

Blockchain for Science

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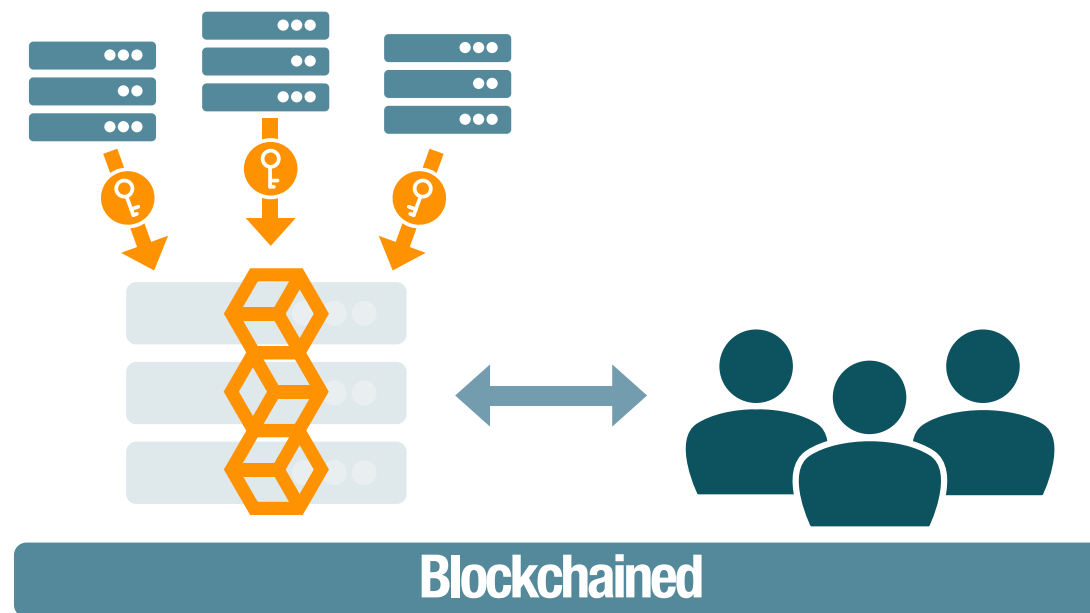
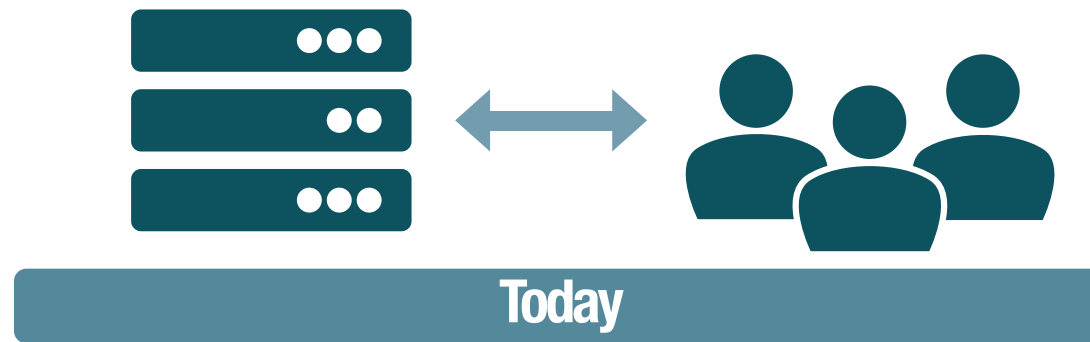
BlockchainHub

INTRO

WHAT IS BLOCKCHAIN?

- A new computer protocol involving cryptography
- A new way to look at databases
- A socio-legal-cultural-economical-political-(r)evolution
- A hype¹

¹ For the first time a novel technology (blockchain) has an intrinsic incentive (coins!) to be hyped

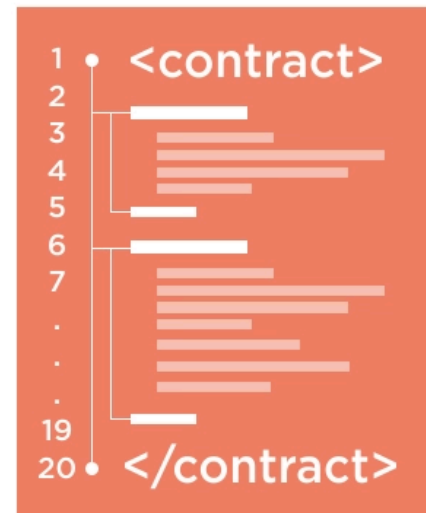


BLOCKCHAIN

- Distributed
- Decentralized
- Immutable (append only)
- Transparent / provable

SMART CONTRACTS

- Computer programs on the blockchain
- Unstoppable
- Unchangeable
- Transparent



BLOCKCHAIN IN SCIENCE



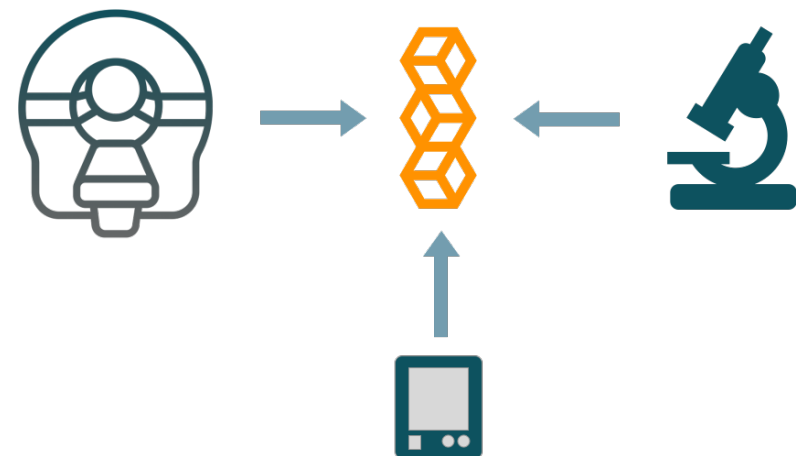
RESEARCH CIRCLE



ACQUISITION



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



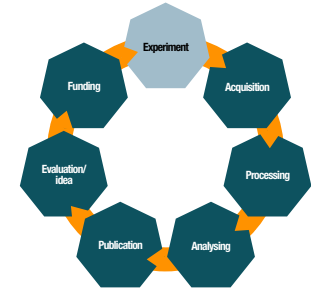
PROCESSING



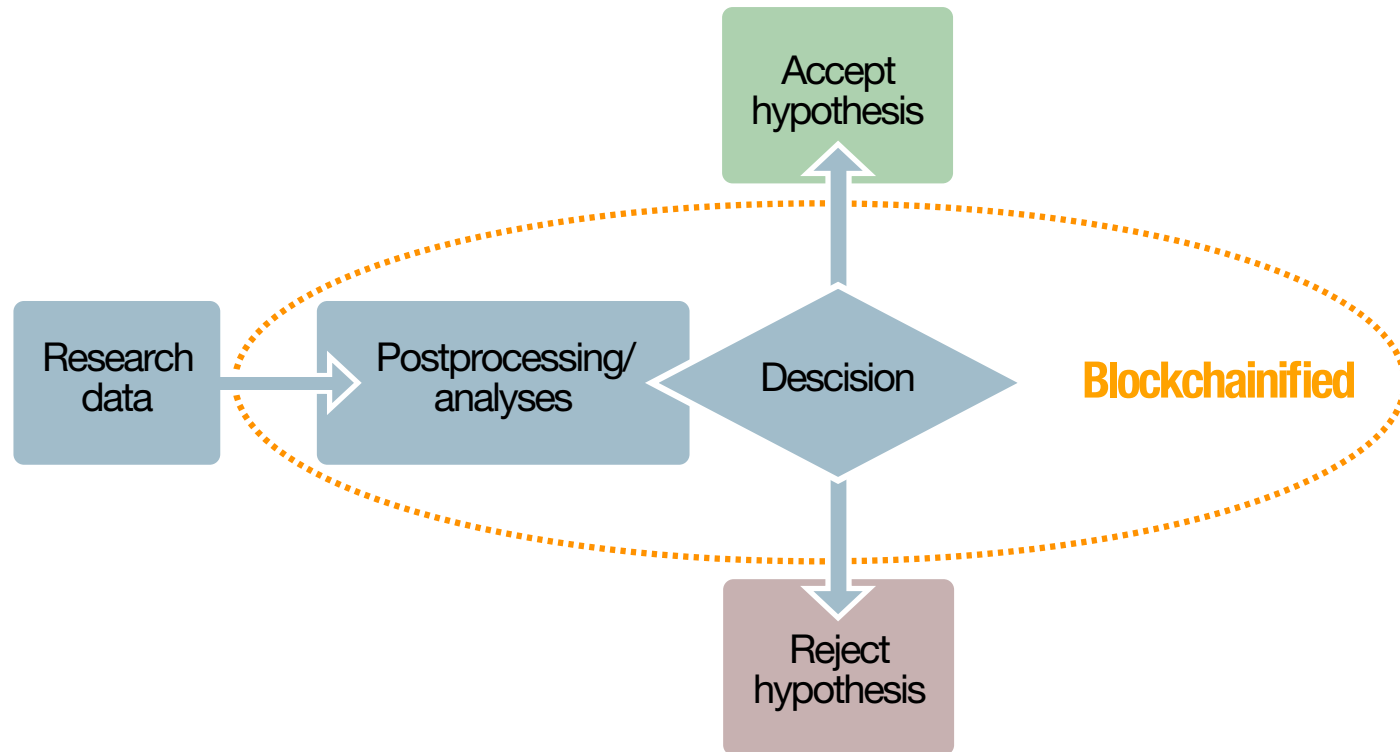
- Processing through smart contracts
- Unchangeable
- Provable processing trail



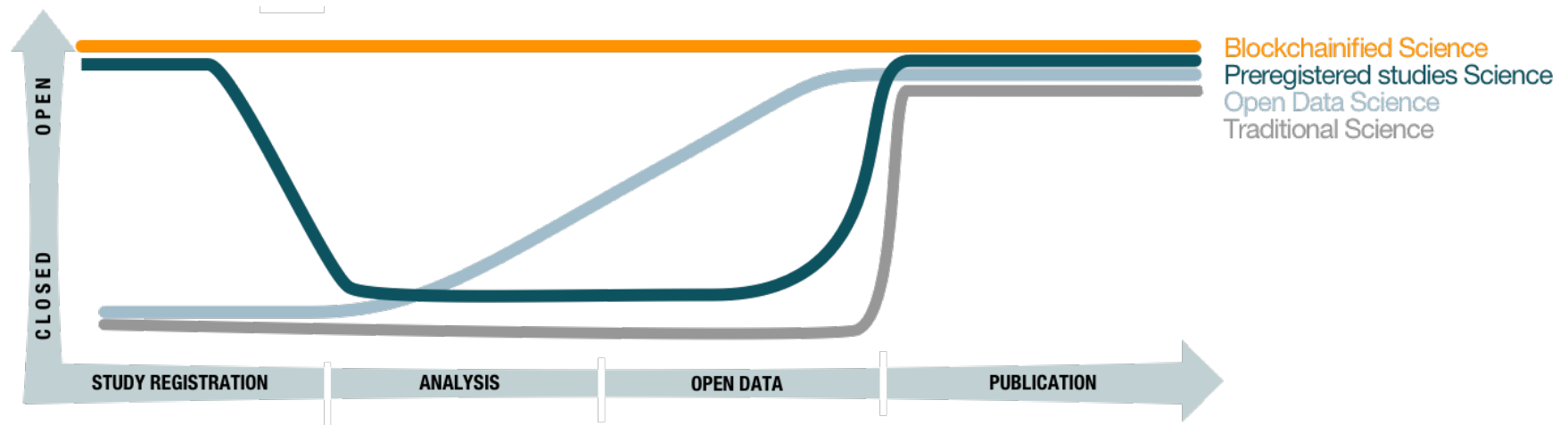
ANALYSIS



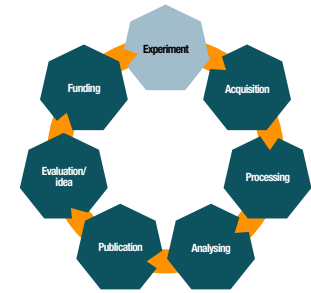
- Smart evidence



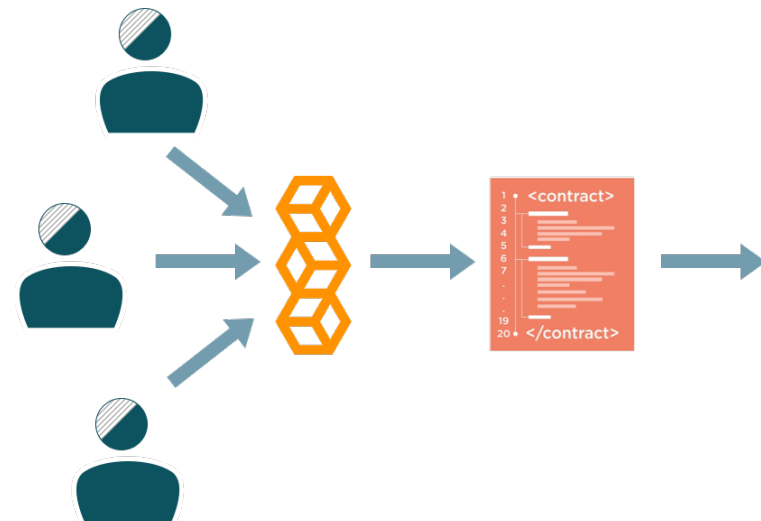
BLOCKCHAINIFIED SCIENCE



ANALYSIS

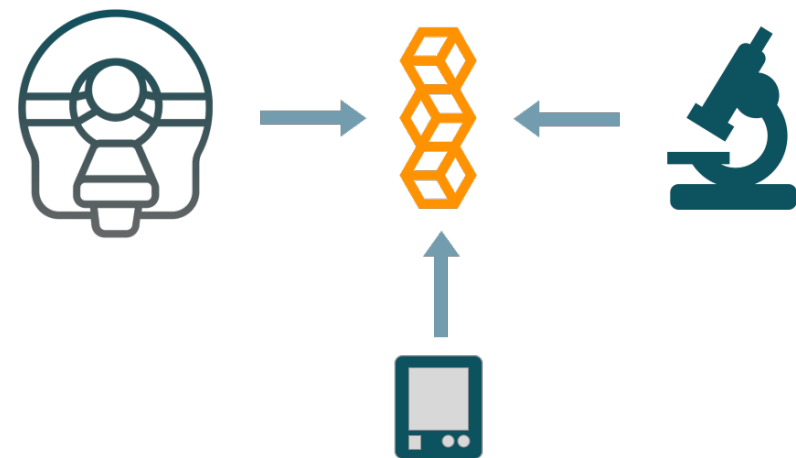
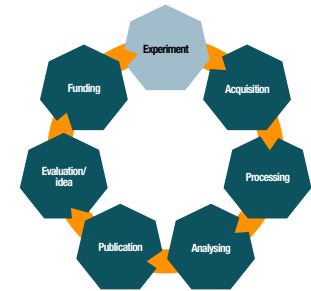


- Privacy preserving data analysis
- The smart contract looks only at certain data, reviewed by committee
- Releases data delayed, averaged, etc.
- Data privacy issues solved?



RESEARCH DATA

- Decentralized cloud
- 100% cryptography
- Storage forever?



FUNDING

- Blockchain token
- Reputation system
- Science market place
- Decentralized academic endorsement system
- ...



ANONYMOUS PUBLICATIONS?

- People do it
- Cryptographic proofs
- Get money for it

ANONYMOUS PUBLICATIONS?

Towards Open Science: The Case for a Decentralized Autonomous Academic Endorsement System

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Abstract

The current system of scholarly communication is based on tradition, and does not correspond to the requirements of modern research.

The dissemination of scientific results is mostly done in the form of conventional articles in scientific journals, and has not evolved with research practice.

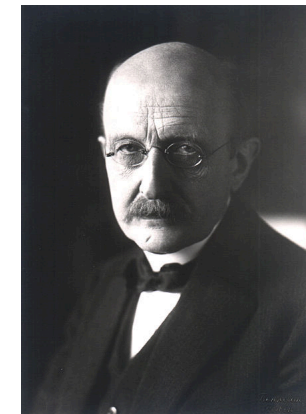
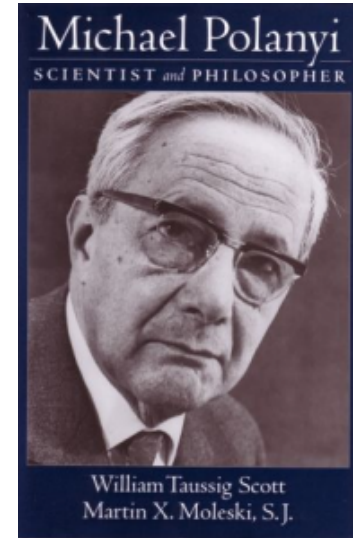
In this paper, we propose a system of academic endorsement based on blockchain technology that is decoupled from the publication process, which will allow expeditious appraisal of all kinds of scientific output in a transparent manner without relying on any central authority.

Introduction

for decisions by funders and recruitment committees.

There are many problems with the current state of affairs, including

cost Scientific output is to a large extent controlled by a profit-driven publishing industry that provide little added value. In fact, many scientific journals only consist of collections of papers produced by public funds, refereed for free by the scientific community. The role of the journal is then simply to provide a publishing platform, organize the refereeing process and make editorial decisions. In spite of this, scientists are expected to relinquish copyright for their articles and pay the journal for publishing their work. In addition to this,

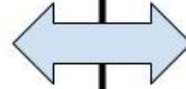


How will blockchain help science?



- Provable, immutable data acquisition, post-processing & handling
- Smart evidence
- Research subject privacy, crypto-assured study blinding
- Connection to IoRT (Internet of research things)
- Transparent approval studies

More reproducible and true results



- Unconventional, innovative, but still transparent means of research money distribution
- Early, simple and strong incentivisation of `crazy` concepts / ideas through blockchain tokens
- Researcher anonymity for whistle-blowing / unorthodox stand points

More innovation/discovery



Sönke Bartling (@soenkeba)

WHAT PROBLEM IS BEING SOLVED?

- A trusted, well equipped third party can do everything a Blockchain can do (Leviathan)
- Do we have such trusted third parties? Or did we do it because we had no other mean until now?



WHAT IS BLOCKCHAIN IN SCIENCE?

- A socio-legal-cultural-economical-political-(r)evolution
- A multi-stake holder process
- Bears huge potentials
- Parallel to other developments (Web 3.0)
- New business models?
- Not a hype (yet)

Thank you

**Blockchain for Open Science /
Knowledge creation - living doc**

goo.gl/kPIElr



BLOCKCHAIN IN HEALTHCARE

- Decentralized database (any cloud)
- Cryptographically secured access control
- Access rights are saved in *blockchain*
- Patient data not necessarily immutable

