



Nandivada Rathnasree

(26.11.1963 – 9.5.2021)

A researcher, mentor, educator, author, story-teller, science communicator, outreach person in the field of astronomy, institution builder and a leader who passionately shared knowledge, that is **Dr.Nandivada Rathnasree!**

She will always be remembered for her yeoman efforts towards preservation and upgradation of Jantar Mantar observatories and popularising these among the general public through myriad activities. Her passion combined with her creativity helped her break

heavy concepts into capsules that the common public can assimilate and apply.

Born to a civil servant Nandivada Bhima Rao and Syamala, she showed inclination towards learning and sharing knowledge from her young age. Like many girls who don the role of nurturer of their younger siblings, she too bonded with her brother Som while teaching him. This probably helped her develop the urge to be a mentor, a good teacher and an excellent communicator in later years.

Rathnasree did her research in the area of stellar evolution and population synthesis under the guidance of Prof. Alak Ray in the theoretical astrophysics group at Tata Institute of Fundamental Research (TIFR), Mumbai. Later, she joined as a postdoc fellow at the University of Vermont, Burlington,



USA during 1992-1994, where she carried out pulsar observations using the **Arecibo radio-telescope** under the mentorship of Prof. Joanna Marie Rankin.

Later she returned to our country to join Raman Research Institute, Bengaluru. Her research included areas of study on massive binaries, particularly in the large magellanic cloud evolution of stars, stellar remains and on a range of aspects manifested in the pulsar radio emission and associated polarisation properties.

Dr. Rathnasree moved to Delhi in 1996 when her husband had joined the department of physics and astrophysics at the Delhi University. She took up the position of senior planetarium educator at Nehru Planetarium, of which she became Director in 1999. **She remained the fountainhead of activities that nurtured interests of thousands of students and public in astronomy for the next three two decades.** Under her leadership, Nehru planetarium started a range of initiatives and this became the hub for amateur astronomers around NCR and Delhi region to carry out their projects. She guided them on various topics, be it photometric observations of stars or new techniques for astrophotography.

Dr. Rathnasree designed her planetarium shows to reach-out different audiences, through her multi-faceted approach:

- ▶ provide information and create enthusiasm,
- ▶ deepen or widen knowledge,
- ▶ build technical facilities to explore further
- ▶ remove fear due to superstitions.



She captured every celestial event across the country, be it solar and lunar eclipse, annular and partial eclipses, planetary conjunctions and transits or any launching mission, meteor showers and converted them as an opportunity to drive the message.

A hands-on person who believed in experiential learning, she provided a floor to make these possible with low cost too, say by constructing pinhole cameras and solar projection boxes, so public and school children can learn by doing. Her networking abilities, willingness to travel across the country to meet people in small towns, share her expertise, training abilities, work long hours, ability to curate public demonstrations all came handy along with her vast knowledge and experience.

One can understand her leadership skills and how versatile she must have been through the list of programmes she organised. Even during COVID pandemic, before her last breath, she was actively engaged with students through online programmes like Astro Adda, Astronomy code camps, Virtual tour of cosmos from

different planetariums, **Ask an astronomer** interactions, **Samanta Chandrasekhar Challenge** and so on. These online recordings are available as a treasure for anyone who aspires to enter the field of astronomy.

She could explain the radio pulsars and train students on handling online databases through Python coding and exoplanets; she could also take participants on a virtual tour of India to discuss various historical constructions with positional astronomy features. She was an expert in archeo-astronomy research. The Archaeological Survey of India had appointed her on the committee overseeing restoration of Jantar Mantar in Delhi (built around 1720-35 by Raja Sawai Jai Singh). She was of the opinion, “the four extant Jantar Mantar observatories at Delhi, Jaipur, Ujjain and Varanasi have tremendous potential as teaching laboratories of positional astronomy. These observatories consist of a variety of ingenious, constructed positional astronomy instruments, so that, the instruments give a feel of walking through spherical trigonometry.”



She restored the *Samrat Yantra* ('equinoctial' or 'equal hour' sundials), *Nadivalaya Yantra*, *Jaiprakas Yantra*, *Misra Yantra*, *Niyat Chakra* to their glory and recalibrated them. *Unnatamsa Yantra* of the Jaipur observatory measures altitudes of celestial objects, while *Digamsa Yantra* measures azimuths of celestial objects and the *Ram Yantra* can measure both altitude and azimuth that has consistently shown accuracies of about 0.1 degrees.

During the Venus transit in 2012, in her call for careful quantitative observations, she wrote, "We have vast monumental heritage in our country and this is a unique opportunity to try and image this heritage as a backdrop for this unique celestial event. These images will remain of interest for hundreds of years to come!"

Dr. Rathnasree was a person who cherished nature and enjoyed beauty in all forms. She nurtured her garden as she did young minds. She was fond of travel, photography and food that are evident from her social media posts. Her love for aesthetics, language, music, heritage history and literature is apparent from her writings. She effortlessly wove a tapestry of these with astronomy topics.

In her paper on *Inspiration of celestial phenomena in the works of Kalidasa*, she looks at this great Indian poet's literary works from an astronomical viewpoint. She looks for astronomical references in them - various celestial phenomena like eclipses, conjunctions, the occultation of Aldebaran around a lunar eclipse, annual motion of Sun, light pollution by Moon, North star and movement of a comet across the sky. She concludes "he had a keen interest in observing the skies,

and some of these observations entered as contexts in his poetry. Most such references in the works of Kalidasa would indicate some actual observations of these events on his part. He was a poet, not an astronomer, but he would surely qualify as an amateur astronomer based on these observations."

Dr. Rathnasree celebrated the 150th anniversary of Mahatma Gandhi in a very unique way through her very innovative project **Bapu Khagol Mela**. Through this initiative of Nehru Memorial Museum & Library in collaboration with B.M.Birla Science Centre and ASI POEC (Public Outreach Committee, Astronomical Society of India), she organised a over a year, sky watching events at 42 places that Gandhiji had visited or lived. This involved the setting up of telescopes and allowing people to enjoy the spiritual experience of celestial views—naked eye and telescopic. She helped the country know about Gandhi's interest in stars and how he used to gaze through telescopes while he was at Yaravada jail. She very beautifully integrated Gandhi's notes and sketches on these observations, how he later enthused his ashram inmates towards astronomy and his wish that more books were written for Indian readers on this subject into a short full dome planetarium show which left an indelible mark on the planetarium visitors.

Dr. Rathnasree took many efforts to further astronomical knowledge of the next generation through activities like **Vigyan Samagam**, e-classes like **Rad @home** under National Science Centre or NCSM or ASI POEC. When ASI formally set up its Public Outreach and Education Committee (POEC) in 2014, she

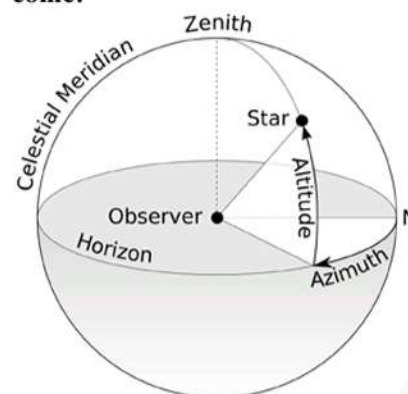
was the unanimous choice to be its first chair.

Her efforts celebrating India's international collaborative efforts like **SKA (Square Kilometer Array of radio telescopes)**, **LIGO (Laser Interferometer Gravitational Wave Observatory)** need a special mention. She worked with the National Council of Science Museums to advise them on astronomy related exhibits and activities at various science centres.



She was also the chief editor for class VI textbooks for NCERT. She was an exemplary astronomy outreach person of our country, connecting sky observers, amateur astronomers, educators, science clubs, students and the public.

This luminous star who led us from darkness to light through her knowledge will remain as a guiding star for generations to come!



Azimuth is the position of an object in the sky, expressed as an angle related to a distance on the horizon of the Earth.

