# Convocation Address at the 22nd Convocation of North Maharashtra University Jalgaon 21st May 2014

## Research elevates importance of the University

**I realize: experience of research leads to quality teaching and quality teaching imparted to the young in turn enriches the research**

I am delighted to participate in the 22nd Convocation of North Maharashra University, Jalgaon. I congratulate all the graduating students on their accomplishment of acquiring knowledge and resulting into award of degrees. My greetings to the great teachers who have worked very hard in shaping the young minds. I also greet all the parents who have inspired their children towards studies and provided them the resources and environment for their growth.

The North Maharashra University, I understand was established two decades ago primarily to cater to the students from the districts of Jalgaon, Dhule and Nandurbar a predominantly tribal area. It is inspiring to note that the University with its 229 affiliated colleges and institutes provides education to over 2,29,800 students. It is also heartening to note that the University gives special emphasis on teaching and research and also offers a number of modern

innovative and applied courses in the campus. My best wishes to the pioneers and the faculty of this great institution. After achieving the independence for the nation, today we have the responsibility of transforming India into a developed nation before the year 2020. I am confident that the 540 million ignited youth of our country will definitely work towards this transformation by removing the poverty among 220 million people of the billion plus people and by preserving our civilizational heritage. I am sure, the North Maharashtra University will empower the youth of this region with value based education and equip them to spread the confidence amongst all the people that “we can do it”. Hence, I have chosen the topic of my Convocation Address as **Research elevates importance of the University.**

I was studying the University Mission which is *"To impart relevant quality higher education to the students, to groom them to be conscious, researchers, technologists, professionals and citizens, bearing the torch for disseminating knowledge in masses for suitable socio-economic development of the society.*" This is indeed an important focal area. It is important to ensure that quality higher education “reach the Unreached” and overall development of the student is the ultimate goal. I congratulate the pioneers both present

and past who have established and nurtured a multi-discipline educational system in Jalgaon.

**Research Teaching Research**

Friends, good teaching emanates from Research. The teachers' love for research and their experience in research are vital for the growth of the institution. Any University is judged by the level and extent of the research work it accomplishes. This sets in a regenerative cycle of excellence. Experience of research leads to quality teaching and quality teaching imparted to the young in turn enriches the research.

Technology is the non-linear tool available to humanity, which can affect fundamental changes in the ground rules of economic competitiveness. Science is linked to technology through applications. Technology is linked to economy and environment through manufacture of knowledge products. Economy and environment are linked to technology, which promotes prosperity to the society. We have to use innovation to generate high value added products for becoming a global player.

Now, I would like to discuss the role to be played by the University in building capacity among our students.

**Capacity Building**

A good educational model is the need of the hour to ensure that the students grow to contribute towards the

economic growth of a nation. Normally, research, technology and performance in the three sectors namely agriculture, manufacturing and services lead to economic growth. Can we sow the seeds of capacity building among the students? There will be continuous innovation during the learning process. To realize this, special capacities are required to be built in education system for nurturing the students. The capacities which are required to be built are research and enquiry, creativity and innovation, use of high technology, entrepreneurial and moral leadership.

If we develop in all our students these five capacities, we will produce "Autonomous Learner" a self-directed, self controlled, lifelong learner who will have the capacity to both, respect authority and at the same time is capable of questioning authority, in an appropriate manner. These are the leaders who would work together as a "Self-organizing Network" and transform the nation into a prosperous and peaceful nation. The most important part of the education is to imbibe the confidence among the students is the spirit of "we can do it" which will enable them to meet the challenges of our national mission of transforming the nation into a developed country by 2020.

**Teacher gives Aim**

When I think of aim in life, I am reminded of Shri Sivasubramaniam Iyer who taught me when I was studying in

5th class at the age of 10. He was a great teacher in our school. All of us loved to attend his class and hear him. One day he was teaching about bird flight. He drew a diagram of a bird on the blackboard depicting the wings, tail and the body structure with the head. He explained how the birds create the lift and fly. He also explained to us how they change direction while flying. Nearly for 25 minutes he gave the lecture with various information such as lift, drag, how the birds fly in a formation of 10, 20 or 30. At the end of the class, he wanted to know whether we understood how the birds fly. I said I did not understand. When I said this, the teacher asked the other students whether they understood or not. Many students said that they also did not understand. Our response did not upset him, since he was a committed teacher.

Our teacher said that he would take all of us to the seashore. That evening the whole class was at the sea shore of Rameswaram. We enjoyed the roaring sea waves knocking at the sandy hills. Birds were flying with sweet chirping voice. He showed the sea birds in formations of 10 to 20 numbers. We saw the marvelous formations of birds with a purpose and we were all amazed. He showed us the birds and asked us to see how the birds looked like, when they fly. We saw the wings flapping. He asked us to look at the tail portion with the combination of flapping wings and twisting tail. We noticed closely and found that the birds in that condition flew in the

direction they desired. Then he asked us a question, where the engine was and how it was powered. Bird is powered by its own life and the motivation of what it wants. All these aspects were explained to us within fifteen minutes. We all understood the whole bird dynamics from this practical example. How nice it was? Our teacher was a great teacher; he could give us a theoretical lesson coupled with a live practical example available in nature. This was real teaching.

For me, it was not merely an understanding of how a bird flies. The bird's flight entered into me and created a special feeling. From that evening, I thought that my future study has to be with reference to flight and flight systems. I am saying this because my teacher's teaching and the event that I witnessed decided my future career. Then one evening after the classes, I asked the teacher, "Sir, please tell me, how to progress further in learning all about flight." He patiently explained to me that I should complete 8th class, and then go to high school, and then I should go to engineering college that may lead to education on flight. If I complete all my education with excellence, I might do something connected with flight sciences. This advice and the bird flying exercise given by my teacher, really gave me a goal and a mission for my life. When I went to college, I took Physics. When I went to engineering in Madras Institute of Technology, I took Aeronautical Engineering.

Thus my life was transformed as a rocket engineer, aerospace engineer and technologist. That one incident of my teacher teaching the lesson, showing the visual live example proved to be a turning point in my life which eventually shaped my profession and flying my friends.

Friends, before you enter into your professional life, it is important to forge your unique aim in life which will steer your efforts towards a well defined goal for the rest of your life. It will always remind you of your goals and give your strength in life.

**Acquire Knowledge**

Having an aim in life is incomplete until you are able to acquire the right knowledge needed to accomplish that aim. It is a matter of great privilege that you are all a part of an institution which is known for the knowledge enlightenment it provides. It is now your duty to make the best use of the resources, people and networks to acquire the optimal knowledge needed to propel you towards your goal. Knowledge will give you greatness, and will help you accomplish difficult missions in life.

I would like to share with all of you the story of my teacher Prof. Satish Dhawan. First, I worked in Delhi with the Ministry of Defence. Later I joined Defence Research and Development Organisation (DRDO) in 1958 at Aeronautical Development Establishment at Bangalore. There with the

advice of the Director, I took up the development of Hovercraft. Hovercraft design needed the development of a ducted contra-rotating propeller for creating a smooth flow balancing the torques. I did not know how to design a contra-rotating propeller though I knew how to design a conventional propeller. Some of my friends told me that I can approach Prof. Satish Dhawan of Indian Institute of Science, who was well known for his aeronautical research, for help in designing the ducted contra-rotating propeller.

I took permission from my Director Dr. Mediratta and went to Prof. Satish Dhawan who was sitting in a small room in Indian Institute of Science with lot of books in the background and a blackboard on the wall. Prof. Satish Dhawan asked me what the problem was that I would like to discuss? I explained the problem to Prof. Dhawan about my project work. He told me that it was really a challenging task and he would teach me the design if I attended his classes in Indian Institute of Science between 2.00 p.m. to 3.00 p.m. on all Saturdays for the next Six weeks. He was a visionary teacher. He prepared the schedule for the entire course and wrote it on the black board. He also gave me the reference material and books I should read before I started attending the course. I considered this as a great opportunity and started meeting him regularly. Before commencing each class, he would ask critical questions and assess my understanding of

the subject. That was for the first time that I realized how a good teacher prepares himself for teaching with meticulous planning and prepares the student for acquisition of knowledge. This process continued for the next six weeks. I got the capability for designing the contra-rotating propeller. Prof. Dhawan told me that I am ready for developing the contra-rotating propeller for a given hovercraft configuration. That was the time I realized that Prof. Satish Dhawan was not only a teacher but also a fantastic development engineer of aeronautical systems.

Later during the critical phases of contra-rotating propeller system testing Professor Dhawan was with me and finding solutions to the problems. After reaching the smooth test phase, contra-rotating propeller went through 50 hours of continuous testing. Prof. Satish Dhawan witnessed the test himself and congratulated me. That was a great day for me when I saw the contra rotating propeller designed by my team performing to the mission requirement in the hovercraft. However, at that time, I did not realize that Prof. Satish Dhawan would become Chairman, ISRO and that I would get the opportunity to work with him as a Project Director in the development of Satellite Launch Vehicle SLV-3 for injecting the Rohini Satellite into the orbit. Nature has its own way to link the student's dream and the real life later.

This was the first design in my career, which gave me the confidence to deal with many complex aerospace systems in future. The hovercraft could fly just above the ground level carrying two passengers. I was the first pilot for this hovercraft and I could control and maneuver the vehicle in any direction. Above all, I learnt that in a project, problems would always crop up; we should not allow problems to be our masters but we should defeat the problems. Then success will sparkle.

Friends, North Maharashtra University, you have department of Pesticides Agro-chemicals in the Department of Organic chemistry and also you have school of life sciences, and department of Food Technology. I thought of sharing a thought on transgenic technology.

**Transgenic technology**

This year marks the 30th anniversary of the first successful introduction of a foreign gene into a plant. A transgenic crop plant contains a gene or genes which have been artificially inserted instead of the plant acquiring them through pollination. Depending on where and for what purpose the plant is grown, desirable genes may provide features such as higher yield or improved quality, pest or disease resistance, or tolerance to heat, cold and drought. Transgenic technology enables plant breeders to bring together in one plant useful genes from a wide range of living sources, not just from within the crop species or from closely related

plants and expands the possibilities beyond the limitations imposed by traditional cross-pollination and selection techniques. Transgenic BT corn, for example, which produces its own insecticide, contains a gene from a bacterium.

**GM technology**

In developed countries, the new life sciences companies have dominated the application of GM technology to agriculture. There is clear evidence that the use of GM crops has resulted in significant benefits like higher crop yields, reduced farm costs, increased farm profit and improvement in health and the environment. And yet there have been heated debate over genetically modified (GM) crops and the argument has not yet settled. The debate features not only science but also economics, politics, and even religion, is taking place almost everywhere. Science can't be bogged down by dogma and no illusionary fears can stop the advancement of what is rational and logical. The solution lies in developing beneficial transgenic crops locally.

**Public-Private Enterprise**

The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and the Department of Biotechnology (DBT), Government of India have together established a Platform for Translational Research on Transgenic Crops (PTTC). The DBT funded platform is a 6.2 million US dollar project that will translate transgenic technology and harness

its products to meet the needs of agricultural growth and serve as a facility of reference to strengthen national, regional and international linkages in transgenic R&D, exchange of materials and information, as well as support training, consultation and technology commercialization. The PTTC will provide an opportunity for public sector research institutes and private sector biotechnology companies to work together for translating transgenic research into products.

With every new emerging technology, there are potential risks and transgenic crops are no exceptions. There is a danger of unintentionally introducing allergens and other anti-nutrition factors in foods. There is a likelihood of transgenes escaping from cultivated crops into wild relatives. There is potential for pests to evolve resistance to the toxins produced by GM crops. And also there is a risk of these toxins affecting non-target organisms. But with legislation and regulatory institutions in place, there are elaborate steps to precisely avoid or mitigate these risks. It is the obligation of the technology innovators and scientists, producers, and the government to assure the public of the safety of the novel foods that they offer as well as their benign effect on the environment.

**Second-generation GM crops (nutritional enhanced foods)**

The Platform for Translational Research on Transgenic Crops (PTTC) will be the birthplace of new generation

transgenic crops which will even surmount the genetically modified crops developed so far in terms of their ability to lower farm-level production costs and also feature increased nutritional and/or industrial traits giving direct benefits of affordability and health to the consumers. In his book, *"Feeding the Forgotten Poor",* Dr William Dar, DG-ICRISAT has drawn the map for "second-generation" GM crops. It is not hard to imagine the immense value of Rice enriched with iron, vitamin A and E, and lysine; Potatoes with higher starch content, and insulin; Edible vaccines in maize, banana and potatoes; Maize varieties with low phytic acid and increased essential amino acids; Healthier oils from soybean and canola; and Allergen-free nuts. I have no doubt that the developing world stands to benefit from any technology that can increase food production, lower food prices, and improve food quality. Nutritionally enhanced foods could play a key role in helping to alleviate malnutrition in developing countries.

I am sure the young graduates will contribute to our society by following these basic truths in life. Make a difference, wherever you are and whatever you do. The knowledge and skills that you have acquired are not everything. They are probably sufficient to earn a living. But instead of learning to earn, you must try to earn for learning. Understand that ultimately you will shine as a leader if you

possess an attitude of a good human being, a human being who tries to live among fellow human beings, for betterment of all, a human being who tries to give back much more to the society than what has received from it.

**Conclusion**

Ultimately, education in its real sense is the pursuit of truth. It is an endless journey through knowledge and enlightenment. Such a journey opens up new vistas of development of humanism where there is neither scope nor room for pettiness, disharmony, jealousy, hatred or enmity. It transforms a human being into a wholesome whole, a noble soul and an asset to the universe. Universal brotherhood in its true sense becomes the sheet anchor for such education. Real education enhances the dignity of a human being and increases his self-respect. If only the real sense of education could be realized by each individual, and carried forward in every field of human activity the world will be so much a better place to live in.

Once again let me congratulate all the Ph.d scholars, and graduating students of North Maharashtra University and my best wishes to all the members of the Faculty for success in their mission of evolution of enlightened citizens.

May God bless you.

## Oath for the Students

1. I realize: experience of research leads to quality teaching and quality teaching imparted to the young in turn enriches the research
2. I will have a goal and work hard to achieve that goal. I realize that small aim is a crime.
3. I will work with integrity and succeed with integrity.
4. I will be a good member of my family, a good member of the society, a good member of the nation and a good member of the world.
5. I will always try to save or better someone's life, without any discrimination of caste, creed, language religion or state. Wherever I am, a thought will always come to my mind. That is “What can I give?”
6. I will always protect and enhance the dignity of every human life without any bias.
7. I will always work for clean planet Earth and clean energy.
8. As a youth of my nation, I will work and work with courage to achieve success in all my tasks and enjoy the success of others.
9. I am as young as my faith and as old as my doubt. Hence, I will light up then, the lamp of faith in my heart.
10. My National Flag flies in my heart and I will bring glory to my nation.