

PHYSICS



PURNIMA SINHA

A Role Model for All

- **1954-62**

Published two papers in the journal *Nature* based on her study on 50 samples of clays, soils, and shales from different parts of India

- **1956**

The first woman to earn PhD in Physics from Calcutta University

Purnima Sinha was a distinguished scientist, the first woman to obtain PhD in physics from Calcutta University, a noted musician, an artist and sculptor, a litterateur, an author, an independent thinker, fearless to express her opinion, a devoted wife and loving mother - all rolled in one.

Purnima Sinha (nee Sengupta) was born on 12 October, 1927. Her father Naresh Chandra Sengupta was a jurist. Purnima grew under the aegis of a father who was influenced by the Russian revolution of 1917 and had communist inclinations. Purnima was thus brought up in this liberal environment which shaped her as a free-thinking individual.

Purnima belonged to the group of "Transition Scientists" as she completed her basic education in colonial India, while she carried out her scientific research in independent India. Women studying physics in the mid-1940s was extremely rare and required a lot of courage and determination.

After obtaining her MSc degree in Physics from Calcutta University, she joined for her PhD work in 1951 under the legendary physicist Satyendra Nath Bose. Post-independence India was struggling to set up new laboratories and infrastructure with limited resources. Purchase of commercial equipment was unthinkable and research was more inclined to be an art in pursuit of science by building instruments with components available in the open market. She recalled "we had put together our X-ray equipment from the World War II surplus gathered in the lane behind Dr Bidhan Roy's house".

Purnima's PhD research was entitled "X-ray & Differential Thermal Analysis of Indian Clays". The major aim of her research was to classify clays using X-ray diffraction and differential thermal analysis. She studied 50 samples of clays, soils, and shales from different parts of India and published two papers in the journal, Nature.

An interesting incident from her PhD days concerns the visit of Linus Pauling, Nobel Prize winner, to Calcutta. After a lecture by Pauling, Purnima ran after him to catch him at the gate and drew a diagram on the back of her palm to clarify some doubts on the structure of silicates. However, Prof. Bose reprimanded her later for this action. Nobel Laureate physicist Paul M Dirac and his wife were attended to by Purnima. This interaction with Dirac family formed a bonding which continued till they died.

Purnima married Surajit Chandra Sinha in 1956, a reputed anthropologist, who later retired from Visva Bharati as its Vice-Chancellor. After a brief stint at the Geological Survey of India, Purnima proceeded to the USA

with her husband. During this period Purnima worked on the origin of life with clay as the substrate in the Biophysics Group at Stanford University, California. She observed that the spacing in the clay structure, determined through X-ray studies, corresponded to the pitch of the DNA double helix. Since then, she remained interested in biophysics till the end of her life.

During her stay in the USA, she delivered seven lectures on music in a programme organised by the Department of Music, University of Chicago which was later published in the form of a book "An approach to the Study of Indian music". She was a vocalist too. She broke the glass ceiling by playing the Tabla, a male-dominated music accompaniment.

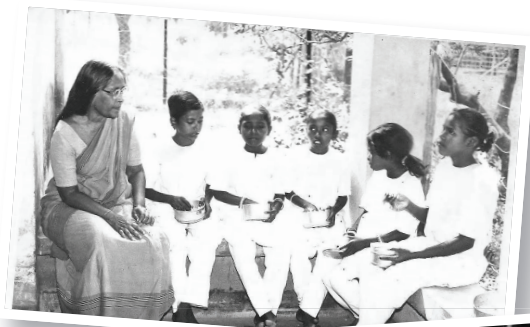
After her return from the USA in 1964 she spent most of her professional life at the CGCRI, Kolkata till she took voluntary retirement on 1 August 1986. She was instrumental in introducing the MA course in music at Visva Bharati in 1978 after her inaugural lecture there on musical acoustics on 2 December, 1977.

Sinha was a painter and sculptor too. She participated and organized an exhibition of works on pottery, wooden and clay toys, toys made of lac, bamboo objects, mat and applique at Visva Bharati.

Purnima extensively wrote on many subjects in both English and Bangla. She was a regular contributor to the Bangla magazine Jnan O Bijan, established by Satyendra Nath Bose. She wrote several biographies of Bose, her teacher and mentor, in Bangla; translated Erwin Schrödinger's book "Mind and Matter" into Bangla under the title "Mon O Jodobostu". She also translated the book "Unravelling DNA" written by Maxim DF Kamenetskii, a Fellow of the Russian Academy of Sciences, Moscow in Bangla.

After living a fulfilling and colourful life, a life that can inspire future generations, Purnima died on 11 July 2015. Her life is a model to show that women should not allow their aspirations to die because of social constructs and it is possible to maintain a balance between family and profession by sheer determination. •

— Suprakash C Roy



Top: Mela Mesha r Pathashala, an inclusive informal school run by Dr Surajit Sinha and Dr Purnima Sinha at their residence in Shantiniketan

Above: PAM Dirac, Purnima Sinha, and SN Bose in Botanical Garden, Kolkata

PHOTO: SINHA FAMILY

The high voltage transformer of the X-ray equipment that Purnima used in her research was fabricated in the applied physics department of the university.