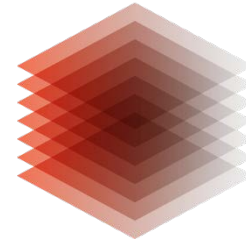


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# Co-creating the future of research funding? Observations & ideas from the literature (and what else we need)

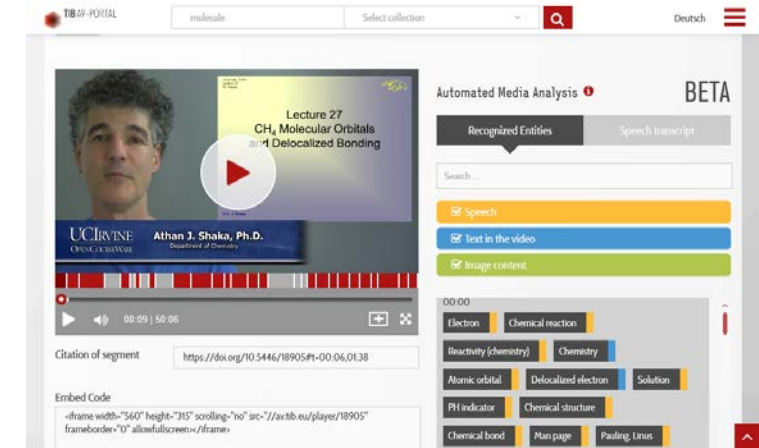
Lambert Heller, Ina Blümel  
February 25 – 26, 2019  
SEED, Davos



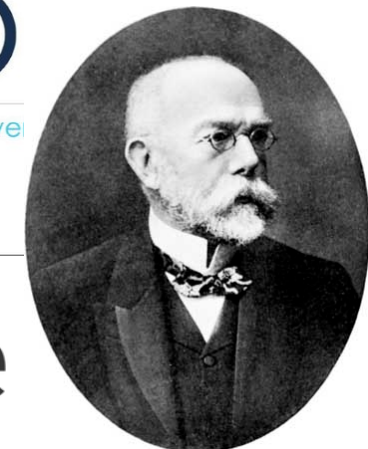
## Quick intro: The TIB



- Founded 1959 in Hannover, as the German National Library of Science and Technology
- Leibniz funded
- Also Hannover's University Library
- 500+ employees
- 50+ R&D dept.
- 11 of them: Open Science Lab



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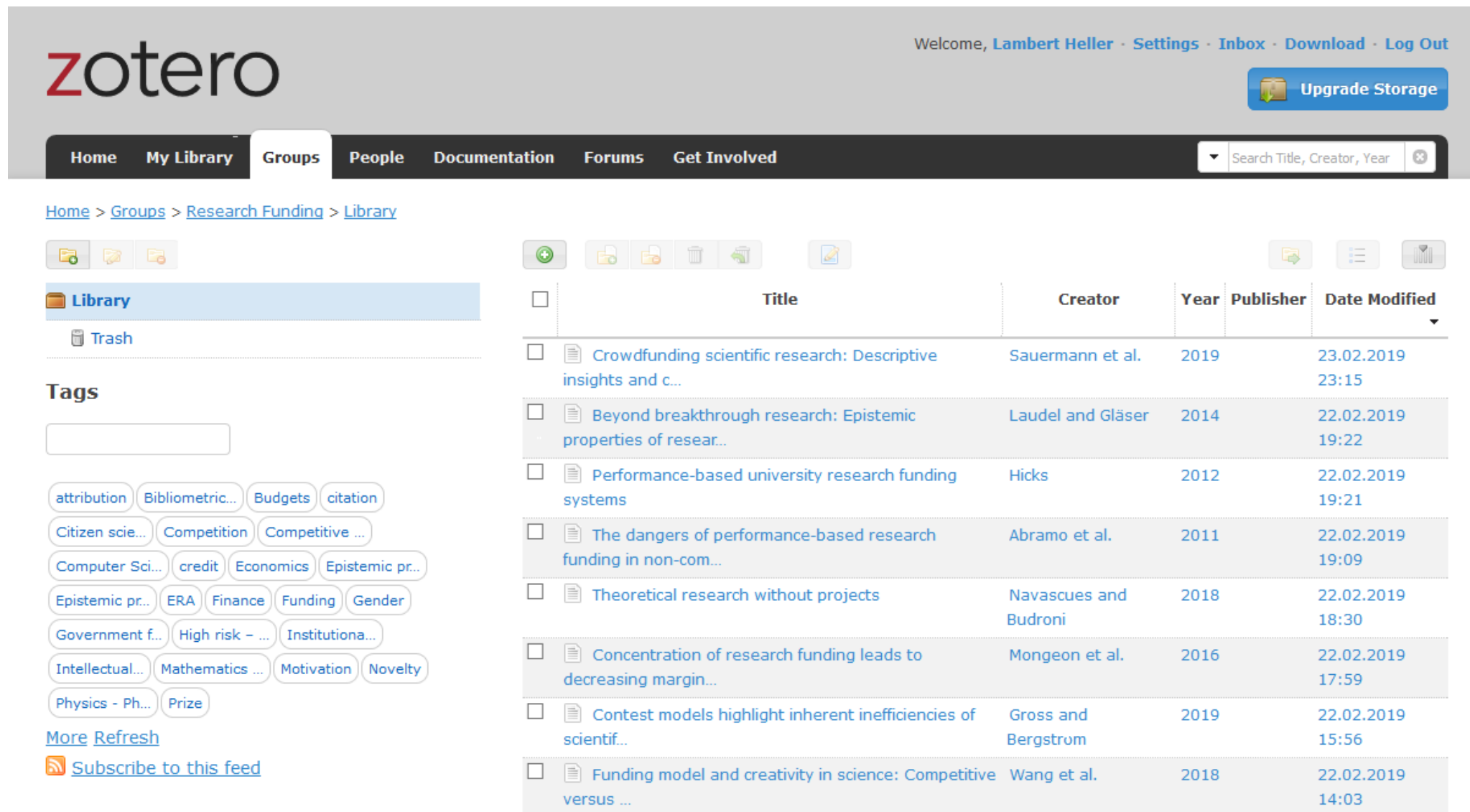
TIB is one of the partners of recently started H2020 funded project QualiChain, which is about **supporting learners and employers by validating educational certificates on a blockchain.**

<https://qualichain-project.eu/>

One of six grant projects projects we're currently working on at TIB Open Science Lab, including grants from EU, research associations, federal and state ministries.

One of the new projects in preparation right now: **Embedding smart attribution ("transitive credit") of scholarly works in the submission workflows of legacy systems**, to support nano publications, data publications, smart contracts etc. With TIB's new blockchain expert, Ingo Keck.

# Collaborative bibliography on research funding: Join, add, annotate and discuss at <http://bit.ly/seed2019>



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## Agenda

1. Development and pain points of current research funding policies – I'll quickly walk you through some of the recent (mostly from the last 1-2 years) literature
2. Some cryptoeconomic funding mechanisms we experience today
3. Some crypto funding mechanisms we will likely see in the next 2-3 years
4. A crypto funding mechanism *avant la lettre*: Bollen et al 2013
5. A cautionary tale from the history of Open Access: PLOS vs Springer-Nature
6. How do we co-create the future of research funding? – A few suggestions

## **Diana Hicks 2012:**

### **Performance-based university research funding systems**

An OECD-funded international meta-study on the effects of performance-based funding systems, as opposed to e.g. long-term block grants, including centers of excellence like in some EU countries and Japan.

Main results:

- Performance-based funding is effective in terms of creating excellent, competitive research.
- Assumed that research impact on economy and society is (at the least) not only achieved by excellence, but also by equity and inclusion, this is not effective.

**Thomas Franssen et al. 2018:**  
**The Drawbacks of Project Funding for Epistemic Innovation**

*„Drawing on eight case studies of funding arrangements in high performing Dutch research groups (...) we argue that the **prize case studies** diverge from **project-funded research** in three ways:*

- 1) a more flexible use, and adaptation of use, of funds during the research process compared to project grants;*
- 2) investments in the larger organization which have effects beyond the research project itself; and*
- 3) closely related, greater deviation from epistemic and organizational standards.“*

## Gross & Bergstrom 2019: Contest models highlight inherent inefficiencies of scientific funding competitions

Study based on economic theory of contests; takeaways:

- Writing grant proposals is highly wasteful
- Most probably better outcomes with (partial) lotteries
- *„at least three funding organizations—New Zealand's Health Research Council and their Science for Technological Innovation program, as well as the Volkswagen Foundation—have recently begun using partial lotteries to fund riskier, more exploratory science.“*



## Wang et al. 2019: Funding model and creativity in science

*„Combining survey data from a large sample of research projects in Japan and bibliometric information about the publications produced from these projects, we find that projects funded by competitive funds on average have higher novelty compared to those funded by internal block funds. However, such positive effects only hold for researchers with high status, such as senior and male researchers. (...) The findings suggest that the competitive project selection procedure is less receptive to novel ideas from researchers with low academic status and therefore discourages their novel research.“*

## Henry Sauermann et al 2019: Crowdfunding scientific research

Statistical analysis of the by now largest platform of its kind, Experiment.com.

Some main results:

- Large number of projects receive (a little) support, though not covering salaries
- Complementary funding opportunity viable for younger people and women without an academic track record
- Funders have no real stake in the outcome, rewards are mostly gimmicks (visiting the lab, a shark is named after those who funded the research etc.)

## Problems with current funding schemes – some main results from across the literature

- Writing funding proposals is wasteful
- ...while prizes and other rewards for past efforts perform better in terms of novelty (according to qualitative & economic theory studies)
- ...even long-term block grants like ERC seem to perform better in this regard
- ...even partial lotteries might perform better, are actually applied
- Overly competitive funding schemes (i.e. not only proposal writing) are inherently non-inclusive and don't support equity, lack economic & societal impact.
- Crowdfunding science (beyond crypto) clearly works in complementary ways, but is way too small (per project), and doesn't address co-ownership.

## Some common crypto economic funding mechanisms of today (and their limitations)

- Expanding peer review to the micro level
- Immediate monetary incentivisation for what you want your participants to do
- Introducing enhancements to the open protocols of scholarly communications on branded platforms of monetary value

Many risks here, mostly for (behavioral) economics reasons.

**We need serious social science accompanying current projects.**

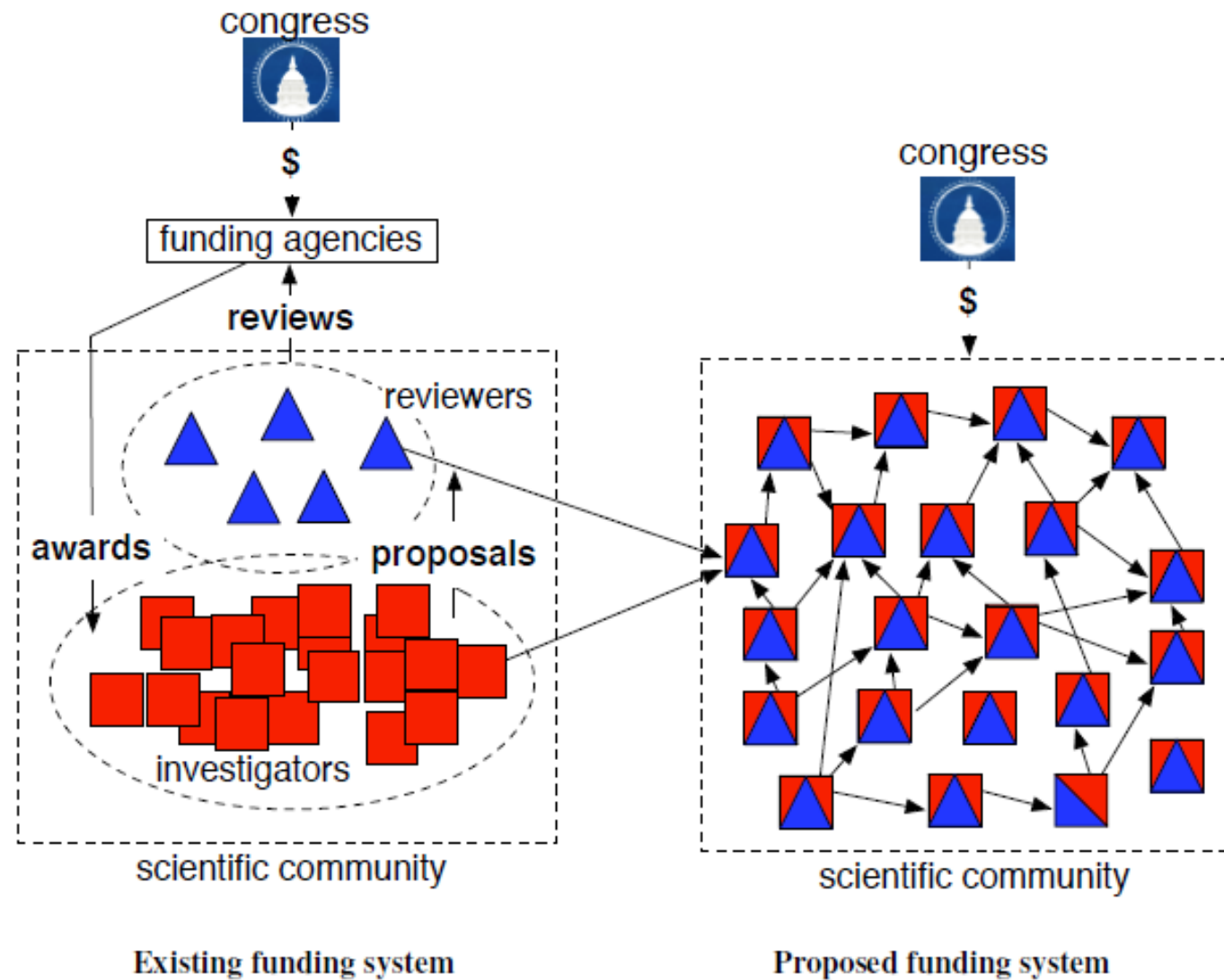
Or at least more than our everyday assumptions.

Let me come back with a more concrete proposal at the end of my talk.

## **„Embrace and extend“ – things we will (likely) see in research funding, in 2-3 years (not included here: IP rights)**

- „JP Morgan Coin, but for Science“: Centrally managed stablecoins, in order to increase internal transparency while decreasing administrative effort
- Permissioned blockchains for smoothing workflows between competing publishers, e.g. avoiding double efforts in peer review of submissions. (Of course this doesn't disrupt ownership/governance of platforms/processes at all.)
- More intermediaries, e.g. DAOs and (traditional) institutions governing funds applying different schemes, not targeting projects or universities, but disciplinary communities.
- Managing credentials, in higher education, vocational training and other areas. Have a look at QualiChain, but also Artifacts, who use Sovrin. These credentials will turn out as essential building blocks for DAOs, and other smart contracts.


# Johan Bollen et al. 2013: Collective allocation of science funding: from funding agencies to scientific agency



## Why I think „Blockchain for Science“ folks should embrace this – Some reflections on Bollen et al. 2013

- It doesn't assume crypto tokens, but is clearly a P2P approach.
- Its assumptions are particularly close to the key insight of „let's fund less competitive“. (See summary slide)
- Not a call for new intermediaries – neither new branded platforms, nor „embrace and extend“. (See “things we will likely see” slide)
- Most importantly, it asks virtually **everybody to predict who will conduct impactful research** – which in itself might turn out as a highly useful building block for mechanism design and tokenization. (See my point about credentials on the last slide.)

## A cautionary tale from the history of Open Access - some key events from PLOS vs Springer-Nature

- 2000: Online petition for Open Access by Noble laureate Harold Varmus
- 2003: First article produced by newly formed publisher „Public Library of Science“ (PLOS), a.o. introducing APC business model for Open Access
- 2006: Innovative new „mega journal“ PLOS ONE
- 2007: Covert Dezenhall PR campaign against OA
- 2008: Springer buys BioMed Central
- 2011: Nature starts ONE clone „Scientific Reports“
- 2013: Growth of PLOS ONE stalls 
- 2016: „Scientific Reports“ biggest mega journal
- 2017: Springer-Nature claims to be biggest Open Access publisher worldwide (cf. Jon Tennant’s talk)

# Welcome, Nature. Seriously.

Welcome to Open Access, the most exciting and important development in science communication since journals were invented.

And congratulations on your new journal *Scientific Reports*—an important step towards comprehensive Open Access to research. To realize the full power of Open Access, we urge you to permit your content to be re-used without restriction and to extend the Open Access model to all your journals.


Putting real knowledge into the hands of everyone will change the way people work, think, learn, and communicate. Openly sharing research encourages faster progress in solving some of the world’s toughest problems—from protecting the biodiversity of our planet to finding more effective treatments for diseases such as AIDS and cancer.

As a result, Open Access is fast becoming the publishing model of choice for the scientific and medical community.

We’re delighted that Nature and other publishers have recently announced journals modeled on *PLoS ONE*—a peer-reviewed journal that judges articles on scientific rigor rather than potential impact. Last year, *PLoS ONE* published 6,749 articles, making it the world’s largest peer-reviewed journal.

We look forward to responsible partnerships in the massive effort to increase Open Access research throughout the world.

Because what we are doing is bringing about social change and accelerating progress.

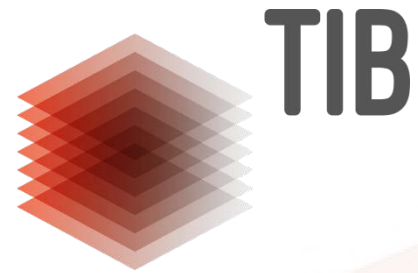
Welcome to the challenge.  PLOS



## Acting individually as advisors and consultants probably won't cut it: Co-creating the future of research funding

- We experience a lot of entrepreneurship in this field today, which is natural to an disruption of economic nature, like blockchain...
- ...though we definitely need a better understanding of these endeavours' outcomes, including the risks and failures, and taking into account the complex and changing landscape of funding as well as research itself.
- Rushing users into some new branded platform? This in itself is not the disruption we need. There's a lesson in the history of Open Access and PLOS.
- There's a lack of **comprehensive studies on innovation in research funding**, with the goal of informing funding agencies & policy makers, new businesses, researchers and the general public.
- Even better: **Continuous monitoring** of this space.

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### Contact

Lambert Heller

T +49 511 762-5348, [lambert.heller@tib.eu](mailto:lambert.heller@tib.eu),  @Lambo



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