



# Talking Points



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# Talking Points Outline



- Preface
  - "Science not communicated is essentially science not done."
- The Audience
- The Presentation
- Visual Aids
- Delivery

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# Resources



- The Craft of Scientific Presentations, by Michael Alley. Springer-Verlag, New York, 2003.
  - Good information, current technologies
- The Complete Academic - A Practical Guide for the Beginning Social Scientist. Mark P Zanna and John M. Darley (eds.); Random House, New York, 1987. ISBN 0-394-35252-1 (pbk).
  - *Very readable guide on the perils a beginning academic may face, and has some very good suggestions for ways to cope with them.*
- A Handbook of Public Speaking for Scientists and Engineers, by Peter Kenny. Published by Adam Hilger, Ltd., Bristol, 1983. ISBN 0-85274-553-2
  - *A bit older, but the content remains germane.*
- European Federation of Catalytic Societies
  - [http://www.efrats.org/Give\\_Successful\\_Presentations-p-5/Give\\_Successful\\_Oral\\_Presentation.html](http://www.efrats.org/Give_Successful_Presentations-p-5/Give_Successful_Oral_Presentation.html)

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## Why Are Presentations Part of the SURF Program?



- Present for the experience of communication
  - Educating your colleagues or public
  - Enhancing your own personal development and recognition
  - Raising money to carry on your work
- Share their research experiences, approaches, and results
- Discover what you know and what you don't understand yet

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## The Oral Presentation



- **The Assignment**
  - 12 min presentation and 3 min for Q and A
  - Audience of peers, mentors, faculty, staff, and possibly parents
- **The Standard**
  - Presentation must be of professionally quality – an excellent representation of you, your advisor, your work, and the SURF program!

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## Speaking in Science



- An oral scientific presentation should:
  - Present the facts in an unbiased manner
  - Be clear: concise and complete
  - Reinforce the talk with visual aids (slides)
  - Repeat talking points
- An oral scientific presentation should not:
  - Be haphazard, jumbled and illogical
    - Audience cannot return to any information!
  - Provide too much information in rate and volume
  - Distract the audience from the message

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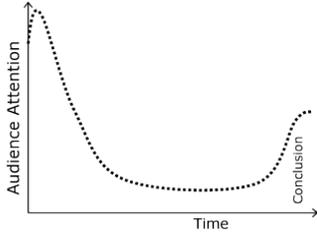
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## The Audience: The attention curve



- Why is the audience there?
- How does the audience listen?



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## The Audience: Managing the Attention (1 of 2)



- Everyone listens in the beginning, *carpe diem*
- State message in the beginning
- Repeat the message at the end
- Divide talk into parts with intermediate conclusions
  - Direct or re-direct (if lost) the audience
  - Repeat key points

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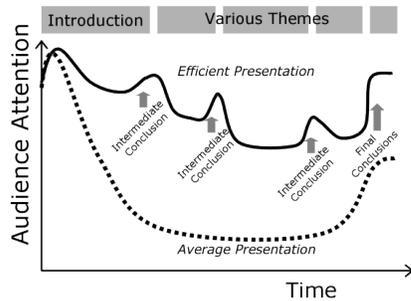
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## The Audience: Managing the Attention (2 of 2)



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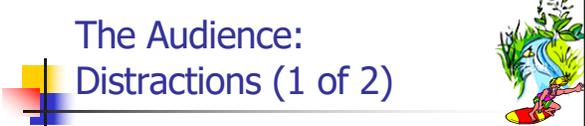
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## The Audience: Distractions (1 of 2)



- Failure to establish the background
  - Information to appreciate the work is usually *not* common knowledge
- Poor organization of the talk
  - Lack of clarity for problem identification, aims, or motivation for the work
- Inadequate visual aids (slides)
  - Confusing, unreadable, too small, too crowded, etc.

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## The Audience: Distractions (2 of 2)



- Complex oral speech
  - Long sentences, unnecessary jargon, abbreviations, etc.
  - Passive sentences
    - *"From this figure it was deduced that ..."* or *"It was therefore concluded ..."* versus active voice (*"This figure implies that ..."* or *"Therefore, we conclude ..."*)
- Reading a written speech
  - Formal and complex language
  - Pace (and information density) high
- Speaking style
  - Monotonous sentences, speaking too fast or slow, unclear pronunciation, lack of emphasis, etc.

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## The Presentation: Organization



- Group together what belongs together

<p><b>Introduction</b></p> <ul style="list-style-type: none"> <li>• goal 1</li> <li>• goal 2</li> <li>• goal 3</li> </ul> <p><b>Experimental</b></p> <ul style="list-style-type: none"> <li>• experimental set up for reactions</li> <li>• analysis technique 1</li> <li>• analysis technique 2</li> </ul> <p><b>Results</b></p> <ul style="list-style-type: none"> <li>• catalyst characterization (spectroscopy 1)</li> <li>• catalyst characterization (spectroscopy 2)</li> <li>• catalytic reaction</li> <li>• catalytic reaction at different pressures</li> <li>• catalyst with promoter</li> </ul> <p><b>Discussion</b></p> <ul style="list-style-type: none"> <li>• discussion</li> <li>• catalytic results</li> <li>• effect of promoters</li> </ul> <p><b>Conclusions</b></p>	<p><b>General Introduction</b> <i>not too short, is very much appreciated by a large part of the audience</i></p> <p><b>Catalyst &amp; Characterization</b></p> <ul style="list-style-type: none"> <li>• aims</li> <li>• preparation of catalyst</li> <li>• principles: characterization technique 1</li> <li>• results: interpretation</li> <li>• principles: characterization technique 2</li> <li>• results: interpretation</li> <li>• discussion of catalyst structure + conclusion</li> </ul> <p><b>Catalytic Reaction</b></p> <ul style="list-style-type: none"> <li>• aims</li> <li>• experimental set up: reactions</li> <li>• results: catalytic reaction</li> <li>• results: catalytic reaction at different T</li> <li>• catalytic reaction at different pressures</li> <li>• catalyst with promoter</li> </ul> <p><b>Conclusions</b></p> <ul style="list-style-type: none"> <li>• catalyst structure</li> <li>• catalytic properties</li> <li>• assessment and outlook</li> </ul>
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**Article Structure**      **Presentation Structure**  
not recommended for talks

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**The Presentation:  
Key issues**



- The message
  - What should the audience know at the end of the presentation?
- The audience
  - How should the presentation be delivered to convey the message for the audience?

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**The Presentation:  
Messaging**



- Summarize into ONE sentence
- Serves to focus the presenter and consequently the presentation
- Example:  
*I want to convince the audience that metabolites of the anticoagulant drug warfarin (Coumadin) inhibit their own formation and consequently could impact adequate dosing for patients.*

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**The Presentation:  
Introduction (1 of 2)**



- Time zero
  - Rapt attention from the audience
  - Set the tone to maintain the attention
- Address the audience and pause
  - Confirm the attention of the audience
  - Test the audio system
- The opening
  - Pose a question, provocative statement, your conclusion

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## The Presentation: Introduction (2 of 2)



- Sketch background for the project
  - Introduce the topic
  - Explain terms, concepts, and theories
  - Establish context for discussion of research
  - Include only *relevant* information
- Define the scientific question or hypothesis
- Help audience anticipate experimental outcomes
  - Possibly include the conclusion

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## The Presentation: Results



- Employ the message sentence to select *appropriate* results
- Order the results for the presentation
  - Is chronology important?
  - What are the intermediate conclusions?
- Include enough experimental details to provide context for results
  - Note, audience is *not* your mentor

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## The Presentation: Conclusions



- The take home message
  - Answer questions raised in the introduction
  - Validate/refute the hypothesis
- Emphasize impact of resolving the challenge
- Cite future directions resulting from the study
- Acknowledgements
  - Include summary statement on last slide – repetition!
  - Mentors, Colleagues, institutions and organizations
  - **Granting agency**
  - *Sometimes placed at the beginning*

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## Visual Aids: General



- **Consider 1-2 min per slide**
- Complement speaker not supplant
- Affect evaluation of presenter and studies
- Capture right information
  - Lead logically from one point to next, interpreting, and clarifying points
  - Make an outline for starters
- Provide structure *not* text for speech
- Resources (actual slides, presentation, etc.)
  - Advisor, lab members, ...

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## Visual Aids: Design concepts



- Make it **BIG**
- Keep it **Simple**
- Make it **Clear**
- Be **Consistent**

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## Visual Aids: Design specifics (1 of 2)



- Components
  - Title – informative or conclusive
  - Figure/Data
  - Conclusion(s) at the bottom
- Font: Tahoma, Helvetica, or Arial **not** Times
- If color slides, ...
  - Shadow the text
  - Employ contrasting colors

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## Visual Aids: Design specifics (2 of 2)



- Repetition of format
- Left-to-right, top-down bias
- Size: Readability – BIGGER is better
- Employ minimal flashing visuals
- Use simple, labeled visuals

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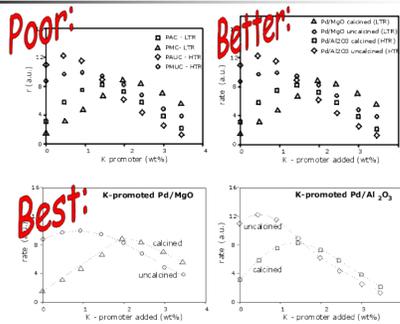
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## Visual Aids: Presenting data




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## Delivery: Guidelines (1 of 3)



- Focus on the audience and their needs
- Place weight on balls of feet to stand straight
- Gesture with hands in front & towards audience
- Respond to ideas – facially and bodily
- Look at people to see the understanding
- Embrace the entire space of the room
- Walk toward the audience on important points and avoid backing-away on any key ideas

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## Delivery: Guidelines (2 of 3)



- Use voice to respond to material employing volume and pitch to support content of speech
  - Speak louder than normal conversation and project enthusiasm
- Enhance the talk and stimulate the audience through the speaking pace
  - Slow down for new/difficult material and emphasis
  - Speed up when reviewing
- Always repeat questions
  - Clarify the question
  - Ensure rest of the audience heard the question
  - Provide time for you to compose the appropriate response

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## Delivery: Guidelines (3 of 3)



- Practice
- Practice
- Practice

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## Writing Points



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## Hungry?



*"If you have an apple, I have an apple, and if we exchange these apples then you and I will still have one apple. However, if you have an idea, I have an idea, and we exchange these ideas, then each of us will have two ideas."*

- George Bernard Shaw

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## Writing in Science

- Present the facts in an unbiased manner
- Be clear: concise and complete
- Use facts to make statements
- Be complete enough that other scientists can repeat your work (research papers)

*"Everything should be made as simple as possible, but not simpler."* – Albert Einstein

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## Anatomy of a Research Paper

- Title
- Abstract
- Introduction
- Materials and Methods
- Results
- Discussion (start here?)
- Conclusions
- Acknowledgements
- References
- Supplemental Material

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## Getting started

- Format for PC in Microsoft Word
- Submit using a PC format on a USB or via email
- Set-up: 8.5 x 11 with 1 in margins all around
- **INBRE Format:**
  - Text: Times New Roman 12 point font, left justified, indent first line of paragraphs 0.5 inch, single spaced.
  - Section Titles: Times New Roman 14, Centered, Bold
  - Do NOT number pages

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## Title

- Function
  - Orientate the audience
  - Brief, concise description of purpose and major findings
- **INBRE Format:** Title
  - NVR. U. ABBRVS. In a TTL. Like OMG. WTF. BBQ.
  - Include technique or method (Research Paper)
  - Times New Roman 14, Centered, Bold
- **INBRE Format:** Author name and affiliation
  - Author only; acknowledge others in Acknowledgements
  - Name, Student University
  - University town and state
  - Times New Roman 10, Centered, Bold

The Production of Cytochrome P by XYZ Mutants  
John Doe, University of New Mexico  
Las Cruces, New Mexico

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## Abstract

- Short summary (usually 250 words)
- Provide concise statement of purpose
- Succinctly and clearly describe major findings
  - Highlights, no details
- Understandable in itself
- No undefined abbreviations or specialized terms
- Typically written last
- **INBRE: Abstract**
  - Times New Roman 12, Center justified, Bold

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## Introduction

- Brevity
- Start with broad focus and then end narrowly
  - Not an extensive review of the literature
  - Relationship to earlier work in the field
- State relevance of topic – the *context*
- Give the purpose of the paper



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## Parts of the Introduction

- Background
  - Introduce the topic
  - Familiarize audience with terms, concepts, and theories
  - Establish context for discussion of research
  - Include only *relevant* information
- Current Research
  - Focus on specific studies related to reported research
  - Frame the *challenge* in the paper
- Proposed work
  - State the purpose of the study
    - Is there a hypothesis to be tested?
  - Discuss the strategy of the study

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## Materials and Methods

- *Like a recipe*
- Cite source of all materials
  - How would these materials be obtained to reproduce the experiments?
- Use sub-titles to organize the material
- Include only experimental details
- Reference all established approaches
  - Typical methods built upon prior work

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## Results



- Use sub-titles to organize the material
  - Include summary finding
- Employ introductory sentences to keep the audience focused
  - Why was this particular experiment included?
- Present material in a logical fashion often mirroring the methods
- State the facts and *that's all*
- Be descriptive of results emphasized in the Discussion to guide the audience

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## Discussion



- Focus on *objective of the study as stated in the Introduction*
  - What was the challenge?
  - Was the challenge met? What resulted?
  - *What is the significance of that result?*
- Break up into sections to emphasize key observations and simplify the writing
- Refer to results not restate them
- Facts support conclusions not “fancy talk”
- Anticipate and respond to potential questions

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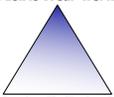
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## Conclusions

- Summarize the most important finding
- Emphasize impact of resolving the challenge
- Cite future directions resulting from the study
- Return to breadth of impact but avoid over-speculation

SPECIFIC (Your work)



**BROAD**  
(the field)

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## References

- There are three major, journal-specific styles
- Name and year
  - References at end of sentence in parentheses (Einstein, 1955)
  - Indexed alphabetically, using years as secondary
- Italic number in line
  - Number in parentheses or brackets at end of sentence (34) or [34]
  - Indexed in the order of appearance
- Superscript numbers
  - Numbers at the end of a line after the period.<sup>34</sup>
  - Indexed in the order of appearance
- Be complete, correct, and consistent
- **INBRE: References**
  - Times New Roman, size 12 font
  - ~~Do not use the endnote or footnote function in Word~~
  - ACS Citation Style Guide

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## Acknowledgements



- NO friends and family – you didn't win an Oscar
- Proofreaders
- Mentors
- Colleagues who helped with training, reagents, etc.
- Institutions and organizations
- **Granting agency**
  - This project was supported by the Arkansas INBRE program, with grants from the National Center for Research Resources - NCR (P20RR016460) and the National Institute of General Medical Sciences - NIGMS (P20 GM103429) from the National Institutes of Health.

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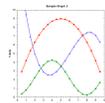
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## Figures



- A picture is worth a thousand words
- Clarity is important!
  - Carefully choose image size, font size, line widths, and labels
- Plot theory and experiment on same graph
- Explanatory captions necessary
- **INBRE: Tables, figures and graphics**
  - Fit within 1 in margins
  - Format to fit in portrait, not landscape layout
  - Be reproducible in *black and white*

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## Supplemental Material

- Additional results that support the study
- More common in the information age
- Ease in data generation leaving the challenge to its interpretation
- Examples
  - Raw data
  - Quality control studies
  - Repetition of the same or similar studies

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## Writing Style



- Employ
  - Short sentences (complexity = confusion)
  - Primarily\* passive voice
  - Primarily\* past tense
  - *Consistent* tense
  - Gender neutral terms
- Avoid
  - Ambiguity through precise language
  - Vernacular (often employs contextual terms)
  - First person singular/plural wherever possible

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## Other Thoughts

- Talk “to” not “at” the audience
  - Reminder – all research papers are *reviewed*
- Avoid blather (BS)
- Do not plagiarize, e.g. parts of sentences or complete sentences directly from papers
- Proofread!
  - Content, grammar, spelling, format
  - Capitalization
  - Read a sentence and confirm the intention is clear
  - Spell check! For example, from (form), there (their), etc.
- Get a second, third, ... opinion on the writing

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## Plagiarism



- Intentionally or knowingly presenting the work of another as one's own (i.e., without proper acknowledgment of the source). The sole exception to the requirement of acknowledging sources is when the ideas, information, etc. are common knowledge.\*

\*[http://www.unf.edu/registrar/forms/misconduct\\_policy.pdf](http://www.unf.edu/registrar/forms/misconduct_policy.pdf)

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## Resources

- ACS Style Guide – Janet Dodd (2nd or 3rd edition)  
<http://pubs.acs.org/page/books/styleguide/index.html>
- How to Write and Publish a Scientific Paper* by Robert A. Day  
<http://abacus.bates.edu/~ganderso/biology/resources/writing/HTWgeneral.html>
- On being a scientist: responsible conduct in research*  
Committee on Science, Engineering, and Public Policy  
<http://books.nap.edu/openbook.php?isbn=0309051967>
- On Writing Well : An Informal Guide To Writing Nonfiction* by William Zinsser
- Style: Toward Clarity And Grace* by Joseph M. Williams
- Writing Guidelines for Engineering and Science Students  
<http://www.writing.engr.psu.edu/>
- The Craft of Scientific Writing* by Michael Alley
- Lecture by Michael Lufaso, Ph.D. at University of North Florida

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