Research Ethics

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“No one is more hated than he/she who talks about following ethics”
Ethics

- Derived from the Latin word “ethos” — character
- Moral principles about how a person conducts an activity
- One should know and do
  - Right things and not the wrong things
  - Follow good practice and not the bad ones
  - Be moral and not the immoral

Ethics is knowing the difference between what you have a right to do and what is right to do.

— Potter Stewart —
Research ethics

- “Research ethics involves application of fundamental ethical principles” in performing scientific research

- Guidelines for responsible conduct in research activities

- From design to implementation – carrying out experiments using animals and humans

- Avoiding scientific misconduct – Fabrication and falsification of data, plagiarism, etc.

- It is imperative to educate researchers as well as to monitor their activities on whether the ethical principles are followed or not

- Every institution should constitute an ethical committee to provide valuable suggestions on ethical issues in research
Ethical Principles for Scientific Research

- **Beneficence** – “Researchers should have the welfare of the research participant in mind as a goal and strive for the benefits of the research to outweigh the risks” [1]

- **Duty to Society** - “Researchers and research must contribute to the well-being of society” [1]

- **Conflict of Interest** - “Researchers should minimize financial and other influences that could bias their research results and any incentive is provided for the participants” [1]

- **Informed Consent** – “Participants must voluntarily agree to participate in research, without pressure from financial gain and they should be informed about the risks” [1]

**Ethical Principles for Scientific Research**

- **Integrity** – “Researchers should demonstrate honesty and truthfulness. They should not fabricate data, falsify results, or omit relevant data. They should report findings fully, eliminate bias in their methods, and disclose underlying assumptions” [1]

- **Nondiscrimination** – “Researchers should minimize attempts to reduce the benefits of research on specific groups and to deny benefits from other groups” [1]

- **Nonexploitation** – “Researchers should not exploit, or take unfair advantage of, research participants” [1]

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**Ethical Principles for Scientific Research**

*Privacy and Confidentiality* – “Research participants have the right to control access to their personal information and to their bodies in the collection of biological specimens” [1]

*Professional Competence* – “Researchers should engage only in work that they are qualified to perform, improve their skill sets, choose appropriate research methods, statistical methods, and sample sizes to avoid misleading results” [1]

*Professional Discipline* – “Researchers should engage in ethical research and promote ethical behaviors through practice, publishing and communicating, mentoring, teaching, etc.” [1]

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Honesty in Research Activities

- No fabrication of data
- No misinterpretation of data
- Follow honesty in reporting
  - Methodology/test protocols adopted (no hiding of facts)
  - Your findings
- Publication status (Communicated; Under preparation)
- Moral responsibility of not to deceive fellow colleagues, collaborators, sponsors or funding agencies and the public

Honesty is the best policy

- Benjamin Franklin
Consideration for research methods

Ø Compliance – Adopt the correct methodology

Ø Appropriateness – Proper sampling, experimental conditions

Ø Adequacy – Adequate sampling, number of iterations, etc.

Ø Transparency – Openness

Ø Authenticity - Validation, adopting multiple methods

Ø Reproducibility – Precision and error

Carefulness in Research Activity

★ No negligence in performing the experiments
  ✫ Keep the work place neat and tidy
  ✫ Always keep ready the necessary tools (spanners or multi-meter)
  ✫ Calibrate the instruments and accessories (thermometer)
  ✫ Maintain the experimental conditions properly

★ Log the research activities
  ✫ Log-book is a must for every researcher
  ✫ Give unique ID for every experiment
  ✫ Every experiment/sample should be traceable at any point of time
  ✫ Record all details including sample weight
  ✫ Observations are key – record all observations

★ Critically evaluate your results/findings
  ✫ Compare with the published reports
  ✫ Discuss with the peers
Openness in research

- Sharing of results/data
- Tools – softwares
- Resources
- Accept critics about our research work
- Explore new ideas based on discussion with peers
WHAT ARE RESEARCH DATA?

Research data are the files generated or analysed in your research, that are not your research manuscript.
Benefits of Open Research Data

Benefits for Individual Researchers
- Greater discoverability
- More citations
- Greater recognition
- Reduces inefficiencies
- Enhances visibility
- Increases validity
- Longevity of research
- Increases usage
- Improves credibility
- New collaboration opportunities

Benefits for Research Communities
- Advances reproducibility
- Increases collaboration
- Enables replication
- Improves future research
- Improves long-term archiving
- Enables public understanding
- Increases trust in research
- Greater understanding of research

Benefits for Society
- Advancement of research
- Economic benefits
- Increases innovation
- Easier access to research
- Promotes citizen science
- Informs policy

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go.nature.com/opendata
RESEARCHER MOTIVATIONS FOR SHARING DATA

- 57%: Data sharing is standard practice within my research community
- 55%: To increase the impact and visibility of my research
- 50%: Public benefit
- 42%: Journal requirement
- 37%: Transparency and re-use
- 30%: Personal trust in the requester

- 25%: Discoverability and accessibility
- 23%: Funder requirement
- 18%: Institutional requirement
- 13%: Freedom of information request
- 13%: Preservation
- 13%: Other
- 2%: Other

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Data Sharing Trends by Country

- 46% Sharing, 54% Not Sharing (United States)
- 43% Sharing, 57% Not Sharing (United Kingdom)
- 44% Sharing, 56% Not Sharing (Japan)
- 36% Sharing, 64% Not Sharing (China)
- 52% Sharing, 48% Not Sharing (Brazil)
- 41% Sharing, 59% Not Sharing (Australia)
- 55% Sharing, 45% Not Sharing (Germany)

48% do not share data
52% share data
Reasons why researchers are hesitant to share their data

- Intellectual property or confidentiality issues
- My sponsor/Institution doesn’t require data sharing
- I am concerned that my research will be scooped
- I am concerned about misinterpretation or misuse
- Insufficient time and/or resources and/or funding
- I didn’t know where and how to share my data
Transparency in research

♠ Be open to elaborate
  – Your methodology
  – Materials used
  – Assumptions made in theoretical work
  – Basis of analysis
Animal care

- If we have to use animals for our experiments, then we have to take care of them properly.
- Experiments should be properly planned.
- Avoid unnecessary experiments.
- Testing your drug? Dosages should be carefully selected.
- Wrong choice of treatment is another form of crucifying the animals.
Bronze Statue of a Mouse Knitting a DNA Double Helix in Russia

“It combines both the image of a laboratory mouse and a scientist, because they are connected to each other and serve one cause”

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Ethics in performing animal experiments

- Researchers at McGill University applied painful stimuli to restrained mice by injecting noxious chemicals into their ankles, hands, and feet.
- They have injected acetic acid into their abdomens, causing them to writhe in severe pain on the test chamber floor.
- They also put mice on hot plates, clamped metal binder clips on the tips of their tails, and inflicted nerve injury.
- They intentionally subjected these mice to various levels of pain, in order to study their facial expressions.
- These mice were kept alive for about 2 weeks after the experiments without pain relief.
Coding of facial expressions of pain in the laboratory mouse


*Nature Methods* 7, 447–449 (2010) | [Cite this article](#)
What is your choice?
Good Scientific practice

- Observing professional standards
- Practicing strict honesty and openness
- Respect for the intellectual property of others
- Observing ethical standards when carrying out experiments
- Documenting results
- Safeguarding and storing primary data
- Consistently and rigorously questioning one's own findings
- Scientific publication as primary medium through which scientists give an account of their work
Misconduct in research

* Fabrication and falsification of data

* Plagiarism

* Following unacceptable practices
  - Misappropriation of funds
  - Use of prohibited chemicals/drugs
  - Violating ethical standards

* Willful failure to comply with the requirements
Misconduct in research – Where it could happen?

🌟 Research proposal writing

🌟 Performing experiments

🌟 Reporting research results

🌟 Peer-review process
# Ethics in publishing

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<td>Manipulating the data</td>
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<td>Copying from other publications</td>
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<tr>
<td>Salami slicing</td>
<td>Segmenting the result into many fragments</td>
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<td>Dual Publication</td>
<td>Submitting same article to many publishers at the same time</td>
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<tr>
<td>Inappropriate authorship</td>
<td>Not giving due credit to contributing authors</td>
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<tr>
<td>Gift authorship</td>
<td>Including as author in lieu of funds/obligation</td>
</tr>
<tr>
<td>Ghost authorship</td>
<td>Including name of influential researcher</td>
</tr>
<tr>
<td>Citation Manipulation</td>
<td>Undue citation of many articles</td>
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</table>

Source: Dr. Pawar, Research & Publications Ethics
Fabrication and falsification of data
Unexpected similarity between XRD traces of Fe$_3$O$_4$–SiO$_2$ and HIO@MgSi. All except small region of MgSi peak.

*Zhang et al., J. Mater. Chem. A, 2013, 1, 11691-11697*
Retraction: Control of Nanoparticle Release by Membrane Composition for Dual-Responsive Nanocapsules

Prof. Xiaoling Liu, Xueyi Wang, Prof. Brigitte Voit, Dr. Dietmar Appelhans

First published: 23 August 2019 | https://doi.org/10.1002/chem.201903459

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RETRACTED: Stem cells from human exfoliated deciduous teeth transmit microRNA-26a to protect rats with experimental intracerebral hemorrhage from cerebral injury via suppressing CTGF

Bin Zhao, Min Qian, Yan Zhang, Fei Yin
Similarities between the ‘Control’ image and the ‘Mineralized induced’ image, when rotated 180°
Plagiarism
“Plagiarism is the "wrongful appropriation" and "stealing and publication" of another author's "language, thoughts, ideas, or expressions" and the representation of them as one's own original work [1]”.

“Plagiarism is considered academic dishonesty and a breach of journalistic ethics. It is subject to sanctions such as penalties, suspension, and even expulsion from school or work [1]”.

“Plagiarism is not in itself a crime, but can constitute copyright infringement [1]”.

“In academia and industry, it is a serious ethical offense [1]”.

GROSS CASE OF PLAGIARISM. What do you do when you discover that major sections of a 2016 paper by R Jivani et al sciencedirect.com/science/articl... (e.g., Sections 4.1 & 4.2) are directly copied from your 2013 paper in ADDR sciencedirect.com/science/articl... (same 4.1 & 4.2 sections)? You go public!
4.1. Micropatch

The size of orally delivered particles has a great impact on their transit through the GI tract. Larger particles can get trapped in the mucus layer protecting the epithelium, resulting in a relatively short residence time. Certain types of smaller Micro- and Nano-scale particles are known to permeate the epithelium (Tao and Desai, 2005a,b,c), but the uptake is largely restricted to Peyer's patches, which take up a small fraction of the brush border and lead to lymphoid tissue. This pathway carries the risk of toxic accumulation and poor bio-distribution.

Microfabricated patch systems are alternative to standard particulate delivery systems, such as microspheres. They are designed small enough to travel in between intestinal villi, maximizing the large absorptive surface area of the intestinal folds, but wide enough to prevent cell uptake. In contrast to particulate systems, micropatches are designed flat and thin to maximize contact area with the intestinal lining. At the same time, this flat design minimizes the side areas exposed to the constant flow of liquids through the intestine. The devices can be microfabricated to incorporate single or multiple drug reservoirs which can be loaded with any number of drugs/biomolecules of interest. These reservoirs, unlike multidirectional release from a spherical delivery system, allow for unidirectional release of the drug. Furthermore, regions of the device can be surface modified in order to incorporate cell targeting mechanisms which localize the vehicle at a specific site of action. Modification of microspheres is performed uniformly over the entire surface area, which increases instability and may induce rolling when exposed to flow (Sant et al., 2011). However, selective surface modification on only the reservoir side allows micropatches to stably anchor in an orientation which permits the released drug to follow the shortest diffusional pathway toward the intestinal epithelium. Fabrication processes for creating oral micropatches have been developed based on standard MEMS fabrication techniques including photolithography, etching, and thin film deposition, as well as soft lithography (Tao and Desai, 2005a,b,c).

Standard materials such as porous silicon and silicon oxide have been successfully used for microfabrication based drug delivery systems. Although silicon and glass are the materials of choice for electronic and mechanical devices, it is not clear if these materials are necessarily appropriate for all applications in biology and medicine (Quake and Scherer, 2000). Polymers allow for shorter fabrication times and potential large scale fabrication of complex drug delivery vehicles. In one such demonstration, poly(methyl methacrylate) (PMMA) microdevices were fabricated using an off-wafer process. Microdevices were also fabricated from SU-8, a chemically amplified; epoxy based negative photoresist typically used for producing ultra-thick resist layers. The use of SU-8 as a device material eliminates the need of a secondary patterning material and the dry etch procedure. Instead, multi-level processing can be used to create features in multiple layers. Repeated, aligned photolithography was used to define the backing, reservoir, and supplementary feature layers (Ainslie et al., 2008, 2005). Asymmetrical microparticles were also fabricated from biodegradable polymers poly(lactide-co-glycolide) (PLGA) and gelatin using soft lithographic techniques. In this manner, several batches of asymmetrical microparticles may be generated from a single master. The height of the resulting devices is determined by the height of the features in the PDMS master and the concentration of polymer in solution. Lateral resolution is determined by the features of the PDMS master and the solvents used. Guan et al. were able to combine methods of dip-coating, microcontact hot-printing and soft lithography to produce microdevices containing single-reservoir and multiple-reservoir systems as well as sustained release microcapsule depots in PLGA (Fig. 3A–C).
Table 2
Reasons for retraction and proportion of misconduct by category.

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<th>Reason of retraction</th>
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<th>Misconduct, n (%)</th>
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<td></td>
<td>Uncertain 29 (100)</td>
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September 1, 2022

Your offer of admission to the Mechanical Engineering, Ph.D. program at Marquette University has been revoked effective today, September 1, 2022. This decision is due to the plagiarized writing sample you submitted as part of your application for admission. The Certification Agreement you signed on the application states:

As a result, you have been withdrawn from your courses and your financial aid has been terminated. The Office of International Education has been notified and they will terminate your SEVIS record shortly. You should contact the Office of International Education immediately to discuss the consequences of the termination of your SEVIS record.

Sincerely,

Katie Ruetz
Director of Graduate Admissions
Marquette University Graduate School

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20th April, 2020

PUBLIC NOTICE

SELF-PLAGIARISM

In the interests of Indian academia, to promote Indian research among the nations, and to ensure credibility and quality, from time to time the UGC has instituted various measures. In its efforts to curb plagiarism the UGC issued the University Grants Commission (Promotion of Academic Integrity and Prevention of Plagiarism in Higher Educational Institutions) Regulations, 2018, so that plagiarised work does not acquire any credibility or value in evaluation. In continuation of its initiative, and in line with global standards of ethical publishing established by leading institutions and Committee on Publication Ethics (COPE), the UGC draws the attention of the academic community to the following:

The UGC will be issuing a set of parameters to evaluate instances of text recycling/self-plagiarism soon.

(Prof. Rajnish Jain)
Secretary
Excerpts from UGC notice on self-plagiarism

- “Reproduction, in part or whole, of one’s own previously published work without adequate citation and proper acknowledgement and claiming the most recent work as new and original for any academic advantage amounts to ‘text-recycling’ (also known as ‘self-plagiarism’) is not acceptable”
Excerpts from UGC notice on self-plagiarism

Text-recycling/self-plagiarism includes:

▲ “Republishing the same paper already published elsewhere without due and full citation”

▲ “Publishing smaller/excerpted work from a longer and previous one without due and full citations in order to show a large number of publications”

▲ “Reusing data already used in a published work, or communicated for publication, in another work without due and full citation”

▲ “Breaking up of a longer/larger study into smaller sections and publishing them as altogether new work without due and full citation”

▲ Paraphrasing one’s own previously published work without due and full citation of the original
Excerpts from UGC notice on self-plagiarism

• “Vice chancellors, selection committees, screening committees, IQACs and all/any experts involved in academic performance/evaluation and assessment are hereby strongly advised that their decisions in the case of promotions, selections, credit allotment, award of research degrees must be based on an evaluation of the applicant’s published work to ensure that the work being submitted for promotion/selection is not self-plagiarized”
<table>
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<th>Average time to retraction</th>
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Only primary reason were considered
Substantial overlap with a previously published paper - Plagiarism
Integrity of the data – Not provided the raw data
Overlap with previously published papers by different authors
Providing fake e-mail IDs of the corresponding authors and reviewers
RETRACTED: Visible-light-induced photocatalytic mitigation of ibuprofen using magnetic black TiO$_{2-x}$/CaFe$_2$O$_4$ decorated on diatomaceous earth

Yan Chen $^a$, Qiong Wu $^a$, Jun Wang $^{a,b}$, Youtao Song $^a$

Submitted without the consent of Jun Wang and Youtao Song
E-mail addresses provided were fake
They have informed the editor that they do not support the conclusions of the article
RETRACTED: The evaluate tendencies of corrosion process for reinforcing steel when covered with special polymer sulfur coating

Mariusz Książek

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https://doi.org/10.1016/j.engfailanal.2014.01.005

One faked reviewer report - Reviewer suggested by the author with a fictitious email account - Manipulation of the peer-review process represents a clear violation of the fundamentals of peer review

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- Getting permission to re-use such data is mandatory not only for publication in another journal/book/website but also for thesis/project report

- Permission to reuse warrants a written clearance and some times we may have to pay for re-use of data

- Follow the recommended procedures
Abstract

Since the first exfoliation in 2004, graphene has been widely...
Graphene-based composites for electrochemical energy storage

Author: Bo Wang, Tingting Ruan, Yong Chen, Fan Jin, Li Peng, Yu Zhou, Dianlong Wang, Shixue Dou
Publication: Energy Storage Materials
Publisher: Elsevier
Date: Available online 6 August 2019

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Expected presentation date*  
Jan 2020

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Available online 6 August 2019
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Compromised editorial handling and peer review process
RETRACTED ARTICLE: Medical Image Enhancement by a Bilateral Filter Using Optimization Technique

V. Anoop & P. R. Bipin

Journal of Medical Systems 43, Article number: 240 (2019)  Cite this article

581 Accesses  14 Citations  Metrics

This article was retracted on 11 May 2022

Part of a guest-edited issue
Compromised editorial handling and peer review process,
Inappropriate or irrelevant references
Beyond the scope of the journal or guest-edited issue

Copyright – T.S.N. Sankara Narayanan
The entire volume has been retracted

No credible peer review process

All the papers are potentially unreliable

Systematic manipulation of publication process

Considerable citation manipulation
Exclusive: PLOS ONE to retract more than 100 papers for manipulated peer review

In March, an editor at PLOS ONE noticed something odd among a stack of agriculture manuscripts he was handling. One author had submitted at least 40 manuscripts over a 10-month period, much more than expected from any one person.

The editor told the ethics team at the journal about the anomaly, and they started an investigation. Looking at the author lists and academic editors who managed peer review for the papers, the team found that some names kept popping up repeatedly.
Our Network

Favourable review report

Suggested reviewers

Our Network

Caption – T.S.N. Sankara Narayanan
The researchers using AI to analyse peer review

Anna Severin explains how her team used machine learning to try to assess the quality of thousands of reviewers’ reports.
Reasons for misconduct in publication

- Lack of awareness about research and publication ethics
- Pressure for publication by Supervisor and Institutions
- Academic advancement and promotion
- Competition among the colleagues
- Financial enticement to compromise integrity
Publish or be ethical?
Publishing pressure and scientific misconduct in research

Mariola Paruzel-Czachura\textsuperscript{ID}, Lidia Baran\textsuperscript{ID}
and Zbigniew Spendel
Institute of Psychology, University of Silesia in Katowice, Poland

No correlation between unsatisfactory work conditions and scientific misconduct

Perceived pressure to collect points (for assessment) is correlated with willingness to exceed ethical standards
Authorship issues
Criteria for authorship research publications

• To qualify as an author one should have actively participated
  – In formulating the problem
  – In writing the research paper
  – Prepared to defend the publication against criticisms

• Who do not qualify as authors

Those who have
  – Provided the funds, space and technical assistance
  – supplied chemicals, materials and accessories
  – co-ordinated and collected data
  – Head of the department or Institute
Today, I read a report on issues surrounding (co-)authorship on academic papers and was freaked out that 80% of students and actually also about 40% of academic staff do not know the rules. So here they are again:
(1) contributed substantially to the conception and design, acquisition of data, or analysis & interpretation of data AND
(2) contributed to writing the paper or revising it critically for important intellectual content AND
(3) given final approval of the version to be published

Please note the AND! I vaguely remember that some institution changed the AND by an OR, and while there are cases where and OR might apply, I think the AND should remain the rule.
Conductive Gels: Properties and Applications of Nanoelectronics

Nguyen Dinh Trung, Dinh Tran Ngoc Huy, Maria Jade Catalan Opulencia, Holya A. Lafta, Azher M. Abed, Dmitry Olegovich Bokov, Kahramon Shomurodov, Hoang Van Thuc Master, Ali Thaeer Hammid and Ehsan Kianfar

9 February

*Co-Authors Participation*

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Ali Thaeer Hammid - Computer Engineering Department, Imam Ja’afar Al-Sadiq University, Baghdad, Iraq

Ehsan Kianfar - Department of Chemical Engineering, Arak Branch, Islamic Azad University, Arak, Iran
Young Researchers and Elite Club, Gachsaran Branch, Islamic Azad University, Gachsaran, Iran
Former PhD student loses two papers for forging co-author’s name

- Retracted from *Macedonian Academy of Sciences and Arts: Section of Medical Sciences* in July 2022

- Reason – Included one co-author in their manuscripts without his knowledge and permission.

- “I was never involved in the preparation of these papers and never consented in being a co-author” and “I have nothing to do with the work”
  - Frank Rademakers, cardiologist at KU, Leuven, Belgium
Suspicious responses to authorship change requests

Case number: 21-15

Case text (Anonymised):
A journal received a request for multiple changes to the authorship list after the manuscript was accepted. Originally, there were five co-authors. After acceptance, the journal received the following requests from author A, the corresponding author and co-first author: remove one of the co-authors (author D), add a new co-author (author E), reorder the list of authors, and change the designated co-first authors.

The publisher explained that before processing any authorship changes after an article is accepted, the consent of all co-authors is required. All authors except author D responded promptly, and author A ultimately had to chase author D. The response from author D was somewhat suspicious; it was from an unfamiliar email address (ie, not the one provided at the time of submission of the manuscript), the text matched verbatim the response from author A and was oddly phrased, and the email was unsigned. Given these peculiarities, the publisher quickly replied to author D, asking if they could reiterate their consent to the proposed changes, preferably via an institutional address. Author D never responded, even after sending a follow-up message. Without that confirmation, the publisher did not think they could presume to have...
Reviewer requesting addition of multiple citations of their own work

Case number:
19-01

Case text (Anonymised):
A handling editor noticed a reviewer report where the reviewer instructed the author to cite multiple publications by the same reviewer in their manuscript. The handling editor noted a similar instance involving this reviewer from the past and requested the editorial office to look into his reviewing history. This uncovered a concerning pattern of behaviour where the reviewer habitually asked authors to add citations to his work when reviewing their manuscript, often when there was no scientifically legitimate reason to do so.
Change of corresponding author after manuscript published online

Case number: 21-14

Case text (Anonymised):
On submission of a manuscript to a journal, one of the authors was indicated as the corresponding author. During the submission, review, and revision process, and also through copyediting and proofreading, the corresponding author responded to all emails, signed the publishing agreements, and was generally available. At this time, the authors of the manuscript did not mention a possible change of the corresponding author. The manuscript was published online (as an "article in press/online first" without a volume or issue number but with a DOI). However, 5 months after the paper was published online, the authors of the manuscript asked the journal to change the corresponding author, but provided no clear explanation.
Institutions paying authors to be named on papers

Case number: 21-09

Case text (Anonymised):
Some academic institutions are paying authors for the name of the institution to be included in the manuscript so that the institution has an increased number of publications in a given year. The institution gives the author payment and the author terms it as ‘funding’ or ‘grant’, which is not the case. The author publishes the research article in a journal with two affiliations and explains in the acknowledgment section that the institution gave a partial grant. The terms funding and grant are used to camouflage the purpose.
Elsevier, Wiley and ACS have filed a suit against Sci-Hub in India in 2020.
Inclusion of your colleague(s) as co-author(s) of your paper

When it is ethical and when it becomes unethical?
One of your friends is helping you to type the manuscript. Another friend of you in other institution has performed some characterization for your sample – Tensile testing

Will you include them as authors in your paper?
Operating an instrument – Breaking an accessory – spectrophotometer Cuvette - No one is around

Will you report it to the supervisor?
What will be the response of the supervisor?
What should be the response of the supervisor?
You have done the experiment only once. The reviewer is asking you how many times the experiments was performed and include the standard deviation.

What will be your response?
You have an SEM/TEM image
You have already included it in your earlier publication

Can it be reused again?
Do you recommend the use of animal testing and human trials? What is your opinion?
Wishing you all the best for your research career.