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Mexico-Netherlands TRACKS

Innovation for Social Welfare

Common Tracks

Mexico and the Netherlands find a common path to innovation in hydrogen

Innovating in The Netherlands

Progress reported in creating insect-sized drones

News from Mexico

Mexican researcher innovates in the early detection of cancer through cancer-causing particles in the blood

Special Content

A new Double Degree Agreement for Doctorates between Mexico and the Netherlands is announced

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Quarterly Magazine
Embassy of Mexico in the Netherlands

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INTERNATIONAL COOPERATION IS CALLED UPON TO BRING TRADITION AND INNOVATION INTO DIALOGUE FOR SOCIAL BENEFIT.

MESSAGE FROM AMBASSADOR JOSÉ ANTONIO ZABALGOITIA

Tradition and innovation meet, communicate and integrate when an objective of social benefit integrates them. In this dialogue, international cooperation has a wide-ranging task to carry out.

On the one hand, we must transcend the traditional scheme that places the horizon of international cooperation in the "donor country" and the "recipient country".

At present, no country is capable of meeting the challenges of our time on its own.

The sense of complementarity as the basis for a renewed vision of international cooperation is one of the great signs of our times.

On the other hand, we cannot escape the fact that the notion of "progress", understood solely as linear technological progress, has been severely questioned in light of the climate crisis.

Nature-based solutions" are, therefore, today one of the basic subjects for building a more sustainable and equitable world.

Thus, bringing together the experience of each country's traditions and ancestral knowledge is just as essential as being assertive in exchanging knowledge or transferring technology.

Therefore, in this issue of **TRACKS**, we share the installation of the "Centro de Innovación Mezcal Oaxaca", a space at the service of the artisanal producers of this traditional Mexican beverage.

The Centre seeks to promote the production of mezcal, orienting it to comply with international standards for export while at the same time protecting the traditional forms of production and making the entire production chain more sustainable.

Also, under this certainty that we all have a lot to learn from each other, it is a pleasure for **TRACKS** to announce a new Dual Degree Programme between Mexico and the Netherlands.

Undoubtedly, the great potential for complementarity that marks the relationship between our two countries will benefit from the agreement that Tecnológico de Monterrey and the University of Twente have signed to offer dual degree doctorates.

Nanotechnology, biomedicine, cybersecurity, engineering systems and multidisciplinary design, bioelectricity and educational innovation are some fields that will benefit from this new agreement between the UT and the Tec de Monterrey.

The frontier between different disciplines is where the most significant findings for innovation, science and technology occur. And this is precisely the idea with which the Leiden University Medical Centre has recognised the innovative work of Dr Agustín Enciso Martínez, a Mexican scientist on a postdoctoral stay at the Centre.

TRACKS dedicates one of its main reports to advancing the method of early cancer detection using blood studies. We also report on the results of a survey of the Cancer Institute in the Netherlands, which is part of a global effort against different types of cancer.

In this direction of joint efforts between countries, special mention should be made of the development in Mexico and the Netherlands of the application of hydrogen as a viable fuel for the future.

In this issue, hydrogen and its possibilities as a fuel is the subject of our Routes in Common section, which covers the experience of the Mexican multinational CEMEX in the use of this energy source, on the one hand, and the Dutch shipping industry's adoption of hydrogen, on the other.

Finally, as in all our issues, we pay attention to the work of young innovators in Mexico and the Netherlands while looking for projects that stand out for their social impact.

The stories of Gabriela Vita, a young Mexican engineer, who faces the drought in her hometown with creativity and knowledge of robotics, and the proposed App to learn languages created by Shadi Alhakimi, who was born and grew up in Sanaa, the capital of Yemen, displaced by the war in that country and today living in the Netherlands, are two cases in which resilience, study and talent form the common denominator.

The present calls us to consider the circularity that connects tradition and innovation, mutual learning, and lines of collaboration as a route that allows us to walk together towards ways of life that have people and their well-being at the centre.

Contributing to these crossings and encounters is a primary concern of scientific and technological diplomacy and, of course, also of **TRACKS**.

COMMON TRACKS

Science, innovation and technology at the center of institutional strategies in Mexico and the Netherlands

MEXICO

Mexico starts hydrogen-based cement production

CEMEX, a Mexican multinational company and one of the world's leading cement producers, has announced that it will implement hydrogen injection technology in four of its cement plants in Mexico.

According to the company, this action aims to increase the use of alternative fuels and reduce the consumption of fossil fuels.

At the same time, CEMEX places its determination to move towards hydrogen-based production as part of its Future in Action program to achieve sustainable excellence and become a company with zero net CO2 emissions.

CEMEX is a pioneer in adopting hydrogen technology in the building materials industry, with successful projects underway since 2019.

NETHERLANDS

Sustainable shipping en route to hydrogen as fuel

Like other industries, shipping must limit its CO2 emissions and sail in a CO2-neutral way by 2050.

It is expected that by early 2023, the first zero-emission ships will be running on hydrogen.

Projects such as Sh2ipdrive, MENENS, and Condor are counting on government subsidies to make this transition effective.

Shipping is responsible for 2.9 percent of all CO2 emissions worldwide.

The best way to reduce CO2 emissions is to sail on other fuels.

The Dutch inland waterway fleet consists of approximately 5,000 vessels.

Last year, 34,700 seagoing ships called at Dutch ports.

According to Statistics Netherlands, maritime and

MEXICO

inland transport emits 7.6 billion kilos of CO2 per year, 4.4 percent of total emissions.

A small proportion of inland waterway vessels have an exhaust after treatment system or run on diesel or electric power, but the effects have yet to be reduced.

That is why countless new technologies and alternative fuels are now being researched, tested and applied.

One of the promising new fuels for ships is hydrogen.

The container ship FPS Maas is being converted for this purpose, and in

February 2023 will be the first existing ship to run entirely on hydrogen.

Future Proof Shipping (FPS) owner also wants to build a fleet of ten emission-free inland and coastal vessels over the next five to ten years.

The first new-build vessel to run on green hydrogen next year is the Antonie, owned by Lenten Scheepvaart.

The hydrogen propulsion system for these ships was developed and built in the HEAT (Hydrogen & Energy Applied Technologies) laboratory of ship engine suppliers Koedood and De Ruyter in Sliedrecht.

HEAT is the first field laboratory in the Netherlands where hydrogen for shipping is researched and tested with students from universities of technology and other schools.

The Sh2ipdrive (Sustainable Hydrogen Integrated Propulsion Drives) consortium, involving universities of technology, the Netherlands

NETHERLANDS

Consortium for Applied Science (TNO), and Shell, among others, is investigating how hydrogen can be transported and stored safely and practically.

"Our aim is primarily to generate knowledge that can be applied in the actual construction or conversion of hydrogen-powered ships," says Sh2ipdrive and Future Proof Shipping project leader Dirk de Jong.

Finally, there is the Condor project, a consortium of approximately 45 entities, such as seaports and shipping companies, initiated by the Port of Rotterdam Authority and the Province of South Holland.

Condor aims to have 40 to 50 vessels running on electric hydrogen within the next ten years.

This hydrogen is stored under pressure in containers. Like fuel cells and batteries for zero-emission propulsion, it will soon be available for rent or lease by shipowners.

"When I first started talking about hydrogen shipping four years ago, people laughed at me. When the first ship starts sailing on hydrogen soon, no one will be able to say it can't be done," says project leader Marjon Castelijns.

MEXICO

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"Our aim is primarily to generate knowledge that can be applied in the actual construction or conversion of hydrogen-powered ships"

NEWS FROM MEXICO

Mexican researcher innovates in the early detection of cancer through cancer-causing particles in the blood

Agustín Enciso Martínez is a Mexican researcher dedicated to finding an effective method for the early detection and monitoring cancer progression through liquid biopsies.

Enciso Martínez argues that liquid biopsies, i.e., blood and not tissue as commonly done, are an effective method to quickly and less invasively detect different types of cancer.

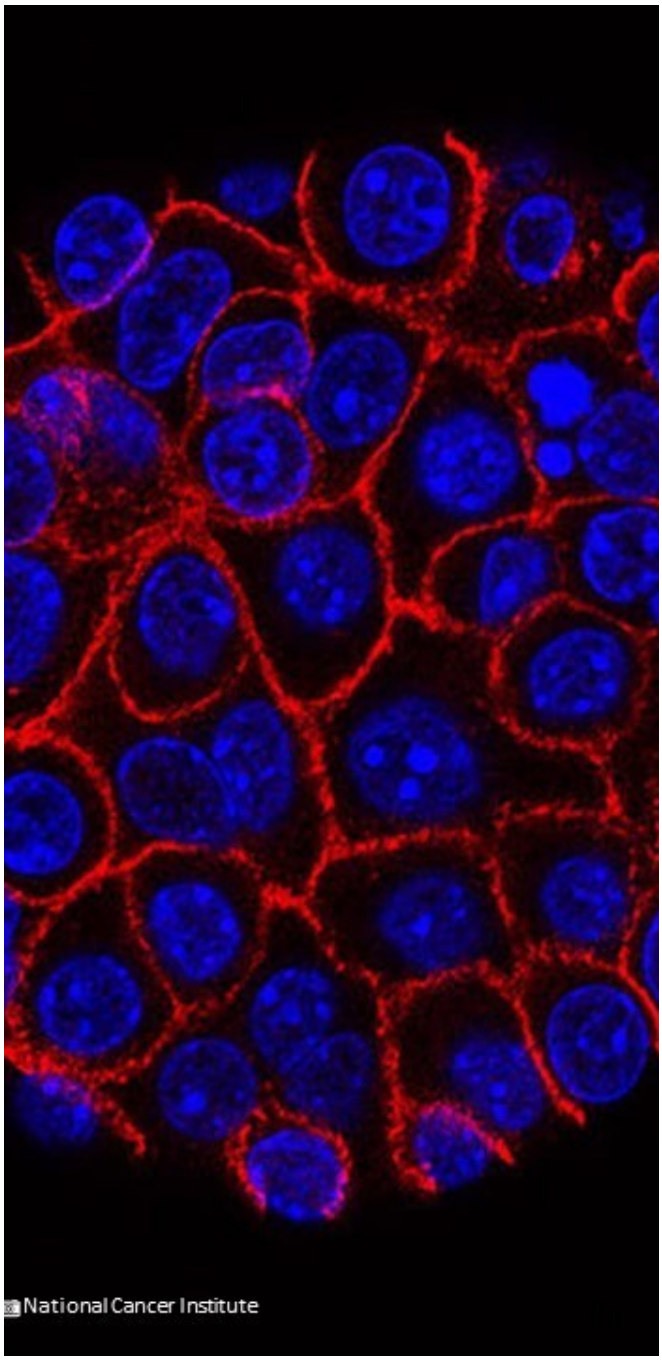
Convinced that early detection and constant monitoring can be the difference between a patient's life and death, the Mexican researcher also stresses the advantages of liquid biopsies over tissue biopsies in that they allow the evolution of the disease to be monitored in real-time and in a less invasive way.

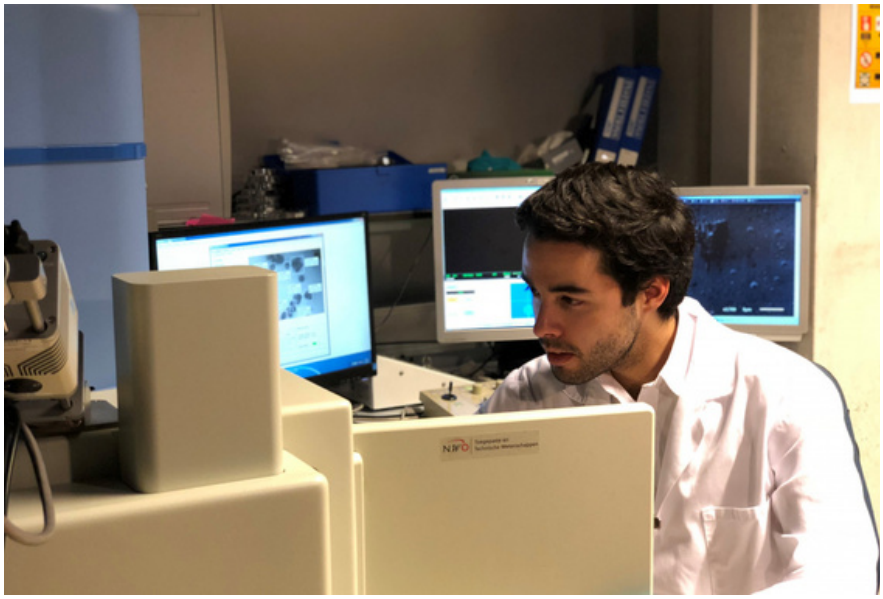
Recently, at an event organised by De Maatschappij, or the Dutch Society of Industry and Commerce, Enciso Martínez, a postdoctoral fellow at Leiden University, shared with the audience the progress of his innovative work on cancer testing from blood samples.

Among the particles that come from tumours, Enciso Martínez explained that, in the first place, they are those associated with circulating tumour DNA.

On the other hand, said the researcher, there are circulating tumour cells, which, when detected in the blood, suggest the progression of cancer in a patient's body.

Postdoctoral work at Leiden University Medical Centre has allowed the Mexican researcher to use





cryo-electron microscopy, a recent method in which tumour particles are frozen at such a fast and cold speed and temperature (-160 °C) that the structure of the particles can be captured to facilitate their study.

The high throughput of this method allows the isolation of extracellular vesicles.

In turn, the isolated vesicles are bound with antibodies that are then attracted by a magnet. From this, it is possible to recognise the type of cancer present in the blood sample studied.

Enciso Martínez holds a bachelor's degree from the Instituto de Estudios Superiores de Monterrey, a master's degree from the Catholic University of Leuven in Belgium, and a Ph.D. from the University of Twente (UT) in the Netherlands.

In addition to his formal studies, the Mexican researcher has spent time at the Interuniversity Microelectronics Centre (IMEC) in Leuven, Belgium, as well as at the John Hopkins Hospital and the MD Anderson Cancer Center in the United States.

Enciso Martínez is convinced that using liquid biopsies for the early detection and monitoring of cancer development can drive personalised medicine and treatments.

Based on the characteristics of the patients, i.e., through the study and continuous monitoring of their biomarkers, the Mexican researcher says it is possible to determine the most appropriate and precise treatment for each patient.

In addition, Enciso Martínez affirms that personalised medicine is a way of avoiding overtreatment and the excessive use of drugs, which in the long run have side effects on patients.

During his presentation, the Mexican researcher was accompanied by Professor Peter ten Dijke, who directs Enciso Martínez's research at the Department of Cell Biology and Chemistry at the Leiden University Medical Centre.

Both researchers used the presentation for a call to prevent commercial companies from overreaching to use patient samples.

The Mexican and Dutch researchers pointed out that people's health cannot be gambled with and that any method has to be tested and used with care to ensure proper handling of the samples and the people they come from.

Finally, Professor Peter ten Dijke

highlighted the relevance of Enciso Martínez in his research team.
In highlighting the contribution of the Mexican researcher, Ten Dijke concluded that "most interesting things happen at the border between different disciplines."

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*Natalia Sobrino Saeb holds a BA in Liberal Arts with a specialisation in Government, Economics and Development from Leiden University College, The Netherlands. She is currently doing an internship at the Department of Innovation, Science and Technology of the Embassy of Mexico in the Netherlands.

"most interesting things happen at the border between different disciplines"

NEWS FROM THE NETHERLANDS

The Cancer Institute in the Netherlands tests a method that makes it possible to see the complete tumour DNA of each patient

Until now, whole genome sequencing has mainly been used for clinical studies.

Over the last few years, this has been one of the lines of research at the Cancer Institute in the Netherlands.

Part of this genomic research is carried out at the Antoni van Leeuwenhoek Hospital.

It is precisely there that research has been carried out on the wider applicability of the "whole genome sequencing" (WGS) test method for cancer diagnosis.

The considerable advantage of this method is that with WGS it is possible to measure all DNA errors in a tumour at once.

Through an extensive study called WIDE, the Hospital has sought to corroborate the reliability of the implementation of WGS in diagnostics for cancer patients.

The encouraging results have recently been published in the scientific journal The Journal of Pathology.

The study involved 1200 patients and, according to the evidence gathered, has shown that the method is suitable to complement the daily pathological oncological diagnosis in hospitals.

In principle, this means that whole genome sequencing (WGS) can now be used in practice.

According to the researchers, this use requires an

adjustment in the laboratory's working method, but that is, as the study shows, easy to do.

One of the adjustments in the WGS test method is to work with deep-frozen tissue samples. Formalin-fixed tissue is now generally used.

Another conclusion from the study is that the new test method, compared to current molecular tests, does not lead to longer waiting times for the result.

The study also investigated the reliability of the WGS test.

To this end, the method was compared with standard hospital diagnostics. The researchers expected a reliability of 95 percent compared to current diagnoses.

In practice, the reliability was even higher, over 99 percent.

Similarly, the study confirmed that this method gives doctors and patients more treatment options because the chance of finding a DNA error turned out to be higher.

A quarter (24 percent) of patients have been or are being treated based on such a DNA error found.

"Current molecular tests usually look at a limited number of DNA abnormalities, for which pre-selection by tumour type has already been done," says pathologist Kim Monkhorst.

"With the WGS test, it looks at all tumour DNA in every patient, regardless of tumour type, and it is also possible to find treatable DNA errors that would not normally be looked for. Because there is no pre-selection, the test is very objective," says Monkhorst.

In addition, a third benefit for patients was confirmed, especially for those with a tumour of uncertain origin ("unknown primary tumour").

Thanks to the WGS test, a diagnosis could still be made in two-thirds of these patients.

According to Gerrit Meijer, leader of the research team and ultimately responsible for WIDE, "WGS is a new technology and not just a specific test. Compare it to the introduction of MRI in radiology when that happened.

"Change is always difficult, warns Meijer. However, we have taken an important step with WIDE. What remains now are the next steps," says the Dutch pathologist.

In this respect, an essential next step is to investigate, together with actors in the field of health care, how WGS technology and diagnostics can be offered effectively and efficiently in the Netherlands.

The WIDE study was conducted under the direction of pathologists Kim Monkhorst and Gerrit Meijer in collaboration with the Hartwig Medical Foundation.

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http://www.anuies.mx/noticias_ies/alumnas-desarrollan-sensores-de-bajo-costo

INNOVATING IN MEXICO

With a social sense, they create sensors that can be adopted for teaching in schools with low technology budgets.

Leslie Nuño and Mariana Gómez are two young chemical engineering students at the Instituto de Estudios Superiores de Occidente in Guadalajara, in the state of Jalisco, Mexico.

The two students have developed a type of sensor that, among other functions, can be used to determine the exact amount of sugar in a juice.

The sensors created by these two young Mexicans can also be used to mark the amount of colouring in a drink and can also be used to determine the amount of a drug in medicine.

Both students are committed to a type of innovation with a social impact. So, they have been concerned that their development should be inclusive, pedagogical, and economically accessible.

With this in mind, future chemical engineers created a spectrophotometer for chemical analysis and a surface tension meter.

The young women based their work on non-patentable public designs and open-source code available free of charge on the web. The electronic and mechanical inputs are inexpensive and readily available.

Thus, the two instruments created by the young Mexicans are comparable in function to their commercial versions but cost much less.

Thus, the fact that the sensors are low-cost means that pre-university schools with limited budgets can obtain these instruments for teaching.

"We want students from different high schools, hopefully from all over Mexico, to be able to make this equipment themselves instead of buying it. That's why, in addition to making the instruments, we put a lot of effort into making the manuals," said Mariana Gómez.

The commercial version of the surface tension meter costs up to 40 times more than Leslie Nuño's proposal. Mariana Gómez managed to reduce the cost of her spectrophotometer by 98 percent.

Melissa Ley Cervantes, an academic from ITESO's Department of Technological and Industrial Processes (DPTI), highlighted the qualities of the project since, in addition to being technically competent, it is also socially responsible.

She also celebrated that Mariana and Leslie's work is an example for the younger generations to become interested in science, technology, engineering, and mathematics (STEM), especially girls and young women.

Dr. Carmen Patricia Guillén Flores, professor in the Department of Technological and Industrial Processes, explained that in the case of the spectrophotometer, Mariana made improvements to the equipment using an open-source platform for data acquisition and processing and then presented the measurement on display.

At the same time, Dr. Guillén Flores pointed out that, although some parts were manufactured using 3D printing, they can be easily replaced with other materials.

In the spectrophotometer, "a beam of light is passed through a sample and then diffracted in all wavelengths of light. A sensor measures how much light of a specific wavelength manages to pass through a sample. The more light that passes through, the smaller the concentration and vice versa," said Mariana.

Meanwhile, the surface tension meter measures the maximum force required to break through the surface of a liquid. Then, these measures are calculated by hand to determine the surface tension, Leslie explained.

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http://www.anuies.mx/noticias_ies/alumnas-desarrollan-sensores-de-bajo-costo

Inauguration of the Innovation Centre dedicated to the production of Mezcal, the first of its kind in the country

Oaxaca is a region in Mexico with vast cultural diversity. It is also a state of the Mexican Republic with a rich historical, tangible and intangible heritage.

Mezcal is an alcoholic beverage made from the distillation of the heart of the maguey. Its production and consumption date back to before the arrival of the Spaniards in Oaxaca.

In recent years, the production and consumption of Mezcal from Oaxaca have increased considerably.

In this context, the government of the State of Oaxaca recently announced the start of operations of the "Centro de Innovación Mezcal Oaxaca," the first of its kind in the country.

The Centre is located in the municipality of Santiago Matatlán, in the Valles Centrales region, the same region where the state capital is located.

With an investment of 13.3 million pesos (about 700,000 USD), the Centre will benefit 30,000 producers, primarily small producers who use artisanal techniques.

In a statement, the state government stressed that the centre "seeks to create awareness of the responsible management of solid and liquid waste, promote the importance of saving water, firewood, energy and the use of by-products and waste."

Mezcal is currently exported to 79 countries around the world. Of the total exports, 77% comes from Mezcal production in Oaxaca.

In this sense, the authorities have pointed out that the aim is to provide the mezcal industry with more efficient processes through technological innovation and to optimise and standardise production practices.

Similarly, the Centre aims to improve health standards and promote a sustainable culture in producing this drink, respecting its traditional and ancestral processes.

All of this, state authorities have said, with the aim that "the Centre will be a space that dignifies the

production of this ancestral drink but above all the work of the mezcal masters."

The Oaxaca Mezcal Innovation Centre has a conical oven, a hybrid oven, a weighing area, a milling, fermentation, distillation, a rectification area, a laboratory, a solar water heater, solar panels, and a tank for collecting vinasse.

The authorities are confident that this pilot plant will strengthen the Mezcal production chain. Achieving this would benefit the producers while enhancing the competitiveness of the agro-industrial sector in the state of Oaxaca.

At the start of the Centre's work, the authorities also emphasised that this project seeks to show that tradition and innovation are achievable.

Since 1994, to preserve its production, the Mexican government granted Mezcal the Denomination of Origin.

Currently, the Denomination of Origin Mezcal includes the states of Guerrero, Oaxaca, Durango, State of Mexico, Aguascalientes, San Luis Potosi and Zacatecas.

During 2021, Mezcal production throughout Mexico was 8.2 million litres. Some of this was for domestic consumption, and some for export.

The main export markets are the United States, England, Germany, France, Spain, Italy, Australia and Chile.

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"This project also seeks to show that tradition and innovation are not irreconcilable."

Brain-computer interface helps patients regain mobility

Full mobility means, among other things, that a person can get from one place to another on their own, as well as being able to carry out activities independently as well.

But in the same way, mobility is related to aspects such as feeling the parts of the body involved in it, for example, the legs.

Decreased or total lack of mobility in people can result from different factors related to physical health.

Thus, for example, one of the sequels that a spinal cord injury can have is that the person can no longer feel their legs.

Mexican biomedical engineers are helping generate physical rehabilitation tools to help patients regain the ability to carry out their daily activities.

Such is the case of the brain-computer interface (BCI) that Mexican researcher Erik Bojorges Valdez is working with.

Dr. Erik Bojorges Valdez is an academic and researcher at the Department of Engineering Studies for Innovation at the Universidad Iberoamericana in Mexico City.

In a lecture that was part of the "10th Anniversary of the Postgraduate Degree in Engineering Sciences" at the Universidad Iberoamericana, Dr. Bojorges Valdez said that the brain-computer interface is used for patients with a very severe disability, which prevents them from moving.

The BCI allows the recording of signals emanating directly from the cerebral cortex, which are then interpreted by a computer and finally translated into a command, for example, to move the legs.

It is a communication and control system that does not depend on any neuromuscular pathway in the body.

The recovery of movement becomes a virtuous circle, says Dr. Bojorges Valdez.

BCI triggers an increase in mood and the interaction of people with other people.

The Mexican researcher stresses that when a person feels loved, their cognitive conditions improve, which motivates them to move more.

This positive feedback benefits the patient, who progressively recovers and reintegrates into society.

At the same time, Dr. Bojorges Valdez explains that BCI is used in rehabilitating upper and lower limb movement, which promotes neuroplasticity through neurofeedback.

With this training, the biomedical engineer responsible for using BCI can ask the patient to generate or reinforce a specific pattern of neural activity. Repeated execution of this pattern will create new neural networks.

It is through operant conditioning that, when repeated several times, new neural networks that generate neuroplasticity can be created.

This technique can be applied to a patient who, for example, suffered a stroke in which blood leaked out of the veins, spread over the cerebral cortex, caused the death of some brain regions, and thus damaged neuromuscular communication.

In this case, the Mexican researcher emphasises the loss of movement neurons is replaced by the creation of new neural pathways, which will restore the patient's ability to move.

In such a way that this restructuring of the brain facilitates the patient's rehabilitation and, with it, the person's ability to move.

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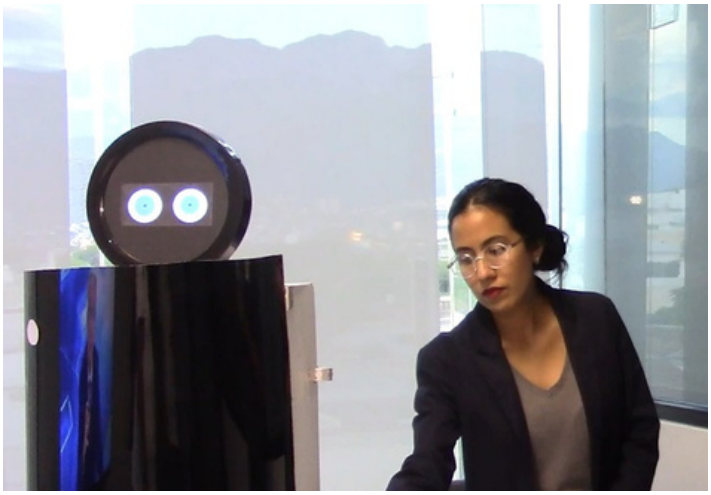
BCI is used in upper and lower limb movement rehabilitation, promoting neuroplasticity through neurofeedback.

Source:
https://ibero.mx/prensa/conoce-como-funciona-la-interfaz-cerebro-computadora-que-ayuda-con-problemas-motrices

Young Mexican engineer creates robot capable of generating water from air condensation



Technology should be at the service of people. That is the life motto of the very young Mexican robotics engineer Gabriela Vita.

Gabriela is originally from the state of Nuevo León in Mexico. She knows well the rigours of living in a semi-desert climate.

In 2022, amid one of the most severe droughts in her home state, Gabriela unveiled the construction of a robot capable of generating water from the density of the air.

Earlier, during the pandemic, this talented young Mexican had already used technology to serve people's needs.

Just at the point where there was a higher risk of contagion when going out on the street, Gabriela created a robot capable of going to the shop and bringing back goods.

"The robot would go to the shop to do my shopping, to avoid infecting us at home; I didn't want to put my family at risk," says Gabriela.

Then I built a disinfectant robot equipped with an atomiser to disinfect the common areas," she says.

Gabriela underlines that her interest is always in using technology to alleviate a problem that affects people. "I detect a problem and immediately think about how I can help".

This is how another of her projects was born—a robotic prosthetic hand to help people who have lost this part of their body.

At the same time, Gabriela has also successfully ventured into the field of sensors.

Among her creations is an intelligent device to support those with a visual impairment. The tool is equipped with sensors and actuators so that it can detect objects and people, thus preventing those who use it from having accidents.

Recently, the city of Monterrey, where Gabriela lives with her family, suffered a water supply crisis.

In response to this, says the young inventor, "I had the idea of creating the machine that could generate water.

Families no longer had access to water, even drinking water was becoming scarce, and the shops no longer had bottled water.

In the face of what was happening around her, says Gabriela, "I felt the need to apply my knowledge of robotics to develop a robot that condenses air and turns it into water".

According to its creator, this robot can generate up to 35 litres of drinking water a day.

"Water scarcity currently affects 40 percent of the world's population, and according to the FAO, up to 700 million people are at risk of being displaced due to droughts by 2030," warns Gabriela.

"I intended to create the robot to solve the problem of water scarcity at home caused by the shortage at the state level," she recalls.

"But with the necessary investment, this project could be produced on a larger scale to help people in any region of the world," concludes Gabriela.

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Source: Special collaboration from Gabriela Vita for TRACKS, Innovation for Social Wellbeing.

Given what was happening around her, says Gabriela, "I found myself needing to apply my knowledge in robotics, to develop a robot that condenses air and turns it into water"

INNOVATING IN THE NETHERLANDS

Coating building facades with solar panels that can also be coloured

A group of Dutch students at Radboud University set out to work on a new way of conceiving solar panels.

The result of the work of these young innovators has been a spin-off called Soluxa, which has been promoted by Radboud University itself.

Soluxa is a start-up company that, determined to break the monopoly of the colour black, started offering coloured solar panels a couple of years ago.

In addition to offering a range of colours that enhances the panels' visual aspect, this innovation provides the opportunity for the panels to be placed on the facade of buildings.

Thus, based on their knowledge of nanotechnology, the young Dutch innovators base their work on the "Vibrant" manufacturing technique.

By making it possible to adjust the colours of the panels, "Vibrant" allows the well-known dark panels to be coloured as desired.

In 2021, Solux won the Jan Terlouw Innovation Prize, which recognises outstanding initiatives by young people in the Netherlands.

The Jan Terlouw Innovation Prize also aims to promote projects that focus on the energy transition or the circular economy.

Regarding this recognition, the initiators of the project have stated that "this award demonstrates the confidence in our concept and our company. It shows us that our ambition to complete our mission will be possible".

A year earlier, in 2020, Soluxa carried out a pilot coating of one of the facades of the Radboud University in Nijmegen, in the east of the Netherlands.

On that occasion, Soluxa applied panels in 14 different colours and 60 square metres of cladding.
"The different colours were applied to examine the performance and efficiency of our solar panels. We even applied a colour that changes depending on the angle from which you look at it," said the young Dutch innovators.
In the same way, Soluxa has tested on a public building in the province of Zwolle, where it placed 60 panels covering an area of 115 square metres of façade.
According to the developers of the innovation, the Zwolle project demonstrated that the use of solar façades has excellent added value in the built environment.
In the Netherlands, says Soluxa, facades can accommodate 2.5 times more solar panels than roofs.
Solar panels on facades have many additional advantages, say the young developers. They form the cladding and, at the same time, generate up to 85 per cent additional energy compared to solar panels commonly placed on roofs.
By placing the solar panels on the various facades of the building, energy is generated throughout the day. In this way, the energy can be fully utilised by the building and the electricity grid is not overloaded.
Soluxa has set itself the goal of placing coloured solar panels on 500,000 square metres of facades by 2025.

In addition to offering a range of colors that already enhance the visual presence of the panels, this innovation provides the opportunity for the panels to be used as building facades

Soluxa has set itself the goal of placing coloured solar panels on 500,000 square metres of facades by 2025.

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Source:
https://https:/www.soluxa.solar/

Crushed minerals are proposed as an aid in combating climate change

Emily Te Pas is a PhD student at Wageningen University in the Netherlands. Her research work focuses on the ability of minerals to remove greenhouse gases from the air using minerals.

Fifteen years ago, Dutch geologist Olaf Schuiling predicted that olivine, the most reactive silicate and one of the most common minerals on earth, could be used to extract CO2 from the air on a large scale and deployed in the fight against climate change.

Emily Te Pas, who holds a Master's degree in Climate Studies from Wageningen, took up Schuiling's core ideas, known as the Meteorisation principle. She is now working on what she calls "enhanced weathering".

In 2020, the young researcher's Master's thesis was awarded the Prize of the Dutch Soil Science Association.

During the development of her Master's thesis, Te Pas conducted a laboratory experiment with different silicate minerals in order to get an initial idea of the effect of adding them to soil on soil chemistry.

"My research focuses on their use in arable crops, which is a huge area worldwide," she says.

So Te Pas is also looking at the potential benefits for the farmer, such as improving soil fertility. The conversion of CO2 into bicarbonate and lime, for example, increases soil pH, which can be beneficial for crops.

In her ongoing fieldwork, the Dutch researcher has been working on 'lysimeters', which are concrete containers that are buried and fitted with equipment to measure soil hydrology.

The lysimeters also contain plastic containers filled with soil in which different types of minerals are mixed and on which maize is grown.

Alongside the lysimeters, Te Pas has decided to place a type of bucket to extract water from the soil at various depths.
One of the concerns of the young Dutch researcher is whether this technique causes seepage into the subsoil, which could be dangerous to health.
Therefore, the research aims not only to discover how much CO2 can be captured and for how long, but also what chemicals are formed, whether they leach, and how the crop reacts to these compounds.
"My focus is on the chemical processes in the soil," says Te Pas, "but I also want to see the link to agriculture. This is a trial under reasonably natural conditions, where we can monitor and control what happens in the soil.
According to the young Dutch researcher, "the latest IPCC report makes it clear that we will not achieve the goals of the Paris Agreement without techniques like this, even if we manage to reduce greenhouse gas emissions significantly."

The Dutch researcher's approach is straightforward. "In addition to reducing emissions, we also need new techniques to combat climate change. For me, that is one of the main reasons for working on this proposal".

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Source:
https://www.wur.nl/en/show-longread/using-crushed-minerals-to-combat-climate-change.htm
https://issuu.com/wageningenur/docs/ww2022_02_en/33

So Te Pas is also looking at the potential benefits to the farmer, such as improving soil fertility. The conversion of CO2 into bicarbonate and lime, for example, increases soil pH, which can be beneficial for crops.

Language app specially designed to help refugees, displaced people and migrants

Shadi Alhakimi was born and raised in the Yemeni capital city of Sanaa.

There, he completed computer science and accounting studies and won the national innovation prize—his invention: searching video files based on a self-learning algorithm.

In the end, Alhakimi's invention needed to be simplified to be developed in Yemen, although its creator proudly shows off the patent application filed in the United States.

At the same time, to generate income, Alhakimi's company started providing computer security services and grew to nine employees.

However, says Alhakimi, "in 2014, the war literally invaded the office".

According to the United Nations, the war in Yemen has claimed at least 377,000 lives.

During the conflict, Alhakimi escaped to Saudi Arabia across the desert.

Finally, in 2015, Alhakimi managed to reach the Netherlands. After obtaining his residence permit, he decided to start a new business.

Together with a partner, the developer set up Elanza, an internet platform that healthcare institutions can use to manage temporary recruitment.

However, the "enormous frustration" caused by language difficulties, coupled with late-night working days and unprocessed emotions on the run, eventually led to a personal situation that pushed him to leave Elanza.

Today, sometime later, Alhakimi reflects.

'Language is everything,' he says. "If you are in the place where you were born, you don't think about it. But language is about making friends, building a

relationship, and keeping in touch with the government".

Once Alhakimi recovered after leaving Elanza, he learned Dutch, completed a master's degree at the University of Amsterdam, and developed his language app idea for Taaly.

The Dutch are efficient," says the innovator. "Their language is efficient too. He says it is concise while acknowledging that it takes work to learn the language.

Taaly is an app dedicated to people with difficulties in learning Dutch. Language deficiencies or difficulties can be supported by "language buddies."

"Language buddies," explains the developer, "can provide advice voluntarily or for a fee.

Alhakimi found his first investor through friends. "I'm looking for customers for the app with the government, but also from companies that employ people with language difficulties with Dutch."

Several dozen students have already signed up since Taaly was launched in October in the first version for Android. Shortly afterward, it was one of the nominees for an award from the refugee student organisation UAF. The entrepreneur acknowledges this. With his experience and education, he could quickly become an IT security expert in a company.

Language partners, the developer explains, can accompany others on a voluntary basis or in exchange for remuneration.

But Alhakimi has no doubts: "It's a good choice to invest my time here. I know how much it costs to learn and integrate the language. This gives me much more satisfaction than any other job".

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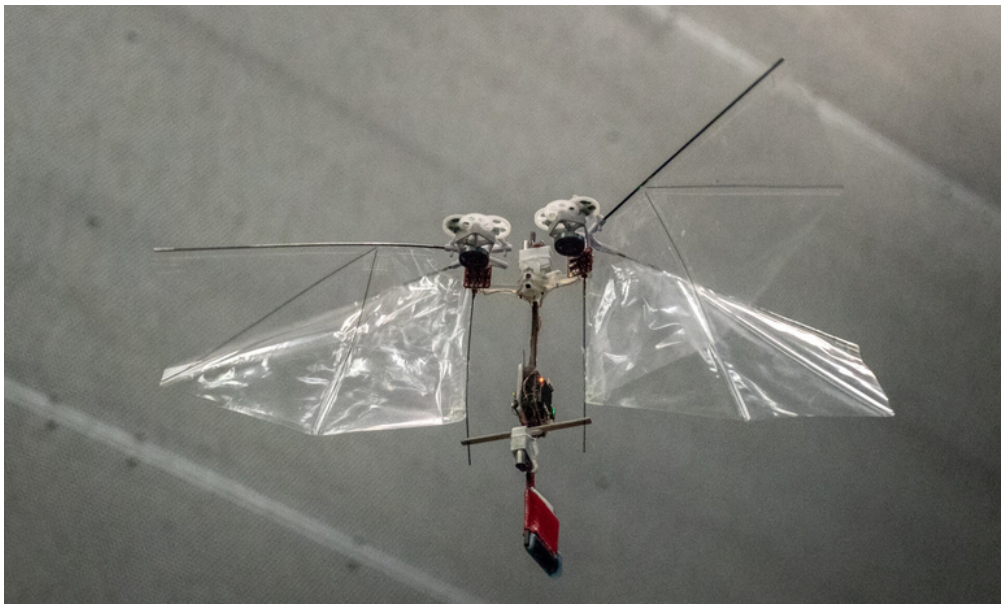
Source:
https://fd.nl/tech-en-innovatie/1458009/taal-is-alles-voor-vluchtelingen-mijn-app-gaat-ze-helpen-qka3ca2MMwkd

Progress reported in creating insect-sized drones



A fifty-centimetre-tall flying robot takes off, flapping its insect wings furiously; wobbling, this flapper drone hovers about a metre above the ground in a Delft laboratory. It is reminiscent of a buzzing bee or a bluebottle fly.

With this demonstration, researchers at Delft University of Technology TU Delft show that drones and insects can know how to orient themselves to fly steadily by observing the movement of their surroundings. The results of their research appeared in the scientific journal Nature recently.

"It is important for a drone, but also for insects, to know what is above and below and what their orientation is relative to the ground so that they can stay upright," says Guido de Croon, from TU Delft.

"However, we don't know how insects stabilise themselves. They are too small for a balancing organ."

Drones use an accelerometer to determine their orientation and fly stable and straight.

An accelerometer is a small chip in mobile phones that, for example, makes screens tilt when the device rotates.

For larger drones it is no problem to have such a chip.

But when working with insect-sized drones weighing less than 100 milligrams, "every milligram counts, so it's important to equip them with as few sensors as possible," says De Croon.

To find out how insects are stabilised and to see if this also works for insect-like drones, the Delft researchers developed a two-part computer model.

First, a drone or insect must know how to control its own movements, so that it moves to the left if it flaps harder with its right wing.

In addition, the insect must see in which direction it is moving based on the so-called optic flow: the way the environment appears to move when it moves. In this way it can deduce its orientation in relation to the ground.

These two things together allow micro drones, and possibly insects, to fly stably.
The researchers tested this model with two types of drones in which the accelerometer was not involved: a quadcopter with four propellers and a flapper drone with wings.
"The technology worked surprisingly well for both drones," says De Croon.
"I find it interesting that this research is not only a step forward for flying insect robots, but also helps explain how insects stabilise themselves."

...mini insect-shaped robots have advantages over the ones in common use. They are cheaper, they can fit into smaller spaces and they are also not dangerous if they fall or fly into something or someone.

Drones are already on the rise, "but mini insect-shaped robots have advantages over commonly used quadcopters that weigh hundreds of grams. They are cheaper, they can fit into smaller spaces and they are also not dangerous if they fall or fly into something or someone," the researcher points out.

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SPECIAL CONTENT

Tecnológico de Monterrey and the University of Twente celebrate 25 years of collaboration

Under the sign of learning from each other, a new double doctoral degree agreement is announced between Mexico and the Netherlands

Based on the idea of mutual learning, a new Double Degree Agreement for Doctorates between Mexico and the Netherlands has been announced.

Thus, the University of Twente and the Tec de Monterrey open the door to double degrees in PhD programmes. Both institutions are committed to further scaling their academic exchange, student mobility, and joint research programmes.

At the end of October 2022, directors, researchers and support staff, led by the President of the Executive Committee of the University of Twente, Dr. Prof. Vinod Subramaniam, paid a working visit to the Tec's main campus in the city of Monterrey.

This visit was part of the commemoration of the first 25 years of scientific and academic exchange and cooperation between the two institutions.

In addition to celebrating what has already been achieved during this quarter of a century, the purpose of the visit was to look at ways in which the collaboration between the University of Twente and the Tec de Monterrey could be even more fruitful.

In this context, a ceremony took place in which both institutions signed a Double Degree Agreement at PhD level.

Karin Paardenkooper, who is in charge of coordinating the relationship of the University of Twente with Mexico, pointed out that "we complement each other very well and have similar ambitions regarding innovation and entrepreneurship. In terms of education, research and values, we learn a lot from each other".

"It really is a unique collaboration," says the Dutch representative, "especially on this scale.

Likewise, the coordinator for Mexico at the University of Twente has also declared that "there are many different projects that we are undertaking together".

This cooperation is so extensive, said the Dutch representative, that it includes cooperation projects within the European Consortium of Innovative Universities (ECIU) framework, of which the University of Twente is a member.

The visit to Monterrey also included the presence of the Dutch Ambassador to Mexico, Wilfred Mohr, who witnessed the formalisation of this agreement that opens the doors for Mexican and Dutch PhD students to obtain two degrees, one from each institution.

In this same framework, the contribution of the Erasmus+ programme (KA107 Mexico), initiated by Dr. Arturo Susarrey, a Mexican graduate of the Tec de Monterrey, who today collaborates with the Department of Mesoscale Chemical Systems of the Faculty of Science and Technology at the University of Twente, was recognised.

Dr. Susarrey is a strong promoter of academic and scientific collaboration between Mexico and the University of Twente. D., which focused on the development of structured materials with applications in the fields of energy, chemistry, and materials science.

Dr. Susarrey has also worked as a research assistant at the Open Innovation Centre for Antimicrobial Surfaces at the Surface Science Research Centre of the University of Liverpool in the UK.

This outstanding Mexican researcher has also participated in research projects at Chalmers University of Technology, working in the field of nanofabrication.

The Erasmus+ programme (KA107 Mexico), initiated by Dr. Arturo Susarrey, is an open opportunity for the exchange of academics and researchers, both to strengthen teaching and the experience of those in training.

In this sense, during the visit to Mexico, Anne Olde Loohuis, strategic advisor in internationalisation of the University of Twente, underlined that "we see great opportunities to strengthen exchange, educational innovation (such as challenge-based learning), joint research and cooperation with companies," stressed Olde Loohuis.

Both Tec and the University of Twente have committed to work together in the coming months on a multi-year strategic cooperation plan.

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Source:

https://www.utwente.nl/en/news/2022/11/265146/tecnologico-de-monterrey-and-university-of-twente-mark-25-year-collaboration

LEGAL DISCLAIMER

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