

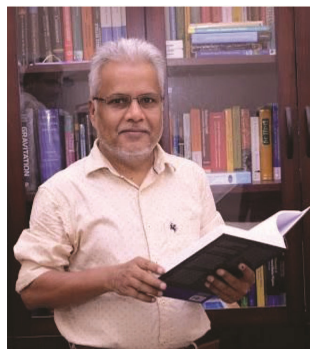
Amrendra Vijay (1967–2020)

Prof. Amrendra Vijay passed away on 10 December 2020 in his home town Ranchi. He was born on 25 March 1967 and completed his B.Sc. (in 1985) and M.Sc. (in 1988) degrees from L. N. Mithila University, Dharbanga in Bihar. From 2005 onwards until his death, he has been a Faculty in the Chemistry Department at the Indian Institute of Technology (IIT) Madras.

Subsequent to the completion of M.Sc., he joined the Department of Inorganic and Physical Chemistry, Indian Institute of Science, Bangalore for Ph.D. under the guidance of D. N. Sathyanarayana (DNS) in 1988. During his Ph.D. programme, he carried out systematic structural and spectroscopic studies of diverse compounds employing *ab initio* calculations in conjunction with normal coordinate analysis. He was one of the early researchers who employed quantum chemical calculations extensively. From his Ph.D. thesis, he published 10 papers in journals including the *Journal of Physical Chemistry*, *Chemical Physics* and *Journal of Molecular Structure*. He received the J. C. Ghosh medal for the best Ph.D. thesis in 1994.

What is remarkable is his foray into entirely new areas of research upon completion of his Ph.D. He had extensive post-doctoral experience in diverse institutions in Denmark, USA and France and he diversified into new topics in theoretical chemistry/physics. For a period of about three years from 1995, he was a post-doctoral Fellow, in the University of Copenhagen with G. D. Billing and analysed non-adiabatic scattering with the help of wave packet propagation methods. Then he spent nearly two years at the University of Texas at Austin with Robert Wyatt investigating spectral filters using Hermite polynomials. He then moved to the University of Houston to carry out research on inverse scattering theories with D. J. Kouri and carried out a critical analysis of Volterra and Fredholm integrals for computing parameters pertaining to acoustic scattering. His most important breakthrough came during his stint with Horia Metiu in the University of California at Santa Barbara. There he employed extensive computational studies pertaining to modelling of diverse reactions at surfaces, in particular for adsorption of gold on rutile surfaces. His paper with Horia Metiu in the

Journal of Chemical Physics in 2003 remains highly cited, even today. His single-author paper was published in the *Journal of Chemical Physics* in 2003 wherein he employed Chebyshev polynomials for the inversion of extremely large matrices to compute the energies of bound states.



Upon joining the Department of Chemistry at IIT, Madras, he made a new beginning to tackle challenging newer problems in theoretical physics/chemistry, not connected with his earlier research. It is difficult to enumerate all the research work that he single-handedly pursued at IIT Madras but a few of them that engaged his complete attention are as follows: (i) theory of turbulence and analytical solutions for Navier–Stokes equations; (ii) exact solutions of three-dimensional Ising models; (iii) analytical and numerical solutions of Boltzmann transport equations; (iv) Debye–Hückel theory of electrolyte solutions; (v) transport in ion channels; (vi) spin–orbit couplings in metal–insulator transitions and (vii) electromagnetic properties of metallic nanoparticles. In view of this diversity, results were hard to come by and although the number of research publications in journals appears to be ‘small’, each published paper often spanned between 20 and 30 printed pages in addition to extensive supplementary material. During his entire tenure at IIT Madras, he has not been away from the Institute even for one day. He neither took any ‘professional visits’ nor attended any conferences/symposia outside Chennai. His mathematical forte, esoteric writing, exemplary oratorical skills and link with modern experimental data are unique.

He has left several manuscripts incomplete at various stages and efforts are under way at IIT Madras to complete

them, wherever possible. The ‘void’ left by him is difficult to fill in view of his immense talent not only in research but also in teaching.

He was a teacher par excellence as the students of IIT Madras will vouch. He was an inspirational teacher and his teaching record in IIT remains unparalleled. Several of his undergraduate and graduate students upon completion of their degrees have cleared civil services examinations as well as joined Ph.D. programmes in theoretical physics/chemistry and would frequently meet him in person to express their gratitude. In contrast to others, he was a ‘complete’ person and as one student remarked recently ‘he is not only awesome in quantum mechanics but knows a lot about arts, music and philosophy. Every class he takes is unique’.

In all the departmental meetings, he was unafraid to voice his opinion, irrespective of the ‘majority decision’ and ‘hierarchical set up’. He used to publicly remark appreciatively about IIT Madras for having allowed him to pursue unhindered research in ‘high-risk’ areas, by completely reposing faith in his abilities. Although he was a fearless critique of the way science is practised in our country, he had ‘malice towards none’. The very thought of applying for ‘awards’, ‘promotions’ and ‘nominations’ never occurred to him.

Since fate has snatched him away prematurely, one can only speculate about the accomplishments he would have made, had he lived longer. As a close associate having interacted with him, almost on a daily basis for the past 15 years, I can confidently state that he had set his eyes on achieving what is perceived as ‘impossible’. In all his endeavours, he was in search of the ‘Holy Grail’ and did not waste his time in solving ‘uninteresting problems’. I consider it as a privilege to have known him and his true abilities are more than what the above account tries to convey.

ஊழிற் பெருவலி யாவள மற்றொன்று
சூழினூந் தான்முந்தறும். (Thirukkural)

(What is more powerful than Fate? If we think of a method to avoid it, it will reach us even before the thought.)

M. V. SANGARANARAYANAN

Indian Institute of Technology-Madras,
Chennai 600 036, India
e-mail: sangara@iitm.ac.in