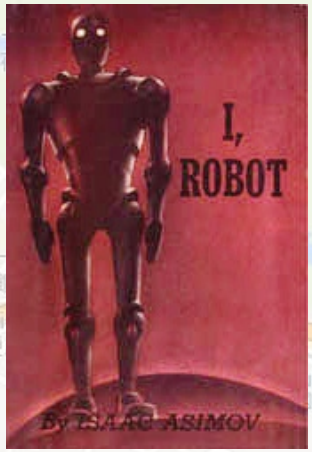
I, Researcher:
Finding one's role in science

Ray Luo (LC)
RIKEN BSI

rayluo@ucla.edu | rayLC.org

I, Researcher: the roadmap.

- Science is not wholly objective but depends on the researcher doing it.
- Scientific journey and personal journey determines the direction and methods of research.
- I, Researcher: inspirations from fiction.



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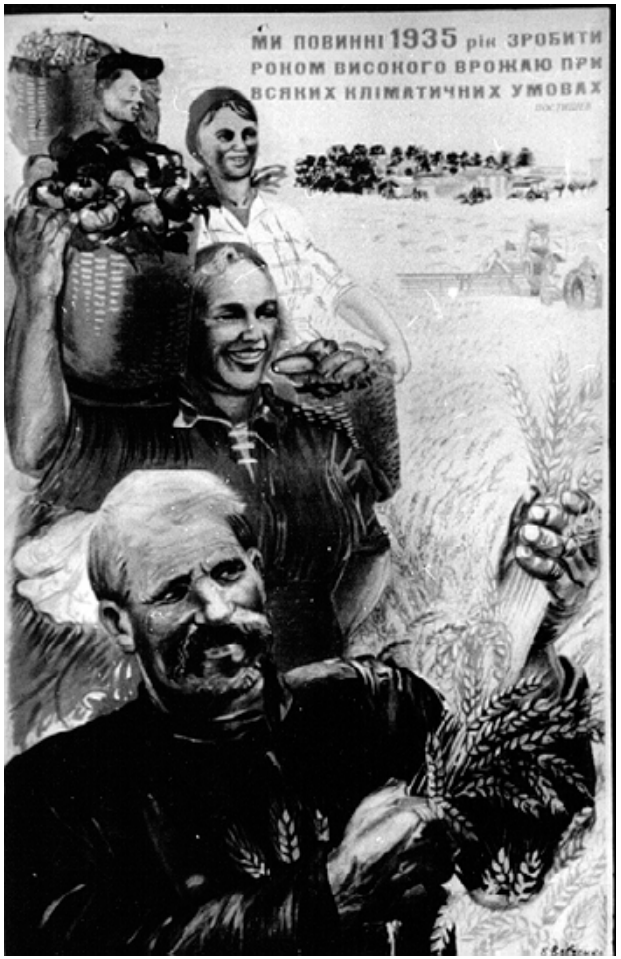
Science depends on the scientist.

- Trofim Lysenko: exposed seed to humidity low temp (vernalization) to increase yield, passed trait to offspring (reject natural selection for cooperation)
- Questionnaire of farmers confirms agricultural revolution (against theory is against the party)
- Famine, imprison scientists



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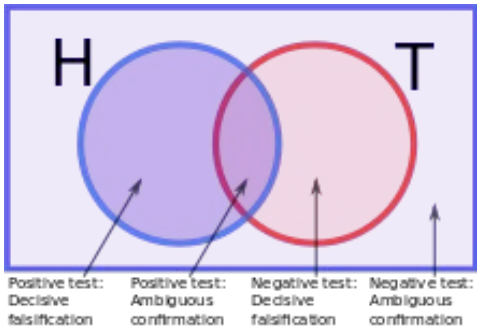
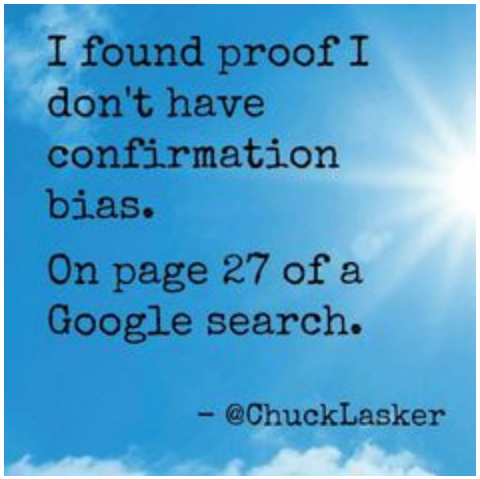
Science depends on the scientist.

- Peter Wason: asked to identify rule applying to three numbers (2-4-6)
- Subjects can ask if any set of 3 nums satisfies rule, most tested seq of even num even though correct rule is increasing nums
- No questions that would falsify rule: confirmation bias, gather positive info





Cultural personal influences on science.

- Motivation
- Metaphysical
- Practicality
- Culture (science fiction)
- Consistency (avoid cognitive dissonance)
- Controversy (debate)
- Perspective (C. P. Snow, The Two Cultures)

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Case study culture 1: HRL research labs, UC Riverside robotics REU.

8.1. Inheritance Relationships

8.1.1. Application Suite Inheritance Diagram

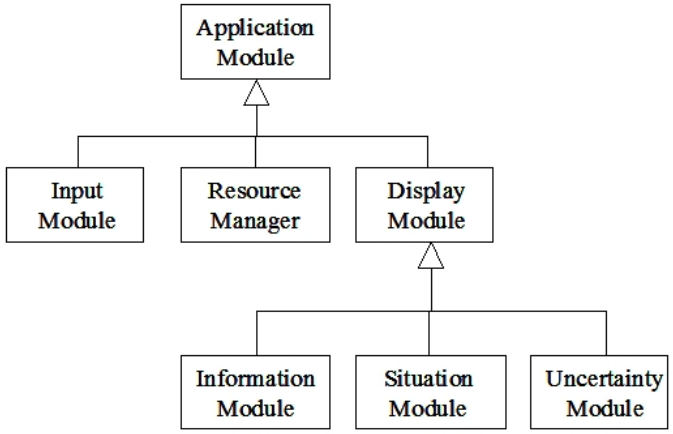
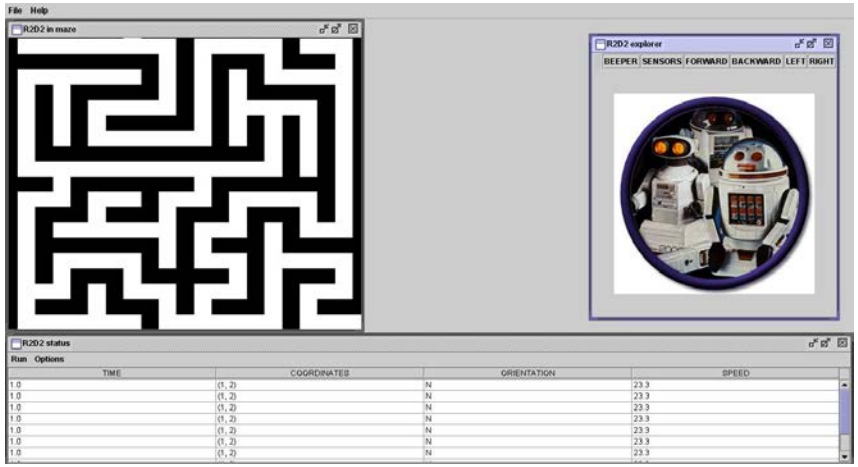


Figure 1. This is an inheritance diagram that represents how the applications will be derived; notice that this is not a class inheritance diagram. The Input Module, Resource Manager, and Display Modules will inherit the sockets implementation and a main control panel from the Application Module. The Information, Situation, and Uncertainty Modules will be inheriting display navigation and display interfaces from the Display Module.



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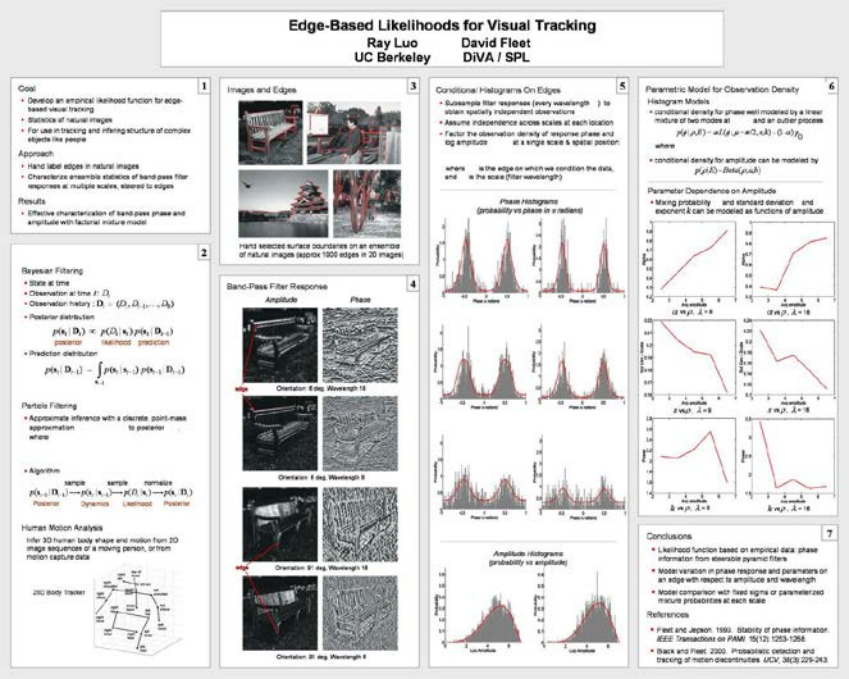
Case study culture 2: Cal Berkeley, Palo Alto Research Center.



Every node in the model is continuous, with equations that look like

$$
\begin{aligned}
H_s(t+1) &= BV_s(t+1) - H_s(t) + W_H(t), \\
V_s(t+1) &= AV_s(t) + W_V(t), \\
H_o(t) &= C_H H_s(t) + U_H(t), \\
V_o(t) &= C_V V_s(t) + U_V(t),
\end{aligned}
$$

where H_s is the control module associated with the hand, H_o is the estimated hand parameters (in particular, hand position), V_s and V_o are the estimated and observed target motion characteristics, A, B, and C are corresponding output matrices, and the Ws and Us are noise. H_o and V_o are observed. Note that the first equation accounts for sensory correction due to visual feedback.

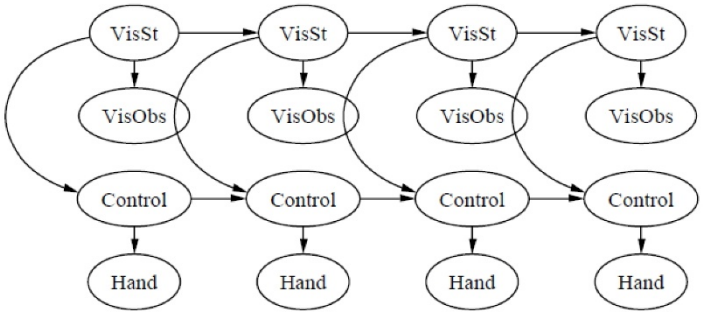


Figure 1: Graphical model of visuomotor tracking. Note that $VisSt$ and $Hand$ nodes are observed in our case.

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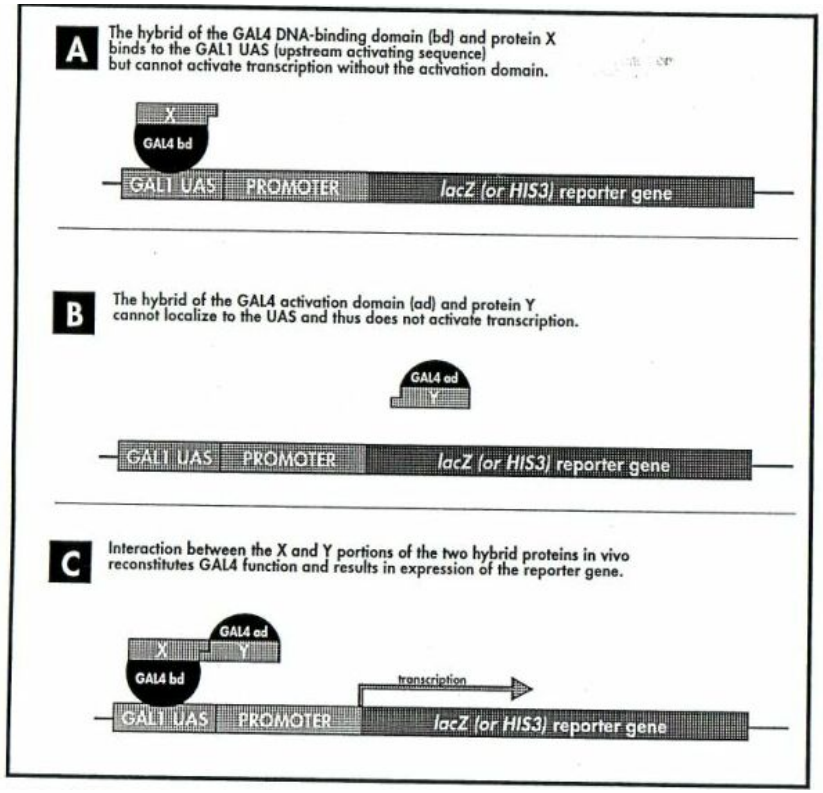
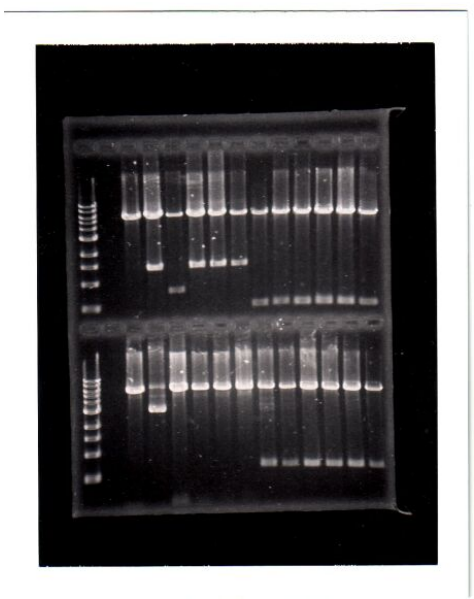
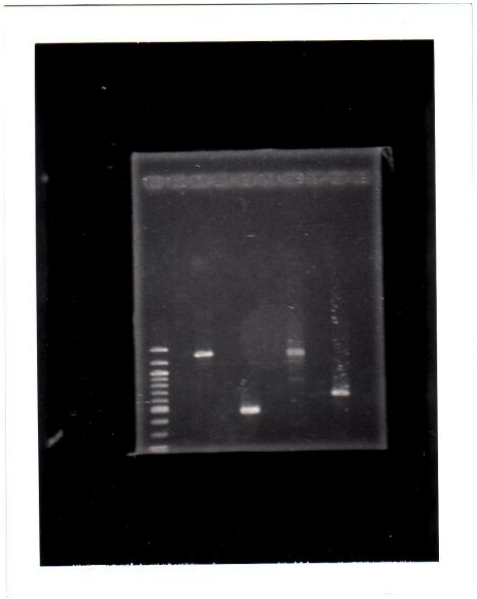
Case study culture 3: UCLA.



AP{2μ, 2σ, 3μ, 3σ}
ligated to pGBT.





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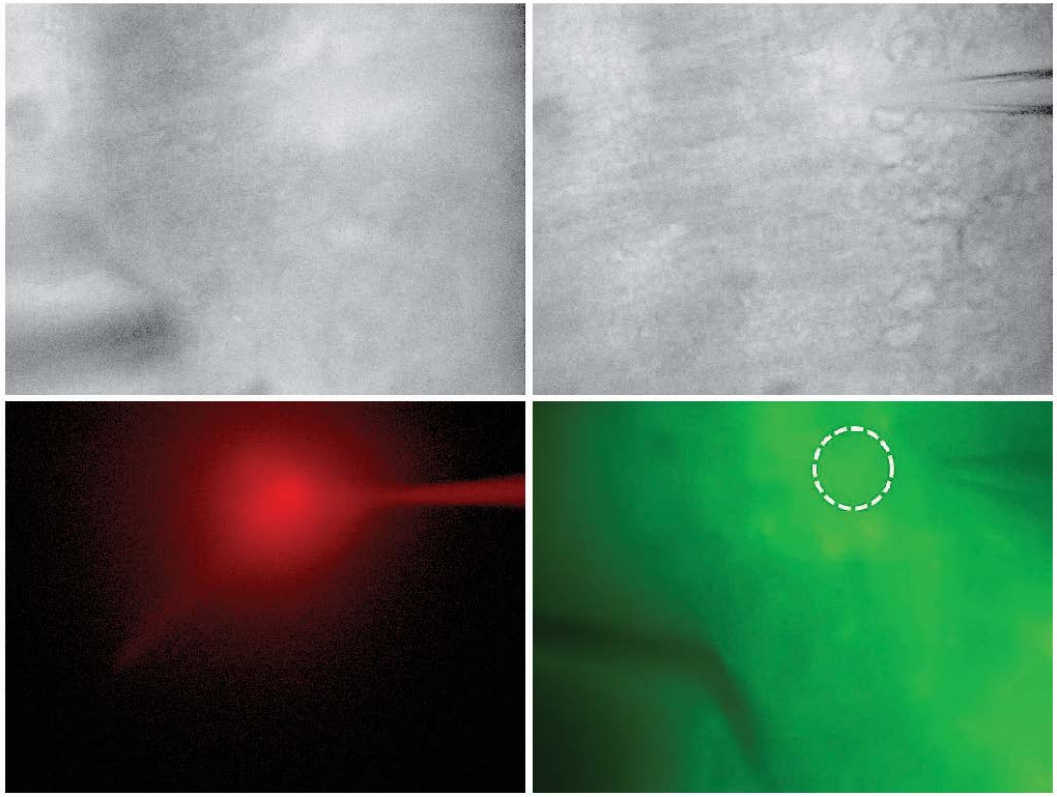
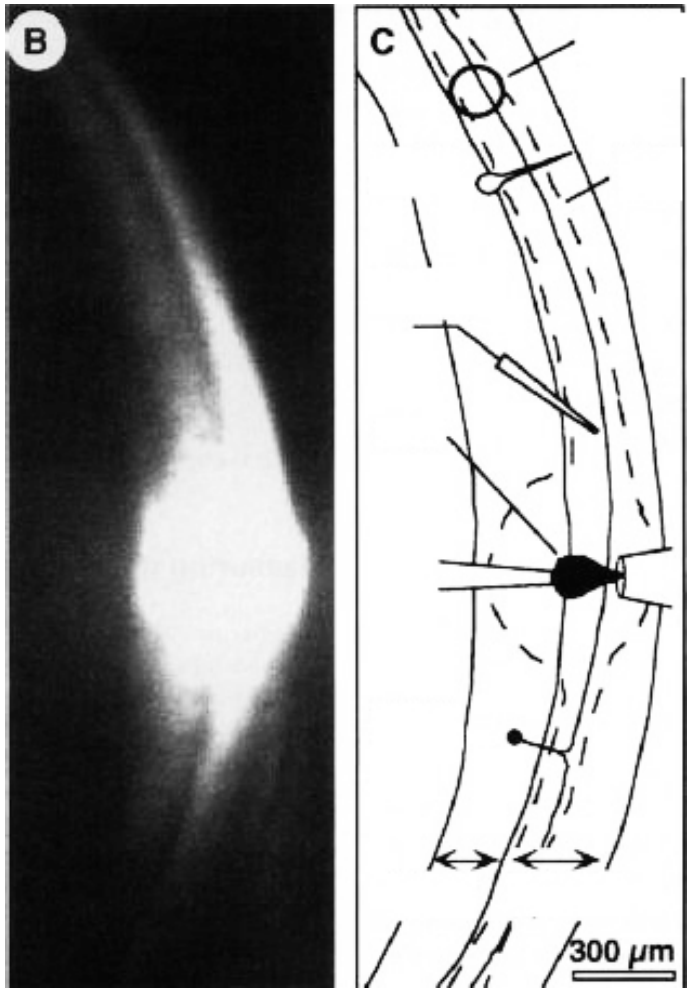
Case study culture 3: UCLA.

Oregon Green BAPTA-1 AM -> transverse slice

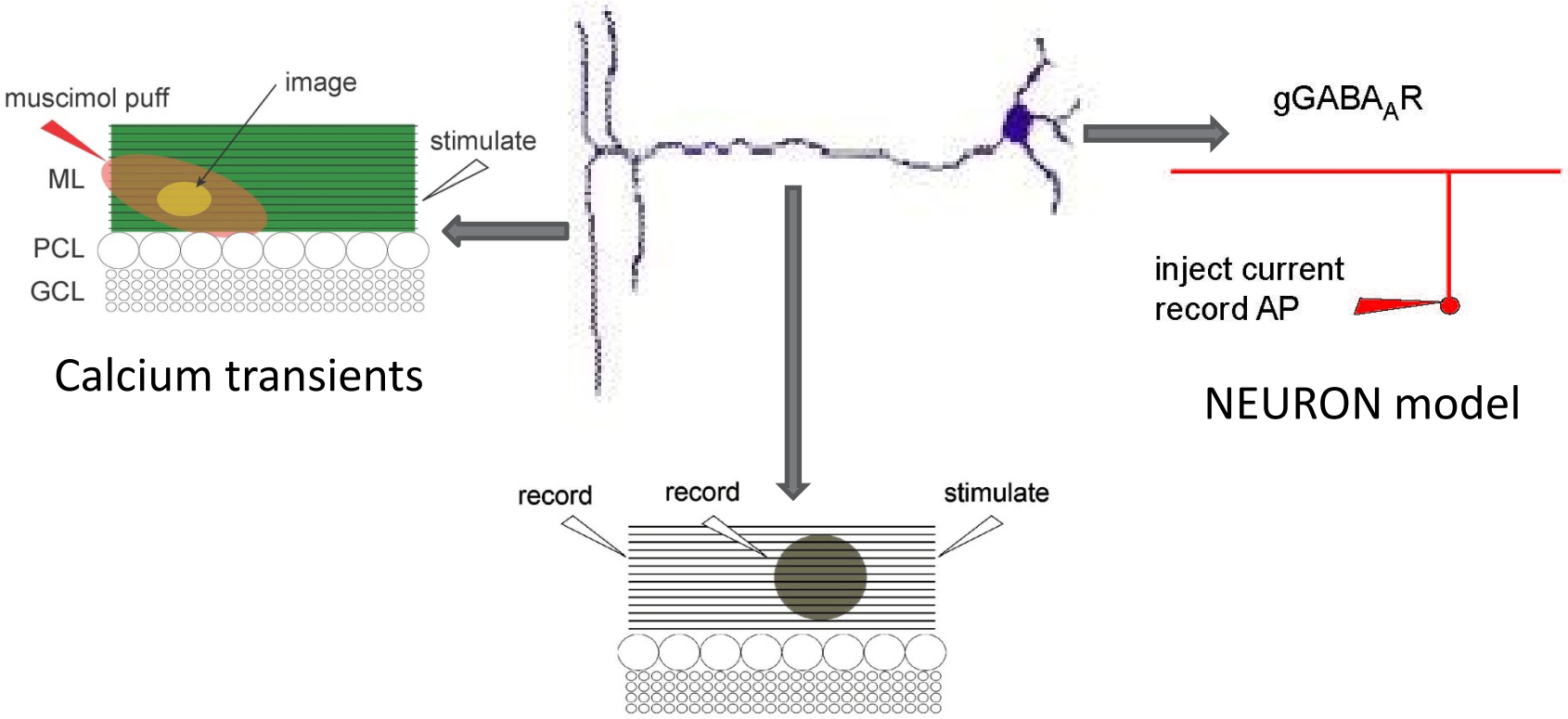


Luo, Dellal, Otis, 2012



Regehr and Atluri, 1997

Case study culture 3: UCLA.



Calcium transients

NEURON model

Fiber volleys

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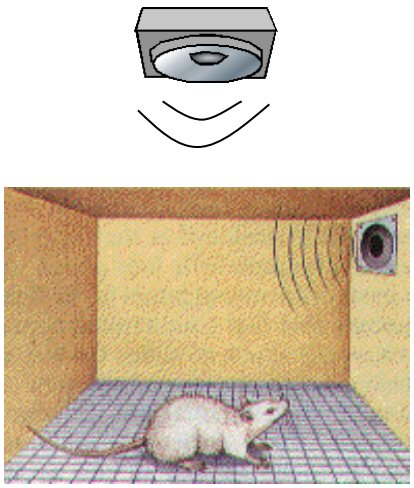
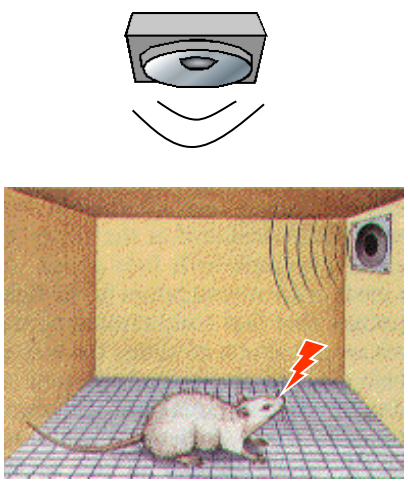
Case study culture 4: RIKEN Brain Science Institue.

CS



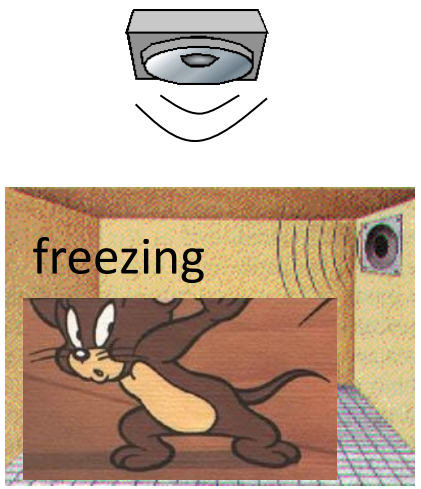
habituation

CS + US



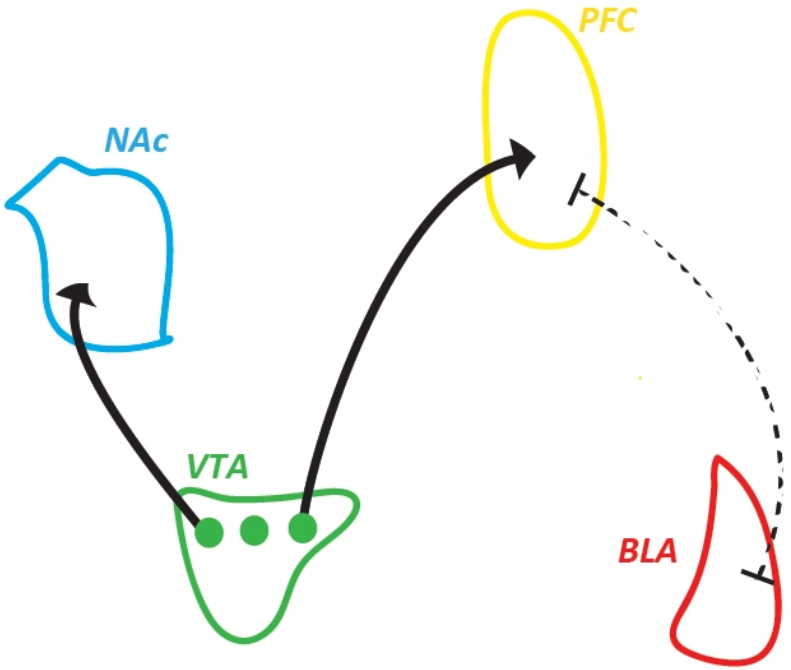
training

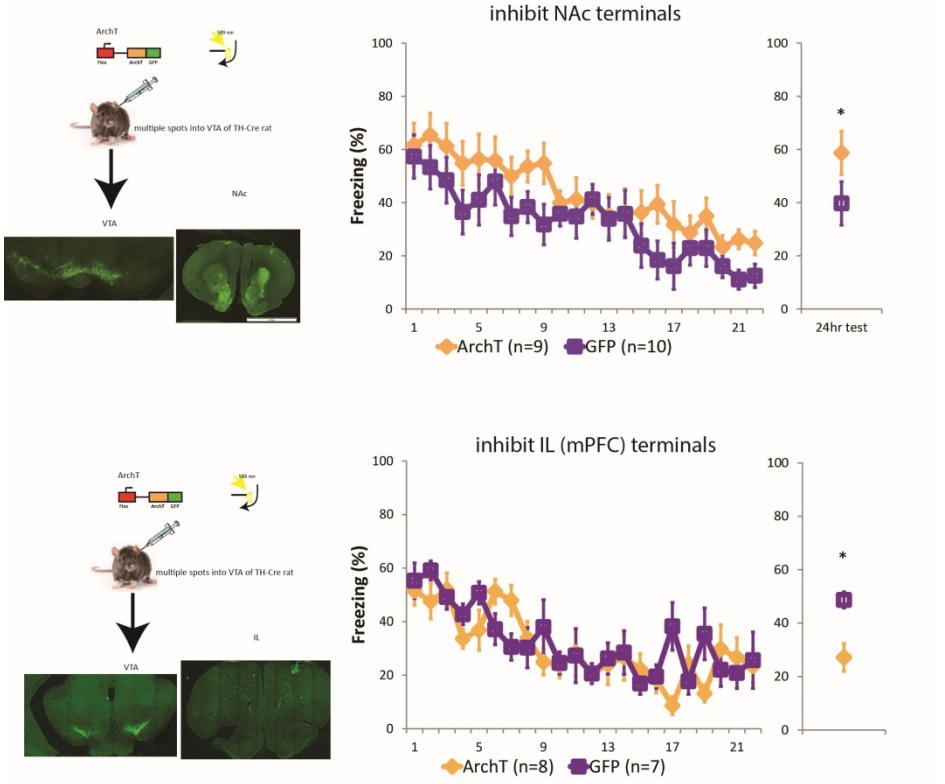
CS



testing

Case study culture 4: RIKEN Brain Science Institue.





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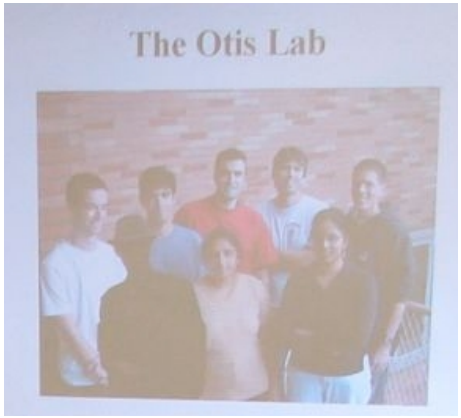
Lab pictures: a collection.



ray LC

rayluo@ucla.edu | rayLC.org

How to reconcile doing unbiased science with doing what you want?

- In social science, interpretation is inevitable.
- Even in science, direction and methods differ.
- In papers we tell “a story”.
- In next step we do what is feasible, interesting
- SAT testing has hidden bias (Aguinis et al, 2016).
- Cultural differences: Japan vs. US.
- Like writer making sense of world around her.
- Recognize subjectivity in self, but try to eliminate systematic bias.

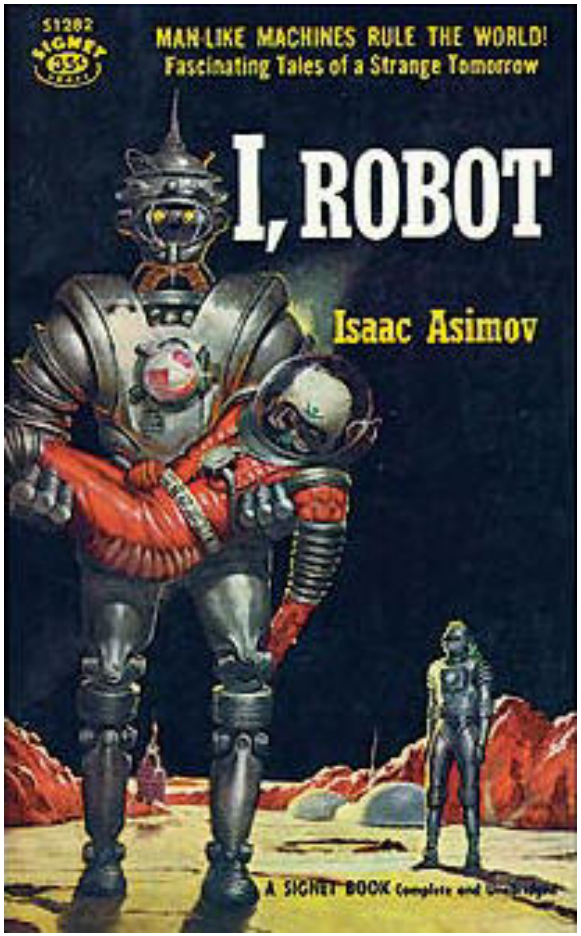
rayluo@ucla.edu | rayLC.org

Three Laws of Research

1. robot may not injure humans
2. obey humans unless conflict 1.
3. protect own existence as long as 1. and 2.

I, Researcher

1. researcher may not bias results
2. obey scientific method unless bias
3. do what thrills you as curiosity dictates long as 1. and 2.



"Evidence": robot runs for office

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I, Researcher: the summary.

- Science is not perfectly objective.
- Life goals and interests affect science.
- Recognize one's own limitations.
- Let's discuss!

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