

# The science performer

Rinku Dutta

*IIT graduate Arvind Gupta performs tricks to make science fun for children – and everybody else*

There are all kinds of performance artists who entertain people through dance, drama, music and mime. But rarely does one come across a science performer. Therefore, it was a treat to watch Arvind Gupta perform his bag of science tricks at Lahore's Ali Institute of Education auditorium on April 7.

As he rose from his chair to face the over 150 teaching staff spectators, Arvind looked a neo-Gandhi activist in a well-worn *khadi kurta* with a frayed front pocket, unpresed khaki trousers and black Bata slip-on canvas shoes. Other than a pair of gleaming eyes, set in a mobile, bearded face that often cracked into a "hey-hey" laugh, there wasn't much in his balding, middle-aged appearance that distinguished him from the ordinary.

After graduating with a degree in mechanical engineering from a premiere institute, IIT Kanpur, Arvind worked a couple of years in industry, TELCO, soon realising that this was not his calling. Since quitting TELCO, he has been following his inclinations, taking the path dictated by his heart. His path, with many turns, has led to him towards children, and making the learning of science a fun activity.

Since his reputation had preceded him, I watched closely for signs of genius as he unpacked his knick-knacks from shoebox sized white plastic boxes onto the wooden

table. What he had laid out resembled little more than assorted trash – old film canisters, dot pens, cycle tubing of various sizes, used juice packs, old newspapers and the like; no fancy black hat to pull out rabbits from. I began to feel vaguely disappointed.

Then Arvind began his show.

Before my sceptical eyes, matchsticks connected by snippets of cycle tubing progressively became triangles, squares, tetrahedrons, cubes and increasingly complex polygons. Because the joints were flexible, Arvind could show that while a square could easily be bent to a rhombus, a triangle formed a rigid, fixed structure. He explained how the stabilising properties of triangles are used ubiquitously, as in the tripod, the three-legged stool. He then demonstrated how the tetrahedron (structure of four triangles) is the most rigid of all natural geometric forms; he positioned three matchstick tetrahedrons on the table and placed a couple of books on them. While the tetrahedrons did not buckle under the weight, three cubes placed in similar positions fell flat. Arvind related this to the shapes of pylons supporting bridges. Dipping his hand into a bag of marbles, he then heaped four glassy balls inside a tetrahedral matchstick skeleton to represent methane, elaborating how tetrahedral carbon was the basic building block of all living forms. Thus, within a few minutes of



Arvind Gupta: a man with a mission

matchstick manipulation, Arvind had drawn the audience into the marvellous world of geometry and the architecture of molecular modules in Nature.

Hooking people, especially children, on to science, is Arvind's game. And he has mastered it well. For over 25 years he has been practicing activity-based science teaching and is linked to several educational organisations in India, both governmental and non-governmental. For his efforts, he has received the National Award for Science Popularisation. Along with two able assistants he now runs the Muktangan Science Exploratorium for Children that was established in 2004 at the Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune. Here, every day, 50 children from any one school come and spend four hours toying with science. In the summer, children get to do science projects with scientists at IUCAA.

What fuels his drive? Relaxing in his comfortable guest room at the Rausing Centre at the Lahore University of Management Sciences (LUMS), Arvind admits that it is his colourful memories of childhood, particularly the time he spent with his mother, that keep him going. Being a girl, she was deprived of schooling. She vowed that her children would not suffer her own fate – against strong opposition, she sent them to the Maria Goretti

Convent in their hometown, Bareilly, Uttar Pradesh. After returning from school, Arvind would spend hours relating to his mother all the 'non-sense' that had happened that day. She would listen with enthusiasm. "When I quit TELCO, my mother just said, '*Achha hua, abhi wo kuchh nek kam karega.*' ('Good. He will now do some positive work.') It is because of my mother's deep trust that I would do something good in life that I am here. She is the well-spring of my life."

Arvind has been doubly blessed. His wife Sunita, a sociologist, has supported him in his brilliant madness. For 15 years he has freelanced, taking his science show to schools, writing books, translating children's classics into Hindi and getting the National Book Trust to translate them into other Indian languages.

Arvind's primary goal is to advocate context-based, child-centred education that frees the human potential of a child, and doesn't stifle it. His science show is just one aspect of this larger concern. Skilfully interwoven with demonstrations of physical principles through affordable, make-it-yourself toys are Arvind's educational politics ("Never wear your politics on your sleeve," he advised us later). A gifted raconteur, he holds his audience mesmerised through tales that speak of alternative, more holistic ways of learning, such as that of the choo-choo-

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Arvind's levitation trick

train school which the Japanese girl Tottochan attended. Arvind is strongly critical of the dumbing-down we subject our children to in the name of education.

To propagate his method of teaching, Arvind has set up a website, [www.arvindguptatoys.com](http://www.arvindguptatoys.com), which recommends more than 400 world-class works of literature on education

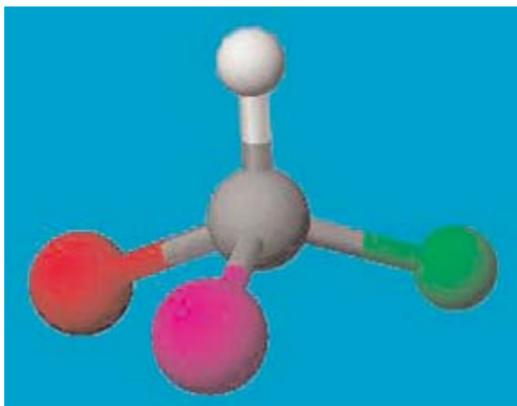
and philosophy of the good life, ranging from anecdotes and stories to parables and essays. The site has detailed illustrated manuals for building his repertoire of science toys. A few inspirational films and a documentary on the kind of activity that takes place at his children's science play centre are also on the site. Moreover, Arvind has copied all this information on a CD, which he is distributing free of cost and encouraging others to pass on his generous act. The Ali Institute of Education has agreed to copy the CD and distribute it to every institution that sent a representative to the teaching-with-toys lecture-demonstration (lec-dem).

How has Arvind pulled it off? How did he drop out of the charted path and take the road less trodden? Where did the money come from? How did he support himself? Arvind bursts into his hey-hey laughter and asserts "Kaam mein kuchh khushbu hona chahiye –

your work must be fragrant, that's all. There's no dearth of good people in this world. If you bring them something good, they will support you. You bring your bag of tricks to them,

open their minds to new things and they will serve you food and pay the bus fare to your next destination!"

Arvind will not suffer cynics. He listens patiently enough, though – my complaints of the corrupt, repressive system in Pakistan, the power of the religious right, the marginalising of independent thinkers and doers – Arvind is not dismissive. "I can see how it can get here [in Pakistan]. We in India are much more fortunate. Hinduism is no religion (He breaks into his "hey-hey hey" laughter). We have much more space to do things. But hey! Let me tell you the story of Elzeard Bouffier. [In Jean Giono's short story] Bouffier was 'the man who planted trees.' And before the trees, he prepared the soil so that the saplings could grow. If you find the land is barren, go create fistfuls of fertile soil! Wherever you find a crack, a crevice in the system, put your foot in, make more breathing space. Life's so



The tetrahedral carbon

**"There's no dearth of good people in this world. If you bring them something good, they will support you. You bring your bag of tricks to them, open their minds to new things and they will pay the bus fare to your next destination!"**

short. You have so much to give."



Kiskatinaw Bridge on the Alaska highway demonstrates the strength of triangles

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Arvind visited Pakistan for two weeks, courtesy the Ali Institute of Education. His visit was facilitated by his friendship with Pervez Hoodbhoy and Tariq Siddiqui, and extended in outreach by his e-acquaintance with Isa Daudpota, who connected him with Zaffar Junejo of Dadu in interior Sindh. Arvind held his lec-dems in four cities: Karachi, Hyderabad, Islamabad and Lahore. When the organisers in the Lahore school he

visited led him to the room where 60 of its best students had been assembled, Arvind exclaimed, "I'm here from India, who knows when I shall cross the border again? What will I do with 60 kids? I want to speak to the whole school." A neo-Gandhi activist indeed! ■

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