



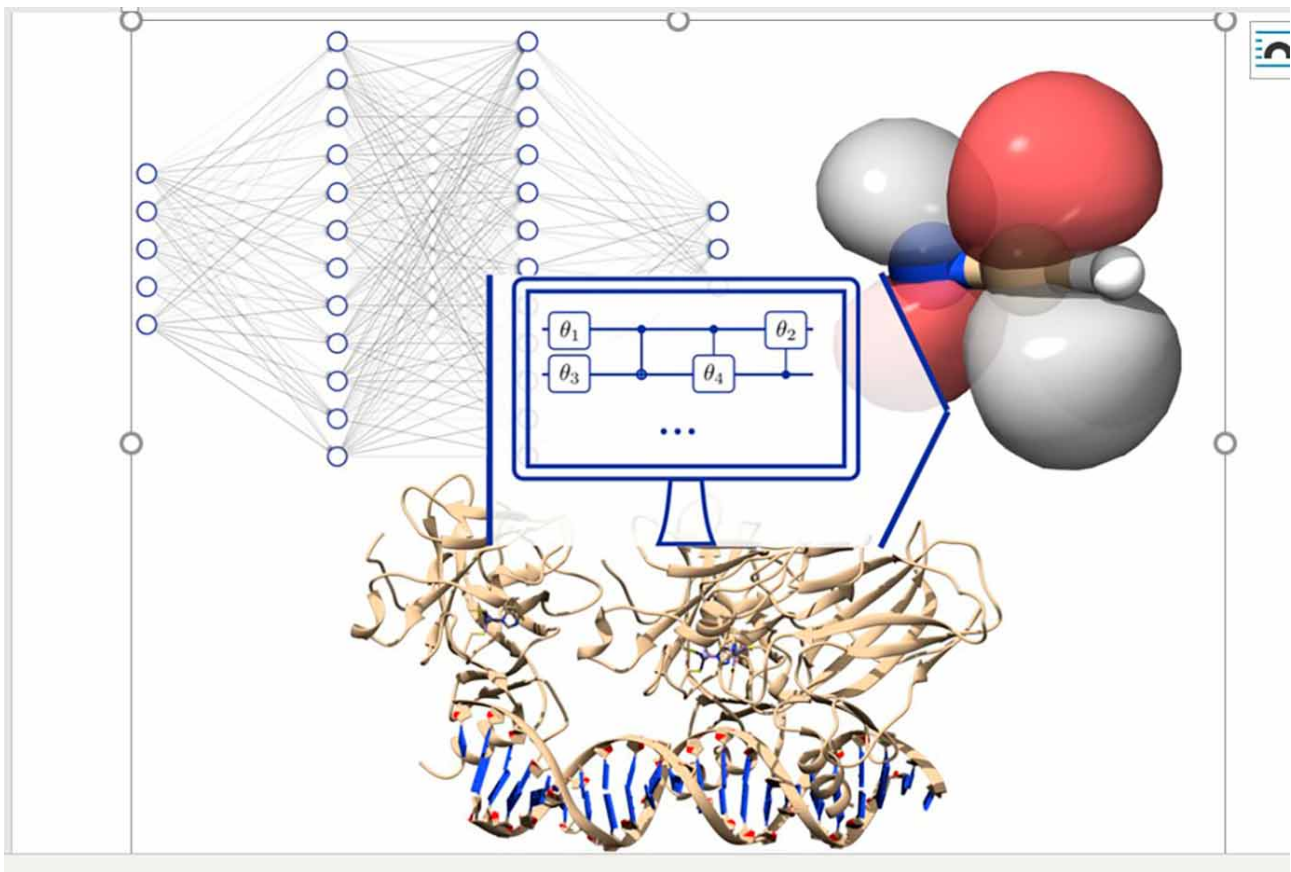
Tec transfers quantum computing knowledge to AstraZeneca

[AstraZeneca](#) and the [Tec's Guadalajara campus](#) have designed a knowledge transfer program for various cutting-edge technologies, including **quantum computing**, which the pharmaceutical company will apply to **quantum bioinformatics**, a tool for **designing new drugs**.

This training forms part of **AstraZeneca Guadalajara's** strategy for the **global evolution of information technology (IT)**, which it has been working on in collaboration with [Tec de Monterrey](#) since 2018.

Quantum computing is a branch of technology that began in the 1980s. Its objectives include the **simulation of complex physical systems** and the **solution of highly complex computational problems** in less time than that taken by current digital technology.

Current development and road maps predict that powerful quantum computers will become available in the short term.



César Cárdenas, a professor at Tec Guadalajara and academic coordinator of the digital evolution program, invited Salvador Elías Venegas-Andraca, founder of quantum computing in Mexico and research professor at the Tec's State of Mexico campus, to take part.

Venegas-Andraca explained that this computing power has a big impact on **solutions that will allow us to solve problems** in areas such as:

- *Medicine*
- *Finance*
- *Logistics*
- *The simulation of physical and chemical phenomena*
- *Weather forecasting, and others.*

*“Quantum computing will be a **fundamental tool in the design of new drugs**. As a result, calculations that would take hundreds of years with classical computing can be solved in a short period of time,”* Cárdenas explained.

The focus of the Tec's knowledge transfer program for **AstraZeneca's Global Technology Centre (GTC)** includes the following aspects:

- *Knowledge, essential tools, and **state-of-the-art technology**.*
- *Directly applicable examples and practical exercises with an **innovative approach**.*
- *This is complemented by **research**, innovative experiences, and **technological development** from the Tec's expert instructors.*

How will AstraZeneca use this?

As a global leader in the bio-pharmaceutical sector, the British-Swedish company has developed a **high-tech ecosystem made up of two Global Technology Centres**, one in Chennai, India and, since May 2016, the other in Guadalajara, Jalisco.

As part of AstraZeneca's strategy, **the Tec shares this cutting-edge knowledge with the latter**, which focuses on **high-performance computing**, particularly quantum computing.

Salvador Elías Venegas-Andraca is also a co-founder of [quantum image processing](#). He explained that this program allows progress to be made on the creation of quantum algorithms with diverse applications.

At **AstraZeneca GTC Guadalajara**, he gave a webinar for 100 attendees and a masterclass for more than 20 participants, who created their first **quantum computing** algorithm on the IBM Q System One machine.

To date, the Tec has trained 6 corporate groups on digital innovation and industry 4.0 and given 9 virtual webinars on disruptive technologies and methodologies.

It has also given a masterclass in quantum computing and is currently working on a four-module specialization in business automation.

*"The partnership between AstraZeneca's GTC in Guadalajara and the Tec has enabled a very important step to be taken in **developing the human capital necessary for quantum computing** in Mexico.*

*"The aim of this was to make progress towards the design of quantum algorithms to **solve problems on the cutting edge of medicine**," said Venegas-Andraca.*



Currently, the project is working on proposals to accelerate the development of talent in this area and to thus increase the **number of advanced quantum computing algorithms implemented** for different applications related to biopharmaceutical and other sectors.

Luis Ayala, from Tec de Monterrey's Continuing Education department, along with Professor Cárdenas, designed and implemented the program which includes cutting-edge technology and methodologies.

*"The experience of liaising with the GTC has allowed us to **transfer our best practices in research, innovation, and technological development** in cutting-edge areas and methods," said Cárdenas.*

"Strategic partnerships for the development of talent with global companies such as AstraZeneca allow us to grow together.

"As a result, companies can achieve their cutting-edge talent development goals and the Tec can contribute to the design of programs aligned with those strategies by assigning our best instructors," Ayala commented.

The AstraZeneca GTC in Guadalajara is home to more than **550 engineers specializing** in the latest information technology. It is led by:

- *Alberto Treviño, director of the AstraZeneca GTC in Guadalajara.*
- *Alejandra Gutiérrez, Global IT Talent Development partner, and*
- *Adriana Chavoya, Guadalajara Talent Development specialist.*

*“Here at AstraZeneca’s Global Technology Centre in Guadalajara, we’re striving to take a leading role in the **Digital Transformation** of our company,” explained Alberto Treviño.*

*“Partnerships such as that developed with the Tec allow us to make solid progress in pushing science to its limits and **improving the lives of people** around the world.*

*“We’re grateful to the Tec for supporting us with these valuable Quantum Computing sessions. We’re convinced that together we can shape the way in which this technology will **benefit the pharmaceutical industry in the future** and improve the lives of millions of people,” he said.*

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Understanding quantum computing

“If we use a coin to compare the bits in classical computing with the qubits in quantum computing, bits only have two values, heads or tails.

“However, the qubit has an infinite number of values. It can be any point on the surface of the sphere generated by a spinning coin,” explained Professor Cárdenas.

He also said that it will be one of the **technologies with the biggest impact** on the IT industry in the years to come. He added that IBM expects to start scaling up and commercializing this technology in 2023.

That is why this Tec academic believes it is important to develop the human talent that will be needed in this area in the shortest possible time.

To this end, Tec de Monterrey is promoting this line of cutting-edge research by **transferring knowledge** to corporations such as AstraZeneca.

The aim is also for this type of collaborative work to eventually **generate tangible applications** that **benefit industry and society** (ITEM No. 115337).

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