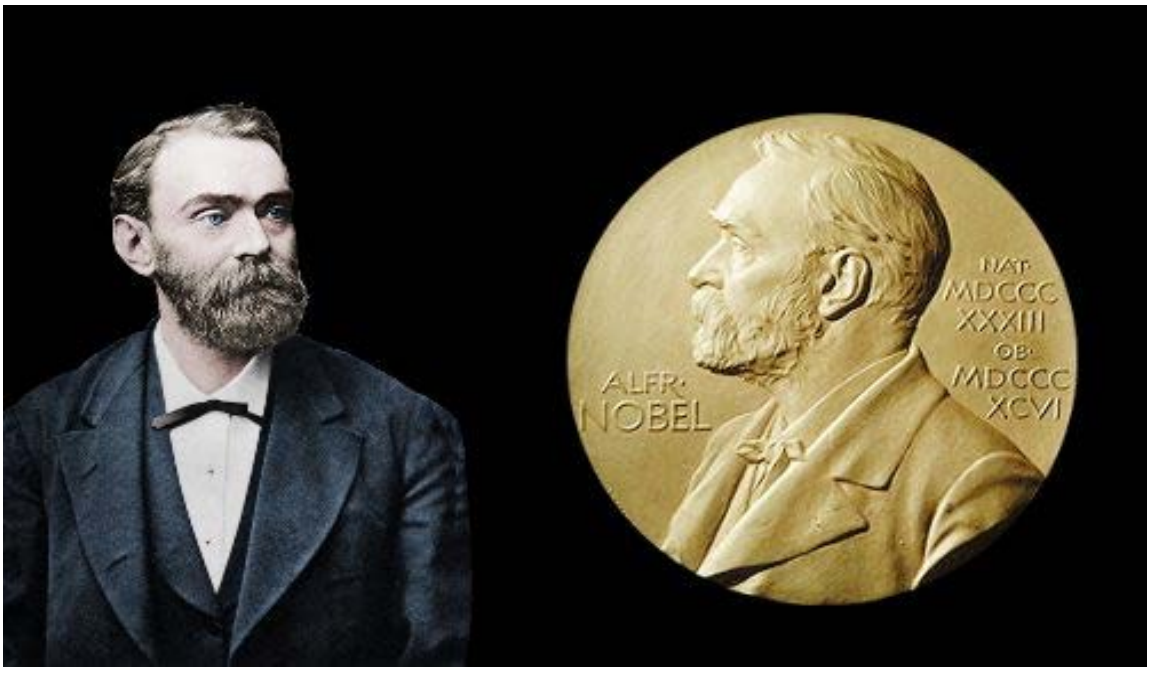
Nobel Prize 2025 in Physics, Chemistry, Medicine, Peace, Literature & Economics



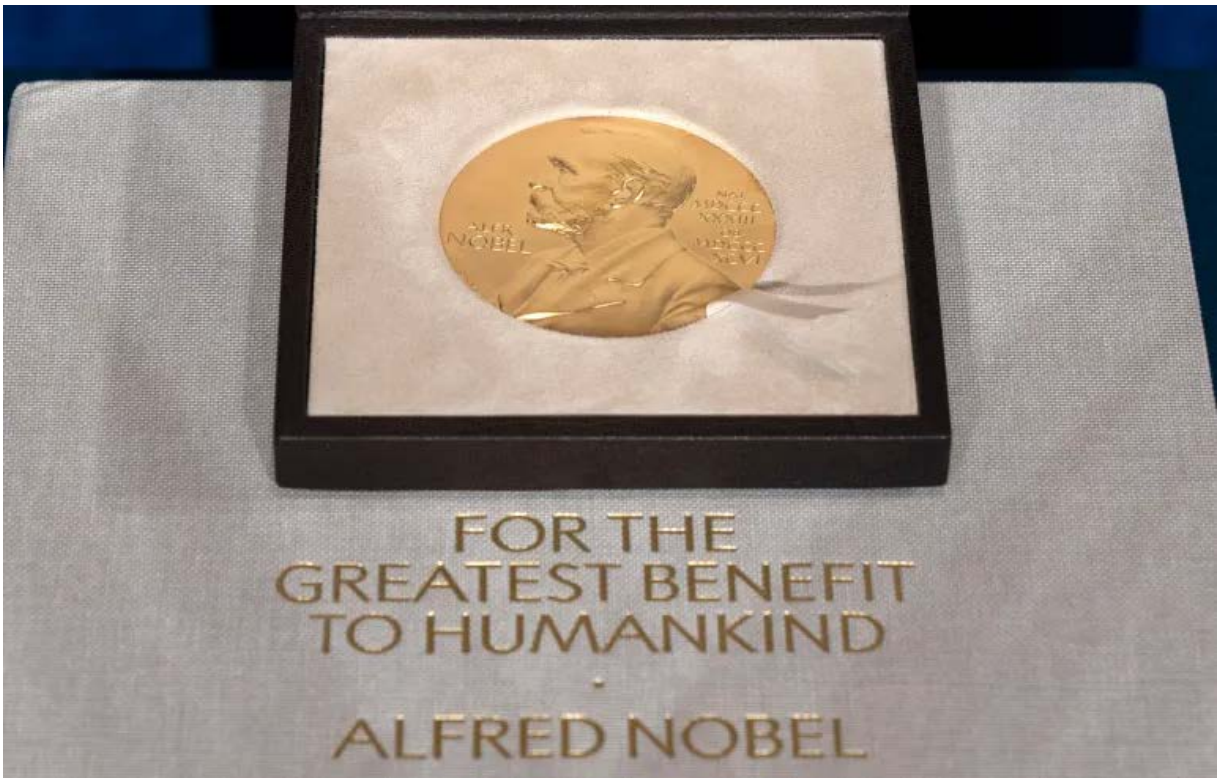
Context:

- The **Nobel Prize announcements for 2025**, made between **6th and 13th October 2025**, recognized **exceptional contributions** that have

profoundly **transformed scientific understanding, strengthened efforts toward global peace, and enriched the world's cultural and intellectual heritage.**

1. What is the Nobel Prize?

- The **Nobel Prizes are the most prestigious international awards**, established by the will of **Alfred Nobel, a Swedish chemist, engineer and industrialist** best known for discovering dynamite.
- In his **1895** will, Nobel left the bulk of his fortune to fund the annual prizes, recognising those who **"have conferred the greatest benefit to humankind" in the preceding year.**
- The **first Nobel Prizes were awarded in 1901** for outstanding achievement in the fields of **physics, chemistry, medicine, literature and peace.**
- In **1968, Sweden's central bank, Sveriges Riksbank, established the Prize in Economic Sciences in Memory of Alfred Nobel, expanding the categories to six.**



2. What is the history of the Nobel prize?

The Nobel Prize was set up **when businessman** and entrepreneur **Alfred Nobel died** and left the majority of his fortune to the establishment of **prizes in physics, chemistry, physiology or medicine, literature and peace.**

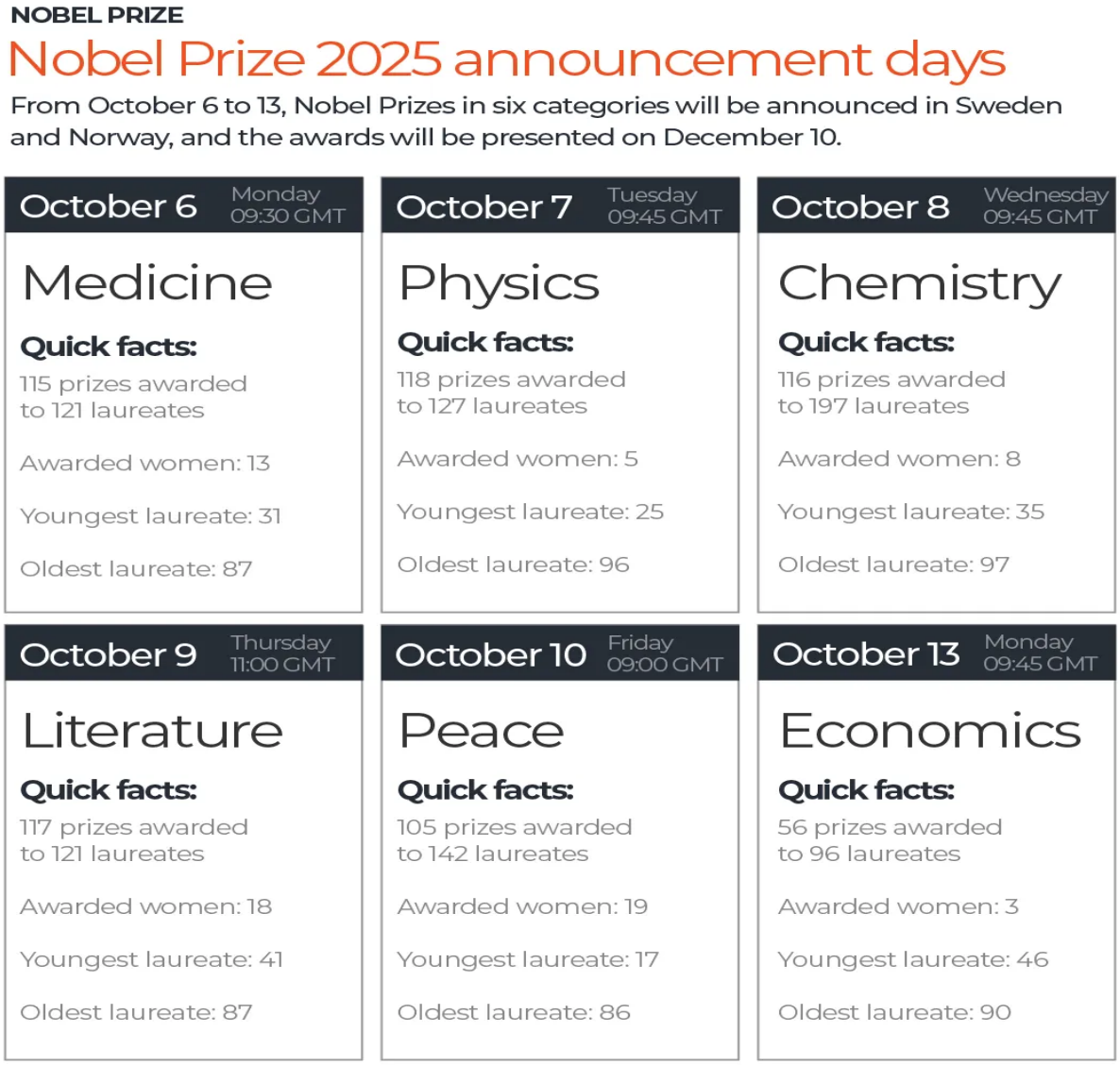
- **Alfred Nobel was an inventor, entrepreneur, scientist and businessman** who also wrote poetry and drama.
- His varied interests are reflected in the Nobel Prizes which he laid the foundation for in **1895 in his last will and testament.**
- **His will** stated that the **prizes should be awarded to "those who, during the preceding year, shall have conferred the greatest benefit to humankind."**
- The **first Nobel Prizes were awarded in 1901** and they have been awarded annually since then.
- There have been years in that time when the Nobel Prizes have not been awarded - mostly during **World War I (1914–1918) and II (1939–1945).**

3. Who awards the Nobel Prizes, and how much is the prize money?

- The prizes are awarded by different institutions: **the Royal Swedish Academy of Sciences (for physics, chemistry and economics), the Nobel Assembly at the Karolinska Institutet (for medicine), the Swedish Academy (for literature) and the Norwegian Nobel Committee (for peace).**
- Each laureate receives a **gold medal, a diploma and a cash award funded by the Nobel Foundation**, which manages **Nobel's endowment.**
- This year's prizes amount to **11 million Swedish kronor ($1.2m) each.**

- The prizes are formally presented on **December 10, the anniversary of Nobel's death in 1896.**

4. What is this year's Nobel Prizes schedule?

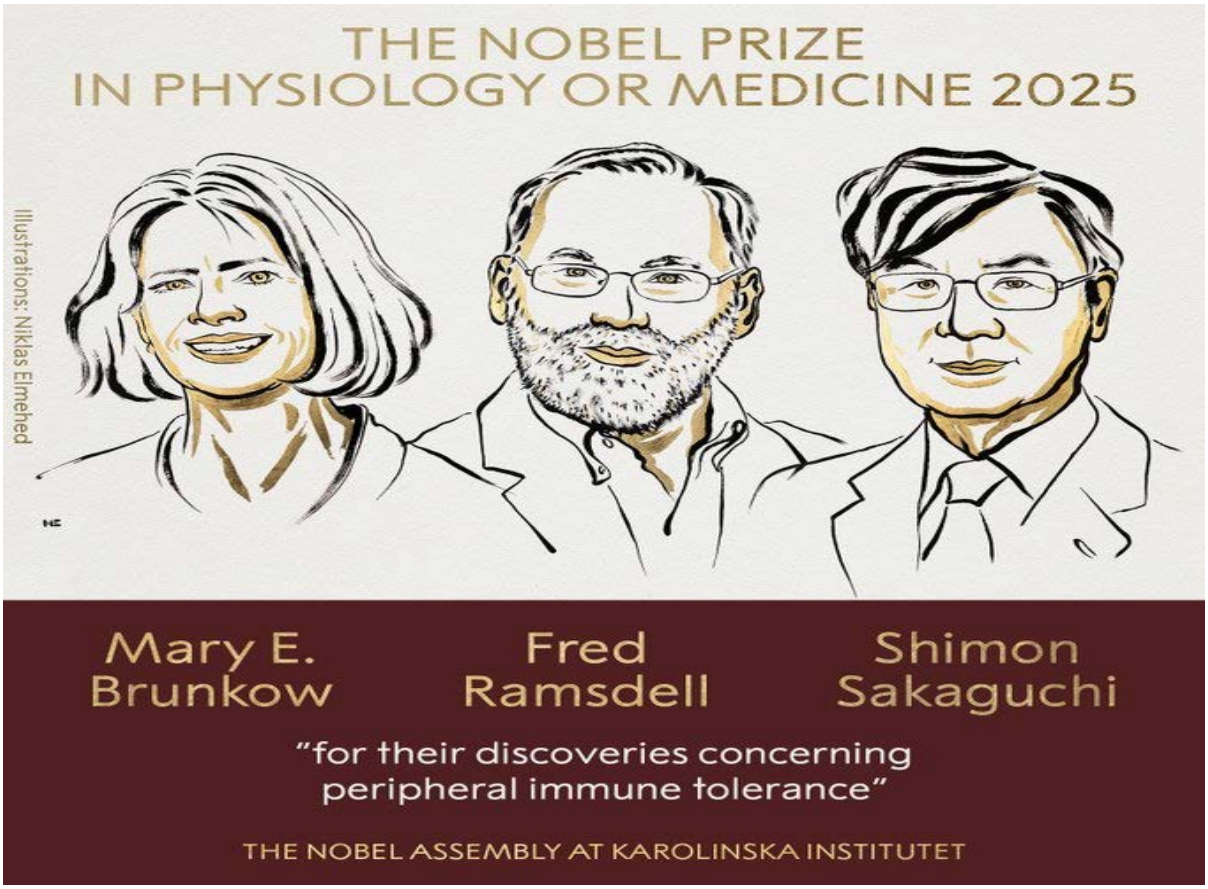


The announcements for Nobel prize began on October 6, Monday and will end a week later on October 13.

- **Monday, October 6: physiology or medicine**
  - **Announced by the Nobel Assembly at Karolinska Institutet, Wallenbergsalen, Nobel Forum, Solna, near Stockholm**
- **Tuesday, October 7: physics**
  - **Announced by the Royal Swedish Academy of Sciences, Stockholm**

- **Wednesday, October 8: chemistry**
  - **Announced by the Royal Swedish Academy of Sciences, Stockholm**
- **Thursday, October 9: literature**
  - **Announced by the Swedish Academy, Stockholm**
- **Friday, October 10: peace**
  - **Announced at the Norwegian Nobel Institute, Oslo, by the chairperson of the Norwegian Nobel Committee**
- **Monday, October 13: economics**
  - **Announced by the Royal Swedish Academy of Sciences, Stockholm**

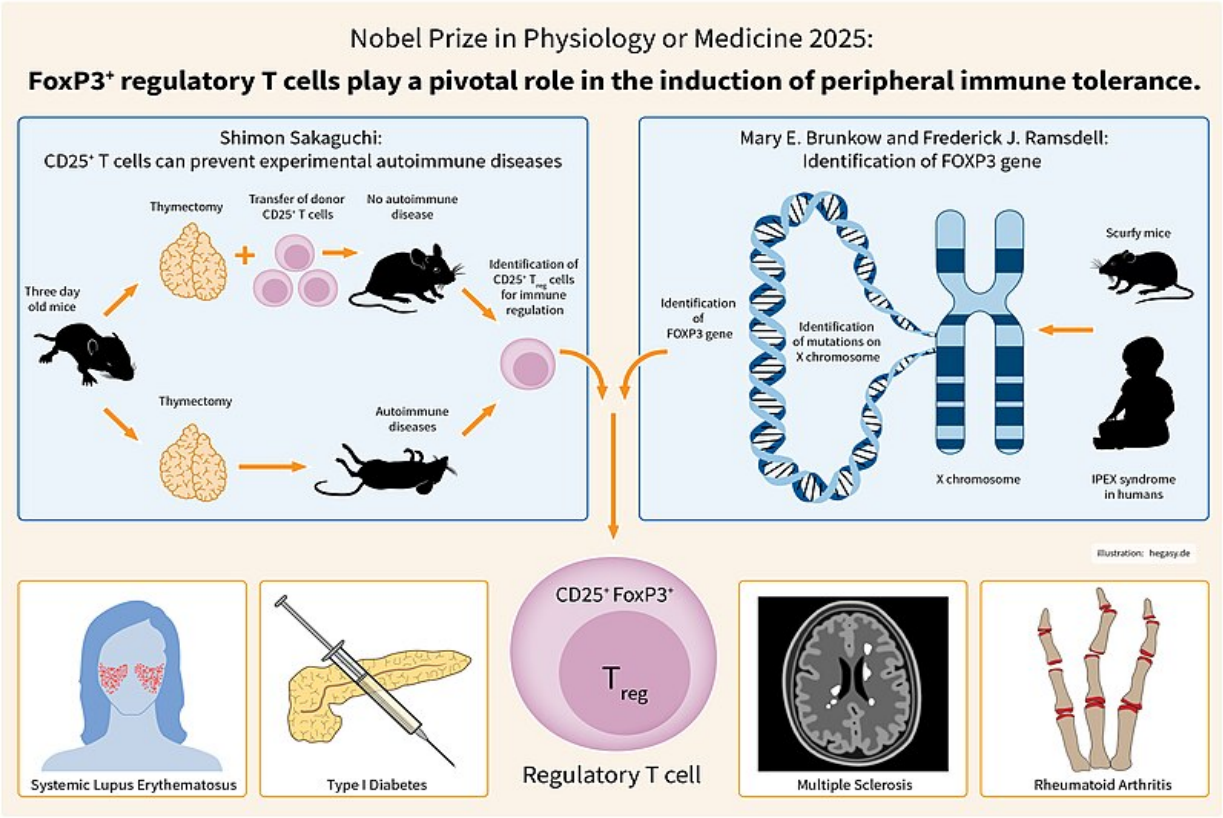
5. Who are the recipients of the 2025 Nobel Prize in Physiology or Medicine?



- The **Nobel Assembly at the Karolinska Institutet** has decided to award the **2025 Nobel Prize in Physiology or Medicine to Mary E. Brunkow, Fred Ramsdell and Shimon Sakaguchi "for their discoveries concerning peripheral immune tolerance."**
- They identified the **immune system's security guards, regulatory T cells**, thus laying the foundation for a new field of research.
- The discoveries have also led to the development of **potential medical treatments** that are now being evaluated in clinical trials.
- The hope is to be **able to treat or cure autoimmune diseases, provide more effective cancer treatments and prevent serious complications after stem cell transplants.**

6. What have the three winners done?

- The human body has a **powerful and complex immune system, which not just fights off various bacteria and viruses**, but also knows what cells should not be attacked.
- According to the **Nobel Prize's official press release**, **"Mary Brunkow, Fred Ramsdell and Shimon Sakaguchi are awarded the Nobel Prize in Physiology or Medicine 2025** for their fundamental discoveries relating to **peripheral immune tolerance.**
- The laureates identified the im**mune system's security guards, regulatory T cells, which prevent immune cells from attacking our own body."**



Key Insights	About
The basics of the immune system	• The **human body's immune system fights off thousands of microbes** attempting to invade our bodies every day. • **Microbes vary wildly, and many even have 'camouflages' that mirror human cells.** • Thus the **immune system must distinguish** what to attack and what to tolerate. • It should also be able to **identify our own healthy cells, so that our body does not turn upon itself.** • When this **identification does not happen properly**, people develop auto-immune diseases.

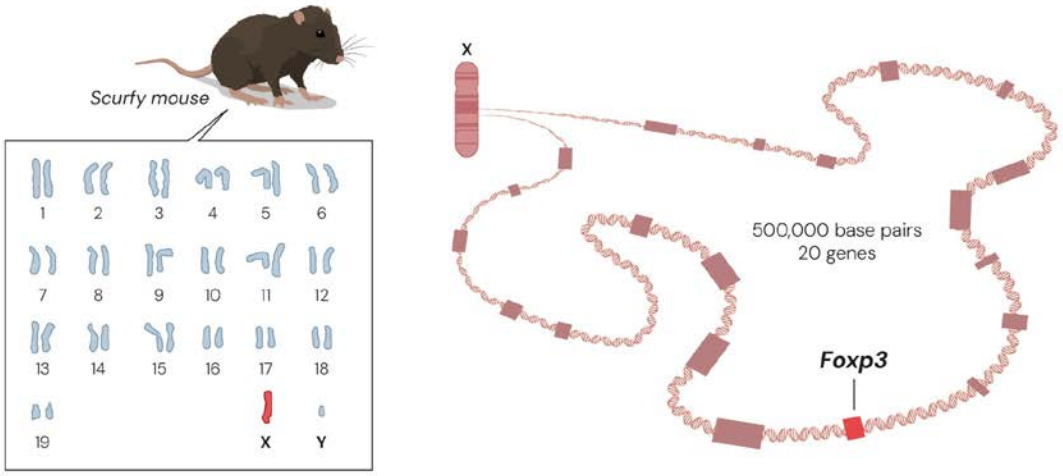
	• Also, in **case of organ or stem cell (or bone marrow) transplants**, there is always the danger of the immune system attacking the newly **transplanted cells.** • Thus, an **understanding of how the immune system works** – how the signal to attack or not attack is given and executed – **is very important.** • The immune system's work is done by **T cells.** • While **helper T cells patrol the body and raise an alert when they detect an attack, the killer T cells attack the invader (virus or any other pathogen).** • For a long time, it was **believed that the thymus**, an organ just **behind our sternum, played a central role in how the immune system worked.** • The thymus is specially active in **babies and children.** • The T cells travel to the **thymus.** • If they are found attacking our own cells – **basically can't tell** apart invader from the body's constituents – the **thymus does not release them into the blood stream.** • Thus, it was understood that passing through the **thymus was a kind of exam T cells had to clear to enter the blood stream and do the job of protecting.** • The three **Nobel laureates** proved that the picture is more complicated than that, and there is a third category of **T cells.**

	• **"The Nobel Prize laureates identified the immune system's** security guards, regulatory **T cells**, thus laying the foundation for a new field of research," the press release says.
Shimon Sakaguchi's key insight	• In the mid-1990s, **Shimon Sakaguchi challenged conventional belief** by postulating that some specialised T cells act as **"security guards" of the immune system**, suppressing overly aggressive responses. • In a series of **experiments, he examined mice whose thymus** had been removed and matured **T cells injected into their bodies later.** • **Shimon Sakaguchi identified a class of T cells that basically ask other T cells**, which might be attacking the body's own tissues, to calm down. • These are called regulatory T cells.
Brunkow, Ramsdell, and the FOXP3 gene	• Far away from **Sakaguchi, Brunkow and Ramsdell** were examining sick male mice, and through painstaking elimination and identification of genes, **had managed to find that the particular mutation** making these mice sick was related to a rare autoimmune disease among humans, **called IPEX.** • Both the diseases were caused by mutations in the **FOXP3 gene.** • Finally, in another few years, it was established that **FOXP3 gene controls the development of regulatory T cells**, whose existence **Sakaguchi had earlier established.**

7. What was the scientific discovery that earned the 2025 Nobel Prize in Medicine?

- The **immune system has overlapping ways to detect and fight bacteria, viruses and other intruders.**
- Sometimes certain **immune cells run amok, mistakenly attacking people's own cells and tissues to cause autoimmune diseases.**
- Scientists once thought the **body regulated this system only in a centralized fashion.**
- Key immune soldiers such as **T cells get trained to spot bad actors and those that go awry in a way that might trigger autoimmunity get eliminated in the thymus.**
- The Nobel winners unraveled an **additional way the body keeps the system in check if immune cells later get confused and mistake human cells for intruders, which is what happens when a person has an autoimmune disease.**

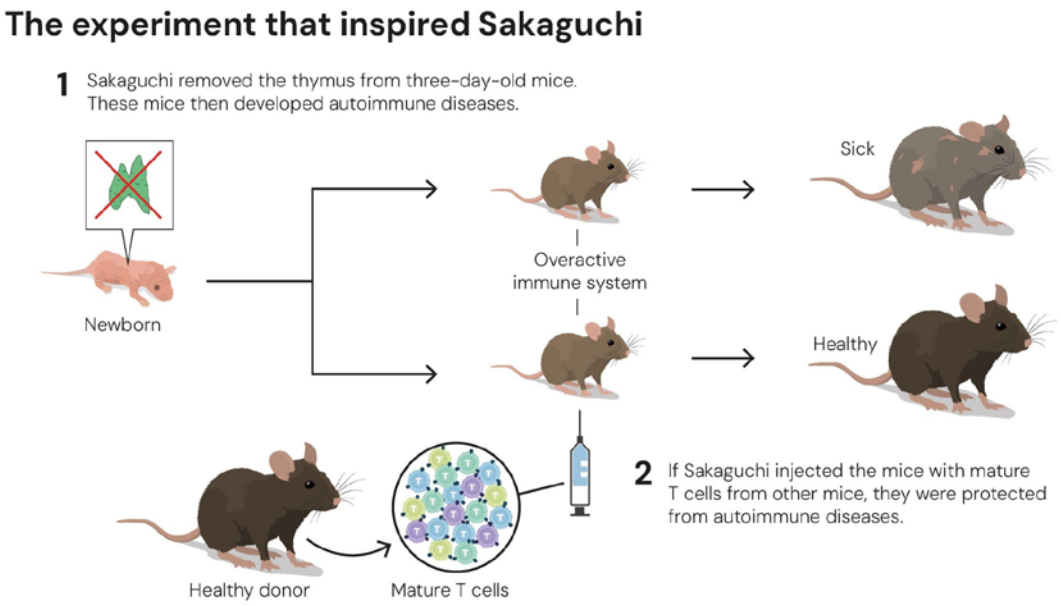
- His experiments in **mice showed that the thymus pathway couldn't be the only explanation.**
- In **1995, he discovered a previously unknown T cell subtype, the regulatory T cells**, that also could **tamp down overreactive immune cells like a biological security guard.**
- In **2001, Brunkow and Ramsdell** were working together at a **biotech company investigating mice with an autoimmune disease.**



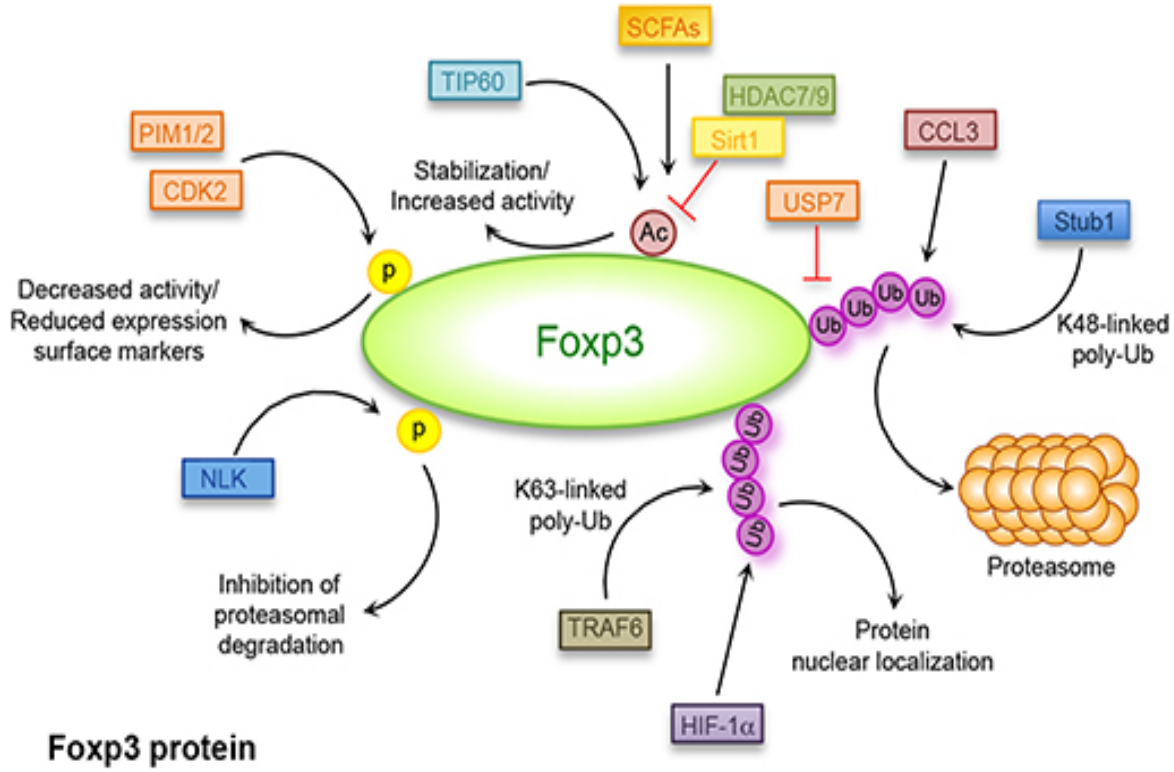
Brunkow and Ramsdell find the scurfy mutation

The scurfy mutation causes a mutiny in the immune system. Brunkow and Ramsdell succeeded in narrowing down the area of the mutation and locating it in the *Foxp3* gene, which turned out to be decisive in the development of regulatory T cells.

- In painstaking work at a time when **mapping genes was still an evolving field**, they figured out that a **particular mutation in a gene called Foxp3 was to blame** – and quickly realized it could be a major player in human health, too.
- **Brunkow** told that a **seemingly minor change at the DNA level led to a major transformation in how the immune system functions.**
- Two years later, **Sakaguchi linked the discoveries** to show the Foxp3 gene controls the **development of those regulatory T cells so they're able to curb other, overreactive cells.**



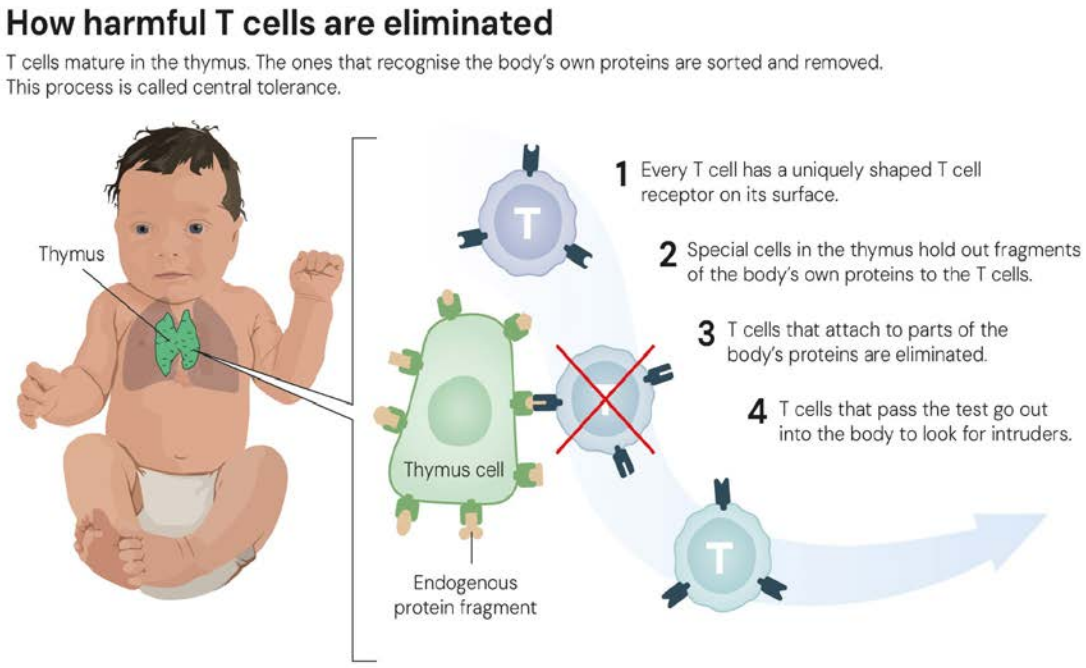
8. What are FOXP3 genes?



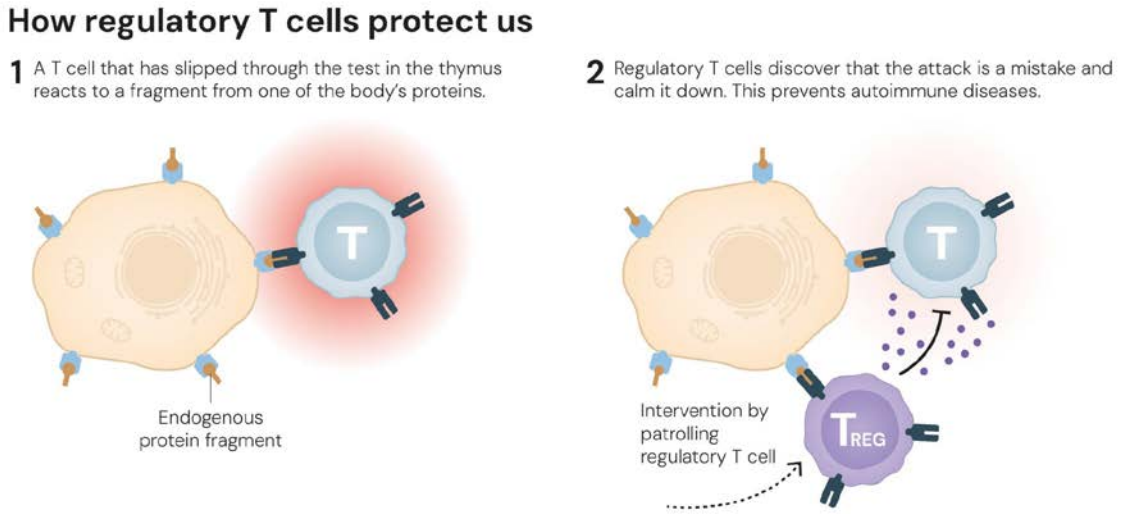
- The **FOXP3 gene provi**des instructions for producing the **forkhead box P3 (FOXP3) protein.**

- The **FOXP3 protein attaches (binds)** to specific regions of **DNA and helps control the activity of genes** that are involved in regulating the immune system.
- The **immune system normally** protects the body from foreign invaders, such as bacteria and viruses, **by recognizing and attacking these invaders and clearing them from the body.**
- On the basis of its role in controlling gene activity, the **FOXP3 protein is called a transcription factor.**
- This protein is essential for the **production and normal function of certain immune cells called regulatory T cells**, which play an important role in **preventing autoimmunity.**
- **Autoimmunity** occurs when the body attacks its own tissues and organs by mistake.
- The **FOXP3 protein** is found primarily in an immune system gland **called the thymus, where these regulatory T cells are produced.**

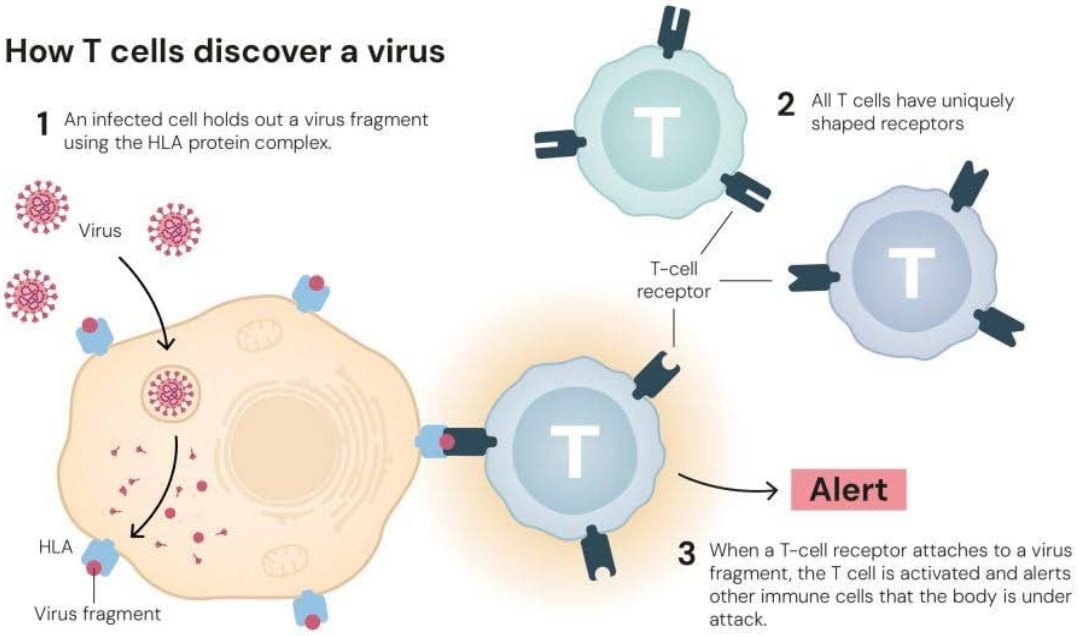
9. How harmful T cells are eliminated?



10. How regulatory T cells protect us?



11. What can be the potential impact of the discoveries on medical treatment?



- The discoveries of **regulatory T cells and the FOXP3 gene** have launched a **new field of immune-regulation research, with significant implications for human health.**

- In **cancer, tumours are often surrounded by many regulatory T cells**, which protect them from **immune attack.**
- Researchers are investigating how to dismantle this **"protective wall" so that the immune system can better reach and destroy cancerous cells.**
- Conversely, in **autoimmune diseases, strategies aim to boost regulatory T cells**, so that they can stop the **attacking cells from destroying the body.**

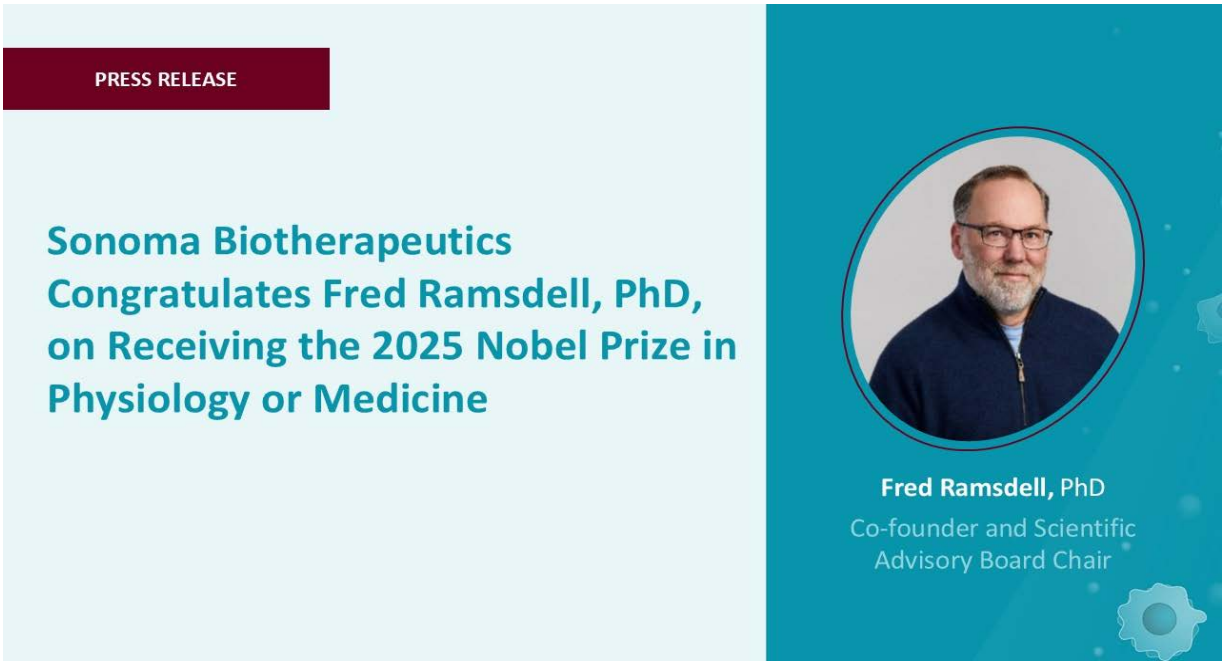
Impact	Description
For cancer treatment	• **Tumours** are often **surrounded by large numbers of regulatory T cells** that protect them **from immune attack.** • Cancer researchers are now **investigating how to temporarily reduce regulatory T cell** activity around **tumours**, allowing the immune system to recognise and destroy cancer cells. • This could lead to more **effective immunotherapy treatments.**
For autoimmune diseases	The opposite strategy applies here. • Researchers are testing ways to **boost regulatory T cell numbers in patients with conditions like rheumatoid arthritis, inflammatory bowel disease** and **Type 1 diabetes**. • Early clinical trials are using **interleukin-2,** a substance that **helps regulatory T cells thrive** and multiply.
For organ transplants	• When someone receives a **transplanted organ, their immune syste**m sees it as foreign and **tries to reject it.**

	• Patients must take **powerful immunosuppressive drugs for life**. • Researchers are now exploring whether they can **isolate a patient's regulatory T cells,** multiply them in the laboratory and return them to the **patient's body where they can specifically protect the transplanted organ** without suppressing the entire immune system. • Better understanding of the **immune system can also help in making sure the body does not reject transplanted organs.**

12. Where did the three medicine laureates work?

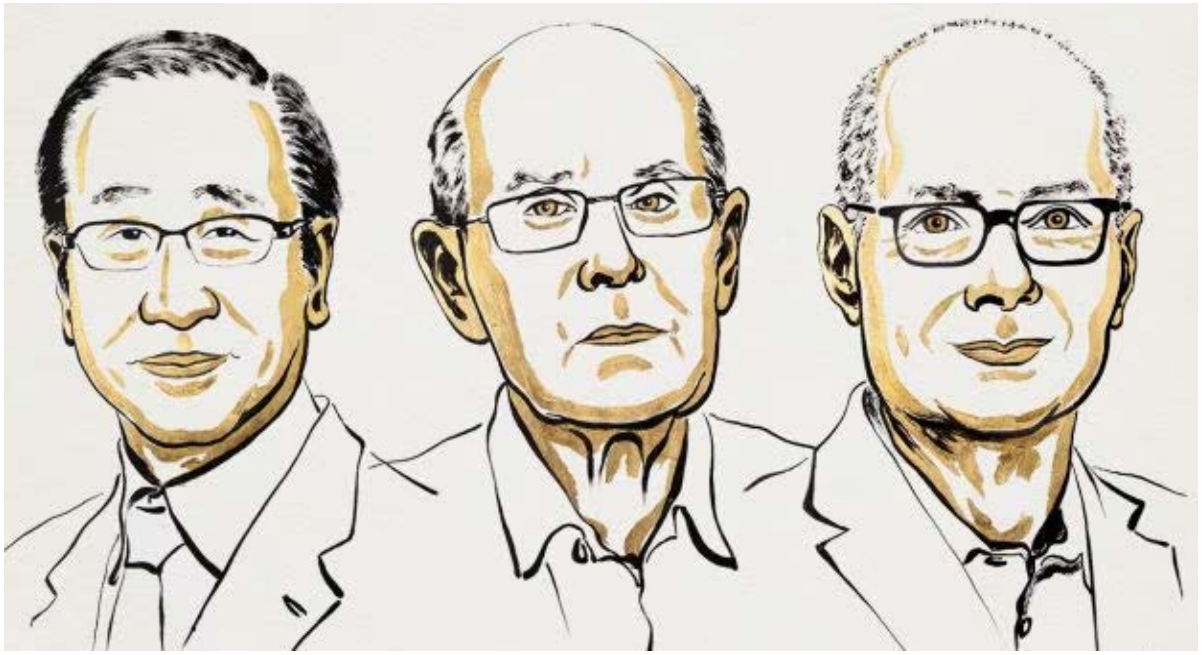
- **Mary Brunkow, born in 1961,** works at the **Institute for Systems Biology, Seattle, USA.**

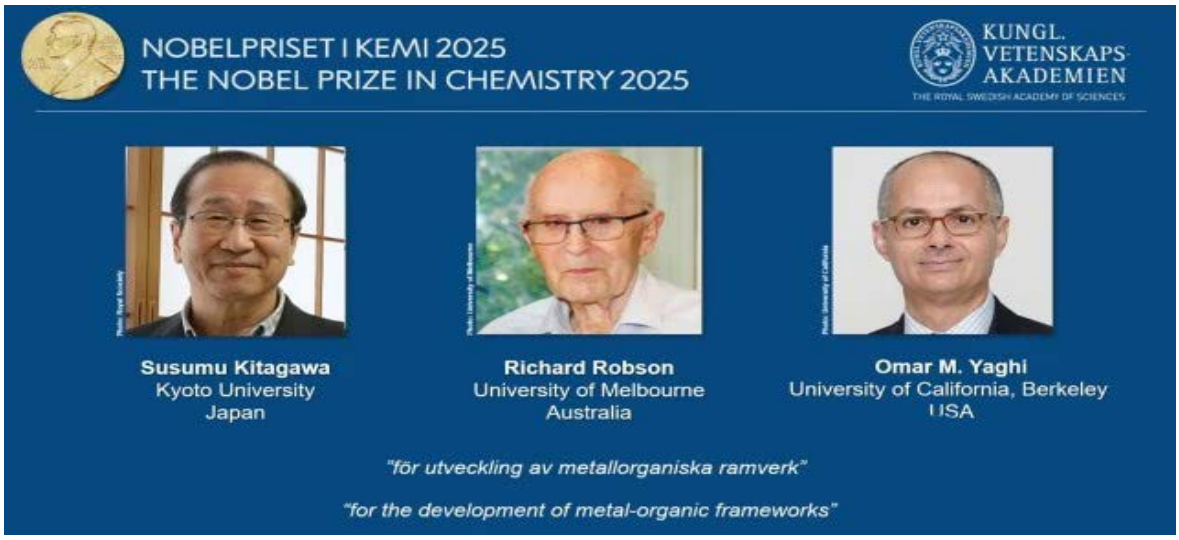
- **Frederick Ramsdell, born in 1960,** works at **Sonoma Biotherapeutics, San Francisco, USA.**



- **Shimon Sakaguchi, born in 1951,** works at **Osaka University, Japan.**

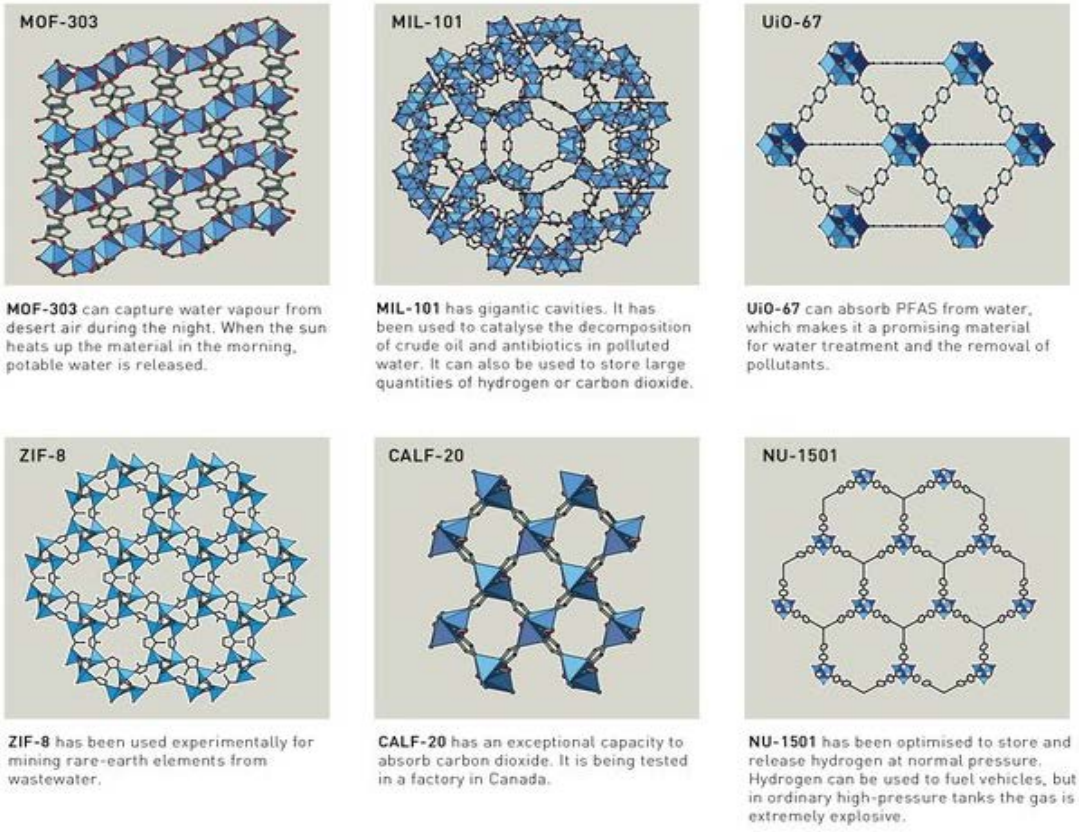
13. Who are the winners of the Nobel Prize in Chemistry?



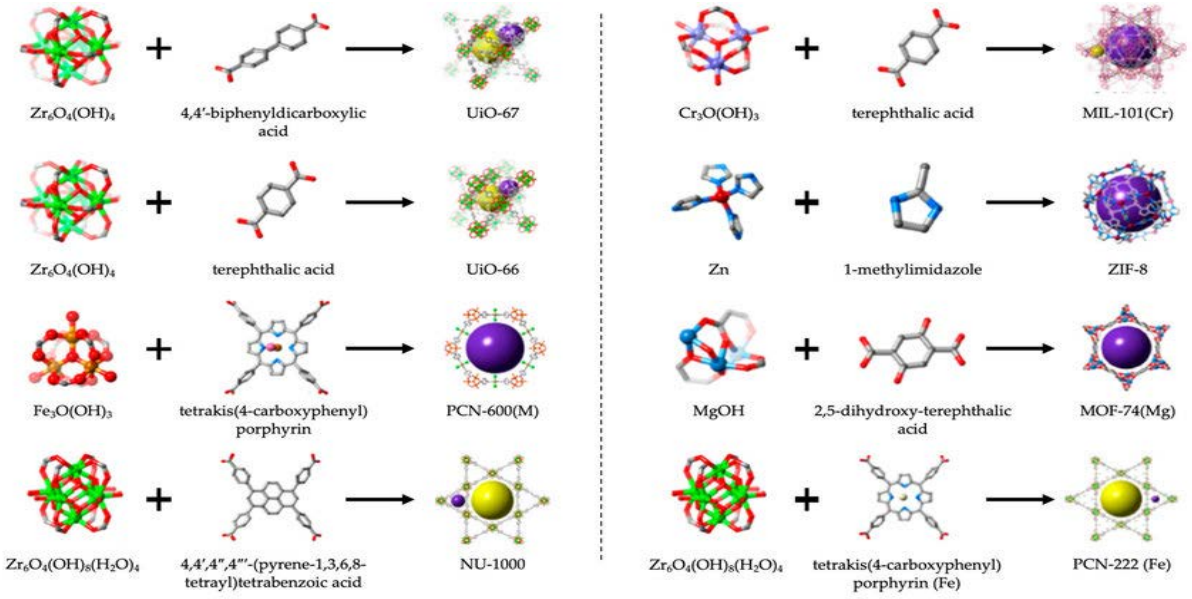


- **Susumu Kitagawa, Richard Robson, and Omar M. Yaghi have been awarded the 2025 Nobel Prize in Chemistry** for pioneering the development of **metal–organic frameworks (MOFs), the Royal Swedish Academy of Sciences** announced.
- Through the development of **metal–organic frameworks, 2025 chemistry laureates Susumu Kitagawa, Richard Robson and Omar Yaghi** have provided chemists with **new opportunities for solving some of the challenges we face.**
- Following the laureates' **groundbreaking discoveries, researchers have created numerous different and functional metal–organic frameworks (MOF).**
- **So far, in most cases, the materials have only been used on a small scale.**
- To harness the benefits of **MOF materials for humanity, many companies** are now investing in their **mass production and commercialisation.**
- For example, the electronics industry can now use **MOF materials to contain some of the toxic gases required to produce semiconductors.**
- Another **MOF can instead break down harmful gases, including some that can be used as chemical weapons.**

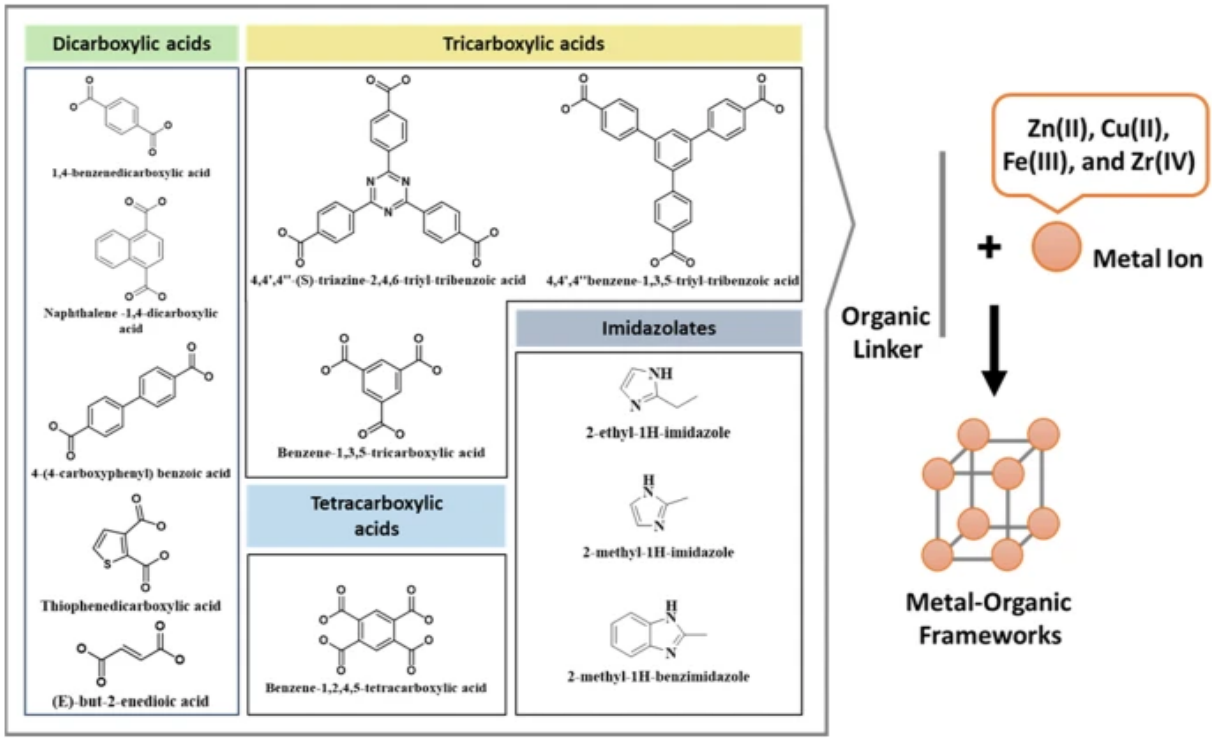
- Numerous companies are also **testing materials that can capture carbon dioxide from factories and power stations**, to reduce greenhouse **gas emissions.**



14. What are Metal-Organic Frameworks?



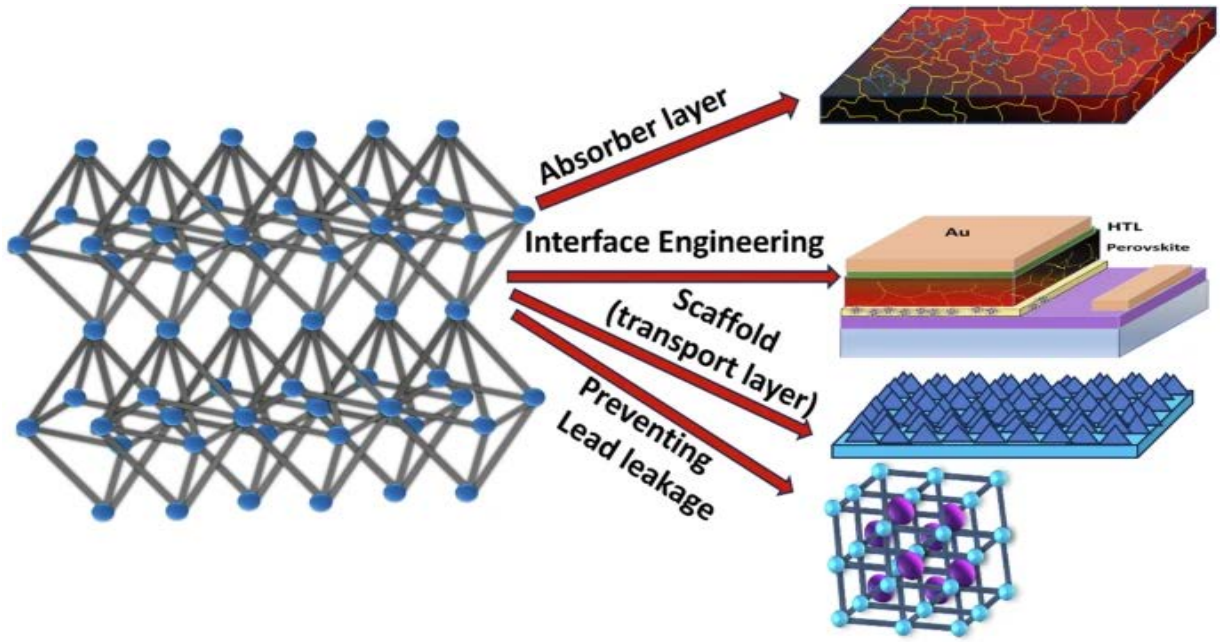
- **MOFs are a class of materials composed of metal ions connected by organic molecules**, forming a **three-dimensional network with large, porous cavities.**
- This design **allows gases and liquids to flow** through, making **MOFs highly adaptable for various applications.**
- **Metals** can form bonds in **multiple directions**, and thus metal ions are the anchors here, like **joints in a scaffolding.**
- Organic molecules link them together.
- Organic molecules are f**lexible, can form rings and chains, and can be designed to have chemical groups with specific properties.**
- **Bonds are formed because atoms want to be stable, which often means having eight electrons in their outer shells.**
- Those that have **less than four electrons generally** lose them, those with more than four try to gain the missing electrons **(the number of electrons available for bonding is called valency of an atom).**
- Organic compounds **contain carbon atoms,** and **carbon's unique bonding ability allows it to form chains and rings**.



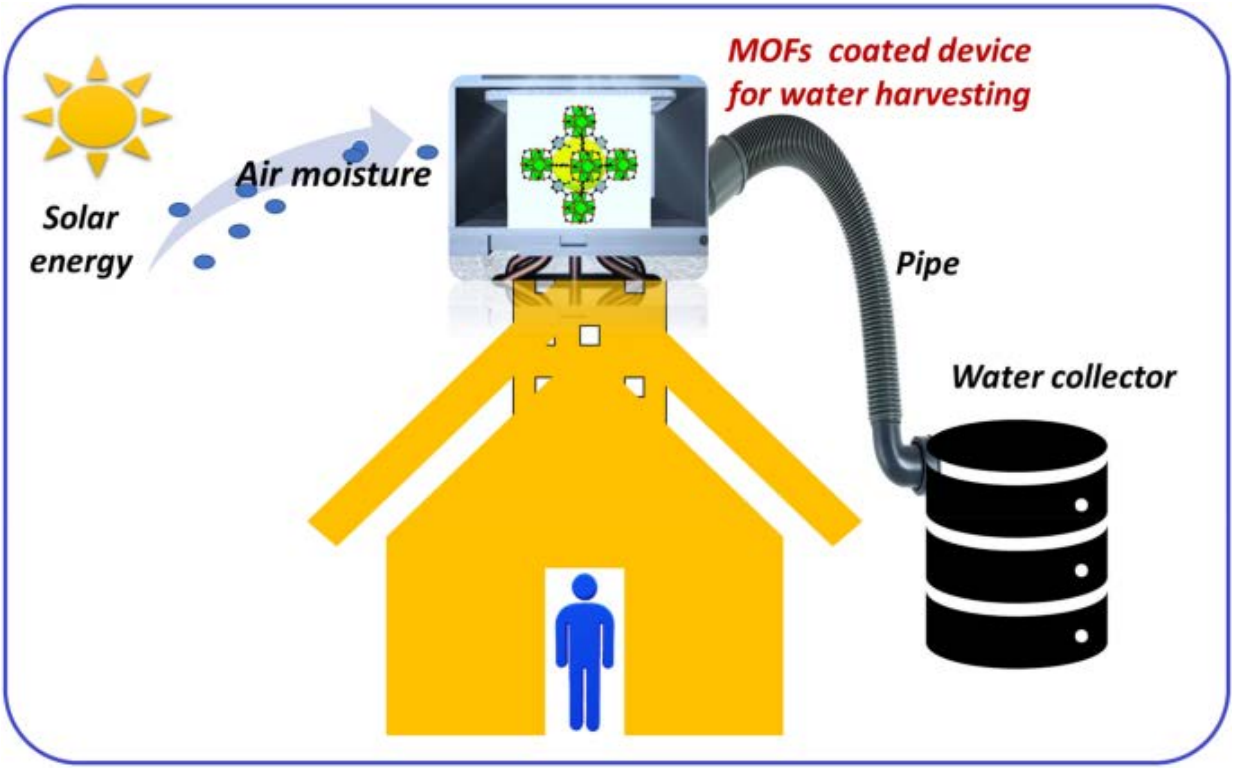
15. What are various Real-world applications of MOFs?

The unique properties of MOFs have led to their application in various fields:

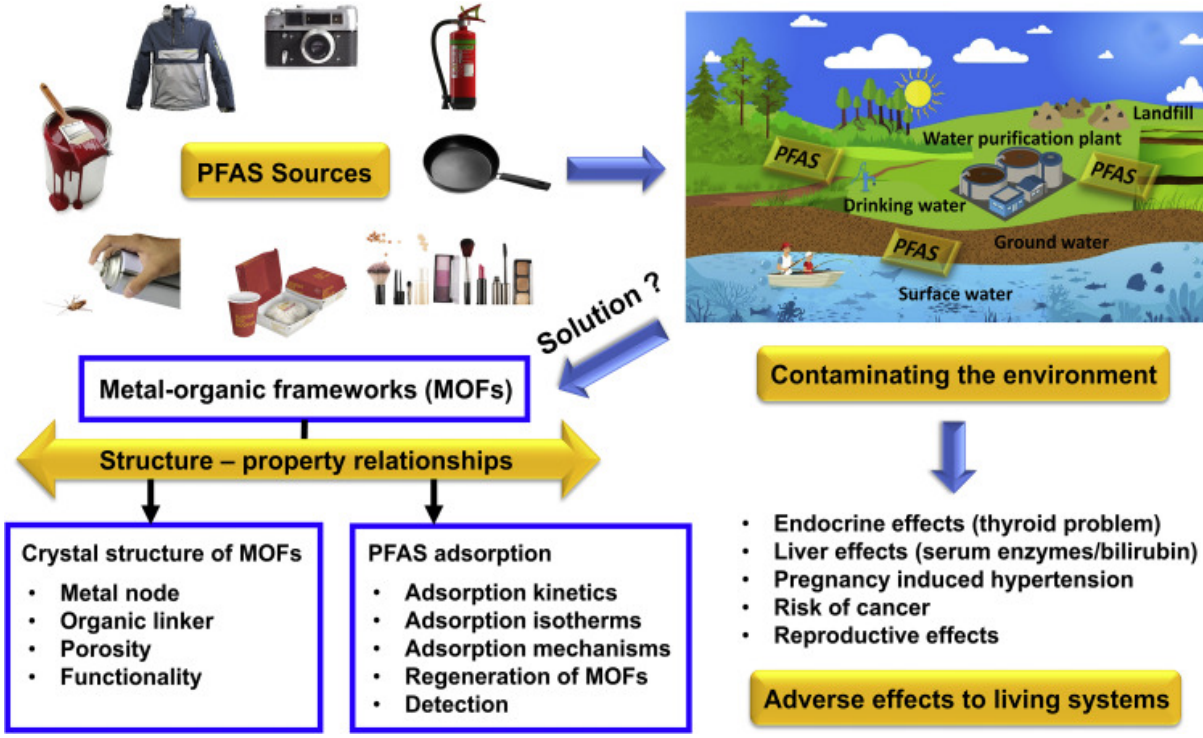
- **MOFs and their derivatives in 3rd generation solar cells:**
  - Metal-organic framework (MOF) is gaining immense interest in photovoltaics.
  - **Different types of 3rd generation solar cells including perovskite solar cells (PSCs), dye-sensitized solar cells, organic solar cells and quantum-dot solar cells etc. are reported to involve MOF, having better performance and stability.**



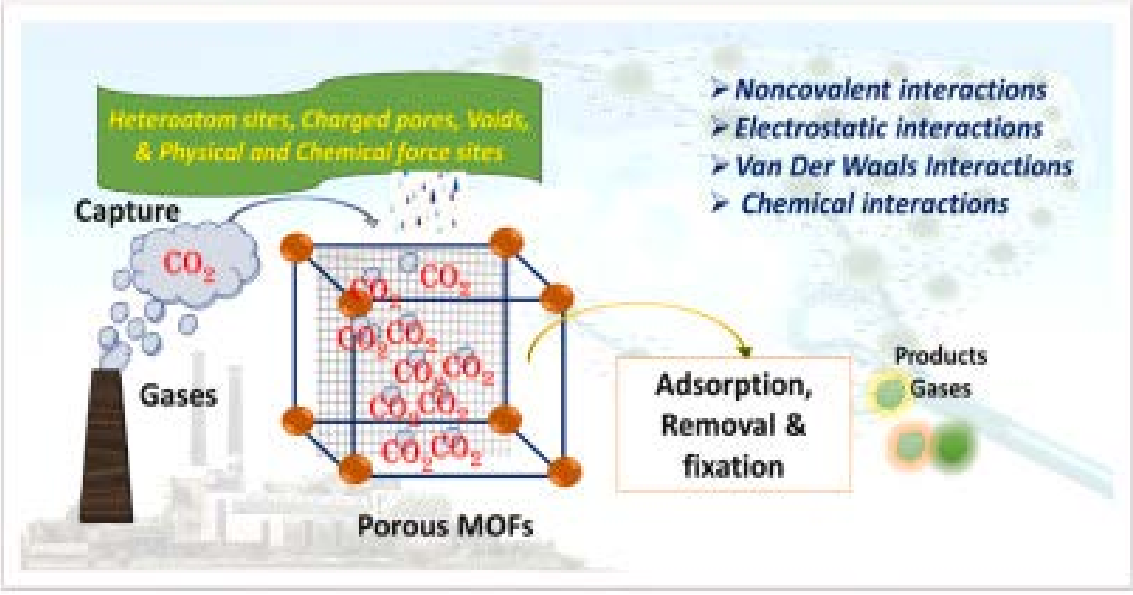
- **Water harvesting:**
  - MOFs can **extract water from dry air, offering a potential solution for water-scarce regions.**



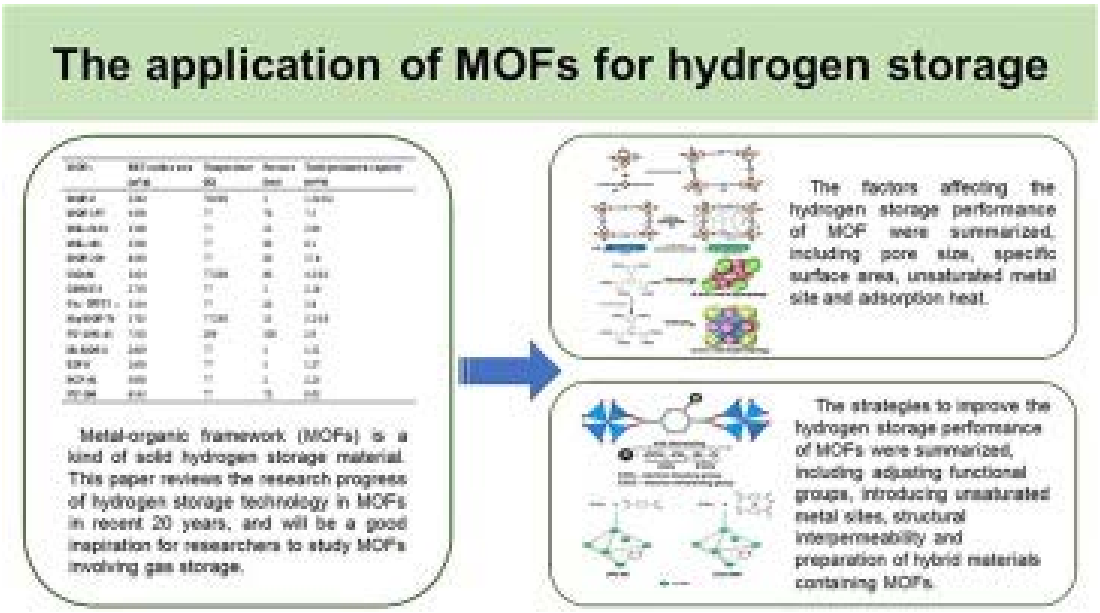
- **Pollutant Removal:**
  - They can **filter out harmful substances like PFAS from water, addressing environmental contamination.**



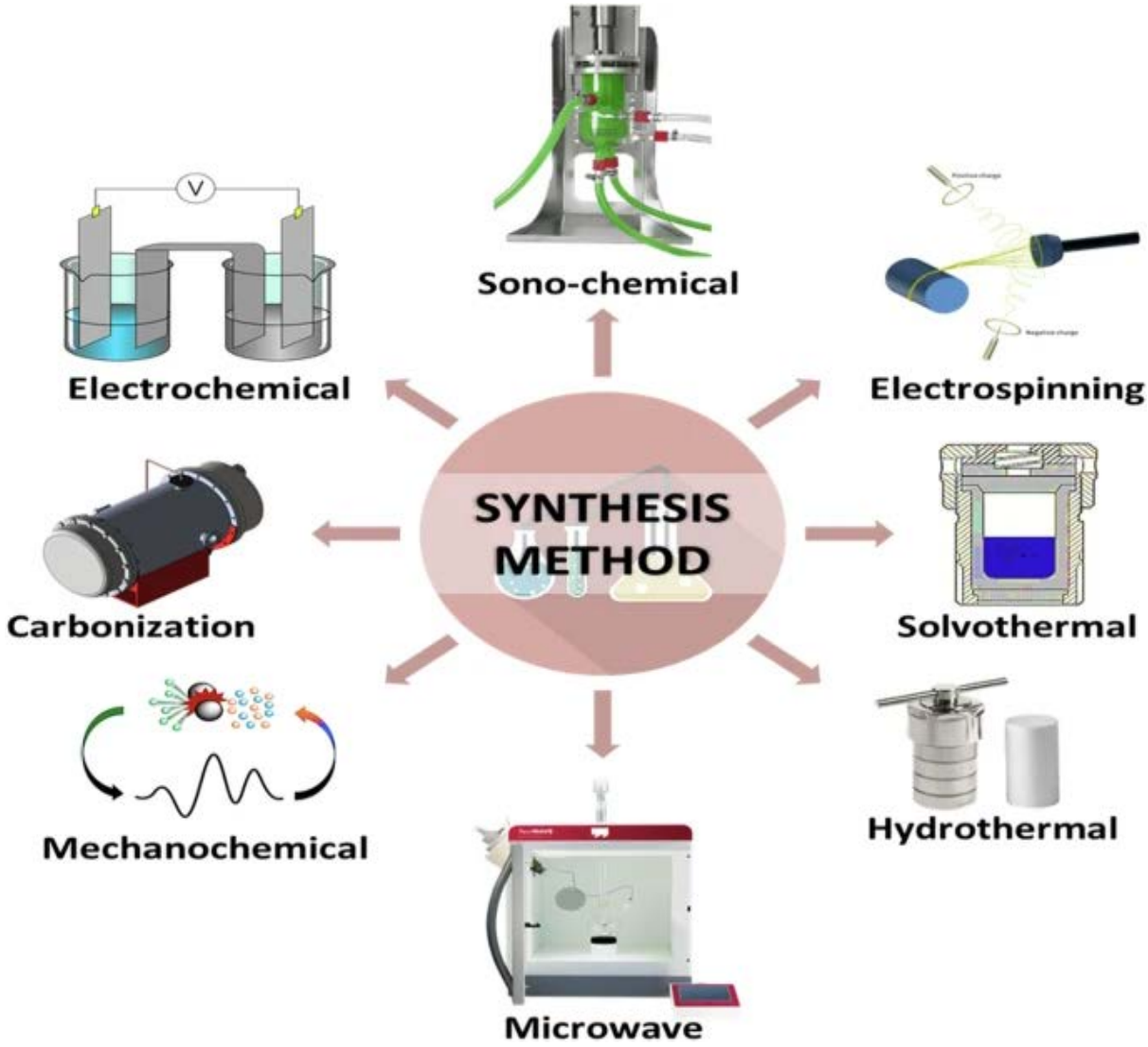
- **Carbon capture:**
  - MOFs are effective in **capturing carbon dioxide, aiding in efforts to mitigate climate change.**



- **Hydrogen storage:**
  - Their porous nature allows for the **safe storage of hydrogen, crucial for clean energy applications.**



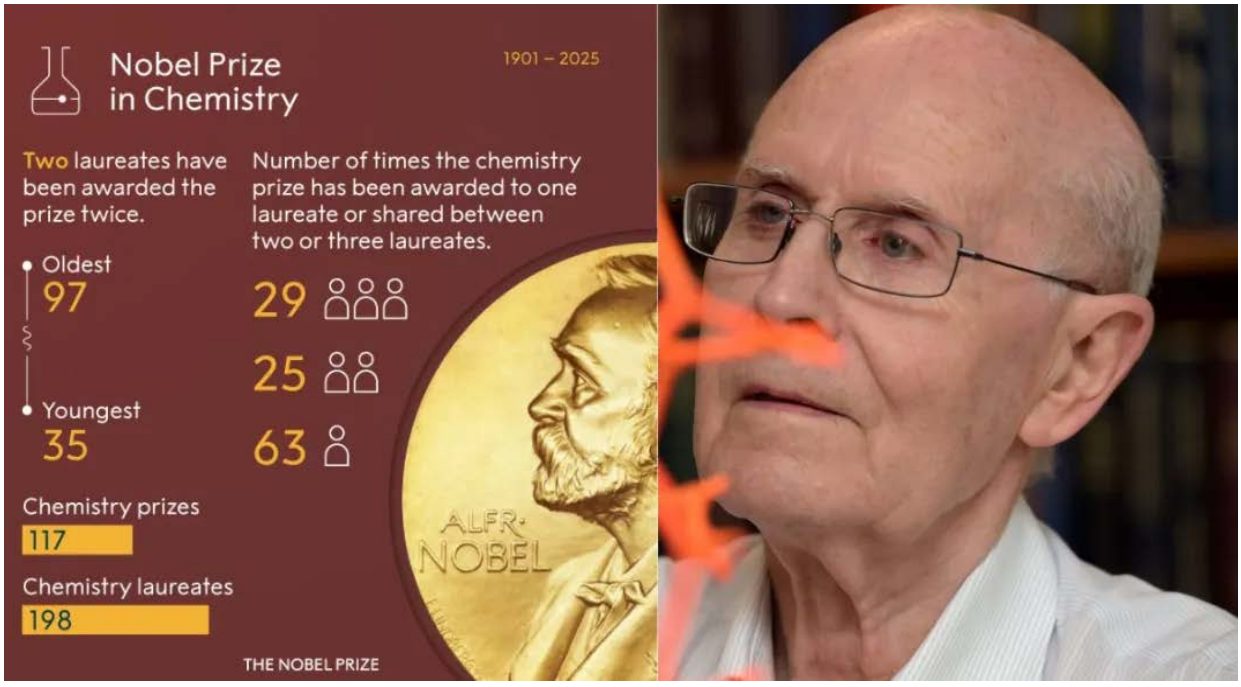
16. What are Approaches for synthesis of metal-organic frameworks?



17. Where did the three chemistry laureates work?

- **Susumu Kitagawa,** was **born in 1951 in Kyoto, Japan.**
  - He is a Professor **at Kyoto University, Japan.**

- **Richard Robson** was born **in 1937 in Glusburn, UK.**
  - He is a Professor **at University of Melbourne, Australia.**



- **Omar M Yaghi** was born **in 1965 in Amman, Jordan.**
  - He is a Professor at **University of California, Berkeley, USA.**


His work has transformed materials science and enabled new applications in energy, water, and the environment.
Saudi scientist Professor Omar Yaghi
Has WON the 2025 Nobel Prize in Chemistry
Announced by the Royal Swedish Academy of Sciences, for his pioneering work in Reticular Chemistry and the development of MOFs and COFs.
This achievement reflects:
The Kingdom's vision to become a global hub for science and innovation
Its commitment to empowering a national research and innovation ecosystem
NATIONAL ACADEMY OF SCIENCES
Leopoldina
KACST
He was elected as a member of the U.S. National Academy of Sciences and the German National Academy of Sciences (Leopoldina)
With his expertise, Professor Yaghi has supported KACST's projects in energy, water, and smart materials
Recipient of major international awards, including:
2015
King Faisal Prize for Science
2018
Wolf Prize in Chemistry
2024
Great Arab Minds Natural Sciences Award

18. Who are the recipients of the 2025 Nobel Prize in Physics?

Nobel Prize in Physics 2025

Ill. Niklas Elmehed © Nobel Prize Outreach

John Clarke

Prize share: 1/3

Ill. Niklas Elmehed © Nobel Prize Outreach

Michel H. Devoret

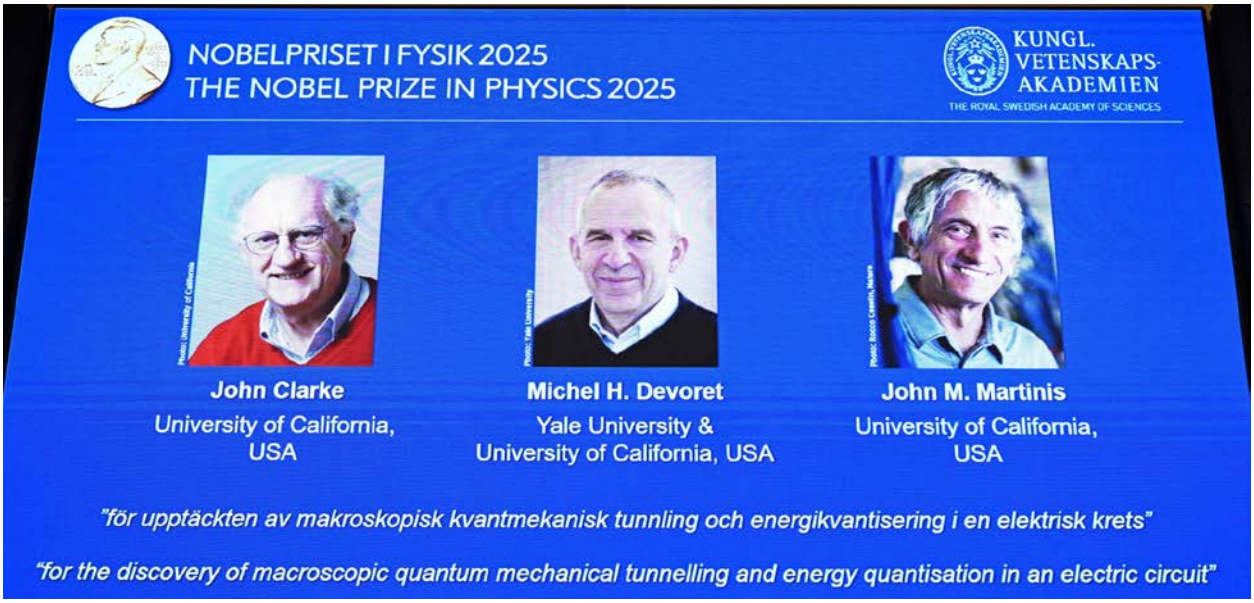
Prize share: 1/3

Ill. Niklas Elmehed © Nobel Prize Outreach

John M. Martinis

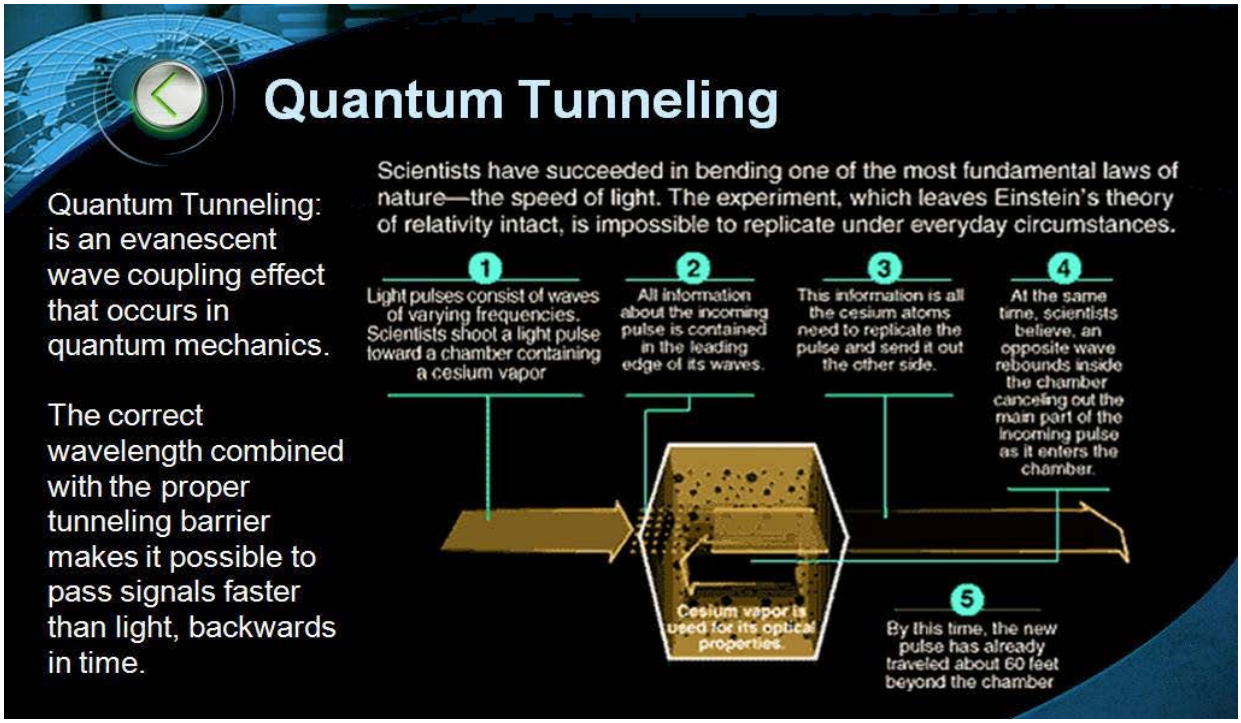
Prize share: 1/3

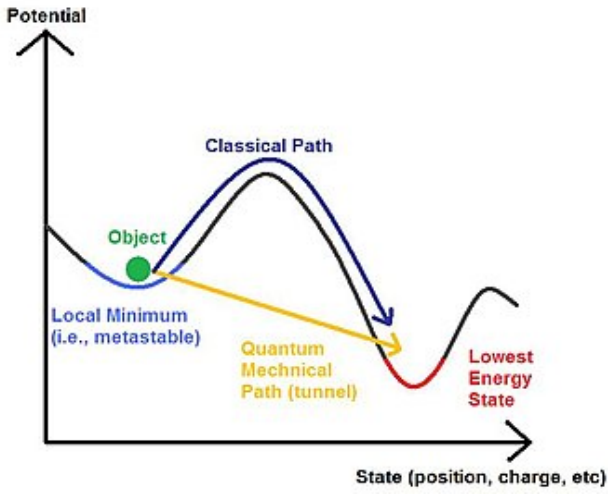
The Nobel Prize in Physics 2025 was awarded to John Clarke, Michel H. Devoret and John M. Martinis "for the discovery of macroscopic quantum mechanical tunnelling and energy quantisation in an electric circuit."



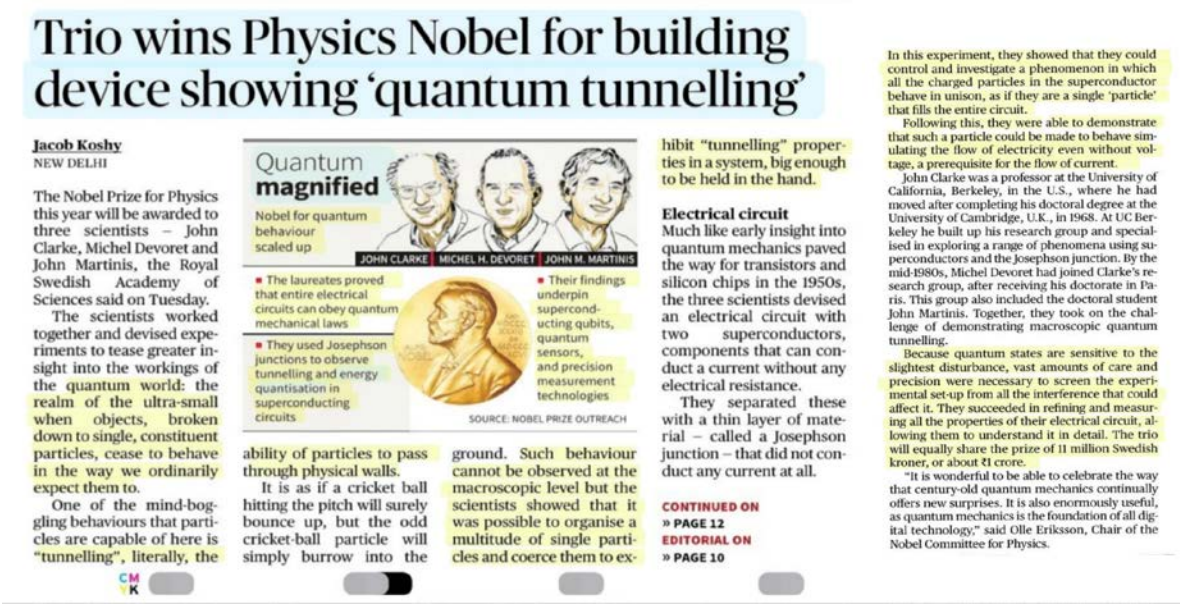
- The **Nobel Prize in Physics 2025** is out, and the winners are **John Clarke, Michel H Devoret, and John M. Martinis**, all three working in the USA, **"for the discovery of macroscopic quantum mechanical tunnelling and energy quantisation in an electric circuit."**
- This is the **second time in three years after 2022 that the Physics Nobel has been given for work in the field of quantum mechanics.**

19. What are quantum mechanics and tunnelling?





- **Tunnelling is a quantum mechanical process**, which entails that chance plays a role.
- Some types of **atomic nuclei have a tall, wide barrier, so it can take a long while for a piece** of the nucleus to appear outside it, while other types decay more easily.
- **Quantum mechanics describes properties** that are significant on a scale that involves single particles.
  - In **quantum physics, these phenomena are called microscopic**, even when they are much smaller than can be seen using an **optical microscope.**
- This contrasts with **macroscopic phenom-ena, which consist of a large number of particles.**
  - For example, an everyday ball is built up of an **astronomical number of molecules and displays no quantum mechanical effects.** We know that the ball will bounce back every time it is thrown at a wall.
- A **single particle, however, will sometimes pass straight through an equivalent barrier** in its microscopic world and appear on the other side.
  - This quantum **mechanical phenomenon is called tunnelling.**



Trio wins Physics Nobel for building device showing 'quantum tunnelling'

Jacob Koshy
NEW DELHI

The Nobel Prize for Physics this year will be awarded to three scientists – John Clarke, Michel Devoret and John Martinis, the Royal Swedish Academy of Sciences said on Tuesday.

The scientists worked together and devised experiments to tease greater insight into the workings of the quantum world: the realm of the ultra-small when objects, broken down to single, constituent particles, cease to behave in the way we ordinarily expect them to.

One of the mind-boggling behaviours that particles are capable of here is "tunnelling", literally, the ability of particles to pass through physical walls.

It is as if a cricket ball hitting the pitch will surely bounce up, but the odd cricket-ball particle will simply burrow into the ground. Such behaviour cannot be observed at the macroscopic level but the scientists showed that it was possible to organise a multitude of single particles and coerce them to exhibit "tunnelling" properties in a system, big enough to be held in the hand.

Quantum magnified
Nobel for quantum behaviour scaled up

JOHN CLARKE | MICHEL H. DEVORET | JOHN M. MARTINIS

- The laureates proved that entire electrical circuits can obey quantum mechanical laws
- They used Josephson junctions to observe tunnelling and energy quantisation in superconducting circuits
- Their findings underpin superconducting qubits, quantum sensors, and precision measurement technologies

SOURCE: NOBEL PRIZE OUTREACH

Electrical circuit

Much like early insight into quantum mechanics paved the way for transistors and silicon chips in the 1950s, the three scientists devised an electrical circuit with two superconductors, components that can conduct a current without any electrical resistance.

They separated these with a thin layer of material – called a Josephson junction – that did not conduct any current at all.

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In this experiment, they showed that they could control and investigate a phenomenon in which all the charged particles in the superconductor behave in unison, as if they are a single 'particle' that fills the entire circuit.

Following this, they were able to demonstrate that such a particle could be made to behave simulating the flow of electricity even without voltage, a prerequisite for the flow of current.

John Clarke was a professor at the University of California, Berkeley, in the U.S., where he had moved after completing his doctoral degree at the University of Cambridge, U.K., in 1968. At UC Berkeley he built up his research group and specialised in exploring a range of phenomena using superconductors and the Josephson junction. By the mid-1980s, Michel Devoret had joined Clarke's research group, after receiving his doctorate in Paris. This group also included the doctoral student John Martinis. Together, they took on the challenge of demonstrating macroscopic quantum tunnelling.

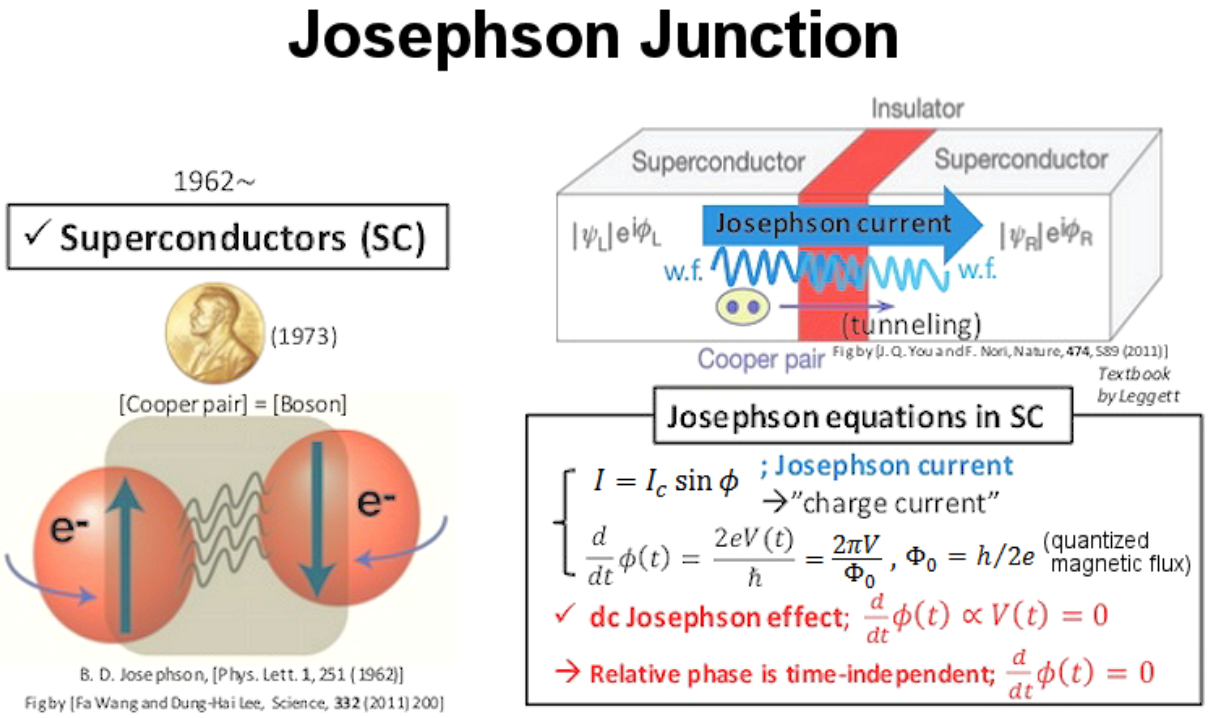
Because quantum states are sensitive to the slightest disturbance, vast amounts of care and precision were necessary to screen the experimental set-up from all the interference that could affect it. They succeeded in refining and measuring all the properties of their electrical circuit, allowing them to understand it in detail. The trio will equally share the prize of 11 million Swedish kroner, or about ₹1 crore.

"It is wonderful to be able to celebrate the way that century-old quantum mechanics continually offers new surprises. It is also enormously useful, as quantum mechanics is the foundation of all digital technology," said Olle Eriksson, Chair of the Nobel Committee for Physics.

20. What are quantum mechanical effects?

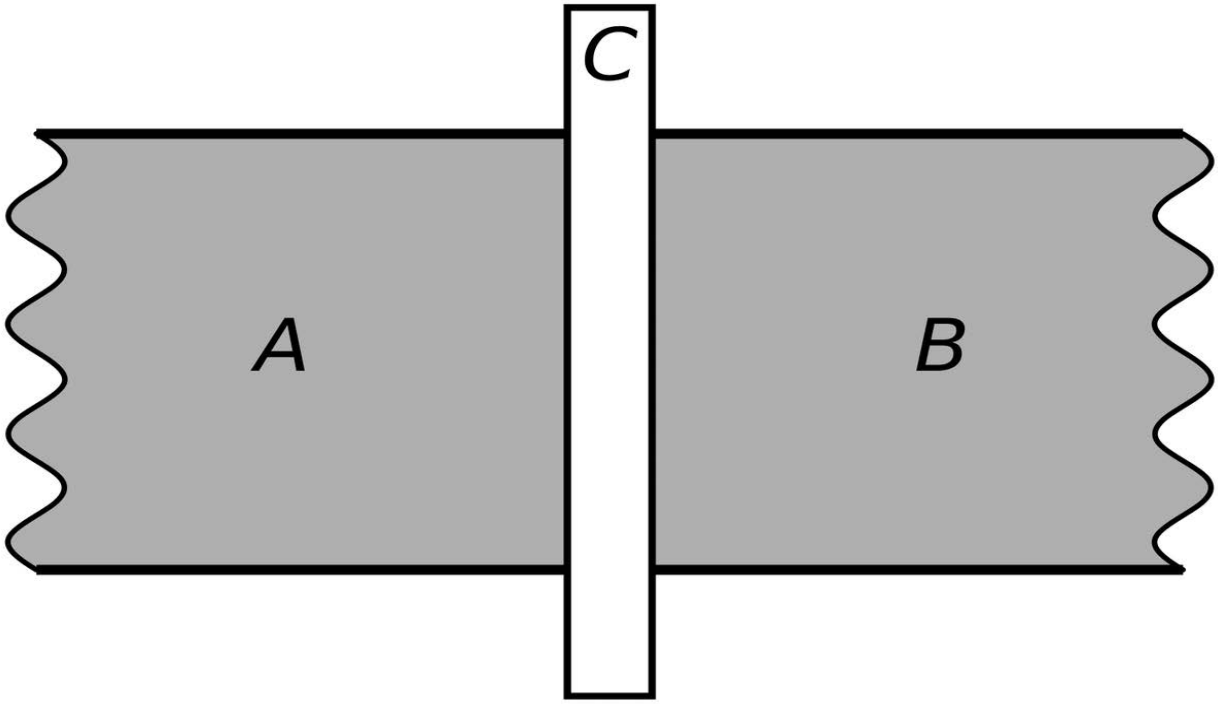
- **Quantum effects** are generally observable in one or **very few small particles – atoms, photons – at a time**, where these particles don't follow the **classical laws of physics.**
- For example, **a particle can cross a physical barrier (tunneling), exist in different locations at once (superposition), or influence the behaviour of another atom it had once interacted with, even if they are far apart in the moment (entanglement, work on which won the 2022 Physics Nobel).**
- **Quantum mechanics gets its name from another property shown by such particles, which is energy existing in quanta.**
- Basically, when **we start increasing an atom's energy, it may not go from say 5 joules to 6 joules.**
- It will **jump to the next band, or quanta, of energy available to it, whatever that may be.**
    - Usually, **such properties can be observed only in microscopic particles.**
- It is this **limitation that the Nobel winners' work crossed.**
- **"The laureates used a series of experiments to demonstrate that the bizarre properties of the quantum world can be made concrete in a system big enough to be held in the hand,".**
- Specifically, their **"superconducting electrical system could tunnel from one state to another, as if it were passing straight through a wall. They also showed that the system absorbed and emitted energy in doses of specific sizes, just as predicted by quantum mechanics."**

21. What is a Josephson junction?



- The **fundamental unit of the award-winning experiments the trio conducted is a device called a Josephson junction.**
- Here, **two superconductors are separated by a very thin insulator**.
- The trio wanted to know if a **parameter of the circuit as a whole, in this case the junction's phase difference, could behave like a single quantum particle.**
- They came away from their **experiments with a resounding 'yes', by observing both macroscopic quantum mechanical tunnelling and discrete energy levels in the circuit.**
- In a superconductor, **many electrons pair up and move without resistance.**
- In a **Josephson junction, the relevant variable is the phase difference of the superconducting order parameter.**
- Put differently, the **superconducting order** parameter is a macroscopic variable that trillions of **electron pairs in the material share and which describes the state the system is in.**

- Theory predicts that the current through the **junction depends on the value of the parameter**, and that it **evolves in time according to the voltage across the junction.**
- When the s**cientists sent a current through the Josephson junction**, they found that if it was small enough, **the flow of paired electrons was stalled and the circuit produced no voltage.**
- In classical physics, this state would never change: **the electrons' flow would remain blocked.**
- In the quantum world, **the current has a small chance of suddenly tunnelling out of the trap and flowing freely on the other side, creating a measurable voltage.**



A schematic illustration of a single Josephson junction. A and B are two superconductors; C is an ultrathin insulator.

22. Why was the circuit fragile?

- In the early **1980s, several groups searched for this tunnelling by varying the current** and recording the value at which the **junction produced a voltage.**

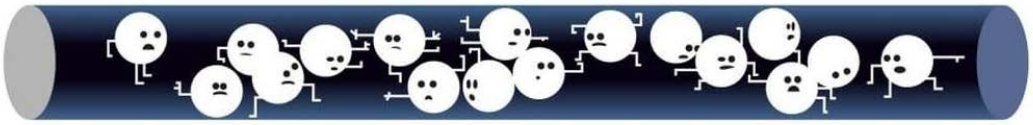
- If the electron pairs were simply escaping to the **other side due to thermal fluctuations** – akin to being heated enough to jump across the mountain – cooling the device ought to steadily increase the amount of current required to produce a voltage.
- On the other hand, **if the electron pairs were tunnelling through, the rate of crossing over would eventually stop changing with temperature.**
- Simple though the setup was, **the challenge was in keeping stray microwave radiation** from affecting the circuit and producing data consistent with the temperature-independent behaviour.
- So the **experimenters needed to reduce and characterise environmental noise with great care.**
- The Berkeley team led by **Clarke, working with Devoret and Martinis, solved this problem by redesigning their setup so stray signals couldn't interfere.**
- They used special filters and shielding **to block unwanted microwaves and kept every part of the experiment extremely cold and stable.**
- Then they sent in faint yet **precisely tuned microwave pulses to gently test how the circuit responded**, allowing them to measure its electrical properties accurately.
- When they **finally cooled the system to very low temperatures, they saw that its behaviour matched the exact patterns predicted by quantum tunnelling theory.**

23. How did the circuit show quantum effects?

- The researchers also wanted to find out if the **circuit's trapped state behaved like a quantum system** with distinct energy steps – **a hallmark of a quantum state, instead of a smooth range.**
- They shone **microwaves of different frequencies onto the junction while adjusting the current.**

- When the **frequency exactly matched the gap between two allowed energy level**s, the circuit suddenly escaped more easily from its **trapp**ed state.
- The **higher the level, the faster this escape happened.**
- These patterns showed that the **circuit's overall state could only receive or emit fixed packets of energy**, which is also how a single particle following the rules of quantum mechanics would behave.
- In short, **the circuit as a whole behaved like an atom.**
- Putting together, the results revealed two facts.
  - First, **a macroscopic electrical circuit that you could see with the naked eye could display quantum behaviour when sufficiently isolated from its environment.**
  - Second, **the relevant macroscopic coordinate in that circuit could be understood using the standard tools of quantum mechanics.**
- These experiments revealed a practical method for manipulating and detecting macroscopic quantum states—**by applying a bias current, using weak microwaves, and ensuring strong protection from external radiation.**
- This approach served as a blueprint for **achieving reliable quantum measurements in solid-state systems.**
- Subsequent work in the **1990s and 2000s extended these ideas, developing superconducting qubits, embedding them in microwave resonators, and improving their coherence (i.e. their ability to maintain their quantum states without them being destroyed by noise).**

24. What happens inside a superconductor?



1 In a normal conductor, the electrons jostle with each other and with the material.

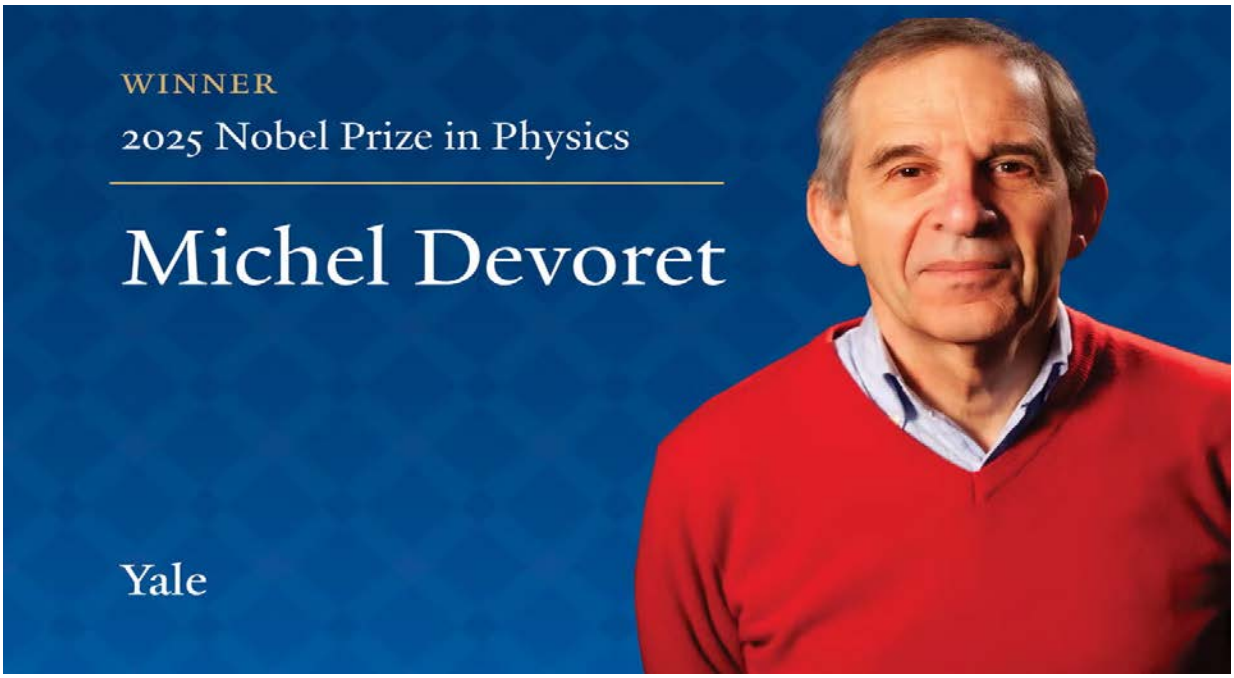
2 When a material becomes a superconductor, the electrons join up as pairs, *Cooper pairs*, and form a current where there is no resistance. The gap in the illustration marks the Josephson junction.

3 Cooper pairs can behave as if they were all a single particle that fills the entire electrical circuit. Quantum mechanics describes this collective state using a shared *wave function*. The properties of this wave function play the leading role in the laureates' experiment.

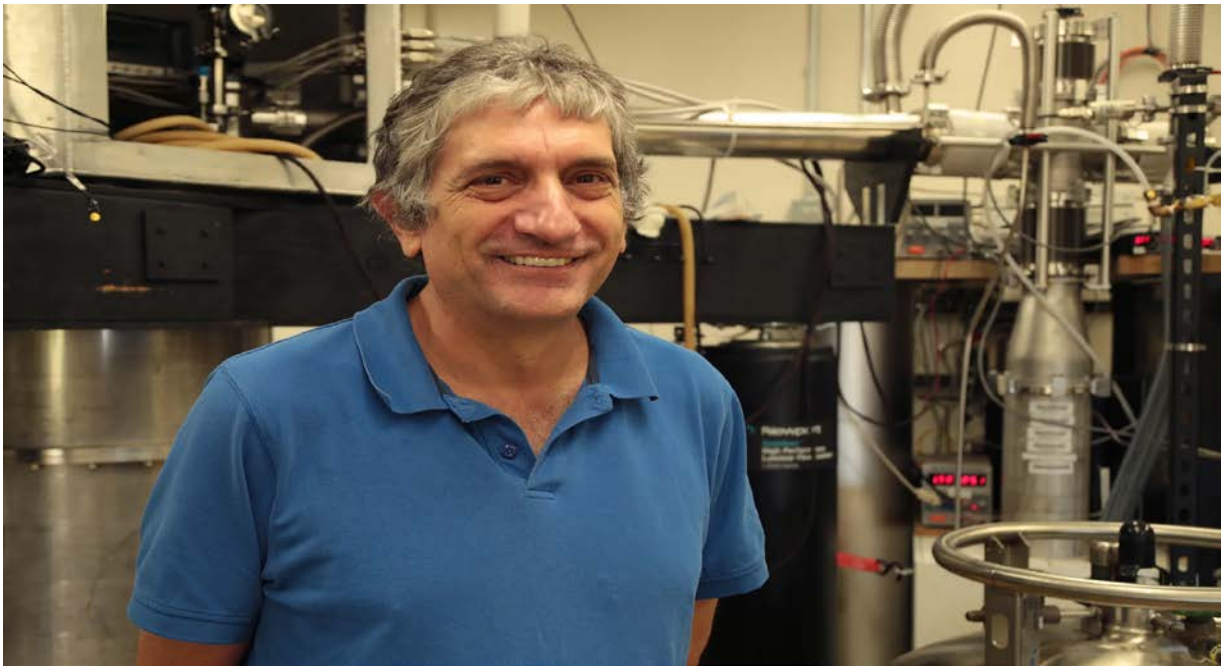
25. Where did the three physics laureates work?

- **John Clarke was born in 1942 in Cambridge, UK.**
  - He is a **Professor at University of California, Berkeley, USA**

- **Michel Devoret was born in 1953 in Paris, France.**
  - He is a **Professor at Yale University, New Haven, and University of California, Santa Barbara, USA.**



- **Martinis was born in 1958.**
  - He is **Professor at University of California, Santa Barbara, USA.**



26. Who was awarded 2025 nobel peace prize?

- The **Nobel Peace Prize for 2025 was awarded to "a brave and committed champion of peace – to a woman who keeps the flame of democracy burning amid a growing darkness".**
- **Maria Corina Machado** was awarded the prize for her **"tireless work promoting democratic rights for the people of Venezuela and for her struggle to achieve a just and peaceful transition from dictatorship to democracy".**
- As the leader of **Venezuela's democracy movement**,she has emerged as one of the m**ost extraordinary examples of civilian courage in Latin America**, according to the **Norwegian Nobel Committee, unifying a once deeply divided political opposition** around the demand for free elections and representative government.
- Her recognition comes at a c**ritical moment for world peace and democracy.**
- This was top of mind at the **beginning of the year when the Global Risks Report 2025** identified state-based armed conflict as the '**top current risk' globally, with 23% of respondents ranking it as 'most likely to present a material crisis in 2025'.**

27. Who is Nobel Peace laureate Maria Corina Machado?

- **Maria Corina Machado, 58**, was born in Caracas, Venezuela, on **October 7, 1967.**
- She is an **industrial engineer by training, and her father was a prominent businessman in Venezuela's steel industry.**
- Her **upper-class roots have been criticised by Venezuela's governing socialist party.**
- Machado won a **resounding victory in the opposition's primary election in 2023** and her **rallies attracted large crowds**, but a ban from holding public office prevented her from running for president against **Nicolas Maduro in an election in 2024, and she went into hiding.**
- The country's **electoral authority and top court say Maduro** won the election, though they have **never published detailed tallies.**
- **Machado** emerged from hiding to make a brief appearance during a protest before **Maduro's inauguration in January. She was briefly arrested and then freed**.
- **Machado advocates** for **liberal economic reforms**, including the privatisation of state-owned enterprises such as **PDVSA, Venezuela's oil company**.
- She also supports the **creation of welfare programs aimed at aiding the country's poorest.**
- Machado is isolated in **Venezeula as nearly all of her senior advisers** have been detained or forced to leave the country.
- Machado has accused **Maduro's administration of operating as a "criminal mafia".**

28. Why Nobel Peace Prize Winner Maria Corina Machado is facing criticism?

- **A controversy has surfaced after Venezuelan democracy activist Maria Corina Machado** was awarded the **Nobel Peace Prize 2025.**
- Critics pointed out that she supported **Israel and its bombing of Gaza** and that she had also **called for foreign intervention to overthrow the government in her country.**
- **Machado** is a key figure in **Venezuela's pro-democracy movement** who has emerged as a powerful symbol of civilian courage in recent years.
- **The Nobel Prize Committee** announced her as the **Peace Laureate** yesterday for her work in promoting democracy and **fighting dictatorship in Venezuela.**
- **Within hours, the announcement drew criticism from the White House for "placing politics over peace"** after a failed campaign to portray **President Donald Trump** as a **global peacemaker who stopped half a dozen conflicts around the world.**

- Machado later dedicated her **Nobel to Trump, and the US President said he was happy for her.**

29. Why Machado got Nobel prize?

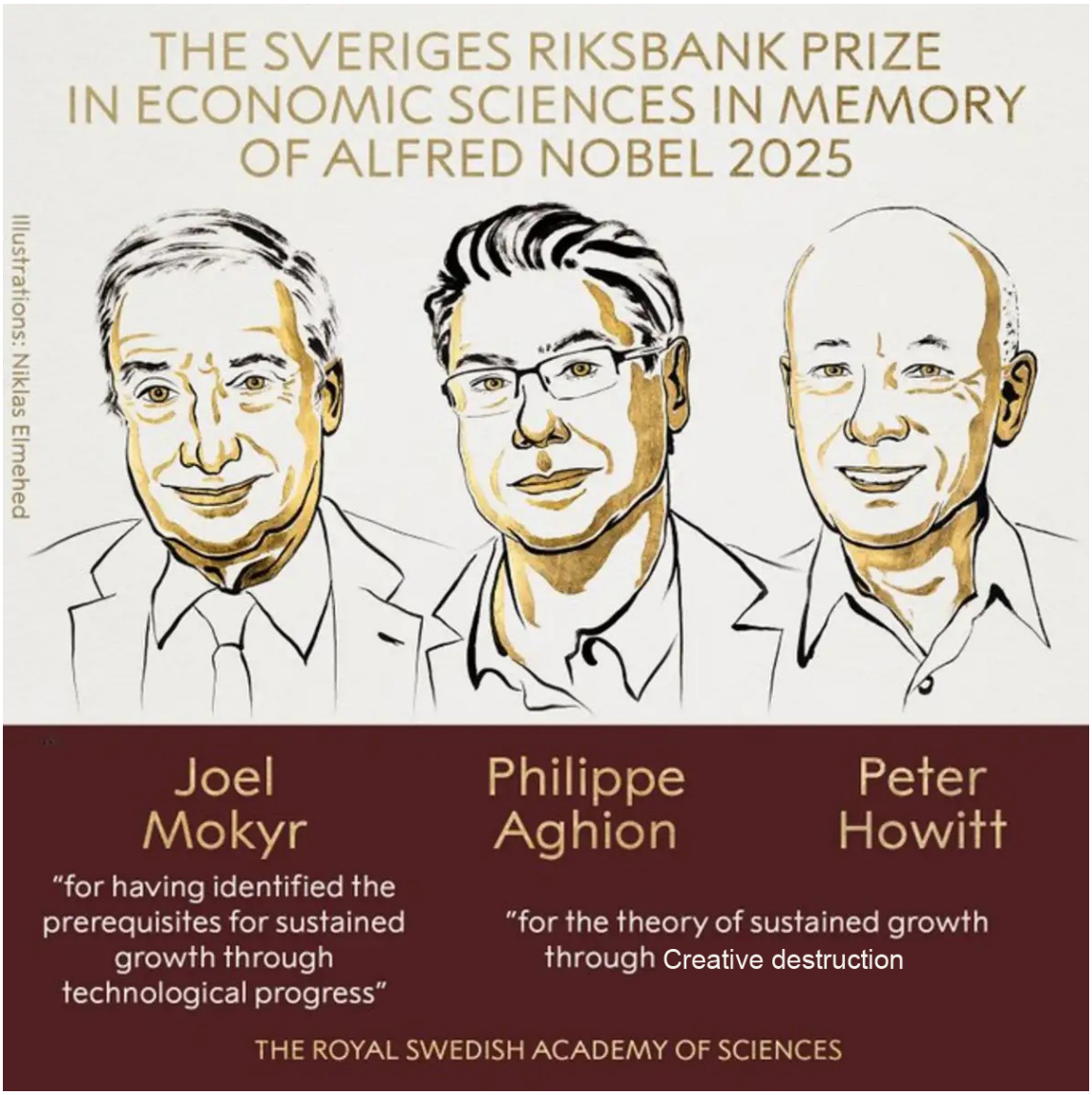
- The **Nobel Prize Committee hailed Machado as a "champion of peace"** who has kept the **flame of democracy burning in Venezuela amid growing darkness.**
- **Jorgen Watne Frydnes, the committee's chair, called her a "key, unifying figure in a political opposition"** in Venezuela that was once divided.
- The **Peace laureate** has shown that the **tools of democracy are also the tools of peace**, the Committee said, **praising Machado for embodying the hope of a different future, one where the fundamental rights of citizens are protected, and their voices are heard.**
- "In the past year, **Machado has been forced to live in hiding. Despite serious threats against her life, she has remained in the country, a choice that has inspired millions. When authoritarians seize power, it is crucial to recognise courageous defenders of freedom who rise and resist,"Jorgen Watne Frydnes said.**

30. Who are the winners of Economics nobel prize and why were they awarded?

- **Joel Mokyr was born in 1946 in Leiden**, the **Netherlands.**
  - He completed his **PhD in 1974 from Yale University** in the **U.S., and is currently a professor at Northwestern University.**
  - According to the **award citation, he won the prize "for having identified the prerequisites for sustained growth through technological progress".**
- **Philippe Aghion was born in 1956 in Paris, France.**

- He completed his **PhD in 1987 from Harvard University and is currently a professor at Collège de France and INSEAD, Paris, France and The London School of Economics and Political Science, U.K.**

- **Peter Howitt was born 1946 in Canada** and completed his **PhD in 1973 from Northwestern University.**
  - He is currently a **professor at Brown University in the U.S.**
  - **Mr. Aghion and Mr. Howitt jointly** won the other half of the award **"for the theory of sustained growth through creative destruction," the award citation said.**



31. What was Joel Mokyr's work in Economics?

- To **understand the work of all three economists**, one must first understand the fact that **global growth has been unusually sustained over the last 200 years**, following centuries of **stagnation.**
- The **work of all three economists, in different ways, tries to answer what happened in the last two centuries that set them apart.**
- This also **creates a model of sorts for sustained growth into the future as well.**
- Through his research in **economic history, Mr. Mokyr showed that a continual flow of "useful knowledge" is necessary for sustained growth.**
- This useful knowledge, **he theorised, has two parts: propositional knowledge and prescriptive knowledge.**
  - **Propositional knowledge basically has to do with looking at the natural world and figuring out why something works.**
  - **Prescriptive knowledge refers to actual practical instructions, drawings or recipes that describe what is necessary for something to work — like an instruction manual.**
- He argued that, prior to the **Industrial Revolution, the world's leading innovators had a good command of propositional knowledge.**
- That is, they had **strong theories, after observing the world, of why things worked.**
- This **propositional knowledge, however, did not rest on a bedrock of prescriptive knowledge.**
- Without the latter, it **became next to impossible to build upon existing knowledge.**
- This changed in the **16th and 17th centuries, Mr. Mokyr** argued.

- Scientists began **include precise measurement methods and controlled experiments in their work, and began to insist that results be reproducible.**
- This **led to improved feedback between propositional and prescriptive knowledge.**
- Some **examples of how this led to "useful knowledge"** was how the steam engine was continuously improved thanks to **insights gained around that time into atmospheric pressure and vacuums,** and also advances made in **steel production due to a greater understanding of how oxygen reduces the carbon content of molten pig iron.**

32. What are the implications on policy from Mokyr's work?

- The policy prescription of **Mr. Mokyr's research was twofold.**
- The first was that new **ideas would become reality only if practical, technical and commercial knowledge was abundantly available.** Without these, he argued that even **brilliant ideas such as Leonardo da Vinci's helicopter designs would remain on the drawing board, as they indeed did.**

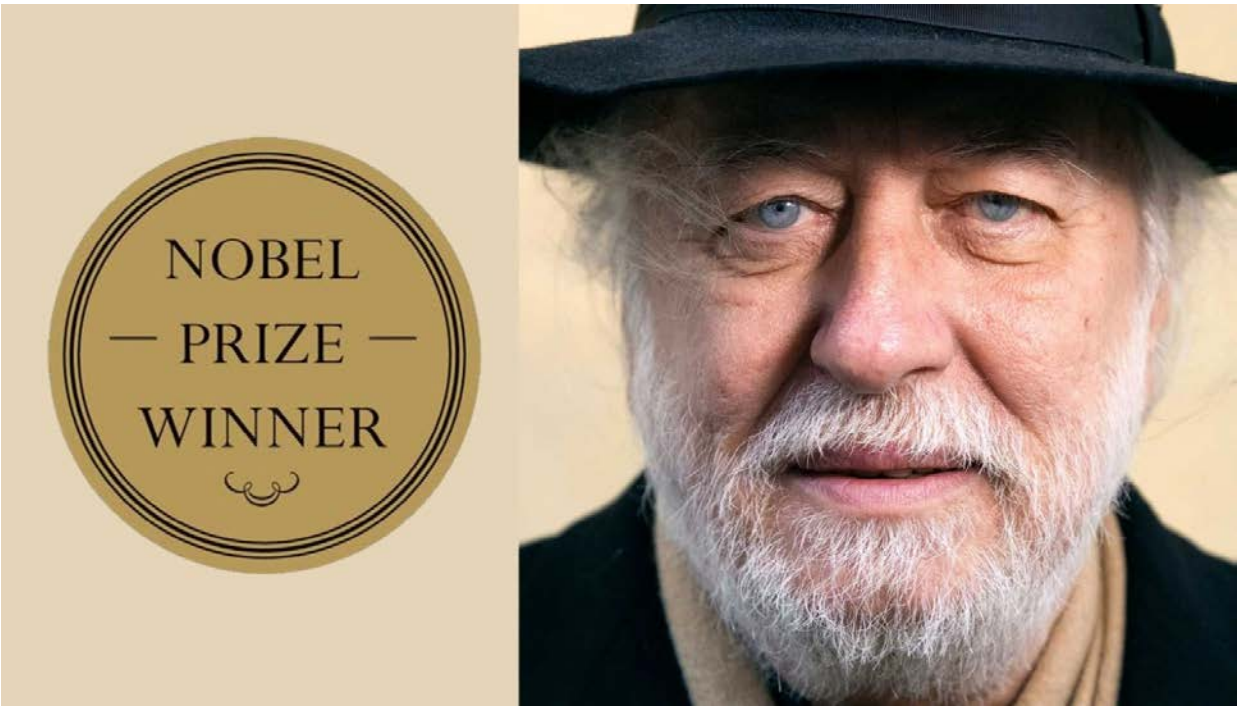
- He argued that **sustained growth first took place in Britain** because it was home to many **skilled artisans and engineers who were able to transform ideas into practical, commercial products, which was vital in achieving sustained growth.**
- The policy implication from this is **that governments must invest heavily in skilling if they want sustained growth.**
- The **other factor — and policy prescription — for sustained growth, according to Mr. Mokyr, was that society should be open to change.**
- **Innovation invariably creates winners, but it also creates losers as new technologies replace existing ones.**
- This can often lead to **resistance to change from established interest groups.**

33. What was the work of Philippe Aghion and Peter Howitt?

- These two economists took this idea of **"creative destruction" — where innovation leads to gains, but also the destruction of the incumbents** — and created a **mathematical model to capture it.**
- **They showed, through maths, how technological advancement leads to sustained growth.**
- The basic assumption is that **economies include companies** that do research and development to **create a product that they can patent**, thereby creating a monopoly for them and putting them at the top of the **chain.**
- However, a **patent can't stop another company from also investing in R&D and coming up with a new product.**
- If that **new product is better, it will replace the incumbent and the profits will now flow to the new company.**

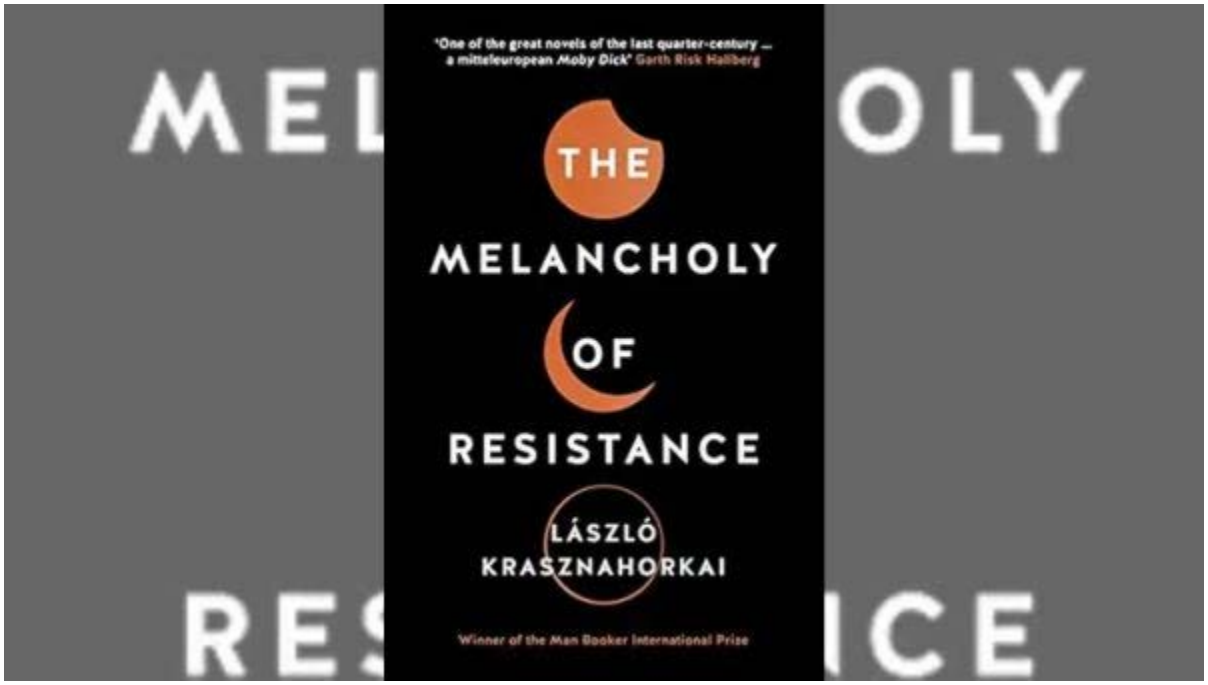
- The model developed by **Mr. Aghion and Mr. Howitt** can be used to analyse whether there is an **optimal volume of R&D, and therefore economic growth in a free market scenario where there is no political interference.**
- They found that there were **two competing trends that made it difficult to arrive at an answer.**

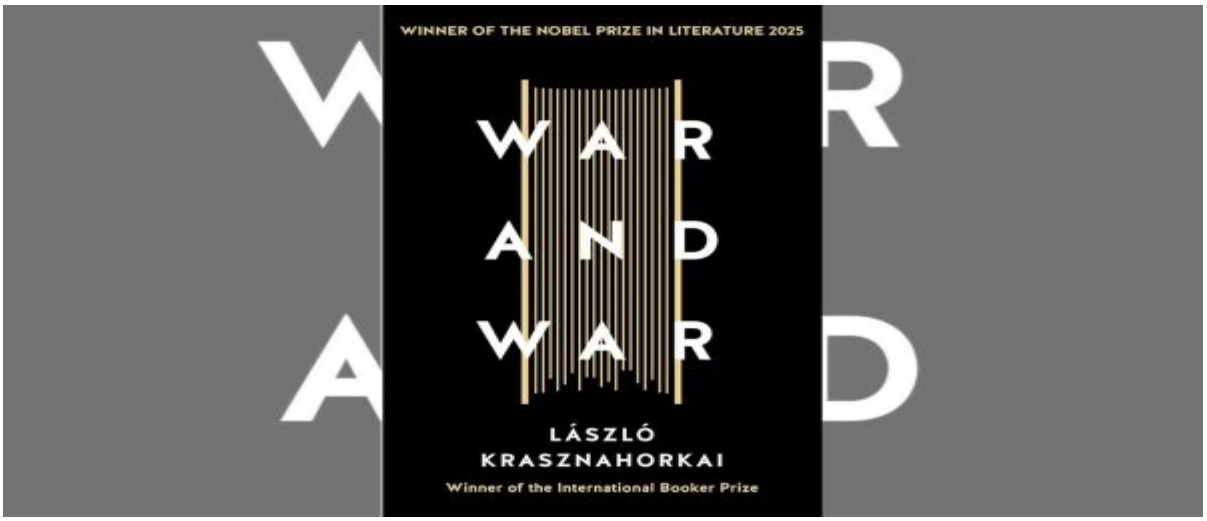
34. Who is the nobel prize winner for literature?



- The **Royal Swedish Academy of Sciences** has awarded the **2025 Nobel Prize in literature to Hungarian novelist** and screenwriter **Laszlo Krasznahorkai.**
- The Nobel Prize in Literature for 2025 is awarded to **László Krasznahorkai,"for his compelling and visionary oeuvre that, in the midst of apocalyptic terror, reaffirms the power of art".**
- Born in the small **southeastern Hungarian town of Gyula, Krasznahorkai** draws inspiration in his writing from his experiences under **communism** and the extensive travels he undertook after **first moving abroad in 1987 to West Berlin** for a fellowship.

- His novels, short stories and essays are best known in Germany, where he lived for long periods, and Hungary, where he is considered by many as the country's most important living author.
- **Several of Krasznahorkai's works,** including his debut, Satantango, and The Melancholy of Resistance, were turned into films by Hungarian director Bela Tarr.




WINNER OF THE NOBEL PRIZE IN LITERATURE 2025
WAR AND WAR
LÁSZLÓ KRASZNAHORKAI
Winner of the International Booker Prize


SEIOBO THERE
LÁSZLÓ KRASZNAHORKAI
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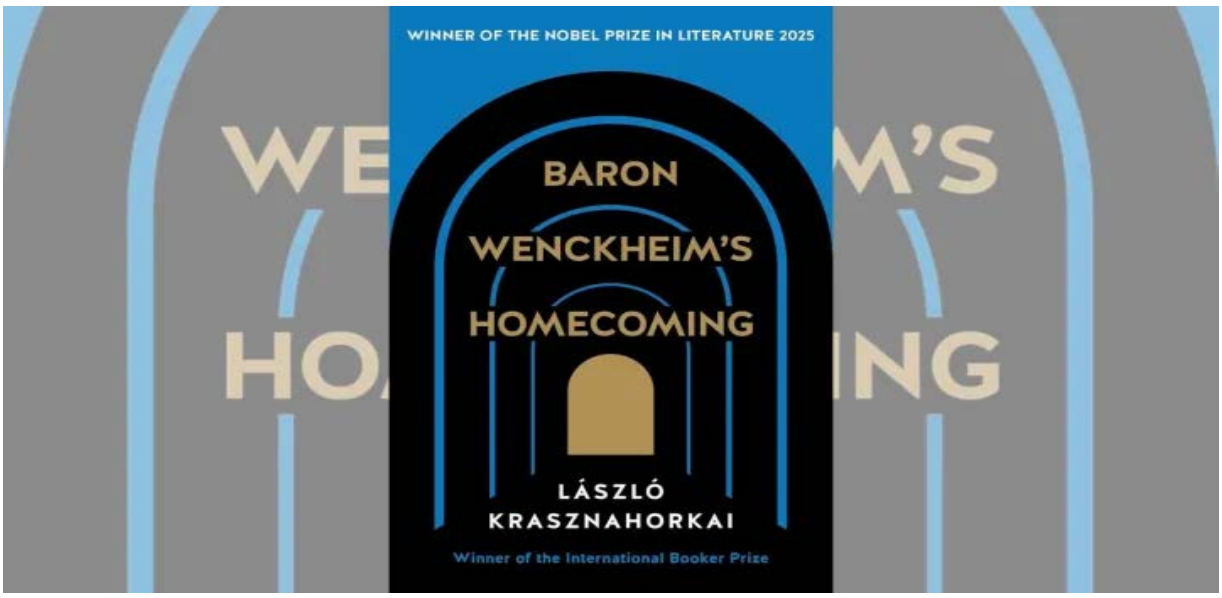
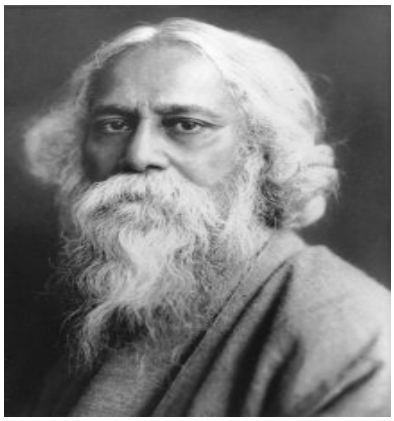

WINNER OF THE NOBEL PRIZE IN LITERATURE 2025
BARON WENCKHEIM'S HOMECOMING
LÁSZLÓ KRASZNAHORKAI
Winner of the International Booker Prize

35. How many people can share the same Nobel Prize?

- **A Nobel Prize** can be **shared by up to three individuals**, or in the case of the **peace prize, it can also be awarded to an organization.**
- The rule that a prize can only be awarded to three people comes from the **statutes of the Nobel Foundation,** which is **responsible for fulfilling the intentions of Nobel's will**.
- It specifically states that in **no case may a prize amount be divided between more than three persons**.

36. Enlist the Nobel Prize laureates from India?

Nobel Prize winners	Contributions
Rabindranath Tagore (1913) - Literature 	• **Rabindranath Tagore** was **conferred with the Nobel Prize** in the category of **literacy in 1913** for his profoundly sensitive, **fresh and beautiful verse.** • Often called **Bard of Bengal and Gurudev**, **Tagore is one of India's most dignified figures**. • Rabindranath Tagore was the **first Indian to be awarded the Nobel Prize.**
C. V. Raman (1930) - Physics 	• **Sir Chandrashekhar Venkata Raman** or CV Raman is recognised for the Nobel **Prize in 1930** in the field of Physics for his **work on the scattering of light** and for the discovery of the **effect named after him**. • His discovery is **also referred to as the "Raman Effect"**. • This discovery **transformed spectroscopy and has important implications in physics and chemistry**.

	• **C VRaman** was the **first Asian and non-white person to be awarded the Nobel Prize in Science.** • His findings paved the way for advances in **quantum physics and molecular structure analysis.**
Har Gobind Khorana (1968) - Medicine 	• **Dr. Har Govind Khurana** was awarded the **Nobel Prize in the field of Physiology or Medicine in 1968** along **with Marshall W. Nirenberg** and **Robert W. Holle**y for their interpretation of the **genetic code** and its f**unction in protein synthesis**. • His research work related to the **synthesis of functional genes outside the living organism.** • **H Khorana's research** contributed to the understanding of how **nucleotides in DNA determine amino acid sequences in proteins, which was a fundamental discovery in molecular biology.**
Mother Teresa (1979) - Peace 	• **Mother Teresa was the first Indian woman** to be conferred with the **Nobel Prize in the category of Peace in 1979**. • She was born in the **Republic of Macedonia.** • At the age of 19, **she moved to India** and spent the **rest of her life in India as a Roman Catholic nun** and as a missionary **serving the "poorest of the poor" in slums** in the city.

	• Her humanitarian work led to the establishment of **Missionaries of Charity.**
Subrahmanyan Chandrasekhar (1983) - Physics 	• **Subrahmanyam Chandrasekhar** was awarded the **Nobel Prize in the field of Physics in 1983** for his theoretical studies of the **physical processes of importance to the structure and evolution of the stars**. • He is an **Indo-American mathematician.** • His **research contributed** to the discovery of the **Chandrasekhar Limit, which determines the maximum mass of a stable white dwarf star (about 1.4 times that of the Sun).** • This research was **critical in understanding star evolution, particularly black hole development.** • Born in India, he later became a **United States citizen and made substantial contributions to astrophysics throughout his career.**
Amartya Sen (1998) - Economic Sciences 	• **Amartya Sen was awarded the Nobel Prize in 1998** in the field of **Economic Sciences** for his contributions **to welfare economics**. • He was born in **Manikganj (British India).** • He **studied economics and taught the subjec**t in many reputed institutions in both the **US and the United Kingdom.**

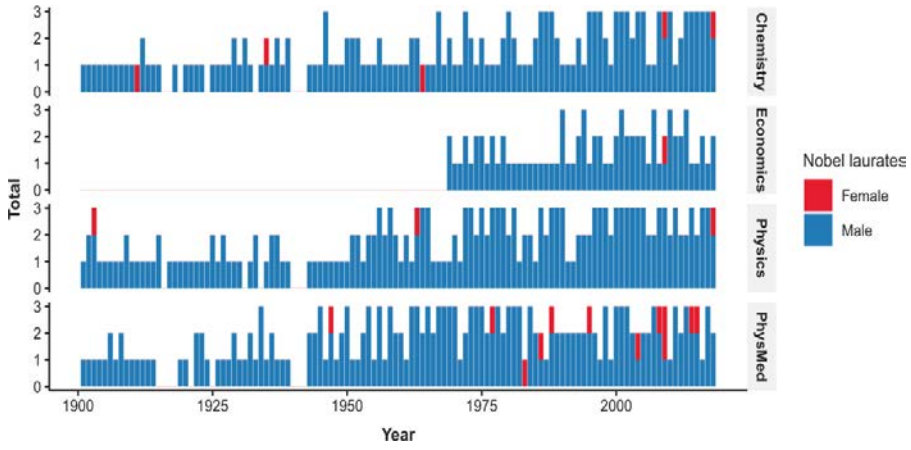
	• His research stressed the **importance of economic policies in eliminating inequality and increasing human potential.** • **Amartya Sen's** seminal work on **famine analysis demonstrated that food shortages are frequently caused by distribution difficulties rather than production limitations.** • His famous book, **Development as Freedom, looks at economic development in terms of human well-being rather than GDP growth.**
Venkatraman Ramakrishnan (2009) - Chemistry 	• **Venkatraman Ramakrishnan was awarded the Nobel Prize in 2009** in the field of **Chemistry for h**is work in studies of the **structure and function of the ribosome.** • The Nobel Prize is given by the **Royal Swedish Academy of Services.** • He was born in India and shared the prize with **Thomas A. Steitz and Ada E. Yonath for their work utilizing X-ray crystallography to map ribosomal structures at the atomic level.** • His discoveries have **substantially benefited molecular biology and medicine, particularly our understanding of how medicines target bacterial ribosomes.** • Ramakrishnan later served as **President of the Royal Society (2015-2020).**

Kailash Satyarthi (2014) - Peace 	• **Kailash Satyarthi** was born in Madhya Pradesh and was awarded the **Nobel Prize in 2014 in the field of Peace** for his **struggle against** the **suppression of children and** young people and for the **right of all children to education**. • He is an activist who has dedicated his whole life to **children's rights and education.** • He split the honor with **Malala Yousafzai.** • **Satyarthi** established the **Bachpan Bachao Andolan (Save Childhood Movement)**, which freed thousands of children from slavery and bonded labor. • His initiatives have **influenced global policies on child rights, and he continues to campaign for universal education and the abolition of child labor around the world.**
Abhijit Banerjee (2019) - Economic Sciences 	• **Abhijit Banerjee, born on February 21, 1961, in Mumbai, India**, is an Indian-born American economist who, along with **Esther Duflo and Michael Kremer, won the Nobel Prize in Economic Sciences** in 2019 for their experimental approach to **reducing world poverty.** • **Abhijit Banerjee, who graduated from the University of Calcutta, Jawaharlal Nehru University, and Harvard University** (Ph.D., 1988), co-founded the **Abdul Latif Jameel Poverty Action Lab**

	(J-PAL) at the Massachusetts Institute of Technology in 2003 and is now the **Ford Foundation International Professor of Economics.** • His creative research has **greatly aided our ability to address global poverty through evidence-based policy solutions.**

37. Enlist a few controversies surrounding the Nobel prize?

- The **Nobel Prize has been involved in several controversies**, including:

Controversies	Analysis
Lack of diversity	• **The Nobel Prize**s have been **criticized for their lack of diversity, particularly among women** and **people from outside of Europe and the US.** • For example, **in 2023, Carolyn Bertozzi was the only woman** to win a science prize. • So far, **109 individuals** have won the peace award but **only 18 were women, including Mother Teresa in 1979 and Aung San Suu Kyi in 1991.** 

Political bias	• The **peace and literature awards** have been accused of being politicized, **with some questioning whether winners** are selected based on their work or **their political views.** • For example, **President Barack Obama won the peace prize in 2009**, less than a year after taking office.
Premature understanding of peace	• **The award** has been criticized for its **premature or faulty understanding of peace** or for being politically motivated. For example, **Ethiopia's Prime Minister Abiy Ahmed** won the prize in **2019 for ending the 20-year conflict between Eritrea and Ethiopia** by establishing a **peace agreement.** • However, a **conflict started in northern Ethiopia** in November 2020, and **Abiy has been criticized for human rights violations** and **war crimes** committed by his forces in the **Tigray region.** 
Controversial winners	• **Former US Secretary of State Henry Kissinger** received the **Nobel Peace Prize in 1973** for his **negotiations to end the Vietnam War**. • But Kissinger was also **accused of several war crimes during the Cold War**, including bombings in **Cambodia in 1969 and 1970.**

	
Jocelyn Bell Burnell	• **Burnell discovered pulsars in 1967**, but **only Antony Hewish and Martin Ryle** were awarded the **Nobel Prize for Physics in 1974.**
Adolph Hitler	• **Hitler barred Germans** from **accepting Nobel Prizes** and created the **German National Prize for Art and Science.** 
The European Union, Nobel Peace Prize:2012	• The Nobel peace prize in 2012 was given to the **EU** for over **six decades contribution to the advancement of peace and reconciliation**, democracy and **human rights in Europe.**

	• **However** many complained about the choice, as the **European Union was dealing with several pressing economic problems,** including the **Greek debt crisis,** and because several **European countries make and sell weapons.** 
Mahatma Gandhi (by omission)	• In 2006, the **former director of the Nobel Institute, Geir Lundestad**, said the **greatest omission in the prize's history** was **never awarding** the **peace prize to** the **Indian political activist Mahatma Gandhi.** • According to Lundestad, **Gandhi was shortlisted five times** (**twice before World War II, then in 1946, 1947 and 1948**), but the **committee's Euro-centric viewpoint** and its **failure to appreciate the struggle** for freedom in colonies **kept Gandhi from receiving the award.** ***"Gandhi could do without the Nobel Peace Prize. Whether the Nobel committee can do without Gandhi, is the question,"*** said Lundestad.

	
1994 Nobel peace prize	**Nobel peace prize in 1994** was given to **Palestinian leader Yasser Arafat, Israeli Prime Minister Yitzhak Rabin** and **Israeli Foreign Minister Shimon Peres** for their work on the **Oslo Peace Accords.** • The decision received criticism, not only because the **awards are generally seen to have failed at ending the Israel-Palestine conflict** but because of **Arafat himself**. • Many critics noted that while **Arafat was head of Fatah**, the **PLO (The Palestine Liberation Organization) group engaged in acts of terrorism.** • A member of the committee, **Kare Kristiansen, resigned** over **Arafat's nomination,** and in an article for the **Times of Israel in 2012**, American columnist Jay Nordlinger called Arafat **"the worst man ever to win the Nobel Peace Prize."**

38. Why is the Nobel Peace Prize being watched closely this year?

- The world is **fraught with conflict, including an ongoing genocide in Gaza, a war in Ukraine, and civil wars** and political repression in numerous countries.

- However, the headlines and debates about this **year's Nobel Peace Prize** are rather outsized and focused on **United States President Donald Trump for his relentless self-promotion – at times, claiming to deserve it for "ending seven wars".**
- At the United Nations, Trump told delegates, **"Everyone says that I should get the Nobel Peace Prize."**
- On Tuesday, Trump reiterated that he **"deserved" to win the prize for the possibility of ending an eighth war, Israel's two-year-long war on Gaza.**
- However, experts have noted that his **chances are slim.**
- The **Norwegian Nobel Committee typically focuses on the durability of peace, the promotion of international fraternity and the quiet work of institutions that strengthen those goals, experts argued.**
- Among **this year's nominations for Trump** were those from **Israeli Prime Minister Benjamin Netanyahu and Pakistan's government although both were made after the deadline for the 2025 award.**
- One of the N**obel-awarding bodies** has also warned that academic freedom is under **threat from the political interference by the Trump administration.**
- **Ylva Engstrom, vice president of the Royal Swedish Academy of Sciences**, said the **Trump administration's changes were reckless.**
  - **"I think in both the short and long term, it can have devastating effects,".**
  - **"Academic freedom is one of the pillars of the democratic system."**
- **Ylva Engstrom** is not herself on any of the three committees **that will award the prizes for chemistry, physics or economics.**

39. What is the relevance of the topic for UPSC CSE?

For Prelims: Nobel Prize, Computational Protein Design, Machine Learning with Artificial Neural Networks,
For Mains: Discovery of microRNA and its role in post-transcriptional gene regulation.

Some previous years prelims questions.

Q. Who among the following discovered heavy water? **(2008)**

(a) Heinrich Hertz
(b) H.C. Urey
(c) G. Mendel
(d) Joseph Priestley

Ans: (b)

Some questions from this year and previous years interview transcripts.

Board Sheel Vardhan sir:

- Who was the Indian who got Nobel in Economics in 2019, what was their contribution.
- What was the controversy related to them?

Board Sanjay Verma sir:

- There was a famous Nobel laureate who was fond of jogging.
- He also spoke of difference between jogging and marathon.
- Do you know his name?

Board Preeti Sudan mam:

- A scientist of Indian origin won the Nobel prize for his work on ribosomes. Can you name him?

- Jennifer Daudna is a Nobel laureate. Can you tell me what has she worked on?
- Can you tell me how crispr-cas9 can help in the development of vaccines?

Board Satyawati mam:

- Why were Esther Duflo and Abhijit Banerjee awarded with the Nobel Prize?
- Is Randomised Control Trials applicable only to medical sciences and not social sciences?

Board Smita Nagaraj mam:

- Name of the person who got Nobel prize both in chemistry and physics.
- Board Smita Nagaraj mam:
- Why did Einstein get the Nobel prize?
- Why not for his earlier work?

Board Satyawati mam:

- What was John Nash famous for?
- Tell me about Nash equilibrium, game theory and the Nobel prize in economics?

Some questions for QUIZ.

Q1. Consider the following Awardees.

1. Mary Brunkow
2. John Jumper
3. Victor Ambros
4. Fred Ramsdell
5. Shimon Sakaguchi

How many of the above scientists have been awarded the Nobel prize for medicine?

(a) Only two
(b) Only three
(c) Only four
(d) All five

Ans: (b)

Q2. FOXP3 gene, recently in the news, is related to which of the following?

(a) Clean Energy
(b) Immune system
(c) Gene technology
(d) Bio weapons

Ans: (b)

Some questions for POLL.

Q1. Do you think that the Nobel prize nomination process is biased?

(a) YES
(b) NO
(c) Can't say.

Q2. Should there be a Nobel Prize for Environmental Protection?

(a) YES
(b) NO
(c) Can't say.

Q3. Do you think that not awarding the Nobel prize to Gandhi was a mistake?

(a) YES
(b) NO
(c) Can't say.

Q4. Do you think Nobel Prizes reflect global diversity fairly?

(a) YES
(b) NO
(c) Can’t say.

Q5. Do you believe Nobel Prizes are always free from political influence?

(a) YES
(b) NO
(c) Can’t say.

■■■■