Gold: Tec students detect pollutants and win global competition

The **NeoTech-e** student group from **Tec de Monterrey on Guadalajara** stood out from among **405 university teams** from **50 countries** by winning a **Gold Medal** in the **“Environment” category** at the international ***iGEM Grand Jamboree* 2023** competition held in Paris, France.

The team developed **a low-cost biosensor** with a fluorescent enzymatic system **capable of detecting emerging pollutants in bodies of water**.

Their innovative proposal **stood out for its technological development**, its experimental process, and the **dissemination of scientific knowledge** in local communities.

NeoTech-e is made up of 20 **Biotechnology Engineering (IBT) students** from the campus, each of whom participated in ***The EC-FRET Biosensor* for *in-vivo* Monitoring Contaminants in Water** project.

The ***International Genetically Engineered Machine***, or ***iGEM, Grand Jamboree*** is an organization dedicated to **promoting synthetic biology** and education and competitiveness.

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Pollutant detector

The **NeoTech-e** proposal included the creation a **biosensor capable of detecting erythromycin, a polluting antibiotic** found in bodies of water in Jalisco.

The biosensor takes the form of a **fluorescence detector** which uses a chimeric enzyme (a protein involved in biological processes) with a fluorescent protein at each end.

Upon contact with the pollutant, the **chimeric enzyme in the middle is able to detect the pharmaceuticals**. The proteins at the ends generate a **fluorescence reaction**, better known as **FRET** (Förster Resonance Energy Transfer).

“*We were very proud to represent not only the country, but all of Latin America*,” said Jorge Donato, professor at the School of Engineering and Sciences (EIC) at Tec and student group advisor.

“*Through this proposal, we want to combat the problem of **new pollutants polluting bodies of water**,”* added the academic.


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Strong and supportive communities

Donato mentioned that the main objective is to "***monitor the fluorescence in different bodies of water in Jalisco****; this sensor* ***can be used to detect the amount of erythromycin*** *in bodies of water."*

The project **also had a local impact** by including the El Salto community (near Guadalajara). The team carried out **intervention work** by informing the people there about the risks threatening the **Santiago River**.

The **NeoTech-e** students also carried out activities called *Human Practices*, which took the form of **talks aimed at raising awareness and disseminating scientific knowledge** in schools for blind children and nursing homes.

They explained **the role of synthetic biology** and the impact of the lack of action taken against new pollutants in bodies of water.

"Through this proposal, we want to combat the problem of new pollutants in bodies of water." Jorge Donato.

They also designed an **inclusive lottery** with a laboratory theme. This included information written in *Braille* to spread scientific knowledge among **visually impaired children**.

This led the team to be nominated for the ***Inclusivity Award*** at ***iGEM* 2023**, a category that recognizes teams that make exceptional efforts **to include people with diverse abilities and identities in scientific research**.

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The future and impact of NeoTech-e

“There are currently no methods for detecting and quantifying new pollutants. Our project creates a friendly and low-cost biosensor to detect pollutants. It's a device that measures fluorescent signals and allows users to see the results through an application,” said team leader Elizabeth Valencia.

Donato hopes that the students will continue participating in scientific projects to be presented internationally in 2024 and, at the same time, promote dissemination within the community.

"*Our project is the tip of the iceberg of something much more complex:* ***water pollution****... The idea is to adapt this system in such a way that it will be able* ***to detect several types of polluting compounds***," he highlighted.

NeoTech-e aims to continue developing the project in 2024 and **to analyze the possibility of** commercializing the biosensor, thereby helping **combat water pollution**.

NeoTech-e participated in **iGEM 2022**, which was also held in Paris, France. On that occasion, they won a **Bronze Medal** with the same project. After that presentation, they improved the proposal and won their category in 2023.

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