Lecture 2
Authorship and research integrity

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Authorship matters!

- Authorship confers **credit** and has important academic, social, and financial implications;
- Authorship implies **accountability** and **responsibility** for published work.

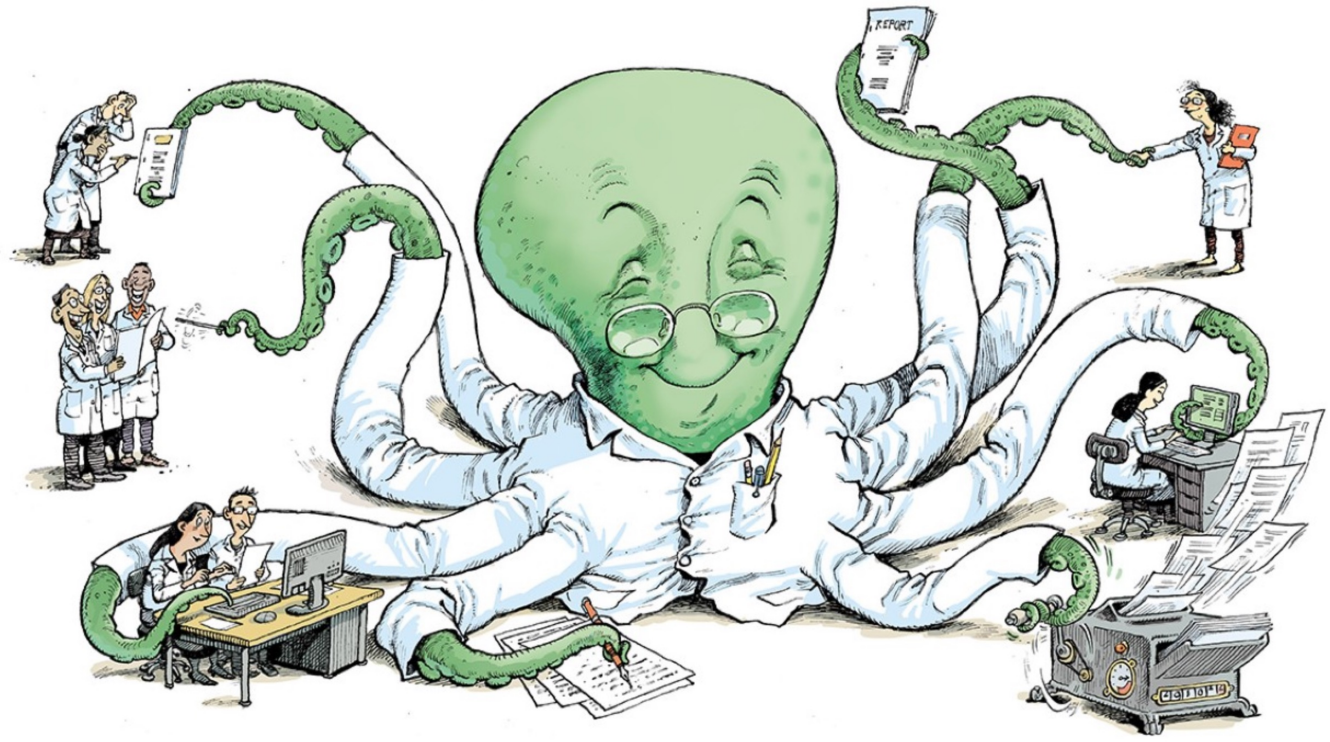


Illustration by David Parkins

h-index

- Number of publications and citations is often used to gauge a scientist's achievement;
- **h-index** is a widely used measure of individual scientist's productivity and impact;
- h-index is defined as the maximum value of h such that the given author has published at least h papers that have each been cited at least h times.

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)

Jorge Hirsch, Professor of Physics at University of California San Diego, devised the metric h-index in 2005

Who qualifies as an author?

International Committee of Medical Journal Editors (ICMJE) recommends the following criteria for authorship:

- Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND
- Drafting the work or revising it critically for important intellectual content; AND
- Final approval of the version to be published; AND
- Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Who qualifies as an author?

Nature Portfolio journals expect authors to fulfil the following criteria:

- Each author is expected to have made substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data; or the creation of new software used in the work; or have drafted the work or substantively revised it
- AND to have approved the submitted version (and any substantially modified version that involves the author's contribution to the study);
- AND to have agreed both to be personally accountable for the author's own contributions and to ensure that questions related to the accuracy or integrity of any part of the work, even ones in which the author was not personally involved, are appropriately investigated, resolved, and the resolution documented in the literature.

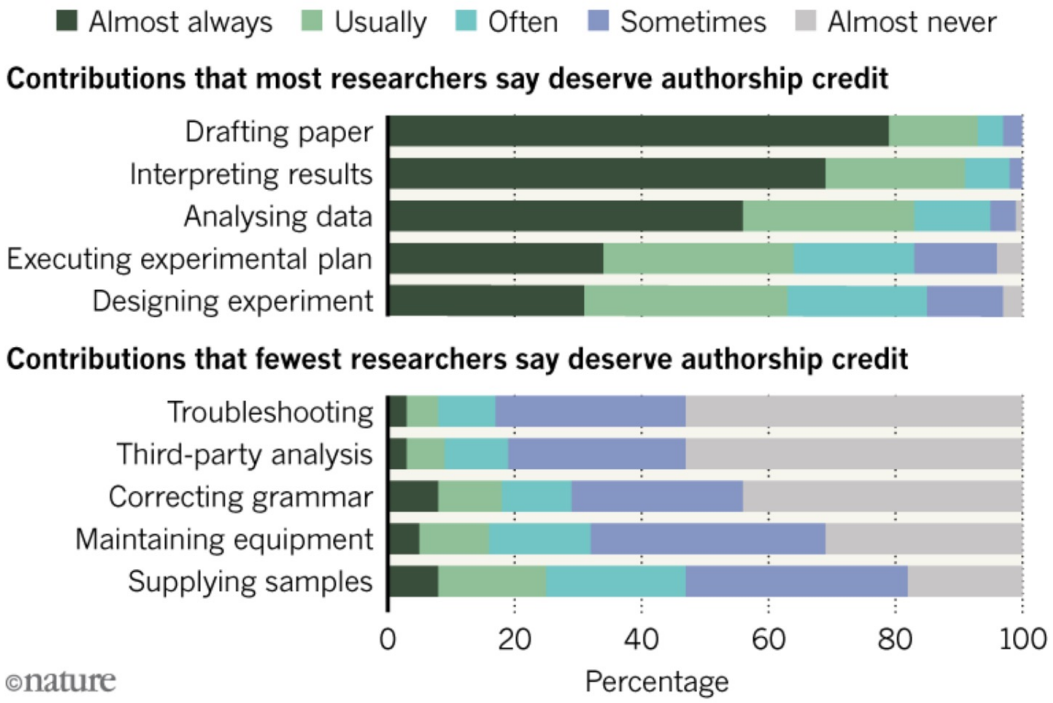
Who qualifies as an author?

Ecological Society of America (ESA) suggests that authorship could be legitimately claimed if researchers:

- Conceived the ideas or experimental design
- participated actively in execution of the study;
- analyzed and interpreted the data; or
- wrote the manuscript.

Who qualifies as an author?

- Although there are general consensus, authorship rules are not always clear-cut and opinions vary.



(Guglielmi 2018, Nature; based on data from Patience et al 2019, PLOS One)

My recommendation for authorship

- Made substantial contribution to the work
- Participate in the writing or revision of the work
- Approve the version of manuscript submitted
- Be responsible for the content published

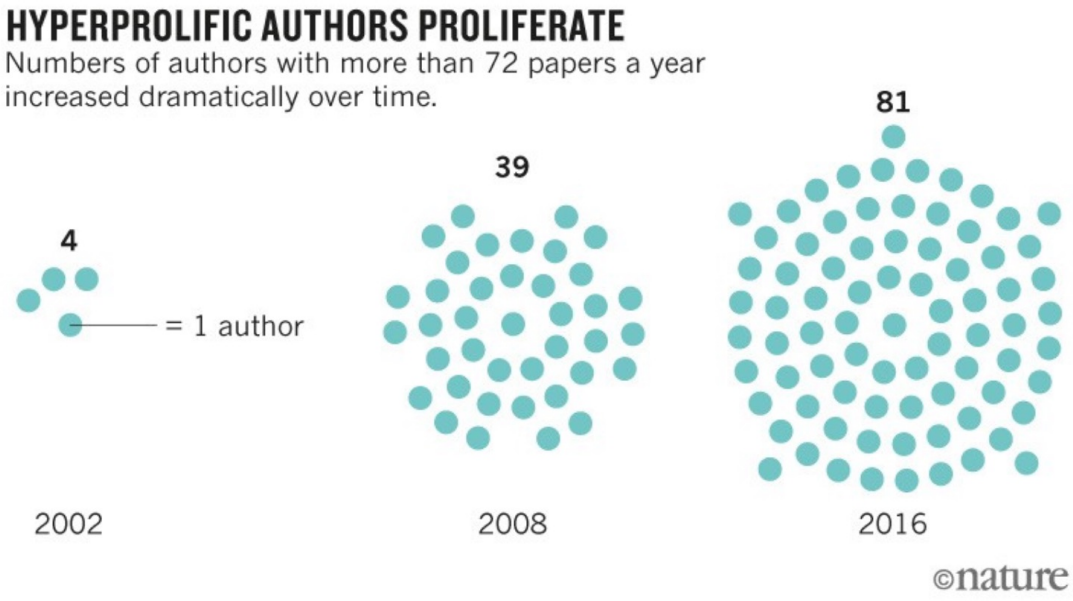
Common issues in authorship

Detrimental authorship practice	Definition
Ghost authorship (7)	Authors who contributed to the work but are not listed, generally to hide a conflict of interest from editors, reviewers, and readers.
Guest/gift/honorific authorship (8)	Individuals given authorship credit who have not contributed in any substantive way to the research but are added to the author list by virtue of their stature in the organization.
Orphan authorship	Authors who contributed materially to the work but are omitted from the author list unfairly by the drafting team.
Forged authorship	Unwitting authors who had no part in the work but whose names are appended to the paper without their knowledge to increase the likelihood of publication.

(McNutt et al, 2018, PNAS)

Common issues in authorship

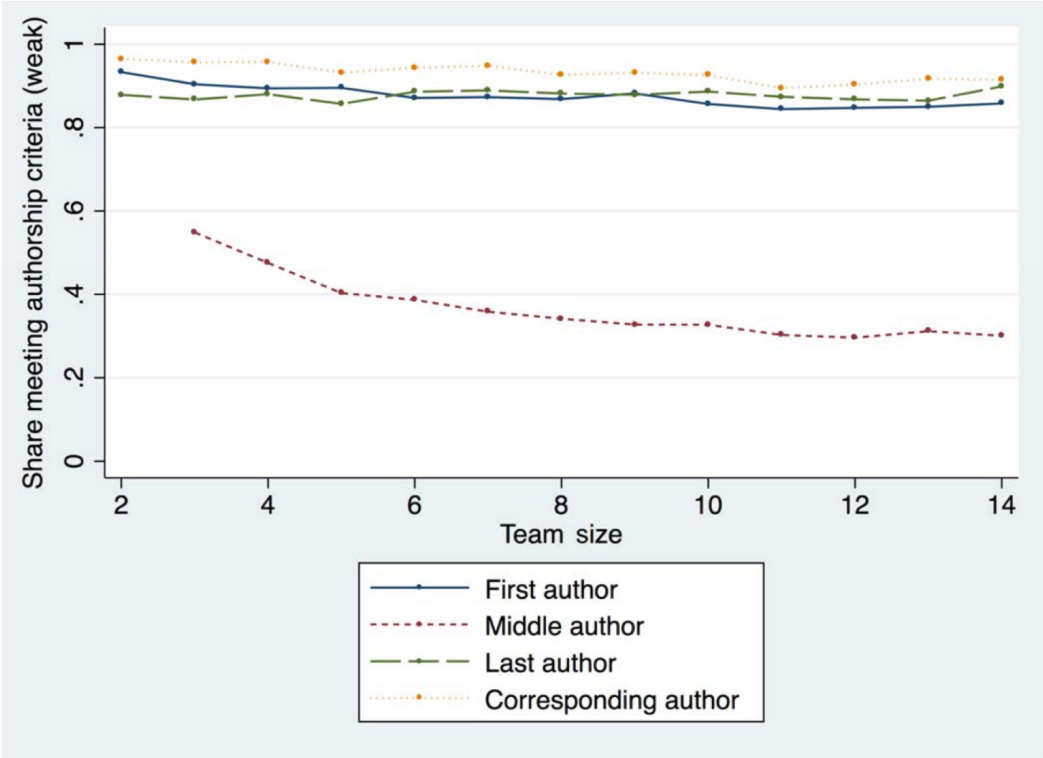
- Number of authors who publish more than 72 papers a year, i.e., one paper every 5 days on average, has increased dramatically over time.



(Ioannidis et al, 2018, Nature)

Authorship order

- Authorship order often indicates magnitude of contribution;
- In ecology and most other fields, first author and corresponding author add the most value because they are perceived to contribute most to the work.



(Sauermann and Haeussler 2017, Science Advance)

Authorship order

- First author is typically the person who carried out the research and wrote and edited the paper;
- Corresponding author is the author to whom correspondence should be sent to. It usually signifies seniority and supervision of the whole work.
- First and corresponding authors are thus much more valued in academic performance evaluation globally.
- Too much emphasis on first and corresponding author may have side effects: stifle collaboration, abuse of co-first authors etc.

# Equal contribution

- Co-first authors or authors will equal contribution are increasing, possibly due to the emphasis on first author papers.

TABLE 1. Number of original research articles with authors given equal credit and annual prevalence

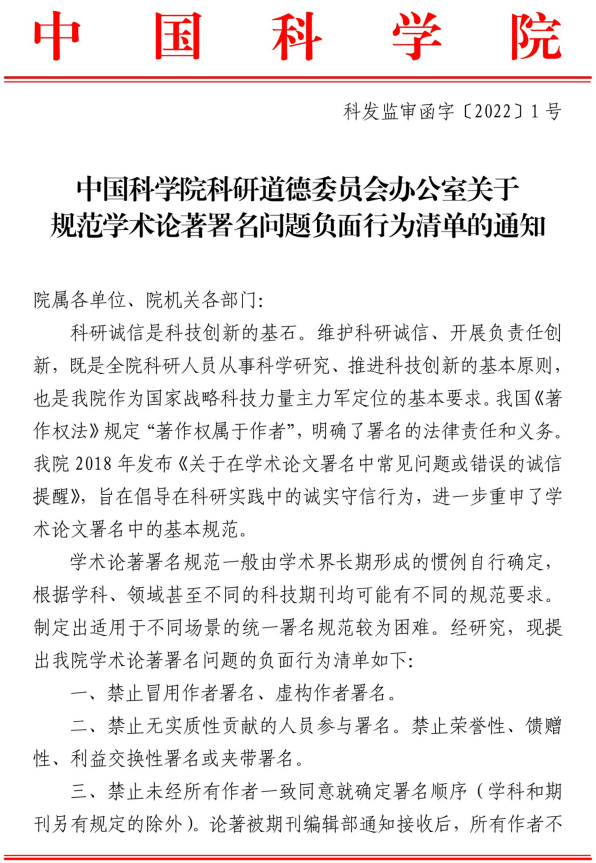
Year	NEJM	JAMA	Annals	Lancet	BMJ
2000	3/362 (<1%)	0/349 (0%)	0/200 (0%)	4/795 (<1%)	0/579 (0%)
2001	1/362 (<1%)	1/364 (<1%)	1/204 (<1%)	7/716 (1.0%)	1/586 (<1%)
2002	7/372 (1.9%)	8/357 (2.2%)	0/176 (0%)	16/637 (2.5%)	3/590 (<1%)
2003	20/361 (5.5%)	5/372 (1.3%)	1/196 (<1%)	21/531 (4.0%)	1/643) (<1%)
2004	11/299 (3.7%)	5/340 (1.5%)	5/180 (2.8%)	18/498 (3.6%)	1/623 (<1%)
2005	20/306 (6.5%)	5/307 (1.6%)	5/178 (2.8%)	15/396 (3.8%)	4/514 (<1%)
2006	19/283 (6.7%)	9/257 (3.5%)	3/159 (1.9%)	10/330 (3.0%)	3/333 (<1%)
2007	17/338 (5.0%)	10/229 (4.4%)	3/158 (1.9%)	13/326 (4.0%)	1/292 (<1%)
2008	19/328 (5.8%)	9/211 (4.3%)	4/156 (2.6%)	18/311 (5.8%)	4/260 (1.5%)
2009	29/336 (8.6%)	17/226 (7.5%)	7/186 (3.8%)	10/279 (3.6%)	5/525 (1.0%)
Total	146/3347 (4.4%)	69/3012 (2.3%)	29/1793 (1.6%)	132/4819 (2.7%)	23/4945 (<1%)
Trend	$p < 0.001$	$p < 0.001$	$p < 0.001$	$p < 0.001$	$p < 0.001$

NEJM = *New England Journal of Medicine*; JAMA = *Journal of the American Medical Association*; Annals = *Annals of Internal Medicine*; BMJ = *British Medical Journal*.

(Akhabue et al 2010, Annals of Epidemiology)

# Equal contribution

- Because of the emphasis given to first and corresponding authors, designation of co-first authors or co-corresponding authors are sometimes abused.



中　国　科　学　院

科发监审函字〔2022〕1号

中国科学院科研道德委员会办公室关于规范学术论著署名问题负面行为清单的通知

院属各单位、院机关各部门：

科研诚信是科技创新的基石。维护科研诚信、开展负责任创新，既是全院科研人员从事科学研究、推进科技创新的基本原则，也是我院作为国家战略科技力量主力军定位的基本要求。我国《著作权法》规定“著作权属于作者”，明确了署名的法律责任和义务。我院2018年发布《关于在学术论文署名中常见问题或错误的诚信提醒》，旨在倡导在科研实践中的诚实守信行为，进一步重申了学术论文署名中的基本规范。

学术论著署名规范一般由学术界长期形成的惯例自行确定，根据学科、领域甚至不同的科技期刊均可能有不同的规范要求。制定出适用于不同场景的统一署名规范较为困难。经研究，现提出我院学术论著署名问题的负面行为清单如下：

一、禁止冒用作者署名、虚构作者署名。

二、禁止无实质性贡献的人员参与署名。禁止荣誉性、馈赠性、利益交换性署名或夹带署名。

三、禁止未经所有作者一致同意就确定署名顺序（学科和期刊另有规定的除外）。论著被期刊编辑部通知接收后，所有作者不得再任意修改署名顺序。

四、不得违反署名第一作者或通讯作者时的必要性原则而罗列过多的第一作者或通讯作者，也不得因为有多个第一作者或通讯作者而拒绝承担对整篇论文的责任。

五、不得因作者所属机构变化而随意变更论著工作主要完成机构。不得虚构、伪造作者所属机构，不得把论著非完成机构作为署名单位。

六、不得使用非正式联系方式作为论著作者的联系方式，例如使用公众邮箱等社会通讯方式作为联系方式。

七、不得故意排斥有重要贡献的科研工作者参与署名。不得侵害直接实施科学实验的研究生的基本署名权。不得为均衡其他非学术利益而随意调整学生的署名及其署名位置。

为落实“零容忍”要求，凡我院科研人员出现上述清单所列行为时，将由相应第一责任单位按照科发函字〔2020〕71号文的相关规定开展调查，并根据具体事实和相关情节予以认定和处理，对严重违背科研诚信要求的行为终身追责。

中国科学院科研道德委员会办公室

（此件主动公开）

— 2 —

Determine authorship order

- First author or the corresponding author should take the initiative to determine authorship order.
- Consensus on authorship order should be reached before any work is submitted for publication.
- Ways to determine authorship orders:
  - Magnitude of contribution
  - Alphabetical
  - Random
  - Combinations of the above

Authorship order: a case study

- First and last author were most involved in the designing and carrying out the work;
- Other coauthors ordered based on the amount of involvement in the work;

Statistical Reports

Ecology, 101(12), 2020, e03184

An assessment of statistical methods for nonindependent data in ecological meta-analyses

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[2]*Odum School of Ecology, University of Georgia, Athens, Georgia 30602 USA*

Authorship order: a case study

- Some of the co-authors made substantially more contributions and are given prominent positions in the author list;
- Others are ordered alphabetically.

nature geoscience

ARTICLES

https://doi.org/10.1038/s41561-018-0125-5

Continental-scale decrease in net primary productivity in streams due to climate warming

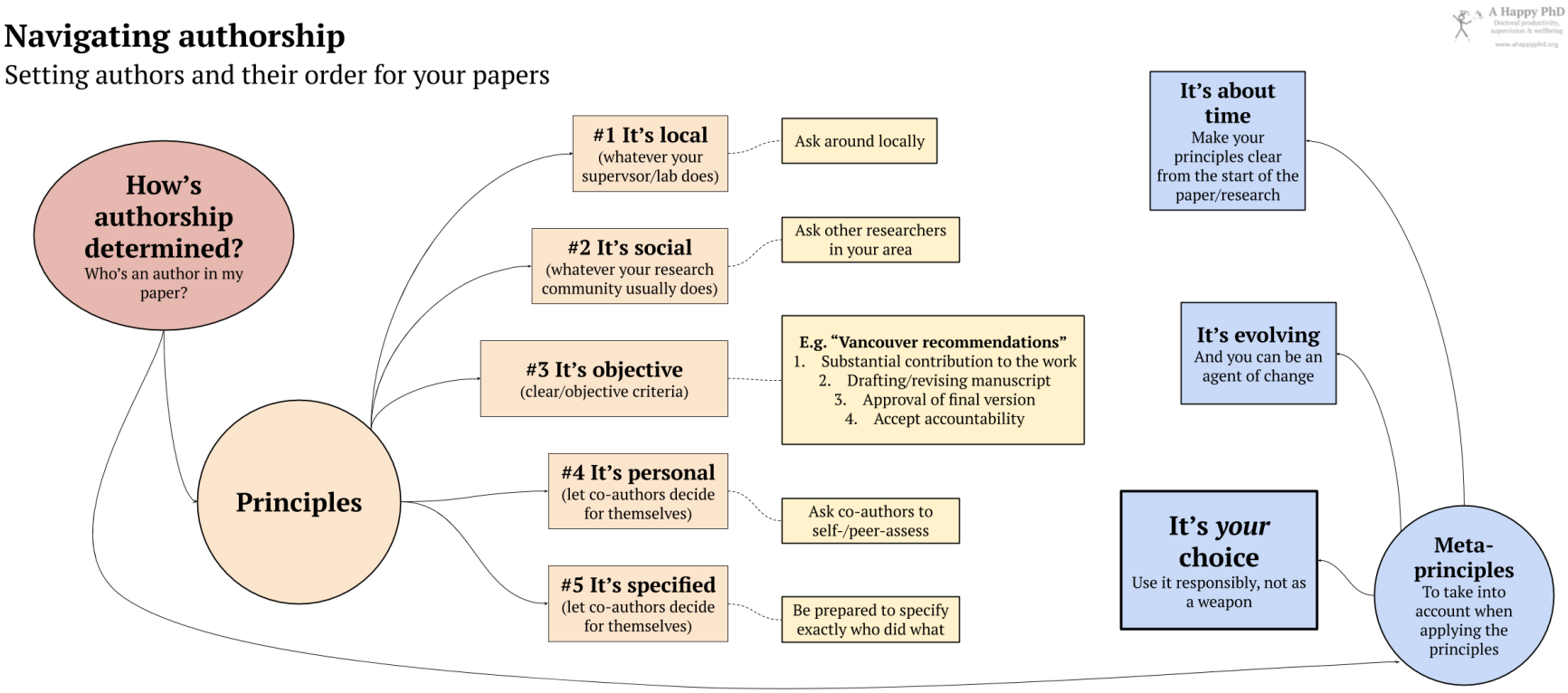
Chao Song[1*], Walter K. Dodds[2], Janine Rüegg[2,3], Alba Argerich[4,5], Christina L. Baker[6], William B. Bowden[7], Michael M. Douglas[8], Kaitlin J. Farrell[1,9], Michael B. Flinn[10], Erica A. Garcia[11], Ashley M. Helton[12], Tamara K. Harms[6], Shufang Jia[2], Jeremy B. Jones[6], Lauren E. Koenig[12,13], John S. Kominoski[1,14], William H. McDowell[13], Damien McMaster[11], Samuel P. Parker[7], Amy D. Rosemond[1], Claire M. Ruffing[2,6], Ken R. Sheehan[13,15], Matt T. Trentman[2,16], Matt R. Whiles[17], Wilfred M. Wollheim[13] and Ford Ballantyne IV[1]

Navigate authorship issue

- Initiate discussions about authorship expectations early
- Consult guidelines but don’t be constrained by them
- Document contributions and communicate frequently
- Transparency and open scholarship can help
- Responsible inclusion in scholarly authorship
- Value diverse contributions
- Seek external input
- Realize that authorship norms vary and some perspectives are ingrained

(Adapted from Cooke et al 2021, FACETS)

Navigate authorship issue



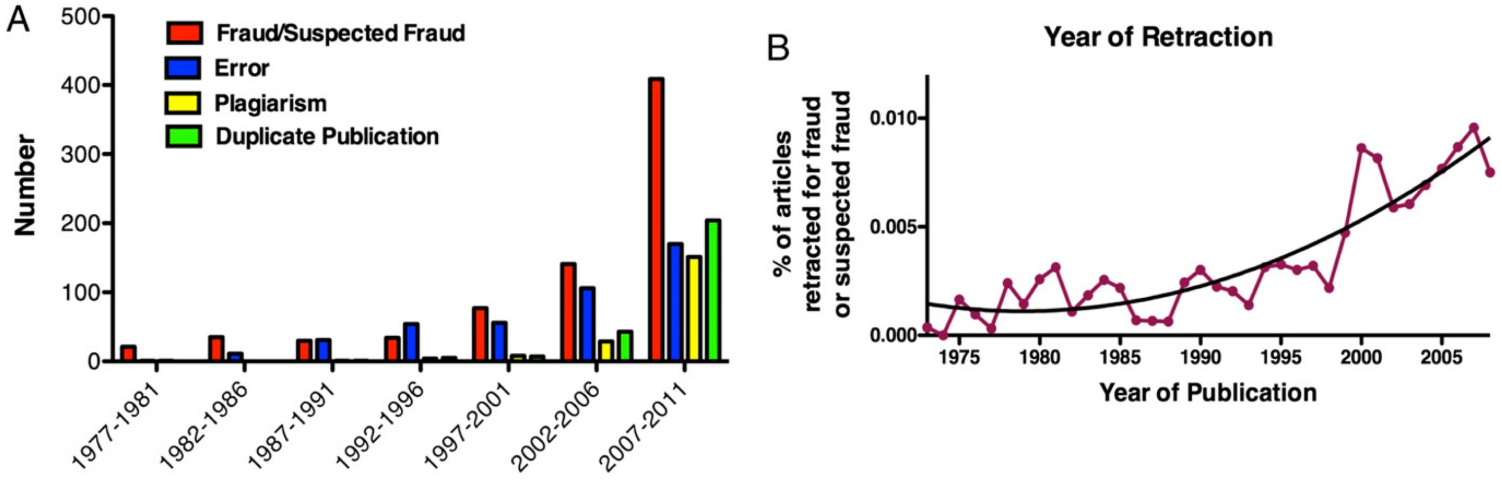
(Figure by Luis Prieto)

Research integrity

- Misconduct in research damages the scientific enterprise, is a misuse of public funds, and undermines the trust in science;
- Most common forms of breaching research integrity:
  - **Falsification**: changing or omission of research results to support claims, hypotheses, other data;
  - **Fabrication**: construction and/or addition of data, observations, or characterizations that never occurred in the gathering of data or running of experiments;
  - **Plagiarism**: representation of another author's language, thoughts, ideas, or expressions as one's own original work.

Misconduct and publication

- **Expression of concern**: a notice issued by a publisher against a particular publication, warning that it may contain errors or be otherwise untrustworthy
- **Retraction**: withdrawals of previously published academic journal article



(Fang et al 2012, PNAS)

On plagiarism

- Under no circumstances should you direct use other people's language as your own original work;
- Self plagiarism: recycling or reusing one's own specific words from previously published texts;
- Avoid plagiarism:
  - **Quoting**: put the words in quotation mark if you need to use another author's specific words;
  - **Paraphrase**: taking the words of another source and restating them, using your own vocabulary (change structure; use synonyms)

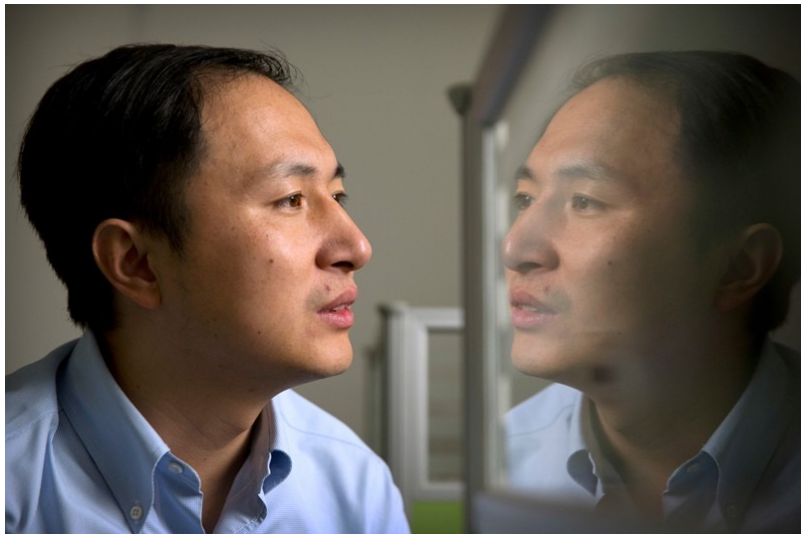
Example of paraphrase

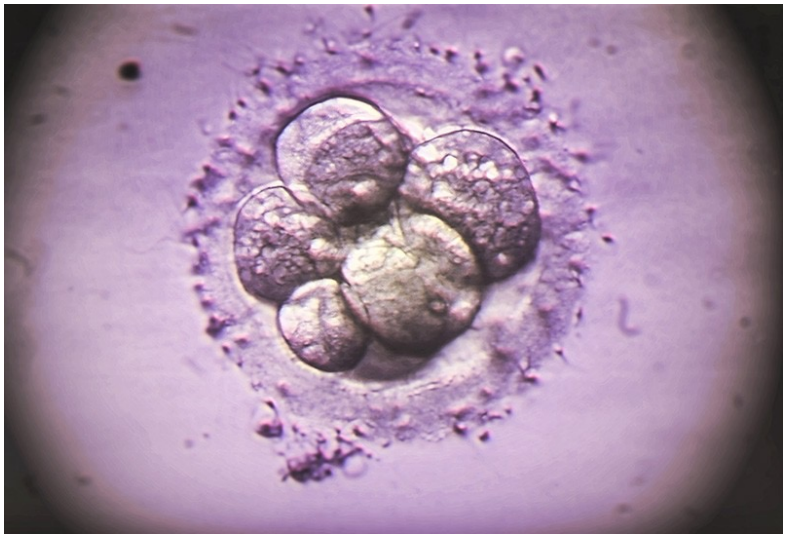
Original	Acceptable Paraphrase #1	Acceptable Paraphrase #2
Like drought, excess rainfall and flooding can also contribute to epidemics of waterborne infectious diseases, in this case due to poor sanitation resulting from runoff from overwhelmed sewage lines or the contamination of water by livestock. (Source: Shuman, E., M.D. (2010, March 25). Global climate change and infectious diseases. New England Journal of Medicine; 362, 12, 1061-1063. Retrieved from nejm.org at MIT Libraries.)	**Used Synonyms** **An overabundance of** rainfall can also **be a factor in spreading** infectious diseases **carried by** water, usually as a result of **overflowing sewers** and **pollution from farm animals** (Shuman, 2010).	**Changed Sentence Structure** **When** there is an overabundance of rainfall, **two situations can occur**: sewers can overflow and water can become polluted by the presence of livestock, **both of which can lead to** outbreaks of waterborne diseases (Shuman, 2010).

(MIT academic handbook)

Research ethics

- Appropriate steps should be taken to protect the rights and welfare of humans and animals participating as subjects in a research study;
- Approval from Institutional Review Board (IRB) or Independent Ethics Committee (IEC) is required when conducting research involving human or animals;





Jiankui He and gene-edited babies using CRISPER technology sparked discussion in research ethics around the world.