The Use of Slides in Oral Presentations

Slide presentations have become the most common way for scientists to share their work and ideas with others. Typical graduate students and postdocs publish 1–3 papers and present 5–10 posters during each stage of their training. In contrast, they deliver dozens of slide presentations. The frequency of talks only increases at the faculty level as principal investigators teach courses, present seminars on the lecture circuit, and speak at scientific meetings. With the use of slides so widespread, it is surprising that there is a general lack of training about their use in oral presentations. When used poorly, slides can mar a presentation, sabotage a speaker’s message, and confuse an audience. However, when well designed, slides add tremendous impact to a talk, enriching the information an audience receives and enhancing the communication of scientific ideas.
The Purpose of Slides as Presentation Tools

Slides are so ubiquitous in oral presentations that most people don’t even consider the possibility of delivering a talk without them. Whether we realize it or not, using slides in our presentations is a deliberate choice, and we often have the freedom to present talks with oral delivery alone. Thinking as designers, it is worthwhile to ask: Why do we use slides in oral presentations at all? What benefit do they provide our audiences?

As discussed in earlier chapters, data are best conveyed visually in charts and tables. People don’t just want to hear about the results of experiments, they want to visualize data so they can draw their own conclusions. Additionally, diagrams, illustrations, and photographs provide tremendous explanatory power. Therefore, visual aids are indispensable to good science presentations.

So why not use a handout instead of using slides?

The power of slides as presentation tools is that they allow you to show your audience whatever you want them to see, whenever you want them to see it. Unlike a paper, poster, or handout, it is you who controls the flow of information in a presentation.

Without care and deliberation, the misuse of the power to control the flow of visual information to your audience can lead to confusing, unintelligible, and even annoying presentations. However, with care for your audience and attention to principles of good design, slides can offer much greater impact than your words alone.
**Slides are for the Audience, Not the Speaker**

Perhaps the most common mistake people make when creating slide presentations is to create slides for *themselves* rather than their audience. For example, they use slides as presentation notes so they know what to say during a talk and when to say it. They put visual elements on a slide that will remind them to explain a concept, instead of to help audience members understand a concept. They allow templates and default settings to structure a talk for them, without regard to the best narrative for their listeners.

*Slides are tools to help you convey information, ideas, and emotions to your audience, not tools to save you time and effort making and delivering a presentation. If you feel you can’t present without slides, you are probably using them for the wrong reason.*

The proof of the dependency of some presenters on their slides occurs when a computer crashes or a projector fails and the speaker suddenly has to deliver a presentation without slides. Everyone in the audience feels bad for the speaker, instead of the other way around. If the speaker is a master of the content and has thoroughly thought through the needs of the audience, then he or she should be able to get through the presentation without slides. In fact, it should be the *presenter* who feels bad for the *audience* that they are denied a communication aid.

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**Hunting and Eating**

- Lions prey on large mammals
- Lions hunt in coordinated groups
- Cooperative hunting increases the likelihood of a successful hunt
- Teamwork also enables lions to defend their kills more easily against other predators

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The slide on the left helps the speaker more than it helps the audience. All of this information can easily be conveyed orally without needing to be placed on a slide. Instead, the speaker probably intends to use the slide as personal lecture notes. In contrast, consider the immediate emotional impact of the slide on the right. With this slide the speaker can deliver the same information in a much more powerful way.
Design a Slide Presentation from an Audience’s Perspective

We may not all consider ourselves experts at presenting science, but we are all expert audience members. After the hundreds, if not thousands, of slide presentations we have seen, we have many opinions about what we like and dislike in a talk. As a presenter, your goal is to consider your presentation from the point of view of your audience, providing the kinds of experiences you would want if you were attending your own talk.

What audiences want from Presentation Design

- a scientific story with a beginning, middle, and end
- a rationale for the science
- an introduction that tells them what they need to know in order to understand the science
- clear, legible slides
- balance of data with the big picture
- information presented one piece at a time
- a chance to catch up if they lose attention
- a presentation that runs on time
- an indication of what to remember after the talk is over

What audiences want from Presentation Delivery

- a clear, dynamic delivery
- a sense of expertise in the speaker
- interest and passion from the speaker
- a friendly, accessible speaker
- a speaker that can empathize with the general mood of the audience
- a flawless technical delivery and use of technology
- a sense of how much a talk has progressed (and how much remains)

An interesting exercise: Have you ever tried making a slide presentation in an empty lecture room? Literally sitting where your audience will sit can help you design a presentation from an audience’s perspective. Try leaving your desk behind and getting a different point of view.
Know Your Audience

One of the most important factors that affects the success of a talk is a speaker’s ability to connect with and understand his or her audience. Sometimes an otherwise excellent presentation fails because it doesn’t conform to a particular group of people. There is no such thing as “the right talk for the wrong audience,” because there is no such thing as “the wrong audience.” It is your job to know your audience and to get your presentation right.

When designing the narrative of a slide presentation, you must consider who your audience will be and what relationship you want to establish with them.

Questions to ask about your audience

Who are they?  
What do they care about?  What are their interests?  What do they find exciting and what is likely to bore them?

Why are they attending your talk?  
Is their attendance required or voluntary?  What will they be looking for in your presentation?  What do they hope to receive?

What do they already know?  
What background information is not necessary to present in detail because your audience is already likely to know it?

What do they need to know?  
What background information is essential to present because your audience won’t understand your talk without it?

Do they hold any preconceptions or biases?  
What opinions about your topic or field are they likely to have prior to the start of your talk?  Why might they already object to information in your background or results?

What is their likely mood during your talk?  
What time of day is your talk?  Is your audience likely to be tired? Hungry?  Anxious?  Are they waiting for your talk to end so that they can go do something else?

Connecting with your audience is more than just knowing who they are, you also have to consider who you are, and the roles you may play in addition to your role as speaker. Are you also a teacher? A mentor? A trainee seeking advice? Are you a salesperson, trying to convince your audience of an idea? A cheerleader, trying to raise hopes? Define your role carefully, because in order to connect with your audience you have to know the nature of your relationship.
Create Ideas, Not Slides

When using slide creation software, there is a natural tendency to focus on slides rather than on ideas. After all, when you first open these applications you see windows that look like this:

![Apple Keynote user interface](image1)
![Microsoft PowerPoint user interface](image2)

Big, blank slides with long, empty slide columns almost seem to beg you to fill them up with stuff. It is easy to find yourself going from blank slide to blank slide, filling them up one at a time until eventually all of your content is represented within the slide show.

The problem with using blank slides as a starting point is that it changes your narrative style and the structure of your talk. Rather than focusing on your ideas and the best way to share them with an audience, you focus on slides as individual units, segmenting your information into bite-sized bits that may not be ideal for communication.
Instead of designing slides in a way that is slide-centric, design in a way that is idea-centric.

**Slide-centric**
Focus on filling individual slides with content

**Idea-centric**
Focus on ideas first and then apply them to slides

Before you even open a slide-making application, outline the structure of your presentation and organize the order and importance of your ideas. Concepts that you especially want to emphasize may take more than one slide to communicate.

**Recommended reading:** Anyone who cares about slides as a presentation tool will learn from a brief 32-page essay, *The Cognitive Style of PowerPoint: Pitching Out Corrupts Within*, by Edward Tufte, a pioneer in the field of data visualization and information design. This fascinating essay (available from any online bookseller) is critical of many of the properties and uses of slide presentations, especially in the way that slide software itself can change the way that people conceive of and deliver information.
The Relationship Between Slides and Oral Delivery

During a slide presentation, audiences receive information from two different sources: your voice and your slides. When your narration and visuals complement each other, you achieve a great harmony that helps your audience understand your content. When narration and visuals contrast, your audience can become distracted and confused.

Your oral narration is what drives your presentation forward, and visual aids are always subservient to what you say. It is possible to give a talk without slides, but slides without oral delivery lack content and meaning.

Consequently, anything on a slide should be acknowledged in your oral delivery. *If you’re not going to talk about it, get rid of it.*

![Before](image1.png) ![After](image2.png)

Only talking about Figure B? Then get rid of the other figures you aren’t presenting.

![The Genetic Code](image3.png) ![The Genetic Code](image4.png)

Only discussing the figure on the right? Then get rid of the figure on the left.

However, everything you say doesn’t need to be on a slide. Only show something on a slide if it will help your audience to understand your message.

![Before](image5.png) ![After](image6.png)

Just because you want to say it doesn’t mean it has to be on your slide.
How Many Slides?

There is a common myth that you should make about one slide for every minute of a presentation. In reality, there is no formula that calculates the time your talk will take to deliver based on the number of slides in your presentation. How long you typically spend delivering slides depends on your delivery style and your content. Some excellent presenters use only 20 slides over the course of an hour-long talk and the audience is never bored. Others use hundreds of slides and the audience never feels rushed.

There is no golden rule about how many slides to use in a presentation except to know yourself and your own speaking style. The only way to truly know how long a presentation will last is to rehearse.

Depending on how the speaker presents the subject matter of these slides, each may take several minutes to explain and discuss.

These three slides, when presented in relatively rapid succession, make a point in seconds.
Exceptional Presentations Require Time and Effort

Making a mediocre slide presentation is really easy. All you have to do is wait until the day before a presentation is due, open a slide-making application, create a bunch of slides, and deliver them in front of an audience. If you’re lucky, you won’t have any obvious typos in your slide titles.

Designing a world-class slide presentation is hard work. Consider the amount of time you might spend:

<table>
<thead>
<tr>
<th>Time estimates for designing a professional slide presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>5–50 hours</strong></td>
</tr>
<tr>
<td><strong>Analyze data.</strong> Sort data in spreadsheets, perform quantitative and statistical analyses, etc.</td>
</tr>
<tr>
<td><strong>5–20 hours</strong></td>
</tr>
<tr>
<td><strong>Design elegant tables, charts, diagrams, and photos.</strong> Optimize all visual elements for a slide presentation.</td>
</tr>
<tr>
<td><strong>1–10 hours</strong></td>
</tr>
<tr>
<td><strong>Research relevant background information.</strong> Peruse the scientific literature to find key background papers, figures, etc. for your audience.</td>
</tr>
<tr>
<td><strong>1–8 hours</strong></td>
</tr>
<tr>
<td><strong>Brainstorm and outline the narrative of the presentation.</strong> Organize your information into a scientific story and simultaneously translate your content into an oral delivery and slide presentation.</td>
</tr>
<tr>
<td><strong>5–50 hours</strong></td>
</tr>
<tr>
<td><strong>Design slides.</strong> Use a presentation application to translate your ideas into a visual story.</td>
</tr>
<tr>
<td><strong>1–5 hours</strong></td>
</tr>
<tr>
<td><strong>Edit slides.</strong> Proceed through your presentation, one slide at a time, optimizing visual elements, layout, and animations.</td>
</tr>
<tr>
<td><strong>1–2 hours</strong></td>
</tr>
<tr>
<td><strong>Rehearse.</strong> Practice your delivery in whatever way works best for you: in front of a practice audience, by yourself, on your bike, etc.</td>
</tr>
</tbody>
</table>

**Total: 20–150 hours**

These time estimates assume you are creating a presentation completely from scratch. In reality, you may recycle much of one presentation for another, and some presentations are much shorter than others.

The amount of time you should dedicate to designing a presentation is proportional to the importance of the talk. Designing a presentation for a professional meeting, invited talk, job talk, thesis defense, etc. will require many hours, perhaps even a full week of work.

Even presentations that are less consequential (e.g., lab meetings, journal clubs) are important because they establish your reputation among your peers and colleagues. There is no such thing as a presentation that doesn’t require time and effort.

Although it is possible to “get by” with a hastily crafted presentation, you diminish the impact you could have on your audience. Each presentation you give is a chance to showcase your content and develop your professional reputation. Make sure you dedicate enough time to prepare so that your talks aren’t just adequate, but truly world class.
Summary: Don’ts and Dos

Don’t design slide presentations without routinely asking yourself how your slides are beneficial to your audience.
Do design slides deliberately to enhance communication with your audience.

Don’t become dependent on using slides to give a talk.
Do design slides purely for the benefit of your audience, and be able to speak about your science without needing your slides for assistance.

Don’t ignore what an audience needs when designing a talk.
Do ask yourself what you would want from a slide presentation if you were in the audience, and design a talk accordingly.

Don’t fail to consider the nature of your specific target audience.
Do consider who your target audience will be and what kind of relationship you want to establish with them.

Don’t be slide-centric, starting with blank slides and figuring out how to fill them with content.
Do be idea-centric, starting by first outlining your ideas and then applying them to slides.

Don’t include anything on a slide that you aren’t going to talk about.
Do use slides as a complement to what you say, only presenting visual information that supports your oral narration.

Don’t feel the need to put everything you talk about on a slide.
Do only show something on a slide if it helps emphasize a message.

Don’t make assumptions about how long your presentation will take to deliver based on how many slides you have.
Do rehearse your presentation so you know whether you adhere to time restrictions.

Don’t design a presentation at the last minute.
Do dedicate multiple hours to designing a talk that will, at the very least, influence your reputation with your audience.
The Structure of a Slide Presentation

When most people think about designing a slide presentation, they focus on their content and what their slides will look like. Just as important, if not more so, is the structure of a presentation—the organization of ideas and concepts into a larger scientific story. Scientists that design well-structured talks not only communicate information better; they also create experiences for their audiences that increase attention, comprehension, and impact.
A Good Scientific Talk Is a Good Scientific Story

A common problem with many science presentations is a narrow focus on experiments and data. While data and ideas are obviously the meat of any science talk, audiences can become uninterested and even confused if they have not been adequately prepared to interpret the data in a larger scientific context.

Audiences don’t just want to see data, they want to hear a complete scientific story with a beginning, middle, and end. The beginning conveys a rationale, a sense of importance, and a clear goal. The middle contains the experiments, results, and conclusions. The end places your results in a larger scientific context and looks to the future.

In this respect, science presentations have a surprising amount in common with action movies. Nobody wants to see a thriller composed entirely of action scenes. Instead, movie audiences like a good beginning that introduces characters, conflict, and a sense of purpose. They also want a good ending that provides a resolution, a conclusion, and a hint of a bright future to come. Likewise, a good scientific talk is really a good scientific story. Take a lesson from your favorite movies and place your actions within a larger scientific context.

A typical plot diagram for a thriller is similar to the narrative structure of a scientific presentation. Just as a protagonist overcomes obstacles through a series of action scenes, a scientist pursues scientific objectives through a series of experiments.
Set the Tone of Your Talk with a Title Slide

Your scientific story begins before you even begin speaking.

Title slides are more than just token beginnings to a slide show. They introduce details about yourself and set a tone for the rest of your presentation to follow. Because title slides are displayed as an audience enters a room, you can use these slides to communicate information without costing you time during the actual talk. Consider that your title slide will probably be the slide that your audience looks at for the longest amount of time.

A **good title slide contains:**

- **A good title.** A good slide show title informs the audience of what to expect from the talk.

- **Your name and affiliation.** (This isn’t necessary for internal talks in which everyone already knows you.)

- **The date and function of the talk.** Writing the date and function will convey that you designed the talk specifically for this audience and this venue.

- **A picture or diagram that sets the tone.** Including a picture or diagram will psychologically prepare your audience for the subject matter of your talk before you even say a word.

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**Quantitative genetics of butterfly wing patterns**

Kelly P. Papajosko, PhD
McDowell Institute

April 18, 2012
University of WA
Genome Sciences Symposium

**Correlation of lunar phase with striped bass catches**

Dr. Andrew Cross
Shiley College
14th Annual ASSM Meeting
June 8, 2009

**The role of Brainstem Nuclei in food intake behavior**

Lab Meeting
October 13, 2011

**Solar–climate relationship: Variation of cosmic ray flux and global cloud coverage**

September 13, 2012
Stanford University

Abraham Villeda
Department of Geology and Atmospheric Sciences
Start a Talk by Progressing from General Questions to Specific Goals

It is jarring for an audience when a speaker begins with highly detailed, specific information. Even people who are familiar with your work or research topic want to be gradually led from a broad question or problem to a specific scientific goal.

To attract the interest of everyone in your audience, always start a presentation with a statement or question that anyone from any discipline should be able to understand. Gradually focus your introduction toward your specific topic and research goal, defining specific terminology and concepts that people might not understand.

A good science talk starts with a general question and becomes progressively more and more specific until the speaker asks a unique scientific question.

**General**

How is the Earth's climate affected by global warming?

As the earth warms, some regions demonstrate anomalous cooling.

Is the decrease in Arctic sea ice in autumn linked to increases Northern Hemisphere snow in the winter?

**Specific**

What are the molecular mechanisms behind the aging process?

In sexual animals that don’t self-replicate, telomere shortening correlates with cell senescence.

Is telomere maintenance different in sexual animals and asexual animals that do self-replicate?

**General**

How do chemicals cycle through the environment?

Isotopes of iodine play significant environmental roles.

How does $^{131}$I cycle throughout terrestrial ecosystems?

**Specific**
Clearly State Your Scientific Goal and Why It Is Worth Pursuing

Audiences want to know the answers to two important questions before learning about any specific experiments or results: what are you doing, and why are you doing it? In other words, what is your ultimate scientific goal, and why is reaching that goal important?

When speakers do not clearly articulate a question or goal that drives their research, their data and results lack context: the audience may understand specific experiments, but not how the results fit into the bigger picture. When speakers do not explain a rationale for their experiments, their results don’t seem interesting: the audience may understand what the speaker did, but not why they should care.

Before presenting any data, clearly state and emphasize your overarching scientific goal and why reaching that goal is interesting. If you don’t state your goal in the beginning, your audience won’t know if you reached it at the end. And if you don’t state your rationale in the beginning, your audience won’t care if you reached it at the end.

Before

After

In the slide on the left, the major question that drives the entire research study is buried at the bottom of a text-heavy slide. Any audience member who is not paying full attention may miss that it was even mentioned. A better way to emphasize the research question is to separate it from the background information and place it on its own slide. Adding an attractive photograph or diagram increases audience attention so that everyone clearly understands the research question throughout the rest of the talk.
Prepare for Inevitable Shifts in Attention

Audiences rarely focus their complete attention on a science presentation throughout the entire talk. They may start out actively listening to what you say, but they inevitably become distracted and lose attention as your talk becomes more detailed. These distractions are natural—we are all human, and full concentration is difficult to maintain, especially for presentations that last an hour or more. Even the best presenters occasionally lose parts of their audience.

One of your goals in structuring a scientific talk is to prepare for the inevitable periods during which your audience is likely to become distracted.

Predict the moments during which people are likely to break concentration and deliberately structure your presentation so that you employ methods, described on the following pages, of maintaining and regaining their attention.
Organize the Presentation of Data into Individual Segments

After delivering background information to their audiences, most scientists usually present detailed scientific information (experiments, methods, results) in one long continuous section until they reach the end of their talk. During these long stretches of technical detail, audiences often become unfocused and gradually stop paying attention. In presentations that last longer than 10–15 minutes, scientists (even hard-core scientists) need mental breaks. Instead of presenting data all at once, organize your information into more manageable segments.

After each segment of data, give your audience a brief break—not a literal pause in your talk, but a pause in the presentation of detailed information. During this pause you can:

- Summarize what you just covered
- Ask if there are any questions
- Connect the details of your data with the larger scientific story
- Provide interesting examples/applications of what you just covered
- Tell a relevant anecdote or humorous story
- Show a video clip likely to recapture audience attention

By providing these pauses in data, you not only allow your audience to firmly plant their feet on the ground after a stretch of detailed information, you also balance the details with the big picture, integrating the results of experiments with your overall scientific story.
Unite Sections of a Talk Using a “Home Slide”

When dividing a presentation into manageable segments, it can be helpful to your audience to provide an outline that follows the structure of your talk and tracks your progress throughout. This outline can be provided in the form of a home slide—a slide you return to throughout your talk to unite different segments into a cohesive whole.

A good home slide contains an outline of the different sections of your talk with a picture or unifying diagram that represents the big picture. Show this slide before you present your first segment of data and at the end of every section until the conclusion of your talk, using it to transition between sections and help increase audience attention and understanding. You can even return to your home slide at the end of your presentation to summarize all of the information you covered.
When does a home slide become too repetitive? A good rule of thumb is to show this slide no more than once every few minutes. For an hour-long talk, you might divide your data into two to four segments and use a home slide three to five times. While using this slide over and over may seem repetitive to you, your audience will appreciate the obvious exposition of structure.
Deliberately Emphasize One to Three Take-Home Messages

Hours after a presentation ends, most audience members will forget all but a few details of your talk. While certain experiments or results may be especially interesting or important to you, your audience will probably blend all the details together into a single, general memory. Months after your talk, they may not even remember what your presentation was about.

If you want your audience to remember one to three key aspects of your talk, deliberately highlight these items when they are most salient. Telling your audience what is important to you will make those items resonate long after your talk is over.
End a Talk by Transitioning from Specific Details to a Broader Scientific Context

Just as you begin a talk by transitioning from general ideas into your specific scientific story, end a presentation by transitioning from your experiments and results to broader conclusions and a larger scientific impact. Ending on a general note will remind your audience why your research interests you and why they should care.

A good science talk ends by progressing from specific conclusions to more and more general statements, placing results in a broader context.

- **Specific**
  - We showed how ATP binding triggers activation of a P2X receptor.
  - This mechanism explains many experimental findings and provides insight for the future design of antagonists.
  - Our methods can be universally applied to other ion channels involved in various physiological processes.

- **General**

- **Specific**
  - We determined the three-dimensional structure of the IRES subdomain IIa in complex with a benzimidazole translation inhibitor.
  - Our findings will be a valuable starting point for structure-based designs of HCV inhibitors.
  - Such drugs may lead to the development of anti-HCV drugs for infected individuals worldwide.

- **General**

- **Specific**
  - We showed that hatchery pink salmon were larger and grew faster than wild pink salmon during the first summer at sea.
  - Differences in growth rate may indicate variable growing conditions or food consumption.
  - Evidence of competition could indicate that carrying capacity has been reached for the ecosystem.

- **General**
Acknowledgments

Scientists often conclude their presentations with a slide that acknowledges the contributions of others. It is always important and considerate to acknowledge the people, organizations, and funders who helped make your science and presentation possible. However, consider that an acknowledgments slide typically doesn’t hold much value for the audience. In fact, when a speaker displays an acknowledgments slide, most audience members immediately stop paying attention. This is not the way to end your presentation on a high note. Definitely acknowledge your colleagues, but try not to spend too long presenting long lists of names (which most people in your audience probably won’t recognize).

Tips for acknowledging your coworkers:

• Try not to spend more than 20–30 seconds on an acknowledgments slide.

• Display a photograph of your lab, the key individuals who contributed to your work, or the city/institution where you are located (photographs are more entertaining to look at than names).

• Don’t read through long lists of names that most people probably won’t recognize. Highlight a few key individuals, but don’t read the names of everyone in your lab.

• Instead of acknowledging everyone at the end of your talk, acknowledge key individuals throughout your presentation, when appropriate.
Answer Questions While Showing a Summary Diagram

Most talks typically end with a brief question-and-answer period. During this time, presenters usually either exit their slide shows or continue to display their acknowledgments slides. Consider a third option: while answering questions, display a slide that contains a simple summary of your talk. This slide can be your home slide, or perhaps an optimized version that displays the overall conclusion of your experiments. Showing a summary diagram at the end will help make your talk more memorable and also help your audience ask good questions because all the relevant information will be in front of them.
Outline of a Structured Scientific Talk

Here is an example of the structure you might use for a scientific talk. Each of the slides below could represent one or several slides that you create for an actual presentation. Don’t let this outline make you think that a structured talk has to seem typical or routine. Remember that, just like the steps in a dance routine, structure provides the foundation for expression, innovation, and creativity.

1. Title slide

The effect of LC modulation on sleep/wake behavior
Flores de Lemos, Ph.D.
Suzanne Institute
May 21, 2010
Whitman Seminar Series

5. Home slide

The effect of LC modulation on sleep/wake behavior
Part 1: Stimulation experiments
Part 2: Inhibition experiments

2. Broad question or topic

What is the neural basis of sleep-to-wake transitions?
EEG
EMG

6. Home slide (part 1)

The effect of LC modulation on sleep/wake behavior
Part 1: Stimulation experiments
Part 2: Inhibition experiments

3. Background information

The Locus Coeruleus (LC)
- Major source of norepinephrine in the brain
- Activity correlates with periods of wakefulness

7. Data slides

Stimulation of the LC increases wakefulness

4. Main question or goal

What is the effect of stimulating or inhibiting the LC on sleep and wakefulness?

8. Summary of part 1

Summary of Stimulation Experiments
- Acute stimulation of the LC is sufficient to promote immediate transitions from sleep to wakefulness
- Long-term stimulation of the LC at 3 Hz is sufficient to increase wakefulness and general locomotor arousal
- Long-term stimulation of the LC at 10 Hz increases wakefulness but decreases locomotion
9. Home slide (part 2)

The effect of LC modulation on sleep/wake behavior

Part 1: Simulation experiments
Part 2: Inhibition experiments

10. Data slides

Inhibition of the LC decreases the duration of wakefulness

11. Summary of part 2

Summary of Inhibition Experiments
- The LC is necessary for normal maintenance of wakefulness states during the active period
- Inhibition of the LC increases slow-wave activity in the EEG towards the end of wake bouts
- The LC is necessary for Hert-mediated sleep-on-wake transitions

13. Conclusion

Conclusion: The LC is necessary for normal durations of wakefulness and sufficient to promote wakefulness

14. Broad ending

Future directions: what about other subcortical nuclei?

15. Acknowledgments

Acknowledgments

The de Lemus Lab:
Mark Duncan
Evan Matthews
Lindsey O'Brien
Yakima Grey
Pacey Carter
Anne Blatt

16. Question-and-answer

The effect of LC modulation on sleep/wake behavior

Stimulation of the LC increases wakefulness
Inhibition of the LC decreases wakefulness
Summary: Don’ts and Dos

Don’t focus a talk exclusively on experiments and data.
Do tell a complete scientific story, with a beginning, middle, and end.

Don’t discount the value of a title slide.
Do use a title slide to set the tone of your presentation as your audience enters the venue.

Don’t start a talk with information that is too detailed or specific.
Do start a talk with general interests and questions and gradually transition to your specific content.

Don’t present any experiments or data without first clearly stating your scientific goal and why it is worth pursuing.
Do clearly articulate your goal and its importance early in your talk.

Don’t be ignorant of the fact that your audience is likely to become distracted throughout your talk.
Do help your audience by occasionally employing tactics to regain their attention.

Don’t present one long stretch of experimental data in the middle of your talk.
Do divide your talk into more manageable segments to let your audience take mental breaks.

Don’t divide a presentation into segments without using a home slide to unite your talk.
Do use a home slide throughout longer talks to provide your audience with a sense of structure.

Don’t expect your audience to remember important details of your talk on their own.
Do deliberately inform your audience the one to three points that are most important to you.

Don’t end a talk abruptly once you finish presenting your data.
Do transition from specific details to a broader scientific context.

Don’t dwell on an acknowledgments section.
Do acknowledge key people gracefully but swiftly.

Don’t answer questions to a blank screen or an acknowledgments slide.
Do create a summary slide to help your audience during a question-and-answer session.
Visual Elements in Slide Presentations

Compared to a document or poster, the usable surface area of a presentation slide is relatively small. In a single slide you only have room to display a handful of visual elements: a background, a title, one or two figures, and some minimal text. Because the number of visual elements that can and should be used per slide is low, the design choices you make about each are highly important to the tone of your presentation and the clarity of your message.
Visual Elements on Slides

There aren’t many ingredients that make up a typical slide:

Background | Color | Text | Tables
---|---|---|---
Century Gothic | Comic Sans | Helvetica | Myriad Pro
| X | Y | Z |
A | 15.4 | 12.3 | 11.1 |
B | 14.8 | 15.8 | 19.9 |
C | 10.4 | 10.6 | 14.7 |
D | 10.9 | 41.2 | 14.1 |
E | 14.2 | 16.3 | 12.1 |

Charts | Photographs | Shapes and diagrams | Video
---|---|---|---

Because there are only a modest number of elements that constitute a slide, the selection and decisions you make about each can greatly affect the message and tone of your presentation.

Optimizing visual elements for slides is kind of like choosing the best ingredients for a simple recipe: because you only use a few items, the quality of those ingredients has a tremendous impact on the final result. The more you use design principles to optimize visual elements, the better you communicate your slides, and the better you communicate information and emotion to an audience.
Add Design Instead of Decoration

When creating a presentation from scratch, the sight of a blank, new slide can sometimes cause us to fall into the trap of decorating rather than designing. We have a natural tendency to want to fill the slide with “stuff,” adding visual elements so that the slide doesn’t appear empty. Additionally, when we see a slide that seems too simple, we have an urge to add style, color, ornamentation, and special effects.

The problem with this way of thinking is that it ignores the entire purpose of creating a slide in the first place: to help communicate a message to an audience.

Instead of adding decoration to a slide, add design. Decoration may help fill a slide, but designing a slide to communicate with your audience adds meaning, value, and utility.
Backgrounds

The best backgrounds are just that: backgrounds that, by themselves, lack visual content.

**Before**  
Slides with busy backgrounds reduce the amount of space you have for your own visual elements.

**After**  
Slides with clear backgrounds allow you to fill the entire space with your own content.

**Before**  
Backgrounds composed of warm, bright colors can be too intense on the eye.

**After**  
Backgrounds composed of cool tints or shades are comfortable to look at for long time periods.
When choosing a background, consider how your charts and photographs will appear when placed in the foreground.

The same chart as depicted on backgrounds of black, white, and shades of gray. In some slides, a white square is placed beneath the chart so that it stands out more from the background; however, this white square introduces a non-essential visual element to the scene. In other slides, the line colors on the chart are inverted from black to white.

Whatever background you choose, be consistent throughout your presentation. Jumping back and forth between different backgrounds is distracting and hard on the eyes.
Color Considerations for Slides

Color was discussed in Chapter 4. Remember that color should always be used judiciously, either to emphasize a message or to set a tone.

Ensure there is high contrast between your foreground and background colors.

Use color to emphasize important information.

Use color sparingly so the audience knows what to look at.
Assemble a Unifying Tone Using a Color Palette

Depending on the occasion of your talk, you often have the freedom to use a greater combination of colors than you would for a more formal written or poster presentation. Different color combinations (called “color palettes”) can set a unifying tone for your presentation while affecting the atmosphere and mood of your talk. There are hundreds of color palettes embedded in many software applications (such as Photoshop and Illustrator), as well as thousands online. To find great color palettes on the Internet, simply type “color palette” into your favorite search engine.

You can also design your own color palettes from one of your own photographs or a photo you find online. When choosing colors for your palette, identify a range of colors from light to dark so that you can create optimal foreground/background combinations. Whichever color palette you choose, make sure you are consistent across your presentation to unify your talk and create a stable tone.

The photograph on the left was used to produce this custom-made color palette. The slides could have been made on a dark background with light green foreground, but here they are presented with the lightest color of the palette as the background. This color scheme is used consistently throughout the entire presentation.
Fonts Must Be Legible

Fonts and typography were discussed in Chapter 5. The most important consideration when choosing fonts is legibility.

Choose a sans serif font instead of a serif font. Sans serif fonts are easier to read across a room.

Calibri
Century Gothic
Gill Sans
Helvetica
Myriad Pro
Tahoma
Verdana

Don’t use overly complex fonts.

Brush Script is hard to read
Lucida Handwriting is too
Don’t even think about Edwardian Script

The font size should be large enough to be seen in the back of the presentation room. This is typically at least 20–36 pts, depending on the font. It is okay to use a relatively smaller font size for citations and footnotes, which can be placed in an inconspicuous location on the bottom of the slide. However, these references should still be legible in the back row.

On a slide, it is harder to read underlined words or words in ALL CAPS

If you want to emphasize a word, use bold letters or italics
Keep Text to a Minimum

Probably the most common design problem in most slide presentations is too much text on one slide. If you find yourself filling up an entire slide with text, realize that you are not really creating a slide—you are creating a document.

<table>
<thead>
<tr>
<th>A common mistake...</th>
<th>...but no less annoying.</th>
</tr>
</thead>
<tbody>
<tr>
<td>• How many times have you seen a slide like this? Probably too often.</td>
<td></td>
</tr>
<tr>
<td>• The use of too much text on one slide is so common that many of us don’t even think to question it.</td>
<td></td>
</tr>
<tr>
<td>• If presenters are going to write out everything they are going to say during their delivery, then what is the point of attending their presentations? They might as well send their slides to us over email and we can read them whenever we want.</td>
<td></td>
</tr>
<tr>
<td>• Seriously, slides like this are awful. Especially when every slide in the entire presentation looks like this.</td>
<td></td>
</tr>
<tr>
<td>• Too much text on a slide is one of the top reasons why audiences stop paying attention.</td>
<td></td>
</tr>
<tr>
<td>• One hundred years ago, movie studios realized that silent movies shouldn’t contain too much dialogue because audiences didn’t enjoy reading text on a screen. You’d think we would have learned the same concept in slide presentations by now...</td>
<td></td>
</tr>
</tbody>
</table>

Try to limit yourself to only two lines of text for any single title, bullet point, or statement on a slide. And limit the total amount of text to only about one-fourth the total area of the slide...one-half when you are in extreme need.
Minimize the Use of Lists and Outlines

Scientists have many reasons to use lists in presentations: to present a set of facts, to describe the results of multiple published studies, to write steps in a process or procedure, to show all the outcomes of an experiment, etc. Outlines are a special category of lists with headings and subheadings (and sometimes sub-subheadings) that organize and sort information into logical groups.

The problem with lists and outlines on slides is that they are boring to look at.

Try your best to minimize the use of lists in slide presentations, and try not to use outlines altogether. Instead of listing multiple facts or background studies on the same slide, consider breaking them up into several slides. Instead of presenting multiple items in one long list, consider splitting them up into different categories.

Try to limit the number of items in a list to four or five. If you need to present more than five items, try splitting a single list into different categories.
Use Slide Titles to Make a Point

Most people place titles on the top of their slides because slide creation applications seem to insist upon it. From a designer’s point of view, we must think about the purpose of a slide title. Instead of making a title, make a point. Emphasize the message contained in your slide with brief text that conveys an unmistakable conclusion.

**Before**

**After**

Use a title to make a point, such as when presenting results, background information, ideas, etc.

Don’t use generic words or phrases like “Background,” “Results,” or “Conclusion.” Instead, try to be specific about the larger point you want to emphasize.

Don’t use a title when the contents of a slide are obvious and you don’t need to emphasize a point.
Optimize Tables and Charts for Slides

A usual practice among scientists concerning figures with data is to optimize tables and charts for written presentations and then re-use these figures in slides. However, slides are a different medium than documents and have different needs.

Before

<table>
<thead>
<tr>
<th>Name</th>
<th>Data</th>
<th>Y-axis label</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item A</td>
<td>2.3</td>
<td>1.9</td>
</tr>
<tr>
<td>Item B</td>
<td>4.6</td>
<td>7.2</td>
</tr>
<tr>
<td>Item C</td>
<td>0.4</td>
<td>0.8</td>
</tr>
<tr>
<td>Item D</td>
<td>8.0</td>
<td>9.1</td>
</tr>
<tr>
<td>Item E</td>
<td>6.5</td>
<td>4.1</td>
</tr>
<tr>
<td>Item F</td>
<td>0.5</td>
<td>1.7</td>
</tr>
<tr>
<td>Item G</td>
<td>7.0</td>
<td>1.4</td>
</tr>
<tr>
<td>Item H</td>
<td>1.6</td>
<td>0.3</td>
</tr>
<tr>
<td>Item I</td>
<td>4.7</td>
<td>8.2</td>
</tr>
<tr>
<td>Item J</td>
<td>8.1</td>
<td>6.3</td>
</tr>
<tr>
<td>Item K</td>
<td>7.1</td>
<td>4.2</td>
</tr>
<tr>
<td>Item L</td>
<td>8.8</td>
<td>5.7</td>
</tr>
</tbody>
</table>

Appropriate amount of data for an audience to comprehend

<table>
<thead>
<tr>
<th>Name</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item A</td>
<td>2.3</td>
</tr>
<tr>
<td>Item B</td>
<td>4.0</td>
</tr>
<tr>
<td>Item C</td>
<td>0.4</td>
</tr>
</tbody>
</table>

Only include data in tables that you will actively show or discuss. Adding gridlines to tables in slide presentations is helpful for audiences who must examine data from a distance.

Place titles of tables and charts at the top of a slide and footnotes at the bottom. The best title of a data slide is the result of the experiment, not simply the word “Results.”

Sometimes when importing figures from other software programs into a slide presentation, the default line weights are too thick. Optimize the weights of lines that make up gridlines and axes in tables and charts.

Optimize figures depending on your background. Coordinate color schemes, and change the colors of text, lines, and shapes accordingly.
Try to Only Present One Table or Chart per Slide

Audiences can only reflect meaningfully on one piece of information at a time. Therefore, try only to show one chart or figure per slide unless you have a good reason not to do so.

Many presenters intend to discuss only one figure at a time, but nevertheless display multiple figures on the same slide, addressing each sequentially. The problem with this strategy is that (1) each chart is much smaller than it needs to be, and (2) audiences always break their focus and look at whatever figure catches their eye, no matter which figure the speaker presents. There is no reason to distract an audience with visual elements that aren’t currently being discussed.

If you want to present two or more figures side-by-side for comparison or discussion, consider presenting them individually at first and then grouping them together afterwards.
Animate Information in Tables and Charts for Maximum Impact

One of the advantages of slide presentations compared with any other science presentation format is your ability to emphasize information in tables and charts using simple animation techniques. Doing so allows you to highlight specific datasets or even specific data points at a time of your choosing.

Animate the entrance of data to emphasize each category, one at a time.

Animate with color and shapes to highlight individual data points.
Diagrams in Slides

Diagrams were discussed in Chapter 9, and all guidelines mentioned there are certainly applicable to the use of diagrams in slides. In contrast with research articles and poster presentations, you can use as many explanatory diagrams as you would like in a slide presentation. Because they are so helpful to audiences, use them whenever they convey information better than words or photographs alone.

Diagrams are relatively easy to create in slide creation applications because of how simple it is to draw shapes, lines, and arrows. In fact, many scientists create their diagrams in PowerPoint or Keynote and then export them for use in written or poster presentations.

Pay attention to default settings such as the fonts, colors, and thickness of lines. Deliberately adjust each until your diagram is optimal.

Avoid the temptation to fill each item with a different color. Use color minimally, only to emphasize the most important aspect of your diagram (which in this case is “mKP3”).

As with tables and charts, another major advantage of slide presentations is the ability to animate diagrams to enhance communication with an audience.
Photographs in Slides

Photographs were described in Chapter 10. Because slide presentations are not as formal or space-limited as written or poster presentations, they are an ideal opportunity to use photographs, both to show data and to enhance atmosphere and tone.

If the photograph is of a high enough resolution, consider enlarging the photo to fill the entire slide to increase the impact.

If a photograph does not fill the entire slide, place it within a minimal frame so that it stands out from the background.

When presenting fluorescent images, use a dark background so that the fluorescent signal is the brightest aspect of the visual scene.

If possible, extract objects from their photographic backgrounds so that they blend in better with your slide background.
When appropriate, use a striking photograph to instantly convey an emotional tone. Make sure that the photograph fits in with the overall style and theme of your presentation.

- A great jumping-off place
- An uphill battle?
- Are we so focused on the trees that we forget the forest?
- The Missing Link?
- The road ahead....
- The End
Video: The Ultimate Presentation Tool

Videos are one of the best tools you can add to a slide presentation. Not only do they dramatically show data or ideas in a way that static images or words alone cannot, they also function as something like an “audience reset button,” immediately increasing attention and enthusiasm in anyone who may have lost focus. The moment a speaker says, “Let me play you a quick movie…,” every single audience member immediately looks attentively at the screen. It’s like magic.

However, only show videos when they help communicate your data or ideas to your audience:

- Show dramatic changes that occur over time, such as an animated map of the United States that shows obesity trends over the past 50 years.
- Show the rotation of a three-dimensional object so your audience has a better perspective—for example, a three-dimensional rotation of the anatomy of an organ.
- Show a case study, such as a brief movie of a patient who suffers from a specific disease that you address in your presentation.
- Show a single trial of an experiment.
- Show a clip from a popular TV show or movie that helps illustrate a point—for example, a relevant news clip or joke from a late night program that addresses your research topic.

Add a video when relevant to your presentation, but also consider adding a quick clip during moments when you think your audience may need a break (see Chapter 16 about particularly good moments). Using a video can simultaneously communicate information, increase attention, and provide the audience with a mental break after a long stretch of data.

**Key Tip:** You can find many great movies to add to your science presentations by searching video sites like YouTube or Google Video; however, many of the best scientific movies can be found as supplementary videos in scientific papers. To find these movies, type the subject of your search plus the words “supplementary movie” into your favorite Internet search engine. For example, if looking for movies about octopus behavior, type “octopus supplementary movie” into a search engine. You’ll be surprised how many great movies you can find this way.
Embed a movie within your presentation. It is distracting when a presenter leaves a slide show to play a separate file. You can find free, downloadable software that allows you to save YouTube videos as files that you can embed in your presentations.

If the resolution is good enough, enlarge the video so it fills the entire screen.

If your video doesn’t fill the entire screen, make sure it stands out from the background. Consider framing it within a box or other graphic.

Add animation on top of a video to help show your audience what is important.

Use a movie in a title slide to create an atmosphere and immediately engage your audience as they enter the room. Loop your video so that it plays continuously until you advance to the next slide. In this example, the stunning video of rush hour in Vietnam communicates a powerful tone.
Summary: Don’ts and Dos

Don’t fill a slide with meaningless decoration.
Do add design.

Don’t choose a background that is distracting to look at.
Do choose a neutral background that emphasizes the visual elements in the foreground.

Don’t choose colors randomly to decorate.
Do choose colors judiciously and use a consistent color palette.

Don’t choose a serif or fancy font that is hard to read.
Do choose a sans serif font in a size that is legible in the back of the presentation room.

Don’t use too much text in a slide or include long lists or outlines.
Do minimize text as much as possible and reduce lists to four or five items.

Don’t add meaningless slide titles that don’t convey information.
Do add titles to make a point.

Don’t reuse tables and charts without optimizing them for a slide presentation.
Do minimize the amount of data in tables and coordinate figures with your backgrounds and color schemes.

Don’t present more than one table or chart per slide.
Do only present one piece of information at a time and consider animating datasets for maximum impact.

Don’t add photographs or videos to slides without making decisions about sizing and framing.
Do optimize the impact of photographs and videos by enlarging them or making them stand out from the background.
When designing the layout of a scientific poster or arranging the figures for a written presentation, you have flexibility in how you arrange visual information but are also confined by the traditional structure of these formats. In contrast, when designing a slide presentation you have virtually total freedom to arrange visual elements however you want. Slide layout has a tremendous impact on your ability to communicate ideas with your audience. Poor layout can obscure the meaning of visual elements, even elements that, by themselves, are well designed. However, a good layout helps to convey the meaning and importance of information, making the impact of a slide much more than the sum of its parts.
The Importance of Slide Layout

Designing a slide is not only about optimizing individual visual elements. Perhaps even more important, one must deliberately arrange these elements in a logical way to help the audience perceive and process information.

Arranging visual elements on a slide is much more consequential than simply making a slide “look nice.” Slide layout is about adding meaning to your content, controlling the flow of information to your audience, and emphasizing what is most important.

When a scientist creates a slide without designing an optimal layout, the meaning of visual elements can become obscured, and the slides themselves can seem overwhelming, random, and yes, even ugly.

Slides that could use a good layout tune-up:

- Too busy and overwhelming
- Too random and chaotic
- Too sparse and asymmetric (and a terrible use of a bullet!)
Avoid Universal Slide Templates

All slide creation applications come with about a dozen templates—master slides with a prearranged layout that users can fill with their own content. These master slides can be useful for anyone new to creating slide shows because they quickly teach users how to add and arrange content on a slide.

The problem with templates is that they are not specific to your own content. The software engineers who created these templates deliberately designed them to be universal and applicable to any kind of visual information. Although these templates may present your content adequately, they are certainly not designed to communicate specific messages optimally.

This is your presentation. Instead of using templates, start with a blank canvas and intentionally arrange your content in the way that best communicates your message.

Consider ditching these...

...and starting with this.

A blank slide may be intimidating to start out with, but your end result will be deliberate and intentional.
Design a Natural Flow of Information

Each time you advance to a new slide in your presentation, your audience immediately begins scanning the slide for information. Help them intuitively know what to examine first by organizing visual content in a logical way.

When people view a slide for the first time, they have a natural tendency to read the slide as they would read a book: in Western cultures, we start by gazing from top left to top right and finish by gazing from bottom left to bottom right. Therefore, to provide your audience with a flow of information that seems natural and intuitive, try laying out your content in accordance with this “book reading” paradigm.
Without thinking about it, audiences should know immediately whether information is grouped in rows or in columns.

Audiences will process information grouped into rows by reading each row left to right and descending top to bottom. Audiences will process information grouped into columns by reading each column top to bottom and proceeding left to right.

If it is necessary to organize the flow of visual information in a way that is different from a natural reading style, guide the audience with arrows or by varying the size of visual elements.

Arrows immediately convey the proper flow of information to an audience. Even if you use arrows, try to organize information from left to right or top to bottom to create a natural reading experience.

In the absence of arrows or other visual cues, audiences tend to perceive bigger objects as the foreground and will scan visual elements biggest to smallest.
Emphasize Important Elements

Just as with diagrams, it is possible to emphasize visual elements within a slide by varying simple parameters.

- **Shape**
- **Size**
- **Shade**
- **Location**
- **Orientation**
- **Color**
Each time you arrange elements on a slide, you make a statement about their relative importance. Even if you don’t explicitly state what you find most important, the audience will make conclusions about what you are trying to emphasize based on your slide layout. Be deliberate about arranging your elements so that your most crucial information is emphasized the most.

All of these slides present the same information but emphasize different figures. Make sure you are deliberate about which figures you highlight as particularly important.
Align Visual Elements for Harmony

The human eye is remarkably good at perceiving the proper alignment of visual elements. When objects are not aligned properly, audiences become distracted and the meaning of the elements becomes obscured.

In contrast, when visual elements are aligned evenly on a slide, your arrangement conveys a sense of order and harmony. Your audience members probably won’t be aware of it, but they will pay more attention to your presentation because your slides will be easy to look at.

In the slide on the left, the four images are slightly disjointed and not evenly spaced horizontally. The descriptions above the images are not aligned and sometimes spill off the edge on the right-hand side. The slide on the right is much more balanced because the image sizes have been adjusted so they are all the same width. Even though they are different heights, there is a sense of harmony because they all descend from the same imaginary horizontal line. The descriptions are centered above the images and no spill-off occurs.

In the slide on the left, the bottom left image stands out even though the right image is much larger. If this is intentional, kudos to the author for using design principles to deliberately emphasize the bottom left image. However, if this is unintentional, enlarge the images on the top left and right until the widths and heights of the total image achieve a sense of balance.
Align Elements Using a Grid

When arranging elements on a slide, it can be helpful to imagine an invisible grid (or use a grid included in your slide creation software) to aid in good alignment. A grid with three rows and three columns follows the principle of the Rule of Thirds (discussed in Chapter 10). Aligning objects along these lines or at their intersections creates a harmonious scene with a remarkable simplicity. In addition to the Rule of Thirds, you can design a grid with however many rows and columns as you would like. In slides, creating a $4 \times 3$ or a $4 \times 4$ grid can also achieve excellent results.
Embrace Simplicity

Visual elements on slides are like people in an elevator: you can theoretically fit a maximum capacity into a tiny space, but it’s nice to have some breathing room.

People new to making slide presentations often feel the need to fill their slides with too many visual elements. In reality, the old maxim “less is more” truly holds for slides. Putting less on a slide adds greater impact to the information that you choose to show, increasing the clarity of your message and simplicity of your delivery.

This slide embraces simplicity and empty space by showing only what is important.

A simple metaphor of jumping hurdles to describe the methods of a research project. Although slightly cheesy, this slide easily conveys a sense of order and procedure. Minimal use of words and images allow for a balanced, uncluttered visual scene.

When presenting data, avoid the temptation to fill a slide with too many figures, footnotes, keys, photographs, and explanatory information. Let the data speak for themselves by placing a single chart or photograph front and center. Minimize any text surrounding the data so it can be perceived with maximal impact.
Split Busy Slides into Many Slides

The best slides are clear, simple, and only convey a single idea. If you find yourself creating a slide that contains too much information (such as a slide with several bullet points), consider splitting your slide into three to five separate slides. Don’t believe the myth that each slide takes a minute to present...in reality, it will probably take you less time to present five ideas on five slides compared with five ideas on one slide because your presentation will be more clear and easier for your audience to understand.

Do we still need science libraries?

- Most scientists now look up papers in computer databases and Internet search engines instead of perusing journals at the library.
- Bound journals remain on long shelves, untouched, because scientists have no need to look up and photocopy articles.
- Old chairs and lounges, formerly occupied by interested readers, now sit empty by long stacks of books.
- Is the University Science Library an anachronism?

This slide is typical of many that you’ve probably seen in science presentations: dense text, maybe a token picture, and definitely too many ideas for one slide. You can imagine a slide like this presenting background information for a project, a summary of methods, a list of future directions, etc. What would happen if we divided the information contained in the bullet points into separate slides?

Breaking up one busy slide into several separate slides greatly improves the presentation of your content. Each idea is emphasized on its own for maximal impact. Audience members can better process the information, one piece at a time.
**Achieve Harmony with Photographs**

When including photos of dynamic or conscious subjects, arrange the photos so they are an active part of the visual scene. Subjects that seem to be moving or staring away from your visual scene can disrupt the harmony of your slide and distract from your message. Use simple photo flipping or rotating techniques to make sure that all of your visual elements are congruent with each other.

**Before**

![Image: In wilderness is the preservation of the world. Henry David Thoreau](image1)

**After**

![Image: In wilderness is the preservation of the world. Henry David Thoreau](image2)

![Image: Deer Diets in Old-Growth Forests in Western Washington. David Hogan, Ph.D. Whitman University](image3)

![Image: Deer Diets in Old-Growth Forests in Western Washington. David Hogan, Ph.D. Whitman University](image4)
Summary: Don’ts and Dos

Don’t trust predesigned slide templates to optimally lay out your content for you.  
Do design your own layout, emphasizing the elements you find most important.

Don’t randomly place visual elements on a slide.  
Do use design principles to create a logical flow of information and emphasize salient details.

Don’t ignore how visual elements are aligned on a slide.  
Do carefully ensure that objects are aligned harmoniously.

Don’t fill a slide with too much content.  
Do embrace simplicity and try to only convey one idea per slide.