I. **Executive Summary**

II. **Modeling actomysoin dynamics in the C. elegans cortex**

A. **Introduction**

1. The biology of cortical flow
2. Soft-condensed matter of biopolymer networks
3. Active matter and myosin contractility
4. The biophysics of filament recycling

B. **The impact of filament recycling on cortical flow in animal cells**

1. Measurements of cortical flow in C. elegans embryos
2. Understanding in vivo turnover rates with smPReSS
3. Disruption of flow through recycling inhibition

C. **Modeling 2D active networks with recycling**
methods from paper and benchmarking

D. **How filament recycling shapes active and passive properties of networks**
The bulk of the results from paper

E. **A closer look at the distinct timescales of passive relaxation**
Results from slippage

F. **The role of upstream regulators in shaping activity**
The modeling results from Jon's paper

G. **Discussion and pilot experiments**
A mention of the cell squishing experiments plus all the wonderful things that can be done with this modeling framework

III. **Teaching and Broader Impacts**

A. **Workshop on modeling in biology**

B. **Reducing power consumption in high performance computing**

C. **Artistic interpretations of filament recycling**

IV. **Appendices**

A. **Detailed documentation**

B. **TECH-VIVO: excerpts from a biotechnology blog**

C. **An after-school program in computer programming**