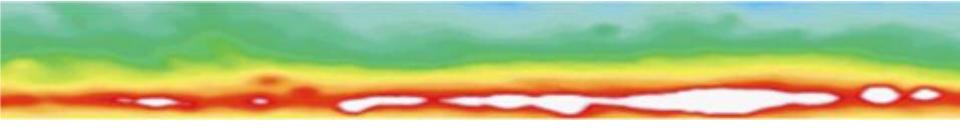


我是誰? 神是誰? 神關我的事嗎? Who am I? Who is God? Does God matter to me?

> 張懋中弟兄 Brother Frank Chang



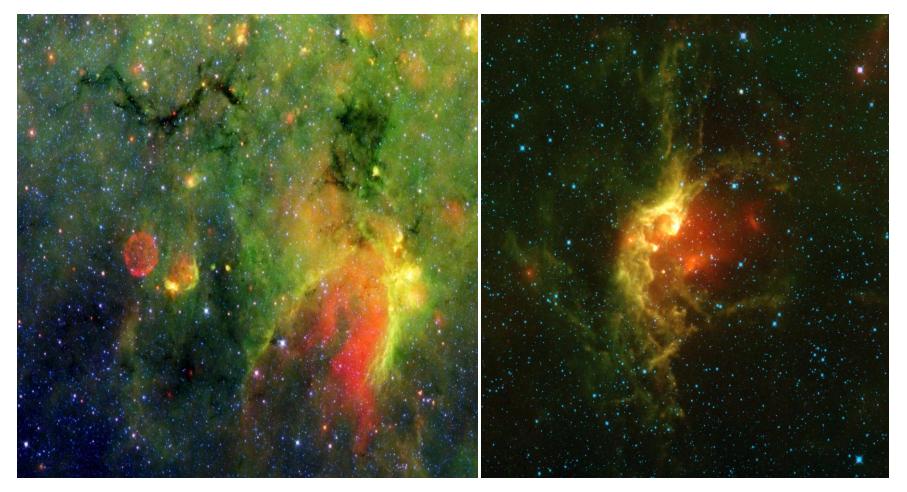
我是誰? Who am I?

我為何在這兒?

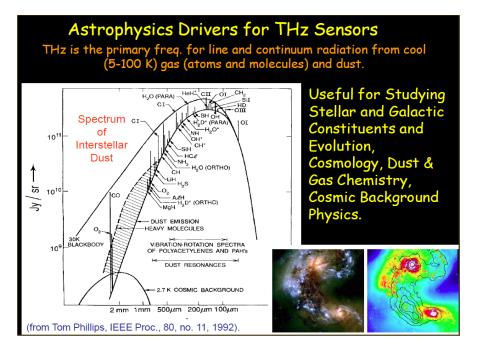
Why are we here?



The Incredible and Magnificent Universe



宇宙如何開始? How Did the Universe Get Started?



Cosmic Microwave Background was detected by Arno Penzias and Rob Wilson in 1964 by using a Dicke Radiometer with perfectly fitted Planck Blackbody radiation temperature at 2.7K

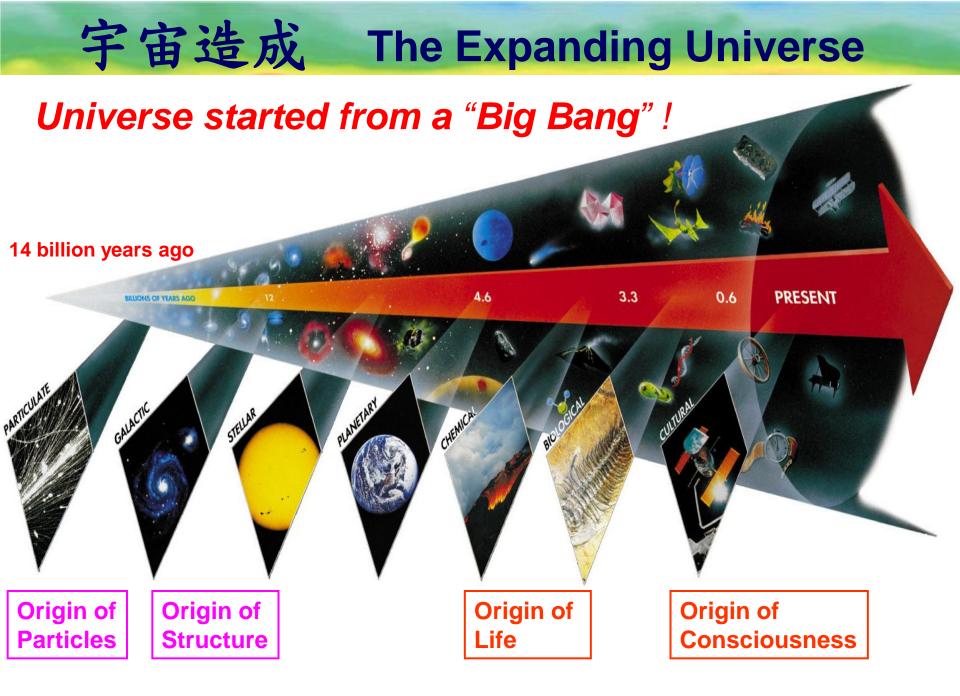
Frequency [1/cm]

6 8 10 12 14 16 18 20 22

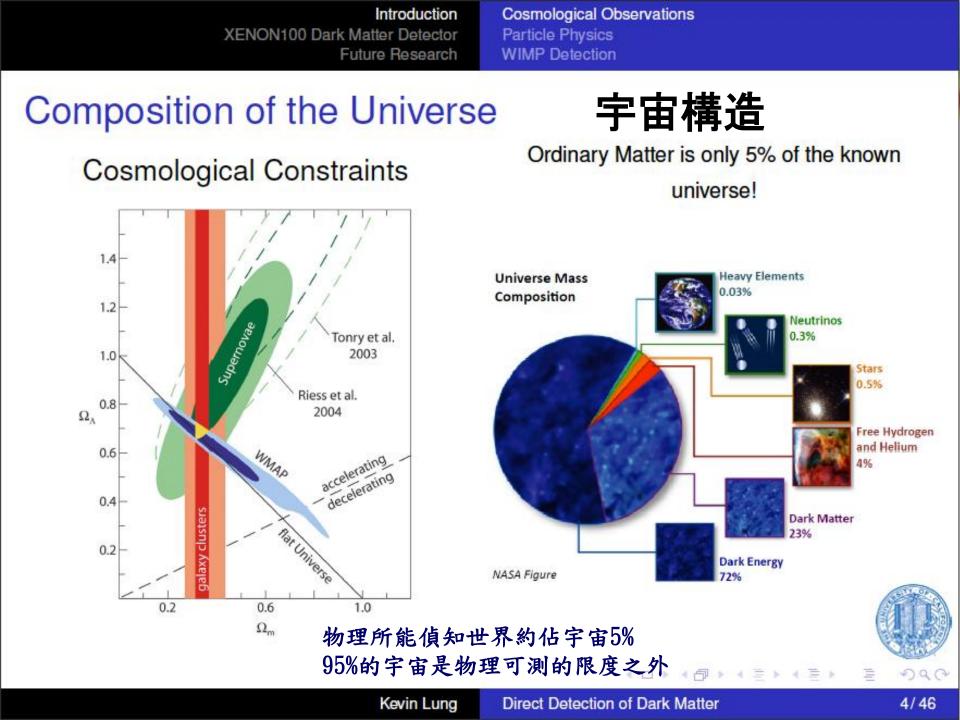
Cosmic Microwave Background Spectrum from COBE



Dicke Radiometer at Crawford Hill of ATT Bell Laboratories



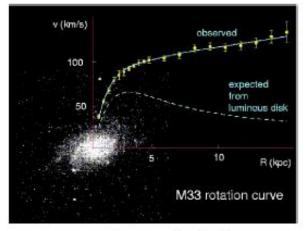
Courtesy Katsushi Arisaka



Introduction XENON100 Dark Matter Detector Future Research Cosmological Observations Particle Physics WIMP Detection

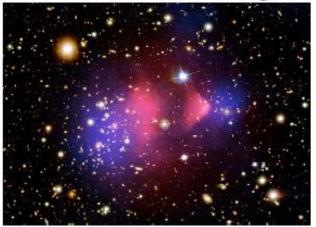
Evidence for Dark Matter

Galactic Rotation Curves

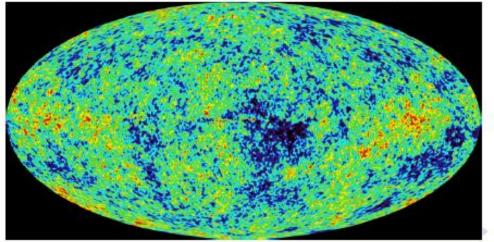


黑暗物質的証據

Gravitational Lensing



Cosmic Microwave Background (CMB)



物理學家如何看早期宇宙 **Physicists' View of Early Universe** 神說:要有光,就有了光. And God said: "Let there be light."

Fiat lux !!

光明與真理 Light and Truth



Let there be light !

要有光, 就有了光.

加州大學

神說:要有光, 就有了光.

And God said: "Let there be light."

(創世紀, Genesis 1:3)

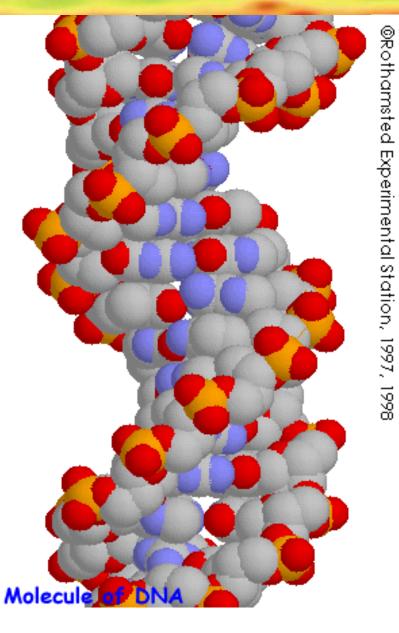


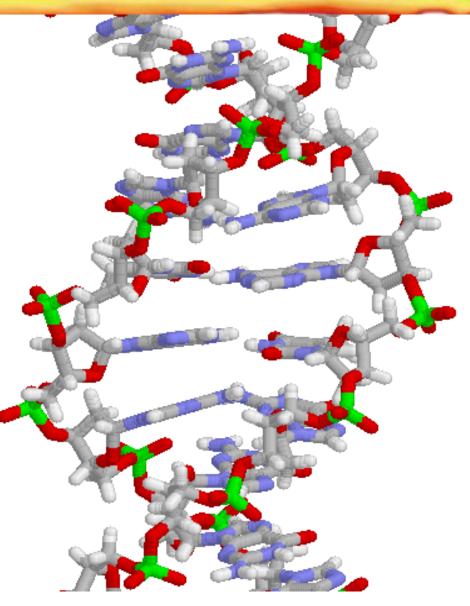
Light and Truth !

光明與真理

耶魯大學

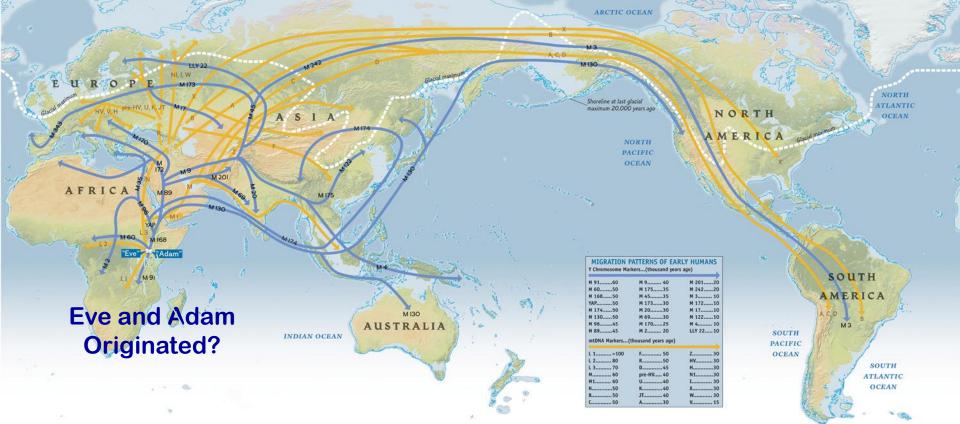
基因結構 Structure of DNA





Human Migration from Africa from One Mother (Eve, based on Mitochondria identification)

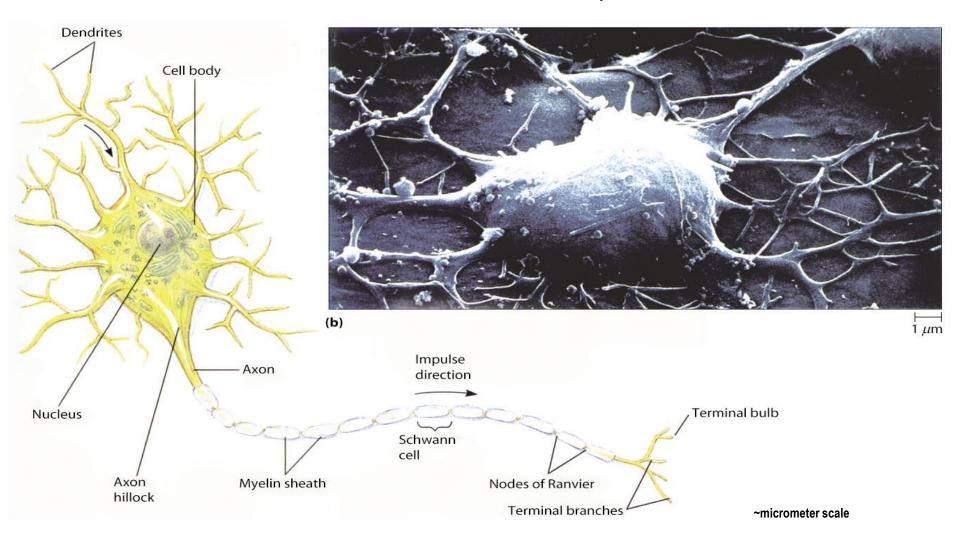




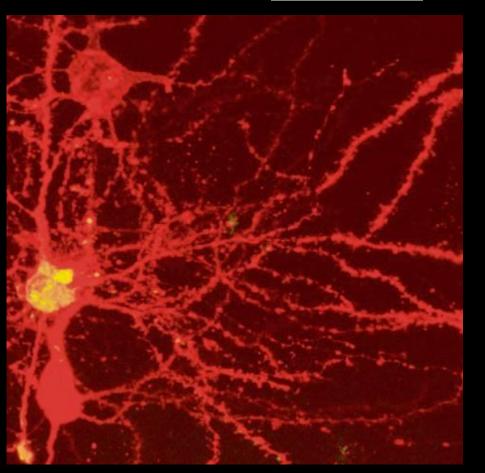
Only with 150,000 years history.

神經 Neurons

Each Neuron has ~1,000 connections (10¹¹ x 1000 = 10¹⁴)

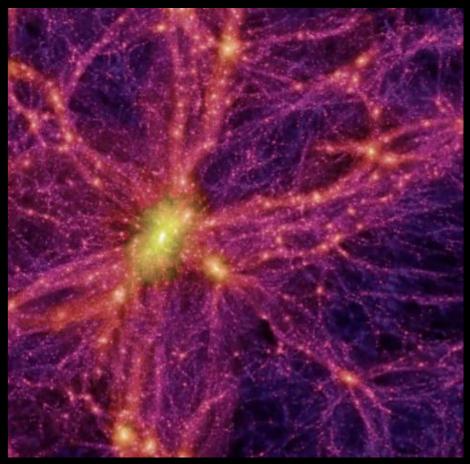






Universe





100 Billions Neurons

100 Billions Galaxies

New York Times 8/21/2006

From No Brain to Big Brain 從無腦變有腦



Paramecium (Single Cell)



Lymnaea (~1,000 neurons)



Zebrafish (~10,000 neurons)



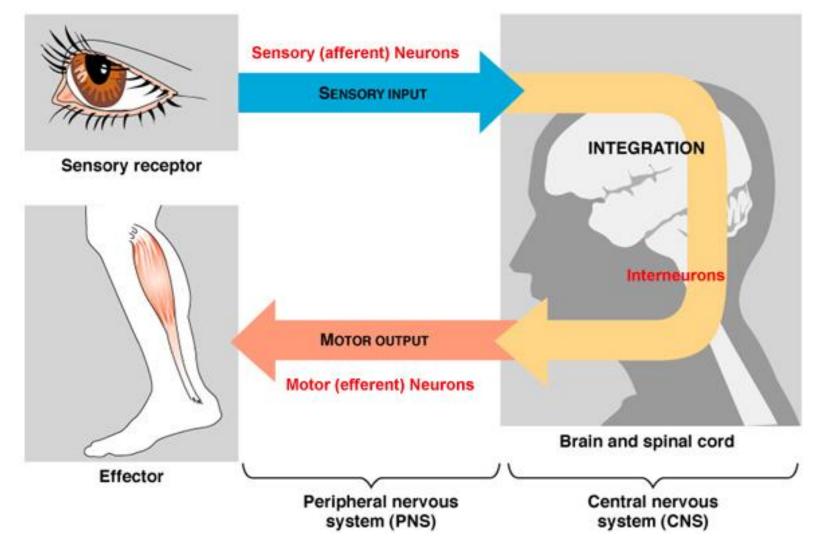
Bullfrog (~10⁷ neurons)



Rat (~10⁸ neurons)

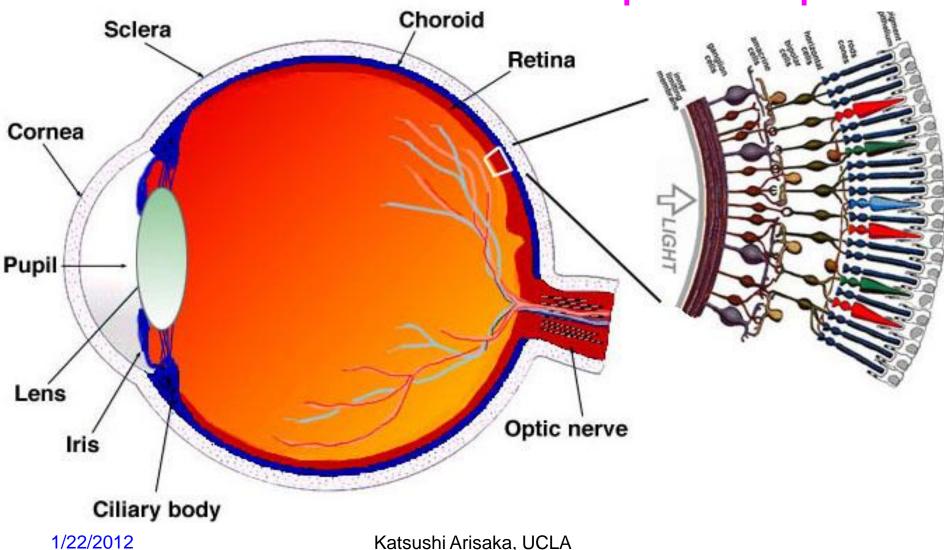
大腦的感應和決策

Sensory Input and Decision Making in Brain

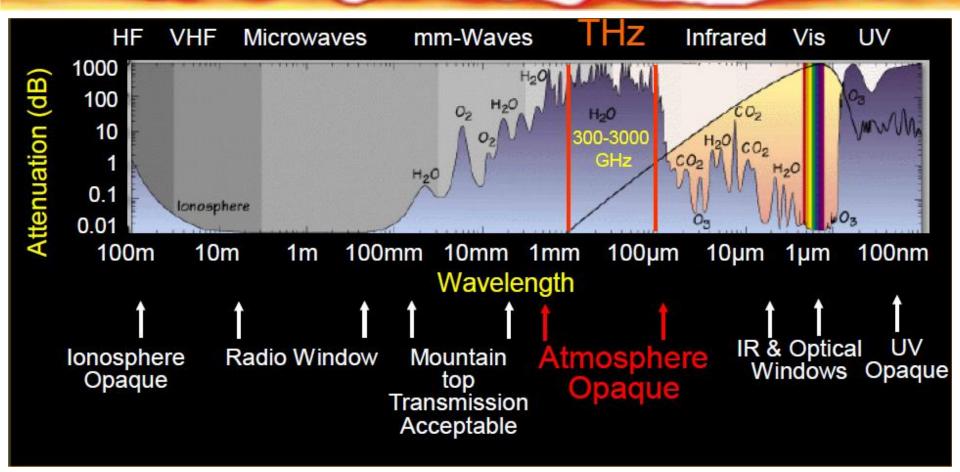


人的視覺 (Human Sight)

~100M photo receptors



電磁波頻譜 EM Wave Spectrum



1 Tera-Hertz = 10¹²/sec (one trillion times per sec) US National GDP \$14.2 trillion

(Courtesy JPL) 18

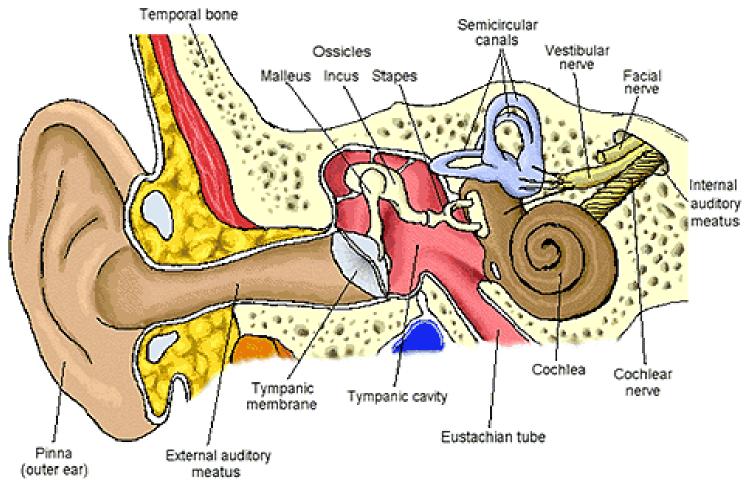
如何從遠處辯識一個人? How can I recognize a person so far away?



➤ Genetically encoded? 基因認知? ➤ Learning and memory? 記憶和學習?

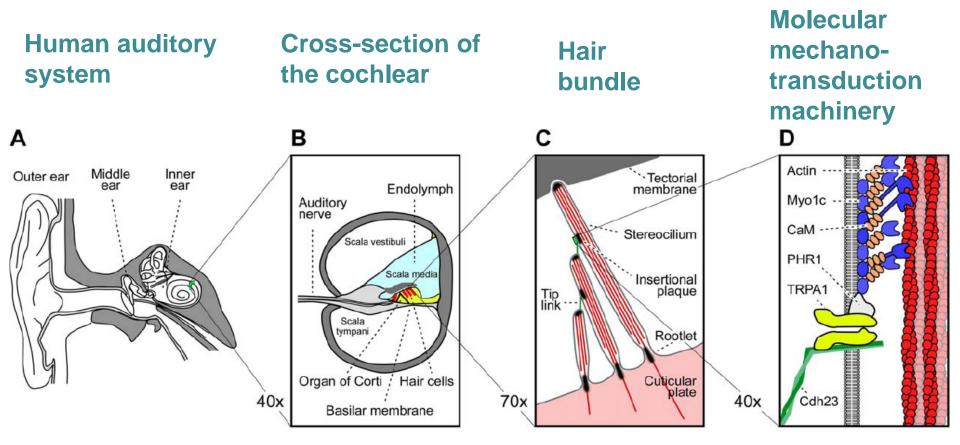
人的聽覺 Human Ears

~10,000 Hair Cells



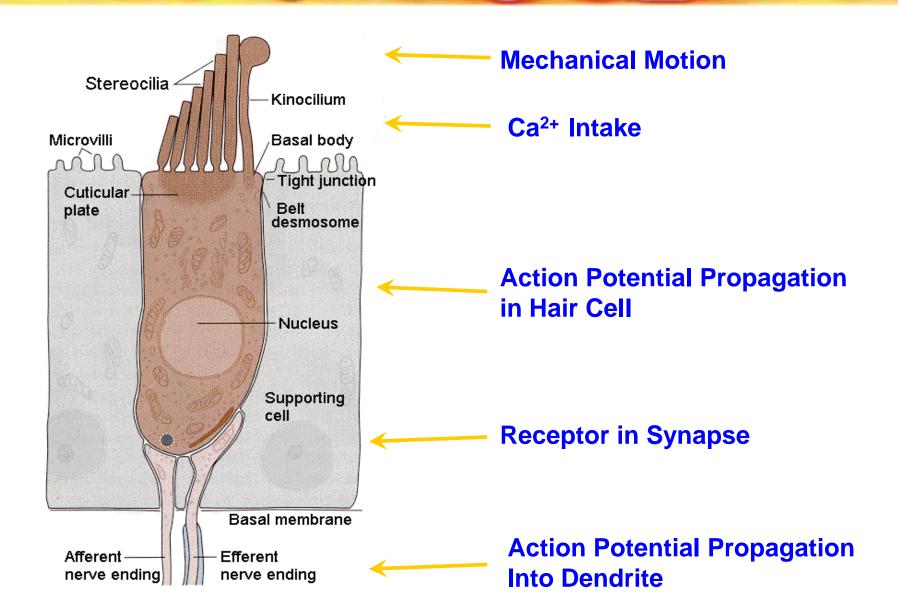
內耳結構 Anatomy of Inner Ear





Meredith LeMasurier and Peter G. Gillespie, Neuron, Vol. 48,2005

同時感應完整音頻 Simultaneous sensing entire audio spectrum

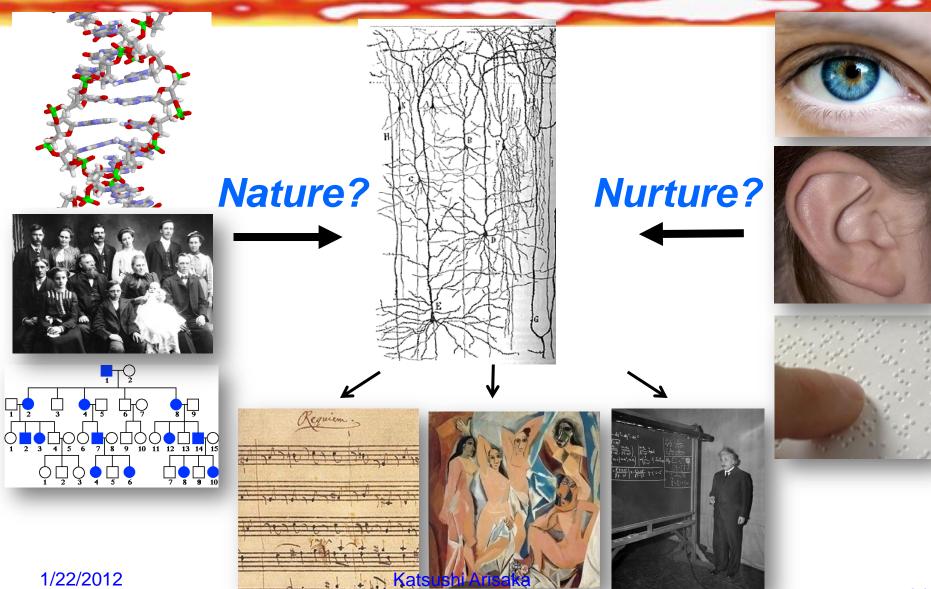


聽覺的奧秘 Mystery of Hearing

- Extremely wide dynamic range in amplitude.
 - -10^{6} compressed to 100
 - Smallest amplitude is 0.3 nm
- Extremely wide frequency range.
 - 20 Hz 20 kHz
 - Dynamic range of 1000
 - Corresponding to 10⁶ in k
 - Selectivity of 0.2%
 - up to 5 kHz
 - How can the brain handle up to 20 kHz?
 - Missmatch to the speed of action potential of 1 kHz

$$\omega = \sqrt{\frac{k}{m}}$$

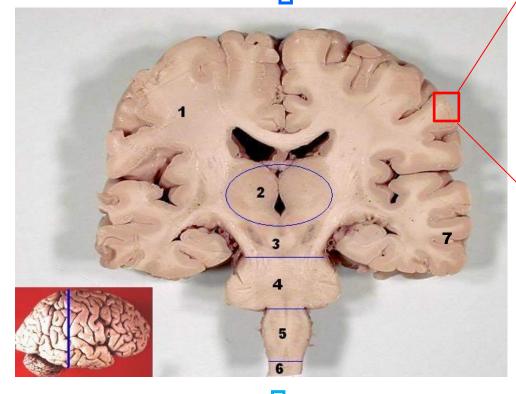
何為自然? Who is "Nature"?



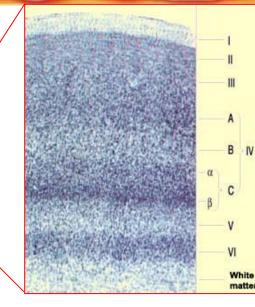
1/22/2012

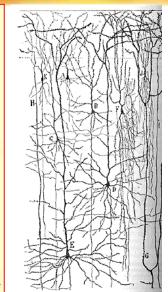
The Cerebral Cortex 大腦皮層

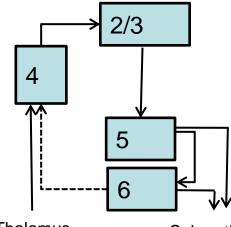
Conscious



Unconscious







Thalamus

Subcortical areas

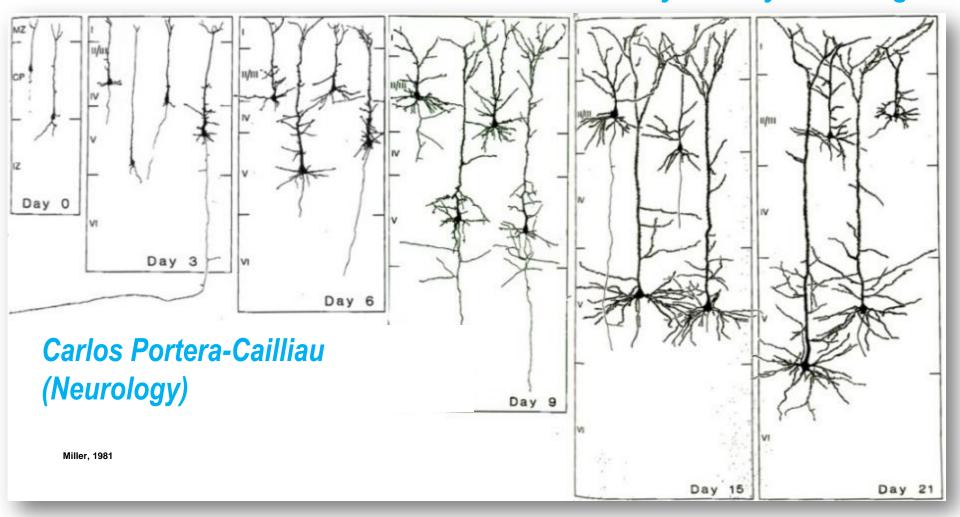
Katsushi Arisaka



1/22/2012

老鼠皮質電路發展過程

Assembly of rat's cortical circuits during development How/when do neurons establish networks? → Symmetry Breaking



電腦對人腦 Computer vs. Brain

| | Computer (Watson) | Human Brain |
|--------------------|---|---------------------------|
| Key Unit | Transistor | Neuron |
| No. of units | ~ 10 ⁹ (~10 ¹²) | ~ 10 ¹¹ |
| Connection | Copper Wire | Axon + Dendrite |
| No. of Connections | ~ 10 ¹⁰ (~10 ¹³) | ~ 10 ¹⁴ |
| Signal Carrier | Electrons | lons (Na+, Ca+, K+) |
| Clock Speed | ~ 1 GHz | ~ 1 kHz |
| Method | Sequential | Parallel Processing |

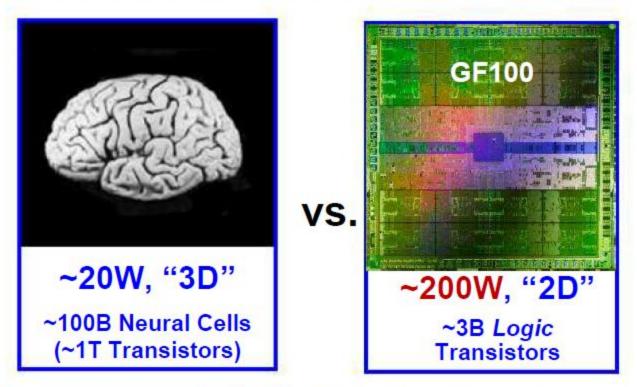
Who Build Human Operation System?

師法自然? Learn from Nature?



Collaborate to Innovate

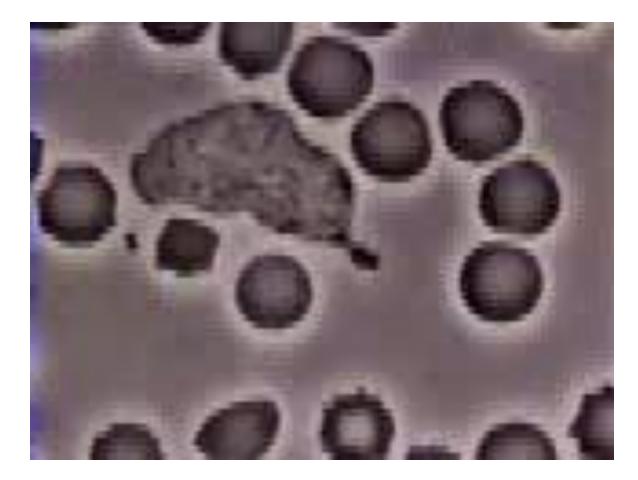
Human Brain vs. State-of-the-Art Chip



We are power constrained and must learn from nature

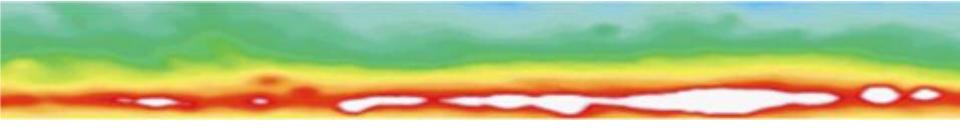
受造奇妙可畏! Can it be done without Creation?

"我的肺腑是你所造的。我在母腹中你已覆庇我。我要稱謝你因我受 造奇妙可畏。詩篇一百三十九篇十三至十四節

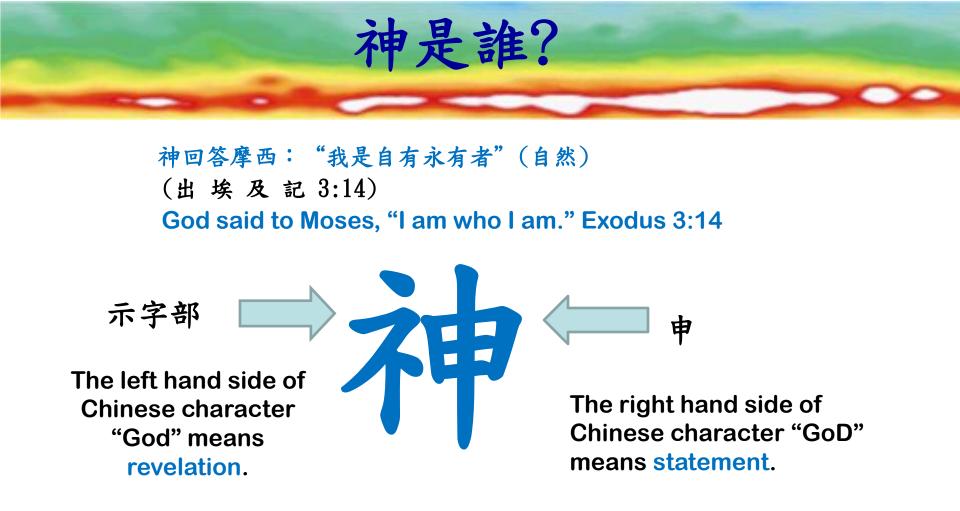


For you created my inmost being; you knit me together in my mother's womb.

I praise you because I am fearfully and wonderfully made; your works are wonderful, I know that full well. (Psalm 139: 13-14)



神是誰? Who is God?

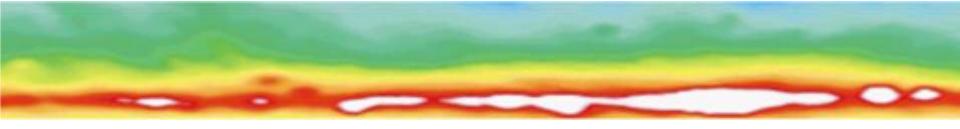


自從造天地以來, 神的永能和神性是明明可知的. 雖是眼不能見, 但藉 著所造之物, 就可以曉得, 叫人無可推諉. (羅馬書 1:20) For the invisible things of him since the creation of the world are clearly seen, being perceived through the things that are made, even his everlasting power and divinity; that they may be without excuse. (Romans 1:20)

開我的眼睛 Open My Eyes



求你開我的眼睛,使我看出你律法中的奇妙。 我是在地上作寄居的;求你不要向我隱瞞你的命令!(詩篇119:18) Open my eyes that I may see wonderful things in your law. I am a stranger on earth; do not hide your commands from me. (Psalm 119:18)



神關我的事嗎? Does God Matter to Me?

太初有道 (In the Beginning Was Word)

太初有道、道與 神同在、道就是 神. 這道太初與 神同在. 萬物是藉著他造的·凡被造的、沒有一樣不是藉著他造 的. 生命在他裏頭·這生命就是人的光.

(約翰福音1:1-4)

In the beginning was the Word, and the Word was with God, and the Word was God. He was with God in the beginning. Through him all things were made; without him nothing was made that has been made. In him was life, and that life was the light of man. (John 1:1-4)

大道之行也 When God's Word Prevailed on Earth

有物混成,先天地生,可以為天下母,吾不知其 名,强字曰道,强為之名曰大 道生一,一生二,二生三,三生萬物 人法地、地法天、天法道,道法自然 (老子) 大道之行也,天下為公,選賢與能,講信修睦, 故人不獨親其親,不獨子其子…是謂大同…今 大道既隱,天下為家,各親其親,各子其子 (禮記禮運大同篇)

耶穌道成肉身 (Word Became Flesh)

道成了肉身,住在我們中間,充充滿滿地有恩典,有真理. 我們也見過他的榮光,正是父獨生子的榮光.

The word became flesh and made dwelling among us. We have seen his glory, the glory of one and only Son, who came from the Father, full of grace and truth. (John 1:14)

因為世人都犯了罪, 虧缺了 神的榮耀. 如今卻蒙 神的恩典, 因基督耶 穌的救贖, 就白白的稱義. 神設立耶穌作挽回祭, 是憑著耶穌的血, 藉 著人的信, 要顯明 神的義. 因為他用忍耐的心, 寬容人先時所犯的 罪·(羅馬書 Romans 3:23-25)

For all have sinned and fall short of glory of God, and justified freely by his grace through the redemption that came by Christ Jesus. God presented him as a sacrifice of atonement, through faith in his blood. He did this to demonstrate his justice, because in his forbearance he had left the sins committed beforehand unpunished. (Romans 3:23-25)

作神的兒女 Become Children of God

那光是真光,照亮一切生在世上的人.他在世界,世界也 是藉著他造的.世界卻不認識他,他到自己的地方來,自 己的人倒不接待他.凡接待他的,就是信他名的人,他就 踢他們權柄作神的兒女. (約 翰 福 音 1:9-12)

The true light that gives light to everyone was coming into the world. He was in the world, and though the world was made through him. He came to that which was his own, but his own did not receive him. Yet to those who did receive him, to those who believed in him name, he gave the right to become children of God. (John 1:9-12)

耶穌是道路,真理,生命(Jesus is Way, Truth, Life)

我就是道路,真理,生命,若不藉著我,沒有人能到父那裏去.(約翰14章6節)

I am the way and the truth and the life. No one comes to the Father except through me. (John 14:6)

我是葡萄樹,你們是枝子.常在我裏面的,我也常在他裏面.這人就 多結果子,因為離了,我你們就不能做什麼. (約翰15章5節)

I am the vine; you are the branches. If a man remains in me and I am in him, he will bear much fruit; apart from me you can do nothing. (John 15:5)

耶穌是生命 (Jesus is Life)

我就是生命的糧,到我這裏來的必定不餓,信我的永遠不渴.(約 翰6章35節).

I am the bread of life. He who comes to me will never go hungry, and he who believes in me will never be thirsty. (John 6:35)

我是世界的光, 跟從我的就不在黑暗裏走, 必要得到生命的光(約 翰8章12節)

I am the light of the world. Whoever follows me will never walk in darkness, but will have the light of life. (John 8:12)

復活在我,生命也在我.信我的人雖然死了,也必復活.凡活著信我 的人,必永遠不死.(約翰11章25-26節) I am the resurrection and the life. He who believes in me will live, even though he dies; and whoever lives and believes in me will never die. (John 11:25-26)

Does God matter to me?神關我的事嗎?

不從惡人的計謀,不站罪人的道路,不坐褻 慢人的座位, 惟喜愛耶和華的律法,晝夜思想,這人便為 有福!(詩篇1:2-3)

But whose delight is in the law of the Lord, and who meditates on his law day and night. He is like a tree planted by streams of water, which yields its fruit in season, whose leave does not wither- whatever they do prospers. (Psalm 1:2-3)