Art and science have always been linked: With art we can describe the form of natural objects and systems, define their structure and find underlying patterns in their shape. Art also allows abstract expression, enabling us to visualise structures that cannot be seen by conventional means. Take cell biology. The microenvironment of the cell is all about organization and ordered systems, arrangements that are best visualized in figures and diagrams. The compartments of the cell and the interactions between them offer plenty that can be shown with icons and stylized graphical elements. This is an example of how art is essential in translating the concepts of science, to record observations and theories, and to convey their meaning visually. The art of analogy is important when illustrating novel ideas, conveying abstract scientific concepts in a way that is easily interpretable.

Throughout the history of Nature, there have been many memorable and iconic images and diagrams, such as Roentgen’s X-rays, the 3D model of myoglobin, and the structure of DNA. Regardless of the topic, these visual elements are an essential component of the scientific articles. A diagram should complement and enhance the scientific content, and can be as important as the text itself in conveying the theories and data. A diagram provides a visual entry point and draws the reader in to the article.

In the following text I shall be looking at the work I do for the various sections of Nature magazine, looking at some specific examples of graphics, their starting points, the concepts behind them and the artistic processes involved.

**NEWS & VIEWS**

News & Views is the review section of Nature, and is the section in which art and science is most intimately linked. The graphics of this section are the most technical of the magazine (aside from the figures of the primary research articles) as they are reviews of research papers written by authors to summarize the main points, implications and concepts of a research paper for a non-specialist reader. The graphics should be engaging, easily digestible and as simple as possible, whilst still complementing the article and summarizing the main findings of the primary paper. The author of the review is encouraged to provide an idea for a figure, which the editor then discusses with the artist. These ideas are usually nothing more than a basic pencil sketch that is then used as a guide to produce the final figure. Graphic style is important in this section, to ensure consistency in the representation of each element across a variety subject matter. A simple style has been developed over time that is bright and eye-catching, using depth and colour to make the graphics as engaging as possible. Elements that come up repeatedly, such as proteins, cell structures, nanoscale transistors in physics, stars and orbits of planets and so on, all have their own styles (Figure 1).

![Figure 1. A News & Views graphic. Here we can see an authors brief for a News & Views graphic (Left panel). This was simplified, leaving only the most important elements, which were then taken from a graphics library and the final diagram was assembled. Receptors, proteins and cells all have a specific style.](image)
ies of these graphical elements have been built up over time, so that these styles remain consistent, but as *Nature* is a multi-disciplinary journal covering a variety of subject matter, these libraries cannot be exhaustive. So the graphics libraries also act as reference material, giving the artist guidelines and an idea of how novel elements can be represented in the relevant style.

**NEWS FEATURES**

Over recent years, *Nature* magazine has undergone two redesigns of the print journal. The first of these greatly expanded the News and Features section, giving more space for features and more flexibility in design. This included larger and more integrated graphics, bolder infographics and more graphical double-page spreads. The second redesign was a more comprehensive restructure of the magazine, looking at the fundamentals of navigation, style and design of the whole journal, including graphics. An important part of this redesign was news feature design, looking at how to give each article an identity that was relevant to its content. This involved a stronger use of typography, so that typography could be used as the lead graphical element of the feature, and using a style that is consistent throughout the feature and in its graphics. We looked at how infographics could be incorporated more prominently, so that they could dictate the style of the article. We experimented with the placement of visual elements, so that they would have more impact. We simplified the graphic style, keeping it clean and bold, and used space and strong iconography wherever possible.

When designing infographics for news features at *Nature*, especially when covering complex subject matter or summarizing dense data sets, there are certain elements that are important (Figure 2). The first of these is ‘the key’. The key of a graphic is often overlooked, seen as secondary to the graphic itself, something that should be hidden or tucked away in the corner of the page. The key can often be the most important element of an infographic, and one that the reader should see before anything else. It explains how the data is presented, and by what rules it should be interpreted. Then it is important to consider a series of strong navigational aids, to lead the reader through the various stages of the graphic. These could be numbering, icons, a series of subheadings, or short blocks of text organized in a clear way throughout the infographic. These are essential to guide the reader through the graphic, so that the elements are read in order and the concepts build in the way that you as a designer intended them to be. This should then be supplemented by ‘callouts’ – descriptive snippets of text that highlight important points in the data but also provide a narrative and help the reader to interpret the data that you are presenting.

The next aspect to consider is the style of the graphic. This should be dictated by the subject matter, but sometimes a deviation from what is expected can actually help by drawing the reader in with unexpected and, therefore, interesting visual cues. With subject areas such as theoretical physics, the visual graphic elements are often essential for the non-specialist reader, to help understand difficult and complex theories. For a designer, these can often be the most challenging of graphics to produce (Figure 3). Abstract shapes and designs often have to be used to depict concepts that often have no physical form, or exist at extreme scales making them challenging to illustrate. Subject areas such as string theory or black hole physics are examples of this.

In many scientific graphics a light-hearted approach to illustration can be the most effective way to depict processes or concepts. When this is appropriate, a fun graphic can engage the reader and gives the designer licence to show scientific processes in new and interesting ways (Figure 3). Often these sorts of graphics are the most widely shared through social media, and so can reach a greater audience. When tackling a graphic in this way, the style is important – it needs to reflect the subject matter, and be in keeping with the rest of the feature, considering the images and typography to be used in the article design.
Covers and Conceptual Illustration

Conceptual illustration plays a big role in the interpretation of science through art in Nature. Editorial illustrations and cover designs frequently try to summarize concepts or broad subject areas for a wide range of topics. This is done through visual metaphor or by taking processes or relevant imagery from a subject and using it as the basis for an abstract design (Figure 4). Often the most difficult aspect of cover illustration is the specificity of a concept. The design needs to be representative of a broad subject area, without being so vague that the concept becomes difficult to understand. The use of visual analogy in designs allows the artist to be suggestive of a topic without having to be too scientific or technical with the design. Ideas for conceptual illustrations often come about through discussion with editors about the subject area, followed by consideration of which styles and visual elements would be most appropriate. Then the artist comes up with a rough draft that outlines these ideas, before working up a final illustration based on feedback from the editors.

Art is important in every section of Nature, and shapes the look and feel of all that we do. It helps to illuminate and explain the theories we publish, and it illustrates concepts and subjects in ways not possible with text. It forms the essential iconography that we associate with all of science and also gives us the ability to visualize scientific abstraction in new and exciting ways.

Figure 3. Feature graphics: contrasting styles. Here are two very different sorts of News Feature graphic. The top panel shows a theoretical physics infographic, which attempts to explain the link between string theory and condensed matter physics. The lower panel also shows a step-by-step infographic, but this time is a humorous take on the production of synthetic meat in the lab.

Figure 4. Covers and conceptual illustration. Here are some examples of cover illustrations for Nature supplements. Scientific elements are represented using visual metaphor and analogy to convey the subject areas in engaging and interesting ways.