

**Visual Communication of scientific data: figures, posters, slides.**

Visual communication is key for the scientific discourse – as figures in papers, slides for talks, and posters and increasingly also as graphical abstracts, interactive visualizations, and online databases. However, visual communication strategies for scientific data are not part of the scientific curriculum.

In this workshop, participants learn to read and create clear scientific visualizations that can be used in figures, slides or posters.

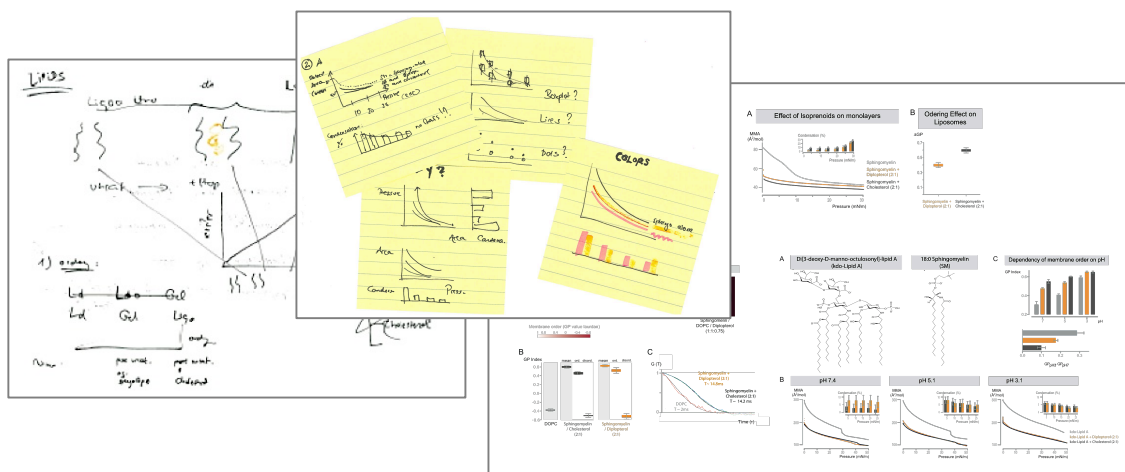
We will discuss for example:

- What data needs a figure
- How to **choose chart types**
- How not to lie: **ethics and truthfulness in data presentation**
- How to increase the legibility by considering **graphic design principles**

Importantly, we will discuss in detail good and bad examples from scientific literature and from the participants. The course includes lectures, exercises in small groups, and discussion of individual data visualization challenges from the members of the group.

The course is a general training in scientific visual communication and data presentation.

*From sketch to publication – the process of creating scientific data visualizations*



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## *Example schedule*

We will have six lecture blocks each followed by relevant exercises that allow participants to apply their new knowledge to example cases. The exercises are a mix of group work and individual problem sets. We will use breakout rooms and discussion boards to exchange ideas and content. Here, we will have a “Visual session” where we look and discuss figures sets together.

Important: we will not use specific software in this course, students are encouraged to use pen and paper during the design process, however we may look at, and discuss advantages/disadvantages for common software such as R, sigmaplot, Matlab, Illustrator, PowerPoint, and Excel.

Important: discussion of individual data visualization challenges requires students to share a work-in-progress with the members of the group.

## *As a 2-day in person course*

### *Day 1 - Morning*

From raw data and numbers to figures

- Exploratory versus explanatory data visualization
- Which display type to choose for what kind of data, univariate data
- Display types for multivariate data
- **Exercise** Too little data or too much data – what makes a good figure?

Graphs and Charts

- Categorical, relationship, time-course data, comparisons of datasets
- Statistical data
- **Exercise** Choosing a chart type
- Ethics of data presentation

### *Day 1 - Afternoon*

Text & Typography

- Text arrangements, typography
- Table design, heat maps, databases
- **Exercise** Figure legends, titles and labels.

Image data

- Choosing an image, picture detail and magnification
- Image data labels
- **Exercise** Image legibility, guidelines for image reproducibility
- **Exercise** Image ethics, guidelines for image integrity
- **Homework** Find a good and a bad example figure, upload

### *Day 2 - Morning*

**Group work** Discuss homework

Color in figures

- The do's and don'ts of color
- Color for qualitative, quantitative, and diverging data

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# Helena\*Jambor

## Scientific Information Design

- **Exercise** Choosing a color scheme, applying color concisely
- Layout of figures and figure sets
- Gestalt principles
- **Exercise** Use your space!

### *Day 2 - Afternoon*

**Group work** Work in peer groups, apply learned principles to your work

Focus the attention & Decluttering

- De-cluttering of figures
- Rapid techniques to increase readability of figures

### *After the course*

**Exercise** improve your work, send in before/after to course instructor for feedback.

## *As a 3-day online course*

### *Day 1*

Welcome, **From raw data and numbers to figures**

- Exploratory versus explanatory data visualization
- Which display type to choose for what kind of data, univariate data
- Display types for multivariate data
- **Exercise** too little data or too much data – what makes a good figure?

### **Graphs and Charts**

- Categorical, relationship, time-course data, comparisons of datasets
- Statistical data
- **Exercise** Choosing a chart type
- Ethics of data presentation

### *Day 2*

#### **Designing a good figure**

- Text arrangements, typography
- Table design, heat maps, databases
- **Exercise** Figure legends, titles and labels.
- The do's and don'ts of color
- Gestalt principles and good layout

### *Day 3*

#### **Your own work**

- Group discussion of exercises from Day 2
- Peer group: apply learned principles to your work
- **Exercise** Improve your work, send in before/after

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