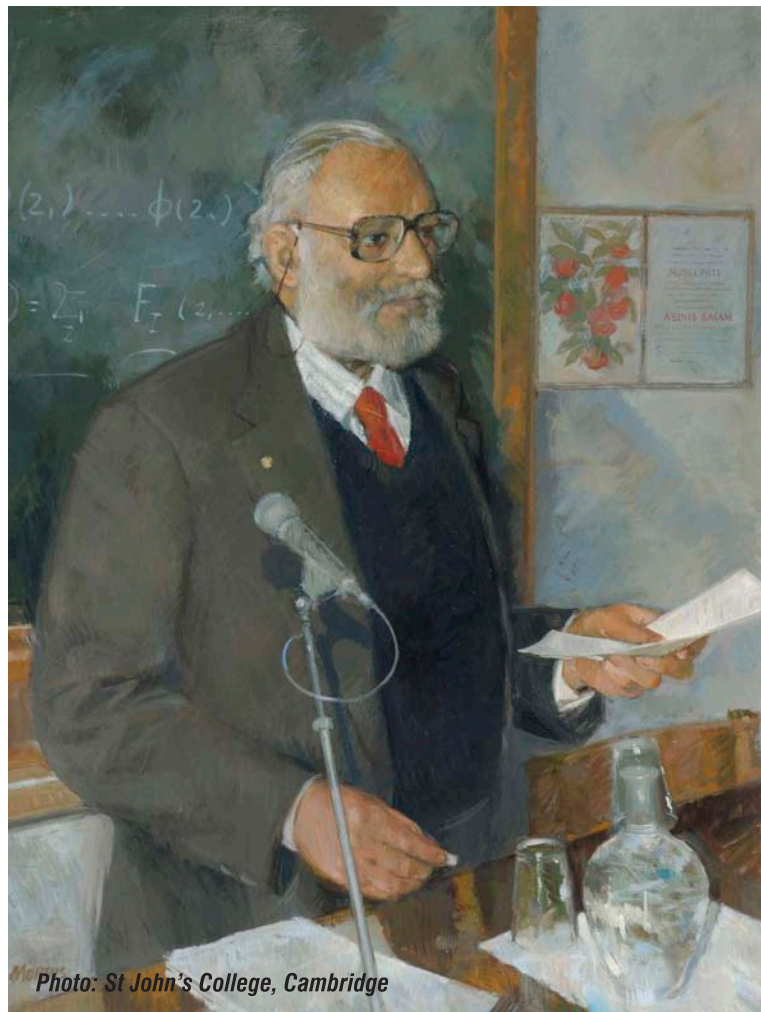


Photo: St John's College, Cambridge

The posthumous portrait of Abdus Salam by Anthony Morris was commissioned to mark the fiftieth anniversary of Salam's election to a Fellowship at St John's College, Cambridge, Hall Portraits.

compassed a vast spectrum. Apart from the books on physics, mathematics, biology and other scientific disciplines, he had a collection of books on all the major religions of the world, various philosophical works, works of literature from different cultures, histories of different parts of the world, works on different kinds of policy making and studies of various aspects of societies across the world. In terms of religion and the "metaphysical" aspects of life, it was clear that he had done a thorough comparative study. That gave him an insight into the motivations and desires deep within the human soul. His own personal beliefs gave him a conviction that could guide him through any circumstance. Prominently displayed in his office is a large Arabic inscription "Naad-e-Aliyan Mazhar-ul-Ajaib" or an invocation of the help of Hadrat Ali in the manifestation of miracles. This scientist believed. Also, perhaps it is not surprising that Salam had a passion for literature, the distinction between "science" and "art" is really quite arbitrary, especially for a keen mind as his. His exceptional intellect and his intellectual versatility gave him an understanding of the human side of affairs which is rare, not just in specialized scientists, but in people of all backgrounds. Salam had the tools to perform miracles.

His life, judging from the collection of various news clippings and photographs, had taken him a long way. A small kid in an oversized turban from an unknown village in Punjab had grown to become a maestro who would claim his place in the top echelons of global intellectual community -an elitist community with many subscribers to the colonialistic mindset. As Nigel Calder, the famous science writer from Britain, pointed out, Salam's life is like "a fantasy straight out of a story-book". He wished that Pakistani children should grow

up reading story books about a hero named Abdus Salam, and through him they would find confidence in their own abilities, and have high aspirations about their own futures. The life of this hero was shaped by a will that could defy all odds. And in the process, he gave a lot in return to others. One of the most poignant moments in Salam's life was when he had to leave Pakistan in order to pursue his interest in physics. He desired that no young scientist from a Third World country should ever have to make a choice between his homeland and his interest in the sciences. This was one of the causes that he gave to freely. During his life and after his death, people found themselves celebrating his services: little kids in a Peruvian village, who followed him around shouting "El Nobelo, El Nobelo", scores of awards and honorary degrees from universities and governments throughout the world, his students who went on to found centers of advanced learning throughout the under-privileged parts of the world, Salam-Fest's organized by scientists, the outpouring of grief over his demise.

At the end of the day, I realized, that for Salam, all of these endeavours and achievements were not an end in themselves, but a means to an end. His life was a manifestation of his convictions and his understanding of his roots.

In the main lecture hall of AS-ICTP, there is a large framed picture entitled "The Silent Genocide". One half of the picture is a painting which shows a soldier involved in the sacking of a city. His sword is raised high above his head, ready to strike down on a baby lying on the floor. The mother is desperately trying to save her baby by imploring to the soldier. The other half of the picture contains an abstract of Salam's Red Book, which he used to publish annually under

the umbrella of the Third World Academy of Sciences:

This globe of ours is inhabited by two distinct species of humans. According to UNDP count of 1987, one quarter of mankind, some 1.2 billion people are developed. They inhabit two-fifths of the land area of the earth and control 80% of the world's natural resources, while 3.8 billion developing humans -"Les Miserable" -the "mustazeffin" (the deprived ones) -live on the remaining three-fifths of the globe.

What distinguishes one species of human from the other is the ambition, the power, the elan which basically stems from their differing mastery and utilization of present day Science and Technology.

Salam believed that the present divide between the scientific and technological achievements of the (rich) Northern and (poor) Southern nations was a result of the concentration of economic power in the hands of a few nations after the Industrial Revolution[1]. Even after the dismantling of the colonial empires, and the emerging of the Third World, the situation was not corrected. First of all, the ruthless exploitation of the poor countries continues unchecked in many forms. And second, the widening economic disparity between the rich and the poor also leads to an ever widening scientific and technological gap which in turn further widens the economic gap. This, he believed, constituted "the silent genocide" of the poor by the rich.

In an article titled, "Diseases of the Rich and Diseases of the Poor", which was published in the Bulletin of the Atomic Scientists in April 1963, he wrote:

Year after year I have seen cotton crop from my village in Pakistan fetch less and less money; year after year imported fertilizer has cost more. My economist friend tells me that terms of trade

are against us. Between 1955 and 1962 the commodity prices fell by 7%. In the same period, the manufactured goods went up by 10%. Some courageous men have spoken against this. Paul Hoffman called it a subsidy, a contribution paid by the under-developed countries to the industrialized world. In 1957-58 the under-developed world received a total of \$2.4 billion in aid and lost \$2 billion in import capacity through paying more for the manufactured goods it buys and getting less for the raw commodities it sells...

...It was in 1956 that I remember I heard for the first time of the scandal of commodity prices -of a continuous downward trend in the prices of what we produced, with violent fluctuations superposed, while industrial prices of goods we imported went equally inexorably up as a consequence of the welfare and security policies the developed countries had instituted within their own societies. All this was called Market Economics. And when we did build up manufacturing industries with expensively imported machinery -for example cotton cloth -stiff tariff barriers were raised against their imports from us. With our cheaper labour, we were accused of unfair practices...

...In 1970, the world's richest one billion earned an income of \$3,000 per person per year; the world's poorest one billion no more than \$100 each. And the awful part of it is that there is absolutely nothing in sight -no mechanisms whatsoever -which can stop this disparity. Development on the traditional pattern -the market economics -is expected to increase the \$100 per capita of the poor too all of \$103 by 1980, while the \$3,000 earned by the rich will grow to \$4,000 -that is, an increase of \$3 against \$1,000 over an entire decade.

Salam believed there were two necessary steps to stop this ever-growing disparity between the rich and the poor. First, a dedicated system of aid from the rich countries to the poor. This aid would not only foster economic growth and inter-dependence between the rich and the poor (with benefits to both), but also compensate for the past and present exploitation of the poor countries. It would also account for the unequal distribution of natural resources between the rich and the poor. Linus Pauling, twice Nobel laureate, had initially sketched out a scheme at the Nobel Symposium in 1969. He had suggested a transfer of \$200 billion per year from the rich to the poor countries, roughly 8% of then world GDP and suggested heavy cut-backs in the defense spending around the world, to free resources for global development. Pauling's proposal in turn inspired Salam to espouse the same idea. Unfortunately, Pauling's idea was deemed too idealistic for implementation at the time, even though it won many advocates within and out-

side scientific circles.

The second necessary step, was sketched out by Salam in his address at the 13th Annual All-Pakistan Science Conference in Dhaka (1961) [emphasis added by the author]:

I have mentioned technological skills and capital as the two pre-requisites before a pre-industrial society like ours can crash through the poverty barrier. Actually there is a third and even more important pre-requisite. And that is the National Resolve to do so. In Professor Rostow's words, nation's take off into sustained growth awaits not only the buildup of social overhead capital -capital invested in communication networks, schools, technical institutes ... but it also needs the emergence to political power of a group prepared to regard the modernization of the economy as a serious high order political business. Such was the case with Germany with the revolution in 1848, such was the case with Japan with the Meiji Restoration of 1868, such was the case with Russian and Chinese Revolutions. Our independence in 1947 did not -definitely did not -coincide with the emergence of a political class which made economic growth the center piece of state policy. I can still recall the interminable arguments, conducted in private and public, in the early years of Pakistan about ideology. Never did I hear the mention of total eradication of poverty as one of the priority ideological functions of the new State.

To Salam, poverty was "synonymous with kufr", or a heinous sin. Poverty is engendered by population explosion and depletion of global resources. Poverty in turn causes the decline of science and technology and further widens the gap between the rich and the poor. Eradication of poverty, therefore, has to be a part of the state policy.

Today, as we remember Abdus Salam, we realize the long road Pakistan has travelled in the last 50 years. There have been many successes and many failures. If Salam were to return to his small village close to Jhang today, he would probably notice that a lot has changed since he first left his village about sixty years ago. On the other hand, he would also bemoan the fact that not enough has changed, and that we could have done much better. Perhaps, the best way to remember Salam is then to learn from what we have experienced as a nation, and understand that our collective will as a nation is an agent of change, and we have to exercise our will to improve our lot. If for no other reason, at least for all the Abdus Salams, born in the backward areas of Pakistan, who are mercilessly devoured by poverty.

References:

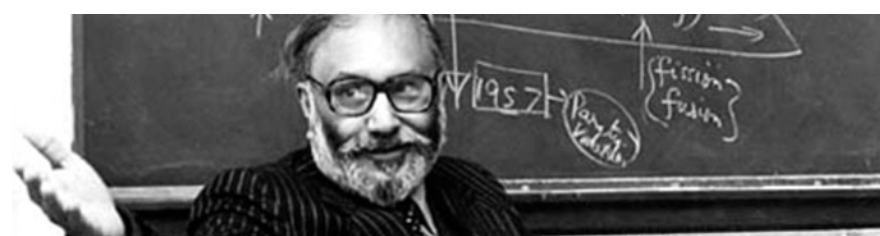
Abdus Salam -A biography by Jagjit Singh, Penguin Books, 1992.



Nalaka Gunawardene

Technology, politics and development

The Third World is now slowly waking up to the realization that, in the final analysis, creation, mastery and utilization of modern science and technology are basically what distinguished the developing from developed countries. Nothing else, neither differing systems of economics, governance, nor differing cultural mores nor differing



Technology, politics and development

Abdus Salam the Pakistani physicist and Nobel Laureate has long promoted the effective use of science and technology by Third World nations. He discusses his controversial ideas with Nalaka Gunawardene.

This interview with published in Asia Technology Oct 1989 edition.

AT: Your theme in recent times has been that science is the key to economic development, especially for developing countries. Critics argue that this drains much needed cash from treasuries in pursuit of esoteric goals.

Salam: The Third World is now slowly waking up to the realization that, in the final analysis, creation, mastery and utilization of modern science and technology are basically what distinguished the developing from developed countries. Nothing else, neither differing systems of economics, governance, nor differing cultural mores nor differing perceptions of religious thought can explain why the developed countries can master this globe of ours. I was recently attacked by an Indian newspaper that claimed I was talking only of science and technology, a "God that failed" – that was their title! They're forgetting that despite setbacks, it is the "failed God" that gave them high-yield rice to feed their millions.

AT: But developing nations are faced with urgent problems. How can basic science solve these problems quickly?

Salam: We have to remember the long-term nature of science and technology as applied to development. The year 2000 will be a good year to aim at if we start today. A few developing nations – Venezuela, Iran, South Korea – have realized that investments in science and technology produce sufficient returns and are planning to raise their science budgets accordingly. It is the wealth-producing science of physics and geophysics and the survival science of medicine and molecular biology that less developed countries will have to turn to if they are to surmount their pressing problems.

AT: What is the role of scientist in development?

Salam: Scientists and technologists have not yet fully played their role in the development process. They have to get involved

in the political process. They have to convince politicians that investing in science and technology is money well spent.

AT: In other words, doing good academic science alone is no longer sufficient?

Salam: Yes, Scientists must ensure that their research does not go to waste (and) should play a far greater role in public affairs. Science and scientific ideas have a great potential for human welfare (but) we have to accept that it is scientists who have created many of the world's problems.

AT: But won't that admission cause laymen in the Third World to lose faith in scientists?

Salam: It is not an admission of guilt, but one of responsibility. Think of the relationship between antibiotics like penicillin and the population explosion – between nuclear physics and nuclear weapons. These problems will not be solved without science.



Science gets the blame because scientists and their various organizations have not been sufficiently active in proselytizing on behalf of science.

We have to take science to centre stage by showing how it is directly linked with economic development. Most scientists don't even

know the GNP (gross national product) figures of their respective countries. We don't concern ourselves with these things. This has to change!

Courtesy: <https://movingimages.files.wordpress.com/2014/11/nalaka-gunawardenes-interview-with-dr-abdus-salam-asia-technology-oct-1989.jpg>

From page 1: A belief in unity: The life of Abdus Salam

That intense focus stayed with him throughout his life, as did his lively curiosity.

Salam had an active, wondering mind, always brimming over with ideas. He kept track of these through notes scribbled on whatever he could find – from envelopes to scraps of paper, to the backs of posters. No 'writable' surface was safe.

His son tells an amusing story about the time Abdus Salam had lunch at the Buckingham Palace

with the Queen and Prince Philip. After all the guests had left the table, Salam went back and asked if he could take his napkin – he had written some notes on it.

Abdus Salam was a truly cultured man and extremely well spoken. He read widely – spanning the spectrum from Islamic history to P.G. Wodehouse. Salam was a man of many interests. He was able to enjoy the beauty of Punjabi poetry, as well as the comic antics of the Marx brothers.

Although he lived away from Pakistan for well over half his life, no one could mistake Abdus Salam's roots. Tied up forever in our memories of him is the indelible image of a turbaned man in an achkan and curling khussas, receiving the Nobel Prize.

A citizen of the world, at ease with people of all cultures and persuasions, he remained proudly Pakistani to the end of his days, and was – despite governmental attempts at disowning him – perhaps the best ambassador the country has ever had.

A journalist once asked Salam how he felt about the fact that his extraordinary accomplishments had now branded Jhang as the birthplace of one of the greatest scientific minds of the century, whereas previously the only claim to fame this small village had, was due to the folktale of Heer Ranjha. With wit and humility, Salam answered;

There are over 325 Nobel laureates in the world, but only one Heer.

Salam was firmly committed to the cause of science in Pakistan, and he worked tirelessly to increase the exposure of, and create a better intellectual environment for, Pakistani scientists.

He played a critical role in establishing Pakistan's Atomic Energy and Space Research agencies PAEC and SUPARCO, and even initiated an annual physics conference in the hills of Nathia Gali, to which he attracted many international luminaries.

Salam was the beloved mentor for an entire generation of Pakistani students, some of whom (most notably the twin brothers Riazuddin and Fayyazuddin) became physicists of international repute in their own rights.

But while Salam's nationalistic zeal brought out his generosity and spirit of service, it did not limit his outlook. One of his most famous students was the Israeli physicist Yuval Ne'eman, who pursued a PhD under Salam's supervision while serving as Israel's Defense Attache in the UK.

Where others might have seen this as a source of conflict, given the prevailing tensions between Israel and Pakistan, Salam viewed neither political nor religious differences as boundaries. Although a devout believer in his own faith, he did not feel the need to either apologise or proselytise – a quality that is becoming increasingly rare in Pakistan.

Salam's motivations for work-

ing on the Electroweak theory might have had their origins in faith, but his collaborator on this work – Steven Weinberg – is an avowed atheist. The two not only worked together to produce a Nobel Prize winning theory, they also maintained a lifelong respect and affection for each other.

There is no doubt in my mind that Abdus Salam would not have realised even a fraction of his potential, had he been unable to see across apparent – but artificial – boundaries.

Today, in a Pakistan that is increasingly divided, along religious, ethnic and political lines, I think we would do well to look on Salam's life as a lesson: our hearts and minds shrink or expand to fill the spaces that are available to them; the more fences we erect, the narrower the lives we confine ourselves to; should we elect to break down walls instead, a vast, exciting world of possibility lies open, with room for each of us to live up to our potential.

This blog was originally published on January 29, 2014. Tasneem Zehra Husain is a writer, educator and Pakistan's first female string theorist. She is the author of the popular science novel Only The Longest Threads [Paul Dry Books, 2014].



Italian physicist Paolo Budinich, left, and Pakistani physicist Abdus Salam with a model of the International Centre for Theoretical Physics (ICTP) building, during the cornerstone-laying ceremony on 18 June 1964. (Photo: ICTP Archives)



Rao M. Sajjad Sharif

A homeless bird-house sparrow

House sparrow is a harmless social, small and lovable bird. It can be seen anywhere in our surrounding. In recent years, it is one of the endanger species. It has played an important role in urban environment. The main reasons for being endanger species is



A homeless bird-house sparrow

Rao M. Sajjad Sharif¹, Ashfaq Ahmad², and Syed Zia-Ul-Hassan³

House sparrow is a harmless social, small and lovable bird. It can be seen anywhere in our surrounding. In recent years, it is one of the endanger species. It has played an important role in urban environment. The main reasons for being endanger species is due to some reasons such as lack of food and lack of nesting place. Generally sparrows are plump, brown-grey birds with short tail, small, powerful beaks and stubby. The female and male can be easily differentiated; the female have brown colour with eye stripe while the male have black throat white cheeks and black bib. The average size of sparrow is 14-16 cm and weight is 26-34 grams. It is a small bird_ legs are short.

Food Habit and habitat:

The diet of sparrows consists of grain seeds, especially these grain seeds are from the animal feed stock and waste. Another source of diet of sparrows is larva of mosquitoes, small butterfly and garbage chunk by human and small insects. They also prefer yellow colour flowers and fruits etc in spring season. The house sparrow prefers to live in old structure building for shelter and roosting. They build their nests in sun shades, lofts, exhaust holes, hanging basket, shrubs, garden trees and kitchens.

Importance of Sparrow

Every organism has its own role to play and participate in this planet. The small birds play an important role in the environment.

Plant Pollination: The house sparrow plays an important role in the plant pollination and fertilization of flowers. The house sparrow visits various types of flowers for food in a day. At the end the sparrow is very important for our environment as well as for us.

Maintain the Ecological Balance: House sparrow is very important for various food webs and rural and urban food chains. It feeds on larva of mosquitoes, dragon fly and small insects etc. and also feed on wheat grains, rice, pieces of bread and some fruits. In 1850, thousands of trees are destroyed due to the attack of green inch worms in New York City park, the house sparrow was introduced Brooklyn institute United State to this park for the control of this worm. Now

the sparrow is common in U.S. This small bird is also preferred for the natural pest control process.

Brings Prosperity: The house sparrow brings prosperity for us, our children always observe the movement of this small lovable sparrow and sing songs related to this small sparrow to entertain themselves.

Reasons for population decline

According to the International Union for Conservation of Nature (IUCN) the house sparrow is listed in red book which is an alarming for us. There are many reasons for the decline of house sparrow, these are given below

Lack of food: In searching of food such as insects, grains etc the house sparrow flocks fly around 1-2 miles in a day. In modern era, the life style of many peoples have changed and tend to buy pre cleaned or dried thing. Now a days, the chance of drying and cleaning the different types of grains in front of balconies, top floor and house is very rare. The changed behaviour of man has led to food scarcity for the tiny social birds. Many corner shops has been closed due to the establishment of modern developmental stores where everything is available in packed form. The other main factor is the availability of minute insects feed which became the minimum due to the excessive use of dangerous insecticides. According to the recent survey the house sparrows are observed near the less fertilized, organic fields and perching at that place for the food.

Loss of Habitat: Loss of habitat is a main primary factor for the declining of house sparrow. Due to loss of habitat the tiny birds-house sparrow is eliminated from the houses and streets. The modern technologies and the old structure buildings, have been altered to the modern structure building where the tiny birds don't find their nests for their survival.

Modern societies: In the modern era, the lifestyle of many peoples has been changed. Mostly the luxurious life style peoples want tiny birds to be inside the building not outside for free living birds. The new landscaped gardens and construction of buildings are not friendly for all tiny birds such as house sparrow. The modern box shapes are very important for the nests of many tiny birds. According to the re-



Due to loss of habitat the tiny birds-house sparrow is eliminated from the houses and streets. The modern technologies and the old structure buildings, have been altered to the modern structure building where the tiny birds don't find their nests for their survival

er use of pesticides affects the wildlife (birds), environment and human. The bird's habitat is also affected due to the higher use of pesticides. The pesticides cause the behavioral changes, loss of safe habitat and local extinction.

Pollution: Air pollution, oil pollution and water pollution have highly significant impacts on the bird's populations. Many small birds are killed due to the oil spill. Poor quality of air due to chemicals and smog can have a significant effect on the bird population. The bird populations are also effected due to the water pollution because water pollutants can reduce the amount of O₂ in water and many birds rely on the fish population for their survival.

Steps to save the sparrow: It is the great time to take some efforts to save the small, lovable, social, beautiful and harmless birds for the environment and for ourselves. The little efforts may

er use of pesticides affects the wildlife (birds), environment and human. The bird's habitat is also affected due to the higher use of pesticides. The pesticides cause the behavioral changes, loss of safe habitat and local extinction.

Pollution: Air pollution, oil pollution and water pollution have highly significant impacts on the bird's populations. Many small birds are killed due to the oil spill. Poor quality of air due to chemicals and smog can have a significant effect on the bird population. The bird populations are also effected due to the water pollution because water pollutants can reduce the amount of O₂ in water and many birds rely on the fish population for their survival.

Steps to save the sparrow:

It is the great time to take some efforts to save the small, lovable, social, beautiful and harmless birds for the environment and for ourselves. The little efforts may

the house sparrow.

- Installation of small boxes for the sparrow in stair cages, balconies and around the window where there are maximum chances of visit of sparrow.
- Place a small bowl for water near the sparrow nests area to drink or bath. In the summer season this may help the small birds to avoid the dehydration.
- To spread over the rejected household grains rather than dump them in dust bin.
- To maintain your vehicle to minimize the pollution.
- Use of high quality fuels and tries of minimizing the pollution.

The authors are from: 1Institute of Soil and Environmental Sciences, University of Agriculture Faisalabad; 2Department of Agronomy, University of Agriculture Faisalabad; 3Department of Horticulture, University of Agriculture Faisalabad.



Umar Shaikh

Nano-oncology a way forward for breast cancer treatment

Pakistan get the peak position of breast cancer in Asia as different studies code in Pakistan every year 90,000 patients are reported and out of these 40,000 are virtually killed by cancer. Every 1 in 9 women of Pakistan



Nano-oncology a way forward for breast cancer treatment

Umar Shaikh

Pakistan get the peak position of breast cancer in Asia as different studies code in Pakistan every year 90,000 patients are reported and out of these 40,000 are virtually killed by cancer. Every 1 in 9 women of Pakistan are in high threat of breast cancer. In Pakistan we have estimated 200 million population and as of 2015 estimates about 340,000 patients per annum were detected. Out of these for new cancer patients we need 7000 beds, 680 doctors and 6800 nurses.

Cancer: Tumor is caused by the group of cells that performs abnormal job that structure lumps or growth. Tumor can start anywhere in trillions of cells in our body they grow and illustrate different act whether they are cancerous, precancerous and non-cancerous.

Cancerous Tumor: In this sort Cancer, be capable of set up any part of body and after form a lump is called cancerous tumor it can raise into close by tissues and can break away and voyage through the lymphatic system to diverse part of body.

Precancerous cells: These are abnormal cells can alter into cancerous cells if they are not treated some can disappear without any treatment but some pass on genetic changes and progressively they turn into more cancerous and put on the concluding shape of cancerous cells.

Noncancerous: these cells don't move in the body parts and don't come back after removed have different shape.

Nano-oncology

Detection diagnosis and treatment of human cancer by using nano-medicine is called nano-oncology. Nano-Particle are developed for tumor imaging in vivo, bio molecular profiling of cancer biomarker and targeted drug delivery. Nanoparticles encompass exclusive biological properties specified their tiny mass and large surface area-to-volume ratio, which permits them to connect, absorb, and carry compounds such as small molecule drugs, DNA, RNA, proteins, and probes with high effectiveness.

Nanoparticles have unique biological properties given their

small size and large surface area-to-volume ratio, which allows them to bind, absorb, and carry compounds such as small molecule drugs, DNA, RNA, proteins, and probes with high efficiency.

We use Gold Nanoparticles By attaching monoclonal antibodies (mAbs), which can identify a precise cancer cell, by the "heating phenomenon" can be used in cancer detection. Gold nanoparticles are not toxic for human health it does not require high microscope to view the results, Result can be seen immediately.

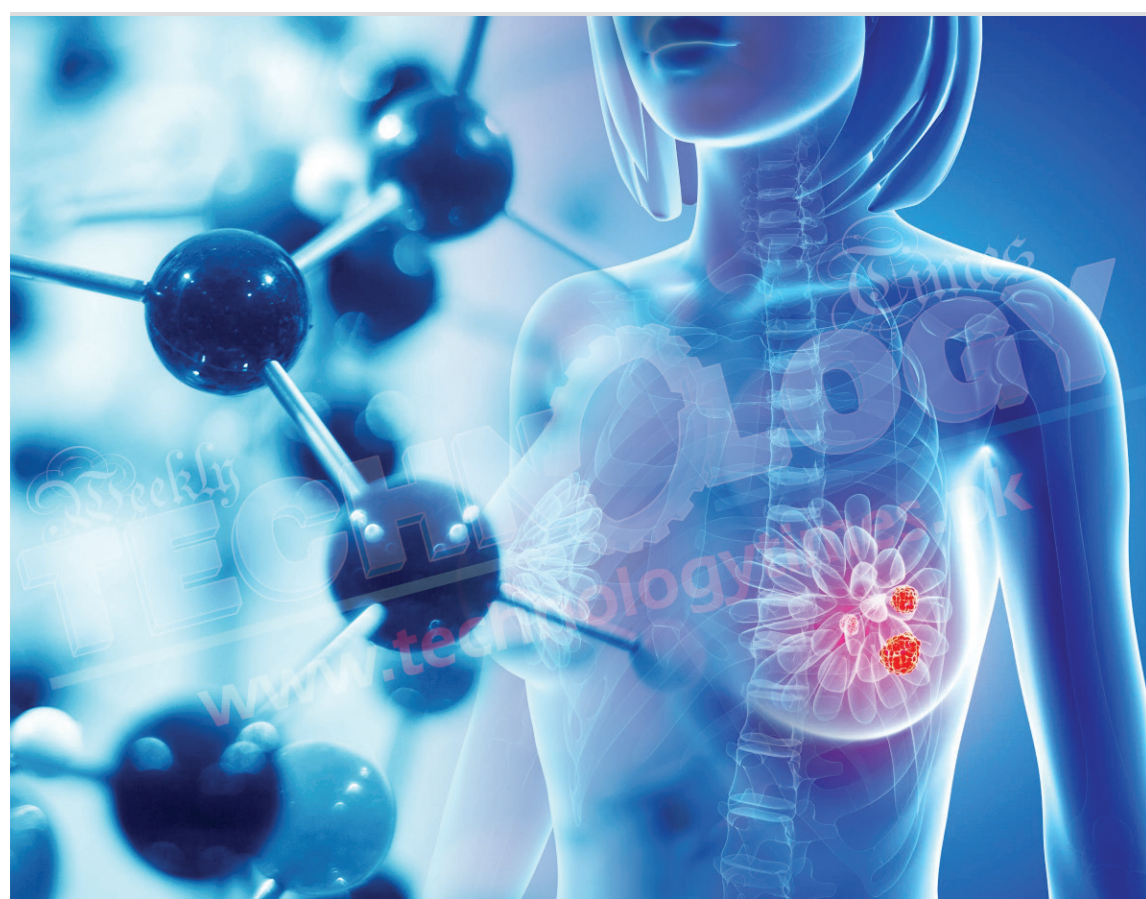
We use Quantum dots in diagnosis human breast cancer by detecting the expression level of Oestrogen and progesterone receptors, Paraffin embedded human breast tumor stained with the human antibodies against these receptors conjugated with Q.D.

We also done tumor imaging in vivo by using magnetic nanoparticles because of key advantages low toxicity, Biocompatibility and high level of accumulation in target tissues, Treatment of breast cancer by nanotechnology tumor selective drug delivery desirable to increase cell kill effect while protecting the healthy tissue from cytotoxic agent.

Anthracyclines are most active agent for treatment of breast cancer and widely used at every stage but use of anthracyclines is limited due to cardiac toxic effect, like this, Trastuzumab is monoclonal antibody that target ERBB2 use for the treatment of aggressive form of cancer its use is limited because of cardiac toxic effect.

We use liposomal nanoparticles that carry this drug to cancer cells and protect the other healthy cells from cytotoxic agent the use of these drug loading nanoparticle offers improved tumor penetration. Selective tumor targeting and subsequent decrease in toxic effect.

We also use Gene therapy technique for breast cancer treatment this therapy involves the transfer of suppressor gene, enhancement of immunological response transfer of suicide gene we use nanoparticles for the delivery of DNA and RNA. They are encapsulated into nanoparticles and thus protected from degradation with targeted antibody increase gene delivery to tumor



in Pakistan every year 90,000 patients are reported and out of these 40,000 are virtually killed by cancer. Every 1 in 9 women of Pakistan are in high threat of breast cancer

Cancer is leading to death around the world and estimated 84 million people died of diseases between 2005 and 2015 only. Devolving countries are hit by cancer than the high resources countries, revealed by United Nations, WHO and other health organizations. It is detained below the guidance of the Union for International Cancer Control (UICC) sanctioned by in excess of 400-member organizations transversely 120 countries.

Why Pakistan is step back in cancer:

Inadequate training in oncology, there are 21 dedicated hospitals which treat only cancer another 50 general hospitals have facilities to treat cancer with chemotherapy and radiation.

Lack of awareness majority of patients tends to present at a late stage in their disease because patients to shun going to observe a doctor for only for probable and

expensive investigations.

Way forward:

There is need of education and training significant challenges exist for the outlook of oncology within Pakistan and special training and educations programs for doctors and nurses on innovative techniques in this field, Development of infrastructure more hospitals and advance techniques and low cost of cancer treatment ,cancer registries based data on cancer incidence and mortality ,research in oncology, cancer screening and prevention, health education first step is needed to raise the awareness in public about cancer, public awareness seminar.

The Future:

There are huge statistics of patients and insufficient data from cancer registries, making planning used for the future incredibly tricky. Patients present at an advanced phase, here are

the national cancer plan, well intentioned as it undoubtedly was, has not been implemented. There are wide variations in the standards of care, no formal palliative care facilities, a dearth of trained manpower and a paucity of training opportunities, both locally and overseas.

A culture of research is lacking, although it is developing slowly—opportunities are certainly aplenty. The future ought to involve enhanced partnership between the private sector and philanthropic organizations or funding agencies, since the government is increasingly seen as being incapable or unwilling to provide health care. National priorities in this struggle ought, perhaps, to be focused on cancer prevention, early detection and therapy, development of a national cancer registry and collaboration between cancer centers in training as well as in research.

Abdus Salam is dead at 70; Physicist shared Nobel Prize

The New York Times – November 23, 1996 by Malcolm W. Browne

Abdus Salam, a Pakistani physicist whose work helped reveal the underlying unity of two of the fundamental forces of nature, died on Thursday at his home in Oxford, England. He was 70 and had been suffering for years from a disabling neurological disorder.

Dr. Salam shared the 1979 Nobel Prize in Physics with two Americans, Dr. Steven Weinberg (now a professor at the University of Texas in Austin) and Dr. Sheldon Glashow of Harvard University, for research all three conducted independently of one another. Their theory on the fundamental forces is regarded by physicists as one of the landmarks of 20th-century science.

Besides his trailblazing research in theoretical physics, Dr. Salam was a leader in international efforts to make physics accessible to students from developing countries. He was a founder of the International Center for Theoretical Physics in Trieste, Italy, which has supported the studies of third-world physicists since its founding in 1964.

Research by Dr. Salam, Dr. Weinberg and Dr. Glashow culminated in equations demonstrating a fundamental relationship -- or "symmetry" -- between the elec-

tromagnetic force (which is transmitted by light and other forms of radiation) and the weak nuclear force, which operates within atomic nuclei and is responsible for certain types of radioactive decay. The four known forces of nature are the electromagnetic force, the weak and strong nuclear forces, and gravity.

For the first instant after the universe was created by the Big Bang fireball some 15 billion years ago, physicists believe, the underlying symmetry of nature unified all the forces as one. But as conditions cooled, the symmetry was broken and the forces went their separate ways.

Dr. Salam, remembered for his kindly manners and luxuriant black beard and mustache, used to explain the concept of symmetry breaking by analogy with a dinner party, at which the guests are seated around a circular table and a salad dish is placed between each pair of neighbors. The table setting is symmetrical until someone takes a salad dish either from his right or left side, after which the salad-dish symmetry is broken, and the other guests can no longer choose between left or right dishes. The broken symmetry of the weak force results in interactions that have a left-handed bias.

But the three physicists were able to show that although the

weak and electromagnetic forces seem completely unlike one another, they nevertheless share a hidden symmetry that can be demonstrated by an extremely difficult set of equations. Complicating matters, most of the solutions of these equations produce infinite values rendering the equations useless. A solution was found by developing mathematical tools to make the equations "renormalizable," that is, free of uselessly infinite solutions.

This was no easy task.

In an interview yesterday, Dr. Glashow recalled that in 1960 he presented a paper in Copenhagen that he believed would lead to a "standard model" of particle physics that would be renormalizable.

"This caused a dispute," Dr. Glashow said, "and about a month later, Abdus Salam showed that I was all wet."

But by the end of the 1960's all three scientists had reached generally similar conclusions. One was a prediction that the weak force must be transmitted by particles undiscovered up to then, known as weak vector bosons. These hypothesized particles -- the W-plus, W-minus and Z-zero particles, analogous to the photon particle, which transmits the electromagnetic force -- became the objects of a sometimes bitter race

between accelerator physicists.

In 1983, a group headed by Dr. Carlo Rubbia at CERN, the European Laboratory for Particle Physics in Geneva, found the W particles, and the next year they detected Z-zero particles, which transmit what is called weak neutral current within atomic nuclei.

Acting with unusual speed, the Nobel committee awarded a physics prize to Dr. Rubbia and his collaborator, Dr. Simon van der Meer, in 1984, and the "electroweak theory" forged by Dr. Salam, Dr. Weinberg and Dr. Glashow was confirmed.

Dr. Salam was born on Jan. 29, 1926, at Jhang, a rural community in what is now Pakistan. His father was a schoolteacher who encouraged his education, and his prodigious intellect won him first-class educational opportunities even as a child. At the age of 14 he entered Government College in Lahore, having achieved the highest grade ever recorded for an entrance examination to the college.

He completed his undergraduate education at Punjab University and then moved to Cambridge University in England, which awarded him a doctorate in 1952. From 1951 to 1954 he also served as a professor of mathematics at Government College and Punjab University in Lahore. He then

moved back to England, where in 1957, he became a professor of theoretical physics at the Imperial College of Science and Technology in London, where he remained for most of his life. It was there that he developed the mathematics of the electroweak theory.

Awarded an honorary knighthood by Queen Elizabeth as well as many scientific prizes, Dr. Salam spent much of his later life trying to promote scientific education in developing countries, including Pakistan. In 1966 he recalled that while he worked in Lahore, he had felt "terribly isolated" by lack of communication with scientific peers, and that above all, third-world scientists need contact with counterparts in developed countries. He dreamed of founding a "World University" to that end.

Dr. Salam, the first Muslim scientist to win a Nobel Prize, observed Muslim customs, including multiple marriages. His two wives attended his award ceremony in Stockholm in 1979, but Swedish officials felt obliged to seat them in different parts of the auditorium while the King decorated their husband.

Dr. Salam, unable to speak or move without a wheelchair in his last years, is survived by his wife, Dr. Louise Johnson, and their child, as well as four children by his Muslim wife.



Pursuing Prof. Salam's Vision of South-South & North-South Science-led Cooperation for Sustainable Development

Belonging to the elite of organizations working for science-led socio-economic development in the South, COMSATS takes pride in being founded by the Nobel Laureate, Dr. Abdus Salam. COMSATS shares the institutional building fame of Dr. Salam with The World Academy of Sciences (TWAS-Italy), International Center for Theoretical Physics (ICTP-Italy) and International Center for Physics (CIF-Colombia).

COMSATS is an inter-governmental organization (IGO) with its 26 member states in three continents and a Network of 21 International S&T Centres of Excellence in four continents that provides a huge technical resource-base for facilitation of its international projects and programmes pertaining to:

- joint research projects, high level capacity building, interactivity and mobility of scientists amongst member countries;
- basic and applied research to develop and test scientific solutions for socio-economic development; and
- support for higher education through scholarships and training in various fields of S&T at its International S&T Centres of Excellence

COMSATS Network of twenty one International Science and Technology Centres of Excellence

 BCSIR Bangladesh	 Embrapa Agrobiologia Brazil	 ICCES China	 CIF Colombia	 NRC Egypt	 CSIR Ghana	 IROST Iran	 ICENS Jamaica	 RSS Jordan	 KazNU Kazakhstan	
 NMC Nigeria	 ICCBS Pakistan	 CIIT Pakistan	 AQU Palestine	 UCAD Senegal	 ITI Sri Lanka	 IRCC Sudan	 HIAS Syria	 TIRDO Tanzania	 CERT Tunisia	 TUBITAK MAM Turkey

COMSATS Secretariat, Shahrah-e-Jamhuriat, G-5/2, Islamabad - Pakistan. Phone +92514515-7; Fax: +92-51-9216539; URL: www.comsats.org Email: comsats@comsats.org