Making effective powerpoint-based presentations

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Consider first the slide background...
Can you really read this very well?

- Careful NOT to have too “busy” a background in the slide.
Some slide formats use a lot of room

The first thing you write is already 1/3 down the page. This means your most important material is on the bottom of the slide, which may be difficult to see....
Thinking about ways to present your data

The colors you can use depends on the background!
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Oil and Fossil Fuels

- Global industrial growth is increasing the demand for fossil fuels and energy
  - Peak in US oil production 30 years ago produced a crisis
  - Global production of oil will peak in the next 10 to 20 years
  - CO₂ emissions continue to increase causing climate change

- Energy alternatives that exist (nuclear, coal, oil shale, methane hydrates?) pose continued environmental challenges.

![CO₂ concentration in the atmosphere: Mauna Loa curve](image)

Source: Scripps Institution of Oceanography (SIO), University of California, 1998.
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  - Peak in US oil production 30 years ago produced a crisis.
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Choose fonts that are clear (these letters are too close).

Use a bigger font rather than a bold font (these are too bold).
Do NOT use a slide like this that has no real “information”

• Introduction
• Methods
• Results
• Discussion
• Conclusions
• Acknowledgements
Do indicate different subjects that you might cover

- How an MFC works
- Laboratory tests using a single substrate
- Pilot scale tests using industrial wastewaters
Graphs:

If you use the Excel default font size, it is probably too small!
Current density (mA cm\(^{-2}\))

Cell Voltage (V)

Power density (mW m\(^{-2}\))

- V-Treated
- V-Untreated
- P-Treated
- P-Untreated
Do not use decimal places when they are not needed!
The ppt software chooses your graph size… but don’t let it!
You can put two graphs side-by-side, with the right font size.

A background color can be helpful to emphasize one graph over another.
Ammonia treatment of the anode

- Carbon cloth electrode
- Exposed to ammonia gas (5%) at 700°C for 60 minutes
- Surface charge increased from 0.38 to 4.0 meq m⁻²
- Maximum power of 1970 mW/m² (115 W/m³)

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You can use “appear” to emphasize specific graphs during your talk.
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Use motion paths and animation to help reinforce your point…

but don’t overdo it!
Microbial Fuel Cells: Aqueous cathode

- **Anode**: Bacteria oxidize fuel (wastes) to produce **H^+**.
- **Cathode**: Oxidation products (CO_2) are converted to **O_2** and **H_2O**.
- **Load**: Electron flow (e^-) is driven by the proton exchange membrane (PEM).
- **Power**: 0.1 – 40 mW/m^2.

Air Cathode MFC

Power = 500 mW/m²
H₂ Day Activities

- Posters can be viewed all day
- 1:30 Panel Sessions
- 3:50 Laboratory tours
- 5:30 Reception
- 6:30 Dinner— with Dan Desmond, PA Dept. Environmental Protection

H₂E Web page: www.engr.psu.edu/h2e
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Take lots of pictures!
Nanowires on a MFC electrode

Yuri Goby (2005). Pres. DOE NABIR meeting, April 20, 8:10 am, Warrenton, VA.
Power = 494 mW/m² (No PEM)

Power = 250 mW/m² (PEM)

Match colors with graphs to help with complex figures

- **Hydrophobic tube cathode (CoTMPP, 113 m²/m³)**: 16 W/m³
- **Carbon flat cathode (Pt, 25 m²/m³)**: 10 W/m³
- **Hydrophilic Tube Cathode (CoTMPP, 84 m²/m³)**: 9 W/m³

**Single chamber, continuous flow MFCs (SC MFC)**

**Substrate**

<table>
<thead>
<tr>
<th>MFC Type</th>
<th>Power (mW/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FP-MFC (close spacing)</td>
<td>76</td>
</tr>
<tr>
<td>SC-MFC (large spacing)</td>
<td>28</td>
</tr>
</tbody>
</table>

Use a “screen capture” to obtain graphs or pictures from other documents
J-Cloth (Associated Brands LP) on the water-facing sides of the cathodes (Fig. 1B). The J-Cloth does not contain any antibacterial coating and is about 0.3 mm in thickness. The MFCs without J-Cloth but same cell structure (Fig. 1A) were used as control. In the other MFCs, J-Cloth (2 layers) was sandwiched between the anode and the cathode at one end (Fig. 1C) or both ends (Fig. 1D) of the cylindrical chamber. Similar to membrane electrode assembly (MEA), we refer this type of configuration as cloth electrode assembly (CEA).

2.2. MFC test

The MFCs were inoculated with a mixed bacterial culture from the anode of a single chamber MFC, which was originally inoculated with domestic wastewater (Corvallis Wastewater Treatment Plant, Corvallis, OR) and has been operated for about 1 year. Acetate (20–30 mM) was used as the substrate and the fuel cell chamber. Experiments were conducted under constant temperature of 30°C in duplicate.

2.3. Analyses

Voltage (V) was recorded using a multimeter mentioned above, and used to calculate volumetric power densities based on empty bed volumes and surface power densities based on projected surface area of electrodes. The projected surface area of all the MFCs was 7 cm² except MFCs with double CEAs (Fig. 1D), which was 14 cm².

CE was obtained by calculating the ratio of total recovered coulombs by integrating the current over time to the theoretical amount of coulombs that can be produced from acetate. Detail information can be found in a previous report [9].

The internal resistance of MFCs operated in batch mode, \( R_{int} \), was calculated from the slope of plots of voltage (V) versus...
Use a motion path and multiple pictures to convey your point

Source: Fan et al. (2005), J. Power Sources
Before your presentation

• Check out the room you will present in before your presentation (arrive early)
• View your slides on the computer to make sure fonts and animation work correctly
• Determine microphone and pointer availability
Starting your presentation

• If your name and presentation title have just been given, don’t repeat them (unless they are incorrect)
• If you are nervous, memorize your first two sentences… after that, it gets easier.
• Adjust your explanation of material based on previous presenters (if they just explained how an MFC works, don’t spend much time on it)
Speaking pointers

• Look at your audience
• Talk to the audience, not the projector screen behind you.
• Use the laptop screen as your “teleprompter” as it is in front of you.
• Consider using the mouse as a pointer instead of a laser pointer so you don’t have to turn around
When using a microphone

- Keep a constant distance to the podium microphone
- If using a mobile microphone, don’t change your voice direction relative to the location of the microphone
- Put the microphone on the side that is closest to the projector screen
Make the point of your slide clear, so that the slide is understood even if the audience has trouble understanding your accent.
Power production in MFCs worldwide under optimal conditions (only oxygen cathodes)

- Maximum estimated to be 17 W/m²
- 6860 mW/m² (Anode 1/14th the size of the cathode)
  = 490 mW/m² based on cathode size
- 2700 mW/m² (equally sized electrodes)

The text on the right makes the main points that we are trying to show in the graph
**Predict:** Reducing electrode spacing increases power

Power: 700 → 1210 mW/m² (4 cm → 2 cm)

**Prediction verified:**
power increased with decreased electrode spacing

When answering questions

• Don’t rush into an explanation… think for a few moments. It is okay.
• If the questions may not be clear to others, restate the question. This can also help you to focus on the main points.
• Putting slide numbers on your slides helps people to ask about specific slides.
Sometimes it is useful to vary spacing in a set of bulleted items

• Lets use the previous slide as an example…
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Be sure to acknowledge colleagues and funding sources

Use your last slide to provide contact information (email address or websites)
Thanks to students and researchers in my laboratory at Penn State!

Left to right (2008 group):
1st row: Fang Zhang, Yimin Zhang, Elodie Lalaurette, Farzaneh Rezaei, Ellen Bingham (technician), Valerie Watson.
2nd row: (Bruce Logan), Shaoan Cheng, Patrick Keily, Rachel Wagner, Xin Wang, Xiaoyuan Zhang
3rd row: Matt Merrill, Geoff Rader, Roland Cusick, Jack Ambler, David Jones (technician), Tomonori Saito, Defeng Xing
Questions?

Email: blogan@psu.edu

Logan web page:
www.engr.psu.edu/ce/enve/logan.htm

International MFC site:
www.microbialfuelcell.org

MFC webcam (live video of an MFC running a fan)
www.engr.psu.edu/mfccam