**Assumptions**

* Some sort of image system on the end of catheter
* Mentor will have specific procedure in mind
* Project is an electronic version of existing mechanical catheters
* There will be wires running through catheter (potential for electric shock)
* Arduino controlled
* We design motor system
* Basic design is already known
* 2 joystick system for 360° motion
* Primary design advantage will be one-handed use
* Project will require hollow lumen
* Handle is user friendly; concise/compact
* Material in question is pertinent in clinical setting; in case dropped by physician
* Prototype will be much larger than standard catheter. Material will be non-trivially different
* Actuating in L/R and A/P directions
* Strain relief
* We design software and components novelly
* We have limited resources
* Existing solution does not exist on market

**Questions**

* What is the problem you would like to address with the electronically steerable catheter?
* What sort of materials are used in catheters?
* What are current surgical procedures w/ using catheters (prep work, insertion, steering, function, etc.)
* How do existing catheters get directed?
* Could we design something to fit over existing handles that is then controlled?
* What sort of precautions will we need with electrical safety?
* How small can we possibly make the final product?
* Are there specific design intents that improve functionality that you recommend us going about?
* What are the current most similar solutions?
* What are the major challenges? Why has no one else done it?
* Design specs? (Not as important initially)
* Challenges - using machine to patient interface?
* What is the optimal ergonomic layout of controls for surgical use?
* What is the best power delivery system?
* What are the respective procedures these catheters will be engaged in?
* Are there any outside resources or materials you recommend for us to utilize?
* What is best microcontroller platform to drive motorized controls and is it shrinkable?
* Is there a certain protocol that is useful to follow?
* Are we limited to mentor’s design specs? Option to think outside the box?
* Can we get an actual catheter and reverse engineer?

**Priority Questions**

* What is the problem you would like to address with the electronically steerable catheter?
  + Several steerable catheters available, but some limitations inherent to mechanical. Could offer more complex movement, precision (angles, simple user interface), data return to user instead of planar imaging.
* Who is this project specifically supposed to help?
  + Up to us
  + Many procedures, but right now it's all mechanical, so you crank until you get the degrees you want. Want something you can implement in multiple situations, would be ideal. None use electronic, but a lot of steerable out there.
  + Depends on the challenge we want.
    - One tiny curve
    - Complex geometries
    - Up to us what we want. Start small go big or however we want to achieve it.
* What is the outcome that the project will deliver? (maybe improve accuracy and decrease procedure time?)
  + Described steerable current catheters with tip of catheter with marker bands, weld flat wires to marker band. Catheter steers by pulling wires for different directions. Maybe read out live data (angle of bend, etc.).
  + Steer tip of catheter and if we have time, just make it better and better
  + One handed use would be great for surgeon
* What are the respective procedures these catheters will be engaged in?
  + So many procedures and ways of use. Whatever we want to venture into, go for it.
  + Should we do generic first? Then split to procedures
    - Start with proof of concept and then specify procedures or versatile design
* What are the major challenges? Why has no one else done it?
  + Expense
  + People already know about current designs and don’t want to branch out
  + Many are disposable
  + Make it reusable?????
    - Current ones aren’t because it’s expensive and difficult to re-sanitize
* Are there specific design intents that improve functionality that you recommend us going about?
  + Handle would be best place to start,
  + The more simple the better, easier to implement for a more complex catheter
  + Start with a couple of wires and be able to pull one direction or another then get to catheter design
  + Or just work with arduino and steering
  + Eventually find what angles we can make, what the OD of the catheter could be
    - 2 vs 4 way tip deflection
  + Design protocols or specks that need to meet, that we could have in mind?
    - Contract manufacturer, so everyone has different needs
    - If we decide what pathway we are most interested in, they can find more specific specs based on past projects
* Are there any outside resources or materials you recommend for us to utilize?
  + Talk with doctors/surgeons about what they would like to see in a device
    - I have orthopedic surgeon connections
  + Prototyping in Chicago?
    - Lab open to us
  + Existing catheter to use?
    - They have examples of steerable catheters
* Are we limited to mentor’s design specs? Option to think outside the box?
  + Open to whatever direction we take.
* Extra Tips?
  + Nah
  + They are open to more questions always
  + Senior Design?
    - Start making prototypes early
    - Helps lead to solid project by the end of year
    - Earliest working with arduino the better to do simple things even
      * Proof of concepts
    - Jesse knows the most about arduino so ask him those

**Agenda**

* Intros
  + Names, track
* Ask about their roles in company
* Establish familiarity with senior design
* Start interview with **Priority Questions** in order