The Art of Scientific Presentations

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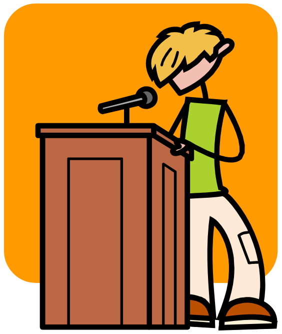

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DEPARTMENT OF VETERINARY BIOSCIENCES
COLLEGE OF VETERINARY MEDICINE

Summer Research Program Brown Bag
Seminar June 2008

Outline of Presentation

- Posters and Abstracts
- Preparing to Give a Scientific Presentation
- Knowing the Audience
- Use of Visual Aids and Content
- Responding to Questions
- Presentations to Non-scientific Audiences
- References

Scientific Abstracts

- The abstract is a general synopsis of the entire project and contains the sections of a scientific paper
  - Typically 200 to 250 words (follow meeting/journal instructions!)
  - Begins with 1-2 sentences of introduction, then methods and results
  - Summation of the data is given along with the techniques used
  - Detailed methods are omitted
  - 1-2 sentences of interpretation or discussion - what the data means
  - At beginning or end a summary of implications of the data

Example

- **Background** HTLV-1 is a deltaretrovirus that causes adult T-cell leukemia/lymphoma and is implicated in a variety of lymphocyte-mediated disorders. Role of HTLV-1 p30, …. incompletely defined…
- **Results** Herein, we further characterized the role of p30 in regulation of cellular gene expression, using stable p30 expression system ….. to test cellular gene expression with Affymetrix arrays, ….. Reporter assays in Jurkat T cells and RT-PCR in Jurkat and primary CD4+ T-lymphocytes….. to confirm selected gene expression patterns. Our data reveals alterations of interrelated pathways of cell proliferation, T-cell signaling, ….
- **Conclusions ……..**Collectively, our data suggests that this complex retrovirus, associated with lymphoproliferative diseases, relies upon accessory gene products to modify cellular environment to promote …… proviral loads *in vivo*.

Posters- Overview

- Large document to effectively and concisely communicate your research
- Composed of a short title, an introduction, an overview of experimental approach, results, discussion/conclusions, brief bibliography, acknowledgement
- Text is kept to a minimum, a person should fully read your poster in under 10 minutes

Posters –General

- Posters are more efficient than a talk
- Poster template files for many software programs on the internet
- Start with a template and insert your information and graphics
- Review and understand the size allowed at the meeting before starting
- Take with you as carry on

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Poster Components

- **Title:** Should convey the "issue," the approach, and the system (organism); if catchy may attract viewers. [Maximum length: 1-2 lines.]
- **Abstract:** Do not include an abstract on a poster (unless instructed by meeting)
- Use **bullet approach** versus narrative text

Posters - Components

- **Introduction:** Get viewer *interested* - minimum of background information (>bullets) (~150-200 words)
- **Hypothesis** to be tested
- **Materials and methods:** Briefly describe experimental equipment and methods (not a manuscript) (approximately 200 word)
  - figures and tables
  - flow charts
  - statistical analyses

An informative title, formatted in "sentence case", that attracts viewers

Your name(s) here — Department of BlahDeBlah, Harvard Medical School, Boston, Massachusetts

INTRODUCTION

Planning the poster is important.

- Refer to the poster session guidelines to determine correct poster size.
- Contact the poster printing service bureau to confirm acceptable file formats, acceptable poster dimensions, turnaround time, and cost.

Take advantage of the poster's inherent ability to display graphic elements: With regards to text, be brief, and opt for photographs, tables, graphs or illustrations to elucidate organism, protocol, or experimental design. Don't overstuff the poster- leave some blank space.

5.75" x 3.75"
Image placeholder

Fig. 1. Allow room for figures and captions. Use a sans serif font for figure captions to provide cue to reader that he/she is not reading normal text section. Smaller font size also sets captions apart from body text blocks.

MATERIALS & METHODS

After you refer to the poster submission guidelines, open and existing poster template or use PowerPoint's *Page Setup* dialog box to set poster size. It is important to note that the maximum size for PowerPoint is 56" x 56". Larger posters can be printed by setting the dimensions to one half of the target dimension and instructing the poster printing service bureau to print the poster at 200%.

If printing at 200%, be sure to double the resolution of all photographic and scanned images to 250-400 dpi.

Each of these are 2.25" x 2.25" Image placeholders

Fig. 2. Allow room for figures and captions. Use a sans serif font for figure captions to provide cue to reader that he/she is not reading normal text section. Smaller font size also sets captions apart from body text blocks.

RESULTS

Start making the poster by inserting all text content into *Text Boxes*. If using these templates, first delete all 'slides' but the one you plan to use. Select the contents of the existing text boxes and replace it with your own content. After inserting text content, format the content to an appropriate font choice, text style and size.

Sans serif fonts are good choices for the poster title, section headings and figure captions. Serif fonts are good for text block section content.

Don't underline. Italics and bold text is OK. Bullets should be avoided. Use standard, cross-platform fonts to avoid printing problems.

Arial	Verdana
Times	Trebuchet MS
Georgia	Times New Roman

Once formatted, edit the content. Be ruthless. If you are too attached to the content, enlist someone's help to reduce the verbiage. Remember a picture is worth a thousand words- plan to insert supporting graphics where possible, especially if it reduces the amount of blah, blah, blah.

Only after the text boxes have been inserted and edited can a determination be made about the size of

4" x 8.75"
Image placeholder

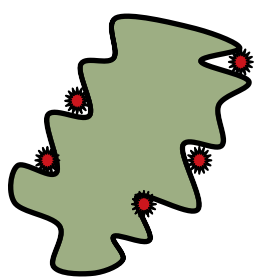


Fig. 3. Remember that you can draw complex shapes with PowerPoint drawing tools

RESULTS

RASTER IMAGES (photographs, scans, images that come from microscopes): Using the *Rectangle Tool*, create raster image placeholders in the poster. Keep in mind the aspect ratio of images when drawing placeholders: draw landscape oriented and portrait oriented rectangles where appropriate. Double-clicking on the image placeholders and looking at the size tab will allow you to determine the correct physical dimension that you will need to make the raster images.

For raster images, plan to edit the image with Photoshop to set the correct

- Physical dimension (see image placeholder)
- Resolution (125-200 dpi)
- File type (.jpg, .tif, .png)
- Color mode (RGB or Grayscale)
- Crop

Once edited in Photoshop, *Insert* the raster image into PowerPoint. Do not resize Inserted raster images within PowerPoint- doing so may result in non-printable posters.

VECTOR IMAGES (Illustrations from other PowerPoint figures; tables, charts and graphs from other Microsoft applications; vector objects generated by other applications like Canvas, Illustrator, CricketGraph, ChemDraw and KaleidiaGraph): No need to put in placeholders, no need to edit using Photoshop.

Paste Special, perhaps *Ungroup* and edit!

Another option is to save the vector as a .wmf or .eps file and *Insert Picture… from File* as you would a rast

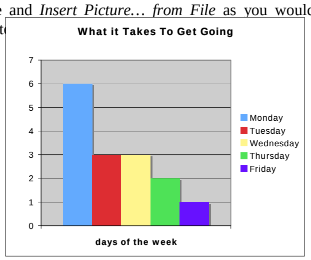


Fig. 4. The above graphic is an example of a vector taken from Microsoft Excel, copied and *Paste Specialed* into the poster. It was resized once in the poster with no reduction in image quality.

CONCLUSIONS

After all the content is entered, *Inserted*, *Paste Specialed* and edited, resize the white section backgrounds to fit around text block section content.

Using the Alignment Tools can make the final steps easier.

Poster printing service bureaus - upload files to their websites:

http://www.makesigns.com/scientific_posters.htm
http://www.megaprint.com/medical.html
http://www.thinkiii.com/
http://www.imagers.com/poster.html

*These service bureaus are examples of what is available. Since Research Imaging Solutions has not tested these providers, we can not endorse their services.

Upon receiving the completed poster, be sure to proof read it, especially where there are scientific symbols present.

LITERATURE CITED

Begg, J.E. 1980. Morphological adaptations of leaves to water stress. Pages 33-43 in *Adaptation of Plants to Water and High Temperature Stress*, edited by N.C. Turner & P.J. Kramer. Wiley Interscience, New York.

World Health Organization. 1999. Malarial mortality in Africa. *www.who.int/rbm/Presentations/MIP-RBM-final/sld005.htm* (June 4, 2000).

The above are provided to illustrate format for articles, books, book chapters, and web sites (avoid web sites, though, if possible).

ACKNOWLEDGEMENTS

C. Purington, Department of Biology, Swarthmore College, Pennsylvania

[Typically only initials are used for first (and middle) names, and people's titles are omitted.]

Download poster templates at it.med.harvard.edu/ris

VETERINARY MEDICINE

Posters - Components

Results: (approximately 200 words, w/o figure legends)

- Describe outcome then briefly
- Data analysis that address hypothesis; supporting charts
- Engaging and complete figures and descriptive graph titles
- Tables with legends (prefer graphs)

Conclusions: (approximately 300 words)

- Remind hypothesis and result that support or refute
- Bulleted results
- Relevance to other published work
- Future directions

Improving the Climate for Female Scientists at The National Center for Atmospheric Research

Tim Killeen, Robert Roesch, Sandra Petrie

The National Center for Atmospheric Research, P.O. Box 3000, Boulder, Colorado 80305-3000, United States

Introduction

The National Center for Atmospheric Research (NCAR) is sponsored by the NSF and is operated by the University Corporation for Atmospheric Research (UCAR).

UCAR's Scientists fall into two categories: the NCAR tenure track scientists and non-tenure scientists. The NCAR tenure track includes: Scientist I, Scientist II, Scientist III and Senior Scientist, which is matched to a Full Professor appointment. There is an up-or-out "tenuring" decision to the Scientist III level. The non-tenure track includes Associate and Project Scientists.

The total percentage of female scientists in the two scientific categories has traditionally averaged about 20%, although prior to 2000 the average number of women on the tenure track was about a third of the average on the non-tenure track (10% vs. 30%). (**Fig. 1**)

The total number of female Senior Scientists remained very small through the 1990's; and a problem of women leaving the tenure track for non-tenure track positions was identified. While women were entering the tenure track at the Scientist I level and moving to the Scientist II level they left the tenure track prior to advancing to the Scientist III level. (**Figs. 2a,b**).

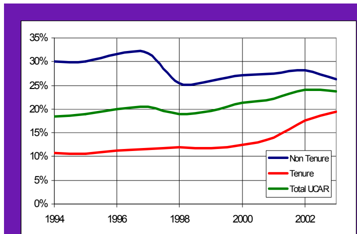


Fig. 1. Percentage of women scientists at UCAR by track

SOURCE: UCAR Internal Statistics

APS Review

Internal issues, such as the attitude towards women and the tenure clock, were discussed in various internal committees through 1999. In 1999 an internal UCAR group reviewed "A Study on the Status of Women Faculty in Science at MIT" and used some of the criteria in the MIT study to analyze conditions for women in scientific positions. While no statistical basis for disparate treatment was identified, anecdotal input identified a range of issues concerning attitudes towards women. As a result of the internal study, several women scientists, led by Senior NCAR Scientists Margaret A. LeMone and Chin-Hoh Moeng, encouraged the organization to invite the American Physical Society's (APS) Committee on the Status of Women in Physics for a site visit to review the climate for women at NCAR and UCAR.

Findings

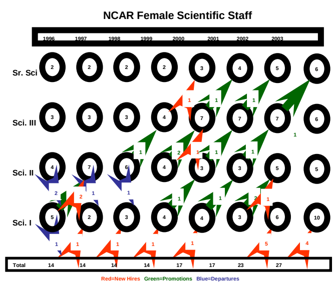
The APS study was conducted in July 2000 with a final report delivered in October 2000. Recommendations were made in the following categories:

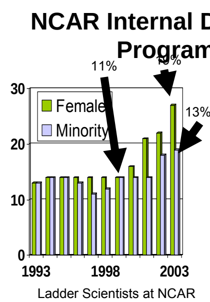
- Differing Cultures And Communication
- Career Potential And The Promotion Process
- Mentoring
- Family Friendliness

The APS Committee report also recognized an issue that UCAR had previously identified: *Flat funding from NSF and an aging scientific staff represent serious problems, which must be dealt with creatively if NCAR is to maintain its high standard of scientific excellence.*

UCAR senior management saw there were two elements in the problem of the leaky pipe:

- Women were leaving the tenure track before making the transition to Scientist III. (**Figs. 2a,b**)
- The total number of women entering the ladder track was too low.





Women comprise 12.5% of geoscience faculty in U.S. Colleges and Universities and only 10% in Ph.D.-granting universities ***(de Wet et al., GSA Today, 2002)***

African-American, Hispanic-Americans, and Native Americans earn 5% of doctoral degrees in the geosciences ***(NSF/GEO Strategy for Diversity Program, 2001)***

Figs. 2a,b. In the mid-1990's there was a trend for female scientists to leave the ladder track before the "tenure" step to Scientist III (blue arrows - a leaky pipeline). This trend has been stopped since then through aggressive recruitment, retention and mentoring programs. NCAR's proportion of female "faculty" is now significantly larger than the national average for Ph.D. granting universities

Response

To solve the problem required action on both elements. NCAR and UCAR committed funding to increase the recruitment of scientists to the tenure track. The goal was to hire approximately 6 new Scientists I per year for five years to revitalize the flow into the pipeline. NCAR conducted national and international searches and was able to recruit a total of 21 Scientists I, almost 50% of which are women. Some of the successful candidates came from the NCAR's well-known Advanced Study Postdoctoral Program (ASP). (**Fig. 3**)

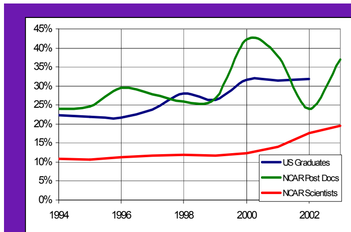


Fig. 3. Percentage of women with Ph.D.s in Earth, Atmospheric, & Ocean Sciences

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Earned Doctorates and UCAR Internal Statistics

In addition to early career appointments, NCAR committed to a long-term effort to recruit senior female scientists and managers whenever appropriate and possible. Two such appointments were made in 2000. As a result, the number of women entering the tenure track has significantly increased and represents ~ 50% of additions to the track since 2000.

The APS report made recommendations for ways to improve the climate for women; NCAR and UCAR felt the recommendations were valid, but saw they could improve the climate for both men and women. No women have left the tenure track since 1998 (**Figs. 2a,b**); in that same period, 18 men left or retired from the tenure track.

Specific actions taken by UCAR since 2000 to address workplace climate issues for scientists:

- **Review of the Associate and Project Scientist Appointments**
  A two-year review to ensure that the policy with regard to associate and project scientist tracks is being implemented consistently across divisions.
- **Early Career Scientist Forum**
  In place since 2000, this active forum is run by the early career scientists and is designed to foster improved networking among NCAR scientists. NCAR funds the forum, which meets on a regular basis.
- **Mentoring/Leadership**
  UCAR initiated a program to develop the human capital of the organization that includes peer mentoring, peer mentoring groups, and a skills/learning exchange. A key element of the program is a Leadership Academy that has been designed to provide knowledge and skills for current and/or future leaders consistent with competencies needed to be a successful leader. The academy consists of approximately 23 full days of leadership training over six months. The first class of 24 future leaders was held in 2003; the next is scheduled to begin in January 2004.
- **Family Friendliness**
  UCAR is determined to be both a "family friendly" institution and one with very high standards of excellence. Polices and benefits to address issues for employees with families have been reviewed and modified. An employee led committee is currently examining on-site day care options and action is expected in 2004.

New Scientists I at NCAR

Summary

NCAR is committed to building a diverse population of scientists and technical staff. The American Physical Society's Committee of Senior Women Scientists' review in 2000 was influential in helping UCAR and NCAR establish a comprehensive program to improve the climate for female *and* male scientists. Significant progress has been made in eliminating the "leaky pipe" and NCAR now has a proportion of female scientists significantly greater than the national average.

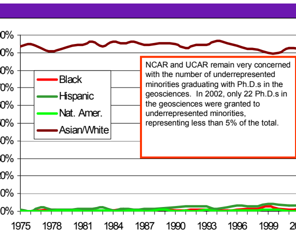


Fig. 4. Ph.D. Graduates in Earth, Atmospheric & Ocean Sciences

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Earned Doctorates

NCAR and UCAR also believe that it is imperative to increase the numbers of underrepresented minorities entering the geosciences at the graduate level. In 1996 UCAR created the Significant Opportunities in Atmospheric Research and Science (SOARS) Program which is dedicated to increasing the number of African American, American Indian, and Hispanic/Latino students enrolled in master's and doctoral degree programs in the geosciences. This program has involved 85 undergraduate and graduate students.

NCAR

Producing Poster Sessions

Author(s)
Affiliation(s)

INTRODUCTION

- This is a Microsoft Powerpoint template that has column widths and font sizes optimized for printing a 30 x 45" poster-just replace this text with your text.
- MedMedia Solutions produces poster sessions as a continuous roll print referred to as a "window shade" or rollout poster. Poster sessions can be designed by Med Media staff with your content, or if you choose to design your own poster, you can use Powerpoint to assemble your content for proofing and printing on the wide-format printers in Med Media.
- Poster printing is offered in high-resolution color (720 x 720 dpi) on either matte, semi-gloss, and high-gloss paper. Posters can be of varying lengths and up to 48 inches high. The continuous roll prints can be conveniently carried to meetings in a large mailing tube or other light-weight containers.
- It is strongly suggested that a small version of your poster be printed to proof all the design elements including fonts, placement, scans, and alignment Allow about three days production time for proofing, printing and any finishing necessary.

METHODS

Page size
Check conference instructions for display area size or maximum poster size before you start.

Open a new "slide" in Powerpoint and establish a paper size proportional to your final poster size. Powerpoint's maximum page size is 56", so for larger posters we suggest making the page size one-half the size of the final poster. For example, if your poster is to be four feet high and six feet wide, establish a paper size under *File-Page Setup* of 24 inches high and 36 inches long. Your final poster will be printed at 200 percent size after proofing.

OBJECTIVES

To see the entire page on the screen, go to View-Zoom and then Fit to Page.

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RESULTS

Powerpoint Suggestions

- Use **bold** characters instead of whole sentences in capitals or underline to stress your point.
- When laying out your poster leave 'breathing space' around the text.
- Use plain fonts such as Arial, Helvetica, Times New Roman, or Univers.
- All body text should be the same size and style of font.
- Justification for body text looks best as left-aligned. Do not justify text.
- Use photographs, colored graphs and charts wherever possible.
- Convert complex tables to graphs or charts.

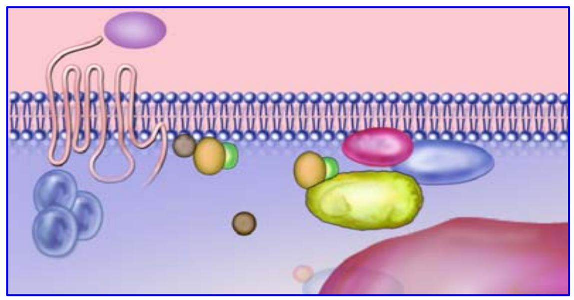

Fig. 1. Legends can be a different font or size to separate it from the body text.

Above illustration copyrighted Stan Coffman

Importing Images
Graphs Photographs, diagrams, & logos can easily be imported into your poster. To insert scanned images, graphs, etc. go though the menus as follows: Insert / Picture / From File ... then find the file to be inserted, select it, and press OK.

Resolution
Avoid 'resolution overkill' which can result in enormous file sizes. Scans need to be at least 72 to 100 dpi in their final size. For example, a 3x5 photo that will be 6x10 in size on the final poster should be scanned at 200 dpi. Be cautious about import images from the Internet. They may not suitable for printing as the resolution is too small.

DISCUSSION AND CONCLUSION

Turnaround Time
- To **only print** a poster we like to have **3 days.** (1) to provide a proof (2) review the proof (3) print the final
- To **design and print a poster** we like to have **5 days.**

However, we will get your poster to you when needed. Please keep in mind it can take up to 2 hrs. to print a poster and there may be other posters in the print queue

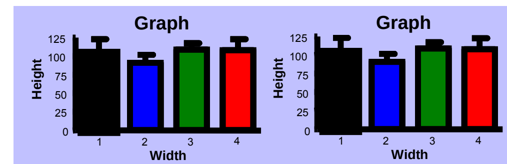

Fig. 2. Legends can be a different font or size to separate it from the body text.

Billing
We'll invoice you or whomever you specify via email after the job is done. We accept the following:
- **Procurement cards**
- **MC/Visa**
- **Checks**

After the poster is delivered we will email an invoice. There is a link on the emailed invoice that will take you to our secure online payment site. If you wish to pay by check please send to the address found on the invoice.

Sending the File to Medmedia
- When your poster is complete, go to http://www.medmediasolutions.com/posters.htm
- Provide contact person and billing information.
- Provide poster information such as paper type, poster size, etc.
- Upload your files, (you will be allowed to browse the directories of your computer to select the Powerpoint file for transfer).

REFERENCES

- References can be small such as 20pt.
- Ref.
- Ref.
- Ref.

Posters - Components

Literature cited:

- Standard format
- 2 - 10 citations

Acknowledgments:

- Individuals for *specific* contributions
- Funding
- Do not list people's titles

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Posters – Some Common Errors

- Poster does not fit the allotted space
- Poster too word dense and reads like a manuscript
- Avoid too dark of backgrounds and red lettering
- Font size - large enough to read text from 3 feet or so away, title 10 to 15 feet away
- Images on the computer does not match print – consult and note that screen color (RGB versus CYMK mode)

Gravity Wave Effects on the Mid-Latitude F Region of the Ionosphere

J.H. Klenzing, G.D. Earle, G.S. Bateman

William B. Hanson Center for Space Sciences, University of Texas at Dallas

Introduction

Gravity waves incident on the bottom-side of the ionosphere may produce perturbations that seed the development of midlatitude spread F (MSF). Although there are differing theories regarding the mechanism by which MSF is produced, gravity wave-induced perturbations are a common theme [Perkins, 1973; Miller, 1997; Cosgrove and Tsunoda, 2004]. Empirical data show some limited evidence of gravity wave penetration into the thermosphere up to F region altitudes, although as yet there are no *in-situ* MSF data coincident with gravity wave signatures [Bauer, 1958; Hung *et al*., 1978; Kelley, 1997].

A numerical study by Huang *et al*. [1998] showed evidence of plasma structuring at midlatitude F region heights due to gravity waves with different assumed propagation characteristics. In the study presented here we have extended the work of Huang *et al*. by modifying the simulation code, and using it to study the sensitivity of midlatitude F region density perturbations to the propagation angle between the gravity waves and the geomagnetic field.

The Numerical Simulation Model

The model is two dimensional, with the simulation region defined as the magnetic meridional plane. The positive horizontal coordinate is therefore equivalent to magnetic north, and the positive vertical coordinate is upward. The model considers a spatial domain covering the F region, with a total horizontal extent of 600 km. The two-dimensional 600 km by 400 km grid is divided into 10,201 cells. The curvature of the Earth is ignored because of the relatively small spatial scale considered. The region is initially populated by a daytime ionospheric density profile generated using the IRI-2001 model. The scale height (H) is calculated self-consistently using a neutral profile from the MSIS-90 model.

A gravity wave with user-defined parameters is introduced into this system, and the continuity and momentum equations are solved iteratively in conjunction with the gravity wave dispersion equation for a non-dissipative atmosphere:

$$(\omega - k_x u_{0x})^2 = \frac{\omega_b^2 k_x^2}{(k_x^2 + k_z^2 + 1/4H^2)} \qquad (1)$$

In this equation, k_x and k_z are the horizontal and vertical wave numbers, H is the scale height, u_{0x} is the zeroth order background wind, ω_b is the Brunt-Vaisala frequency, and ω is the wave frequency.

Modifications

Although the governing equations used are the same as those used in Huang *et al*. [1998], several changes have been made to the code. First, we have moved the maximum for the F region production peak from 300 km to 325 km. Second, we perform our model runs using magnetic parameters appropriate for Wallops Island, Virginia (dip angle = 68°). Third, our production profile is Chapman-like, rather than an *ad-hoc* profile. Finally, we calculate the scale height self-consistently as a function of altitude rather than using a fixed scale height at all altitudes.

Validation Runs

To validate the code after making the changes listed above, we ran a case study using input parameters identical to one of the cases presented by Huang *et al*., [1998]. Table 1 shows the specific wave inputs, and the corresponding Huang *et al*. results are presented in Figure 1a. For comparison, our results for the same input wave are shown in Figure 1b.

Table 1.

Parameter	Value
k_x	$-2\pi/(300\text{ km})$
k_z	$-2\pi/(100\text{ km})$
Wave Amplitude (x)	-12.0 m/s
Wave Amplitude (z)	4.0 m/s

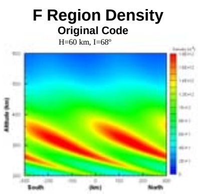

Figure 1a.

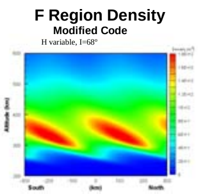

Figure 1b.

Comparison of the original code with the modified version. Both codes use the same initial daytime profile generated by the IRI-2001model, at the coordinates of Wallops Island. The amplitude of the gravity wave increases exponentially, and k_z decreases exponentially with height. Simulated time is 1200 seconds.

There are several obvious differences between Figures 1a and 1b, but in a large-scale sense both versions of the code lead to similar results. For example, both show tilted layers of enhanced plasma density, with horizontal separations that are compatible with the horizontal wavelength of the imposed gravity wave. The tilts are similar in both cases, as are the undulations evident in the topside gradient. The main differences are the vertical scale of the enhanced plasma region, with the original code producing structures that are longer and extend farther downward. These differences are reasonable, considering that the modified code uses a self-consistent scale height that varies with altitude, and an initial production profile with a steeper bottom-side gradient.

Data Presentation and Discussion

Figures 2a and 2b show the resultant plasma density, and the fluctuation levels as compared to the initial IRI density profile, respectively. In this case the gravity wave has the same amplitude as in Table 1, and the k-vector has the same magnitude but is reoriented to be perpendicular to the magnetic field. The k-vector and the wave amplitude are held constant at all altitudes. The resultant density perturbations form bands that are essentially aligned with the magnetic field.

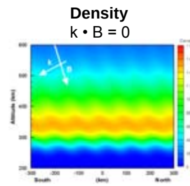

Figure 2a.

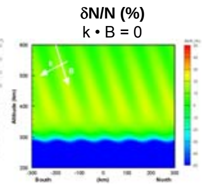

Figure 2b.

Plasma density and dN/N for a case with the k-vector perpendicular to the B-field. The amplitude of the gravity wave and k_z are held constant. Simulated time is 1200 seconds.

Figures 3a and 3b show the results for the same propagation angle, but now the amplitude and vertical wave number are allowed to vary exponentially with altitude, as one would expect in a real atmosphere. These variations cause the density structures to become much more distinct, and in the topside the decrease of k_z with altitude leads to banded density structures that become nearly vertically oriented. These results serve as a second, independent consistency check since they display the same kind of steepening that was observed by Huang *et al*. [1998].

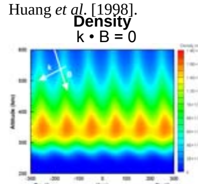

Figure 3a.

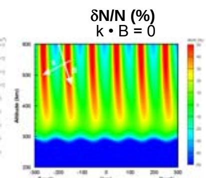

Figure 3b.

Same as Figure 2, but now the amplitude of the gravity wave increases exponentially and k_z decreases exponentially with height. Simulated time is 1200 seconds.

Figures 4 and 5 show how the striations in the density structure are modified depending on the angle of propagation of the gravity wave relative to the magnetic field. In Figures 4a and 4b we show the plasma density and perturbation intensity for the case where the gravity wave's k-vector makes an angle of 110° relative to the magnetic field at 200 km. As in Figure 3, the amplitude and vertical wave vector vary exponentially with altitude. This geometry results in the wave vector being almost horizontal, and the resultant density perturbations are nearly vertical throughout the F region.

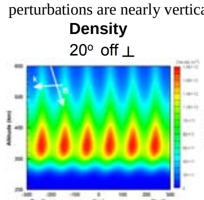

Figure 4a.

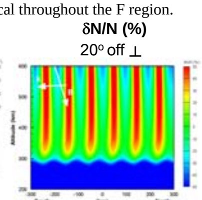

Figure 4b.

The k-vector lies 20° above the perpendicular line through the B-field. The amplitude increases exponentially and k_z decreases exponentially with height. Simulated time is 1155 seconds.

In Figures 5a and 5b the wave parameters are again unchanged, but the angle between **k** and **B** at 200 km is now 70°. As in the previous case, the main effect of this change is to create tilted perturbation structures in the lower and middle F region, with steepening at higher altitudes due to the decrease in k_z with increasing height.

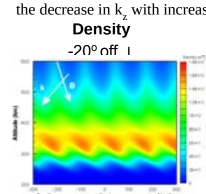

Figure 5a.

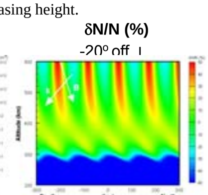

Figure 5b.

The k-vector lies 20° below the perpendicular in this case. The amplitude increases exponentially and k_z decreases exponentially with height. Simulated time is 1200 seconds.

Conclusions and Future Work

The main conclusions of our numerical studies are:

1. Large plasma density perturbations are created throughout the F region by gravity waves propagating at these altitudes.
2. The perturbations (δN/N) tend to align with their gradients parallel to the wave vector at low and middle F region altitudes, independent of the local magnetic field.
3. The perturbation structures steepen at the higher altitudes due to the decrease in the vertical wave number.

In future work we intend to seed this simulation with wave parameters obtained from empirical observations rather than *ad hoc* assumptions, and to simulate the densities that would be measured by a rocket or satellite passing through such a region. We also plan to extend this study to nighttime conditions, and perhaps to lower E region altitudes so that the coupled E-F region instability of Cosgrove and Tsunoda [2004] can be explored.

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Acknowledgments

This work was supported by NASA grant NAG5-10335. The authors gratefully acknowledge Dr. Chao-Song Huang for providing access to his numerical simulation code.

For More Information

Please contact *jeffk@utdallas.edu*. This poster is available online at *www.utdallas.edu/~jeffk/CEDAR/poster01.ppt*

ICOST-Improving the Internal Cost Estimating Practices at Conceptual Design Stage

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Introduction

Most research in cost estimating mainly focus on improving costing models and methodologies. The ICOST Project is about the integration of internal Costing practices within industry, primarily Commercial Cost Estimation with Technical Cost Engineering.

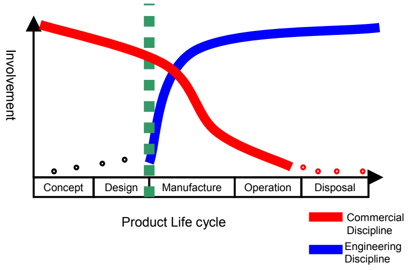

Fig. 1. Involvement of Commercial and Engineering Disciplines in the Product Life Cycle.

Deliverables

1. AS-IS Industry Best Practice Report (Fig. 2);
2. Materials Cost Estimating Hand Book;
3. Two CBTs on cost estimating of injection moulding and metal forming operations. (Fig. 3);
4. A framework on lateral transfer of cost estimating knowledge between engineers and people with commercial background (Fig.4);
5. Data and Information requirement for Cost Engineering (Fig 5)
6. Functional-based costing framework (Fig 6 & 7)

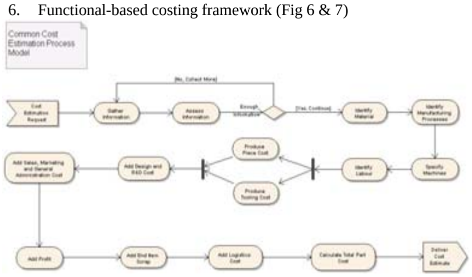

Fig. 2. Best Practice in Cost Estimating.

Fig. 3: CBT template created for Impression-die drop hammer forging operations.

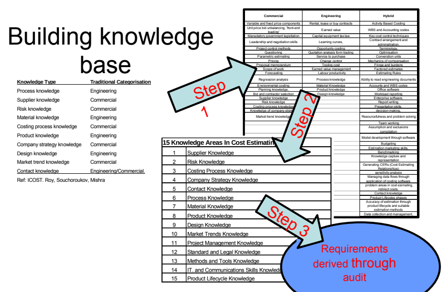

Fig. 4. Lateral Transfer of Costing Knowledge.

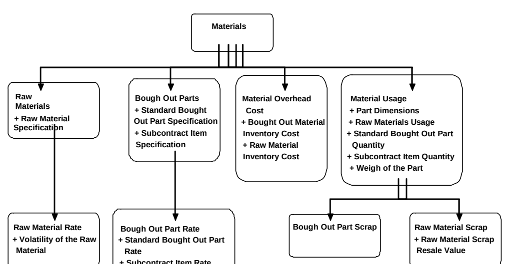

Fig. 5. Data Infrastructure for Cost Estimating in Manufacture

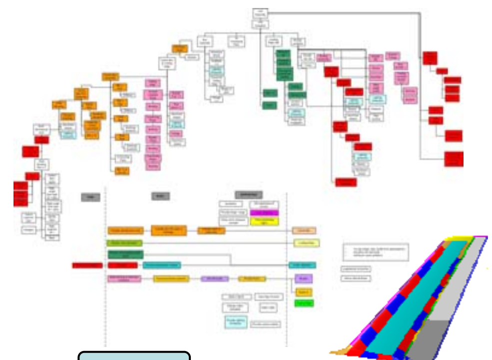

Fig. 6. Using Functional Decomposition Techniques and Value Engineering to create relationships between functions and product components to assist cost estimating.

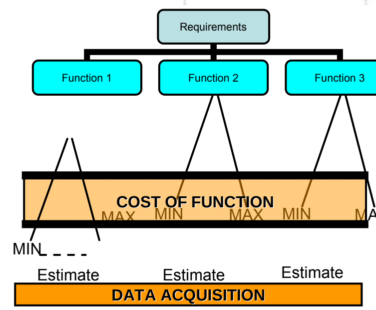

Fig. 7. The Functional-Based Costing Framework.

Conclusions

- Identified the issues within internal costing practices
- Assisted in integrating commercial and engineering disciplines
- Successful three years of Strategic research
- Improved scientific understanding about cost estimating
- Active industry participation
- Contributed to improve collaboration and further research and development opportunities.

Acknowledgments

We thank Miss Keren Mishra for her contribution in the knowledge management research for this project, Harry Koponen for gathering data requirements, Leo Kwok and Hashank Thilakawardhana for the assistance of the CBT development and Andrew Cazzaniga for his work on the Knowledge Audit Framework.

For further information

Please contact *p.souchoroukov@cranfield.ac.uk* and *r.roy@cranfield.ac.uk*. More information on this and related projects can be obtained at *http://www.cranfield.ac.uk/sims/cim/people/roy.htm*

Development of Written Sentence Combining Skills in School-Age Children

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Nickola W. Nelson, Western Michigan University, Kalamazoo, M
Sally A. Andersen, Western Michigan University, Kalamazoo, M
Kara Zielinski, Rush University Medical Center, Chicago IL

BACKGROUND

Writing is a difficult task for many students. It exacerbates the language difficulties of children with language impairments (Nelson & Van Meter (in press); Saddler & Graham, 2005; Scott & Windsor, 2000).

Sentence construction is a foundational skill of writing. Although children may generate complex sentences when speaking (an implicit ability), it takes many more years to develop the same flexibility in a more explicit way for writing (Hunt, 1965; Kroll, 1981). Educators and researchers wondered if there was a way to "speed up" children's syntactic maturity in writing.

Sentence combining (SC) was explored in the 1970's and 80's as a way to teach more flexible, higher-level sentence construction skills for writing. SC is a technique for combining simple sentences into longer, more complex sentences via syntactic operations such as deletion, insertion, replacement, coordination, and subordination, for example,

The girl was a great pianist.
The girl was very young.
The girl took lessons from a world-famous teacher.

The very young girl, who took lessons from a world-famous teacher, was a great pianist.

Early research on SC was promising (e.g., Combs, 1975; O'Hare, 1973). More recently, Saddler and Graham (2005) reported positive effects of SC instruction on 4th grade story writing and revising compared with general grammar instruction. In a recent systematic review, Anderson and colleagues concluded that SC has a more positive effect on writing than general grammar instruction (2006).

SC tasks (oral and written) can be found in

RESEARCH QUESTIONS

1. Does sentence combining ability change quantitatively and qualitatively with increasing age/grade?
2. Do children with higher general language abilities differ from children with lower general language abilities in sentence combining ?
3. Is sentence combining ability related to sentence complexity in spontaneous narrative writing ?

VETERINARY MEDICINE

METHODS

Participants (N = 104) were students in 2nd, 4th, 6th , and 9th grade classrooms in 2 Midwestern school districts (urban and rural), who were participating in a larger school-university investigation of formal and informal language assessment.

Participants were divided into two language ability groups on the basis of positive or negative z-scores averaged across several criterion referenced listening and reading comprehension tasks, and a spelling task, as follows:

- Typical language (TL) participants (N= 86) > -1.0 SD ave score
- Low language (LL) participants (N= 18) < -1.0 SD ave score

Task: Participants completed two writing tasks on consecutive days, as follows:

Task	*Instructions*
Original Story (OS)	Plan and write a story, real or imagined. Stories tell about a problem and what happens (50 minutes).
Sentence Combining (SC)	Put these notes together to write a news story (10 minutes). [Kernel sentences were read in unison and a model of sentence combining is provided; the test set of kernels was then provided and read in unison; students were given 10 minutes to put these "facts" together in a more interesting way to tell the story.]

Measures

1. **Kernel Sentence Index** (KSI): The number of kernel sentence prompts represented in the SC writing sample, divided by the number of T-units (if the child simply reproduced the original prompts, the index would be 1.0; to the extent that the child combined several kernels within one T-unit, the index increases).
   - KSI = # kernel (stimuli) maintained / T-units (SC task only)
2. **Sentence Complexity Index** (SCI): The sum of all instances of subordination (relative, adverbial, verb complement clauses) and coordination within a writing sample (normalized according to # T-units):
   - SCI = Σ sub & coord / T-units (SC & OS tasks)
3. **Type of complexity: frequency (normalized) of:**
   - Adverbial clauses
   - Relative & postmodifying clauses
   - Verb complement clauses
   - Coordinated clauses
   - Non-complexity combining (SC only)

Reliability

One-third of all transcripts were jointly coded by CS and at least one (of two) graduate research assistant for consensus. Ten percent of the remaining transcripts were randomly selected and recoded. Inter-rater reliability for all codes combined was 90% (94.5% for SCI and 88.5 % for KSI).

RESULTS AND DISCUSSION

KSI: Effect of grade

Significant grade effect: F (3, 100 df) = 13.286 (p < .001)
Scheffe: Significant difference * at 2-6, 2-9, 4-9

__Interpretation__: There is strong developmental growth in sentence combining. 2nd graders routinely "rewrite" kernels as single T-units, but 6th and 9th graders average almost 2 kernels per T-unit (1.7 and 1.8 kernels per T-unit respectively).

KSI: Effect of language ability

Significant language ability effect : T (102 df) = -2.933 (p < .004)

__Interpretation__: Students with lower general language ability (compared with grade peers) do significantly less sentence combining (KSI mean = 1.06; averaging 1 kernel per T-unit) than those with average or higher ability for their grade level (mean = 1.55; averaging 1.5 kernels per T-unit). Separate one-way ANOVAs by grade level, however, showed KSI to differentiate students by ability only at the 2nd grade (p < .01) and possibly at the 6th grade (p < .06). The KSI measure did not differentiate students by ability level a the 4th or 9th grade, suggesting that it may not be sensitive enough to serve as a clinical measure at all grade levels.

KSI: Relationship with SCI in original stories

Significant correlation (*r* = .41)

__Interpretation__: The ability to combine kernel sentences in a highly constrained sentence combining task is significantly related to sentence complexity in "free" (unconstrained) narrative writing.

KSI: Effect of grade on type of complexity

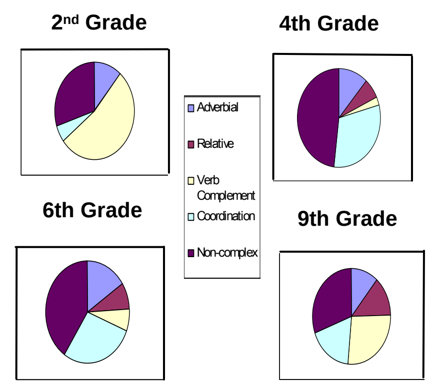
Significant grade effect for all types of complexity except adverbials (all p values< .001)
Scheffe: Patterns of significance differ depending on the type of complexity

__Interpretation__: With increasing age/grade, older students' SC ability advances through the use of 4 (of 5) grammatical mechanisms/structures. However, over the 7 year period covered, structures are developmentally "active" at different times, for example:

- __Growth rates for relative clauses and verb complements__ are relatively "flat": from 2nd through 6th grades, but there are substantial changes by 9th grade.
- __Growth rate for coordination__ is active between 2nd and 4th grade, then remains relatively flat.
- __Growth rate for non-complex combining__ is more active in the middle years (4th and 6th grades)

*All Scheffe post hoc tests are significant at the 0.05 level; Correlation coefficients reported are significant at the 0.01 level (two-tailed)

Changes in Proportion of Sentence Combining Types Across Grade Level



CONCLUSION

1. Written sentence combining is a grammatical skill with a robust developmental course between the ages of 7 and 15.
2. Over time, students become more adept at combining short, one-clause, simple sentences into longer sentences by way of coordination and subordination operations (adverbial, relative, verb complement clauses), as well as adverb and adjective insertion deletion/insertion operations.
3. Although 2nd graders are "barely" combining sentences at all, 9th graders use all grammatical operations with equal facility as needed.
4. Students with lower levels of language ability do not combine sentences at the rate shown by children with average or higher language ability.
5. The rate of sentence combining in a constrained task is significantly correlated to the rate of subordination and coordination as shown by complex sentence use in an unconstrained (spontaneous) narrative writing task.
6. The task and measures developed in this study are promising clinical measures for both assessment and intervention domains in school-age children and adolescents with language impairments and are worthy of continued clinical research.

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Types of Presentations

Professional Presentations

- Important for your career and peer recognition
- Your statements are more important than your slides
- Most people are more interested in your science
- Key issues:
  - Remember your audience
  - Avoid use of jargon and keep simple
  - Emphasize the most important points
  - Body language, e.g. hands in your pockets, look at the audience, clear voice, nervous pointer use
  - Look at your audience not the screen

Importance

- If communication is flawed; science is not facilitated
- Poor public speaking skills - negative consequences
- We retain best what we see and hear together
- Quality scientific talks → audience retains information
- Oral presentations are interactive experiences

Commitment to Preparation

- Agreeing implies a commitment to audience
- Commitment includes proper preparation and visual aids
- Avoid thinking that "the data speak for themselves" syndrome.
- Polished delivery will not make up for poor quality designs or data, but impacts how well it is received.
- Bad talks reflect poorly on your competence or demonstrate an enormous ego and disregard for your audience

Assessing the Audience

- Often the first step in preparing an invited oral presentation
- Often self-evident, but if in doubt, ask questions
- Incorporate aspects of institution or the audience interests into the talk
- It is easier to speak to either all experts or all non-experts
- Mixed audiences can be challenging – the right mix
  - Longer introduction and highly technical material later
  - Brief summaries throughout the course of your talk

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Fitting Into the Program

Know the Program

- Date, time and place and how long you will have to speak.
- Clear understanding of how your talk will fit into the total program

Ask questions about the program

- Program focused on one discipline or cross-disciplinary?
- Other talks on similar or related subjects? When in the program?

What are the size and layout of the presentation room?

- important information when preparing visual aids.

What order are you in a program of multiple speakers?

- First speaker - include definitions or other introductory material
- Final speaker - provide summary

Extra challenges

- Before lunch or right after lunch, end of the day and at the end of the meeting
- Some humor is helpful; but don't overdo it

Content

- Before talk, define the purpose, topic and depth
- Entertain your audience, but don't lose purpose
- Enthusiasm is good → transmitted to the audience
- Ask yourself a few questions:
  - Why would other scientists be interested?
  - How to generate excitement for subject?
  - How might others use this information?
  - Research or teaching anecdote to include?

Clarity

- Key to a successful scientific talk is clarity
- Be well organized and logical
- Introduction, body and a conclusion
- The language must be concise
- Avoid excessive detail
- Avoid long introduction and detailed methods
- Math equations may not strengthen the talk

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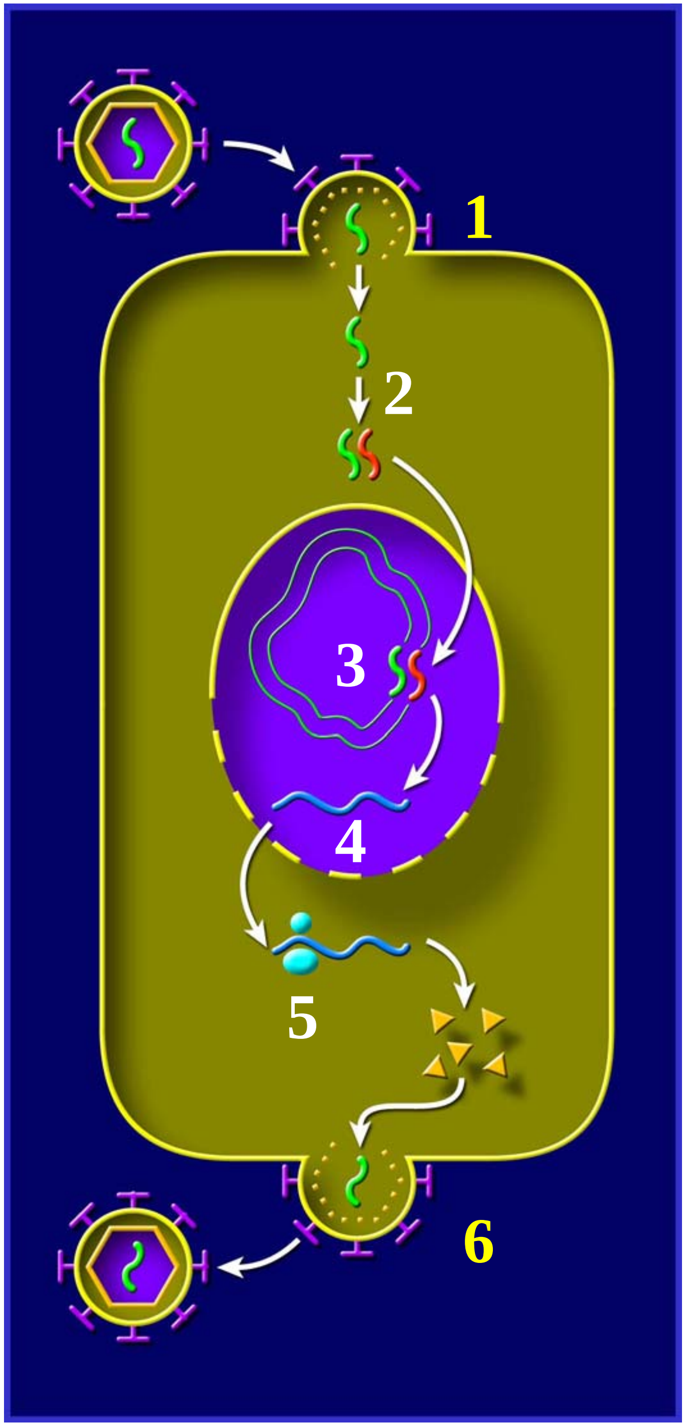
Drafting the Talk

- May be useful to allow comfort with your material
- Notes and some visual aids if you know your subject!
- A word-for-word draft inhibits conversational style
- Guidelines in drafting and editing your talk
  - Introduction, a body and a conclusion
  - Use simple, direct, active words, non-technical language
  - Avoid math and symbols if possible
  - Scientific talks contain many facts, so summarize!
  - Visual summaries are a good tool.



Retroviruses

Contain an RNA genome

1) Virus attaches to host cell and fuses with membrane
2) Reverse Transcriptase transcribes RNA genome to DNA
3) DNA copy is integrated into host cell's genome (provirus)
4) Provirus is transcribed into RNA, which is translated into protein
5) Viral proteins assemble into new virion
6) Virion buds from infected cell

Comfort with your Material

"Effective communication is 20% what you know and 80% how you feel about what you know."

Jim Rohn

Do Not Run Overtime

"Be sincere; be brief; be seated." - Franklin D. Roosevelt

- Suggests you are egotistical or did not prepare
- Defining your material to fit within the specified time
- Never squeeze your 30-min. talk into a 20-min.
- Good editing skills and scrutiny of your visual aids
- Remember time to adjust the microphone, etc.
- Avoid, "I think I'll stop here" -sends message that you have not prepared
- A few, brief words of conclusion better

Practice, Practice, Practice

Transforming a talk into a good or outstanding talk takes time.

- Rehearsals important
- Speaking aloud to audience (spouse, friends) - constructive feedback
- Do your thoughts flow logically? Transitions smooth?
- Vary your voice and your pace for emphasis
- Do you hear any "ers," "ahs," "ums?"
- Videotaping or record a practice session
- Practice with your visual aids - use speaker room
- Visual aids visible from the back of the room?
- Familiarity with environment → increase confidence


What not to wear!

Handouts

- Advisable if complex topic & if time allotted
  - Can reinforce & provide summaries
  - When best to distribute during talk
- Distributing handouts during presentation
  - Pass them out quickly and ask are they relevant?
  - Audience will be distracted and you will lose momentum
- If after talk, let your audience know and tell them what information is useful and encourage them

Visual Aids

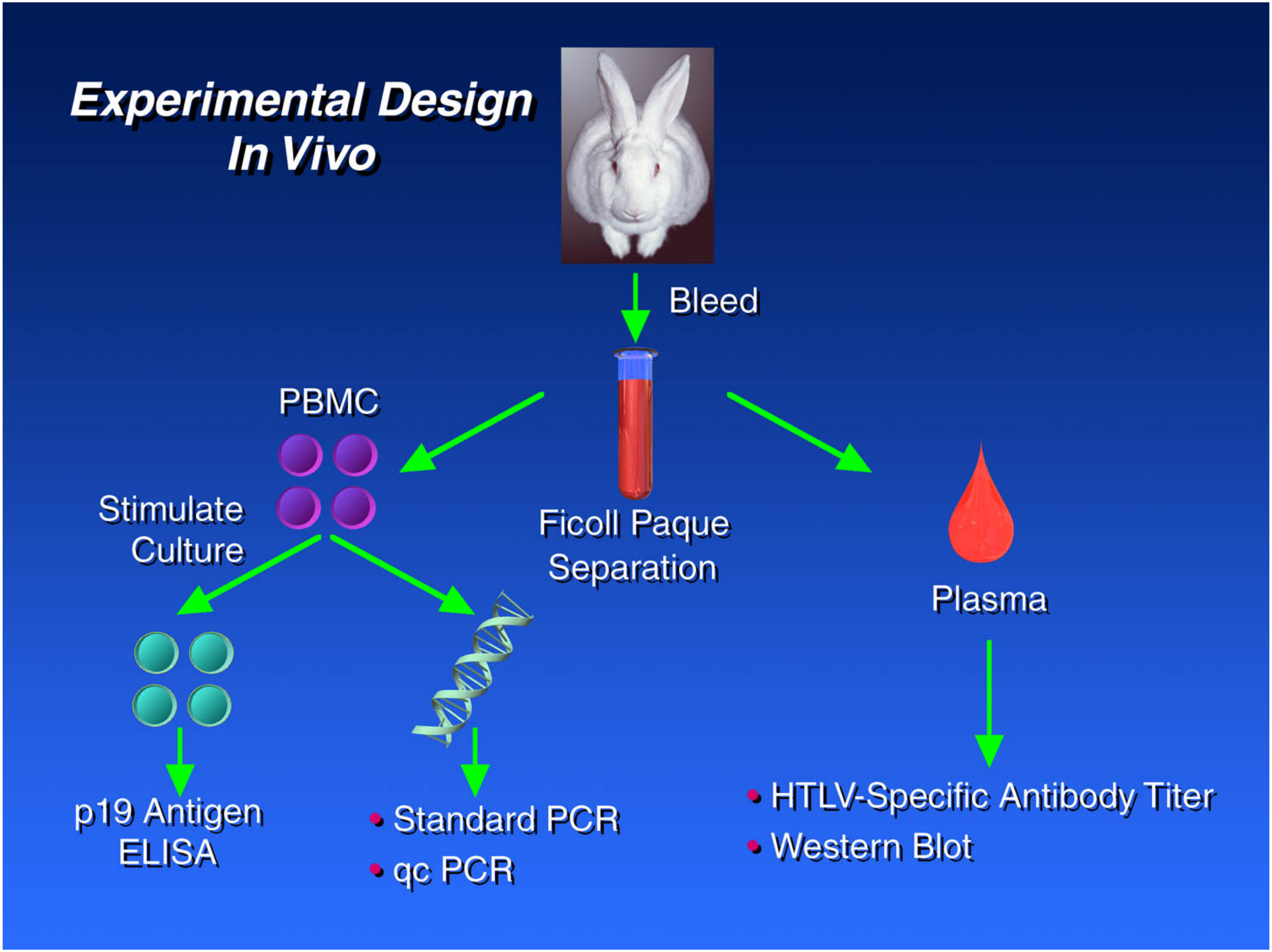
Visual aids enhance understanding

- For each ask three questions
  - Will it add to my presentation?
  - Does it relate to my talk?
  - Is the graphic quality acceptable?
- Not necessary for every point in your talk
- Visual material is not meant to stand alone

Visual Aids

Information - brief and concise

- Editing visual materials - when too much or too little
- Complete sentences NOT necessary
- Consider:
  - Word charts (lists) of no more than 36 words
  - 6 lines with 6 words - good rule of thumb
  - Pie charts for percentages
  - Bar graphs (horizontal) or column charts (vertical) for comparisons
  - Column or line charts for changes over time and frequency
  - Bar graphs and dot charts for correlation


Experimental Design
In Vivo
Bleed
PBMC
Stimulate
Culture
Ficoll Paque
Separation
Plasma
p19 Antigen
ELISA
• Standard PCR
• qc PCR
• HTLV-Specific Antibody Titer
• Western Blot

Visual Aids

Must be legible and clear

- Avoid, *"I know you can't read this, but"*
- Audience must have an unobstructed view
- Use readable lettering- e.g., 24 points or greater
- Slides better visual aids than transparencies
- Slides must be clear and bright in large rooms
- Tips:
  - Left justify the copy
  - Uniform, bold typeface such as Sans-serif
  - UPPER and lower case
  - Larger type for headings and smaller type for subheads

Visual Aids

2-3 facts per image ideal; 6- maximum

- With a complex visual build it up, layer by layer
- Creative use of color as information is added

Do not load too much visual material into a talk

- Use of three to six images per 10 minutes optimum
- More complex information = more time to absorb→ Reduce visuals

Visual Aids

Use color for emphasis, distinction and clarity

- Highlighting headings and key points
- Colored backgrounds can make less distinct
- Yellow and bright blue -good;
- Dark blue and red BAD
- White (or off white) may allow most flexibility
- Magnification reduces brightness and clarity.
- Use complementary colors like blue with orange,
- ~ 7-10 % male population is color blind - red-green common

Avoid Annoying Backgrounds!

- **Color acceptable unless it detracts**
- Colored backgrounds can make less distinct
- Use complementary colors

Make sure you're using the best and colors for legible text - and avoiding the worst ones!

Blue on Black | Yellow on White | Red on Green

http://www.colorvoodoo.com/cvoodoo8.html

•**http://www.colormatters.com/sym2.html**

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Visual Aids

Do not read your visual aids

- Audience can read faster than they hear
- Your back will be to the audience
- If your visual aids contain most or all of your talk, prepare a handout
- Speak conversationally and confidently
- Do not read your talk

Visual Aids

Be aware of the "life span" of each visual

- Visuals immediately draw audience's attention
- Display only when you are ready to talk
- Factors - time needed to understand
- More complex concepts & math take longer
- Don’t be too fast
- Audience's attention drifts if on too long
- Screen savers - screen go dark

Visual Aids

Rehearse your talk with your aids

- Effective use requires practice
- Point to the information on the screen
- Test all animation on computer to be used
- Software differences or images may not work
- Avoid auto slide changes or distracting transitions

Visual Aids

Know what can be accommodated

- Speaker responsibility
- Questions:
  - What equipment will be available?
  - How many screens and how large?
  - Size of the room and how arranged?
  - Will an AV technician be on hand?

Who would you rather listen to?

Question and Answer Pointers

- To encourage your audience - "What questions do you have?"
- Always repeat or restate a question from the floor
- Paraphrase negative questions – turn negative to positive
- Respond directly and avoid rambling
- Don't bluff or lose your cool or respond defensively
- Irrelevant questions, “really is not part of your topic” or "It sounds like an interesting subject."
- Offer to make yourself available after your presentation & **always-thank your audience**

Addressing a Nonscientific Audience

- Clearly and concisely communicate on their level
- Try not to impress them with your vast knowledge
- Greatly simplifying a complex topic
- Thumbnail sketches of any essential principles
- Frame your talk in the context of everyday life
- Nonscientific audience confused by variables or caveats
- Practicing with same age and educational level

Bibliography

- *How to Write and Publish a Scientific Paper*, 6th edition, By Robert A. Day and Barbara Gastel. Greenwood Press, Westport, Conn., 2006
- *Scientific Papers and Presentations*, Second Edition (Paperback) By Martha Davis. Academic Press, Inc. 2005
- http://www.onr.navy.mil/about/speaking_tips/
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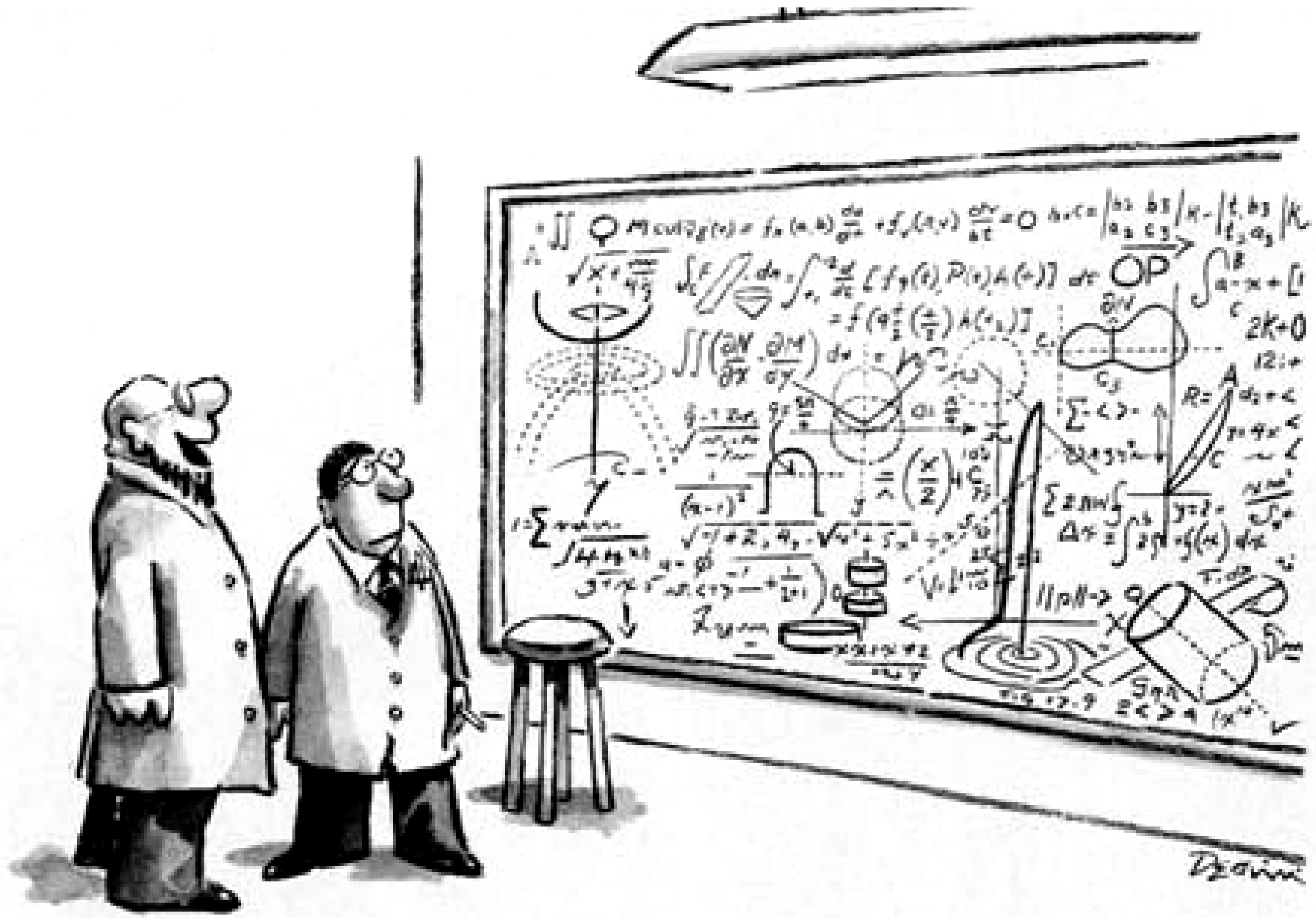

"Hey, no problem!"