Scientist or artist? Why not be both?

Training in visualization should be a part of every scientist's journey.

In January 2020, the Centers for Disease Control and Prevention (CDC) released an image that took the world by storm: that of the SARS-CoV-2 virus. This image finally gave a face to an invisible killer that was tearing through the city of Wuhan, China, and that was about to change life as we knew it.

Scientific visualizers are a rare breed, shedding light on the unseeable by packing dense information into something readily accessible to others. The potency of this is threefold: visuals grab attention, they are free of language barriers and they are a Trojan horse for information. The CDC's SARS-CoV-2 image, illustrated by Alissa Eckert and Dan Higgins, first connects with us on an emotional level: the blood-red hue of the spike proteins subconsciously triggers our innate response to danger, and the sense of realism evoked by the rendered structures creates tangible objects in the mind's eye. We subtly become aware of the coronavirus spike protein: a key player in coronavirus testing, vaccination and variant evolution that has become a common discussion point among the wider public.

A career in scientific visualization is not always clean-cut. I did not follow an academic program to learn the tricks of this trade; instead, I took a leap of faith after realizing that a typical scholastic or industrial career trajectory would not play to my strengths. This became abundantly clear to me as I studied for a PhD in biotechnology because, whilst I found scientific concepts deeply interesting, lab work and academic writing oftentimes seemed to be a fruitless struggle. I took refuge in creative hobbies over time, and once I had submitted my thesis I knew that a creative career was what I had really longed for.

For most scientists, a standard pathway takes you through school, an undergraduate degree, a masters and/or PhD, then to a postdoc and beyond. The focus of each step is ever-narrowing, with career options often following suit. Of course, this is ideal for the student who has a deep affinity with

their practice, but for those less sure, it can restrict awareness of the potential creative intersections and branching points. To my knowledge, very few institutions offer programs or modules that integrate visual arts with science, despite its importance at the public-scientific research interface. Visualization can garner trust and understanding and can generate revenue for science.

In 2019, with no experience and little knowledge of the potential in this field, I began offering a graphical abstract and journal cover design service through a freelancing website, learning more with each job. To my surprise, the services quickly gained traction, and I expanded my offerings to include scientific animations. Over the past two years I have helped academics and businesses to colourfully and concisely communicate their work through animations and illustrations, mostly covering molecular processes and mechanisms of drug action. During this time, it became apparent that many scientists often lack confidence in their ability to make their work stand out. As such, I believe there is huge scope to educate scientists in engaging ways to visualize their work, particularly as part of standard scientific programs.

The tools for scientific visualization are better now than they have ever been, whether you are a novice or someone looking to expand your skills. Three-dimensional visualization software has dramatically improved over the past decade in terms of accessibility, integration with scientific software, open learning resources and realism. For instance, Blender (<https://www.blender.org/>) is open-source software that can be used to realistically visualize a broad range of subjects as illustrations, animations, virtual reality and three-dimensional printed objects. Large online communities contribute to Blender resources, for example by creating plugins that integrate scientific data, such as Atomic Blender, which imports molecular structures from PDB files. Thus, high-level

scientific visualization is merely a few clicks away for anyone wishing to learn the tools of the trade.

Scientific visualization does come with its own unique set of challenges. The accurate representation of a concept is usually crucial and often requires the designer to research the topic in depth to achieve scientific rigour. There are allowances for artistic license — such as adding false colours or movement to an object, such as a cell, for emphasis — but it is this fine balance between scientific accuracy and visual appeal that is often most challenging. Ultimately, creative decisions depend on what the piece will be used for. For example, a molecule used in company branding may be displayed with vibrant colours and a unique form to attract investors, whereas in a textbook, the colours and form may require adherence to rigorous standards, such as those set by the International Union of Pure and Applied Chemistry (IUPAC).

My message to graduates in science who feel locked out of the creative world is that it is never too late. Since few others in creative fields share the same knowledge and expertise, your experience as a scientist can add enormous and unparalleled value to your visual work. You can learn artistic techniques through practice and self-teaching.

The scientific community needs to recognize how much it can benefit from exploring the interface between art and science and should provide more opportunities for students to learn and explore the boundless possibilities in this growing field. □

Thom Leach

Amoeba Studios Ltd, London, UK.

✉e-mail: thomasleach@amoeba-studios.com

Published online: 24 December 2021
<https://doi.org/10.1038/s41564-021-00995-9>

Competing interests

The author declares no competing interests.