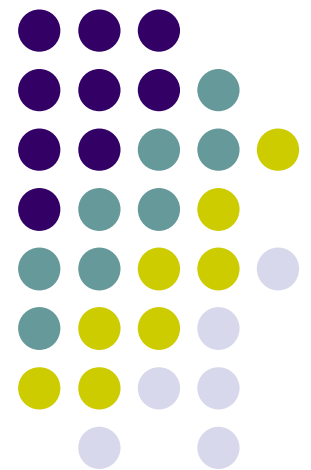


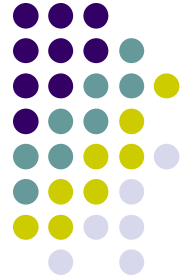
# Testing System for Pressure Sensitive Cardiovascular Catheter

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Friday, October 27th



# Design Team



## Team Members

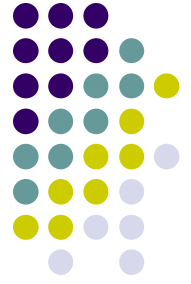
- Danielle Ebben – Team Leader
- Erik Yusko – BWIG
- Anita Zarebi – BSAC
- Tony Wampole – Communications

## Client

- Colette Wagner
- Dr. Nancy Sweitzer
  - Dept. of Cardiology, UW Medical School

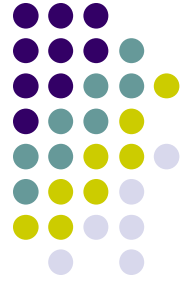
## Advisor

- Professor William Murphy



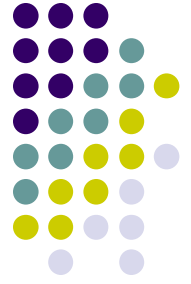
# Overview

- Problem Statement
- Background material
- Product Design Specifications/Client Requirements
- Three design alternatives, explanation and analysis
- Future work



# Problem Statement

- Pressure sensitive cardiovascular catheters are being used to verify a new blood pressure monitoring technology
- The three pressure sensors on the catheter are not recording the same pressure.
- Need a system to verify accuracy of sensors or diagnose a problem

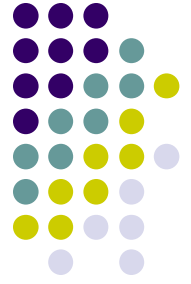


# Previous Work

- Pressure calibration procedure
- Tubular device
  - Sphygmomanometer induced pressure

## Problems:

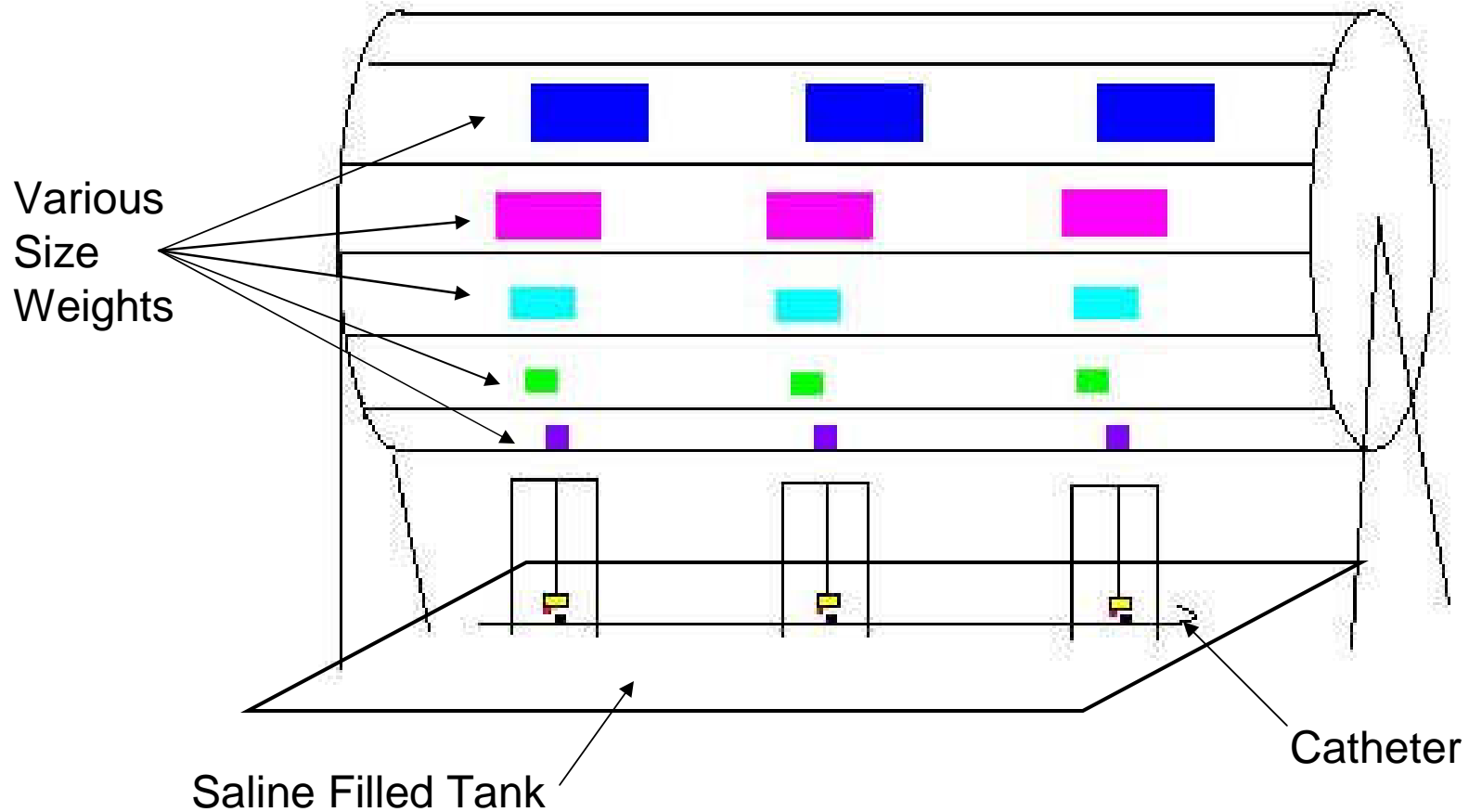
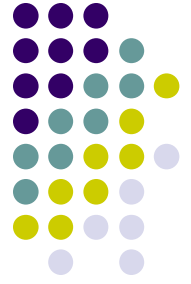
- Maintaining constant pressure
- Leaking saline



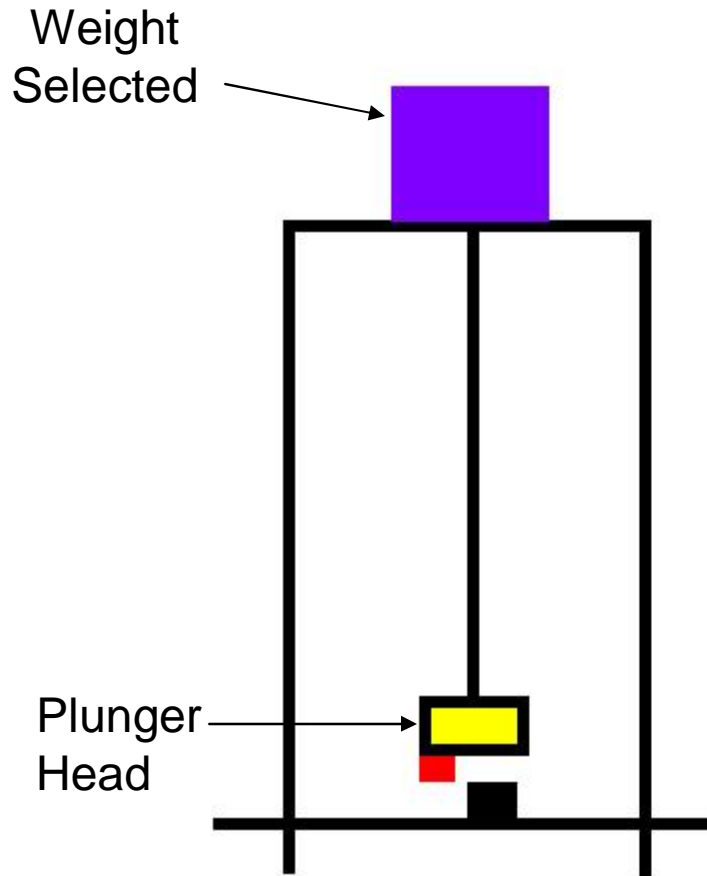
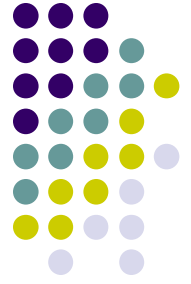
# Client Requirements

- Testing system for catheter calibration
- Test at range of pressures
  - Atmospheric
  - Saline
  - Increments of 50 mmHg
- Controllable saline range
- Stable/constant calibration values
  - 2% allowable error
  - 200 mmHg max
- Short amount of time
- Sterility
- Inexpensive

# Alternative #1: Rotating Cylinder Design



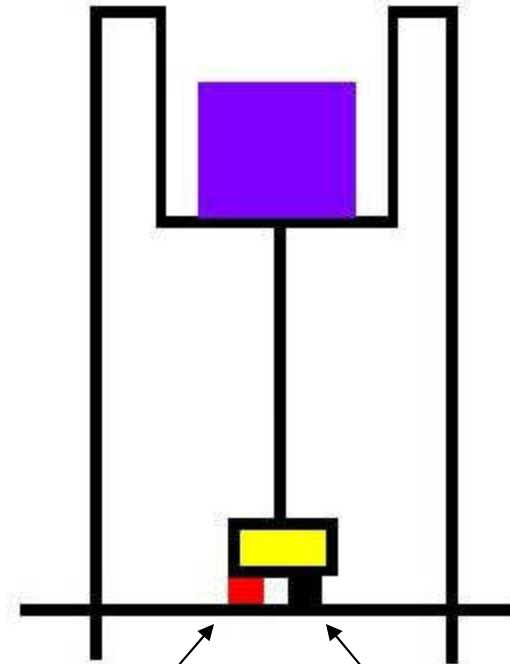
# Alternative #1: Rotating Cylinder Plunging Mechanism



When user selects weight,  
release rod retracts into cylinder,  
causing the weight to fall

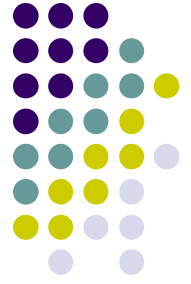
Our Pressure Sensor

Catheter Sensor





# Alternative #1: Rotating Cylinder Design



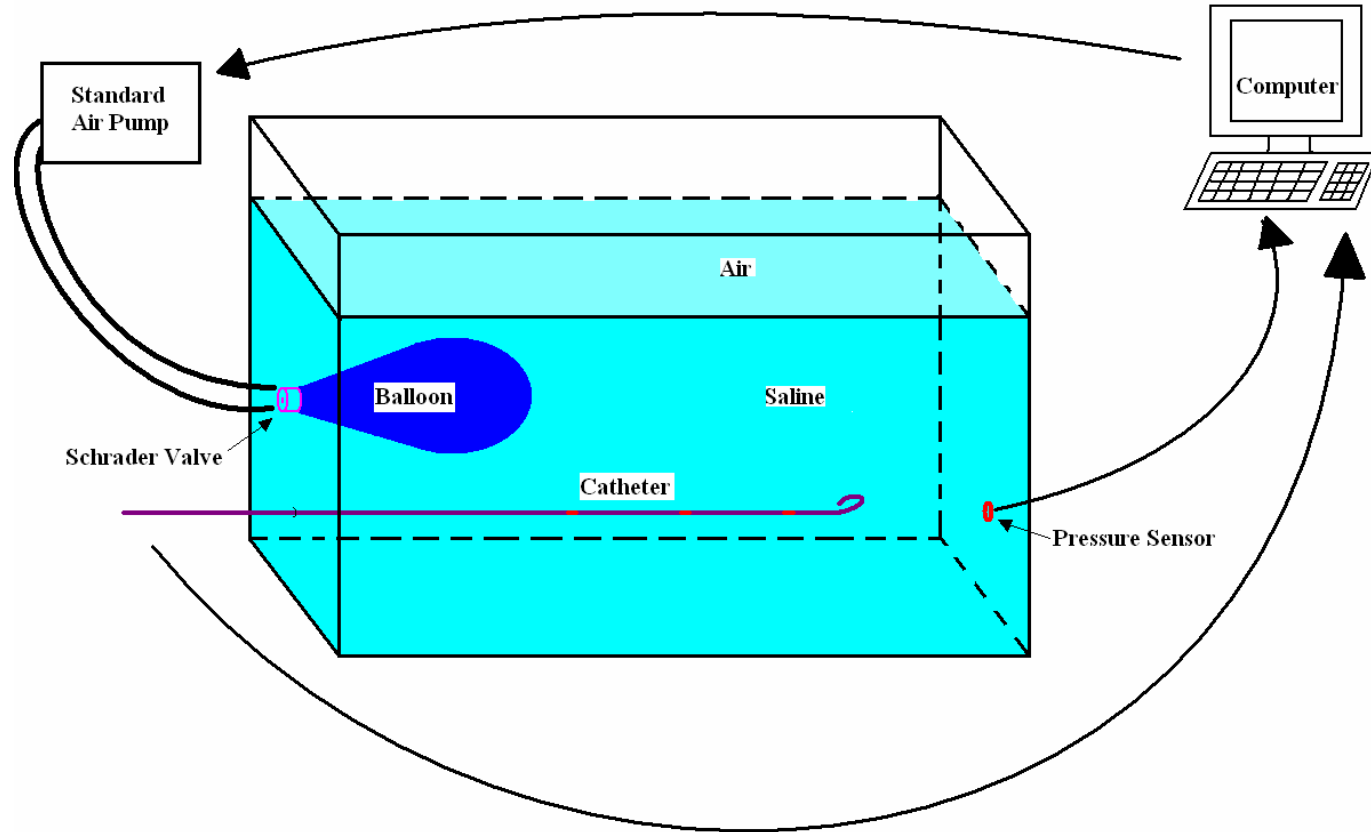
## Pros

- User control over process
- Catheter sensor close to ours
- Fairly small size
- Neat/Clean Design
- Removable Saline

## Cons

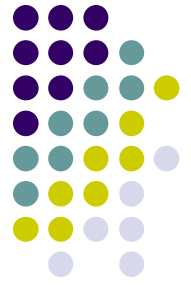
- Cost
- Time to Program
- Fabrication
- Saline contact
  - membrane instead of foam?

# Alternative #2: Balloon Design



- Air tight container
- Balloon fills, increases pressure inside tank
- Pressure sensor regulates air pump

# Alternative #2: Balloon Design



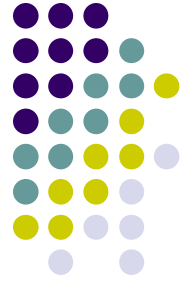
- Pros

- Simplicity
- Saline easily removed for storage
- Many components already fabricated
- Simple geometry for machining
- May or May not be automated depending on client preference

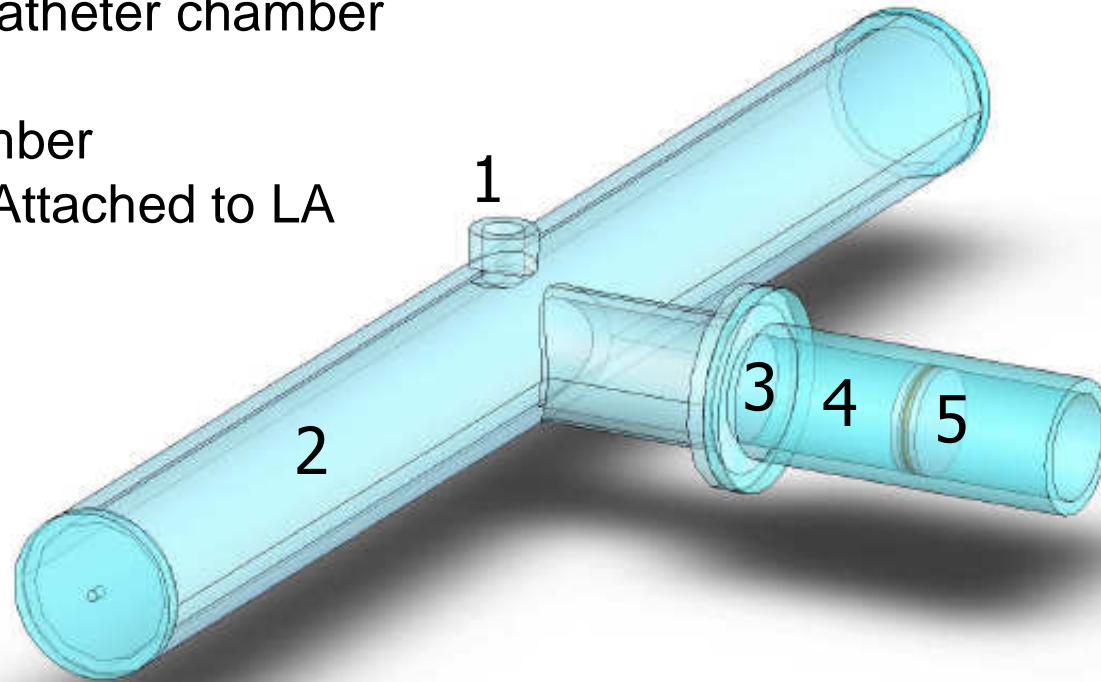
- Cons

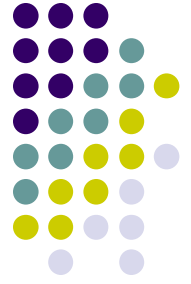
- Gas/Liquid interface
- Requires air/water tight seal
- Automation may require additional computer program
- Cost of automation

# Alternative #3: Plunger Design

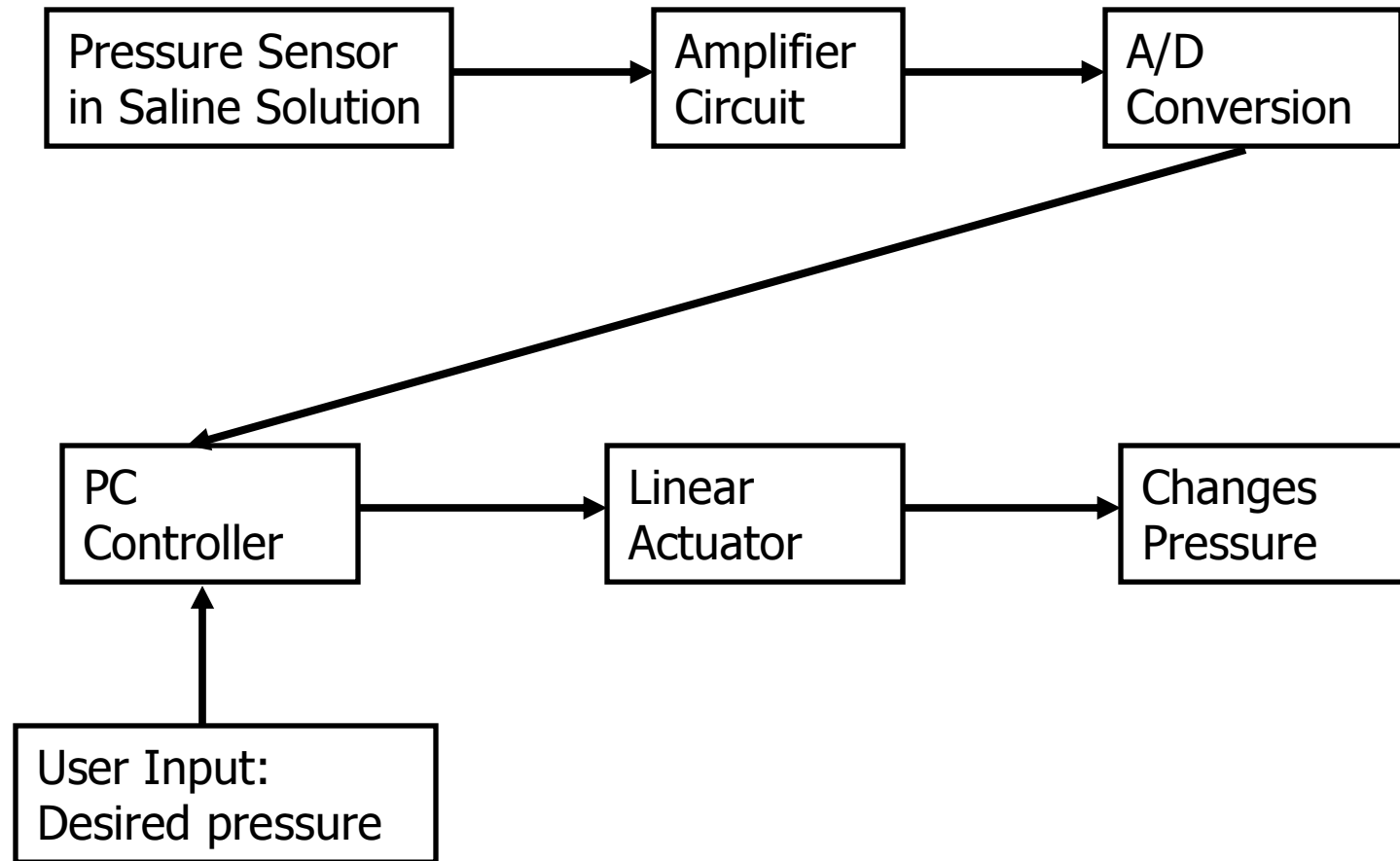


1. Filling port
2. Saline filled catheter chamber
3. Membrane
4. Air filled chamber
5. Piston Head Attached to LA

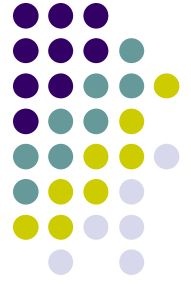




# Alternative #3: Plunger Design



# Alternative #3: Plunger Design

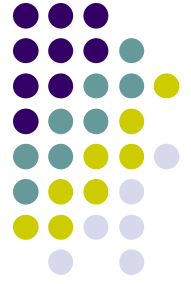


## Pros

- Simple
- Repeatable
- Easily automated
- Allows for user control

## Cons

- Requires air/water tight seal
- Moving components
- Difficult machining



# Future Work

- Decide on specific design
  - Specifics within design (e.g. automation)
- Build prototype system
- Design calibration method
- Test system and calibration method



**Questions?**