# Seminar in Honour of Padma Vibhushan Prof M.M.Sharma at ICT

MMS Academic Tree: About 1000 research students in 5 generations – Broadening the base of Chemical Engineering

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"GururBrahma GururVishnu GururDevo Maheshwaraha Guru Saakshaat ParaBrahma Tasmai

Sri Gurave N a m a h a ". Illustrious MMS research tree contributions were highlighted in a historic seminar on 5th January 2018 at K.Venkataraman Auditorium. 150 people comprising well-wishers, colleagues, friends and students (second and third generations as well) attended 21 lectures delivered (inclusive of 3 hangout presentations) in brief with content that were streamlined live and through online YouTube for the benefit of viewers. Excerpts: *Images* - Courtesy Chemical Weekly (Images of dais and Prof M.M.Sharma).

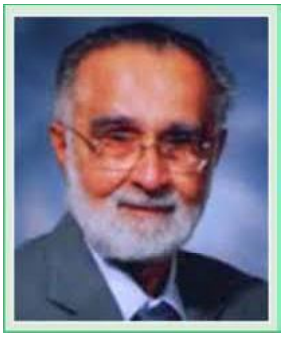
**Inaugural Session**: Prof J.B.Joshi, supported by Prof

A.B.Pandit, Manish, Sashank et al convened the function. Welcoming the audience, he said that five generations of MMS Research Tree consisted of 71 PhDs (during 1967-1997) who guided 458, in turn 396, and in turn 50 totalling to about 975, which is a world record in chemical engineering against four generations of 700 students of George Stephanopoulos at MIT. Prof G.D.Yadav added that those who did Master's degrees with MMS went elsewhere and did their PhDs and that number is more than 100. Bringing 5 generations together was the idea of MMS friends and also sponsored the seminar. The following persons spoke about their association with MMS.

**Prof A.P.Kudchadkar** and **Mr.Suhas Mokashi** began their talks from their student days in B.Chem Engg class of 20 in 1954. One had to listen fully to him before raising a question. Happy and proud to share views physically and intellectually with MMS, his characteristics like listening to everyone unless he has something different and novel to say besides his interests not limited to academic, professional or scientific areas, they wished him all the best, a fit life and continue his love for the line that he had chosen.

. **Mr.J.R.Shah** recalled his association with MMS

right from their days hostel days. He, along with K.V.Mariawala, initiated the formation of UDCT Alumni Association with support and guidance from MMS. The UAA has become a vibrant association over the years. During the strolls after dinner, he enjoyed the talks on various topics like politics, film music, share market etc besides technology. Honest, sincere, outspoken and a kind-hearted person, he helped in several ways trade associations and professional bodies connected with chemical and allied industry and earned respect of the chemical fraternity. His contributions to the industry are not only well recognised but will be remembered for long time. He is the most decorated chemical engineer having received highest number of awards nationally and internationally and recognitions including Padma Vibhushan, which is a great achievement. His deep insight in technology coupled with commercial sense



is rarely found in an academic person. A caring husband, he attended 600 dialysis procedures for his wife Sudha's severe kidney problem. He is a man of conviction and confidence which was evident when he was suffering from soft tissues syndromes ailment and preferred ayurvedic treatment to steroid allopathic treatment. He

wished his lifelong friend MMS long and purposeful life and continue to guide chemical industry for long time to come.

· **Mr.K.V.Mariwala**, a contemporary, said that apart from academics, MMs changed culture of the institution in a number of ways viz. number of publications, secondly influenced faculty members to become consultants to the industry in resolving practical problems, thirdly humanitarian approach to student, faculty and non-teaching staff required help and he would go out of his way to ensure that help.

· **Dr.P.Mulchandani**, a batch-mate (stood first in all 4 years of study and gold medallist) who attended MMS wedding and continued his association for several years was and went into the field of electronics. MMS was well ahead of the others in the class and knew his subject far more than the then professor who used to be confused and go back to verify his subject. He wished him good health and joy.

·**Prof (Mrs) Padma Devarajan**, President gave a brief account of UAA since its inception in 1989 which now has 5000 members.

· **Dr.S.Sivaram**, IISER said he met MMS when he was 30 years old after joining a petrochemical company to learn about it. He was touched with MMS gesture of making tea for him and his lecture on C force. He used to visit IPCL and has enormous insights into petrochemicals and various streams. He got to know him more intimately at NCL in 1989 and discuss more about research. He is a man of great accomplishments and it was a sort of fatherly relationship at every critical juncture of life seeking his for guidance. Ask him for advice with choices. MMS suggested he should become a member of UAA though he did not study there. It was learning, and self-revelation and he couldn't have learnt entire hydrocarbon industry by going to any school, selection of technology and discussed on polyethylene, gas phase reactors, fluidised bed reactors. MMS has been a great friend and teacher and we will continue to learn from him.

His erudition and wisdom, read and remember things like him. He is an amazing personality with such gift of knowledge, interest and understand the world.

· **Prof Shantanu Bhattacharya,** Director, Indian Association for Cultivation of Science regarded MMS as legend of legends and spoke about his contributions in Phase Transfer Catalysis when he was a graduate student in USA and his incisive questions on Micellar catalysis provided him ideas for research. Further, he learnt about streamlining tenure of PhD degree in IISc besides creating corpus for doing research which has applications and such values were inculcated with mentoring of MMS in Indian Association for the Cultivation of Science, Kolkatta. His commitment to the society is unparalleled.

**Dr.R.A.Mashelkar**, Chief Guest said it was unique event to celebrate the life and work of unique individual MMS, his Guru, friend, philosopher and guide. He reiterated some points spoken on the celebration of MMS 80th birthday on 9th June 2017. He enrolled as his PhD student in 1966 and finished in 1969 and said those were the best years of learning.

· Frugal innovation: MMS did research with nothing. His was not the power of budget but of ideas.

· High ethics: The annexe to his CV has a list of papers published by his students as independent authors.

· Considered his contribution as a teacher/ professor had value and hence he did not accept offers of government posts such as DG-CSIR, Secretary DST, Member Planning Commission etc.

Journey from slide rule to computers empowering the young ones with tools and technology; e-library etc. The world has changed, and he wondered under what conditions he did research with Chemical Abstracts reference. They have been lucky since they have MMS, a unique

**Session 1: Chairmen - Prof J.B.Joshi and Prof B.N.Thorat**

| Speaker / Organisation | Topic |
|---|---|
| Prof P.A.Ramachandran, Washington University | My new book on Mass Transfer Processes |
| Dr.Bhavani Janakiraman, Schlumberger | Micellar catalysis to oil wells (*on Skype*) |
| Dr.V.A.Juvekar, IITB | A view on thermodynamics on electrolytes |
| Dr.V.G.Gaikar, Dr.Baba Saheb Ambedkar Uty | Genesis of novel separation techniques |
| Prof Basab Chaudhuri, West Bengal State Uty | MMS: Master of Multi Skills |
| Prof S.S.Bhagwat, ICT | Application of interfacial science & engineering and Energy engineering |
| Prof Sanjay Mahajani, IITB | Process intensification through multifunctional reactors |
| Dr.M.G.Kulkarni, CSIR-URDIP | Reminiscences of a Researcher |
| Prof A.M.Lali, DBT-ICT | Renewable carbon engineering: Confluence of biological and chemical sciences |
| Prof K.Niranjan, University of Reading | The profoundness of Prof Sharma's Soundbites |

**Session 2: Chairmen – Prof G.D.Yadav and Prof A.B.Pandit**

| Speaker / Organisation | Topic |
|---|---|
| Prof Dhanajay Rane, Alchem Synthon Pvt Limited | Design, Development of non-infringing and practical synthesis of Teflubenzufuron |
| Dr.Shini Varghese. Duke University | Polymers in medicine: From implants to organ surrogates |
| Prof Jogesh Joshi, IITK | Modelling yield stress fluids: going beyond Bingham Model |
| Dr.Kinshuk Dasgupta, BARC | Indigenous development of materials of strategic importance |
| Dr.Pramod Khumbhar, Praj Industries Limited | Concept to Commercialization: Carrying forward the MMS way |
| Prof Vivek Ranade, Queen's University | Compute, Innovate and Develop: Reactors, Products and Processes (*on Skype*) |
| Dr.Haresh Maniyar, Queen's University | Catalysis by Design: Investigating catalyst structure-activity relationship at molecular level (*on Skype*) |
| Dr.Parag Gogate, ICT | Process intensification of chemical processing intensification using cavitation reactors |
| Dr.Meena Singh, IITB | Molecular dynamics in separation processes |
| Dr.Nillesh Mali, CSIR-NCL | Intensifying distillation with divided wall columns: Status and challenges |
| Dr.Advait Chhatre, IITB | Mysteries of anisotropy in Nano materials |

individual in every possible way. 20 years down the line, we should celebrate his 100 years and 5 generations begetting more than 6 generations.

All were invited to the celebration of 75th birthday of Dr.R.A.Mashelkar on 29th January at Pidilite Pavilion in ICT.

Summing up: **Prof G.D.Yadav** summarized the day's proceedings:

· Prof P.A.Ramachandran: writing a book on mass transfer processes in 30 chapters. 1969 paper in Chemical Engineering Science brought out nano, effect of small particles in difficult thickness.

· Dr.Bhavani Janakiraman spoke about micellar catalysis and oil wells and her work on application was remarkable.

· Prof V. A. Juvekar views on thermodynamics of electrolytes, brief account of new jerry pot electrostatic interaction for single and mixture.

· Prof V.G.Gaikar gave genesis of novel separation processes, reactive separation, dissociation extraction, understanding the role of solvents.

· Prof Basab Chaudhuri gave anecdotes of MMS; managing life in holistic fashion.

· Prof S.S.Bhagwat spoke on applications of interfacial science and engineering and energy engineering, micro emulsions. Application of heat rays refrigeration in Gokul Dairy, Kolhapur.

· Prof Sanjay Mahajani presented process intensification through multifunctional reactors. He talked about multi functionality, reactive distillation, esterification and acetalization.

· Dr.M.G.Kulkarni shared his reminiscences besides speaking on Beta cyclodextrine encapsulation, drug solubility, drug delivery. Besides application of good science.

· Prof A.M.Lali talked about renewable carbon engineering and macro innovation. 4th generation of carbons which could be used and collaboration with Harvard University is under way. Waste utilization to value - agricultural waste, municipal solid waste.

· Prof K.Niranjan said that chemical engineering is a highly science-based discipline and Chemical Engineering Science Journal is reflection of that. MMS is a trend setter who knew when to move on. His key messages are Never barter teaching and research for dealership roles where you cannot make a difference; Never change irrelevant measures for esteemed rich undermining teaching and research.

· Dr.Dhananjay Rane, with pharmaceutical background in the industry talked about design, development of non-infringing and practical synthesis of Teflubenzuron.

· Dr.Shyni Varghese from polymer engineering became trend set engineer, biophysicist of business who quoted humans are more supported by mice than 9/11 phone call in USA.

· Dr. Yogesh Joshi presented modelling of yield stress fluids and theory and experimental proof with examples which we encounter in day to day life and how research can take to another level on different issues.

· Dr.Pramod Kumbhar from concept to commercialization in industry with different examples and regretted Isophorone to dimethyl sulfoxide was a missed opportunity.

· Prof Vivek Ranade: Compute, innovate develop: reactors, products and processes without magic (Vivera) and gave an account of his research in ICT, NCL and abroad and work on computational fluid dynamics.

· Dr.Haresh Manyar: Selectivity, forces, intensification using catalysis with example of hydrogenation how selectivity can be changed due to absorption and density function in hydrogenation reaction.

· Dr.Kinshuk Dasgupta, a metallurgist who became chemical engineer and went on to produce CNTs, indigenous development of materials of strategic importance, rare magnets and how science could be used to develop something of strategic importance.

· Dr.Parag Gogate: Cavitation reactors, acoustic and hydrodynamic cavitation for wastewater treatment, ozonix reactor, chemical synthesis, nano materials etc.

· Dr. Meena Singh: Molecular dynamics in separation processes and acid driven aggregates.

· Dr.Nilesh Mali: on intensifying distillation using divided wall columns and challenges faced in different areas.

· Dr.Advait Chhatre gave a science based lecture on mysteries of anisotropy in nano materials.

**MMS profile**: Simple, down to earth, with childlike curiosity, complicity and integrity had trained several individuals, helped them in getting jobs and life partners and generations talk about him passionately. He was inducted into research by late Prof N.R.Kamath. Late Dr.G.P.Kane recommended him to Cambridge and Prof Peter V Danckwerts catapulted him into different orbit. Ashok Nanda was his first PhD student struggling hard for 9 months nothing tangible came as he didn't get any results and got the breakthrough in a beaker on a Sunday afternoon which was the most memorable event of his life. That piece of work catapulted them into international field of chemical engineering science. Many of his collaborators published papers in solo name when hardly anybody from any institute in India could publish and gave him sight. He started his work with mass transfer with chemical reaction and the banian tree has gone to many different areas like materials, engineering, polymers and also did research with students older than him, he and his legacy changed the face of ICT.

**ICT growth update**: J.B.Joshi worked hard for converting UDCT and UICT into deemed university status followed by GDY for elite status (Centre of Excellence for ICT deemed-to-be-University at par with IIT, IISc etc) given by government of Maharashtra. National Assessment and Accreditation Council (NAAC) with Cumulative Grade Point Average (CGPA) of 3.77 to get an A++ They are going to create 29 different centers, campus in Bhubaneswar and support of 400 crores. MOU with IIT Kharagpur. Super structure is being built with a cost of 130 crores. Besides campuses, best of professors and researchers, ICT dream is becoming Institute of Eminence in 2018 and paid 80G of 1 crore to government of India for competition (10 will be chosen out of 100 applied).

**Response by Professor M.M.Sharma**: He expressed gratitude to Kishore Mariwala who triggered

this event and his classmates could organize it

together. It was a memorable and enjoyable day. He referred to his start in June 1954 as a young lad of 17 hailing from Rajasthan. Little did he imagine that he would be spending his life at ICT besides his daughter and son who had also studied here. He kept getting awards regularly from 1973 onwards and crowning glory came in 1990 where he reached pinnacle of becoming one of the three FRS, breaking the situation that no engineer ever got it. R.A.Mashelkar got the second FRS from ICT besides becoming an icon and the other was Roddam Narasimha.

· Teachers bask in the glory of their former students and one could see its ample demonstration and erudite presentations of subjects that shows how versatile chemical engineering is e.g. biomedical, polymeric based materials whether it is heart-valve, knee joint which go into body. He was happy to see so many collaborators and in turn their collaborators doing exceptional performance and achievement. This measure cannot be expressed in words. Following his Bhatnagar prize, JBJ and Vivek Ranade got such prize. Similarly, Fellow of INSA, JBJ, VR and A.B.Pandit followed suit. Getting encomiums showered on your collaborators is an unusual experience. If you aspire for an award and don't get, you feel frustrated. Padma Vibhushan was one such he never aspired for and received in 2001.

· The event marvelously summarized by Prof G.D.Yadav and ICT will go places. He believed should now move into a central institution, recognized by the Central Government. Non-receipt of salary money poses an extraordinary problem for an administrator when he should he should be looking into more of development of subjects.

· Considering 8 students each in PPV and Plastics and 18 in pharmacy was not viable, they worked hard to boost to 16 and 30 respectively and with proper funding from AICT. Performing institutes should be encouraged with financial support to add to their strength.

· Research teachers are able to analyse the problem and they started with G.P.Kane's Fund. You should not be measured by whatever contributions you have made but by subsequent contributions made by your collaborators. People have made use of their background in completely different fields. He did not wish to pursue any of the ideas recorded in his thesis in Cambridge and started on completely different path.

· Teaching is of paramount interest to trigger interest in the students. In research, teaching is the priority and he delivered the same number of lectures even on his last day as director.

· ICT is an extraordinary institution compact, performing and utilitarian part of research invigorates the rigors of fundamental research. Institution is identified as almost impossible to get admission and as the same place in Matunga wherein Mukesh Ambani studied. Tradition has been created by way of merit-based admissions, a social revolution, and all prospered professionally and financially. We have students from all over India and the hostel is a great place for all regions.

· Motto "Teachers should make themselves dispensable rather than indispensable." He started with a mission that he must have collaborators who will do better than him and this event borne testimony to that effect and paid tributes to the participants.

Proposing Vote of Thanks, **Prof A.B.Pandit** said they obey MMS due to love and respect and that is because of his action and the way he lived his life. He never demanded respect which was earned by him by selfless activities which he had performed and given benefit to one and all through this family tree and the

name for this seminar was Guru Satra – continuation of tradition of teaching as happening in the society. He thanked all those who had participated in this function in his honour and making it a great success.

Nikhil, a student of Viswanath (JBJ student) in 5$^{th}$ generation had made an excellent sketch of MMS which was presented through Dr.Meena Singh o the occasion.