

# DAYANNE and MURILLO



The power of  
nanoscience

**NANO KOMIK**  
FIRST PARTICIPATIVE NANOFICTION COMIC



GOBIERNO  
DE ESPAÑA

MINISTERIO  
DE ECONOMÍA, INDUSTRIA  
Y COMPETITIVIDAD

FECYT



FEDERACIÓN ESPAÑOLA  
DE CENTROS DE INVESTIGACIONES  
CIENTÍFICAS



CIC  
nanogune  
nanoscience cooperative research center

dipc

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### SPONSORS



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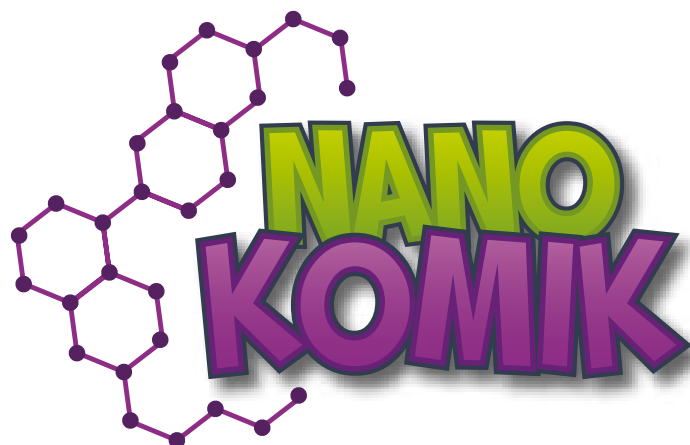
The great scientific advances of the last century have made nanoscience a reality. Thanks to quantum mechanics, we now understand the properties and phenomena relating to matter at the nanoscale, and large microscopes manipulate atoms one by one. The possibilities opened up by this new field of science are endless and will have great repercussions in various sectors ranging from medicine to construction, generating important changes in our lifestyle.

Conscious of this reality, in 2016 the research centers CIC nanoGUNE and the Donostia International Physics Center (DIPC) launched the nanoKOMIK project for the creation of the first participative nanofiction comic. This is a science outreach initiative of a participatory, multidisciplinary, and international nature that seeks to make society aware of the advances that are being made in the field of nanoscience and nanotechnology, in this way awakening the creativity of the younger generation.

This book is the end result of the nanoKOMIK project. For its creation, the nanoKOMIK challenge was launched in early 2016, and has involved more than 190 youngsters between the ages of 12 and 18 in a free creative process. This has meant giving life to their own comic superheroine or superhero, endowing them with nanopowers thanks to the surprising properties that matter acquires through nanotechnology. In response to the challenge, more than 100 pieces of work have been presented in Basque, Spanish, and French.

Based on the best ideas from the comics presented in response to the challenge, the comic has taken shape as *Dayanne and Murillo. The power of nanoscience*. The book is available in Basque, Spanish, French, and English on the website [www.nanokomik.com](http://www.nanokomik.com)

The nanoKOMIK project is co-funded by the Spanish Foundation for Science and Technology - Ministry of Economy, Industry and Competitiveness.





# STUCK



DR. MURILLO!  
I MISSED YOU DURING  
THE COFFEE  
BREAK!



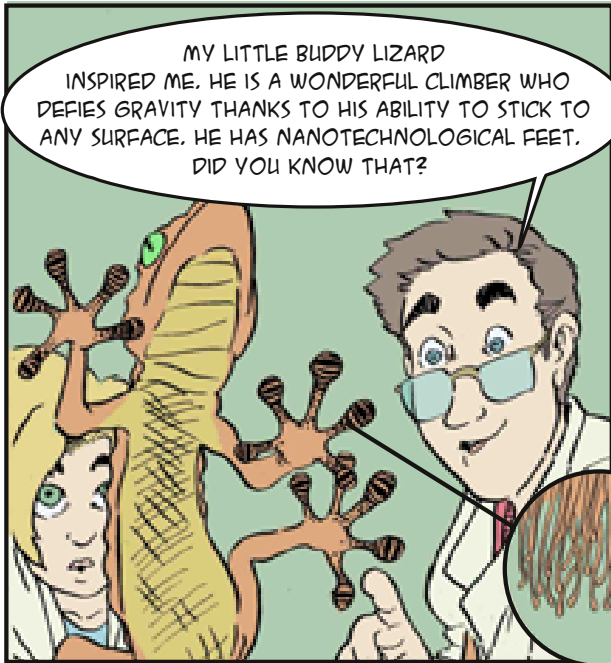
HEY DAYANNE!  
SCIENCE'S MYSTERIES  
HAVE ME PRETTY BUSY  
RIGHT NOW.

LOOK!  
LOOK!

I CALL THEM  
GECKO GLOVES. THIS  
IS GOING TO BE  
REVOLUTIONARY!

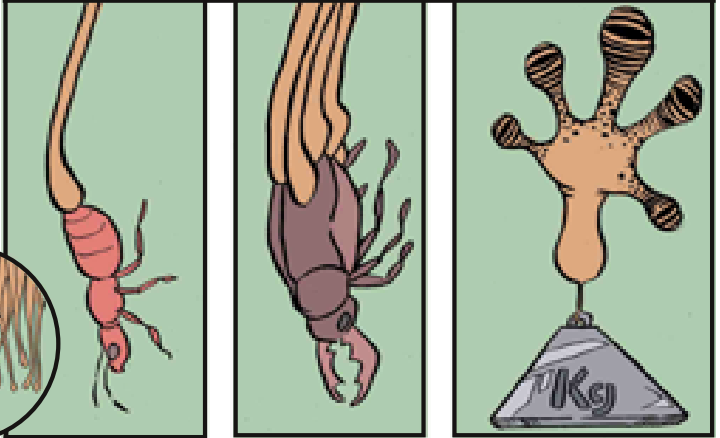
YEAH  
I KNOW.

I'M A GENIUS.



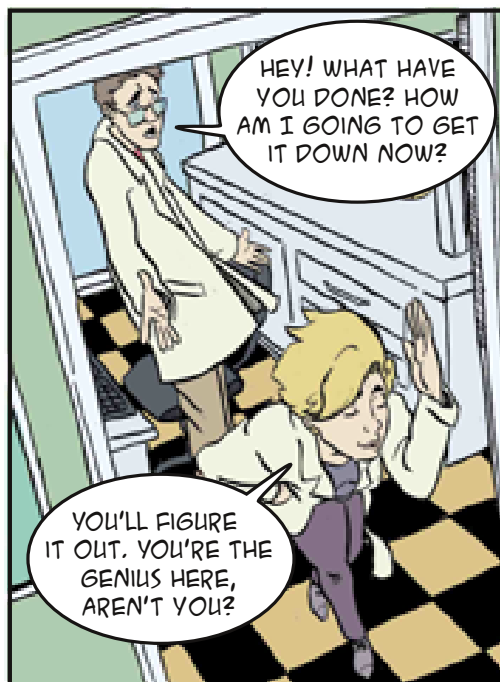
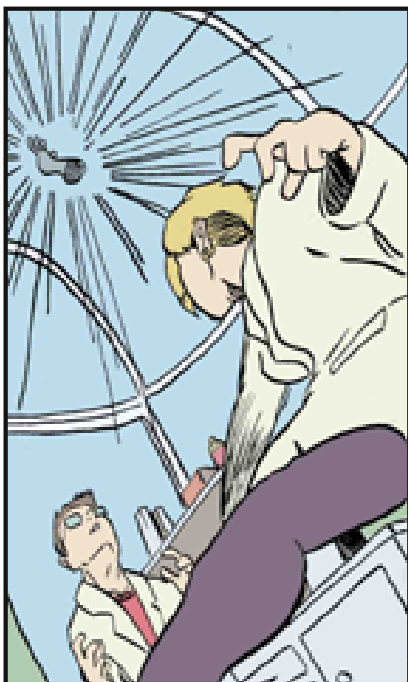
MY LITTLE BUDDY LIZARD INSPIRED ME. HE IS A WONDERFUL CLIMBER WHO DEFIES GRAVITY THANKS TO HIS ABILITY TO STICK TO ANY SURFACE. HE HAS NANOTECHNOLOGICAL FEET. DID YOU KNOW THAT?

Lizard's feet are equipped with millions of very thin hairs. Every hair has hundreds of branches with tiny mushroom-shaped structures on their ends that only measure 100-200 nanometers. Because of Van der Waals Forces, the little mushroom-shaped bodies can bear the weight of an ant and, when millions of these little hairs are combined, geckos can hang from the roof and hold up to 130 kg.



LET ME SEE THAT GLOVE!

CALM DOWN, ENVY ISN'T GOOD FOR YOU... YOU KNOW?



HEY! WHAT HAVE YOU DONE? HOW AM I GOING TO GET IT DOWN NOW?

YOU'LL FIGURE IT OUT. YOU'RE THE GENIUS HERE, AREN'T YOU?



YOU DON'T KNOW WHO YOU'RE UP AGAINST, LITTLE MURILLO. WHEN YOU SEE WHAT I'VE GOT GOING, YOU'LL REALLY BE SURPRISED.



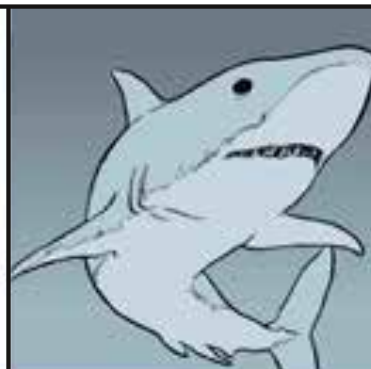
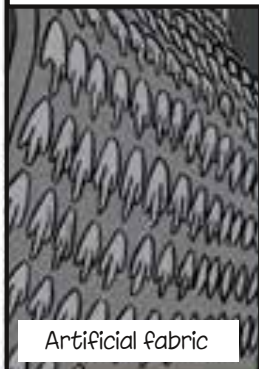
# BATHED IN WATER



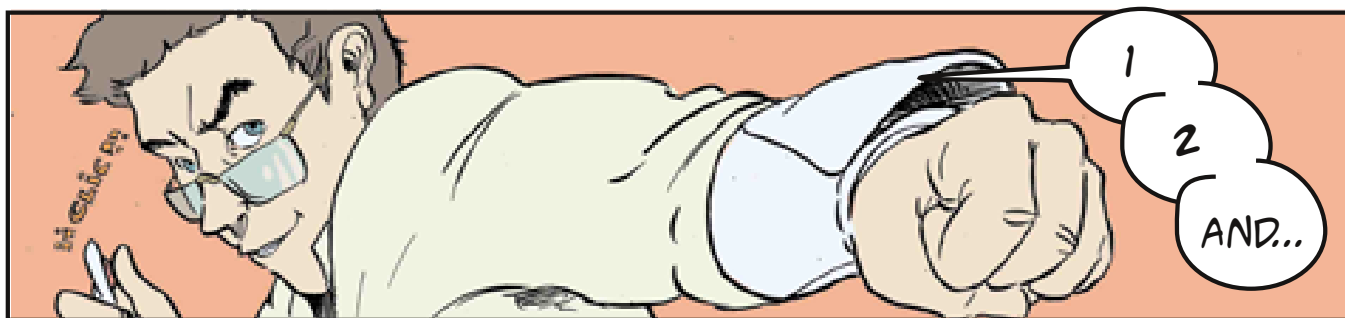
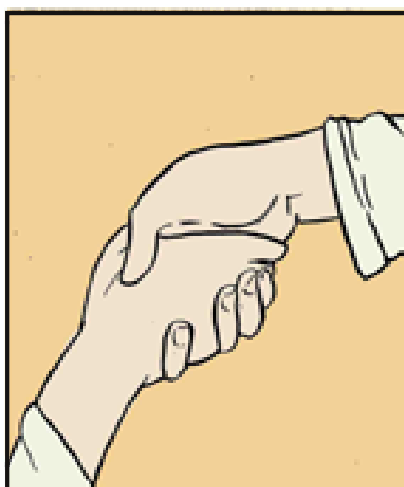
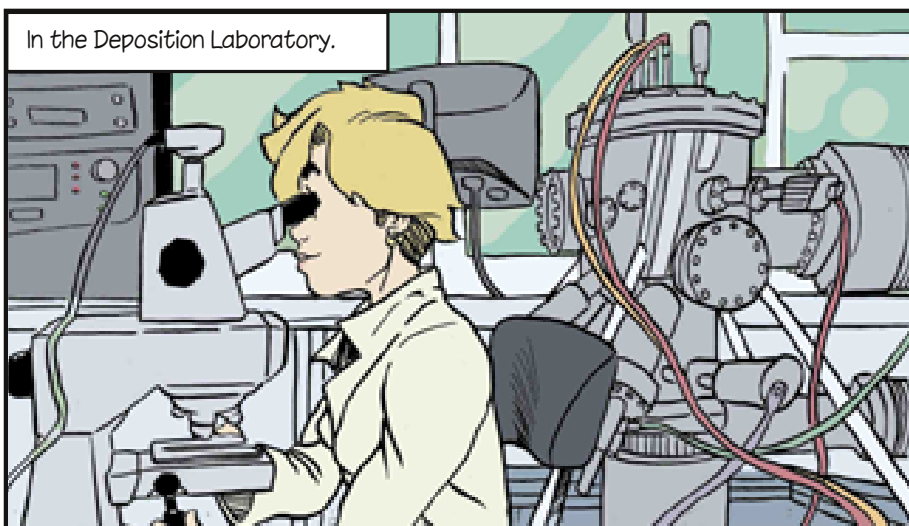




A nanostructured fabric with superhydrophobic properties imitates the skin of a shark, reducing friction in the water and increasing the swimming speed.



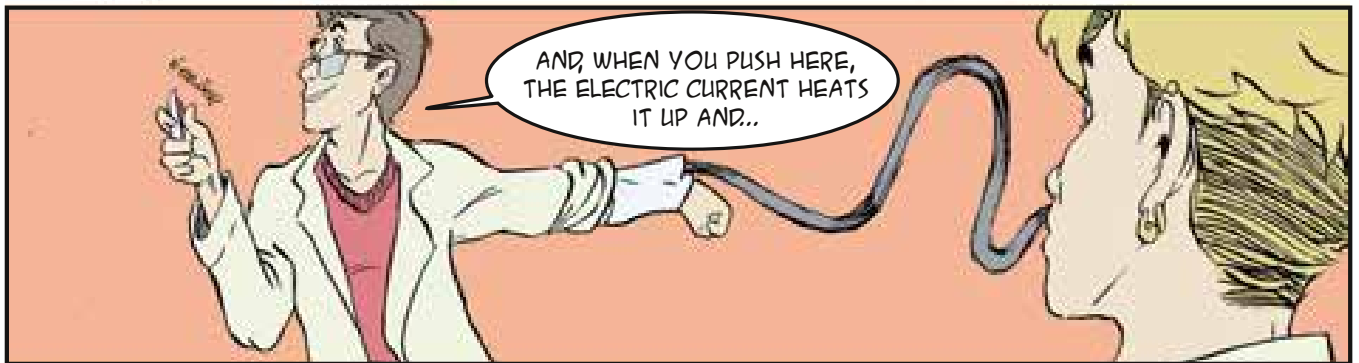
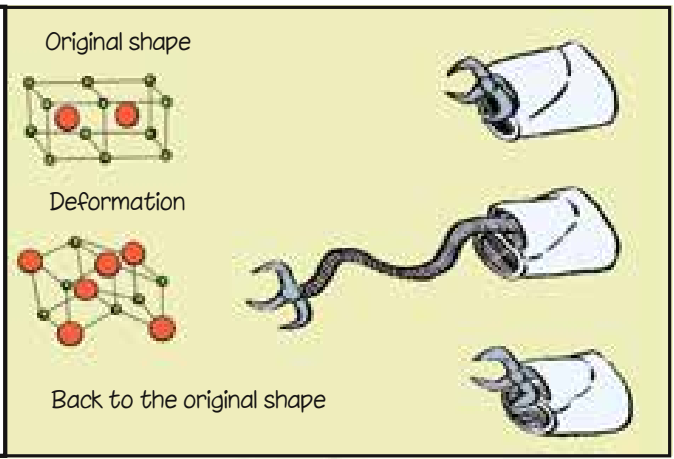
# BACK TO THE ORIGINS





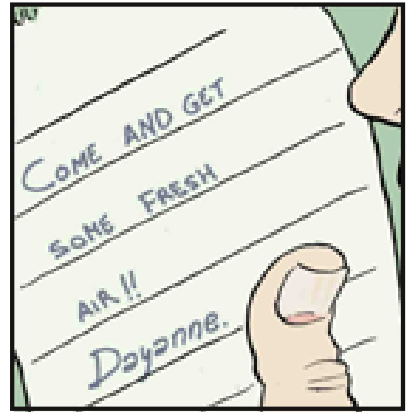


Some malleable alloys like nitinol - a mixture of nickel and titanium- have shape memory: they easily undergo deformation but they go back to their original shape when they heat up thanks to atomic shifts that alter their nanostructure.



# GYMKHANA

In the Computer Center supercomputers process data and more data.

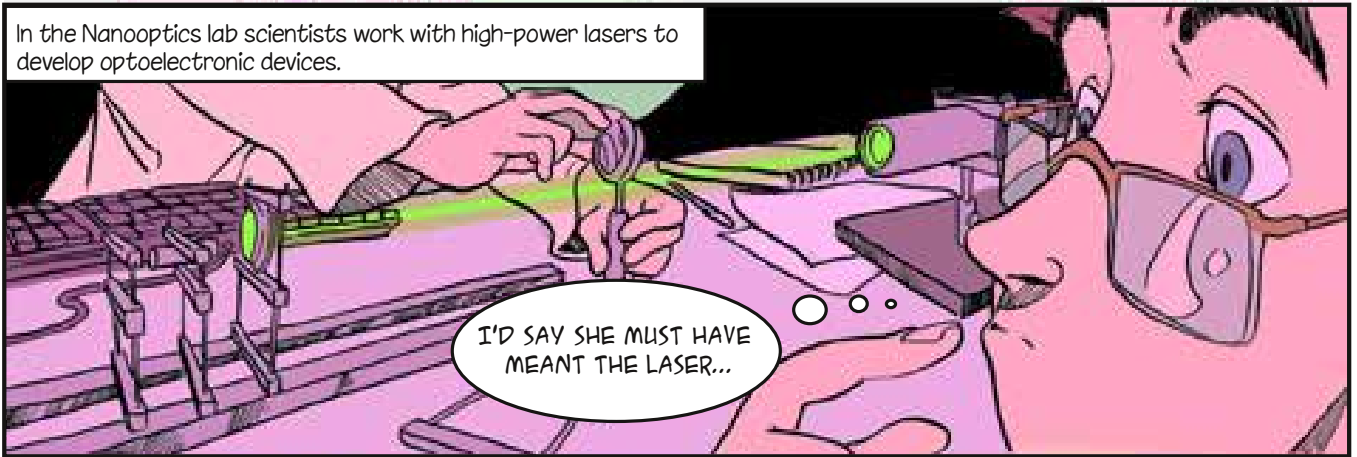


In the cleanroom, the environmental parameters (particles in the air, moisture, light, etc.) are strictly controlled so that samples are not contaminated.





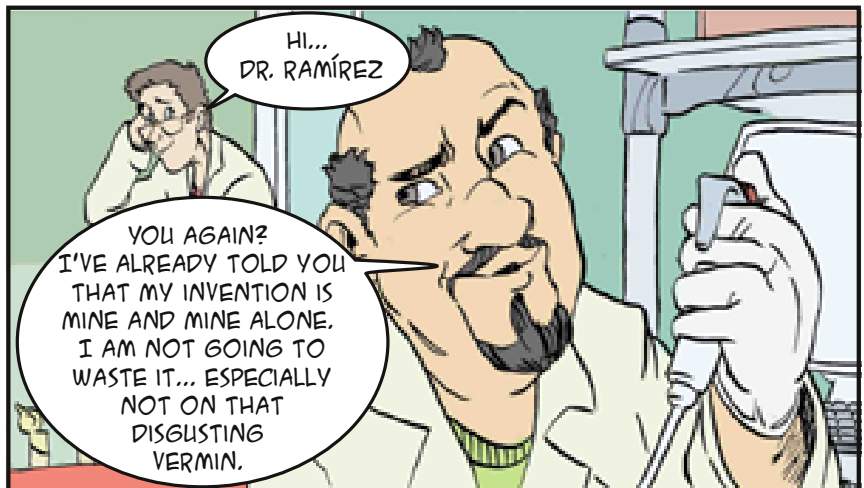
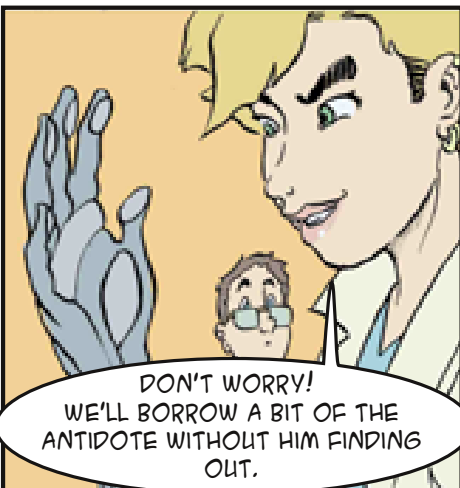
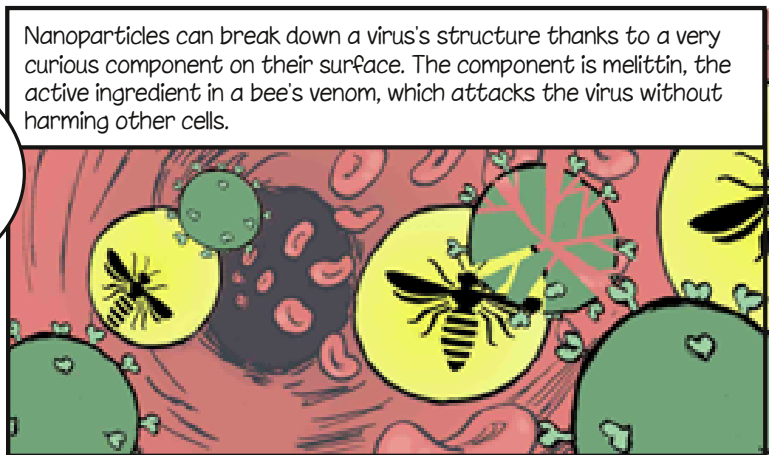
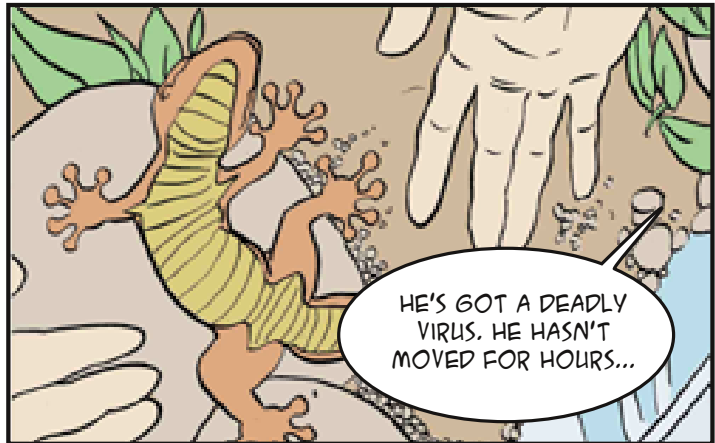
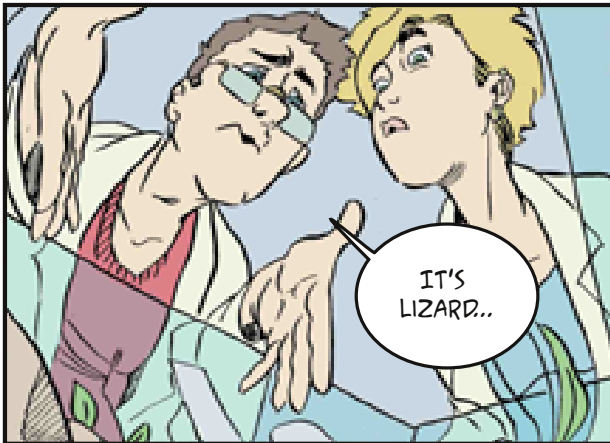
In the Nanooptics lab scientists work with high-power lasers to develop optoelectronic devices.



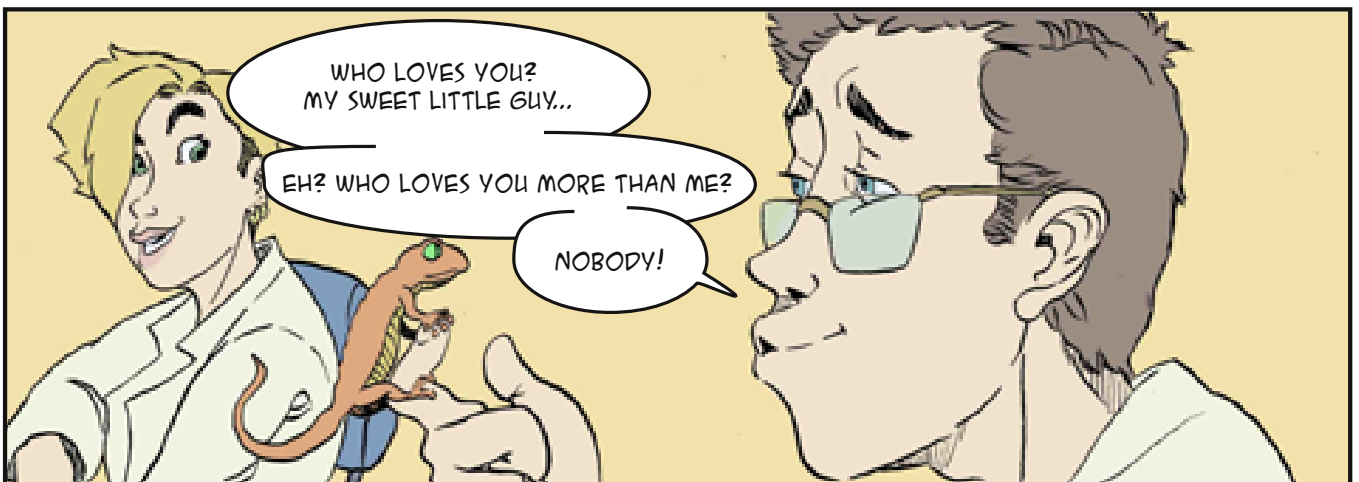
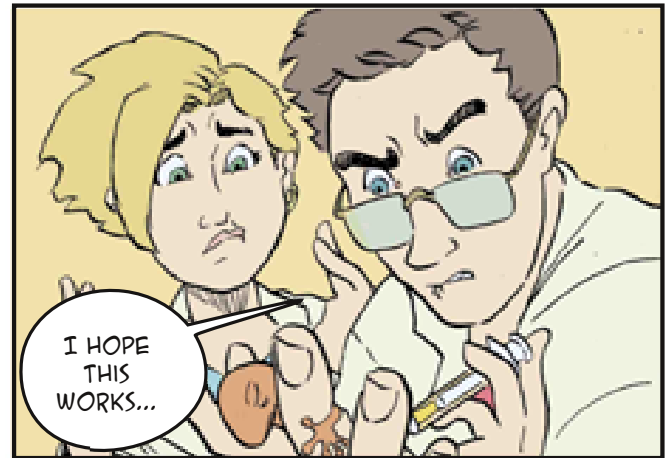
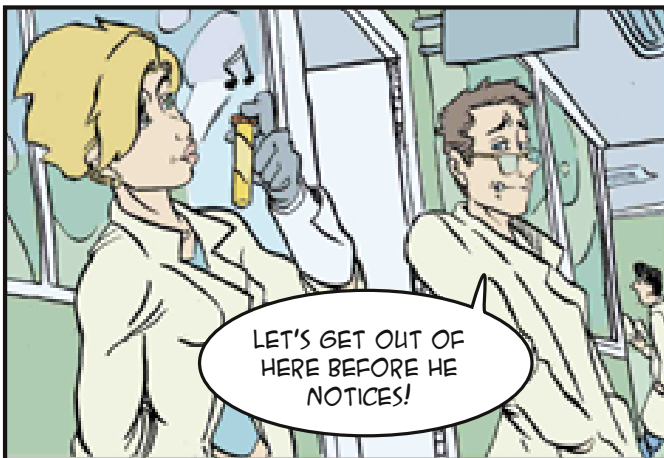
The suit has a network of nanocrystals that changes its density to imitate the cells of a chameleon's skin. This allows it to control how much light is reflected and, in turn, to change its color, blending in with the surroundings.



# SMALL BUT DEADLY

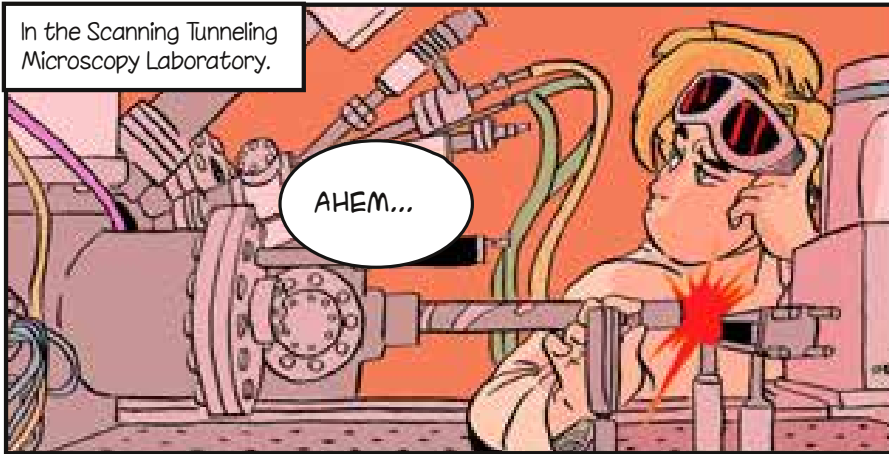




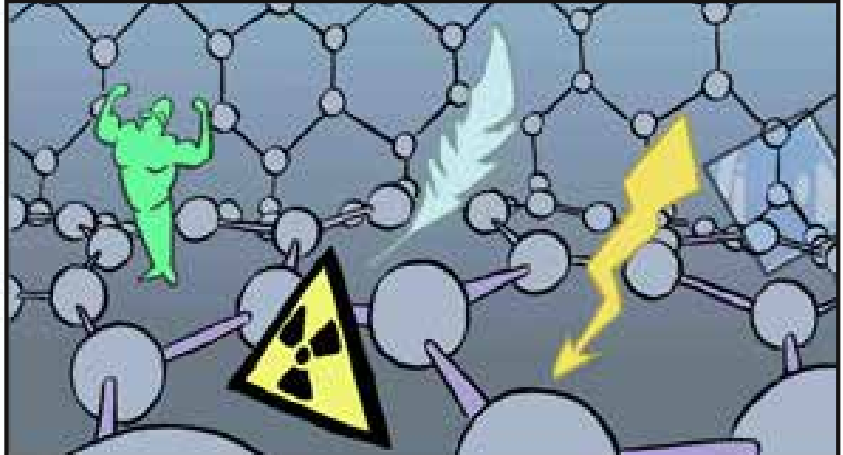


# DIAMOND IN THE ROUGH

In the Scanning Tunneling Microscopy Laboratory.



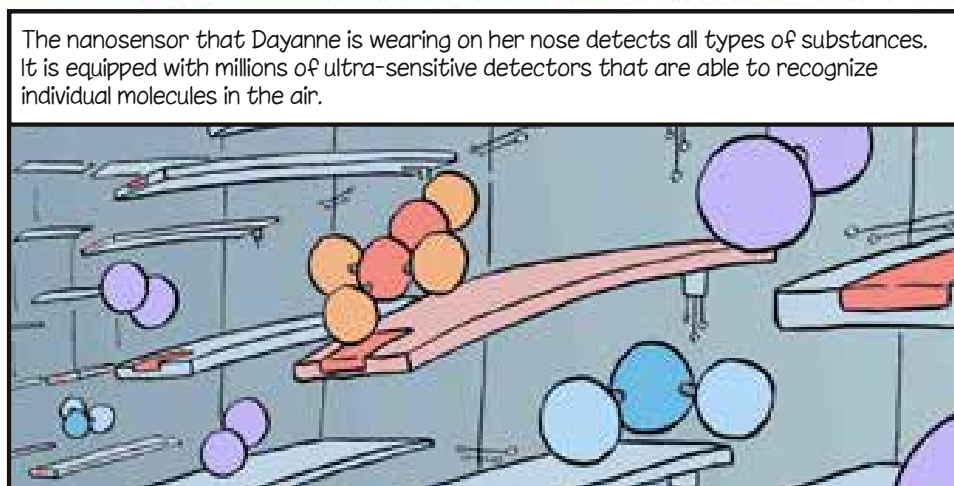
Graphene is pure carbon -like diamonds- but its atoms are hexagonally arranged in a layer which is only one atom thick. This is the thinnest cape in existence and it is about 100 times stronger than steel, flexible, super light, transparent, an excellent conductor, and it even provides protection from ionizing radiation.





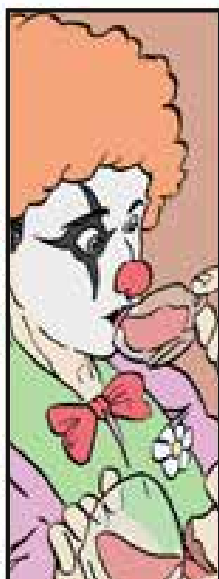
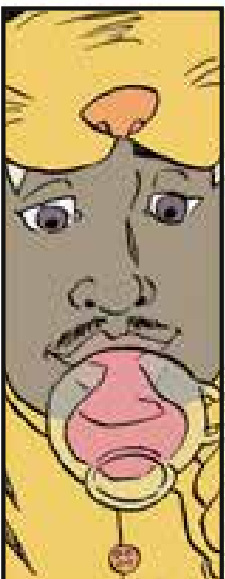


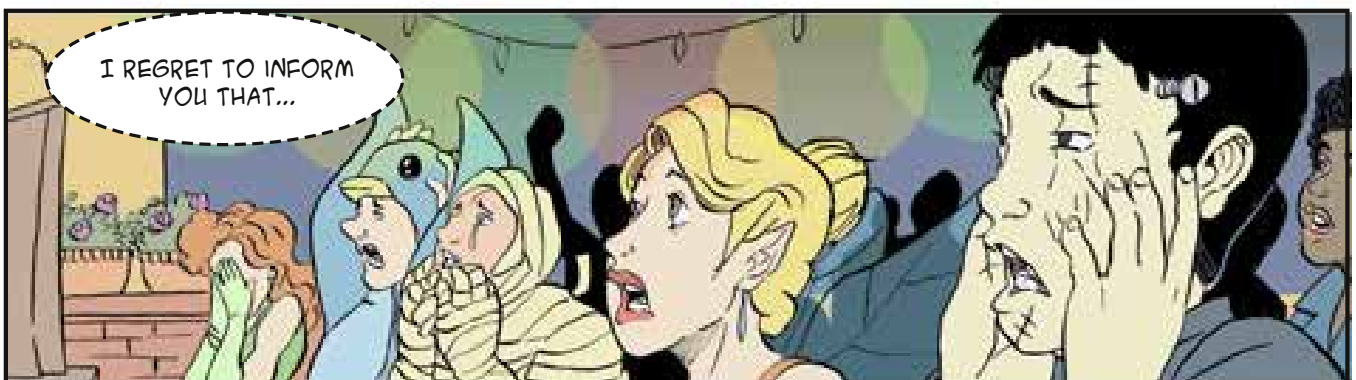
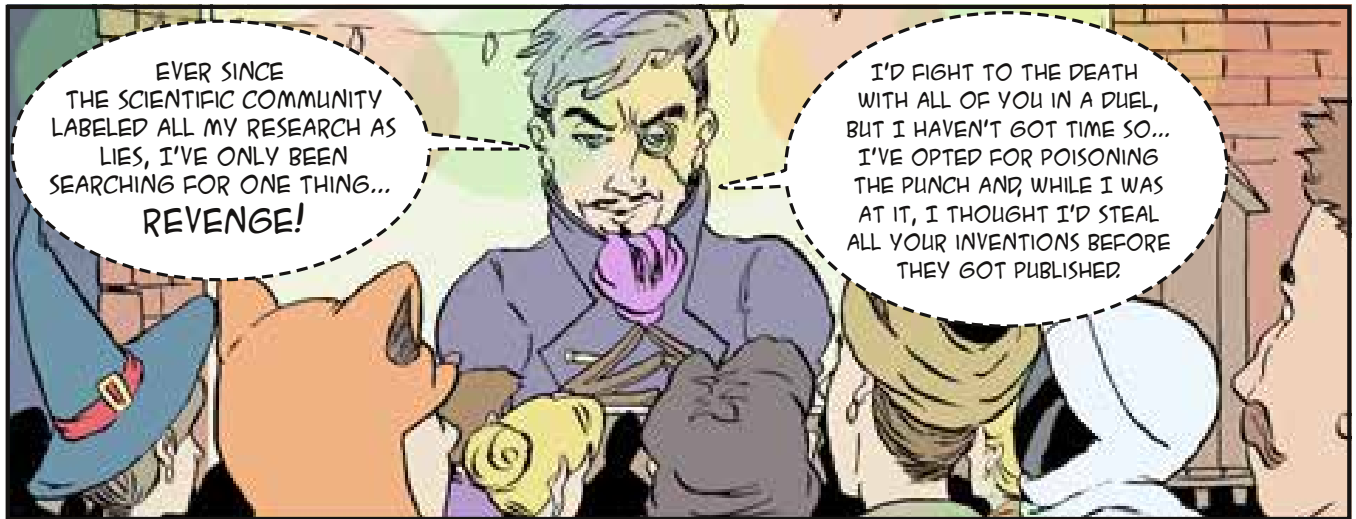
# LETHAL PUNCH















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