



Professor Dr. Padmakar V. Panat: *Teacher and Scientist, extraordinary*

Professor Dr. Padmakar Vasudeo Panat, Emeritus Professor and former Head of the University Department of Physics, Pune University, passed away recently on January 20, 2009 at the relatively young age of 65. He succumbed to multiple organ failure arising out of an auto-immune disorder that he had been fighting against, during the last six months.

Teaching and carrying out research in Physics was not just Dr. Panat's occupation: he had Physics for his passion...Physics had been his obsession... Physics had been his religion. Several generations of students have been immensely benefited by attending his superb discourses in physics, which he masterfully delivered with utmost enthusiasm.

I particularly recount our first encounter some three decades ago. We had been curious about who would be teaching us our first course in Quantum Mechanics (QM) at our M. Sc. (Physics) at Poona (now, Pune-) University. Our seniors had 'admonished' us that QM had been very dreadful, enigmatic, esoteric, counterintuitive, heavily infested with mathematics and abstract concepts. During our very first lecture on QM, there came in a rather slim, nondescript person with unkempt hair and a short beard wearing a clean but ruffled, modest outfit of a khaki trouser and a white full-shirt, who walked into the Raman Auditorium. Somebody rather audaciously exclaimed whether this guy even spoke any English. But when this 'guy' started to speak, we were all stumped...not only did he speak fine English with slightly nasal drawl and a dash of American accent, but above all, he spoke *Physics*. We then realized that we had been blessed with a unique teacher who taught with concurrence of head, hand and heart. During the course we used to always get glimpses how profound his knowledge had been, and how versatile his reach encompassing *all* facets of theoretical physics was. He demystified physics; brought out the core physical concepts. His introductory lecture over any topic used to be so enticing, stimulating and a veritable treat: he gave a crystal-clear overview, interspersed with anecdotes and true stories of how scientists were led to a particular discovery or theory and such like, and yes, thankfully, *no mathematical equations!* Perspective, conceptualization would come first, he used to say, the math then simply followed suit and described them, which he did with adroitness.

Originally hailing from Jalgaon and subsequently converted into a '*Punekar*', Dr. Panat had had an extraordinary and meritorious academic career. Having obtained his master's degree from the University of Poona he had the uncommon (-even today!) opportunity of pursuing his doctoral degree (Ph.D.) from one of the best universities in the world: The University of California at Berkeley, CA, U.S.A., under the able guidance of Professor Dr. Hugh DeWitt. Subsequent to two postdoctoral positions the United States, he returned to

India and joined the Department of Physics, University of Pune, in 1975, where he had been working ever since. The source of his unfazed enthusiasm, the amazingly vast reach and range of his knowledge had been the rigorous training at the graduate school at Berkeley, where one had to mercilessly toil one's way to pass the course-work and the comprehensive examination which he had, in flying colors. We had, way back in 1978, once asked him how he could be so circumspective about all the facets of theoretical physics, to which he had very modestly answered that he had just been recounting his Berkeley lectures, given by doyens in physics which included many a Nobel Laureate.

Over the years, driven by his zest to disseminate knowledge, Dr. Panat, earned the reputation of being a teacher *par excellence*. In his teaching career, he had a vast, rich and unparalleled experience of teaching *all* core-level physics courses such as classical mechanics, electrodynamics, quantum mechanics, nuclear physics, atomic and molecular physics, statistical physics...just to name a few. Moreover, he taught a diversified set of special courses: theory of critical phenomena, advanced condensed matter theory in several of its ramifications, and quantum field theory. This list is not exhaustive but only indicative of his versatility and mastery over theoretical physics. He was endowed with an uncanny ability of tuning his lectures, right from popular, up to the hard-core expert level. He delivered his lectures with full of enthusiasm with astounding conceptual clarity, that had always been an inspiration to the students. In recognition of his unique teaching contributions he had been bestowed upon several awards for being an exemplary teacher, but his true reward had been the radiant, beaming faces of his students after his classes. While he always emphasized upon the crux, as he did intensive problem solving and pioneered the Tutorial system that has proven extremely stimulating and beneficial to the students.

With Dr. Anton Capri, he wrote a book on introductory classical electrodynamics aimed at master's level that gained a wide international critical acclaim. From time to time, he would be invited on a visiting-professor post to teach and academically interact in most reputed universities in the world, especially in the United States. Very recently he wrote two more books, on classical physics and on statistical physics that embody a wealth of information, motivating a novice and also have uncommon subtleties for the expert. His books have been prescribed by the Arizona State University as well as in the University of California university system as classic companion-texts.

Dr. Panat had been an ardent researcher in theoretical physics, with contributions chiefly in condensed matter theory, advanced statistical physics, and interaction of radiation with matter. He has, both single-handedly and collaboratively contributed to the advancement of diversified areas of research, such as charged Bose systems, nonlinear dynamics, density functional theory in coordinate and momentum spaces, Polarons, the Casimir effect, super-radiance, superconductivity, electronic structure of clusters, model Hamiltonians for strongly correlated electron systems, quantum optics with a particular reference to laser-atom interactions, and thus forth. His research has indeed been truly innovative and non-repetitive. He guided several research students for doctoral work and published numerous research articles in international journals of repute that evoked eloquent appreciation and recognition from academicians all over the world. As a mark of his scholarship, he would always be invited to deliver seminars at international workshops and symposia. For the benefit of the

scientific community in our country, Dr. Panat always endeavored to evolve a forum for a dialogue through exchange of ideas by the global ‘Diaspora’ of experts pursuing frontline research. He arranged two International conferences in 1996 and 1998 proudly hosted by the University of Pune. The 1996 CMT-20 International Workshop on *Bose-Einstein Condensation* organized by Dr. Panat at the Pune University turned out to be Dr. Eric Cornell’s [a 2001-Nobel Laureate] first international conference since his group’s path-breaking experimental demonstration of the condensation phenomenon. That marked a distinctive privilege of our university. The 1998 International Conference on *Foundations of Quantum Theory* also proved to be a treat to the intellect due to its collective scientific wrangling and brainstorming over the interpretations of quantum theory of entangled states, a crucial and queer phenomenon indispensable to quantum information processing and computing.

I had the unique privilege of being his first doctoral student. He was an unusual guide, in that, he would strongly recommend that the student first read the pioneering research papers, which he said would be like listening to fine music from its ‘original sound track’ (and not any ‘re-mix’), rather than someone else’s critique and only then diversify and study all the ramifications. He would never spoon-feed the matter, but in case of a genuine difficulty encountered, would spend hours together with undiminished enthusiasm and bring out the innate subtleties...a virtue once again traced back to his Berkeley days. We had a free hand to collaborate with anyone. I recount the numerous brainstorming discussions with Drs. Panat and Shridhar Gadre (of the department of chemistry) when we proposed a momentum (or, velocity-) space description of atoms, based on a certain density functional model. Dr. Panat had anticipated the prowess of the density functional theory formalism as an alternative exact many-body quantum theory, that eventually received due recognition by the scientific community, culminating into the 1999 Nobel Prize for its creation, that was bestowed upon Dr. Walter Kohn of Santa Barbara, California, in the United States. Dr. Panat had envisioned the importance of the theoretical superstructure two decades ago. He was a unique visionary, a friend, philosopher, guide, mentor, and a preceptor, who would guide by setting an example.

Dr. Panat instilled all his fine attributes in his son and daughter who have been pursuing their remarkably illustrious careers in the United States. He looked after his family very caringly and lovingly. When his son, Dr. Rahul Panat (a University of Illinois Ph.D. in mechanical engineering) bagged prestigious awards for his research, and was offered a coveted position in Intel, Inc., the senior Dr. Panat was mighty ecstatic and beyond himself! Thereafter, he had started looking all the more cheerful and with a slight ripening with age, very avuncular. Dr. Panat added a human touch to everything: he loathed snobbishness, formality, and was always approachable.

Dr. Panat took pride in being an ardent connoisseur of Indian Classical Music. He attended practically every concert of Indian classical music in town and also arranged a few private programs by stalwarts at his residence. There always had been a childlike curiosity in him, a virtue preserved right till the end. At the *Sawaai Gandharwa* Musical Fest, when (now, *Bharat Ratna*-) Pandit Bhimsen Joshi used to grace it with his august presence

throughout, Dr. Panat, with absolutely no hesitation or obsequy, would have the courage of offering him *Paan* or roasted peanuts. After Panditji's heavenly concluding rendition he would congratulate the Maestro up front, face-to-face, on his composition and masterful presentation of his *Bandish!*

The aforesaid is only a glimpse of the accomplishments of remarkably ambidextrous Dr. Panat and his extraordinary career as a teacher, scientist and human being. He always unswervingly adhered to ethical principles and had been an informal, amicable and a very outspoken person. His had been a particularly simple lifestyle, but he was ferociously uncompromising for topmost quality in his scientific endeavors. One seldom runs into such an outspoken personality as Dr. Panat who would call 'spade a spade' with no compunctions or qualms. This had landed him sometimes in awkward situations, but he would neither relent nor regret, never cover-up and would adhere to what he said, because he had a clear conscience...he always fought for justice, for principles, never indulged in petty politics, never coaxed the 'higher ups' for appeasement.

Dr. Panat never flaunted his own accomplishments, but no matter how renowned or how 'junior' a scientist someone be, he always encouraged him/her to deliver a seminar or a lecture series on a topic of their pursuit which he would religiously attend, and in the end the speaker would face a volley of incisive and thought-provoking questions from Dr. Panat. This also included his students, and he had no qualms or false issues about 'prestige' against attending their lectures or seminars. He despised dishonesty and a 'research through proxy' type of an attitude. In the long corridors of our department we will miss his stentorian roar of "Hey, what have you been working on lately?... Why don't you give a seminar on that topic?" ...and such like. He single-handedly had started the 'Nobel series' in which he would elucidate the theme that won the prestigious Nobel Prize in the respective year.

Bereft of him, not only his family –kith and kin-, but his extended family of colleagues and students that he endeared will miss those vehement wranglings in the cafeteria, his ever so inspiring presence and the undaunted interest he had had for physics. Personalities like him never retire until the last day of their life. Even on his death-bed he spoke of various projects he wanted to undertake; the topics he would like to study and the music he would like to listen to. But that was not to happen...the devastatingly brutal blow of destiny was struck on that ill-fated morning of January 20.

There are several fond and memories about him that will be cherished as long as we live. If his Soul is receptive of what I am putting here, we, his students, would like to make a tryst with ourselves: "Sir, you may not be bodily with us any longer, we will miss your gratifying physical presence, but you will always remain with us in spirit...you will never slip into oblivion. We will emulate your example...your earnest pursuit of academics carried out chastely with honesty, applying our head, hand and heart." Only that will be a true homage and a fitting tribute to him.

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