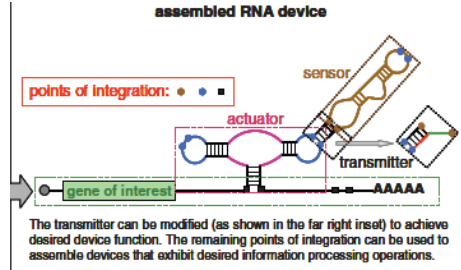


RNA-Based Gene Regulation

by Leon Lin

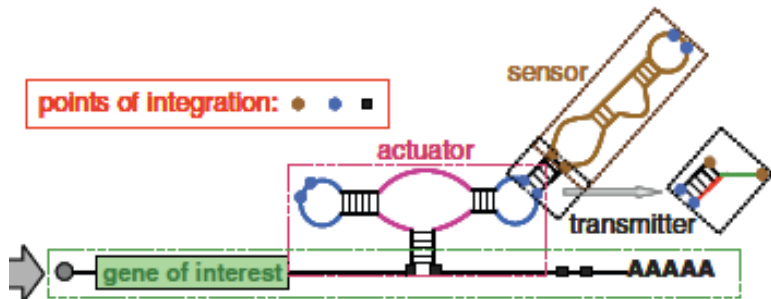
Why Do This Project?

- It's new, but not too new
- It's an incredibly powerful tool with a simple mechanism
- We have research at Stanford already being conducted



Modifying the Sensor

assembled RNA device

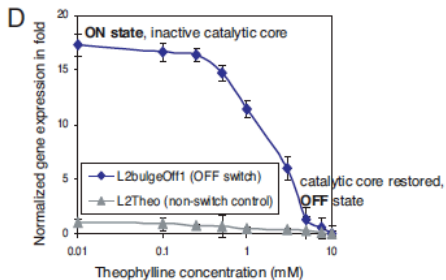
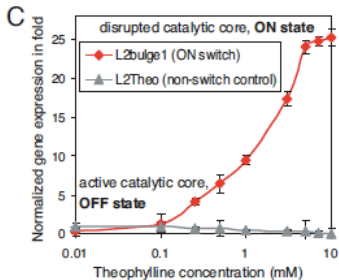


The transmitter can be modified (as shown in the far right inset) to achieve desired device function. The remaining points of integration can be used to assemble devices that exhibit desired information processing operations.

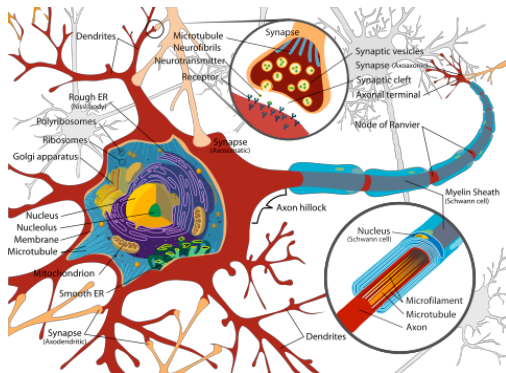
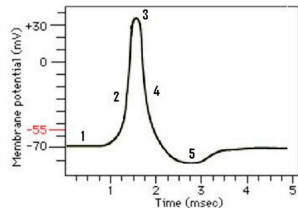
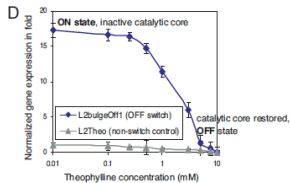
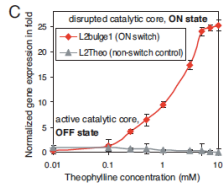
Why Change the Sensor?



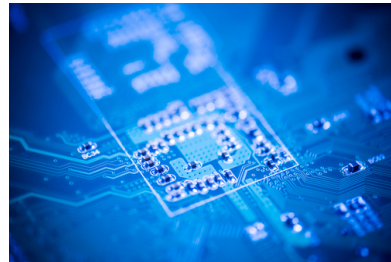
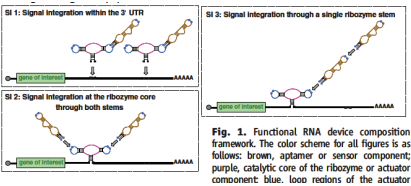
Action Potential



Multiple Receptor Devices

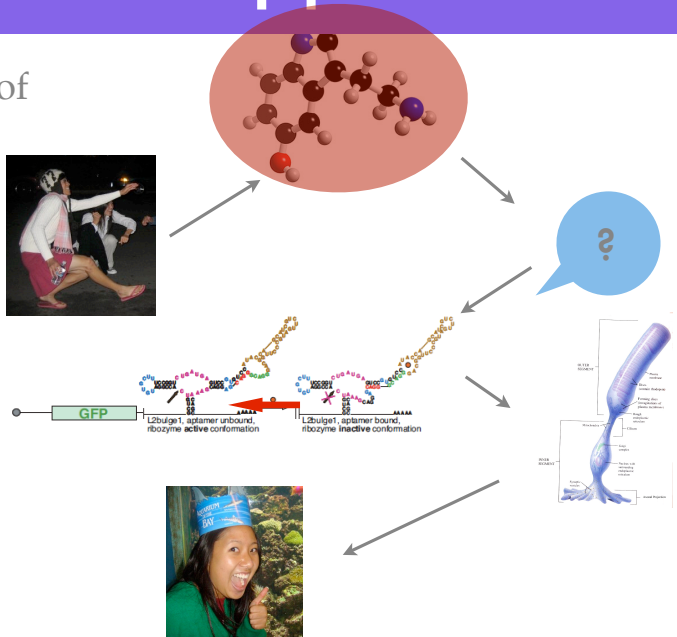


Complex Logic



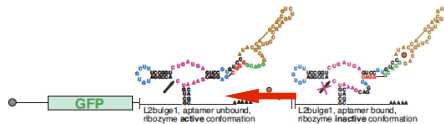
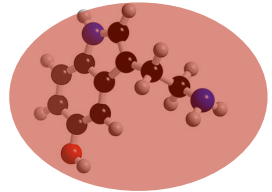
Theoretical Application

- Decreased levels of serotonin
- Proposed Sensor
- Ribozyme rearrangement
- GFP expression
- Photoreceptor activation

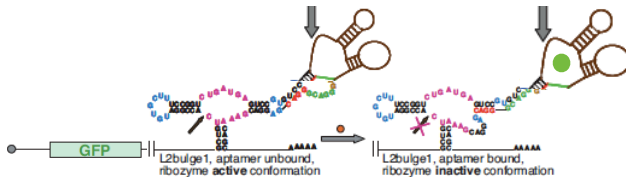


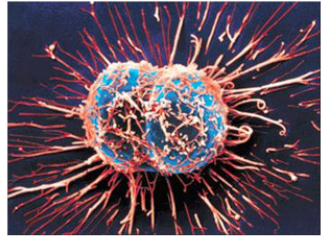
Theoretical Application

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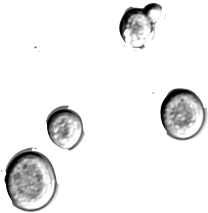


Adding to the Library



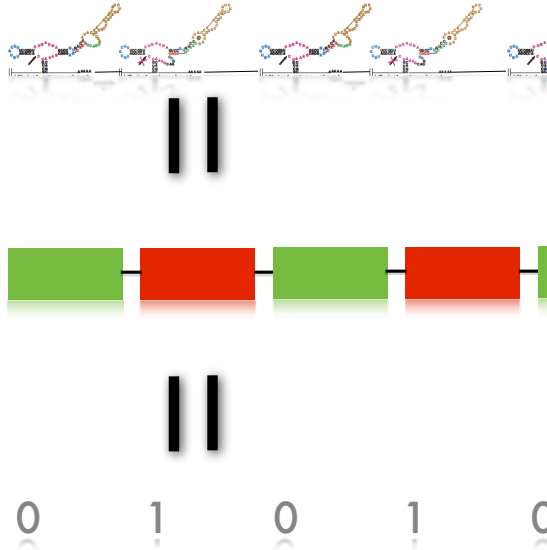


Use in New Genes or Organisms



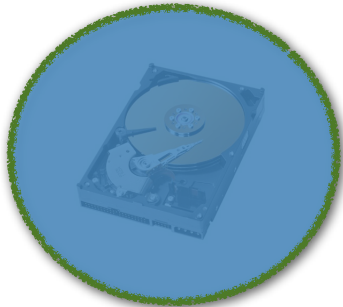
Use of Logic Gates as Binary Code

- Computers use binary code
- Transistors create that binary code
- RNA-based switches can also create binary code



Information Gathering

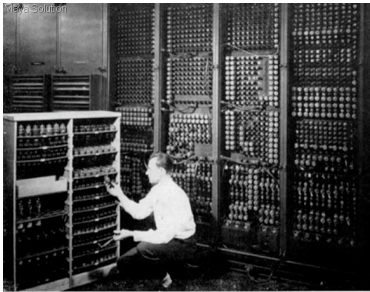
0 1 0 1 0



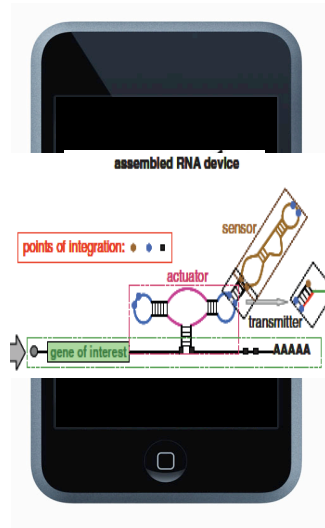
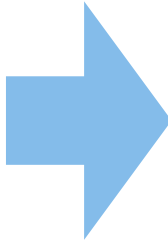
VS



The Value of an Idea



Replacing a bad tube meant checking among ENIAC's 19,000 possibilities.



The End

assembled RNA device

