ANNUAL REPORT 2017-2018

1st in India as per normalized citation index - Web of Science, 2016

INSTITUTE OF CHEMICAL TECHNOLOGY

Deemed University under Section 3 of UGC Act 1956
Elite Status and Centre of Excellence - Govt. of Maharashtra;
TEQIP Phase - II Funded
National Institutional Ranking Framework (MHRD) - 2016,
Rank 2 amongst all Universities in India (April 2016)

Nathalal Parekh Marg, Matunga, Mumbai - 400 019, India
Telephone: (91-22) 3361 1111/ 2222; Fax: (91-22) 3361 1020 ● Website: www.ictmumbai.edu.in

Annual Report
2017-2018

INSTITUTE OF CHEMICAL TECHNOLOGY

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Nathalal Parekh Marg, Matunga, Mumbai - 400 019, India
Tel: +91-22-3361 1111/2222, Fax: +91-22-33611020
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BOARD OF GOVERNERS (2018)

Dr. R. A. Mashelkar
FTWAS, FNA, FASc, FNASc, FNAE, ChE, FIChemE (UK), FIIChE, FMASc, FIIChE

Chancellor
CSIR Bhatnagar Fellow and
President Global Research Alliance
Former Director General CSIR and Secretary, DSIR, GOI
Padmavibhushan Awardee

Professor G. D. Yadav
FTWAS, FNA, FASc, FNASc, FNAE, FISTE, FRSC (UK), ChE, FIChemE (UK), FIIChE, FICS, FMASc, FIIChE

Vice-Chancellor, Chairperson
R.T. Mody Distinguished Professor;
J.C. Bose National Fellow (DST-GOI)
Padmashri Awardee

Mrs. Sandra Shroff
Chancellor's Nominee

Managing Director,
United Phosphorous Ltd.

Shri Sitaram Kunte, *IAS*
Principal Secretary,
Ministry for Higher and Technical Education, Government of Maharashtra

Shri Nikhil Meswani
Member,
Distinguished Alumni,

Executive Director,
Reliance Industries Ltd.

Shri S.M. Mokashi
Member,
Distinguished Alumni,
Mumbai

Shri M. B. Parekh
Member,
Distinguished Alumni,

Chairman and Managing Director,
Pidilite Industries Ltd.

Shri C.V. Gogri
Member,
Distinguished Alumni,

Chairman Emeritus,
Aarti Industries Ltd.

Professor Devang Khakhar,
FNA, FASc, FNASc, FNAE
Member- *Head of Academic Institute/ Organization of National Importance having International Standing*

Director, *Indian Institute of Technology - Bombay, Mumbai*

Shri U. Shekhar
Member,
Nominated by the Board,
Eminent Industrialist,

Chairman,
Galaxy Surfactants Ltd.

Professor P. R. Vavia
Member,

Dean (Academic Programme)
Department of Pharmaceutical Science and Technology,
Institute of Chemical Technology, Mumbai

Professor A. B. Pandit, *FTWAS, FNA, FASc, FNASc, FMASc, FIIChE*
Member,

Dean-Human Resource Development
Department of Chemical Engineering
Institute of Chemical Technology, Mumbai

Professor S. D. Samant
Member, Senior Most Professor,
Department of Chemistry,
Institute of Chemical Technology, Mumbai

Professor (Smt.) S.S. Lele
Member Secretary,
Registrar,
Department of Food Engineering and Technology
Institute of Chemical Technology, Mumbai

INSTITUTE AUTHORITIES

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Padmashri Awardee
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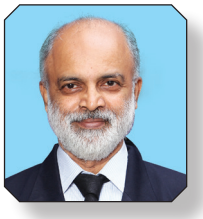

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P.A. to Vice Chancellor
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Shri. S. B. Kadam
Assistance Registrar (Finance)
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Store Superintendent
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Mrs. Madhuri Shete
System Engineer
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WARDENS AT ICT HOSTELS

Hostel 1
Dr. P. D. Vaidya
Tel.: 91-22-3361 2014

Hostel 2
Mrs. Madhavi Wadkar
Tel.: 91-22-3361 1126

Hostel 3
Dr. Jyoti Sontakke - Gokhale
Tel.: 91-22-3361 2511

Hostel 4
Dr. Amit Pratap
Tel.: 91-22-3361 2556

Hostel 5
Dr. S.T. Mhaske
Tel.: 91-22-3361 2412

ADMINISTRATIVE STAFF
(VICE CHANCELLOR'S & REGISTRAR'S OFFICE)

Shri Deepak Jadiye

Officer on Special Duty

Ms. Sanghamitra Bhavsar

P. A. to Director

Smt. Anushka Bhandare

Jr. Typist cum Clerk

ACADEMIC

Shri. R. B. Sawant

Assistant Registrar

Shri. N. S. Lakhan

Superintendent

Shri. V. A. Mulam

Sr. Clerk

Smt. Asha V. Bhangare

Sr. Clerk

Shri. A. B. Rane

Jr. Typist Clerk

Smt. Urvashi Vanjara

Jr. Typist Clerk

Shri. S. V. Pawar

Jr. Typist Clerk

Shri. S. A. Dombale

Account Clerk

Shri S.S. Mane

Laboratory Attendant

Shri S.L. Pawar

Laboratory Attendant

Shri A.L. Kadam

Jr. Typist Clerk

FINANCE & ACCOUNTS

Shri S. B. Kadam

Assistant Registrar

Mrs. Sayali Loke

Deputy Accountant

Smt. Manisha Varadkar

Assistant Accountant

Smt. Smita Kinjale

Assistant Accountant

S. Y. Chandivade

Assistant Accountant

Shri. B. G. Dingankar

Assistant Cashier

Shri. S. A. Udmale

Sr. Accounts Clerk

Smt. S. P. Kadam

Sr. Accounts Clerk

Shri. L. D. Bagul

Daftari

Shri. S. V. Raghatwan

Hawaldar

Ms. Jagruti Salim

Jr. Typist Clerk

ADMINISTRATION

Shri. J. G. Mandavkar

Sr. Clerk

Smt S. S. Shelar

Sr. Clerk

Smt. Lalita Chauhan

Receptionist

Ms. Pradnya Mahendrakar

Telephone Operator

Shri. K. P. Bhole

Hawaldar

Shri. D. G. Kamble

Auditorium Attendant

Smt. B. M. Joshi

Jr. Typist Clerk

Shri Adam Khan

Watchman

Shri Jagdish Waghela

Sweeper

STORES AND MATERIALS ACQUISITION

Dr. S. M. Mane

Ag. Store Superintendent (From 02/01/15)

Smt. N. S. Goud

Sr. Clerk

Smt. M M Amberkar

Store Assistant

Shri. N. S. Pujare

Jr. Typist Clerk

Shri. P. G. Desai

Laboratory Attendant

PROFILE OF THE INSTITUTE

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Website: www.ictmumbai.edu.in

VISION

We shall perennially strive to be a vibrant institute with continuously evolving curricula to brighten the future of the chemical, biological, materials and energy industries of the nation, and rank amongst the very best in the world through active participation and scholarship of our faculty, students and alumni. We shall be creators of sprouting knowledge and design cutting-edge technologies that will have the greatest impact on society and benefit mankind at large.

MISSION

We shall generate and sustain an atmosphere conducive to germinating new knowledge at every available opportunity. The education we shall impart will enable our students to devise new solutions to meet the needs of all segments of society with regard to material and energy, while protecting the environment and conserving the natural resources. Our endeavours, while extending well beyond the confines of the classroom, will aim to enhance public welfare and our attempts to disseminate knowledge will spread to a greater multi- and cross-disciplinary platform to conduct research, discovery, technology development, service to industry and entrepreneurship, in consonance with India's aspirations to be a welfare state. We will team scientists and engineers with professionals in other disciplines to arrive at better solutions. We will provide all our students with a strong foundation to encourage them to be our ambassadors in the professional activities that they choose to undertake in service of society at national and international levels. Through our vision, we will serve the profession and society and strive to reach the summit as a team, and ultimately serve as role models to the younger generation.

Deemed University

The Institute of Chemical Technology (ICT), Mumbai is a unique institute which was established on 1st October 1933 as a University Department of the Bombay University (UDCT), which has created its own brand over the years. Under the TEQIP it was granted full autonomous status in 2004 and declared as Deemed-to-be University on September 12, 2008 by the MHRD under Section 3 of the UGC Act of 1956. It was granted an Elite Status and Centre of Excellence on par with IITs, IISc and IISERs in the State Assembly on April 20, 2012 by the Maharashtra Govt. based on its stellar performance on par with institutes of national importance. This was indeed confirmed by the NIRF-MHRD ranking on 4th April 2016 which recognised ICT as number TWO university in the country, a few points behind IISc, Bangalore. Even if it is clubbed with Engineering category including IITs, its rank is 4. Web of Science shows that ICT is number one under Category normalized citation impact of 0.98.

ICT is housed on 16 acres in Mumbai and is running 9 UG (Chemical Engineering; 7 branches of Chemical Technology; 1 Pharmacy), 18 PG (9 inter-disciplinary) and 29 Ph D programmes (11 interdisciplinary), 1 PG Diploma in Chemical Technology Management for doctoral students and 1 PG Certificate Course in Chemical Safety and Risk Management for all Masters students. ICT is governed according to special Statutes which go beyond Deemed University concept as approved by the State. In the QS ranking of Chemical Engineering only 3 from India are mentioned along with G.D. Yadav and A.B. Pandit are included.

- ICT has 11 departments and 6 centres of excellence.
- First batch of 20 students of 2-year B.Sc. (Tech.) in Textile Chemistry and Chemical Engineering (the first degree courses in Technology in Bombay University) commenced on 4th August, 1934.
- Many distinguished alumni in government, academia, industry and other walks
- 3 Padma Vibhushan, 8 Padma Bhushan, 8 Padma Shri awardees; 2 Fellows of Royal Society (among 5 engineers from India); Several Fellowships- FNA, FNASc, FNAE, FRSC, FTWAS, MUSAE.
- Over 500 first generation entrepreneurs, some owners of Fortune 500 Companies;
- Current student strength: 1100 UG; 450 PG and 730 Ph Ds
- Since last few years, Doctorates produced per year are more than 100, which is thehighest in the country for such unique University.
- Publication record per faculty is the best in India. In 2015 calendar year, 468 peer reviewed papers
- Sept 2016 statistics from the Web of Science shows that ICT is number one in India under Category normalized impact citation impact of 0.98; impact relative to the world is 0.961.
- Last 10 years, 348 Patents filed/acquired.
- Two non-profit companies under Companies Act Section 8 and two more
- Student entrepreneurs; one of the Ph D student having established a company with Rs 11 Cr turn-over.
- Selected as a Lead Institution under TEQIP-1.
- The External Cash Flow >2:1 over government grants.
- Majority of faculty consultants to industry with 1/3 share going to the institute without any material use.
- Except one, all are Ph D holders but the non-Ph D holder has also produced Ph D.s
- Generous support by Alumni Association for welfare of students, support staff, institute and infra-structure, student interest-free loans, in-plant training.
- Some support staff have earned Ph Ds while on job.
- Vibrant syllabus. New pattern to create UG students as entrepreneurs, Masters and Ph D student fellowships from industry.

- All faculty having Ph D students including V.C., Registrar and Deans, who also teach and conduct research, and publish.
- Rated as Number One State supported Deemed University with "A" grade by MHRD
- FICCI Higher education Award in two categories viz. i) Excellence in faculty, and ii) Enabling a Research Environment(2015)
- Ranked as Number One Institute in India and in top 5 in the world in Chemical Engineering by a survey published by Professor Jude Sommerfeld of Georgia Tech., USA (January 2012)
- Rated as Number one among all Biotechnology programs in India, in2010, 2011 and 2013 by the Biospectrum magazine
- Rated as Number One Institute by NPIU among all the TEQIP funded Institutes (October 2010). Qualified for Phase II of this program from December 2011
- Awarded Ramakrishna Bajaj National Quality Award in service sector category by The Indian Merchants Chamber (IMC) in 2003
- Received the AICTE-CII sponsored Tata Chemicals Best Industry Linked Institute in Chemical Engineering thrice in a row- 2012, 2013, 2014
- Received 4 Bill and Melinda Gates Foundation awards of US $ 1000,000/- each on global competition.
- The faculty is highly accomplished, with multi-disciplinary interests and decorated with national and international awards and honours, having live connections with industry and policy making bodies. These include Fellowship of the Royal Society- UK (2), TWAS fellowships (4) Bhatnagar Award (6), INSA Fellowships (14), Young Scientist medals (5); Indian Academy of Sciences Fellowships (14), Young Engineeraward of INAE (7), Gold Medal of the Society of Dyers &Colourists, UK, etc.
- CSIR Lab retired directors as full time faculty to work up to age of 70 under endowment positions
- 15 faculty members received special recognition by UGC for supervising more than 15 Ph.D students as single guide
- Merit is the only criterion for admission; 52% students come from reserved category.
- Several merit-cum-means scholarships (350) ranging from Rs.10,000/- to\
  Rs. 1,00,000/-
- Many endowments to cater to different activities; 21 faculty, 49 visiting faculty and 11 library, campus development; travel; support staff
- 107 MOUs in operation for academic and research collaborations with industry, Indian and foreign universities and CSIR laboratories.
- India's first 2 G bioethanol plant of 10 TPD, based on agro-wastes composed of lignocellulosics. dedicated to the nation on 22nd April 2016; three more of 250-500 TPD plants to be set up by PSUs.
- Developed technologies for cleaning of Rankala Lake in Kolhapur under CSR; more to follow.
- UG students 6 Prototype models having patents for commercialisation
- Establishing 29 centres of excellence in new emerging areas with satellite campus near Mumbai, in Odisha and Aurangabad to support local industry and creation of manpower.
- FICCI - Federation of Indian Chamber of Commerce and Industries awarded the Best Institutional Social Responsibility Award to ICT for the year 2016.
- FICCI felicitated Dr. R.A. Mashelkar, Chancellor, ICT with the Life Time Achievement Award (2016).

CHANCELLOR

Padmavibhushan
Dr. R.A. Mashelkar,
National Research Professor,
is presently also the
President of Global Research Alliance,
a network of publicly funded R&D institutes from Asia-Pacific,
Europe and USA with over 60,000 scientists.

Dr. R.A. Mashelkar, National Research Professor, is presently also the President of Global Research Alliance, a network of publicly funded R&D institutes from Asia-Pacific, Europe and USA with over 60,000 scientists.

Dr. Mashelkar served as the Director General of Council of Scientific and Industrial Research (CSIR), with thirty-eight laboratories and about 20,000 employees for over eleven years. He was also the President of Indian National Science Academy and President of Institution of Chemical Engineers (UK).

Dr. Mashelkar is only the third Indian engineer to have been elected (1998) as Fellow of Royal Society (FRS), London in the twentieth century. He was elected Foreign Associate of National Academy of Science (USA) in 2005, Associate Foreign Member, American Academy of Arts & Sciences (2011); Foreign Fellow of US National Academy of Engineering (2003); Fellow of Royal Academy of Engineering, U.K. (1996), Foreign Fellow of Australian Technological Science and Engineering Academy (2008) and Fellow of World Academy of Arts & Science, USA (2000).

Dr. Mashelkar has been on the Board of Directors of several reputed companies such as Reliance Industries Ltd., Tata Motors Ltd., Hindustan Unilever Ltd., Thermax Ltd., Piramal Enterprises Ltd., KPIT Technologies Ltd., etc. He chairs the Board of GeneMedix Life Sciences Pvt. Ltd., Vyome Biosciences Pvt.Ltd. and Invictus Oncology Pvt. Ltd.

In August 1997, Business India named Dr. Mashelkar as being among the 50 path-breakers in the post- Independent India. In 1998, Dr. Mashelkar won the JRD Tata Corporate Leadership Award, the first scientist to win it. In June, 1999, Business India did a cover story on Dr. Mashelkar as "CEO OF CSIR Inc.", a dream that he himself had articulated, when he took over as DG, CSIR in July 1995. On 16 November 2005, he received the Business Week (USA) award of 'Stars of Asia' at the hands of George Bush (Sr.), the former President of USA. He was the first Asian Scientist to receive it.

Deeply connected with the innovation movement in India, Dr. Mashelkar is currently the Chairman of India's National

Innovation Foundation, Reliance Innovation Council, Thermax Innovation Council and KPIT Technologies Innovation Council, He Chairing Marico Foundations Governing Council.

Thirty four universities have honoured him with honorary doctorates, which include Universities of London, Salford, Pretoria, Wisconsin, Swinburne and Delhi.

Dr. Mashelkar's contributions have been multifarious.

When Dr. Mashelkar took over as the Director General of CSIR, he enunciated "CSIR 2001: Vision & Strategy". This was a bold attempt to draw out a corporate like R&D and business plan for a publicly funded R&D institution. This initiative has transformed CSIR into a user focused, performance driven and accountable organization. This process of transformation has been recently heralded as one of the ten most significant achievements of Indian Science and Technology in the twentieth century.

Dr. Mashelkar has won over 50 awards and medals, which include S.S. Bhatnagar Prize (1982), Pandit Jawaharlal Nehru Technology Award (1991), G.D. Birla Scientific Research Award (1993), Material Scientist of Year Award (2000), IMC Juran Quality Medal (2002), HRD Excellence Award (2002), Lal Bahadur Shastri National Award for Excellence in Public Administration and Management Sciences (2002), World Federation of Engineering Organizations (WFEO) Medal of Engineering Excellence by WFEO, Paris (2003), Lifetime Achievement Award by Indian Science Congress (2004), the Science medal by the Academy of Science for the Developing World (2005), Ashutosh Mookherjee Memorial Award by Indian Science Congress (2005), etc.

The President of India honoured Dr. Mashelkar with Padmashri (1991), with Padmabhushan (2000) and with Padma Vibhushan (2014), which are three of the highest civilian honours in recognition of his contribution to nation building.

PROFESSOR M. M. SHARMA

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EMERITUS PROFESSOR OF EMINENCE, INSTITUTE OF CHEMICAL TECHNOLOGY

Institute of Chemical Technology, Mumbai (Deemed University) (2003-)

Scientific Advisory Council to the Prime Minister (2006-2009; 2009-)

Chairman, Board of Governors, IIT, Madras (June, 2011-May, 2014)

Member, Advisory Board, IIT, Bombay (2003-)

Director, Central Board of Directors, Reserve Bank of India (2006-)

Director,Board of Directors, AERAS Global TB Vaccine Foundation,MD.,US(2005-2008)(Non Profit Foundation).

[Former Professor of Chemical Engineering (1964-97) and Director (1989-97), Institute of Chemical Technology (Autonomous), Now Institute of Chemical Technology (ICT)-A Deemed University, Matunga, Mumbai- 400 019]

Adjunct Professor of Chemical Engineering,Monash University,Australia(1995-2002,Four weeks in a year).

Chairman,Empowered Committee for rejuvenation of Universities,UGC/MHRD,Government of India,(2006-)

Visiting Professor,Department of Chemical Engineering,University of Delaware,US,Spring Semester 1982,(Also consultant of DuPont, Wilmington, during a part of this period).

Consultant of Dow Chemicals and Dow Corning, 2000-2003, Midland, Michigan.

Three Festschrift (special issue) in my honour, Two in Chemical Engineering Science (Pergamon and Elsevier) (1997, 2007) and Industrial Engineering Chemistry Research (2007) (American Chemical Society)

AWARDS / HONOURS:

S. S. Bhatnagar Prize in Engineering Sciences (1973)
Fellow, Indian National Science Academy (INSA) (1976), (VP: 1987-88; President: 1989-90); Vishwakarma Medal (1985); Meghnad Saha Medal (1994); Sir J. C. Bose Memorial Lecture (1994); Medal for Promotion and Service to Science (2008)

Fellow, The Royal Society, London (1990); Leverhulme Medal (1996)(First engineer from India to be elected in the 20th Century).

International Fellow, The Royal Academy of Engineering

PROCEEDINGS OF THE SIXTH CONVOCATION

FEBRUARY 8, 2017

"From inception, ICT has been an innovation centric having produced more than 500 entrepreneurs."

Professor Dr. Ganapati D. Yadav
Vice Chancellor, ICT

The Chief Guest, Hon. Governor of Maharashtra and Tamilnadu - Ch. Vidyasagar Rao, the Guest of Honour Padma Vibhushan Prof. M. M. Sharma, the Chancellor of ICT PadmaVibhushan Dr. R. A. Mashelkar, Noble Laureate Prof. Gean Marie Lehn, Noble Laureate Prof. Robert H. Grubbs, registrar Professor Smita Lele, Dean A P - Prof. Vavia, dean R C R M - Prof. Rekha Singhal, controller of Examinations Dr. R. R. Deshmukh, members of the board, deans, faculties, students, industrialists, dear graduating students, Ladies and Gentlemen, and particularly our guests from Ethiopia who are here this evening,

At the very outset, we congratulate all graduates who will receive their degrees today. "Shubhaste Panthanam" - Let your future be bright and distinct. Ladies and Gentlemen, with an unbound delight and affection I welcome you all for the 6th convocation. Our performance has been spectacular, on the rise with every passing year and several accolades have been received by faculties, students, alumni, support staff and the institute at large. I cannot enumerate all but will touch upon a few. On this moment of occassion I stand before you with all humility at my command and the sense of gratitude and pride. ICT is a unique institute with achievers who have changed the destiny of our country. Two Noble Laureates Prof. Gean Marie Lehn and Prof. Robert H. Grubbs will receive their honorary doctorate today. They are the symbiosis of Saraswati, the goddess of knowledge and wisdom, and Laxmi, the goddess of wealth and prosperity. Our Rasayan devika in whose praise the song was written, is a universal deity, combination of all virtues to bring peace, prosperity, luxury, comfort, and fulfilment in life in harmony with nature. Between these two laurels so many records have been created in serVice of science and society at large. What a great day for ICT today! We thank them most Profusely for blessing us by their gracious presence. In Dr. Mashelkar, we have fatherly Chancellor who is available 24x7 to give adVice, mentorship and encouragement. In Prof. M. M. Sharma, we have a Mahaguru- the great Acharya, whose blessings have brought us today's day as a separate University. Ladies and Gentlemen, it is also interesting that Prof. Sharma will be completing 80 years in this year. So this is a very unique occassion for us. The National Ranking Framework of MHRD placed ICT at number 2 in April 2016 among all leading universities and institutions in India. However, the Web of Science of thomson reuters in Spetember 2016 has placed ICT at number 1 among all universities, institutes and IITs based on the normalized citation impact index. It is indeed remarkable that within 8 years of our autonomy and status as a Deemed University we have surpassed all expectations. No wonder that the state cabinet took a decision in October 2016. To grant ICT an additional campus of 200 acres in Marathwada near Jalna, Aurangabad with provision of additional grant so that the Marathwada region is benefitted by the legacy of ICT. We are going to start there innovative programs during 2017-18. Furhter,

the Orissa govt. has approached us for opening up a satellite campus there. These developments suggest that despite being a state funded small University or institute, how innovation and spirit of entrepreneurship has taken ICT to greater heights in the committee of great institutions. The legacy of ICT of producing over 500 industrialists, top class academicians, educationists, 19 Padma awardees including 3 Padma Vibhushans, 8 Padma Bhushans, and 8 Padmashris, 2 Fellows of Royal Societies and Fellows of many prestigious foreign bodies and academias is a class apart and should serve as a road map for others. The distinguished alumni have given us the mantra of how to be successful. With this awesome performance ICT has made Maharashtra proud. What an impressive record of producing 95 PhDs today, a year in which many universities are even able to do that! Our international standing has led to major developments - Dual Degree PhD programme with Michigan state University, USA is a unique concept different from split or joint degree. Also 3 leading universities from Israel Tel Aviv Hebrew and Technion have signed MOU with ICT for collaboration. The University of Manchester UK has also signed MOU with us in collaboration with Reliance Industries, projects will be undertaken soon. So as Harward University Professor Daniel Nossira's group. We confer UAA ICT Dhirubhai Lifetime Acheivement Award on Prof. Dem Nancy Roth Well President and Vice Chancellor of Manchester University. We have ongoing projects with Unilever and soon we will have a project with queen's University. ICT has been at the forefront of creation of new knowledge and research has been integral part of our culture. From inception, ICT has been an innovation centric having produced more than 500 entrepreneurs. ICT is the original model of Make in India. As part of innovation and entrepreneurship, we have remodeled our syllabi and a group of 6 students have reconfirmed experimental findings from our master and Ph.D. degrees and create a business model. Some 45 projects per year will be given to start up companies. Not only that but all our master students will undergo 6 months industrial training during third semester without losing any course content or thesis requirement. Research will commence from first semester. 33 classrooms are provided with this facility. Our prime minister is laying a strong emphasis on Make in India, Swachchha Bharat Swastha Bharat, Namami Gange, skill development and alike. Dr. Mashelkar is a chairman of the Swachchha Bharat abhiyan. In this regard, the 2G biethanol technology developed by ICT is making waves nationally and internationally. The 10 ton plant at Kashpur, Uttarakhand dedicated to the nation on 22 April 2016 has now laid to MOU of setting of 2 plants 400 tons per day by BPCL and HPCL with establishment of a company by ICT under section 8. The water purification technology of Prof. A. B. Pandit used in Rankala lake purification also shows prowess of ICT. My own water splitting technology to produce clean fuel hydrogen with assistance of ONGC will soon be taken to a bigger scale. Vegetable processing plants developed by Prof. Smita Lele in Satara and Ratnagiri, technologies developed by Prof. Wavia, Vandana Patravale, Padma Devarajan, B. M. Thorat, Ph.D. student Vaibhav Tidke's start up company with 13 cr. turnover and many such examples place ICT at top. We would like to help sick industries to come to Profit making states. Until that no fee will be charged. Today all processes must be clean and green and therefore our campus will be totally green.

Ladies and Gentlemen, world is facing 2 major problems - depletion of fossil fuels and increased greenhouse gas emission. The demand of energy is critical for sustainable development. The demand for hydrocarbon based chemicals and fuels is expected to keep pace with global GDP growth. Energy management will also become more prominent. ICT would like to establish joint research and innovation park and some 29 centres are proposed. ICT is in need of fund so that a corpus of 1000 crore could be built. Corporate social responsibilities are welcome. We have 350 scholarships ranging from 10 thousand to 1 lakh Rupees, Fellows hips for research and lab renovation welfare funds are needed. I request all of you to donate generously and be a part of this exciting culture. I will say that aano bhadra krtavo yantu vishwatah. Let good knowledge, global thoughts come to us from all directions. Thank you. ■■

"India is now the fastest growing economy of the world and will continue to be for the years."

- Padma Vibhushan
Dr. R. A. Mashelkar
Chancellor, ICT

His excellency, Hon. Governor of Maharashtra and Tamilnadu, Vice Chancellor Prof. G. D. Yadav, Noble Laureates Prof. Grubbs and Prof. Lehn, graduates of the day, their equally proud families and friends, Ladies and Gentlemen, I begin by first thanking Hon. Governor. These are the difficult times. He had to be elsewhere. But despite that he said, my first duties are to academic excellence, academic institution and is here among us. So let us applaude. This may be a historical day in the Indian universities. I don't think there has been an occassion where in the Convocation 2 Noble Laureates have been honoured. I am very proud that ICT can proudly say that these 2 Noble Laureates are our alumni. This University is in the current shape because of the path it has followed, the inspiring leadership that has been provided. We owe over existence today to Prof. Sharma. A mere Bombay University department of chemical technology rises as a University and becomes number 2 in national ranking; I think it's a great journey. There are a very few parallels I would say. I would thank Prof. Lehn and Prof. Grubbs for accepting our honour. It's our humble appreciation of your great life and work.

Many of you will turn to research, and a question is asked in India, as to when an Indian working in India will get Nobel prize? Except for CV Raman no one has received it so far. To my simple mind it is like this- Indian science will be preoccupied with looking through the windows that others have created. There is a breakthrough in superconductivity, everybody works on it. We do top class work; but if we keep on saying that we are going to be first word in India and not in the world, then we'll never have a nobel prize. So we have to open new windows.

Prof. Lehn opened new windows in supramolecular chemistry. There are Grubb's catalysts now, series of transition metals, carbon complexes which have changed the world. The first thing I would like to urge to our young people to work on opening new windows. That will require some risk taking, boldness in your research. Since these iconic figures on the dias - from their life and work we can take some lessons.

I want to congratulate the graduates of the day. You have worked very hard. You will enter the real world now. It's a very different world. India is rapidly changing. Now the fastest growing economy of the world and will continue to be for the years. People don't look at India as third world country; they look at us as the third most powerful country. The responsibility of building it is with you. We are talking about science 2.0, education

3.0, industry 4.0. These are the paradigm shift. ICT is creating products like yourselves, which are relevant and to continue to be relevant we will have to do a number of game changing things. You must have ability and attitude. We must build mindsets. There is a common belief that certain aptitudes are important by 2020. They involve complex problem solving, emotional intelligence, creativity and ability to cocreate.

While closing, I will leave just 5 basic messages. The first is aspiration are your possibilities. So keep your aspirations high. Second, hard work. There is no instant success. All of us, we acheived anything in life, have worked 24x7 day after day, month after month, year after year. Third, work in silence. Let success speak for itself. Fourth, don't wait for an opportunity to knock on your door. And the last one, please remember there is no limit to human imagination, no limit to human acheivement. So go limitless. We can make the impossible possible. I totally agree with my guru, we must set our heights high. We have to have global benchmark. We have to be counted among the top in the world. The affection and the commitment of the alumni and the spirit of doing something for 'my' Institute will take us to a different height. Thank you. ■■

"If you don't keep yourself up to date, you will become a fossil..."

- Padma Vibhushan Prof. M. M. Sharma

PadmaVibhushan, Guest of Honour

Hon. Governor, Chancellor Dr. Raghunath Mashelkar, Vice Chancellor G. D. Yadav, Noble Laureates Prof. Grubbs and Prof. Lehn, the dignitaries on the dias, faculty members, graduates, Ladies and Gentlemen, I spent my lifetime here. I am not a guest, I am inhouse person. ICT is a shining example of transforming people. Many people who came from rural areas, weak economic background are now Professionally and financially very prosperous. ICT has played a pivotal role in transforming people.

We started in 1933 with explicit desire of industrialists and philantrophists and with heavy financial inputs. In 80's we got autonomy follwed by 90's to get autonomous department followed by efforts to convert this into Deemed University, in turn followed by efforts to make it an elite institution on par with IITs. It is my clarion call and fervant hope that having the scale of great heights it should look forward to becoming a national University of chemical technology. Chemical industry is an essential industry. Life without chemistry will be miserable. It's interesting that when a boy meets a girl they say there is a good chemistry - not good physics or biology.

It all started with India trying to process grey cloth and that's how textile chemistry was introduced in 1933. Chemical engineering at that time was ahead of time and made very great impact.

The relationship that ICT has developed with industry on one side and fundamental sciences on the other side is absolutely unique. Fundamentals are harbingers of invention, and innovation thus triggering rapid economic growth. This place has sparks of all these. With talented students and faculties the institution is going places, but it has to keep on challenging itself to reach still greater heights and I believe that will keep on happening.

I will like to quote the example of mobile phones. It's all inclusive growth in India. Economaically weakest people also can use mobile today. The fundamental research that has been done for this is extraordinary. We must pay tribute to our forefathers who conceived this institution.

Everybody knows the progress of MRI, when some cracks are not detected by X ray they can be very well seen by MRI. I would gently remind the graduating students that this is the beginning of your career. Please bear in mind chemical technologies and chemical engineers have half life of maximum 6 years only. If you don't keep yourself up to date, you will become a fossil. I wish all graduating students to shine in their career, in their future endeavours, but with a gentle reminder : never forget your alma mater, your mother. As the Vice Chancellor approached you, please make generous contributions, whatever is within your own mind. Thank you very much.

"With the current size of approx 108 dollars the indian chemical industry is 3% of the global chemical industry."

- Ch. Vidyasagar Rao
The Chief Guest, Hon. Governor of Maharashtra and Tamilnadu

PadmaVibhushan Dr. Sharma, former Director of ICT, PadmaVibhushan Dr. R. A. Mashelkar, Chancellor of ICT, Padmashri Prof. G. D. Yadav, Vice Chancellor, Jean Marie Lehn, Noble Laureate, Prof. Robert Grubbs,Noble Laureate, Prof. Wavia, Dean, academic programs, Prof. Rekha Singhal, dean - research, Prof. Smita Lele, Registrar, Prof. R. R. Deshmukh, Controller of Exams, members of Board of management, Academic Council, heads of various departments, graduating students and their parents, students, and Ladies and Gentlemen, greetings to each one of you. I am happy to be visiting this institute and to share the joy of the graduating students on this day. Today I was doubtful whether I would be able to attend this convocation. A lot of political developments are taking place in Tamilnadu. I am happy to be here amongst you and by the side of Noble Laureates.

At the outset, I congratulate all the graduating students. This is indeed a momentous occassion in the history of the institute. 2 Noble Laureates are being presented with honorary doctorates. I applaud both of them for their outstanding work and congratulate them.

Dear friends, ICT was placed at second position among all Indian leading universities in April 2016. Further, it was ranked number 1 among premier universities Indian Institute of Science and all IITs in september 2016. It's immense pride that the Institute enjoys a global standing of number 4 among all chemical engineering programs.

ICT was once a Department of University of Mumbai. It was then known as UDCT. It's a classic example of how autonomy could be used to transfer our centres of excellence. Being the Chancellor of 20 universities in Maharashtra, my first agenda in every meeting is about autonomy of the institutions that I am going to implement. Over years ICT has produced 19 Padma awardees, 3 Padma Vibhushans, 8 Padma Bhushans, and 8 Padmashris, 2 Fellows of Royal Socoeties and over 500 first generation industrialists and owners of fortune-500 companies.

Recognizing the important work of ICT the Government of Maharashtra has taken a decision - to allot 200 acres of land to ICT to build a satellite campus in Marathwada near Aurangabad, Jalna. The number of PhDs produced by India in Professional and higher education is significantly lower compared to China. We must have a comprehensive plan to acheive substantially higher number of phds across the streams in the country. About 700 PhDs and 450 Master students of ICT are conducting cutting edge research on this small piece of land. ICT is an example of how things must be done. We are only recently tracking of incubation centres, which were part of ICT culture for over 8 decades. ICT is an institute that respects work and not the person.

The culture of quality and success that permits the campus resonates in the students who pass through these portals. Some of these institute's most famous alumni had no business background; but they have

created industrial and intellectual empires beyond anybody's imagination. Govt. of India has launched many ambitious missions. The role of University in these missions is going to be crucial since you have been working on solving problems. I am also aware of institute's efforts of cleaning Rankala lake using csr funds.

Waste Management is a huge problem for India as well as for the world. ICT's research and innovation are greatly related to it. By 2020, the average age of an Indian will be only 29 years that is 8 years younger than China and America. The world is looking towards us. They are expecting much more from you. It is a demographic dividend for us. But if we fell to guide the students of young generation, the demographic dividend will turn into demographic disaster. So we have to be very conscious. As it is a double edge weapon and both its edges are very sharp, it is necessary that we provide the best of education and skills to the youths to make them stakeholders and serve in nation's progress and development.

The College of Engineering, Pune had worked out mentorship arrangements with IIT, Mumbai and it helped in bringing the transformation of the college of engineering.

With the current size of approx 108 dollars the indian chemical industry is 3% of the global chemical industry. It could grow at 11% to reach the size of 224 billion dollars by 2070. Greater investments in manufacturing and chemical section are absolutely essential. I am sure about growth of the Indian chemical industry. Let's all ensure that ICT remains the great institute. Let me once again congratulate all the graduating students success in their future.

Thank you very much.

Jai Hind, Jai Maharashtra.

"Walk the way from the conquest of knowledge to the control of our own destiny."

- Prof. Jean Marie Lehn

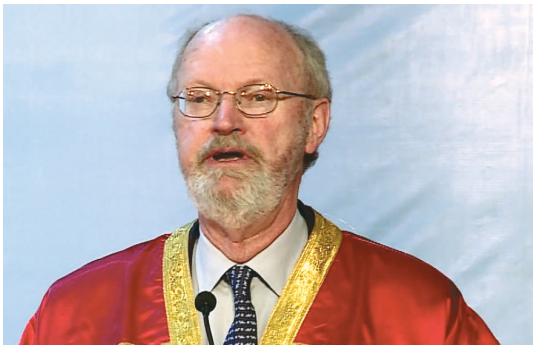
Noble Laureate, Professor at Collège de France in Paris

I wish to thank very warmly the Academic Council of the Institute of Chemical Technology for conferring on me a Doctorate of Science. I would like to salute here the high level of teaching and activities in chemical sciences. Institution also recognizes the role at the vitality of science - chemistry. Indeed chemistry plays a central role both in natural sciences and in knowledge. Without chemistry, many acheivements we consider as very basic would not be recognized. It does not advertize itself but it has realized spectacular progress. It contributes to meet your needs and food and medication and clothing and shelter in energy and raw material. It supplies material for Physics. It makes models and substrates for biology and pharmacology. It develops processes for science and technology. Chemistry is a science of matter and energy transformation. It is a science of transfers, a communication, a relay between the simple and the complex, between the laws of Physics and those of life, between the basic and the applied. In the molecule and the materail chemistry expresses its creativity. Chemical synthesis can produce new molecules and new materials with noble properties. Chemistry has been evolving from years. From simple molecules to molecular populations, from small molecular structures to large molecular architectures, from molecular properties to supramolecular functions. Thus one witnesses the emergence of chemistry from systems and functions.

Beyond the molecule lies supramolecular chemistry - our field of research. It strives for increased control of the structures and functions of molecular assemblies of large entities and materials. It also emphasizes abiotic non-nature species. Like the artist, the chemist engraves into matter the products of his or her imagination. Chemistry is not only to discover but to invent and to create. The book of chemistry is not to be just read, it must be written. The score of chemistry is not to be just played, it must be composed. Thus chemistry is a science as well as an art. Chemistry is called upon more and more often to face a number of new and increasingly important socioeconomic imperatives. We have 2 fold challenge - intellectual and technical. To meet it becomes even more fascinating. One must have the courage.

Science education in our schools and colleges must be a major priority to train the researchers and discoveres tomorrow, to develop scientific spirit and attitude. It is my strong opinion that the scientist has first of all general responsibility to prove. Many of you must have heard about Leonardo da Vinchi. When he wrote, where nature finishes to produce own species, man begins using natural things. By this, I mean elements of the universe. Development of science is an irreversible process. We must walk the way from the conquest of knowledge to the control of our own destiny.

Thank you.



"As new degree holders you are entering a new field of chemistry at a very exciting time."

- Robbert H Grubbs
Noble Laureate, Victor and Elizabeth Atkins Professor of Chemistry, California Institute of Technology

Good Afternoon. Hon. Governor Mr. Vidyasagar Rao, Hon. Guest Prof. Sharma, Chancellor Mashelkar, Vice Chancellor. ICT Mumbai is an institution that has raised itself through really hardwork and come a very long way in a short span of time and reached the highest levels. Over the past several years, I have the opportunity to learn the progress of Indian chemistry through my interaction with Reliance Industries. It appears as well India is going through a big transition and growth in the development of chemistry and chemical engineering. I know it is in great hands and I was very excited to see that the majority of world winners were women. It is really great. As academic scientists, we are entering a new world where the opportunity to be involved in translation of fundamental research and commercial products is not only possible but it's really encouraged. This close interaction between academia and commercial science and technology is very rewarding. Now whereas with all revolutions, there are many consequences those require very serious considerations and changes are to be maintained. Freedom, academic freedom, all the other things important in their academia are flooding with interface of commercial technology and its financial and legal aspects. For those who are not going to go into academia, very exciting jobs are opening into startups and lots of new enterprises may provide many many job opportunities. There is no change that is significantly changed. Now, I do my research and I am sure yours. For you being young enough, you may not recognize it. But it is an immediate access to knowledge. This is now possible in the new fields and explore new projects at the interface of many many fields due to ease of obtaining information and ability to explore the new areas. Now it is your age. You had to go to library and spend hours going through books. Now you sit at your desk and explore almost anything you want. So this possibility allows you to work in wide range of fields from basic science reactions to design and synthesise the material for medical devices. Also for you, many serious problems of today in biochemistry, pollution as chemistry, global warming, energy production, really important area is energy storage. These are all chemistry and your generation has to solve these problems. If you do not, we are in serious trouble. As new degree holders you are entering a new field of chemistry at a very exciting time. Many other limitations have been removed. The ability to obtain knowledge, to explore the ability to go into new fields... So it is upto you and your creativity, hard work to be able to push this field of chemistry and chemical engineering to new heights.

Thank you. ■■

EMERITUS PROFESSOR OF EMINENCE, INSTITUTE OF CHEMICAL

PROFESSOR M. M. SHARMA

B. Chem. Eng., M.Sc. (Tech) (Bombay), Ph. D. (Cambridge), D.Sc. (I.I.T., Bombay) (I.I.T., Delhi) (B.H.U.) (Calcutta) (Kanpur) (Bundelkhand) (Lucknow) (h.c.), D. Eng. (Roorkee) (h.c.), LL.D. (Mumbai) (h.c.),FREng, FRS, FNA, FASc, FNASc, FTWAS, C Chem, FRIC (U.K.), C. Eng., FIChE (U.K.), FIIChE, FICS, FBRS

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profmmsharma@gmail.com

Institute of Chemical Technology, Mumbai (Deemed University) (2003-)

Scientific Advisory Council to the Prime Minister (2006-2009; 2009-)

Chairman, Board of Governors, IIT, Madras (June, 2011-May, 2014)

Member, Advisory Board, IIT, Bombay (2003-)

Director, Central Board of Directors, Reserve Bank of India (2006-)

Director,Board of Directors, AERAS Global TB Vaccine Foundation,MD.,US(2005-2008)(Non Profit Foundation).

[Former Professor of Chemical Engineering (1964-97) and Director (1989-97), Institute of Chemical Technology (Autonomous), Now Institute of Chemical Technology (ICT)-A Deemed University, Matunga, Mumbai- 400 019]

Adjunct Professor of Chemical Engineering,Monash University,Australia(1995-2002,Four weeks in a year).

Chairman,Empowered Committee for rejuvenation of Universities,UGC/MHRD,Government of India,(2006-)

Visiting Professor,Department of Chemical Engineering,University of Delaware,US,Spring Semester 1982,(Also consultant of DuPont, Wilmington, during a part of this period).

Consultant of Dow Chemicals and Dow Corning, 2000-2003, Midland, Michigan.

Three Festschrift (special issue) in my honour, Two in Chemical Engineering Science (Pergamon and Elsevier) (1997, 2007) and Industrial Engineering Chemistry Research (2007) (American Chemical Society)

AWARDS / HONOURS:

S. S. Bhatnagar Prize in Engineering Sciences (1973)
Fellow, Indian National Science Academy (INSA) (1976), (VP: 1987-88; President: 1989-90); Vishwakarma Medal (1985); Meghnad Saha Medal (1994); Sir J. C. Bose Memorial Lecture (1994); Medal for Promotion and Service to Science (2008)

Fellow, The Royal Society, London (1990); Leverhulme Medal (1996)(First engineer from India to be elected in the 20th Century).

International Fellow, The Royal Academy of Engineering

(2005)

Foreign Associate, U.S. National Academy of Engineering (2006)

PADMA BHUSHAN (1987); PADMA VIBHUSHAN (2001), Second highest Civilian Honour by President of India

Moulton Medal of Institution of Chemical Engineers, UK (1971, 1977)

SIES Sri Chandrasekarendra Saraswati National Eminence Award, Science & Technology (2008)

Fellow, Indian Academy of Sciences (1974)

FICCI Award in Science and Technology, Engineering and Technology (1981)

Best Teacher Award, Government of Maharashtra (1984); Om Prakash Bhasin Award, Engineering (1985)

Danckwerts Memorial Lecture, Chemical Engineering Science/ Institute of Chemical Engineers, U. K. (1987)

Honorary Fellow, National Academy of Sciences (1988); Prof. N. R. Dhar Memorial Lecture Award (1999)

P.C. Ray Lecture (1998); Hon. Member (1997); Honoured as an Individual Technologist 1990, Indian Chemical Manufacturers Association (now Indian Chemical Council),

Shreve Distinguished Visiting Professor, Purdue University, USA (1989)

Jawaharlal Nehru Lecture, (1989); P.C. Ray Memorial Award (1995); Platinum Jubilee lecture, Chemistry (1995); Shatabdi Puraskar, Engineering and Technology (1999); Millennium Award (2003): Indian Science Congress Association

Fellow, Third World Academy of Sciences (1990); TWAS medal Lecture in Engineering Sciences and Technologies (1997)

H.K. Firodia Award for Excellence in Science and Technology (1999)

G.M. Modi Science Award, Modi Foundation (1991)

Life Time Contribution Award in Engineering, India National Academy of Engineering (2001)

Life Time Achievements Award, Dr. B.P. Godrej-I.I.Ch.E. (2002); Dhirubhai Ambani Oration; I.I.Ch.E. (2004): Diamond Jubilee Award (2007)

Life Time Achievement Gold Medal, Chemical Research Society of India (2003)

Life Time Achievement Award, Indian Chemical Society (2004); Mid Day (2005)

Honorary Member, Perfumery and Flavours Association of India (1995) and Indian Speciality Chemicals Manufacturers Association (1994); Honorary Fellow, Indian Chemical Society (1997); Honorary Fellow, Indian Plastics Institute (2003); Honorary Fellow, Indian Association for Cultivation of Sciences, Kolkatta (2005); Honorary Fellow, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore (2004)

University of Calcutta, P. C. Ray Medal (2010)

UDCT Golden Jubilee Distinguished Fellow (1984), UDCT Diamond (1994); UDCT Alumni Association Distinguished Alumnus Award (1990); Institute of Chemical Technology (Deemed Uni.) Platinum Award (2009)

Rajasthan Science Congress Award (2016)

Editor, Chemical Engineering Science, UK (1975-1986); Associate Editor, Chemical Engineering Research and Design, UK (1974-1986); Member, International Advisory Board, Canadian J. of Chemical Engineering (1989-1993); Member, International Advisory Board, Reactive and Functional Polymers (1995- 2006), Editorial Board, Separation and Purification Technology (1997-1999); Editorial Board, Green Chemistry (1999-2000), Member, Editorial Board, Clean Technologies and Environmental Policy (2002-2004)

Published 250 research papers in Chemical Engineering Science; Industrial and Engineering Chemistry Research; Chemical Engineering Research and Design; Canadian Journal of Chemical Engineering; Reactive and Functional Polymers, etc.

Supervised 71 Doctoral Thesis and 35 M. Chem. Eng. / M. Sc. (Tech.); Thesis Active Consultant to Industry since 1964

Book Published:

"Heterogeneous Reactions: Analysis, Examples and Reactor Design", Volumes I and II, Wiley-Interscience, USA, 1984 (with L. K. Doraiswamy)

Fine Chemicals: Technology and Engineering, Elsevier, The Netherlands, Dec. 2001 (with J. A. Moulijn, A. Cybuluski and R. A. Sheldon)

Also contributed several chapters in renowned books

(April, 2017).