Scholarly communication & the blockchain

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Digital Science
Challenges in Scholarly communication

1. Reproducibility
Challenges in Scholarly communication

2. Peer review crisis: transparency & recognition

The Crisis Of Peer Review

Geoffrey Kabat, CONTRIBUTOR

Opinions expressed by Forbes Contributors are their own.

“If peer review were a drug, it would never get on the market.”

Hundreds of thousands of papers are published each year in the medical literature, and this number continues to grow. In the medical community, peer review is a core requirement for publication, and since quality is an important issue (and since quality is not defined by the number of papers published) it is a valuable tool.

Peer review is in crisis, but should be fixed, not abolished

November 15, 2016 2:54am GMT

More is less in the world of research publications. Desktop image via www.shutterstock.com.
Challenges in Scholarly communication

3. Limited & outdated metrics
Challenges in Scholarly communication

4. Commercial crisis

Is the staggeringly profitable business of scientific publishing bad for science?

It is an industry like no other, with profit margins to rival Google - and it was created by one of Britain’s most notorious tycoons. Robert Maxwell. By Stephen Buranyi

‘Predatory’ Science Journals

The New York Times

To the Editor:

“In Academia, a Predatory Twist in Publishing” (ScienceTimes, Oct. 31) aligns two worrisome trends: the ever-increasing need to publish or perish and the commercialization of science.

Each trend on its own has been around for a while, but predatory journals effectively ply the two together for goals that have nothing to do with traditional scientific values.
Blockchain & scholarly communication
What Blockchain IS NOT

Bitcoin's scalability problem

Bitcoin's blocks are limited to 1MB in size and the transaction volume on the Bitcoin network is large and can be overwhelming. This is a scalability issue that needs to be addressed.

Bitcoin Mining Now Consuming More Electricity Than 159 Countries Including Ireland & Most Countries In Africa

Bitcoin Consumes 30 Times More Electricity than Tesla Cars
What is blockchain (1)?

The technology behind cryptocurrencies:

“A digital currency in which encryption techniques are used”
1. A cryptocurrency for science

Creating an token-based economy of science & research
What is blockchain (2)?

From Internet of information to an Internet of value

Blockchain:

- Establishes ownership
- Prevents double spending
2. Digital Rights Management

- Blockchain is an ideal technology for DRM (‘smart publishing’)
- **Micropayments** open way for a new business model
What is blockchain (3)?

Blockchain is a (very special kind of) **data storage**:

- Decentralized & distributed
- Immutable
- Transparent & pseudonymous
3. Single science repository

Author X submits Data Y to repository A

Author X submits ms Y to journal Y

Editor X sends MS Y for review to reviewers X, Y

Reviewer X,Y submit review reports A,B

Editor X makes decision Y

Article X based on MS Y was published on date X

Article X was downloaded on date X

Article X was cited by journal Y on data Y
Advanced research metrics

Access allows for validation, transparency, reproducibility

Research Blockchain

Author X submits Data Y to repository A
Author X submits ms Y to journal Y
Editor X sends MS Y for review to reviewers X, Y
Reviewer X,Y submit review reports A,B
Editor X makes decision Y
Article X based on MS Y was published on date X
Article X was downloaded on date X
Article X was cited by journal Y on data Y
Information on review activities is fed from publishers, via submission systems, to the blockchain.
Validated information can be sent to platforms recognizing reviewer work, such as researcher profile pages on ORCID.

With information stored on blockchain, sophisticated tools can be built to find and validate reviewers across publishers. Fraudulent reviewers can be flagged.

Review activity on journals and article level can be independently verified, giving stamp of quality to legitimate scientific content.

Publishers, reviewers, editors have access to their part of the content.
Innovation ... or disruption?
Thank you!

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Digital Science
The Blockchain (R)evolution in Science and Research

PD Dr. Sönke Bartling
Associated Researcher at HIIG
Founder Blockchain for Science
Advisor at BlockchainHub
First: What is Blockchain?
A new way to look at databases
A chain of blocks...

Compare: “Internet”
WHAT IS BLOCKCHAIN?

- A chain of data blocks
- A new way to look at databases
- A negotiated status in distributed systems
- A cultural change in how we manage data, identities, computer security through cryptography
- A new economy
- Distributed
- Decentralized
- Immutable (append only)
- Transparent / provable
Web 2.0 world
Blockchain world / Web 3.0

User

IoT
Science structure today?

- Legacy structures
- Centrality (data repositories, service providers)
- Unlimited media breaches
- Walled gardens/silos around business models
- Admin efforts, artificial competitions that maintains themselves
We are doing science!

• Grown cultures
• Science culture deeply intervened with society and individual’s lifes
• Science is important & fun
Second: What is Blockchain in Science?
RESEARCH CIRCLE

Experiment

- Funding
- Acquisition
- Evaluation/idea
- Processing
- Publication
- Analysing

BLOCKCHAIN
for Science
ACQUISITION

- Research data in Blockchain database
- Time stamped
- Immutable
- Blockchain / Real-world interface problem
BLOCKCHAINIFIED SCIENCE
PROCESSING

- Processing through smart contracts
- Unchangeable
- Provable processing trail
ANALYSIS

• Smart evidence
RESEARCH DATA STORAGE

• Decentralized cloud
• 100% cryptography
• Storage forever?
PUBLICATION

- Dynamic publications
- Micro contributions
- Standard peer-review “on the blockchain”
- Incentivation for peer-review
FUNDING

• Blockchain token
• Reputation system
• Science market place
• Decentralized academic endorsement system
• Quickly changing funding system
• Blockchain could provide new measurements that could withstand “economic pressure”
• No third party that need to be trusted
FUNDING

• Continuous coin offerings
• Create token for an idea
• Grow with the project, share with your peers
• Todays Crowdfunding $\leftrightarrow$ Tokens can be sold
• The project should be ‘blockchain open’
FUNDING – first ICO in Science!

FIRST BLOCKCHAIN BIOTECH ECOSYSTEM
Be part of a company with a multi-billion dollar potential

Good practices for ICOs in Research and Science

This science community is invited to contribute

Status: Initiated - collection of practices/ideas
Contributors: Sönke Bartling, Martin Etzrodt, Darius Styra
Supported by:

ICOs may become a novel way to fund research and science projects. If so, we should now work out the good practices for it. So to break with wrong cultures in the science and research ecosystem.

Here the community will develop and peer-review a good practice for ICOs in the research system.

Research outlets that search for funds through ICOs should adhere to the following:

[Image of ARNA Panacea]
Conclusion

• Next Open Science
• This time: Funding is affected
• Blockchain will play a role in Science and Knowledge creation
• In ‘high’ value transactions
• Centralized services will coexist
Events

Twin unconference Symposium:

On Blockchain for scientific publishing, data handling, tokenized research platforms and new incentivation structures, etc....

• SPONBC2018 7th-8th of May, Vienna
• CRYPTSCIENCE2018 9th-10th May, Zürich/Zug

www.blockchainforscience.com/events
First international conference on Blockchain for Science and Knowledge creation

5th – 6th of November, Berlin

www.blockchainforsciencecon.com
Advanced P2P architectures will set new standards for how we take care for scholarly works & interactions

Lambert Heller
12. April 2018
ICSTI Webinar on Blockchain for Science
BitTorrent based protocols turn the client-server paradigm upside down. But how does that help with scholarly works?

**Premise:** A researcher’s everyday need: to have lots of objects at the same time. (*Think “distant reading” methods, think PDF archive on personal hard drive etc.*).

**Problem:** To get hold of scholarly objects today, you have to go through a number of platforms, API (non)standards, “open” policies, business models etc. With each of these levels, the problems multiply.

**Approach:** BitTorrent sets sharing of objects as the norm. Loading gets easier the more people are interested, not the other way round.

New protocols like IPFS and DAT allow for a web-like experience based on BitTorrent.

**Solution:** Instead of gatekeeping a database (of supposedly open works) on a server, use nothing but open protocols (like HTTP, BitTorrent) in order to keep stuff available online.

**Outcome:** More resilient storage of objects (cf. Linux distributions on BitTorrent). Replacing privileged access with permissionless innovation, thereby leveling playing field for business model innovation.
Blockchains allow for exchange of value, following transparent rules, without having to trust any player

**Problem:** Researchers and contributors hardly interact directly with the public and with each other, instead routinely putting their trust into intermediaries like journal editors, metadata aggregators etc.

**Approach:** Blockchain allow them to interact following transparent rule sets. Valuable interactions are directly published by (and tied to) those who are involved. No need to trust 3rd parties.

**Solution:** People actually involved claim their contribution to a given piece of work, their assessment / review of other persons work etc. directly. Control what information is given away to the public is held by the sender and / or receiver of that information.

**Outcome:** Permissionless reuse and innovation of the scholarly metadata trail.

Responsible, efficient governance of the scholarly metadata trail – will probably set new standards
Completely decentralized educational certificates: They are here

https://blockcerts.org/
Expect similar added value when applied to peer review?

- The added value is having an “ownerless” database holding the metadata trail
- Proof of exchanges between nodes that are directly controlled by the people actually involved
- Peer review is the most basic element of tenure / hiring / funding committee decision in academia.

https://commons.wikimedia.org/wiki/File:In_Peer_Review_We_Trust.jpg
In beta: Completely decentralized social networks

https://blog.akasha.world/2018/02/10/akasha-beta-emergence/
Article covering some ideas from these slides, with further links:


Blockchain offers a route to a true scholarly commons

Using decentralised networks to share data and publications could make research more open, efficient and fair, says Lambert Heller.
MORE INFORMATION
tib.eu

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