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Erasmus + Project

VR Science Lab

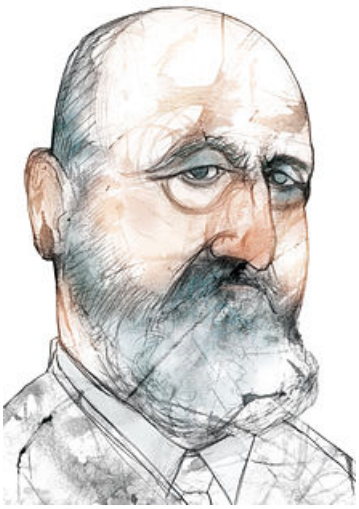
Our Famous Scientists

In this document we present the biographies of the most relevant figures of Spanish science throughout its history. They are the characters that with their scientific work contributed to the impulse and renewal of knowledge. .

Leonardo Torres Quevedo (1852-1936)

Torres was born on 28 December 1852, on the Feast of the Holy Innocents, in Santa Cruz de Iguña, Cantabria, Spain. The family resided for the most part in Bilbao, where Leonardo's father worked as a railway engineer, although they also spent long periods in his mother's family home in the Cantabria's mountain region.

Torres Quevedo demonstrated twice, in 1914 and in 1920, that all of the cogwheel functions of a calculating machine like that of Babbage could be implemented using electromechanical parts. His 1914 analytical machine used a small memory built with electromagnets; his 1920 machine, built to celebrate the 100th anniversary of the invention of the arithmometer, used a typewriter to receive its commands and print its results.



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In 1902, Leonardo Torres Quevedo presented to the Science Academies of Madrid and Paris the project of a new type of dirigible that would solve the serious problem of suspending the gondola by including an internal frame of flexible cables that would give the airship rigidity by way of interior pressure.

In 1905, with the help of Alfredo Kindelán, Torres directed the construction of the first Spanish dirigible in the Army Military Aerostatics Service, created in 1896 and located in Guadalajara. It was completed successfully, and the new airship, the España, made numerous test and exhibition flights. As a result, a collaboration began between Torres and the French company Astra, which managed to buy the patent with a cession of rights extended to all countries except Spain, in order to make possible the construction of the dirigible in its country.

So, in 1911, the construction of dirigibles known as the Astra-Torres airships was begun. Some were acquired by the French and British armies at the beginning of 1913, and were used during the First World War for diverse tasks, principally naval protection and inspection.

In 1918, Torres designed, in collaboration with the engineer Emilio Herrera Linares, a transatlantic dirigible, which was named Hispania, aiming to claim the honor of the first transatlantic flight for Spain. Owing to financial problems, the project was delayed and it was the Britons John Alcock and Arthur Brown who crossed the Atlantic without stop from Newfoundland to Ireland in a Vickers Vimy twin-engine plane, in sixteen hours and twelve minutes

In early 1910, Torres began to construct a chess automaton he dubbed El Ajedrecista (The Chessplayer) that was able to automatically play a king and rook endgame against king from any position, without any human intervention. This device was first publicly demonstrated in Paris in 1914, and is considered the world's first computer game.[5] Mechanical arms moved the pieces in the prototype, but by 1920, electromagnets under the board were employed for this task.

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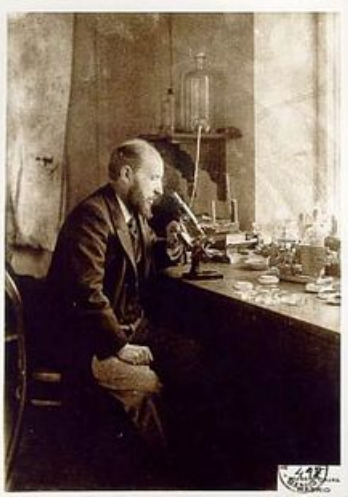
In 1903, Torres presented the Telekino at the Paris Academy of Science, accompanied by a brief, and making an experimental demonstration. In the same year, he obtained a patent in France, Spain, Great Britain, and the United States.

The Telekino consisted of a robot that executed commands transmitted by electromagnetic waves. It constituted the world's second publicly demonstrated apparatus for radio control, after Nikola Tesla's Patented "Teleautomaton", and was a pioneer in the field of remote control

Santiago Ramón y Cajal (1852-1934)



Santiago Ramón y Cajal was a Spanish neuroscientist and pathologist, specializing in neuroanatomy, particularly the histology of the central nervous system. He and Camillo Golgi received the Nobel Prize in Physiology or Medicine in 1906, with Ramón y Cajal thereby becoming the first person of Spanish origin to win a scientific Nobel Prize. His original investigations of the microscopic structure of the brain made him a pioneer of modern neuroscience. Hundreds of his drawings illustrating the delicate arborizations ("tree growing") of brain cells are still in use for educational and training purposes.

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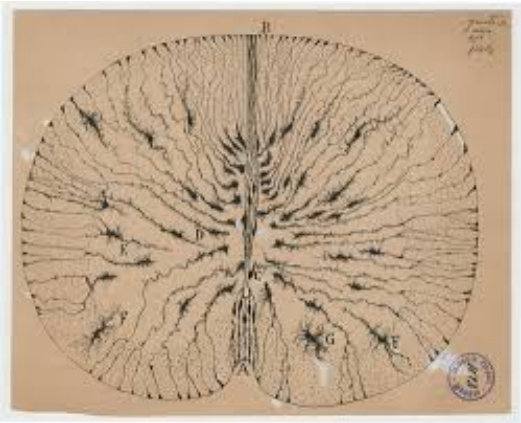
Ramón y Cajal attended the medical school of the University of Zaragoza, where his father was an anatomy teacher. He graduated in 1873, aged 21. After a competitive examination, he served as a medical officer in the Spanish Army. He took part in an expedition to Cuba in 1874 –75, where he contracted malaria and tuberculosis. In order to heal, he visited the Panticosa spa-town in the Pyrenees

Ramón y Cajal made several major contributions to neuroanatomy. He discovered the axonal growth cone, and demonstrated experimentally that the relationship between nerve cells was not continuous, but contiguous. This provided definitive evidence for what Heinrich Waldeyer coined the term neuron theory as opposed to the reticular theory. This is now widely considered the foundation of modern neuroscience.

He was an advocate of the existence of dendritic spines, although he did not recognize them as the site of contact from presynaptic cells. He was a proponent of polarization of nerve cell function and his student, Rafael Lorente de Nó, would continue this study of input-output systems into cable theory and some of the earliest circuit analysis of neural structures.

By producing excellent depictions of neural structures and their connectivity and providing detailed descriptions of cell types he discovered a new type of cell, which was subsequently named after him, the interstitial cell of Cajal (ICC). This cell is found interleaved among neurons embedded within the smooth muscles lining the gut, serving as the generator and pacemaker of the slow waves of contraction which move material along the gastrointestinal tract, mediating neurotransmission from motor neurons to smooth muscle cells.



In his 1894 Croonian Lecture, Ramón y Cajal suggested (in an extended metaphor) that cortical pyramidal cells may become more elaborate with time, as a tree grows and extends its branches.

Ramón y Cajal received many prizes, distinctions, and societal memberships during his scientific career, including honorary doctorates in medicine from Cambridge University and Würzburg University and an honorary doctorate in philosophy from Clark University. The most famous distinction he was awarded was the Nobel Prize in Physiology or Medicine in 1906, together with the Italian scientist Camillo Golgi

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Severo Ochoa de Albornoz (1905-1993)

Severo Ochoa de Albornoz (24 September 1905 – 1 November 1993) was a Spanish physician and biochemist, and joint winner of the 1959 Nobel Prize in Physiology or Medicine with Arthur Kornberg.

Ochoa completed his undergraduate medical degree in the summer of 1929 and developed an interest in going abroad to gain further research experience. His previous creatine and creatinine work led to an invitation to join Otto Meyerhof's laboratory at the Kaiser Wilhelm Institute for Biology in Berlin-Dahlem in 1929. At that time the Institute was a "hot bed" of the rapidly evolving discipline of biochemistry, and thus Ochoa had the experience of meeting and interacting with scientists such as Otto Warburg, Carl Neuberg, Einar Lundsgaard, and Fritz Lipmann in addition to Meyerhof who had received the Nobel Prize in Physiology and Medicine less than a decade earlier

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In 1930 Ochoa returned to Madrid to complete research for his MD thesis, which he defended that year. In 1931, a newly minted MD, he married Carmen García Cobián, he did not have any children. He then began postdoctoral study at the London National Institute for Medical Research (NIMR), where he worked with Henry Hallett Dale. His London research involved the enzyme glyoxalase and was an important departure in Ochoa's career in two respects. First, the work marked the beginning of Ochoa's lifelong interest in enzymes. Second, the project was at the cutting edge of the rapidly evolving study of intermediary metabolism.

In 1956, he became an American citizen. In 1959, Ochoa and Arthur Kornberg were awarded the Nobel Prize for Physiology or Medicine "for their discovery of the mechanisms in the biological synthesis of ribonucleic acid and deoxyribonucleic acid".

Ochoa continued research on protein synthesis and replication of RNA viruses until 1985, when he returned to Spain and gave advice to Spanish science policy authorities. Ochoa was also a recipient of U.S. National Medal of Science in 1978. Severo Ochoa died in Madrid, Spain on November 1, 1993. His wife died in 1986.

A new research center outside Madrid that was planned in the 1970s, was finally built and named after him, the Centro de Biología Molecular Severo Ochoa. South of Madrid, a hospital bears his name, as does the Madrid Metro station serving it, Hospital Severo Ochoa.

The asteroid 117435 Severochoa is also named in his honor.

In June 2011, the United States Postal Service issued a stamp honouring him, as part of the American Scientists collection, along with Melvin Calvin, Asa Gray, and Maria Goeppert-Mayer. This was the third volume in the series.

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