Scientific Visualization: Exploring a Sample Dataset

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1 Introduction

This report template uses the `article` document class with an 11-point base font and A4 paper. All page margins are set to 2 cm on the top, bottom, left, and right, providing a consistent text area throughout the document. The main text uses the Latin Modern font, with microtypographic adjustments enabled to improve spacing and readability.

Paragraphs are left-aligned without a first-line indent, and a small vertical space separates one paragraph from the next. Lists use compact spacing to conserve space. Figure captions are set in a smaller font than the main text, with bold labels and automatically generated figure numbers. Hyperlinks and cross-references are clickable in the compiled PDF.

The report is organised into three main sections: Introduction, Results, and Conclusion. The total report must not exceed five A4 pages, including figures and captions. The title, author name, student ID, and date appear at the beginning of the first page. The date is generated automatically and can be replaced with a fixed date by editing `\ProjectDate`.

Scientific visualization transforms numerical, spatial, or experimental data into visual representations that help readers identify patterns, compare values, and communicate findings. Figures should be readable, clearly labelled, and accompanied by captions that explain what is being shown. Use a full-width figure when a visualization contains substantial detail; use two side-by-side figures when comparing related results.

The aim of this project is to explore a scientific dataset and explain how visual design choices affect the interpretation of the results. Replace the illustrative figure placeholders below with visualizations generated from your own data. All example figure areas are placeholders rather than scientific results.

2 Results

Present the main visual outputs in a logical order. Refer to every figure in the text, describe the most important visible pattern, and use consistent units, labels, and colour scales. Avoid conclusions that are not supported by the data.

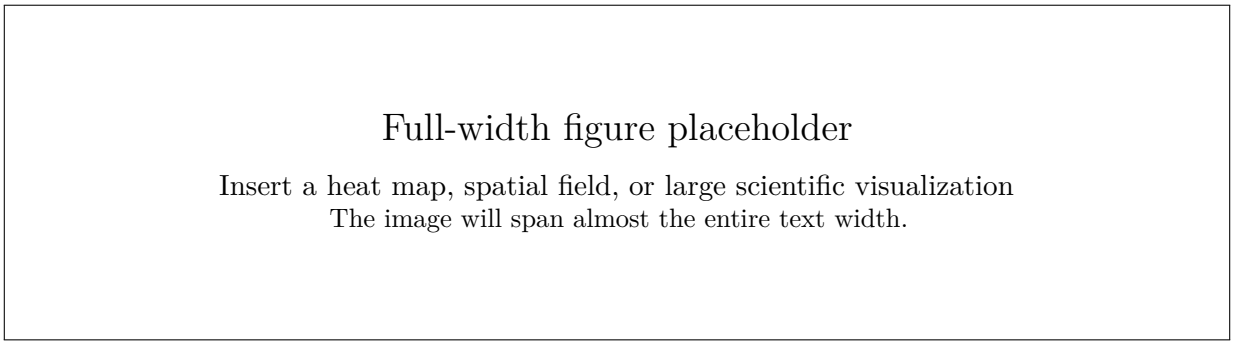
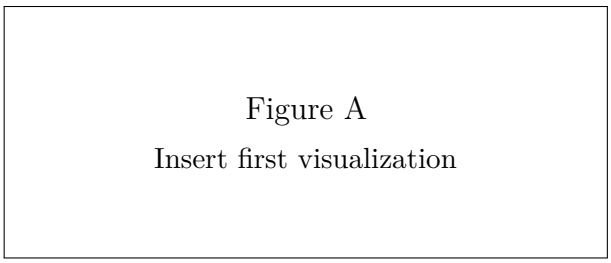
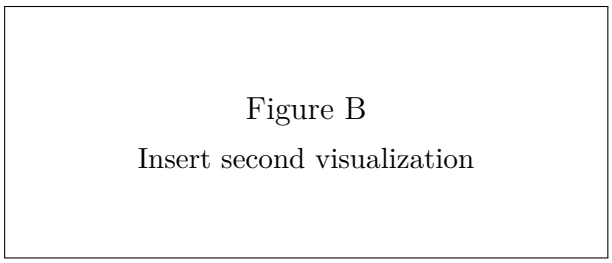


Figure 1: Full-width example: spatial distribution of a measured variable. Replace this placeholder with your own figure.

Figure 1 illustrates the full-width layout. This format is appropriate when details need enough space to remain legible, for example in a heat map, a simulation result, or a complex 3D rendering. Describe the main features, gradients, clusters, or extreme values visible in the final image.



(a) First method or condition.



(b) Second method or condition.

Figure 2: Side-by-side comparison of two visualizations of related data. Replace both placeholders with your own figures.

Figure 2 demonstrates how two figures can share one row. Each subfigure occupies approximately 48% of the text width, leaving a small gap between them. This layout is useful for comparing two methods, datasets, time points, or parameter settings. Refer to the individual panels as Figures 2a and 2b, and explain the similarities and differences in the results.

A useful comparison should identify the visual encoding used in each panel, such as colour, position, shape, or size. Check that axes, units, and colour scales are consistent wherever a direct comparison is intended. If different scales are necessary, state this clearly in the caption or discussion.

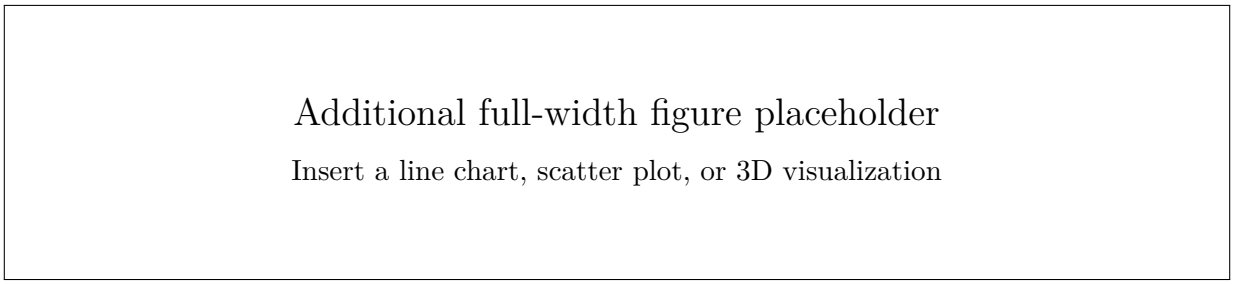


Figure 3: An additional visualization used to show a trend or relationship in the dataset.

Use Figure 3 to report another important result, if needed. Explain the trend or relationship that it reveals and mention any limitations, such as uncertainty, missing values, sample size, or choices of scale.

3 Conclusion

Summarise the main findings from the visualizations and explain which representation was most useful for answering the project question. State whether the figures support the same interpretation or reveal complementary features of the dataset. Mention relevant limitations, such as measurement uncertainty, missing data, sample size, or the effect of colour and scale choices on interpretation.

Before submitting the report, replace every placeholder with a real figure, check that all captions and figure references are correct, and ensure that the final PDF does not exceed five A4 pages. Keep figure text and axis labels large enough to read, and ensure that every figure is discussed in the main text.