



Poster Presentations

June 2017

Adapted from a presentation by
Michael Sjoerdsma

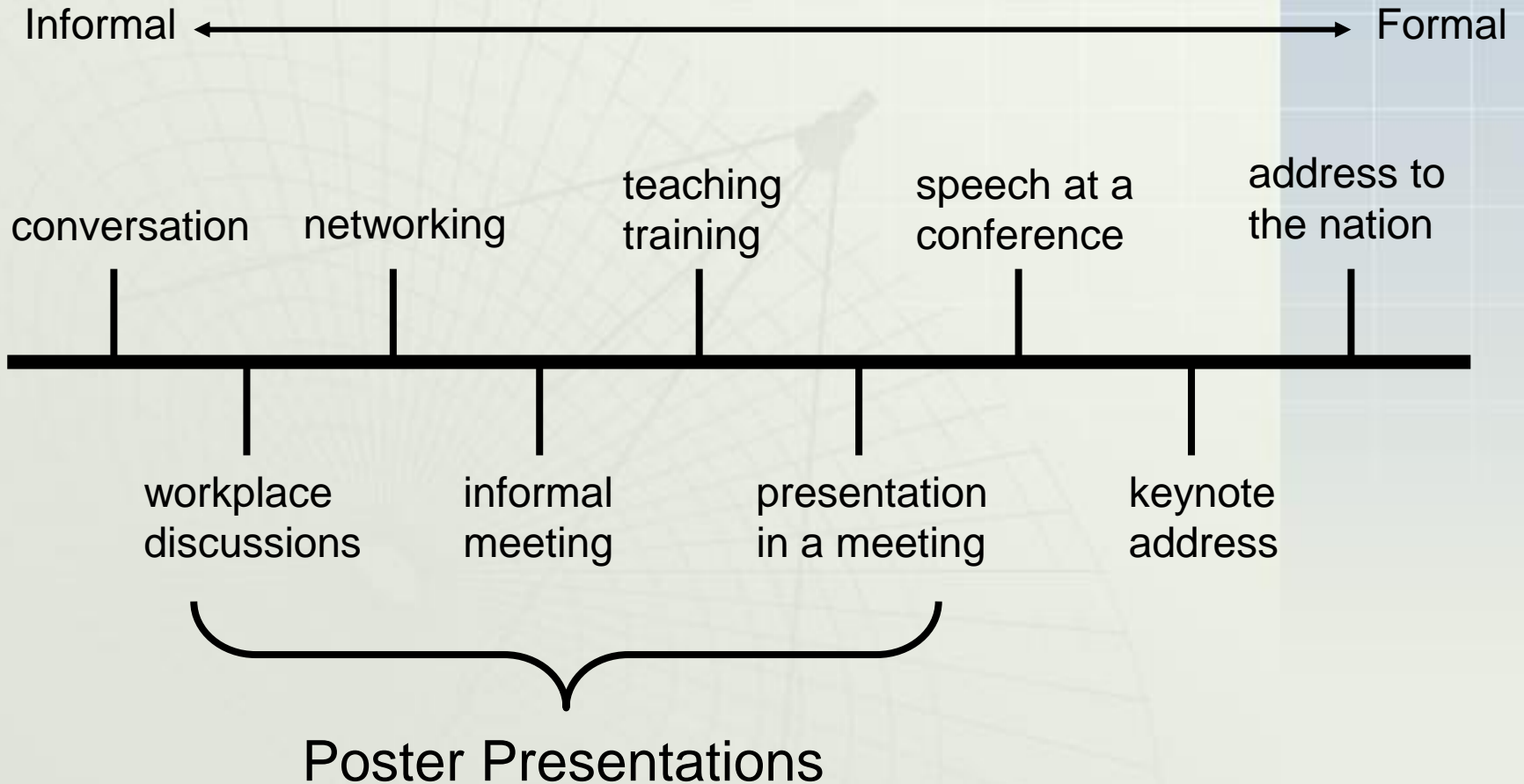


Poster Presentation Outline

- Different Types of Oral Presentations
- Poster Considerations:
 - Organization
 - Layout
 - Colour
 - Pixelation and Alignment
- Presence:
 - Body Language
 - Questions
 - Learning Styles
- Making a Poster
- ENSC 803 Virtual Posters
- Method for Blind Review



Oral Presentations





Posters

- Becoming more prestigious
- Most conferences have a poster session
- Excellent way to network
- Good if you dislike talking to crowds
- Some have cash awards :-)
- Have seen many bad ones (poor organization and layout are the biggest problems)



Typical Sections

- Title & ID: Name, E-mail, Affiliation, Conf., Where, Date
- Objective/Purpose/Problem Statement
- Background Information
- Research/Results
- Proposed Solution/Future Work
- Conclusion
- Abbreviated References



The Layout

More Intuitive Layout

Less Intuitive Layout

Improving Automobile Ride Quality: Actuator and Controller Design for Active Noise Control

Nakul Verma, Matthew Ward, Ash Parameswaran, and Mike Sjoerdsma

Objective

- Improve ride quality for occupants
- Implement active noise and vibration control

Disturbances

- Road roughness
- Engine vibration

Sound and Vibration

- Sound and vibration are pressure waves in matter
- Constructive Interference
- Destructive Interference

Research Direction

- Active noise and vibration cancellation
- Generate anti-phase signal for actuators
- Controller design and actuator research

Controller

- Controller facilitates sensor and actuator testing
- Sound algorithm development applied to vibration
- Filtered-X LMS adaptive strategy (in development)

Actuators

- Linear actuators added to vehicle suspension
- Active engine mounts
- Use off-the-shelf components where possible
- Build actuators if required

Electromagnetic actuators being considered

Active Door Panels

- Damp out car door vibrations

- Hard base material with embedded actuators
- Investigations into magnetostriction (Terfenol-D)

Olympia™ Soundings turn rigid surfaces into speakers

Lexan

Posterboard

Cardboard

Future Work

- Vibration setup with shaker table
- Transition controller algorithm to vibration setup
- Working door panel with matching power amplifiers

Class D Audio Amplification: The Power Electronics Solution

Nakul Verma, Ash M. Parameswaran

Traditional Audio Amplification

- Linear amplification: Output = Gain x (Input)
- Multi-stage linear analog system
- Amplifier energy dissipation controlled by input
- Transistor or vacuum tube based

Disadvantages:

- Efficiency vs. fidelity trade-off
- High component count
- High operating temperature
- Large and heavy

Class D Audio Amplification

- Analog/digital audio to PWM conversion
- PWM drives H-bridge power stage

Advantages:

- Highly efficient
- Small size
- Minimal operating temperature
- Relatively low component count
- Digital audio device seamless integration

Manufacturers:

- Philips Semiconductor
- Bang & Olufsen
- Texas Instruments

Power Electronics

- Power conversion: AC-DC, DC-DC, AC-AC
- Electromagnetic actuator control:
 - AC/DC motors
 - Solenoids
- Actuator minimum threshold voltage
- Pulse Width Modulation (PWM): time encoded pulses
- PWM pulses drive "H-bridge" amplifier
- H-bridge amplifier:
 - Dual opposing switch pairs
 - Bi-directional current routing
 - Switches fully on or fully off

Current Class D Audio Applications

- PWM essentially digital
- Audio to PWM conversion via signal processing
- Eliminates A/D converter chips:
 - Reduces audio signal distortion
 - Lowers cost
 - Lowers system power consumption
- Low power devices last longer
- High power systems run cooler
- Audiophile digital audio amplifiers
- Personal/portable electronics:
 - Personal Digital Assistant (PDA)
 - Cell phones
 - MP3 players
 - Hearing aids
- Car subwoofer amplifiers

Poster Presentations


6 of 36



Colour



Auto 21 Reducing Structure Borne Noise: The Development of a Semi-active Bushing
 Michael Sjoerdsma, Nakul Verma, and Arsh Passarwan
 Project F03-FIN, Simon Fraser University

<p>PURPOSE</p> <p>Car manufacturers are reducing the mass of automobiles in order to increase the fuel economy of their vehicles. Although this reduction of mass has positive benefits, it also makes newer vehicles more susceptible to structure borne noise. The focus of our research is to create a semi-active bushing to minimize this noise.</p>  <p>2004 Jaguar XJ All-wheel Drive</p>	<p>TEST SETUP</p> <p>Data Acquisition</p> <ul style="list-style-type: none"> • The vehicle drive (J2020) accelerometer • An Auto 21 (F03-FIN) accelerometer <p>Test Procedure</p> <ol style="list-style-type: none"> 1. Drive on a test track at 100 km/h 2. Drive on a test track at 120 km/h 3. Compare the noise levels during 1 & 2 
<p>MODIFIED BUSHING</p>  <p>It is called a Semi-Active (SA) Bushing (SA-Bushing). It is a modified bushing that is made from SA-Bushing.</p> 	<p>ELECTROMAGNETS</p> <p>The electromagnetic system is a power source that is used to generate the magnetic field that is used to create the magnetic field.</p> <p>Design Challenge</p> <p>Designing an appropriate system that is able to generate the magnetic field that is used to create the magnetic field.</p>   <p>Required Technology: Electromagnet in Energy Control System</p>
<p>MR FLUIDS</p> <p>Magneto-rheological (MR) fluids are composed of oil, iron particles (0.1µm to 10µm), approximately 20-30% by volume, suspended in a base oil (SAE 10W-30).</p>  <p>MR fluids change from a free flowing liquid to a thick gel like substance when an applied magnetic field.</p> 	<p>RESULTS/REMARKS</p> <p>Results:</p> <p>It is found that the noise level is reduced by 10% when the vehicle is driven on a test track at 100 km/h.</p> <p>It is also found that the noise level is reduced by 10% when the vehicle is driven on a test track at 120 km/h.</p> <p>Remarks:</p> <p>It is found that the noise level is reduced by 10% when the vehicle is driven on a test track at 100 km/h.</p> <p>It is also found that the noise level is reduced by 10% when the vehicle is driven on a test track at 120 km/h.</p> <p>Conclusion:</p> <p>The noise level is reduced by 10% when the vehicle is driven on a test track at 100 km/h.</p> <p>It is also found that the noise level is reduced by 10% when the vehicle is driven on a test track at 120 km/h.</p>

Auto 21 Reducing Structure Borne Noise: The Development of a Semi-active Bushing
 Michael Sjoerdsma, Nakul Verma, and Arsh Passarwan
 Project F03-FIN, Simon Fraser University

PURPOSE

Car manufacturers are reducing the mass of automobiles in order to increase the fuel economy of their vehicles. Although this reduction of mass has positive benefits, it also makes newer vehicles more susceptible to structure borne noise. The focus of our research is to create a semi-active bushing to minimize this noise.



Colour

Reducing Structure Borne Noise: The Development of a Semi-active Bushing
 Michael Sjoerdens, Håkel Tveita, and Ash Parameswaran
 Dept. PD, SFU, Vancouver, BC, Canada

PURPOSE
 Car manufacturers are reducing the mass of automobiles in order to achieve the fuel economy of their vehicles. Although this reduction of mass has positive benefits, it also makes some vehicle mass susceptible to structure borne noise. The focus of our research is to create a novel active bushing to minimize the noise.



2004 April 22 Automotive Car Show

MODIFIED BUSHING
 It is called a Bushing (Suspension) (BS) with a Magneto-Rheological (MR) fluid. The fluid is a magnetic fluid that can become solid MR fluid.




MR FLUIDS
 Magneto-rheological (MR) fluid is composed of sub-micron sized iron particles (0.1µm to 0.5µm), approximately 20-40% by volume, suspended in a non-conductive carrier. MR fluid is used in a variety of applications.




TEST SETUP
 Data Acquisition
 - The engine drive (DC) motor
 - An AMPLIFIER (100V)
 - A MOTOR (100V)
 Test Procedure
 1. Drive a vehicle system at 1000 rpm
 2. Drive a vehicle system at 1000 rpm with a magnetic field
 3. Compare the noise level at 1000 rpm



ELECTROMAGNETS
 The electromagnet is a copper wire coil that is 100mm in diameter.
 Design Challenge
 Finding an approach with 100mm diameter and 100mm length.




RESULTS/REMARKS
 Results:
 It is shown that the noise level is reduced by the active bushing.
 In the design stage we showed a 10% reduction in the noise level when the magnetic field was applied to the system.
 Remarks:
 It is an actively manufacturing a new bushing using MR fluid which is a new design of structure.

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Reducing Structure Borne Noise: The Development of a Semi-active Bushing
 Michael Sjoerdens, Håkel Tveita, and Ash Parameswaran

PURPOSE

ELECTROMAGNETS

BUSHINGS

RESULTS

MR FLUIDS

CONCLUSION

White Space

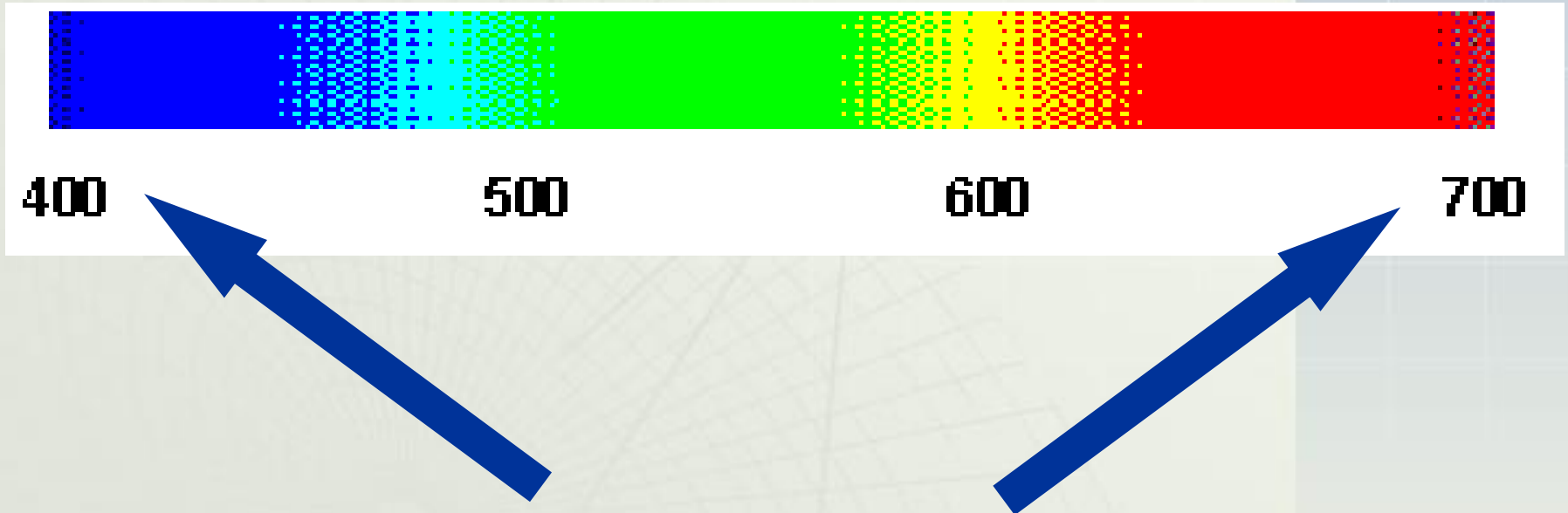


Colour

Contrast



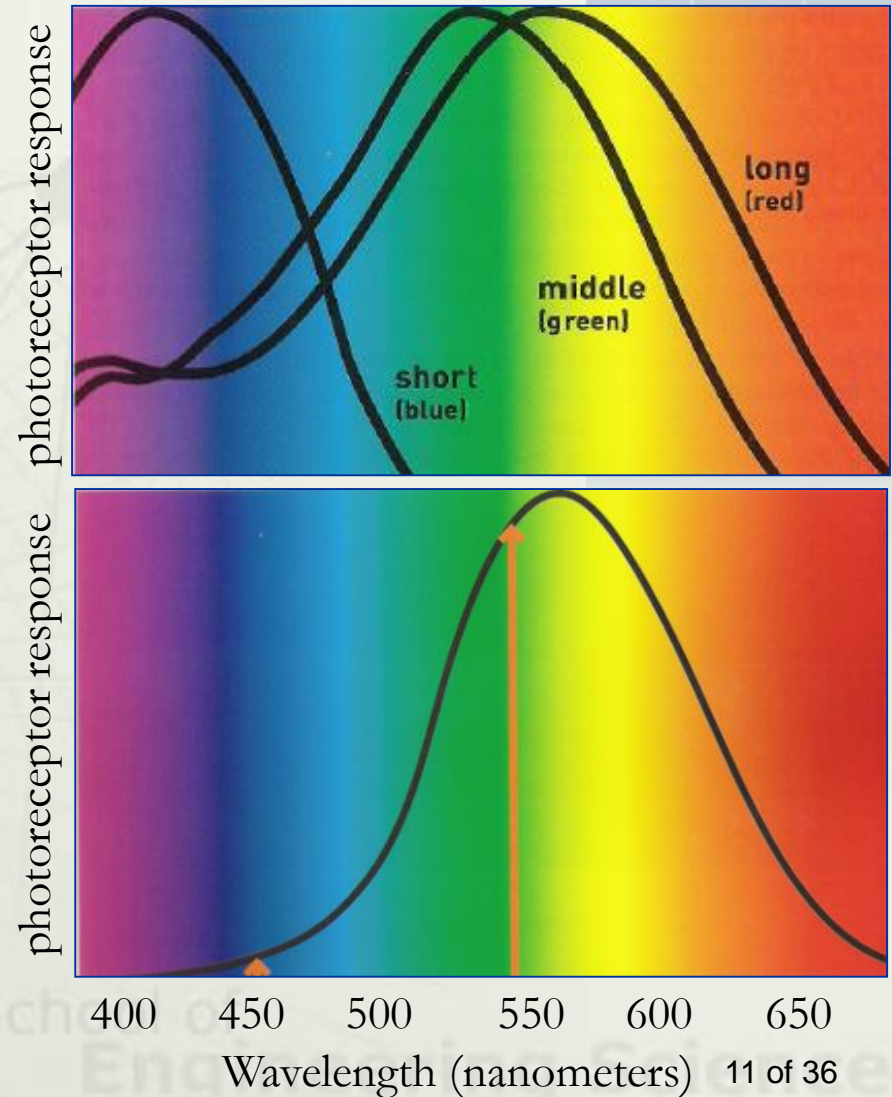
Colour



- Avoid using colours from the opposite ends of the spectrum

Colour

- Green 20 : Blue 1
- Pure blue should not be used for text, thin lines, or small objects
- Blue is good for backgrounds





Pixelation





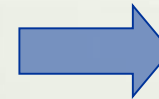
Other Issues

➤ Point Form?

➤ Alignment

<p>Introduction</p> <p>Currently, car manufacturers are reducing the mass of automobiles in order to increase the fuel economy of their vehicles [1]. Although this reduction of mass has positive benefits, it also makes newer vehicles more susceptible to structure borne noise. This susceptibility to increased noise is a major concern that must be addressed by future car manufacturers because vibrations in the automobile's cabin are distracting to the driver. Distractions can cause fatigue which can jeopardize the safety of the occupants of the vehicle.</p> <p>An approach to help minimize structure borne noise is to modify the traditional passive spring-damper system with actuators placed in series or parallel with these existing components. Other researchers are modifying the traditional suspension systems of automobiles by introducing semi-active components. Sadok et al. [2], have shown that electrorheological fluid in a damper can change the damping characteristics. Our research focuses on novel techniques of creating semi-active bushings utilizing magnetorheological fluid (MRF).</p>	<p>Bushings</p> <p>Bushings are used in vehicle suspensions wherever the suspension meets the chassis of the automobile. Similar to the tradeoff found in a passive suspension, bushings compromise between reducing vibration transmission and handling performance. Commercially available cars have bushings made from rubber that limit unwanted noise while introducing play into the suspension system.</p> <p>Many car enthusiasts replace the stock bushes that come with their automobile with polyurethane bushes that increase performance of the automobile. Although these may improve the suspension to a certain degree, the bushes are still passive elements and suffer from the vibration and handling trade off.</p>
<p>Suspension Background</p> <p>The suspension of an automobile has several functions which include maintaining road-tire contact, enhancing handling performance, and minimizing forces to the occupants of the vehicle [3]. The majority of consumer vehicles have passive suspension systems consisting of springs and dampers. The major limitation of an automobile's suspension is that a tradeoff between ride quality and suspension exists [4]. That is, a passive car suspension cannot deliver optimal ride comfort while still delivering optimal handling performance.</p>	<p>Active and Semi-active Suspensions</p> <p>Changing the passive suspension system of an automobile to an active suspension has been the focus of much research. The suspension is changed by adding an actuator in series or parallel with the existing components. However, active suspension systems are notorious for their complexity and high power consumption [6], [7]. Other researchers have created semi-active suspensions by introducing components that have adaptive damping. These semi-active components do not introduce energy into the system; instead they vary how much energy the system absorbs [8], [9].</p> <p>Our modified bushing is a semi-active system which uses MRF to change its damping properties.</p>
	<p>Magnetorheological Fluid</p> <p>Our semi-active bushing uses MRF to change the</p>

Screen View



Printed View






Other Issues

- Background Images
- Font Size

Microfabricated Biochip

Pathogen Identification

Sureswaran, Marek Syrzycki, and Paul Li



Issues

Process

layer of titanium and then of gold

; a photolithographic process that uses photoresist, expose, and

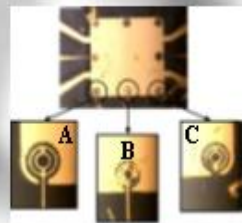
and pattern titanium using

glass slide

to glass slide

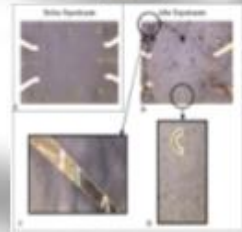
slide

Chip Issues



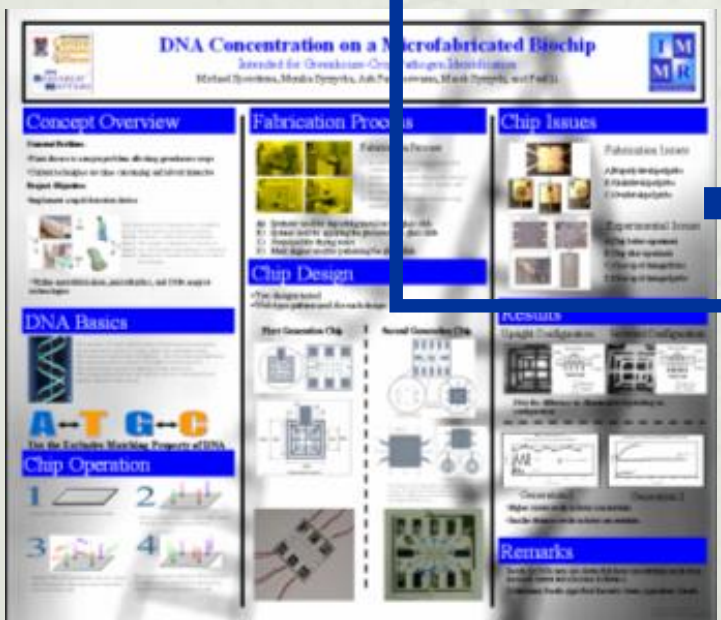
Fabrication Issues

- A) Properly developed probe
- B) Underdeveloped probe
- C) Overdeveloped probe



Experimental Issues

- A) Chip before experiment
- B) Chip after experiment
- C) Close up of damaged trace
- D) Close up of damaged probe





Graphs (Tufte)

Maximize:

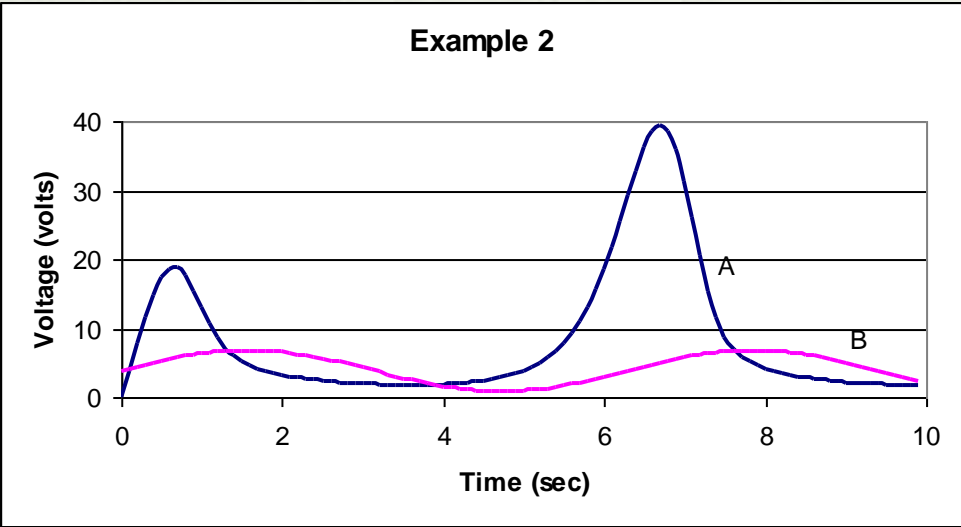
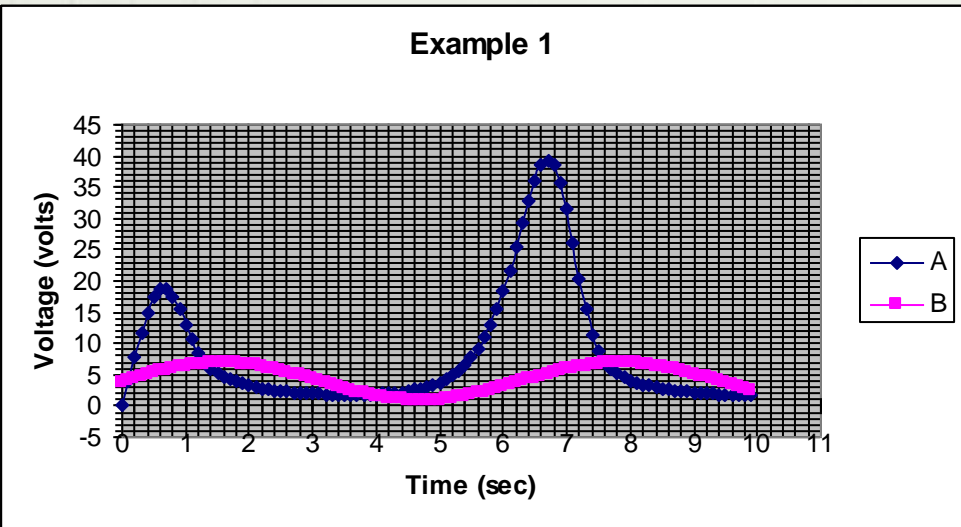
Data-ink

Data-ink ratio =

Total ink used to print the graphic



Graphs





Example 1: The Poster Walk

Novel Inductorless Oscillators and Dividers

Introduction

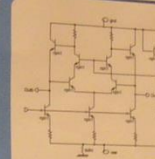
Monolithic inductors generally have poor quality factors (i.e. $Q < 20$) and consume large chip areas. When these low quality inductors are used in a parallel resonant structure, such as an LC-tank for a voltage controlled oscillator (VCO), a low quality factor equivalent resonant structure results. However some designs do not require high Q's. For designs with reduced Q requirements, an inductorless design may offer the necessary performance at a cost of increased noise, but with significant area savings. (Recall that a real LC-tank appears purely resistive at resonance.)

In [1], it was demonstrated that an inductorless VCO with large tuning range (3 GHz) and an acceptable phase noise of -87 dBc/Hz at a 1 MHz offset from a 25 GHz carrier tone was achievable in a 45 GHz SiGe technology. The concept of utilizing inductorless circuit topologies at RF frequencies was further extended in [2] by developing an inductorless quadrature voltage controlled oscillator (QVCO), and in [3] through the development of an inductorless injection locked frequency divider (ILFD). These additional projects are the focus of this work.

It is natural for the VCO and dividers to be of a similar architecture. For example, if the tuning range is improved (degraded) due to a process variation, the acceptable input frequency range of the dividers may be improved (degraded) by the same mechanism. Current research is focused on the implementation of an inductorless QVCO integrated with several cascaded inductorless ILFDs.

©2008 Joshua K. Nakarika and James M. Hillhouse. "Novel Inductorless Quadrature Voltage Controlled Oscillators" Design for a 45 GHz SiGe Process. The 2008 Annual IEEE NorthEast Workshop on Circuits and Systems, Montreal, June 20-23, 2008.
©2008 Joshua K. Nakarika and James M. Hillhouse. "A Novel 10 GHz Inductorless Injection Locked Frequency Divider." The 16th Annual IEEE North Conference on Wireless Communications, Calgary, July 13-14, 2008.

Differential Inductorless VCO [1]



An inductorless differential voltage controlled oscillator (DVCO) was developed by Saniel et al. (Fig. 1113). The VCO tuned from 22.5 GHz to 25.5 GHz and had an output power variation from -19 dBm to -50 dBm (Fig. 2).

Two of our goals were to further improve the tuning range while reducing the output power variation - these were achieved with the new inductorless quadrature VCO and the new injection locked divider topologies.

Fig. 1. Inductorless VCO.

Inductorless High Tuning Range Quadrature VCO

Quadrature voltage controlled oscillators (QVCOs) are necessary for many high speed and direct conversion circuit topologies. A challenge in achieving such oscillators is to provide inductors and obtain a mean tuning method (as first described in [1]). Phase noise is -110 dBc/Hz at a 1 MHz offset from a 25 GHz carrier was obtained over process variations.

The design utilizes two conventional VCOs (Fig. 11) which are placed in parallel with the differential VCO core. The new architecture is capable of providing a large tuning range - 14 GHz with minimum output power variation (Fig. 11) and a comparison of using varying methods can be made by altering the carrier tones of the quadrature switching transistors placed in parallel in the differential VCO (DVCO) compared to allowing the low carrier of the new core switching transistors (Fig. 12). The output voltage swing across the quadrature transistors of the DVCO and the QVCO is shown in Fig. 13.

Fig. 11. Inductorless quadrature VCO.

10 GHz Integrated Analog Dividers

A novel injection locked frequency divider (ILFD) was developed (Fig. 3). The frequency response of the feedback loop is sensitive to parasitic capacitances at the collectors of transistors Q4 and Q5. For the frequency divider application it is useful to exploit the effects of capacitances C1 and C2. Using dominant capacitances C1 and C2 in the feedback loop (much larger than transistor parasitics), the centre operating frequency of the divider can be easily adjusted.





Fig. 3. Inductorless injection locked frequency divider.

This inductorless divider architecture can be designed to operate with reduced in-power consumption if RL is large - at a cost of higher phase noise. Since the injection locked frequency divider is in essence an oscillator which phase locks to the signal applied to the base of Q1, for a divide-by-2 function, the ILFD operates at half of the input signal frequency - in this case 5 GHz.

Fig. 4. Inductorless injection locked frequency divider.

This circuit topology also boasts a large lock-in range. For example when a 500 mVpp input signal is applied to the divider, it will lock from 8.5 GHz to 12 GHz (Fig. 4a). Comparatively, Fig. 4b shows that the simulated lock-in range for a Gilbert ILFD on the same wafer, Fig. 5a is 5 GHz for a 400 mVpp input signal.



The final layout consumed approximately 1000um x 1000um of silicon (Fig. 6).




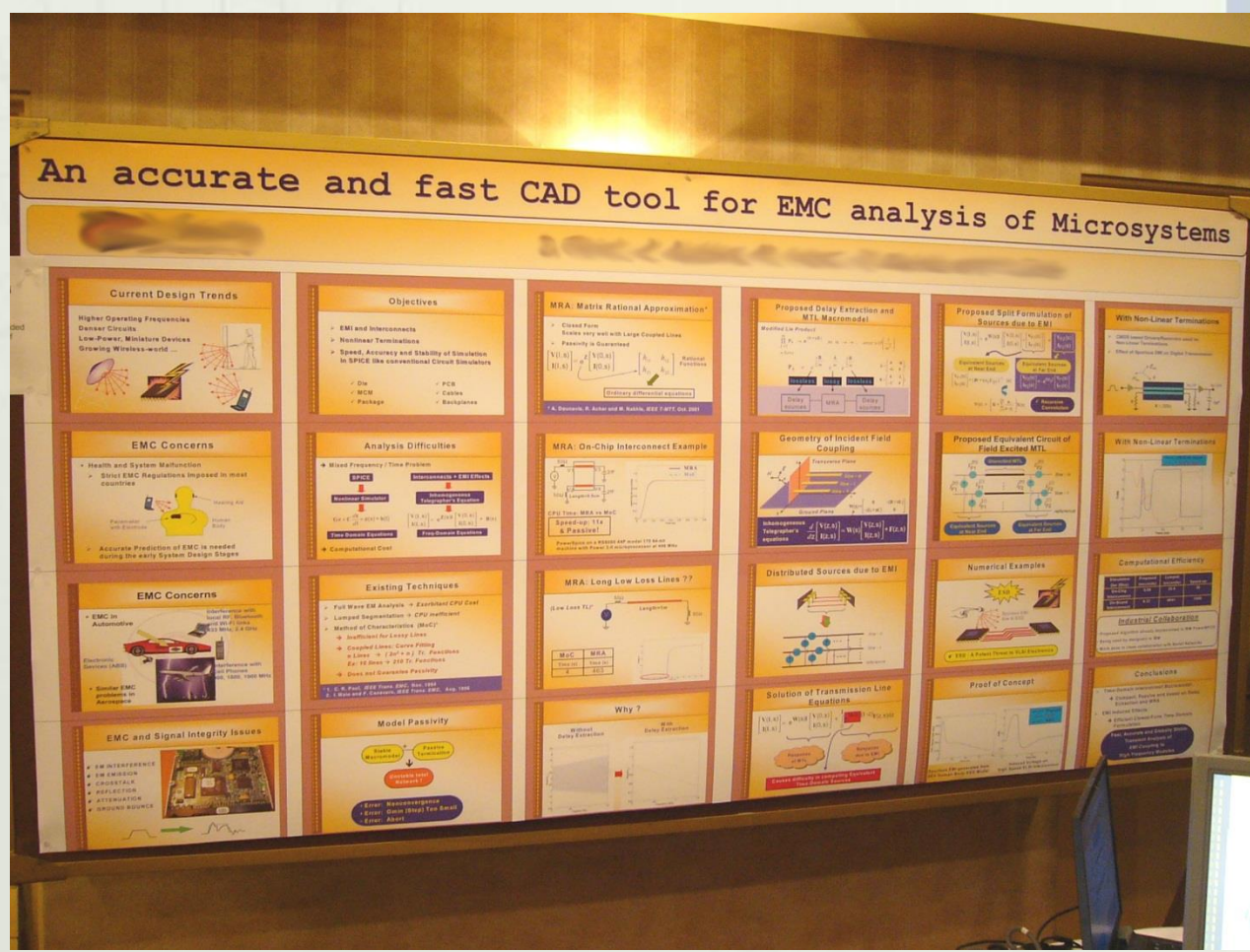
Fig. 6. Final layout of the inductorless injection locked frequency divider.

This work has been presented at the 16th Annual International Conference on Wireless Communications in Calgary in July 2008 (WICOM'08).

Joshua Nakarika and Dr. Jim Hillhouse

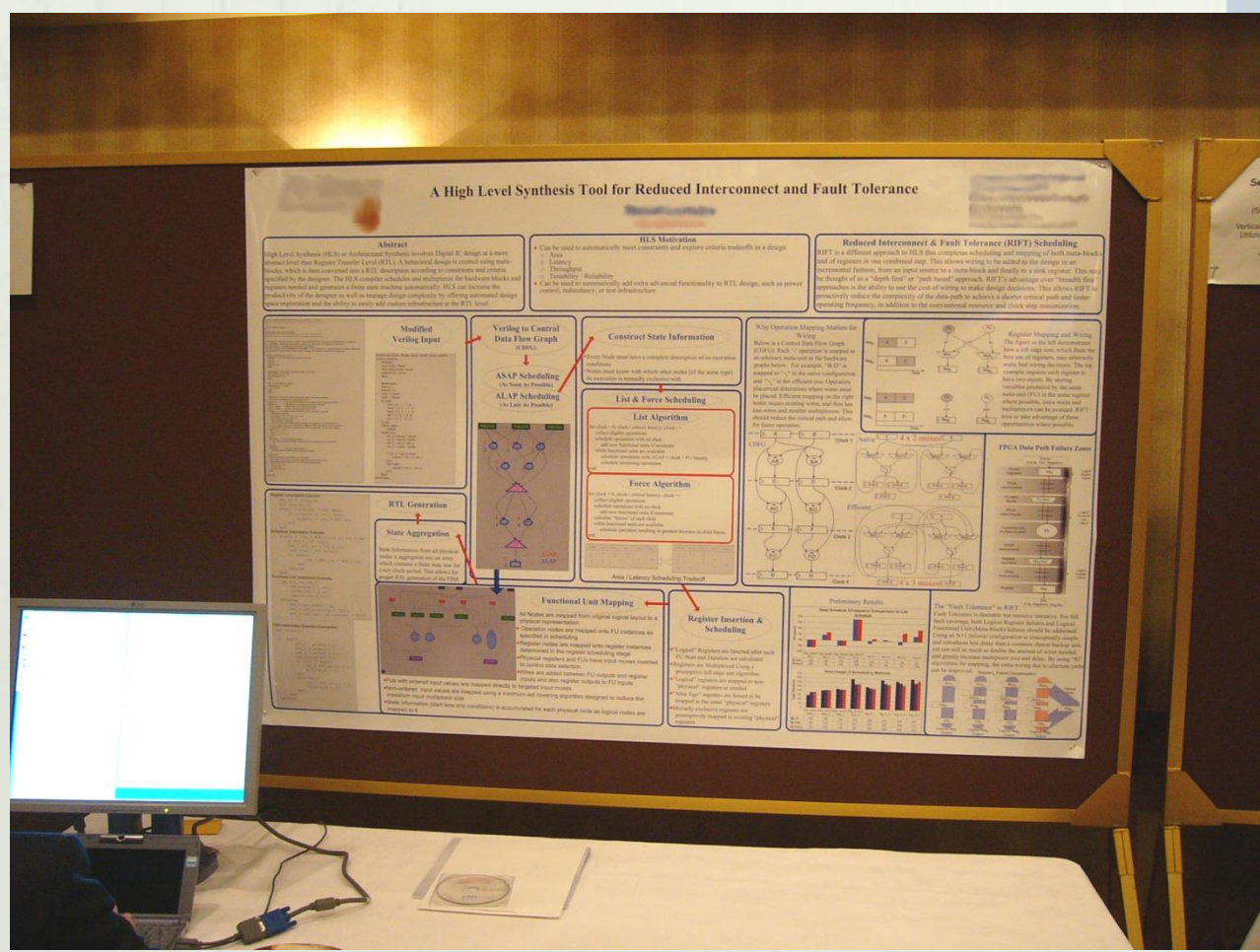


Example 2: The PowerPoint Show





Example 3: The Maze





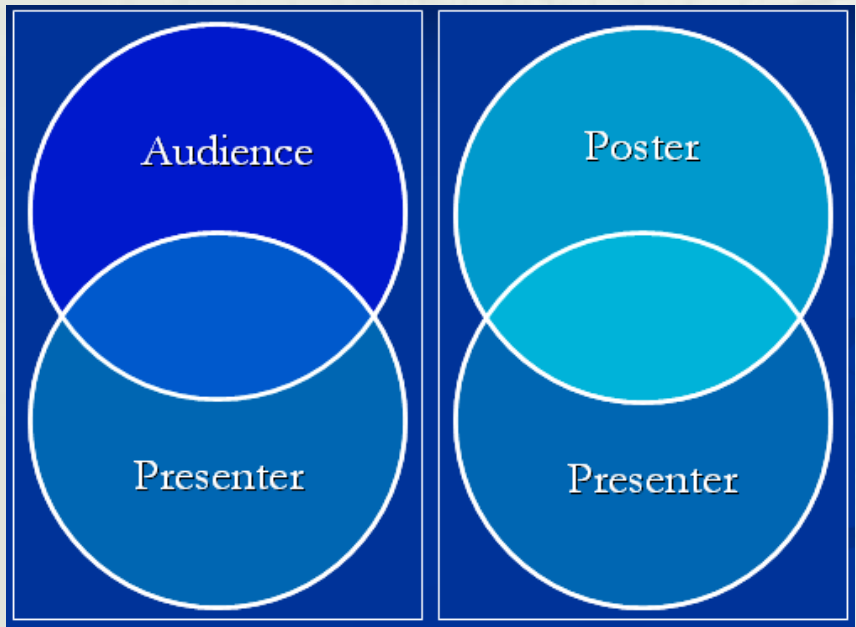
Information Deployment



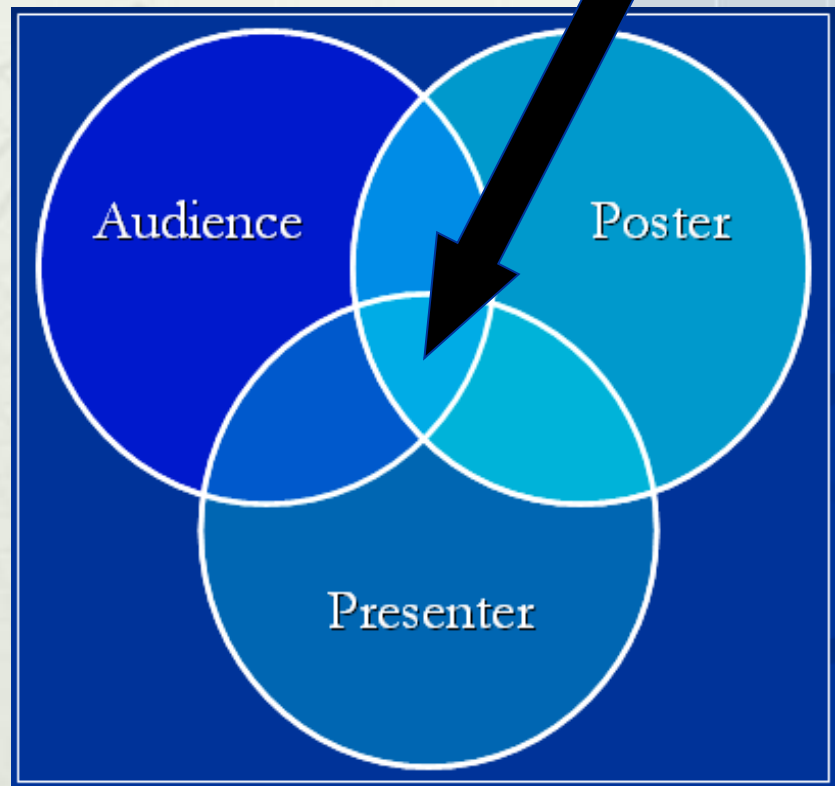


Synergy

NO

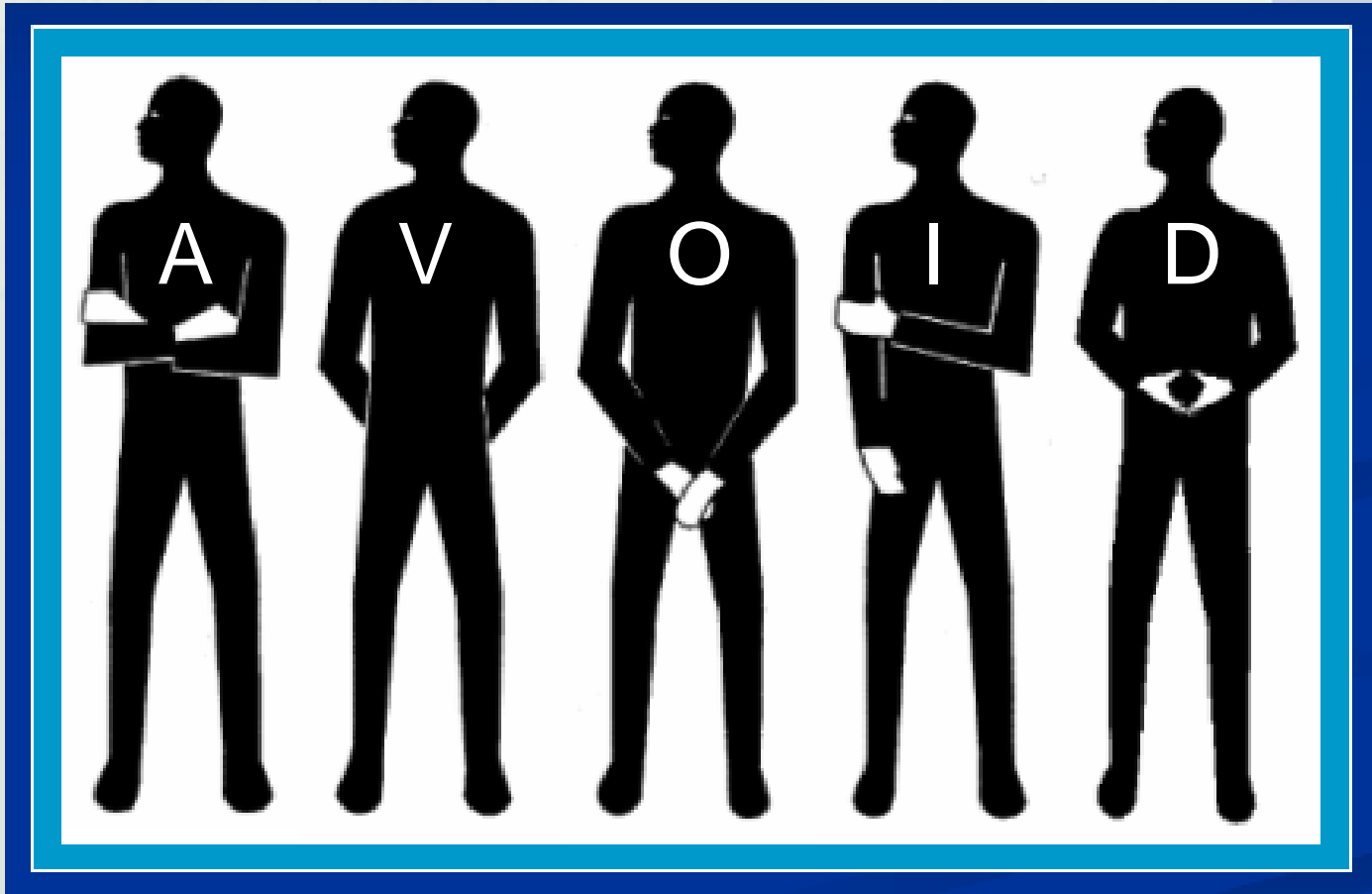


YES



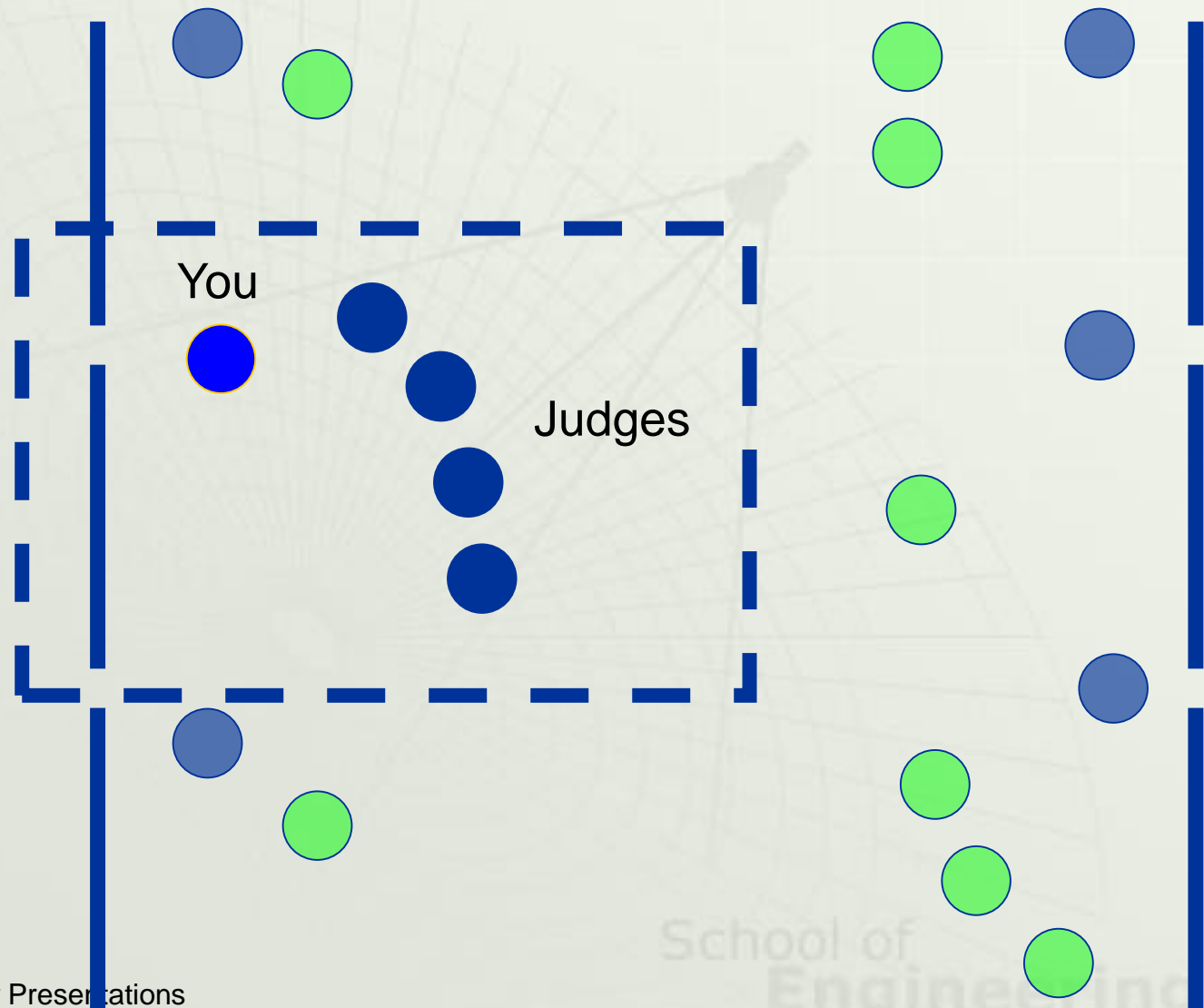


Body Language





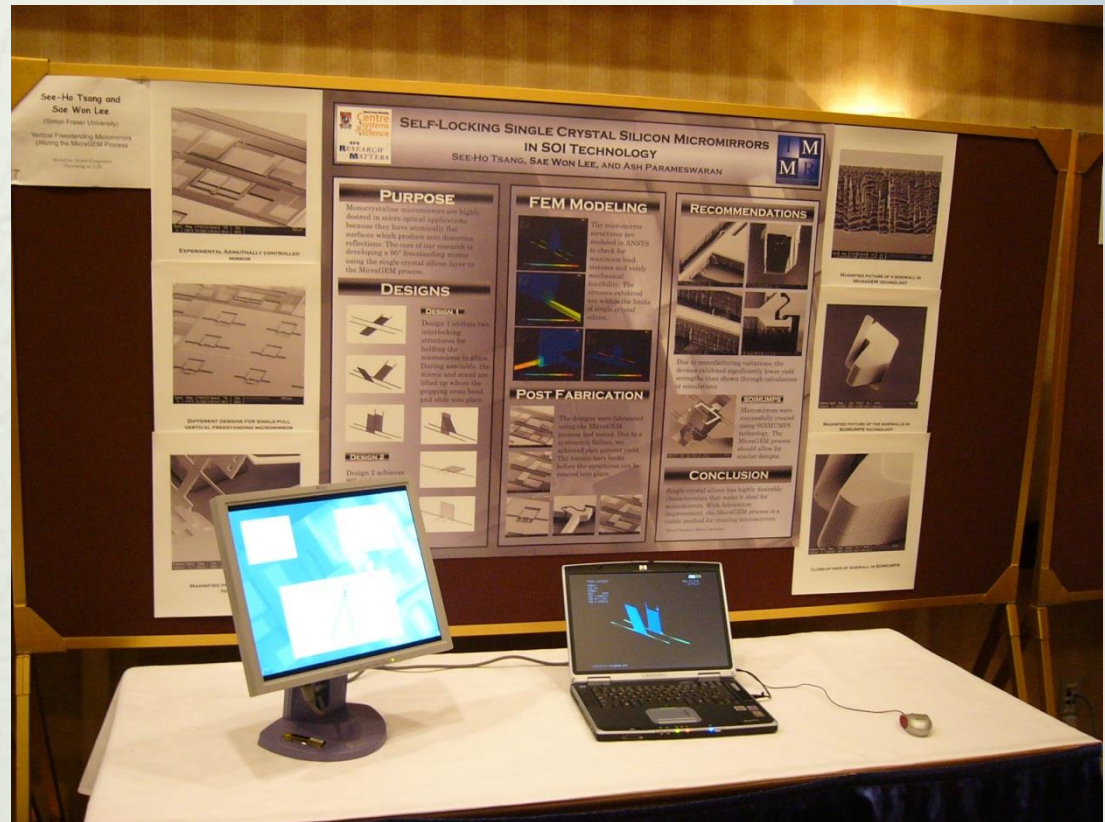
Eye Contact and Voice





Learning Styles

- Bring demos
- Have a computer
- Interactive elements





Gardner's Multiple Intelligences

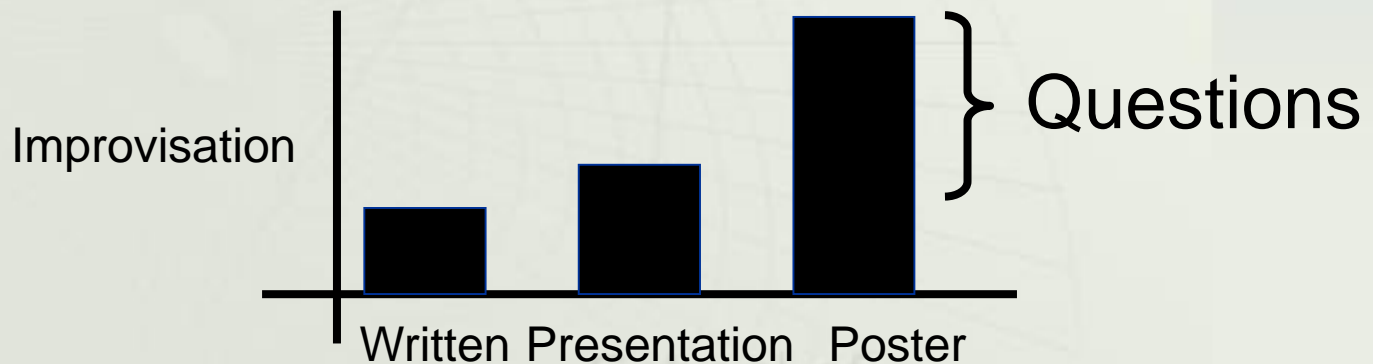


- Gardner's theory of multiple intelligences, while virtually untested after 31 years, is worth considering in teaching.
- In poster presentations, you might try some of the differing approaches illustrated.



Handling Questions

- Encourage questions/suggestions
- Reiterate question if unsure
- Don't make stuff up
- Remember your audience (level of detail)





Making the Poster

- Start Now!
- Double (at least) the amount of time you think you'll need





Reprographics

- Ground floor of Maggie Benston Building
- Open 8:30 am to 4:30 pm, Mon to Fri
- General enquiries call 778-782-4160





Cost

- Poster printing \$7.50/ft²
- Lamination \$3.00/ft²
- Foam core and lamination \$3.00/ft²
- Total cost = Printing and lamination = \$150.00 (check for latest prices)





Payment

- Reprographics only takes work orders
- Supervisor fills out and pays from grant
- Or, Department pays and you reimburse

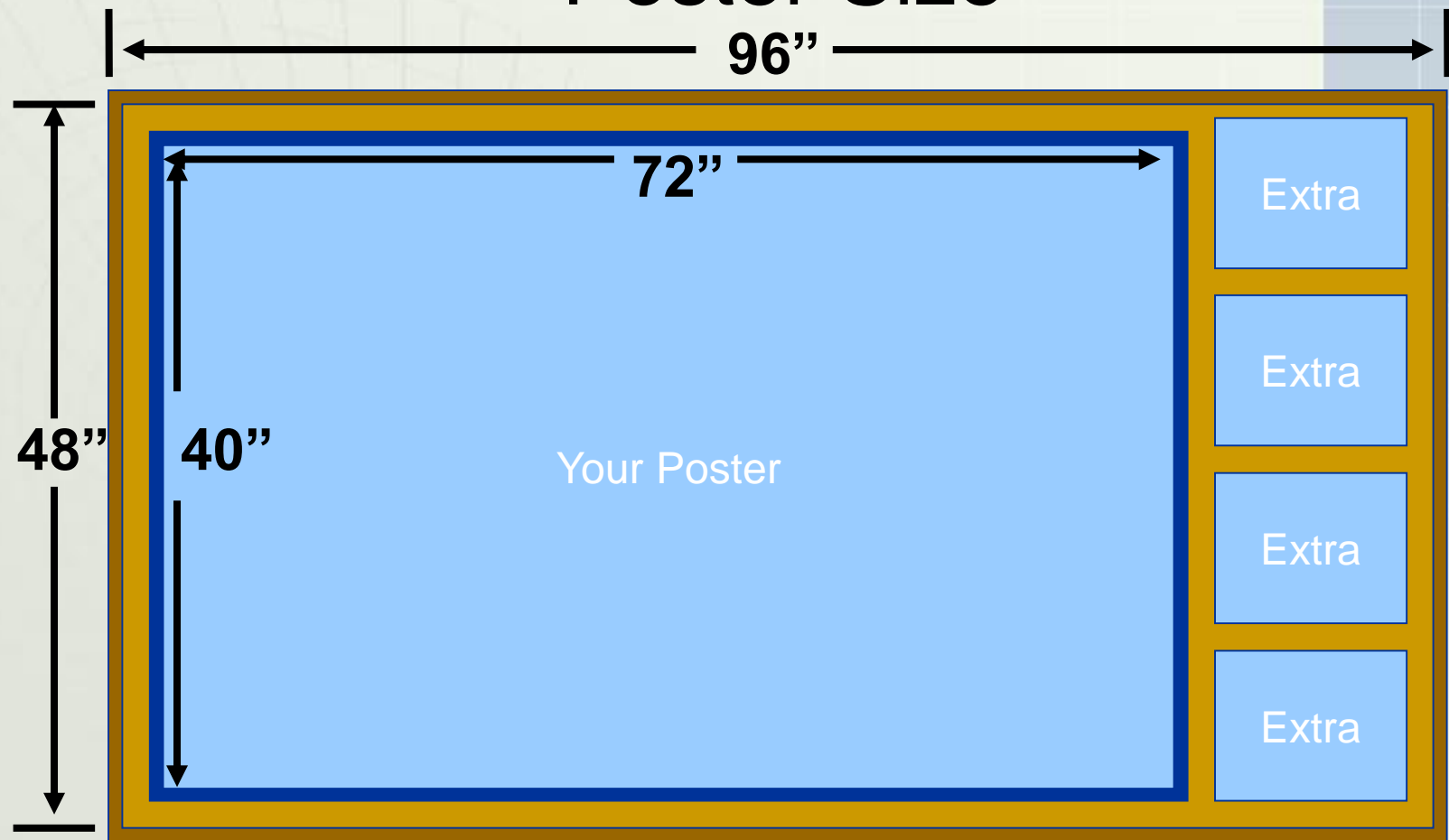


Poster Size

- Check conference for size allowed
- HP DesignJet 5000 printer/plotter
- Paper is 42" wide and any length
- Account for margins (i.e., 42"x48" poster would be 40"x46")



Poster Size



Poster Board



File Types

- PDF file recommended (turn around time 48 hours)
- PowerPoint files (turn around time a little bit longer)
 - Technician changes to pdf, if longer than 15 min, then charges \$45/hour



ENSC 803 Virtual Poster -- 1

1. One of the easiest ways to create your poster is to do it in PowerPoint. But if you prefer to make it in an alternative manner (i.e., using a graphics program), you are welcome to do so (if you choose to follow this path, however, please submit it as a .pdf file).
2. The poster should be 4 feet wide by 3 feet high (122 cm by 92 cm). Set the page size in PowerPoint by going to the <File> tab and clicking <Page Setup> and then set the Width and Height to the appropriate dimensions. You can then import drawings and text (or simply enter them in PowerPoint). Ensure you set the font sizes appropriately.
3. Once you have completed your poster, you can convert the .pptx file to a .pdf file, but the settings for this can be a bit tricky. I prefer the PowerPoint format, so I recommend you submit it in that format.



ENSC 803 Virtual Poster -- 2

4. If the file is small enough (under 20 MB), you can e-mail it to me (but I expect some files will exceed that limit). Alternatively, you may post it on the web and e-mail me the URL. Please name the file using the following convention: “Your_Name.ppt”.
5. A colleague and I will assess the poster presentations by projecting them on a screen. The grading criteria are available on the website. Examples from a few years ago are also posted on the website (be cautious here – I chose these examples based upon the various approaches used rather than the quality of the poster).
6. Be creative! Your audience will appreciate it.
7. Due: Monday, August 7th.



Questions?

➤ Colour:

- ✓ M. Livingstone, *Vision and Art: The Biology of Seeing*. New York: Harry N. Abrams, Inc., 2002.
- ✓ G. M. Murch, "Physiological Principles for the Effective Use of Color," *IEEE CG&A*, pp. 49-54, November 1984.

➤ Graphics:

- ✓ E. R. Tufte, *The Visual Display of Quantitative Information*. Cheshire, Connecticut: Graphics Press, 1990.