THE NANONAUTS

BIG SCIENCE ON A TINY SCALE!
Welcome to the Nanonauts’ adventures!

This booklet is a quick introduction to carbon nanomaterials and how they can help people and the environment.

This comic gives an idea of the work carried out by COST Action CA15107 ‘MultiComp’ – a group of scientists from all over Europe and beyond who work together to study these tiny materials and find ways to use them.

MultiComp is funded by the EU and is led by Dr Sharali Malik from the Institute of Nanotechnology at the Karlsruhe Institute of Technology, Germany. It covers 34 nations and hundreds of researchers.

Find out more at https://multicomp-ca15107.eu/en/

What are carbon nanomaterials?

These are tiny materials, much to small to see, but have big effects. They’re made of carbon (the same stuff as coal), but have really neat shapes, like sheets, tubes and balls.

They can do amazing things – some can conduct electricity, some are stronger than steel.

We use them in racing bikes, wind turbines, superblack paints, solar cells, tennis rackets and smart phones.

We’ve known about them for a few years now, but new ideas on how to use them are being thought up all the time.

The scientists in MultiComp are always looking to find new ways to use carbon nanomaterials. See what we’re up to with Silvia and Jan in this comic!
**What is a nanometre?**

A nanometre is one billionth of a meter, which is *tiny*. Think how tall you are, now shrink to a thousandth of the size – you’re smaller than a grain of rice and measure in *milimetres*. Shrink again to a thousandth of that size – bacteria now think you look like a snack, but you’re still not small enough even though you now measure in *micrometres*. Shrink to a thousandth of the size again and you’re in the *nanometres*. Now you can see atoms, but no-one can see you!

---

**Silvia** is a happy, bubbly and fun scientist! She loves to include others in her work. She enjoys her job and is very passionate about science. She is also friendly, talkative and incredibly smart.

**Jan** is quiet and calm and like to think things through. He is extremely bright and is great at problem solving, but can be scared to do new things. Together, they explore carbon nanomaterials and can shrink down to see how they work.
Professor Silvia Marchesan’s group in Trieste, Italy, work on changing the surfaces of nanocarbon materials using chemistry. This lets them survive in air and water and be really useful in medicine, engineering and chemistry.

Silvia has made a special water-based gel called a hydrogel that contains carbon nanotubes. The tubes help the gel to heal itself when it is cut, just like in the comic here.

Follow the QR code to see more on Silvia’s group and read more about her MultiComp work on hydrogels with nanotubes here:
http://dx.doi.org/10.1021/acsnano.8b01182
Sylvia and Jan investigate...

Oil’s well that ends well

Jan! What’s happened to Fishbert?

Some nasty oil got into his bowl and Fishbert’s trapped underneath.

Don’t worry, these graphene flakes will help. Let’s see what happens.

The graphene’s like a wire fence!

And it’s trapped the droplets of oil!

I love this biiiiiiiiiiiiii!

I hate this biiiiiiiiiiii!

The horrible oil is trapped and Fishbert is safe!

Carbon to the rescue again!

Postgrad Profile

Rachel McLaren is a postgraduate researcher in the Owen group at the University of South Wales, UK. She works on using graphene to help the environment and to make dangerous chemical processes safer to use.

One project Rachel is working on is using graphene to make filters to remove oil spills from water, just like in the comic here.

For more on Rachel’s work, check out her Twitter feed (@RLMcLaren) or follow the QR code or link below to see more on her MultiComp work:

https://doi.org/10.1039/D0NJ04187D
MAKE YOUR OWN GRAPHENE
Turn over for instructions!
Instructions: Cut out the panel below and fold along the dotted lines. Now cut the black lines while folded. Unfold the paper and carefully pull out to make a graphene sheet!
About the artist
Lottie Keene is a young animator and cartoon artist. She loves wildlife and animation. She lives in the south of Ireland. See what she’s up to on her YouTube channel: Plush Toy Bonnie