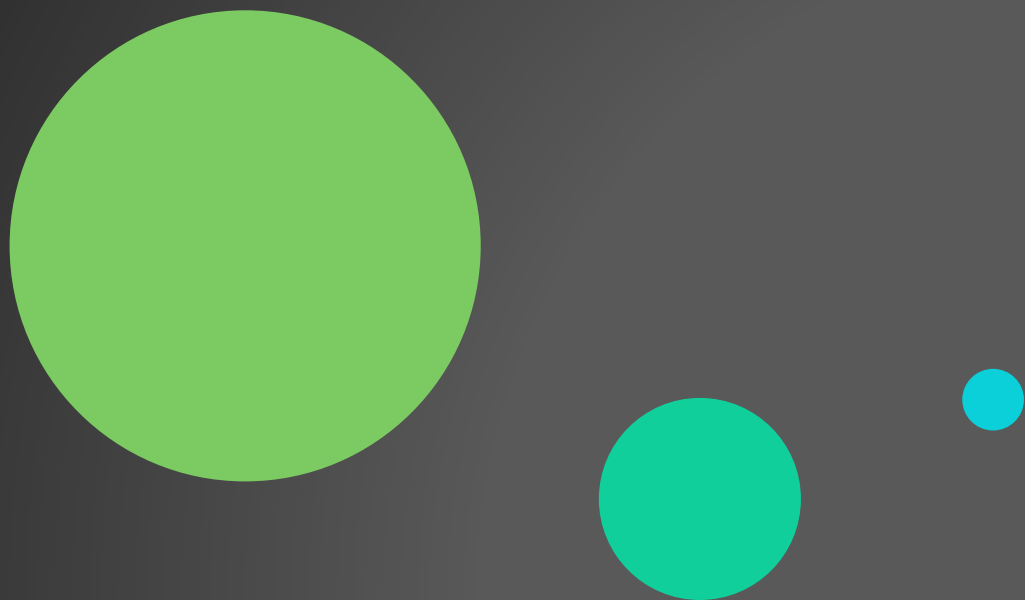




Information Wisdom Theory

- **Nature gave life freedom;
life uses it to find orders.**

Liang Zhao

Professor, Dr. Informatics

Division of Grad. Studies and Grad.
Sch. Advanced Integrated Studies in
Human Survivability, Kyoto University

November 13th, 2025

About me



PI of Future Wisdom Institute (FWI) at Kyoto University

Research interests: Wisdom, AI, Network/Data/Information science, Management, Law, Economics, etc.

Interdisciplinary studies on life, human, society, AI, and the future.

<https://aw.gsais.kyoto-u.ac.jp>

I. Intro. of Kyoto University

Kyoto University at a Glance



Students
(As of April 1, 2025)

22,300

Undergraduate 12,700

Graduate 9,600

3,000



International students

2

Semesters



Apr. → Sept.

Sur



Income in
the 2024
academic year

10

Faculties

18

Graduate schools

12

Research institutes

JPY
195

billion
(USD 1,304 million)

26

Centers
& other
organizations

Faculty and staff members

(As of May 1, 2025)

International Partners

<https://news.yahoo.co.jp/articles/fc68edf88a83fdff9bdc0d38f739ce2ad904ee8f>

YAHOO JAPAN

ログイン アプリはじめて利用限定、お得な千円クーポン

キーワードを入力



トップ

速報

ライブ

エキスパート

オリジナル

みんなの意見

ランキン

主要

国内

国際

経済

エンタメ

スポーツ

IT

科学

ライフ

地域

ノーベル賞受賞決定の阪大・坂口志文氏と京大・北川進氏 母校の京大に揃い踏み

11/10(月) 18:05 配信



MBS NEWS



MBSニュース



352

Student Exchange
Agreements (Total)

64

Overseas offices
and facilities

155
University
level

197
Department
level

13



Award winning research

Nobel laureates

1

Abel Prize
Laureate

2

Fields
Medalists

1

Gauss Prize
winner

5

Lasker Award
winners

1

Chern
Medalist

5

Strategic
Partnerships

14

On-site
Laboratories

31

Overseas alumni
associations

Dark-Fly (暗黒果蝇)

https://www.kyoto-u.ac.jp/static/ja/news_data/h/h1/news6/2010/110301_1.htm

1300世代暗黒に保たれたショウジョウバエの活動リズム



Publish

About

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advanced search

OPEN ACCESS PEER-REVIEWED
RESEARCH ARTICLE

Genome Features of a Dark-Fly Long-Term in a Dark Environment

Minako Izutsu , Jun Zhou, Yuzo Sugiyama, Osamu Nishimura, Tomoyuki Aizu, Atsushi Toyoda, Asao Fujiyama, Kiyokazu Agata, Naoyuki Fuse  

Published: March 14, 2012 • <https://doi.org/10.1371/journal.pone.0033288>

- 2012, 1400 generations (57 years), 5% mutation but no much change except for sense of smell
- 2025 now: 1600 generations, continuing...

0
Save

30
Citation

319,811
View

0
Share

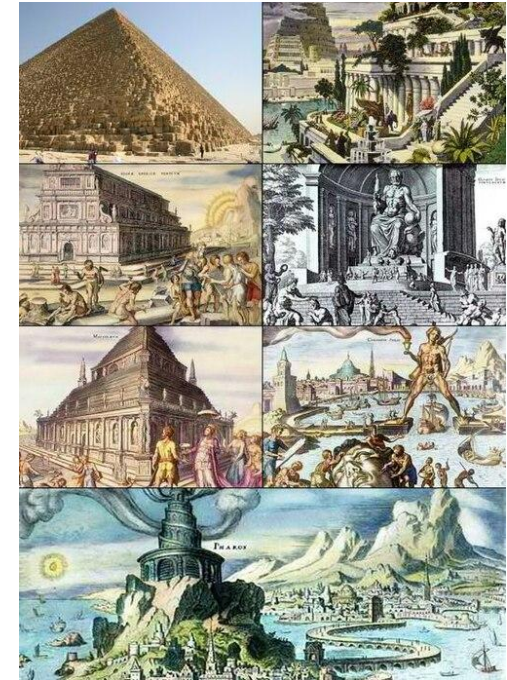
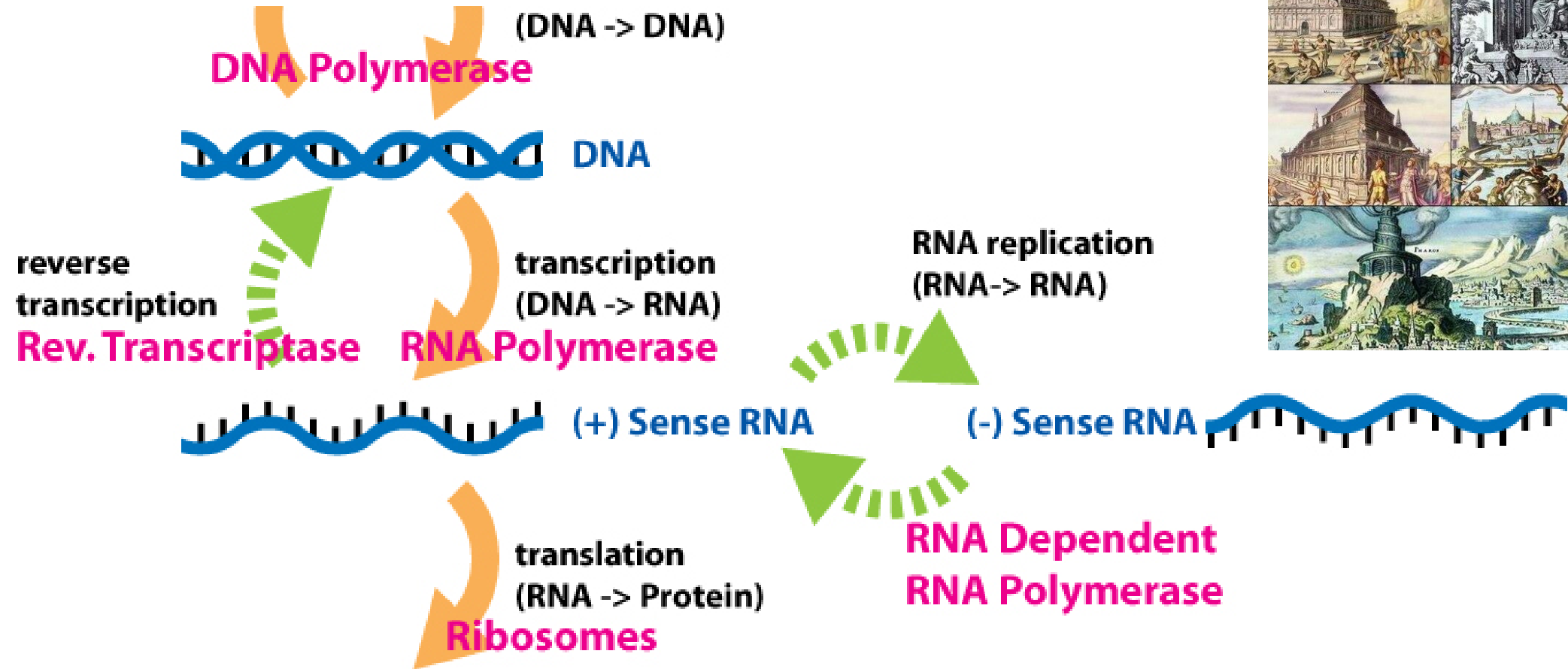
著者：今福道夫（京都大学名誉教授）・原村隆司（京都大学理学研究科リサーチフェロー）

発表雑誌：Zoological Science（日本動物学会 学会誌）28巻3号（2011年3月1日発行）

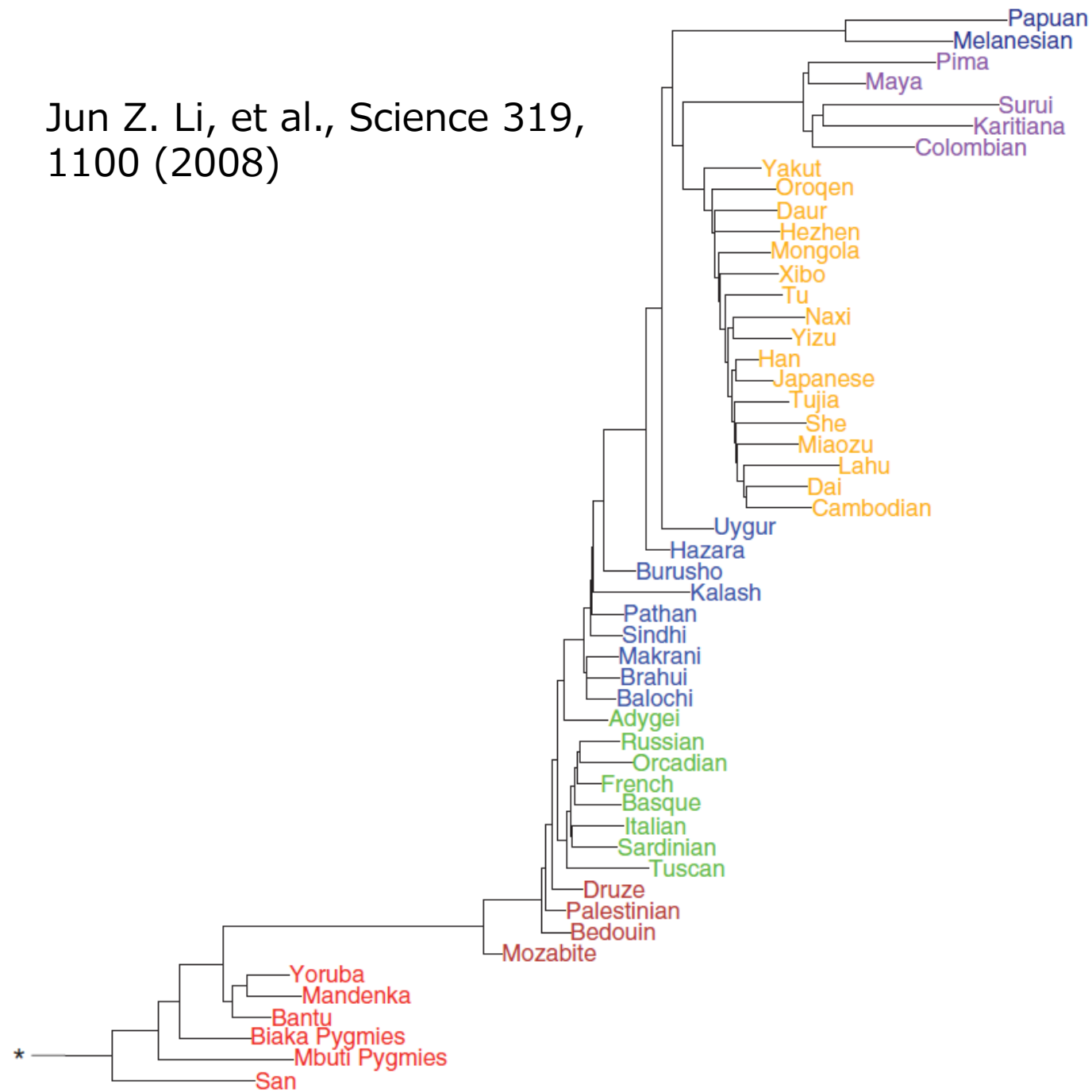


左から、原村リサーチフェロー、今福教授

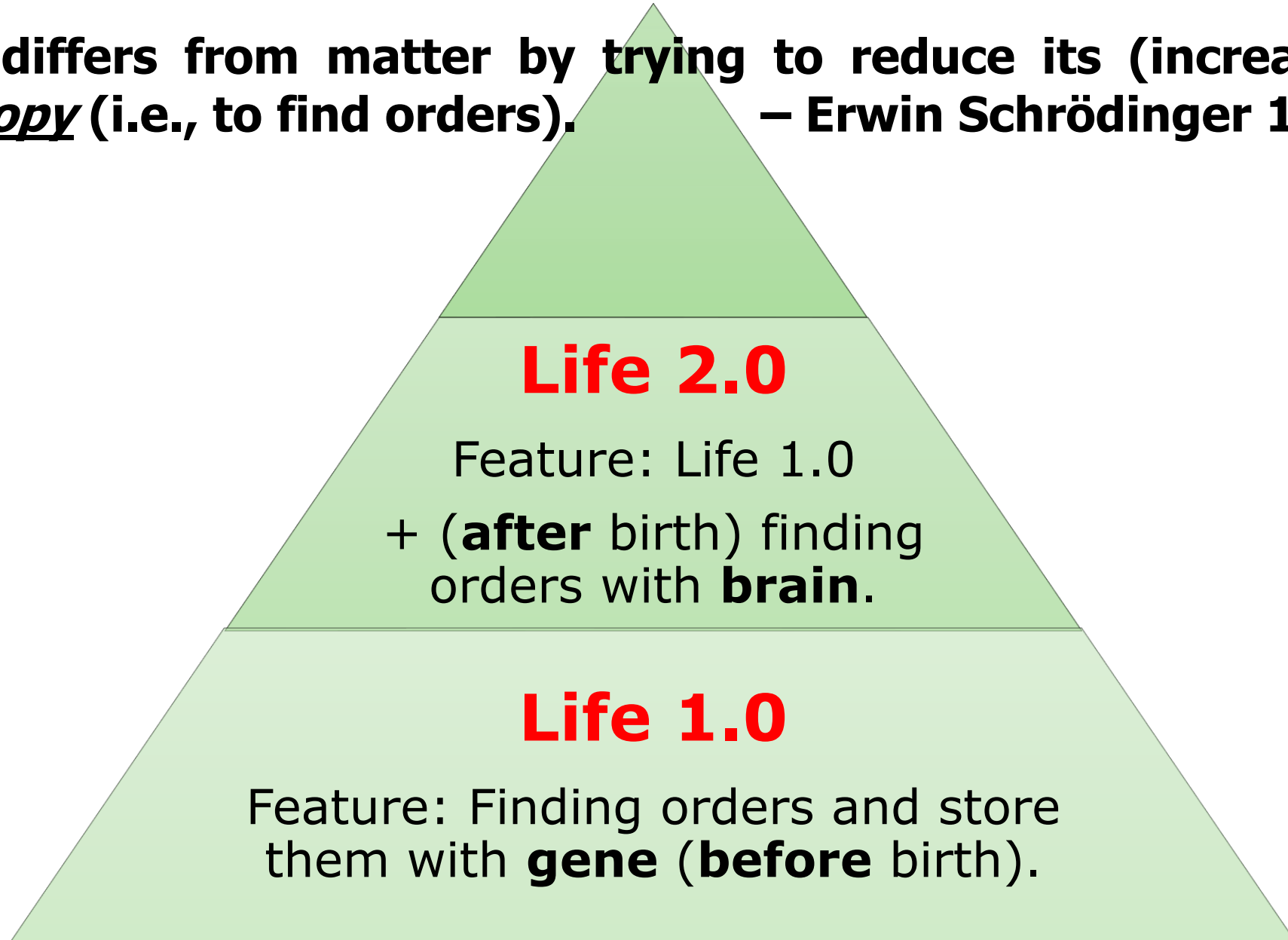
II. Wonder of the Life



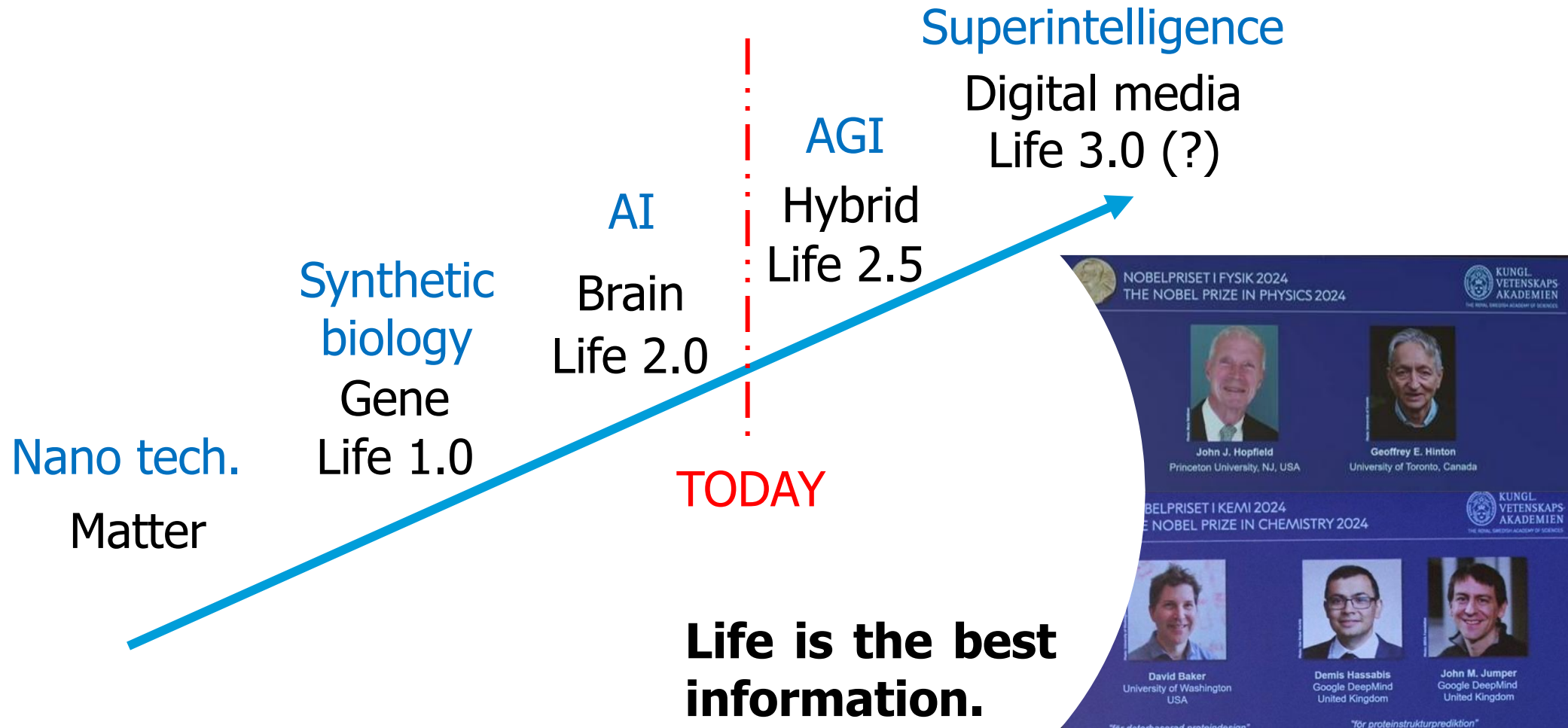
Jun Z. Li, et al., Science 319,
1100 (2008)



Life differs from matter by trying to reduce its (increasing) entropy (i.e., to find orders). – Erwin Schrödinger 1944



Life - Matter = Information (?)



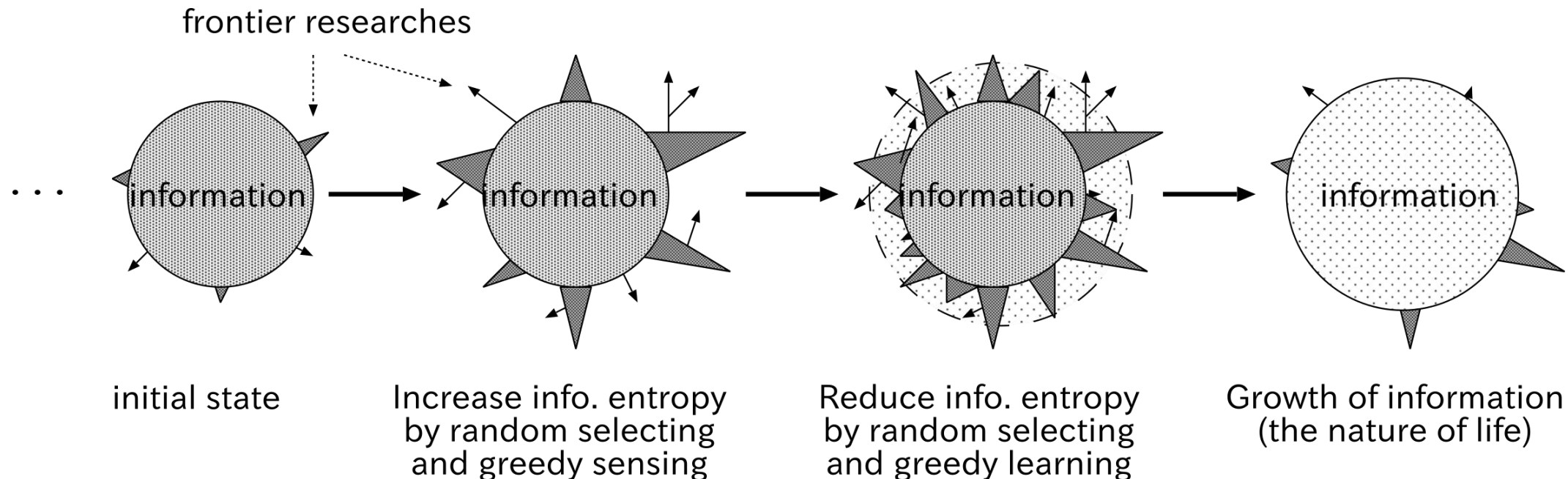
III. What is Wisdom and IV. What is Scientific Research?

Deterministic

**Nondeterministic (may
not be really random)**

My theory: Wisdom = Learning + Free selecting

e.g., live (heredity + mutation)



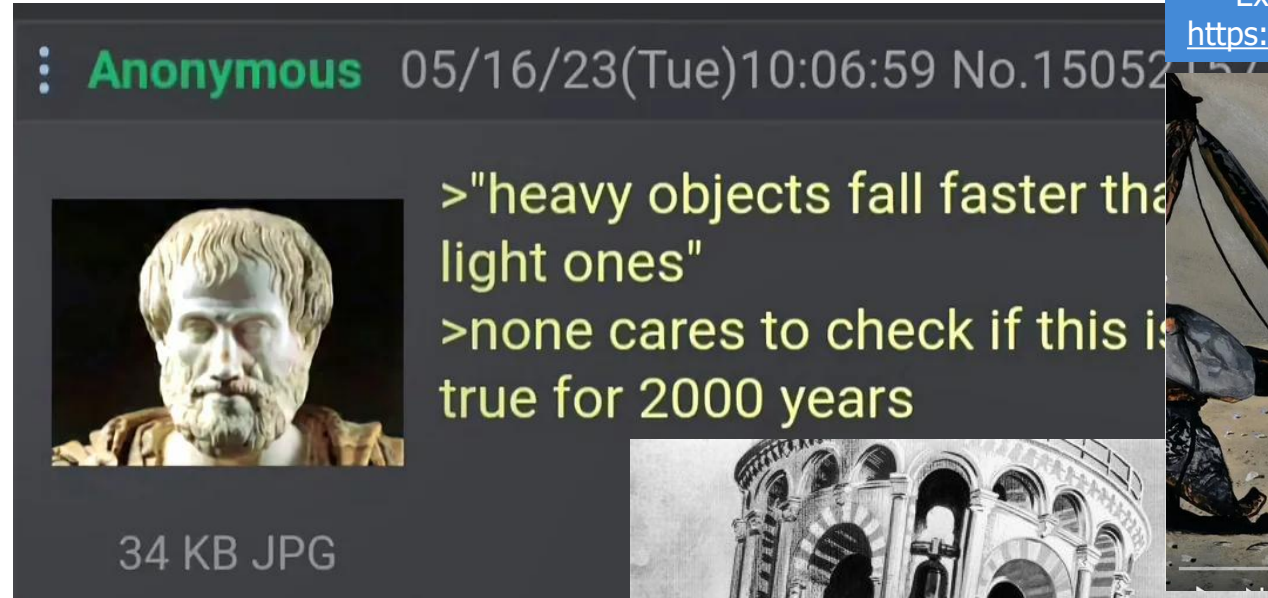
(Brain-based) Scientific study illustrated

https://www.reddit.com/r/meirl/comments/16785bm/me_irl/

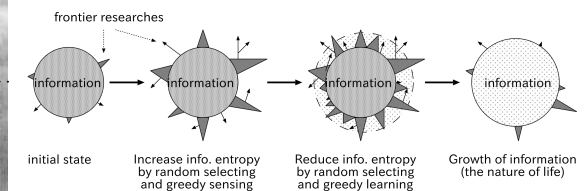
Experiment by a crew of Apollo 15 (1971)
<https://www.youtube.com/watch?v=l7tEA8Vtc0o>



ChatGPT 5 (2025)

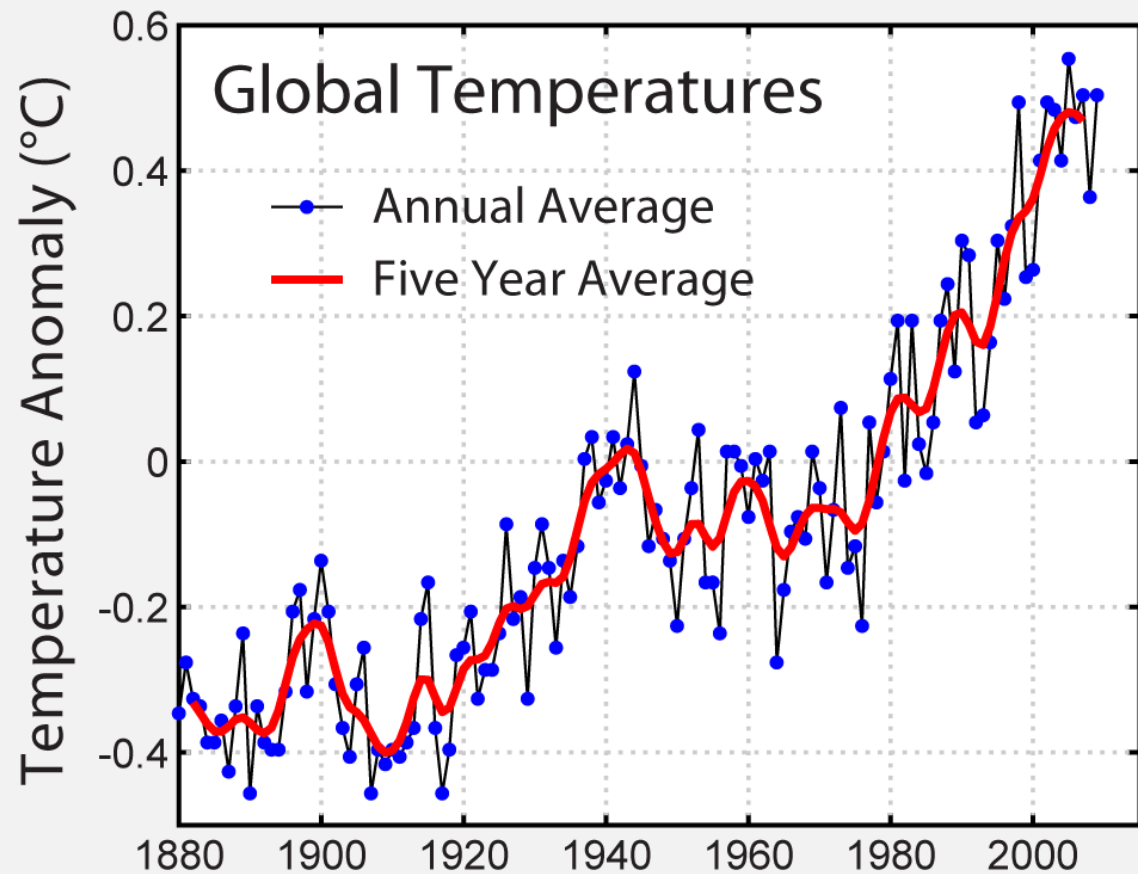


Galileo's experiment
(1589)
<https://natgeo.nikkeibp.co.jp/nng/article/news/14/8909/>

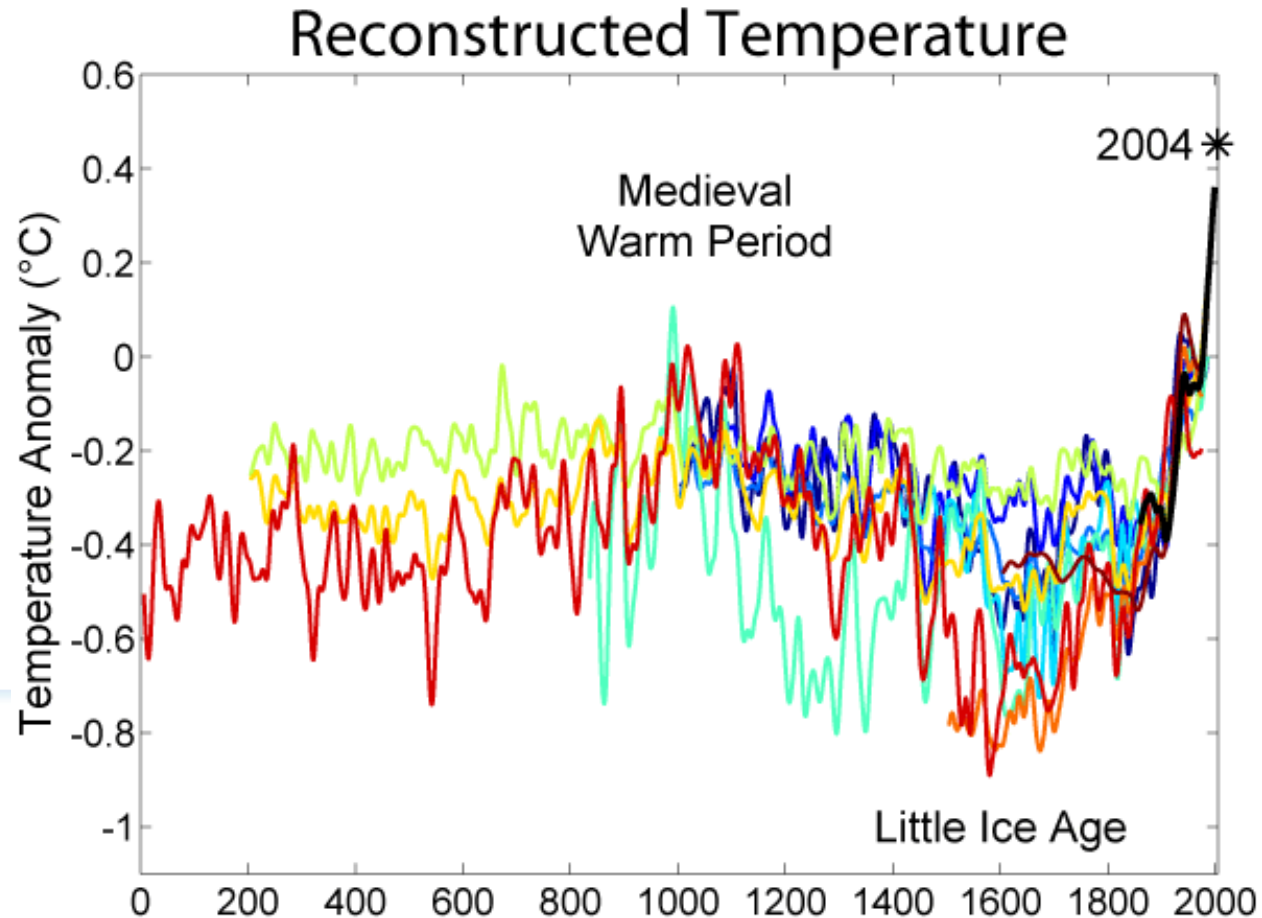


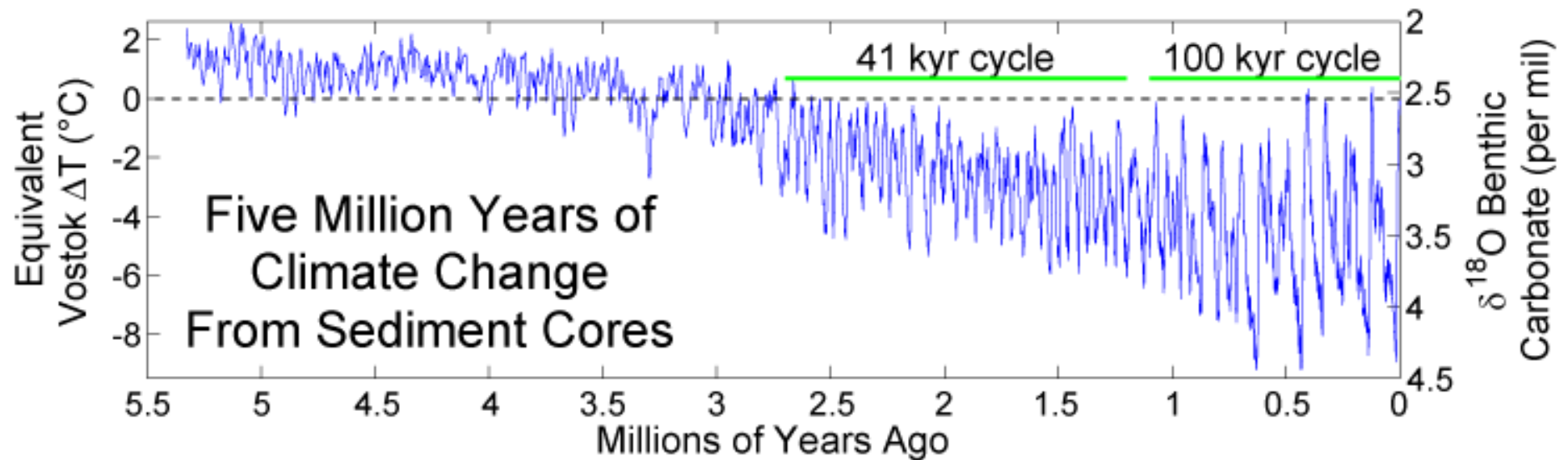
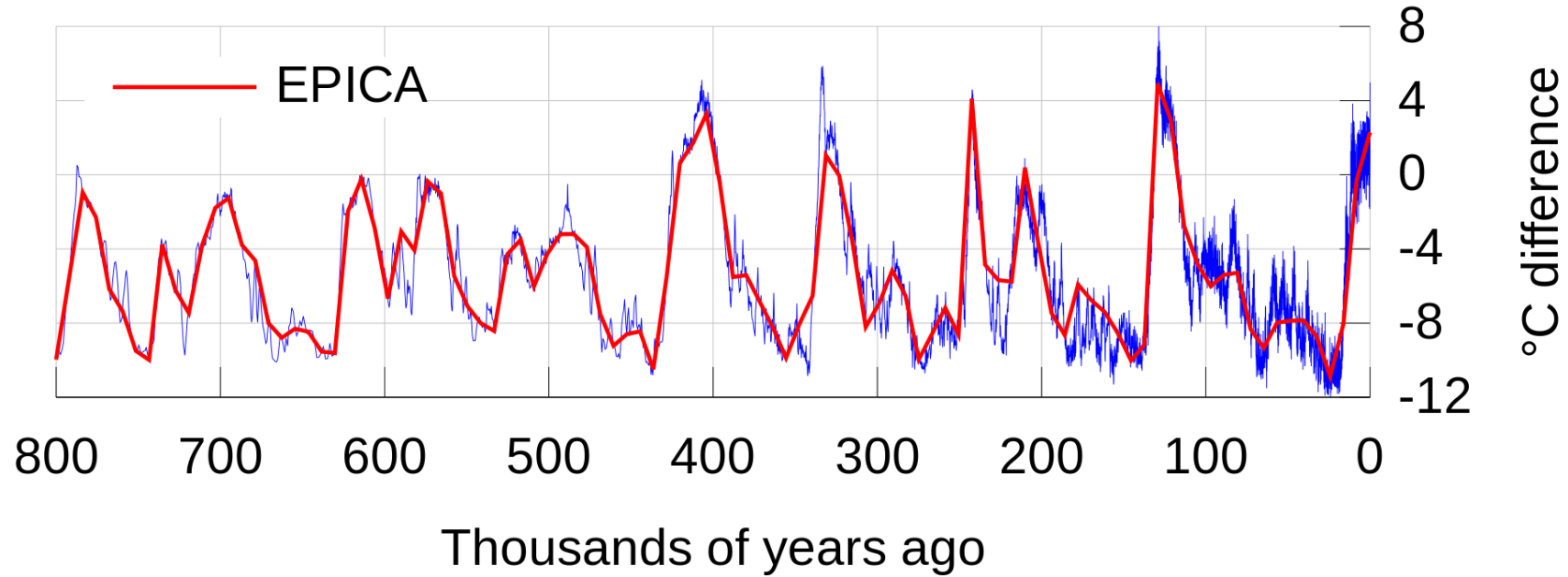
Ex. How do you study climate change?

<http://data.giss.nasa.gov/gistemp/graphs/>



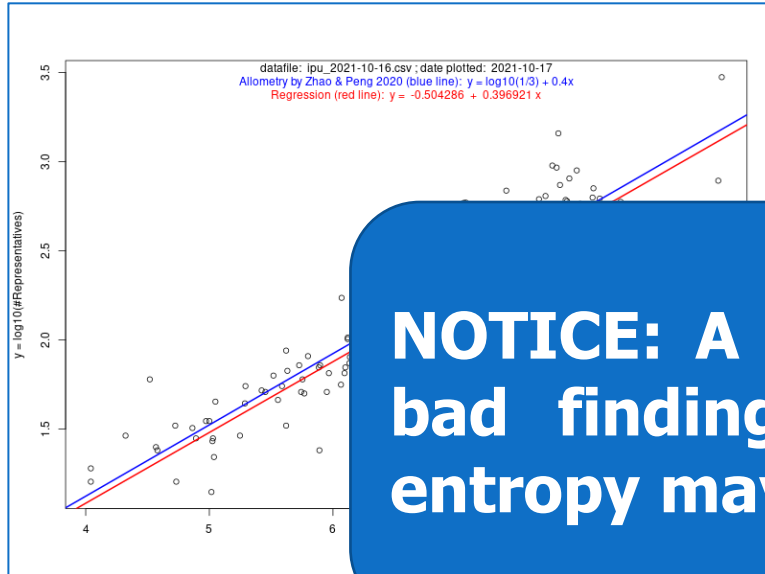
https://en.wikipedia.org/wiki/Global_temperature_record





Machine Learning = Find good information (order) automatically

NOTICE: A NEW finding is mostly a bad finding. Only those with low entropy may be called a good finding.



https://commons.wikimedia.org/wiki/File:Deep_Learning.jpg

https://commons.wikimedia.org/wiki/File:Kernel_Machine.png

Mastering the game of Go with deep neural networks and tree search

David Silver , Aja Huang, Chris J. Maddison, Arthur Guez, Laurent Sifre, George van den Driessche, Julian Schrittwieser, Ioannis Antonoglou, Veda Panneershelvam, Marc Lanctot, Sander Dieleman, Dominik Grewe, John Nham, Nal Kalchbrenner, Ilya Sutskever, Timothy Lillicrap, Madeleine Leach, Koray Kavukcuoglu, Thore Graepel & Demis Hassabis 

Nature 529, 484–489(2016) | [Cite this article](#)

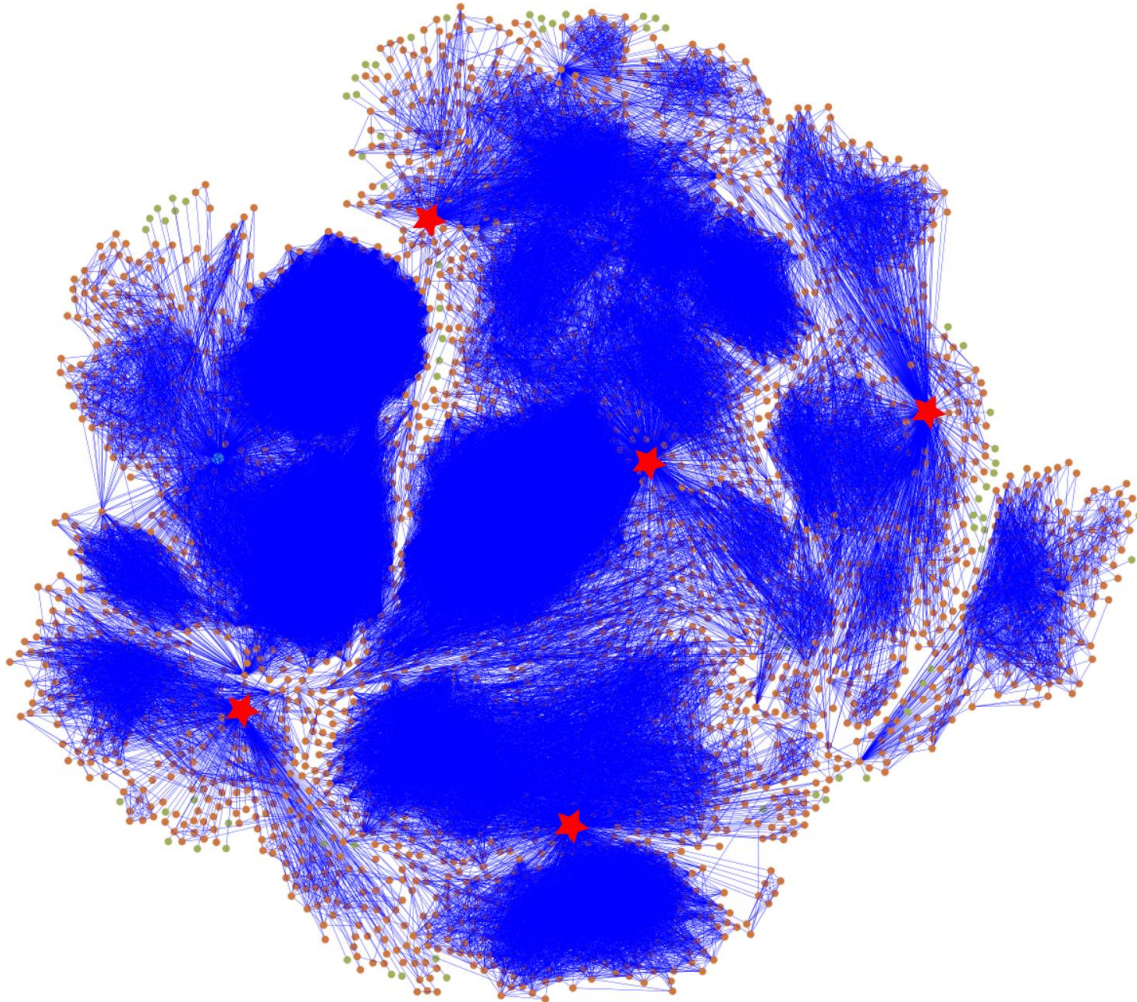
105k Accesses | 3632 Citations | 3127 Altmetric | [Metrics](#)

Abstract **Wisdom in AI algorithms**

The game of Go has long been viewed as the most challenging of classic games for artificial intelligence owing to its enormous search space and the difficulty of evaluating board positions and moves. Here we introduce a new approach to computer Go that uses ‘value networks’ to evaluate board positions and ‘policy networks’ to select moves. These deep neural networks are trained by a novel combination of supervised learning from human expert games, and reinforcement learning from games of self-play. Without any lookahead search, the neural networks play Go at the level of state-of-the-art Monte Carlo tree search programs that simulate thousands of random games of self-play. We also introduce a new search algorithm that combines Monte Carlo simulation with value and policy networks. Using this search algorithm, our program AlphaGo achieved a 99.8% winning rate against other Go programs, and defeated the human European Go champion by 5 games to 0. This is the first time that a computer program has defeated a human professional player in the full-sized game of Go, a feat previously thought to be at least a decade away.

V. Research at FWI

Learning social interactions



By Marcello Casal JR/ABr - Agência Brasil ([1]), CC BY 3.0 br,
<https://commons.wikimedia.org/w/index.php?curid=2814826>

Information Wisdom Theory

<https://www.spacex.com/humanspaceflight/mars/>

How small information creates big order

- Boids (Reynolds'86): Alignment, Cohesion, Separation
- 日本人の団結（羽田正）：ルールを守る、空気を読む、迷惑をかけない
- Shared leadership (Xu & Zhao 2022):

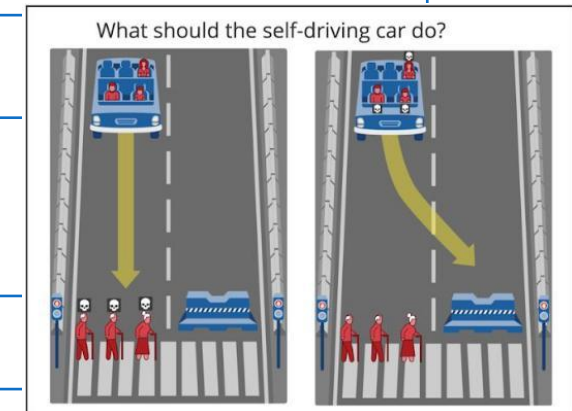


Learning information from graphs

- Network analysis, chemical compound analysis, etc.

Life and Wisdom, future AI

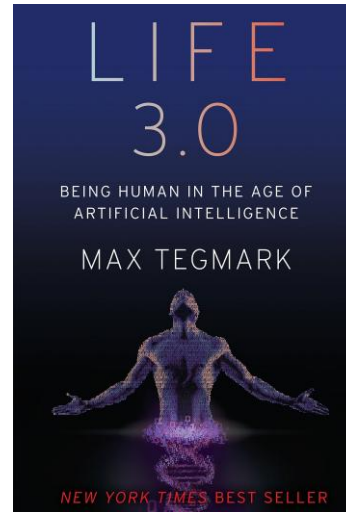
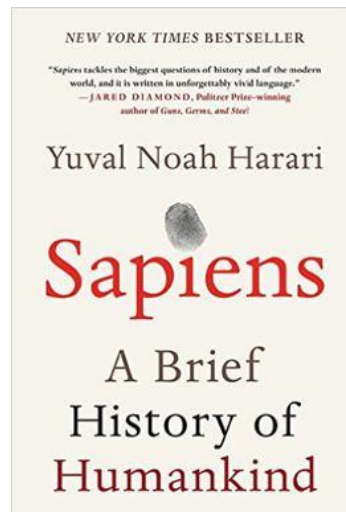
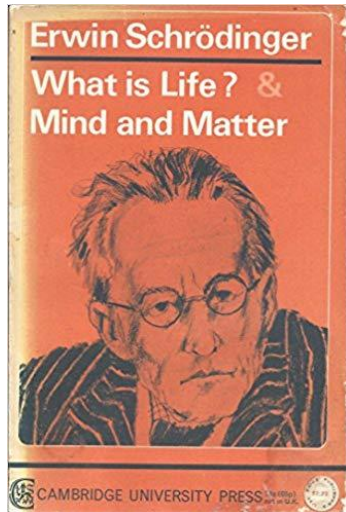
- What is life, What is wisdom, AI ethics, Future life/society



Awad, E. et al. "The Moral Machine experiment."
Nature 563, 7729 (October 2018): 59–64

References

The Whole History of the Earth and Life
(Newest Edition)
<https://www.youtube.com/watch?v=SkeNMoDIHUU>



第12章 情報乱雑さ
で生きを考える
—機械は賢く
なれるか [趙 亮]

VI. Discussion & homework

HOMEWORK: Prepare a 10-minutes presentation on your research or any study (hobby etc. is also OK) with good (not too much, not too low) information entropy.

A recipe of scientific presentation

- Motivation (money, personal interest, job, etc.)
- Review mainstream understanding (appropriate entropy)
- Review frontier studies and research gap (high entropy)
- Your hypothesis (if true, the entropy shall decrease)
- Methodology, results and theory
- Conclusions, etc.

