

# Microscopic photo from Tec scientists on international journal cover



A **microscopic image** from [Tec de Monterrey](#) researchers has been featured on the cover of the December 2022 special issue of the [Advanced Healthcare Materials](#) journal.

*“The cover they gave us was on a special issue of Advanced Healthcare Materials, a very prestigious journal in biofabrication and advanced materials applied to biomedicine, which is our area of expertise,”* said **Dr. Grissel Trujillo**, a research professor at the Tec.

Dr. Trujillo explained that her team was invited to collaborate on the publication of an article on biofabrication applications, which is one of the most important areas of expertise for the [Álvarez-Trujillo Laboratory](#) at the **FEMSA Biotechnology Center**.

*“We submitted a manuscript on the use of chaotic 3D bioprinting to create **microvasculature**. As a proof of concept, we printed **skeletal muscle tissue** with small channels within the bioprinting constructs.*

*“This gives us a lot of visibility with the audience that we’re interested in, and it also gives visibility to Tec de Monterrey and the research work we’re conducting in Mexico,”* added the academic.

<https://twitter.com/GrissSantiago/status/1605950733290831872>

**The microscopic image**

Dr. Trujillo explained that the image was taken with a **scanning electron microscope** on the **Monterrey campus** by doctoral students Joana Bolivares and Carlos Fernando Ceballos, who are working on **chaotic bioprinting**.

Dr. Trujillo said that a **chaotic flows** technique was used to create the structures, **with one permanent material and another expendable one**.

*“(These) chaotic flows have that peculiarity of creating **very fine structures** efficiently, in a very short space of time.*

*“In the **permanent** one, we placed muscle precursor cells that eventually form mature musculoskeletal tissue; and the **expendable** one forms holes within the structure, leaving very narrow microchannels.”*

*“**This gives is a lot of visibility with the audience that we’re interested in, and it also gives visibility to Tec de Monterrey and the research work we’re conducting in Mexico.**”*

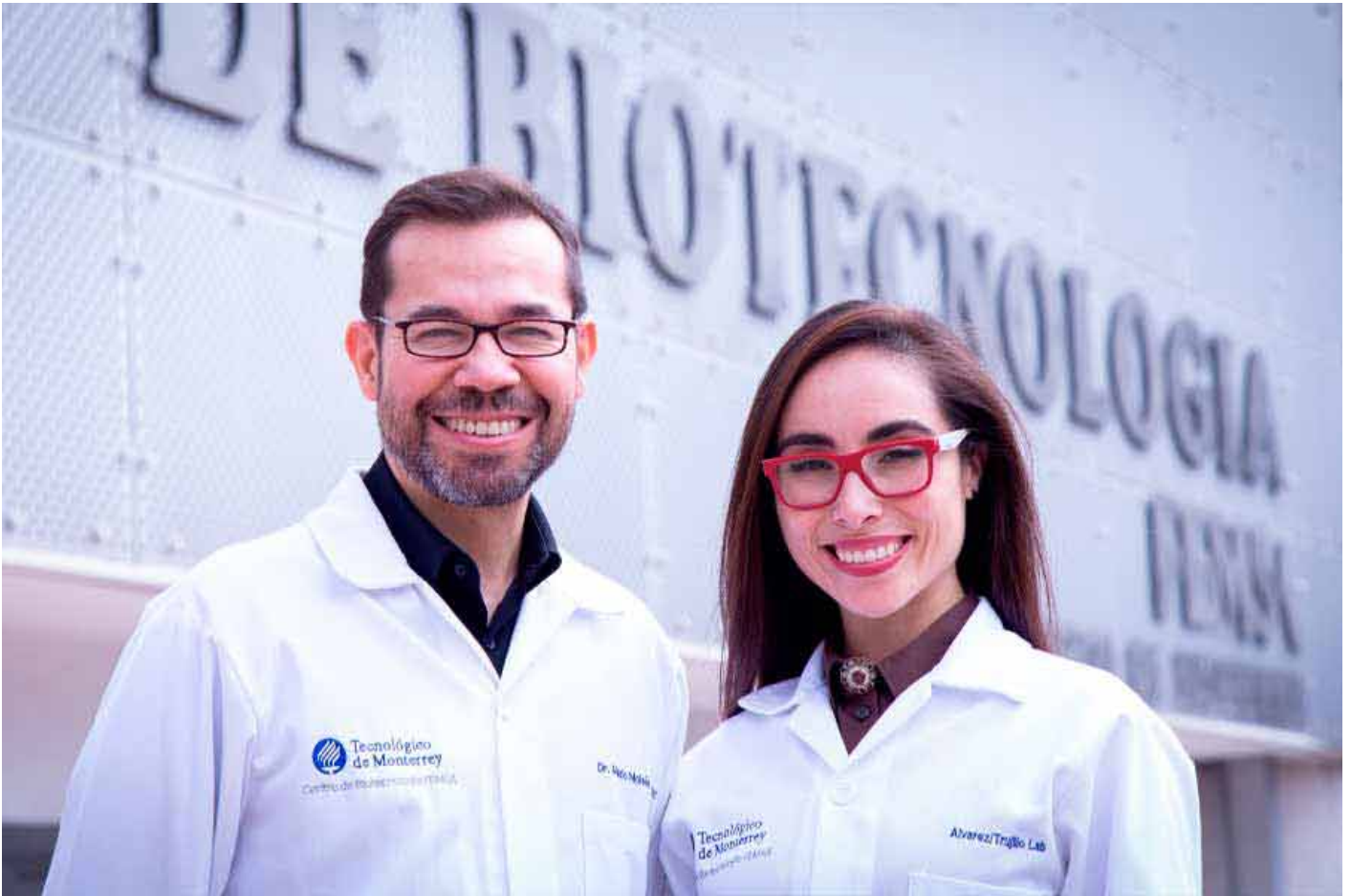
She said that the cover picture shows **just one filament**.

*“The strips you see are actually hydrogel that we dehydrated so they could be seen under a microscope, and you can see channels between **those strips of hydrogel**.*

*“Those channels were made by the expendable material, the hydrogel that doesn’t stay in the structure, which breaks out and **makes channels as thin as 20 microns.**”*

The researcher said that this width of 20 microns replicates the width of the **capillary vessels** that are naturally found in tissues.

*“This **allows us to more efficiently transport the culture medium**, nutrients, and gases such as oxygen, and also carry waste products that can eventually be toxic to cells.”*



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### **The symbolism of the color pink**

This project was led by Dr. Trujillo and **Dr. Mario Álvarez**, with whom she runs the [Alvarez-Trujillo Lab](#) at Tec de Monterrey.

The work was based on **Joana Bolívar's** thesis, on which **Carolina Chávez Madero**, author of the first article on continuous chaotic 3D bioprinting also collaborated, as well as Silvana Vázquez Marín and other undergraduate students.

*"It should be noted that **the science and the art are very important** for an image to be accepted on the cover of **a journal of this level**," said Dr. Álvarez.*

Dr. Álvarez highlighted the image editing work done by Dr. Trujillo by putting the image **in pink**.

*"**That pink color decorates the interior of the fiber**, which is symbolic because it represents the culture medium that circulates through that central part of the fiber.*

*"**The editors of the journal acknowledged the importance of this by giving us this cover and putting part of the journal's title in that same pink, mimicking the color.**"*

### **A remarkable achievement for the Tec researchers**

This is not the first time that this group of researchers has been on the cover of a specialized journal.

**In 2021**, Dr. Trujillo was the **winner** of the **cover** design for the scientific journal **Material Advances**, published by the **Royal Society of Chemistry**, a scientific society from the **U.K.**

Previously, Dr. Álvarez was published on the cover of **Horizon Materials** journal, totaling more than 10 covers for the group.

Dr. Álvarez highlighted that this cover is an important achievement for the **Tec, Mexico, and the Álvarez-Trujillo Lab.**

*“The Tec has announced **advanced materials as a strategic research area**. Now, they’ve given us a cover on **Advanced Healthcare Materials**. It’s not a minor thing.*

*“A journal of this level has recognized us for the work of **chaotic printing**, invented here at the Tec. This recognition of **Advanced Materials** is very significant and relevant for the Tec de Monterrey,”* said Dr. Álvarez.

Dr. Trujillo agreed with the **importance of this achievement.**

*“It’s important to us that this has been chosen for the cover of such an important journal, which shows **clear leadership from Mexico, Tecnológico de Monterrey, and the Álvarez Trujillo laboratory**,”* she concluded.

## **The authors of the work**

- *Edna Johana Bolívar*
- *Carlos Fernando Ceballos*
- *Carolina Chávez-Madero*
- *Brenda Guadalupe de la Cruz*
- *Silvana Velásquez Marín*
- *Shirley Mora*
- *Luisa María Reyes*
- *Ali Khademhosseini*
- *Paul S. Weiss*
- *Mohamadmahdi Samandari*
- *Ali Tamayol*
- *Mario Moises Alvarez*
- *Grissel Trujillo*

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