Anveshanā

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FEATURED INTERVIEWS

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USTAD ASAD ALI KHAN
AMIT KUBER

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REMEMBERING KHANSAAB

SARASWATA SENSARMA ON
BE WISE, RANDOMIZE!

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DEBOJIT CHANDA ON
WHISPERS IN THE VALLEY OF
GOD

Dedicated to those who dream boldly, venture endlessly, and share generously

In the Echoes of their Light

Chen-Ning Yang (1922–2025)
Idun Reiten (1942-2025)
P. P. Divakaran (1936–2025)
Rodney James Baxter (1940-2025)
Jane Goodall (1934-2025)

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January 2026

Dear Reader,

As one season swiftly blossoms into the next, *Anveshanā* January 2026 issue unfolds another chapter in the enduring spirit of truth, beauty, and inquiry, with a renewed alacrity and joy drawn from the journey just past. So many eyes, as many truths: as our last issue echoed, it has led our *Anveshanā*—our quest—far and wide.

Even though being rooted in sciences, *Anveshanā* commits to a pilgrimage of quests to far beyond familiar boundaries, landscapes, and territories. We honour the spirit of inquiry, delving into the different underpinnings of truths. In this spirit, we are continuing our journey to the quieter terrains of knowledge and the beauty within.

This issue unravels the mystique of the infinite and its praises, peering into the life of a musician, while hearing from those who appreciate and choose to follow in those footsteps; the life of a teacher, a learner amid adversity, who preaches that teaching's true importance lies in human connection and understanding, in making students feel heard. An illustrative article takes you on a journey through Har Ki Dun, also known as the Valley of Gods, with an accompanying travelogue. Another explores randomization, the concept on which the world relies: God does not play dice with the universe.

To the friends of Anveshanā, who have sustained its spirit across time and space, in particular C.S. Aravinda, we offer our lasting gratitude.

We leave you this treasure trove of a repository to unfold before your eyes. We wish you a happy journey and invite you to the pages ahead.

With warm regards,
Purnima Tiwari
Aayush Verma

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In Praise of the Infinite: Interview with Asad Ali Khan

Ustad Asad Ali Khan playing Rudra Veena in 2009 Wikipedia Domain

Asad Ali Khan (1937–2011), born in Alwar and shaped by the Jaipur lineage, stands among the most luminous voices of Hindustani classical music. Revered as Khansaab, he represented the epitome of sādhanā and discipline in Rudra Veena. Across the world, his playing carried a rare integrity, leaving behind a legacy that still feels austere and unmistakably alive.

The interview presented in these pages was conducted on 24 January 2010 at Khansaab's home in New Delhi by Ananya Chaturvedi, Taruna Kumari, and Raghav. Sixteen years later, Anveshanā is honoured to offer this conversation to its readers, as a gesture of respect to an enduring legacy and to the quiet purity with which Khansaab lived and made music. The interview was originally in Hindi but an English translation is presented alongside for a wider audience.

रुद्र वीणा आपके लिए क्या है और आपने इसे क्यों चुना?

ख़ानसाब: रुद्र वीणा को ही चुनने के आपके सवाल पर मैं ज़रा तफ़सील से बात करूँगा; क्योंकि जब तक आपको इसके बारे में कुछ बातें मालूम न हों, तब तक इस सवाल का जवाब पूरी तरह समझ में नहीं आ सकता।

मैं एक 'परंपरा' वाला व्यक्ति हूँ। परंपरा का मतलब होता है पीढ़ी-दर-पीढ़ी चलने वाली सामाजिक और सांस्कृतिक विरासत। यह कला गुरुजनों से विशेष रूप से मेरे परिवार में, लगभग बारहवीं पीढ़ी से चली आ रही है। मेरे पिताजी ने यह कला अपने पिताजी से सीखी, और उन्होंने अपने पिताजी से।

वीणा बजाने वाले लोगों को 'बीनकर' कहा जाता है और उसका शाब्दिक अर्थ वीणा-वादक होता है। यह एक फ़ारसी शब्द है; 'कार' कार्य करने वाले को कहते हैं, और 'बीन' रुद्र वीणा का उपनाम है। जब पहले लोग कहते थे कि आप बीनकार हैं, तो उसका अर्थ होता था कि आप वीणा बजाते हैं। लेकिन पिछले पचास सालों से यह परिभाषित करने की कोशिश हो रही है कि यह साज़ रुद्र वीणा है, या सरस्वती वीणा, या फिर नारद वीणा है।

पुराने बुज़ुर्ग रुद्र वीणा को ही 'बीन' कहा करते थे, और कई बार इसे 'सरस्वती वीणा' भी कहा जाता था। हालांकि सरस्वती वीणा हमारे दक्षिण भारत में बजाई जाती है, और यह [रुद्र वीणा] उससे मिलती-जुलती है। भगवान शिव ने पार्वती जी से प्रभावित होकर इस साज़ को बनाया था। वैसे वाद्य-यंत्र तो एक ही बना, लेकिन बजाने की क्रिया और तकनीक अलग-अलग रखी गईं। इस वजह से नाम अलग-अलग पड़े, अर्थात रुद्र वीणा, नारद वीणा और सरस्वती वीणा—ये सभी एक ही वीणा के नाम हैं। अब मैं आपके सवाल पर आऊँगा। मैं एक वीणा-वादक परिवार की बारहवीं पीढ़ी से हूँ। अब आने वाली पीढ़ी की ज़िम्मेदारी को ज़की हैदर पूरी करेंगे, और उनके बाद भी यह परंपरा चलती रहेगी—इंशाल्लाह!

What is the Rudra Veena to you, and why did you choose it?

Khansaab: On your question about why I chose the Rudra Veena, I will speak in a bit of detail, because unless you know a few nuances about it, you cannot fully understand the answer.

I am a person of "tradition". By tradition, I mean a social and cultural inheritance that continues from generation to generation. This art has come down through gurus—especially in my family—for about twelve generations. My father learnt this art from his father, and he in turn, from his father.

People who play the Veena are called "Beenkar", and its literal meaning is "Veena player". It is a Persian word: "kar" means the doer, and "been" is a name used for the Rudra Veena. Earlier, when people said that you are a Beenkar, it meant that you play the Veena. But for the last fifty years, there has been an attempt to define whether this instrument is the Rudra Veena, the Saraswati Veena, or the Narad Veena.

In earlier times, elders used to call the Rudra Veena itself "been," and it was also often called "Saraswati Veena". Although the Saraswati Veena is played in South India, this [Rudra Veena] resembles it. Lord Shiva, being influenced by Parvati Ji, invented this instrument. In any case, the instrument was only one, but the act of playing and the technique were kept different. Because of this, the names changed—Rudra Veena, Narad Veena, and Saraswati Veena, but these are all names for the same Veena.

सबसे बड़ी बात यह है कि इसमें ख़ास तौर पर कुछ ऐसे अनूठे कला-तत्व हैं, जो बहुत ज़्यादा मुश्किल तो नहीं, लेकिन विशिष्ट अवश्य हैं। जैसे कि ध्रुपद एक गायन-शैली के रूप में आता है, वैसे ही वाद्य-संगीत में ध्रुपद से बिल्कुल निकट जुड़ी रुद्र वीणा है। इसके पश्चात ताल-वादक और अन्य संगतकारों की भूमिका आती है; उनके लिए भी यह कला आसान नहीं है; क्योंकि मुख्य कलाकार के साथ सामंजस्य बिठाना एक अत्यंत उत्तरदायित्वपूर्ण कार्य है। हमारे पूर्वज इस परंपरा को भगवान शिव की ईजाद से जोड़ते हैं—पुराणों में ऐसा माना जाता है कि उन्होंने ही रुद्र वीणा की रचना की; और इसे हमारी परंपरा में एक महत्त्वपूर्ण तथा सर्वमान्य मान्यता के रूप में स्वीकार किया जाता है।

इसके साथ-साथ आपका यह सवाल भी था कि मैंने रुद्र वीणा को ही क्यों चुना और धारण किया? तो ख़ास तौर पर इन ललित कलाओं में—यानी जो प्राचीन विधाएँ थीं—उनमें वीणा सबसे अद्वितीय और प्राचीन है, जो अनादि काल से परंपरा के रूप में चली आ रही है। दो-तीन ख़ानदान इसमें रहे हैं, जिनमें मेरा ख़ानदान सबसे ऊपर है, और जिसे 'जयपुर बीनकार घराना' कहा जाता है।

वीणा को चुनने के लिए, या इसका वादक बनने के लिए, एक तरह की मंसूबाबंदी होती है, और वह ख़ानदान द्वारा, यानी कि माता-पिता और पूर्वजों के द्वारा की जाती है। ये सारी चीज़ें ज़रूरी हैं। मैं अपने पिताजी का एकलौता बेटा हूँ। मेरी एक बड़ी बहन थीं, फ़रीदा, और दो छोटी बहनें हैं, जिनमें से एक मौजूद हैं , माशाअल्लाह!

अब जब उनका बेटा हुआ, तब उन्होंने एक मंसूबा बनाया। जब मैं १-२ साल का था, तब से पिताजी ही मुझे अपने पास सुलाया करते थे। जबकि आम तौर पर इतना छोटा बच्चा, जिसकी उम्र साल डेढ़ साल की हो, जो न स्कूल जाने के लायक हो, न तालीम के- उसे माँ ही अपने पास रखा करती है। पर मेरे पिताजी के कहने पर माँ मुझे खिला पिला कर उनके हवाले कर दिया करती थीं। अब रात में जब भी मेरी आँख खुलती थी, या मैं रोता था, या

Now I will come to your question. I am from the twelfth generation of a family of Veena players. And the mantle of the coming generation will be carried by Zaki Haider, and even after him this tradition will continue–Inshallah!

The biggest thing is that, especially in this artform, there are some unique artistic elements which might not be very difficult, but are certainly distinctive. Just as Dhrupad comes as a style of singing, in the same way, in instrumental music, the Rudra Veena is very closely connected with Dhrupad. After this comes the role of the tabla player and other accompanists; for them, too, this art is not easy, because to establish coordination with the lead artist is a task bearing great responsibility. Our ancestors connect this tradition with Lord Shiva's invention in the Puranas; it is believed that he himself created the Rudra Veena, and this belief is widely accepted in our tradition.

Along with this, your question was also why I chose and adopted the Rudra Veena. So, especially in these arts—that is, in the ancient disciplines—the Veena is the most unique and the most ancient, and it has continued as a tradition from time immemorial. Two or three families have remained in it; among them, my family is at the top, and it is called the 'Jaipur Beenkar Gharana'.

To choose the Veena or become its player, there is a specific planning involved, typically done by the family, specifically by the parents and forefathers. All these things are necessary. I am my father's only son. I had an elder sister, Farida, and I have two younger sisters, of whom one is present,

चिल्लाता था, या कुछ भी करता था, तो पिताजी ही मुझे चुप कराते थे या दिलासा देते थे।

हमारे ख़ानदान में ख़ास तौर पर रात में रियाज़ करने का मिज़ाज है। तो पिताजी की भी यही आदत थी । रात के १० बजे के बाद से लगभग २-२:३० बजे, और कभी-कभी ३ बजे तक वे रियाज़ किया करते थे। उनका मुझे अपने पास ही रखने का सबसे बड़ा मक़सद, जिसका अंदाज़ा मुझे बाद में हुआ, था कि मेरे कानों में बचपन से ही वीणा की आवाज़ जाती रही।

अभी फ़िलहाल मेरी तालीम का यह सवाल नहीं था कि कौन सा राग बज रहा था, या कौन सा साज़ छिड़ रहा था। बस यह कि वे आवाज़ मेरे कानों तक पहुँचती रहे। जब मैं लगभग साढ़े तीन या चार साल का हुआ, तब मेरी वोकल की शिक्षा शुरू कराई गई। पढ़ाई की शुरुआत भी तभी हुई थी, और बचे हुए वक़्त में मैं सा-रे-गा-मा, यानी सरगम का रियाज़ करता था। मुझे एक छोटा सा तानपुरा थमा कर कहा जाता था कि चलो, उधर कोने में बैठकर रियाज़ करो। सुर ज्ञान की नींव गायन से ही रखी गई थी।

> "उनका मुझे अपने पास ही रखने का सबसे बड़ा मक़सद, जिसका अंदाज़ा मुझे बाद में हुआ, था कि मेरे कानों में बचपन से ही वीणा की आवाज़ जाती रही"

हम जिन्हें पलटे कहते हैं, यानी जिन्हें अभ्यास कहते हैं, मैं वही किया करता था, और उनसे ही सुरों की पहचान होती थी कि गले से, दिल से, दबाव से–कौन सा सुर कहाँ से सही तरह से निकल रहा है। वे हमें यही अभ्यास बताया करते थे, और यह रियाज़ साल-डेढ़ साल तक लगातार चलता रहा। फिर जब मैं लगभग ५-६ साल का हुआ, तब मुझें सितार बजाना बताया गया, ख़ास तौर से 'वीणा अंग' का सितार, ताकि मैं कम से कम तकनीकी तौर पर इसका आदी हो जाऊँ।

Masha'Allah!

When his son was born, my father made a plan. When I was only 1–2 years old, he would have me sleep by his side. Ordinarily, a child that young—a year or a year and a half old—who is fit neither for school nor for taalim, is kept by the mother with her; yet my father kept me close to him even then. After my mother had fed me, she would hand me over to him; this was the arrangement at night as well. It meant that whenever I woke, or cried, or shouted, or did anything at all, it was my father who would quieten me or offer me solace.

Our family has, especially, a temperament for doing riyāz at night, and my father too had the same habit. After 10 PM, until about 2-2:30 and sometimes till 3, he used to do riyāz. The biggest purpose of keeping me close to him, which I understood only later, was that from childhood, the sound of the Veena would keep reaching my ears.

For the time being, in my taalim, the question was not which raag was being played, or which saaz was being sounded—only that the sound should keep reaching my ears. When I was about three-and-a-half or four, my vocal education began. My schooling also started at the same time, and in the remaining time, I would practice sa-re-ga-ma, that is, the sargam. A small tanpura was placed in my hand, and I was told, "Come on, sit over there in the corner and do riyāz". The foundation of my knowledge of notes was laid through singing.

I used to do what we call *palte*, that is, ex-

जब मैं ११-१२ साल की उम्र का हुआ, तब मेरे कंधे पर वीणा की ज़िम्मेदारी सौंपी गई, और मेरे लिए एक छोटा सा आसन भी बनवाया गया। जैसा कि आपको मालूम है कि मैं वज्रासन में बैठता हूँ, तो मुझसे उसी का अभ्यास करवाया गया। यानी कि, चाहे मैं गा रहा हूँ या सितार बजा रहा हूँ, लेकिन रियाज़ असल में इसी आसन में बैठने का हो रहा था। यानी जब मैं लगभग १२ साल का था, तब वीणा का अभ्यास शुरू कराया गया।

अब देखिए कैसे यह सब कितनी बारीकी से योजनाबद्ध किया गया था–उस बच्चे को न तो यह पता है कि यह कितना ज़रूरी है, न उसे इसमें रुचि थी, और न ही वीणा की ध्वनि का अंदाज़ा, बस यह तय हो गया थी कि उसे यही करना है। तो उस बच्चे को एक तरह से सख़्त तालीम दी गई और तैयारी कराई गई। इसलिए यह सवाल पैदा ही नहीं होता कि वीणा को मैंने क्यूँ चुना? यह मेरे चुनने की बात नहीं थी, यह तो उन्होंने चुना था।

तो एक लंबे अरसे तक मेरी तालीम और पढ़ाई लिखाई साथ-साथ जारी रखी गई। घर पर शिक्षक भी आते थे और मैं विद्यालय भी जाता था। रियाज़ और पढ़ाई का वक़्त अलग-अलग तय किया गया था। फिर वह दौर आया जब मुझे नियम से रियाज़ के लिए बैठाया जाने लगा। शुरुआत २ घंटे से हुई, फ़िर ४, ६, ८, १०, और अंततः १२ से १४ घंटे तक का रियाज़ चलने लगा। तब जाकर कहीं आज मैं इस मुकाम पर पहुँच पाया हूँ। मुझे इस प्रकार की तैयारी से गुज़ारा गया।

मैं अकसर अपने शागिर्दों को एक मिसाल देता हूँ कि जिस तरह एक सिपाही को इसलिए तैयार किया जाता है कि जब मुल्क पर कोई आँच आए, तो वह मैदान-ए-जंग में जाकर लड़ सके और ज़रूरत पड़ने पर अपनी जान न्योछावर कर दे। हर शख़्स वहाँ नहीं जा सकता। अब आप मुझे बंदूक थमा कर यह नहीं कह सकते कि देखिए देश पर कैसा वक़्त आ गया है, आप जाइए और लड़िए।

लेकिन उस सिपाही की तरह ही मुझे मेरी कला की

ercises, and through them one recognizes the notes, through the throat, the heart, through pressure, which note is correctly coming out from where. He used to show us these very exercises, and this riyāz continued continuously for a year to a year and a half. Then, when I was about 5-6 years old, I was taught to play the sitar, especially the sitar in "veena ang," so that at least technically I would become accustomed to it.

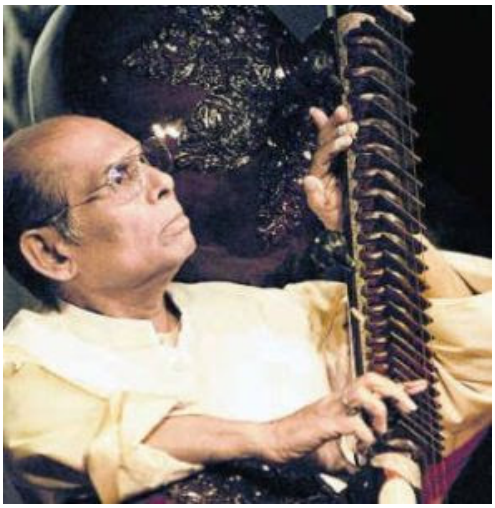
When I was 11 or 12 years old, the responsibility of the Veena was placed on my shoulders, and a small asana (seating platform) was also made for me. As you know, I sit in vajrasana, so I was made to practice that. That is, whether I was singing or playing the sitar, the riyāz was really of sitting in that asana. Then, when I was about 12 years old, Veena's practice was started.

Now see how meticulously all this was planned. That child neither knew how important it was, nor had any interest in it, nor even any sense of the Veena's sound. It was simply decided that this is what he had to do, so the child was given, in a way, a strict taalim and preparation. Therefore, the question of *why I chose the Veena* does not even arise. It was not a matter of my choosing; *they chose it*.

For a long time, my taalim and my studies continued side by side. Teachers would come home, and I would go to school as well. The time for riyāz and the time for studies were fixed separately. Then came the phase when I was made to sit regularly for riyāz. It started with 2 hours, then 4,

ज़िम्मेदारी सौंपी गई है–मुझे उस सिपाही की तरह ही तैयार किया गया है कि जैसा भी वक़्त आए, जैसी भी परेशानियों की हद से गुज़रना पड़े, मुझे उनका मुक़ाबला करना है। कोई सुने न सुने, कोई पसंद करे न करे, पैसे मिलें न मिलें, कोई सीखे न सीखे, लेकिन मुझे यही करना है। क्योंकि यह मेरे ख़ानदान की ज़िम्मेदारी है, और मुझे इस परंपरा को क़ायम रखना है।

जब मुझे यह तालीम दी गई, तो यह तय था कि इसमें पूरा जीवन देना होगा। यह महज़ शौक की बात नहीं है, न ही इसका उद्देश्य केवल मनोरंजन है। इसलिए मेरे चुनने का तो प्रश्न ही नहीं उठता। यह तो उनकी–गुरु की कृपा थी। जब मुझे इसमें रस आने लगा, तो मैंने हर दिन १२-१४ घंटे तक रियाज़ किया। आज भी उसी मुकाम को पाने के लिए रियाज़ करता हूँ। बस, यही असल बात है।



Ustaad Asad Ali Khan playing Rurdra Veena.
Public Domain

आपने फिर पढ़ाई-लिखाई और रियाज़ में तालमेल कैसे बैठाया ?

ख़ानसाब: हाँ, यह बहुत अहम बात है। मेरे वालिद–उस्ताद सादिक अली खान साहब, जो हिंदु-

6, 8, 10, and finally, riyāz went on up to 12 to 14 hours. Only then have I been able to reach this level today. I was made to go through this kind of preparation.

I often give my students an example: a soldier is trained so that when their country is in danger, they can go to the battlefield, fight, and, if necessary, sacrifice their life. Not everyone can go there. Now you cannot simply put a gun in my hand and say, "Look at what kind of time the country is going through; go and fight."

But just like that soldier, the responsibility of my art has been entrusted to me. I have been prepared like that soldier, so that whatever time comes, and however far I have to go through hardships, I have to face them. Whether anyone listens or not, whether anyone likes it or not, whether money is received or not, whether anyone learns or not, I still have to do this. Because this is my family's legacy, and I have to keep this tradition going.

When this taalim was given to me, it was already decided that I would have to give my whole life to it. This is not merely a hobby, nor is its purpose only entertainment. Therefore, the question of my choosing it does not arise. This was their grace, the guru's grace. When I began to develop a taste for it, I practiced for 12 to 14 hours a day. Even today, I practice to reach that same level. That is the real thing.

Then how did you coordinate your schooling and your riyāz?

Khansaab: Yes, that is a very important point. My father, *Ustad Sadiq Ali Khan*

स्तान के बेहद मशहूर वीणावादक थे, उन्हें नवाब-ए-रामपुर ने अपने यहाँ दरबारी संगीतकार के तौर पर बुला लिया था। हमारे बुज़ुर्ग पहले अलवर-जयपुर में थे, फिर रामपुर आ बसे। तो मेरी सारी तालीम और परवरिश वहीं हुई। इस लिहाज़ से रामपुर ही मेरा असली घर है।

> "पूरे दिन का एक खाका बना हुआ था, जो मेरे कमरे के दरवाज़े पर बिल्कुल कैलेंडर की तरह टँगा रहता था"

मेरी दिनचर्या का निज़ाम ऐसा था कि मैं सुबह ५-५:३० बजे उठता, तैयार होकर इबादत करता, और फिर रियाज़ के लिए बैठ जाता था। १० से ४ बजे तक विद्यालय होता था, तो मैं सुबह ९ बजे तक, यानी दो से ढाई घंटा रियाज़ करके ही पढ़ने जाता था। विद्यालय घर के बिल्कुल करीब था, तो बचपन से ही वहाँ जाने का सिलसिला शुरू हो चुका था।

शाम ४ बजे वापसी के बाद, घंटे भर आराम करता और फिर मास्टर साहब घर आ जाया करते थे, वे मुझे कभी गणित, कभी अंग्रेज़ी या फ़ारसी, और जो भी ज़बानें मुझे सीखनी थीं, पढ़ाते थे। ६ बजे उनके जाने के बाद फिर इबादत का वक़्त हो जाता। उसके बाद ७ बजे से मैं फिर रियाज़ में जुट जाता।

पूरे दिन का एक खाका बना हुआ था, जो मेरे कमरे के दरवाज़े पर बिल्कुल कैलेंडर की तरह टँगा रहता था। उसमें सब दर्ज था कि किस वक़्त रियाज़ करना है, कब इबादत करनी है, कब किस से मिलना है, कब पढ़ाई करनी है, और कब बाहर जाना है। हाई स्कूल तक तो यही दस्तूर रहा, क्योंकि विद्यालय का वक़्त मुकर्रर था। जब कॉलेज में गया, तब जाकर थोड़ी रियायत मिली।

वहाँ वह विद्यालय आज भी है। हाल ही में बाहर के कुछ लोगों ने मुझ पर एक वृत्तचित्र बनाया है।

Sahab, who was a very famous Veena player in Hindustan, was called by the Nawab-e-Rampur to serve as a court musician. Our elders were first in Alwar, Jaipur, and then they settled in Rampur. So all my training and upbringing took place there. In that sense, Rampur is my real home.

My daily routine was arranged so that I would wake up at 5:00 or 5:30 AM, get ready, offer my prayers, and then sit for riyāz. School was from 10:00 AM to 4:00 PM, so I would go to study only after practicing until about 9:00 AM, that is, for two to two-and-a-half hours. The school was very close to our house, so this routine had already begun in childhood.

Upon returning at 4 PM, I would rest for an hour, and then Master Sahab would come to our house. He would teach me sometimes mathematics, sometimes English or Persian, and whatever other languages I had to learn. After he left at 6 PM, it would be time for prayers again. After that, from 7 PM onward, I would again get down to riyāz.

A complete outline of the day was already made and was hung on the door of my room, exactly like a calendar. Everything was written there: at what time to do riyāz, when to pray, when to meet whom, when to study, and when to go out. This order continued until high school, because the school hours were fixed. Only when I went to college did I get a little concession.

The school is still there to this day. Only recently, some people from outside made a documentary about me. It is a detailed documentary of about an hour and a quar-

यह लगभग सवा–डेढ़ घंटे का एक विस्तृत वृत्त-चित्र है, जो मेरे पूरे जीवन पर आधारित है। इसमें रामपुर जाकर मेरे विद्यालय को दिखाया गया है कि मैं कहाँ पढ़ता-लिखता था, कहाँ बैठता था, और कहाँ रियाज़ करता था।

जैसे कि कहा जाता है कि शास्त्रीय कलाएं, विशेषकर शास्त्रीय संगीत, मूलतः एक साधना या ध्यान है। तो जब आप साज़ बजाते हैं, तब आपके भीतर क्या घटित होता है?

ख़ानसाब: यह सब हमारे गुरुजनों और बुज़ुर्गों की दी हुई तालीम, यानी शिक्षा है। गुरुजन तालीम देने के बाद यह आशीष देते हैं कि परमात्मा तुम्हारी आत्मा को अच्छी रखे। इसलिए यह आत्मा या रूहानियत वही, यानी ईश्वर देगा, और इसलिए उससे प्रार्थना करो, और उसे याद करो। उसे याद करके ही साज़ बजाओ, और इसमें अपनी आत्मा डालो। गुरु केवल तालीम दे सकता है, वह आत्मा नहीं डालता, और डाल भी नहीं सकता।

गुरु अपनी ओर से पूरी ईमानदारी और न्याय के साथ शागिर्द या बेटे को तालीम सौंपता है। लेकिन वह यह सीख ज़रूर देता है कि संगीत में शक्ति और असर पैदा करने वाला परमात्मा ही है। उसे याद करो, उसे सुनाओ, उसे मन में उतारो, और अपनी हाज़िरी लगाओ। यदि वह चाहेगा, तो तुम्हारे सुरों में तासीर, यानी असर बख्शेगा। लोग उसी असर को पसंद करते हैं, क्योंकि वह किसी की सिखाई हुई विद्या से नहीं, बल्कि ईश्वरीय कृपा से आता है।

रियाज़ करना और अभ्यास करना हमारा काम है, और हमसे रियाज़ करवाना गुरुजनों का काम है। लेकिन इसके साथ-साथ प्रार्थना भी ज़रूरी है। जब मैं सुबह रियाज़ के लिए बैठता हूँ, तो उससे लौ लगाता हूँ और दुआ माँगते हूँ कि हे ईश्वर, इन सुरों में असर भरने वाला तू ही है।

देखिए, एक होता है केवल अभ्यास, और एक होती है आत्मा। चूँकि मैंने फ़ारसी ज़बान का अध्ययन किया हुआ है, तो मैं आपको दो लफ़्ज़ बताता

ter to an hour and a half, based on my whole life. In it, they went to Rampur and showed my school, where I used to study, sit, and do riyāz.

It is often said that the classical arts, especially classical music, are basically a form of sādhanā or meditation. So when you play an instrument, what happens within you at that time?

Khansaab: This is the taalim, meaning the education, given to us by our gurus and elders. After giving taalim, the guru gives this blessing: "May the Parmātmā keep your ātmā in a good state." Therefore, this self, or spirituality, is the same thing that God will give, and so pray to Him, and remember Him. Remember Him and only then play the instrument, and put your ātmā into it. A guru can only give the taalim; he does not put the ātmā into it, and he cannot do so either.

On his part, the guru entrusts the taalim to the disciple or son with complete honesty and fairness. But he also indeed teaches that the Parmātmā alone is the one who imparts power and effect to music. Remember Him, play for Him, let Him settle into your mind, and present yourself before Him. If He wills, He will grant taaseer, meaning effect, to your notes. People like that very effect because it comes not from anyone's taught knowledge but from divine grace.

Riyāz and practice are our duty, and making us do riyāz is the work of the gurus. But along with this, prayer is also necessary. When I sit for riyāz in the morning,

हूँ: एक है रियाज़, और एक है रियाज़त। इन दोनों में बहुत बड़ा फ़र्क है। अभ्यास तो सभी करते हैं, लेकिन हमारे भारतीय संगीत में एक विचित्र बात है। आम पढ़ाई-लिखाई में, जैसे आपने बाल कक्षा से लेकर स्नातकोत्तर तक परीक्षाएँ पास कीं और उपाधियाँ लीं, उपाधि लेने के बाद आप वापस बाल कक्षा की किताबें रोज़ नहीं पढ़ते। भाषा और तकनीकी समझ आप हासिल कर चुके होते हैं, इसलिए आप केवल अपने वर्तमान विषय का, चाहे वह गणित हो या रसायन शास्त्र, का ही अभ्यास करते हैं। मगर संगीत में ऐसा नहीं है। हम आज भी वही अभ्यास दोहराते हैं जो हमने पहले दिन, या आरम्भिक कक्षा में शुरू किया था, ताकि हमारा कौशल और तकनीकी पकड़ बनी रहे।

"एक है रियाज़, और एक है रियाज़त। इन दोनों में बहुत बड़ा फ़र्क है"

यह एक पहलवान की तैयारी की तरह है। अगर पहलवान कसरत छोड़ दे, तो उसका शरीर बेकार हो जाएगा। इसलिए हमें रोज़ वहीं लौटना पड़ता है जहाँ से हमने शुरुआत की थी। यह तो हुआ अभ्यास। अब सवाल है कि रियाज़ और रियाज़त में क्या अंतर है। आपने सर्कस देखा होगा, जैसे रशियन सर्कस है–वहाँ नट और बाज़ीगर जो कमाल के करतब दिखाते हैं, वह वर्षों की मेहनत का नतीजा होता है। उनका शरीर इतना सधा हुआ होता है कि कोई साधारण व्यक्ति वह नहीं कर सकता। लेकिन वह क्या है?- वह रियाज़ है। उन्होंने केवल अपने जिस्म को साधा है। अब आपने वह अभ्यास नहीं किया, इसलिए आप वह नहीं कर सकते, पर वे कर सकते हैं। लेकिन यह साधना नहीं है, यह केवल शारीरिक अभ्यास है। इसमें शरीर को साधा जाता है। लेकिन ४०–५० साल की उम्र के बाद वे वह करतब नहीं कर सकते, क्योंकि शरीर साथ छोड़ देता है।

मगर हमारा संगीत अलग है। हमारे इस अभ्यास

I attach myself to Him and ask in prayer: "O God, it is You alone who fills these notes with effect."

See, one thing is only practice, and another thing is the ātmā. Since I have studied the Persian language, I will tell you two words: one is riyāz, and another is riyāzat. There is a massive difference between the two. Everyone practices, but in our Indian music there is a strange thing. In ordinary schooling, as you pass examinations from the early class up to postgraduate level and take degrees, after taking the degree, you do not go back and read the early-class books every day. You have acquired the language and the technical understanding, so you practice only your current subject, whether it is mathematics or chemistry. But in music, it is not like that. Even today, we repeat the same exercises that we began on the first day, or in the initial class, so that our skill and technical grip remain.

Think of a wrestler: if he abandons his exercise, his body will become useless. That is why we have to return every day to the very place from where we began. This is practice. Now the question is what is the difference between riyāz and riyāzat. You must have seen a circus, for example the Russian circus; there the acrobats and performers show remarkable feats, and that is the result of years of their hard work. Their bodies are so well-trained that an ordinary person cannot do it. But what is that? That is riyāz. They have trained only their body. Now you have not done that practice, so you cannot do it, but they can. But this is not sādhanā, this is only physical practice. In this, the body is

में आत्मा बसती है। जो हमने साधा है, उसकी असली शुरुआत तो ४० साल के बाद होती है। यही साधना है, और यही एक साधक और केवल अभ्यास करने वाले में अंतर है। हम वर्षों तक अभ्यास इसलिए करते रहे ताकि साधना के स्तर तक पहुँच सकें, और जब साधना सिद्ध होने लगती है, तब हम उस परम आत्मा को याद करके अपने सुरों में असर पैदा करने की कोशिश करते हैं। असली समय तो तब आता है।

> "यही साधना है, और यही एक साधक और केवल अभ्यास करने वाले में अंतर है"

वह शारीरिक कसरत बस एक आदत की तरह है। शरीर को उसका अभ्यस्त हो जाता है। नृत्य में भी यही है–आपने शरीर को साधा, ४० साल तक आप बहुत अच्छा प्रदर्शन कर सकते हैं, लेकिन उसके बाद वैसा प्रदर्शन संभव नहीं होता। किंतु एक संगीतज्ञ के लिए आमतौर पर लगभग ४० साल के बाद ही काम में निखार आना शुरू होता है। हम उस परमात्मा को याद करके, अपनी कला में आत्मा डालने की कोशिश करते हैं।

जब वह ताल-मेल बैठता है, तो कैसा अनुभव होता है?

ख़ानसाब: वह अनुभव ऐसा होता है मानो आज हमें सब कुछ मिल गया हो। उस संगीत का सबसे पहला श्रोता मैं स्वयं हूँ, बाकी सब बाद में। रियाज़ करके मैं बैठ गया,अब प्रयास यह है कि अपने साज़ में आत्मा ला सकूँ। कोई एक स्वर ऐसा लगे जिससे रूह खुश हो जाए। संगीत रूह की गिज़ा, यानी खुराक है–आत्मा का भोजन यही है। आत्मा हमेशा इस तलाश में रहती है कि कहीं से वह सच्ची आवाज़ मिले।

आखिरकार मैं भी तो एक आत्मा हूँ, एक संगीत-कार हूँ। मेरी आत्मा कब खुश होगी? मान लीजिए

trained. But after the age of 40 or 50, they cannot do those feats, because the body stops supporting them.

But our music is different. In this practice of ours, the ātmā dwells. What we have trained, its real beginning happens only after 40 years. This is sādhanā, and this is the difference between a sādhak and one who only practices. We kept practicing for years to reach the level of sādhanā, and when sādhanā begins to become accomplished, then, remembering that Supreme ātmā, we try to bring effect into our notes. The real time comes only then.

That physical exercise is just like a habit. The body becomes used to it. It is the same in dance too; you train the body, and for 40 years you can perform very well, but after that such performance is not possible to maintain. But for a musician, generally, only after about 40 years does refinement in the work begin to appear. Remembering God, we try to put ātmā into our art.

When that coordination falls into place, what kind of experience is it?

Khansaab: That experience is as if I had received everything today. The very first listener of that music is I myself; everyone else comes later. Having done riyāz, I sit down, and now the effort is to bring ātmā into my saaz. Let there be even one note that makes the rūḥ happy. Music is the food of the rūḥ, that is, its nourishment; this is the food of the ātmā. The ātmā is always in search of this, that it may, from somewhere, receive an authentic sound.

मैं राग मुल्तानी का रियाज़ कर रहा हूँ या प्रस्तुति दे रहा हूँ, जो कि सूर्यास्त का राग है। उस राग की प्रदर्शनी के दौरान शिष्य को कोई तान, कोई मुखड़ा, या कोई एक स्वर बहुत पसंद आ गया, लेकिन उसे यह नहीं पता कि वह तकनीकी रूप से क्या है, बस उसे वह ध्वनि अच्छी लगी। वह पूछता है–"गुरुजी, यह कैसे होगा?" अब वह कोशिश करता है। गुरु उसे बारीकियाँ बताता है और यदि रियाज़ करते-करते इत्तेफाक से कभी उससे वह सही सुर लग गया, तो जो खुशी होती है, उससे रूह खिल उठती है- यह प्राप्ति अमूल्य है। संगीतकार जानते हैं कि उसकी असली कीमत क्या है।

"उस संगीत का सबसे पहला श्रोता
मैं स्वयं हूँ, बाकी सब बाद में"

यदि आप सच्चे साधक हैं और आपने गहरा रियाज़ किया है, तो जब भी आप बजाएँगे, वह सच्चाई और असर अपने आप निखर कर सामने आएगा। लोग उसे ही पसंद करेंगे, क्योंकि वह दिल से निकली आवाज़ है। आपने अभ्यास से उसे पाया है, पर वह अपने-आप में इतना सच्चा है कि उस स्वर के आगे सब फीका है।

अब सवाल यह है कि हमारे और पाश्चात्य, यानी यूरोपीय, संगीत में मूल अंतर क्या है? उनका संगीत, चाहे वह ईरानी हो या अरबी, बहुत उम्दा है। उनके पास बेहतरीन गले हैं। लेकिन अगर तुलना की जाए, तो एक बड़ा फ़र्क है। उनका कमाल है उनकी लिपि और सटीकता। मान लीजिए मैंने एक राग या तान की स्वरलिपि लिखकर आपके विश्वविद्यालय भेज दी, और आप बैंगलोर में हैं और वायलिन बजाती हैं। आपने वह पर्चा सामने रखा, प रे ध रे म प, और उसे हूबहू वैसा ही बजा दिया जैसा मैंने लिखा था। यह आपकी निपुणता है। पाश्चात्य जगत में पुराने उस्तादों की लिखी हुई रचनाएँ आज भी १५० वायलिन वादक एक साथ, एक ही समय पर, पर्चा सामने रखकर बिल्कुल

After all, I too am an ātmā, and I am a musician. When will my ātmā be happy? Suppose I am doing riyāz on Raag Multani, or giving a performance in Raag Multani, which is a Raag of sunset. During the presentation of that raag, the disciple likes some taan, some mukhda, or some single note very much, but he does not know what it is technically; he only feels that the sound is good. He asks, "Guruji, how will this happen?". Now he tries. The guru tells him the finer points, and if, while doing riyāz, he, by coincidence, once places that note correctly, then the happiness that follows makes the rūh bloom. This attainment is priceless. Musicians know what its real value is.

If you are a genuine seeker, and you have done deep riyāz, then whenever you play, that truth and effect will, on its own, come out clearly. People will like that alone because it is a sound that comes from the heart. You have attained it through practice, but in itself it is so true that, before that note, everything else feels pale.

Now the question is: what is the fundamental difference between our music and Western, that is, European, music? Their music, whether it is Iranian or Arabic, is very fine. They have excellent voices. But if one compares, there is a big difference. Their excellence is their notation and precision. Suppose I wrote the notation for a raag or a taan and sent it to your university, and you are in Bangalore and play the violin. You kept that sheet in front of you, "pa re dha re ma pa," and you played it precisely as I wrote it. This is your skill. In the Western world, compositions by

एक जैसा बजाते हैं। यह उनकी निपुणता है।

लेकिन हमारे यहाँ का चिंतन और सोच अलग है। मैं सामने बैठकर सिखा रहा हूँ, खुद गाकर बता रहा हूँ, उसकी तकनीक समझा रहा हूँ, सुर बता रहा हूँ। भले ही मैं लिखकर भी दे दूँ, फिर भी वह वैसा नहीं बजेगा जैसा मेरे सिखाने पर बजेगा, क्योंकि भारतीय संगीत तब तक पूर्ण नहीं होता, जब तक कि आप उसमें अपनी आत्मा न डाल दें।

"यदि आप सच्चे साधक हैं और आपने गहरा रियाज़ किया है, तो जब भी आप बजाएँगे, वह सच्चाई और असर अपने आप निखर कर सामने आएगा"

कहते हैं कि एक बार आत्मा का एहसास हो जाए तो फिर मन उसी को खोजता है। पर यह इतनी आसानी से मिलती भी नहीं है। आपको उस मुकाम तक पहुँचने में कितना समय लगा?

ख़ानसाब: उसके लिए समय की कोई सीमा नहीं है। पूरी ज़िंदगी भी कभी-कभी कम पड़ जाती है। यहाँ तक कि गुरु भी यह नहीं बता सकते कि यह कब होगा। हमारा काम बस रियाज़ करके अपने-आप को माँजते, यानी अपने संगीत को साफ़ करते रहना है। हो सकता है कि अभी न हो, लेकिन एक सच्चाई यह है कि अगर आप सच्चे रास्ते पर हैं, तो वह हासिल ज़रूर होगा।

जैसा कि अभी आपने बताया कि पश्चिमी संगीत में सब कुछ लिखकर दिया जा सकता है और उसे पढ़कर शिष्य पूरी सटीकता से बजा भी सकते हैं। लेकिन भारत में 'गुरु-शिष्य परंपरा' है, जहाँ गुरु सामने बैठकर सिखाते हैं। इसके बारे में आप थोड़ा विस्तार से बता सकते हैं?

ख़ानसाब: वहाँ पुरानी रचनाएँ और बंदिशें लिखित रूप में मौजूद हैं, जिन्हें वे हूबहू उसी तरह बजा सकते हैं। हमारे यहाँ भी शास्त्र लिखा हुआ

old masters are still performed today by 150 violinists together, at the same time, with the sheet music in front of them, all playing precisely the same. This is their perfection.

But here, our way of thinking and understanding is different. I sit in front and teach; I myself sing and show; I explain its technique; I show the notes. Even if I write it down and give it to you, it still will not be played the way it is when taught by me, because Indian music is not complete until you put your ātmā into it.

It is said that once one gets a sense of ātmā, then the mind searches for that alone, but it does not come so easily either. How long did it take you to reach that state?

Khansaab: There is no fixed limit for that. Sometimes, even a whole life turns out to be not enough. Even the guru cannot say when it will happen. Our work is only to keep doing riyāz and keep polishing ourselves, that is, keep refining our music. It may be that it does not happen yet, but one truth is that if you are on the true path, then you will attain it for sure.

As you just said, in Western music, everything can be written down, and by reading it, the student can also play it with complete accuracy. But in India, there is the "guru-shishya parampara," where the guru sits in front and teaches. Could you tell a little more about this?

Khansaab: There are old compositions and bandishen available in written form, which they can play exactly as written. In

है, लेकिन उस पर अमल कैसे करना है, यह क्रिया केवल गुरु ही बता सकता है। हम गुरु होने के नाते बताते भी हैं और चाहते भी हैं कि शिष्य अच्छा बजाए। लेकिन अगर हम उसे लिखकर दे भी दें, तो भी वह उसे, उसी वक़्त वैसा नहीं बजा सकता, क्योंकि हमारा संगीत रचनात्मक है।

"अगर कोई मुझसे कहे कि 'साहब, जैसा आपने कल बजाया था, आज ठीक वैसा ही फिर से बजा दीजिए', तो वह वैसा नहीं होगा"

उदाहरण के तौर पर, मान लीजिए मैंने आई-आई-टी दिल्ली में पहले राग यमन-कल्याण बजाया है, और वह बहुत सफल भी रहा, लोगों को बहुत पसंद आया। अब अगर कोई मुझसे कहे कि 'साहब, जैसा आपने कल बजाया था, आज ठीक वैसा ही फिर से बजा दीजिए', तो वह वैसा नहीं होगा। मैं चाहूँ तो भी नहीं होगा। हो सकता है उससे बेहतर हो जाए, या उससे कुछ कम रह जाए, लेकिन बिल्कुल वैसा नहीं होगा। इसका कारण क्या है? कारण यह है कि हमारे संगीत में हर पल सृजन, यानी नवनिर्माण, होता है। सुर वही हैं, सब कुछ वही है, लेकिन उस पल मेरी आत्मा और मेरे मन की जो उपज है, वह उसे नया रूप देती है। यह बात लिखकर नहीं समझाई जा सकती। यह किसी किताब में नहीं मिलेगी। इसीलिए हमारे संगीत में हर बार वही सुर नया लगता है। सुर नहीं बदलेंगे, लेकिन अंदाज़ हर बार नया होगा। अगर गुरु ने आज कुछ लिखवाया भी है, तो कल वह ठीक वैसे का वैसा ही निकले, यह संभव नहीं है।

तो मूलतः गुरु की क्या भूमिका है? जब 'आत्मा' शिष्य खुद डालता है और हमारा संगीत हर बार बदलता रहता है, तो क्या गुरु की ज़िम्मेदारी केवल यह देखना है कि हम सही कर रहे हैं या नहीं?

ख़ानसाब: गुरु की भूमिका बहुत बड़ी है। सबसे महत्वपूर्ण काम यह है कि गुरु निरंतर यह परखता

our tradition too, the books are written, but how to act upon them, that practice is something only the guru can tell. As a guru, we also tell it, and we also want the disciple should play well. But even if we write it down and give it, they still cannot play it in the same way at that very moment, because our music is creative.

For example, suppose I played Raag Yaman-Kalyan earlier at IIT Delhi, and it was very successful, with people liking it a lot. If someone tells me, "Sahab, play exactly the same again, as you did yesterday", then it will not be the same. Even if I want to, it will not be the same. It may become better than that, or it may remain somewhat less than that, but it will not be precisely the same. What is the reason for this? The reason is that in our music, at every moment there is creation, that is, new making. The notes are the same, everything is the same, but in that moment, the yield of my ātmā and my mind gives it a new form. This cannot be explained by writing. You will not find this in any book. That is why in our music, every time the same note feels new. The notes will not change, but the manner will be new every time. Even if today the guru has written something down, it is not possible for it to come out precisely the same way tomorrow.

So, fundamentally, what is the role of the guru? When the disciple himself brings in the "ātmā," and our music keeps changing each time, is it the guru's responsibility, only to see whether we are doing it correctly or not?

Khansaab: The role of the guru is imperative. The most important work is for the guru to continuously test whether the

रहता है कि शिष्य का रास्ता सही है या नहीं। वह देखता है कि तकनीकी रूप से शिष्य ठीक जा रहा है या नहीं। उसके स्वरों में वह सच्चाई आई है या नहीं। चूँकि मैं वाद्य की बात कर रहा हूँ, तो गुरु देखता है कि साज़ पर पकड़ सही है या नहीं, सुरों का लगाव और प्रवाह सही है या नहीं।

वह [गुरु] शिष्य की सोच को भी देखता है कि कहीं कोई भटकाव तो नहीं है। अगर शिष्य सही रास्ते पर नहीं है, तो गुरु बार-बार उसे खुद गाकर और बजाकर सुनाता है कि देखो भाई, असली सच्चाई यह है। अभी आपसे यह नहीं हुआ, अभी वह बात नहीं बनी।

> "अगर शिष्य सही रास्ते पर नहीं है, तो गुरु बार-बार उसे खुद गाकर और बजाकर सुनाता है कि देखो भाई, असली सच्चाई यह है"

वहाँ (पश्चिमी संगीत में) कोई यह बताने वाला नहीं है, वहाँ अभ्यास और सटीकता है। आपने वही तान, वही स्वर, हूबहू बजा दिए। लेकिन हमारे यहाँ, अगर गुरु ने लिखकर दिया और हमने वैसा ही बजा भी दिया, तब भी अगर उसमें वह सच्चाई नहीं है, तो वह संगीत अधूरा है। यही मुख्य अंतर है।

आज के ज़माने में गुरु-शिष्य परंपरा कि क्या स्तिथि है? क्या इस परंपरा को आज के ज़माने में अहमियत दी जाती है?

ख़ानसाब: सच कहा जाए तो आज के ज़माने में यह परंपरा न के बराबर रह गई है। न अब वैसे गुरु हैं, न वैसे शिष्य। जो असली गुरु हैं भी, वे बहुत गिने चुने रह गए हैं। और जहाँ गुरु-शिष्य परंपरा नहीं है, वहाँ न वह असर है, न वह बात है, न वह सच्चाई है, और न ही वह संगीत है। हम उसे संगीत मानते ही नहीं।

> "हम उसे संगीत मानते ही नहीं"

disciple's path is correct. He sees whether, technically, the disciple is learning correctly or not, and whether that truth has come into his notes or not. Since I am speaking of an instrument, the guru assesses whether the grasp of the instrument is correct and whether the placement and flow of the notes are correct.

He [Guru] also watches the disciple's thinking to see whether there is any deviation or a loss of the intended path. If the disciple is not on the right path, the guru repeatedly demonstrates by singing and playing, as if to say: "Look, this is the authentic truth; this has not yet happened through you; that thing has not yet come together."

There (in Western music), there is no one to tell you this; there, they have practice and precision. You played the same taan, the same notes, precisely as they were, verbatim. But here, even if the guru has written it down and we have played it precisely that way, still, if that truth is not in it, then that music is incomplete. This is the main difference.

What is the state of the Guru–Shishya tradition in today's age? Is this tradition still given importance today?

Khansaab: To tell the truth, in today's age, this tradition has become almost non-existent. There are no longer gurus like that, nor disciples like that. Even the genuine gurus who do exist have become very few in number. And where the Guru–Shishya tradition is not present, there is neither that effect, nor that depth, nor that truth, nor even that music. I do not even regard

तो हम उस परंपरा को वापस कैसे ला सकते हैं?

ख़ानसाब: परंपरा तो वही ला सकते हैं जिनके पास वह बची हुई है। इसका केवल एक ही रास्ता है कि गुरु-शिष्य परंपरा को फिर से स्थापित किया जाए। इसका कोई छोटा रास्ता नहीं है।

कुछ ऐसे संस्थान हैं जिन्होंने गुरु और शिष्य को एक साथ रखा है। गुरु का कक्ष एक जगह होता है, जहाँ पर वह सोता है, और शिष्य भी उसी तख्त के पास सोता है। जब भी गुरु को कुछ याद आया, चाहे रात हो या दिन, वह शिष्य को उठाता है और कहता है- बैठ जाओ! और इसे समझो। यह नियमित कक्षा से अलग होता है। कोलकाता में आई-टी-सी एस-आर-ए, यानी संगीत रिसर्च एकैडमी, में यही होता है। वहाँ उस्तादों ने अपने शिष्य तैयार किए हैं। पंडित अजय चक्रवर्ती जी, उस्ताद राशिद खान, ये सब वहीं के शिष्य हैं। राशिद खान ने अपने नाना, उस्ताद निसार हुसैन खान साहब से वहीं रहकर सीखा और कामयाब हुए। विदुषी गिरजा देवी जी ने भी वहीं रहकर शिष्य तैयार किए।

उल्हास नागेश कशाळकर जी भी वहीं के शिष्य हैं। वे [कशाळकर] आगरा घराने के उस्ताद लताफत हुसैन खान साहब के शागिर्द हैं और वहीं रहे हैं। इसके विपरीत, ऐसे संस्थान जहां गुरु-शिष्य परंपरा का पालन इतनी लगन से नहीं, और वहाँ के शिष्यों की तैयारी में भी कमी रह जाती है। हिंदुस्तान में ऐसे कई केंद्र हैं पर वहाँ से हमें सधे हुए वादक या संगीतकार अभी तक इसलिए नहीं मिले क्योंकि वहाँ कला तो है, पर कला को सुरक्षित रखने वाली परंपरा नहीं है।

> "वहाँ कला तो है, पर कला को सुरक्षित रखने वाली परंपरा नहीं है"

it as music.

In that case, how can we bring that tradition back?

Khansaab: Only those in whom it has survived can restore that tradition. There is only one way: the Guru–Shishya tradition must be established again. There is no shortcut.

Some institutions have kept the guru and the disciple together. The guru's room is in one place, where he sleeps, and the disciple also sleeps near that same cot. Whenever the guru remembers something, whether it is night or day, they wake the disciple and say, "Sit down! And understand this." This is different from a regular class. At ITC SRA in Kolkata, that is, the Sangeet Research Academy, this is exactly what happens. There, the ustads have trained their disciples. Pandit Ajoy Chakrabarty ji, Ustad Rashid Khan, and all of these disciples are from there. Rashid Khan stayed there and learned from his maternal grandfather, Ustad Nisar Hussain Khan Sahab, and became successful. Vidushi Girija Devi ji also stayed there and trained disciples there.

Ulhas Nagesh Kashalkar ji is also a disciple from there. He [Kashalkar] is a disciple of Agra gharana's Ustad Latafat Hussain Khan Sahab, and he stayed there as well. In contrast, in institutions where the Guru–Shishya tradition is not followed with the same dedication, there remains a shortcoming in the preparation of disciples. And there are many such centers in Hindustan, but from there we have not yet found well-trained instrumentalists or

गुरु अपने गुरु के और अपने बुज़ुर्गों के तजुर्बे बताते हैं। वे बताते हैं कि किस तरह उन्होंने सीखा किन चीजों को सीखने में उन्हें मुश्किलें हुईं–ये सारे किस्से वे हमारे सामने दोहराते हैं। उन्होंने संगीत को जैसा पाया, वैसा ही हमारे सामने रखा। जब उन्होंने यह तालीम दी, उसके साथ-साथ यह भी बताया कि इसमें तकलीफें भी आती हैं। वे अपने आप को इस तरह पेश करते थे, अपनी रूह हमें सुनाते थे, और अपने बड़ों के किस्से बताते थे। यह रास्ता इतना आसान नहीं है, यह आराम से करने वाली चीज़ नहीं है। शिष्य को गुरु की देख-रेख में तैयार इसलिए किया जाता है ताकि यह गुरु-शिष्य परंपरा का सिलसिला चलता रहे। यह अब शिष्य की ज़िम्मेदारी हो जाती है कि वह इस परंपरा को आगे बढ़ाए।

लेकिन यह बात भी है कि अब के दौर में महाविद्यालय से स्नातकोत्तर की उपाधि लेना ज़रूरी है। एक बार विश्वविद्यालय से डिग्री मिल गई, तो आपको आगे नौकरी मिल जाएगी। वैसे उस वक़्त डिग्री का इतना चलन नहीं था।

"वे अपने आप को इस तरह पेश करते थे, अपनी रूह हमें सुनाते थे, और अपने बड़ों के किस्से बताते थे। यह रास्ता इतना आसान नहीं है, यह आराम से करने वाली चीज़ नहीं है"

पर समझने वाली बात यह भी है कि संगीतकार बनने में महारत ऐसी नहीं है कि बस एक बार कामयाब हो गए, तो समझो उस्ताद बन गए या बहुत बड़े कलाकार हो गए–बिल्कुल नहीं! बल्कि हमारे बुज़ुर्गों और गुरुजनों ने ना तो कभी इस सोच को पसंद किया और ना ही हमें ऐसी तालीम दी। उसका हम पर गहरा असर हुआ कि- "अच्छा, संगीत यह भी है!" और तालीम देने के बाद वे कहते थे कि ईश्वर से प्रार्थना करो, क्योंकि असर देने वाला तो वही है। अगर वह असर बख्शेगा, तो

musicians, because there is art, but no tradition to safeguard it.

The guru shares the experiences of his own guru and of his elders. He tells how he learned, and what difficulties he faced in learning certain things, and he repeats all those stories before us. He placed music before us exactly as he had received it. When he gave this training, he also explained that hardships come with it. He would present himself in such a way that we would hear his ātmā, and he would tell the stories of his elders. This path is not so easy; it is not something to be done in comfort. A disciple is trained under the guru's care so that the chain of this Guru–Shishya tradition continues. Now it becomes the disciple's responsibility to carry this tradition forward.

But it is also the case that, in today's time, it is necessary to obtain a graduate degree from a college. Once you have received a degree from the university, you will be able to get a job. In those days, that kind of reliance on degrees was not so prevalent.

But it is also important to understand that mastery in becoming a musician is not about succeeding once and then considering yourself an ustad or a very great artist. Not at all! Instead, our elders and our gurus neither ever approved of this way of thinking nor did they train us in this way. It had a strong effect on us. "So, this is also music!" And after giving training, they would say: Pray to God, because the one who grants the effect is only Him. If God bestows that effect, then people will surely like it.

लोग उसे ज़रूर पसंद करेंगे।

तो ये अनुभव, ये तजुर्बा, ये आत्मा, ये सब उन्हीं की दी हुई तालीम ही तो है। परंपरा का मतलब सिर्फ यह नहीं है कि एक पिता ने बेटे को सिखाया और बेटे ने अपने बेटे को सिखाया। बहुत से ऐसे गुरुजन गुज़रे जिन्होंने अपने बेटों को नहीं सिखाया, तो क्या परंपरा रुक गई? नहीं! बल्कि असल बात यह है कि उन्होंने अपने पुराने अनुभवों की तालीम दी है, उसी ईमानदारी से। वे बताते थे कि उनके बुज़ुर्ग क्या करते थे, क्या चाहते थे, क्या फ़रमाते थे। वे किस तरह प्रस्तुति देते थे, और संगीत को कैसे समझते थे।

अब शागिर्द यह सुन रहा है, देख रहा है, और समझ रहा है कि उन्होंने ऐसा किया तो वे यहाँ तक पहुँचे। फिर एक मंज़िल वह आती है जब वह खुद वही करने लगता है। तब वह उसकी अहमियत, उसकी तकनीक और उसकी मुश्किलों को समझने लगता है कि- "हाँ, यह तो बहुत कठिन है। पता नहीं वे कैसे इन मुश्किलों को पार कर कामयाब हो गए?" तो यह गुरुजनों की तालीम का एक सिलसिला रहा है।

मैं बार-बार इसी बात पर ज़ोर दे रहा हूँ कि गुरु-शिष्य परंपरा तालीम की सबसे बड़ी पाठशाला है। यह चीज़ किसी और विद्यालय में गुरु के बिना नहीं मिल सकती।

"असल बात यह है कि उन्होंने अपने पुराने अनुभवों की तालीम दी है, उसी ईमानदारी से"

हर गुरु का एक तरीका होता है, एक पद्धति होती है। वह उन्हीं तकनीक और बारीकियों को बताता है। तो जब तक गुरु-शिष्य परंपरा में वह तौर-तरीके नहीं होंगे, तो बिना गुरु-शिष्य परंपरा के वैसी कामयाबी नहीं मिल सकती।

अब एक नई यह पहल की गई है कि जब बड़े-बड़े सम्मेलन होते हैं, तो मुझसे और कई संगीतका-

So these experiences, this lived knowledge, this ātmā, all of this is precisely the training they have given. Tradition does not mean only that a father taught his son and the son taught his own son. Many such gurus have passed who did not teach their sons, so did the tradition stop? No! Instead, the real point is that they taught their accumulated, earlier experiences with that same honesty. They would tell what their elders used to do, what they wanted, and what they would prescribe. How they would present, and how they would understand music.

Now the protégé is listening to this, watching it, and understanding that they had did it this way, and have reached this point. Then a stage comes when the shishyas themselves begin to do the very same thing. At that point, they begin to understand its importance, its technique, and its difficulties, thinking, "Yes, this is very hard. Who knows how they managed to cross these difficulties and become successful?" So this has been a continuous chain of training from the gurus.

This is exactly what I keep emphasizing again and again: the Guru-Shishya tradition is the finest school of training. This is something that cannot be found in any other institution without a guru.

Every guru has a way, a method. He explains those very techniques and subtleties. So until those ways and practices exist within the Guru–Shishya tradition, the same kind of success cannot be attained without the Guru–Shishya tradition.

Now, a new initiative has been taken: when

रों से कहा जाता है कि 'आप चुनिए, अगर कोई रुद्र वीणा का साधक है, सीखना चाहता है और लगन रखता है, तो हम [संस्थान] छात्रवृत्ति देने को तैयार हैं।' डॉ. किरण सेठ जी [आईआईटी-दिल्ली] आए, और मुझसे कई बार कहा कि बच्चे वज़ीफ़ा लें और दिल्ली में रहकर हमसे सीखें।

जब तक इस तरह की और व्यवस्थाएं नहीं होंगी, तब तक इस प्राचीन कला और इस गुरु-शिष्य परंपरा वाली विद्या में कामयाबी मिलना मुमकिन नहीं है।

आपने बताया कि जब आप छोटे थे, तो आपके पिताजी आपको साथ में सुलाकर रियाज़ करते थे, जिसका आप पर गहरा 'असर' हुआ। और अब, जैसा आपने बताया कि डा सेठ का 'सुझाव' है कि कोई नया शिष्य आए और आपके सानिध्य में सीखे, ताकि आप अपनी विद्या उसे 'सौंप' सकें। तो इन दोनों में अंतर क्या है? एक तरफ वो माहौल जो आपको बचपन से मिला, और दूसरी तरफ अब इस उम्र में शुरुआत करना—इन दोनों के परिणामों में क्या फ़र्क है?

ख़ानसाब: अभी तक यह क्यों नहीं हो पाया, इसमें बहुत सी दिक्कतें और परेशानियाँ हैं। इसमें दो अलग-अलग बातें भी हैं- एक बात यह है कि दिल्ली में अगर कोई अकेला आए भी, तो उसका वज़ीफ़ा या छात्रवृत्ति इतनी तो होनी चाहिए कि उसका दिल्ली में गुज़ारा हो सके। मंत्रालय की तरफ से एक-दो शिष्य मेरे पास आए भी थे, लेकिन दिल्ली में रह नहीं सके। एक-आध को तो मैंने अपने पास ही रख लिया। जैसे एक लड़का जोरहाट, असम से आया था। उसे २००० रुपये की छात्रवृत्ति मिलती थी, जो दो साल के लिए तय हुई थी। अब कहीं दूर से ट्रेन का टिकट लेकर आने-जाने में ही उसके १०००-१२०० रुपये खर्च हो जाते थे। वह एक-दो बार तो आया, फिर आ भी नहीं सका।

big conferences take place, I, and many other musicians, are told, "You choose. If there is any practitioner of the Rudra Veena who wants to learn and has dedication, then we, as an institution, are ready to give a scholarship." Dr. Kiran Seth ji came to IIT Delhi, and told me many times that children should take a stipend and, staying in Delhi, learn from us.

Until more arrangements of this kind exist, it is not possible to succeed in this ancient art and in this knowledge sustained by the Guru–Shishya tradition.

You said that when you were small, your father used to practice with you by having you sleep alongside him, and that it had a profound "impact" on you. And now, as you said, Dr. Seth's suggestion is that a new disciple should come and learn in your presence, so that you can *hand over* your knowledge to him. So what is the difference between these two? On one side is the environment you received from childhood, and on the other side is the beginning now at this age. What difference is there in the outcomes of the two?

Khansaab: So far, this has not happened because there are many difficulties and problems involved. There are two separate issues here. One issue is that if someone comes alone to Delhi, their stipend or scholarship should at least be enough to cover their living expenses. A few disciples came to me from the ministry, but they could not stay in Delhi. I kept one or two with me. For instance, a boy came

"यह केवल साल-दो साल की बात नहीं है"

बाहर के लोगों के लिए यहाँ रहना और आना जाना बहुत मुश्किल है, तो केवल एक वज़ीफ़े से यह कैसे संभव होगा? व्यवस्था ऐसी होनी चाहिए कि कोई यहाँ दिल्ली में रहकर रोज़ रियाज़ कर सके। कम से कम ५-१० साल का वक़्त तो चाहिए। यह केवल साल-दो साल की बात नहीं है। मंत्रालय ने साल-दो साल के लिए वज़ीफ़ा दे भी दिया, तो उससे ज़्यादा कुछ हासिल नहीं हो पाएगा।

"दूसरी बात यह है कि शिष्य का चुनाव तो मैं ही करूँगा। मान लीजिए अगर चार लोग आए हैं, पर उनमें से परखना और चुनना तो मुझे ही है। "

दूसरी बात यह है कि शिष्य का चुनाव तो मैं ही करूँगा। मान लीजिए अगर चार लोग आए हैं, पर उनमें से परखना और चुनना तो मुझे ही है। आज से तकरीबन ५-६ साल पहले मणिपाल में स्पिक मैके का वार्षिक सम्मेलन हुआ था, शायद मई या जून में। वहाँ ऐलान किया गया था कि बैंगलोर के पास किसी गाँव की एक लड़की है जो रुद्र वीणा बजाती है। वह अपनी एक सहेली और रुद्र वीणा के साथ वहाँ मुझसे मिलने आई। वह ४-५ दिन वहाँ रही, और मुझसे थोड़ी तालीम भी ली। फिर वह वहाँ से चली गई। मैंने उससे कहा- 'यह तो ठीक है कि तुम यहाँ आ गई और एक-आध चीज़ सीख ली, लेकिन सीखने के लिए तो रोज़ रियाज़ करना पड़ता है। मैं तो रोज़ तुम्हारे पास नहीं आ सकता।' अब चूँकि वह शादीशुदा है, इसलिए उसका यहाँ आना मुमकिन नहीं।
पिछले साल यह पता चला कि मेरी एक शागिर्द ने ग्वालियर में आकर प्रस्तुति दी है। बाद में मालूम हुआ कि वे खुद ही वहाँ आई हुई थीं। वैसे मेरी

from Jorhat, Assam. He used to receive a 2000-rupee scholarship, fixed for two years. Now, just in buying a train ticket from far away and traveling back and forth, he would spend 1000–1200 rupees. He came once or twice, and then he could not come again.

For outsiders, living here and traveling back and forth is very difficult, so how will this be possible with only a stipend? The arrangement should be such that someone can stay here in Delhi and practice every day. At least 5–10 years of time is needed. This is not merely a matter of a few years. Even if the ministry gives a stipend for one or two years, nothing more than that will be achieved.

The second issue is that I will select the disciple. Suppose four people come, but it is for me to assess and choose among them.

About 5–6 years ago, SPIC MACAY's annual convention took place in Manipal, perhaps in May or June. It was announced that there is a girl in a village near Bangalore who plays the Rudra Veena. She came there to meet me, along with a friend and her Rudra Veena. She stayed there for 4–5 days and also received some training from me. Then she left from there. I told her, "It is fine that you came here and learned one or two things, but to learn, you must practice every day. I cannot come to you every day." Now, since she is married, it is not possible for her to come here. Last year, it was reported that one of my shāgirds came to Gwalior and gave a performance. Later,

एक और महिला शागिर्द हैं–ज्योति हेगड़े–जिन्होंने मुझसे ध्रुपद में तालीम ली।

ज़की हैदर- साहब, इनका सवाल दरअसल यह है कि वह उस अंतर को समझना चाहती हैं। आपको तो बचपन से वह माहौल मिला, आप उसी वातावरण में रहे। लेकिन अगर कोई इस उम्र में आकर सीखेगा, तो उसके भीतर वह 'आत्मा' या संगीत की वह भावना कैसे पैदा होगी? आपको तो बचपन से साथ रहने का लाभ मिला।

हाँ, यह एक महत्वपूर्ण पहलू है और इसे समझना ज़रूरी है। देखिए, मुझे जो मौका मिला यह तो मेरी क़िस्मत की बात है। लेकिन आज के दौर में हमें भी कुछ समझौता करना पड़ेगा। कुछ ऐसा समझौता जो शायद हमारे गुरुजन नहीं कर सकते थे।

लेकिन समझौते का अर्थ हर प्रथा बदलना नहीं है। आज के हालातों को देखते हुए हमें कुछ हद तक नरमी भी बरतनी ही होगी। शागिर्दों को रियाज़ की आदत समझानी पड़ेगी ताकि वे अपने घर जाकर रियाज़ करने लगें। कम से कम इतना तो हो कि २ से ५ साल में वे कुछ हद तक कामयाब हो जाएँ। अब मैं वह पुराना तरीका नहीं अपना सकता।

लेकिन मैं एक दूसरा पहलू भी ज़रूर मानूँगा। उम्र का तक़ाज़ा अपनी जगह है, और बचपन से गुरु के साथ रहने का अपना एक अलग फ़ायदा है। मगर अगर कोई किसी और उम्र में सीखने आता है, तो पहली बात यह है कि उसकी आत्मा वैसी होती है। उसका वह शौक उसे यहाँ लाता है। यह भी कुदरत की ही देन है कि उसने संगीत को समझा और पसंद किया, तभी तो वह आया। तो कहीं न कहीं संगीत उसकी आत्मा में बस ही जाता है।

गुरु के सानिध्य में रहकर, चीज़ों को समझकर, उसमें जो निखार आता है, जिसे हम चार चाँद लगाना भी कहते हैं, वह अपने-आप और मज़ीद बढ़ता चला जाता है। संगीत कहीं न कहीं उसकी

it was learned that she had come there on her own. Also, I have another female student, Jyoti Hegde, who learned from me in Dhrupad.

Zaki Haider: Sahab, their question is to understand that difference. You had an environment from childhood, and you remained in that atmosphere. But if someone comes and learns at this [later] age, then how will that "ātmā," or that feeling of music, arise within them? You had the benefit of living together from childhood.

Yes, this is an important aspect, and it is necessary to understand it. Look, the opportunity I got was a matter of my fate. But in today's time, we too will have to make some compromise, something that perhaps our gurus could not have made.

But compromise does not mean changing every practice. Given today's circumstances, we will need to be somewhat flexible. We will have to teach the disciples the habit of riyāz so they can go home and begin practicing. At the very least, it should be such that in 2 to 5 years, they become successful to some extent. Now I cannot adopt that old method.

But I will also certainly acknowledge another aspect. The demands of age have their place, and living with the guru from childhood has its own distinct advantage. Yet if someone comes to learn at another age, the first thing is that their ātmā is such. That passion brings them here. It is also a gift of nature that they understood and liked music; only then did they come. So, somewhere or other, music already

आत्मा में भी उतरा हुआ होता है, तभी तो सीखने की भावना इतनी प्रबल होती है। चाहे वह किसी भी उम्र में आए, संगीत उसकी आत्मा में होगा ही। यहाँ उम्र की कोई क़ैद नहीं है।

मगर अब गुरु को भी थोड़ा समझौता करना पड़ेगा। कम वक़्त में कुछ ऐसे रास्ते और तरीके निकालने होंगे कि शिष्य अपनी पढ़ाई या काम भी करता रहे, और साथ ही संगीत की शिक्षा भी चलती रहे। सबसे बड़ी बात यह है कि अगर आपने इस कला [संगीत] में स्नातकोत्तर किया है, तो कम से कम यह तसल्ली रहती है कि कहीं नौकरी मिल जाएगी। आपने अभी वीणा में कोई स्नातकोत्तर की उपाधि तो रखी नहीं है, मगर इतना तो होना चाहिए कि आप किसी इदारे, विद्यालय, विश्वविद्यालय या अकादमी में कुछ कक्षाएँ ले सको, सिखा सको, या थोड़ी बहुत प्रस्तुति दे सको। पुराने और आज के गुरु में यही फ़र्क है कि हमें थोड़ा समझौता करना पड़ेगा।

हाँ, लेकिन समझौते का मतलब यह हरगिज़ नहीं कि हम अपनी शैली बदल दें। मेरे पास बहुत से ऐसे विदेशी छात्र आए जो मेरी बैठक में बैठ ही नहीं सकते थे। वे बाहर से आए थे और बोले, 'साहब, हम इस तरह नहीं बैठ सकते'। तो मैंने कहा, फिर आप मुझसे सीख भी नहीं सकते। यहाँ मैंने कोई समझौता नहीं किया। न ही मैं यह समझौता करूँगा कि कोई कहे, 'साहब, मुझे इस पर कोई धुन बता दीजिए, कोई भजन या गीत सिखा दीजिए'। नहीं, यह भी नहीं होगा। यह हो सकता है कि मैं कम से कम समय में तुम्हें ज़्यादा से ज़्यादा तालीम दे दूँ, इस तरह तैयार करूँ कि तुम जल्द ही किसी क़ाबिल हो सको। लेकिन यह सीखने वाले पर भी निर्भर करता है कि वह उसे कितनी जल्दी ग्रहण करता है, कितनी जल्दी उसे अपनी आत्मा में उतार पाता है। क्योंकि जो आप आत्मा से जुड़ा सवाल कर रही हैं, वह कोई किसी को घोल कर नहीं पिला सकता। दिमागी तौर पर समझना एक चीज़ है, और रूहानी तौर पर उसे महसूस करना दूसरी चीज़। यह पूरी तरह शिष्य की रूह पर निर्भर करता है कि वह उसे कैसे अपनाता है।

settles into their ātmā.

By living in the guru's presence, by understanding things, the refinement that comes, which we also call "to add to the charm", goes on increasing by itself, and even further. Somewhere or other, music has already descended into their ātmā too; only then is the urge to learn so strong. Whatever age they come at, music will be in their ātmā. There is no age restriction here.

But now the guru, too, will have to make a little compromise. In less time, some such paths and methods will have to be found so that the disciple can continue their studies or work, and at the same time, the teaching of music continues. The biggest point is that if you have completed a graduate degree in this art (music), at least you have the reassurance that you will get a job somewhere. You do not yet hold any graduate degree in veena, but you should at least be able to take a few classes, teach, or give a short performance at an institution, school, university, or academy. This is the difference between the older guru and today's guru: we will have to make a little compromise.

Yes, but compromise absolutely does not mean that we change our style. Many foreign students came to me who could not even sit in my baithak. They came from outside and said, "Sahab, we cannot sit like this". So I said, then you cannot learn from me either. Here, I made no compromise. Nor will I make this compromise, that someone says, "Sahab, please tell me some tune on this, teach me some bha-

हाँ, संगीत के घराने में जन्म लेने का फ़ायदा ज़रूर होता है, क्योंकि बच्चे को शुरू से वैसा माहौल मिलता है। लेकिन अब यह ज़रूरी नहीं कि उस्ताद सिर्फ़ अपने बेटे या रिश्तेदारों को ही सिखाएँ। अगर कोई बाहर का व्यक्ति आता है, और उसमें सीखने की ललक और कुव्वत है, और फिर वही आत्मा वाली बात आ गई, तो वह सिखा सकता है। बहुतों ने किया भी है। लेकिन अंततः यह उसी पर निर्भर करता है, क्योंकि यह हुनर कोई किसी को तश्तरी में रखकर नहीं दे सकता है। आज के दौर में लोगों के पास वक़्त की सबसे बड़ी किल्लत है। लेकिन अगर कोई सीखना चाहता है, तो सीखने वाले को कुर्बानी तो देनी पड़ेगी, समय की भी और हर लिहाज़ से भी।

आज के दौर में सबसे बड़ा एतराज़ यह है कि लोग कहते हैं, 'साहब, आजकल के गुरु सिखाते नहीं हैं, सिवाय अपनी औलाद के। अपने बेटे के अलावा ये किसी को इल्म नहीं देते।' यह बात बिल्कुल गलत बात है। लेकिन आप में भी तो कम से कम पात्रता होनी चाहिए।

Pandit Ravi Shankar in Delhi in 2009
Wikipedia Commons

मैं आपको पंडित रवि शंकर जी की इतनी बड़ी

jan or song". No, that will not happen either. It may be that, in the least amount of time, I can give you as much training as possible, and prepare you in such a way that you can become capable soon. But it also depends on the learner: how quickly they absorb it and how quickly they can bring it down into their ātmā. Because the question you are asking, connected with ātmā, no one can dissolve and pour into someone else. Understanding intellectually is one thing, and feeling it spiritually is another. This depends entirely on the disciple's rūh, on how they make it their own.

Yes, there is certainly an advantage in being born into a musical gharana, because the child gets that kind of environment from the very beginning. But now it is not necessary that an ustad should teach only his son or relatives. If an outsider comes, is eager to learn, and has the capacity to learn, and then that same ātmā-related matter comes up, he can be taught. Many people have done so as well. But in the end, it depends on the person himself, because this skill cannot be given to someone by placing it on a platter. In today's time, people have the greatest shortage of time. But if someone wants to learn, the learner will have to make sacrifices, including time, in every respect.

The biggest objection today is that people say, "Sahab, nowadays gurus do not teach, except their own children. Apart from their sons, they do not give knowledge to anyone". This is entirely wrong. But you must have at least some eligibility.

मिसाल देता हूँ। क्या उनके पिताजी सितार बजाते थे? नहीं, उनके बड़े भाई को नृत्य का शौक था, और खुद उन्होंने भी शुरू में थोड़ा नृत्य किया है। यह कम लोग जानते हैं। बाद में वे बाबा अलाउद्दीन खान साहब के पास गए और बाबा ने उन्हें तैयार किया। उनमें वह क़ाबिलियत थी, वह ज़हानत थी, तभी वे आज उस मक़ाम पर पहुँचे। बाबा ने जहाँ अपने बेटे उस्ताद अली अकबर खान साहब को तालीम दी, वहीं शागिर्द, रवि शंकर जी को भी उतना ही तैयार किया।

अब देखिए, एक जर्मन शिष्य हैं, कार्स्टन विके, जो पिछले दस साल से मेरे पास आ रहे हैं। उनका साज़ भी यहीं [रुद्र वीणा] है। उन्हें यहाँ एक नौकरी का प्रस्ताव मिला, और इत्तेफाक से वह नौकरी उन्हें मिल भी गई। उन्होंने वह नौकरी सिर्फ़ इसलिए ली ताकि वे यहाँ मेरे पास रह सकें। लेकिन वह नौकरी उन्हें रास नहीं आई। छह महीने या साल भर के बाद उन्होंने वह नौकरी, जो कंप्यूटर की अच्छी खासी तनख्वाह वाली नौकरी थी, छोड़ दी। उनका कहना था, जब मुझे साज़ बजाने का और गुरु के पास जाने का ही वक़्त नहीं मिल रहा, तो इस नौकरी का क्या फ़ायदा। उन्होंने तय किया कि, 'मैं बिना नौकरी के रह लूँगा, लेकिन संगीत से दूर नहीं रहूँगा'।

A very monumental example of this is Pandit Ravi Shankar ji. Did his father play the sitar? No. His elder brother was interested in dance, and he himself also did a little dancing at first. Few people know this. Later, he went to Baba Allauddin Khan Sahab, and Baba prepared him. He had that capability, that intelligence, and only then did he reach the position he holds today. Where Baba trained his son, Ustad Ali Akbar Khan Sahab, he also prepared his disciple, Ravi Shankar ji, just as much.

Now see, there is a German disciple, Carsten Wicke, who has been coming to me for the last ten years. His instrument here, too, is the same, the Rudra Veena. He received a job offer here, and by coincidence, he got it. He took that job only so that he could stay here with me. But that job did not suit him. After six months or a year, he left that fairly well-paid computer job. He said that when he does not have time to play the instrument and go to the guru, what is the use of this job? He decided, "I will live without a job, but I will not stay away from music."

"अगर कोई सीखना चाहता है, तो सीखने वाले को कुर्बानी तो देनी पड़ेगी, समय की भी और हर लिहाज़ से भी।"

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We hope this work carries the voice forward with the care it deserves.

At Khansaab's Doorway

A couple of Memories

Jyoti Hegde

Khansaab was extremely strict, disciplined, and a man of strong principles. He was a true king in his field and lived with that dignity throughout his life. I believe his strictness with me shaped me into a stronger person-strong enough to pursue the Rudra Veena. He would get furious over even small mistakes and never tolerated them, which made me constantly aware of the need for precision and perfection. I believe his way of showing love was through scolding. He did not teach me every time I visited-sometimes I received nothing, sometimes very little, and sometimes an abundance. I believe that in the seven years I spent learning from him, I received only a single grain of semolina. Khansaab was a deep, endless ocean, with no shore in sight.

Vidushi Jyoti Hegde with Ustaad Asad Ali Khan. Courtesy Jyoti Hegde

When I first met Ustad Asad Ali Khan, I was already a B-grade artist at All India Radio. I initially learnt from Dr Bindu Madhav Pathak of Kirana Gharana and then the foundations

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of Dhrupad by Pt. Indudhar Nirody ji of Agra Gharana. I was deeply drawn to Dhrupad, and as my Guruji, Pt. Indudhar Nirody was moving from Dharwad to Mysore,and I began seeking a guide who could lead me to its deeper understanding. Learning from Khansaab was my biggest dream, and though I knew it would not be easy, I was fully prepared to take up the challenge.

I somehow managed to get his phone number. The first three or four times I called, I could not reach him. His students answered and told me that Khansaab was busy. Finally, one day, I got a chance to speak to him. His voice was deep and powerful, full of authority, and in his royal, Urdu-influenced Hindi, he began explaining how difficult the path was–you are a girl, you live in Karnataka, and I in Delhi, and so on. He seemed more focused on telling me why learning the Rudra Veena would be challenging.

Jyoti Hegde with Ustaad Asad Ali Khan playing Rudra Veena. Courtesy Jyoti Hegde

But when I told him, I already play, and I am a B-High grade artist, yet I want to learn from you to understand it deeply. Without that, I feel incomplete. The conversation took a different turn. He simply said, "Alright, send me your cassette. Baad mein dekha jayega." [We will see later] I sent him my recording, and soon after, I was called to his home in Delhi. It was pretty challenging. I was not earning at the time, and travel itself was not easy in those days. Carrying my Veena and traveling by train from Karnataka to Delhi, with my fifteen-year-old son accompanying me, was a journey in itself. I hardly realized when the journey ended. I was lost in dreams of receiving my first lessons from him. But unfortunately, he did not teach me then. For a woman who had come so far, managing home and family while depending on her husband for financial support, it could have been deeply disappointing. I would not

even call the Rudra Veena a "big" instrument-for me, it never was. What truly sustained me and gave me the strength to keep pursuing Khansaab was my pure, unwavering love for the Rudra Veena and Khansaab's style. After two or three visits to his home in Asiad Village, Delhi, he suggested that I meet him whenever he was closer to Karnataka for concerts-whether in Mumbai or Bangalore-instead of traveling all the way to Delhi. That is when I truly began learning from him. Most of my lessons happened in the green rooms or in the hotels where he stayed, never in a continuous or regular manner, as many people would come to meet him. He never allowed me to sit on the *tanpura* during concerts. Instead, he made me sit beside him and asked me to closely observe his finger movements. He never allowed me to imitate or merely follow him. Instead, he asked me to observe deeply, absorb the lessons, and shape them according to my own nature. As he was imparting advanced taalim, he would often say, "Don't become another Khansaab–be yourself." He expected me to evolve into my own authentic version, which is why he never permitted me to memorize or blindly reproduce any lesson.

I remember an anecdote I will never forget. Whenever I went to meet him, I would look for a small, affordable lodge near his hotel. I would go with my Veena and one accompanying person—sometimes my son, sometimes my niece.

Jyoti Hegde with Ustaad Asad Ali Khan and Zaki Haider. Courtesy Jyoti Hegde

One such day, he taught me something complex. He never really taught in the conventional sense. He would play or sing and then ask, "Ise baja paoge?" [Could you play this?] or his

favorite line, “Main jo keh raha hoon, aapke sar se guzar raha hai?" [What I am speaking, are you making sense of it?]

Somehow, I grasped that lesson and returned to my lodge. I spent the entire day practicing it continuously. My fifteen-year-old niece found it quite amusing to watch her aunt play the exact note again and again, like a damaged gramophone. Finally, I managed to play it exactly the way Khansaab seemed to expect. I was thrilled and eager to show him.

I took my Veena and went back to his hotel. He was in the washroom, and I thought it would be nice to start playing so he could hear it. But instead, he came out furious. Extremely angry, he said, “Meri ijazat li saaz uthane se pehle?” [Did you ask for my permission before picking up the instrument?] I was completely confused—it was my own Veena! I did not understand what had gone wrong, but soon I realized. By then, it was too late. He asked me to leave and refused to teach.

I still remember how terrible I felt that day. I cried all the way back. I didn’t sleep the entire night-I cried and played the veena, again and again. I didn’t eat anything. Early the next morning, around 5 or 6 a.m., I got a call at the hotel reception. It was one of Khansaab’s students: “Khansaab ne Veena leke bulaya hai.” [Khansaab has called you with Veena.] Despite having no sleep and no food, I suddenly felt full of energy. I immediately picked up my veena and went.

He said simply, “Haan, bajao. Kal kya bajana chahti thi.” [Yes, play. What did you want to play?] I played. Then he began teaching continuously until 10 a.m. He had a flight at 11. I gently reminded him, “Khansaab, aapki flight 11 baje hai,” [Khansaab, your flight is at 11], only to be scolded again: “Aapka dhyaan seekhne mein hai ya meri flight mein?” [Are you more interested in learning or in my flight?]

Even after that, he continued teaching and ended up missing his flight, so the organisers had to arrange another one for him. This is how learning with Khansaab was. It felt like walking on thorns - but today, I realized how beautiful it was. Whatever I am today is because of that discipline.

Though he appeared very strict, he was kind at heart. Once, after returning very late from a concert, the hotel kitchen was closed. Since it was Khansaab, they had arranged food specially for him. He was fond of non-vegetarian food, while I am a strict vegetarian. I quietly left for my lodge, assuming I would have to sleep on an empty stomach. Suddenly, Khansaab called me back to join them for dinner. He noticed my discomfort in seeing the dishes and immediately separated the green salads and other vegetarian side dishes for me, insisting that I eat.

At times, I wish he had been with us a little longer. Perhaps we could have received a few more drops from that endless ocean.

C.S. Aravinda

Certain events in life unexpectedly leave indelible imprints. So it was, almost 20 years back, in the month of February of the year 2006, that I was immensely fortunate to experience a feast of musical extravaganza – the three-day Dhrupad Music Festival – featuring two performances each day, organized by the Prakriti Foundation at the Egmore Museum Theatre in Chennai.

Pamphlet of the Dhrupad Music Festival in Chennai, 2006. Courtesy C.S. Aravinda

Even after having stayed nearly a decade in Chennai by then, it was the first time I had been to this excellent venue. And it was also the very first time I was listening to Ustad Asad Ali Khan on the Rudra Veena, second of the two performances on day three, which means the last concert of the grand three-day feast of incredible music, focused on the central theme of Dhrupad.

Indian classical music is believed to have its origin in the *Sāmaveda*. For someone who learnt a bit of Vedic chanting in the traditional way for nearly five years in Bangalore from Swami Chidananda, a swamiji belonging to the tradition of *sādhu*s of Sri Ramakrishna Math, I was exposed to the musical elements of the *Sāmaveda* chanting. I had also listened to a lot of Indian classical music, including Dhrupad, before. However, it was not until that wholesome and intense three-day listening experience of Dhrupad from different artists that I could discern a semblance of connection to the *Sāmaveda* chanting style. I was able to feel the meditative aspect encapsulated by the Dhrupad tradition.

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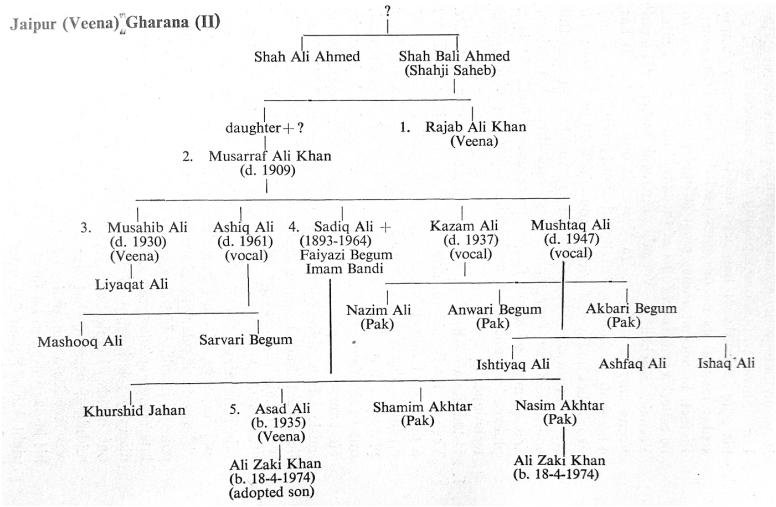
Thus, by the time of the performance of Khan Saheb on the last day, I was already attuned to absorb the spirit of his music. In the performance prior to his, the vocalist Ustad Wasifuddin Dagar had sung Raag Bihag before concluding his concert. When Asad Ali Khansaab came on the stage, he first placed a small soft carpet and said he sits in the position of Vajrāsana, which was already something new to me. He then took the Rudra Veena and held it close to his body, like a Sitar, with one of the two drums resting on his left shoulder. This is the trademark style in which his ancestors played the instrument Rudra Veena, or 'been' as they referred to it. Announcing that he belongs to a long lineage of beenkars of Jaipur, he mentioned that the tradition they perpetuated from generation to generation is known as the Khandarbani style of Dhrupad. After this brief introduction, he announced that while he had planned to play the Raag Darbari, listening to the Raag Bihag by the previous musician, he had now made up his mind to play Bihag instead of Darbari, and the whole two-and-a-half-hour concert of his was just playing this one piece. Truly an experience of a lifetime.

The festival had left a deep impression on the audience, and the reports were all over the newspapers. It was the talk of the town, so to speak, and I was mesmerized beyond words, coming under the spell of a novel experience of Khansaab's unique Rudra Veena performance for the next week. In fact, I was going to go to Delhi on an academic visit a couple of days later, and learning that Khansaab lived in Delhi, I just wanted to go to his home and meet him personally.

I did some prior homework and prepared myself by reading all about his music and his ancestors from the book *Musicians of India: Past and Present*, with particular focus on the 'gharanas of Hindustani music and genealogies', by Amal Das Sharma. I had bought this book only a couple of years before, with the intention of understanding the historical traditions of the present-day musicians whose music had struck a deep chord in me. The book, in particular, carried small snippets of whatever information was available about the ancestors of Khansaab. The genealogy chart shown here is a compilation by the author after an extended conversation with Khansaab.



Lineage of Jaipur Gharana of Ustad Asad Ali Khan. COURTESY C.S. ARAVINDA

Premising that the book[1] may not be easily available, I reproduce below what it says about Khansaab:

> Ustad Asad Ali Khan, born in Alwar on December 25, 1935, began his studies under his father, Ustad Sadiq Ali Khan, when he was only six. In the beginning, he had only to listen to music for hours together. In the course of time, he grew into a renowned Veena player. As a young man, he liked sports and played cricket. He is very fond of white dresses and sherwanis. He is virtuous and sweet-tempered. Unmarried, he adopted his sister's son, Ali Zaki Khan, whom he taught with love and care. He performs regularly on radio and television and at music conferences in India and abroad.
>
> Asked to recall some memorable event of his life, he narrated to this author a miraculous incident which had occurred in 1977 while he was performing at Sydney, Australia. The stage was old-fashioned, with a rolling curtain. During the performance, suddenly the curtain (about 85 kg in weight) started rolling down with a terrible sound. On hearing the awful noise and seeing the curtain fall, a dumb girl in the audience screamed loudly. Two or three feet above Khansaab's head, the curtain suddenly stopped. At the end of the performance the girl's overwhelmed parents congratulated him for the double miracle. He has been saved and their daughter, who had lost her voice some years ago, could speak again.

This was one thing I recalled to Khansaab when I met him at his home. He said he remembered this conversation but had not seen the book.

Meeting Khansaab at his home was special. He introduced me to his sister's daughter and son, Zaki, whom he was grooming to be his successor. He was very warm and full of affection. He said that he respects anyone who respects the Rudra Veena, which was to him an incarnation of the divine. I was overcome with emotion to say anything more, and it was evening, about 9:30 pm, when I left his home after offering my respectful pranams.

Back home, I managed to acquire a second copy of the aforementioned book after some patient waiting and sent it to him. He called me over the phone and said he was very happy to see it. I collected almost all available recordings of his music, and I kept in touch with him from time to time in order not to miss any opportunity to listen to him live again. It turned out that his Chennai performance was the only one I heard.

I, however, visited him at his home the second time in 2010, on my way to the Harish-Chandra Institute in Prayagraj for an academic visit. He was waiting for three young students who had

[1] *Musicians of India – past and present: Gharanas of Hindustani music and genealogies* by Amal Das Sharma, Calcutta : Naya Prokash, 1993, xiii, 348 p. ISBN: 81-85421-18-8.

an appointment to interview him for SPIC MACAY. I had a brief talk with him before the students came, and what ensued during the interview was a delightful conversation. After about half an hour, Khansaab said we would have a chai break. That was when I exchanged email IDs with the students and also took a couple of photographs. I had to leave halfway, having to catch my train to Prayagraj, and I did so very reluctantly.

Pictures taken during the interview in 2010, New Delhi.
Left: Ananya Chaturvedi, Taruna Kumari, and Raghav with Ustad Asad Ali Khan and Zaki Haider.
Right: C.S. Aravinda with Ustad Asad Ali Khan and Zaki Haider. Courtesy C.S. Aravinda

Sadly, Khansaab passed away the very next year, on 14 June 2011. I was not in India then, but upon my return, I spoke with Zaki Haider, who narrated the last days of the music-incarnate Khansaab, and said the end was rather unexpected and sudden.

As luck would have it, one of the students who interviewed Khansaab that day, Ananya Chaturvedi, later did her PhD in mathematics in the US. Upon returning to India, she was a postdoc with me, and so the contact was renewed.

All of this memory suddenly rushed back to me after I read the delightful interview of Jyoti Hegde Ji in the July 2025 edition of *Anveshanā*, and I proposed to its editors the idea of possibly carrying this sixteen-year-old conversation in case it had not been published before. The interview may perhaps have been the last one Khansaab gave. Kind permission from Ananya and friends came soon, and the result is what you see in this January 2026 edition of *Anveshanā*.

Looking back, one cannot help but marvel at the unexpected turn of events in life, and the remarkable way they return in surprisingly different ways. Reading this interview now, in original Hindi and in its English translation, a vivid recollection of that particular evening of 24th January, 2010, became palpable to me, and listening to his voice brought him alive – truly a great gift of the technology and remarkable friendships forged and connections established.

Roots, Roads, and Reason: Interview with Amit Kuber

Amit Kuber delivering a talk at IITK. Amit Kuber

Amit Kuber is a mathematician and an Associate Professor of Mathematics at the Indian Institute of Technology Kanpur (IITK) since 2016. His research spans combinatorial and order-theoretic methods in representation theory, as well as model-theoretic aspects of K-theory. Having pursued education at the University of Pune, the University of Cambridge, and the University of Manchester, he is also a committed advocate of honest teaching and has been recognised at IIT Kanpur with the Distinguished Teacher Award and the Excellence-in-Teaching Award.

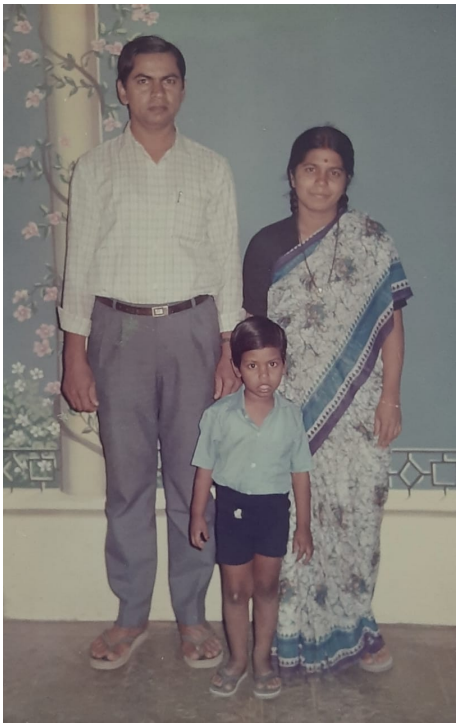
In this conversation with Purnima Tiwari and Aayush Verma for Anveshanā, Prof. Kuber reflects on his childhood and early influences, on discipline as a way of safeguarding curiosity, his mathematics, and on the academic journey that carried him from Pune to Europe and back to India.

Could you tell us a bit about your early life? Where were you born, and what was your childhood like?

Amit Kuber: I was born and brought up in Pune. And until the age of 23, I did not move out of my home. I have a selective memory of certain events. I think my mother (Mrs. Jyoti

Shekhar Kuber) mainly influenced me, but I have also inherited many traits from my father (Mr. Shekhar Digamber Kuber): for example, hard work, no addictions, not getting tired in the office, and the list goes on... Initially, my social interaction was quite a lot, but eventually it declined. At the age of six or seven, playtime decreased considerably. I was more focused on studies.

I remember an incident that happened. My first-grade teacher was very disappointed when she handed over the results to my mother on the last day of school. "He did not do as well as I thought he could," she said. Then my mother looked at the results. I had scored 97%, and she was upset about it: "Why did he lose 3%?" So you can imagine what kind of standards were set. I had scored 100 in the first unit test, and then she expected me to continue the trend. My mother also tells me that I cried once while sitting in a temple because instead of writing "chandra" [moon] in Marathi, I wrote "chandani," which means star. People gathered and thought, "Maybe his exam did not go well". And my mother did not know whether to laugh or cry. I had just missed one word.



Amit Kuber as a child with his parents.
Amit Kuber

Who did you spend the most time with while growing up, and how did that shape your early values and habits?

AK: The person I spent the most time with is my mother. My father is an engineer and was very dedicated to his work. He used to leave home at 7:00 in the morning, but his return time was not fixed every day, so sometimes I saw very little of him in a week. He had a long commute for many years, and because he was so dedicated, that was never an issue for him. As a result, I spent a lot of time with my mother.

She wanted to become a teacher, but she could not. So, whatever students she wanted to nurture, she just had one candidate to fulfill that dream. And she put all her efforts into this. She had prepared for raising a child from a very young age, starting in her 11th grade. When a doctor once visited her college to deliver a talk, she was taking notes. The doctor then spotted her in the audience and said, "You don't need to write so much. I will give you a copy of my book." But she was very dedicated to this.

Most of the things I have learnt, I learnt from her. Our habits are also quite similar. For example, she does not drink tea or coffee because her father did not allow her to. Then she raised me in the same way–I do not drink them either; I never even asked.

Have you never tried a single drop of tea or coffee?

AK: No. I have never tried a single drop of tea. Coffee, I have had, but only as a medicine.

Were you an only child?

AK: I am an only child, yes. It is a nuclear family, just the three of us.

Ages 10–12, what would a typical day in your life look like, including school, and what would you do after coming back home?

Amit Kuber being felicitated by Physicist V.G. Bhide for first position in Maharashtra Talent Search Examination in 2002. Amit Kuber

AK: At the age of 10, I wrote my first state-level scholarship exam. I am not sure if they still exist. My mother asked the teachers, "Will you provide coaching at school?" They said, "What is the point? Nobody gets these scholarships". My mother said, "Let him at least appear for the exam." I stood 6th in the state in that exam. I was showered with appreciation from sectors of society, but not my school. My school was not a good school–neither did they support my endeavours, nor did they celebrate any achievements.

My mother taught me that you should not do anything for appreciation. She also used to say, "If you are doing something, do it well; otherwise, don't do it. If you achieve something, people congratulate you, but you need to get over it and start with something new". The journey has not stopped to this date. I essentially cannot even savour success for a long duration. That was just the beginning. After that, I was mostly focused on doing something extra. School wasn't very challenging. I was always a year ahead in school. For competitive exam preparations, I would often miss school to study with my mother for the whole day, often for 13-14 hours at a stretch. The exam scene in Pune has been extremely competitive. I never said NO to taking on new challenges. I continued like that for several years until I put my foot down for JEE.

Did you not appear for IIT-JEE?

AK: NO! My father wanted me to write the exam. I said I did not want to appear for it because I knew I would crack it, but I did not want to step into an IIT.

"The journey has not stopped to this date. I essentially cannot even savour success for a long duration."

When you decided not to pursue JEE, what alternative path did you choose?

AK: I was interested in learning both science and mathematics. I was also interested in music at that time, but I never looked at music as a career path then, because one needs a guru to make a career. I cannot treat a human being as a supreme lord. On the contrary, academia is more open. I did a three-year Bachelor's in Science at M.E.S. Abasaheb Garware College, Pune. The curriculum did not pose many challenges, and I badly needed a break from the competitive scene.

In the first year, we studied Physics, Chemistry, Mathematics, and Statistics. In the second year, we were required to learn only three subjects, and I considered dropping Physics. Since it was not allowed, I fought for it.

You mean you wanted to drop Physics as one of your subjects?

AK: Yes! The college administration said, "We cannot allow that since it has never been the practice." However, they challenged me to find 12 like-minded students to convince them, and I did exactly that. In fact, now it is a popular choice there.

Kuber in his chemistry lab at home. Amit Kuber

Were you more interested in Chemistry at that stage?

AK: Yes, I was more interested in Chemistry. In fact, I had my own lab. My parents supported me in that way. I would rather not talk about what kind of experiments I have done at home. But let me share that I conducted more than 200 experiments at my home lab starting from the 11th grade. I have a few prized possessions from those days–two silver mirrors (Tollen's reagent) and a gold mirror. In the third year, I had to choose only one subject for my graduation. My Chemistry teachers and especially Statistics teachers were keen to get me in their classes–I

was not interested in the prospect of studying just to earn money. Also, I like exactness and precision, and not approximation, so Statistics did not fascinate me as much. To find time to pursue music, I was naturally pushed towards Mathematics to free lab hours.

Given how much you enjoyed Chemistry and lab work, what eventually made you shift away from it?

AK: Well, let me share the real story. I was a National Talent Search Exam scholar in the 10th grade. I attended the HBCSE training camp after that. When my parents came to pick me up in Mumbai, my mother was scared to see a professor whose face was scarred with chemical burns–this event essentially sealed my fate.

It would have been different if she knew Grothendieck. [Laughter]

Alright, after your Bachelor's, you decided to pursue a Master's in Mathematics.

AK: Yeah, it was a natural progression. I studied at the Department of Mathematics, Pune University.

Looking back, were your professors and peers in Pune supportive of you academically?

AK: Only a few professors supported me, but I was "too much" for most of them! In fact, some of them wanted me to disappear. As a person who asks many questions, I was not welcome in the world of people whose classes are basically spent copying from textbooks. I distinctly remember one course where I learnt the subject by negating everything that was said in the class.

Those who supported had already seen the world. They quickly realized that the university was not suitable for me, and they pushed me in the "right" direction. And people who were there, who were locally trained, did try to sabotage my career as much as possible.

I remember this incident when a group of my friends gave a two-hour-long music concert in the month of January after several weeks of rehearsals. Our program began at 4:30 pm, and there wasn't too much natural light in the big hall with 300 audience members. After two songs, there was a power cut! There was panic everywhere. But I was very calm since, for some weird reason, we were prepared for that situation–we had brought candles, my synthesizer had batteries, and tabla doesn't need power to make sound! I announced, "If you are willing to maintain silence, we can continue with the program." The audience agreed. In candlelight, the chords for the third song filled the ambiance, followed by the lyrics "Main kabhi batalatā nahin, par andhere se dartā hoon main"–it was a wonderful performance! The power was restored

"In candlelight, the chords for the third song filled the ambiance, followed by the lyrics "Main kabhi batalatā nahin, par andhere se dartā hoon main"."

eventually. A few days later, a lecturer taunted, “I really wanted to see how you would react when the power is gone.” So that was the level [of contempt]. They were also incentivizing my friends to cut off contact with me. I have gone through this kind of behaviour throughout my life. Now I am used to it. If it is not there, then I would be surprised!

Are you still in touch with anyone from your college days?

AK: Yes, with those who were good to me, not the other ones. I am also in touch with my music teacher, Mrs. Shubhangi Patankar, who has crossed 85.

Please tell us about her. How did you first come into contact with her?

AK: Unfortunately, I studied at Jnana Prabodhini School, a fancy school in Pune, during my 5th grade, amongst the worst experiences there that left me scarred for the rest of my life. That period of 1.5 years, however, did introduce me to three good things in life–good English, Sanskrit, and Music. I appeared for my first exam in vocal Hindustani classical music conducted by Akhil Bharatiya Gandharva Mahavidyalaya as a school pupil. When I left the school, I wanted to continue with music, so I found my music teacher through a friend.

Her teaching method is so amazing that all her students, despite a gap of several years, still remember everything that she has ever taught them. We used to have this fun activity: identify the raag where she would either sing or play a tune while hiding the harmonium. Whenever I visit Pune, we still have a go at that or sing all bandish in succession.

Amit Kuber performing in a musical event. Amit Kuber

So, do you like music? If yes, then what do you listen to?

AK: Yes, I enjoy music with lyrics more than instrumental, like classic or good Bollywood songs and Marathi bhāvgeet. However, once you get into the mood of a raag, words become irrelevant. If I have to pick my favourite raag in Hindustani classical music, then I would say Charukeshi, Puriya Dhanashree, and Marwa. I like the feeling that is accompanied by those thaats. I like dusk-time raags a lot.

Do you also listen to Western Classical Music?

AK: No, not really. I don’t understand most of it. I had a musical session with Olivia [Caramello] once–she was my teacher in Cambridge as well as an accomplished pianist. After playing a piece by Beethoven, she asked me, "What emotion does it generate in you?" But I was clueless. Perhaps my emotions are not attuned to Western music.

Kuber with his friends from MSc time. Amit Kuber

After your Master's at Pune University, did you plan to stay in Pune for a PhD? If not, what changed your mind?

AK: Yes. In fact, during my Master's, Prof. Varsha Gejji–my teacher, who was an influential person in changing my career trajectory–asked me, "What do you want to do next?" I responded that I wanted to do a PhD either with her or with Prof. Bhate, my favourite teacher at Pune University. She said, "This is not a suitable place for you. You should go abroad." But I wanted to stay in Pune. After some back and forth, she invited my parents to her home and convinced them to push me to apply abroad. Because of her insistence, and despite the unhappiness at home—on my part and my mother's part—I went ahead with her suggestion. And during my Master's, I applied to only one place–Cambridge–because she had been a postdoc there. I was accepted there as a Master's student for Part III for the academic year 2010-11, instead of for a PhD. Several acquaintances were certain that I would not survive for even two hours abroad, as I had always been under the protective umbrella of my parents. I had stayed outside the city for some time before, but living independently was different. Nevertheless, I spent almost seven years abroad!

Now, we are interested in knowing when you first started feeling a passion for research, and what mathematical problems pulled you in?

AK: As an undergraduate, I was fascinated by the Four Color Theorem and spent hours trying to prove it because I was not happy with Appel and Haken's computer-assisted proof–I also could not get good advice on pursuing Graph Theory. The theorem is a beautiful statement–why should one need computers to prove it? I realized early on that I have a strong

affinity towards Combinatorics. At the other end of the spectrum, while studying Algebraic Topology as part of an Annual Foundation School (AFS) by NBMH, I realized that I also have an affinity towards abstraction and Category Theory.

Though at Pune University, I was mainly focusing on applied subjects, because my favorite teachers taught them. It was Prof. Gejji who introduced me to the world of research, where I worked on the combinatorial aspects of the Runge–Kutta method in numerical analysis. But I was bad at literature survey and discovered my findings in the original paper (by Runge and Kutta) itself. To be honest, I realised the true power of computers and that of the Internet at the age of 23!

At DPMMS, University of Cambridge. Amit Kuber

Later at Cambridge, I was forced to choose the courses that did not require any background, because even though I had a Master's degree from India, it was essentially useless to provide the necessary prerequisites for those courses. But I got a chance to study the flavours of Combinatorics and Category Theory.

All I knew was that I wanted to keep studying–earning was not the immediate goal. My father also taught me, "You should do something that you like, and someone should pay you for it." Reflecting back, after I landed in Cambridge, thanks to my parents' support, my career path was essentially uniquely determined.

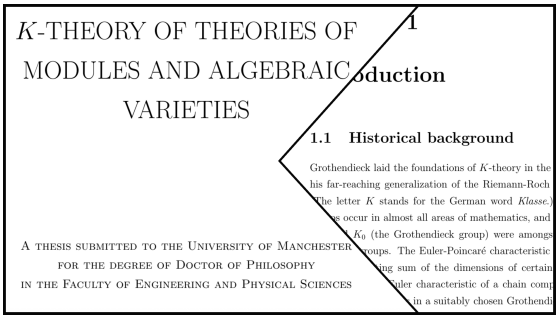
Did you have any mathematical heroes while growing up?

AK: I did not have any heroes while growing up. But Olivia introduced me to Grothendieck. Later, during my PhD at the University of Manchester, he became my main inspiration as a mathematician because of the intuitive depth as well as the variety of subjects he worked on, including Grothendieck categories, Grothendieck topology, and Grothendieck groups. I made sure the first word in my thesis was "Grothendieck", and that the title also contained his name. I had not had a chance to discover him as a person or as a philosopher back then; that happened only later.

In what ways has Alexander Grothendieck influenced your view of mathematics as a way of life? How does this intense focus (like that of Grothendieck) structure a life?

AK: I do not want to compare myself with Grothendieck. But a fascinating thing about him that has influenced me is *mathematics as a way of life*. Let us not call it spirituality, but it is a way of life. I cannot really separate myself as a human being and as a mathematician now–it becomes very difficult.

The precision, the abstraction, the pattern recognition, the connections, the analogies, and then noticing mistakes in little things as a teacher–not just finding but immediately noticing and getting bothered by them—this is all me. It is part and parcel of my life now. Some people find it irritating and hence difficult to talk to me because of that.



Kuber's PhD thesis. On the left, the thesis title and on the right, the first page of the thesis containing 'Grothendieck' in the first line. Amit Kuber

Could you explain Grothendieck's 'Rising Sea' analogy, and what you find most fascinating about it?

AK: Grothendieck's rising sea analogy is about imagining a problem as a hard nut that needs to be cracked. You can take a hammer and a chisel, and strike the nut, and if you are strong and lucky enough, the nut will crack open, but that is just one way of doing mathematics. The other way is you take the nut, and put it into water, let it soak, and then slowly, with time, you rub the shell, and the nut will crack open. You do not have to exert force, but you have to be patient. That is his [Grothendieck] philosophy. Soaking in that liquid is a metaphor for building a theory around the problem–his end goal is to build a theory so strong that the problem becomes a trivial consequence.

He [Aayush] sent me a lecture[1] by Deligne, where he [Deligne] says that in one of Grothendieck's lectures, all the results were very simple, but then at the end he [Grothendieck] had proven something remarkable without anyone ever realizing that it had happened.

You went to the University of Manchester for your PhD. What was your first PhD problem, and how did it shape your way of doing research in mathematics?

> *"Let us not call it spirituality, but it is a way of life. I cannot really separate myself as a human being and as a mathematician."*

AK: The first problem that I was assigned as a PhD student by my supervisor (Mike Prest) was his own conjecture. He told me that he had tried it himself for several years and had not succeeded in proving it. Then he assigned it to another PhD student of his, who proved only a special case, and the general problem remained open. He made a passing comment that he would immediately give a PhD to anyone who solves his conjecture! So he was always skeptical about it, and convinced me

[1] Link to the lecture is at this url.

not to look at the things that did not work while encouraging me to try it myself. I have more or less stuck to that policy for every problem that I work on. He explained the statement of the problem to me, and that was the end. I did not check the literature after that. As a consequence, I was stuck at a point for a long time because I was unaware of a very important lemma called Neumann's lemma, until a friend, Laura [Phillips], told me about it.

The conjecture was essentially motivated by Kontsevich's lecture in Paris, Orsay, in 1995-1996. Two logicians in the audience, Krajíček and Scanlon, observed that the target ring for motivic measures was constructed out of the Grothendieck ring of varieties, which can be essentially understood in a model-theoretic way. The simple reason is that the Grothendieck ring does not utilize the topological structure of varieties. This observation led to the definition of the Grothendieck ring of a model-theoretic structure. My supervisor's conjecture, based on his intuition and expertise in model theory of modules, stated that the Grothendieck ring of a non-zero module is non-trivial. Six months later, I settled his conjecture in the affirmative. In addition, he also made me find generators and relations for such rings.

Kuber with his PhD supervisor, Mike Priest [on the left], and two of Kuber's PhD students in Chennai, December 2025, during a BIRS Workshop on Quivers and Lie Algebra.

Amit Kuber

Working under his supervision taught me professionalism, punctuality in responding to emails, and especially improved my English to a level that is acceptable in the UK! His suggestion of not "contaminating" my thoughts by reading failed attempts shaped my idea of doing Mathematics–I do not read a lot, which is both beneficial and problematic. As soon as I understand the problem, I switch off that literature review process. I basically make sure that the problem I am trying to solve has not already been solved, but then I venture out by myself, trying to apply the techniques that I know, rather than trying those that already exist in the literature. People often complain that my papers are very hard to read, because they are not familiar with the techniques that I use. The downside of it is that I miss out on the latest developments. So I am trying to go forward with a balanced view.

Were you introduced to K-Theory by your advisor at Manchester?

AK: No, my advisor did not introduce me to K-Theory. What I worked on was just K_0. Later on, I learned K-Theory with two friends–David Wilding and Laura Phillips, who were my officemates. We started our PhDs on exactly the same day. They were not doing anything

After Kuber's PhD Defense (8 August 2014) at the University of Manchester with Anthony Chiu, Gareth Jones, Harold Simmons, Angus Macintyre, Marcus Tressl, Mike Prest, David Wilding, and Laura Phillips. Amit Kuber

directly related to this topic. Nevertheless, we formed a study group and delivered lectures to each other. Within six months, we had finished a lot of material in K-Theory, essentially around 60 percent of the K-book and some parts of Rosenberg's text. It was a beautiful experience. We gave a public talk at the end of that, which was two hours long.

Wonderful! It is amazing that you learnt it with friends.

AK: I think it is a boring process to learn alone. Dave and I also started a new style of talks, which we termed "double talks". Particularly when there were ideas that ran in parallel, two of us would stand on the stage and take turns speaking, a few sentences at a time. Maybe he would say one sentence about "his side", and then I would add something corresponding to that on "this side", a bit like a *jugalbandi*. We had the chemistry to pull that off–it is not easy with everyone–but it worked really well for us. We also started and ran a seminar series ourselves for several years.

During your PhD, did you miss home?

"I think it is a boring process to learn alone."

AK: Yes, I missed home very much. My parents supported me a lot during that time. Even though I got a full scholarship for my PhD, a large portion of my living and food expenses was borne by my parents. I was living off my parents' support. I wanted to give something back to them by doing something good.

After your PhD, you spent a year in Italy. What was that like, and how did it compare with the later year in the Czech Republic?

AK: Honestly, I was mostly sick, and it was possibly one of the worst years of my life. This was from November 2014 to November 2015. To make it worse, I did not know Italian either. It was very difficult to live there, not just because of the language but also due to water, food, racism, and loneliness.

I was seriously considering coming back to India. During the same year, I already knew I was going to the Czech Republic in 2016. The year in the Czech Republic was much better in terms of people and productivity.

Did you find time to travel around in Europe?

AK: I was very much aware of every single penny that was spent on me. During my PhD, I would walk to my office every day, irrespective of the weather, which was about three and a half kilometers from where I lived, and I never took a bus. I never went anywhere for a leisure trip in the UK, let alone in Europe.

"It was very difficult to live there, not just because of the language but also due to water, food, racism, and loneliness."

After that, I started earning as a postdoctoral researcher. During my year in the Czech Republic, I took my first and only trip to visit a friend in Hungary. My friends visited me from the UK, Italy, and the Czech Republic, and we visited some nearby tourist spots. I generally do not travel without company or reason. I especially dislike going on pre-organised group tours.

Then you joined IIT Kanpur in December of 2016. What were the first courses you taught?

AK: My first teaching experience was a tutorial in Probability and Statistics. The first courses that I taught as a lecturer were Set Theory and Logic, and then Category Theory. I was teaching these two courses simultaneously.

Which new courses have you introduced at IIT Kanpur, starting with Category Theory?

AK: After Category Theory, I taught Topos Theory, then Model Theory, Combinatorics, Algebraic K-theory, and then Representation Theory of Quivers. I have introduced six courses so far, and I wanted to introduce these subjects in the Indian curriculum as soon as possible.

Please share some memories from your teaching days, something that holds importance for you.

AK: There are several I can recall, essentially every time I see somebody's face light up, capturing their "Eureka" moment. It is a pleasure to watch and a great feeling to have. Also, I capture memories of every single course I teach by taking a picture of the survivors on the final day. But one moment that actually made me quite emotional was in 2019. I was teaching this big course, MTH101, and I only had to teach the first half of the semester. I had actually been quite worried about that course even before I started teaching it. I went and stood in that large empty classroom for half an hour, just to imagine what it would look like when it was full of 600 people sitting in front of me. I made attendance compulsory after learning from others' experience with the course, but I also wanted students to attend lectures because they wanted to be present there, not simply because it was compulsory. On the last night of the course, I shared my experiences with the students in my classes in the form of a very long, heartfelt email—it is also available on my website.[2] I got so many responses in that single night, perhaps more than 200. The next day, when I went to class, I got a standing ovation while I was entering, and that was definitely a very emotional moment for me. When I get the opportunity to interact with them in their first semester on campus[3], I want to make them aware of so many pitfalls and roadblocks. A simple mantra to success that I advocate for is to have three meals at regular times every single day. I care and show care.

Survivors of *Representation Theory of Quivers* course by Amit Kuber in Fall 2025 and Thomas Brüstle. Amit Kuber

MTH101A: the journey, 2019. The last day of the course with Kuber and all students. Amit kuber

One student from that class said, "My mother always tells me that you should listen to this person because he cares about you." Making individual connections with students, even

[2] Email is available here.

[3] Kuber's another email titled 'Gotta catch'em young!' sharing a similar message can be read here.

in such a large class, is exactly what I want to achieve–it is difficult, but I put effort into it. Another fond memory is that once, students brought in a cake at the end of the last class. Then there are several emails from students that I have read so far, and those emails highlight that connection. Even if not everybody comes and talks to you, they would know that if they need something, there is somebody they can talk to. I think that feeling of connection is very important for students to not feel alone.

How would you describe Combinatorics and your own way of thinking about it?

"I went and stood in that large empty classroom for half an hour, just to imagine what it would look like when it was full of 600 people sitting in front of me."

AK: I like the study of patterns, which is essentially what you call Combinatorics. However, my students say, "You basically make the definition so vague that anything can come under that umbrella." And to some extent, maybe that is true. I feel Combinatorics is a way of doing Mathematics rather than a subject.

For you, it was that you did not really bother about what would happen next in your career. But there are many students who come to you and ask whether they should go into research or not. Perhaps someone with an undergraduate degree or a master's degree is considering a PhD. What do you typically tell them?

AK: It's a subjective process, and I cannot provide a uniform answer. I think it depends on the answers to the questions that I ask them–say, an algorithm that I follow.

I usually try to make them aware of the pros and cons, as well as the challenges, whether of the corporate world or of the academic world. I also ask them questions about their financial situation to gauge whether they need to earn immediately. When they need to delay further education because the family needs, the best one can do is to tell them to go out, work for a few years, and then come back and try to pursue the same thing that they initially were inclined towards.

I have sometimes seen students who are really strong in mathematics, and I believe they can have good careers in research, but they do not want to. I do sometimes try to push them in that direction, but I am not always successful. Then there are students who are unsure. Sometimes you know that a person probably should not go in this direction, but they still want to.

Occasionally, it is clear that a person is born to do maths. I had a student from the Computer Science branch in my second-year tutorials for Probability and Statistics. It was my first semester of teaching, and I shared an accessible paper in the class. He came to my office, saying he did not understand it. When I dug deeper, he said, "I do not understand how the author thought about the idea." That immediately shows you he is made to do this (research).

Amit Kuber being conferred with Gopal Das Bhandari Memorial Distinguished Teacher Award, IIT Kanpur, on 3 July 2023, by N. R. Narayana Murthy. Amit Kuber

Eventually, he converted to the Maths branch, and now he is doing a PhD in Number Theory. I am happy about that. You cannot have the same answer for everyone. And it is a feeling which I would say I do not want to mechanize; otherwise, AI could take over that job as well. [Laughs]

Should there be a balance between these abstractions and the need for computations?

AK: There should be a balance or synergy between abstraction and concreteness. They complement each other. I definitely do not mind learning something for its own sake. It was the philosophy of Peter Johnstone when he taught Category Theory to us in Cambridge: if you want to learn this subject, do it because you want to learn the subject, not because you want to learn the language. I totally agree with that because it is an insult to the subject.

However, with me, it is like these two weird extremes of mathematics. One is totally abstract, category-theoretic stuff, and the other one is totally concrete–computational stuff. I try to juggle between those two worlds. But this is the artistic aspect of mathematics. People only focus on the scientific aspect, and write "definition, theorem, proof". I always want to write a story.

How do you view an education system where marks become the main focus rather than learning? How does that shape someone's choices?

AK: It feels bad to tell a student, "Now that you are in this class, you have to learn this, just because you want to score." Scoring is not a good motivation for learning anything, because there are other ways of scoring, even if you understand nothing and learn nothing. But learning should be the goal. I can only comment that our education system has not been

"A simple mantra to success that I advocate for is to have three meals at regular times every single day."

successful at inculcating this point of view. At the same time, I am not going to claim that I have solutions for that. It is difficult to do anything at a mass level, especially with our country being the largest in the world in terms of population. We do not motivate people to think independently and ask questions to satisfy their own curiosity. When you are a kid, you succumb to the pressure of the education system. There are many students who cry because of the pressure and loneliness they face in IIT.

But it is a very complex situation. I once read a specific article that explained how school systems were initially developed to create factory workers by training them to do boring tasks for eight hours a day without any curiosity. That is how our education system was built, and we are still continuing with that.

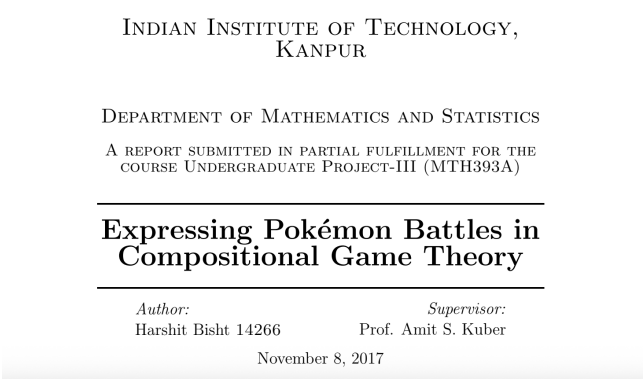
How do you see the balance between teaching and research in an educational institute?

AK: I think that one should do their job very well and fulfill the responsibilities given to them. And everyone should take teaching seriously–I want to emphasize that–irrespective of whether they like it or not, especially in a teaching and research institute, they should do it properly. Now, the definition of "proper" could differ for different people, but I have very strong opinions about that. Teaching is proper if students can get something out of it. One should not think only about oneself and say, "I am delivering my best", but also think about whether it is pitched at too high or too low a level, or whether one is not putting in efforts to convey the ideas, or not making classes interesting enough. In that case, students do not learn. What is important is to convey; the idea should be passed on, and everybody should make efforts in that direction. Now talking of research– It is something that can happen only if all other aspects of your life are in place, but that is not how it works for most people, especially because of the number game (in academia). Unfortunately, our community is forcing people to focus only on research and publishing more, rather than focusing on other things as well. So I would say that I have strong opinions about this, perhaps about this attempt at balancing, and whether it should be done or not. I try to balance things. I know I am only moderately successful on the research front, but I certainly cannot ignore my job of teaching to make up for that.

Lecturing at a CERTEX workshop at IIT Kanpur. Amit Kuber

How do you see the role of AI tools in education today, especially when they can speed things up so much? Do they change how students engage with a subject?

AK: I am actually worried about the future of education with AI being so easily accessible. I do not like the idea of incorporating AI into teaching. Maybe people are focusing on its good aspects, that one can get something done fast. For instance, you can see lots of ads that say you can learn Python, which, in the traditional way, let us say, requires one year, and now here you can learn it in one month. But without romancing with the subject, you do not really develop an intuition for it. Creating a presentation is not just about creating slides–it lacks thought behind what is important and what is not. You actually have to go through that process.



Indian Institute of Technology, Kanpur

Department of Mathematics and Statistics

A report submitted in partial fulfillment for the course Undergraduate Project-III (MTH393A)

Expressing Pokémon Battles in Compositional Game Theory

Author: Harshit Bisht 14266

Supervisor: Prof. Amit S. Kuber

November 8, 2017

A student's report under the supervision of Amit Kuber on Pokémon and Category theory. Amit Kuber

Can you tell us how your student's project connecting category theory to Pokémon came about, and what your own experience with Pokémon has been? Do you enjoy the [Pokémon] game?

AK: Well, Harshit [Bisht], who was my first student at IITK, and I had become good friends by then, and we sometimes used to play Pokémon on the showdown server. When he came across a thesis from Queen Mary University of London that talked about games and monads, we thought, "Okay, can we do something about the game that we both like?" And this is how that project came into existence. Pokémon was really just one very small section at the end of that project, but basically it was about Kleisli categories and how they were used in modelling games. I have played Pokémon with several students here, and participated in Animé society tournaments–I also won a tournament once against seasoned players. It is actually an RPG–a role-playing game–but I do not play that. I like the competitive 6v6 singles random battles format on the Showdown server.

How would you describe your current research to a non-specialised person in the field?

AK: My current research revolves around some combinatorial objects called "quivers" and their "representations". The word "quiver" literally means a bunch of arrows, just as you might have heard in Ramayana and Mahabharata–they are simple-looking yet complex objects and need to be understood through their shadows, which are called representations. In order to understand those shadows, I have to look at some other beautiful pictures–some other quivers–which live above that, and study what properties of those beautiful diagrams above that allow us to get a "good" shadow of the picture that I am interested in.

Alright, what is the origin story of 'Expinfinity', and when did it acquire the meaning 'Exploring Infinity Within'?

AK: I have always been fascinated by the concept of infinity, but the origin story of this name is from 2008. In December that year, I was attending the first-ever Nobel Laureates Conclave in IIIT Allahabad–it was the Indian version of Heidelberg. It was there that I decided to create an email address while toying with the idea of something related to growth faster than infinity, thus expinfinity. The "exp" referred to "exponential" originally, and it did not have the meaning of exploration.

Fast forward 10 years later: on 26 December 2018, I had completed two years of my job. My students had already asked me multiple times by then to create my own website, to which my reply was, "I have not done much in life, what will I write on a website?" But that day, I finally decided to create one. While naming it, I thought about an alternate meaning of the word 'expinfinity,' and this website got its name: "Expinfinity-Exploring Infinity Within". By that time, I had matured quite a lot. The philosophical significance of that phrase is something that I tell a lot of my students–you are looking for answers outside, but the real answers are actually inside you. The current generation is living in so much chaos that they cannot listen to their own inner voice.

Many students learn mathematics through YouTube and social media. Is it easier for them to grasp, and how does that differ from a live classroom?

AK: Nowadays, students ask professors, "Why can't you make your lectures as interesting as Veritasium or 3Blue1Brown?" First of all, they [content creators] put a lot of thought and effort into those videos, and there is an entire production team behind a 15-minute video. They choose a topic to convey an idea that has potential to become popular; they focus on intuition and examples, but often do not go into details and proofs. The purpose is science popularisation, and these features are attractive for students. There is a giant leap from fascination to understanding. Understanding a subject requires romancing with the subject. You have to spend time with it, struggle with it. A readymade solution without struggle cannot be appreciated. True appreciation of a beautiful idea demands struggle. That is how mathematics works because there is no alternative to hard work. Learning is a slow and often boring process. Lecturers can be performers in a limited capacity, and a classroom is not merely a theater.

"But without romancing with the subject, you do not really develop an intuition for it."

How do you choose which students to mentor closely, and how do you tailor your mentoring to each student?

AK: Anyone who approaches me regarding a project, first of all, I try to test whether they are genuinely interested or not; otherwise, there is no point in continuing further–genuine

interest is something beyond the desire to improve their CV. I do not encourage one without a personal interest to pursue something further. I will only have general, limited advice for such people. But if they are passionate about something, show interest, and have potential, then that is the starting point.

Since every student is different, you cannot practically use the same procedure, and since there is no real algorithm, AI certainly cannot replace me on this front! (I would proudly like to say that.)

I spend a lot of time with students. If someone is working with me for a semester-long project, then they have to meet with me for at least three hours per week, where we discuss a variety of topics. Eventually, I understand their strengths and weaknesses. I only need to work on the latter, the things that are holding them back, and that differ for each student.

If a student is too argumentative, then I have to tell them that it is fine if they are doing it with me, but they should not do it everywhere. Sometimes they are too shy, or their communication skills are poor- all of this forms a part of the package. I need to make sure that they feel open to talk to me, and that the connection is strong enough that my words have some impact on them.

"Since every student is different, you cannot practically use the same procedure, and since there is no real algorithm, AI certainly cannot replace me on this front!"

Most of them ask me for a reference letter, and I always write a personalized recommendation from scratch, not by changing the names and qualities in a standard format. I write after recalling their personal interactions with me– some dialogues, or events which indicate something special about them. Every student is different, and so are the challenges they face.

There is a repetitive part in supervision, which becomes quite boring at times, like teaching how to do technical writing and improving communication skills. Even if you end up giving the same talk to a different student, it is essential for their growth.

I strongly believe that focusing on communication and eliminating the misconception from students' brains that mathematics is a solo game are both important. Since the community has to accept and appreciate what you are doing, you have to present your work in an acceptable format. As a result, you should learn how to speak well and how to write well. Your writing should carry your signature, your personality, and convey exactly what you have on your mind. Technical writing, unlike poetry, should not be open to interpretation.

Unfortunately, our education system does not focus on communication. Essay writing is not taken seriously by several high school students, and students interested in science rarely like languages. You have to tell a story. Writing a mathematics paper, delivering a lecture, delivering a seminar- all of it is a story, and that story should be woven around a theme and certain keywords. This is the artistic aspect of mathematics.

Amit Kuber and other participants during the 9th Indian School on Logic and its Applications at IIT Kanpur in 2022. ISLA 2022

To what extent does our current education system allow intellectual independence, and where does it constrain it?

AK: Humans seek validation from others, which comes only when you do something meaningful for a wider audience. Unfortunately, the answer to your question is a resounding "No, it is constrained", which is a fatal flaw in our education system. Why should everybody have to crack the same exam? Is the score of one exam a good indicator of intellect?

The reason is that there is no easy and practical alternative solution. It is not an ideal system but a practical one, the only feasible approach left after eliminating other possibilities, given the scale of population and constraints. So, if you choose to compete in this race, you have to follow certain norms.

Eventually, when you gain independence and when nobody governs your day-to-day activities, you have the choice to skip a lecture if you wish, as you face newfound freedom. And at this point, students tend to do what they want. Unfortunately, our education system does not adequately support or guide them in navigating that freedom in a fruitful manner.

At Anveshanā, we are trying to understand what learning ultimately seeks. So what does 'satisfaction' mean to you in learning and in research?

AK: Research offers the rare opportunity to discover something original, which comes along with a feeling of satisfaction–the joy of discovering something that no one else has known! Most other professions do not offer this opportunity; they might do repetitive work, even creative work, but rarely something entirely new. I personally realized at some point that even though I would like to learn a lot, I have a limited amount of time on this planet. Therefore, I

should learn something, and at some point, I must start using it—applying my knowledge to do something new, and I try to give the same advice to students. You can always find someone who says, "I am learning from this book, I am solving all the exercises from this book and that book", and it never ends. You already accumulate a lot of information as part of the curriculum, and you have to convert it into knowledge as a researcher or a curious learner. This conversion cannot happen unless you process the information, which in turn cannot happen unless you have a concrete goal in mind. The problems you try to tackle guide you through the process and provide a purpose. You cannot be an undergraduate or a postgraduate student throughout your life. What I ask for is to build a strong background and, until then, remain just a student. But once you have laid that foundation, you also become a researcher. Be inquisitive, have a goal, and start reading with that goal in focus–make it a directed effort. Beyond a certain point in your career, your goal should not merely be to read more but to work with purpose.

A Journey to the Valley of God

by Debojit Chanda

Figure 5.1: Yamuna Par; A4, Watercolor. Debojit Chanda
8.3 x 11.7" (21 x 30 cm) - Daniel Smith extra-fine watercolors on Chitrapat handmade paper

The way of life is an enigma, like navigating through an ever-changing maze that too on a pitch-dark night. In this strange journey, a hobby becomes a small lamp, revealing only a few steps ahead, just so we can push towards an uncertain end. Like many fellow travellers, I also hold two such lamps: painting watercolours and gazing at mountains. Though they seem worlds apart, they share a quiet truth. No matter how often you witness a mountain, each new glimpse unveils an uncharted face, just like every brushstroke produces something unforeseen, even for a seasoned painter. To steady my wavering path, last month, I chose to

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follow both lamps at once and trek into the Himalayas. And now, a few days later, soaked in the divinity of the great ranges, I couldn't help but also take you along on a visual journey to the Valley of God: *Har Ki Dun*.

As mundane as the train ride to Dehradun was, the drive to Kotgaon (6,520 ft) was equally charming. Lost in the pine forests unfolding at every bend, with sparkling rivers playing hide-and-seek between the ridges (5.1), I hardly noticed when the evening sun had already gilded the rooftops. By the time the village came into view, only the Swargarohini peaks stood tall, like watchful silhouettes behind the clouds (5.2).

Figure 5.2: From Kotgaon- Last Light; A5, Watercolor. Debojit Chanda
Approx. 5.83 x 8.27" (14.8 x 21.0 cm) - Daniel Smith extra-fine watercolors on Chitrapat handmade paper

The trek began the next morning (5.3) after obtaining entry passes from Sankri. With a bag full of clothes and a heart full of hope, we marched on towards our first stop – Gangaad (7,667 ft), a village beside the Supin River. Bathed in its century-old culture and frugal lifestyle, we fell asleep quickly, with the hymn of the flowing water. The last known memory of that place: golden mountains behind the quiet village, remained permanently engraved in my soul (5.4).

The next day, we started the ascent as the mountains slowly rose into our consciousness. Though occasional, traditional village homes on the slopes began to fade as we moved on.

Figure 5.3: From Kotgaon- First Light; A5, Watercolor. Debojit Chanda
Approx. 5.83 x 8.27" (14.8 x 21.0 cm) - Daniel Smith extra-fine watercolors on Chitrapat handmade paper

With every step, the trail itself began to feel like a prelude to something ancient, becoming nearly unwalkable for my city-grown feet. Seema arrived like a gentle pause – with a cluster of warm smiles and riverside serenity, it reminded us that even in the wilderness, hospitality thrives (5.5). From Seema onward, the trail widened and the valley opened its arms up, and a few miles later our first campsite, Kalkatiyadhar (9,960 ft), came into view. As the height and temperature grew apart, so did the layers under our jacket. Stranded alone beneath the Milky Way, all we could do was wait for the fated summit.

Figure 5.4: Sunset at Gangad; A5, Watercolor. Debojit Chanda
Approx. 5.83 x 8.27" (14.8 x 21.0 cm) - Daniel Smith extra-fine watercolors on Chitrapat handmade paper

We started the next day early, with the sun barely awake. Within a few minutes, the landscape lifted itself toward grandeur. And then, just beyond a bend that seemed to vanish in the sky, the first true glimpse of Har Ki Dun appeared, as we arrived at Boslo (10,430 ft) , a calm panorama surrounded by the mountains, so sudden and so vast, that it demanded silence (5.6). The final stretch to the valley felt like walking into a myth; for the first time in the last few days, my legs did not want to stop. The meadows flattened into a broad cradle of gold and green, merging the trail with the banks of the Thamsa River, which led straight to the feet of Swargarohini, the God's valley (5.7).

Figure 5.5: Seema- The Last Village; A5, Watercolor. Debojit Chanda
Approx. 5.83 x 8.27" (14.8 x 21.0 cm) - Daniel Smith extra-fine watercolors on Chitrapat handmade paper

Figure 5.6: Glimpse of the End; A5, Watercolor. Debojit Chanda
Approx. 5.83 x 8.27" (14.8 x 21.0 cm) - Daniel Smith extra-fine watercolors on Chitrapat handmade paper

Circled by the Hata Peak, Har Ki Dun Peak, Jaundhar Glacier at one side, and Mt. Swargarohini I, II, III, Mt. Bandarponch, Mt. Kalanag on the other hand, snowfields glowed softly in the sun as streams braided themselves gracefully across the plains. Standing there, breathing in wind filled with cold purity, surrounded by the towering amphitheatre of peaks, time seemed to loosen its grip.

Har Ki Dun was not just the end of a trail; it was a place where story and landscape met. A valley whispered about in mythology, framed by mountains that looked unchanged since the days when gods were said to walk these paths. In that dangerously elegant quiet, with the world stretching away endlessly in snow and stone, the journey felt complete in the most profound way.

Figure 5.7: God's Valley; A4, Watercolor. Debojit Chanda
8.3 x 11.7" (21 x 30 cm) - Daniel Smith extra-fine watercolors on Chitrapat handmade paper

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Be Wise, Randomize!

by Saraswata Sensarma

"God does not play dice with the universe."

The above quote expresses the discomfort and disdain of Albert Einstein with the stochastic description of the microscopic world in quantum mechanics. He had his reservations about departing completely from a deterministic worldview and deemed quantum mechanics to be an intermediate step towards a *unified field theory*[1], which he spent his final years working on. However, quantum mechanics has undergone extensive experimental scrutiny and immense development since then, and has become fundamental to our understanding of the universe. To the best of our knowledge, the workings of subatomic particles, the very nature of nature itself, is indeed probabilistic. Out of these random dynamics arise the beautifully structured, apparently deterministic phenomena that we observe in our daily lives.

In some sense, this already speaks to the broad applicability of probability theory, which the title of this article alludes to. But what about the macroscopic world, say governed by Newtonian mechanics, which, by its very nature, is deterministic? Can we use probability to address such fundamentally non-probabilistic problems? If so, does it offer any significant advantages? How wide is the scope of applicability of stochastic methods? In this article, we wish to give a semblance of an answer to these questions and hope that these ideas motivate the readers to investigate further on their own. With this premise, we begin our exploration of the applications of probabilistic ideas in various scientific disciplines.

One of the first uses of probability in the physics literature was in statistical mechanics. Consider a gas in a container, with particles large enough so that the quantum mechanical effects have been averaged out. Then, the interaction of these particles follows Newton's laws and thus, at least locally, is reversible. There is no inherent randomness here—if we could somehow figure out the location, mass, and velocity of each particle at a given time, we would know exactly how the system will evolve. Understandably, this is too much information to accumulate or process and thus does not further our understanding of the system. It was in

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[1]Einstein wanted to unify gravity and electromagnetism into a single framework, and express both as properties of the spacetime geometry. This would have eliminated the need to consider matter fields and sources separately. He believed this might also explain the origin of quantization from classical geometry.

the second half of the nineteenth century, through the work of Maxwell, Boltzmann, and Gibbs, that a framework to model the macroscopic properties of gases was developed. In essence, they realized that because of the large number of particles in the gas, properties such as volume, temperature, and pressure were barely affected by each individual particle. Instead, it was sufficient to understand how a statistically significant fraction of the particles behaved and how these fractions interacted among themselves. It was this *negligence of the few in favor of the many* that enabled the creation of a statistical theory of gases. These results then formed the basis of a probabilistic foundation of thermodynamics, which was able to explain the long-term irreversibility of thermodynamic systems. Of course, all of this was a big leap of faith, as this molecular picture of gases was yet to be experimentally verified! Indeed, it was the success of this framework that put up a strong case for the existence of molecules.

This is one of the first paradigms where probabilistic ideas came to be used. *If a system depends on a large number of parameters and not too much on any one of them, it may be helpful to randomize these parameters and see what happens*. This applies to many situations in our daily lives- from weather prediction to economics, from social media dynamics to ecology. Of course, the exact model and the randomization procedure will vary depending on the problem at hand. Coming up with an effective model is akin to a work of art—it should be simple enough to be analyzed mathematically while preserving salient features of the system we are after. Paraphrasing Einstein,

> "A model should be as simple as possible, but not simpler."

Let us consider a very different problem. In this day and age, where we routinely send sensitive information via the internet, effective encryption is key. Many encryption methods, like the RSA encryption protocol (developed by Ron Rivest, Adi Shamir, and Leonard Adleman), rely on large prime numbers – the larger the number, the harder the code is to crack. As computers become faster and faster, it becomes crucial to find larger and larger primes to keep our data protected. Say we want to check whether a given natural number n is prime. For starters, if the number is not divisible by any number smaller than itself, it is a prime. After a bit of thought, we realize it is enough to check this up to $\sqrt{n}$. But this still requires a rather long time and becomes infeasible for larger numbers. Can we do better? Consider the following fact from number theory:

> Consider any odd natural number $n = 2^s d + 1$, where d is odd. If n is a prime, then for *every* $1 < a < n$ (henceforth referred to as the base of exponent or simply *base*), either a^d leaves a remainder of 1 or -1, or for some index $1 \leq k \leq s$, $a^{2^k d}$ leaves a remainder of -1. If n is not a prime, then this *fails* for at least $3n/4$ bases $1 < a < n$.

If we can somehow find a base such that this does not work, we can conclude that n is composite. However, doing so would require checking the bases one by one (we may have to

check up to $n/4$ bases). In 1980, Gary L. Miller and Michael O. Rabin presented an innovative solution[2], choosing the index at random from the set $\{2, 3, \ldots, n-1\}$. If n is composite, the probability of choosing an index that happens to work is at most $1/4$. However, repeating this m times and choosing the indices independently at random, the probability that all indices just happen to work is at most $(1/4)^m$. All in all, if we allow for an error probability of ε, this test can be run in merely $C_\varepsilon(\log n)^3$ steps, where the constant C_ε depends on the error threshold. This is quite an improvement from what we had before, which required at least $\sqrt{n}$ many verifications!

This is another paradigm where *the problem is completely deterministic, but employing a random choice and allowing for a small chance of error makes for a fast and efficient algorithm*. Although deterministic algorithms running in polynomial time (around $(\log n)^k$ many steps) are now known[3], the Rabin-Miller test remains the most widely used algorithm to date due to its ease of implementation. The probability of error can be made arbitrarily small, which suffices for most, if not all, applications. This approach also works well for problems where finding a solution is hard, but checking if a guess is indeed a solution is easy. For instance, finding the prime factorization of a large integer is difficult, but verifying a guess requires a few multiplications. This is the very difficulty that guarantees the security of the RSA encryption. If we can find a reasonably fast randomized algorithm that obtains the correct factorization with a large enough probability, repeating it sufficiently many times, we could break the RSA! Fortunately, no such algorithm has been found yet that is implementable on a classical computer.

Let us digress to another, very general class of principles used extensively in combinatorics, aptly called *the probabilistic method*. Say, given a finite set S of objects, we wish to find an object satisfying a given property P. Then one version of the probabilistic method states that: If we can generate a *random* object C taking values in S such that it satisfies P with some positive probability, then there must be at least one object in S satisfying P. While the above statement is almost comically obvious, it can be used to solve problems that are anything but. In this regard, it is somewhat similar to the pigeonhole principle. By cleverly selecting the random object C based on the property P, this often leads to concise proofs and easy bounds. These methods were introduced and extensively used by Paul Erdős and his collaborators to great success, tackling problems in topics ranging from graph theory and combinatorics to number theory, set theory, and discrete geometry. While most applications of this method are simple-minded, they often involve the use of moment methods, concentration inequalities, Lovász's local lemma, or other tools from probability theory. Interested readers are encouraged to check out the book *The Probabilistic Method* by Alon and Spencer, or the earlier book by Erdős and Spencer with the same name.

[2] See the book *Introduction to Algorithms* by Cormen, Leiserson, Rivest, and Stein for more details.

[3] The first such algorithm was developed by Manindra Agrawal, Neeraj Kayal, and Nitin Saxena back in 2002. More details about the story behind this algorithm can be found in an interview of Manindra Agrawal published in the July 2025 edition of the Bhāvanā magazine: https://bhavana.org.in/homegrown-at-iit-kanpur/

Randomness, by its very nature, is unpredictable– making it particularly suitable for cryptography. For example, the RSA algorithm for encryption can be further secured using a probabilistic variant. It is also used in generating digital signatures and zero-knowledge proofs. On the other hand, much like quantum effects averaging out over large scales, many random systems become structured over time, or when sufficiently many random components are involved. This phenomenon is utilized handily in statistics and machine learning, indeed in any discipline where we wish to make predictions based on large amounts of (randomly sampled) data. There are other instances where a deterministic object or value is hard to extract, but we can find a stochastic process converging to it (in an appropriate sense). So long as simulating the stochastic process is reasonably fast, we can carry it on for a long enough time to get better and better approximations to our unknown object! Techniques like Monte Carlo simulation and Monte Carlo integration embody this very idea.

Probability theory is a very flexible branch of mathematics– with applications ranging from the depths of so-called pure mathematics to the most applied of problems. As a final example, consider Brownian motion, named after Robert Brown who first observed pollen grains dancing around in a beaker of water in 1827[4], modeled by Albert Einstein to justify the molecular theory of fluids in 1905, and later formalized mathematically by Norbert Wiener in the 1920s. It somehow becomes the perfect tool to solve the Poisson equation in a bounded domain, an equation fundamental to mathematical analysis, and to numerous branches of the natural sciences. On the other hand, the fact that Brownian motion in two dimensions is recurrent can be used to give a proof of the fundamental theorem of algebra[5]! It is hardly possible to come up with two results so far apart, yet their proofs involve the same foundational tool. Above all the paradigms mentioned before, probability theory has a surprising power of bridging gaps and bringing apparently separate disciplines together in what seems like a divine collaboration—maybe what Erdős would describe as *a proof from The Book* ! I hope these examples indicate the immense power wielded by the simple idea of randomization, which often lies untapped before our very eyes. As we probe deeper and deeper into the microscopic scales of the universe and uncover its non-deterministic nature, maybe we hear it whisper back a suggestion "be wise, *randomize*". Maybe the ability to play dice the right way will open up unexplored avenues and allow us to take a figurative peek into the very mind of God.

[4]In the poem On the nature of things (c. 60 BC), the Roman philosopher-poet Lucretius gives what may be considered an almost perfect explanation for this process but based on a wrong example. See https://en.wikipedia.org/wiki/Brownian_motion for more details.

[5]See the wonderful book *Brownian motion and its Applications to Mathematical Analysis* by Burdzy.

Resources Palette

Suggested Readings by Readers

- **What is Mathematics** by **Richard Courant, Herbert Robbins, Ian Stewart**
  This book presents mathematics as a unified, intuitive, and creative science, rooted in both logical rigor and real-world problems. The book can be enjoyed by anybody looking to understand the essence of mathematics as a rich, intuitive, multifaceted subject. The book describes various number systems, algebraic and transcendental numbers, leading up to constructions in geometry and constructible numbers. It goes on to introduce affine and projective geometry, topology, and calculus in detail. The book gives precise definitions and wonderfully demonstrates various concepts in higher mathematics using the simplest non-trivial examples, while assuming little to no prerequisites on the part of the reader.

- **Physics for Entertainment**, **Books One and Two** by **Yakov Perelman**
  This is a popular science book that describes a whole host of concepts for school students. The topics range from kinematics, mechanics, and gravitation to heat, light, sound, and electromagnetism. These ideas are explained through a variety of experiments and historical anecdotes. The book, with its charismatic style of introducing new topics in science, can be enjoyed by readers of all ages and skill levels, regardless of how experienced they are with physics. The non-technical flavour of the book, however, never impinges on its accuracy. The same enthusiasm is deeply ingrained in many other works of the author, *Arithmetic for entertainment*, *Mechanics for entertainment*, *Geometry for Entertainment*, *Astronomy for entertainment*, and *Mathematics can be fun* to name a few.

- **A Mathematician's Lament** by **Paul Lockhart**
  In this book, *Lockhart* laments the loss of the soul of mathematics. He critiques how the subject, as taught in schools, is stripped of its life and reduced to a rote, hollow, procedural, and often robotic method of learning. He argues that mathematics is an art form that can be as evocative as music, but is seen as nothing more than a tool or a requirement for a resume. Throughout the entire book he makes an honest attempt to champion his point that by forcing students to memorize formulas without ever experiencing the joy of discovery, we are "destroying the very thing we claim to be teaching."

- **Murder in the Cathedral** by **T.S. Eliot**
  A drama in verses written by T.S. Eliot, which goes through the event of the assassination of Archbishop Thomas Becket in Canterbury Cathedral during the reign of Henry II in 1170. The play is a blend of hope and hopelessness, of bravery and dread, of temptation and integrity, of faith and shock. The formal control of the theatrical turns one into a meditation on power, conscience, and temptation.

- **The Boy, the Mole, the Fox and the Horse** by **Charlie Mackesy**
  This book by *Mackesy* explores the themes of friendship, kindness, vulnerability, while emphasizing on the very necessary aspect of asking for help when needed. This is a short, reflective book which sits at the intersection of a fable and a sketchbook. The four characters, however highly unlikely to encounter each other in real life, exist in the same space and time, understanding each others sentiments and figuring out a way through life, each offering a different ingredient. The book offers the quiet and calm ambiance which adds to the reading experience. The lessons offered are certainly not 'ever heard of before', but the presentation seems to be more impactful. For those interested, a movie based on the book with the same name is also available.
- **And Every Morning the Way Home Gets Longer and Longer** by **Fredrik Backman**
  This short novella by *Backman* told through fragmented conversations spanning three generations. At its centre is a grandfather battling cognitive decline, striving to preserve his memories; his son, grappling with the slow, anticipatory loss of a parent; and a grandson attempting to understand a world quietly slipping away. The narrative captures their shared struggle to hold on to one another, each seeking, in their own way, a little more time. The inexplicable grief of loss is portrayed through fragments of time and memory, linking the past and the present. The book frames grief as an ongoing, lived experience, shaped by memory and time.
- **The Picture of Dorian Gray** by **Oscar Wilde**
  This is a philosophical novel that interrogates beauty, morality, and the consequences of aesthetic excess. Through Dorian's unaging body and corrupted portrait, *Wilde* externalizes the tension between appearance and ethical responsibility. Ultimately, the novel raises enduring questions about selfhood, influence, and accountability, presenting moral decay as a gradual, seductive process.

Web Resources

- Suggested Readings for Probability Students by Manjunath Krishnapur
  https://math.iisc.ac.in/ manju/suggestedreading.html
- Rudra Veena hosted by Carsten Wicke
  https://www.Rudra Veena.net/
- GAP package for computations in Quivers and Path Algebra
  https://oyvinso.folk.ntnu.no/QPA/
- q.uiver.app–A modern commutative diagram editor for the web
  https://q.uiver.app/

- The Complete Palette Guide for Watercolors
  https://www.handprint.com/HP/WCL/palette1.html/
- Grothendieck Archives (Université de Montpellier)
  https://grothendieck.umontpellier.fr/archives-grothendieck/
- The On-Line Encyclopedia of Integer Sequences
  https://oeis.org/
- The Stacks Project
  https://stacks.math.columbia.edu/
- Simons Center for Geometry and Physics Video Portal on Mathematics and Physics
  https://scgp.stonybrook.edu/video_portal/
- Gudhi: A Library for Topological Data Analysis
  https://gudhi.inria.fr/

Upcoming Conferences and Programs

- Upcoming conferences in algebraic geometry maintained by Ravi Vakil
  https://virtualmath1.stanford.edu/ vakil/conferences.html
- **Millennium Prize Problems Lecture Series** (Sept 17, 2025 - Apr 15, 2026) at Harvard Science Center, Harvard University.
  https://cmsa.fas.harvard.edu/millennium/
- **Thematic Programme on Rational Points, Algebraic Cycles and the Local-Global Principle** (Jan 2026 - May 2026) at LMSI, Mumbai.
  https://lmsi.org/programmes/thematic-programme-on-rational-points/
- **Generalised symmetries and anomalies in quantum phases of matter** (Jan 05, 2026 - Jan 16, 2026) at ICTS, Bangalore.
  https://www.icts.res.in/program/GSYQM2026
- **Partial Differential Equations, Analysis and Geometry** (Jan 12, 2025 - Jan 16, 2025) at IHES.
  https://indico.math.cnrs.fr/event/15217/
- **Geometric Analysis and PDE** (Feb 02, 2026 - Feb 13, 2026) at ICTS, Bangalore.
  https://www.lptms.universite-paris-saclay.fr/leshouches2025/
- **IMSc Spring School on High Energy Physics** (Feb 24, 2025 to Mar 7, 2025) at IMSc, Chennai.
  https://indico.imsc.res.in/event/5/

- **Spring School on Superstring Theory and Related Topics** (Mar 23, 2026 - Mar 31, 2026) at ICTP.
  https://indico.ictp.it/event/11135
- **From Hochschild Homology to Topological Hochschild Homology** (May 25, 2026 - Jun 05, 2026) at ICTS, Bangalore.
  https://www.mpim-bonn.mpg.de/maninmemorial
- **Thematic Programme on Surface Group Representation and Analytic Group Theory** (Jul 1, 2026 to Dec 18, 2026) at LMSI, Mumbai.
  https://lmsi.org/programmes/thematic-programme-on-surface-analytics-group/
- **Strings 2026** (Jul 06, 2026 - Jul 10, 2026) at SIMIS, Shanghai, China .
  https://strings2026.simis.cn/
- **2026 IHES Summer School - Cosmological Correlators** (Jul 06, 2026 - Jul 17, 2026) at IHES.
  https://indico.math.cnrs.fr/event/15597/
- **International Congress of Mathematicians (ICM) 2026** (Jul 23, 2026 - Jul 30, 2026) in Philadelphia, USA.
  https://www.icm2026.org/

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