

Medicine Nobel 2023 goes to duo who paved the way for mRNA COVID vaccines

The Hindu Bureau

The 2023 Nobel Prize in Physiology or Medicine has been awarded to Hungarian biochemist Katalin Karikó and American physician-scientist Drew Weissman. Announcing the names on Monday, the Royal Swedish Academy of Science said they had been feted for "discoveries concerning nucleoside base modification that enabled the development of effective mRNA vaccines against COVID-19".

Dr. Karikó is only the 13th woman to win the prize.

That the citation mentions the pandemic shows the effect mRNA vaccines had on its evolution as well as how the global disaster became an opportunity for the vaccine technology to showcase its potential.

mRNA stands for messenger RNA, a type of molecule that carries instructions from the DNA to a cell's cytoplasm, where those messages are 'read' to produce various proteins. In the late 1980s, scientists realised that mRNA could become the basis for a new kind of vaccines if some hurdles could be overcome.

The idea was to inject the body with a modified

Nobel for Medicine

Hungarian biochemist Katalin Karikó and American physician-scientist Drew Weissman won the 2023 Nobel for Physiology or Medicine



Katalin Karikó



Drew Weissman

- The duo was awarded for their work that enabled the development of effective mRNA vaccines against COVID-19. Dr. Karikó is only the 13th woman to win the prize

- mRNA stands for messenger RNA, which carries instructions from DNA to make proteins in cells. Scientists had realised in the late 1980s that mRNA could become the basis for a new kind of vaccine if some hurdles could be overcome

- Dr. Karikó and Dr. Weissman published two more studies that set the stage for the use of an mRNA platform for a new kind of vaccine. In 2020, when the COVID-19 pandemic struck, mRNA vaccines were crucial in reducing the death toll

mRNA that would instruct cells to build a certain protein, which could then provoke the body's immune system to 'attack' it as well as prepare itself to encounter with the same protein in future. This protein could be something produced by a virus – such as the spike protein of SARS-CoV-2. But the mRNA would have to survive its journey inside the body and be able to enter a cell.

Dr. Karikó and Dr. Weissman began to collaborate in the late 1990s. They and other scientists published many studies elucidating the steps from

delivering mRNA into a body to the immune system responding. But one problem remained. The immune system sensed the synthetic mRNA to be a foreign substance that needed to be eliminated but not the cells' mRNA. Why?

A study they published in 2005, with Michael Buckstein and Houping Ni, had the answer: the cells' mRNA underwent chemical reactions that modified it in certain ways, whereas the synthetic mRNA remained unchanged.

CONTINUED ON
» PAGE 10

EVA STALIN IAS ACADEMY - BEST IAS COACHING IN CHENNAI

12/24, Muthurangan Muthali St, West Tambaram, Chennai - 600045

<https://www.evastalinasacademy.in/>

Contact Number - +91-8678969915, +91-9940332851

Nobel for duo who paved way for COVID vaccine

RNA is made up of smaller molecules called bases. The duo reported that when they modified some of these bases in the synthetic mRNA and delivered it to cells, the cells produced more provocative proteins than they did without the modifications. They had found out how foreign mRNA could enter a body and its cells without setting off alarm bells.

They published two more studies that set the stage for the use of an mRNA platform for a new kind of vaccine. In 2020, the COVID-19 pandemic dawned on the world, and mRNA vaccines played a pivotal role – if also one overtaken by the dubious virtues of vaccine nationalism – in lowering its death toll.

Currently, scientists are exploring their use against influenza, dengue, and some cancers and auto-immune diseases.

EVA STALIN IAS ACADEMY - BEST IAS COACHING IN CHENNAI

12/24, Muthurangan Muthali St, West Tambaram, Chennai - 600045

<https://www.evastalinasacademy.in/>

Contact Number - +91-8678969915, +91-9940332851

At 36%, EBCs largest group in Bihar, shows caste study

Yadavs make up 14.26% of State population, says survey released by Bihar government; Nitish says parties with Assembly representation will be called for a meeting to apprise them of the figures

Amarnath Tewary
PATNA

Months away from the Lok Sabha election in 2024, the Bihar government on Monday released the report of a caste survey conducted in the State, saying "it's only compiled data and no analysis of it has been done yet".

"Today, on the auspicious occasion of Gandhi Jayanti, the data of caste-based census conducted in Bihar have been published. The proposal for the survey was passed unanimously in the legislature," Chief Minister Nitish Kumar posted on the microblogging site X. "All nine political parties in the Assembly will now be called for a meeting to apprise them of the report."

Caste breakdown

The report said the Other Backward Classes (OBCs) make up 27.1286% of the population of the State; the Extremely Backward Classes (EBCs) 36.0148%; the Scheduled Castes 19.6518%; and the Scheduled Tribes 1.6824%. The upper castes make up 15.5224%. Hindus form 81.9986% of the popula-

Caste count

The tables show the caste and religion-based composition in Bihar according to the caste survey report released by the State government

Category	Share in population	Population (in crore)
Other Backward Class	27.13%	3.55
Extremely Backward Class	36.01%	4.71
Scheduled Caste	19.65%	2.57
Scheduled Tribe	1.68%	0.22
Unreserved	15.52%	2.03
Total		13.07



Religion	Share
Hindu	81.99%
Muslim	17.70%
Christians	0.05%
Buddhists	0.09%
Sikhs	0.01%

■ The two-phase caste survey was launched on January 7. The survey recorded the economic status alongside caste

Need nationwide caste census: INDIA

Sandeep Phukan
NEW DELHI

Citing the findings of the Bihar caste survey, leaders of the Indian National Developmental, Inclusive Alliance (INDIA) on

Monday reiterated their demand for a countrywide caste census to ensure "social justice" to the deprived classes.

FULL REPORT
» PAGE 11

tion and Muslims 17.7088%. The total population is over 13 crore.

The survey report - Bihar Jaati Adharit Ganana,

2022 (Bihar caste-based survey, 2022) - says the Yadavs make up 14.26% of the State population; Kushwahas 4.27%; and Kurmis

2.87%. The Musahar caste makes up 3% of the State population and Brahmins 3.66%. The upper-caste Kasha community comes to 0.68% population of the State.

The Congress called upon the Centre to hold a similar exercise at the national level immediately. Former party president Rahul Gandhi said the census had proved that 84% of the people in the State belonged to the OBCs, SCs and STs and their share should be according to their population.

CONTINUED ON
» PAGE 10

HC rules against quota in minority institutions

They held the status, once granted, would continue until the National Commission for Minority Educational Institutions cancels it on valid grounds. However, the first Division Bench upheld the right of the State government to insist that the minority institutions could admit students from the religious and linguistic minorities concerned only up to 50% of the sanctioned intake and that the rest must be filled on the basis of merit.

The minorities who gain admission on merit should be excluded while calculating the first 50% of students, the Bench clarified.

The petitioner college had approached the court assailing a Government Order (GO) issued on November 20, 2021 rejecting the plea for extension of religious minority status to it since it had admitted 52% minority students in the academic years 2018-19 and 2019-20. Advocate-General R. Shunmugasundaram contended such admission had been made in violation of a 1998 GO which restricts admission of minorities to 50%.

On the other hand, senior counsel Vijay Narayan, representing the college, claimed minority educational institutions should be granted a permanent status without being forced to get it extended from time to time. He also argued the Tamil Nadu Backward Classes, Scheduled Castes and Scheduled Tribes (Reservation of Seats in Private Educational Institutions) Act, 2006 would not be applicable to minority institutions.

Finding force in his submissions, the judges said Article 15(5) of the Constitution, introduced through the 93rd amendment in 2005, specifically excludes minority institutions while enabling the State government to make special provisions by law for the advancement of any socially or educationally backward classes of citizens or for the Scheduled Castes or Scheduled Tribes relating to their admission to educational institutions.

Further, the definition of 'private educational institution' under Section 2(d) of the 2006 Act also excludes minority institutions established under Article 30(1) of the Constitution. "Therefore, it is manifest that the State would not have any authority to make any special provision providing for reservation to the Scheduled Castes, Scheduled Tribes or the backward classes of citizens for admission in a minority educational institution," the Bench said.

WHO approves use of malaria vaccine with adjuvant tech

The Hindu Bureau
NEW DELHI

The R21/Matrix-M malaria vaccine developed by the University of Oxford and the Serum Institute of India, leveraging Novavax's adjuvant technology, was recommended for use by the World Health Organization (WHO), after meeting required safety, quality and effectiveness standards, on Monday.

Following a detailed scientific review by the WHO's independent advisory body, the Strategic Advisory Group of Experts (SAGE), and the Malaria Policy Advisory Group (MPAG), the R21/Matrix-M malaria vaccine has been recommended for use, noted a release issued by the Serum Institute of India. With the approval and recommendations by the WHO, additional regulatory approvals are expected to follow shortly and vaccine doses could be ready to begin wider roll-out as early as next year.

The Serum Institute has already established production capacity for 100

Developed by Oxford and Serum institute, R21/Matrix-M vaccine could be widely available next year

million doses a year, which will be doubled over the next two years. This scale of production is critical because vaccinating those at high risk of malaria will be important in stemming the spread of disease, as well as protecting the vaccinated.

The Matrix-M component is a proprietary saponin-based adjuvant from Novavax, which is licensed to the Serum Institute for use in endemic countries, while Novavax retains commercial rights in non-endemic countries.

The vaccine was developed by the Jenner Institute at Oxford University and the Serum Institute of India with support from the European and Developing Countries Clinical Trials Partnership (EDCTP), the Wellcome Trust, and the European Investment Bank (EIB).

Parul steals the spotlight, lands a silver in 3,000m steeplechase

Priti's third-place finish brings more joy to the Indian contingent; Ancy impresses, takes the second spot in women's long jump; the 4x400m mixed relay team adds another silver; decathlete Tejaswin on top after five events; Vithya equals Usha's 39-year record in 400m hurdles



Joy unbound: Ancy is ecstatic after her silver in long jump while Priti and Parul celebrate the podium finish in 3,000m steeplechase. The mixed relay quartet was promoted to silver. GETTY IMAGES, AFP & REUTERS

ASIAN GAMES

Uthra Ganesan HANGZHOU

While the Indian focus in the 3000m steeplechase has been firmly on Avinash Sable for a while now, Parul Chaudhary has been grafting away in the background, repeatedly breaking personal and national records among the women. On Monday, she finally stepped into the limelight with an emphatic silver behind world champion Winfred Mutile Yavi of Bah-

rain for India's 12th athletics medal at the Asian Games here.

Priti Lamba's third place finish in the event added cheer to the Indian contingent and Ancy Sojan's brilliance on the long jump pit earned another silver, as did the 4x400m mixed relay team. But while the others were applauded, the relay team's performance - a let down both in terms of the medal and the timing.

Parul kept pace with Yavi for most part of the race even as the Bahrainian led from start to finish. With two laps to go, the duo broke away from the rest of

the pack while Priti and Tigist Getnet Mekonen stuck together for 3-4 positions. And while Yavi finished almost 80m ahead on the final stretch, it took a final burst of acceleration for Priti to go past the post for bronze in a personal best timing of 9:43.32.

On the long jump pit, the spotlight has been shining brightly on Shaali Singh for a while now. But teammate Ancy saved her big leap for the big stage to snatch the limelight - and silver - ahead of her more fancied rival. While Ancy managed a personal best of 6.63m, Shaali finished a disappointing fifth with a best

jump of 6.48m even as China's Shiqi Xiong took gold with 6.73m.

The mixed relay team, meanwhile, saw Mohd. Ajmal give a good lead-off to stay close to the Bahrain's Musa Ali Isah but a disappointing second-leg by Vithya Ramraj saw India slip and they never came back, finishing 3rd in 3:14.34 behind Bahrain and Sri Lanka before the latter was disqualified for lane infringement to hand India the silver.

Tejaswin Shankar kept raising the bar, going on top after five events in the Decathlon with 4260 points. Tejaswin, who was

fifth after three events in the morning session, took full advantage of his favourite event, the high jump, to go back to the first position.

While the rest of the field cleaned out at 1.97m, he started at that mark and went up to 2.21m before retiring, only to return and win the 400m to increase the lead.

Amidst the medal hype, however, what went unnoticed was Vithya's incredible run in the 400m hurdles heats in the morning that saw her equal one of Indian athletics' oldest-standing records - P.T. Usha's 55.42s, set 39 years

ago at the 1984 Los Angeles Olympics.

Medals Table

Country	G	S	B	T
China	147	81	42	270
Japan	33	44	45	122
S. Korea	31	39	63	133
India	33	24	23	80
Chinese Taipei	12	10	17	39
Uzbekistan	11	14	18	43
Thailand	10	7	16	33
N. Korea	7	10	5	22
Hong Kong	6	15	23	44
Bahrain	6	1	4	11

What are the Lagrange points and why is Aditya-L1 headed to one?

Lagrange points offer ideal 'parking spots' for satellites and are home to several astronomical observatories. Named for French mathematician Joseph-Louis Lagrange, whose research elucidated the existence of these points, they are also being explored as sites of future space colonies

Prakash Chandra

Some of the most amazing phenomena in nature, from electromagnetic radiation and infrared vision to subatomic particles and cosmic rays, are invisible, and we get to know them only through their various applications. This is true of Lagrange points as well - points in space between celestial bodies where a spacecraft stays more or less stationary, as if held in place by some cosmic magic.

The 'magic', of course, comes itself to the unseen forces of gravity exerted by these bodies. Lagrange points are found along the plane of two objects in orbit around their common centre of gravity, where their gravitational forces cancel each other, so that a third body of negligible mass will remain at rest between them.

For example, the combined gravitational force between the sun and the earth equals the centrifugal force required by a satellite or an asteroid to orbit the sun-earth centre of gravity. At this Lagrange point, a satellite will keep its position constant relative to both the sun and the earth.

Maths instead of law

Planetary scientists are fascinated by Lagrange points because they offer the best 'parking spots' in space for satellites. That is, seen from the earth, Lagrange points appear to stay motionless, and this makes them ideal for controllers on the ground to communicate with spacecraft stationed there. No wonder these locations are home to several astronomical observatories that utilise their vantage position to have unimpeded views of the earth and the backdrop of the Solar System, which would not be possible nearer to the planet.

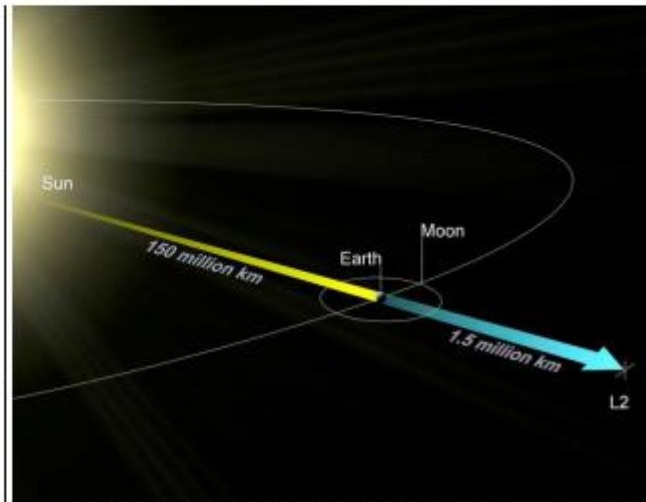
Lagrange points exist throughout the Solar System due to this gravitational interaction between the sun and its retinue of planets and their moons.

The points were named after the Italian-French mathematician Joseph-Louis Lagrange, who was born January 25, 1736, in Turin, Italy. His parents wanted him to study law and enrolled him at the University of Turin. But as it happened, a 17-year-old Lagrange chanced upon an algebra paper by the English astronomer Edmond Halley and was so intrigued that he decided to become a mathematician instead.

He went on to excel in all fields of analytic number theory and celestial mechanics, and became one of the youngest and brightest mathematics professors of his time. He subsequently moved to Berlin, where his work on astronomy, mechanics and calculus resulted in several groundbreaking papers, including one on the moon's orbital dynamics and another on perturbations of the orbits of comets.

The three-body problem

But Lagrange's most important contributions were related to the so-called 'three body problem', which investigated the motion of three bodies (with mass) relative to each other in space - such as the sun, the earth, and the moon. The problem question itself is: if you know the starting positions of the



The L1 Lagrange point is located 1.5 million km from the earth towards the sun. L2 is located 1.5 million km from the earth in the opposite direction. NASA/JPL, PUBLIC DOMAIN

sun, the earth, and the moon, can you predict their exact locations at a later date as they move under the influence of each other's gravity?

Lagrange found that the problem could be solved if he assumed the third body was much smaller than the other two larger masses. This eventually led him to describe the famous five Lagrange points that we know today as L1, L2, L3, L4, and L5.

In any three-body system, three of these Lagrange points - L1, L2, and L3 - are unstable positions that lie along an imaginary straight line connecting the two larger bodies. The other two - L4 and L5 - are stable locations that form the apexes of two imaginary equilateral triangles with the two large celestial bodies at the vertices of each triangle.

Points of accumulation

Objects stay undisturbed at L4 or L5 because of a 'restoring force' - a force acting against any displacement - that prevents them from being nudged away from the stable point. Because of their stability, however, L4 and L5 also tend to accumulate a lot of interstellar dust and asteroids called Trojans that slip around the points. Scientists have detected nearly 10,000 Trojans in the L4 and L5 points of the sun-jupiter system alone, where gravitational and centrifugal forces prompt the space rocks to follow the giant planet's revolution around the sun.

Astronomers have also found four Trojans at Lagrange points around Mars and eight Trojans in the L4 and L5 points around Neptune. One of Saturn's larger moons, Tethys, even has two moonslets at its Lagrange points.



Lagrange points are found along the plane of two objects in orbit around their common centre of gravity, where their gravitational forces cancel each other, so that a third body of negligible mass will remain at rest between them.

On the other hand, an object positioned at one of the three unstable Lagrange points L1, L2, and L3 - can be easily de-orbited by even weak forces, and they will then drift off into space. That is to say, a spacecraft at, say, L3 needs only the slightest disruption to slip and fall from its orbit towards the sun or the earth, unless it frequently burns fuel via its thrusters, at the various moments of displacement, to adjust its orbital movement frequently.

Importance for space exploration

Without Lagrange points, space exploration would have been so restricted, with scientists struggling to find the best orbits and velocities for satellites, and reckoning with the challenges of orbital perturbations. To think that space offers like the Aditya-L1 solar mission of the Indian Space Research Organisation (ISRO) would never have materialised had an Italian boy pursued a career in law, instead of being distracted by mathematics, in the 18th century!

Aditya-L1 is a space-based observatory that ISRO launched on September 2. It is now en route to its designated parking slot

at L1 in the sun-earth system. Once it reaches L1 - at a distance of 1.5 million km away from the earth - the probe will settle into a 'halo' orbit around L1 to acquire an unobstructed view of the Sun.

L1 is already home to four other robotic explorers: NASA's Solar and Heliospheric Observatory Satellite, Deep Space Climate Observatory, Advanced Composition Explorer, and the Global Geospace Science Wind satellite. The point will get even more crowded when three U.S. probes - Interstellar Mapping and Acceleration Probe, Near Earth Object Surveyor, Space Weather Follow-On-Lagrange 1 - and the European Vigil mission begin their Lagrangian journeys in the next few years.

Sites of space colonies

Space scientists are also exploring the potential of the L4 and the L5 points to host space colonies in the future because these points are relatively close to the earth. At these locations, where gravitational forces cancel each other out, spacecraft will need very little fuel to remain in orbit or to launch to another planet, unlike launches from the earth that take up most of the fuel rockets carry. This, in theory, allows space engineers to build habitable space stations at L4 and L5 using resources mined from the moon or an asteroid.

A big space station built this way could be spun on its axis using rocket thrusters so that the artificial gravity thus created would help a large number of people to live and work on board the orbiting post permanently.

(Prakash Chandra is a freelance science writer.)

A (very) brief history of the Nobel Prizes

Associated Press

Fall has arrived in Scandinavia, which means Nobel Prize season is here. The start of October is when the Nobel committees get together in Stockholm and Oslo to announce the winners of the yearly awards.

First up, as usual, is the Nobel Prize in medicine or physiology, which is announced by a panel of judges at the Karolinska Institute in the Swedish capital. The prizes in physics, chemistry, literature, peace and economics follow, with one announcement every work day.

The Nobel Prizes were created by Alfred Nobel, a 19th-century businessman and chemist from Sweden. He held more than 350 patents but his claim to fame before the Nobel Prizes was having invented dynamite by mixing nitroglycerine with a compound that

One reason the prizes are so famous is they come with a generous amount of cash. The Nobel Foundation has raised the prize money 10% this year to about \$1 million. In addition winners receive an 18-carat gold medal

made the explosive more stable. Dynamite soon became popular in construction and mining and in the weapons industry. It made Nobel a very rich man. Perhaps it also made him think about his legacy, because toward the end of his life he decided to use his vast fortune to fund annual prizes "to those who, during the preceding year, have conferred the greatest benefit to humankind."

The first Nobel Prizes were presented in 1901, five years after his death. In 1968, a sixth prize was created, for economics, by Sweden's central bank. Though Nobel purists stress that the economics prize is technically not a Nobel Prize, it's always presented together with the others.

One reason the prizes are so famous is they come with a generous amount of cash. The Nobel Foundation, which administers the awards, has raised the prize money by 10% this year to about \$1 million. In addition to the money, the winners receive an 18-carat gold medal and diploma when they collect their Nobel Prizes at the award ceremonies in December.

Historically, the vast majority of Nobel Prize winners have been white men. Though that's started to change, there is still little diversity among Nobel winners, particularly in the science categories.

To date, 60 women have won Nobel Prizes, including 25 in the scientific categories. Only four women have won the Nobel Prize in physics and just two have won the economics prize.

In the early days of the Nobel Prizes, the lack of diversity among winners could be explained by the lack of diversity among scientists in general. But today, critics say, the judges need to do a better job at highlighting discoveries made by women and scientists outside Europe and North America.

86 bird species found in Tamil Nadu in rapid decline, says nationwide report

Geetha Srimathi
CHENNAI

An analysis of the State of India's Birds (SOIB) 2023 report shows that nearly 110 species of birds recorded in Tamil Nadu are in a state of decline across the country.

A total of 86 species found in Tamil Nadu, including garganey, northern shoveler, common sandpiper and common teal, are in "rapid decline". This has been highlighted by the Salem Ornithological Foundation (SOF) in a Tamil Nadu-specific report, using data from the SOIB 2023 report.

What surprised researchers, according to S.V. Ganeshwar, founder-director of SOF, is that species "taken for granted" by the birding community have been categorised as declining.

"Indian rollers are very casually seen everywhere in the open fields. But their population is declining nationwide," he says.

Aravind A.M., an avid birder, says Indian rollers,



Indian rollers have become hard to spot nowadays, according to birders.

which are not common in Chennai but are spotted widely in outer areas and towns, have become hard to spot nowadays. He had spotted the birds in Vellore quite regularly since 2012. In 2017, he once saw a congregation of 60 rollers, with males engaging in mating displays and rolls for females perched on coconut trees, in Vellore. "In the last three to four years, seeing even one pair has become difficult," he says.

"Within Chennai, one species that is not being sighted as commonly as earlier is the rufous tree-pie," Mr. Aravind adds.

With urbanisation and rapidly changing landscapes, a detailed regional report is important to understand bird patterns, says Mr. Ganeshwar. The trends assessed in the SOIB report were primarily carried out using data uploaded to eBird, a citizen portal for birders and researchers. Mr. Ganeshwar points out that out of 451 species in Tamil Nadu, long-term trends are available only for 39 species. "This is extremely low," he adds.

The SOF report says that going by trends in Tamil Nadu, conclusive long-term and current annual trends are available for only a very small number of species.

"This is why the excerpt document was based on the India trends, where a larger number of species was analysed. Maybe in the future, as more birders continue to contribute information to eBird, data deficiencies would be lessened and more of the State's bird species would be analysed," the report says.

EVA STALIN IAS ACADEMY - BEST IAS COACHING IN CHENNAI

12/24, Muthurangan Muthali St, West Tambaram, Chennai - 600045

<https://www.evastaliniasacademy.in/>

Contact Number - +91-8678969915, +91-9940332851

Stalin announces ₹25 lakh each as reward for nine ISRO scientists from T.N.



Chief Minister M.K. Stalin felicitating space scientists from Tamil Nadu at an event in Chennai. R. RAGU

The Hindu Bureau
CHENNAI

Chief Minister M.K. Stalin on Monday announced a cash reward of ₹25 lakh each for nine space scientists from Tamil Nadu, including former Indian Space Research Organisation (ISRO) chairperson K. Sivan, who have made the State and the country proud with their contributions.

Mr. Stalin also announced a scholarship programme for nine engineering students pursuing graduation with financial assistance from the government under the 7.5%

reservation for government school students. The nine scholarships would be named after the nine noted ISRO scientists from Tamil Nadu, and would cover tuition and hostel fees.

An expert panel would select candidates for the scholarship programme, and a corpus fund of ₹10 crore would be set up, Mr. Stalin said.

Apart from Mr. Sivan, former Director of ISRO's Satellite Centre Myswamy Annadurai; Director of ISRO's Liquid Propulsion Systems Centre V. Narayanan; ISRO's Launch Authorisation Board chief A. Rajarajan; Director of U.R.

Rao Satellite Centre M. Sankaran; ISRO's Propulsion Complex Director J. Asir Packiaraj; Project Director of the Chandrayaan-2 lunar mission V. Vanitha; Project Director of the Aditya-L1 mission Nigar Shaji; and Chandrayaan-3 Project Director P. Veeramuthuvel would receive the cash reward.

During a function at Anna Centenary Library, Mr. Stalin felicitated the scientists and said he was proud not only as the Chief Minister but also as a Tamil. He pointed out that six of the nine scientists studied in government schools in Tamil Nadu.

EVA STALIN IAS ACADEMY - BEST IAS COACHING IN CHENNAI

12/24, Muthurangan Muthali St, West Tambaram, Chennai - 600045

<https://www.evastaliniasacademy.in/>

Contact Number - +91-8678969915, +91-9940332851