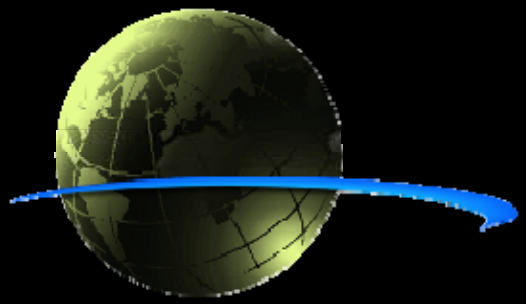
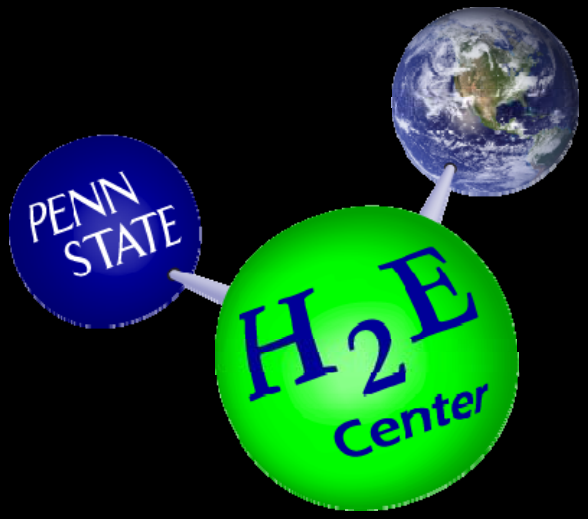
Making effective powerpoint-based presentations

Bruce E. Logan
Penn State University

Engineering
Environmental
Institute



PENNSTATE

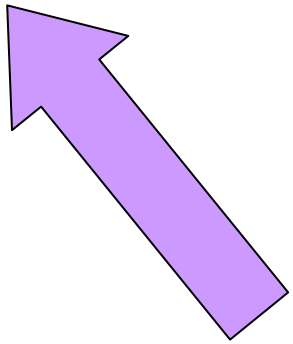


Consider first the slide background…

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!

Thinking about ways to present your data

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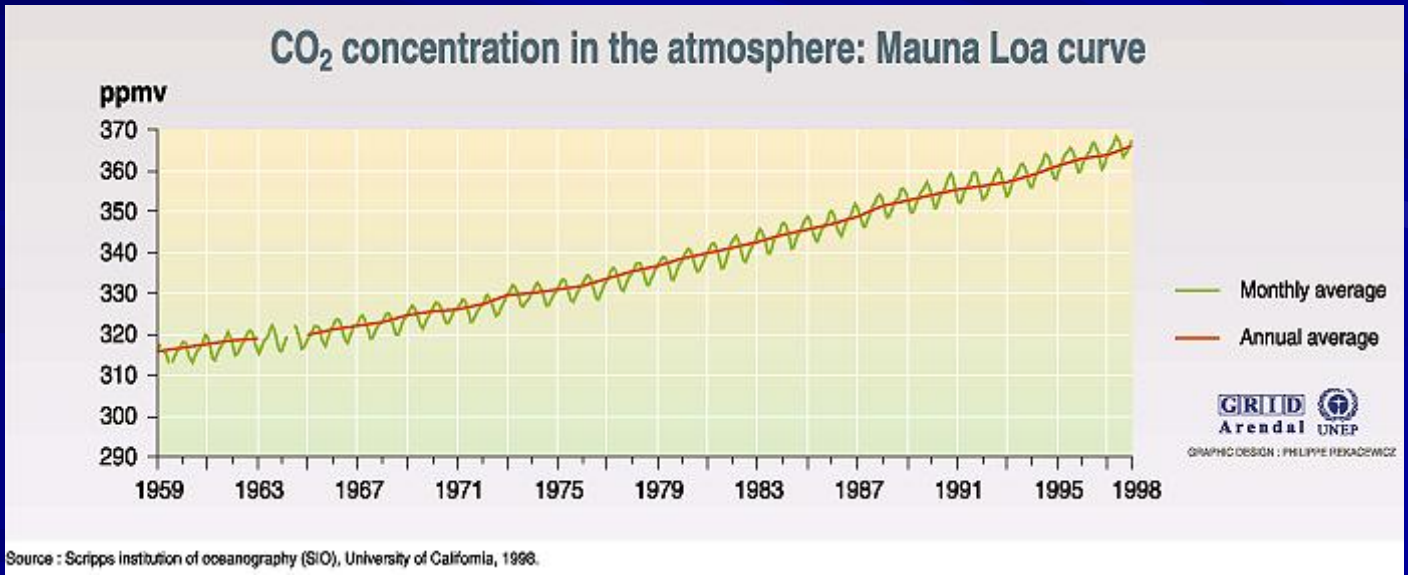
Thinking about ways to present your data

The colors you can use depends on the background!

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
  - CO_2 emissions continue to increase causing climate change
- Energy alternatives that exist (nuclear, coal, oil shale, methane hydrates?) pose continued environmental challenges.



Oil and Fossil Fuels

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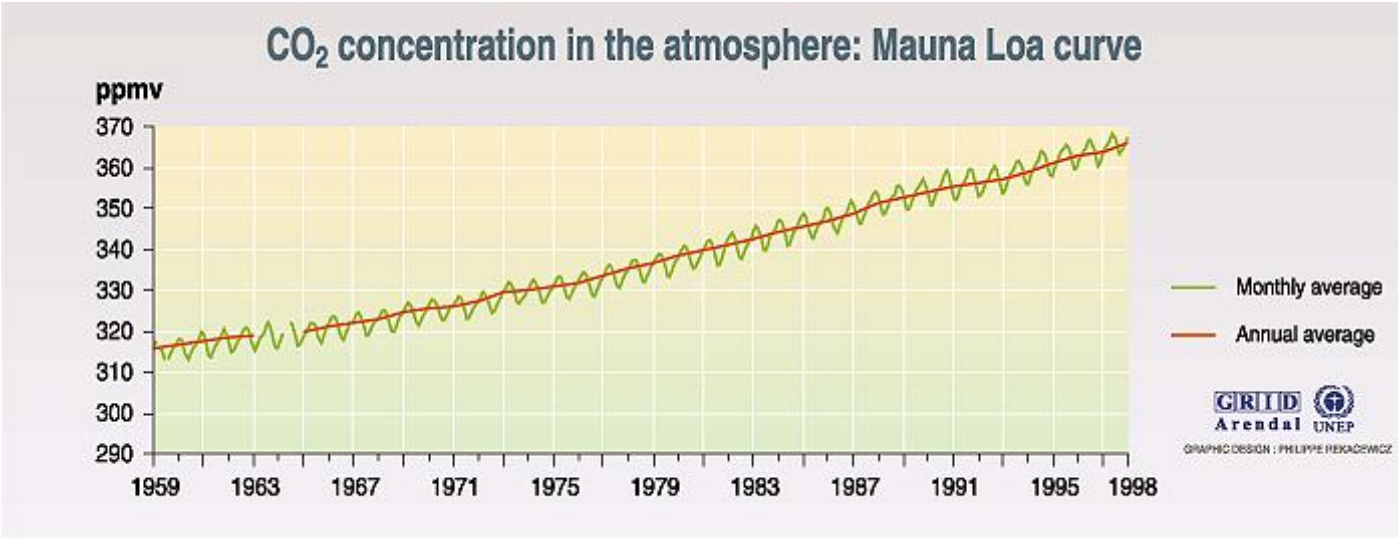


Source : Scripps institution of oceanography (SIO), University of California, 1998.

Oil and Fossil Fuels

- Global industrial growth is increasing the de
  energy
  - Peak in US oil production 30 years ago produce
  - Global production of oil will peak in the next 1
  - CO_2 emissions continue to increase causing clim
- Energy alternatives that ist (nuclear, coal
  hydrates?) pose continued environmental cl

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”

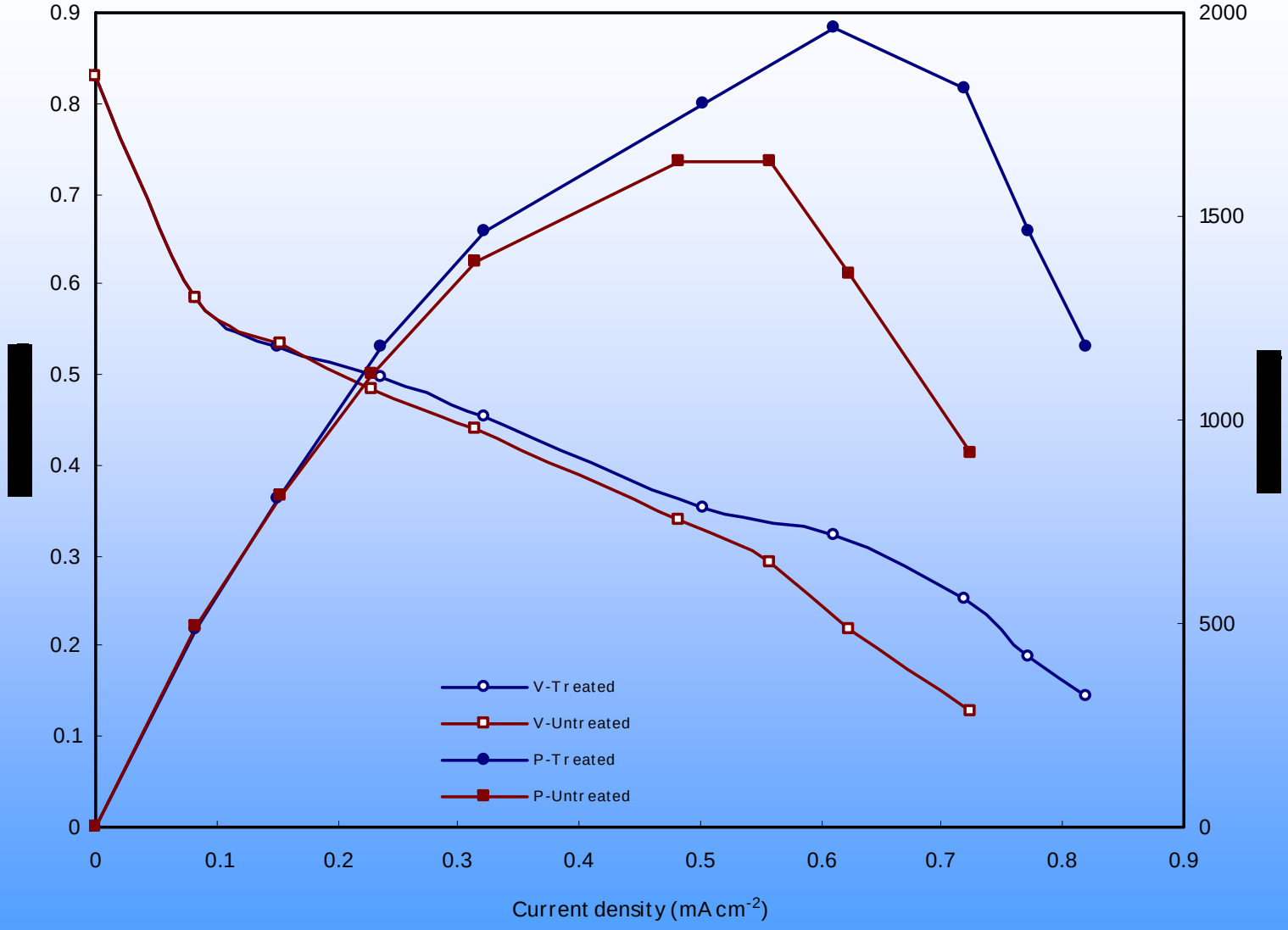
- Introduction
- Methods
- Results
- Discussion
- Conclusions
- Acknowledgements

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!


0.9
0.8
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0.3
0.2
0.1
0
2000
1500
1000
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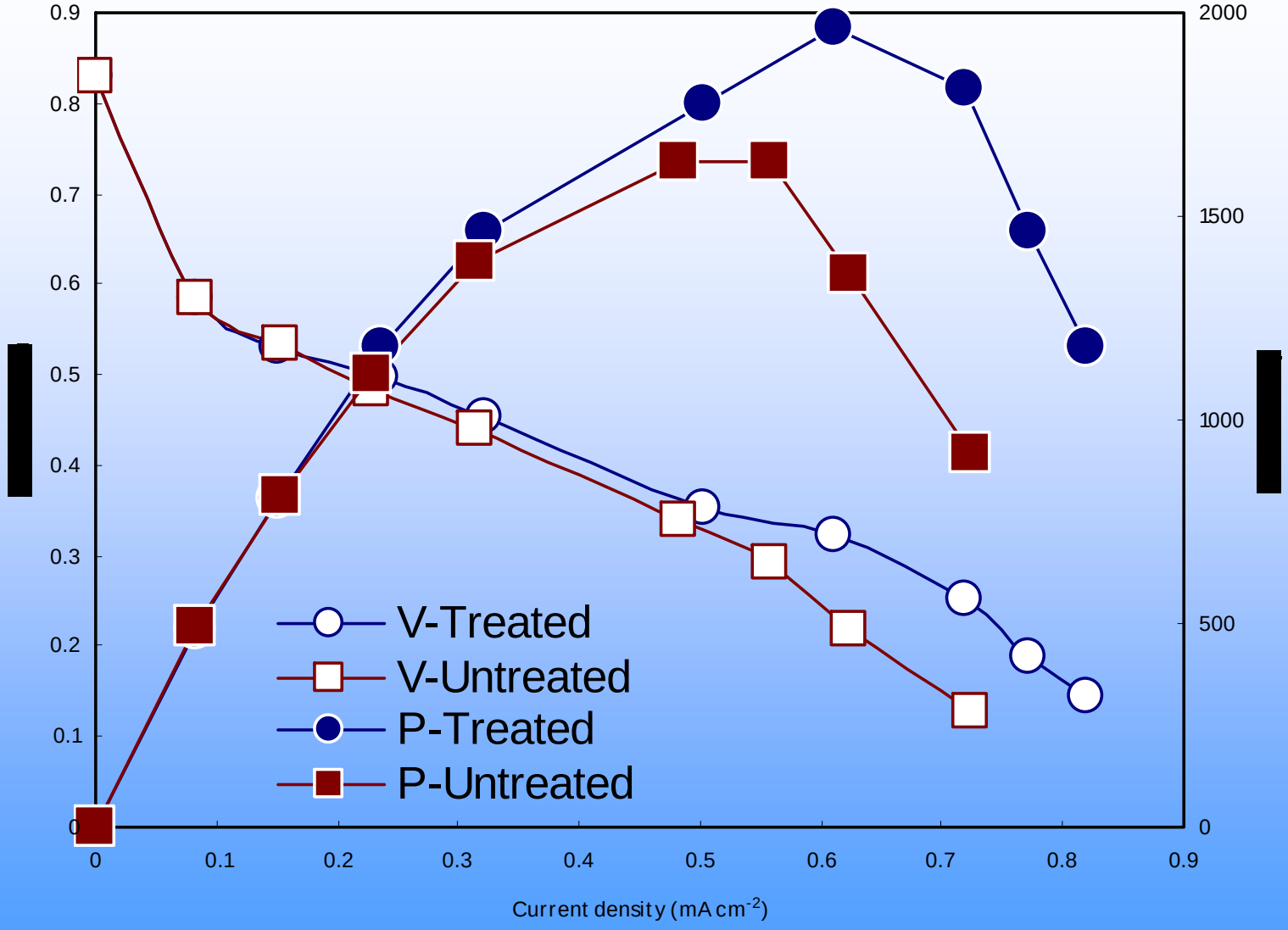
0
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
V-Treated
V-Untreated
P-Treated
P-Untreated
Current density (mA cm-2)


0.9
0.8
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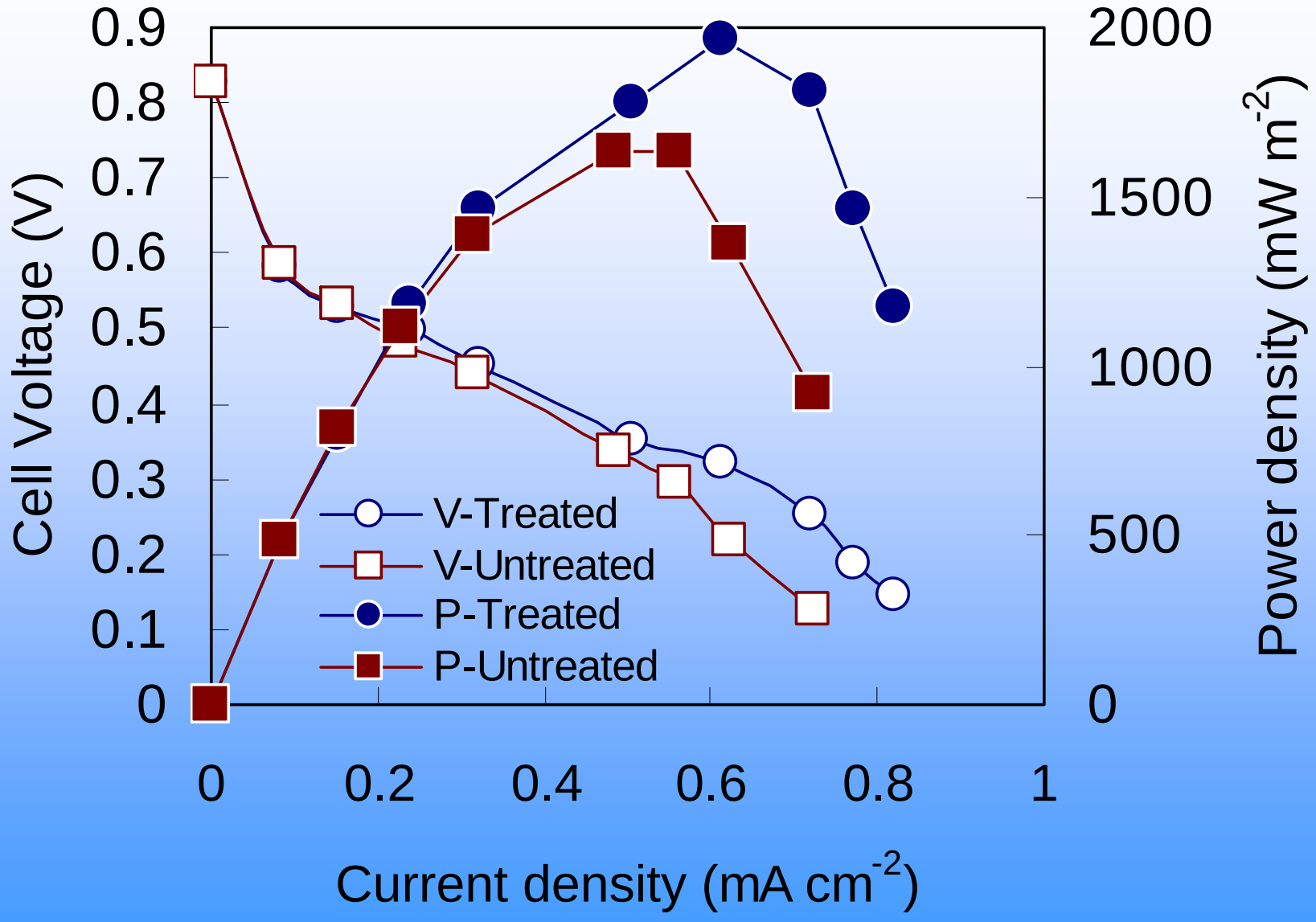
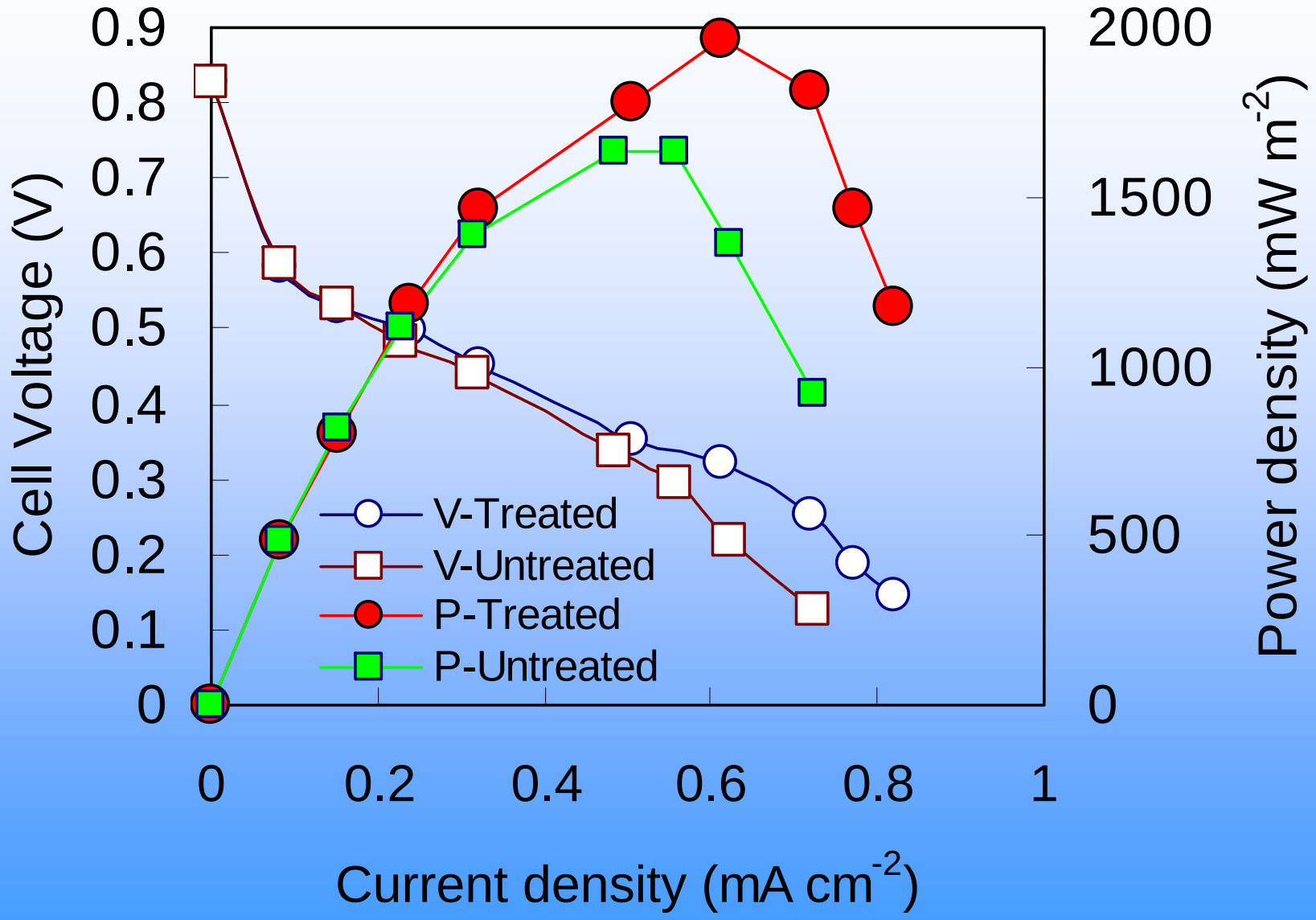
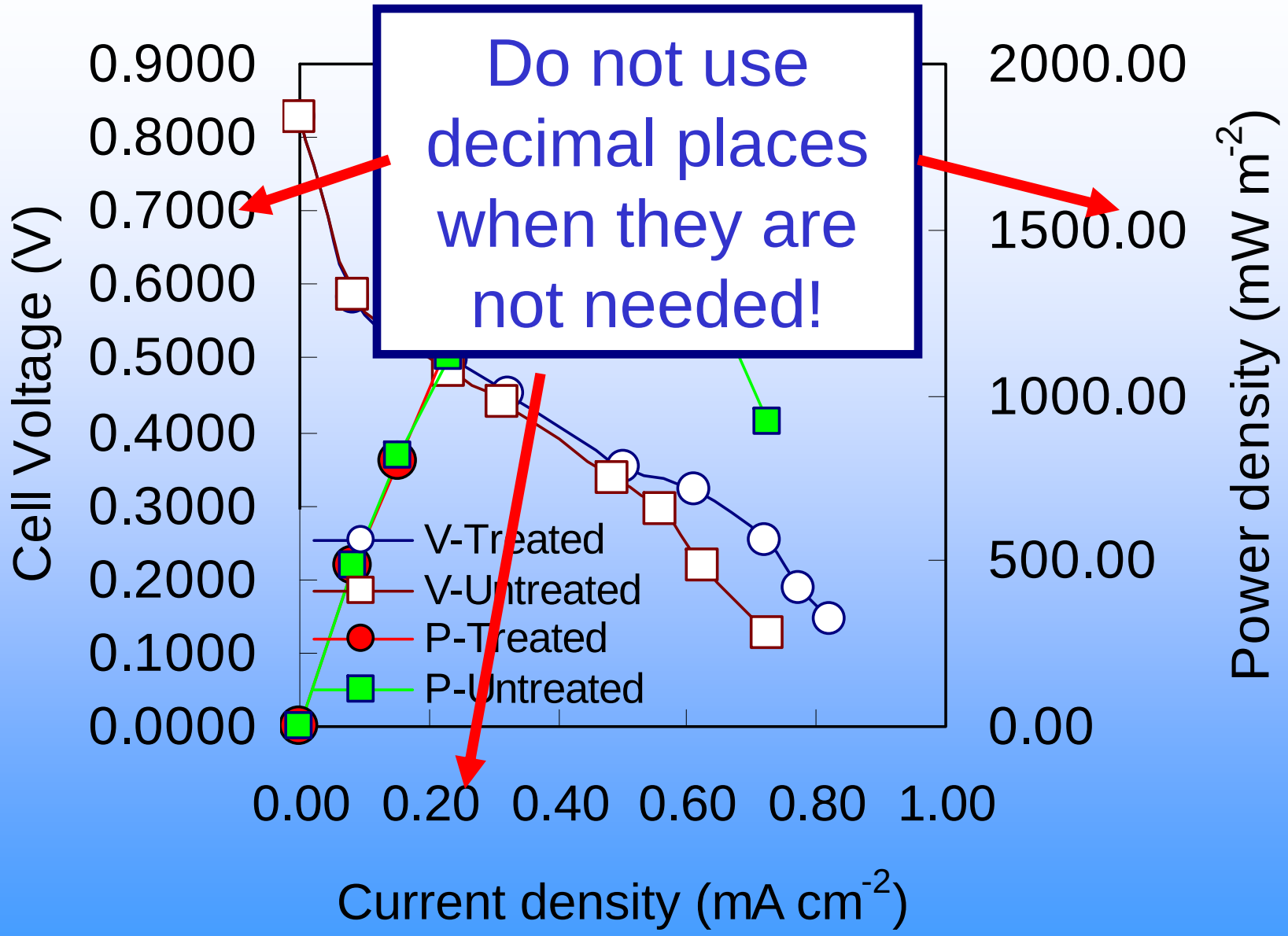
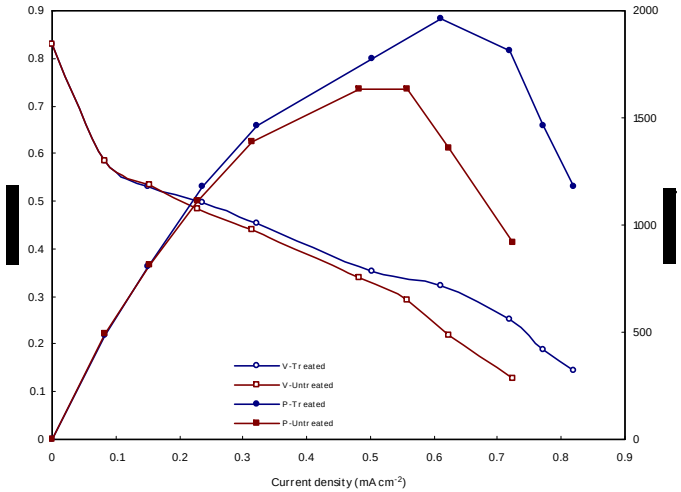
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
V-Treated
V-Untreated
P-Treated
P-Untreated
Current density (mA cm-2)

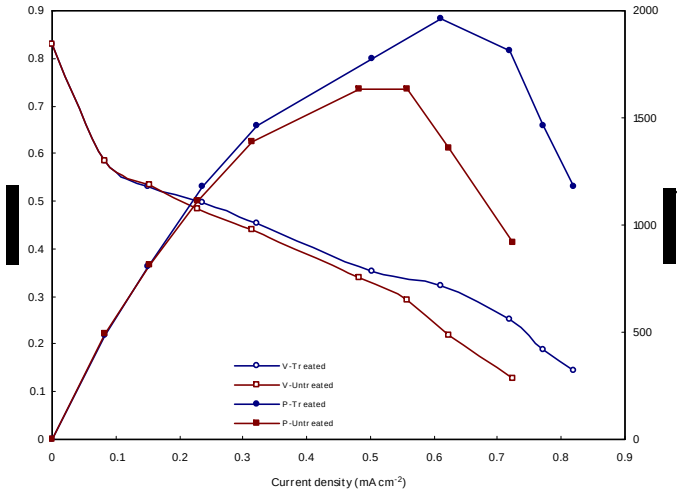

0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Cell Voltage (V)
2000
1500
1000
500
0
Power density (mW m-2)
0
0.2
0.4
0.6
0.8
1
Current density (mA cm-2)
V-Treated
V-Untreated
P-Treated
P-Untreated


Cell Voltage (V)
Power density (mW m-2)
Current density (mA cm-2)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
0
500
1000
1500
2000
0
0.2
0.4
0.6
0.8
1
V-Treated
V-Untreated
P-Treated
P-Untreated


Do not use decimal places when they are not needed!
0.9000
0.8000
0.7000
0.6000
0.5000
0.4000
0.3000
0.2000
0.1000
0.0000
Cell Voltage (V)
2000.00
1500.00
1000.00
500.00
0.00
Power density (mW m-2)
V-Treated
V-Untreated
P-Treated
P-Untreated
0.00
0.20
0.40
0.60
0.80
1.00
Current density (mA cm-2)

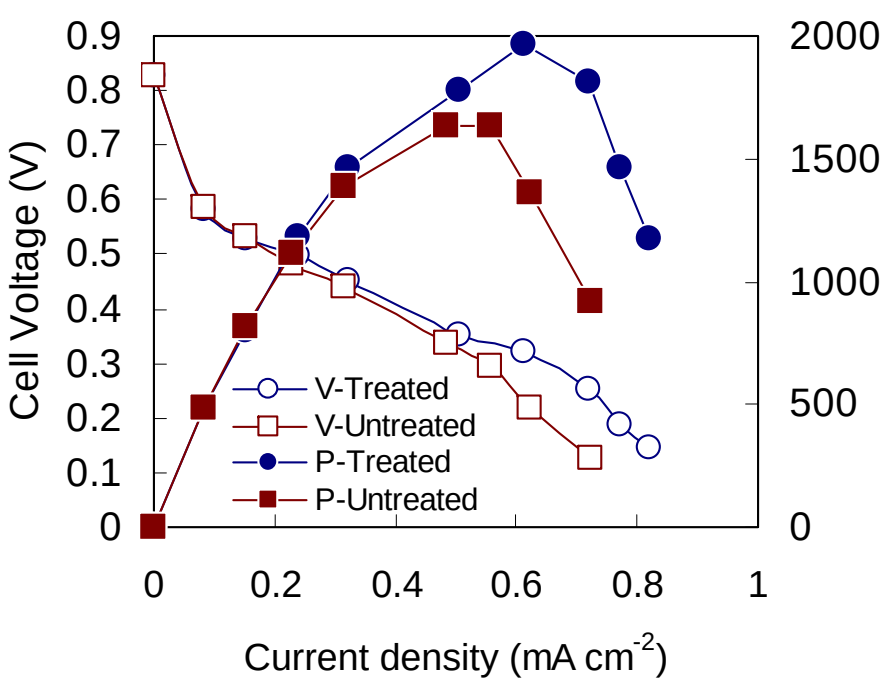
The ppt software chooses your graph size… but don't let it!

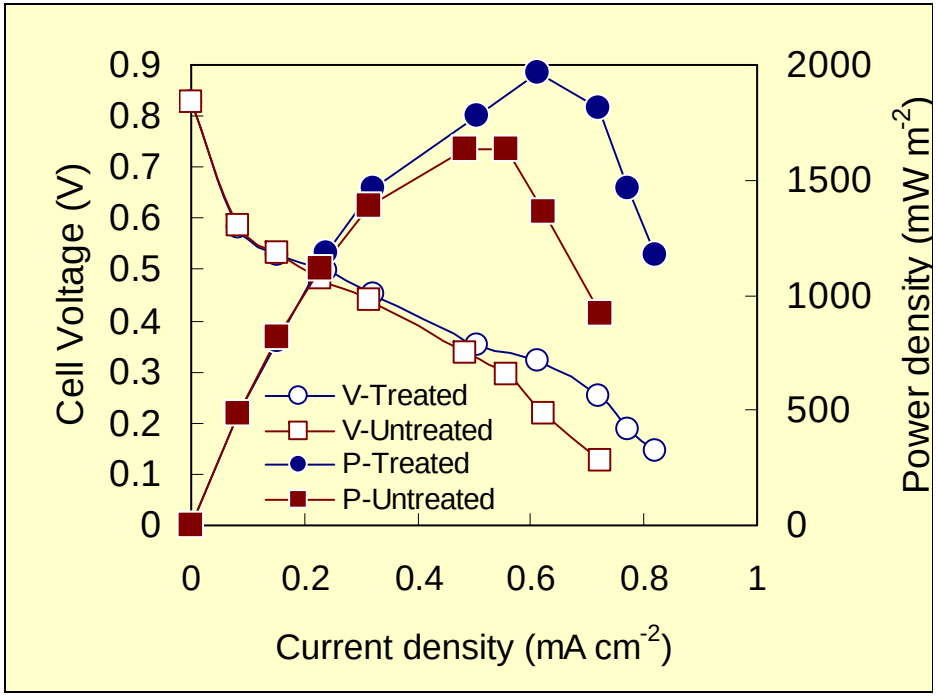




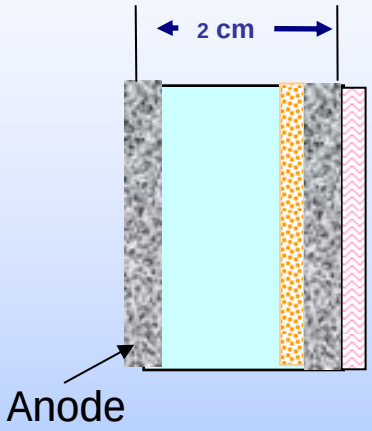
You can put two graphs side-by side, with the right font size.

A background color can be helpful to emphasize one graph over another

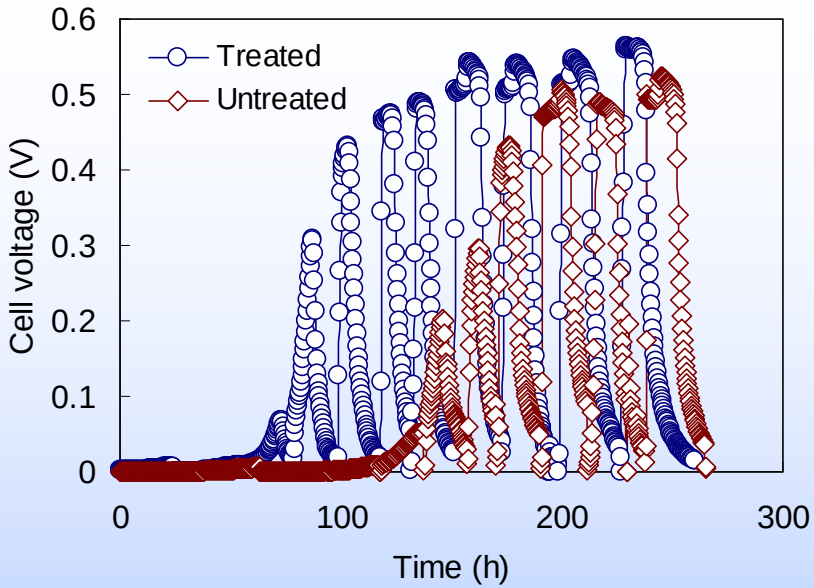


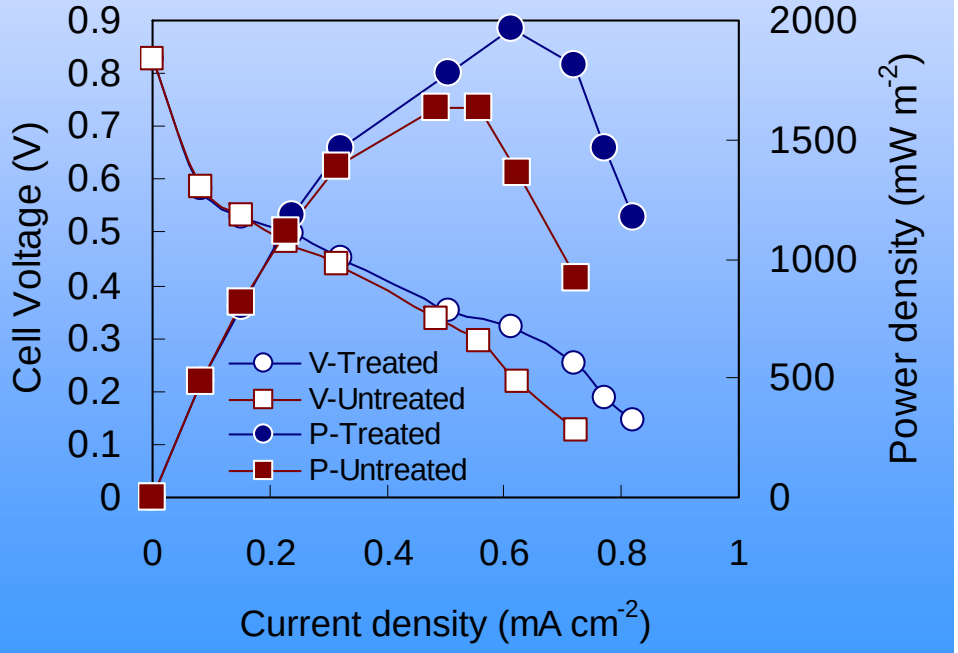


Ammonia treatment of the anode



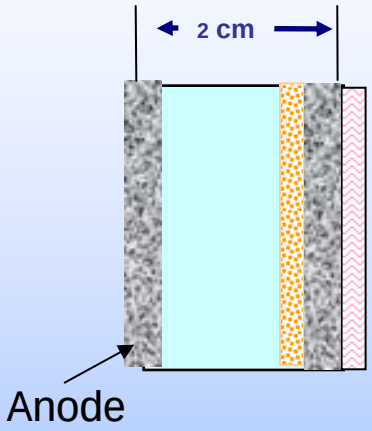
- Carbon cloth electrode
- Exposed to ammonia gas (5%) at 700°C for 60 minutes
- Surface charge increased from from 0.38 to 4.0 meq m^{-2}
- Maximum power of 1970 mW/m^2 (115 W/m^3)





Source: Cheng & Logan, *Elec*. Comm., (2006)

Ammonia treatment of the anode



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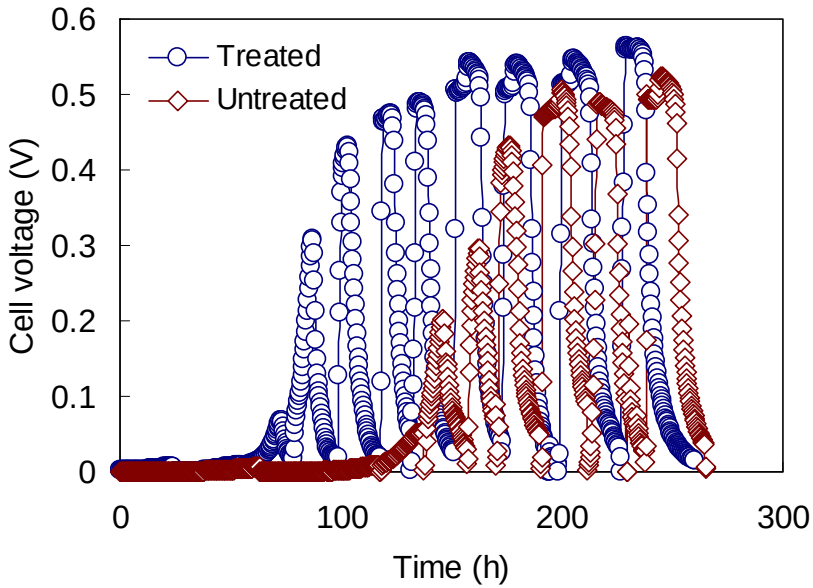
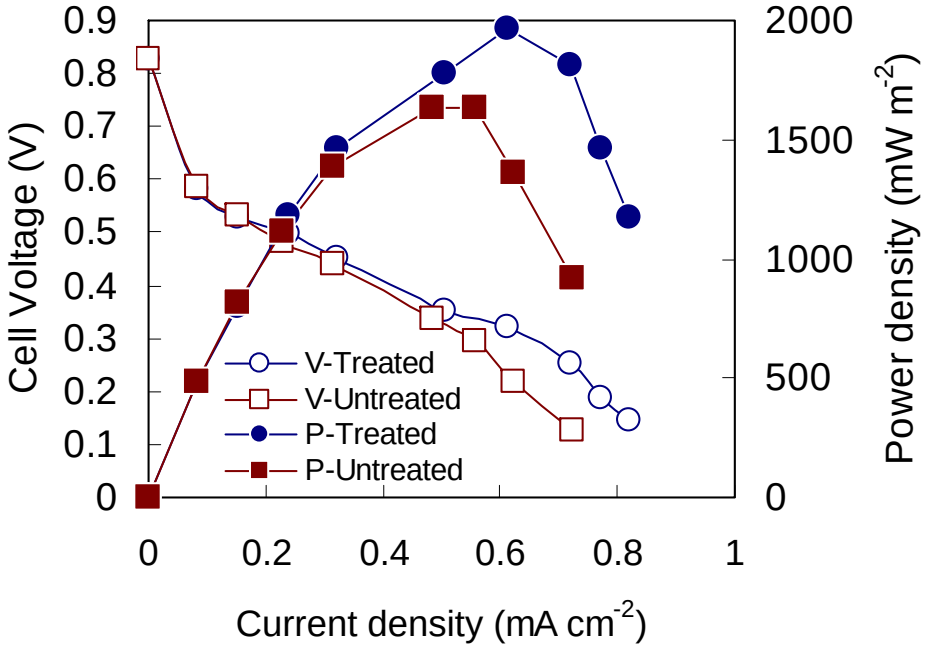
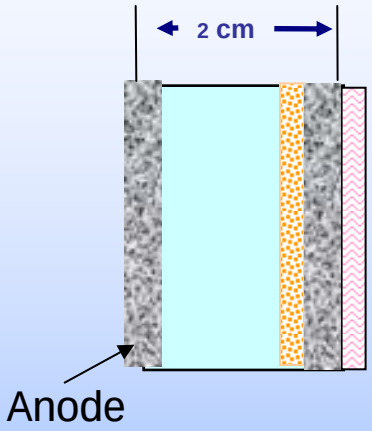




Source: Cheng & Logan, *Elec*. Comm., (2006)

You can use “appear” to emphasize specific graphs during your talk

Ammonia treatment of the anode



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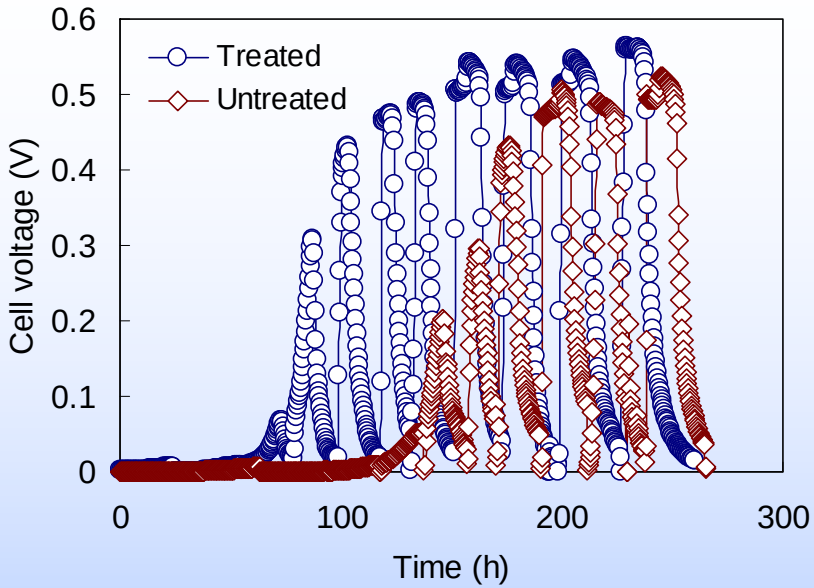
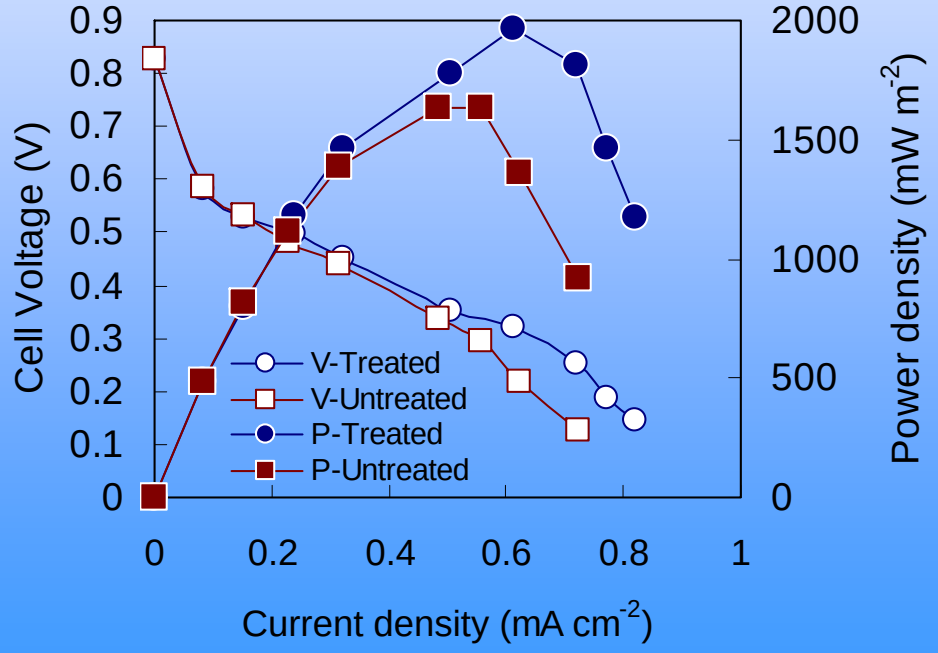


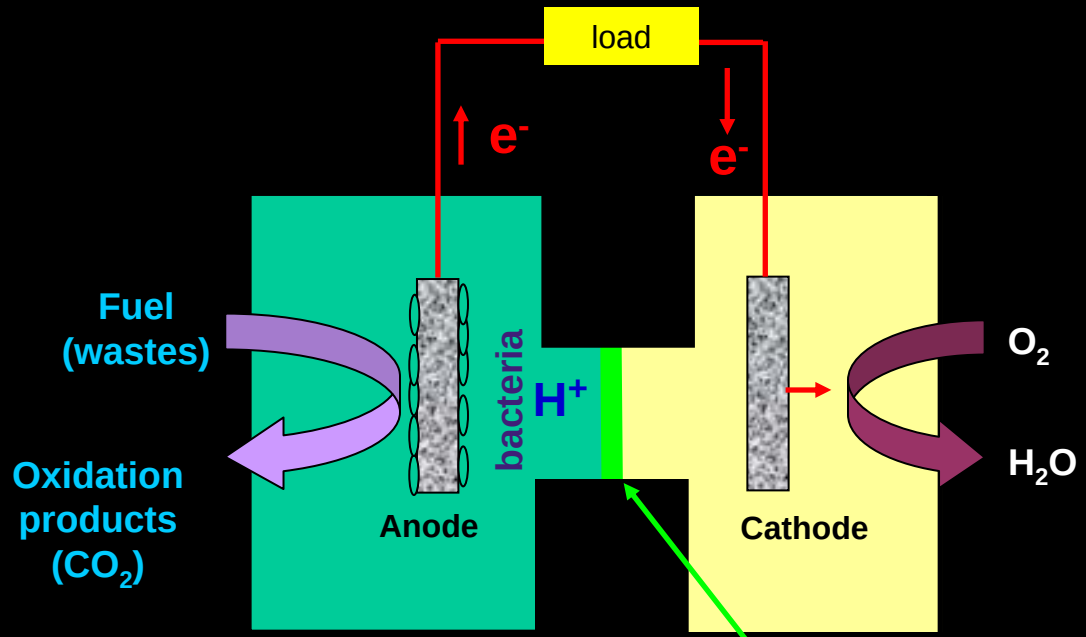


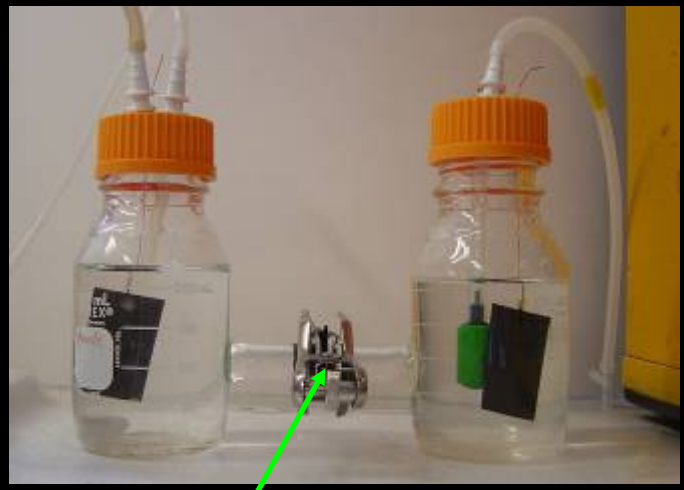
Source: Cheng & Logan, *Elec*. Comm., (2006)

Use motion paths and animation to help reinforce your point…

but don’t overdo it!

Microbial Fuel Cells: Aqueous cathode



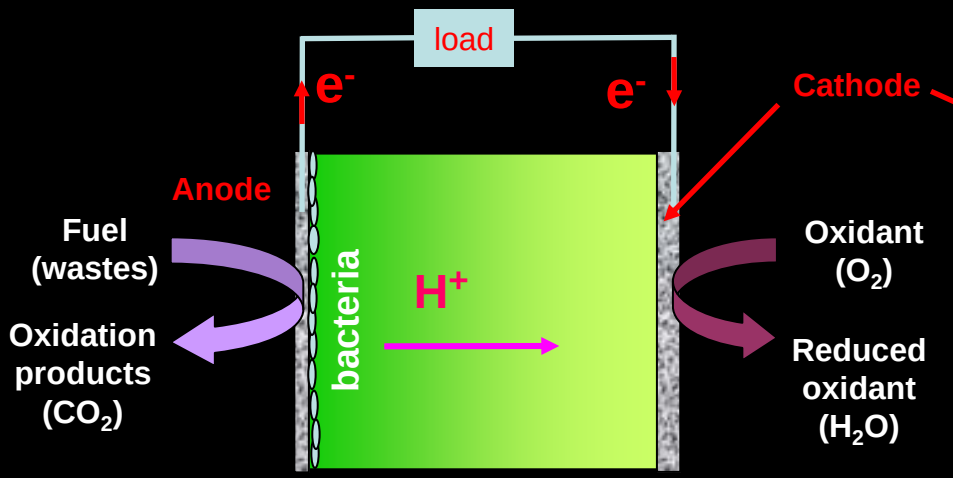


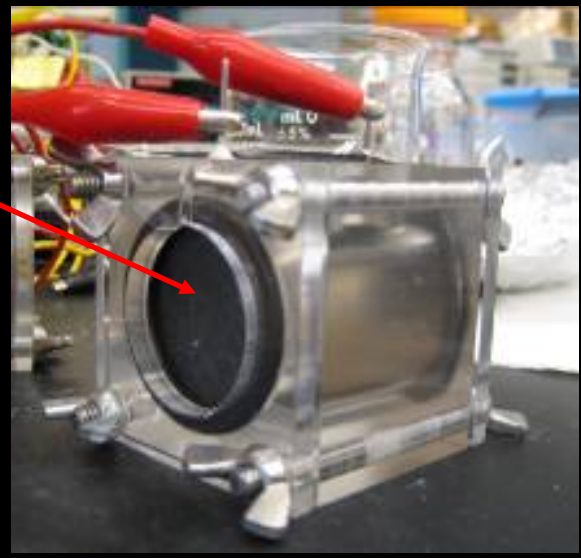
Power = 0.1 – 40 mW/m^2

Proton exchange membrane (PEM)

Source: Liu et al., *Environ. Sci. Technol.*, (2004)

Air Cathode MFC



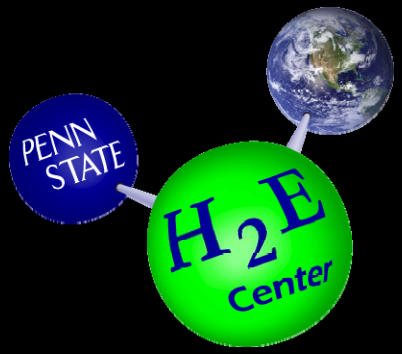


Power = 500 mW/m^2

H_2 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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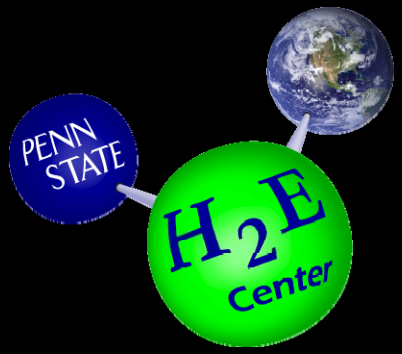
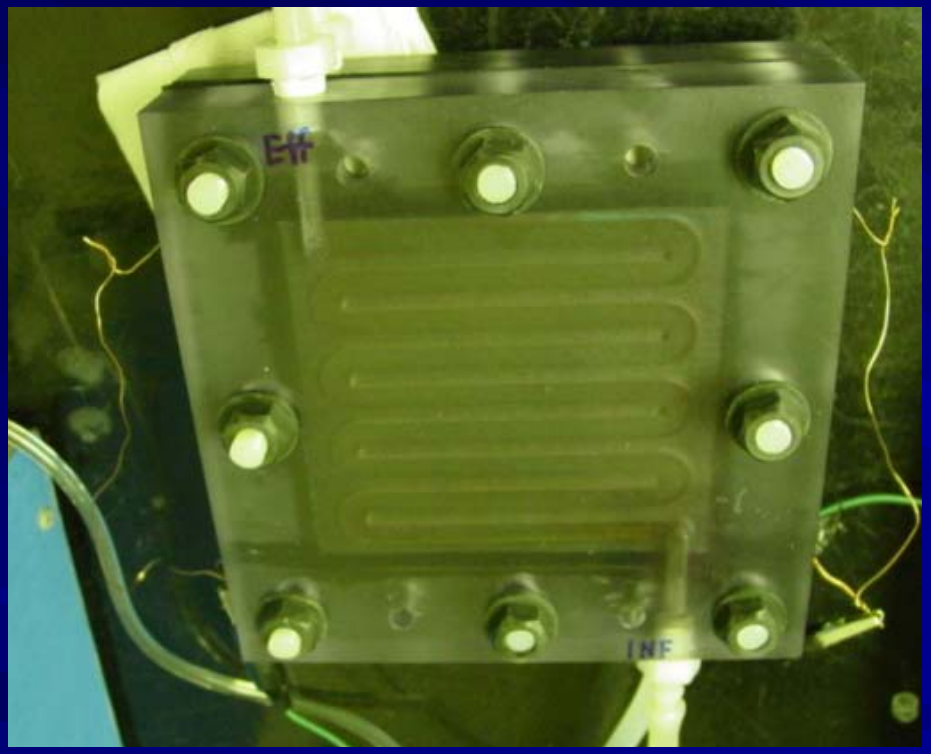
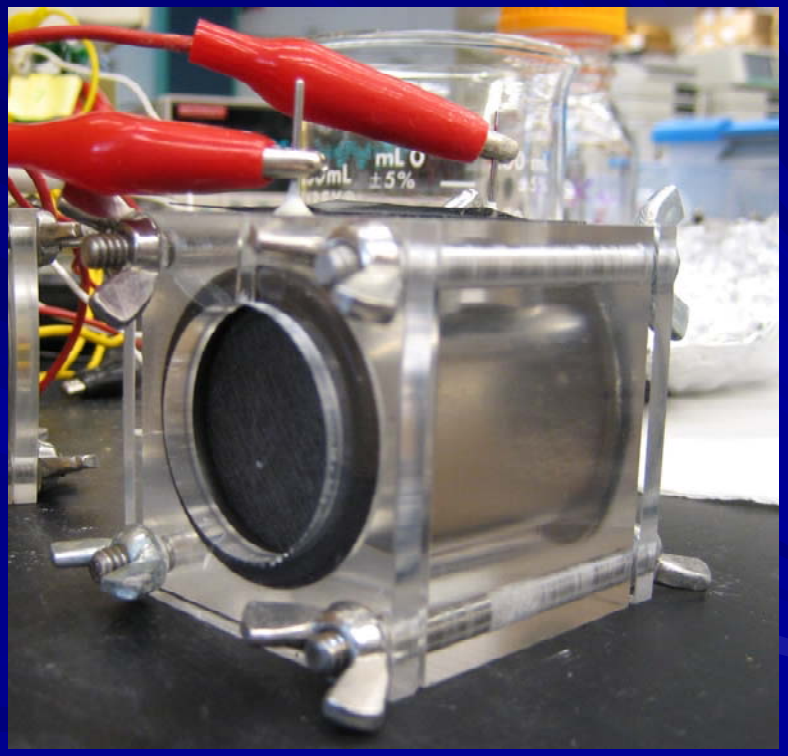
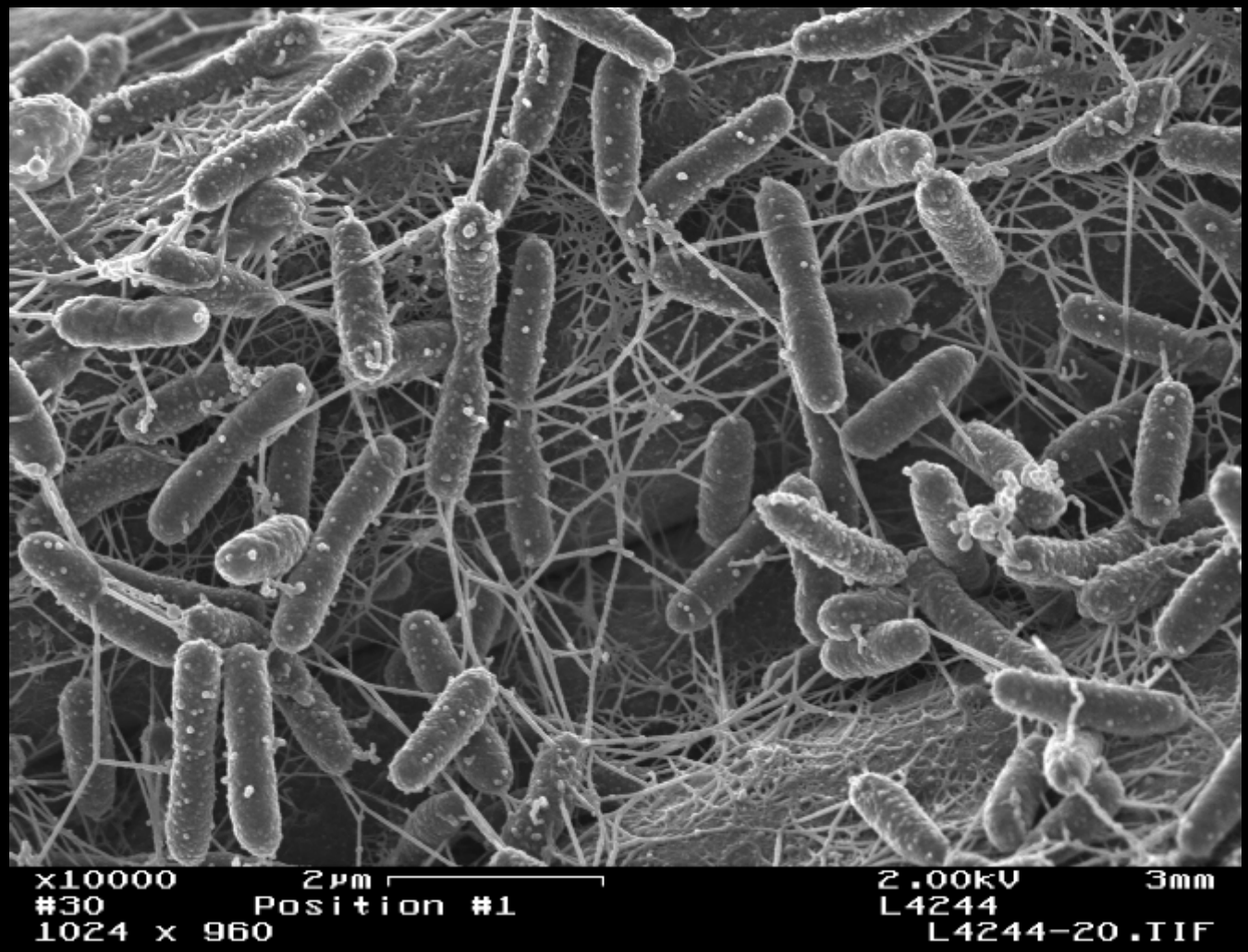


Take lots of pictures!



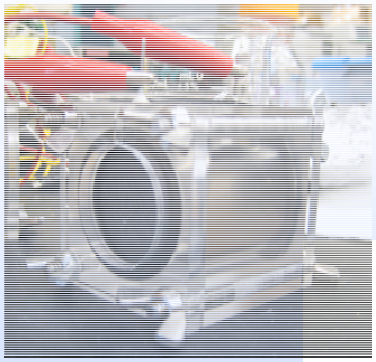


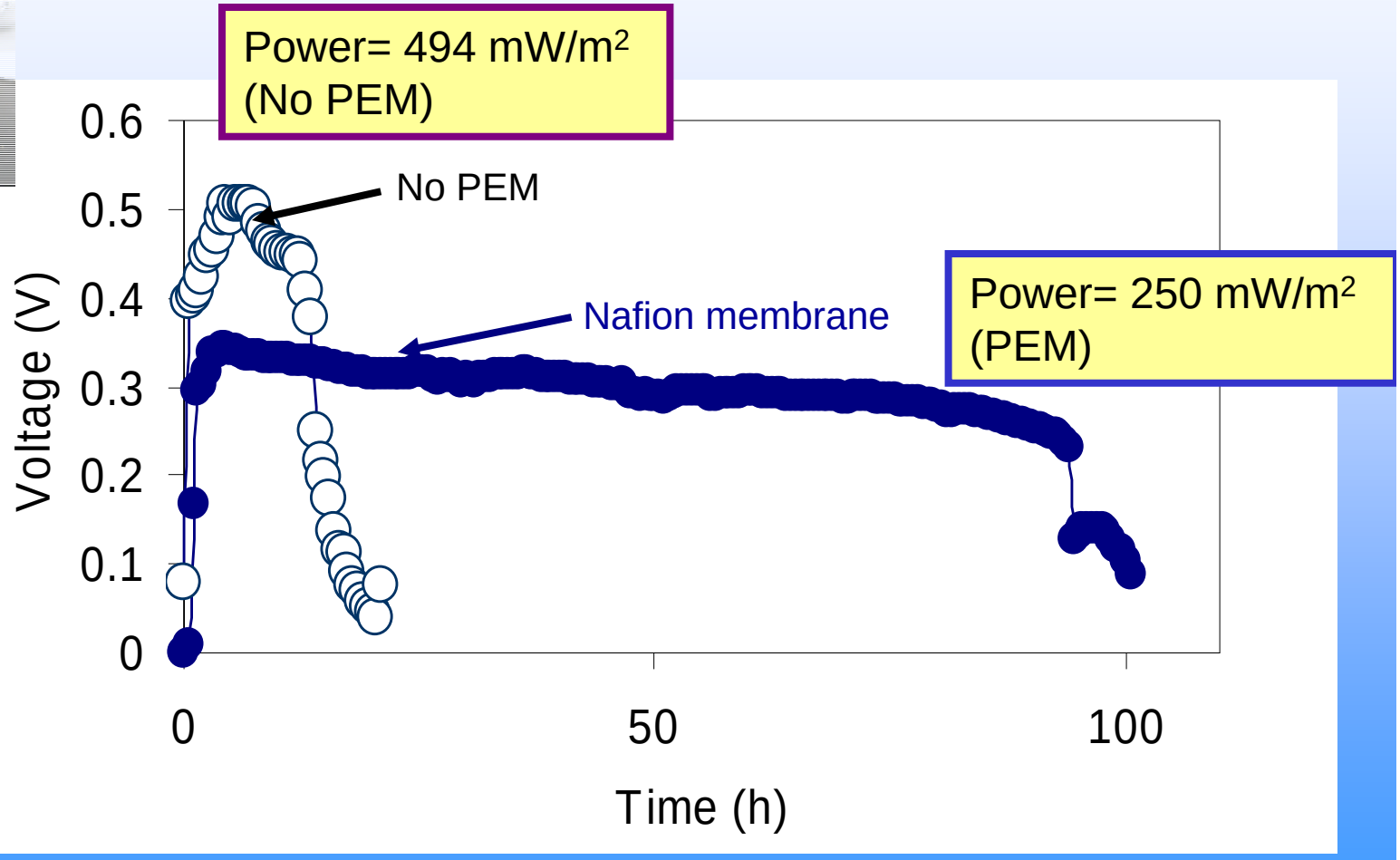
Nanowires on a MFC electrode



Yuri Goby (2005). Pres. DOE NABIR meeting, April 20, 8:10 am, Warrenton, VA.

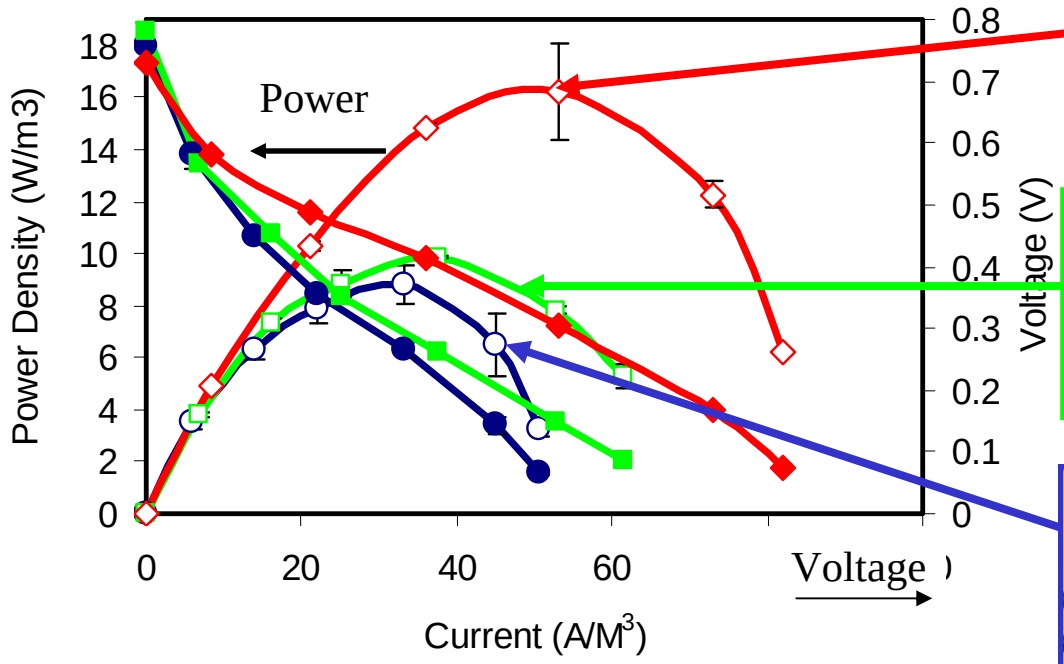
Include pictures with graphs if it helps!

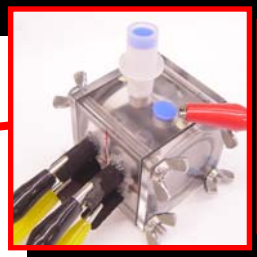




Source: Liu & Logan, *Environ. Sci. Technol.* (2004)

Match colors with graphs to help with complex figures





Hydrophobic tube cathode
(CoTMPP, 113 m^2/m^3)
16 W/m^3

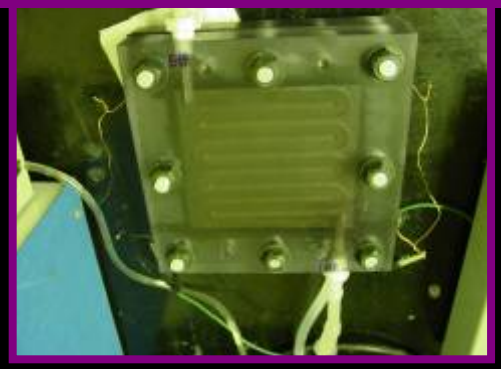
Carbon flat cathode
(Pt, 25 m^2/m^3)
10 W/m^3

Hydrophilic Tube Cathode
(CoTMPP, 84 m^2/m^3)
9 W/m^3

Source: Zuo, et al., *Environ. Sci. Technol.* (2007)

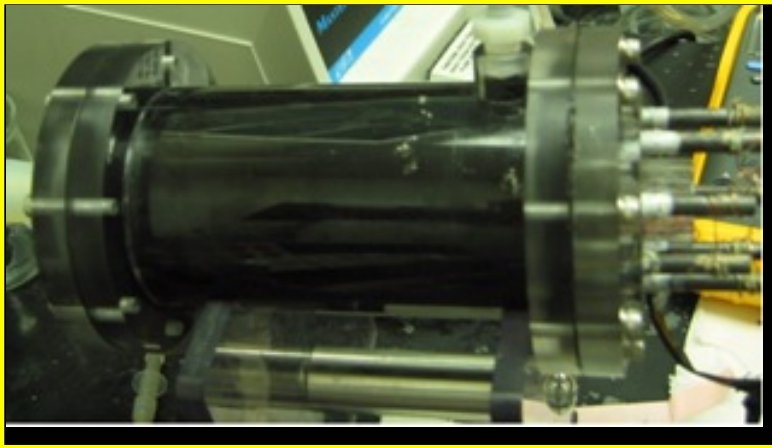
Match colors with graphs to help with complex figures

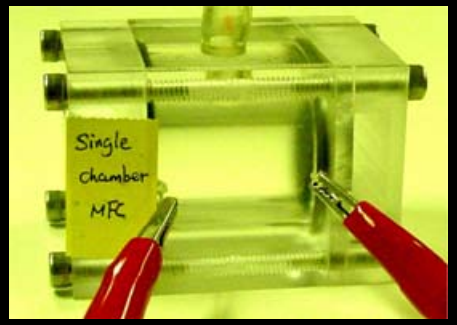
Flat Plate, continuous flow MFC



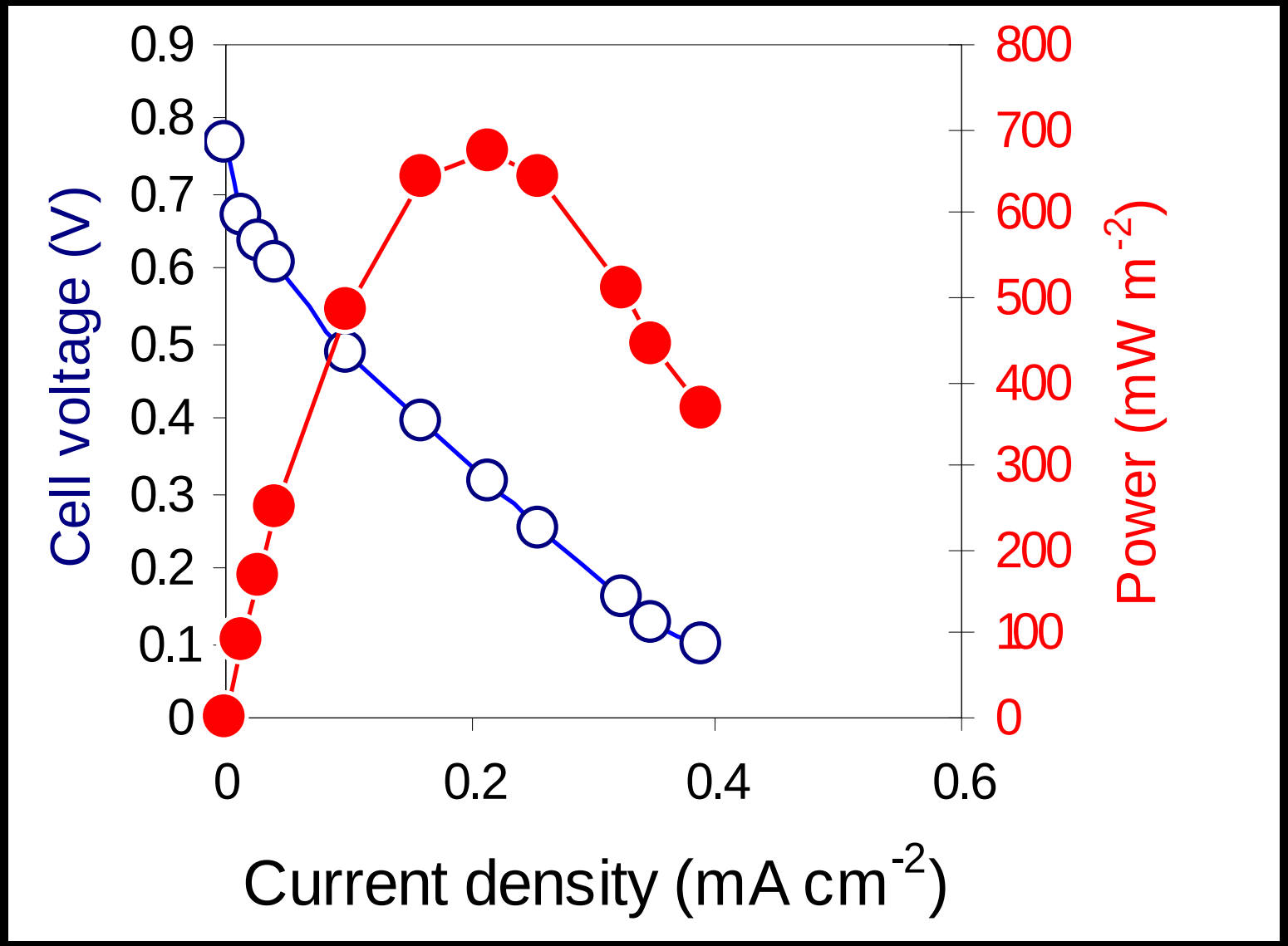
Substrate	Power (mW/m^2)
FP-MFC (close spacing)	76
SC-MFC (large spacing)	28

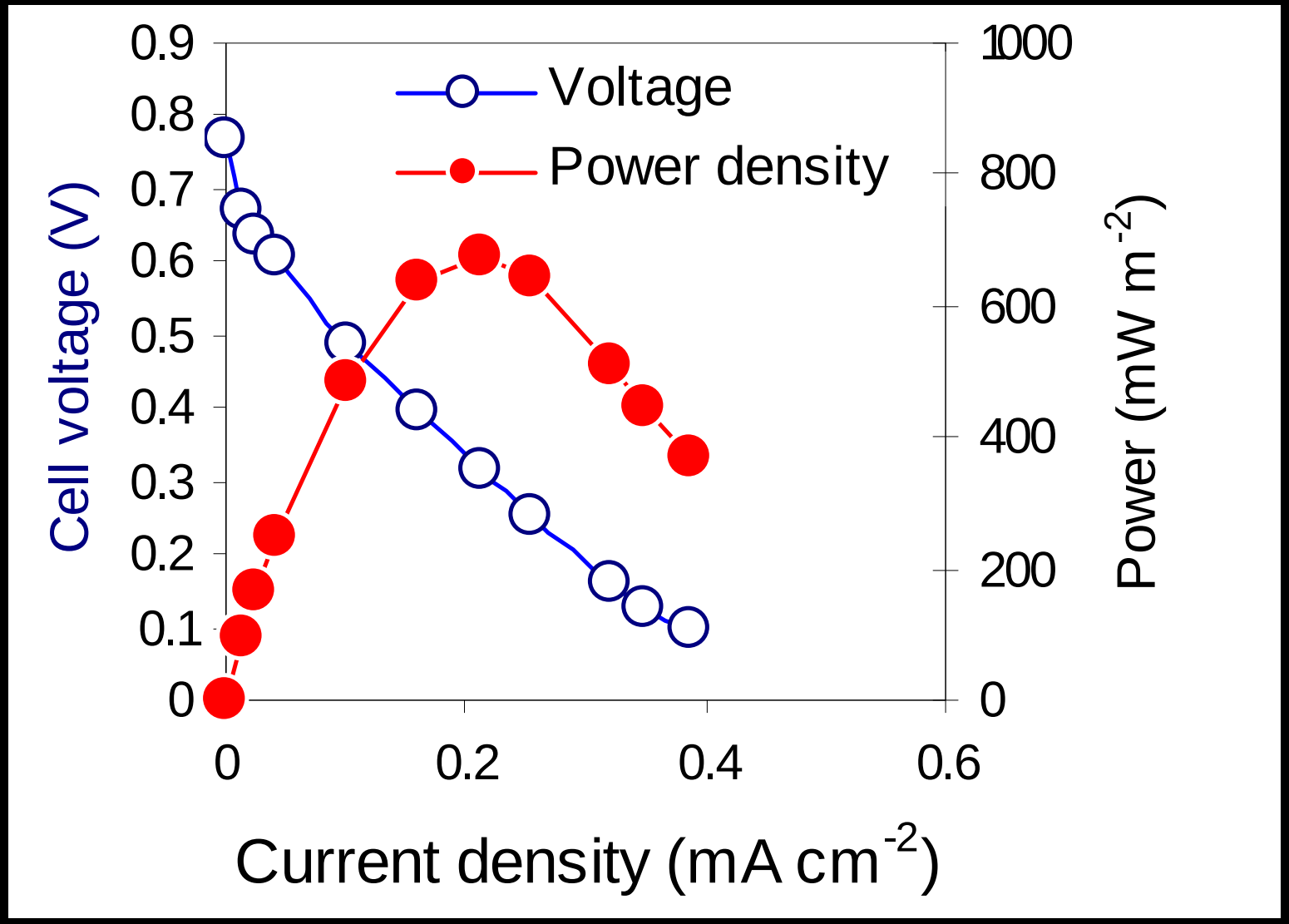
Single chamber, continuous flow MFCs (SC MFC)





Sources: FPMFC: Min & Logan, ES&T (2004); SCMFC Liu et al. ES&T (2004)


0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Cell voltage (V)
800
700
600
500
400
300
200
100
0
Power (mW m-2)
0
0.2
0.4
0.6
Current density (mA cm-2)


Voltage
Power density
Cell voltage (V)
Power (mW m-2)
Current density (mA cm-2)
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1000
800
600
400
200
0
0
0.2
0.4
0.6

Use a “screen capture” to obtain graphs or pictures from other documents

Screen capture from viewing a pdf file of a paper by Fan et al (2008)

MFC- J-cloth paper by Liu group. JPS.pdf - Adobe Acrobat Professional

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 cm^2 except MFCs with double CEAs (Fig. 1D), which was 14 cm^2.

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

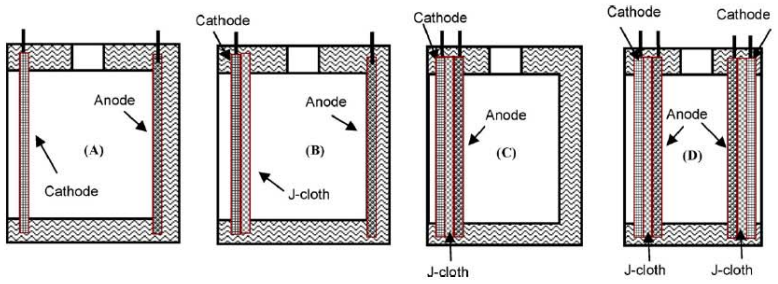
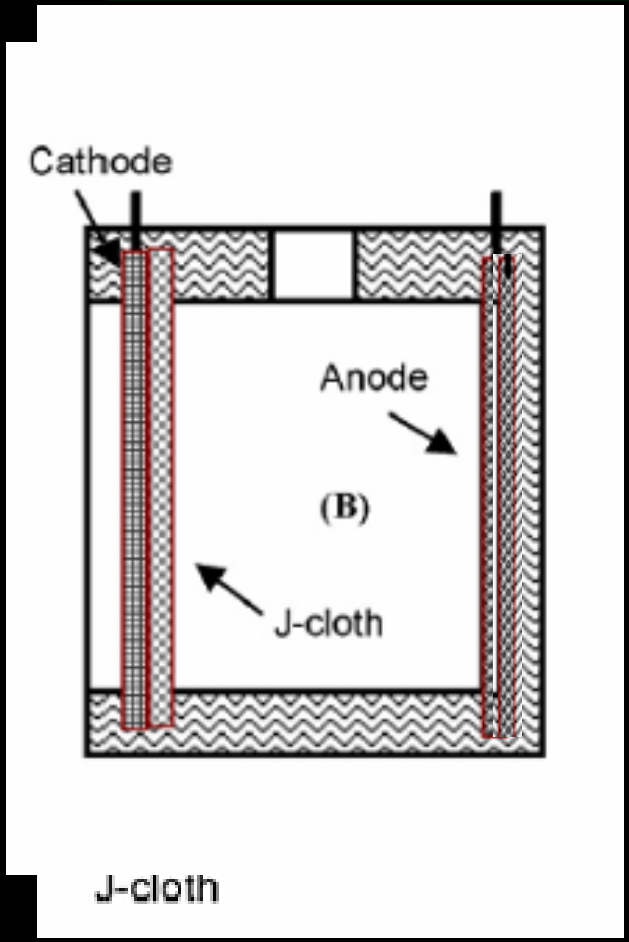


Fig. 1. Schematic of MFCs (A) without J-Cloth, (B) with J-Cloth, (C) with single CEA (cloth electrode assembly), and (D) with double CEAs.

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

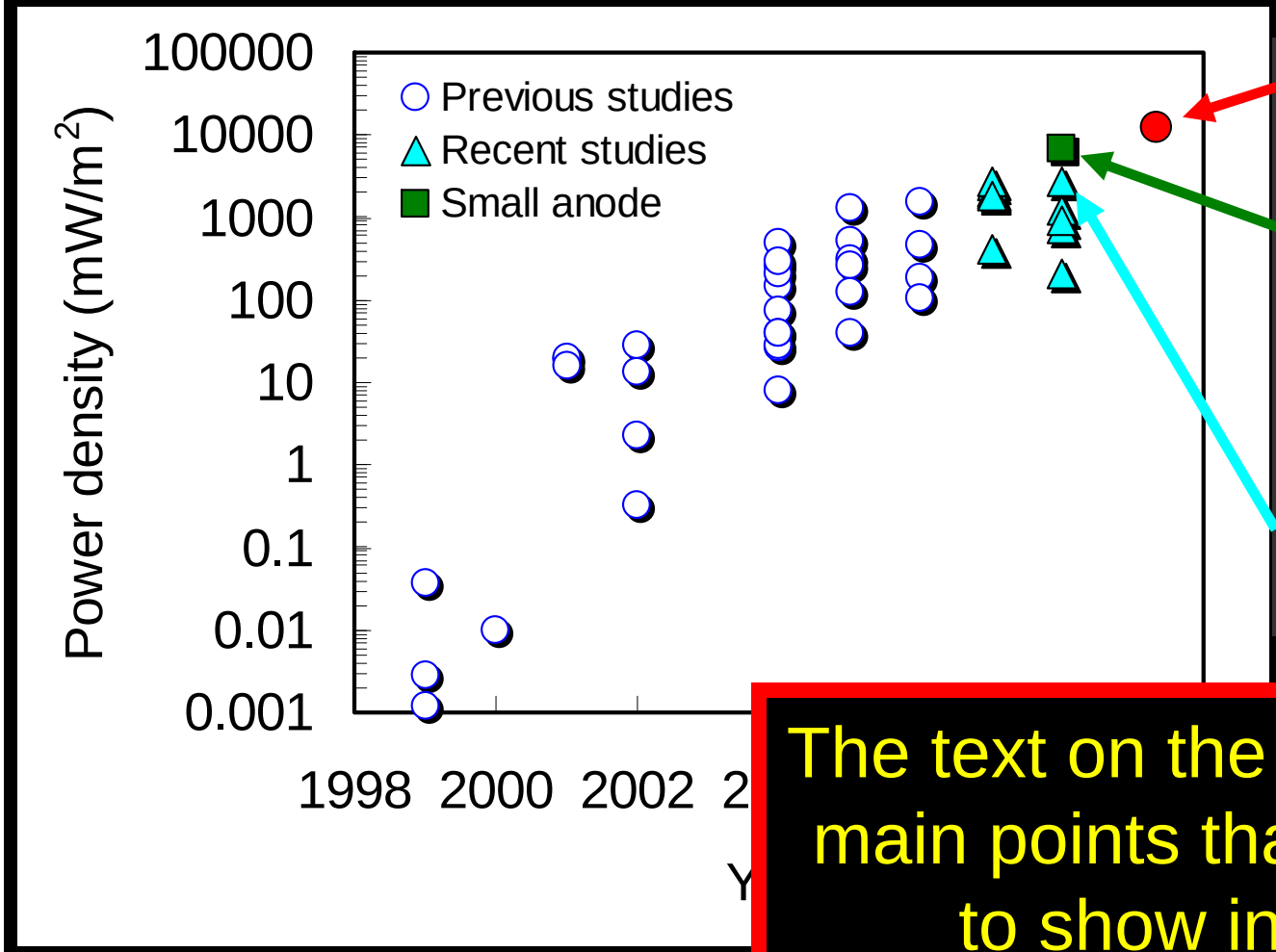
- Look at your audience
- Talk to the audience, not the projector screen behind you.
- Use the laptop screen as your "teleprompter" as it is in front of you.
- Consider using the mouse as a pointer instead of a laser pointer so you don't have to turn around

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/m^2

- 6860 mW/m^2 (Anode 1/14th the size of the cathode)
= 490 mW/m^2
based on cathode size

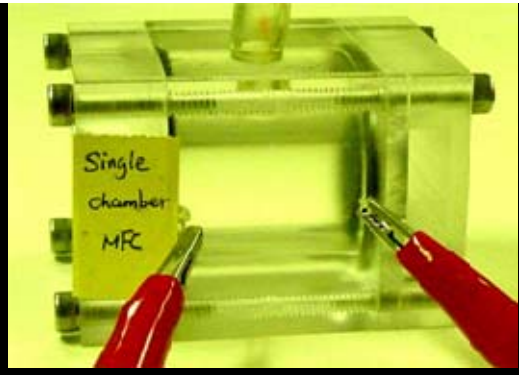
-2700 mW/m^2 (equally sized electrodes)

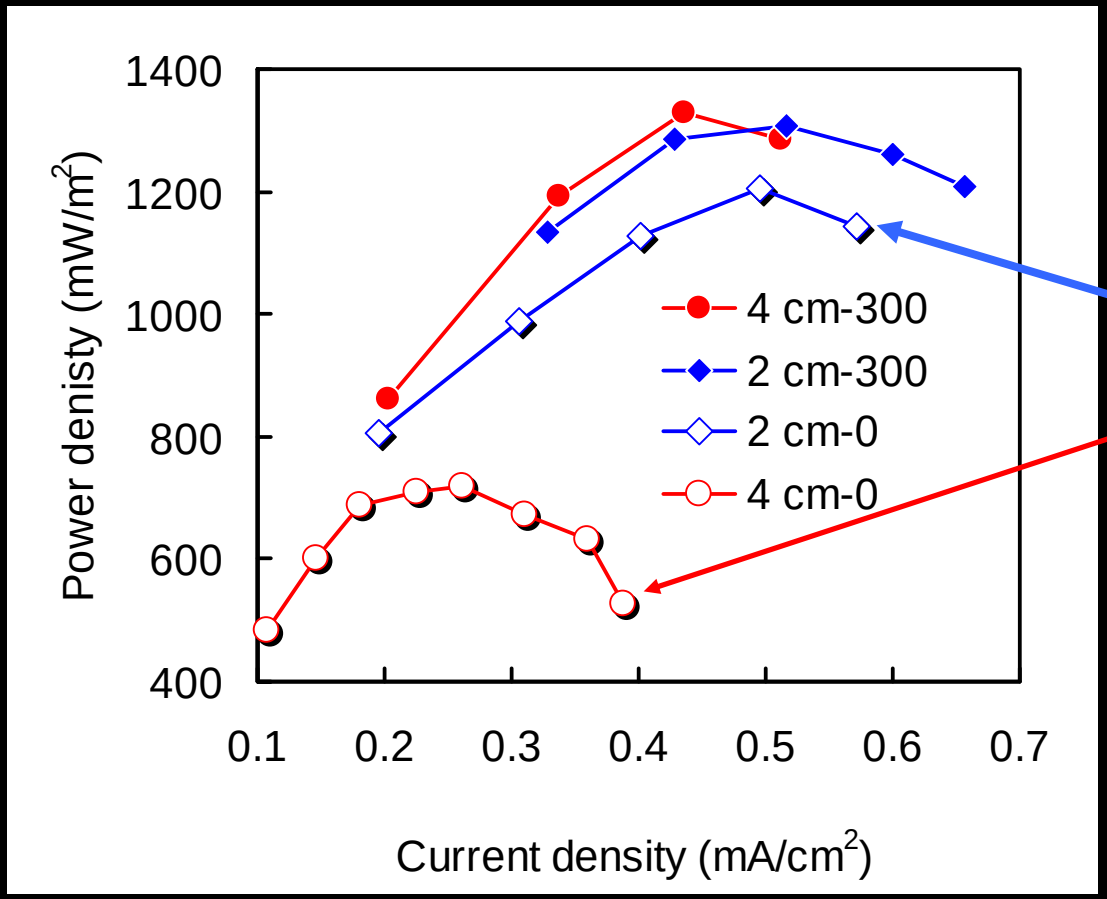
The text on the right makes the main points that we are trying to show in the graph

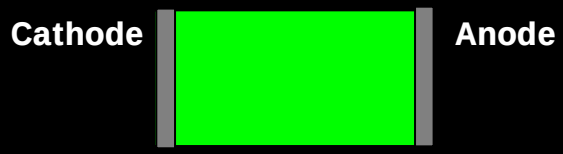
Logan (2008), in preparation

Predict: Reducing electrode spacing increases power

Power= 700 → 1210 mW/m^2 (4 cm→ 2 cm)







4 cm

2 cm

Prediction verified: power increased with decreased electrode spacing

Source: Liu et al., *Environ. Sci. Technol.* (2005)

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 slidess

Sometimes it is useful to vary spacing in a set of bulleted items

- Lets use the previous slide as an example…

When answering questions

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When answering questions

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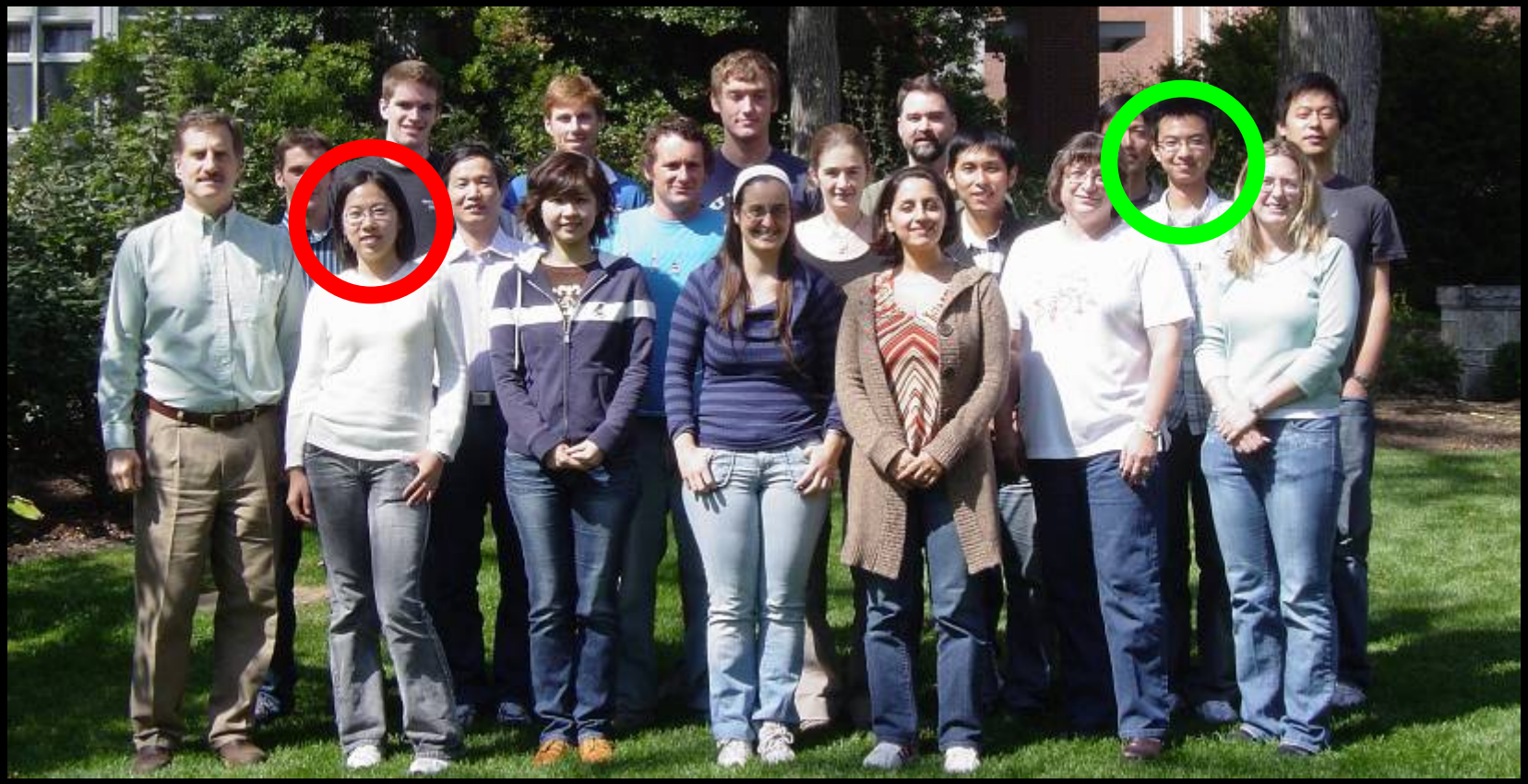
- Putting slide numbers on your slides helps people to ask about specific slides

There is an invisible bullet here that has a smaller font size, so the lines are not too close

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.

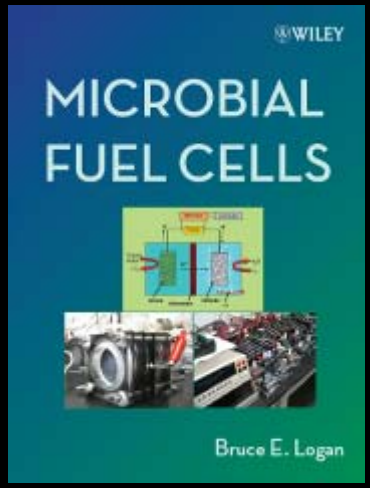
2nd row: (Bruce Logan), Shaoan Cheng, Patrick Keily, Rachel Wagner, Xin Wang, Xiaoyuan Zhang

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