


## 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

**Fiat lux** Pierre Agostini, Ferenc Krausz and Anne L'Huillier have been awarded the 2023 physics Nobel Prize



Pierre Agostini      Ferenc Krausz      Anne L'Huillier

- From 1987, **Dr. L'Huillier et al.** found, explained, and refined the principles of producing **attosecond light pulses**
- **Electrons** in matter move very fast, interacting on the order of a few hundred attoseconds
- **Attosecond physics** deals with ways to capture these interactions
- In 2001, **Dr. Agostini et al.** produced a series of pulses using these principles, each of 250-attosecond duration



The experimental development of short optical pulses has been intimately related to technical developments in laser technology

**ROYAL SWEDISH ACADEMY OF SCIENCES**

- Also in 2001, **Dr. Krausz** and co. isolated a single pulse of 650 attoseconds duration
- Using this, they measured the **kinetic energy** of a bunch of electrons emitted by krypton atoms

**WHY IS THIS IMPORTANT?**

Attosecond physics provides scientists with the ability to look at the minutest particles at the shortest timescales. An attosecond is one-billionth of a nanosecond. The Nobel laureates developed experiments to produce ultrafast laser pulses, which can be used to understand the world at a really minute scale with applications across chemistry, biology and physics

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## Trio wins Nobel Prize in physics for finding a way to 'see' electrons

**Agence France-Presse**  
STOCKHOLM

France's Pierre Agostini, Hungarian-Austrian Ferenc Krausz and French-Swedish Anne L'Huillier won the Nobel Prize in physics on Tuesday for research using ultra-quick light flashes that enable the study of electrons inside atoms and molecules.

Their technique employs pulses measured in attoseconds, a unit so short that there are as many in one second as there have been seconds since the universe's birth over 13 billion years ago, the jury said.

The laureates' research has made it possible to examine moves or changes so rapid that they were previously impossible to follow, with potential applications in both electronics and medical diagnostics.

### **An anecdote**

The Royal Swedish Academy of Sciences likened the process to how the flapping wings of a hummingbird turn into a blur for the human eye, but can be slowed and examined using high-speed photography.

"We can now open the



Members of the Royal Academy of Sciences announce this year's Nobel Prize winners in Physics in Stockholm on Tuesday. REUTERS

door to the world of electrons. Attosecond physics gives us the opportunity to understand mechanisms that are governed by electrons," Eva Olsson, chair of the Nobel Committee for Physics, said.

In 1987, Ms. L'Huillier "discovered that many different overtones of light arose when she transmitted infrared laser light through a noble gas," the Nobel Committee noted.

In the early 2000s, Mr. Agostini and Mr. Krausz worked on experiments that made it possible to isolate light pulses that lasted only a few hundred attoseconds.

Mr. Agostini is a professor at Ohio State University

in the U.S., while Mr. Krausz is a director at the Max Planck Institute in Germany.

### **Fifth woman winner**

Ms. L'Huillier, only the fifth woman to be awarded the Physics Prize since 1901, is a professor at Lund University in Sweden.

Ms. L'Huillier told reporters she was in the middle of teaching a class when she received the call from the Academy, making it "difficult" to finish the class, to whom she told nothing.

Speaking later at a press conference, she encouraged young women interested in a career in science to "go for it".



# A mission rolls out to protect rare and threatened flora of Tamil Nadu

More than 30 taxonomists of premier institutions in the country carried out an assessment of threat to the State's flora and came out with a list of 25 plants. Conservation strategies will be designed for these plants under the Tamil Nadu Biodiversity Conservation and Greening Project for Climate Change Response

Wilson Thomas

**T**amil Nadu, with its rich flora spread across a unique combination of the Western and Eastern Ghats, is on a mission to save some of the rare, endangered and threatened plants, of which many are endemic to the State.

More than 30 taxonomists of premier institutions in the country carried out an assessment of threat to the State's flora and came out with a list of 25 plants. Conservation strategies will be designed for these plants under the Tamil Nadu Biodiversity Conservation and Greening Project for Climate Change Response.

The taxonomists initially shortlisted 100 plants for the exercise. They conducted a conservation assessment management and prioritisation (CAMP) workshop in collaboration with the Institute of Forest Genetics and Tree Breeding (IFGTB), Coimbatore, and 25 rare, endangered and threatened endemic plants were chosen for conservation and restoration.

M.U. Sharief, scientist 'F' and head of the Botanical Survey of India's Southern Regional Centre, Coimbatore, said the taxonomists came up with the list of 25 plants by assessing their conservation status in four groups and considering various factors.

## Population assessment surveys

"The Forest Department will carry out population assessment surveys and come out with recovery plans for them. It will also collect the germplasm in ex-situ gardens. Some of the species are fewer than 500 or 1,000 individuals left in the wild. The remaining plants in the list of 100 will continue to be in the reckoning," says I. Anwardeen, Additional Principal Conservator of Forests and Chief Project Director, the Tamil Nadu Biodiversity Conservation and Greening Project.

Besides their conservation status, the 25 shortlisted species were assessed for their economical, biological, cultural and ecosystem values, says A. Rajasekaran, scientist 'F' of the Forest Ecology and Climate Change Division, IFGTB.

"Since identification of the species in the wild is not very easy, we will help the Forest Department identify them, assess their



**A natural marvel:** The grasslands and shola forests in the upper Nilgiris are a vital part of the Western Ghats, which is home to 85% of the endemic taxa. M. SATHISHMOORTHY

population status and develop propagation techniques. Ecosystem improvement should also be carried out in places identified as micro-centres of endemism," says Mr. Rajasekaran.

P.S. Udayan, senior consultant, Kerala Forest Research Institute, points out that some of these plants have a very restricted population. There needs to be more field explorations to check the occurrence of these plants in the wild.

## Three species over-exploited

Three species that have come up in the list – *Dioscorea malabarica*, *Coccinellum fenestratum* and *Myristica malabarica* – are assessed to be over-exploited for their medicinal values, he

notes. "Now, 25 plants having been prioritised, the aim is to enrich their population through propagation methods and reintroduce them in the same agro-climatic conditions and habitats," he adds.

According to IFGTB Director C. Kunhikannan, the threat assessment and the CAMP workshop cement Tamil Nadu's commitment to preserving its rich flora.

*Flowering Plants of Tamil Nadu: A Compendium*, authored by D. Narasimhan and Sheeba J. Irwin, lists 6,723 taxa belonging to 1,979 genera and 225 families in the State. The 212 endemic taxa reported in the State, according to the book, include 22 herbs, 51 shrubs, 36 trees and three climbers. While 85% of the endemic

taxa are from the Western Ghats, 8% are from the Eastern Ghats and 6% are from coastal regions.

M. Sanjappa, former director of the Botanical Survey of India, feels the exercise is crucial to protecting the endangered plants as they are identified and preserved to save them from extinction.

"Human interventions in the name of development, in the name of agriculture; expansion of the plantation of crops; and diversion of forest areas for other activities are the major threats to these rare plants.

Over-exploitation of the medicinal and wood-yielding plants for commercial purposes also pose threats to these plants and their habitats," he says.

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## **Shot in the arm**

Success of COVID-19 mRNA vaccines  
picked the Nobel winners this year

**A**ll nominees for the Nobel Prize in Physiology or Medicine have path-breaking achievements to their credit, but often, the final choice of the winner might have a lot to do with the timing and the context. Katalin Karikó and Drew Weissman would have thus been safe bets for their work that enabled the development of effective mRNA vaccines against COVID-19. The 2023 Nobel announcement comes as no surprise, given that the benefits of the discovery are still keeping people alive and out of hospitals. It also ticks all the boxes: the Nobel prize for Medicine must be awarded for a discovery that would confer the 'greatest benefit on mankind' which mRNA undoubtedly did. This Nobel is also significant in that it recognises the contribution of a woman of science: 13 women have now won the Nobel Prize for Medicine (out of 225 awarded); and only 62 women have won any Nobel Prize (against 894 men) so far.

The best outcomes inevitably emerge from intersectoral collaborations, and steadfast scientific research conducted against all odds. Hungarian biochemist Katalin Karikó became fascinated with mRNA when it was a mere possibility. In human cells, genetic information encoded in DNA is transferred to messenger RNA (mRNA) and this is then used as a template for protein production. Proteins are the main structural component of cells, and play a key role in growth and repair. During the 1980s, a method called in vitro transcription permitted the idea of using mRNA for vaccine and therapy to take off, but enthusiasm to work on this flagged as several hurdles emerged, including challenges in delivery and inflammatory reactions. Undeterred, Karikó kept on the course of developing methods to use mRNA for therapy, when she was an assistant professor at the University of Pennsylvania. She was then joined by immunologist Weissman, who was studying dendritic cells that have important functions in immune surveillance and activation of vaccine-induced immune responses. Over the years, by making base modifications to the mRNA they managed to ease delivery paths and get rid of the inflammatory reactions. An inchoate idea was finally teased into fruition. This was in 2005, 15 years before the COVID-19 pandemic. But the time and context arrived in 2019, when scientists taught the mRNA vaccine to instruct human cells to make the S protein found on the surface of the COVID-19 virus. This causes the body to create antibodies which will fight the virus if the individual were to contract the infection. The rest, of course, is history.

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# NewsClick founder arrested under UAPA

Delhi Police search homes and offices of journalists of the news portal and question them in an alleged terror case; seize phones, laptops

**The Hindu Bureau**  
NEW DELHI

**T**he Delhi Police on Tuesday arrested Prabir Purkayastha, founder and Editor-in-Chief of news portal NewsClick and its Human Resources head Amit Chakraborty in an alleged terror case.

Deputy Commissioner of Police (PRO) Suman Nalwa said that a total of 46 "suspects", including nine women, were questioned and their phones, laptops and devices seized for further examination. She added that proceedings were on and two persons had been arrested thus far.

Police raided the homes and offices of journalists, authors, academics, contributors and a satirist associated with the news portal in a terrorism case.



**Attack on press:** Founder and Editor-in-Chief of NewsClick Prabir Purkayastha being brought to Delhi Police Special Cell. AP

The journalists were asked questions about the Delhi communal riots and the CAA agitation of 2019-20, the farmers protest of 2020-21 and whether they used encrypted messaging applications such as Signal on their phones.

The Special Cell of the Delhi Police had registered a first information report (FIR) in the case on August 17 under Sections 13, 16, 17,

18 and 22 of the anti-terror Unlawful Activities (Prevention) Act and Sections 153A and 120B of the Indian Penal Code (IPC) for promoting religious enmity between groups and criminal conspiracy, respectively.

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## NewsClick founder arrested under UAPA

The FIR was registered days after *The New York Times* published a report on August 8 that the portal received money from American businessman Neville Roy Singham to spread Chinese propaganda.

The allegations are already under investigation by the Enforcement Directorate (ED) since 2021. The ED has accused the company of money laundering, claiming that the portal received ₹77 crore as foreign remittance between the years 2018-21.

One of the persons whose phone and laptop was seized by the police in an early morning raid told *The Hindu* that she was asked about her visit to Shaheen Bagh area in southeast Delhi in 2020, which was the hub of protest against the passage of the Citizenship Amendment Act, 2019 (CAA), a legislation that fasttracks citizenship of undocumented non-Muslim immigrants from Pakistan, Afghanistan and Bangladesh.

Another contributor who was questioned at Special Cell's office in South Delhi said that he was asked about his involvement in student politics, particularly at the Jawaharlal Nehru University (JNU).

"I was also asked if I have done any report regarding Khalistani activities. They asked if I received phone calls from Poland, Australia and the U.K.," the journalist said, on condition of anonymity.

The questioning of the men was done at the Special Cell office for 6-10 hours after their homes were searched. The women were questioned at their homes.

Senior journalist Paranjay Guha Thakurta said he was questioned for around 10 hours.

The other journalists and contributors who were questioned included Urmillesh, Abhisar Sharma, Bhasha Singh, Subodh Varma, Sanjay Rajora, Aumindyo Chakraborty and Sohail Hashmi.

During the day, the police sealed the Sainik Farms office of the news portal. All staffers, including junior employees of the portal, were questioned by the police. A journalist said he has been asked to appear before the police again in the next few days.



## Parul and Annu turn back the clock to add more golden glow

Former takes the honours in the 5000m with a brilliant finish while the latter unleashes the season's best throw for javelin gold. Tejswini and Afzal claim silver in decathlon and 800m respectively. Vidhya and Praveen win bronze medals



Another bonanza: India struck it rich again in track and field with Parul (5000m) and Annu (javelin) winning gold, Afzal (800m) and Tejswini (decathlon) adding a silver medal, and Vidhya (800m hurdles) and Praveen (javelin) taking home bronze medals. (AP Wire Images, Reuters, AP)

### ASIAN GAMES

Vidhya Ganesan  
BANGALORE

The 2000m steeplechase is one of the hardest events in athletics. To win silver in that and then recover, in less than 24 hours, to go one better and win gold in a grueling 5000m speak volumes about Parul Chaudhary's fitness and determination as the Indian added a third gold to India's athletics tally here on Monday.

She was soon joined by veteran Anna Rani, managing her season's best throw of 62.52m to finish on top in the javelin throw as India continued to shine on the track & field.

It was Annu's first throw just 60m this year, the previous best being a 59.24m in May. In fact, this was her best performance since May last year!

That the two gold medallists of the day for India were both veteran women athletes also speaks volumes on the growing fitness levels of Indian athletes and India's improving status - the country has won 22 medals so far and is currently second in the sport behind China in medals.

Parul, a TE with Indian railways at the moment,



spoke of how getting a job as DSP with CP Police was her main motivation.

"I knew I had the capacity to beat her. Yesterday I was too tired to even sleep after the silver but had decided to go for gold today. I wanted to win for India and the prospect of a good job was also there. I have been working on this since 2011 and everyone had a lot of expectations and I am happy to fulfill them," an exhausted Parul admitted.

**Breaking away**  
Running with the pack for a large part of the race, Parul broke away along with the Japanese duo of Ririka Hirano and Yuna Yanagisawa in the penultimate lap as the field opened up and the race accelerated. Trailers fourth going in-

to the last lap, Ririka and Parul overtook others to be placed one and two respectively at the 300m bend, only for the Indian to kick her way ahead to the finish line in the final 100m in 15:44.75.

#### Determined

Annu, resourceful, admitted she was under pressure to perform but was determined to go all out.

"I have not had great results this year and was quite depressed. I knew I could do it, it was not easy but I was determined to not go down without a fight and gave my everything on the field," the 20-year-old said.

Also finishing among the medals was Vidhya Ganesh, recovering from a grueling 4x400m mixed relay late on Monday night,

to finish third in the 400m hurdles in 55.64sec.

In the men's section, Tejswini Shankar bettered the 12-year-old National record in decathlon en route to winning silver, becoming the only Indian to hold National records in two different field events.

#### New mark

The 26-year-old, the National record holder in high jump, fought cramps, dehydration and exhaustion on a humid night to finish with 7656 points to cross Bharti Singh's 7628 points set in 2013. China's Qibao Sun claimed gold with 7860 points.

Mohd. Afzal ran to silver in the men's 800m in 1:48.43 even as teammate Krishan Kumar was disqualified for obstruction. In triple jump, Praveen

Chitravel managed a bronze with a best mark of 16.61m, behind the Chinese duo of Yanning Zhu (17.13) and Yaoping Fang (16.92m). Abhishek won fourth with an effort of 16.62m.

#### Medals Table

Country	Gold	Silver	Bronze	Total
China	10	5	4	19
Japan	3	4	5	12
S. Korea	2	4	3	9
India	3	3	2	8
Uzbekistan	1	1	1	3
Ukraine	1	1	1	3
Taiwan	1	1	1	3
Thailand	1	1	1	3
Maldives	1	1	1	3
Malaysia	1	1	1	3
Kazakhstan	1	1	1	3