

## EDITORIAL

### Seeing is believing

The James Webb Space Telescope, the largest and the most powerful space telescope that has ever been constructed by NASA, has begun its science operations orbiting the Sun in line with Earth on a trajectory located at an anti-sunward point approximately 1.5 million kilometers away from Earth. In Webb, revolutionary technologies have been used to study the phases of cosmic history of the universe. The continual expansion of the universe has caused the very first stars and galaxies formed over billions of years ago that emitted ultraviolet and visible light to undergo redshifts to observe that radiation in the infrared range. Unlike the Hubble space telescope which views the universe in visible and ultraviolet light, Webb is equipped with an infrared telescope to focus on infrared radiation capable of peering through gas and dust clouds to see distant objects with an unprecedented resolution and sensitivity. Webb is also capable of studying the nearby universe making it a powerful tool to explore the planets and other bodies in our solar system. Already, to the excitement of scientists and readers, headlines appear in news reports on exoplanets, old star clusters and distant galaxies with their spectacular images taken by Webb with much improved clarity. Scientists, with time will be able to come up with new information about the universe with interpretations, models and even new theories.

The newest technologies NASA has used in the Webb include a foldable sunshield which prevents the heat and light from the Sun, Earth, and the Moon reaching the telescope's heat-sensitive optics, a foldable mirror system in the appropriate dimensions to receive the infrared radiation emitted from celestial objects and maintenance of lasting cryogenic operating temperatures to prevent emission of infrared radiation by this massive observatory itself. Webb is considered an engineering marvel that has become a reality due to meticulous planning over the years and its implementation by an international collaboration between NASA and its

partners in Europe and Canada involving thousands of engineers and hundreds of scientists representing a number of universities, organizations, and companies from U.S. and several other countries.

Thus, Webb serves as a classic example that unifies the scientist, the engineer and experts representing other areas in the quest to finding the origin and evolution of the universe. The team on its way to reach this goal has made groundbreaking inventions, innovations leading to new materials and several new technologies which can be used for the benefit of humanity. Applications are already seen in the fields of medicine and engineering. This project shows some parallels to projects launched several decades ago in exploring the subatomic particles which led to the introduction of global communication pathways like World Wide Web that revolutionized the entire communication industry. Webb can be seen as yet another example for how fundamental science can help shape and impact society.

In the context of Sri Lanka, lessons can be learnt from the approach made by NASA to successfully create this massive, amazingly powerful and precisely controllable space observatory. Webb is an example of teamwork which has been guided by proper leadership knowledgeable in correct scientific approach and methodologies which were put into practice. In Sri Lanka, in a culture that focusses on individual glory at personal and institutional level, at times at any cost, Webb shows that strategies must be in place with proper leadership to encourage the collective efforts of scientists, engineers and relevant experts in the country to address the national scientific and technological challenges it is facing at the moment. When considering the size of Sri Lanka, such an approach seems timely and viable. Webb has provided the impetus to believe in ourselves to use human ingenuity to address issues related to energy, environment, agriculture and earth resources etc. recognizing them as high priorities.

**Sumedha Jayanetti**