

# *Academic Writings and Presentations*

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# Introduction

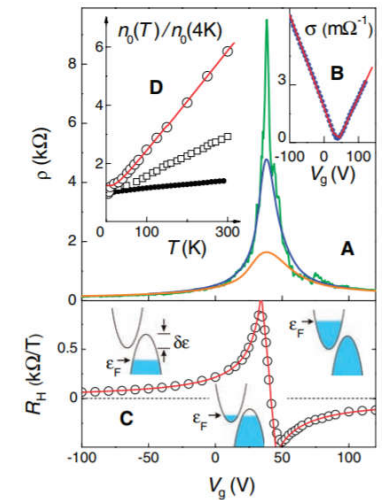
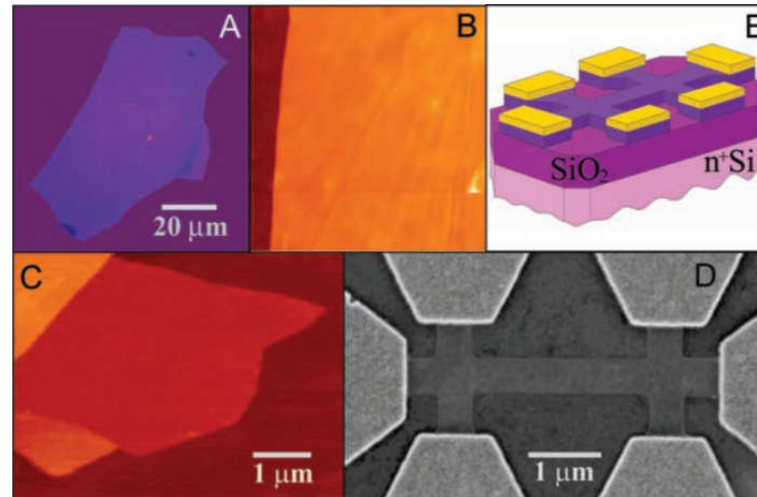
**Xing Sheng 盛兴**

**Department of Electronic Engineering  
Tsinghua University**

**[xingsheng@tsinghua.edu.cn](mailto:xingsheng@tsinghua.edu.cn)**



# Scientific Discovery - Graphene



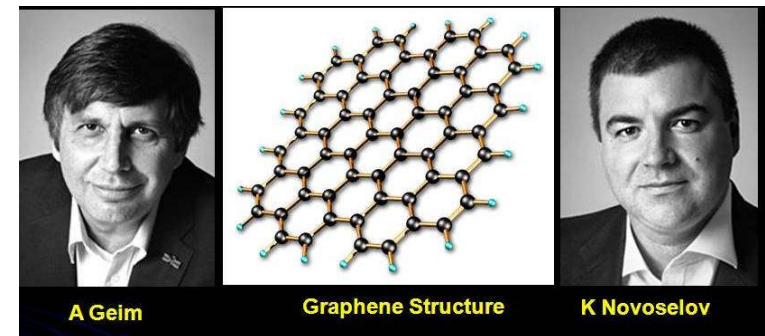
## Electric Field Effect in Atomically Thin Carbon Films

K. S. Novoselov,<sup>1</sup> A. K. Geim,<sup>1\*</sup> S. V. Morozov,<sup>2</sup> D. Jiang,<sup>1</sup>  
Y. Zhang,<sup>1</sup> S. V. Dubonos,<sup>2</sup> I. V. Grigorieva,<sup>1</sup> A. A. Firsov<sup>2</sup>

We describe monocrystalline graphitic films, which are a few atoms thick but are nonetheless stable under ambient conditions, metallic, and of remarkably high quality. The films are found to be a two-dimensional semimetal with a tiny overlap between valence and conduction bands, and they exhibit a strong ambipolar electric field effect such that electrons and holes in concentrations up to  $10^{13}$  per square centimeter and with room-temperature mobilities of  $\sim 10,000$  square centimeters per volt-second can be induced by applying gate voltage.

Science  
AAAS

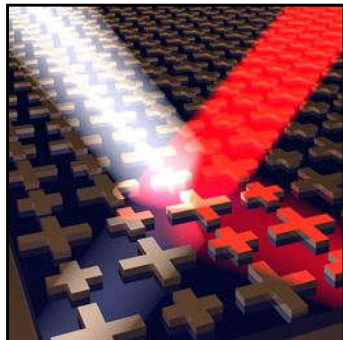
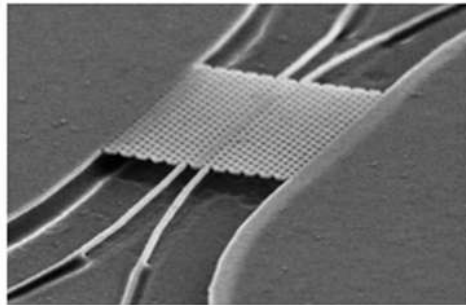
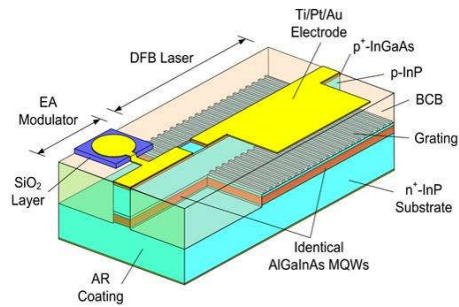
K. S. Novoselov, *et al.*, *Science* **306**, 666 (2004)



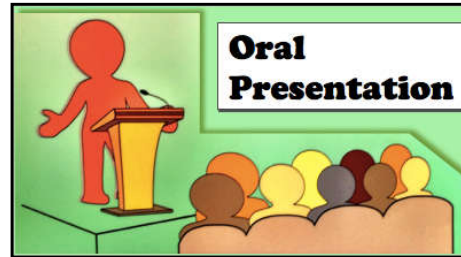
**A. Geim, K. Novoselov**  
**2010 Nobel Prize in Physics**

# Scientific Research

## Results



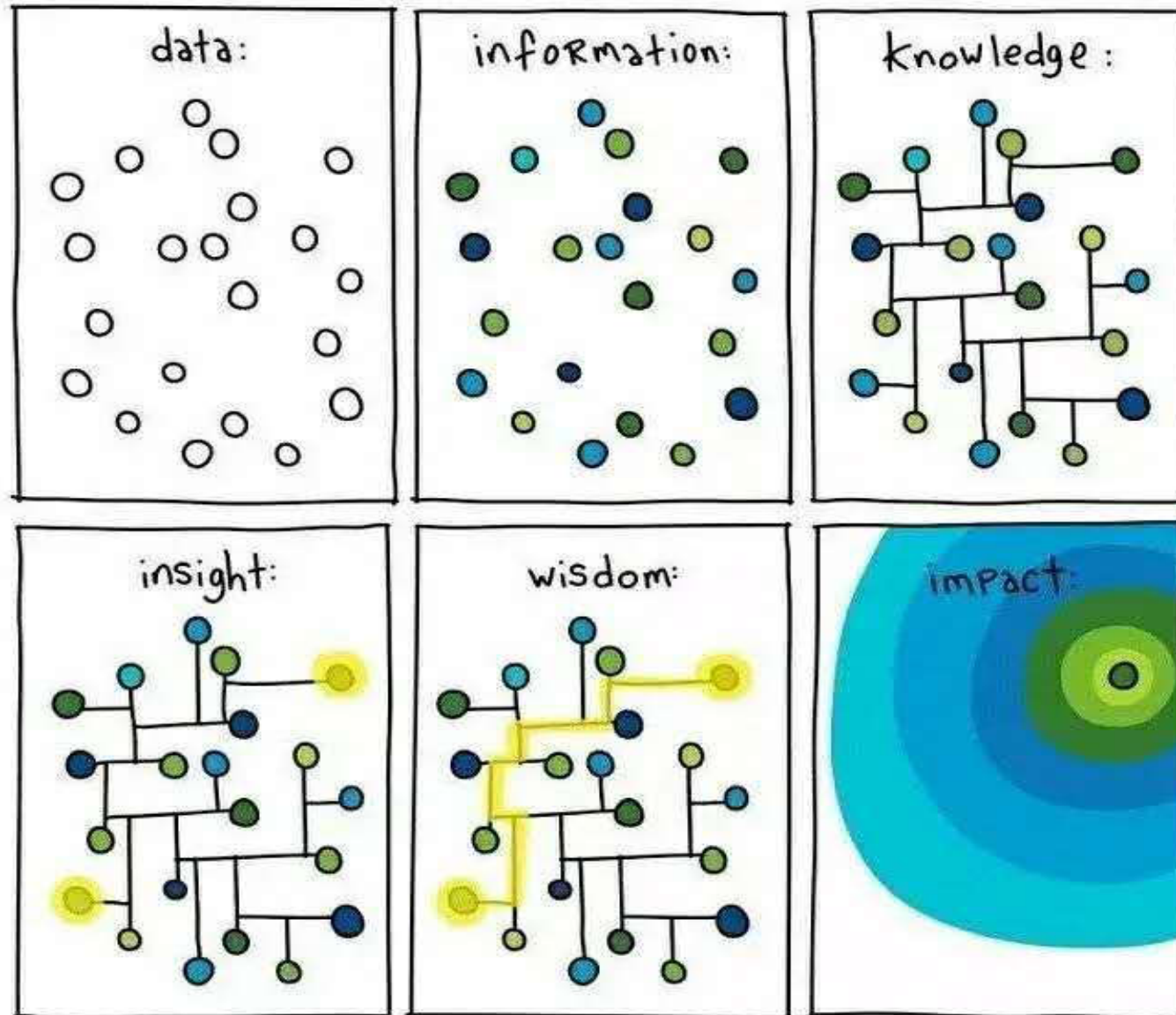
## Presentation



## Outcomes



# Scientific Research



# Skills for Researchers

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- Hard working
- ...

***What are the skills/characters/qualities/attributes required for scientific researchers?***

# Skills for Researchers

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- Creativity
- Initiative
- Problem solving
- Diligence & Persistence
- Stress Tolerance
- Fundamental knowledge → **most courses**
- Organization
- Leadership
- Teamwork
- Personality
- Communication → **this course**
- ...

# Communication is Very Important

***"Reading maketh a full man,  
conference a ready man,  
and writing an exact man."***

***— Francis Bacon***

**"阅读使人充实，  
会谈使人敏捷，  
写作使人精确。"**

**— 培根**

# Goal of This Course

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- Focus on the **basics of academic writings and presentations**
- How to **write and publish** your work?
- How to **present** your work in conferences?
- **Academic ethics** in scientific research, publications and presentations

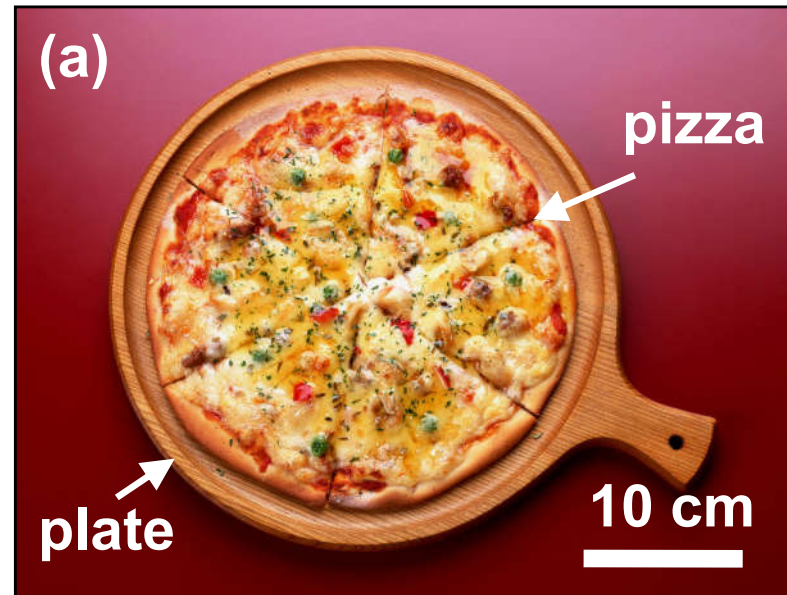


# Construct a Scientific Paper

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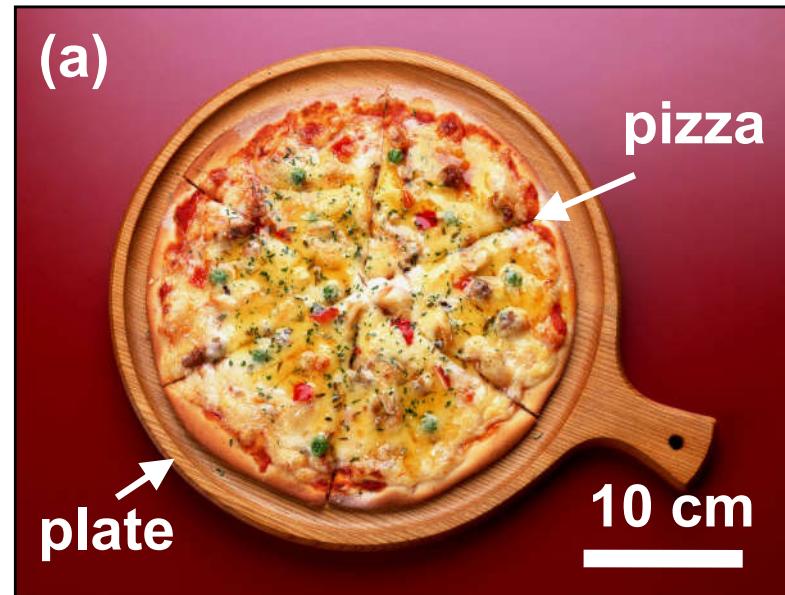


# Construct a Scientific Paper



***Q: Title?***

# Construct a Scientific Paper



- **Level 1 - High school / Undergraduates**
  - *How to make a pizza*
- **Level 2 - Graduate students**
  - *Preparation of a traditional Italian dish*
- **Level 3 - Professors**
  - *Deterministic formation of a thin-layer bio-resorbable fuel cell for clinical nutrition*

# Construct a Scientific Paper

## Reality vs. LinkedIn 😂

Reality:

I got my driving license

LinkedIn:

I am honored and thrilled to announce that I have been selected among the top 5 applicants who participated in professional and the most-respected exam which evaluates the skills and ability to operate fuel-based vehicles. I cannot wait to see what the next chapter holds, and I cannot express my appreciation to the ministry of transportation, Wendy's, Google, NASA, my neighbors who supported me during this difficult journey.

# Basic Suggestions

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- **Work hard**
- **Be prepared**
- **Practice, Practice, Practice!**

# Basic Suggestions

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- **Work hard** — **90%**
- **Be prepared** } **10%**
- **Practice, Practice, Practice!** }

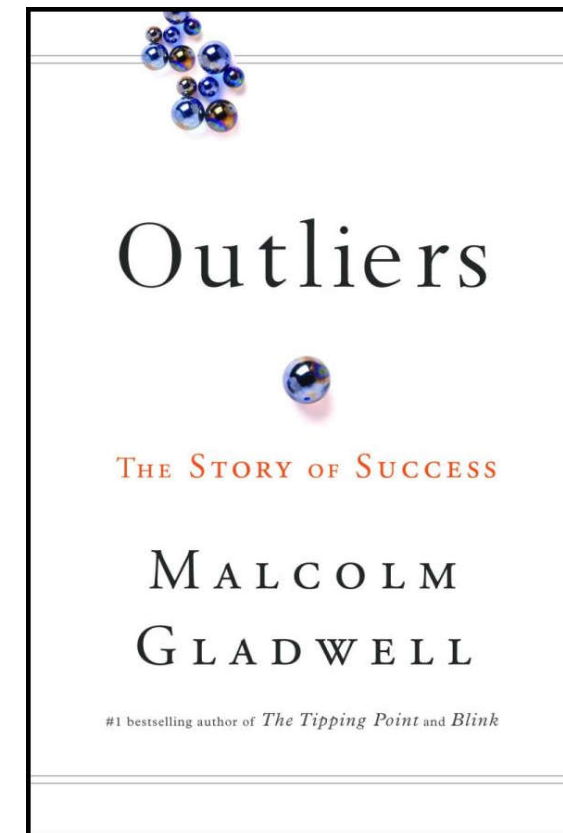
***Most people neglect these basic rules.  
Follow them in this course,  
and you will be ahead of the game.***

# Basic Suggestions

- **The 10000 Hour Rule**
  - **To become an expert in any area, practice for >10000 hours**

***"... (Bill) Gates met the 10000-Hour Rule when he gained access to a high school computer in 1968 at the age of 13, and spent 10000 hours programming on it. ..."***

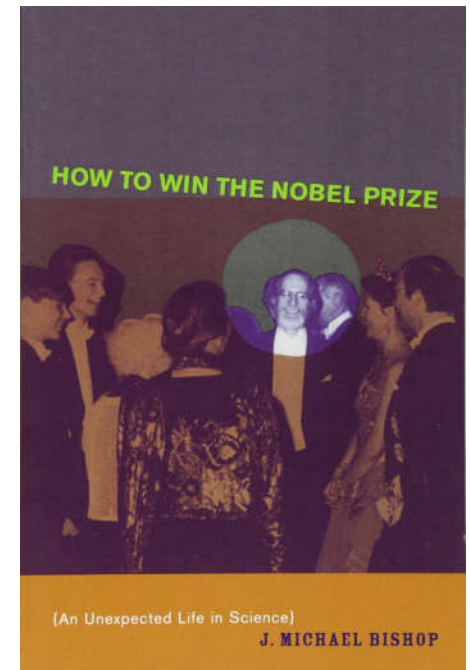
***— Malcolm Gladwell***



# What you *cannot* learn here

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- How to do research?
- How to get your PhD degree within 5/6/7/... years?
- How to publish a Nature/Science paper?
- How to become rich and famous?
- How to win a Nobel prize?
- ...

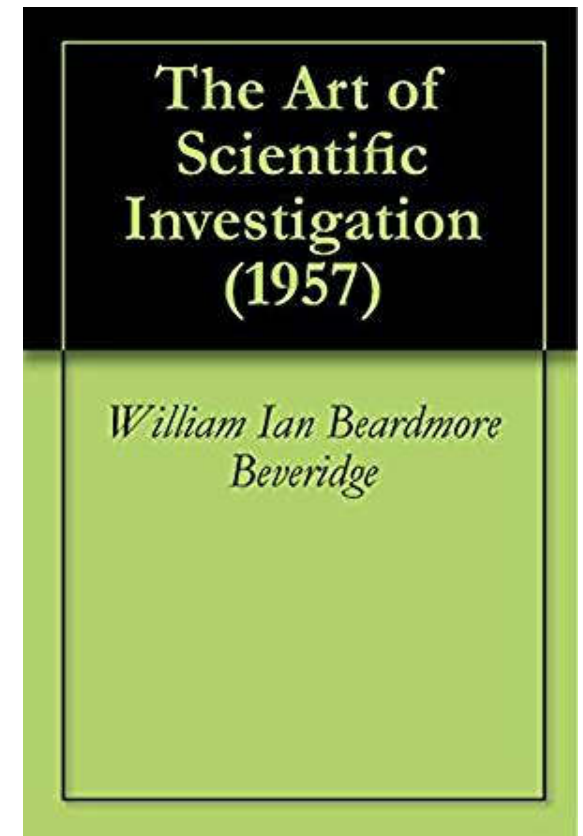




# Scientific Publications

*... Research is one of those highly complex and subtle activities that usually remain quite unformulated in the minds of those who practise them. ...*

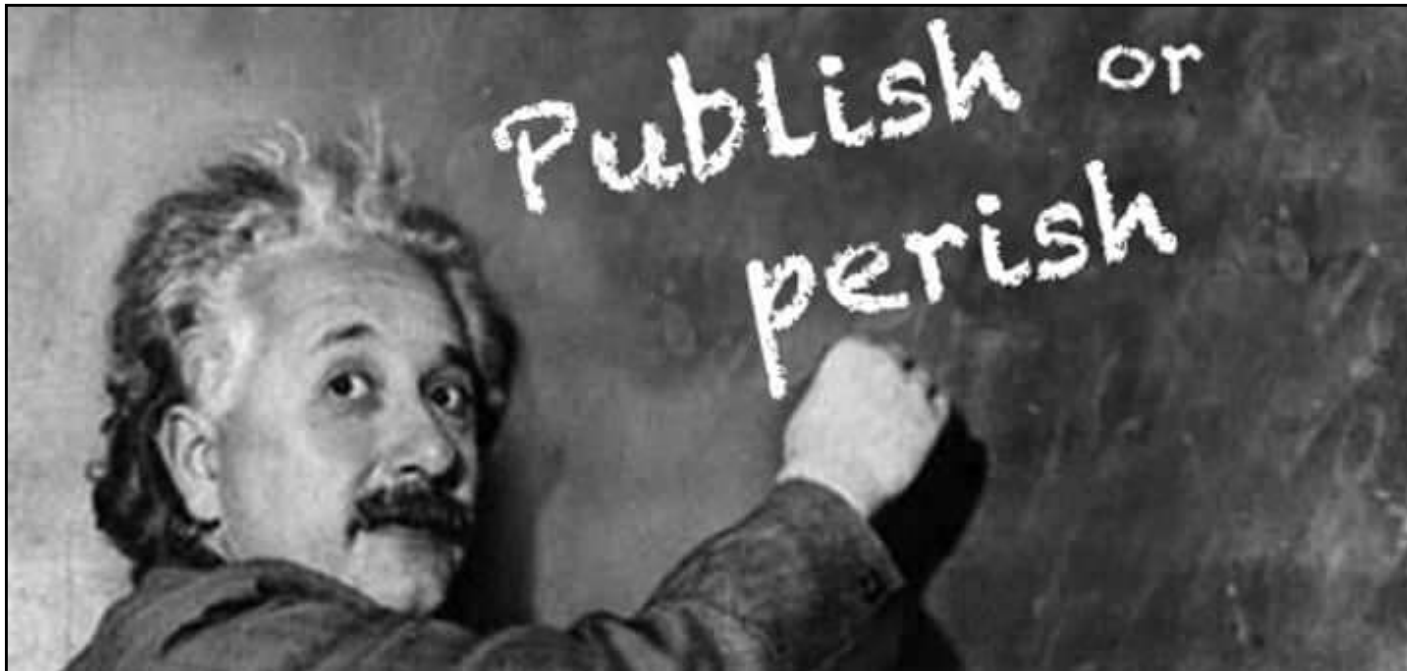
"... 科学研究是一项非常复杂而微妙的活动，平时只以混乱的状态停留在科研人员的脑海中。 ..."  
——《科学研究的艺术》



# Scientific Publications

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- Scientific results should be published
- They need to be peer reviewed



# Why to Publish?

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## Official Answers

- Propagating science to public
- Responsible to public / government / taxpayers
- Communicate with peers
- Establish collaboration opportunities
- Educate the next generation
- ...

# Why to Publish?

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## Realistic Answers

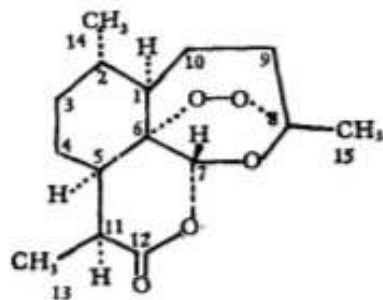
- Required by your advisors / sponsors
- Get your PhD degrees
- Get academic jobs and promotions
- Apply for research funds, awards, ...
- Become famous and rich
- ...

# Story of Artemisinin (青蒿素)

一种新型的倍半萜内酯——青蒿素 **medicine to cure malaria (疟疾)**

青蒿素结构研究协作组

我们从菊科植物 *Artemisia annua L.* 中，分离出的一种结晶。定名为青蒿素，是无色针状结晶，熔点 156—157°C， $[\alpha]_D^{25} = +66.3^\circ$  (C = 1.64, 氯仿)，高分辨质谱 ( $m/e$  282.1472  $M^+$ ) 及元素分析 (C63.72%, 7.86%)



表示其分子式为  $C_{15}H_{22}O_5$ 。根据光谱数据和 X-射线分析以及化学反应，证明其为一种新型的倍半萜内酯，具有左列的相对构型。

又成为原来的羰基。

青蒿素经采用 X-射线单晶衍射方法，确定了其晶体结构。

结晶学参数：空间群  $D_2^7-P_{2,2,2}$ ，晶胞参数  $a = 24.098 \text{ \AA}$ ， $b = 9.468 \text{ \AA}$ ， $c = 6.399 \text{ \AA}$ ，密度：实验  $d_o = 1.30$  克/厘米<sup>3</sup>，计算  $d_c = 1.294$  克/厘米<sup>3</sup>，单胞中分子数  $Z = 4$ 。

衍射强度数据是由 phillips 四圆衍射仪收集，采用石墨单色器 ( $2\theta_M = 26.6^\circ$ )， $CuK\alpha$  辐射 ( $\lambda = 1.5418 \text{ \AA}$ )，收到了  $\theta$  小于  $58^\circ$  的全部强度数据，独立的衍射点为 810 个，可观察的衍射点 619 个。

利用符号附加法得到相角，经  $\lg$  公式修正，由此获得 E 图，应用傅里叶综合法作电子



**Tu Youyou (屠呦呦)**

**2015 Nobel Prize in Medicine**

科学通报 22, 142 (1977)

“三无”

No doctor degree  
No foreign experiences  
No professorship

# Story of Mass Spectrum

## Protein and Polymer Analyses up to $m/z$ 100 000 by Laser Ionization Time-of-flight Mass Spectrometry

Koichi Tanaka<sup>†</sup>, Hiroaki Waki, Yutaka Ido, Satoshi Akita, Yoshikazu Yoshida  
and Tamio Yoshida

Shimadzu Corporation, Nishinokyo-Kuwabaracho, Nakagyo-ku, Kyoto 604, Japan



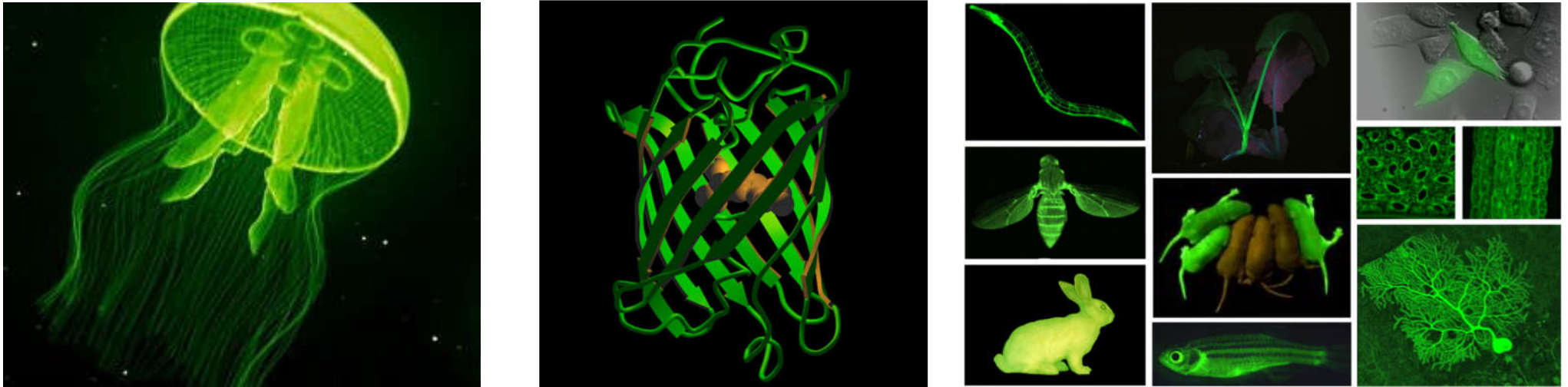
**K. Tanaka**, *et al.*, *Rapid Comm. Mass. Spectrom.* 2, 151 (1988)

**Koichi Tanaka (田中耕一)**  
**2002 Nobel Prize in Chemistry**

“三无”

No doctor degree  
No foreign experiences  
No professorship

# Story of GFP



## Green Fluorescence Protein

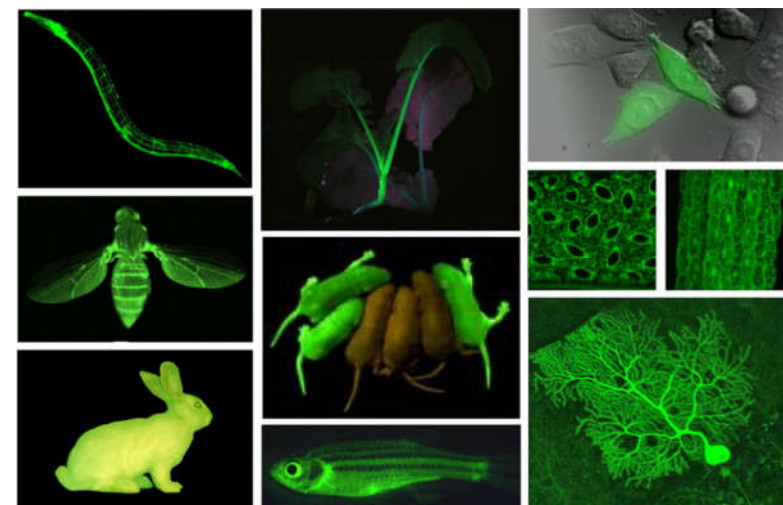
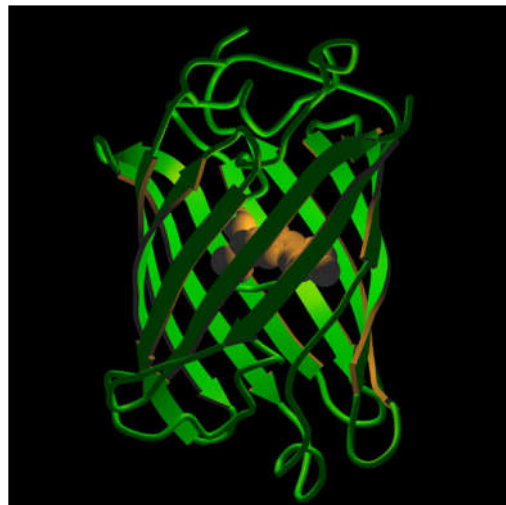
**O. Shimomura**, *et al.*, *J. Cell. Comp. Phys.* 59, 223 (1962)

**D. C. Prasher**, *et al.*, *Gene* 111, 229 (1992)

**M. Chalfie**, *et al.*, *Science* 263, 802 (1994)

R. Heim, D. C. Prasher, **R. Y. Tsien**, *PNAS* 91, 12501 (1994)

# Story of GFP



## Green Fluorescence Protein



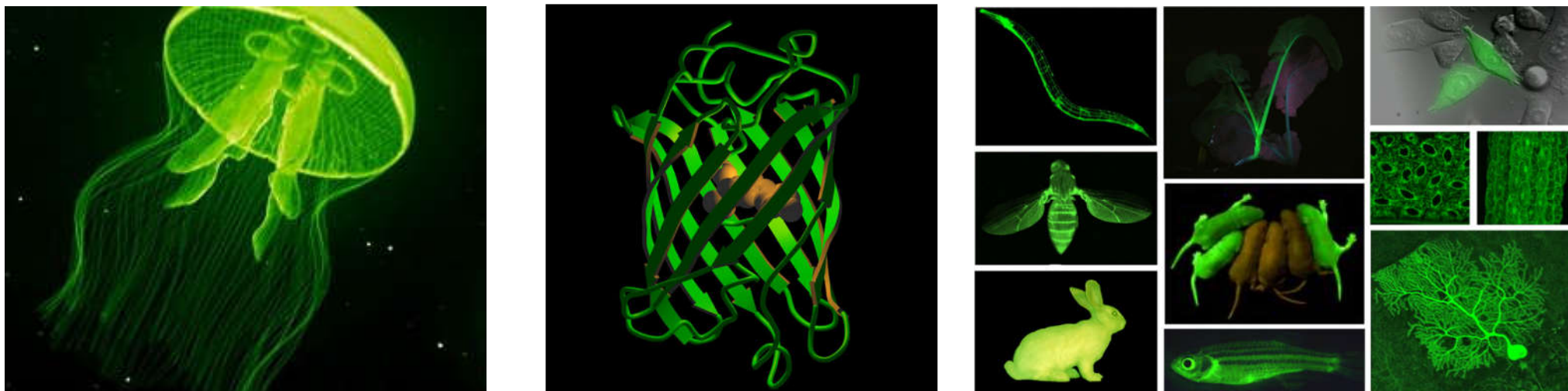
**O. Shimomura, M. Chalfie, R. Tsien**  
**2008 Nobel Prize in Chemistry**



**D. C. Prasher**



# Story of GFP

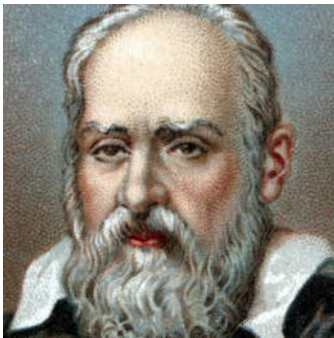


## Green Fluorescence Protein

- *Publish your results*
- *Propagating your work*
- *Improve your visibility*

# Old days

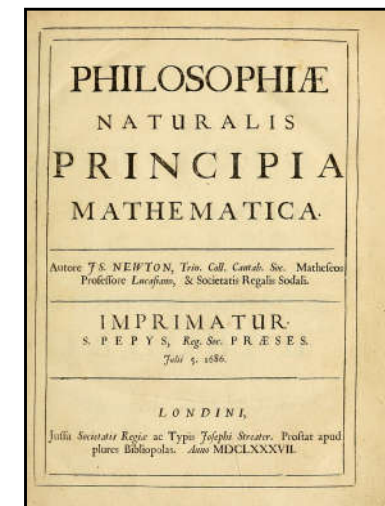
- Private communications
- Books



**Galileo**

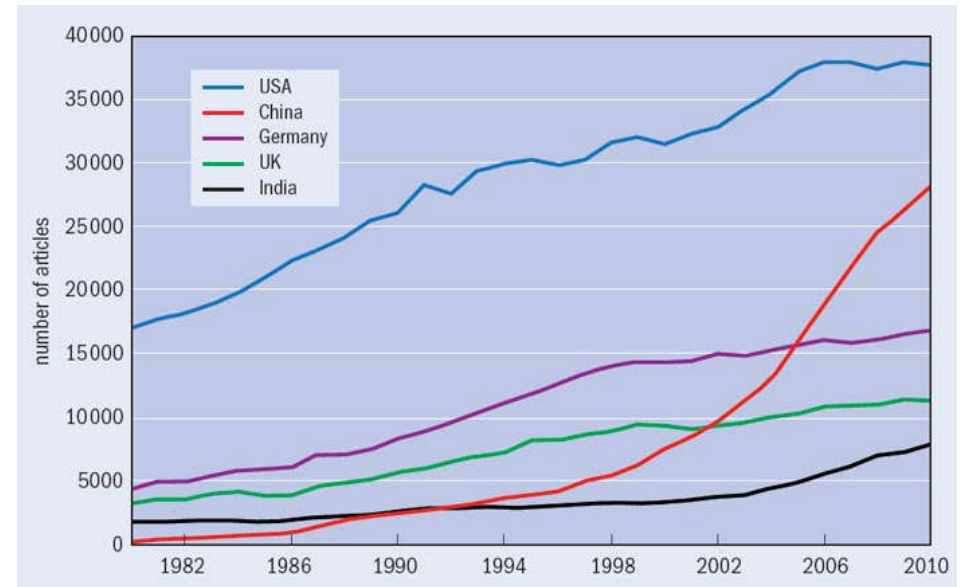


**Newton**



# Today

- Journals
- Conferences



**papers in physics**



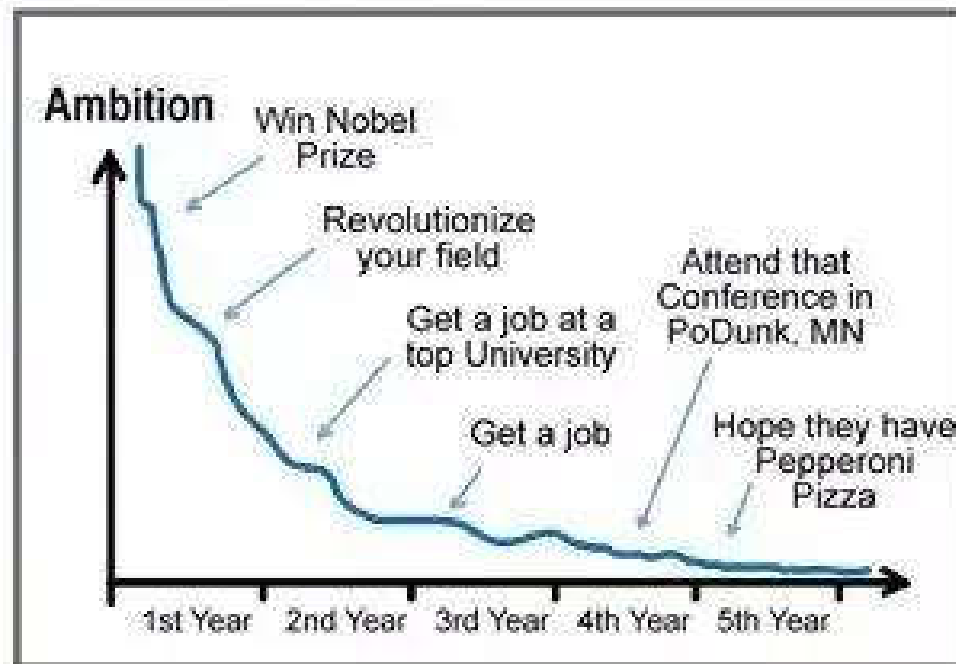
# Venues of Writing

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- **Abstracts**
- **Journal articles**
- **Conference proceedings**
- **Workshops / Presentations**
- **Research reports**
- **Proposals**
- **Patents**
- **Books**
- **Emails**
- **Resume**
- **...**

# Take a Break

## YOUR LIFE AMBITION - What Happened??



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