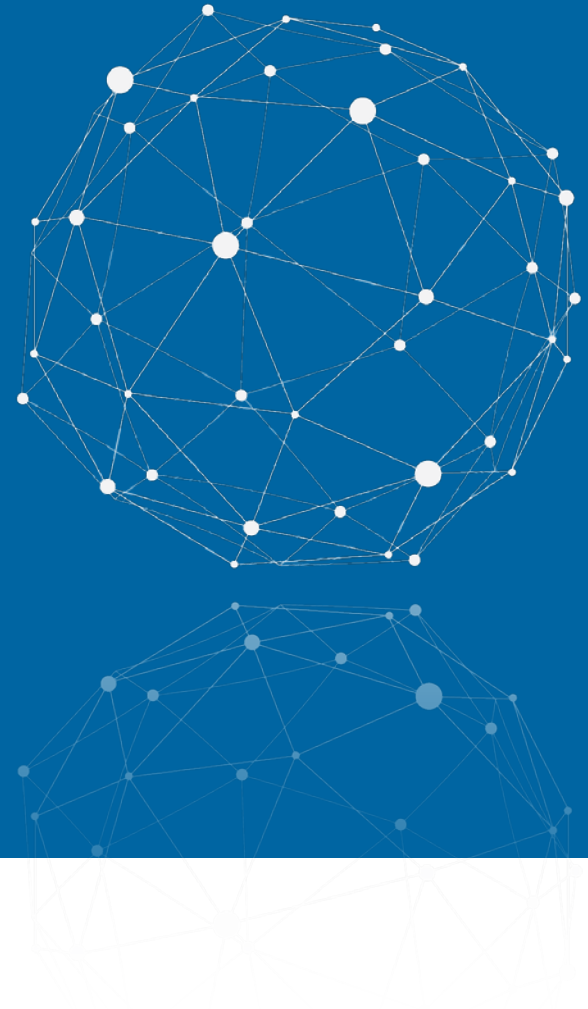


Communicating Science

Telling Your Story Through Poster Presentations



August 18, 2015

Presenters:

Kristene L. Henne, PhD., Postdoctoral Programs Lead

Larisa Blyudaya, Independent Senior Graphic Designer

Content:

- Title
- Headlines
- Message
- Brief Text
- Key Points
- Data
- Supporting Illustrations

Design:

- Layout
- Visual Flow
- Clarity / Simplicity
- Spatial Balance
- Columns / Rows
- Large fonts
- Color
- Supporting Illustrations



The main key is to create an overall structure of your content

Poster presentations are a great opportunity to interact with your audience. Just like oral presentations, they allow you to crystallize your thoughts about your research and focus on its essence.





Types of Layout

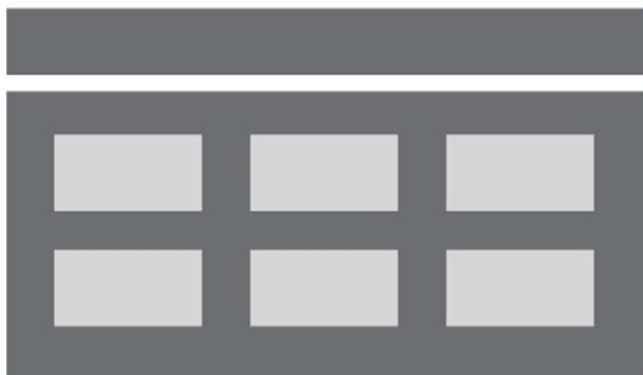
Vertical Columns



Compare and Contrast



Horizontal Rows

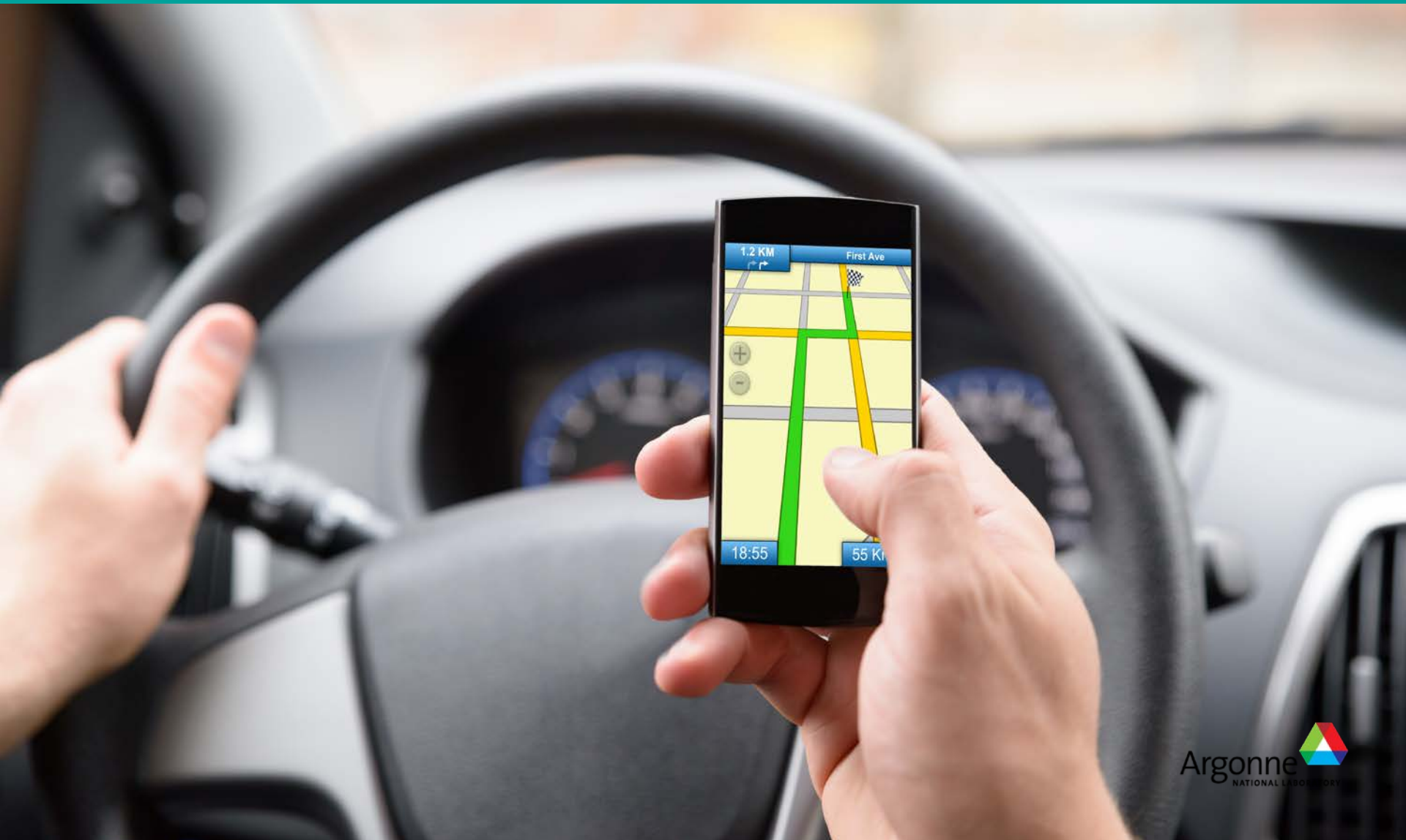


Main Idea Graphic

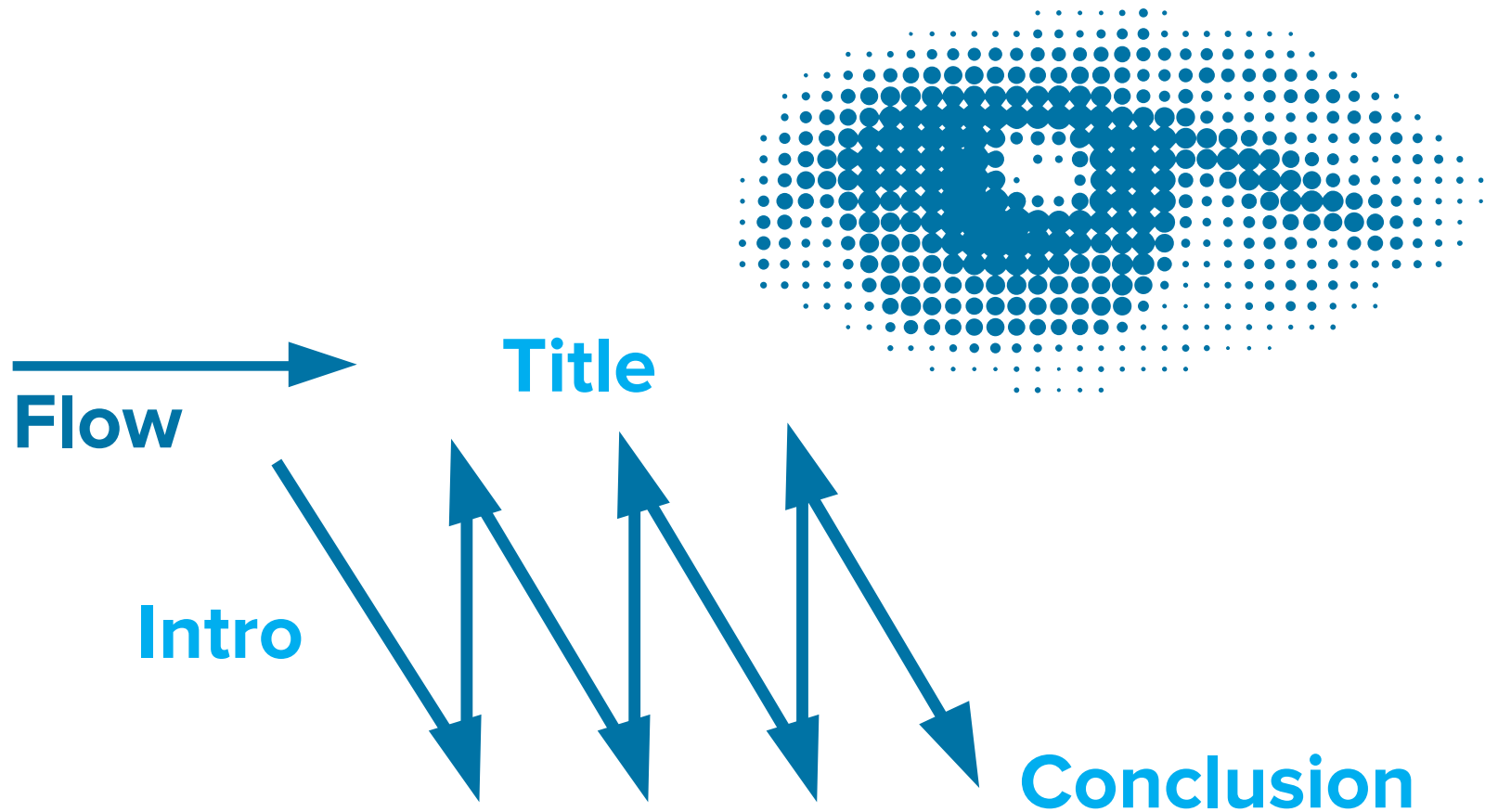




Importance of Layout



Eye Movement



California PEV Readiness Project

Project Partners



Geographical Area Served



Major Program Activities

- Set of six regional PEV readiness plans
- Statewide Toolkit and Workshops

Southern California
Plug-in Electric Vehicle
Readiness Plan



San Diego Regional
PLUG-IN ELECTRIC VEHICLE (PEV) READINESS PLAN
(March 2013 Regional PEV Action Plan)



Central Coast Regional
PLUG-IN ELECTRIC VEHICLE (PEV) READINESS PLAN
(March 2013 Regional PEV Action Plan)



Plug-in
Central
Coast!

Electric Vehicle
Readiness Plan for
Ventura, Santa
Barbara, and San Luis
Obispo Counties

Elements of the regional PEV readiness plans

- | | |
|---|--|
| <ul style="list-style-type: none"> • Streamlining permitting and inspection processes • Implement training and education programs • Update building codes • Update zoning and parking rules • Implement effective marketing and outreach | <ul style="list-style-type: none"> • Public charging site selection • Workplace charging • MUD charging • Manage utility grid impacts • PEV purchases for local fleets • Create new incentives • Encourage renewable energy |
| REQUIRED ELEMENTS | OPTIONAL ELEMENTS |

Ongoing Activities

- Provide input towards statewide PEV Readiness Plan to be finalized Sept 2013 by NREL
- Conduct sub-regional PEV planning through CEC PEV readiness grants (by June 2014)
- Work on challenging PEV infrastructure areas such as workplace and MUD charging with PEV Collaborative and regions
- Conduct follow-up actions in Governor's ZEV Action Plan
- Regional partners collaborating on future DOE alt fuels grant including PEV, CNG, and H2 fuels

Areas of PEV readiness covered by project

- Single family residential
- Multi family residential*
- Workplace charging*
- Fleet charging
- Public charging*
- We did not cover DCFC as a separate topic but along with other PEV readiness elements



Principal Investigators

Patricia Kwon

South Coast Air Quality
Management District

Joshua Cunningham

California Plug-in Electric
Vehicle Collaborative

South Coast Air Quality
Management District
21865 Copley Drive
Diamond Bar, CA 91765

Argonne's Battery Post-Test Facility

INCREASING THE LIFE OF BATTERIES

Did you know...

What happens to batteries as they age?

How do battery chemistries and materials change over time?

How can battery life be lengthened?

How can batteries be made safer to use?

OPPORTUNITY

In an age where everything from heart valves to smart phones to automobiles relies on battery power, these questions are vitally important. Argonne's Battery Post-Test Facility is discovering the answers.

ARGONNE'S SOLUTION

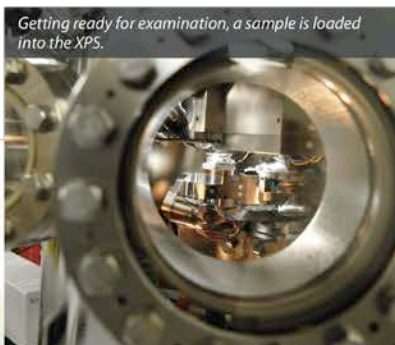
Argonne's new Battery Post-Test Facility (PTF) allows the lab's researchers to dissect, harvest and analyze battery materials from used and previously tested battery cells in order to identify for developers and manufacturers the exact mechanisms that limit the life of their battery cells. In the past, the cause of performance degradation could only be inferred. The PTF is one of the few facilities in the world conducting this research.

A UNIQUE FACILITY

The PTF is unique in that all its work, from dismantling the battery to harvesting and analyzing its components, is performed in one glove box. This keeps the air-sensitive battery materials pristine and intact, yielding more information about what's really going on in the later stages of characterization and analysis. An X-ray photoelectron spectrometer is integrated into the glove box and is used to gather data on the electronic structure of materials, which helps researchers learn what chemical and physical changes have occurred during the aging of battery materials. The PTF can be used to analyze materials from any type of battery, from lead-acid and lithium-ion (found in today's cars) to cutting-edge technologies, such as lithium-air.



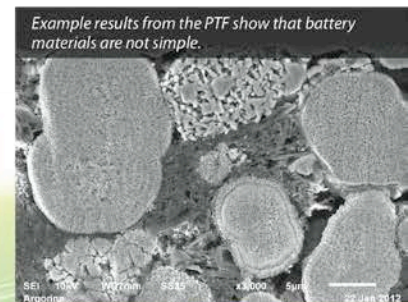
Two Argonne scientists prepare a sample for characterization to answer the question of what changes occurred during the life of a battery.



Getting ready for examination, a sample is loaded into the XPS.



Peering into another world, a sample is mounted in the XPS for characterization of the nature of what on the surface of a material.



The work in the PTF is funded by the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy



Daytime Charging: Opportunities and Customer Needs in Atlanta

D.J. Santini*, Y. Zhou*, V.V. Elango[^], Y. Xu[^], and R. Guensler[^]

*Argonne National Laboratory, Argonne, IL | [^]Georgia Institute of Technology, Atlanta, GA

INTRODUCTION

The charging pyramid indicates that (overnight) residential charging is the foundation, with (daytime) workplace charging at the next level, and public charging at the top. For intra-metro driving, current PHEVs can benefit from 1–3-kW AC charging opportunities at the workplace or other metro area locations. AEVs can benefit from 1–7-kW intra-metro AC charging points and from 50-kW + DC fast charging along highways outside of metro areas.

Key questions:

1. How much can workplace and other intra-metro daytime charging increase electric miles of travel beyond just residential overnight charging?
2. How important is inter-metro travel with infrequent rapid refueling to consumers and how will it influence PHEV vs. AEV choices?
3. How do vehicle type and purpose matter?



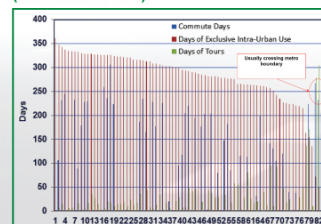
Estimated Lowest-Cost Alternative for Specified Patterns of Use (source: SAE 2013-0494)

\$/gallon for gas	mi/day group	Days of use/yr	Charge/day	Inter-city %	Convent. level	PHEV #	mi. range	PHEV #	mi. range	AEV #	mi. range
5.00	30-50	263	1	all							
5.00	30-50	263	1*	all							
5.00	30-50	328	1	all							
5.00	50-100	263	1	all							
5.00	50-100	328	1	all							
5.00	100-150	263	1*	all							
5.00	100-150	328	1	all							
5.00	30-50	263	1	all							
5.00	30-50	263	1*	all							
5.00	30-50	328	1	all							
5.00	50-100	263	1	all							
5.00	50-100	263	1	all							
5.00	50-100	328	1	all							
5.00	100-150	263	1	all							
5.00	100-150	263	1*	all							
5.00	100-150	328	1	all							
5.00	150-200	263	1	all							
5.00	150-200	263	1*	all							
5.00	150-200	328	1	all							

A prior evaluation of least total cost of future PHEVs vs. AEVs raises these questions:

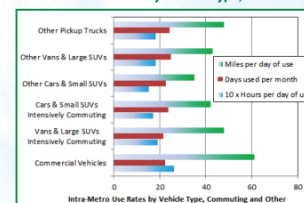
- How many vehicles are driven 263–328 days per year?
- How many vehicles are driven >50 mi/day?
- How often do vehicles need to be fully charged a second time per day?
- How many vehicles are not driven outside the metro area?

Days of Private Vehicle Intra-Metro Use per Year (ordered most to least)



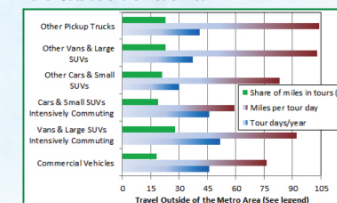
- Many sample vehicles are driven between 263 and 328 days per year.
- Metro edge conditions led to a bias toward overestimating "inter-metro" touring.
- The intense vs. low commuting cut-off is 170 days of commuting per year.

Intra-Metro Use Rates by Vehicle Type, Commuting and Other



- Cars and small SUVs not used for commuting are least intensively used.
- Larger vehicles (vans, large SUVs, pickups) are more intensively used than cars.
- Commercial vehicles are most intensively used (both cars and trucks included).
- The intense commuting miles averages are biased high because of high-use outliers.

Travel Outside of the Metro Area



- Intensively commuting cars and small SUVs take shortest tours, often less than AEV range.
- Commercial vehicle tour average distances are also often < AEV range.
- Private minivans, large SUVs, pickups more intensively tour than private cars and small SUVs.
- Given that % of tour miles is biased high by metro-edge vehicles, intercity 8.5–19.5% is reasonable.

APPROACH

This study uses the filtered Commute Atlanta data base to examine vehicles with a year of consecutive use data, leading to a sample of 91 vehicles.

- The National Household Travel Survey (NHTS) previously used only includes one sample day per vehicle, making understanding annual use patterns impossible.
- The filtered Atlanta sample has very few vehicles of more than 10 years of age.
- Days of use are more than the U.S. average of <10 year old vehicles from the NHTS.
- Atlanta data yearly averages imply very few vehicles consistently travel >50 mi/day; NHTS shows a significant share of vehicles traveling >50 mi/day.

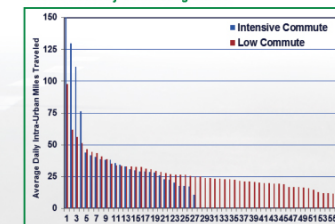
To address question 1: Sample vehicles are divided into those commuting intensively (>170 days/yr) vs. those commuting less or not at all ("others").

To address question 2: Uses are divided into everyday intra-metro travel and occasional extra-metro "touring" outside the metro boundary, 50 mi or more from home.

To address question 3: Sample vehicles are separated into multiple categories

1. Commercial and private vehicles and
2. (a) Small and (b) large light-duty passenger vehicles and (c) pickup trucks.

Average mi/day for Each Private Vehicle, Ordered Most to Least by Commuting Status



- Many sample vehicles average >30 mi/day when driven; few <50 mi/day.
- One-third of sample vehicles commute intensively; could usually use workplace charge.
- Among these, for PHEVs with ~30-mi range, full day pack refills might be rare.

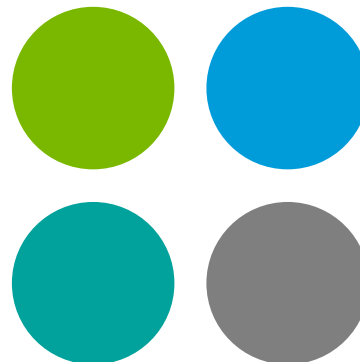
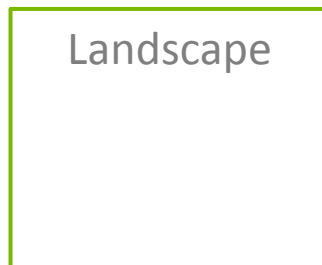
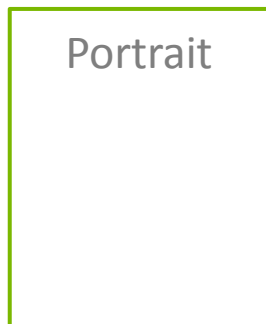
OBSERVATIONS FROM THE COMMUTE ATLANTA SAMPLE

- The use patterns where projected AEVs could be a less-expensive private vehicle option than PHEVs (in SAE 2013-0494) exist, but are unusual for full-year patterns of vehicle use in Atlanta. Commercial vehicles had typical patterns of use serviceable by AEVs.
- Only about one-third of private vehicles commuted intensively enough to suggest a business case for daytime workplace charging.
- When plug-in vehicles can be charged at a residence overnight, a second refill at a workplace will seldom be necessary for PHEVs with 30 or more miles of range, or for AEVs.
- When a plug-in vehicle cannot be charged overnight, every workday workplace charging should be sufficient for most local travel of intense commuting vehicles.
- The group of four outlying high-use intense commuting vehicles represents disproportionate electrifiable miles, possibly enabled by workplace charging and AEVs.
- A minority of vehicles did not tour during the sample year. Favoring PHEVs, the majority of consumers will desire fast, infrequent refueling for intra-metro travel.
- People haulers (minivans and large SUVs) were used more intensively than cars and small SUVs and were more likely to be used for commuting.
- Pickups were least likely to be used for commuting.
- By enabling smaller battery packs, workplace charging for minivans and large SUVs might enable the PHEV option in these vehicles where interior volume is critical.



Key Features

- Decide on layout and orientation
- Make the title the most prominent block of text on the poster
- Choose 3–4 main colors
- Pick 2 type faces
- Use bold headers
- Minimum point size for headers is 48pts
- Minimum size for body text size is 24pts



Headers

Main body text



Key Features

- Maintain spatial balance
- Create visual contrasts
- Captions are quick references

30%

Text



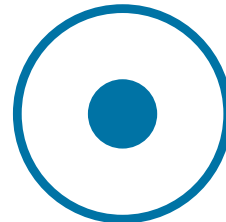
40%

Graphics



30%

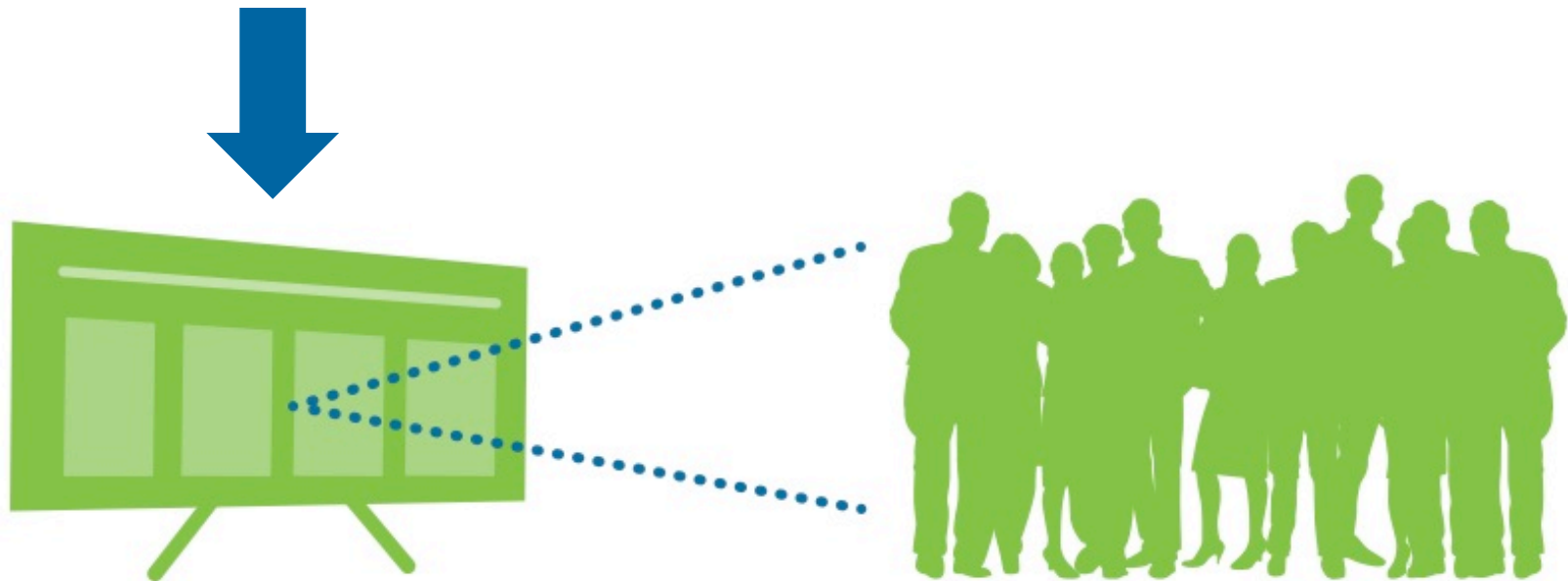
**White
Space**





Key Features

- Should be readable from 5 feet
- Reads within 5 minutes





5

Steps to Getting Started

1. Have all your text in a separate Word file (Word and PowerPoint work well together for copy and pasting purposes)
2. Collect data / generate graphs
3. Find visual aid / supporting images
4. Break up your content in sections using Word (Use image/data placeholders within sections. You can insert images or simply type their name within corresponding sections)
5. Create a rough draft poster layout using PowerPoint or any software of your choice. You may, also, print all contents individually. Then manually arrange them on a large format paper. (Refer to poster templates provided)



You are ready for a final layout!

Questions?



Helpful Resources & Tutorials

<http://www.nature.com/scitable/nated/topicpage/poster-presentations-13907939>

<http://www.writing.engr.psu.edu/posters.html>

<http://guides.nyu.edu/content.php?pid=174875&sid=1471879>

<http://www.makesigns.com/tutorials/poster-design-layout.aspx>

<http://writingcommons.org/2013-12-30-04-56-15/2014-06-19-14-38-15/creating-scientific-posters>

<https://www.youtube.com/watch?v=MqgjgwIXadA#t=274> -

Additional Resources

Title, formatted in sentence case (*Not Title Case and NOT ALL CAPS*), that hints at an interesting issue and/or methodology, doesn't spill onto a third line (ideally), and isn't hot pink

Colin Purrington

666 Teipai Street, Posterville, PA 19801, USA

Introduction

Your reader was mildly intrigued by the title, but you have exactly two sentences to hook them into reading more. So describe exactly what your interesting question is and why it really needed to be addressed. Gratuitous background information will cause them to walk away.

Typography research has shown that text is easier to read if you use a serif font such as Times. But use a non-serif font for title, headings, etc., to subtly tag them as different. Research has also shown that fully justified text (like this paragraph) is harder to read, so don't do this, even if it seems cool and professional looking.



Figure 1. A catchy photograph can help lure people to your otherwise boring poster. Yes, I risked my life getting this shot.

Materials and methods

Few people really want to know the gruesome details of what you've been up to, so be brief. And be visual. Use a photograph, drawing, or flow chart if possible, supplemented with only a brief overview of your procedure.

If you can somehow attach an object, an iPad, etc., that can involve viewers in active way, do so. Refer to the companion website (see bottom right section) for more ideas if you are creatively challenged.

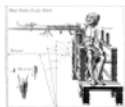


Figure 2. Hand-drawn illustrations are preferable to computer-generated ones. Just bribe or flirt with an artist to get them to help you out. A photograph of you actually doing something might be nice.

Literature cited

Bender, D.J., E.M. Byrne, and R.M. Brigham. 1996. Lunar condition influences coyote (*Canis latrans*) howling. *American Midland Naturalist* 136:413-417.
Brooks, L.D. 1988. The evolution of recombination rates. Pages 87-105 in *The Evolution of Sex*, edited by R.E. Michod and B.R. Levin. Sinauer, Sunderland, MA.
Scott, E.C. 2005. *Evolution vs. Creationism: an Introduction*.

Results

The overall layout in this arena should be visually compelling, with clear cues on how a reader should travel through the components. You might want a large map with inset graphs. Or have questions on left and answers with supporting graphs on right. Be sure to separate figures from other figures by generous use of white space. When figures are too cramped, viewers get confused about which figures to read first and which legend goes with which figure. Cramped content just looks bad, too. The big thing to remember is that a Results section on a poster does not need to look like a Results section on a manuscript, so feel free to be creative.

If you can add small drawings or icons to your figures, do so—those visual cues can be priceless aids in orienting viewers. And use colored arrows or callouts to focus attention on important parts of graphs. You can even put text annotations next to arrows to tell reader what's going on that's interesting in relation to the hypothesis test. E.g., "This outlier was most likely caused by contamination when I sneezed into tube." Also, don't be afraid of using colored connector lines to show how one part of a figure relates to another figure.

Figures are preferred but tables are sometimes unavoidable, like death. If you must include one, go to great efforts to make it look professional. Look in a respected journal and emulate the layout, line types, line thickness, text alignment, etc., exactly. A table looks best when it is first composed within Microsoft Word, then inserted as an Object. Use colored text or arrows to draw attention to important parts of the table.

Paragraph format is fine, but so are bullet lists of results:

- 9 out of 12 brainectomized rats survived
- Brainectomized rats ate less
- Control rats completed maze faster, on average, than rats without brains

This sample results section is way too wordy, in case you were wondering.

Do treatments differ in their effects?

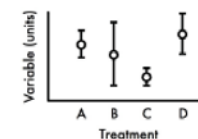


Figure 3. Legends can describe the experiment, answer the question, and even include statistics if you so choose (unlike a manuscript figure legend). And be brief.

Do As and Bs respond differently to X?

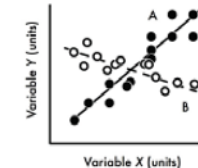


Figure 4. Label elements instead of relying on annoying keys that are defaults on most software. Add pictures of A and B if they are actually things (e.g., icons of aster and begonia flowers).

Are medians of treatment A and D different?

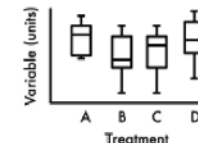


Figure 5. For the love of God, don't be tempted to reduce font size in figure legends, axes labels, etc. Your viewers are probably most interested in reading your figures and legends.

Conclusions

Conclusions should not be mere reminders of your results—that would be boring. You want to guide the reader through what you have *concluded* from the results, and you need to make the first several sentences understandable on their own and interesting...because many conference attendees will start reading this section first. If you don't hook them, they'll walk. These first several sentences should refer back, explicitly, to the burning issue mentioned in the introduction. (If you didn't mention a burning issue in the introduction, go back and fix that.)

A good conclusion will also explain how your conclusions fit into the literature on the topic. E.g., how exactly does your research add to what is *already* published on the topic? It's important to be humble and generous in this section, so assume that authors of previous literature may be at the conference, and further assume they are crabby and influential. You can also draw upon less formal types of context such as conversations you have had with smart and important people (God, personal communication).

Finally, you want to tell readers who have lasted this long what needs to be done next, and who should do it. E.g., are you taking the next logical step, or should another discipline follow up on your amazing result? It's OK to put a bit of personality into this ending because viewers expect posters to be personal, and if you're not actually standing there to convey your enthusiasm, your poster should be doing that for you.

If you have a graphical way to express the next iteration of your hypothesis, by all means include it. For example, you might make a graph of hypothetical data that shows an expected result in a future experiment. That's something you couldn't do in a traditional manuscript, but it's totally fine for a poster.

If you're curious, this poster has 876 words (just look in File Properties to get this statistic). Aim for 500 words. If you are above 1000 words, your poster will be avoided.

University of California Press, Berkeley.
Society for the Study of Evolution. 2005. Statement on teaching evolution. <<http://www.evolutionarysociety.org/statements.html>>. Accessed 2005 Aug 9.

[Don't just make up a format for your references—follow the standard citation format for your discipline exactly. Trust me, if you deviate from absolute perfection, the Type A citation police will be on you within a few minutes, and it won't be pretty. Note that you should not place a period after the journal name.]

Acknowledgments

We thank I. Güter for laboratory assistance, Mary Juana for seeds, and Herb Isside for greenhouse care. Funding for this project was provided by the Department of Theology. [If you want to clutter your poster with annoying logos, shrink them down so that they can fit inside this area without smooching text too much. Note that people's titles are omitted...titles are TML.]

Further information

More tips can be found on "Designing conference posters," at <http://colinpurrington.com/tips/academic/postersign>. Note that URLs should always be stripped of any automatic hyperlink formatting (right-click, then "remove hyperlink").

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Make the Title the Most Prominent Block of Text on the Poster

The title of an effective poster should quickly orient the audience

Authors | affiliations | program number

KEY FEATURES

- Decide on layout and orientation
- Choose 3–4 main colors
- Pick 2 type faces
- Use bold headers
- Minimum point size for headers is 48pts
- Minimum size for body text size is 24pts
- Maintain spatial balance
- Create visual contrasts
- Captions are quick references
- Should be readable from 5 feet
- Reads within 5 minutes



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- 5 Create a rough draft poster layout using PowerPoint or any software of your choice. You may, also, print all contents individually. Then manually arrange them on a large format paper. (Refer to poster templates provided)

! YOU ARE READY FOR A FINAL LAYOUT

LAYOUT



Vertical Columns



Horizontal Rows



Contrasting Fields

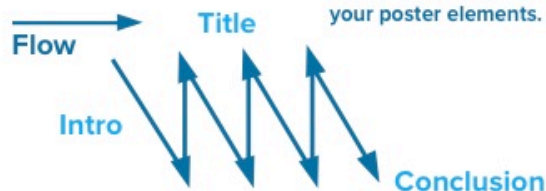


Main Idea Graphic

EYE MOVEMENT



Maintain sufficient white space, keep column alignments logical, and provide clear cues to your readers how they should travel through your poster elements.



BALANCE

30%
Text



40%
Graphics



30%
White Space

