# T. Kohno LAB.

## [Brain-compatible AI]

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Neuromimetic Systems

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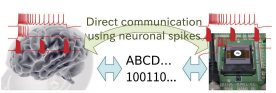
https://www.neumis.iis.u-tokyo.ac.jp

## Silicon Neuronal Networks

〜Electronic circuit copies the nervous system〜

Silicon neuronal network is electronic circuit composed of electronic circuit versions of neuronal cells and synapses. It reproduces electro-physiological activities in the nervous system in real-time or faster.

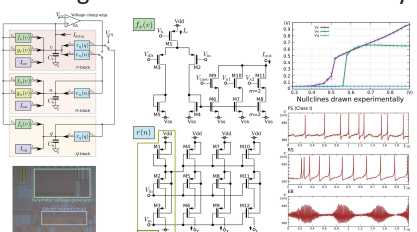
### Final goal is to realize "Brain-compatible AI"




- Capable of direct communication with the brain without symbols or languages. Efficiently deal non-linguistic information: sensations and sens.
- Efficient learning with small amount of data similar to the brain.
- Applicable to neuro-prosthesis

### Analog neuromimetic circuits designed using nolinear mathematics theory

- Ultralow-power
  7nW/neuron, 2pW/synapse
- 0.25μm CMOS process
- Power supply voltage 1V
- Supports 7 types of important brain cells including:
  Regular Spiking, Fast Spiking, and Elliptic Bursting cells.




### Towards brain-compatible computing

Biologically realistic models that differ from machine learning models such as deep learning.
Spatio-temporal pattern detection from noisy spike trains by single layer network with lateral inhibition (by Masquelier)
"Autonomously finding needles in haystack"