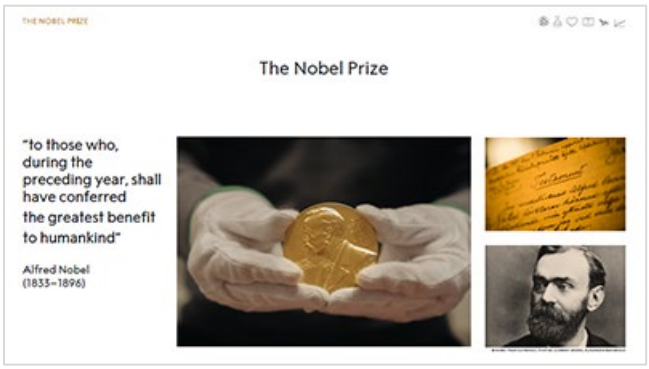
THE NOBEL PRIZE

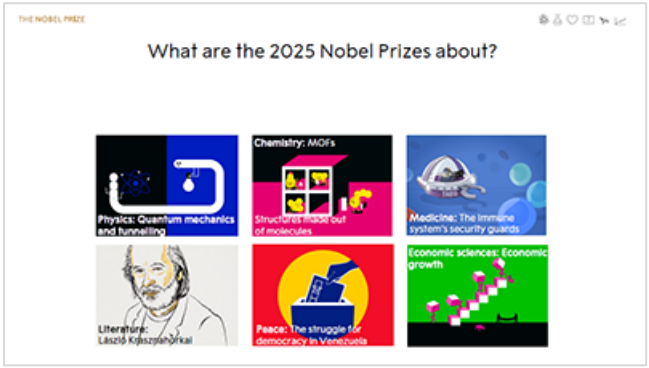
Speaker's manuscript – All 2025 Nobel Prizes

The Nobel Prize



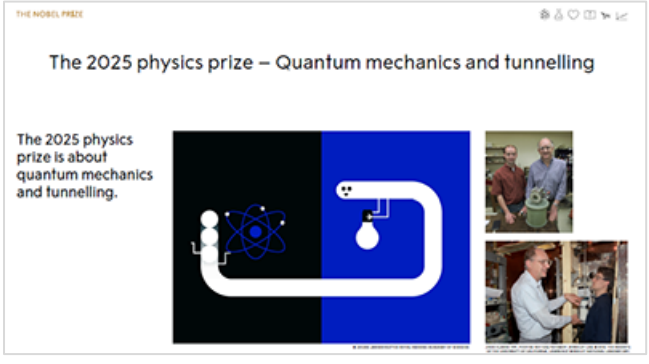
- The Swedish inventor Alfred Nobel died on 10 December 1896. He invented dynamite and became very rich.
- Before he died, he wrote in his will that most of his wealth should be used as a prize to "those who, during the preceding year, shall have conferred the greatest benefit to humankind".
- According to the will, this prize is to be awarded in five categories: physics, chemistry, physiology or medicine, literature and peace.
- The first Nobel Prizes were awarded in 1901.
- The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel was introduced at the end of the 1960s.

The 2025 Nobel Prizes



- The 2025 Nobel Prizes range from the discovery of a previously unknown immune cell, quantum mechanics and tunnelling, new materials known as MOFs, to the writings of László Krasznahorkai, the struggle for democracy in Venezuela and economic growth.

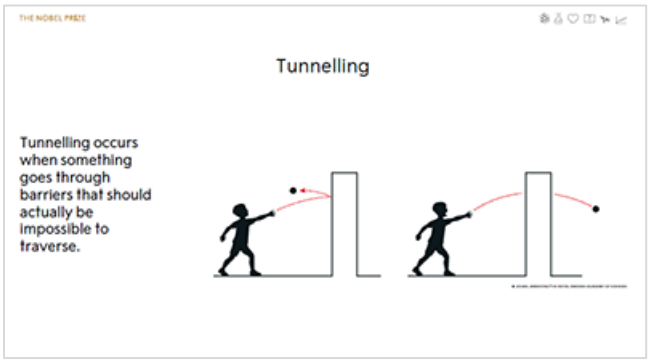
The 2025 physics prize – Quantum mechanics and tunnelling



- The 2025 physics prize is about quantum mechanics. What is that? Well, quantum mechanics is the science used by researchers to describe the small world at the level of atoms and particles.

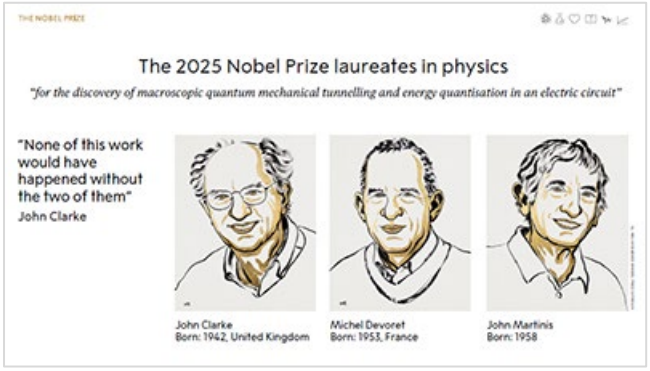
- The laureates are recognised for experiments showing that some very odd things occurring in the world of particles can also happen in our part of reality, more specifically in an electrical circuit. An electrical circuit is something that enables an electrical current to flow, such as a battery, a couple of wires or a bicycle light.

Tunnelling



- If you throw a ball against a wall in our everyday reality, it will always bounce back, right?
- But if we were to exist at the level of atoms and particles, in the world of quantum mechanics, the ball would sometimes go right through the wall.
- This is called tunnelling. It means that barriers that should actually be impossible to pass through may sometimes still be traversed.
- Different physical laws apply inside atoms compared to in our world. This requires a special science, quantum mechanics, to explain how everything works.

The 2025 Nobel Prize laureates in physics



- Here are the 2025 Nobel Prize laureates in physics.
- Through experiments, the laureates showed that tunnelling may occur even in our everyday reality, such as in an electrical circuit that you can see and hold in your hand. Tunnelling allows the current to flow even if there is a barrier in the circuit.
- So, what's the benefit of this? When the laureates made this discovery in the 1970s, no one thought that it would have any practical use.
- These discoveries are important for research, so that we can learn more and better understand our world. The discoveries may also have an impact on the development of quantum computers, which are much more powerful than current computers.
- If you find it difficult to understand quantum mechanics, it's not all that strange. In 1952, a former Nobel Prize laureate in physics, Niels Bohr, in a conversation with two other Nobel Prize laureates said that: "Those who are not shocked when they first come across quantum mechanics cannot possibly have understood it."

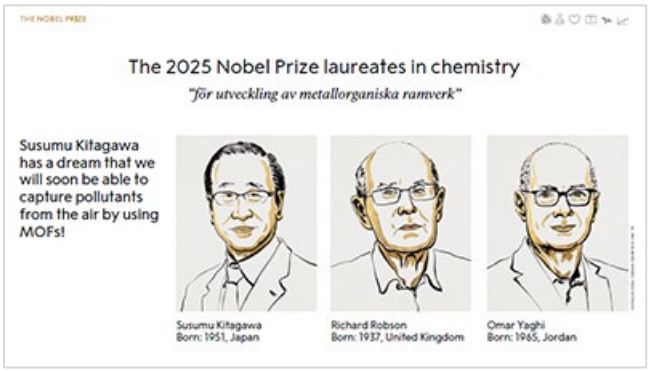
The 2025 chemistry prize
MOFs – Structures made out of molecules

- Did you know that there are materials that can extract water from desert air or capture carbon dioxide from factories?
- The 2025 Nobel Prize laureates in chemistry have developed precisely these kinds of materials, which are called MOFs.
- MOFs are a type of molecular structure with large cavities where other molecules, such as gases, can be stored or move in and out.

A football pitch in a sugar cube

- MOF is an abbreviation for metal–organic framework. These materials are made up of metal ions and organic molecules that form a three-dimensional network.
- A metal is an element with a metallic sheen that also conducts electrical currents. Organic molecules are found in all living things. They are chemical compounds that contain carbon.
- A lot can fit inside the MOFs. One example is a MOF called MOF-5. A small piece of this MOF, not larger than a sugar cube, has an inner surface as big as a football pitch.
- In other words, it is almost like Hermione's handbag in the Harry Potter stories. Despite its small size, it can hold almost anything.
- A very good thing with MOFs is that you can build an almost infinite number of variants. This means that different MOFs can be used to perform different tasks.

The 2025 Nobel Prize laureates in chemistry



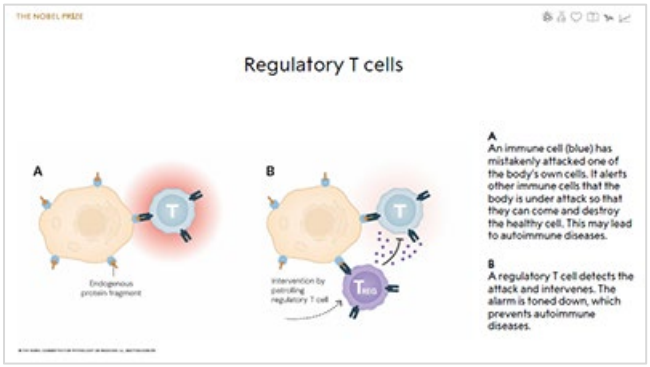
- The history of MOFs began in Australia in 1974. While chemistry teacher Richard Robson was preparing a chemistry lesson, he got an idea. What if it was possible to create new materials out of molecules? Ten years later, he decided to test his idea, and after a few more years, he managed to build the first MOF. But it was unstable and easily fell apart.

- Omar Yaghi showed how to alter and customise MOFs, while Susumu Kitagawa in the late 1990s successfully created MOFs that didn't fall apart and in which the cavities could be filled with gases, which could then be released. His dream is that we will soon be able to capture pollution out of the air!
- MOFs offer previously unimaginable abilities to customise new materials with new features!

The 2025 medicine prize – The immune system's security guards

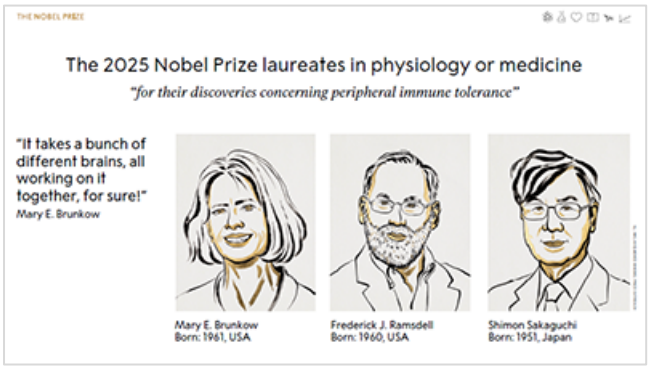
- The 2025 Nobel Prize in Physiology or Medicine recognises discoveries that have increased our understanding of how the immune system works.
- The laureates have discovered a kind of security guard in the immune system, the regulatory T cell (TREG).
- We are every single day exposed to thousands of different viruses, bacteria and other microorganisms trying to invade our bodies. So, how do we stay healthy most of the time? It's because our immune system defends us. Our immune system consists of a variety of immune cells traveling around the body in search of intruders to attack.
- The immune cells must be able to distinguish between the "enemy cells" having entered our body and our own cells so that they do not destroy them.

Regulatory T cells



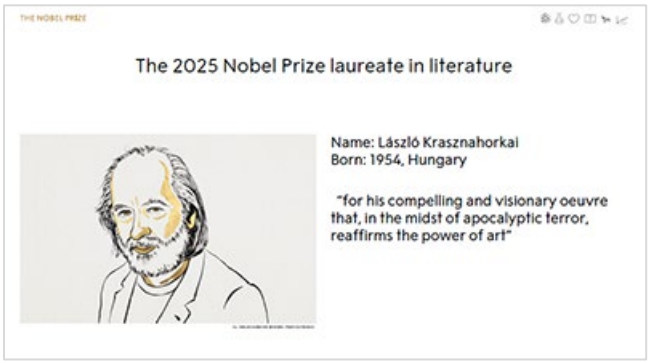
- Sometimes, however, our immune cells make mistakes and attack our own cells. They think that our own cells in tissues and organs are enemies and try to destroy them. The fact that immune cells attack the body's own cells can lead to so-called autoimmune diseases.
- Examples of autoimmune diseases include type 1 diabetes, coeliac disease (gluten intolerance), rheumatoid arthritis or psoriasis.
- This is where the immune system's security guards, the regulatory T cells, come into play. They prevent other immune cells from attacking our own body.

The 2025 Nobel Prize laureates in physiology or medicine



- Finding the regulatory immune cell and understanding what it does took a long time. This work began in the 1980s and continued until the early 2000s.
- Shimon Sakaguchi from Japan was the one who discovered the regulatory T cells.
- The Americans Mary Brunkow and Fred Ramsdell made another important discovery in 2001. They found the explanation for why some mice suffer from autoimmune diseases. These mice have a defect in a gene that prevents them from forming regulatory T cells.
- These discoveries have led to the development of medical treatments for cancer and autoimmune diseases.

The 2025 Nobel Prize laureate in literature – László Krasznahorkai



- The 2025 literature prize is awarded to László Krasznahorkai "for his compelling and visionary oeuvre that, in the midst of apocalyptic terror, reaffirms the power of art". He writes novels, short stories and plays. Many of his books have also been made into movies.
- When he was young, he worked in various jobs, including on a farm. Here, he experienced how little piglets suffered when being castrated. Seeing the animals suffer had a great impact on him, and it was after this experience that he decided to become a writer. He wanted to write about the world and about people's emotions.

About Krasznahorkai's writings

- Krasznahorkai's stories can be dark and gloomy, but many books also include humour.
- The title of one of his books is *The Melancholy of Resistance*.

It is set in a small Hungarian town. One day, a strange circus arrives. They bring a dead whale. This upsets people and triggers various violent events. In the midst of all this darkness, there is also something comical about how people behave.

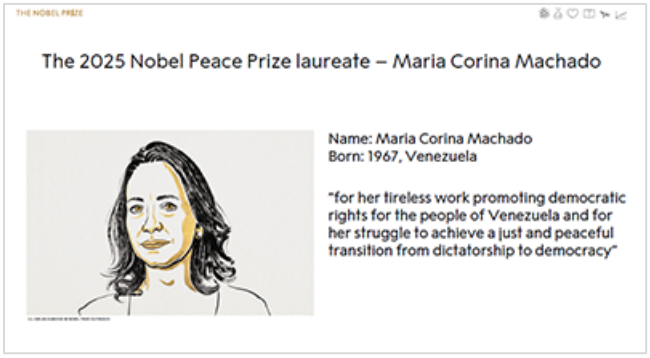
- Something that sets Krasznahorkai apart is that he uses long, winding sentences in his writing. Sometimes, he writes several pages without a single full stop. In fact, one of his books, which is 300 pages long, has only one full stop.
- Krasznahorkai himself has said that he doesn't trust short sentences because people don't speak with full stops but with commas.

A short excerpt from one of his books

- Here is a short excerpt from the novel *Herscht 07769*. This is the book with just a single period. It is set in Germany and is about a man who is worried about everything happening in the world. That is why he starts to write letters to the German chancellor, who is the politician in charge of the government's work. As you can see, there are some commas but no full stops in this short excerpt:

  "... he signed the letter, folded it twice, slipped it into the envelope, and addressed it, but no, he shook his head, it wasn't good, he took the letter out of the envelope, crumpled it up and threw the paper to the ground ..."

The 2025 peace prize – Maria Corina Machado



- Maria Corina Machado is a politician and human rights activist from Venezuela, which is located in South America.
- Maria Corina Machado was awarded the Nobel Peace Prize in 2025 as she has for many years fought to make Venezuela, which is a dictatorship, more free and democratic.

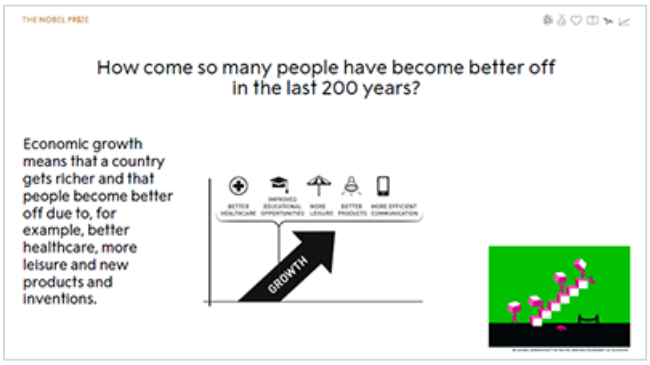
The struggle for democracy in Venezuela

- Venezuela has been ruled by its president, Nicolás Maduro, since 2013.
- The president and his government use violence against people who protest, while politicians who oppose the president are threatened with imprisonment. Many people are poor, and 8 million have left the country.
- In the last presidential election, the president claimed that he had received the most votes, despite the fact that there was a great deal of evidence that his opponent actually won. Maria Corina Machado was not allowed to run in the election at all.
- Today, she is forced to live in hiding as she may otherwise be arrested and imprisoned.

Democracy and peace go hand in hand

- Democracy and peace go hand in hand. In countries where people are oppressed and are not allowed to say what they think, there is a great risk that conflicts and violence will erupt. Furthermore, democratic countries never start wars against each other.
- Maria Corina Machado was very happy and touched when she learned that she had been awarded the Nobel Peace Prize.
- She said that she was one of many people fighting for peace in Venezuela and that the Nobel Prize served as a recognition of the entire Venezuelan people.

The 2025 economic sciences prize – How come so many people have become better off in the last 200 years?

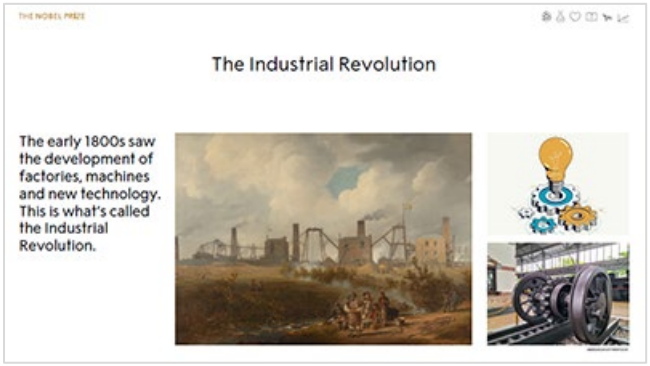


- The Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2025 is about economic growth.

This means that a country gets richer and that people live better lives due to, for example, better healthcare, more leisure and new products and inventions.

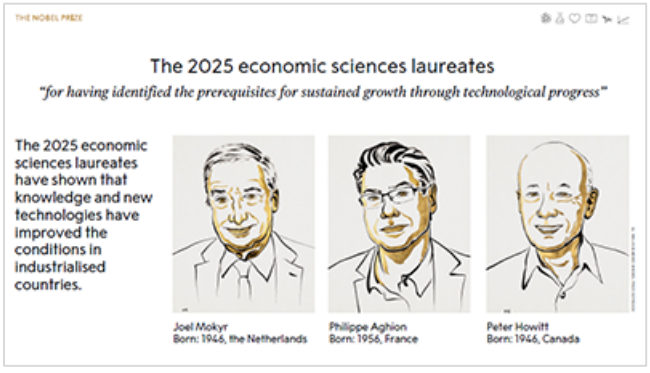
- Did you know that many countries in the industrialised world have had a sustained growth for about 200 years? This means that these countries and their populations have lived increasingly better lives since the early 1800s.
- Why is that? Well, that's exactly the question that the three scholars who were awarded the 2025 economic sciences prize found the answer to.

The Industrial Revolution



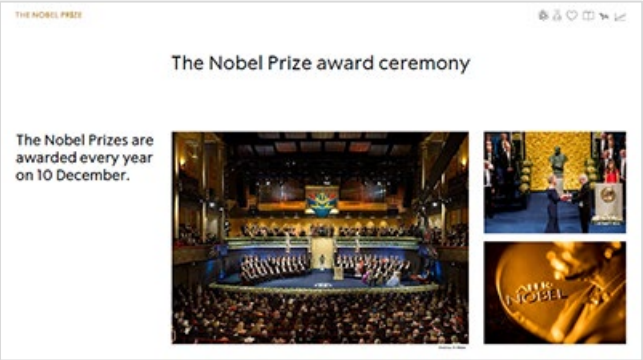
- People's lives did not change all that much for a very long time. Inventions were made, such as the printing press and the windmill, but this did not lead to people becoming better off in the long term.
- The early 1800s saw the development of factories, machines and new technology. This is what's called the Industrial Revolution.
- The economic sciences laureates have shown that people at this time also gained more knowledge – they started to study both how and why things work the way they do. This was important for developing society and enabled people to create more and even better inventions.
- The laureates have also shown that new and better products are constantly developed, which leads to the old products no longer being used. This is good for society because it leads to progress. At the same time, some people lose their jobs when the old products disappear.

The 2025 economic sciences laureates



- Here are the three economic sciences laureates.
- Together, they have shown what is needed to create sustained economic growth, meaning that we live better lives.
- Their research also shows that it's important that society helps people who lose their jobs when a company is closed down because its products have been replaced by better ones.

The Nobel Prize award ceremony



- Alfred Nobel died on 10 December 1896.
- Each prize includes a medal, a diploma, and a large sum of money. In 2025, the prize amount is 11 million Swedish kronor, or about one million dollars.
- The award ceremony is held in Sweden at the Stockholm Concert Hall for all Nobel prizes except the peace prize, which is awarded at City Hall in Oslo, Norway.
- The awarding of the prizes is followed by a festive banquet to celebrate the year's Nobel Prize laureates.