Presenting Your Research

January 17, 2012

Jaclyn Johnson
jenesbit@mtu.edu

Outline

- General Comments
- Format / Organization of Presentation
  - Review of Each Section
- Summary / Conclusions
- References

3

Outline

- **General Comments**
- Format / Organization of Presentation
  - Review of Each Section
- Summary / Conclusions
- References

Why do we give research presentations?

4

- Presentations allow us to *communicate* our research findings
  - From published / conference papers
  - MS or PhD Defense / Proposal
  - Research group meetings
  - Class presentations
  - Etc…
- Effective communication is vital for the success of your research

What makes a Successful Powerpoint?

5

- Well-developed slides
  - Tailor to your audience
  - Organization / flow is important
    - ***Proofread, check for grammar / mistakes on slides***
  - Avoid excessive text on your slides / full sentences
  - Figures
  - Readability
    - Typically 18 pt font or larger
  - Include outline slide to provide 'big picture' for your audience

How to Give a Successful Presentation

6

- Practice, practice, practice
  - **DO NOT READ FROM YOUR SLIDES OR NOTES**
  - Practice with and without an audience -> have audience provide feedback
  - Speak loudly, slowly, to the audience
- Use a laser pointer to highlight content on slides
- Typically spend 1 – 2 minutes per slide
  - Leave time for questions at the end of your talk
- Be prepared for questions
  - Back – up slides
    - Additional information that may be useful to answering the audiences questions, but is not vital for the presentation

Additional General Comments…

- Presenting a conference paper -> discuss key results or one section of the results, and refer the audience to the paper for additional details
  - Include paper number as footer on slides
- Rule of thumb - Repeat key point 3 times to make sure audience fully grasps the point
- Include citations / references in slides
  - Do not plagiarize
  - Cite graphics, figures, ideas -> i.e. literature review, etc.
- Include slide numbers so audience can refer back for questions
- Choose appropriate slide formatting / template
  - Template for MTU AICE group

Outline

- General Comments
- **Format / Organization of Presentation**
  - Review of Each Section
- Summary / Conclusions
- References

Typical Presentation Outline

9

- Introduction / Goals & Objectives
- Apparatus and Procedures / Test Matrix / Test Setup
- Results (Data)
  - Analysis & Discussion
- Future Work
- Conclusions
- Acknowledgements
- Questions

Section: Introduction / Objectives / Motivation

10

- **Introduction**
  - What is being studied?
- **Motivation**
  - Why is this study important?
  - Big picture, top-down approach
- **Literature review**
  - What has been done in the past, and their results
    - Brief summary, include references and details, be quantitative
    - Include in-text references / citations
- **Goals / Objectives**
  - What are the goals of the presentation / research?
  - How will these goals be reached (Objectives?)

Example - Motivation

- Internal combustion engine - primary mode of power generation
  - In US diesel fueled vehicles projected to increase 1.6% annually
- Alternative fuels: Renewable Fuel Standard -> 36 billion gallons by 2022
- Combustion and emissions are controlled by sprays (mixing limited) -> thermophysical properties
- Fuel consumption increasing despite fuel efficiency gains of 70% from 1975 to 2010

http://www.epa.gov/otaq/fuels/renewablefuels/index.htm

http://www.afdc.energy.gov/afdc/fuels/biodiesel_blends.html

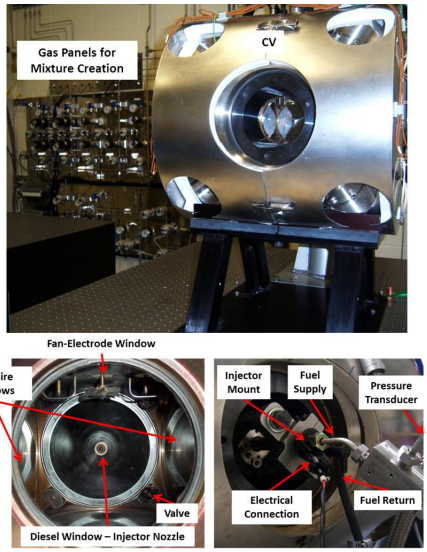
Section: Apparatus and Procedures / Test Matrix / Test Setup

- Test Setup
  - Schematic / Picture with annotations -- “Picture is worth 1000 words”
  - Provide basic overview / key points
    - Refer readers to references as appropriate
- Test Matrix
  - Define testing conditions
  - Parameters swept / held constant

Section: Apparatus and Procedures / Test Matrix / Test Setup

- Diagnostics Used
  - Pressure transducers
  - Data Acquisition
  - Cameras / Imaging Diagnostics
- Testing Procedures
  - Methods
  - Repeating tests
- Data / Image Processing Methods
  - Variable Definitions
  - Processing methods

Example - Experimental Setup



- Optically Accessible Combustion Vessel
  - Electrically heated to 100°C
- Bosch Generation III Piezoelectric Injector with 8 hole nozzle
  - 1.0 mm hole length
  - 0.14 mm hole diameter
- EFS IPoD Injector Driver
- 1.4 ms Injection Duration
- Hydraulics International Fuel System
  - 4140 Bar
  - ULSD Diesel

Example - Test Matrix and Test Operation

- Fill CV with nitrogen to set point fill pressure to target charge density
- Data acquisition started
- Inject diesel fuel
  - Image non-vaporizing spray

Test Set	Injection Pressure (Bar)	Density (kg/m^3)	CV Fill Pressure (Bar)
1	990	34.9	38.6
	1370	34.8	38.5
	1980	34.9	38.6
2	1990	17.6	19.4
	1980	34.9	38.6

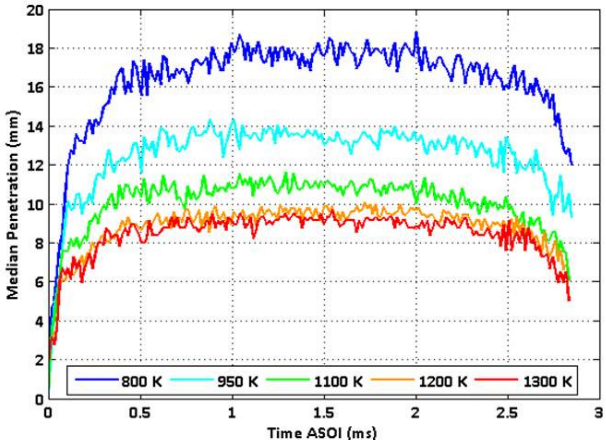
Section: Results (Data)

- Partition into smaller sub-sections
  - Should address all goals and objectives of the presentation
- Discuss, *quantitatively*, your results
  - Explain trends and implications of your results
    - How does it compare to prior research
  - Address any surprising results and if follow-up work is merited.
- Include Figures, and define key point / result from figures

Section: Results (Data) – Figures

- Discuss the figure
  - Define x / y axis
  - Communicate what the figure is showing / key result
  - Include movie or animation as appropriate
    - Test before presentation to ensure it works on the computer
  - Font size should be large enough for the audience to read

Example - Liquid Length Vaporizing Spray Results
Charge-Gas Temperature Sweep
34.8 kg/m^3 Density, 2000 Bar Pinj, 363 K Fuel Temperature

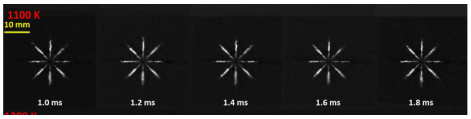


- Charge gas temperature increase 800 to 1300 K, mean liquid length decreases by nearly 50% in a non-linear fashion
- Liquid length fluctuations

Example – Animation - Vaporizing Diesel Spray Movie

67,500 frames per Second
Background Subtracted

1100 K
34.8 kg/m3 Density
2.8 ms Injection, 2000 Bar Pressure



Animation makes it easier to visualize the liquid length fluctuations as compared to images (right)

Section: Future Work

- Discussion follow-up / additional work as an add-on to the current work.
  - Additional experimental testing over different conditions
  - Additional processing / data analysis
  - Modeling with experimental results
  - Repeat tests to verify observed trends or to see if some data anomalies are repeatable

Section: Conclusions / Summary

- No new material should be introduced in this section
- Quantitative summary
  - Reiterate goals and objectives of the work.
  - Discuss *key conclusions and implications* - meeting goals and objectives
    - Quantitative – Ignition delay decreased XX% with YY% increase in oxygen concentration; not ignition delay decreased with oxygen concentration increase
  - Discuss observed trends and implications of observed trends

Section: Acknowledgements

- Short acknowledgement to different sponsors.
  - Research Project Sponsors
    - MTU
    - External Funded; Grant Numbers Where Appropriate
      - DOE / NSF
      - Industry
      - Etc.
  - Laboratory Development / Instrumentation Support
  - Collaborators that are not co-authors
  - Graduate Assistant Support / Fellowships
    - MTU
    - External

Section: Questions Slide

- Leave time at the end of your presentation to field questions from the audience
  - Before presenting, think about what questions may arise and how you might answer them
- When answering questions, provide a thought out response
  - Don't ramble
  - Refer to earlier slides / figures as needed
  - If you do not know the answer, answer with a hypothesis and take note of the question and you can get back to the individual at a later time

Outline

- General Comments
- Format / Organization of Presentation
  - Review of Each Section
- **Summary / Conclusions**
- References

Summary / Conclusions

- Take time to develop your slides
  - Consider audience
  - Figures / Tables instead of large amount of text
  - Provide outline to audience
  - Highlight key results -> bullet points
- Giving your presentation
  - Practice, practice, practice
  - Laser pointer use
  - Be prepared for questions
  - Talk slow and loudly, do not rush
  - Do NOT read from slides / notes
- Presentations are a reflection on your research, and the department and university – make sure your presentation is of high quality, well rehearsed, experimentally and technically accurate, and correctly cites and credits others work

Outline

- General Comments
- Format / Organization of Presentation
  - Review of Each Section
- Summary / Conclusions
- **References**

References / Additional Information

- References used / websites for additional information:
  - http://www.cs.swarthmore.edu/~newhall/presentation.html
  - http://www.cs.washington.edu/homes/mernst/advice/giving-talk.html
  - http://www.cgd.ucar.edu/cms/agu/scientific_talk.html
  - http://acmg.seas.harvard.edu/education/presentations/carlton_presentations.pdf
  - Research online -> several other websites / suggestions exist

QUESTIONS