



Since 1959

Research ethics and intellectual property rights

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Co-founder

InnoNano Research Pvt. Ltd.
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Associate Editor

ACS
Sustainable
Chemistry & Engineering

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Professor-in-charge



International Centre for Clean Water



Stella Maris College, May 4, 2022

Ethics in Research

Research Integrity

Responsible Conduct of Research

All mean the same.

Do research well.

Back to basics

A system of accepted beliefs that control behaviour, especially such a system based on morals. (Cambridge)

Ethics are moral beliefs and rules about right and wrong. (Collins)

Ethics or moral philosophy seeks to resolve questions of human morality by defining concepts such as good and evil, right and wrong, virtue and vice, justice and crime.

The English word *ethics* is derived from the Ancient Greek word *ēthikós* (ἠθικός), meaning "relating to one's character", which itself comes from the root word *ēthos* (ἦθος) meaning "character, moral nature". This word was transferred into Latin as *ethica* and then into French as *éthique*, from which it was transferred into English. (Wikipedia)

Animal ethics, bioethics, business ethics, machine ethics, military ethics, political ethics, public sector ethics, publication ethics, ethics of nanotechnology, ethics of quantification, ethics of technology,...

Ethics in research, ethics in publications, ethics in intellectual property,...

There are larger questions ...

Science and morality

Why science?

Why do I do science?

Science and society

Conflicts – personal/financial/institutional

Science is about truth

To whom it belongs?

To everyone, as public funds research

Researchers

Colleagues and collaborators

Funding bodies

Research institutions/universities

Science is about being responsible



People make science

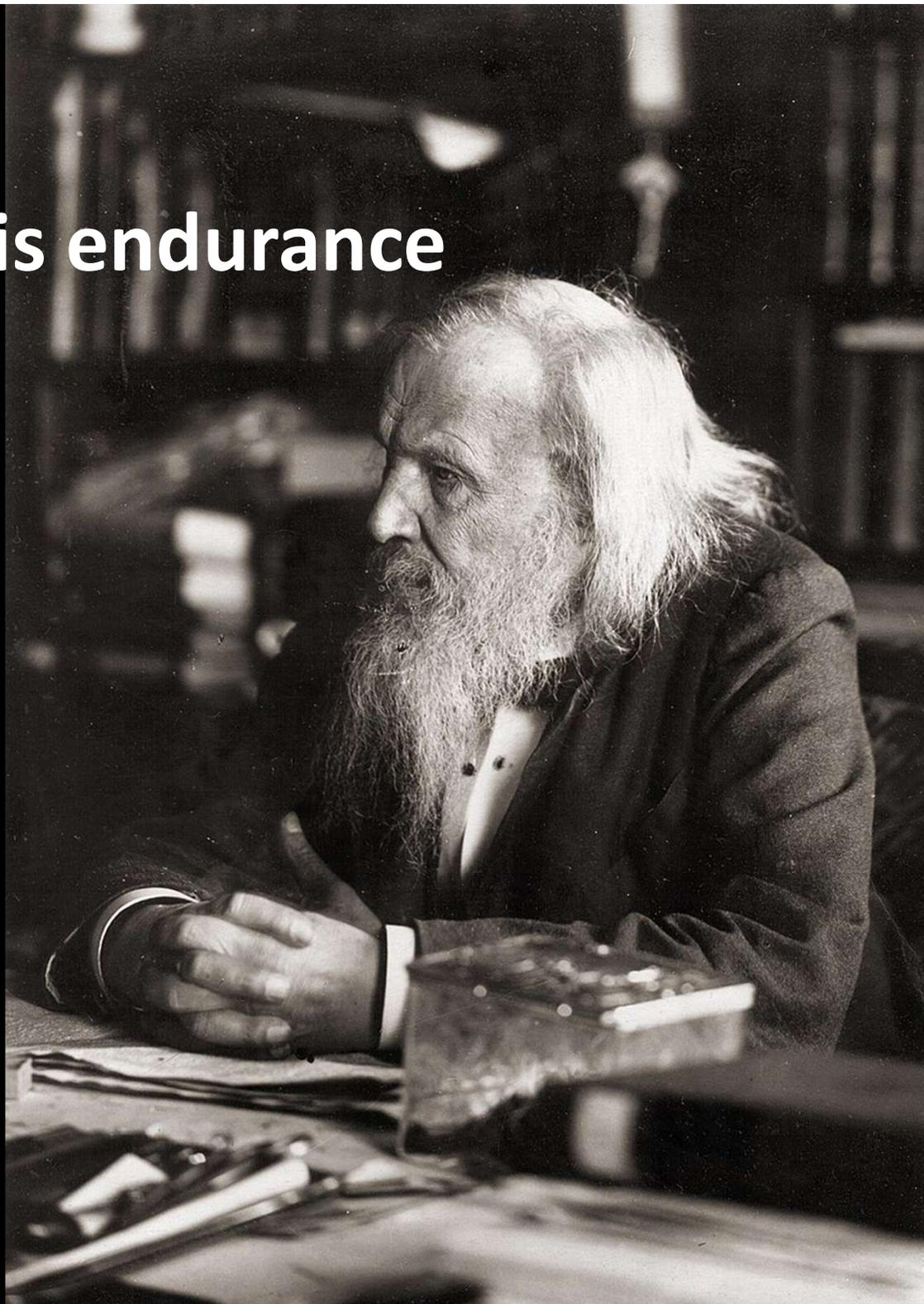
Images from Wikipedia

Science is being open



Image from *Wikipedia*

Science is endurance



Asche 1,503, worin 0,852 4,246 14,721 31,898 0,704 49,720 = 102,141.

Dagegen hatte ein Mehl des ganzen Korns, aus welchem 13 Proc. Kleie abgedondert war, folgende Zusammensetzung:

Wasser 10,548
 Stickstoff 2,518
 Stärke 65,660 Fe₂O₃ CaO MgO KO NaO PO₅
 Asche 1,032, worin 1,338 5,085 12,425 31,456 1,878 48,761 = 100,943.

(Ann. Ch. Pharm. 149, 343.)

Ueber die Beziehungen der Eigenschaften zu den Atomgewichten der Elemente. Von D. Mendelejeff. — Ordnet man Elemente nach zunehmenden Atomgewichten in verticale Reihen so, dass die Horizontalreihen analoge Elemente enthalten, wieder nach zunehmendem Atomgewicht geordnet, so erhält man folgende Zusammenstellung, aus der sich einige allgemeinere Folgerungen ableiten lassen.

			Ti = 50	Zr = 90	? = 180
			V = 51	Nb = 94	Ta = 182
			Cr = 52	Mo = 96	W = 186
			Mn = 55	Rh = 104,4	Pt = 197,4
			Fe = 56	Ru = 104,4	Ir = 198
	Ni =	Co = 59	Pd = 106,6	Os = 199	
H = 1			Cu = 63,4	Ag = 108	Hg = 200
	Be = 9,4	Mg = 24	Zn = 65,2	Cd = 112	Au = 197?
	B = 11	Al = 27,4	? = 68	Ur = 116	
	C = 12	Si = 28	? = 70	Sn = 118	
	N = 14	P = 31	As = 75	Sb = 122	Bi = 210?
	O = 16	S = 32	Se = 79,4	Te = 128?	
	F = 19	Cl = 35,5	Br = 80	J = 127	
Li = 7	Na = 23	K = 39	Rb = 85,4	Cs = 133	Tl = 204
		Ca = 40	Sr = 87,6	Ba = 137	Pb = 207
		? = 45	Ce = 92		
		?Er = 56	La = 94		
		?Yt = 60	Di = 95		
		?In = 75,6]	Th = 118?		

1. Die nach der Grösse des Atomgewichts geordneten Elemente zeigen eine stufenweise Abänderung in den Eigenschaften.

2. Chemisch-analoge Elemente haben entweder übereinstimmende Atomgewichte (Pt, Ir, Os), oder letztere nehmen gleichviel zu (K, Rb, Cs).

3. Das Anordnen nach den Atomgewichten entspricht der *Werthigkeit* der Elemente und bis zu einem gewissen Grade der Verschiedenheit im chemischen Verhalten, z. B. Li, Be, B, C, N, O, F.

4. Die in der Natur verbreitetsten Elemente haben *kleine* Atomgewichte

					18 VIIA
					2
3 IIIA	4 IVA	5 VA	6 VIA	7 VIIA	8 He Helium 4,00304 101179
5 B Boron 10,811 101179	6 C Carbon 12,0107 101179	7 N Nitrogen 14,0064 101179	8 O Oxygen 15,9994 101179	9 F Fluor 18,9984032 101179	10 Ne Neon 20,1797 101179
13 Al Aluminium 26,9815386 101179	14 Si Silicium 28,0855 101179	15 P Phosphor 30,973762 101179	16 S Schwefel 32,065 101179	17 Cl Chlor 35,453 101179	18 Ar Argon 39,948 101179
31 Ga Gallium 69,723 101179	32 Ge Germanium 72,630 101179	33 As Arsen 74,9216 101179	34 Se Selen 78,9718 101179	35 Br Brom 79,904 101179	36 Kr Krypton 83,798 101179
49 In Indium 114,818 101179	50 Sn Zinn 118,710 101179	51 Sb Antimon 121,757 101179	52 Te Tellur 127,60 101179	53 I Jod 126,905 101179	54 Xe Xenon 131,29 101179
81 Tl Thallium 204,387 101179	82 Pb Blei 207,2 101179	83 Bi Bismuth 208,9804 101179	84 Po Polonium 209 101179	85 At Astatin 210 101179	86 Rn Radon 222 101179
113 Nh Nihonium 284 101179	114 Fl Flerovium 289 101179	115 Mc Moscovium 288 101179	116 Lv Livermorium 293 101179	117 Ts Tennessine 289 101179	118 Og Oganesson 294 101179
66 Dy Dysprosium 162,500 101179	67 Ho Holmium 164,93033 101179	68 Er Erbium 167,259 101179	69 Tm Thulium 168,93487 101179	70 Yb Ytterbium 173,0547 101179	71 Lu Lutetium 174,967 101179
98 Cf Californium 251 101179	99 Es Einsteinium 252 101179	100 Fm Fermium 257 101179	101 Md Mendelevium 258 101179	102 No Nobelium 259 101179	103 Lr Lawrencium 260 101179

Ideas built the word!

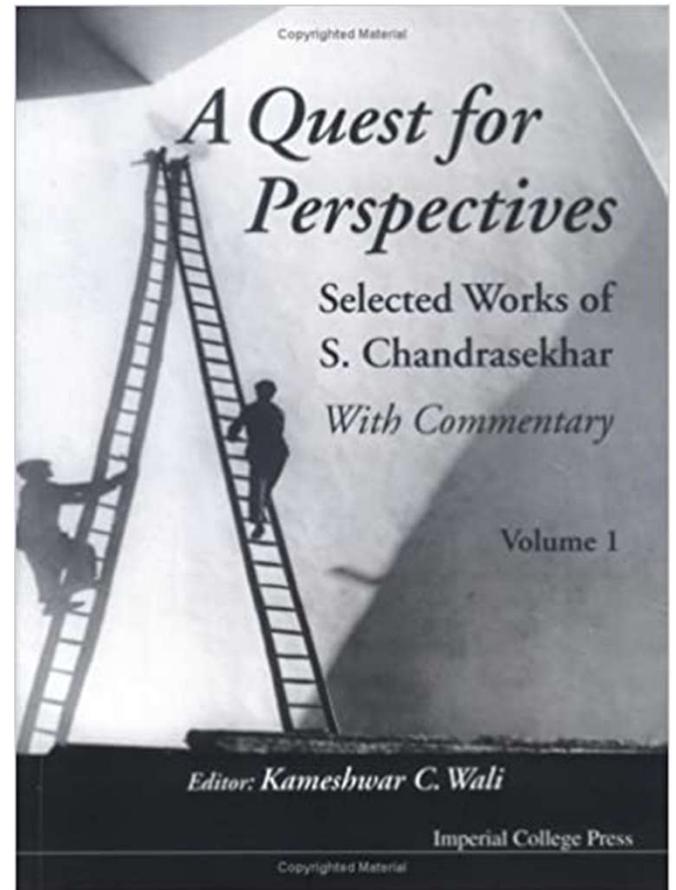
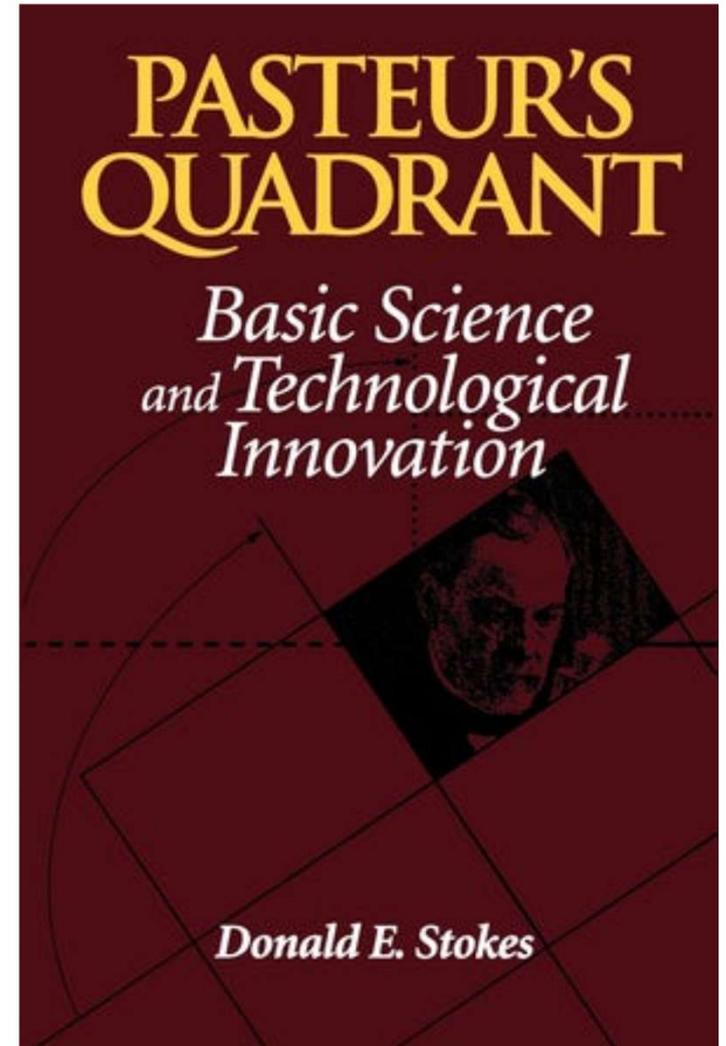
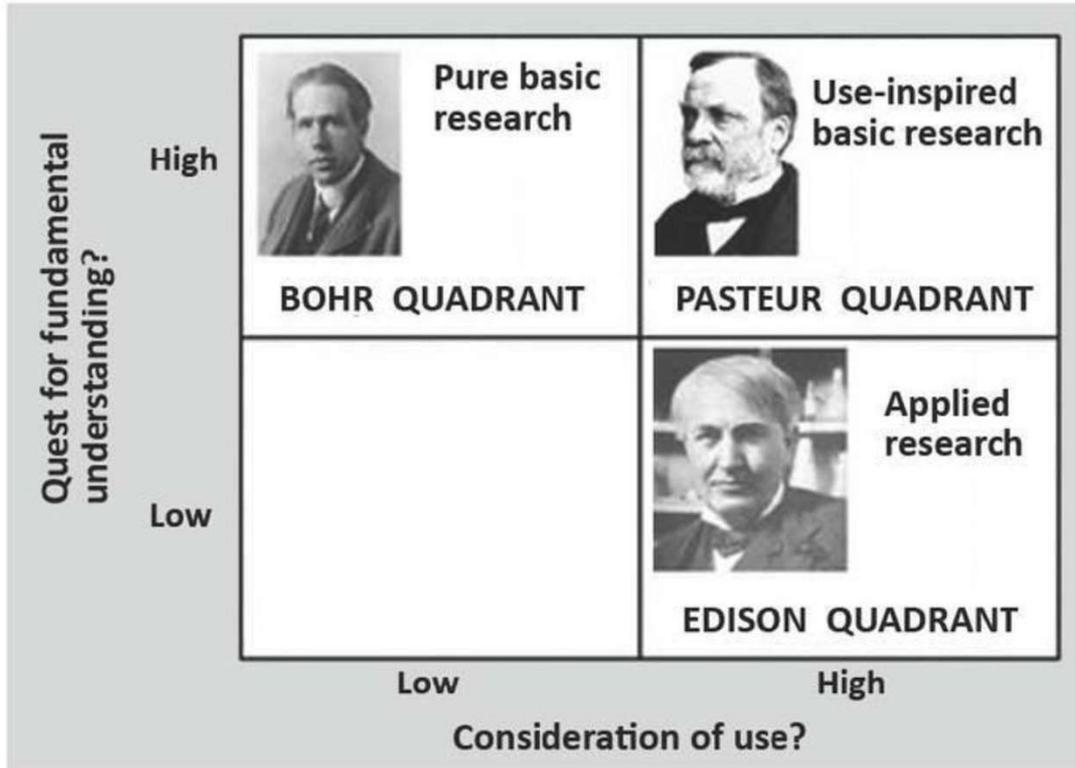




Image from *Wikipedia*

Excellence Vs. relevance



Publications Vs. patents

Science is very young

1800 No compound had been made by chemists.

The first compound was made in 1828.

1900 Atomic structure was not known.

The idea of the chemical bond was not known.

X-rays were not known.

Around 10,000 compounds were made by chemists.

We knew little about cells and nothing about the genetic code (DNA).

We had no rockets, TV, lasers, computers, mobile phones.

2000 We know almost everything about atoms and molecules.

Nine million compounds are known.

Genetic code and human genome (DNA) have been deciphered.

Space exploration has become common, [mining in Moon](#)

World is connected, distances have vanished.

2100 ?

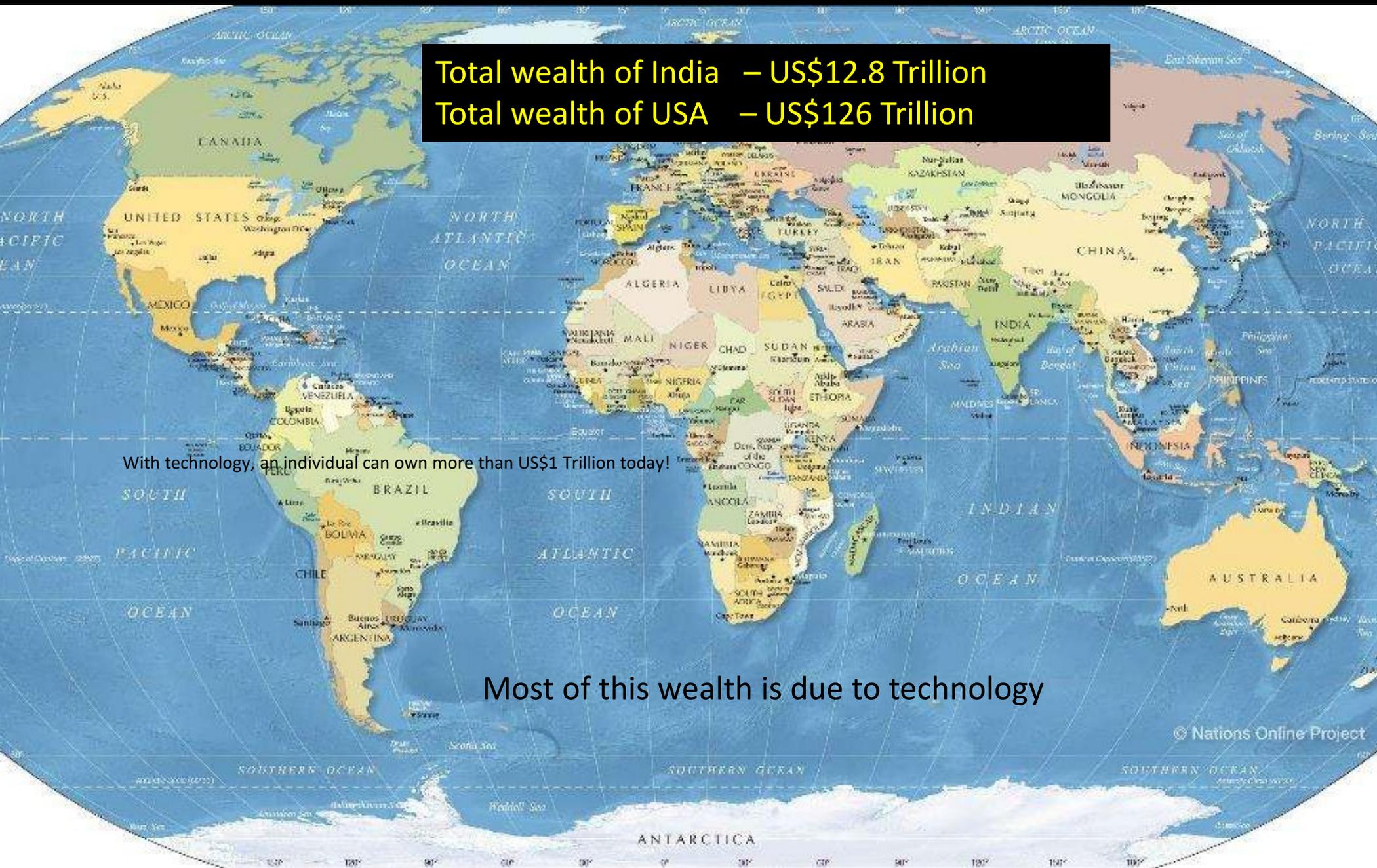
Science and opportunities

So much to discover

Total wealth of India – US\$12.8 Trillion
Total wealth of USA – US\$126 Trillion

With technology, an individual can own more than US\$1 Trillion today!

Most of this wealth is due to technology



Research and pitfalls

The screenshot shows a web browser window displaying the ORI website. The browser's address bar shows the URL `ori.hhs.gov/the-lab`. The page header includes the U.S. Department of Health & Human Services logo and the ORI logo. A navigation menu is visible with items like Home, About ORI, News & Events, Research Misconduct, RCR Resources, Programs, Policies & Regulations, and Assurance Program. The main content area features a section titled "The Lab" with a video thumbnail showing four people and the text "THE LAB Avoiding Research Misconduct". Below this, there is a section for "Interactive Movie on Research Misconduct" with buttons for "PLAY FULL VERSION", "EL LABORATORIO PLAY SPANISH VERSION", "繁體中文版 PLAY CHINESE", and "日本語版 PLAY JAPANESE". A right-hand sidebar contains several utility buttons: "Misconduct Case Summaries", "Newsletter", "Follow Us on Twitter", "PHS Administrative Action Bulletin Board", "Annual Report System", and "ORI Blog". The blog section shows two entries: "New Job Opportunity- Director, ORI" dated Apr-20 and "Annual Report FY 2021" dated Mar-30. The browser's taskbar at the bottom shows several open applications, including PowerPoint presentations and a calendar.

<https://ori.hhs.gov/TheLab/TheLab.shtml>

I'm a good person.

Why do I need to worry about research ethics?

Good person can do good or bad

Issue is about society

Implications to society

Good people do bad

Socially acceptable practices – copying for example

Accidents

Taking shortcuts

Missing details with digital services

Participation in others misconduct

Psychological conditions

Professional Pressures

Publish or perish

Survival

Peer pressure

Funding

Awards, rewards, recognition

Shortcuts to glory

What are the moral foundations of research?
How would institutions govern?

Fundamental principles

Doing good to humans, animals, the planet, future generations, etc. via the pursuit of truth and knowledge – live responsibly

Care for others

Democracy

Rules may be derived from these principles

Ethics and research

Research misconduct (falsification, fabrication and plagiarism)

Collaboration issues (authorship, data ownership and management)

– Who should be an author?

Peer review – Who should review?

Conflicts of interest – Who should know? Who are you responsible to?

Complicity – Multiple involvement

Animal subject ethics

Human subject ethics

Examples of research misconduct

Image manipulation

Data fabrication or falsification

Data omission/suppression

Plagiarism

Sabotage

Affordable excellence in a college

Our competition is not with Oxford.

Excellence does not occur in isolation. Need for an ecosystem.

Key to excellence is people.

Excellence is nurtured.

Excellence has no caste, religion or race!

Excellence is beyond disciplines.

Excellence must be imbibed by the system as a whole.

Destroying excellence is simple.

Just bring the wrong person!

What is expected

Novelty

Quality

Understanding

Applications

How to get all these?

Simple answer is 'people'.

Presentation

Language – scholarly writing

Originality

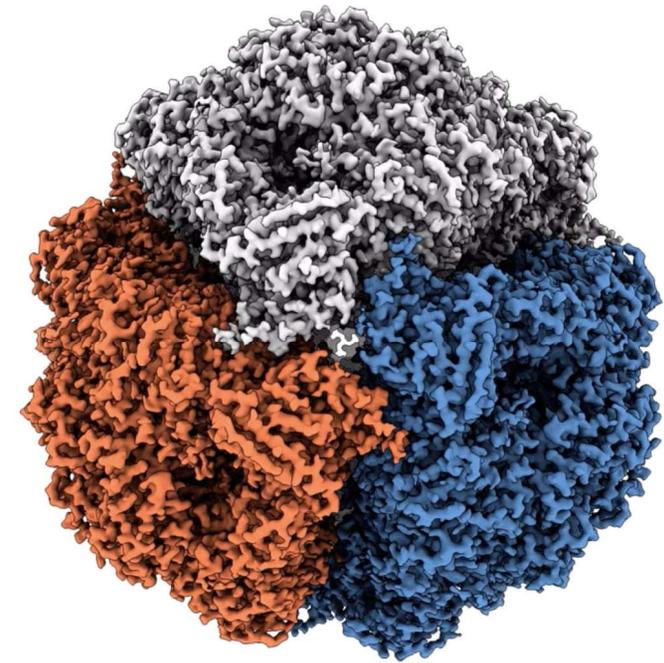
Plagiarism

Credits to people

How about resources?



Source: MRC laboratory of Molecular Biology



Urease, image EPFL

Can we get there?

Impact?

Impact factor?

Get noticed?

Awards/rewards/fellowships

Never publish at lesser places

Publish at the right place

Can we have 10% papers in ACS/APS?

Increase gradually

Universities are not born in a day!



Thank you

Slides 17, 19-23 used inputs from the presentation of Lisa Rasmussen available at:
<https://graduateschool.charlotte.edu/sites/graduateschool.charlotte.edu/files/media/Lecture1ResearchEthics.pdf>

Intellectual property rights

Research produces knowledge
Knowledge is wealth
How to create wealth?
Protect intellectual property
Patents is one of the common ways for protection
Disclose knowledge in the form of patent
Allows protection, commercialization

Intellectual property policy
Incubation policy

INTELLECTUAL PROPERTY RIGHTS POLICY OF IIT MADRAS

PREAMBLE

Faculty, staff and students of IIT Madras are engaged in Research & Development work of diverse nature. Many of these R & D Programmes lead to evolution of intellectual property (IP) in the form of patents, know-how, copyrights, designs, instruments, devices, processes, specimens, software and other inventions, which can be commercially exploited either with or without registration under the Patents Act/Copyright Act. Such a commercial exploitation can be of considerable socio-economic benefit to the country. The Institute, therefore, encourages the protection and licensing of such IP to organisations which can effectively utilise the same for commercial exploitation. This would yield financial returns to the Institute, and partially support the R & D efforts.