

# Tec awards its most exceptional researchers from 2021



The **2021 Rómulo Garza Research and Innovation Awards** recognized innovation and research projects, publications in books and scientific journals, as well as the careers of some Tec researchers.

[Tecnológico de Monterrey](#) and the [Xignux](#) company rewarded the research work of teachers and students at high school, undergraduate, and graduate levels.

*“The award was created to **inspire and encourage** those who dare to face the challenges of the scientific world,”* said Eugenio Garza Herrera, Chairman of the Board of Xignux and Chairman of the Rómulo Garza Award Committee.

*“We believe that when focused on the relevant areas, **research, technological development, innovation, and entrepreneurship** are the driving forces behind **development and wellbeing**,”* said David Garza Salazar, Rector and Executive President of the Tec.



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## Winners of the 2021 Rómulo Garza Research and Innovation Award

This year, seven awards were given in six categories:

- *INSIGNIA Research Professor Award*
- *Most cited articles*
- *Published books*
- *Research projects from PrepaTec, undergraduate, and graduate students*

### An award for her career as a researcher

Dr. Janeth Gutiérrez was recognized with the **INSIGNIA Research Professor Award** for her career at the School of Engineering and Sciences, making her the **second woman to win this award**.

*“For me, winning an award isn’t reaching a goal, but taking time out **to be grateful**,”* said the researcher.

*“When I learned about this recognition, the first image that came to my mind was the day I saw the CETEC building from the backseat of my dad’s car and I said that I was going to study at the Tec because **I wanted to invent things**,”* she recalled.

Her work as a scientist has been dedicated to contributing to **knowledge on promoting wellbeing through diet** at the Department of Biotechnology and Food Engineering.

She is currently a **Level III member of the National Research System**, has **published more than 118 articles in scientific journals**, and has nearly **three thousand citations in the Scopus database**.

Dr. Gutiérrez has been working **at Tec de Monterrey for 14 years**, where she has **advised 20 master's theses and 10 doctoral theses**.

In 2020, she was the first Tec researcher to win the **Young Researchers Award granted by the Mexican Academy of Sciences**, in the category of Natural Sciences.

She was also recognized in 2017 with a **Civic Merit Medal awarded by the Government of Nuevo León** for her work in the food field.

*"Today, I received this award with great responsibility to **continue my passion for research** and invite more young people to this path of **disruption and scientific development**,"* said the winner.



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### **Creating a technique to detect bots in social networks**

Dr. Jorge Rodríguez, director of the Master's Program in Cybersecurity, was recognized in the category of **Articles published in high-impact journals with the highest number of citations**.

The professor, who is a member of the School of Engineering and Sciences at the Tec's Santa Fe campus, is the first author of the article **A one-class classification approach for bot detection on Twitter**.

This analyzes techniques to **detect when an account is managed by a robot and not by a human**. It also proposes a new technique to carry out this process with a strategic approach to computer learning.

The article was published in the **Computers & Security** journal in 2020, had **21 citations in Scopus**, and an **impact factor of 14.41 according to the Field-Weighted Citation Impact (FWCI)**.

The research was conducted in collaboration with other authors from Tec de Monterrey.



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### **Multidisciplinary analysis on the properties of corn**

Dr. Sergio Serna, from the Center for Research and Development of Proteins at the School of Engineering and Sciences, was recognized in the **Published Books/eBooks category**.

The book **Corn: Chemistry and Technology** was published in 2019 by **Elsevier** in cooperation with **the American Association of Cereal Chemists**.

Dr. Serna's work consists of a **study with a multidisciplinary approach to corn**, analyzing its properties based on chemistry, technology, and industrialization.

It has more than **395 citations in the Google Scholar database**.

Dr. Serna has focused his research work on **developing food with properties that help prevent diseases** such as diabetes, cholesterol, hypertension, and cancer.



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### **Analyzing the utilization of waste from the tequila industry**

Biotechnology Ph.D. student Diego Díaz was recognized for his work in the research project **Development of circular bioeconomy strategies for the integrated management of tequila vinasses**.

He was advised by Dr. Misael Gradilla and Dr. Carolina Senés, research professors from the School of Engineering and Sciences in the Tec's Western Region.

His research focuses on **two reproducible methodical approaches for reusing waste from the tequila industry** that are important to the economy and environment of Jalisco.

It analyzes the integrated **management of agro-industrial waste from tequila vinasses** and the **evaluation of water quality in water systems**.

From this research, **five publications were made in scientific journals**.



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### **Creating a system of nanoparticles to treat cancer**

Michaela Prado and Cristobal Riojas, undergraduate students of Nanotechnology and Chemical Sciences Engineering and Biotechnology Engineering, were also recognized with the **2021 Rómulo Garza Award**.

Their project, called **Dual-nanoparticle system for enhanced drug accumulation and prolonged retention in metastatic cancers**, presents a solution to treat metastatic cancer.

They were advised by Dr. Natalie Artzi, from the **Massachusetts Institute of Technology (MIT)** and Dr. Marcelo Videira, research professor at the Tec's School of Science and Engineering.

In their research, they implemented the use of a **system of two nanoparticles linked by a chemical bond** that is designed to separate in the conditions of a tumor microenvironment.

This enables **the formation of nanohydrogels for drug delivery** in tumors.



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### **Designing a tool to reduce the voltage in DC-iEK systems**

Engineering Physics student Rodrigo Ruz was recognized for the project **Amplification factor in DC insulator-based electrokinetic devices: a theoretical, numerical, and experimental approach to operation voltage reduction for particle trapping.**

His advisor was Víctor Pérez, a research professor at the School of Engineering and Sciences of the Tec's Monterrey Region.

The research focused on **a new theory to optimize DC-iEK microfluidic channels to reduce the entrapment voltage of polystyrene particles** and achieve operating voltages below 100 V.

As a result, a computational tool was developed that enables **entrapment conditions to be predicted in DC-iEK devices** and aims to reduce the voltage required for application in different fields such as **biomedical engineering.**

The research was conducted in collaboration with other **students from the Tec, the University of California, and the Rochester Institute of Technology.**



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### **Achieving counting automation with artificial intelligence**

PrepaTec Esmeralda student Máni Ulrik Nielsen focused his research on the development of **machine learning** techniques to **create a counting and pattern recognition system**.

The student's project was called **Counting Dots** and aims to solve a problem associated with the cognitive ability to count elements.

By **reviewing neural networks and artificial intelligence elements**, this student was able to simulate the cognitive processes of the human mind.

The high school student was advised on this project by Maruma Godoy, a professor at **PrepaTec Esmeralda**.





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### **An award that celebrates the legacy of Don Rómulo Garza**

The award was created in memory of the **businessman Rómulo Garza**, who was a promoter of research in Mexico, to recognize those **who are looking for solutions to the great problems of humanity**.

*“When focused on the relevant areas, research, technological development, innovation, and entrepreneurship are the **driving forces behind development and wellbeing** in our country, through a **knowledge economy**,”* said the Rector and Executive President of the Tec.

**The award has been given to researchers annually** since 1974 by **Tec de Monterrey** and the **Xignux** company, of which the businessman was a director and founder.



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This year's winners receive the **Rómulo Garza sculpture** and a **monetary prize** of 400,000 pesos in the Insignia category, 200,000 pesos in the article category, 100,000 pesos in the book category, and 50,000 pesos for student projects.

144 nominations were received for this year's awards: 5 for Insignia Researcher, 47 for Scientific Articles, 16 for Published Books, 26 for graduate students, 22 for undergraduate student projects, and 28 for high school student projects.

The award ceremony was held in person at the **Tec's 52nd Research and Development Conference**, in Hall 3 of the Conference Center on the Tec's Monterrey Campus.

The award ceremony was also broadcast live over the internet.

#### **YOU'LL DEFINITELY ALSO WANT TO READ:**

<https://tec.mx/en/news/national/research/12-tec-projects-go-laboratory-real-world>