

# The Paper Mill challenge

Dr Lisa Parker

Faculty of Medicine & Health, Charles Perkins Centre,  
University of Sydney, Australia



THE UNIVERSITY OF  
**SYDNEY**

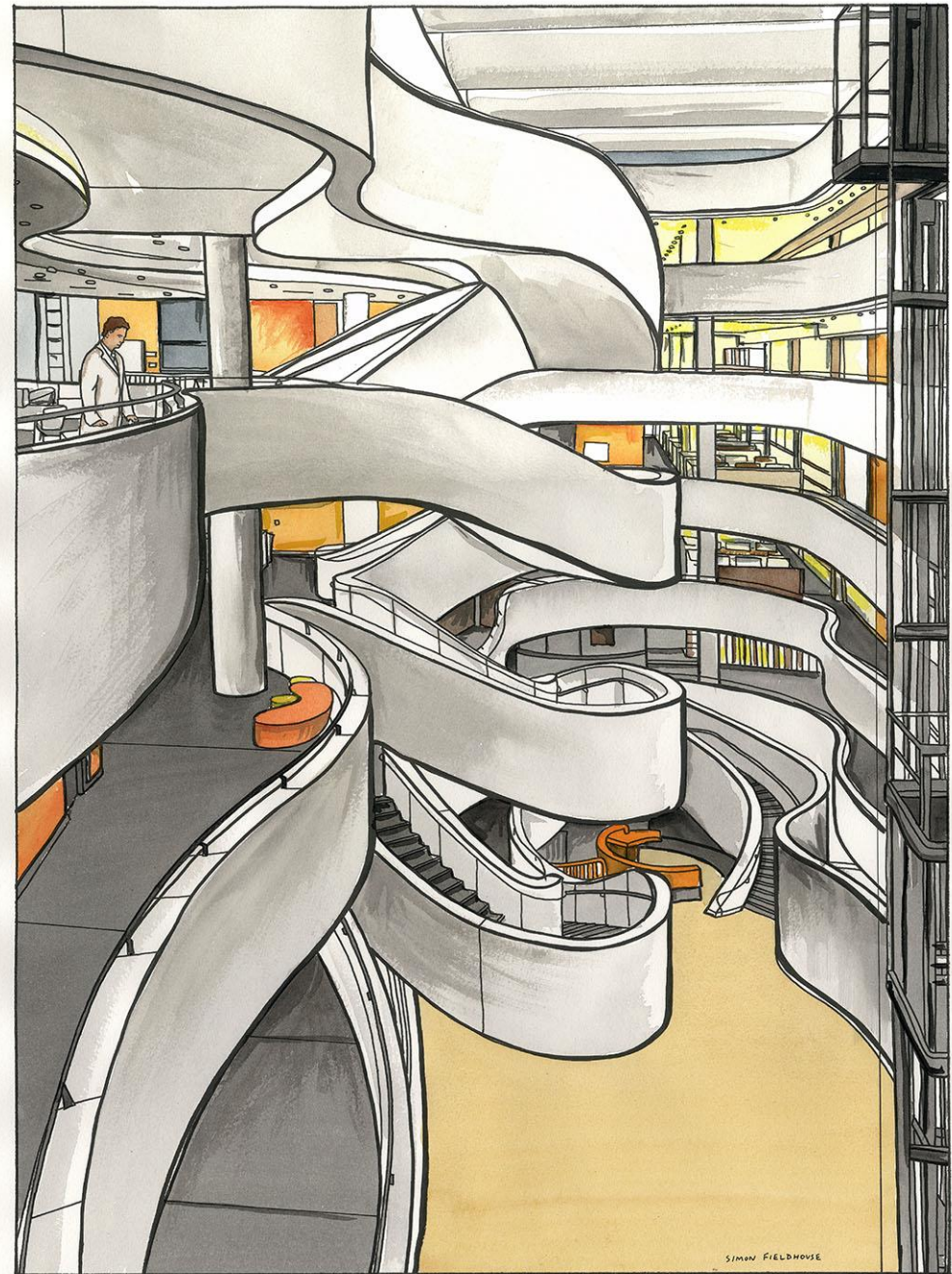
—  
Charles Perkins  
Centre



Trusted evidence.  
Informed decisions.  
Better health.



University of Colorado  
Anschutz Medical Campus



Charles Perkins Centre - University of Sydney

- This talk is informed by a study funded by the National Health and Medical Research Council (NHMRC) of Australia, APP1139997.
- Thanks to my colleagues
  - Stephanie Boughton**
  - Rosa Lawrence**
  - Lisa Bero**
- Lisa Bero is Senior Research Integrity Editor, Cochrane, for which the University of Colorado receives remuneration.
- Stephanie Boughton is employed by Cochrane as Research Integrity Editor.

# A short history of (what we know about) paper mills

## Early 2010s

- Recognition of large-scale manipulation of the peer review process:
  - The submitting author suggested peer reviewers who were made-up people or real people with false emails
  - “Peer Review mills”
- Solutions:
  - Some journals removed the ‘suggest peer reviewer’ function
  - Other journals added vetting policies to confirm peer reviewer identity and email addresses

# A short history of (what we know about) paper mills

## Mid - late 2010s

- Recognition of groups of fake papers submitted for publication, each group seemingly from a single origin
  - Similar topics – eg an obscure cancer gene [Byrne, 2019, Biomarker Insights]
  - Similar manipulated images – eg same Western Blot images flipped, cropped, repeated [Bik, 2020, blog]
  - “Paper mills”
- Solutions:
  - Publishers started requesting raw data
  - Publishers developed Research Integrity support teams
  - Publishers using AI tools aimed at detecting paper mill activity

# A short history of (what we know about) paper mills

2024

- **Editor bribery** activity uncovered
  - Journal editors being offered cash to publish paper mill papers, to increase likelihood of paper being published

# Who are the main players?

## Consumers

- Worried medical professional
- Overburdened academic

## Organised Crime Syndicates

- Peer review mill
- Paper mill

## Detectives

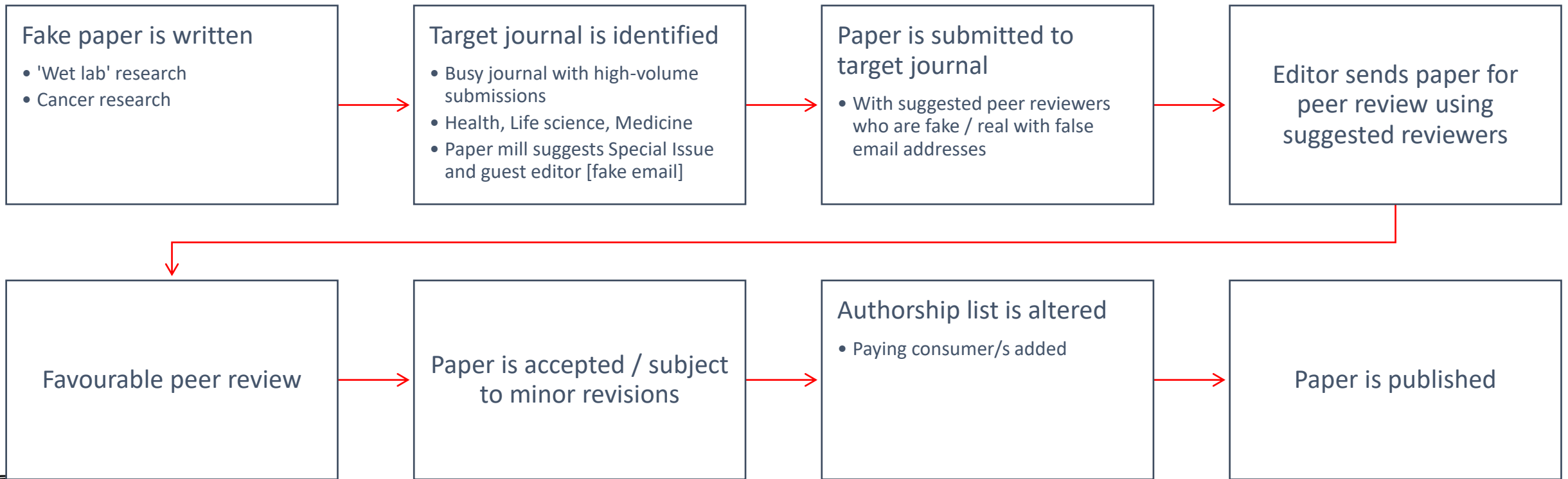
- Editor
- Data Sleuths
- Editor in Chief
- Publisher  
'integrity squad'

# Consumers

- Hospital doctor in China
  - Needs an international publication in order to progress
  - Doesn't speak English
  - Doesn't have access to research lab
  - Doesn't have time
- Other local hotspots: Russian, Iranian researchers
- Sees a Facebook or WhatsApp advertisement to purchase a scientific paper (accepted for publication)



# Organised crime syndicate





# Detectives



- Journal **Editor** recognises that something looks ‘off’ in a pattern of submissions
  - Spike in similar submissions (similar topic / similar country)
  - Repeated paper/different title

OR

- A Data Sleuth recognises image manipulation in published paper & contacts editor or authors’ research institution

# Detectives



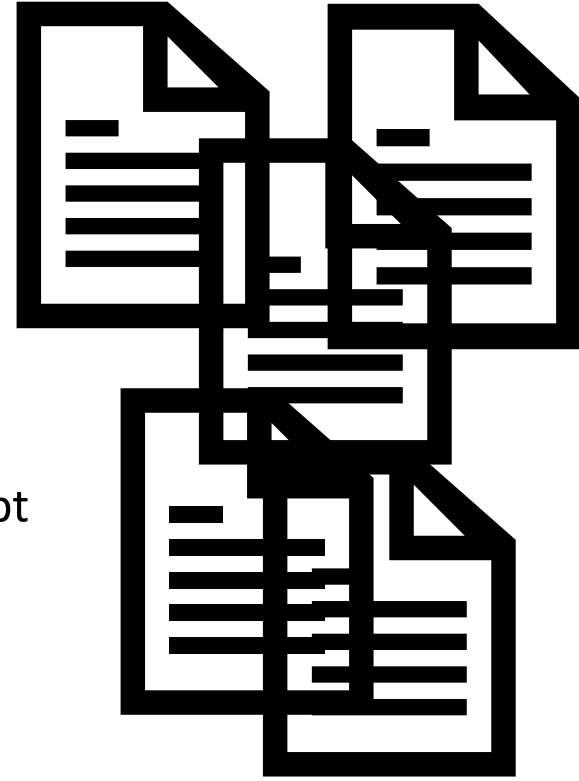
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OR

- A Data Sleuth recognises image manipulation in published paper & contacts editor or authors’ research institution
- The **Editor in Chief** is alerted
- (If available) Publisher’s in-house ‘**integrity squad**’ is informed

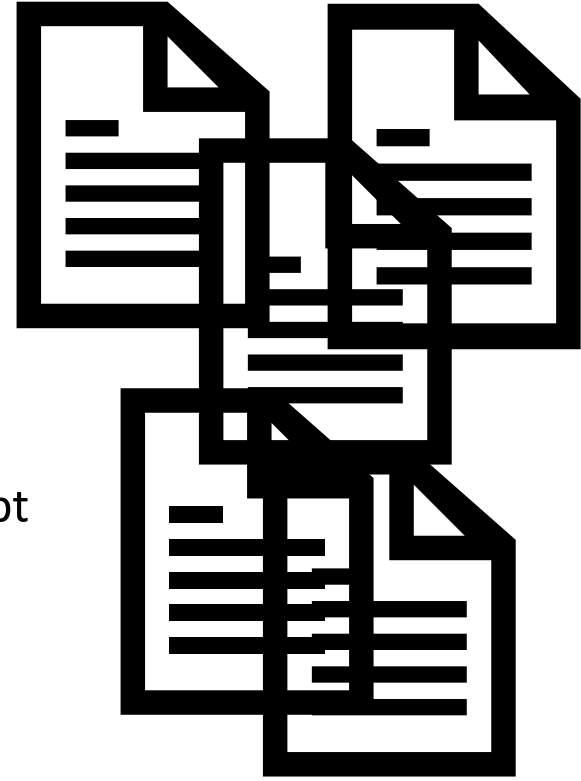
# Integrity squad investigation of a possible paper mill

- Examine target paper
  - The suspicious manuscript is given a tracking number
  - Integrity squad supports and guides Editor/EIC investigation
  - Tasks: ask authors for raw data, check peer review process, scrutinise manuscript
- Identify linked papers
  - Check authors' other submissions, publications
  - Check other papers reviewed by same peer reviewers
  - Check for similar manuscripts in the same journal
    - similar topic
    - similar format
    - repeated keywords
- Screen all those papers for signs of paper mill origin



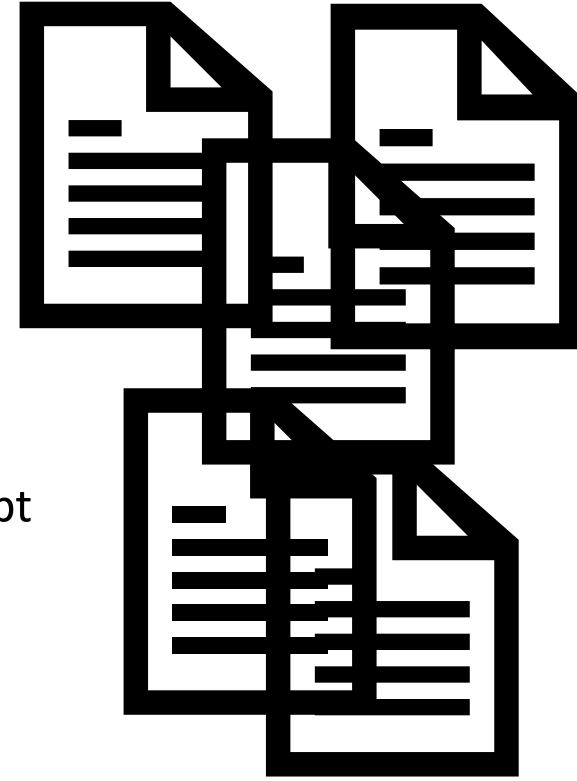
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- Identify linked papers
  - Check authors' other submissions, publications
  - Check other papers reviewed by same peer reviewers
  - Check for similar manuscripts in the same journal
    - similar topic
    - similar format
    - repeated keywords



# Screening for signs of paper mill origin

## Back end / publisher-only information

- No cover letter

Quick screening activity	Warning signs of paper mill fraud
<b>EDITOR, PUBLISHER</b>	
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<b>Author details</b>	
Request received for authorship change	Any request for authorship change, particularly if requesting to add a new author. Multiple sequential requests for authorship change so that the authorship lists completely changes from submission to publication. Name of corresponding author changes but email address does not change.
Check for mismatching author details	Author e-mail address suggests different name than author name.
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# Screening for signs of paper mill origin

## Back end / publisher-only information

- No cover letter
- Suspicious author matters
  - Request to add new authors after acceptance
  - Submitting author has multiple user accounts in the same journal
  - Multiple submissions from author at same time
  - Response to requests for raw data are absent OR similar in tone or content to responses from other suspected / known paper mill papers eg supplies lots of poorly labelled files

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- Suspicious peer reviewer matters
  - Peer review very rapid, superficial
  - Peer reviewer email addresses do not conform to institutional format
  - IP address of submitting author is the same as peer reviewer

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## Suspicious manuscript matters

### ❖ Text anomalies

- Variable writing style / phrasing
- Tortured phrases

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# Tortured phrases

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## ***Tortured phrase***

## ***Likely original***

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Versatile organization

Mobile network

---

Huge information

Big data

---

Face acknowledgement

Face recognition

---

Arbitrary get rite of passage to

Random access

---

Subterranean insect

Ant colony

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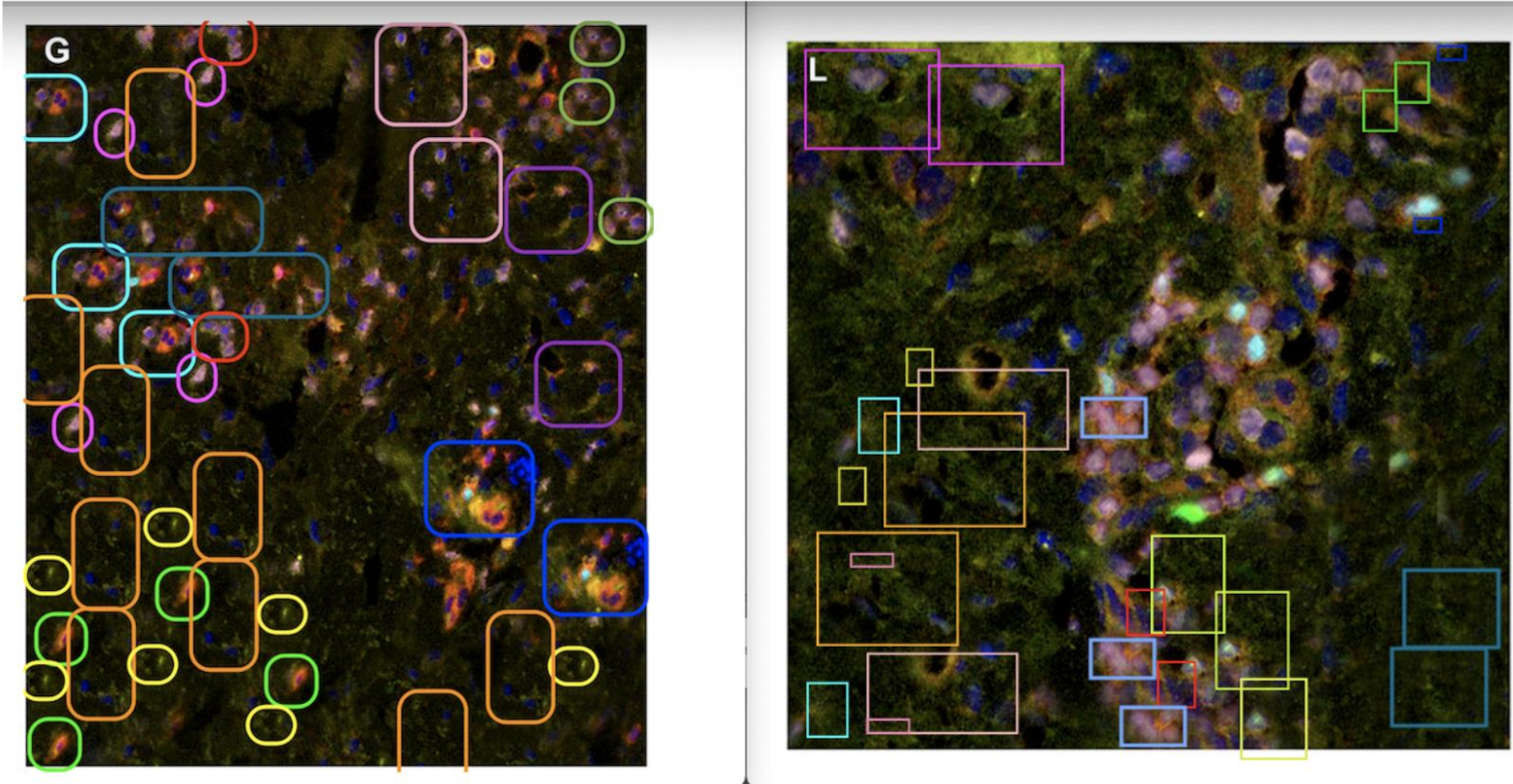
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- Especially Western Blot, histopathology, flow cytometry
- Manipulation/photo shopping: Image cropped, flipped, repeated
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eliesbik  
June 27, 2023

Image Concerns, Large

As I was doing a reverse-image search online on a set of papers, I saw an unrelated photo of a skin biopsy that appeared to contain repetitive areas. Even in the small Google Image Search thumbnail it was clear to me that something unexpected was going on in this image.

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### ❖ Critical Retraction Watch / Pub Peer comments

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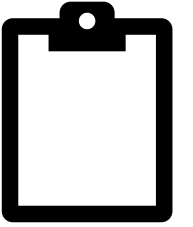
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“It can take years”

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# What happens next?



- During the process of investigation the journal might publish an **Editor's note**
  - Appears on journal website with the paper
  - Not permanent
  - No doi number, not linked by indexing agents so readers might not see unless they are on the journal website
- After paper mill activity is confirmed, the journal may issue a **Retraction Notice**
  - Permanent
  - Has its own doi number, indexed and (hopefully) linked to the paper

# Problems / barriers

- Some publishers are poorly resourced / editors are not trained
- Paper mills adapt in response to publisher attempts to identify them: “It’s like an arms race”
- AI images - may be harder to identify fraud
- Legal issues
  - Paper mills are litigious and may threaten legal action if their papers are pulled
  - Publishers may be worried about sharing lists of authors, peer reviewers identified as paper mill
- Publisher fear of reputational damage
- Competition amongst publishing houses – proprietary tools might give them a market advantage





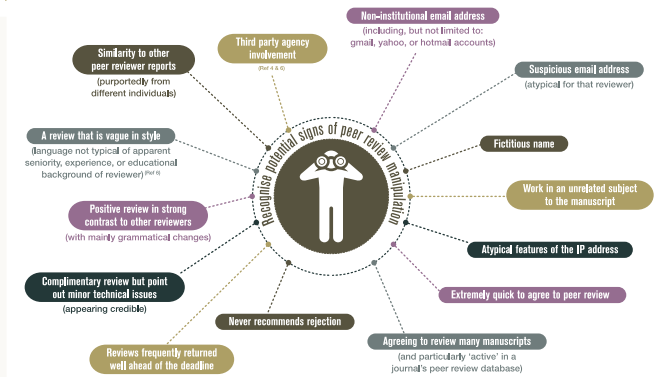
# “How do we get the trust back?”

## Publishers

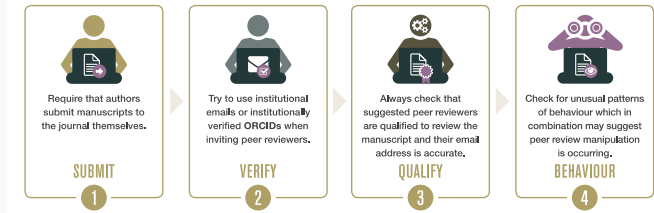
- Education and support for editors – how to identify paper mill activity at submission / prior to publication
- Automated tools – identify submission anomalies / patterns (STM)
- Open peer review (pros and cons)
- Mandate raw data submission with all papers

C O P E

Recognised features or patterns of questionable reviewer activity



Best practice to minimise peer review manipulation



HOW TO RECOGNISE POTENTIAL MANIPULATION OF THE PEER REVIEW PROCESS

Cite this as:  
COPE Council,  
COPE Flowcharts  
and Infographics –  
How to recognise  
potential manipulation  
of the peer review  
process – English,  
<https://doi.org/10.24318/cope.2019.1.0>  
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on Publication Ethics  
(COPE) and the  
International  
Association of  
Publications  
Editors (IAPPE)  
Version 1:  
September 2017.



Peer reviewers may be suggested by:  
• the Editor handling the manuscript.  
• authors on submission of their manuscript to a journal.  
• another reviewer who is unable to peer review the manuscript.  
While there is an expectation that everyone involved in the process acts with integrity, the peer review process can be susceptible to manipulation,\* as discussed at COPE's 2016 North American Seminar.  
The features or patterns of activity shown opposite are suggested to help editors recognise potential signs of peer review manipulation. Often it is the occurrence of these features in combination that may indicate a potential issue, and they may only become apparent at later stages in the peer review or publishing process.

Relevant COPE cases:  
Case 11-27: Author creates bogus email accounts for proposed reviewers. <https://cope.onl/bonus-email>  
Case 12-12: Compromised peer review system in published papers. <https://cope.onl/case-review>  
Case 12-16: Compromised peer review (unpublished). <https://cope.onl/compromised>

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3. Patel J. Who reviews the reviewers? *BMC Blog* 26 Nov 2014. <https://blogs.bmc.com/blog/2014/11/26/who-reviews-the-reviewers/>  
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5. COPE North American Seminar 2016, 'Ethics in peer review'. <https://cope.onl/ethics-seminar>  
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Links to other sites are provided for your convenience but COPE accepts no responsibility or liability for the content of those sites.

# “How do we get the trust back?”

## Researchers and readers

- Increase awareness that paper mills exist
- Education on research misconduct
- Use and fund our watchdogs
  - Retraction Watch, PubPeer



# “How do we get the trust back?”



## Institutions

- Change the research environment – eg amongst hospital doctors in China
- Institutional review of papers before submission
- Preference reputable journals eg those in indexing houses (minimum journal standards)

[Lisa.Parker@sydney.edu.au](mailto:Lisa.Parker@sydney.edu.au)

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Byrne J, Grima N, Capes-Davis A, & Labbé C. (2019). The possibility of systematic research fraud targeting under-studied human genes: causes, consequences, and potential solutions. *Biomarker Insights*, 14, 1177271919829162.

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