June

6.19-6.22

Paper reading, learning about Stochastic Models and network types such as bifan networks

July

7.5-7.7

- Paper Reading: Negative feedback that improves information transmission in yeast signaling &one master thesis of Long Yan, Peking University.
- Learn about wiki language.

7.9-7.11

- Construct the wiki website.

7.12

- Meet with Qi Ouyang and Xiaomeng Zhang
  - Discuss about Reverse Engineering Method and decide to adopt it for designing our project.
  - Decide to search for input-output linear function for making up the shortages of current biosensors.
- Discuss with Yuheng Lu and Haoqian Zhang
  - Decide to use the tri-node network and the essence of each TF Node is still to be discussed.

7.13

- Discuss with Yuheng Lu
  - Decide to use TF as the essence of each TF node.
  - Start to derive the ODEs.
  - Try to search for the right form of equations to describe the combinational regulation of TFs.
- Paper reading: On schemes of combinatorial transcription logic
  - Try to find the answer to the problem discussed today.

7.14-7.19

- Continue paper reading and search for some other materials and papers about combinational regulation.

7.20-7.24

- Derive the ODEs to describe the tri-node network.

7.25-7.30

- Fix the LINUX system on my laptop and start to familiar with coding under LINUX, study about vim operator, gcc and gdb.

7.31

- Meet with Xiaomeng Zhang
  - Discuss the equations derived to see whether it can describe our network precisely.
  - Discuss how to derive the equations describing the binding of Hg to MerR dimer.
  - Discuss whether the hypotheses of our equations fit for the real condition.
- Discuss with Yuheng Lu
  - Develop our equations and discuss about the paper.
  - Find out that the calculation may be too much for our computer that has 16 CPUs in the laboratory so decide to take a more simple form to only consider the combinational

regulation instead of also considering the interactions between TFs and RNAP.

August

8.1

- Derive one set of equations and discuss with Yuheng Lu to revise the equation.

8.2

- After derivation, get the ODEs meet all of our requirements, and so the equations are obtained.
- Examine again the ODEs to see whether there's any problem with them.

8.3

- Meet with Xiaomeng Zhang
  - Examine again our ODEs
- Start to code the object function and read the makefile codes.

8.4-8.9

- Code the object function and other related function codes.

8.10-8.15

- Put the codes together with Yuheng Lu's.
- Examine the codes.

8.16

- Meet with Xiaomeng Zhang
  - Examine our codes.
  - Discuss running the program on laboratory's computer in details.

8.17-8.19

- Examine the codes again and again with gdb because there're some bugs when running on the computer.

8.21

- Try to run the program and find some bugs still present.
- Revise and examine the codes.

8.22

- Run again and examine a small part of the results, find them fit the expectation.

8.23-8.25

- Wait for the program running on the computer.

8.26-9.3

- Get our results and start to analyze it with Matlab and Excel and SPSS.

September

9.4

- Meet with Qi Ouyang
  - Get the guidance to revise our object function for significance in field use
- Revise the object function and run again the program on computer.

9.5-9.7

- Wait for the program running on the computer.

9.8-9.12

- Get the results and analyze them.

9.19-9.21

- Write wiki modeling part.

9.22

- Meet with Qi Ouyang
  - Get some advice about how to revise the wiki modeling part.

October

9.26-10.10

- Revise wiki and draw the figures with Matlab and origin and PowerPoint that used in wiki.
- Further analyze the second results.

10.14

- Work on some drawings need in the biosensor wiki part.

10.16

- Work on the Modelling Part Presentation’s PPT

10.17

- Meet with members and Discuss about the PPT.

10.18-10.19

- Prepare and present the PPT for the first time.

10.20-10.24

- Revise the PPT and the lecture nodes again and again.