

The conference laid particular emphasis on developments of multi-reference-based electronic structure formulations and dynamics with special emphasis on non-adiabatic quantum effects. It was heartening to note that the Indian contributions in the above areas were well recognized in the conference. The pioneering contributions of multi-reference developments, in the context of coupled cluster theory, were highlighted by several speakers. In fact, much of the work

in this area has been generated from the ideas that originated in India. The contributions from India on the recent developments of complex absorbing potential-based CC theory as well as relativistic equation of motion CC theories were also acknowledged by talks in these areas. The work of Indian groups on dynamics, in particular, non-adiabatic quantum dynamics, also attracted attention. The conference also noted strengths of India in the area of density functional

theory and it was clear that some good applications of the theory have emerged from our country.

This conference brought out the strength of theoretical chemistry, in particular quantum chemistry, in India.

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MEETING REPORT

National Conference on Technology Vision*

At the National Conference on Technology Vision 2035, the visions for four sectoral areas – health care, Information and Communication Technologies (ICT), education, and safe and speedy mobility were discussed and reviewed. It was attended by educators, health professionals and students from schools and colleges in Hyderabad.

The inaugural session was presided over by Anil Kakodkar (TIFAC, National Apex Committee and Technology Vision 2035). Y. S. Chowdary (Minister of State for Science and Technology & Earth Sciences, Government of India) released the Medical Sciences and Health Care Technology roadmap document. W. Selvamurthy (Technology Vision 2035 Medical Sciences & Health Care sector) and Gautam Goswami (Technology Vision 2035) also participated in the inaugural session. The session emphasized on the significance of the vision by characterizing technology as the bedrock on which comprehensive national power could be built to empower the citizens, societies, nations and strategic autonomy of the nation. It was observed that R&D investment in India needs to be more productive and industry-driven. An integrated approach should be developed

inculcating our traditional medicine, offering the motto ‘From a Document to a Movement’, hoping that young minds would take the vision in the document forward. Suggestions were given to TIFAC to take a closer look at neglected diseases, which are not lucrative for pharmaceutical firms develop treatments for them. It was desired to implement a 5-year rolling plan for Technology Vision 2035 as well as a monitoring mechanism by TIFAC.

The first plenary session on the first day on universal healthcare and public hygiene was chaired by A. P. Jayaraman (Trustee, IDF) and B. Narayan Iyer (CEO, IDF) and attended by Nirupam Madaan (AIIMS, New Delhi), K. V. S. Prasad (Sanzyme) and D. T. Selvam (Defence Research & Development Establishment (DRDE), Gwalior). The discussion noted that India was ranked 143rd in the Sustainable Development Goals index. It identified the following core issues: (i) lack of vision and direction; (ii) inadequate financial resources; (iii) a skewed distribution of resources and (iv) any new model has to gain cultural acceptability, be accessible, comply with legal framework, and also be a viable business model. The discussion exhorted that a culture of cleanliness was urgent, with special attention to kitchens and hospitals to improve public hygiene. Further discussion focused on the importance of public health, threats of biological and chemical warfare, developing near-future technologies such as bacterial

identification without using body fluids, susceptibility status of pathogens without culture and multivalent vaccines for immunizing against multiple pathogens.

The second plenary session was on maternal and child health. Sangeeta Gupta (ESI Post Graduate Institute of Medical Science and Research, New Delhi), A. T. Dabke (Chhattisgarh Ayush and Health Science University, Raipur); Mahita Reddy (Government Maternity Hospital, Hyderabad) and Swathi Aarya (PG OB-GYN) led the discussions. The speakers informed the audience that: (i) most maternal deaths were still from preventable causes such as haemorrhage and sepsis; (ii) one in three malnourished children is Indian, and (iii) a low-BMI mother is prone to deliver a low-birth weight baby which is more susceptible to health problems such as hypertension, diabetes and obesity. While discussing the schemes in effect at present like the Dakshata programme for nurses and doctors, they emphasized the need to provide high-quality childbirth services at PHCs, and expressed hope in best technological practices from around the world, including mobile apps for data collection and communication (such as Umeed Say in Pakistan). Anaemia was also discussed in depth, including the causes besides just iron deficiency. Prevalence of anaemia in 65–75% people in India compared to 51% in other developing countries was found to be especially worrisome. Measures to improve the situation included ensuring food fortification with iron-rich

*A report on the National Conference on Technology Vision 2035 held on 29 and 30 September 2016. The conference was organized by the Indian Development Foundation at the Oakridge International School, Hyderabad along with TIFAC.

food, especially in women who are in the reproductive age group.

In the third plenary session on ‘Advances and innovations in biomedical technologies’, the speakers included Kasim A. Mookhtiar (Advinus Therapeutics, Pune), Jugal Kishore (Vardhman Mahavir Medical College & Safdarjung Hospital, New Delhi) and V. C. Padaki (DRDO, Bengaluru). The participants were introduced to the concepts and evolution of ideas on ‘what we treat’, in the pursuit of ‘health span’ and ‘successful ageing’, instead of the traditional ‘life-span’, and were familiarized with the highlights of our scientific advances in areas such as biologics, stem cell therapy and gene editing. The speakers also commented on the barriers faced by differently-abled persons in the society: lack of rehabilitation, physical and attitudinal barriers, and hoped for better disability management by 2035. They introduced the Society for Biomedical Technology, which provides affordable indigenous biomedical devices from defence technology spin-offs, further proposing the establishment of a Department of Biomedical Technology and an Indian Medical Devices Regulatory Authority.

The first plenary session on the second day of the conference was on ICT. Speakers like Prithvi Yadav (NMIMS, Hyderabad); Gautam Goswami; Devesh Rajadhyax (CereLabs, Mumbai), Anurag Vohra (Apollo Hospitals), Kamal Karlapalem (IIT Hyderabad) described how

the ICT vision has been developed by looking at the future segments of the Indian population, their needs, translated into roles for the stakeholders who would bring the vision to fruition. They also described visions of ICT in 2035, including multiple displays, vehicles, appliances, even textiles and jewellery, natural gesture and voice for input, and 3D holograms for display; spoke of independent software ‘agent’ modules – which can observe, know what to do, and do what they need to – in such promising situations like long queues in temples, helping the elderly, and managing traffic flow.

The second plenary session on transforming education through technologies included speakers like Pradeep Kumar Ramancharla (IIT), Sita Naik (Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow), Thomas Franco Rajendra Dev (State Bank of India Officers’ Association, Educational Trust, Chennai), B. Karunakar (NMIMS, Hyderabad), and Jyothi Reddy (Delhi School of Excellence, Hyderabad), who stressed that we need to move from mere reading and writing literacy to practical literacy and freedom of vocation, providing re-skilling and second career opportunities and ubiquitous on-line access; and that we have to work to improve accessibility to the technological innovations that would drive better education for 2035. An empirical comparison of the availability of technology in schools and

actual usage revealed the bewildering truth that even the infrastructure currently available in education is, to a large extent, unused. The session concluded by commenting on the kind of confused graduates our education system creates – who do not know their career paths or their worth – and wondered if the purpose of education was simply to provide material comfort.

In the third plenary session on safe and speedy mobility, Sudarsan Padam (CIRT, Pune) and Puppala Srinivas (Road Transport Officer, Mancheriyal, Telangana) apprised the audience on some of the promising research areas in transport safety and speedy mobility such as electronic stability control, forward crash warning system, and intelligent transportation systems. The speakers equated mobility with growth and progress, putting forth recommendations such as using driving simulators not just for testing and training, but for practice as well.

The conference concluded with Gautam Goswami providing an overview of the same and Rajendra Dev delivering the valedictory address.

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