On a Blind Date: Prof. Usha Kumar
Tributes: Prof. Arakere Vasudev, Prof. R. Sankar
Life in the GH (Part 2)
The Tandetron Accelerator at IITK
Antaragni '23: A Glimpse of Empyrean
# The Spark

## December 2023

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* Pages 1-280 refer to the Spark Issues #1 - 7, available at [https://iitk.ac.in/dora/spark/](https://iitk.ac.in/dora/spark/)

Editors: Anuradha Jagannathan, Aseem Shukla, Chilukuri K. Mohan, Shirish Joshi


Special Thanks to Professor V. Rajaraman, the Sankar and Vasudev families, and DORA Kantesh Balani for their help with this issue.

*Views and opinions expressed in The Spark are those of the Editors and Contributors and not those of the Indian Institute of Technology Kanpur, unless specified otherwise.*

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The Spark wishes its readers Greetings of the Holiday Season and Best Wishes for the New Year!

Our second issue on the ‘Women of IITK’ pays tribute to Professor Usha Kumar, one of the most charismatic faculty members to grace the IITK campus. We include a story on life in the Girls Hostel from Nivedita Dutta-Haran, now a retired IAS officer, and a conversation with Prof. Jayathi Murthy, currently President, Oregon State University.

The Spark pays tribute to two pioneering IITK Professors, who had helped establish the ChE and CSE Departments, and passed away in recent months. Professors Vasudev and Sankar will be remembered, not just for their contributions to the IITK curriculum, but also for their continued support to the institute, helping to bring it to the stature where it stands today.

The students’ community and Vox Populi magazine take us on a visit to the Particle Accelerator Lab, one of the more significant facilities on the campus. They also provide a pictorial report on Antaragni ‘ 23, the second cultural festival to be organized at IITK during the 2023 calendar year.

For most of us on the editorial team, working on the ‘Women of IITK’ issues remains an exercise in self-awakening. As young boys, the first time out of our homes, little did we recognize the gigantic strides that our women classmates took in coming to a technical school that was so male-dominated.

For this tiny minority to adjust to the ridiculously skewed gender-imbalance, to maintain their sanity in dealing with boys and their so-called practical jokes, to build relationships, and then go on to successful careers, is by far, a level of achievement that goes well beyond what the boys generally did (which was to get their degrees, get jobs, or go abroad). That these women excelled and continue to excel, without making a lot of noise, without muss or fuss, just adds to the kudos.

Hats off to all IITK women: faculty, alumnae and current students!

2200 hrs, IITK Metro Station. The long walk, after the last train home.

Picture: Shakti Chaturvedi (Research Scholar, IME)
Letters to the Editors

Please write to us directly at spark@iitk.ac.in. We love to hear back from you and will try to publish as many letters as possible.

From a Founding Member

I just received the latest issue of Spark. It has a special place in my heart as I was one of the pioneer group which started Spark with the support and encouragement of Ms. Hutchinson, the wife of Prof. Hutchinson.

I also fondly remember Prof. Erickson. He took two courses with us (3rd Batch, 1962-67) - Fluid Mechanics and Rate Processes. His lectures were always very interesting just as the papers he set were confounding! I remember he let us off from his class so that we could listen in to the commentary of the Tokyo Olympics 1964 Hockey Final which India won, beating Pakistan.

We had an excellent relationship with the Faculty. Ours was the only batch for which Prof. Dahl taught the 2nd year course on Mechanics of Solids in 1963. Later, on a subsequent visit to the campus, sometime in 1966, he autographed a copy of his book when he met with our batch for an informal chat on the lawns of Hall 1. Apart from other interactions, the Vietnam War was on-going and he had to field quite a few uncomfortable questions from some of us!

The original version of the Crandall & Dahl textbook distributed through KIAP for the IITK students. These were hard bound versions available at FX rates of $1=Rs1.60 (the market rate was about Rs 4 in those days). So students could buy a $10 textbook for Rs16, or check it out for the semester from the Library for Rs1.60. By the 1970s the hardbound versions had been replaced by the green paperback International Student Editions that the next generation of IITK grads will remember.
Prof. MM Oberoi would often invite us over for a game of bridge. He had a well stocked cellar and graciously introduced many of us to our first taste of wines. Incidentally, the first issue of the Spark was also celebrated with a glass of champagne courtesy of Ms. Hutchinson.

Another inspiring figure was Dr. Vijay Kumar Stokes who got us together to form the Association of Mechanical Engineers of which I acted as the first Secretary.

During the time we were on the Campus, the facilities were still work in progress as were the many new institutions being set up. So, we had an opportunity to join many activities just as we also went around looking at the various new buildings and wondering which one was going to be put to what use.

Many opportunities came our way. The 1st Convocation was very special anyway and more so because the Chief Guest was our legendary President Dr. Sarvepalli Radhakrishnan. So many more people, even those who didn't have an invitation, came in from Kanpur just to listen to him.

They couldn't all be accommodated at the Convocation Ground, which was an open area adjoining Western Labs with a stage at one end. So many visitors were shown to the hostel common rooms where they could watch the event on TV. Quite out of the blue, I got the opportunity to commentate for the benefit of those who were watching on TV!

I don't know what it is like today but for us life on the Campus was one long joyful celebration.

Udaya Bose, BT, ME, 1962-67
Founding Member, Spark, February 1965
Secretary, Students Gymkhana (position now referred to as President SG), 1965-66

Digging thru the Archives

I was delighted to find that the campus magazine Spark has been revived and is much more advanced and colourful than it used to be. I was associated with the magazine as a photo editor but have no records or any copies with me. It would be wonderful if you could look into the archives and procure a digital copy of one of the issues with the names of all the Editors. If I remember correctly, the Editor during my time was Rakesh Aneja.

Kiron Pasricha, BT, ME, 1968-73

Thanks Kiron, for your note. Unfortunately, we have very few issues in our historical archives, no more than half a dozen from the 1960s and 70s. We continue to look for the rest on the campus and reach out to alumni who might have copies.

But we did find some pictures of your room in Hall 1 with prints used for an Air India calendar, that we believe were clicked by you! These prints continued to adorn the walls of the SAC Darkroom well into the 1980s. We hope you can locate more pictures from your IITK days in the archives of the Pasricha Studios, Delhi, and share them with us!
A Room in Hall 1, 1971-73! Very tastefully decorated with prints from the Air India calendar of that time. Kiron Pasricha embarked on a career as a professional photographer after graduating from IITK and his prints continue to adorn the pages and websites of many magazines. Note the transistor radio, a most valuable asset for listening to cricket commentaries! These pictures were shared by Shriram Bagrodia (BT, ChE, 1968-73)

Great Stories and Cameos!

This is Campus/ Alumni Journalism at its best. A collector's item, the line up of features, backed by editorial finesse, goes beyond the nostalgia of campus life. Many of them, especially the special obituary notes, search for the meaning of education in the contemporary tech culture.

We have here rich cameos of early life at IITK, captured with empathy and objectivity; invaluable oral/institutional history that goes beyond archives and filing cabinets; gendered narratives that record the everyday experiences of female protagonists in the manner of classic buildings Roman; exciting fast-paced narratives of flamboyant professors in their vintage Cessna aircraft, staple more of modern spy fiction than academic travel across ideological barriers during the Cold War!

All six pieces are brought together in a seamless manner. The narratives transcend their time and place. Going beyond the ephemeral, they acquire lasting value as part of institutional history.

The August issue is a festival of letters!

Congratulations to the editors and contributors and the Office of Alumni Affairs, IIT Kanpur!

Sachidananda Mohanty, PhD, HSS, 1987
Former Vice-Chancellor, Central University of Odisha
Former Professor and Head, Department of English, University of Hyderabad

Dear Dr. Mohanty, thank you for your effusive praise of our efforts to rekindle the Spark!
When we hear encouragement such as yours, it redoubles our enthusiasm to do our very best.
Thank you!
Identity Confusion!

I thoroughly enjoyed the new Spark issue, especially the coverage of Dr. M.A. Pai and Dr. Erickson. Dr. Pai had taught us an Electrical Engineering course, whereas Dr. Erickson had taught us Fluid Mechanics. But what was most interesting was the photo of Dr. Usha Kumar. My wife looks so much like her!

Pradeep Srivastava (BT, 1962-67)

Thank You for the Feedback!

Many thanks for sharing the Spark issue. It rekindled very old good memories of IITK while I spent years in the campus as a post graduate student. I feel proud of being an alumnus of IITK. There were so many renowned professors that we got the opportunity to learn from. During our time there was a Maths professor under KIAP named Dr Robert Archer from Univ. of Massachusetts. I was privileged to take one course under him. Remarkable experience.

Please keep on sharing future issues with me.
God bless and best wishes

Swapan Sengupta, IITK 1976

The SPARK has come a long way since our times, with decades of experience and evolution. I congratulate the team for the sleek, interesting and varied contents.
Brings back a flood of memories!
With warm regards

Surojit Sen, BT, 1965-70

Thank you for sharing the new issue of Spark. Prof. Pai was head of the Department of Electrical Engineering when I was a Research Scholar in the department. He was very cooperative and used to discuss with students freely and advise them, even in casual veranda conversations.

K. Kishan Rao
Professor and Retired Principal REC (NIT) Warangal

Happy E-mails from GH... Thank You for the Feedback!

Thanks for the Spark!
The reminiscences from Amrita and Anjali Joshi, amongst the stalwarts who left their footprints in GH before we landed there rekindled my own memories of IIT Kanpur.
Prof Pai’s legacy was inspiring and how the IITK crest came to be was fascinating (I had the chance to get acquainted with Prof. Vijay Stokes during 2001 - 2003 at GE Research)

Kajoli Banerjee Krishnan
MSc/PhD, Physics, 1983-89
Editor, Spark, 1984-85
Thank you Spark team members for all your effort in putting this together. And Trips & Anjali for keeping the GH flag flying high! Really loved going down the memory lane. Thank you.
Lots of love to all.

*Pushpita Mathur (Monty)*
*Centre Director, Math Minds*
*Blackburn, Victoria, Australia*

What a wonderful effort!! Really enjoyed reading it and appreciate the work put into it! Trips, what a wonderful read about our GH days. We were an amazing group of intelligent, independent, forward thinking women of our time (70's India think about it). We would put anyone to shame even today! Just goes to show what you ladies have achieved in your careers!!
Love you all. So proud to be one of us!!
*Pushpanjali Baruah Tandon, PhD, English*

Thank you ladies, for the appreciative words! These (and other messages) go to show the lasting warmth of the ties that bind the small GH community. This despite the centrifugal forces of time and distance!

**And What Really Happened in those IITK Senate Meetings...**

*Shared by Raman Bhatia (BT, ME, 1977-82)*
Championing a Vision at IIT Kanpur: Remembering Prof. Maria Goeppert Mayer

IIT Kanpur was among the earliest engineering institutions in India to introduce the MSc Physics program (in 1965), leading to active interactions between scientists and engineers on its campus. Below are a few letters received from IITK Physics alumni from the 1960s, several of which remember the late Nobel laureate Maria Goeppert Mayer who had visited IITK in 1966. Some letters have been edited for brevity and space constraints.

IIT Kanpur holds a distinct place in my heart, being a haven for those who sought to explore the pure sciences. The institution's commitment to hands-on learning and face-to-face interaction, with mentoring by some of the brightest minds of our time, marked IIT-K as a vanguard in shaping a brighter future for the world.

One example of this commitment was the courage and dedication we witnessed in Prof. Maria Goeppert-Mayer. Her Nobel Prize-winning work provided an understanding of why specific numbers of nucleons (the "Magic numbers") within an atomic nucleus resulted in stable configurations. She also made significant contributions to the theory of two-photon absorption in atoms. This work has applications in laser spectroscopy and nonlinear optics; the unit for the two-photon absorption cross section is named the Goeppert Mayer (GM) unit.

Prof. Maria Goeppert Mayer served as an inspiration to countless women and girls in STEM fields. Her career was marked by unyielding determination in the face of discrimination within the predominantly male domain of physics. She was only the second woman to receive the Nobel Prize in physics, after Marie Curie. Astonishingly, over half a century would pass before another woman, Donna Strickland, received the same honor in 2018.

Despite her health struggles following a stroke, she served as a visiting professor at IITK during the 1966-1967 academic year, coinciding with the beginning of my studies at IITK. Her presence, alongside her husband, Prof. Joseph Mayer, left an indelible mark on all of us. She delivered lectures on Statistical Mechanics and Nuclear Physics, including the ‘Magic Numbers’. One vivid memory I recall is a lecture she delivered for general students in the newly constructed, spacious LHC. Professor Joseph Mayer, stood by her side, assisting her with the presentation. Professor Waghmare, who had completed a postdoc in her research group at UC San Diego, enlisted some of us to assist in ushering in VIPs and moderating audience questions. She promised to return to IITK and even entrusted some belongings to friends in Kanpur, but passed away in 1972.

Prof. Maria Goeppert Mayer’s time at IIT Kanpur serves as a testament to the enduring impact she had on a generation of aspiring physicists, leaving an imprint that will continue to inspire future scientists for generations to come.

Gyan Mehta, MSc, Physics, 1968
Prof. Maria Mayer had been in declining health soon after the Nobel Prize award. There was not much chance of interaction with the graduate students (when Niru and I both were at the UCSD). But they had been visitors at IITK, a visit organized by Professor Y. R. Waghmare. I remember a talk by Joe Mayer where he described his impressions of India. He was quite impressed by the ingenuity and resourceful actions by the taxi drivers in Mumbai. They kept the cars running under the most adverse conditions.

Mrs. Mayer had been the victim of gender biases at universities which would offer her husband a regular faculty appointment but expect her to work as an unpaid volunteer. This continued through their moves from Johns Hopkins to Columbia and Chicago. At Chicago she finally had a job at the Argonne National Labs as a member of the technical staff.

Finally in 1960, it was clear that she was going to get the call from the Nobel Committee (she did in 1963). At UCSD, she was invited to join the Physics Department. Joe had to accept the position in the Chemistry Department.

Pradeep Kumar, MSc, Physics, 1968

I remember the visit of Prof Maria Mayer along with her husband Joseph Mayer during my second year of my M.Sc program at IIT Kanpur. I remember her as a frail person pausing on occasions with her husband backing her in handling projections. Her presentation reminded me at that time of classical atomic orbits theory.

It was an inspiring experience as it was our third Nobel Laureate presentation (after C.V. Raman and Bragg).

Ramaswamy Rajaram, MSc, Physics, 1968

As a student at IIT Kanpur pursuing a science degree in physics, it brings back memories from that period when the Indo-American collaborative program had created a stimulating environment for learning. The top-notch selection of textbooks, the new computer center, and the semester system of the teaching schedule with midterm exams and quizzes, was invigorating. Visiting faculty from the US added to this environment. I recall the presence of Prof. Maria Mayer, a recent Nobel Laureate, along with her brilliant spouse, Prof. Joseph Mayer, on the campus.

After their IITK visit, the Mayers had returned to UC San Diego in La Jolla, California. Another coincidence brought me to enrol at UCSD graduate school to continue a Ph.D. degree in Physics. For health reasons, she could not participate too long in the academic activities, and passed away in early 1972.

_Nirjar Dandekar, MSc, Physics, 1969_

I have warm memories of physics at IIT Kanpur. It was a great privilege to move from a traditional university. The contrast was like night and day. At the American influenced IITK there was freedom to choose subjects, no attendance, no standing up when the prof entered. And boy did I use that freedom!

For me the biggest educational benefit was the interaction with the super-smart fellow students. I lived in Hall 1 with BTech students, rather than the postgrads in Hall 5. I must have won first prize for the least amount of studying! I took full use of the other activities on campus. I was introduced to ham
radio inspired by Prof Pullen of Purdue. I learned of single side-band radio in those days when the radio spectrum was severely limited. We erected a bamboo antenna on the roof of a residence hall. Sadly it lasted only till the first windstorm.

I would spend entire weekends at the gliding center run by V.V. Nanda. I took an elective from the Aeronautical Engg dept: Aircraft Performance and Control. The main payoff was the lab: going up in the Cessna 172 with Wind Commander Ghosh or John Olcott from Princeton doing such things as finding the service ceiling at about 10,000' in the cloudless skies over the Gangetic plain.

I was also a producer on a word quiz show on the closed-circuit campus TV. Another significant expenditure of my time – not solely because it was a rare air-conditioned refuge – was hanging around the computer center. There on the 1st generation IBM 1620 I learned to program using Fortran. Later this turned out to be an advantage as I got my first job as a systems analyst in India's corporate world that was taking its first steps into computerization.

Unlike my early understanding, today I believe that teaching science in the historic form is better; as the puzzles that faced the contemporary scientist. For example, don’t teach the bald fact that Max Planck uncovered the quanta, instead present the specific puzzle, the ultraviolet catastrophe in the spectrum that then led him to his insight.

*Paritosh Kasliwal, MSc, Physics, 1968*

*Three Physicists and a Mechanical Engineer enjoying a spring day on the roof Hall IV. L to R: Niru Dandekar, Jnanadev Maharana, Gyan Mehta and Tej Singh Dhakar, 1967. Picture: Gyan Mehta*
The IITK Campus in 1967. Note the tree in the middle of the Library Pool, there was no fountain then.  
Picture: Gyan Mehta

Corrections Appreciated

Thank you for sharing the latest issue of the Spark. The name of the person (professor) sitting with Ms. Anjali Joshi (photo in page 262) is the Late Prof R. Subramanian. He was a Harvard PhD and taught Control Systems. A very soft spoken gentleman, we affectionately knew him as RSu.

Mukkai Krishnamoorthy  
MT/PhD, EE, 1969-76  
Faculty, EE/CSE, 1976-79

Thank you, Moorthy, for the update. We have updated the document on the shared drive. While we were at it, we also updated some small factoids in issues 1, 3 and 6. For folks keeping up with the changes, the latest pdf copies are always available at the DORA site, though we do suggest that the SAC and PKK Library archives save them as well.
Abhay Bhushan Enters the Internet Hall of Fame

Abhay Bhushan (Roll No. 60001, BT, EE, 1960-65, Distinguished Alumnus IITK, 2006) was inducted into the Internet Hall of Fame this year, 2023. This award recognizes individuals worldwide who have played an extraordinary role in the conceptualization, building, and development of the global Internet, including those who have made crucial, behind-the-scenes contributions.

Abhay’s contributions led to the creation of protocols that enabled effective and secure transfer of data over the Internet. He is recognized as the author of the File Transfer Protocol (FTP) and a pioneer of early TCP/IP architecture models and email standards.

After obtaining his B.Tech. degree in Electrical Engineering from IITK in 1965, Abhay completed his MS in EE along with a Masters in Management at MIT. While serving as a member of the research staff for MIT’s Project MAC from 1967 to 1974, he worked on building the first network that then flowered into the internet (as we know it) some ten to fifteen years later.

In September 2023, the Internet Hall of Fame, in Reston Virginia, announced its seventh inductee class since the award was founded eleven years ago. Abhay was one of only nine inductees in 2023.

Over the years, Abhay has made outstanding contributions towards IITK and India. He is the founding president of Pan IIT USA and past president of IIT Kanpur Alumni Association and the IIT Kanpur Foundation. He has served as the Chief Financial Officer of the IITK Foundation, USA, and the coordinator for the PanIIT global committee. He also served on the Board of the IIT Gandhinagar Foundation in the USA. He has been directly involved with organizations working towards the betterment of the Indian society such as ‘Indians for Collective Action’, ‘Funds for Rapid Advancement of India’, and ‘India Literacy Projects’.

Congratulations Abhay!
Remembering Professor Arakere Vasudev

Prof. Arakere Vasudev, one of the early professors of Chemical Engineering at IIT Kanpur, passed away peacefully on June 28, 2023, at the age of 88. He is survived by his wife of 60 years, Karen, their three sons, Pradeep, Anand, and Roshan, and their 6 granddaughters. He was loved by all who had met him.

Prof. Vasudev was born in Bangalore, in 1935 and finished his education in India from Mysore University and the Indian Institute of Science. In 1956 at the age of 21, he made the now-unthinkable, 26-day journey by ship to the US to pursue a Master’s degree in Chemical Engineering with a minor in Nuclear Engineering, at Washington State University in Pullman, Washington. After completing his masters in 1958 he moved to Seattle, Washington where he completed his PhD in Chemical Engineering in 1963 from the University of Washington, where he also met and married his wife, Karen.

After completing his PhD, he worked for two years in the US. He was offered a position as professor at IIT Kanpur, and he moved there with his family in 1965. He was active in helping to establish the curriculum in Chemical Engineering and was the first to use computer modeling for chemical engineering and held a symposium at IIT/K for that purpose.

Prof. Vasudev loved sports and helped establish a sports program (including cricket, hockey, tennis, and table tennis, along with other sports) for students, in addition to accompanying the teams to the annual Inter IIT sports meets during his tenure in Kanpur. In the evenings, students would drop by his home just to sit and chat, hear stories of his life as a student in the US, and get advice on various topics, and sometimes enjoy home-cooked meals by Karen. He encouraged, mentored, and guided many students in his five years at IITK.
The IITK ChE class of 1968 with Dr. Vasudev seated second from left. Among Dr. Vasudev’s students in this batch were Anil Kumar, Deepak Kunzru and Santosh Gupta, who would go to the US, complete their PhDs and return to IITK as faculty members, mentoring hundreds of students from the 1970s through the 2010s. Picture: The Frontier Batch (1963-68) Collection.

In 1970 the family moved to Bombay where Prof. Vasudev took a position as Technical Manager at Fiberglass Pilkington (FGP). Here he continued to assist students, establishing programs to give them their first job after completing their degrees. He also set up a program for visiting IITK faculty to work in industry for a year to gain experience and a business perspective, thus continuing to expand the scope of experience for both students and faculty.

Prof. Vasudev, as the principal founder of IITK Foundation, helped define its mission, operating procedures and values. He was its first President and was on the Foundation Board from 2001-2010. During this 10 year term, the Foundation created the first website of IITK Alumni Association; changed AA by-laws so alumni living remotely could vote for the next AA leaders; funded the creation of the Los Angeles, Texas and East Coast IITK AA chapters, and co-founded the Pan-IIT movement. For his contributions to the Foundation and the Alumni Association, IIT Kanpur conferred its highest honour, recognizing Prof Vasudev as an Institute Fellow in 2011.
This picture is from August 1999 when the IITK Silicon Valley Chapter Fund-raising for IITK was launched at the Stanford University Faculty Club. In the picture, Prof. Vasudev along with IITK Alumni Rajeev Motwani, Deepak Bhagat and Sriram Sankar are seen recognizing Mr. Narayan Murthy for his accomplishments as an entrepreneur. Picture: Deepak Bhagat (1968-73)

Prof. Vasudev awarding the Silicon Valley Alumnus Award to Dr. Rajeev Motwani. The SV AA chapter recognizes accomplished SV IITK alumni every year, based on selections by IITK Distinguished Alums. Also visible in this picture, on the right, is IITK Distinguished Alumnus Abhay Bhushan (1960-65). Picture: Deepak Bhagat
A Perspective Beyond Academics

Dr. Vasudev had brought a fresh perspective to enhancing life at IITK. In his unique and direct way, he enhanced the faith in scholar athletes who were fortunate to get his mentorship.

I joined IIT Kanpur in August 1966. The infrastructure at the institute was new, and much was still to be done especially in the area of sports. IITK came last (5th) in the Inter IIT meets prior to my joining. I excelled in two sports, Tennis and Table tennis and with the help of some of my peers performing well in other games we moved to the #3 spot when I graduated. I give a lot of credit for this success to Professor Vasudev, who was the Games Counselor during that period. He had the vision that a Scholar Athlete was to be supported and encouraged at IITK. He believed that sports would add to the success of the student after graduation. Living in the USA for the last 52 years I have found that vision to be very true.

I would like to share two incidents about Dr. Vasudev. As youths we tend to be adventurous and often lack discipline and planning. The day before an important tennis match, some friends challenged me to run a 5-mile marathon. I finished the race well and saw Dr Vasudev standing at the finish line. Thinking he would applaud my efforts I walked towards him. To my surprise he was annoyed and said that was foolish of me – wouldn’t I be stiff and probably not be able to play the next day? I learnt a valuable lesson - to win you need to plan ahead.

The second time he showed me that difficult situations can be overcome. In one of the Inter IIT meets I had a conflict with a national table tennis championship where I was representing myself and my state. The only way I could play both was to fly back. The budgets provided by the state and by IITK only covered train travel. I did want to play in both events. I took the problem to Dr Vasudev. The next day he gave me an air ticket, so I could play at both events. All sportsmen had great regard for him.

IITK has made huge strides to stand out in sports. I am told that in the last few Inter IIT meets we have been coming first. I remember Dr Vasudev spending a significant portion of his non-teaching time to interact with the student body and help students to dream bigger things and achieve their potential. We will remember him for this dedication which inspired us to believe in ourselves. I am sad he is no more. I offer my sincere condolences to his family and I pray for his soul to rest in peace.

Rakesh Bhargava (BT, ChE, 1966-71)
Chairman & CEO, Blue Springs Global Advisors, LLC

Cricket at IITK in the 1960s. The E- and F-wings of Hall 1 are visible in the background, with the tree covering the entrance to the hallway. Picture: KIAP Final Report, 1962-72
My Friend, Sankar
V. Rajaraman (Professor EE/CSE, 1963-82)

Prof. R. Sankar was a beloved Professor of Computer Science who taught at IITK from 1975 to 1985, serving as the Head of Department during 1982-1985. In addition to his passion for teaching topics such as Numerical Methods, he was well-known for his sense of humor. He passed away in July 2023 in Bangalore.

I was going to Delhi University in the summer of 1949 to collect application forms to appear in the Entrance Scholarship Examination. On the bus I took from Kashmiri Gate, another boy, who I did not know, came to me and asked whether I was going to the university, and I said yes. We introduced ourselves. He said that he was also going to the university to collect a scholarship form. When the university stop came, we both got out and went in search of the office where the forms were issued. Thus started our seventy-four-year friendship.

We both filled up the forms and wrote the examination a month later. Both of us got scholarships; Sankar to study B.A. (Hons) Mathematics and I, to study B.Sc. (Hons) Physics. We both enrolled in St. Stephens College which was affiliated with Delhi University. Sankar was a star in his class and passed B.A. (Hons) in 1952 standing first in the University. I was an OK student - not a star - and passed with a first class. Sankar continued at Delhi University as a student of M.A. Mathematics with a
scholarship and excelled again, passing at the top of his class in 1954. I decided to pursue a post-
graduate course in Electronics and Communication Engineering (ECE) at the Indian Institute of Science
(IISc) and moved to Bangalore in 1952. That move to Bangalore was the first of several times that I lost

One day in April 1957, while I was a research student at IISc, I saw Sankar in the hostel mess and asked
him, ‘how come you are here’? He replied that he had joined as a lecturer in the newly established
Department of Applied Mathematics at the Institute. Professor P.L. Bhatnagar from the Delhi University
mathematics department was the head of the new department and Sankar was his star student and he
persuaded him to come with him to IISc. I left IISc and went to the US for my doctoral studies in August
1957 and again lost touch with Sankar.

Sankar soon gained a reputation as an excellent mathematics teacher at IISc. T.R. Viswanathan and H.N.
Mahabala, who were students at IISc during the late 1950s (both of whom joined IITK some years later),
were taught mathematics by Sankar.

While I was at IIT/K, I was invited by the National Aerospace Laboratories (NAL) sometime in 1970 to
deliver a lecture. I met Sankar after many years at NAL and was surprised to see him there as I thought
he was at IISc. He told me that he had moved to NAL in 1961 and had obtained a Ph.D. in mathematics
from Oxford University in 1967 under the guidance of Leslie Fox, a famous numerical analyst. His
doctoral thesis was on the numerical solution of differential equations. NAL had a small computer and
he was in charge of the computer centre. He invited me to his home on the NAL campus and I had lunch
with him and Padma, his wife, whom I met for the first time. He was an excellent teacher and researcher
and I felt his talents were not fully utilized by NAL.
IIT/K had started the Computer Science programme in 1972 and I was looking for experienced faculty. I sounded Sankar on his interest in resuming his teaching/research career at IIT Kanpur. He readily agreed. I broached the idea of inviting Sankar to IIT/K as a professor of computer science with the director in 1973 and he concurred. After corresponding with Sankar and the director of NAL, Sankar was invited to join IIT/K as a professor in the Computer Science programme and he joined in 1975. His sons Sriram and Ananth were studying in one of the best schools (Bishop Cotton) in Bangalore and Sankar was concerned about relocating them. Bishop Cotton was following the ICSE curriculum whereas Kendriya Vidyalaya at IIT/K was following the CBSE curriculum. Sankar visited Kanpur and was able to find a good school (Methodist) with the ICSE curriculum and arranged to admit Sriram and Ananth there. It was a long commute from the IIT/K campus to the Methodist School in the cantonment area and Sankar did not mind it as he wanted Sriram and Ananth to get the best possible education.

Sankar was an excellent addition to our faculty. Besides teaching Numerical Methods and programming in TA 306 he got interested in computer graphics and computer-aided design. In 1980 he became the head of the Computer Centre.

As a parent, educating Sriram and Ananth was his top priority. He used to take them on his scooter to Methodist School early in the morning. Later Padma (Mrs. Sankar) taught Chemistry at the school and drove them in her car. The attention Sankar and Padma paid to their sons’ education paid off; both Sriram and Ananth passed JEE with flying colours and joined IIT/K.

I left IIT/K in 1982 and was happy that I had left the Computer Science programme in good hands. In 1983, IIT/K got a grant from the Department of Electronics of the Government of India to start a research and development programme in computer-aided design of mechanical engineering systems. Sankar along with S.G. Dhande steered the programme.

In 1984, Hari Sahasrabuddhe left IIT/K to join Pune University to start a new Computer Science department. Sankar joined him at Pune University in 1985. An MSc programme in Computer Science for DRDO scientists was started by the department and he developed it along with Sahasrabuddhe. I kept in touch with Sankar and learnt that he had expanded his interest in Computer-Aided Design and was a consultant to the automobile industry. He also started a company, Advanced Graphics Systems, in 1985. He recruited students from his graphics elective course taught at Pune University and two IIT students and the group developed computer graphics programs adhering to recently approved international standards. The software was a pioneering effort and ahead of time for the Indian market. I used to meet him every time I visited Pune.

The next time I heard from Sankar was in 2010. He told me that he had relocated to a retirement community, “Suvidha”, in Bangalore. I visited him and found that it was a very nice enclave and he was one of the earliest residents. It was a two-hour drive from my residence near IISc to Suvidha. I was not able to see him as often as I would have liked to – given the notorious Bangalore traffic. It was a rejuvenating experience every time I met him. He had a tremendous sense of humour and was a sparkling conversationalist. Despite the breathing problem he had in his eighties, he was always cheerful and never lost his sense of humour. The last time I met him was in August 2019, just before Covid. Ananth was visiting him and took photographs.

I received a phone call from Ananth on 15 July 2023 that Sankar had passed away on the 14th. Dharma and I went to Sankar’s memorial function on 26 July 2023. Rest In Peace, my friend.

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Prof. and Mrs. Sankar, Mrs. and Prof. Rajaraman, Bangalore, August 2019. Picture: Ananth Sankar

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On A Blind Date: Prof. Usha Kumar

‘While I was completing my post-doctoral internship at the University of Michigan, I was offered a position at IITK. An offer without an interview was unheard of! I considered it a blind date. And thus began a long saga of professional life at IITK – a place vibrant with ideas, where no limits were placed on one’s need to excel, and where initiative came from within in order to explore one’s interest. It was a challenge.’

-- Prof. Usha Kumar, HSS, Psychology, 1967-91 (Credit: An Eye for Excellence, p 181)

Prof. Usha Kumar (UK) was born on 22 August, 1931 in Lahore, and grew up in Lucknow. She studied at Isabella Thoburn (IT) College as an undergraduate, going on to obtain a Master’s degree from Lucknow University. She obtained her PhD from the Ohio State University and was a postdoctoral research fellow at the Univ. of Michigan when she was offered an opportunity to join the IITK faculty in 1967.

Professor UK was a distinctive figure around the IITK campus. She arrived on the campus as a young woman and stayed there until her retirement in 1991. In the intervening years, she made her mark in the community as a person of high standards and devotion to work. She was an imposing presence with her poise, her upright bearing and the occasional sardonic comments. Her psychology classes were very popular among undergraduate students, and she trained many research students as well, some of whom went on to join the IITK faculty.
She was a colourful personality, both figuratively and literally, with the red VW Beetle she drove around the campus and her white Samoyed, Tasha. As a trained clinical psychologist, she was an important part of the Students’ Counselling Service, which helped many students over the years.

Her tenure as Warden of the Girls Hostel, was most probably no sinecure. She must have had to perform a delicate balancing act between the girls’ fierce desire to be independent and the establishment’s attempts to impose restrictions ‘for their safety’. However, tense situations were always resolved, “usually to our satisfaction. Although it was mooted for a while, we never had a curfew, for example -- girls and boys could be seen entering freely at all hours of the day or night -- and nobody was the worse for it”. (From a GH resident of that time).

After retirement, she moved to Hyderabad. In increasingly fragile health, she passed away in 2016, mourned by family, friends, students, and colleagues. A few years later, in 2021, the L.V. Prasad Eye Institute in Hyderabad inaugurated the ‘Dr Usha Kumar Education Program’ and 'Dr Usha Kumar Glaucoma Research Centre' set up in her memory.
A Visit to Secunderabad
Arun Kumar (BT, EE, 1970-75)

On July 10, 2015, I knocked at Professor Usha Kumar’s front door in Secunderabad. It took her a while to come to the door.

“Who’s that?” asked her voice.
“It’s me, Arun, Ushaji,” I said.
“I’m going to open the door Arun, but I must tell you something before I do,” she said.
“Please.”
“I want you to know that when you see me you will not recognize me.”
“Ha, ha,” I said. “Really! No way Ushaji. Try me.”

When she opened the door I saw a very small, very frail woman with a walking stick in hand. It was not the Usha Kumar I remembered. I remembered her from when I had last met her, thirty eight years ago in 1987, in St. Louis, and even earlier in 1984, forty one years ago, at her home in IITK.

Back then Ushaji was attractive. She was vivacious. She was Abha’s dissertation advisor. She had told me, “You can’t go wrong with these girls of today. They are capable. They are companionable. You will have a friend for life,” she said about Abha, her student, and my wife.

We had a lovely lunch at Ushaji’s house back then in 1984. It reminded me of even older times when I was at IITK 1970 to 1975, during my bachelor’s. We lunched at the same old dining table she had had in 1975 when I had last had a meal at her house.

In 1984, the talk was mostly about politics. Indira Gandhi had been assassinated earlier that year in October. Ushaji asked what my feelings were when I heard the news. I said that I thought very poorly of assassinations. I believed in Mahatma Gandhi’s message of nonviolence. But I had not grieved for Indira Gandhi.

Why not, she asked. I had not, I explained, because Indira Gandhi had served Indian democracy poorly when she declared her ‘Emergency’ and used that Emergency to commit serious damage to the democratic tradition of India so painstakingly built by Mahatma Gandhi, by her father, and by the many wonderful leaders India was blessed with during her birth throes.

Ushaji said that that was true, but still she grieved. You people abroad probably have different sorts of feelings about this, she said. Was it the distance perhaps? Was it some sort of disconnectedness?

What we did share equally was a horror of the pogrom against the Sikhs following Indira Gandhi’s murder. I remember saying that if what had happened that year in Delhi was not adequately punished, state-sponsored genocide will happen again.

Ushaji asked how I met Abha, how I traced her to IITK. She asked if Abha had said ‘yes’. (Not so far, she hadn’t.)
But that was not the woman I saw when I entered her Secunderabad apartment in 2015. “You look frail, Ushaji,” I said, “but there’s no not recognizing you.”

I lied. She had changed. She looked very different in 2015 than she had in 1987. I would not have recognized her had I passed her on the street. I hugged her.

“You are hurting me,” she said.

I had thought I was being extremely gentle. I had heard that she had battled breast cancer and survived a surgery or two. I had heard that she had had a bad fall and been bedridden for months after that. But I had not expected to see the Usha Kumar I saw.

I held her arm and led her to a chair in her living room. We sat and we talked. She asked after Abha. She asked after our apartment in the student ghetto in St. Louis where she had visited and stayed with us three days in 1987 or 1988. I was then working on my dissertation. I told her how Abha and I still used the little electric hand mixer she had given us when she visited, and how we invariably thought about her when we used it. Today, in 2023, I still use it to whip up the whites for an omelet.

For the very first time that day, Ushaji spoke to me about her childhood and her parents. I wasn’t paying much attention to what she said. My mind was occupied with a flood of thoughts from many years ago, going back to 1970, when I first saw her, as a student in her HSS 101 class or some such. HSS was ‘Humanities and Social Sciences’ and HSS spelt for us students some respite from what we considered the ‘heavier’, the more ‘relevant’, the more demanding science and technology and mathematics courses.

I wasn’t paying much attention to what she said much of those first few minutes in Secunderabad. My mind was occupied also looking at her and at the things that surrounded her. I felt a sense of sorrow. I felt a sense of time having passed very swiftly. I felt like I’ll likely never see her again. And that was to be because she passed away next year. I heard of her passage from an email Ricky Surie wrote me. Ricky had been a year senior to me at IITK. He used to visit Ushaji in Secunderabad quite often and was, I expect, a source of assistance and comfort to her during the terrible years of her illness and recovery.

She had grown up in a very middle class family. She spoke fondly of her father, about how he would carry her on his shoulder to cross a stream that led to her school in the countryside. But I am not very certain about this memory. She talked about her years in college in Lucknow (La Martinere Girls) where the library shelves had glass doors that were always locked up --- lest someone pick a book from the shelf. One had to go ask a lady at a desk to please provide access for a few minutes when one wanted to look at a book or borrow one!

She spoke about her years doing her PhD at the Ohio State University and how she had stuck to her traditional Indian attire, the saree, even in the bitter cold of Ohio and Michigan.
Ushaji said I must stay for dinner. She said she’ll cook me dinner. Nothing very elaborate, she warned me, but something quick and simple. I accepted happily. We sat and talked another hour till she said she’d better get about dinner. I helped her from her chair, handed her her walking stick and followed her into the kitchen.

The kitchen was neat and tidy. Everything was in place. She didn’t have much by way of cooking utensils or dinner plates, but what she had was all clean and in impeccable order.

She was going to make us some khichri. She lit her gas stove and placed the khichri on the burner. I was surprised that she was not careful about how she placed the pot. That was not like her at all. The pot tilted dangerously. It could have fallen off and spilled its contents on the counter and on the floor, perhaps even on her. When she turned around to look for something, whether salt or a spatula, I secretly corrected the placement of the pot. My sorrow deepened.

I reminded her about how I had once almost set her house on fire, back at IITK. That was in 1974. For the first time that day she laughed. She remembered. And she remembered also her gramophone she had asked me to fix. I had little idea then about how to go about fixing a bad gramophone, and I was loath to admit as much to her. I opened up the instrument with a screwdriver set she supplied. After poking about here and there on the inside, defeated, I put the box back in place, but lo and behold the darn thing started working again! I never did disabuse her of the notion that I had done something to fix it.

The khichri didn’t come out too well but it wasn’t bad. We ate it with dahi and some pickle and we enjoyed it immensely because there we were together after years, reminiscing, living those moments in a different time altogether.

When I was a student at IITK I first met Professor Usha Kumar in a class. I got to know her better over the years as a reporter for the campus newsmagazine ‘The Spark’. She always had remarks and suggestions after every issue. The magazine was handed out to the students free of charge. The expenses were borne from ad revenues. As for the faculty, the issues were distributed door to door. Somehow Ushaji’s home was always in my beat. I’d sit and chat a while and receive her comments, both the negative and the positive. Often she would offer me food; sometimes, if I timed it right, a meal.

So we came to be friends. Later still she’d ask if I could house-sit for her when she was away traveling. I’d put up in her guest room and do my studying and homework at her desk in her bedroom. One winter night, I was house-sitting, reading at the desk. One of her shawls was draped across the back of my chair. Her dog Tasha was asleep to my left and behind. I placed a space heater behind the chair and turned it on.

I dozed off, then woke up to some furious barking. The shawl had slipped off the back of my chair and been ignited by the heater. I carried the shawl out to her front yard and doused it with water. Luckily nothing else was damaged, not me, and nothing else in the house. But things could easily have gone very wrong. There she stood looking ruefully at the charred remains of her shawl when she got back and didn’t ask me to house-sit for her again for months thereafter.

In 2011, I had met Professor Vijay Stokes in Washington DC at a celebration for the fifty year anniversary of the birth of IITK. There in DC, Professor Stokes recruited Sudhindra Seshadri, Raj Bhattarai, and me to work on a history of IITK. In the course of my assignments, I conducted two delightful interviews: one with Professor D Balasubramanian, the other with Professor Usha Kumar. One incident she described
during that interview in 2011, I remember, was how she was approached by Amit (“Mutt”) Mitra one December when she was the Student Activities Advisor. Mutt, or Muttsy, as he was universally called, met with her formally to announce that he and a cohort had decided that they would found the Nudist Club of IITK in Hall Two. He asked her to sign off on the proposal.

“I told him,” she said, “तुम सब को सर्दी में निमोनिया हो जायेगा। तुम सब मर जाओगे। (You will all catch pneumonia and die.) Wait till Spring. Submit a letter of request. I will sign.” Which is exactly what Muttsy did. I happened to be one of the founding members of the IITK Nudist Club and attended the inaugural meeting up on the terrace in my birthday suit.

About the author:

Arun Kumar obtained his BTech in EE from IITK in 1975, completed his MBA from IIMC in 1977, and joined Bharat Electronics (BEL) Bangalore as an administrative assistant to the Chairman and MD, assisting with the management of R&D. Later, as a member of the BEL R&D group, he designed computer hardware for signal processing in radar and sonar systems.

In 1982 he went for higher studies to the US. He received his MS and DSc degrees from Washington University in St. Louis. Arun was the Lead Scientist of the team that put the first images on cell phones in October 2000, in Raleigh, North Carolina.

During his years at IITK, Arun was an active member of the Spark, serving as the Editor in 1974-75. He introduced the Spark Hookah (the daily newsletter rag) during Festival ’74 and covered the strike of Winter ’74 through a series of Spark Newsletters that had a defining impact on the progress of the events.

Abha Varma obtained her PhD in Psychology from IITK in 1985 under the guidance of Prof. Usha Kumar. Arun and Abha married in 1985. They live in Cary, North Carolina, where Arun works as a Data Scientist for a startup. Abha works for the State of North Carolina Division of Mental Health. They have two children.

Abha and Arun with Prof. Usha Kumar at IITK, 1984.
When Paul Turned Communist, Where the Sun Never Set...

Professor UK was ever ready to be a part of Student Activities on campus, providing insights to the Spark, judging events at Cultural Festivals, being a part of treasure hunts. The red VW Beetle was easily the most recognizable vehicle on campus. Stories flourished... about how she had held on to those Michigan license plates for many years, until she was issued a *challan* (ticket) on a visit to the city. Then there was a plan, hatched up by some enterprising students, to paint black dots all over the car, and make it look like a real beetle. Fortunately, it was never carried out to fruition. The consequences would have been severe.

![The Red VW Beetle at IITK. Picture: Shirish Joshi, 1977](image)

A clue in a 1973 Freshers’ Treasure Hunt simply read ‘*When Paul McCartney Turned Communist*’. Music fans put those thinking caps on! No, it wasn’t when he went Back to the USSR. He had simply become the Red Beatle!

Much harder though, was the final clue in a 1980-81 hunt which read ‘*The Sun Never Sets Here*’. The solution needed thought, going back to the old adage of ‘The Sun Never Sets on the British Empire’. The British Empire then suggested the United Kingdom. The United Kingdom pointed to UK. Those who reached her mailbox at 2 AM in the morning found the house with its lights on, with Professor UK waiting to greet the winners.

Rest in Peace, Professor UK. Truly, the sun will never set on your impact on IITK.
Dr. Nivedita Dutta-Haran obtained her undergraduate degrees, in Philosophy (Hons) and Economics, from Jadavpur University and joined the HSS Dept at IIT Kanpur for graduate studies in 1978. She left IITK in July 1980 to join the IAS, later getting her PhD from IITD in 1994. She served in the state of Kerala in several positions, culminating as Secretary, Principal Secretary and Additional Chief Secretary in departments that included Agriculture, Social Welfare, Industries, Energy, Administrative Reforms, Revenue, and Home. She also served as Deputy Secretary, Director, and Joint Secretary in the Govt of India and was part of the UN Peacekeeping Mission in Kosovo for 5 years. Post-retirement she is an adjunct faculty at JNU and other centres of higher learning and training, including the IAS training academy in Mussoorie. She works with various agencies and think tank groups on policy research and field-level analysis on the above-mentioned sectors.

It was a dull dark morning, in early 1978, that we woke up to in Calcutta (now Kolkata), when large parts of the city were water-logged. I had got admission to the PhD programme at IIT/K but my family was loath to see me go, feeling that I was too inexperienced and too young to live in a hostel! Despite my civil servant father being in a transferable job, it was Ma’s decision (and Baba perhaps agreed) that the best place for a child to grow up was ‘at home.’ My teachers from Jadavpur University were proud of the fact that one of their favourite shishyas was moving on for higher studies, but Ma remained inconsolable; the eldest from her brood of three had learnt to fly.

Ensconced in Kalyanpur (then one of the villages outside Kanpur), the approach to IIT was totally uninviting. But then as one drove through the main gate, IITK turned out to be a world in itself. The Girls’ Hostel (GH) with its brick red façade seemed welcoming enough, although the manager with his taciturn manners and squeaky voice was a put-off. The two-and-a-half years I spent in B-208 were among the most memorable and fun-filled times. They provided me the momentum towards an independent life and helped in preparing me for what was to follow.
The Humanities & Social Sciences (HSS) Department was limited only to a few disciplines: Philosophy, Economics, Psychology, Sociology, English and Fine Arts, but had a clutch of nationally renowned faculty. The students spent reading, discussing, arguing and often the conversations continued into late hours until sheer fatigue and hunger took us back to our hostels. Despite a friend’s warnings, I credited a course in Logic from the Mathematics department offered by Prof Ashwani Kumar. I recall discussing with him the need for trans-disciplinarity in our research which these days has become the norm, and even finds mention in the New Education Policy.

The GH mess was supposed to be one of the better ones, but for a hostel novice I faced major problems in the initial months. I was used to my mom’s no-grease nutritious vegetarian diet, so my stomach revolted and took some time to adjust. When the food became intolerable I packed a night-bag and went off to spend the weekend with my grandparents who lived in the city. The travel to the city was no cake-walk. The institute bus ran only at a few specific hours and the tempo and rickshaw rides were a fiendish experience. I have had a full-grown goat as a co-passenger that insisted on chewing on the edge of my scarf, and unwashed people smelling of bidi-smoke were the norm.

A tempo on the IITK Main Drive, late 1970s. Perhaps the greatest mode of transport ever invented! Packed inside, this one has four pillion riders as well. But it could hold more. Lots more! Picture: Shirish Joshi.

To ensure intra-campus mobility bicycling was a must. Like most girls arriving on the campus, I did not know how to ride one. Bhat, a PhD colleague magnanimously offered his services to help me learn, and my excitement knew no bounds. That evening we went to the airstrip runway / helipad. It was where PMs’ helicopters landed, he told me in hushed tones. I sat on the seat of my sparkling red Hero, wobbling precariously. ‘Now hold on to the handle-bars and start pedalling, and don’t stop. I’ll hold on to the carrier and run behind,’ Bhat assured me. I sat ram-rod straight and pedalled furiously on the never-ending runway as the cool wind blew across my face. Suddenly I realised I had no idea how to stop the bike and my instructor was nowhere in my peripheral vision. I crashed into the bushes, more concerned about the scratches on my brand-new bike than about my own bones.
At that age friendship happens organically and naturally: common interests or practical needs (to return from the library after dark). Darshana, Nellie, Premlata, Renu, Shobha and Mary, Leena, and other hostel neighbours are some names I recall. Although the barrier between the young BTech students and the few years older researchers was perceptible in the classroom, the GH ambience had a more egalitarian narrative. Darshana and I were regular ‘walking partners’. We discussed everything under the sun: our research topics, professors, classmates, politics (the emergency had bruised many a psyche), music and lots more. Having been brought up surrounded primarily by Indian classical or at most Rabindra sangeet and Nazrul geeti, she introduced me to Bollywood songs, their lyrics that I had never paid much attention to before, and I told her how a tune had traces of a raag that gave her such excitement that she hummed that song for the next few days to the annoyance of her neighbours. She convinced me to watch Kissa Kursi Ka and I convinced her to become a member of the in-campus movie club Le Montage where we watched Bicycle Thief and discussed it frame by frame ad nauseam!

The campus was a delight, vast and open with wide roads and filled with greens. While cycling around at dusk the sunset near the swimming pool was a gorgeous sight, we often spotted rabbits near the nursery garden. Snakes showed up almost every monsoon, sometimes in the open grassy patch near the GH.

I found time to play a lot of table-tennis especially since the TT table in the hostel lay unused much of the time. I went around trying to entice some of the girls to play as I needed a partner but sometimes I
also got to play with some of the good players from Hall 4. As a result, my game improved considerably. Many years later as part of the UN Peacekeeping Mission in Kosovo I surprised the commander of the German army by defeating him quite easily. That made him comment: Indians can be aggressive too!

I was never involved in institute politics but I recall writing the manifesto for a candidate who was standing for the elections for Hall President. He went on to win and very magnanimously came over to thank me for my help. I wish persons like him joined our national politics.

My most vivid memories of life at IIT remain the classes and tutorials where I assisted Prof Shaida, Prof Mishra and Prof Malik. I enjoyed the entire process, the preparation, the lectures, the interaction in class and finally getting to assess the answer sheets to gauge the extent to which my students had imbibed the knowledge I tried to impart. That wheel came full circle post-retirement, when I lectured at JNU as an adjunct faculty and remembered the time when I had taught Symbolic Logic to a class of 70 plus, in L-7.

IIT/K was a great place to grow up in. It had one of the best educational infrastructures: the library, the faculty and ambience. Many, many years later when as Additional Chief Secretary, Revenue in Kerala I was put in charge of framing the government’s plan for setting up a green-field IIT at Palakkad (Kerala) I was amazed to find the number of ex-IITians who came forward to devote their time and expertise in advising the government. Now as I look back a number of my habits and interests have their genesis in the 30 months that I spent in IIT/K, be it my love for star-gazing, my fascination for sharing knowledge and of course, my interest in old Hindi songs, courtesy Darshana. GH gave me my first experience of living in a hostel; it inculcated a sense of independence in me and provided me with the “backbone” that enabled me to fight many a battle as a hard-core public servant later in life. But that is another story perhaps for another time.

Achieving the Gold Standard

...what it takes to do truly enduring work

A Discussion with Prof. Jayathi Murthy (BT, ME, 1974-79)

Jayathi Murthy earned her B. Tech in Mechanical Engineering from IITK in 1979, and a Master's degree at Washington State University, before completing her Ph.D. in Mechanical Engineering in 1984 at the University of Minnesota. After four years as an Assistant Professor in the Dept of Mechanical Engineering at Arizona State University, she switched to the private sector in 1988, only to return to academia in 1998. Since then she has occupied faculty positions at Carnegie-Mellon, Purdue, and University of Texas at Austin, where she was department chair. In 2016 she became the first woman to be appointed Dean at the UCLA Samueli School of Engineering. In June 2022, she took over as President of Oregon State University (OSU) in Corvallis, OR. She was recognized as a Distinguished Alumna of IITK in 2012, and elected as a member of National Academy of Engineering, USA in 2020.

The Spark reached out to Jayathi to learn the forces behind this rapid trajectory, and understand the individual behind the titles. What were the choices made along the way, the motivations and goals? We put some of our questions to Jayathi, and she took the time to write to us with her responses...

Spark: To an outsider, your trajectory in academia is a straight and vertiginous path – starting as professor, moving up to Head of Dept, then Dean, and culminating as President of OSU, at the very top of the food chain! Is this pretty much how things went, or were there detours along the way where you were tempted to follow other routes?

JM: Not straightforward for sure. Most of my time as a student or as an academic, I did not know or care who the president of my institution was – who keeps track of that? We’re all too busy. So dean, president, etc. was definitely not on my radar. I’ve worked in both industry and academia – started in academics as an assistant prof at Arizona State, switched to a small software start-up, Fluent Inc., which did very well, and after a decade there, I jumped back to academia. Fluent was an amazing experience – we were building some of the earliest Computer Aided Engineering (CAE) and Computer Aided Design
(CAD) software in the fluid/thermal world and captured or created a big chunk of the world market in the field. I learned a lot, not only the technical stuff, but the business and marketing end of things as well. But in the end, my love of teaching and research called me back to academics.

When I returned to academics (to Carnegie Mellon), I swore that I would focus on research and teaching and would stay away from administration. And that is what I did for about a decade. But then, we happened to win a large simulation center contract from the Department of Energy’s National Nuclear Security Administration (NNSA) which I ran for several years. I began to feel that I liked the mix of research and leadership and decided to take on the department chair position at UT Austin. That led to the deanship at UCLA and then the presidency at Oregon State.

It’s been a fun ride and has exercised both sides of my brain – the analytical as well as the people-oriented side. It’s been such a privilege to be given these chances and I consider myself incredibly lucky.

**Spark:** Women remain rather a rare commodity in engineering. How did you decide to come to train as an engineer in IITK? Why Mechanical Engineering? Were there role models in your childhood? Were there, on the contrary, potential barriers, in which case how did you surmount those? Is it similar to the barriers for female engineering students in US universities?

**JM:** Well, my dad was a civil engineer, and I always thought he was the smartest person I knew. As a young person I wanted to do what he did. I was lucky to grow up in a family where we were encouraged to study what we wanted, to follow unconventional paths. My mother was especially daring and free-thinking. And of course, IIT Kanpur has a huge reputation and certainly did in those days also. If you got in, it was not an offer you could reasonably refuse. Why Mechanical Engineering? Well, breaking with convention was always exciting to me, particularly as a teenager – to do what other girls did not do. Of course, neither my parents nor I understood what this path would entail – it was so early in the game in India that none of us understood the life I was choosing.

**Getting Ready for JEE, 1974**

Were there barriers? Yes, of course. My batch of 250 had two girls – and yes, we were girls, only 16 when we started – Madhu Gupta and me. The first couple of years were tough. First, there was simply the fact that we were surrounded by very smart classmates – I wasn’t the smartest kid in class anymore. Second, there was sudden freedom and all its temptations, and learning how to prioritize and focus. But the biggest hurdle at IIT was that so few people took us girls seriously – both classmates and professors.

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Many believed we had no right to be there at all – I don’t think a week went by without someone saying I had “taken” a boy’s seat! And we were so young and so alone – no group to study with, fear of asking questions in class, difficulty finding project partners – you name it. And sometimes, outright harassment – “eve teasing” as they called it in those days. Things did get better with time – we girls grew up and our male classmates grew up too, and we found like-minded men friends. But the sense of being separate lasted throughout my time at IIT – no question about it. But there was a lot of great stuff as well. Being surrounded by creative and bright young people, being exposed to high excellence – this was an amazing experience. I learned so much from my time at IITK. I don’t think I could have gotten that in any other college in India at that time – certainly not in most women’s colleges of that day and perhaps not even today.

In discussions with Piyush Gupta. Hall I quad, 1977. Picture: Shirish Joshi

In the US, I found much more camaraderie and much more acceptance of my path – the women’s movement was much further along, I was older, and there was a deeper societal understanding of the issues. So I had a much more creative and fun experience in graduate school. But here too, women engineers were the exception – I was the first woman PhD out of Mechanical Engineering at Minnesota. And issues of gender have certainly played a role in career advancement both in my life and in the lives of other women engineers I know. It’s taken far greater persistence and toughness on our part to succeed.

Spark: Did you ever feel there was a glass ceiling for reasons of race or gender? And for teaching, and relations with students - are there special difficulties in being an Indian-American (as they say) woman?

JM: Sure – regarding glass ceilings, the data show this quite clearly, especially in traditionally male areas like engineering. It’s not an unbreakable ceiling, but it takes perseverance and requires strong support from the institution and from our families, especially partners and spouses. Regarding teaching, there are many studies that show women consistently receive poorer teaching scores. But again, I’ve found that this is surmountable, but it takes work and energy which men typically don’t have to expend.

Regarding being an Indian-American woman – there are certainly issues around being perpetual foreigners that all immigrants face. But most immigrants I know are resourceful, ambitious and
determined, and have broken through these barriers – witness the large number of IIT alums who’ve found spectacular success here in the US. And US universities especially are generally open and accepting places because there are so many internationals around.

**Spark: Looking back, what aspects of your experience in IITK do you appreciate the most and why? Which aspects the least?**

**JM:** IITK gave me my first vision of high excellence – what the gold standard was for being really good at what you did. At IIT, I met truly brilliant people and I began to understand what it took to do enduring work. I also met quirky people who got terrible grades but were some of the most creative out-of-the-box thinkers I have ever met. And IITK opened up the world to me – I could begin to see myself as a citizen of the world.

What aspects did I like least? I guess the conservative parts. The institution itself was, in a social sense, deeply conservative. I’ve always felt most of us – students and faculty - were pretty self-satisfied – technically brilliant but fundamentally quite conformist. A bit of rebellion would have done us all good.

**Spark (AJ):** I remember seeing you first as a willowy 2nd year undergrad. Only slightly older, but with a certain presence – often broken by an irresistible smile. In the GH we loved your dry wit, and the jokes you made in that slightly cracking contralto voice which made us all crack up. What do you remember of the life and times in the GH?

**JM:** As I think back, I am quite moved by the thought of all these very young women embarking on revolutionary journeys without ever realizing fully the change they were unleashing. I remember the camaraderie of GH, the terrible food most of the week, the egg coupons, and the glorious aloo parathas on Sundays. I remember you (Anuradha Jagannathan) singing beautifully in the shower – your voice could be heard all through the wing! I remember the debate about why we didn’t have curfew and shouldn’t we be locked up at 9 pm as all good girls should be. I remember air being let out of our bicycle tires at least once a week at lectures and having to ride pillion to get back to GH. I remember having to run downstairs to the lone telephone in GH to take phone calls. And so much more. Good times, good times!
Top: Shirish Joshi, Farrokh Langdana, Dinesh Jain, and Jayathi Muthy in the SAC long room, compiling the photobook, The Way We Were, 1979.

Bottom: It was long, long ago that we came. And it will soon be long, long ago since we left... Riding into the sunset along the Panki Canal. DM Raju, Dinesh Jain and Jayathi Murthy, c. 1978. Pictures: Shirish Joshi

An earlier article about Jayathi’s appointment as President, OSU had appeared in the Spark, Issue 4, August 2022, p. 120, available at: https://iitk.ac.in/dora/spark/
A particle accelerator is an instrument which allows us on the one hand, to probe the fundamental nature of atoms and molecules through collisions, and on the other hand to identify the elemental and isotopic composition and the structure of materials and modify them in an extremely controlled way. While such machines play an important role in experimental nuclear and atomic physics, they also serve for numerous other applications in radiation biology, medicine, air pollution studies, or material modification and doping, to name only a few possibilities.

IIT Kanpur got its first particle accelerator in 1968. At that time, it was among the most significant pieces of equipment, after the IBM computer, to arrive on the campus. This accelerator was a 2 MV Van-de-Graff accelerator donated by the US through the Kanpur Indo-American Program (KIAP). In 2006, this accelerator was dismantled and disposed of, since it was no longer suitable for newer projects. The currently installed 1.7 MV Tandetron Accelerator was purchased in 2006 from High Voltage Engineering Europa (HVEE), in the Netherlands, and installed in 2008. Presently, IIT Kanpur is the only IIT to host a particle accelerator. Professor Vishwas Kulkarni, who sadly passed away in 2010, was responsible for setting up the accelerator after its acquisition. Prof. Aditya H. Kelkar has been in charge of the facility since 2014.
beams of energies up to 3.4 MeV (mega electron volt) in this tandem accelerator. An environment of Sulphur Hexafluoride gas (SF$_6$) is maintained inside the accelerator tank because air becomes conducting (dielectric breakdown occurs) at these high voltages. The SF$_6$ gas is compressed to 7 bars or seven times the normal atmospheric pressure.

The Accelerator Tube (left) with Prof. Aditya Kelkar, showing the SF$_6$ compressor unit (right). The Mega Volt power supply is housed inside the accelerator tank, the part behind the compressor.

An ensemble of electrostatic lenses, analogous to concave-convex-concave combination in optics, is used to focus the ion beam. Three lenses are needed, due to the fact that beams have an energy spread – similar to the way in which one corrects for chromatic aberration in optics. These electrostatic lenses require a 20 kV power supply. The focal length of this ensemble of lenses is around 2-3 meters.

The electrostatic quadrupole lens (on the left), and the switching electromagnet for multiple beamlines (on the right).

As this machine is very expensive to operate, there are multiple beamlines to maximize its efficiency and usage. A switching magnet is used to direct the beam towards the desired beamline. This allows an experiment to take place while preparations for others are underway. The laboratory has two dedicated beamlines, one for microbeam experiments and the other for Rutherford backscattering and atomic physics experiments. Parallel plate deflectors in each of the beamlines allow for fine-tuning the direction of the beam.
To minimize interactions between the charged ions and air molecules during the transport of ions over large distances (a few meters) it is necessary to create a good vacuum. Multiple (8 to 10) turbomolecular pumps are used to create a vacuum inside the experimental chamber and beamlines, and they must run continually. Since the life of a pump is about ten years, there is a fair chance that one pump fails every year, and this constitutes the bulk of maintenance costs.

The beamlines are made of 3-mm thick stainless-steel tubes, which also serve to ensure that X-ray or other radiation, produced during operation of the accelerator, does not leak out. An online Geiger counter keeps track of ambient radiation to provide added safety, and the system shuts down as soon as the ambient radiation level exceeds the permissible value. There are similar safeguards if the water pressure drops, or if the vacuum partially fails.

The laboratory gets electricity from the institute, and it has its own 100 kV transformer to isolate the grounding. The laboratory also has a 62 kW UPS that is used to shut down the accelerator safely in case of a power failure.

The Microbeam Setup.

The zero-degree beam line of the accelerator extends into a separate room housing the proton microbeam facility. At the Ion Microbeam facility, a proton beam, defined by two sets of X-Y slits, one serving as the object aperture (defining the shape) and the other as a collimator aperture (limiting the divergence), is focused to micrometer size using a set of magnetic quadrupole triplet. Further, the ion beam can be scanned over the sample using an electromagnetic scanner placed before the focusing system. The high energy highly focused proton beams can be used to create micrometer size patterns and channels on target films and substrates.
Research Collaborations

The accelerator facility has developed frontline atomic and molecular collision experiments to perform detailed investigation of molecular ionization and fragmentation dynamics. These investigations should help improve our understanding of the fundamental electromagnetic interactions holding atoms and molecules together.

Importantly, the use of the accelerator facility is not limited to the Physics department. There have been collaborations with the Mechanical Engineering department, the Chemical Engineering department, and BSBE (Biological Sciences). In one of the experiments (conducted by Prof. P. Munshi, Retired, ME, IITK), MeV energy Ni (Nickel) ion beams were used to irradiate stainless steel samples of varying composition to study the effect of high energy radiation on their mechanical and structural strength. In another experiment from the Chemical Engineering department, organic thin films were irradiated with Ag (Silver) ions beams to study their photoluminescence properties.

The facility was used to determine the composition of conducting printable films (Prof. Y. N. Mohapatra, NCFlexE, IITK). At present, the accelerator laboratory has a standing collaboration with NIT Patna (Dr. N. Shukla) on the use of the ion microbeam facility for studying magnetic properties of Fullerene thin films. This is a molecular semiconducting material offering novel possibilities for applications, including uses as a photovoltaic. Initial investigations using solid state detectors have also been performed for studying low energy nuclear reactions (Prof. C. Basu, SINP Kolkata).

The laboratory is open to all users across academic institutes and welcomes additional collaboration. More details about the facility can be accessed at: https://sites.google.com/view/tal-iitk/tandetron-accelerator.

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Special thanks to Prof. Aditya Kelkar for his help with this article.

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Our Bits of That IITK

Five years ago, a few alumni created the Facebook group “This Bit of That IITK” with the intent of preserving IITK memorabilia, while reliving the cherished memories of our formative years. Today, this community has grown to be nearly 6,000 strong, with the largest collection of current and historical IITK pictures, memorabilia, and anecdotes available anywhere. We welcome new members to this group: students, alumni, faculty, and staff, and all others with valid IITK connections, and we do ask that you respond to the three screening questions so that we can validate your membership.

Here are some bits of IITK that we’d love to share...

The Mighty Egg Coupon

Seen here are Egg Coupons and Butter Coupons from the 1970s/80s. Each egg slip could be swapped for your choice of boiled/half-boiled/half-fry/full fry. Then the 15p butter ticket was an adder if you wanted an omelette. You could get fried rice by handing over a butter coupon to fry the rice, or egg fried rice by handing an anda ticket with it. Presumably a similar system exists today.

Egg coupons also served as a currency for the times. Discreetly added to your mess bill so folks at home did not notice, and so you could swap them for cigarettes, or use as incitement to get people to do things... like a challenge jump in the pool just before the start of an inter-varsity swim meet. Or a striking pose with the body-builders displaying their abs on the L-7 stage. Yes there are a lot of stories!

Credits: H-1 Egg Coupon Dhirendra Tripathi (1980-85), H-3 coupon Nirmal Saraf (1978-83)

And a Different Kind of Coupon

This one entitles the holders to collect their bikes, from the stand near the Main Gate, after a 24-hour trip to the city. Please note the important message at the bottom and do not put this in your mouth! Shared by Mayank Agrawal, from 2010.
Antaragni ‘23: A Glimpse of Empyrean

Antaragni ‘23 was celebrated on the IITK campus from October 19-22, 2023. The celebration marked the return of the Festival to its October spot on the IITK calendar, finally putting the disruptions of the COVID pandemic into the history books. This event witnessed the spectacular culmination of an extraordinary celebration of art, culture, and talent to leave an indelible mark on the hearts and minds of all its attendees.

Picture: Harshit Kant (BT, ME, 2021-25)

Starry Nights at Antaragni ’23. Picture: Shakti Chaturvedi (Research Scholar, IME)
Day 1 of Antaragni ’23 was unveiled with unmatched zeal and enthusiasm featuring Talent Fiesta including the duo of musician Varun-Sagar and mimic artist Yash Gupta, Ritambhara (the fashion carnival) prelims, and a thrilling Rock Night with the Western Ghats Band.

*The Western Ghats Band performing at IITK*

*Antaragni 2023, IITK*
Qawaali performances, Rock music, Soulful songs, and Masquerade Night, marked the second day of Antaragni ’23. The highlights included the grand finale of the eight-month-long rock music competition Synchronicity, musician Yui Yui mesmerizing crowds with his captivating performance, Qawaali performances by the Ali Sufi Brothers and classical music by Shariq Mustafa, and music maestro Amit Trivedi leaving the audience in awe with his soothing voice and soulful melodies.
On Day 3 of Antaragni '23 IITKanpur presented theatrical acts, and Kavi Sammelan. Yogita Bhayan, leader of People Against Rape in India (PARI), graced the India Inspired event, Distinguished alumnus, Abhay K Bhushan, shared stories of success and innovation, and the Kavi Sammelan presented an enchanting assembly of poets. The EDM (Electronic Dance Music) Night in the evening featured The Lost Stories.
Day 4: With Nukkad (street theatre) Finals, Helm and Movie/Webseries Quizzes, Antaragni Idol Finals, Battle of Art, DJ War, Jitterbug Finale, India Haat, & Acapella carrying on through the day, the evening culminated with an electrifying performance by none other than the sensational Darshan Raval.

And a small piece of Festival trivia. 2023 saw two Antargini events in the same calendar year, with the delayed Antaragni ’22 in March, and Antaragini ’23 returning to its normal spot on the calendar in October. Folks on campus in the late 1960s may recall when this happened before...

The ’68 Festival was held in Jan’69. Two Festivals were organized during the cultural year 1969-70. The third Culfest was in October, and was inaugurated by the Maharaja of Patiala. Then, to continue the existing trend of the Jan Festival, the Cul. Council organized a Spring Fest in Feb, 1970. This was followed by the Fourth Festival in September, 1970.

The Spark, Looking Back – A History of the Culfest, October, 1982

Credits: The pictures have been shared by Girish Pant (Information Cell, IITK), unless indicated otherwise.

Cover Pictures:
Back: When You Come Back... Credit: This Bit of That India, photo yearbook, April 1975.
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When You Come Back
Remember Our
30 Km per Hour
Speed Limit