**Review of Thesis Outline**

Reviewer Name: Arushri Swarup

Investigator Name: Kevin Ai Xin Jue Luo

Peer Review Committee #:

Project Title: Topology Cutting of Concentric Metal Tubes to Optimize Performance in Robots

Brief description of project (to be completed by reviewer):

This project will be modeling, fabricating and testing cut patterns on tubes in order to optimize concentric tubes to improve the stiffness ratio and range of motion of the concentric tube robot. Modeling using FEM software will determine the optimal topologies to be fabricated and then tested. Stiffness will be optimized so that the tubes do not snap while being used.

Please answer the following questions and provide detailed explanations/suggestions where appropriate.

1. Are the objectives/research questions clear?

Yes, I understand what and why you are doing this research.

2. Is the outline of the literature review appropriate and complete?

Yes, all sections are clearly answered.

3. Is the rationale for the study coherent and complete?

Yes, very clear and thorough

4. Is the research innovative?

Yes, there is a knowledge gap identified (tubes exhibit snapping behaviour and the current solution to this problem decreases the range of motion which is not ideal) therefore, a new type of concentric tube will be investigated.

5. Are the methods (design, measurement, analysis) appropriate to achieve the objectives?

Yes, the methods outline step by step reasonable and attainable steps to achieve the objectives.

6. Are the expected study outcomes compelling and complete?

Yes, it explains how in the field of mechanical engineering this will be significant research. However, in terms of surgery – the significance can link how this will be beneficial for surgery. E.g. explain that this will develop tubes that have a greater range of motion with less safety risks.

7. Is the study feasible?

Yes, the FEM will narrow down a few different topologies, which will be able to be fabricated and tested in a reasonable amount of time.

8. Is the organization of ideas clear and easy to follow?

Yes.

9. Was the document easy to read and understand?

Yes.

10. What is your overall assessment of the project?

Clear, easy to understand. Logical approach to the design of new instruments that have a very wide range of possible parameters to be set. Use of FEM will definitely help narrow down which specific topologies should be focused on.

11. Please identify major issues and specific recommendations.

Relate significance back to surgery.