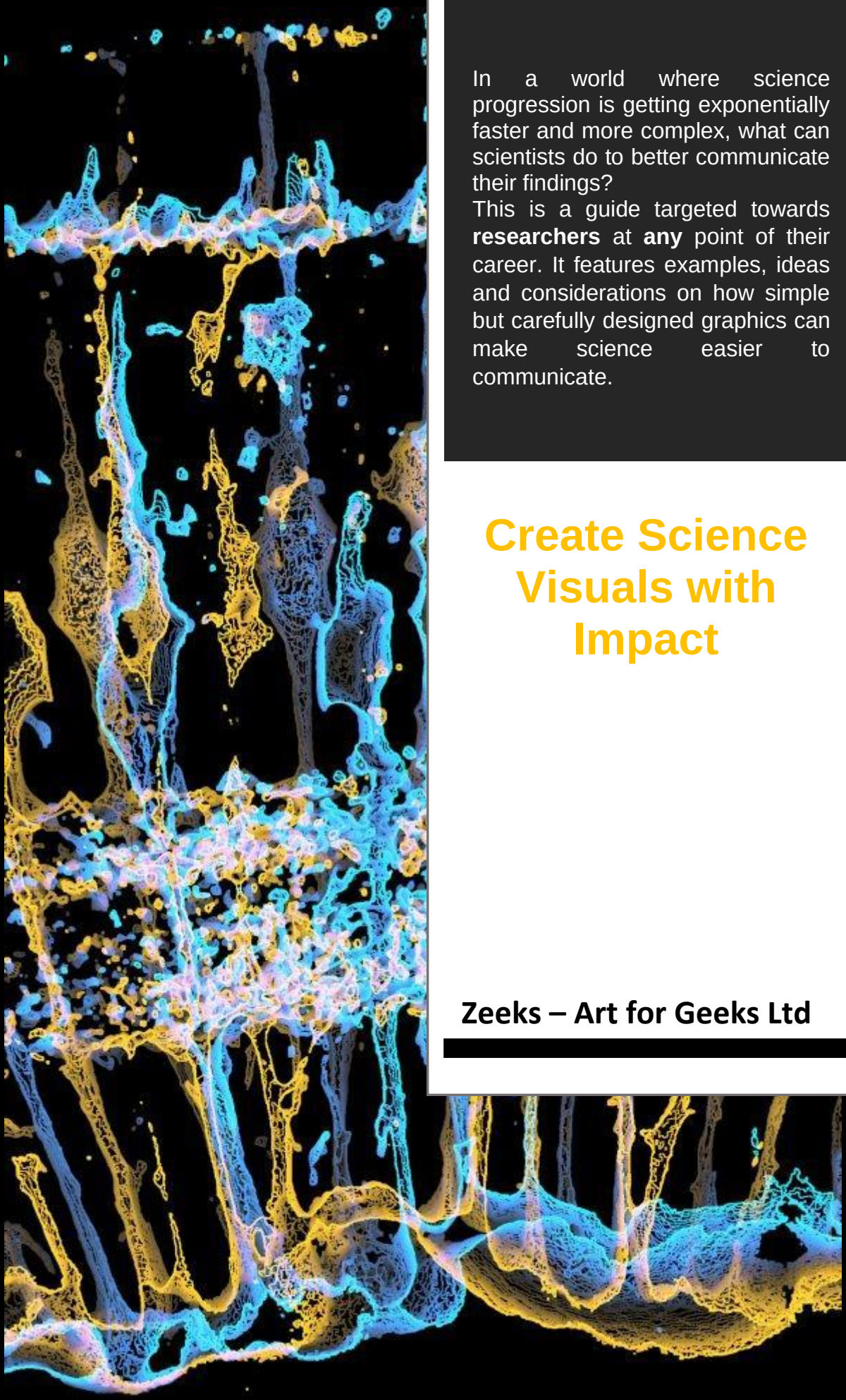

In a world where science progression is getting exponentially faster and more complex, what can scientists do to better communicate their findings?
This is a guide targeted towards **researchers** at **any** point of their career. It features examples, ideas and considerations on how simple but carefully designed graphics can make science easier to communicate.

# Create Science Visuals with Impact

**Zeeks – Art for Geeks Ltd**

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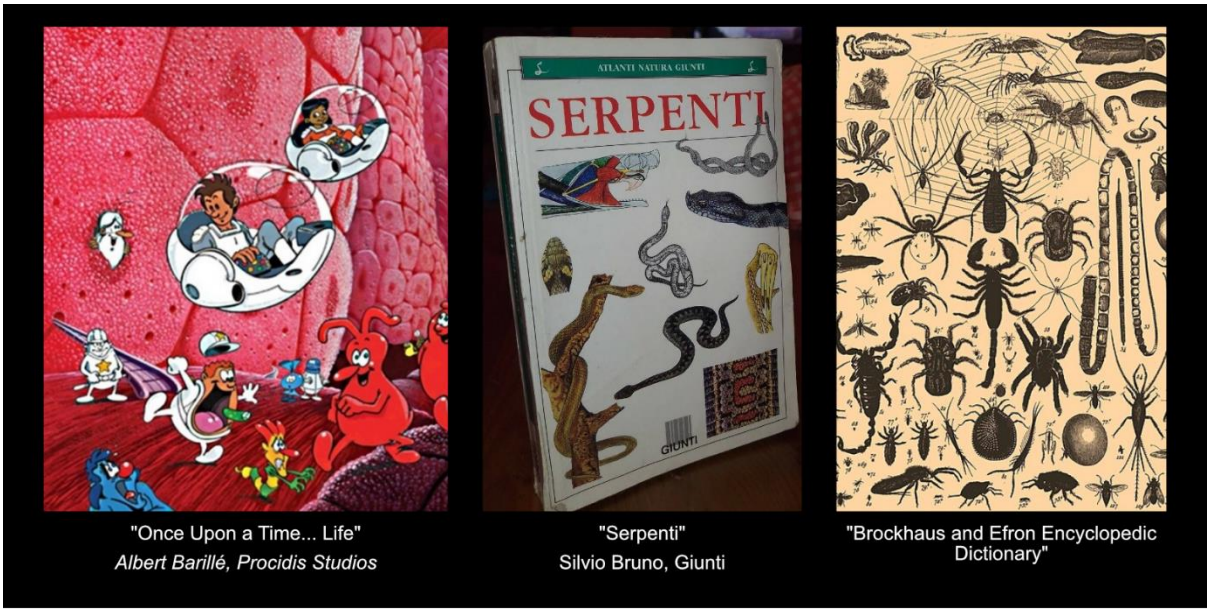
## Contents

# What are Science Visuals?

No matter your background, looking back at your childhood, how many times have you found yourself in front of the illustration of an animal, anatomical models, dinosaurs, plants, be it from an old encyclopaedia from your grandparents, a textbook at school or some kids' magazine? These, as many others,are examples of science visuals!

While not known to many, this is a huge field of the visual arts, containing a vast array of genres, media and applications. Science visuals are generally any form of visual media that can inspire interest for science or try to convey a scientific concept. This can range from extremely figurative illustrations, like the photo-realistic depiction of an animal, to something as abstract as a plot or a chart obtained from data.




"Once Upon a Time... Life"
*Albert Barillé, Procidis Studios*

"Serpenti"
Silvio Bruno, Giunti

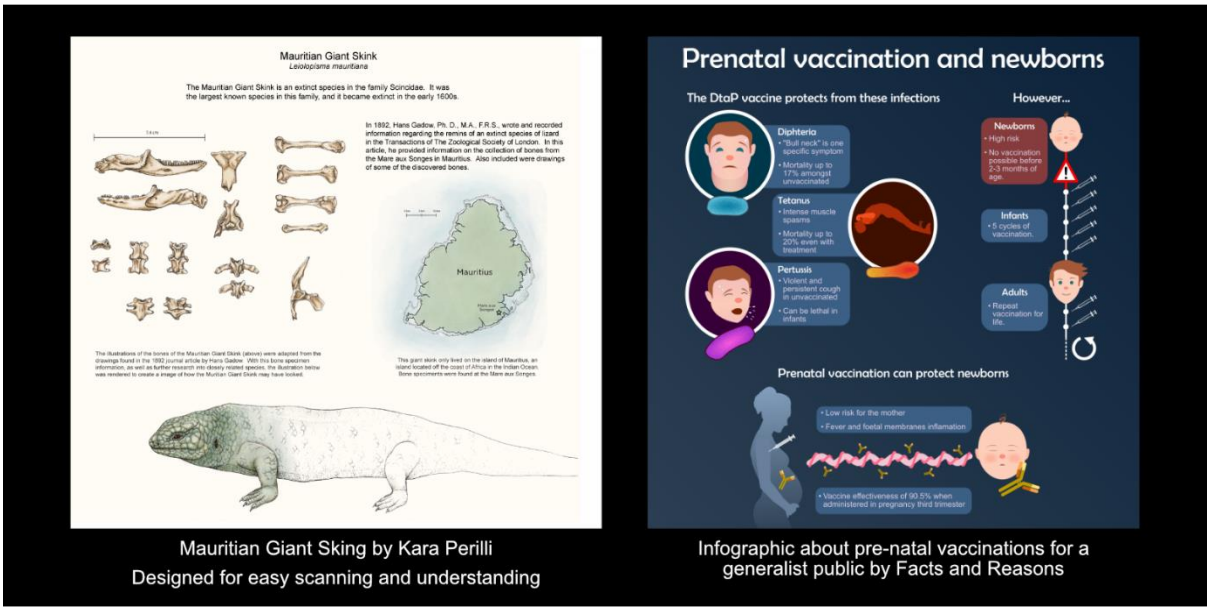
"Brockhaus and Efron Encyclopedic Dictionary"

## Who needs Science Visuals and why?

As you might have gotten from the previous paragraph, science visuals are not only used for communication between scientists, but find uses in a plethora of situations where a visual component can make information easier to understand.

These situations can be:

- An **infographic** hanging in the waiting room of a clinic, depicting the importance of some vaccination or some diagnostic test
- **Illustrations** depicting habits of a rare (or extinct) animal in a museum exhibit
- An **animation** explaining how a new prototype device is going to revolutionise the field to non-technical stakeholders
- An accurate **anatomical 3D model** to help prepare an important surgery or design prosthetics
- **Science-backed images** displaying prospective environmental changes for awareness campaigns
- **Legal and forensic illustrations** to describe complex crime scenes and injury diagrams to the general public




Mauritian Giant Sking by Kara Perilli
Designed for easy scanning and understanding

Infographic about pre-natal vaccinations for a generalist public by Facts and Reasons

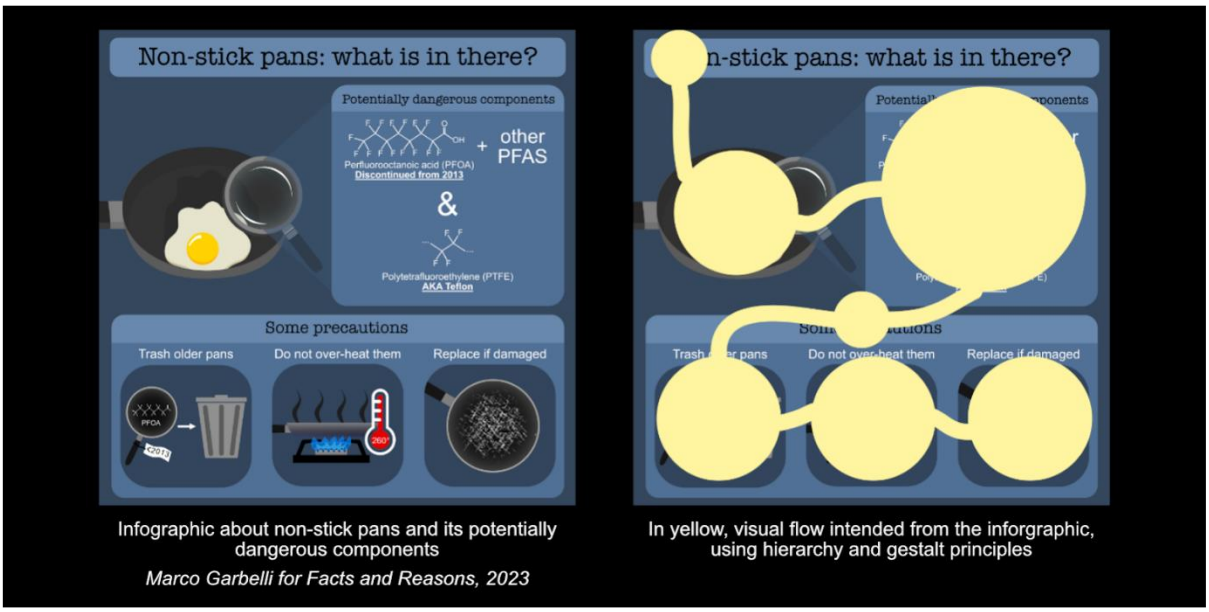
More generally, science visuals can be essential for four main factors:

- **Clarity:** information can be abstract and difficult to transmit with words only. Having graphics alongside the text can help provide a visual reference to the audience. Schemes, visual analogies and other representations can help dissecting the context of the text.
- **Engagement:** walking in a museum, scrolling through social media, or skimming through a magazine, our eyes stop on an interesting image. Graphical elements, when carefully designed and placed, can attract the attention of people more than plain text[1,2]. Including visuals in your piece of work can drastically change how people understand and interact with your science.
- **Conceptualisation:** Visual elements can give life to long lost creatures (e.g. dinosaurs and other extinct creatures and plants), bring us in front of a phenomenon too small or too big for us to witness (e.g. the Solar system and atoms fission respectively), or display graphically elements without a visual component (e.g. we can't see sound waves with the naked eye). Using visuals, we can show what is physically impossible to see. Whether dinosaurs, microscopic life forms or far away planets.
- **Collaboration:** One does not have to be an artist to create useful science visuals. There are several avenues available to give the communicator the tools to compose effective graphics. Visualisations do not have to be pieces of art, but need to convey information in an immediate and accurate way. Collaborations between researchers and artists can create something really unique! Both coming from creative fields (yes, research can be extremely creative) fostering joint projects between them brings together different points of view and ideas. The output from such partnerships often result as inspiring as informative and might even lead to some new insight in the science itself.

## Applications of Science Visuals for Researchers

When it comes to science graphics, researchers immediately think about paper figures. However, that is not the only case where carefully crafted visuals and a pinch of design knowledge can really make the difference in the engagement level of peers (and not) with the hard earned results of a scientist:

- **Posters:** Poster sessions are great for networking with other researchers to talk about science in a more informal way. A good poster makes the information printed on it understandable at a glance and from a distance. Making interesting design choices and presenting captivating layouts will make people stop to see what it is all about, clear hierarchy and visual flow will guide onlookers through the information.



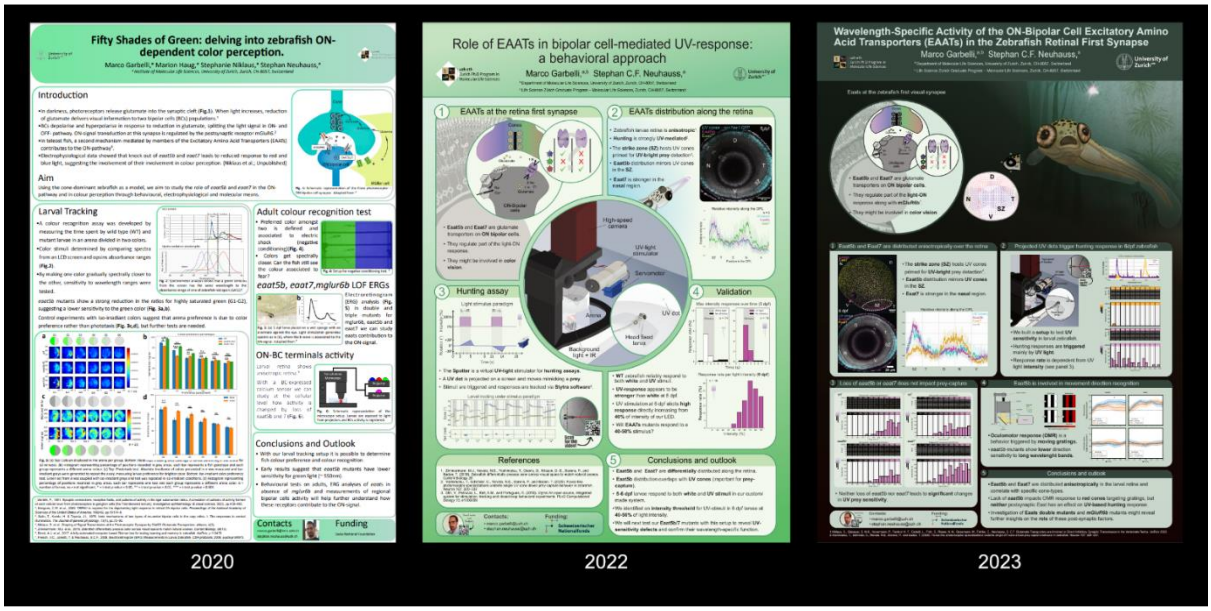

- **Presentations:** Similarly to posters, researchers present their results and discoveries giving presentations aided by slides. Scientific presentations can be lengthy, challenging the audience attention levels in particular when the topics discussed get very specific and abstract. This is why having an engaging presentation, powered by clear-to-interpret graphs, simple and neat design, non-excessive text and to-the-point titles, possibly accompanied by accurate graphical visualisations, can raise the audience interest and make the whole talk more digestible. Remember that slides should complement the presentation without distracting the audience from what the speaker is saying.
- **Grant proposals:** When submitting a proposal for funding, scientists need to explain their research to a committee of stakeholders with varying levels of scientific expertise. Accompanying the proposal with graphics that help framing the project and explain the most abstract parts of it, might make the difference between receiving the grant or not!
- **Outreach Initiatives:** Oftentimes, academic institutions organise scientific outreach events targeted to the general public (e.g. secondary school student visiting the university, an informative event for patients of a particular condition, a science fair for families). These events require scientists to change their communication strategy to adapt to the background of their audience, changing their language, the quantity and the detail of the information they deliver. This is true also when it comes to visuals. With strategies like visual analogies (using

visual elements known to the audience to introduce them to an unknown topic), the introduction of a narrative in the communication piece (creating a character the watcher can keep as a reference point), visual elements can really help generalist audience to grasp at least the core messages of the speaker's science.

# Case Studies – From the Instructor

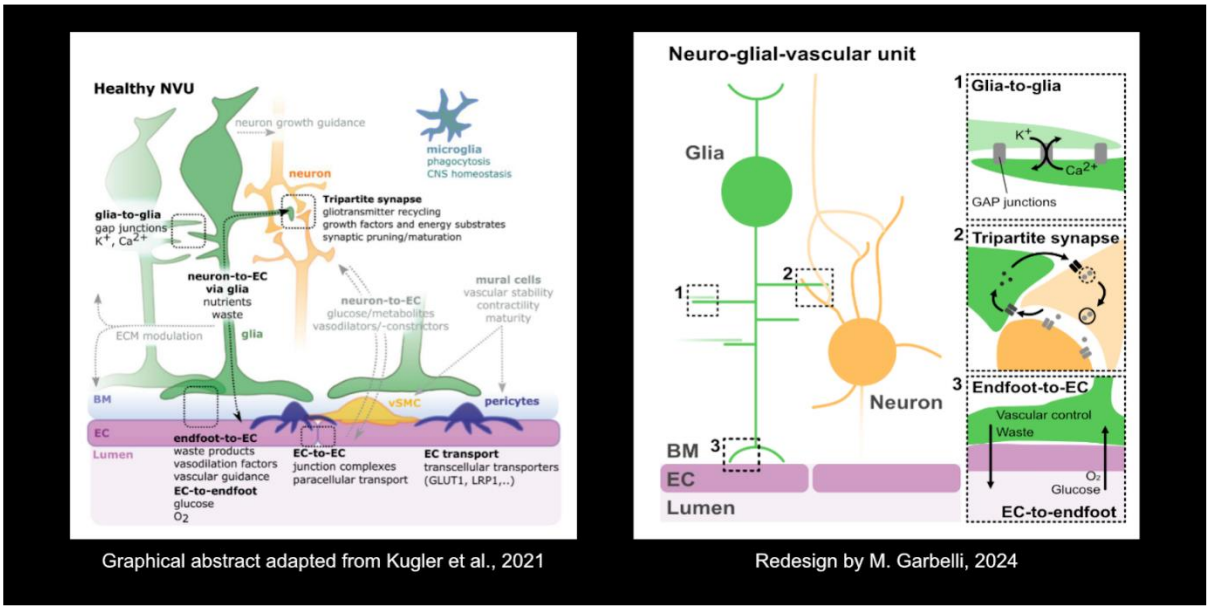
## Poster design - Before and after

Applying basic design principles to the layout of a poster can revolutionise its readability. That, along with experience and a pinch of experimentation can lead to remarkable results and make the poster a catchy piece of art telling an interesting story.




## Graphical abstract - Redesign

Often, when creating a graphical abstract, we are tempted to insert as much information as possible, or to make the graphics look detailed or artistic, sacrificing the information transmissibility. By focusing on the message we want to convey, we can streamline the information creating neat graphics at the same time.




Graphical abstract adapted from Kugler et al., 2021

Redesign by M. Garbelli, 2024

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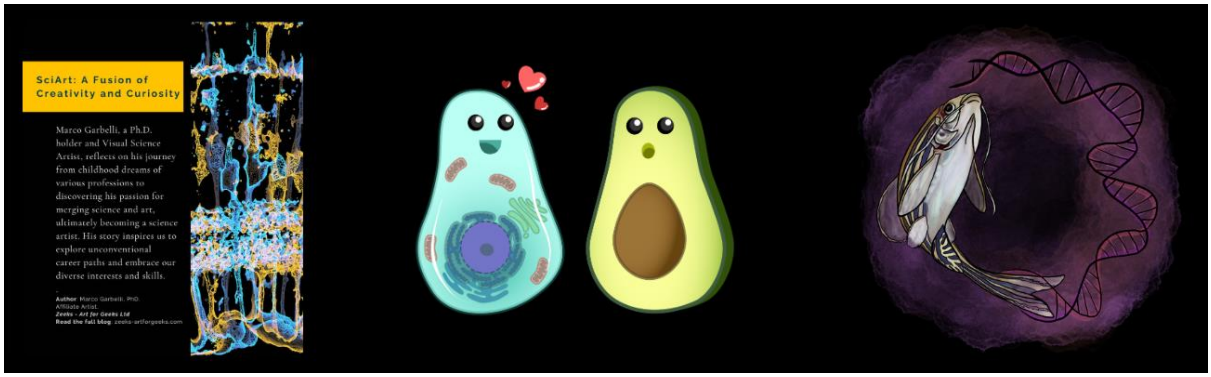
# Your Creator of this Guide

Dr. Marco Garbelli is a researcher with an international background in molecular biology, working with science graphics for over three years. After discovering the science illustration career, he dove deep into the field, taking the leap and starting working as a freelancer.
Marco creates designs, consults about graphical choices, writes and provides training for Zeeks.




Marco's illustrations have been featured for the past 3 years in the science communication project [Facts&Reasons](Facts&Reasons).


## Exhibitions Displaying Dr Garbelli's Work

- Figure 1.A. 2024 Exhibition - Future Unframed (Lausanne, 2024)
- [Art + Science 2023 Virtual Exhibition](Art + Science 2023 Virtual Exhibition) from Promega (Virtual, 2023)

# References

1. Ibrahim, Andrew M. MD, MSc*; Lillemoe, Keith D. MD†; Klingensmith, Mary E. MD‡; Dimick, Justin B. MD, MPH*. Visual Abstracts to Disseminate Research on Social Media: A Prospective, Case-control Crossover Study. Annals of Surgery 266(6):p e46-e48, December 2017. | DOI: 0.1097/SLA.0000000000002277
2. Oska S, Lerma E, Topf J. A Picture Is Worth a Thousand Views: A Triple Crossover Trial of Visual Abstracts to Examine Their Impact on Research Dissemination. J Med Internet Res. 2020 Dec 4;22(12):e22327. doi: 10.2196/22327. PMID: 33275112; PMCID: PMC7748957.