

he could have before the advent of Penrose and Hawking on the scene, proved the famous singularity theorems. Further, had he met with encouragement and appreciation in his early research career, things might have been different. Least

of all, Calcutta University would not have remained oblivious of him and AKR would have been among the top practising scientists. That would have been really remarkable. But then we would not have had the legend of AKR.

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## Usha Ranjan Ghatak (1931–2005)

Usha Ranjan Ghatak was born at Brahmanberia, now in Bangladesh on 26 February 1931 as the fourth of six sons and one daughter to Hem Ranjan Ghatak and Soudamini Devi. He got his early education in the then East Bengal and passed the Matriculation examination in 1947. After partition, Ghatak moved to Agartala, Tripura where he passed his I Sc Examination in 1949. He then migrated to Calcutta and obtained his B Sc degree with honours in chemistry from Asutosh College. He received his Master's degree in chemistry from Calcutta University as a topper in 1953 and secured the Calcutta University Gold Medal and Motilal Mullick Medal. Ghatak then joined the group of P. C. Dutta, a renowned synthetic organic chemist at Indian Association for the Cultivation of Science (IACS) and obtained his Ph D degree in 1957 from Calcutta University. After spending another two years in IACS as a research associate, Ghatak moved to USA for his postdoctoral assignments in 1959. During the following four years he worked at the University of Maine (Orono, Maine), the University of California, Berkeley and at St. John's University, New York in the wide field of organic chemistry from natural products to peptide synthesis.

Ghatak returned to India in 1963 and joined as a reader in the Department of Organic Chemistry, IACS. He started his independent research in the area of organic synthesis. Within a short time Ghatak established himself as an organic chemist of high repute both nationally and internationally. He made substantial contributions to methods for stereochemically controlled organic synthesis, particularly in the fields of polycarbocyclic diterpenoids and bridged-ring compounds related to bioactive natural products. His work is marked by a deep understanding of the conformational, steric and mechanistic factors which control bond formations in organic synthesis.

In the early stages, Ghatak and his co-workers developed a simple stereocontrolled total synthesis of some resin acids of profound contemporary interest and

settled the stereochemical assignments of all the four possible racemates of deoxypodocarpic acid, deisopropyl dehydroabietic acid and the corresponding 5-epimers. These discoveries clarified the stereochemical uncertainties that existed in the literature for the related synthetic compounds and have been widely referred to by later workers in the field.



Ghatak developed a general synthetic strategy which has considerable potential towards synthesis of a larger number of tetracyclic gibbanes and phyllocladane synthons based upon intramolecular copper-catalysed carbenoid addition to double bond by thermal decomposition of  $\gamma,\delta$ -unsaturated diazomethyl ketones. This has been successfully demonstrated in achieving the total synthesis of compounds related to gibberellins, the plant hormones. These molecules posed a challenging synthetic problem from structural as well as stereochemical points.

During the last phase of his tenure in IACS, Ghatak secured a remarkable achievement in free radical cyclization chemistry. The regio- and stereo-specific 6-*endo* and 7-*endo*-aryl radical cyclization leading to a simple convergent general method of synthesis for some linear polycarbocyclic systems was developed. This protocol was successfully employed in stereocontrolled generation of several chiral centers in a single step.

His pioneering contributions in synthetic organic chemistry earned Ghatak recognitions and awards, including the Shanti Swarup Bhatnagar award in Chemistry (1974), Fellow of the Indian Academy of Sciences (1976), Fellow of the Indian National Science Academy (1980) and Chemical Research Society of India gold medal (2003).

As Head of the Department of Organic Chemistry (1977–89), Ghatak steered the department in the right direction and brought glory to it through his own research contributions as well as providing guidance to other faculty members. During his tenure, several sophisticated instruments like high field NMR, GC and LC were procured for the department. Ghatak shouldered responsibilities of the Institute as Director in 1989 at a crucial time and made significant improvements during his four-year term. During his superannuation he continued as Professor of organic chemistry till his retirement in 1996 from IACS. Ghatak then joined Indian Institute of Chemical Biology, Kolkata as Emeritus Scientist and was associated with this institute till the end. He served as member of INSA Council, IASc Council, Editorial Boards of *Indian Journal of Chemistry, Section B* and *Proceedings of the Indian Academy of Sciences*, DST and CSIR PAC and many other scientific bodies.

Ghatak was loved and admired by all in the academic community. He was always approachable and extended a helping hand to everyone. Ghatak passed away on 18 June 2005 at his residence after a massive heart attack leaving his wife, Anindita, relatives and numerous students, associates and friends in grief. With his passing away, the country has lost a great synthetic organic chemist.

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