Personality Development:
Developing yourself as a scientist

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What's in the menu today

- Where you are now, compared to where you were 4 years ago…
- What are you equipped with
  - Knowledge
  - Skills
  - Attitude
- Personality Development
  - As a Person…
  - As a Professional…
  - As a Scientist…
- Today's objective: Awakening the scientist in you

What is a scientist?

https://www.youtube.com/watch?v=AUs6af5Iu8g

What is a scientist?

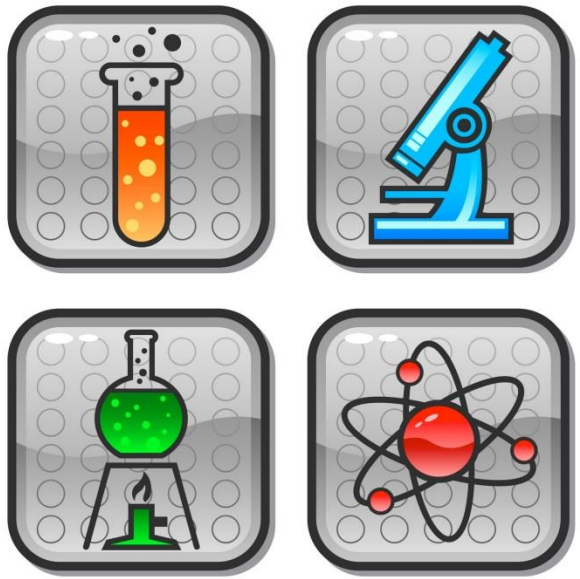
- Scientists differ from the laymen
  - Curious
  - Not easily drawing conclusions (Evidence driven)
  - Organized writers
  - Ethical
  - Build Science

What is Science?

- Science…
  - the body of established knowledge
  - Based on observation, identification, investigation, and theoretical explanation of natural phenomenon
- **Ultimate goal is theory generation and verification**

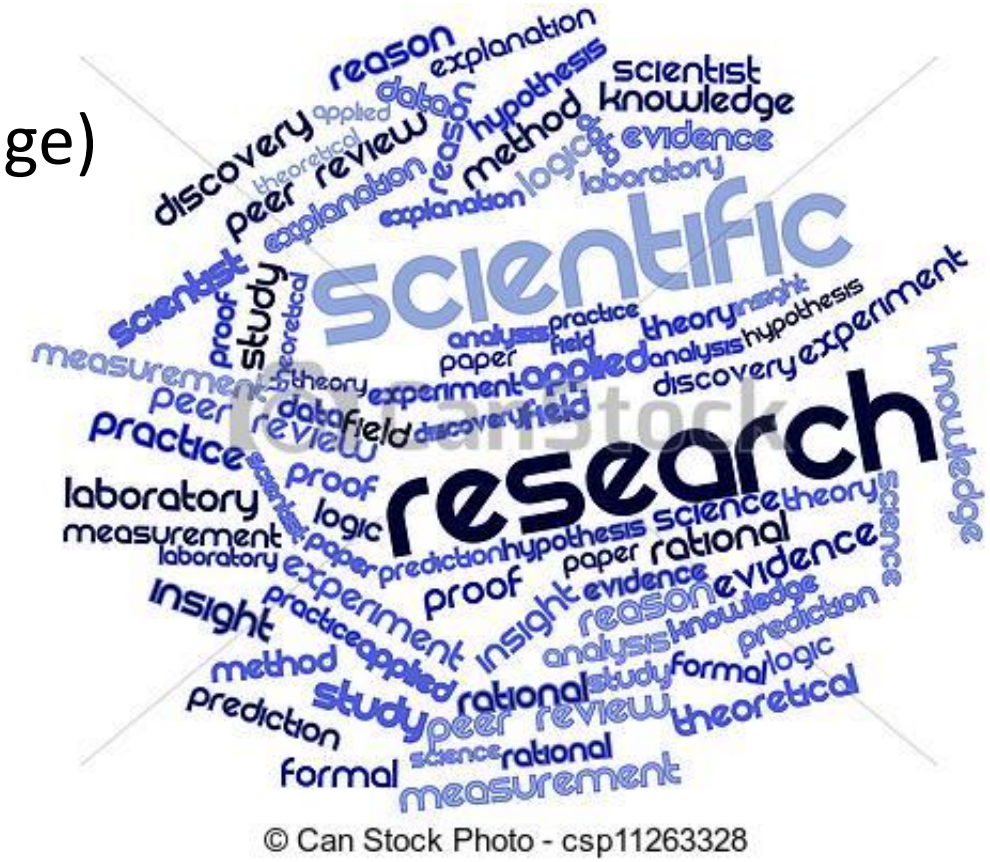
What is Science?

- Theory…
  - a set of inter-related constructs and propositions that specify relations among variables to explain / predict phenomena
  - should be simple, consistent with all observed relationships, and verifiable



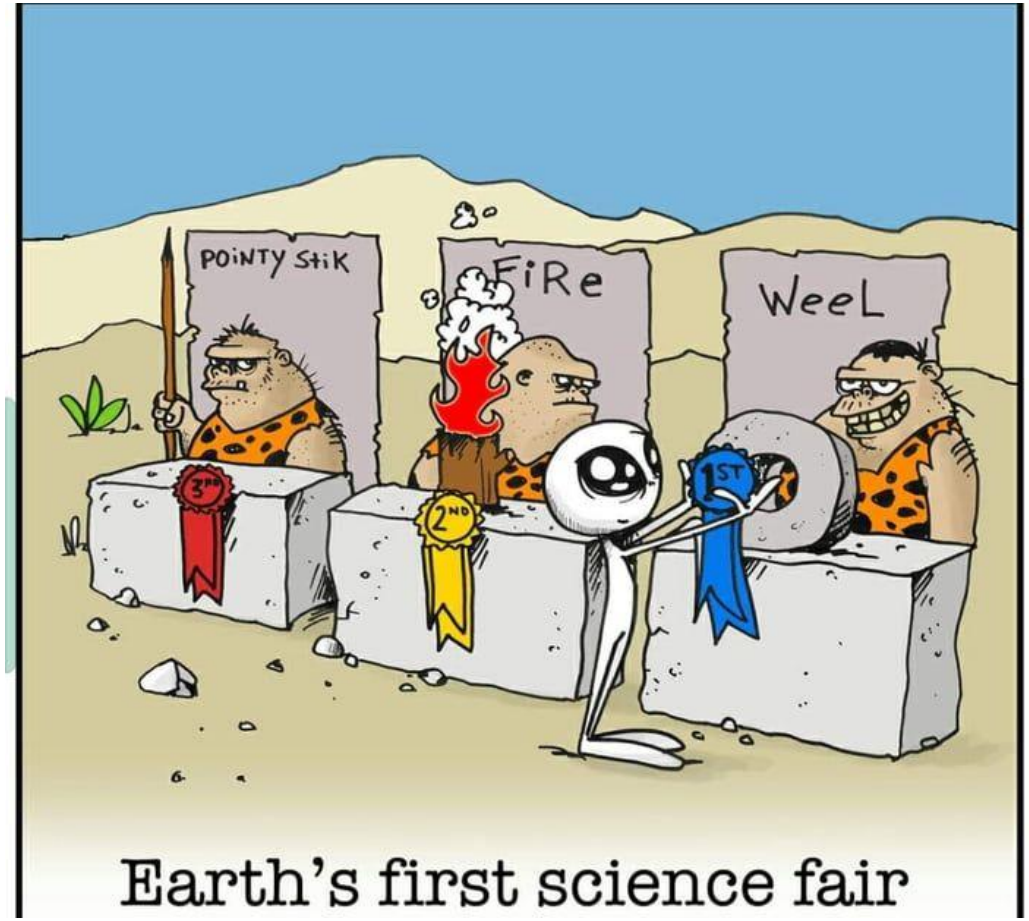
What scientists do?... *again*

- Research (Development of new knowledge)
- Dissemination of knowledge
- Collaboration & Networking
- Make the World a better place



Research?

- Creative and systematic work undertaken to increase the stock of knowledge
- It involves the collection, organization, and analysis of information to increase understanding of a topic or issue



Research?

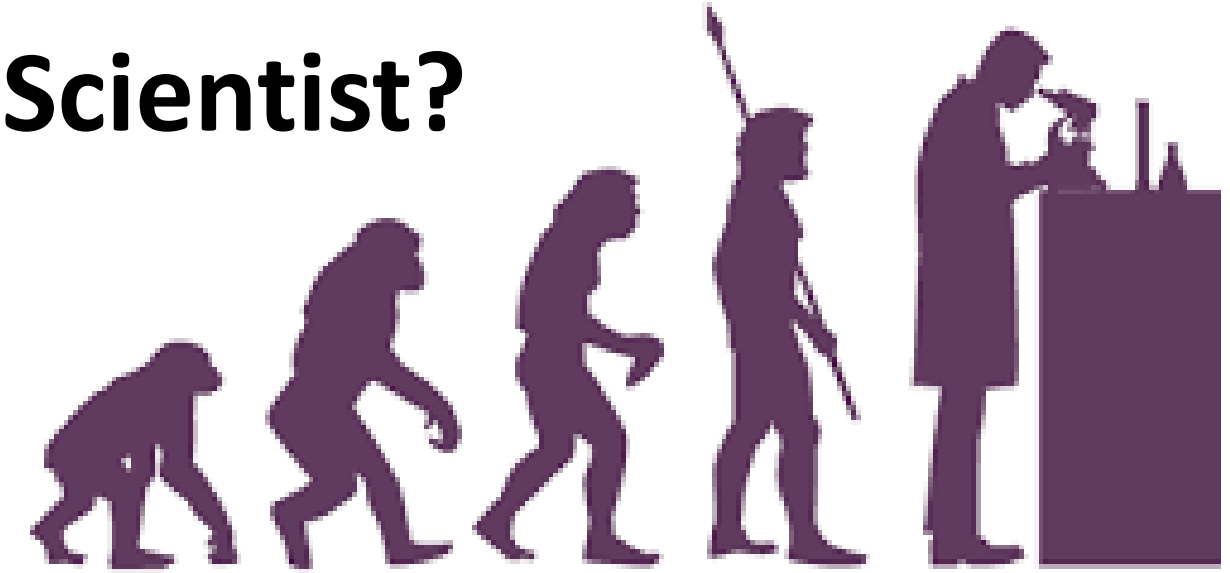
- *What?*, *How?* and *Why?* summarizes what research is
- A logical and systematic search for **new** and **useful** information on a **particular topic**
- *"Research is the systematic approach to obtaining and confirming **new** and **reliable / credible** knowledge* on a **particular topic**"
  - Systematic and orderly (following a series of steps)
  - Purpose is new knowledge, that is reliable / credible
- Applies to all disciplines

Research?

- Search for explanations to - events, phenomena, relationships and causes
  - *think of examples…*
- A **process**, which is;
  - Planned and managed
  - Creative
  - Circular – always leads to more questions
- Research creates KNOWLEDGE

Are you a Scientist?

Where are you as a Scientist?



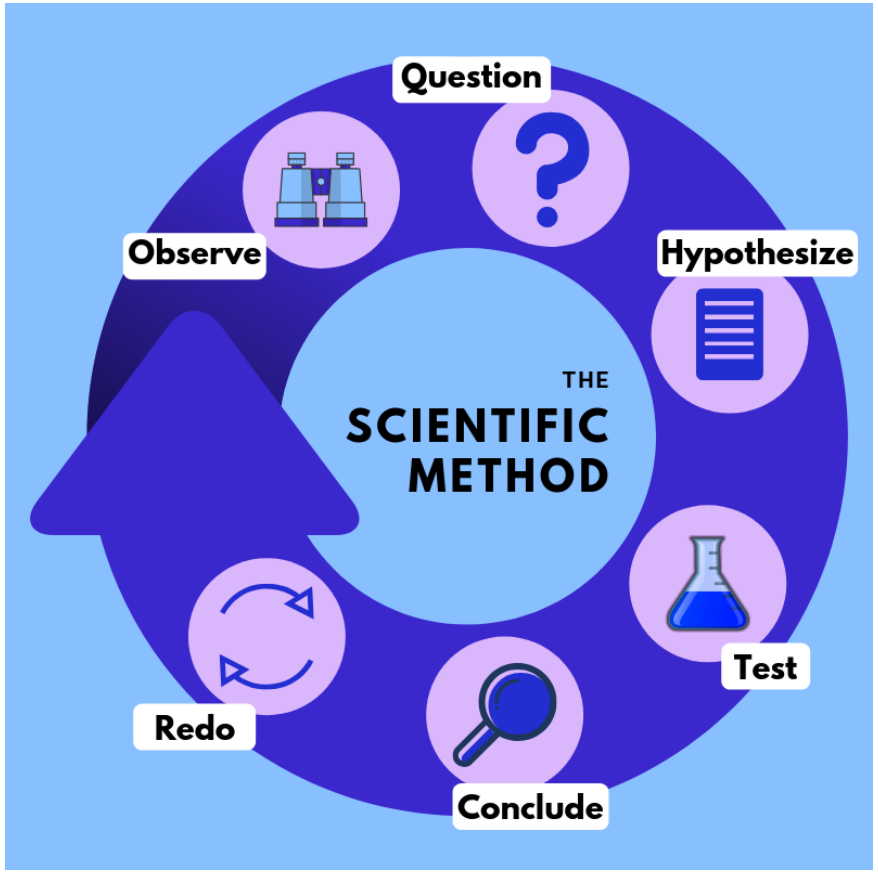
In further developing yourself as a scientist

- I’d like to draw your attention to
  - Curiosity
  - Scientific way of drawing conclusions
  - Scientific writing
  - Dissemination of knowledge
  - Scientific ethics & academic integrity
  - Scientific publishing, academic journals & their impact
  - Collaboration & Networking
  - Making the world a better place
- It’s up to you to decide how far you’d go as a scientist

Curiosity

Scientific way of drawing conclusions

- Scientific Method…
  - Process / approach to generating valid and trustworthy knowledge
- Research…
  - The application of the scientific method
  - Systematic process of collecting and logically analyzing data
- Research Methodology…
  - The ways one would collect and analyze data
  - Methods developed for acquiring trustworthy knowledge via reliable and valid procedures



Scientific Writing

- A very systematic form of writing
- Sections of a Scientific Article
  - Title
  - Abstract
  - Main Body
    - Introduction
    - methodology
    - results
    - discussion
    - conclusions
  - References

Scientific Writing

- Okay…. But, Where do we begin?
  - The more you think of this process of writing your paper you tend to confuse things more???
  - Don’t worry – it has happened to all of us who have been through this process.
  - To come out of it – Your outline should be written before you start your paper.
  - It organizes your thoughts and creates a plan so you know how your paper will flow.
  - Then your final statement under the introduction (or the thesis statement) should be well written.
  - It will let the audience know what to expect from reading your paper – so you have to meet those expectation.

General format for Scientific Writing

- **The Topic**
  - Should be catchy.
  - Should be not confusing (pretty straight).
  - Should be narrow (specific) and short as possible (a narrower topic for a short paper, and a broader topic for a longer paper).
- **Introduction**
  - Should not be too lengthy.
  - Should include a logical arrangement of arguments, providing a rationale/justification for conducting your study.
  - Should have inputs from the literature review, where citations are very important.
  - The introduction should end with a single well written statement (thesis statement), that summarizes what your paper is about, or what you are trying to prove.
  - In a thesis introduction ends with objectives, while in a paper objectives of the study goes in the last paragraph mentioned above.

General format for Scientific Writing

- **Methodology / Materials and Methods**
  - A logical sequence of research activities & under which conditions they were performed.
  - Follows a specific writing style – passive voice & past tense in general; writing from the third person point of view in most cases .
  - Try to follow the research objectives where possible.
  - “Study area” also goes here, as well as “Limitations of the study” (as separate sub topics).
- **Results**
  - All your findings goes here in the forms of tables, figures, graphs, charts and their descriptive texts.
  - Presenting style of results are elaborated later.

General format for Scientific Writing

- **Discussion**
  - Discuss all the new findings in the context of existing knowledge.
  - Literature review is again useful here.
  - Try to follow the research objectives where possible.
  - Finally goes back to the beginning by providing new research questions found during the present study.
- **Conclusions (and Recommendations)**
  - Draw conclusions from the findings presented in results.
  - Answer each research objective (follow each specific objective of the research).
- **References**
  - The previous work you have referred to will be listed in a standard format.
  - In text citations and the list of references are two of the most important aspects of a thesis as well as a research paper.

General format for Scientific Writing

- **Best ways to present Results**
  - A well formulated abstract is the first step in presenting your results
    - An abbreviated version of your findings
  - Tables
    - A matrix of rows and columns of variables
  - Figures
    - visual organization of data/observations
    - Figures / pictures,
    - pie / line / bar charts
    - flow charts, organizational charts
    - gantt charts, cartogram charts
    - scatter plots, box plots

General style of Scientific Writing

- **Third person than the first person writing**
  - writing from the third person point of view and uses pronouns like **'he', 'she', 'it'**, or they.
  - It differs from the first person, which uses pronouns such as 'I', 'me', and 'we' and from the second person, which uses pronouns such as 'you' and 'yours'
- Active vs. Passive voice
  - What ever the voice used it should be consistent within a section
  - Introduction and Discussion better be in Active Voice
  - Methodology be better be in passive voice (by convention)
    - e.g. "DNA was extracted from the soil" (Passive) is better than "We extracted DNA from the soil" (Active)
  - Passive Voice should not be the default for other parts of the text
- Even the First Person, Active Voice can be used when the actor/researcher(s) (or their thoughts, inferences, or assumptions) are important to be stressed
- Writing should be clear, concise and plain

General style of Scientific Writing

- **The use of tenses in scientific writing**
- Introduction section – the present tense is the most natural tense.
  - Because you state your reasons for undertaking the research in that section.
  - The section also describes what is currently known about the topic.
- Methodology section – the past is more natural here.
  - Because you are describing work that is already complete at the time of writing.
  - Here you describe what you did and how you did that., Thus, it is simply a description of your actions.
- Discussion section – it is common to use future tense toward the end
  - To indicate the future course of action suggested by the results of the current research.

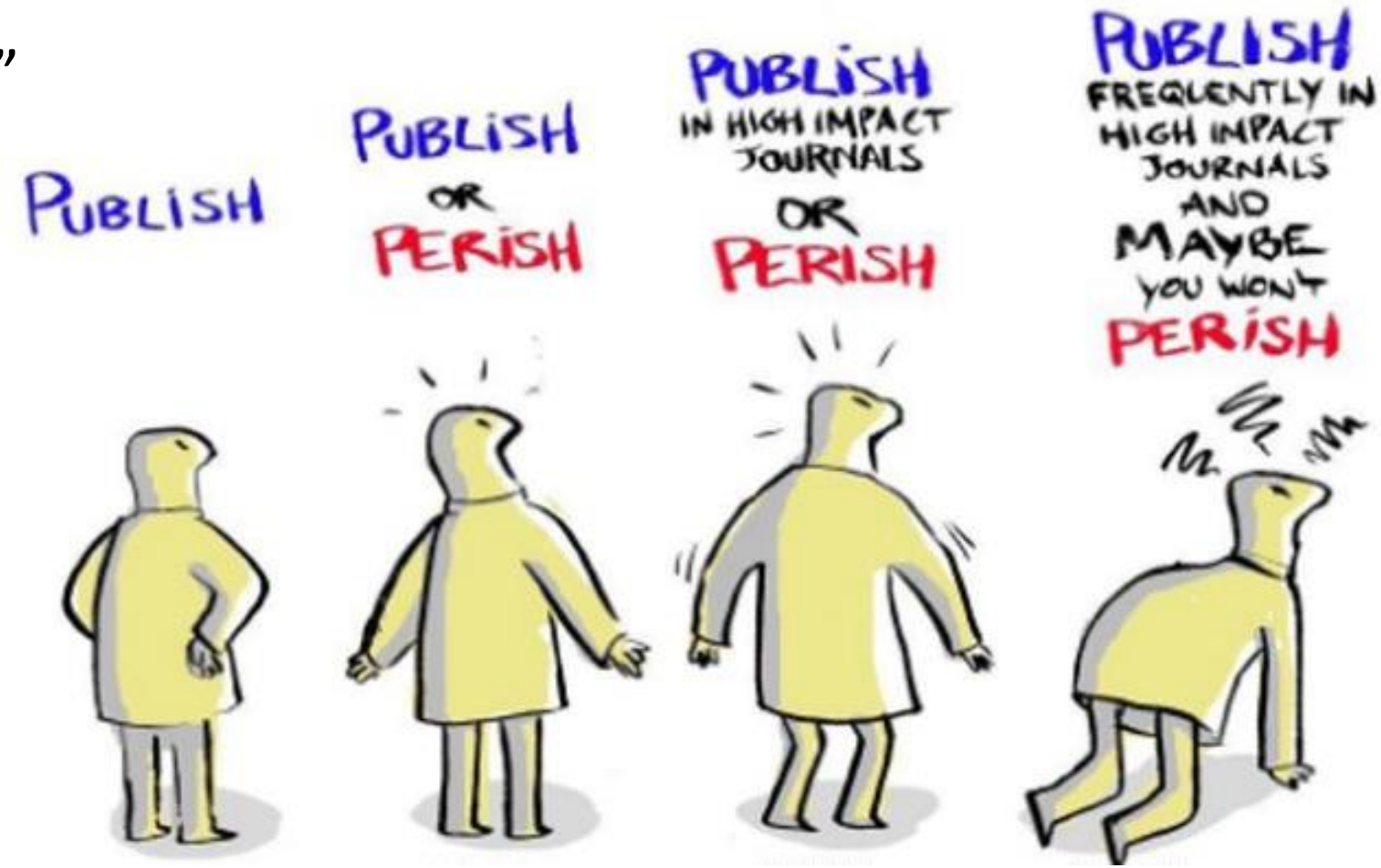
General style of Scientific Writing

- Use of alpha numeric characters
- Use of acronyms
- Consistency
- In text citations

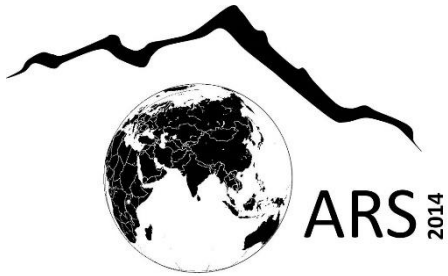
- References/Bibliography
- Non plagiarized paraphrasing
- Direct Quotes

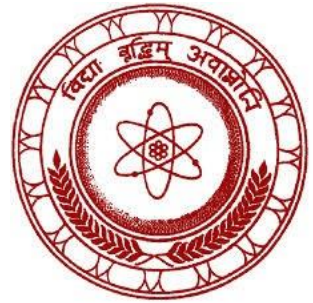
Dissemination of knowledge

- “Publish or perish”



Dissemination of knowledge





- Thesis to the university library
- Abstract at final year research session of the Faculty
- Annual Research Sessions of the University
- Annual Research Sessions of SLAAS Sri Lanka Association for the Advancement of Science
- Research Papers (Articles) in Local / National Academic Journals
- Short Communications / Research Papers in International, Indexed Journals with an Impact Factor (IF)
  - Indexed Journals
    - journals indexed in ***Science Citation Reports*** **(Science Citation Index (Expanded)** & **Social Science Citation Index)**
  - Impact Factor of a Journal
    - a measure reflecting the impact a journal have for the advancement of science
    - IFs are given annually for all indexed journals

Scientific Ethics & Academic Integrity

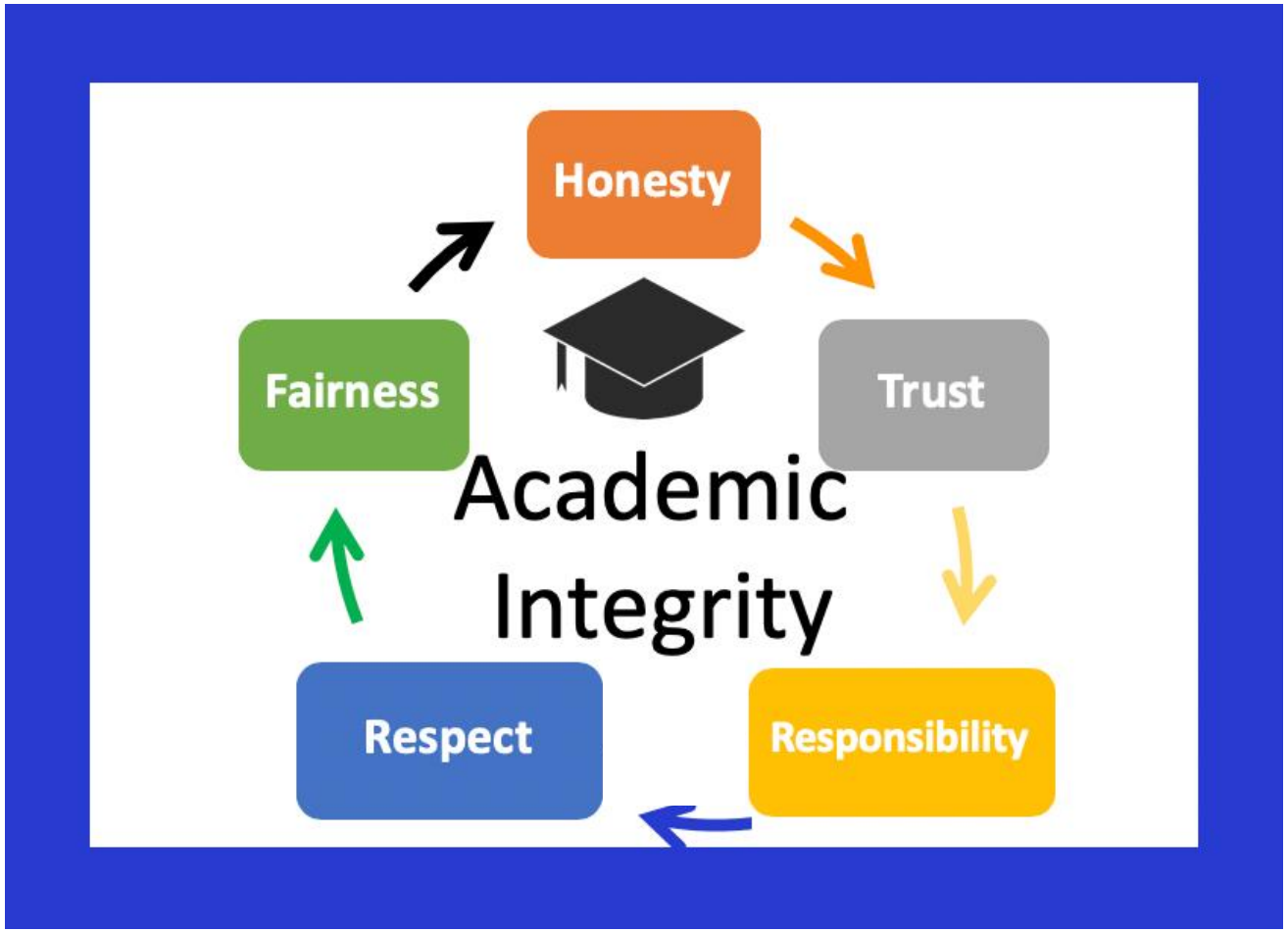
Category	Description of Category	Ethical Principle
Ethical scientific inquiry	The research inquiry itself must benefit society.	• Duty to society
Ethical conduct and behaviors of researchers	Researchers should conduct themselves in certain manners, and they are responsible for their knowledge and awareness of ethics and appropriate research methods.	• Conflict of interest • Integrity • Nondiscrimination • Professional competence • Professional discipline
Ethical treatment of research participants	Research participants should be treated according to certain guidelines and treated humanely, and the environmental or secondary effects of the research should be considered.	• Informed consent • Beneficence • Nondiscrimination • Nonexploitation • Privacy and confidentiality

Weinbaum, C., Landree, E., Blumenthal, M., Piquado, T., & Gutierrez, C.I. (2019). Ethics in Scientific Research: An Examination of Ethical Principles and Emerging Topics.

Scientific Ethics & Academic Integrity

- **Academic integrity** is the commitment to and demonstration of honest and moral behaviour in an **academic** setting.
- This is most relevant at the university level as it relates to providing credit to other people when using their ideas
  - Avoid plagiarism, use paraphrasing and citations comes very important in this context
- The academic integrity is maintained by the scientific publication process

Scientific Ethics & Academic Integrity



Scientific Ethics & Academic Integrity

- The academic integrity is maintained by the scientific publication process
- Texts submitted for publication will be closely examined by reviewers appointed by the editor or publisher.
- These reviewers are usually anonymous, and the identity of the author of the article is often kept a secret to the reviewer as well.
  - It is called the double-blind peer review

Scientific Ethics & Academic Integrity

- Most publishers will only consider original pieces of research for publication.
- Publishing companies and journals have guidelines for their editors on how to deal with suspected redundant (no longer needed or useful) publication.
- Such guidelines are useful for authors as well.

Publication Integrity and Ethics

PIE (n)

P.I.E. Guidelines for Editors-in-Chief

Scientific Ethics & Academic Integrity

- Peer Review Process
  - When an author has submitted a text to a journal, it will be reviewed by other scholars within the field (Peers).
  - The number of reviewers used varies across journals, but having 2-4 reviewers is common.
  - Depending on their comments, the manuscript will then be accepted or rejected.
  - Sometimes, an article will be sent back by the editor to the author, with a request for revisions (minor or major).
  - Articles that are accepted often have to go through minor revisions before being published.

Scientific Ethics & Academic Integrity

- So that, when you are close to the end of preparing your manuscript for publication….
- You should have a little breathing space and then review your work whether it is fit for the process
- PROOFREADING of your won work is essential

Scientific Ethics & Academic Integrity

A checklist to PROOFREAD your manuscript

1. Are all words spelled correctly? (Use a paper or online dictionary is unsure!)
2. Did I capitalize the beginning of each sentence and all proper nouns?
3. Did I punctuate correctly?
4. Do I use grammar correctly?
5. Did I answer all of the topic questions, and fulfill all of the requirements on my rubric.
6. Did I include an introduction and conclusion?
7. Did I type the paper using the correct font type, size, line spacing and margin requirements?
8. Did I paraphrase all content?
9. Did I use parenthetical notations for quotes?
10. Do my sentences make sense when read aloud?
11. Have I had my paper peer edited? – ANY COLLEAGE IN THE SAME FIELD
12. Does my paper flow well?
13. Did I include a Reference/Bbibliography page?

Scientific Ethics & Academic Integrity

- Once all the above steps are done….
- You are ready to get into the business of Publishing
- Scientific publishing is therefore the most accepted method of research evaluation
- Through the process of ‘PEER REVIEW’
- Your research gets evaluated by peers in your specialized scientific discipline

Scientific Publishing, Academic Journals & their impact

- You write up your manuscript
- You format it the way the journal wants
- You submit
- Once submitted; you get relieved; The job is now with the journal, it's editors and reviewers
- The editor looks at it
- If (s)he thinks it's worth a try, he sends it to two-four reviewers
- If they like it too, they say so to editor
- If the editor feels those reviewers liked it enough,
  - (s)he accepts the paper for publication
  - generally conditional to making certain changes (as suggested by referees and/or him/herself)

Scientific Publishing, Academic Journals & their impact

- But not always! – some journals have high rejection rates; might reject even though referees liked the paper (but with many suggestion for improvement).
- You make changes, resubmit
- They send you final proof of your manuscript in the journal format
- You double-check them, approve, sign copyright forms, pay page charges if needed
- It appears in print and/or online (1 month – 3 years later)
- **THERE GOES THE CELEBRATION!!! - becoming a member of the intellectual/scientific community (a peer to all in the field)**
- **If you write/publish, you'll also be asked to review research in your discipline**

Scientific Publishing, Academic Journals & their impact

- The **impact factor** (**IF**) of an academic journal is a measure reflecting the average number of citations to recent articles published in that journal
- It is used as a proxy for the relative importance/impact of a journal within its field
- It is an indicator of the Impact of a particular journal to the advancement of Science
- Journals with high IFs are deemed to be more important than those with low IFs
- IF is developed by Eugene Garfield, the founder of the **Institute for Scientific Information (ISI)**, now **Thomson Reuters**.
- Impact factors are calculated yearly starting from 1975 for those journals that are indexed in the ***Science Citation Reports***

Scientific Publishing, Academic Journals & their impact

- Unfortunately all academic journals are not listed in ***Science Citation Reports***
- ***Science Citation Reports*** contains the **Science Citation Index (Expanded)** and the **Social Science Citation Index**
- Only two SL journals have an IF:

  Journal of National Science Foundation of SL **(Published by NSF, SL)**

  Journal of Agricultural Sciences – SL **(published by SUSL)**
- High caliber, general science journals have much higher IFs –

  e.g. 2018 IFs for ***Nature***: 43.07, and ***Science***: 41.04
- A scientists' impact to science can be calculated from his/her ***Impact Points***

  i.e. the summation of all the ***Impact Factors*** of all his her publications

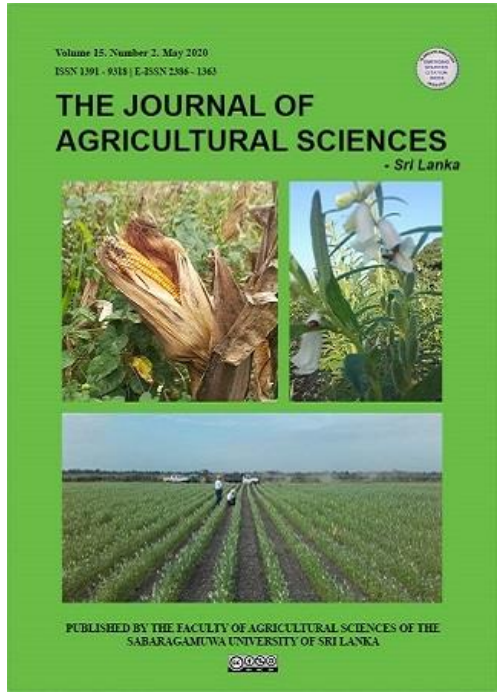
Scientific Publishing, Academic Journals & their impact

JOURNAL IMPACT FACTORS 2012

Abbreviated Journal Title (linked to journal information)	ISSN	Total Cites	Impact Factor	5-Year Impactor Factor	Immediacy Index	Articles	Cited Half-life
CA-CANCER J CLIN	0007-9235	10976	101.78	67.41	21.263	19	3.8
NEW ENGL J MED	0028-4793	232068	53.298	50.075	11.484	349	7.8
ANNU REV IMMUNOL	0732-0582	15990	52.761	42.901	9.174	23	8.2
REV MOD PHYS	0034-6861	31368	43.933	44.436	10.026	38	9.8
CHEM REV	0009-2665	103702	40.197	42.054	7.158	196	7.9
NAT REV MOL CELL BIO	1471-0072	29222	39.123	42.508	6.5	66	5.1
LANCET	0140-6736	158906	38.278	33.797	10.576	276	8.9
NAT REV GENET	1471-0056	20384	38.075	31.359	7.014	71	4.7
NAT REV CANCER	1474-175X	28602	37.545	38.46	4.838	68	5.8
ADV PHYS	0001-8732	4400	37	25.289	3.778	9	>10.0
NATURE	0028-0836	526505	36.28	36.235	9.69	841	9.4
NAT GENET	1061-4036	76456	35.532	33.096	6.357	196	6.8
ANNU REV BIOCHEM	0066-4154	18684	34.317	35.013	2.951	41	>10.0
NAT REV IMMUNOL	1474-1733	22613	33.287	34.302	5.116	69	5
NAT MATER	1476-1122	39242	32.841	36.732	6.246	134	4.7
CELL	0092-8674	171297	32.403	34.774	6.382	338	8.6
ENERGY EDUC SCI TECH	1301-8361	2992	31.677		5.46	174	1.5
SCIENCE	0036-8075	480836	31.201	32.452	6.075	871	9.4
NAT REV NEUROSCI	1471-003X	24316	30.445	34.187	5.085	47	5.9
JAMA-J AM MED ASSOC	0098-7484	117668	30.026	29.684	6.927	220	8.8
NAT PHOTONICS	1749-4885	10259	29.278	30.773	5.031	96	2.7
NAT REV DRUG DISCOV	1474-1776	16887	29.008	32.123	5.59	61	5


Science
The End of
PRIVACY
QUICK
MANEUVERS
Flapping-wing robot models
insect flight pp. 1073 & 1089
Science
Science
HIDDEN
CONFLICTS?
ILLUMINATING
THE BRAIN


Journal
of the
National Science Foundation
of Sri Lanka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SABARAGAMUWA UNIVERSITY OF SRI LANKA


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SEEING


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University
Journal
Volume 17 Number 1 February 2019
ISSN 1391-3166
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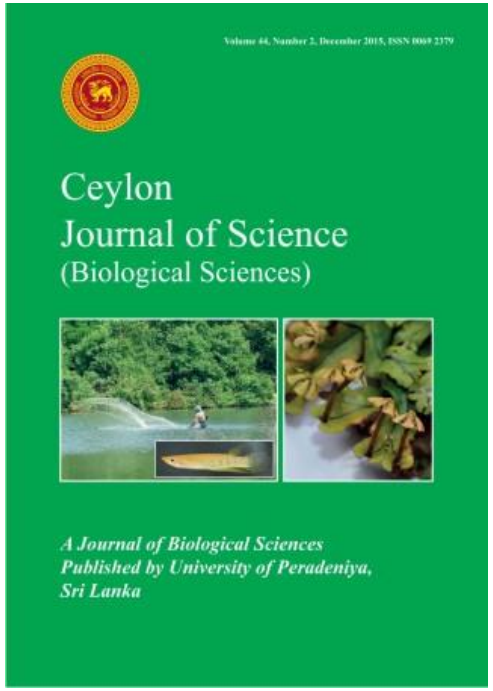
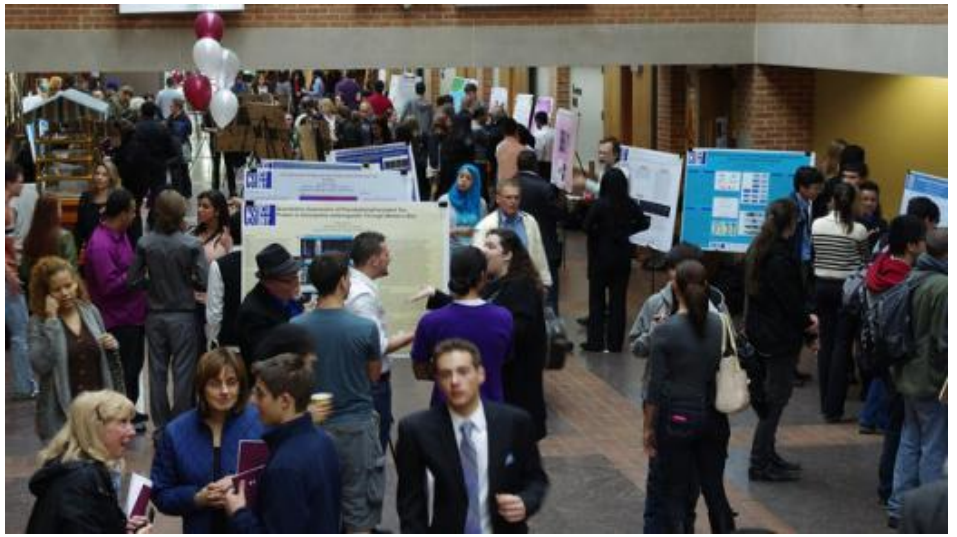

Ceylon
Journal of Science
(Biological Sciences)
A Journal of Biological Sciences
Published by University of Peradeniya,
Sri Lanka

Collaboration & Networking

- Research Groups
- Scholarly Society Memberships
- Conferences



- Citations
- Web based profiles of Scientists (*Scholarly Social Media*)

Citations

Individual Scientists' Performance

Hirsch index
"H-factor"

PNAS

An index to quantify an individual's scientific research output

J. E. Hirsch*

Department of Physics, University of California at San Diego, La Jolla, CA 92093-0319

Communicated by Manuel Cardona, Max Planck Institute for Solid State Research, Stuttgart, Germany, September 1, 2005 (received for review August 15, 2005)

I propose the index *h*, defined as the number of papers with citation number ≥*h*, as a useful index to characterize the scientific output of a researcher.

(*i*) Total number of papers (N_p). Advantage: me
ductivity. Disadvantage: does not measure imp
impact of papers.
(*ii*) Total number of citations (N_{cit}). Advantage

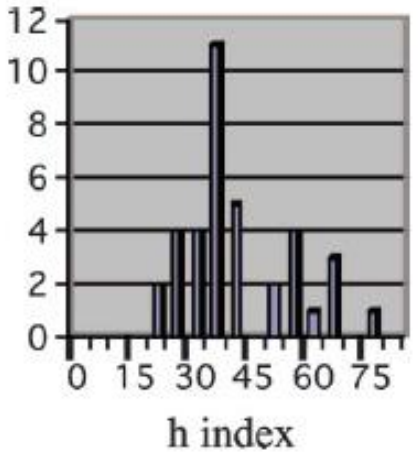
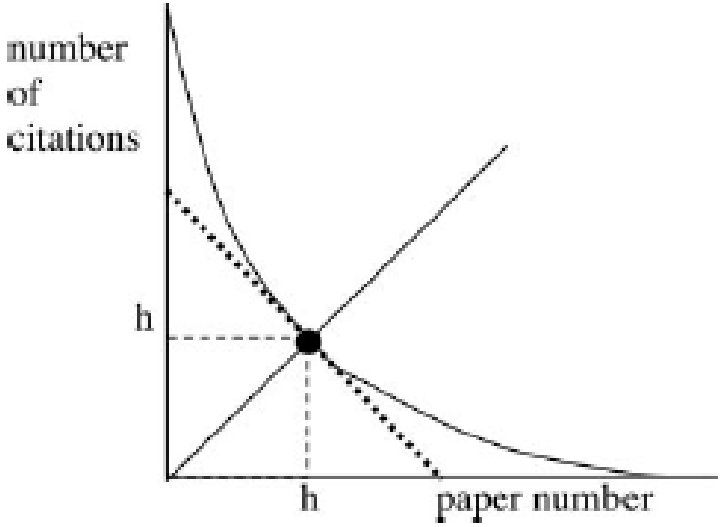


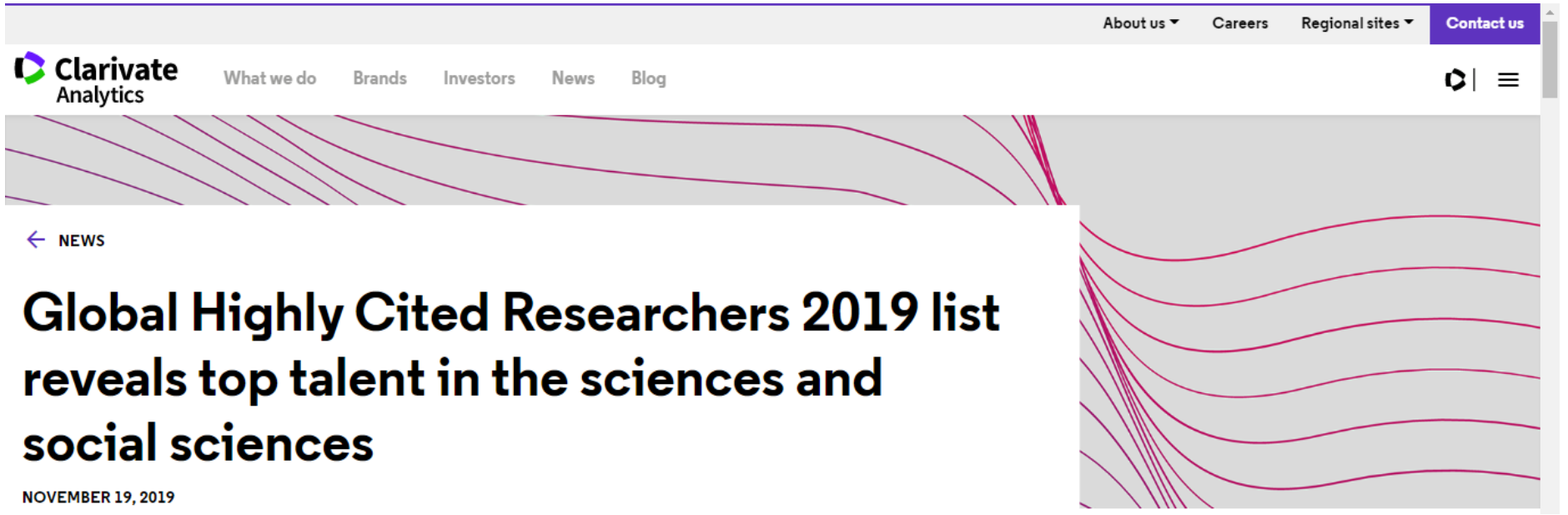
Fig. 2. Histogram giving the number of Nobel prize recipients in physics in the last 20 years versus their *h* index. The peak is at the *h* index between 35 and 39.



Citations

Highly Cited Researchers

Highest impacting researchers in the world revealed through their citations

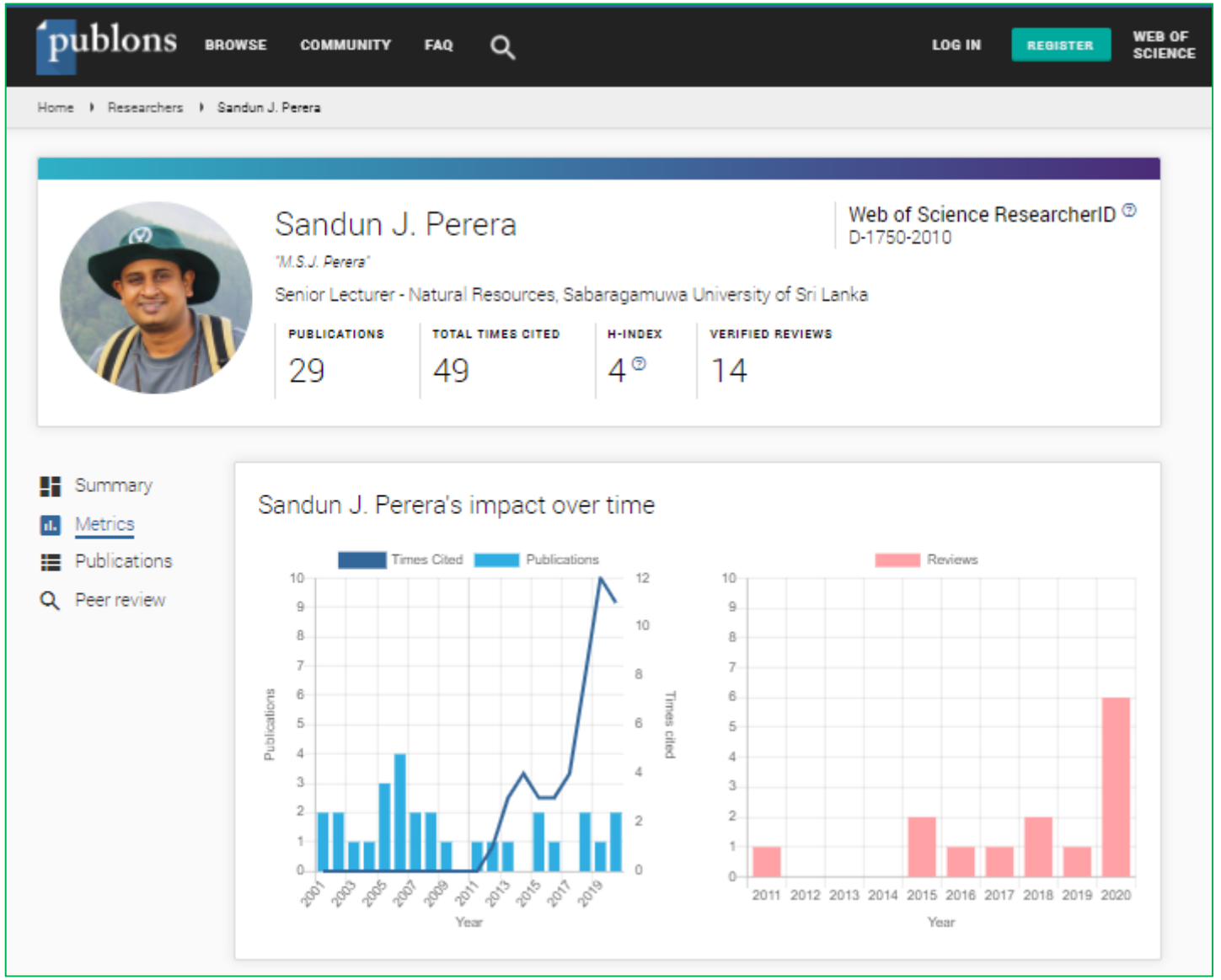


Web-based profiles of academics

- We can call them as *Academic social media*
- There are many
- We'll discuss only on three such websites
  - Web of Science ResearcherID / ORCID / Publons / Scopus
    - Allows to search scientists from all around the world by keywords
    - Can view all Indexed Journal Publications & Citations in such journals on one's name – develop citation metircs, H index, ect.
    - Can also view all journal articles one has reviewed
  - ResearchGate
    - Reveals all Academic Journal publications, and any other web based scientific publi-cations & their citations (not only indexed journals – better in our part of the world) , as well as individual H index & citation history on one's name
  - GoogleScholar
    - Similar to RG, but the two differs in their performance in detecting citations

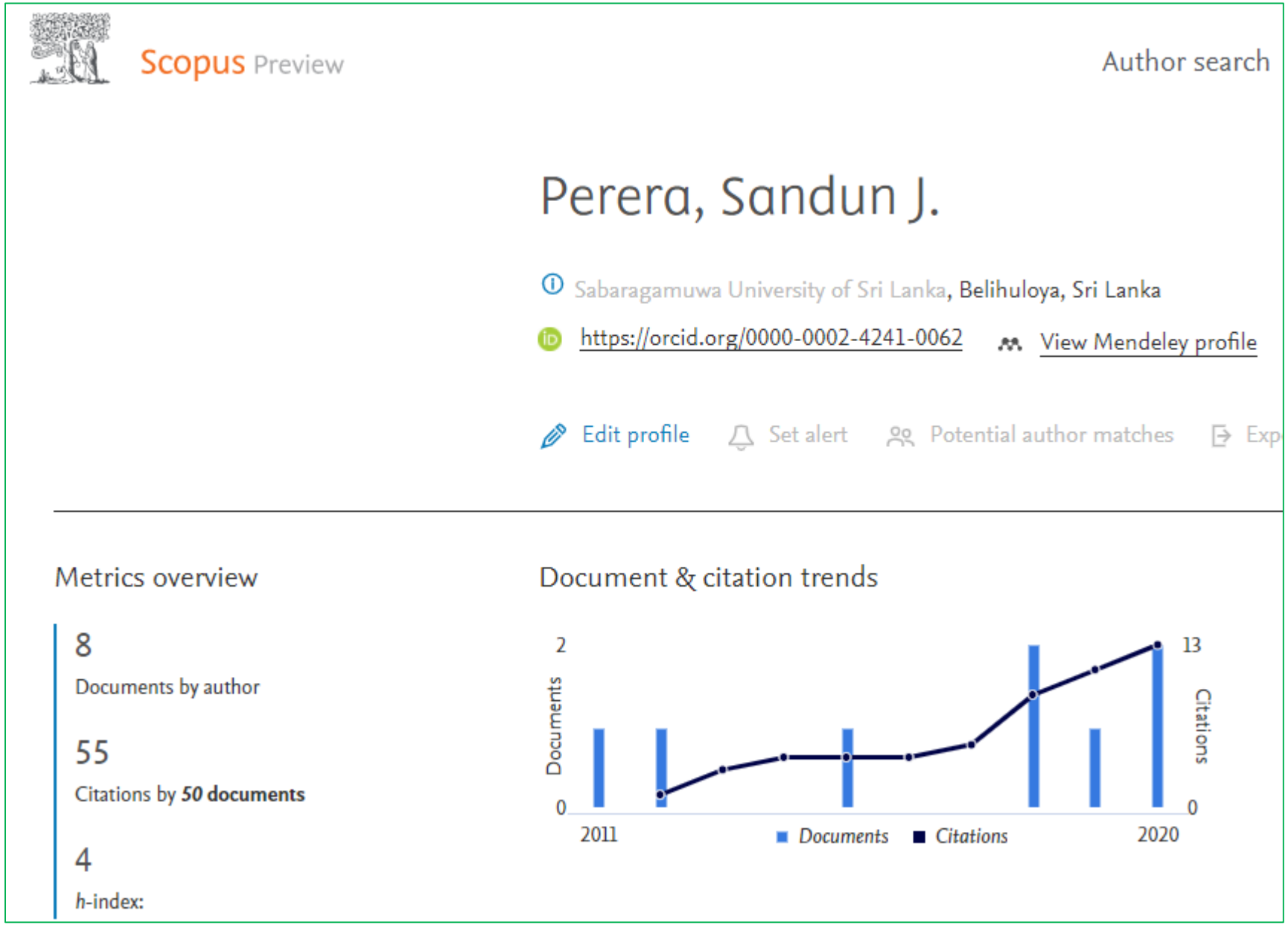
Web of Science ResearcherID in Publons

Search scientists from all around the world by keywords
Reveals Academic Journal publications, & their citations from the SCIE (Science-citation Index Expanded)



Scopus

Search scientists from all around the world by keywords
Reveals Academic Journal publications, & their citations from the SCIE (Science-citation Index Expanded)



Google Scholar: author profiles

Google Scholar

Sandun J. Perera

FOLLOW

GET MY OWN PROFILE

Senior Lecturer, Department of Natural Resources, Sabaragamuwa University, Sri Lanka.
Verified email at appsc.sab.ac.lk - Homepage

Biodiversity Biogeography Conservation Biogeography Conservation Science Zoogeography

TITLE	CITED BY	YEAR
Vertebrate distributions indicate a greater Maputaland-Pondoland-Albany region of endemism SJ Perera, D Ratnayake-Perera, Ş Procheş South African Journal of Science 107, 49-63	44 *	2011
Global hotspots in the present-day distribution of ancient animal and plant lineages Ş Procheş, S Ramdhani, SJ Perera, JR Ali, S Gairola Scientific Reports 5, 15457	17	2015
Composition of faunal species in the Sinharaja world Heritage site in Sri Lanka CNB Bambaradeniya, MSJ Perera, WPN Perera, LJM Wickramasinghe, ... Sri Lanka Forester 26 (2), 21-40	16 *	2003
Larvicidal potential of five selected dragonfly nymphs in Sri Lanka over Aedes aegypti (Linnaeus) larvae under laboratory settings C Samanmali, L Udayanga, T Ranathunge, SJ Perera, M Hapugoda, ... BioMed research international 2018	10	2018
A report on the terrestrial assessment of tsunami impacts on the coastal environment in Rekawa, Ussangoda and Kalametiya (RUK) area of Southern Sri Lanka CNB Bambaradeniya, SP Ekanayake, MSJ Perera, RK Rodrigo, ... IUCN–The World Conservation Union, Sri Lanka (Unpublished Report)	8	2005
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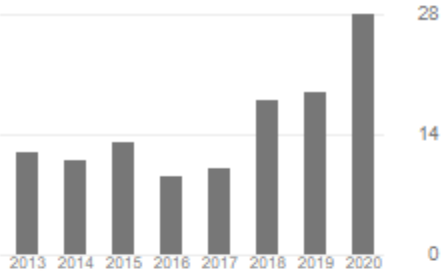

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ResearchGate: author profiles

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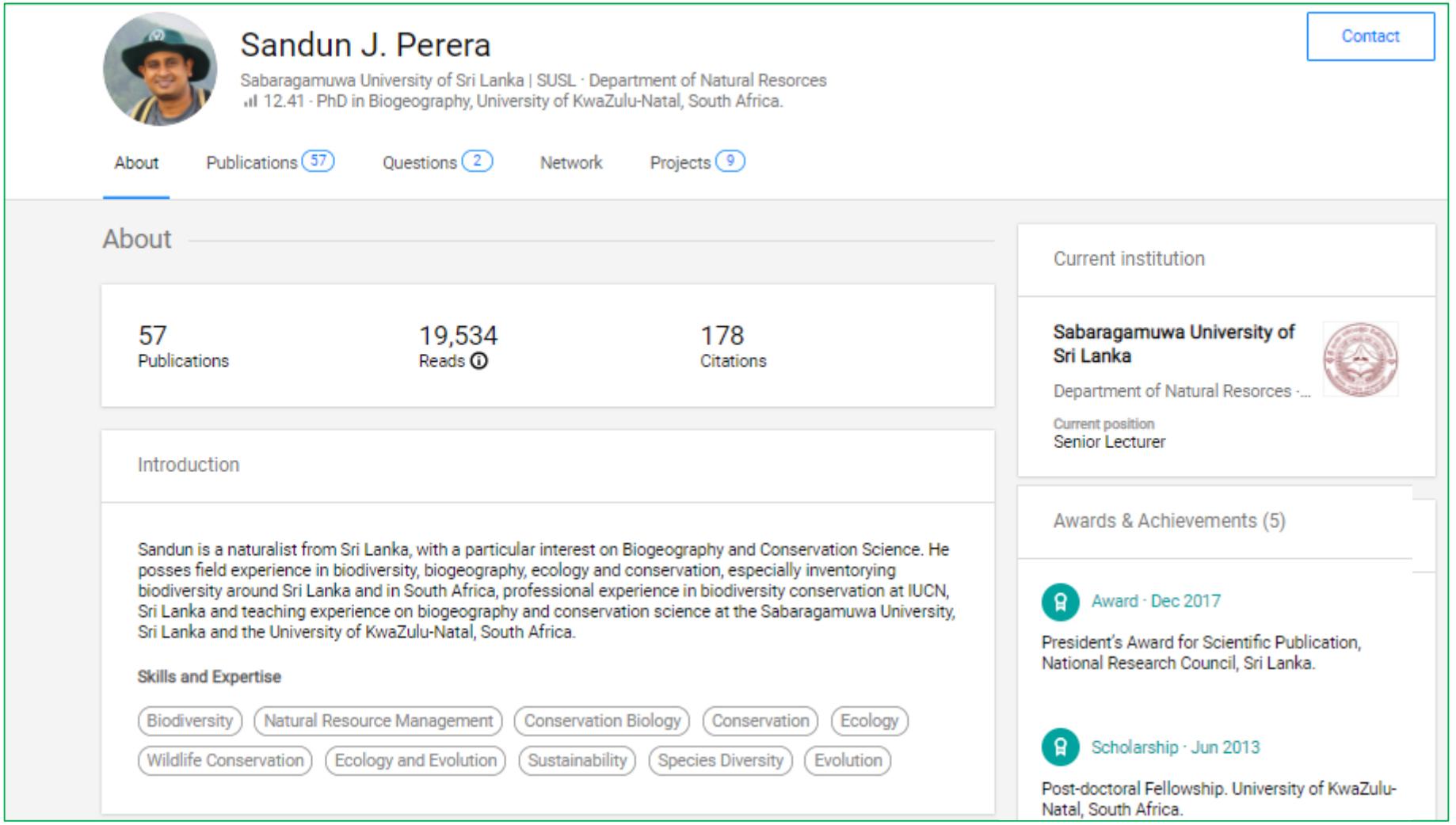


Make the World a better place

- https://www.youtube.com/watch?v=IzPcu0-ETTU (until 3:47)

- https://www.youtube.com/watch?v=8zyhNSLC9Gw&list=PLu4Zo9fB5MNdZ8BI73IW3kEM7MluHqsdM&index=1

Make the World a better place

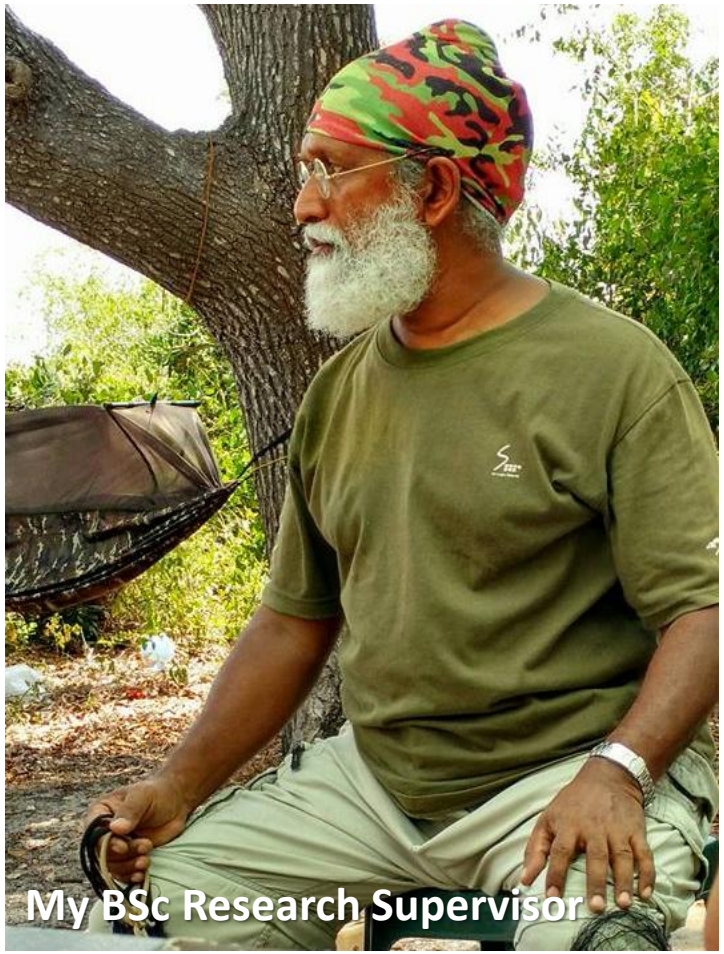
- Nobel Price
  - According to Alfred Nobel's 1895 will, Nobel Prizes are awarded "to those who, during the preceding year, have conferred the greatest benefit to humankind”, in the fields of Physics, Chemistry, Physiology or Medicine, Literature, and Peace.
  - Alfred Nobel was a Swedish chemist, engineer, and industrialist most famously known for the invention of dynamite.

Make the World a better place

Heal the world, Make it a better place,
For you and for me And the entire human
race, There are people dying If you care
enough for the living, Make it a better place,
For you and for me - Michael Jackson

Finally a dedication to my heroes in Science

Emeritus Professor Sarath Wimalabandara Kotagama, Founder of the Field Ornithology Group, Univ. of Colombo.



Finally a dedication to my heroes in Science

Dr Channa Nalin Bandara Bambaradeniya, Leader of field ecologists group, IUCN – Sri Lanka.

My MSc Research Supervisor

Field work in southern Sinharaja
Kosmulla – Lankagama - Pitadeniya, 2002

Finally a dedication to my heroes in Science

Professor Şerban Procheş & Dr Syd Ramdhani, Biogeography Research Group @ School of Environment, UKZN, Durban.

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Global hotspots in the present-day distribution of ancient animal and plant lineages

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The current distribution of biotic lineages that emerged in the deep time has both theoretical and practical implications, in particular for understanding the processes that have forged present-day biodiversity and informing local and regional-scale conservation efforts. To date however, there has been no examination of such patterns globally across taxa and geological time. Here we map the diversity of selected extant seed plant and tetrapod vertebrate lineages that were already in existence either in the latest Triassic or latest Cretaceous. For Triassic-age linages, we find concentrations in several regions – both tropical and temperate – parts of North America, Europe, East and South-east Asia, northern South America, and New Zealand. With Cretaceous-age lineages, high values are relatively uniformly distributed across the tropics, with peak the values along the Andes, in South-east Asia and Queensland, but also in the temperate Cape Mountains. These patterns result from a combination of factors, including land area, geographic isolation, climate stability and mass extinction survival ability. While the need to protect many of these lineages has been long recognised, a spatially-explicit approach is critical for understanding and maintaining the factors responsible for their persistence, and this will need to be taken forward across finer scales.

Dr Sandun J. Perera, a senior lecturer in Biogeography, Biodiversity and Conservation Science attached to the Department of Natural Resources, received the "President's Award for Scientific Publication, for the year 2015" on the 6th of November 2017, for the research paper he co-authored entitled "Global hotspots in the present-day distribution of ancient animal and plant lineages" published in the refereed journal Scientific Reports published by the Nature Publishing Group.

Thank You!

- Let’s get yourselves out there and save the world!