

## Remembering Arvind

*From Friends, Colleagues, and Students of Arvind*



It is with a heavy heart that we write to share the news that on June 17th 2024, we lost our beloved colleague, mentor, and friend Arvind. Arvind passed away at 77 years old, after an illness he was being treated for took a sudden turn for the worse.

Arvind was a pioneer in computer architecture and digital systems. Over his five decades at MIT, he contributed countless foundational techniques, spanning dataflow architectures, parallel processors and programming languages, hardware description languages, and synthesis and verification of digital systems. Arvind made lasting contributions to hardware and architectural abstractions for both correctness and efficiency.

Arvind received a B.Sc. in Electrical Engineering from IIT Kanpur in 1969, followed by a M.Sc. and Ph.D. in Computer Science from the University of Minnesota in 1972 and 1973, respectively. He taught at UC Irvine from 1974-78 before moving to MIT in 1978. He received several awards during his illustrious career, including distinguished alumni awards from both his alma maters. Arvind became an IEEE Fellow in 1994 and an ACM Fellow in 2006. He was also elected to the National Academy of Engineering in 2008.

Arvind's presence in the computer architecture community will continue to be felt via his legacy of deep technical contributions and his academic lineage. Arvind advised over 35 Ph.D. students during his career, who have all gone on to become leaders in academia and industry.

Arvind was a deep thinker with a great sense of abstraction. He would continuously seek to simplify complex systems proposed and implemented by his students, by relentlessly pushing them to explain the fundamentals to him at abstraction levels that hid the implementation complexity. Those of us who had the pleasure of writing a paper with Arvind know his single-minded devotion to really understand each result at its most fundamental level. Even after all the research was done and maybe after we all, meaning everyone except Arvind, thought the paper was done, Arvind would often force us all to understand it at yet a deeper level. Then, no matter the lateness of the hour, we had to explain this new understanding to the world to Arvind's satisfaction. Two of his students recall working hard on a paper over many weeks but could not get it polished to Arvind's exacting standards before the deadline. The students thought it was good enough to potentially be accepted and certainly not an embarrassment. Arvind told them "you can submit it, but take my name off of it." This was his way of teaching students how to simplify complexity through abstraction. Invariably, these efforts would result in advancements that would have been difficult to tease out from the original description. Arvind would say that once a researcher gets used to this abstract thinking style, there is no way for them to change back. Arvind was like this in all intellectual and interpersonal pursuits. Certainly, his students were converted for life.

Arvind sincerely believed that knowledge was its own reward. One time in a discussion about the content of annual reviews, he commented that when he thinks back over the year if he can identify one (or maybe two) deep insights he gained over the year, then he considered it a successful year. That seems to be the epitome of self-actualization.

Arvind would say that a PhD advisor shouldn't believe that they had anything to do with the brilliance of the students they graduate when the students were already bright when they came to the advisor! His sage advice to his students who went on to become professors was "The best thing an advisor can do is to keep pointing a student in the right direction and hang on for the good ride."

Arvind treated his research group as part of the family. Arvind's wife Gita would often take their sons to visit him at the office when they were young, as much to see the grad students as Arvind. Frequently, discussions at MIT would last into late evenings, and Arvind would call on Gita to bring food to him and his students, so they could continue the discussion. And Gita would deliver, without fail!

Arvind was deeply passionate about teaching and played a significant role in developing course content for computer architecture and hardware design courses both at MIT and several other universities via sabbaticals and collaborations. He would prepare extensively, sometimes for days, going over each slide in excruciating detail, for a lecture that he had given many times before. His love for and dedication to teaching never took a back seat even when he was ailing

– he watched and critiqued the final project presentations and actively participated in final grading for the course he was teaching in Spring 2024 from a hospital bed.

On a personal level, Arvind was a wonderful person: truly kind and giving, and always smiling. He was an inspiring mentor and a true friend to countless students, colleagues, and researchers around the world. Arvind and Gita opened their Arlington home to anyone and everyone they met. Their annual Diwali parties over 3 decades were highlights for those lucky enough to attend; attendees would invariably be amazed by the myriad friends from different walks of life that Arvind and Gita had collected. They were true pillars of both the MIT and Arlington communities — and in some circles, Arvind was simply known as Gita’s husband!

For all of us, Arvind was a constant source of positive energy and wisdom. One of his favorite quotes was, “*Pessimists are more often right, optimists live happier lives!*.” That was certainly true of Arvind — his zest for life was infectious and he invariably lifted people’s spirits. May you rest in peace, dear Arvind. You will live forever in our hearts.