

LUX:PLORATIONS

A UNIVERSE OF RESEARCH





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Printed in Luxembourg, Ehlerange by Reka Print + www.reka.lu

ISBN: 978-2-87971-171-3



Disclaimer: This comic is a work of fiction and does not reflect the opinion of NASA, CFL, Uni.lu or any other organisation or of any character appearing in this publication. All events and characters in this comic – even those based on real people – are entirely fictional.

WHY SCIENCE COMICS?



With comics you can tell **ANY** story in a visually pleasing, emotionally engaging and compelling way, don't you agree?



FROM ELEMENTARY PARTICLES TO GARGANTUAN TARDIGRATES - THERE ARE **NO LIMITS** TO YOUR IMAGINATION!

Hey!
What's up,
Quark?



Sigh.
I'm really
down



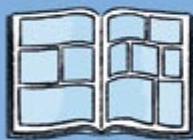
Holy COW!
What's going
ON?!



AND THERE'S MORE!

1. COMICS BREAK DOWN THE BOUNDARIES OF CLASS AND EDUCATION

I'm entertaining,
funny and easy to
read Promise!



THEY CAN MAKE SCIENCE ENTERTAINING & ENJOYABLE FOR THE MANY.

2. COMICS ARE ALL ABOUT TELLING GOOD STORIES

All I
want is YOU to
CARE about and
remember me!

OK



THEY HELP TO MAKE SCIENCE COMPELLING & RELATABLE

3. COMICS COMBINE IMAGES AND TEXT IN A UNIQUE WAY.

I can
SHOW you
things...

...and
I ensure
accuracy!



image + text

THEY HELP TO SIMPLIFY COMPLEXITY WITH ACCURACY.

4. COMICS USE THE FAMILIAR, VISUAL LANGUAGE OF IMAGES



THEY CAN FOSTER INTUITIVE UNDERSTANDING OF SCIENCE.

5. IN COMICS, EVERY READER IS PART OF THE STORY.

For I
CONTROL time &
space in between
panels.

It's
all in my
head!



Depth, complexity,
appeal, entertainment,
understanding - it's all there!
Comics are a **POWERFUL TOOL**
to build bridges between the
world of science and our
everyday life.



Let's go exploring.

Science meets art

For these science comics, we brought together young scientists and comic artists from Luxembourg. We are very thrilled to present 8 short comics resulting from the cooperation between all these talented people, including the science communicators and comic experts in our team. I hope that you will have as much fun reading our comics as we had conceiving them.

Our aim is to present you some research topics which our local scientists are working on but also to give you an idea of the daily life and work of scientists. Research institutions live from the dynamism, curiosity and enthusiasm of our many young researchers.

Serge Haan

Vice Dean of the Faculty of Science, Technology and Medicine (FSTM)

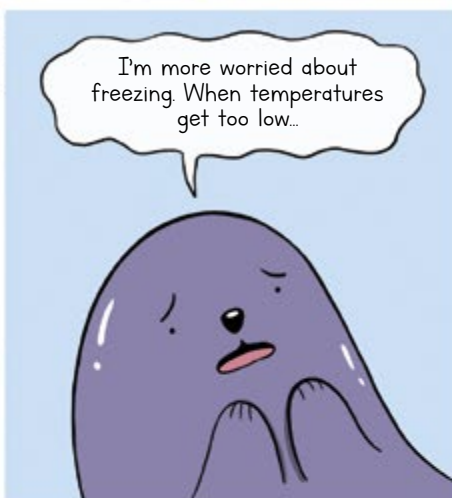
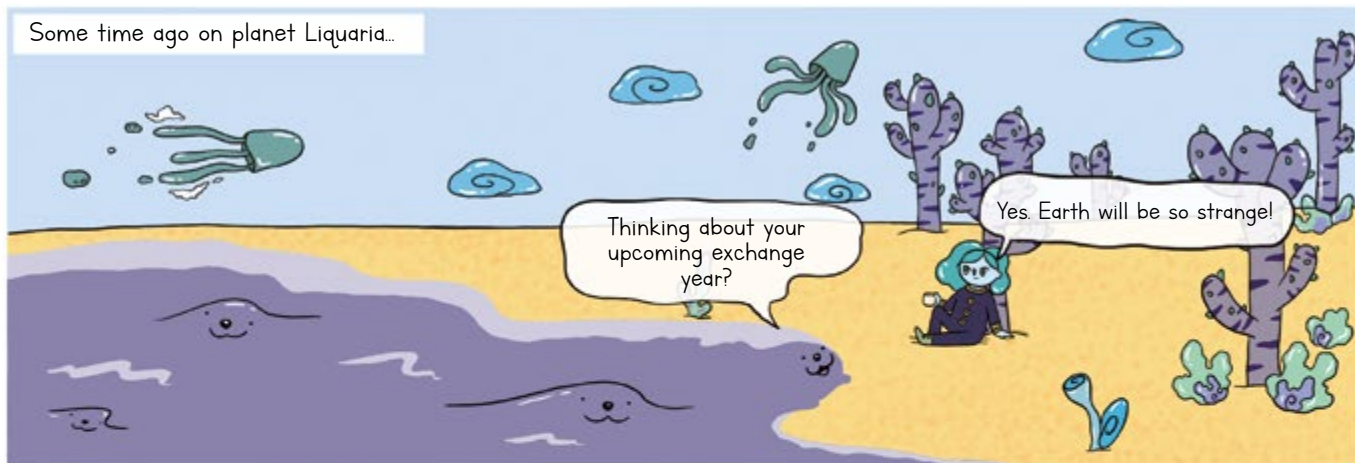


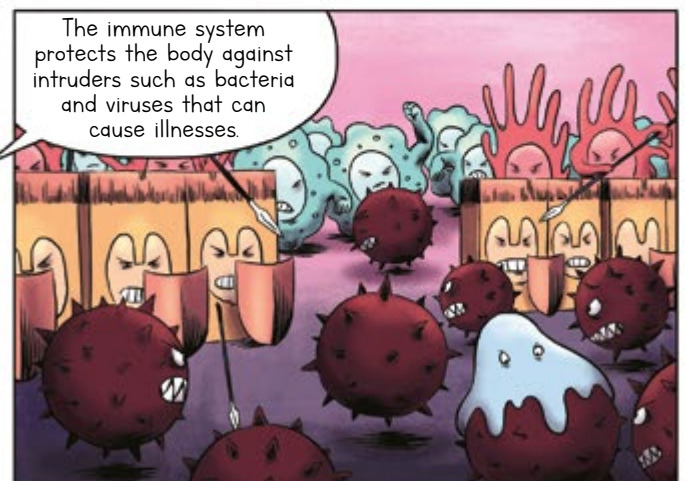
Zamara is a planetary exchange student (think Erasmus, but further away.) from Liqaria. She is also the first Liqarian to leave the planet for an exchange! Earth is so different from her planet – she had never heard of such strange concepts as “war” and “gender” but she is slowly learning how humans work. Zamara learned that on Earth there are several gender identities like female, male, non-binary, trans, genderfluid and agender. Although Liqarians do not distinguish different genders, Zamara has decided to identify as female during her stay on planet Earth. She is bursting with curiosity to understand everything she possibly can about her human friends in Luxembourg. Sometimes she can even get into trouble, for example when chasing her best dog friend Yso.

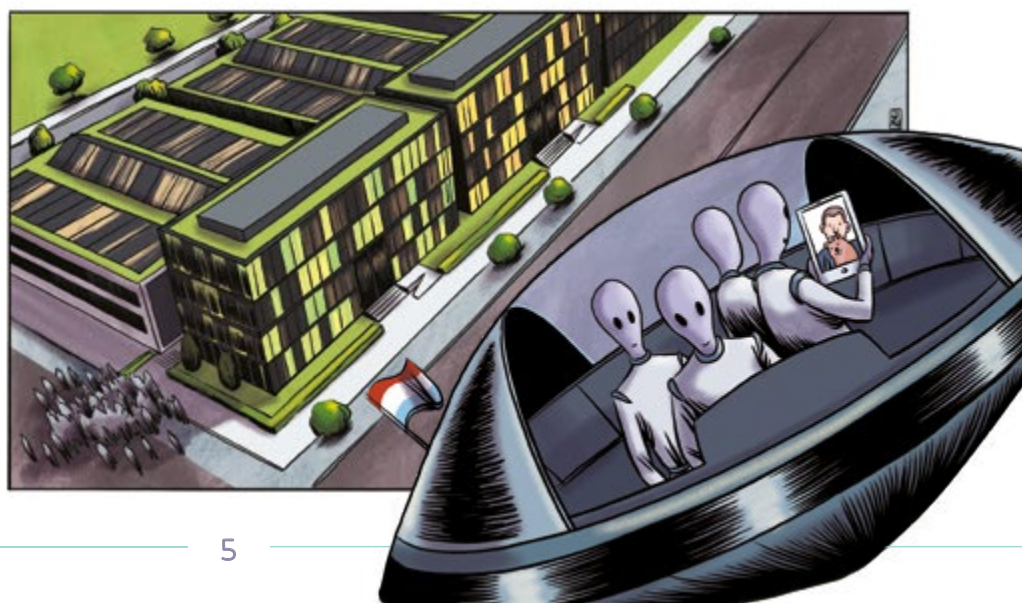
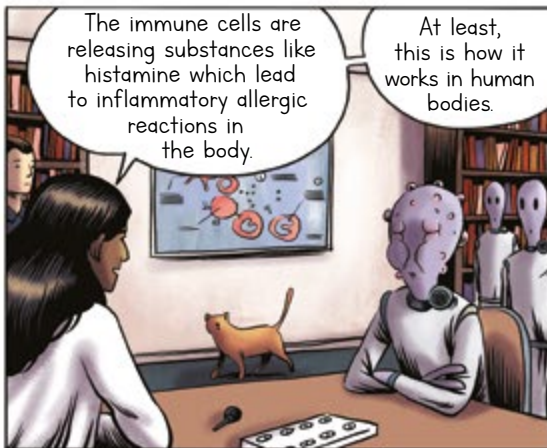
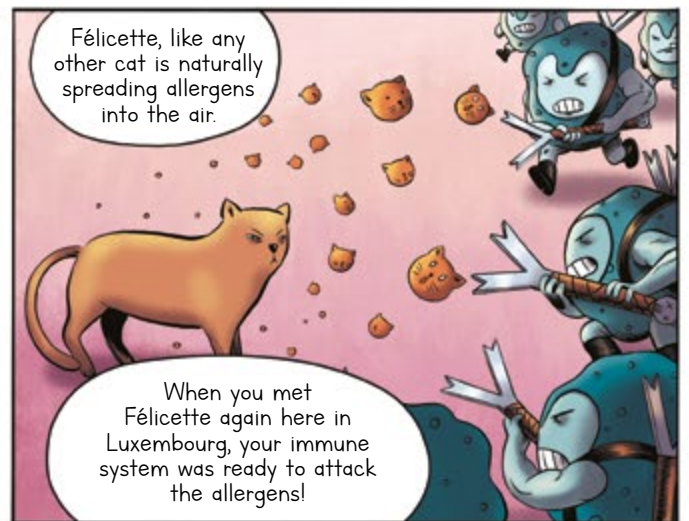
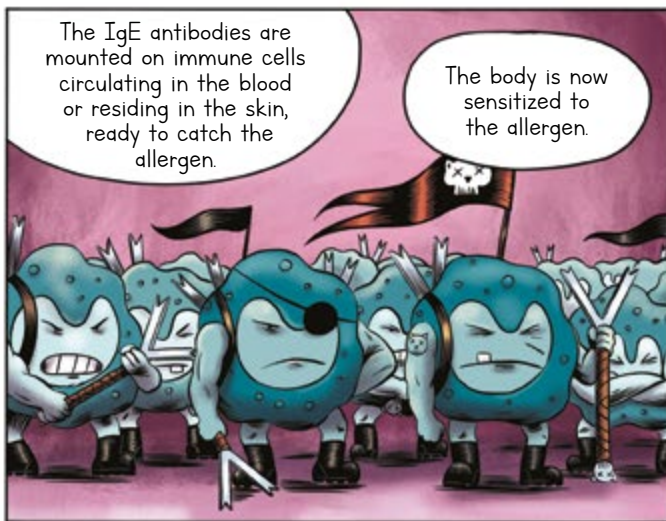
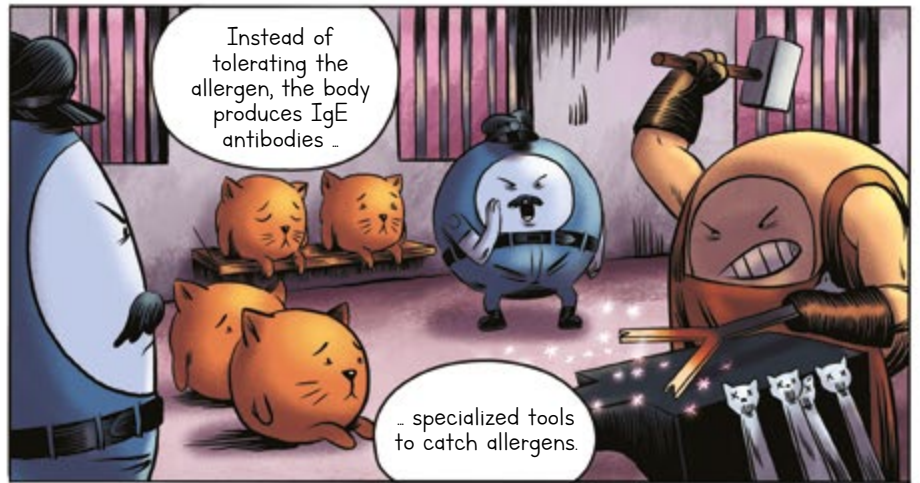
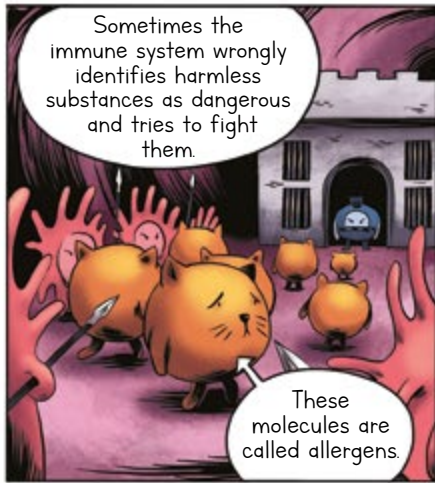
Yso (pronounced why-so?), Zamara’s faithful companion, is as adventurous as our dogs on Earth – but when he eats (Yso has decided to identify as male) something he shouldn’t, we see his inner workings! He can also change shape and turn to liquid when he wants! Cool, right? It would be, if he didn’t keep running off all the time and slipping through cracks – causing Zamara to chase him all around the University!

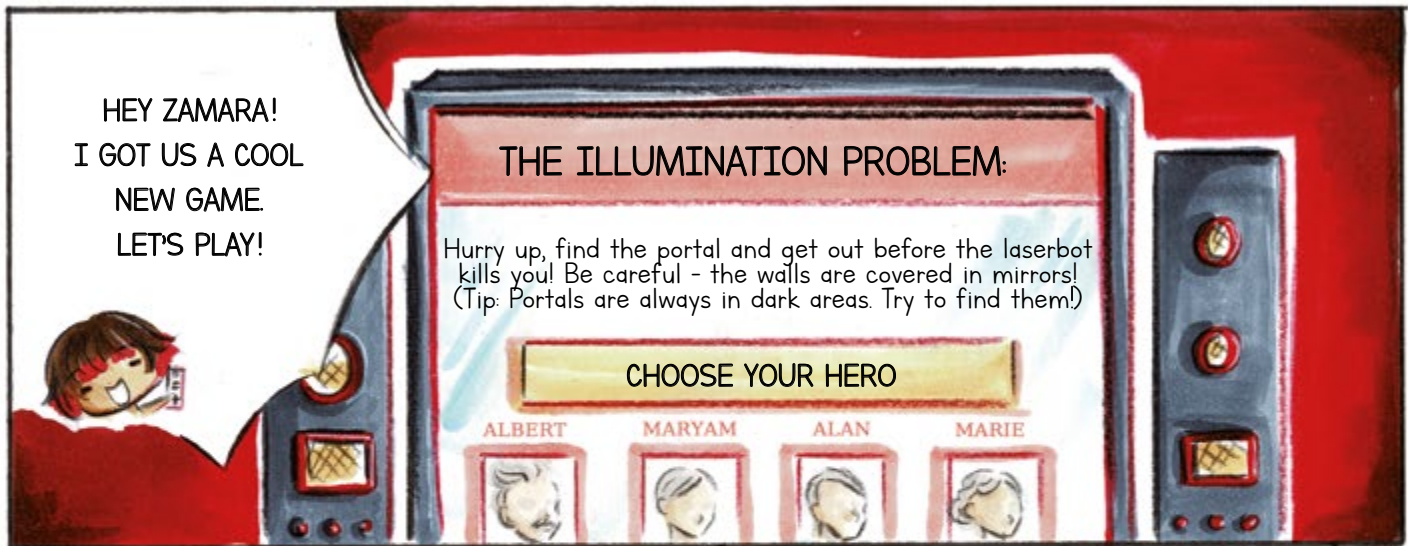


Some time ago on planet Liquria...



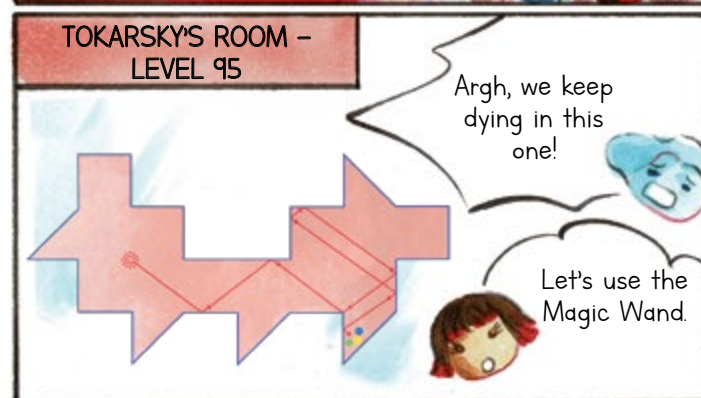
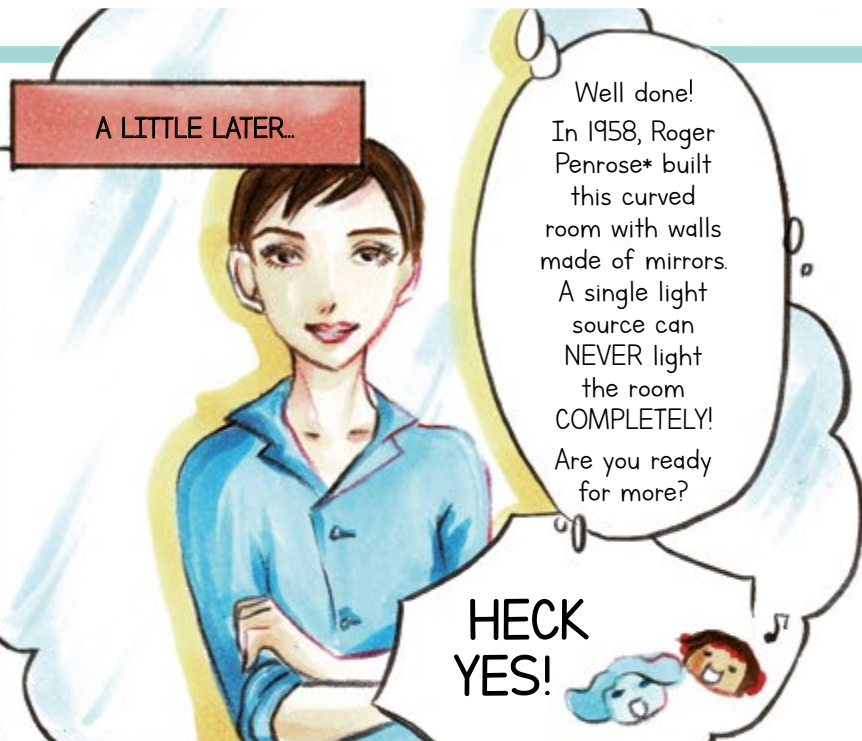






* The Fields Medal - comparable to the Nobel Prize - is awarded to outstanding mathematicians under 40. To this day, Maryam was the first and only woman to receive it.

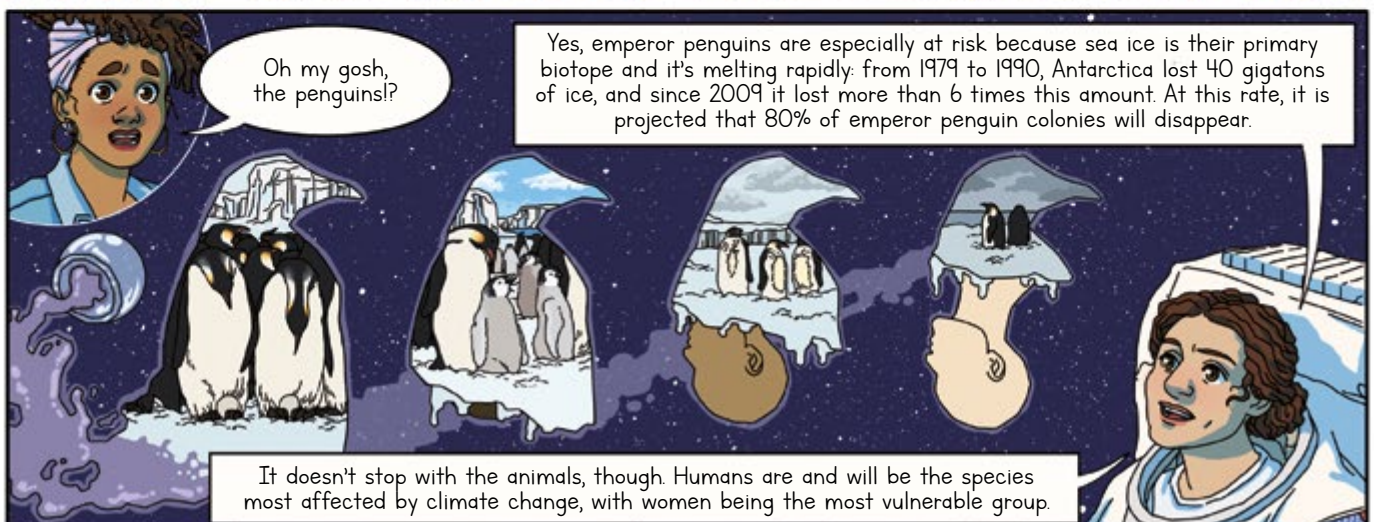
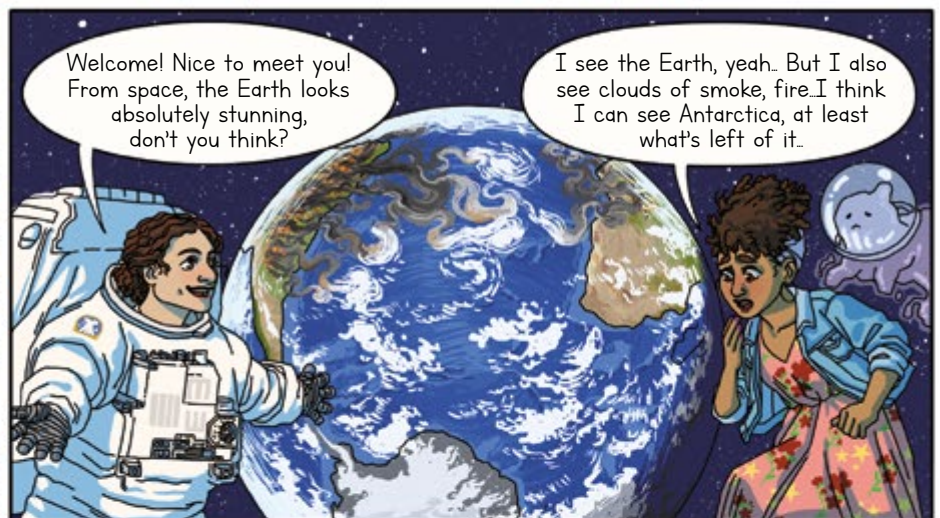




* Roger Penrose has been awarded the 2020 Nobel Prize in Physics. He mathematically proved the existence and formation of black holes.

** The Magic Wand Theorem by Mirzakhani and Eskin can be applied to show that there are no dark regions in any room of a particular shape (rational polygon), when lit by a single light source.



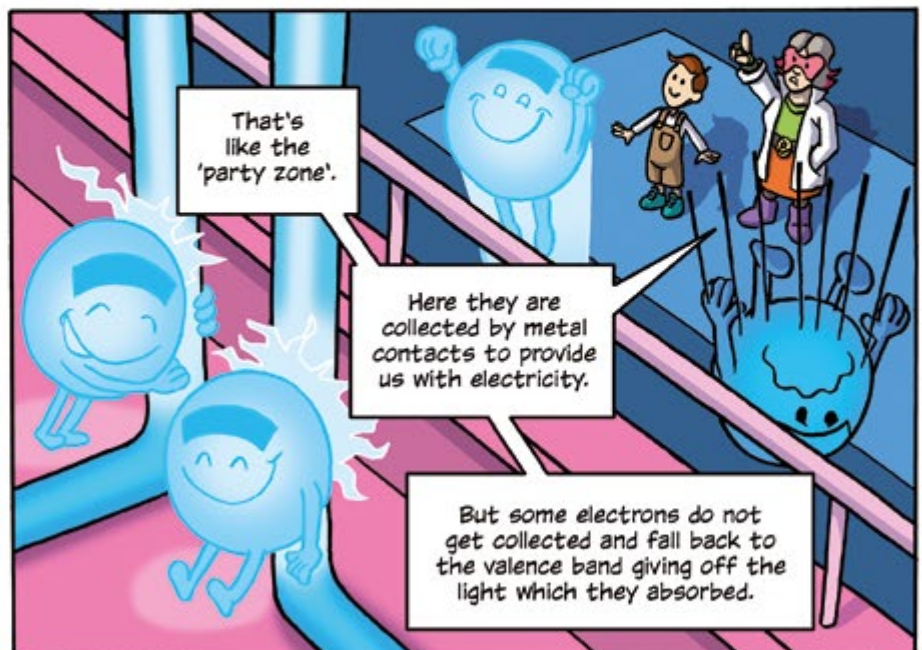
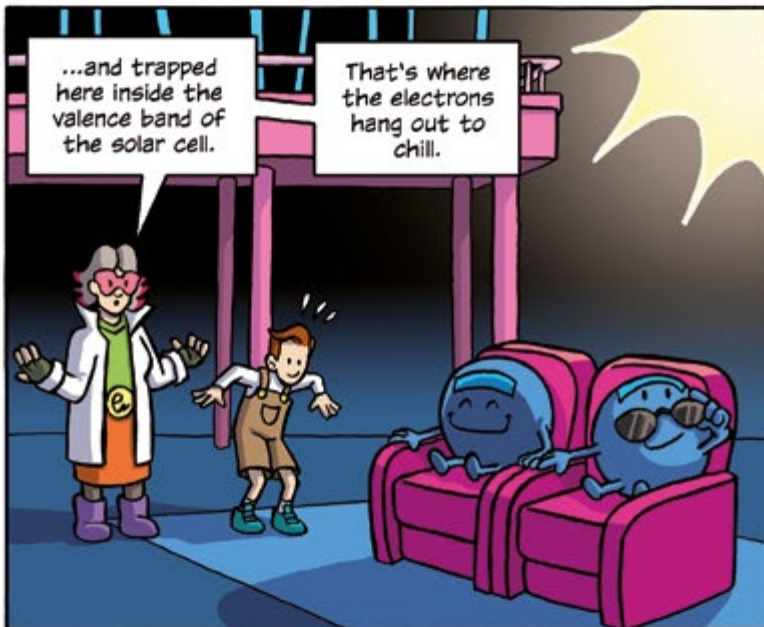
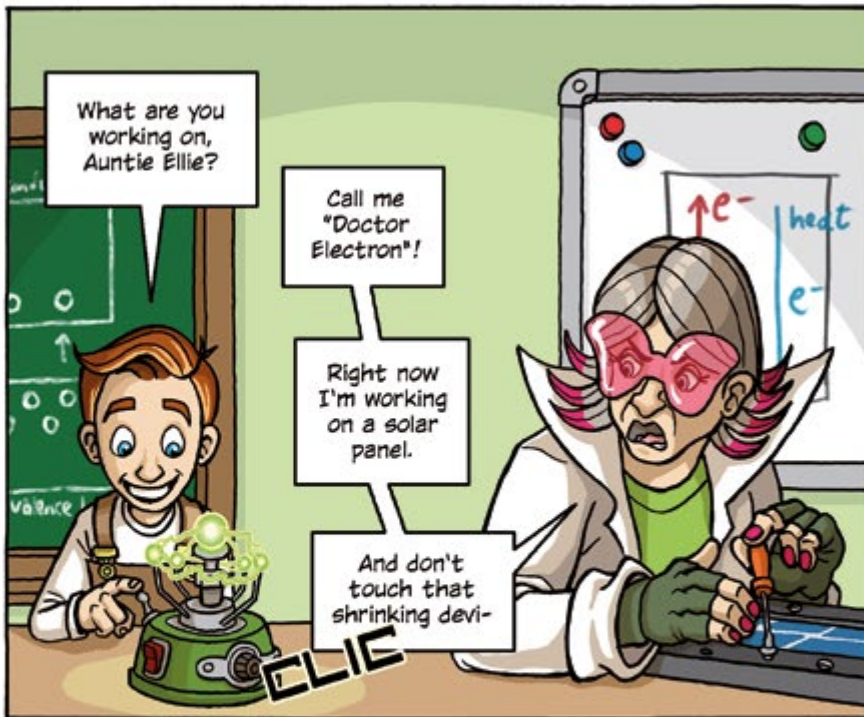


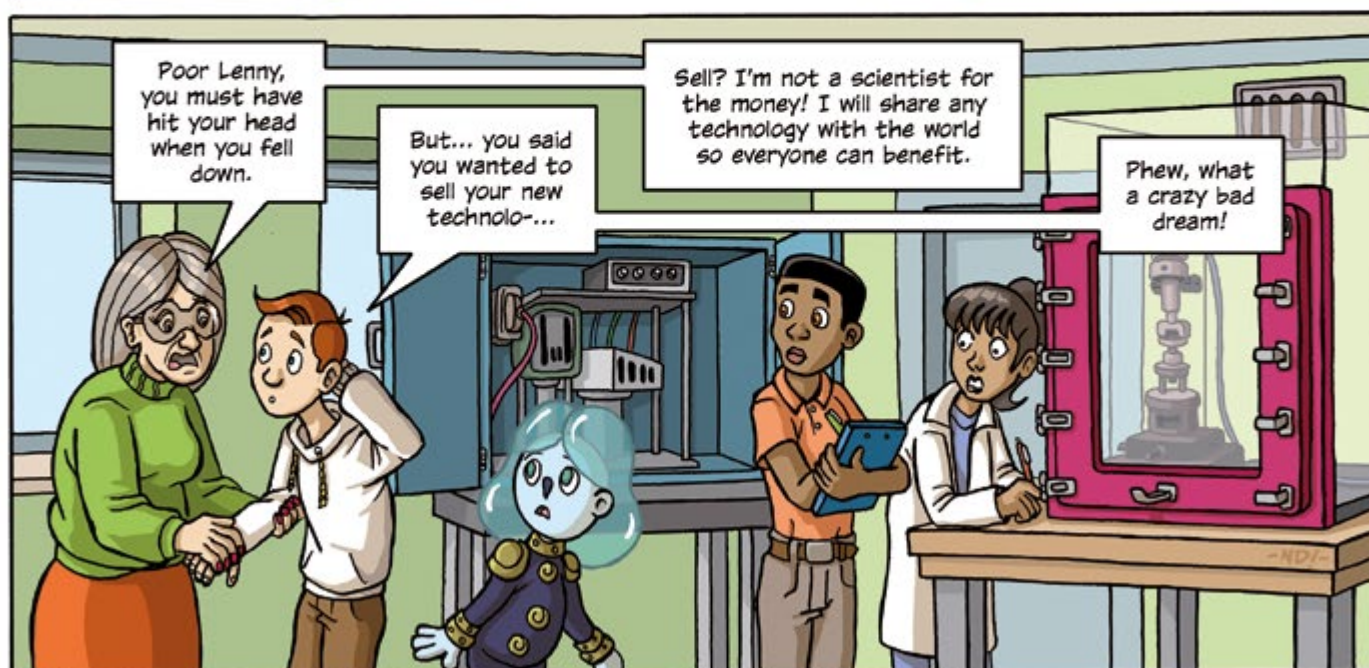
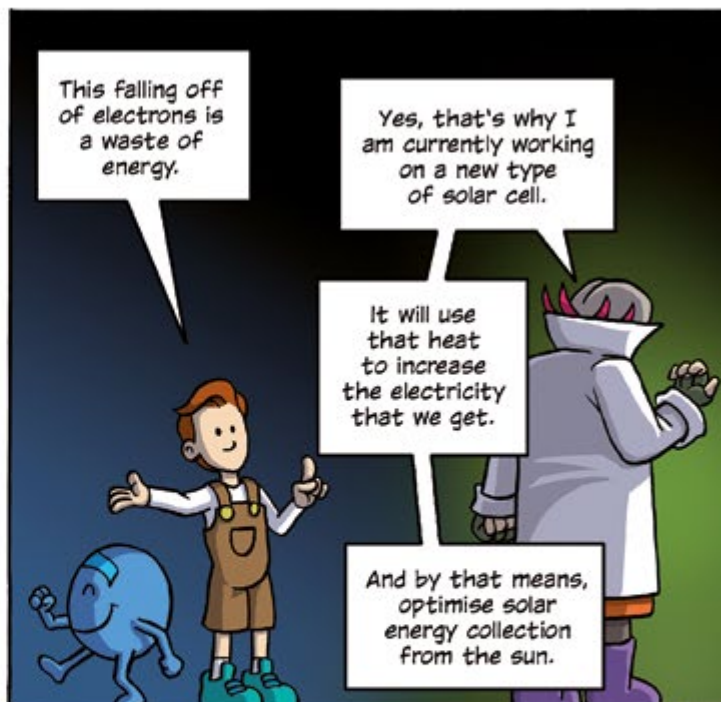
Every day women endure the consequences of climate change to a disproportionate degree: 77% of household income depends on natural resources which are being depleted day by day, while women are mostly responsible for looking after the family and are the main care providers.

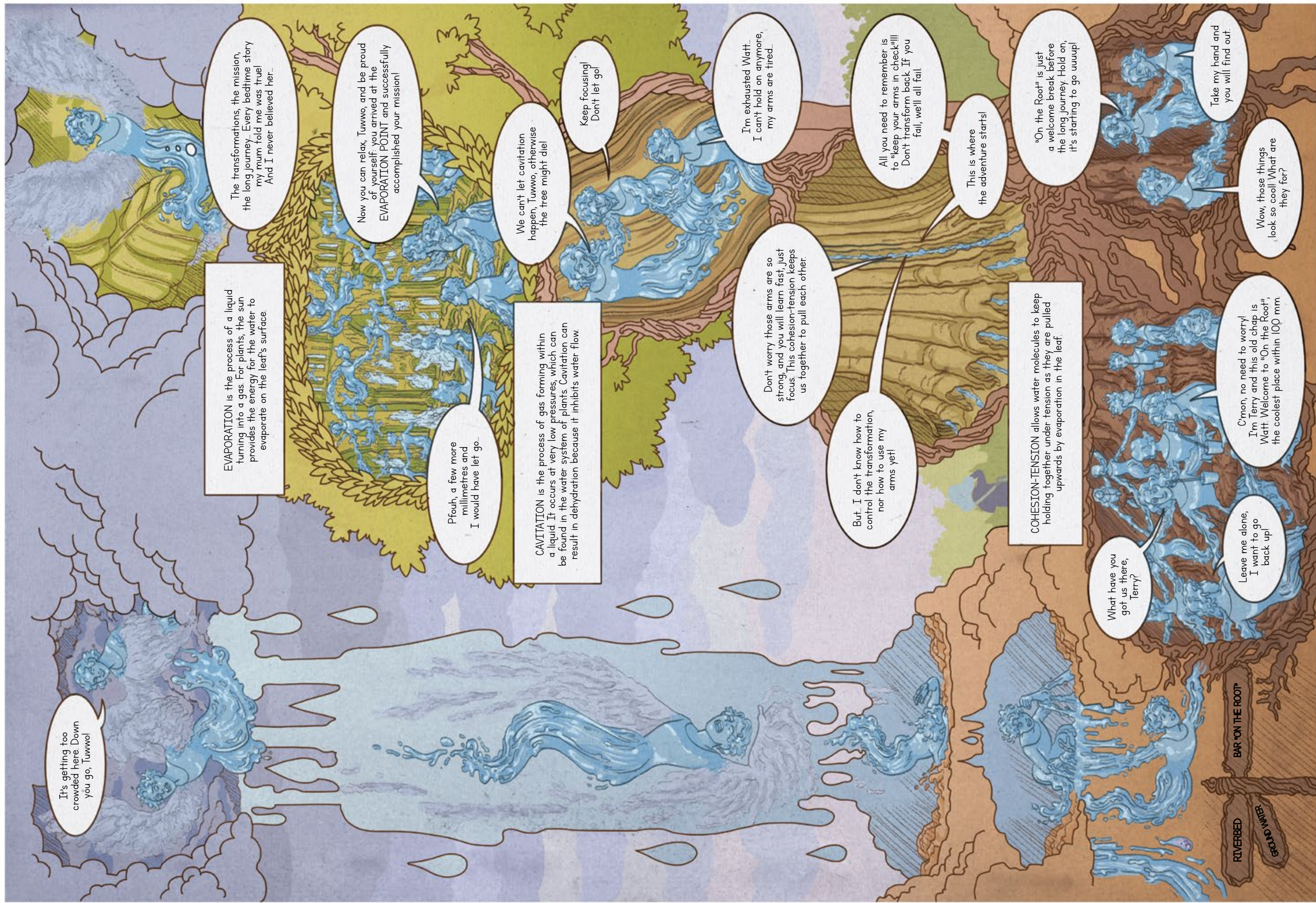


Climate change is a threat amplifier; besides its environmental impact it highlights gender inequality. Women account for 70% of the world's poor, meaning that climate-related events such as flooding and droughts hit them harder, in a world where they already lack independence.









It's getting too crowded here. Down you go, Tuwwo!

EVAPORATION is the process of a liquid turning into a gas. For plants, the sun provides the energy for the water to evaporate on the leaf's surface.

The transformations, the mission, the long journey. Every bedtime story my mum told me was true! And I never believed her...

Now you can relax, Tuwwo, and be proud of yourself: you arrived at the EVAPORATION POINT and successfully accomplished your mission!

Pfouh, a few more millimetres and I would have let go...

CAVITATION is the process of gas forming within a liquid. It occurs at very low pressures, which can be found in the water system of plants. Cavitation can result in dehydration because it inhibits water flow.

We can't let cavitation happen, Tuwwo, otherwise the tree might die!

Keep focusing! Don't let go!

I'm exhausted Watt... I can't hold on anymore, my arms are tired...

Don't worry those arms are so strong, and you will learn fast, just focus. This cohesion-tension keeps us together to pull each other.

But... I don't know how to control the transformation, nor how to use my arms yet!

All you need to remember is to "keep your arms in check"!!! Don't transform back. If you fail, we'll all fail.

This is where the adventure starts!

COHESION-TENSION allows water molecules to keep holding together under tension as they are pulled upwards by evaporation in the leaf.

"On the Root" is just a welcome break before the long journey. Hold on, it's starting to go uuuup!

What have you got us there, Terry?

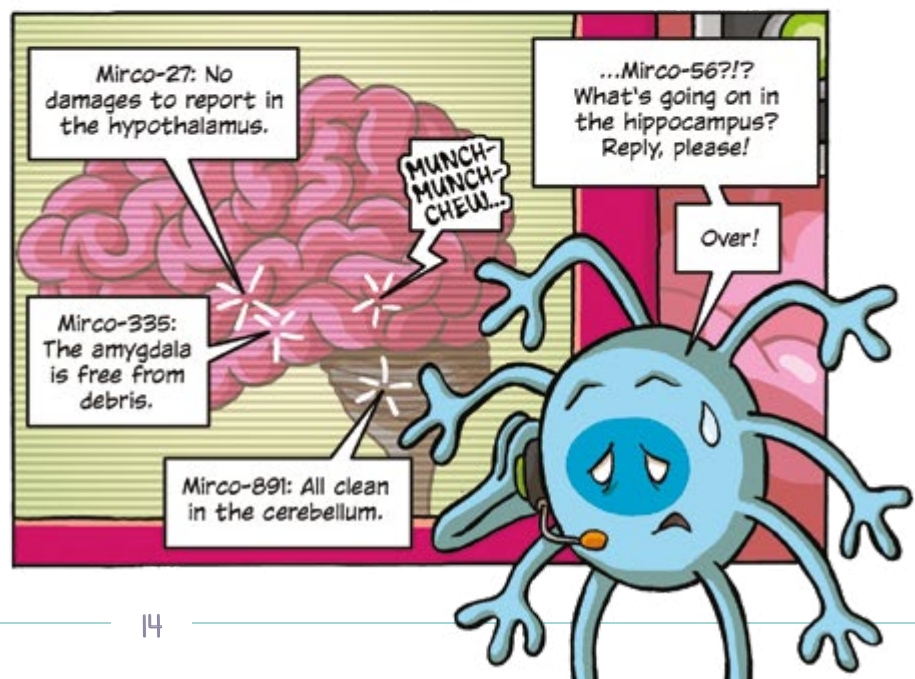
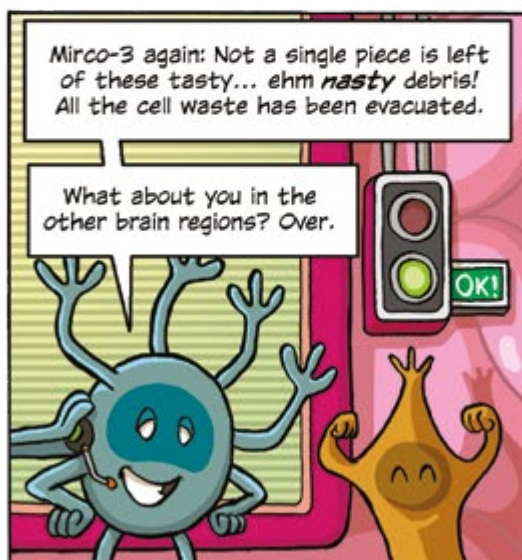
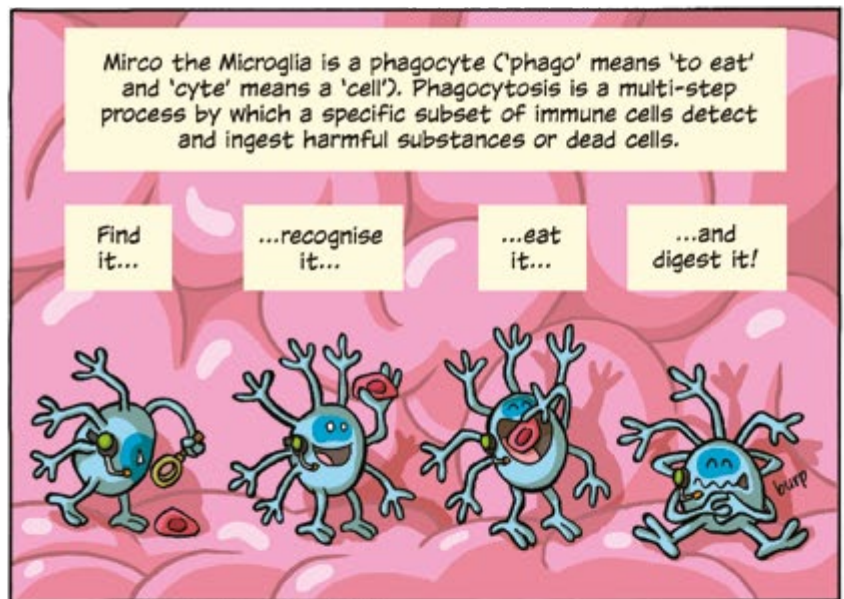
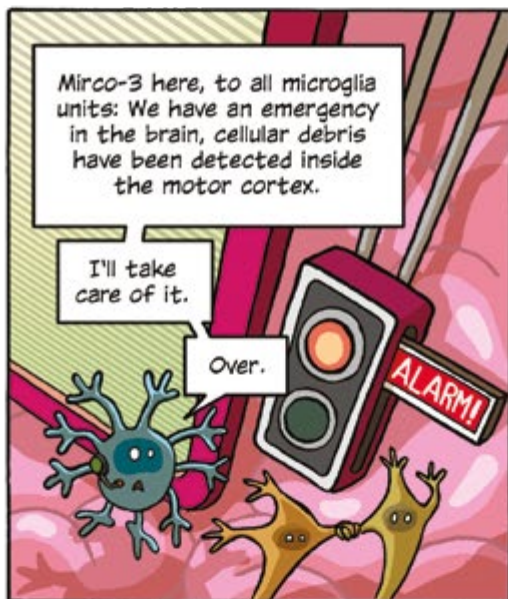
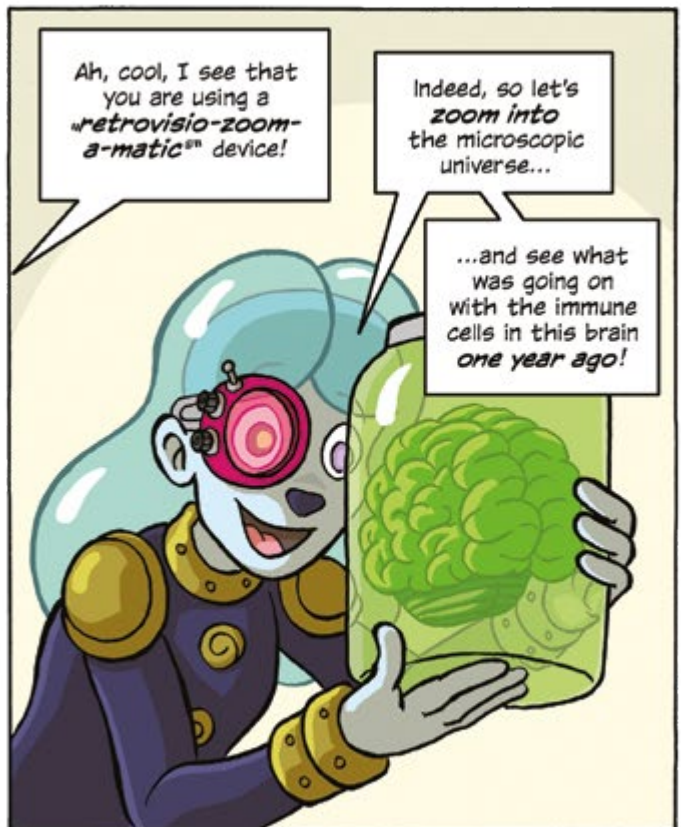
RIVERBED
BAR "ON THE ROOT"
COHESION-TENSION

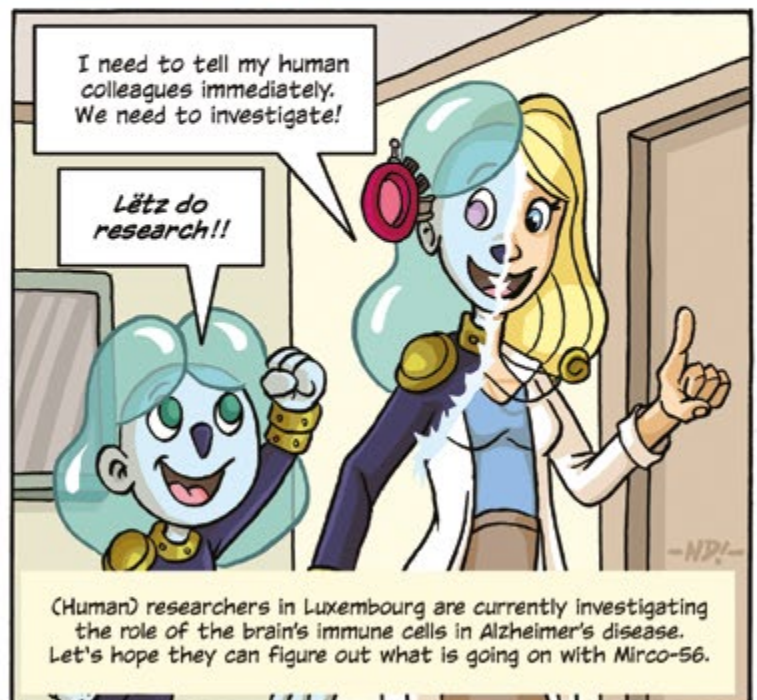
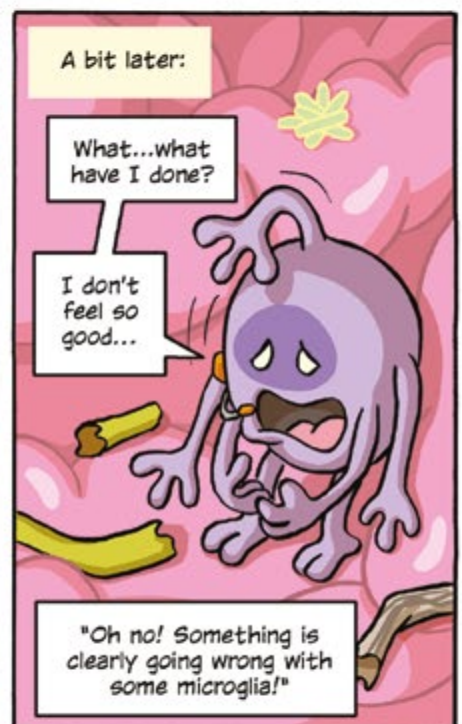
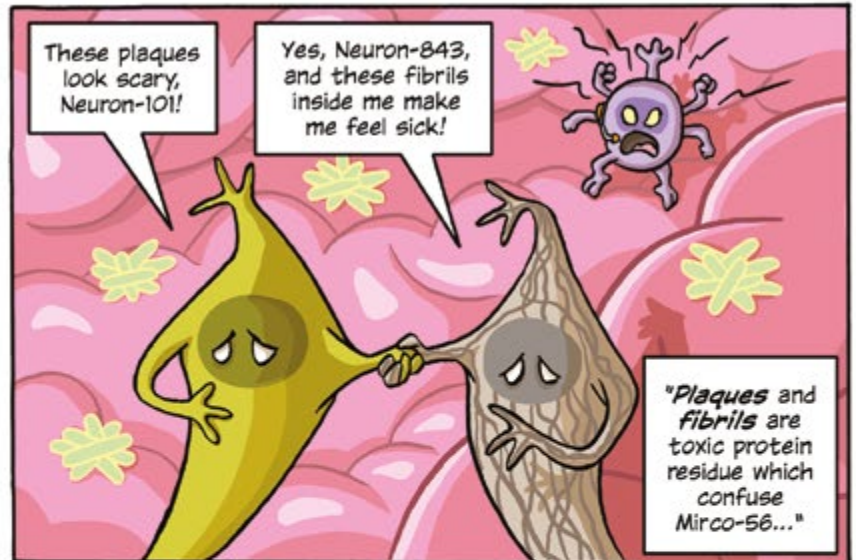
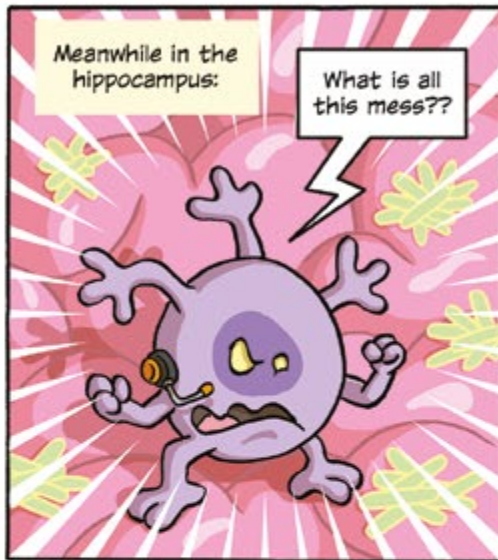
C'mon, no need to worry! I'm Terry and this old chap is Watt. Welcome to "On the Root", the coolest place within 100 mm.

Leave me alone, I want to go back up!

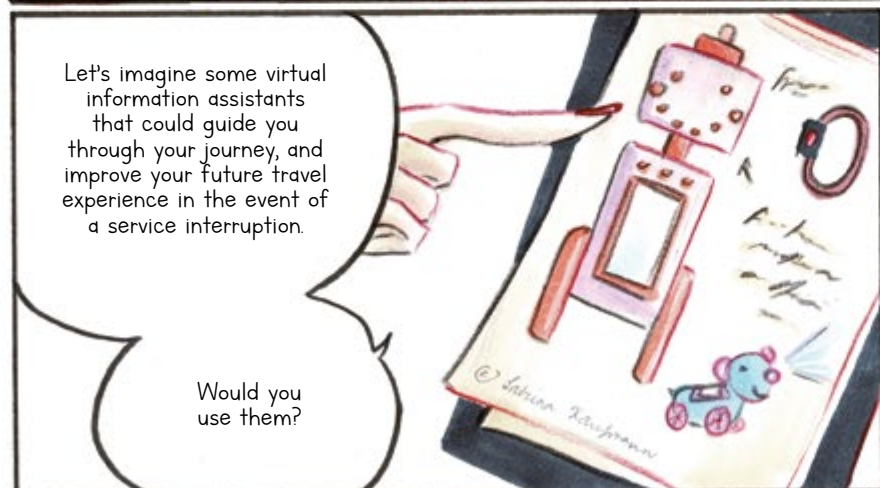
Wow, those things look so cool! What are they for?

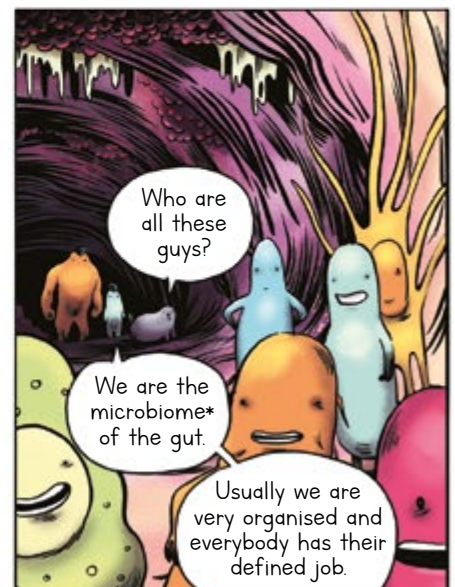
Take my hand and you will find out.



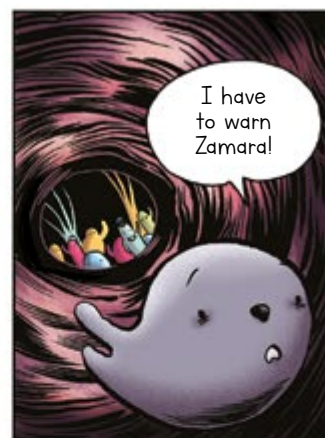








*A community of microorganisms, such as bacteria, viruses and fungi.



ANDY GENEN



Andy

Ever since he was a kid, Andy Genen (born in 1979) has always loved all kinds of comics. After finishing his studies at the Institut St-Luc in Brussels, where he actually studied "creating comics", he started working as a freelance illustrator / comic book artist and has since illustrated numerous very varied projects. His best known comic work includes "De Ieschte Ritter" trilogy, which he created with Lucien Czuga, and several collaborations with John Rech ("Dream Catcher" and "Alex & Tun"). "De Roude Puma" and his latest series "Tow & Tank" are among his solo works.

Inside the Solar Cell

The comic 'Inside the Solar Cell' is about an accidental journey of a scientist and her nephew inside a solar panel. It gave us the chance to disseminate some knowledge about solar cells so that everyone can understand how our energy of the future works.

Himanshu Phirke is studying the optical and electrical properties of solar cells in the Department of Physics and Materials Science (DPhyMS) at the University of Luxembourg. He is very passionate about science and loves to do fun experiments.

Anna Schmitt is working on the neuronal activities of gifted adults at the Institute of Cognitive Assessment (COSA) within the Department of Behavioural and Cognitive Sciences (DBCS) of the University of Luxembourg. Science communication is also one of her interests.



Himanshu



Anna



Sonja



Shubhra



Anna



Anouk

Microglia: Guardians of the Brain?

In Luxembourg, more than 10,000 people suffer from Alzheimer's disease, the major cause of dementia. Researchers are investigating whether the immune cells of the brain, microglia, could drive brain deterioration and symptoms in this, still incurable, disease.

Sonja Fixemer is currently analysing microglia heterogeneity in post-mortem brains from Alzheimer's disease patients at the Luxembourg Centre for Systems Biomedicine (LCSB).

Shubhra Acharya comes from India and is interested in finding novel biomarkers for better diagnosis and prognosis of Parkinson's disease at the Luxembourg Institute of Health (LIH).

Anna Schmitt is currently studying the neuronal activities of gifted adults at the Institute of Cognitive Assessment (COSA) at the University of Luxembourg.

Anouk Ewen comes from Luxembourg and is currently investigating the role of protein modifications in innate immune cells at LIH.

ANTOINE GRIMÉE

Born in 1992, Antoine "Tunn" Grimée completed a master's in narration at the École de Recherche Graphique in Brussels in 2017. After his studies, he started working in comics and illustration. He produces various illustrations for the written press as well as posters for the Luxembourg cultural scene, and regularly publishes one-page comic strips devoted to historical characters in Warte-Perspectives. In 2018, "De Coyote am Schofspelz" was published by Fairtrade Luxembourg, first in the serial section of the Revue, then as a full-length album. In 2019, he released "D'Geheimnis vum verschwonnene Sall", commissioned by the Lycée Michel Rodange on the occasion of its 50th anniversary.



Antoine



Catherine



Lynn



Catherine

A Gut Feeling

Our gut is home to millions of little creatures, called microorganisms. Depending on what we eat and thus feed them, they can keep us healthy or make us sick. With this comic, we highlight the important relationship between nutrition and the gut microbiome, which influences our health.

Catherine Delbrouck, a PhD student at the Luxembourg Institute of Health (LIH), explores how a specific metabolic by-product promotes cancer cell invasion.

Lynn Bonetti is a PhD student at the Luxembourg Institute of Health (LIH). She investigates the importance of antioxidants in immune cells and their relevance in gastrointestinal diseases.

Catherine Sedrani, a PhD student at the Luxembourg Centre for Systems Biomedicine (LCSB), is studying the interactions between the gut microbiome and the nervous system.

A Furry Tale

Most people have heard about allergies before and the word is commonly used, but only few know that allergies are actually an overreaction of the immune system. With this comic, we wanted to explain what an allergy is in a simple and fun way, make you aware of the problems that come with allergic diseases and highlight the importance of allergy research.

We are **Bente Janssen-Weets** and **Julia Klüber** and we are doing our PhD at the Luxembourg Institute of Health (LIH) in the Department of Infection and Immunity. We both are members of the research group Molecular and Translational Allergology. Bente is focusing her research on respiratory allergies and Julia is specialised in food allergies.



Julia



Bente

MARION DENGLER



Marion

A non-binary queer comic artist living in Berlin, trying to work as a freelancer. Likes the macabre and gothic horror. Main inspirations are Symbolism, Art nouveau and works from the golden age of illustration. Eerie, mysterious stuff with hidden meanings is my jam, which is why my stories and illustrations tend to veer into magical realism, if not outright fantasy. I grew up with Franco-Belgian comics, started reading manga after that and now primarily read American indie graphic novels, preferably with queer themes. Successfully blending these three different styles of comic art and narration is something I want to achieve in my own work.

The Adventures of Tuwwo the Water Molecule

We wanted to be part of this cool project that promotes the sharing of science in a lively way. The topic itself came from a combination of our research topics and interest in our natural surroundings.

Louis Krieger is working in the Environmental Research & Innovation (ERIN) department at the Luxembourg Institute of Science and Technology (LIST), completing his PhD in the costs and benefits of plant water transport.

Adnan Moussa is working in the ERIN department at the LIST and completing his PhD in hydrological modelling of catchment travel times.

Marie-Alix Dalle is part of the Department of Engineering (DoE) at the University of Luxembourg, completing her PhD on desalination process based on evaporation.



Louis



Adnan



Marie-Alix



Adriana



Chrysovalantou



Eleftheria



Johanna

Becoming an Agent of Change

Women account for the minority of the world's researchers while representing 70 percent of the world's poor. It's time for a change. Let's start by raising our female academic voices!

Adriana Coppola works at the Department of Engineering (DoE) of the University of Luxembourg (Unilu) on energy efficiency.

Chrysovalantou Kalaitzidou is a member of the Department of Engineering (DoE) at the Unilu doing research on data-driven modelling of biomaterials.

Eleftheria Charalambous is working at the Department of Infection and Immunity of the Luxembourg Institute of Health (LIH) and investigates how early life adversity shapes the microbiome.

Johanna Jaschik works at the Luxembourg Centre for Contemporary and Digital History (C2DH) of the Unilu, focusing on border and migration studies of Eastern Europe.

SABRINA KAUFMANN

Sabrina Kaufmann is an illustrator from Luxembourg. Since her childhood, she has always loved drawing and writing, a passion that finally led her to become a freelance artist and teacher in the manga field. In love with fashion and aesthetic worlds, she focuses mainly on illustrating beautifully dressed ladies in enchanting settings. Since 2016, she has been constantly working on her free-to-read webcomic project Illustrated Fairytales, after Grimm's and Andersen's stories. Most importantly, she strives to create meaningful content that motivates and inspires, and loves sharing the behind-the-scenes of everyday freelance life on her social media.



Luce



Prasad



Abiodun

Chronicles from Platform 6

User eXperience (UX) is an interdisciplinary science that allows a better understanding of users' interactions with products or services. In this story, we illustrate some methods used by designers to investigate users' perceptions and behaviours (such as user interviews and tests of concepts) in order to improve the experience of services and products.

Luce Drouet is working at the Department of Behavioural and Cognitive Sciences (DBCS) at the University of Luxembourg (Uni.lu). In her doctoral thesis, she researches travellers' experiences with the information devices of the Luxembourgish railways.

Prasad Adhav is focusing his research on simulations of fluid mechanics at the Department of Engineering (DoE) of the Uni.lu.

Abiodun Solanke is currently investigating how to extract evidence from digital texts at the Department of Computer Science (DCS) of the Uni.lu.

Math, Magic and Maryam

Maryam Mirzakhani was one of the greatest mathematicians. Her solutions to different problems connected different areas in mathematics, physics and engineering. In our comic, we portray an application of her work visually, hoping it entertains and encourages you to take up math.

Kamelia Jamaati, a computer engineer and psychologist from the Luxembourg Centre for Educational Testing (LUCET) of the University of Luxembourg (Uni.lu), is analysing patterns in educational data in order to predict special needs of children with, for instance, ADHD or dyslexia.

Nhat Minh Doan from the Department of Mathematics (DMATH) at the Uni.lu is investigating curves on surfaces and their moduli spaces.

Poorani Gnanasambandan from the Materials Research and Technology (MRT) department of the Luxembourg Institute of Science and Technology (LIST) is working on transparent conducting materials for solar cells.



Kamelia



Nhat Minh



Poorani



Nicole Paschek loves to talk about science. During her studies in behavioural and neural biology, she also found her passion for writing and decided to study journalism as well. As a journalist, she realised that scientists sometimes struggle to explain what they do in an understandable way. Improving those skills is the mission of DESCOM, a training programme in science communication for doctoral candidates in Luxembourg. Since 2019, Nicole has been working as Project Manager of DESCOM.

Serge Haan is a professor of biological chemistry in the Department of Life Sciences and Medicine (DLSM) at the University of Luxembourg. His research focusses on molecular disease mechanisms associated with the development and metastasis of colon cancer: how do cancer cells develop resistance to treatment and how do they interact with their microenvironment? His strong interest in communicating science to the public led to his founding the DESCOM project.



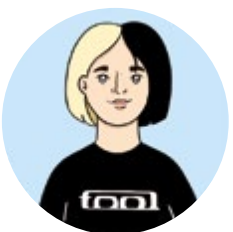
Oliver Glassl is an educational management professional with long-term experience in academic teaching and curriculum development. His education includes degrees in speech and language therapy and business administration. His research in the field of neurorehabilitation has given rise to various publications. Currently working for the Doctoral School in Science and Engineering (DSSE) at the University of Luxembourg, he is a member of the DESCOM team.

Bruno Teheux is a researcher in the Department of Mathematics (DMATH) at the University of Luxembourg. He also likes to organise activities that allow as many people as possible to experience the multiple aspects of mathematical research and to become aware of the incredible modernity of this discipline. Where there is no fun, there is no math!



Veronika Mischitz (Véro) is a former biologist, turned visual storyteller. For over a decade, she has been creating (science) comics for various clients as well as teaching the magic of her craft to kids and adults. Driven by curiosity and a sense of wonder, she loves to explore unknown territory, learn new things along the way and turn them into compelling stories. She is a mentor for LUXplorations and the creator of the comic story "Why Science Comics?".

Jessica Burton is a researcher at the Luxembourg Centre for Contemporary and Digital History (C2DH), working on the relationship between European comic transfers in the 1960s within the Popkult60 project. She specialises in comics studies and has previously worked as a comic editor for Titan Comics, on titles such as Doctor Who, before embarking on her PhD. She is a mentor for LUXplorations, and teaches classes on comics history at the University.



Valérie Minelli is a Luxembourgish cartoonist, living in Germany. She writes and draws the international webcomic "MrsFrollein", which hopefully brings some love and joy to her readers. For LUXplorations she drew all the portraits, designed Zamara and Yso, their comic as well as the cover of this comic booklet. When she's not busy creating comics, Minelli loves to draw illustrations, especially for children's books, or is busy fangirling about whatever band she likes the most at the moment.

THANK YOU

to everyone else involved in the production of the science comics, especially the academic supervisors who made sure the comics are scientifically correct, namely Hugo Parlier (Unilu), Kacy Greenhalgh (International School Michel Lucius, Luxembourg), David Bouvier (Unilu), Stanislaus Schymanski and Remko Nijzink (LIST), Melania Guerra, Vincent Koenig and Francesco Viti (Unilu), Annette Kuehn and Christiane Hilger (LIH), and Alex Redinger (Unilu). Furthermore, we would like to thank Alexandre Lagarmitte, Aurélie Couvidat, Anastasia Mouzard-Teickner, Martina Christen, Laura Bianchi, Aswin Lutchana and Jean-Paul Hoffmann (Unilu), as well as the Luxembourg Learning Centre (LLC) for their support.



Sabrina Kaufmann

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FB @ Insta @sabinak.art



♥ From Art to Business ♥

YOUTUBE.COM/C/
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Tips and resources to inspire the
aspiring artists among you: how
to make a living with illustration,
finding clients, selling at
conventions, publishing, ... Join
me every Tuesday, 18h for a new
video ♥



MARION DENGLER
ILLUSTRATOR



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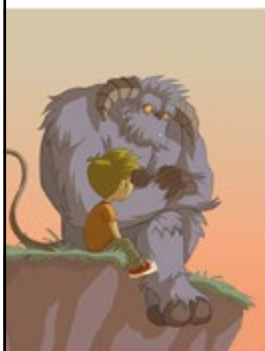


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