Effective Technical Communication: Posters

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Poster Basics

1. **Bait ‘em**
   - A poster should draw the eye-- attract your prey from across the room.
   - Something visually stunning, and perhaps a bit unexpected/confounding.
     - Almost always a large image

2. **Hook ‘em**
   - Your prey has approached your poster, but they’re not yours yet!
   - What’s the juicy morsel that is exciting?
     - Your title / figure caption that convinces them you’ve done something neat, even if only at a simplified level.

3. **Reel ‘em in**
   - Now they’re reading your poster.

4. **Release ‘em**
   - Poster judges have other posters to see. Practice your 30 second and 2 minute pitch. Respond to questions.
   - Leave on a high point. Thank them for their interest.
Parts of a poster (e.g.)

- Header
- Hook
- Details (Reel 'em in)

- Header
- Hook (problem statement)
- Detail (approach, methodology)
- Bait
- Hook (outcome, conclusions)
- Detail (results)
• Title
  ▶ Pithy but descriptive
  ▶ Interesting

• Author List
  ▶ Which order? There’s a protocol to learn for your discipline! Could be:
    - Alphabetical
    - In (decreasing) order of contribution.
    - Advisor’s name last, or sometimes omitted. Ask!

• Affiliation Logos
  ▶ Get the right logos. Make sure they’re high quality: no jagged edges!
  ▶ Get the transparency right!
  ▶ Avoid NASCAR syndrome.
Bait ‘em

• Goal: lure them in

• Your budget:
  ▸ A quick glance from across a room. About a second.

• A big provocative picture
  ▸ “That looks neat! Even if I don’t understand what it is!”

• A series of pictures that tells a story
  ▸ Great for algorithms that can be described as a sequence of steps.
Hook ‘em

• Goal:
  ‣ Tease them with an interesting conclusion, idea, result

• Your budget: about two sentences.

• Tools
  ‣ Title plus a bullet or two
  ‣ Can use your abstract
  ‣ A more involved figure
Reel ‘em In

- **Goal:**
  - Sell them on it.

- **Your budget:** about 2-4 minutes.

- **Tools**
  - It’s the poster *and* you. (But poster should suffice if you’re grabbing a coffee.)
  - Greet them.
    - “Any Questions?” NO!
      Walk them through your idea and results. 30 second pitch.
  - Explain your data.
Abstract

• Almost always answers four questions:
  - What’s the problem?
  - What is this poster about?
  - Why is it interesting?
  - If it’s not interesting, then who cares?
  - Why is it hard?
  - If the problem is easy to solve, then who cares?
  - What did we do about it?
  - Should generally describe a claim that is evaluated by the work.

• A large block of text is impenetrable.
  - A bullet-form abstract is okay on a poster.
Bullets

• Bullets must exhibit parallel structure
  ▶ A complete sentence is formed by the bullet header and each bullet item.

• Examples:
  ▶ The goals of this project are:
    - Develop algorithms to detect colored balls
    - Understanding principles of computer vision
    - We implemented our own Union-Find algorithm
  
  ▶ The goals of this project are to:
    - Develop algorithms to detect colored balls
    - Understand principles of computer vision
    - Explore methods for accelerating the Union Find algorithm
Results/Evaluation

- The “meat” shot
  - A photo/cartoon/block diagram
  - Immediately and intuitively conveys that “the method works”

- The “squiggly line” plot
  - Generally used to compare proposed method versus an alternative method
  - Gives a feeling of rigor, and a scholarly understanding of related work.
Graphic Design Basics

• **White space:** the empty ("negative") space is just as important as the filled space. More white space emphasizes what remains. More white space is generally "classier" and "more elegant".

• **Shading and blocks:** Background blocks provide a sense of organization and lead the eye. But go too far and the blocks are distracting!

• **Eye flow:** Be able to predict how an eye will trace over the poster.
  - Is your intended flow a natural flow?
  - Z-shapes
Graphic Design

- **A cohesive design:** Avoid the “10 sheets of paper tacked to posterboard” look.

- **Use a light color:** Easier to get a better print quality.

- **Make reading easy:** Minimize text and maximize reading speed.
An experiment (1)
An experiment (I)

John Adams (October 30, 1735 (O.S. October 19, 1735) – July 4, 1826) was an American Founding Father, lawyer, statesman, diplomat and political theorist. A leading champion of independence in 1776, he was the second President of the United States (1797–1801). Hailing from New England, Adams, a prominent lawyer and public figure in Boston, was highly educated and represented Enlightenment values promoting republicanism. A Federalist, he was highly influential and one of the key Founding Fathers of the United States. He came to prominence in the early stages of the American Revolution.
An experiment (2)
An experiment (2)

James Madison, Jr. (March 16, 1751 (O.S. March 5) – June 28, 1836) was an American statesman and political theorist. He is hailed as the “Father of the Constitution” for being instrumental in the drafting of the United States Constitution and as the key champion and author of the United States Bill of Rights. He was the fourth President of the United States (1809–1817). He served as a politician much of his adult life. Like other Virginia statesmen, he was of the landed gentry; he inherited his plantation known as Montpelier, and owned hundreds of slaves during his lifetime to cultivate tobacco and other crops.
Near Misses

AUTONOMOUS ROBOT RECHARGING

James Naughton
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Abstract
One major problem in autonomous robotics is battery life. The battery limits the amount of time the robot can be actually autonomous, once the battery is low humans need to interact to recharge the robot. My research explores and implements creative ways to make the recharging process human-free. My task is to design, build, and test a recharging station that the robot can dock with and be charged from. I must also program the robot to recognize it is low on battery, go to, and dock with the station. Through an exhaustive brainstorming process, I have found that a reliable design resulting in a pressure contact of the charging terminals on the robot and the station is the best. I have also found that the use of a protruding pipe from the station can help the robot identify the station. I designed the parts to be created by a CNC router so that they may be easily duplicated for manufacturing. This research will lead to a more efficient lab by making recharging the robots one less task to worry about. This will also allow for the constant movement of robots, a goal of the head of the lab.

Objectives
- Design, build, and test a robot recharging station
- Program the robot to identify the station without the aid of humans
- Program the robot to drive to and align with the station
- Create a docking system that produces a quality connection between battery terminals and charging source
- Keep the design efficient and cost effective
- To always have robotic movement in the lab through autonomous recharging
- To develop a system for manufacturing recharging stations and connectors efficiently and easily
- To create a connection system that can easily be mounted onto the current robot without major adjustments
- To ensure there is no possible way a cross terminal connection can be made to protect the battery and those around the robot

Methods
First use AutoCAD to create design ideas and to model how the robot will interact with the recharging station. Then construct a prototype of the recharging station. Gather interaction data between the robot and the station and use this data to update the prototype. Then gather data on the recharging station. Use this data to design a program that models the robot driving to the station and identifying the station. After completing the program to identify the station, use this program to write a program making the robot drive to the station. Once the robot is fully charged send a signal to the robot telling it to undock from the station. Once the robot undocks make sure the robot goes back to the task it was performing before the charging sequence.

Results
Through multiple designs and trials a final prototype has been developed. This design consists of a ten-inch wide by 38 inch long docking station, as seen in Figure 2. The connectors are mounted on a two and a half inch raised platform that is five inches wide. This platform sits a quarter inch below a lip to allow the robot contacts to settle down into the proper location. At the opposite end of the station is the identifying tower. This tower protrudes up out of the station and is visible by the laser range finder on the robot.

The entire time the robot is running an application will be executing on the robot. This application will continuously be searching for recharging stations. Once the battery is in need of recharging a signal will be sent to the robot, telling it to find the docking station. With this signal flagged the robot will now use the data from the searching application to recognize the station. Once the station is recognized the robot will run code that drives the robot to the station. The robot will use the normal vector from the wall behind the station to align itself properly, see Figure 4. Once aligned the robot will proceed to drive forward and dock with the station. Once the charging is complete the robot will be flagged and it will undock with the station and continue the task it was executing prior to the charging sequence.

Conclusion
It is safe to conclude that this charging process will increase efficiency in the laboratory area because a robot will always be charged and ready to go whenever it is needed for research or other projects. The pressure connection design is also one that has been proven to decrease tests performed using the robot and prototype recharging station.

The next step in the process will be to thoroughly test the alignment algorithm using a multitude of real time tests. Using data gathered by these tests will allow for restructuring of the algorithm to ensure correctness. After the alignment code is correct the next challenge will be to design an efficient way to produce multiple stations and connectors to be used on multiple robots.

Consideration must also be given to how to prevent a cross terminal connection. Possible ideas include separating the robot in the correct connection plate. Another possible idea is using a large diode so current can only flow into the battery and not out of it.
Near Misses

James Naughton
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Abstract
One major problem in autonomous robotics is battery life. The battery limits the amount of time the robot can be actually autonomous once the battery is low, humans need to interact to recharge the robot. My research explores and implements creative ways to make the recharging process human-free. My task is to design, build, and test a recharging station the robot can dock with and be charged from. I must also program the robot to recognize it is low on battery to go to and dock with the station. Through an iterative design and manufacturing process, I have found that a cable design results in a pressure contact of the charging terminals on the robot and the robot is low. I have also found that the use of a protruding pipe from the station can help the robot identify the station. I designed the parts to be created by a CNC router so that they may be easily duplicated for manufacturing. This work will lead to a  more efficient lab by making recharging the robots one less task to worry about.

This will also allow for the constant movement of robots, a goal of the head of the lab.

Methods

To go wherever it is needed for research or other projects. The pressure connection design is also one that has been proven in several tests performed using the robot and prototype recharging station.

The next step in the process will be to thoroughly test the alignment algorithm using a multitude of real time tests. Using data gathered by these tests will allow for restructuring of the algorithm to ensure correctness. After the alignment code is correct the next challenge will be to design an efficient way to produce multiple stations and connectors to be used on multiple robots.

Conclusion

It is safe to conclude that this charging process will improve efficiency.
Fonts

- Use a tasteful, simple font.
  - Your poster’s font shouldn’t be making a statement.

- Maximize readability
  - Serifs, Mixed Case are good

- Avoid “controversial” fonts: Arial, Comic Sans.

- Minimize font variation
  - Count how many combinations of different styles / sizes you use... aim for three or less.

- Nobody gets fired for using Helvetica.
Equation Type Setting

- Those who know recognize LaTeX-typeset math
  - An easy way to look more sophisticated
  - Note: equations on posters should be used sparingly.

\[
G(f) = \int_{-\infty}^{\infty} g(t) \exp(-j2\pi ft) \, dt
\]
\[
G(f) = \frac{e^{j\pi f} + e^{-j\pi f}}{j2\pi f}
\]
\[
G(f) = \frac{\sin(\pi f)}{\pi f}
\]

Microsoft Equation Editor

LaTeX
Production

• Double check the size and aspect ratio requirements.

• Paper
  ▶ Avoid glossy stock. Glare can be horrific; poster is ruined by a single kink/wrinkle.
  ▶ Use heavy-weight acid-free paper.

• Full-bleed
  ▶ Before using a full-bleed design, make sure you can print it!
  ▶ Or add a margin and TRIM it.
Critique (1/3)
Critique (2/3)
Critique (3/3)
Creation Tools

• Presentation tools work pretty well
  ▸ PowerPoint/Keynote
    - Especially with “snap-to” enabled
    - Use temporary design guides or rectangles to get alignment right.

• Page layout tools can work even better

• Iterate, iterate, iterate.