Beyond the Bad Actors

A reflection on prominent ethical issues in the context of Quantum Technologies
in collaboration with Peter Remmers (TU Berlin)

What is a „Bad Actor“?

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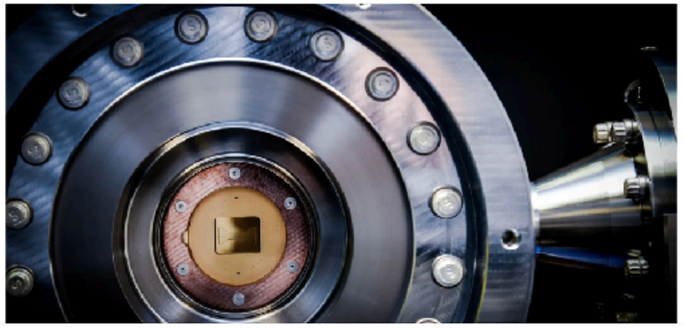
- Terminology from Cybersecurity describing…
  - … Cybercriminals (*black hat* hackers, financial gain)
  - … Hacktivists (activists, e.g. anonymous)
  - … Insiders (within the business)
  - … Government/state-sponsored (spies, military, politics)
  - … Cyberterrorists (causing harm for their cause)

https://www.parkersoftware.com/blog/what-is-a-bad-actor-in-cybersecurity/

THERANDBLOG

Hack Post-Quantum Cryptography Now So That Bad Actors Don't Do It Later

COMMENTARY



The new encryption algorithm that was just cracked was designed to be secure against quantum computers. A large-scale quantum computer may eventually be able to quickly break the encryption used to secure today's internet traffic. If internet users don't take any countermeasures, then anyone in possession of such a computer might be able to read all secure online communications—such as email, financial transactions, medical records, and trade secrets—with potentially catastrophic impacts for cybersecurity that the U.S. National Security Agency has described as "devastating to…our nation."

- https://www.rand.org/blog/2022/07/hack-post-quantum-cryptography-now-so-that-bad-actors.html

2022

Article

6 minute read · 12 May 2022

Quantum computing may create ethical

Quantum could potentially threaten existing protections

Cybersecurity: Some experts have predicted that within a decade, quantum computers could be used by hackers and hostile nation-states to break existing encryption protocols. This would represent a major blow to a wide array of internet services, including e-commerce and other virtual financial transactions, which rely on encryption.[2] The cybersecurity protocols of widely used blockchain technologies, like Ethereum and Bitcoin, would also be vulnerable to such attacks, which highlights the need for blockchain developers to update their platforms to use postquantum cryptography.[3]

- https://www2.deloitte.com/us/en/insights/topics/cyber-risk/quantum-computing-ethics-risks.html

2022

„What are future pitfalls to watch out for?“

(Answer 1) „It‘s too early to say, as we do not have the application yet. The technology itself is simply still too young to say anything about it.“

(Answer 2) „Even if there is an application we can anticipate, there are always **bad actors** that will misuse the technology in ways that were not intended.“

(1) Focuses on **Misuse**

Does not reflect on intended use

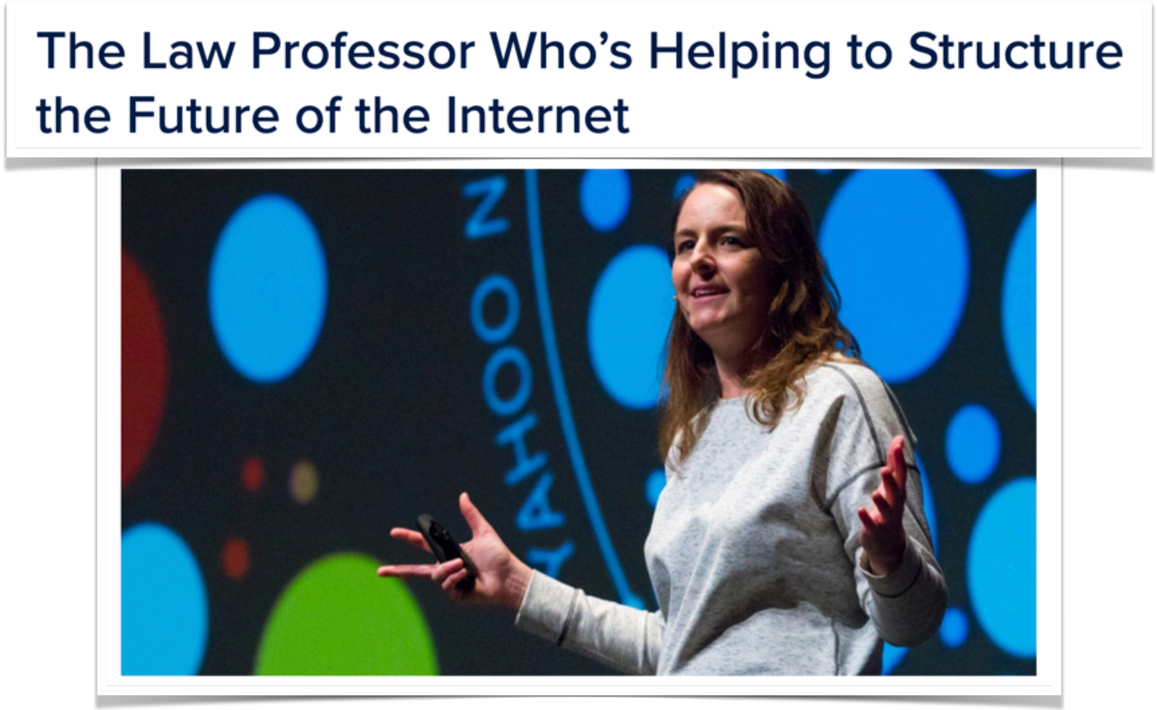
What if the technology is used as intended?

- Scaling effects:
  - What if the technology is accessible to everyone?
  - e.g., Cars lead to traffic jams,
- Necessary evil: Bad Actors
- Solution: Post-Quantum Cryptography
- Problem solved?

https://www.cybertalk.org/2020/07/27/a-virtually-unhackable-internet-around-the-corner/

Quantum Internet

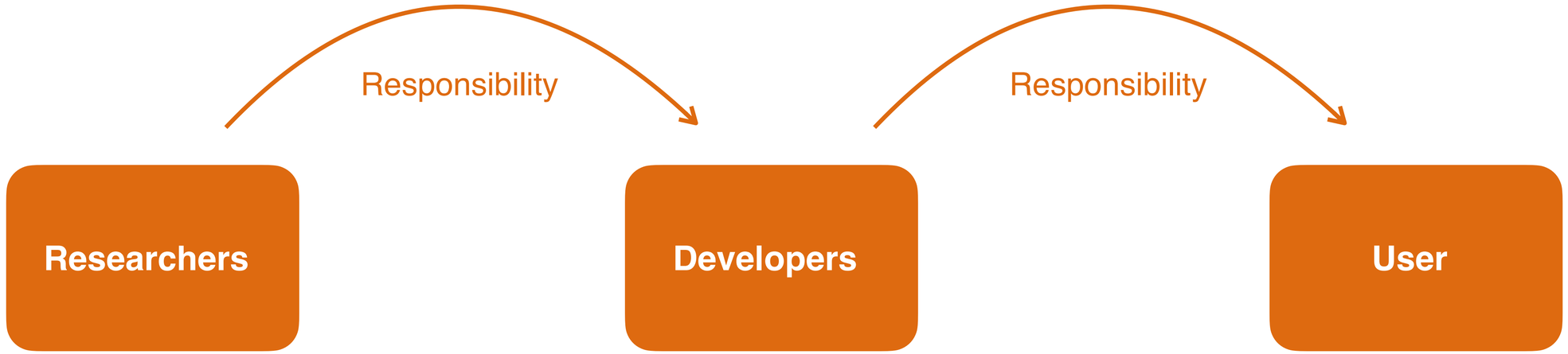
- Equity problem
  - Quantum internet can not be spread equally over the world due to topography
  - „If we rely on post quantum cryptography as the main source for security, this means we‘ll basically leave large ares of our society unsecured.“



- Jane Bambauer, Law professor at Arizona working on Quantum Ethics
- https://www.youtube.com/watch?v=QINBaEnH4sE

(2) Shifting responsibility

Shifting responsibility



Do artifacts have politics? (Winner 1980)

- „In our accustomed way of thinking **technologies are seen as neutral tools** that can be used well or poorly, for good, evil, or something in between. But we usually do not stop to inquire whether **a given device might have been designed and built in such a way that it produces a set of consequences logically and temporally prior to any of its professed uses.**“ (125)

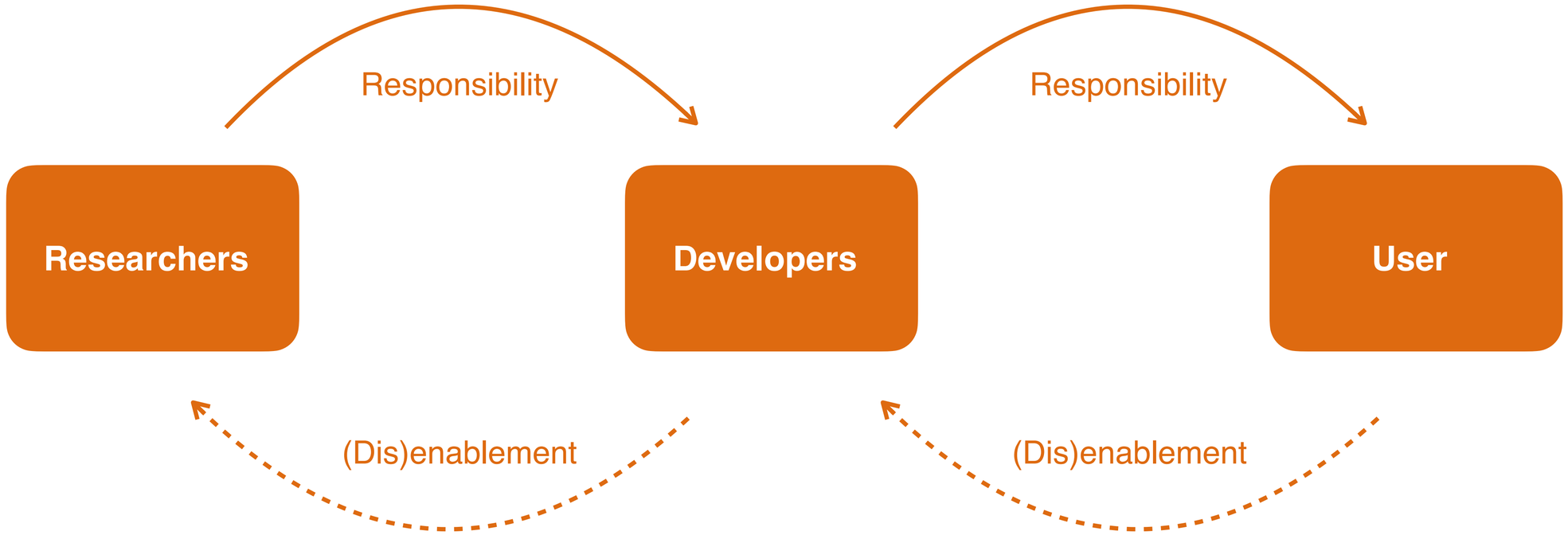
- „In that sense technological innovations are similar to legislative acts or political foundings **that establish a framework for public order** that will endure over many generations.“ (128)

Example: Bridge

- „Robert Moses, the master builder of roads, parks, bridges, and other public works from the 1920s to the 1970s in New York, had these overpasses built to specifications that would **discourage the presence of buses on his parkways**.“ (123)
- „**Poor people and blacks**, who normally used public transit, **were kept off the roads** because the twelve-foot tall buses could not get through the overpass“ (124)

- New (technological) artifacts create new social dynamics.
  - Enabling for some, disabling for others.
  - „Technical objects define a framework of action together with the actors and the space in which they are supposed to act.“ (Akrich, 1994, 208)

Artifacts do have politics!



(3) Colonises reflection space and overshadows other issues

Value Neutrality Thesis (Marcuse / Weber 1965)

- „Certain purposes and interests of domination are not imposed on technology 'after the fact' and from the outside - they already enter into the construction of the technical apparatus itself; technology is always a historical-social project; **[technology] projects what a society and the interests that dominate it intend to do with people and with things.**“ (Marcuse, 1965, S.127).

- "For as a "coagulated spirit“ (geronnener Geist) the machine is not neutral; **technical reason is the prevailing social reason at any given time**." (Marcuse, 1965, S. 180)

- Problem: Current values caused current crisis

- Values can be identified by the promises described in the visions of the technology
  - … and in the potential beneficiaries of the technology.

Beneficiaries of Quantum

2023

McKinsey & Company

Im letzten Jahr haben Quantentechnologien (QT) deutliche Fortschritte erzielt. Sie rücken damit immer näher in die Position, Probleme zu lösen, die mit herkömmlichen Technologien nicht oder nur unter großem finanziellen Aufwand zu lösen sind. Gleichzeitig beflügelt der technologische Fortschritt die wirtschaftlichen

The **automotive, chemical, financial** and life science industries can achieve a potential value creation of up to 1.3 trillion US dollars by 2035 through the use of quantum computing. Value creation potential in the context of the study refers to future sales revenues and cost savings.

Den größten ökonomischen Effekt könnten Anwendungsfälle für Quantencomputing in der Finanzbranche entfalten. Hier liegen die Prognosen zwischen 394 und 700 Milliarden US-Dollar, wobei Corporate Banking, Risk und Cybersicherheit die relevantesten Einsatzbereiche darstellen.

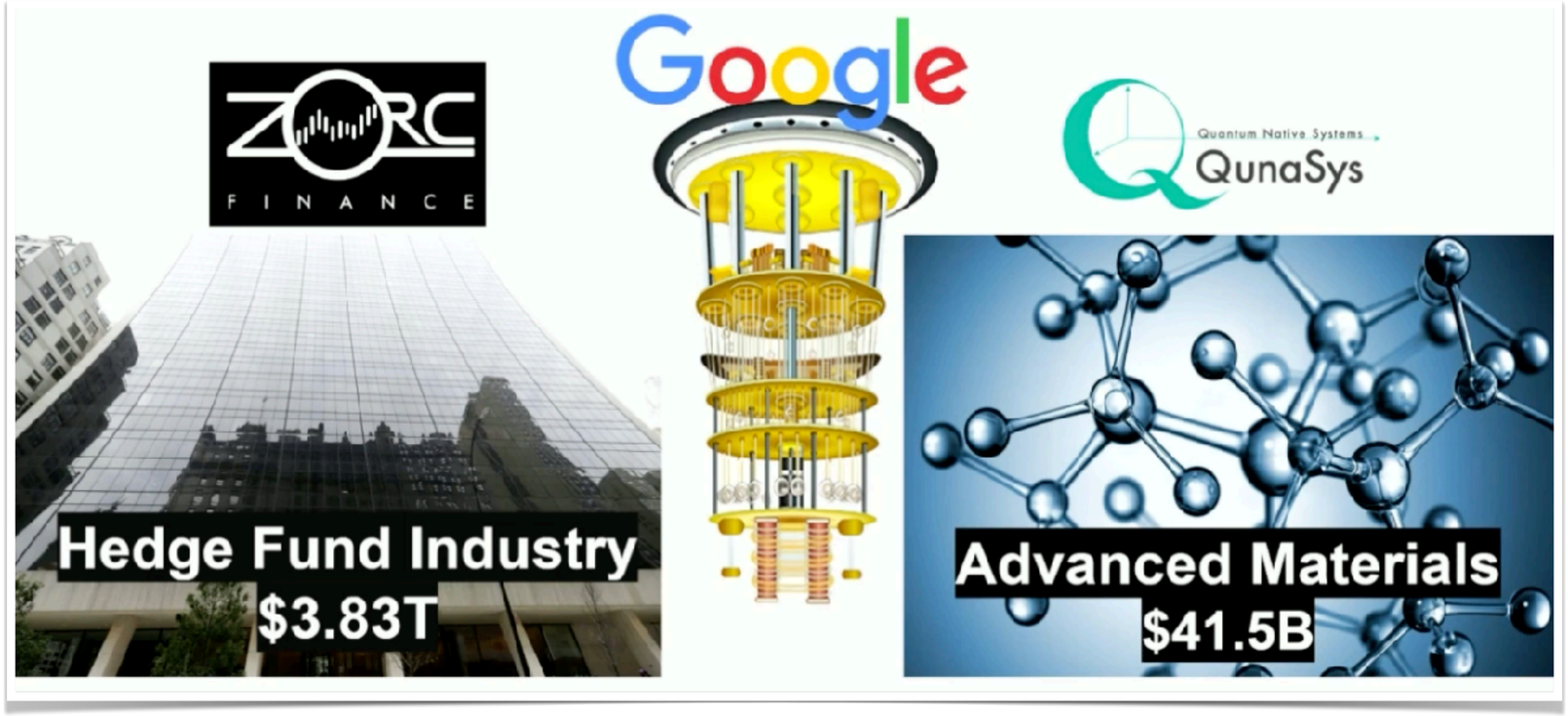
https://www.mckinsey.com/de/news/presse/quantum-technology-monitor-2023-marktanalyse-quantencomputer-quantenkommunikation-quantensensorik

2021

McKinsey & Company

As breakthroughs accelerate, investment dollars are pouring in, and quantum-computing start-ups are proliferating. Major technology companies continue to develop their quantum capabilities as well: companies such as Alibaba, Amazon, IBM, Google, and Microsoft have already launched commercial quantum-computing cloud services.

Beneficiaries of Quantum



Joan Arrow (2023)

https://www.youtube.com/watch?v=AV_iGgRajHY

What if we are the bad actors?

- Developing a technology that will make the rich richer and foster current trajectories.
- While at the same time, current trajectories cause social, environmental and political challenges for society.

Wrap Up

The Bad Actor Narrative…

1. … focuses on the question „What if the technology is **mis**used?“
   - Does not address the question „What if the technology is used as intended?“

2. … shifts the moral burden from the researcher to the developer, from the developer to the user.
   - Does not acknowledge the responsibility held.

3. … colonises the ethical realm of reflection.
   - Does not leave space for other ethical issues.

With great responsibility comes great power

- The „Bad Actor“ narrative does not only cut away the responsibility, it also cuts away the power to act
- Instead, we need an **EMPOWERING** statement to acknowledge the responsibility because:

- … and an invitation to **re-imagine the future of Quantum technology** to seek potential for change and for making the world a ‚better‘ place.

Thank you!

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