

# Third Convocation

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Address by

**Prof. Goverdhan Mehta, FRS**

National Research Professor

University of Hyderabad and

Former Director Indian Institute of Science Bangalore



**INDIAN INSTITUTE OF TECHNOLOGY ROPAR**

**Chairperson of BOG Madam Lila Poonawala, Director, Professor M. K. Surappa, Esteemed members of the BOG and Academic Senate, Distinguished faculty, Dear Graduating Students, Guests, Ladies and Gentlemen**

I am truly privileged to be part of your annual convocation and grateful for the opportunity to share some thoughts with you this morning. Let me at the outset, warmly congratulate and offer very best wishes to all the graduating students and the medal and prizewinners. On this solemn occasion, as you cross a major milestone in your life's journey, I exhort you to steadfastly remain a lifelong learner, always striving to excel, to fully realize your potential and aspirations. Treat self discovery as a continuum and be yourself in a world that is over time trying to influence you to be something else. Draw inspiration from Rabindranath Tagore's description of the real purpose of education to shape your destiny and I quote "The highest education is that which does not merely give us information but makes our life in harmony with all existence." Thus, a broader exposure and understanding of life and the world is essential for your generation. A recent study has indicated that success in life is determined only 20% by disciplinary/domain skills and the rest comes from attitudes and soft-skills. I am certain that you have acquired these traits in good measure.

IIT, Ropar is a young institution, born out of a policy initiative to enhance high-end educational opportunities for our aspirational generation by building upon and amplifying the globally recognized brand IIT. In a short span of time, you have endeavored to live up to the expectations and are poised to soar higher. As we just heard from Director Surappa's report, your achievements are impressive in terms of research publications and other S & T performance indicators and this trajectory should propel you into the top league in good time. I am confident that you will carve out a niche for this institution and not position yourself simply as a clone of the older IIT's. I wish to complement the Director, distinguished faculty and students for a promising beginning and considerable accomplishments in a short span of time and wish your premier institution success in coming years on all fronts.

While thinking about today's event, I have been asking myself as to what is it that the young graduates may like to hear on a day of personal triumph, rejoice and celebration? Initially, I thought that some good natured pep-talk or dwelling upon some facets of my current research would perhaps suffice. However, on some reflection, I considered it appropriate to surf a broader horizon and engage on a few

issues that may sensitize you and help calibrate your mind-set as a citizen, arouse your ambition and provoke some thoughts about the profession you have chosen. But, please do try to understand if I sound a bit pontifical at times, as persons at my stage in life do have some entitlement to such indulgences.

Quite unlike my professorial instincts as a teacher to speak freely and unfettered, I have opted to read from a written text, so that I do not meander too much – and forget when to stop.

I wish to make a five points.

### 1. Diversity, colors and flavors of India

Let me begin by emphasizing the fundamental importance of understanding the complexities and diversity of India, and the social responsibilities and unifying role of the new generation like yours. Let us be reminded that we are a 'rainbow nation', a melting pot of contrasts and colors, where past, present and future, sometimes separated by over a century, coexist in a complex social milieu and we justifiably celebrate our unity in diversity.

I wish to capture a few contradictions that we harbor and seem to embrace them so uniquely. We see them; seemingly assimilate them; but do not do enough to mitigate them. India ranks high on Forbes list of billionaires in the world but ranks 136<sup>th</sup> in the UNDP human development index. We are projected to have the largest English speaking population in the world but are home to majority of world's illiterate persons. Our institutions like IIT's and IIM's produce graduates who are sought world over but we also produce millions of graduates who are largely regarded as unemployable. We have over 900M cell phone users but only a fraction of them have access to the essentials of life like safe drinking water and sanitation. We proudly launch Agni V and Mangalyan but can't ensure every girl child a toilet in the school. We are the inheritors of the legacy of Buddha and Gandhi, yet unacceptable levels of violence and corruption plague us.

This Indian panorama of 'lights and shadows' is unique and paradoxical and reflects our formidable strengths as well as a soft, vulnerable underbelly. It is imperative that the widening knowledge and socio-economic divide that engulfs us needs to be effectively bridged if we are to emerge as an inclusive, sustainable and innovation led society. Such a transformation has to be steered by the young generation like yours. So, young friends, make a great career, scale new professional heights, and accomplish all that you never thought you could but also make sure that

you climb high on the social responsibility and human sensitivity scale. As the products of India's best known brand and representing the *crème-de-la-crème* among the young generation in which the Nation has invested heavily, you have a special responsibility.

## **2. Emergent India - a canvas of many opportunities - challenge the impossible**

Today, we live in a dynamic world where time domains and geography are rapidly shrinking but innovation space and opportunities are expanding with competition as the key driver. Remarkable advances in science and technology have greatly fuelled high economic growth and placed the rapidly globalizing world on a transformative trajectory. In these momentous times, India is widely perceived as a rising star on the world stage, and our economy, having displayed much resilience in the recent past, appears to be on a recovery path.

New opportunities to unleash the innovation and entrepreneurial instincts of our people are on the horizon and beckon young India. Let no one miss an opportunity and let no opportunity go by. We are entering an era where good is not good enough, even better is not enough, only better than the best will be recognized and make the grade. Thus, as you gaze at the limitless horizon of opportunities, set ambitious goals and aim for the impossible. Mark Twain said a century ago “[They did not know it was impossible, so they did it](#)”. Today, myriad innovative possibilities fundamentally challenge the dogma of impossibility. Human spirit and indomitable resolve, backed by passion can overcome any adversity and achieve everything. History is replete with inspirational examples. This summer, 13 year old girl, Malavath Purna, proud daughter of farm labourers in Andhra Pradesh, became the youngest person to climb Mount Everest; Ludwig Beethoven composed his 9<sup>th</sup> symphony after turning stone deaf and Steve Jobs invented i-pad and i-phone even after being afflicted with deadly pancreatic cancer. So my young friends, dream big, don't be deterred by adversity or failures and through dedication, hard work, incisive skills and a unique sense of purposefulness brew your own success formula.

In the present day context, clarion call for 'Swachh Bharat' and 'make in India' and the mission to clean Ganga and other water bodies of our country offer opportunities for innovations that range from 'frugal to grandiose' and devising technological solutions that are adaptable and scalable from 'local to global' level. Think about possible approaches and strategies and some of you should gear-up to tackle these huge challenges. It would require crafting networks and trans-disciplinary collaborations to devise robust and sustainable solutions.

## **3. Rejuvenation of our science and technology enterprise**

In the past few decades, the research landscape and S & T scenario has dramatically changed world-wide and India is no exception. Since, advances in science and technology are generally regarded as the engine for development, economic progress and prosperity, it is important that India emerges as a formidable force in this arena. There has been an incremental progress in science and technology in India and it has provided many benefits to our people but regrettably we have not excelled to a level expected of a nation that harbors nearly one-fifth of humanity.

A recent report places India at the bottom of the top ten scientifically productive nations of the world with research productivity at ~3% of the global output. In terms of its impact, as measured through citations, the scientific output from India did not make even to the top ten. This is quite worrisome and points to the existence of systemic fault-lines and idea deficit that plague our underperforming science and technology system. Needless to say that major reform and course correction is needed at policy level and in science management systems to foster an enabling eco-system. Our S & T enterprise must expand its outreach as there is so much talent out there, remaining untapped and un-reached.

Every other day we read about persons of Indian origin, researching overseas, achieving breakthroughs in areas ranging from medicine and molecular biology to nanotechnology and high performance computing. Yesterday, 8-year old whiz-kid Reuben Paul of Indian origin addressed a world conference on cyber security at Houston, in USA. This is commendable but why not comparable knowledge advancement outcomes from universities, institutions and industrial R & D outfits on our own turf and from home grown prodigies within the country? Examples of Nano car hepatitis C vaccine and affordable anti-AIDS medicines for Africa from our country in the recent past do us proud. But, we should aspire to be at the forefront of global research in many arenas through sustainable cycle of ideation and innovations.

Recently, a transnational company announced success in developing a vaccine for dengue, a disease which afflicts many in our midst with fatal consequences. One wishes this should have happened in India. There has been a report last week from a US university that a single dose, needle free, vaccine for deadly 'Ebola' has been demonstrated in monkeys and its variant for humans may be round the corner. This indicates that certain S & T based objectives need to be pursued with breakneck

speed and at the highest level of expertise for timely delivery. Our S & T system needs to be geared and strategically positioned for such responses.

But, amid this less than rosy picture of S & T in the country, I see hope and better future as I look at the young and enthusiastic faces in this congregation. Do consider choosing a career as a researcher and in academia. Some of you have been exposed to the joy and excitement of research; sustain that enthusiasm and reinforce it by an instinct for surfing the blue sky.

Also consider exploring career prospects in our major Science and Technology agencies like Space, DRDO and Atomic energy. They have many exciting and challenging opportunities and need recharging their talent pool. This week's startling news that space craft 'Rosetta' and its piggy-back 'Philae' travelling 6.5 billion km in a decade long journey to land on comet 67P, fondly called 'chury', represents a giant leap for human civilization. Notwithstanding our own spectacular first time success with 'Mission to Mars', we do have future challenges to catch-up. Same thing applies to fusion power, often projected as panacea for world's energy needs along with solar energy. Lockheed Martin's claim last month of achieving magnetic confinement in a compact truck-size reactor and making fusion power available in a decade, if true, is truly revolutionary.

I am confident that many of you will grow to be great inventors and leaders in science and engineering. Please remember to be always guided by a sense of objectivity and fairness which is the fundamental ethos of science.

#### **4. Restoration of primacy of research in educational institutions**

*"Research is civilization and determines the economic, social and political development of a nation" C. V. Raman*

It is believed that the number of Ph.D's produced is an important indicator of a country's intellectual capital and global leadership in the knowledge driven era. If that be so, our record is a matter of concern as we produce about 10-12000 Ph. D's per year (*cf.* >30,000 in U.S.A) across all S & T disciplines. In engineering and technology field the number of Ph. D's produced per year is a paltry ~1200.

Research must occupy center stage in the intellectually stimulating and continually recharging environment of the academic institutions.

Being in academia all my life, I cannot resist making a passionate plea for the restoration of the primacy of research. Research and teaching are to be considered as conjoined twins that must defy separation. For an academic, teaching brings enormous

satisfaction but that is not enough; research is an elixir that fuels creative energy and instincts and enriches the intellectual life of a university in a unique way. We, as academic institutions must value, recognize and put a premium on research. It is not a luxury but necessity.

Our industry, particularly manufacturing and high tech sectors, as they move up the value chain, will need research savvy postgraduates and doctoral degree holders in science and engineering in increasing numbers. The present job market scenario, where one notices disproportionately greater demand for undergraduates compared to postgraduates is poised for correction and a demand-pull and premium on the more qualified engineers and scientists can be expected in years ahead.

### **5. Be creators, entrepreneurs and innovators**

Being among many graduating engineers in a technology institution, I cannot resist making a pitch for harnessing the special attributes that your discipline and training has imparted you. Engineering is about science, art, mathematics, complexity, fabrication, production, simulations modeling and scaling-up etc. It is application of scientific knowledge to create, develop and maintain technologies - ranging from micro to mega scale - to address myriad real world problems. The strong interface of engineering with industry and commerce is all too obvious. New technologies thrive on good science and innovations and are driven by entrepreneurial fervor. We live in an era dominated by innovations as Bill Gates aptly put it and I quote “ *...Never before in history has innovation offered promise of so much to so many in such a short time*”. Engineers by training and profession are better disposed to be innovators and entrepreneurs. So my young friends, each one of you must endeavor to become one. It is said ‘*innovation distinguishes between a leader and a follower*’. Be leaders not followers, be employers and not employees, be wealth creators and not mere consumers. As you embark on such a journey, never be afraid of risks, never be deterred by failures and turn every obstacle into an opportunity. Remember, ‘*a person who never failed, never tried anything new*’. In your actions, follow the footsteps of a great innovator like Thomas Edison “*I never perfected an invention that I did not think about in terms of the service it might give others... I find out what the world needs, then I proceed to invent*”. That is a wonderful way to lead a purposeful life and serve the humanity and the country.

Finally, my dear students, I implore the new graduates of this premier institution of the country to set new benchmarks in scholarship, values and service to the nation and humanity. I thank you all and in particular the Chairperson of BOG Madam

Ponawalla and Director Surappa for giving this opportunity. Jai hind and May God bless us all.