



BLOXBERG

The blockchain for Science

Sandra Vengadasalam
Friederike Kleinfercher
Max Planck Society | bloxberg Founder





Starting point: Why do researchers need a timestamp for their data?

> OPEN SCIENCE! YES...BUT....



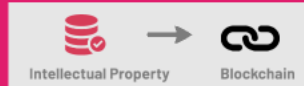
...“With **‘water mark’** on my research data, I would be much more relaxed and share my result more often”...

...“As a researcher, I want to **protect my ideas, findings or collected data** etc. (Intellectual Property (IP)) as early in the research process as possible, so I don't have to worry about rushing to publish or being scooped.”....

> Challenges in science:

- High pressure to publish fast
- Intellectual Property can be stolen
- ‘Who was first?’

> Instead of going to a notary, we came up with the blockchain idea!



> Trustlessness

We don't rely on trust between people - we trust the network.



e.g. Government,
Bank,
Publisher,
Research Funder,
Research Organization,
...

> OPEN SCIENCE! YES...BUT....



"Poster session during a scientific conference"

... "With **"water mark"** on my research data, I would be much more relaxed and share my result more often!"...

... "As a researcher, I want to **protect my ideas, findings or collected data** etc. (Intellectual Property (IP), as early in the research process as possible, so I don't have to worry about rushing to publish or being scooped."

> OPEN SCIENCE! YES...BUT....



"Poster session during a scientific conference"

...“With *“water mark”* on my research data, I would be much more relaxed and share my result more often!”...

...“As a researcher, I want to *protect my ideas, findings or collected data* etc. (Intellectual Property (IP), as early in the research process as possible, so I don't have to worry about rushing to publish or being scooped.”



Starting point: Why do researchers need a timestamp for their data?

**> OPEN SCIENCE!
YES...BUT....**



... "With 'water mark' on my research data, I would be much more relaxed and share my result more often!" ...

... "As a researcher, I want to protect my ideas, findings or collected data etc. (Intellectual Property (IP)) as early in the research process as possible, so I don't have to worry about rushing to publish or being scooped." ...

> Challenges in science:

- High pressure to publish fast
- Intellectual Property can be stolen
- 'Who was first?'

> Instead of going to a notary, we came up with the blockchain idea!



Intellectual Property → Blockchain

> Trustlessness

We don't rely on trust between people - we trust the network.

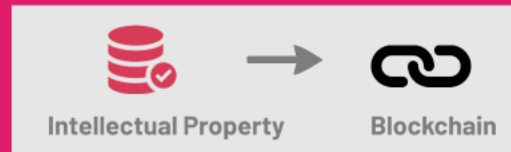


• e.g. Government,
 Bank,
 Publisher,
 Research Funder,
 Research Organization,
 ...

> Challenges in science:

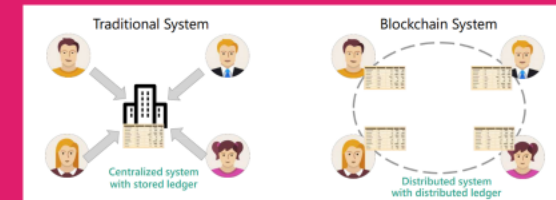
- High pressure to publish fast
- Intellectual Property can be stolen
- 'Who was first?'

> Instead of going to a notary, we came up with the blockchain idea!



> Trustlessness

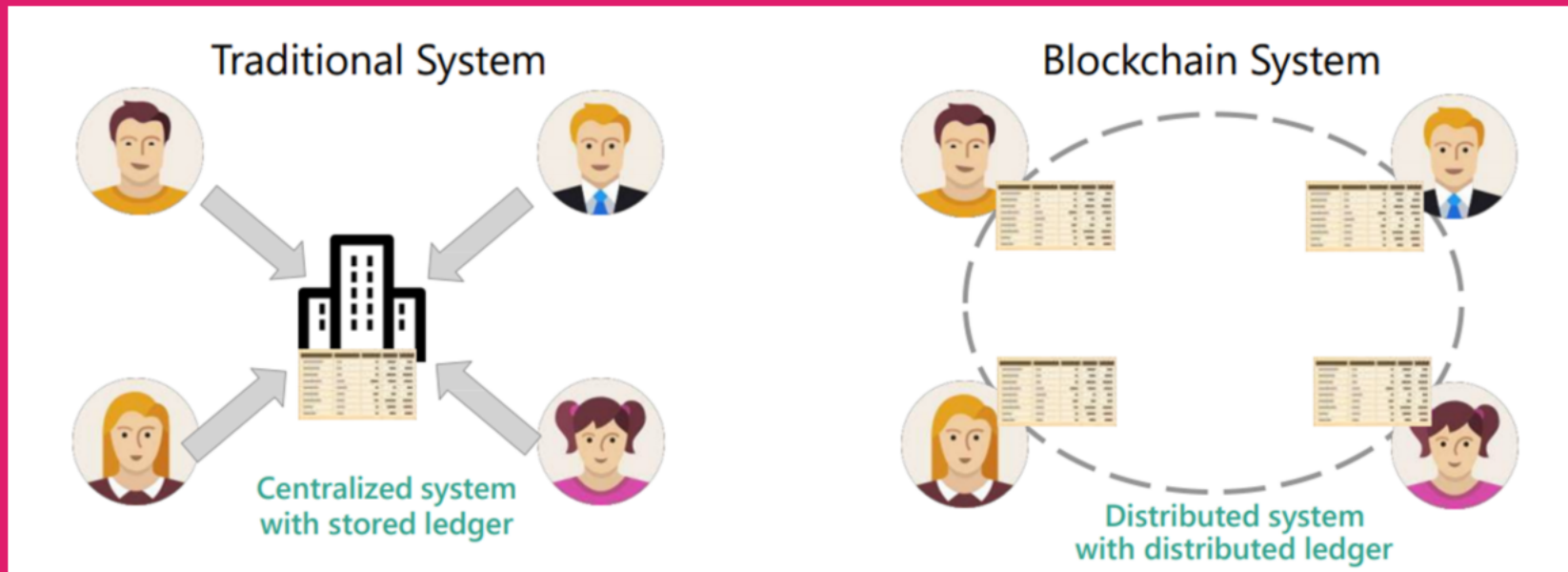
We don't rely on trust between people - we trust the network.



e.g. Government,
Bank,
Publisher,
Research Funder,
Research Organization,
...

> Trustlessness

We don't rely on trust between people – we trust the network.



e.g. Government,
Bank,
Publisher,
Research Funder,
Research Organization,
...



BLOXBERG

The blockchain for Science

Sandra Vengadasalam
Friederike Kleinfercher
Max Planck Society | bloxberg Founder



> Public

 *bitcoin*


ethereum

> Private



HYPERLEDGER

> Public -
Permissioned

 ripple



**Seeking for the
Right
Blockchain for
Science**



Seeking for the Right Blockchain for Science

> Public



bitcoin




ethereum

> Private



HYPERLEDGER

**> Public -
Permissioned**



ripple



BLOXBERG

The blockchain for Science

Sandra Vengadasalam
Friederike Kleinfercher
Max Planck Society | bloxberg Founder





Solution

**Consortium driven
public blockchain**

**> by science
for science**

> The Genesis of bloxberg in 2019

A Winter's Tale in the Bavarian Alps



Castle Ringberg | Tegernsee

11 founders from 10 nations

> The first bloxberg summit in February 2019



Carnegie Mellon, UCL, ETH Zürich Lab, Georgia Tech, IT University of Copenhagen, University of Belgrade, University of Johannesburg, University of Kassel, University of Nicosia, University of Sarajevo and Max Planck Society

> The first bloxberg summit in February 2019



Carnegie Mellon, UCL, ETH Zürich Lab, Georgia Tech, IT University of Copenhagen, University of Belgrade, University of Johannesburg, University of Kassel, University of Nicosia, University of Sarajevo and Max Planck Society



Solution

**Consortium driven
public blockchain**

**> by science
for science**



BLOXBERG

The blockchain for Science

Sandra Vengadasalam
Friederike Kleinfercher
Max Planck Society | bloxberg Founder





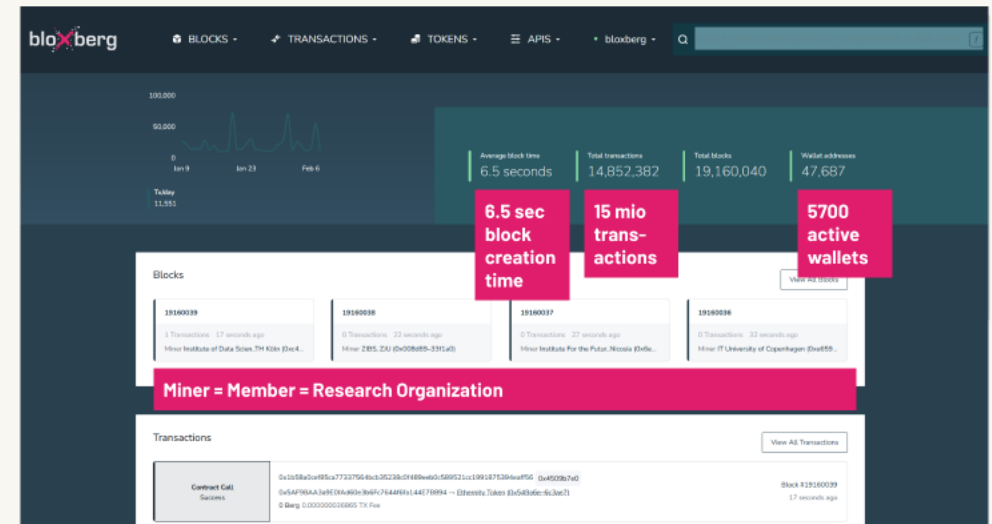
**> 15 mio
transactions**

> 55 Member

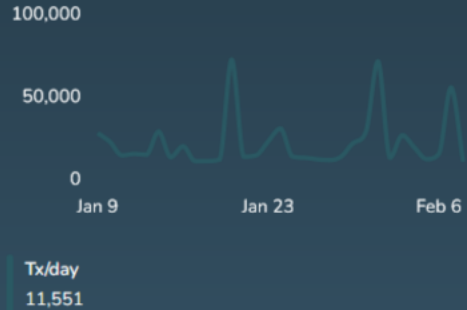
**> 25 +
dApps**

**bloxberg became
the largest
POA blockchain
in the world**

Explore bloxberg's machine room



<https://blockexplorer.bloxberg.org>



Average block time
6.5 seconds

Total transactions
14,852,382

Total blocks
19,160,040

Wallet addresses
47,687

6.5 sec
block
creation
time

15 mio
trans-
actions

5700
active
wallets

Blocks

View All Blocks

19160039
1 Transactions 17 seconds ago
Miner Institute of Data Scien..TH Köln (0xc4...

19160038
0 Transactions 22 seconds ago
Miner ZIBS, ZJU (0x008d89-33f1a0)

19160037
0 Transactions 27 seconds ago
Miner Institute For the Futur..Nicosia (0x6e...

19160036
0 Transactions 32 seconds ago
Miner IT University of Copenhagen (0xe659...

Miner = Member = Research Organization

Transactions

View All Transactions

Contract Call
Success

0x1b58a0cef85ca77337564bcb35238c0f489eeb0c589521cc1991875394eaff56 0x4509b7e0
 0x5AF98AA3a9E0fAd60e3b6Fc7644f6fa144E7B894 → Ethernity Token (0x549a6e-6c3ae7)
 0 Berg 0.000000036865 TX Fee

Block #19160039
17 seconds ago



**> 15 mio
transactions**

> 55 Member

**> 25 +
dApps**

**bloxberg became
the largest
POA blockchain
in the world**

> bloxberg is public blockchain driven by a scientific association

55 members in Feb 2023



<https://bloxberg.org/consortium/#bloxberg-members>

The bloxberg Association for the Advancement of Science and Blockchain

- Consists of research institutions who run the bloxberg nodes for validating the transactions
- Each organization is restricted to run only one authority node
- All rights and duties are defined in the detailed bloxberg governance model

The bloxberg Association for the Advancement of Science and Blockchain

- Consists of research institutions who run the bloxberg nodes for validating the transactions
- Each organization is restricted to run only one authority node
- All rights and duties are defined in the detailed bloxberg governance model



**> 15 mio
transactions**

> 55 Member


**> 25 +
dApps**

**bloxberg became
the largest
POA blockchain
in the world**


Through **bloxberg's open API** dApps communicate with the bloxberg blockchain to provide services.

dApps running on top of bloxberg benefits from the scientific ecosystem.

> Core Applications

 Validator Information

 Blockexplorer

 Data Certification & Validation

... and more

> External Applications


 Wolfram Language


 eLabFTW


 Ethernity Cloud

... and more

> Member Applications

 SAIRA Open Access Hub by Fraunhofer FIT

 MatLab Integration by Westphalian University

 Seafire Integration by Max Planck Society

... and more

dApp
blox
scien

> Core Applications

 Validator Information

 Blockexplorer

 Data Certification & Validation

... and more

> External Applications

 Wolfram Language


 eLabFTW

 Ethernity Cloud

... and more

> Member Applications

 SAIRA Open Access Hub
by Fraunhofer FIT

 MatLab Integration
by Westphalian University

 Seafile Integration
by Max Planck Society

... and more

<https://bloxberg.org/apps/>



<https://certify.bloxxberg.org/>

Anyone can certify and validate their data directly through bloxxberg. The certification is freely available.

Attention: Your data will not be stored on bloxxberg! Only the 'hash value' of your digital file - a digital fingerprint that is unique.



Seafile Inegration: Blockchainification of research data at the MPG

- For all MPG employees: **Sync & Share service** (Keeper), based on the software Seafile connected to bloxxberg.
- **"Fire and forget"** blockchainification of **single files or batches of up to 1000 files** at once with the single click of a button.
- The application has **natively inbuilt versioning** and stores the certified version of a file or snapshot of a folder for the user
- Optionally, **metadata can be included** in the certification. (No data or metadata will be exposed, ensuring the user's data privacy)



HANDS-ON

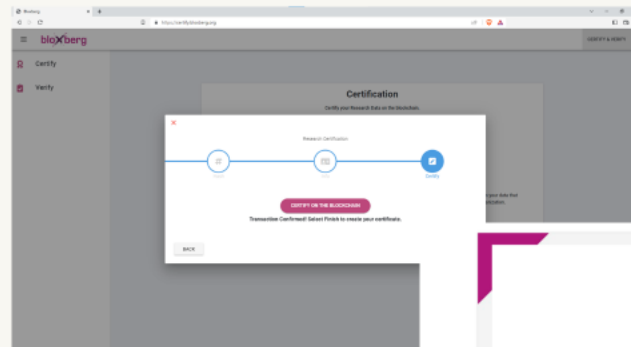
> "Blockchainification" of (Research) Data via bloxxberg



<https://certify.bloxberg.org/>

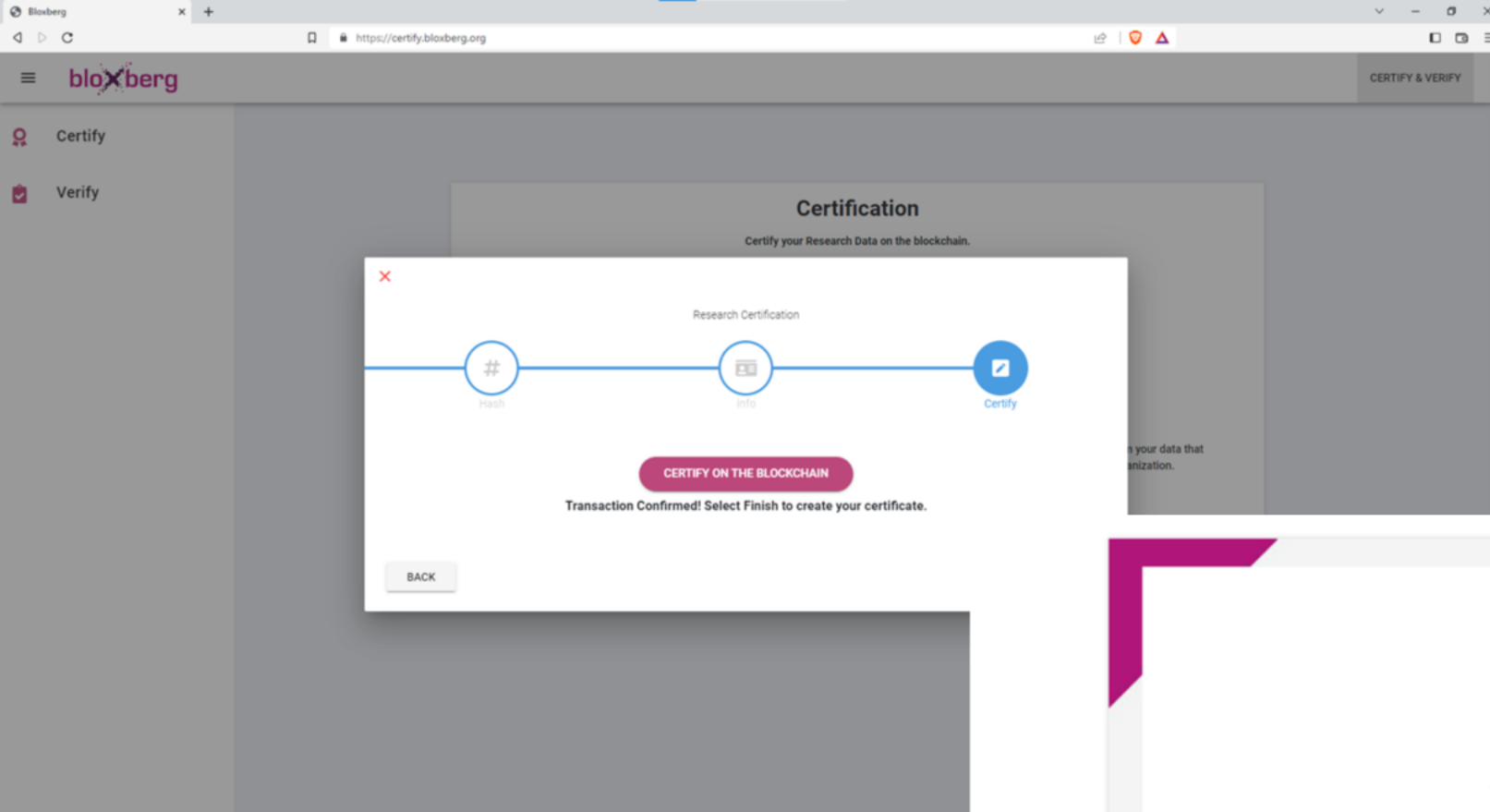
Anyone can certify and validate their data directly through bloxberg. The certification is freely available.

Attention: Your data will not be stored on bloxberg! Only the "hash value" of your digital file - a digital fingerprint that is unique.



<https://certify.bloxberg.org/>





<https://certify.bloxberg.org/>



Research Object Certificate

This bloxberg certificate serves as a proof of existence that the data corresponding to the cryptographic identifier were transacted on the **bloxberg** blockchain at the issued time.

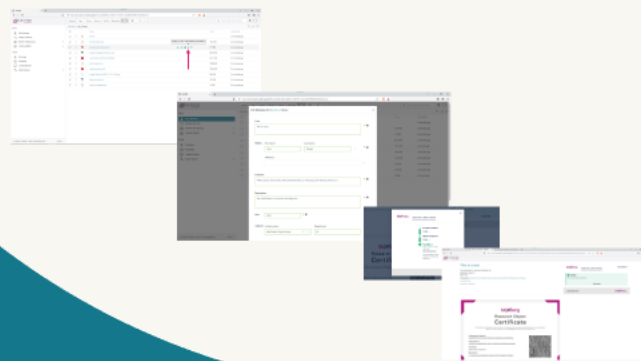
Cryptographic Identifier 54a463f8700e7624e73db4b1ad7cbd6af323a72e846b554abc2efc0b39b500ae	
Transaction ID 0x853b62c795c5699b0a35a84110b5810cc26de66940419d00e8aade7ac966daec	
Timestamp 2023-02-07T10:37:30.362714	
Merkle Root ec573a99852d0e5c6f38386e60851bc85db442752e07ce86d89a51597fd0f4b9	

View the transaction at <https://blockexplorer.bloxberg.org>Verify the certificate at <https://certify.bloxberg.org/verify>

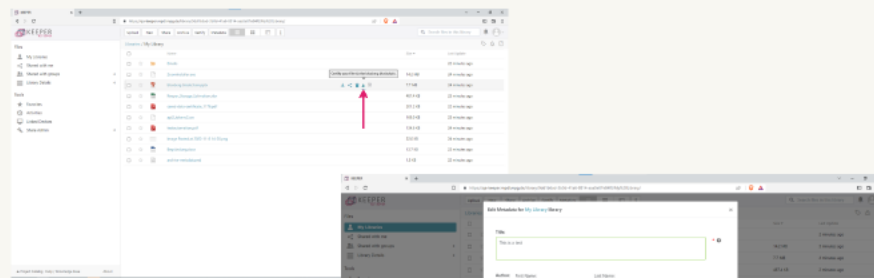
blo

Seafile Inegration: Blockchainification of research data at the MPG











- For alle MPG employees: **Sync & Share service** (Keeper), based on the software Seafile connected to bloxberg.
- **“Fire and forget” blockchainification** of **single files or batches of up to 1000 files** at once with the single click of a button.
- The application has **natively inbuilt versioning** and stores the certified version of a file or snapshot of a folder for the user
- Optionally, **metadata can be included** in the certification. (No data or metadata will be exposed, ensuring the user’s data privacy)



- For alle MPG employees: **Sync & Share service** (Keeper), based on the software Seafile connected to bloxberg.
- **“Fire and forget” blockchainification of single files or batches of up to 1000 files** at once with the single click of a button.
- The application has **natively inbuilt versioning** and stores the certified version of a file or snapshot of a folder for the user
- Optionally, **metadata can be included** in the certification. (No data or metadata will be exposed, ensuring the user’s data privacy)



Libraries / My Library

<input type="checkbox"/>	Name	Size	Last Update
<input type="checkbox"/>	☆  Emails		22 minutes ago
<input type="checkbox"/>	☆  ZoomInstaller.exe	14.2 MB	24 minutes ago
<input type="checkbox"/>	☆  bloxberg blockchain.pptx	7.7 MB	24 minutes ago
<input type="checkbox"/>	☆  Keeper_Storage_Estimation.xlsx	487.4 KB	23 minutes ago
<input type="checkbox"/>	☆  cared-data-certificate_1176.pdf	201.2 KB	22 minutes ago
<input type="checkbox"/>	☆  api2_tokenv2.csv	169.0 KB	23 minutes ago
<input type="checkbox"/>	☆  testautomation.pdf	134.6 KB	24 minutes ago
<input type="checkbox"/>	☆  Image Pasted at 2022-11-8 14-28.png	32.0 KB	24 minutes ago
<input type="checkbox"/>	☆  Begründung.docx	13.7 KB	23 minutes ago
<input type="checkbox"/>	☆  archive-metadata.md	1.5 KB	22 minutes ago

Certify your file via the bloxberg blockchain.



KEEPER TEST SERVER

Files

My Libraries

KEEPER TEST SERVER

Upload New Share Archive Certify Metadata

Libraries

Files

- My Libraries
- Shared with me
- Shared with groups
- Library Details

Tools

- Favorites
- Activities
- Linked Devices
- Share Admin

Project Catalog Help / Knowledge Base About

Edit Metadata for My Library library

Title:

Author: First Name: Last Name:

Affiliation:

Publisher:

Description:

Year:

Institute: Institute name: Department:

Search files in this library

Size	Last Update
	2 minutes ago
14.2 MB	3 minutes ago
7.7 MB	4 minutes ago
487.4 KB	2 minutes ago
201.2 KB	a minute ago
169.0 KB	3 minutes ago
134.6 KB	4 minutes ago
32.0 KB	4 minutes ago
13.7 KB	2 minutes ago
1.5 KB	a minute ago

5a84110b5810cc26de66940419d00

bloxberg Issued on Feb 7, 2023 by mpdl.berg
Certified by the bloxberg Consortium

- Format validation
4 Items
- Hash comparison
3 Items



Issued on Feb 7, 2023 by mpdl.berg
Certified by the bloXberg Consortium



Format validation

4 Items ▲



Hash comparison

3 Items ▲



Verified

This is a valid bloXberg certificate.

[View transaction link](#)

This certificate has been verified on the bloXberg blockchain.

bloXberg
Research
Certificate

certificate serves as a proof of existence
identifier were transacted on the bloXberg

cbd6af323a72e846b554abc2efc0b39b500ae



[Verify again](#)

KEEPER

bloXberg certificate - KEEPER

Transaction



https://qa-keeper



This is a test

Test certification to showcase bloXberg cert

Author(s): Ranger, R.

Year: 2023

Transaction: 0x853b62c795c5699b0a35a84110b5810cc

[Download File](#)



This is a test

Test certification to showcase bloxberg cert

Author(s): Ranger, R.

Year: 2023

Transaction: 0x853b62c795c5699b0a35a84110b5810cc26de66940419d00e8aade7ac966daec

[Download File](#)

[Download Certificate](#)



Issued on Feb 7, 2023 by mpdl.berg
Certified by the bloxberg Consortium

[View Recipient](#) >

Verified
This is a valid bloxberg certificate.

[Verify again](#)

[Verify another record](#)

Research Object Certificate

This bloxberg certificate serves as a proof of existence that the data corresponding to the cryptographic identifier were transacted on the **bloxberg** blockchain at the issued time.

Cryptographic Identifier	
54a4638700e7624e73db4b1ad7cbd6af323a72e846b554abc2efc0b39b500ae	
Transaction ID	
0x853b62c795c5699b0a35a84110b5810cc26de66940419d00e8aade7ac966daec	
Timestamp	
2023-02-07T10:37:30.362714	
Merkle Root	
ec573a99852d0e5c6f38386e60851bc85db442752e07ce86d89a51597fd0f4b9	


Through **bloxberg's open API** dApps communicate with the bloxberg blockchain to provide services.

dApps running on top of bloxberg benefits from the scientific ecosystem.

> Core Applications

 Validator Information

 Blockexplorer


 Data Certification & Validation

... and more

> External Applications


 Wolfram Language


 eLabFTW

 Ethernity Cloud

... and more

> Member Applications

 SAIRA Open Access Hub by Fraunhofer FIT

 MatLab Integration by Westphalian University


 Seafile Integration by Max Planck Society

... and more


Through **bloxberg's open API** dApps communicate with the bloxberg blockchain to provide services.

dApps running on top of bloxberg benefits from the scientific ecosystem.

> Core Applications

 Validator Information

 Blockexplorer

 Data Certification & Validation

... and more

> External Applications


 Wolfram Language


 eLabFTW

 Ethernity Cloud

... and more

> Member Applications

 SAIRA Open Access Hub by Fraunhofer FIT

 MatLab Integration by Westphalian University

 Seafile Integration by Max Planck Society

... and more



**> 15 mio
transactions**

> 55 Member

**> 25 +
dApps**

**bloxberg became
the largest
POA blockchain
in the world**



BLOXBERG

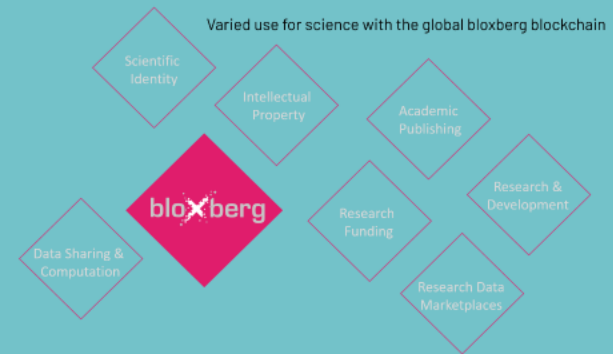
The blockchain for Science

Sandra Vengadasalam
Friederike Kleinfercher
Max Planck Society | bloxberg Founder





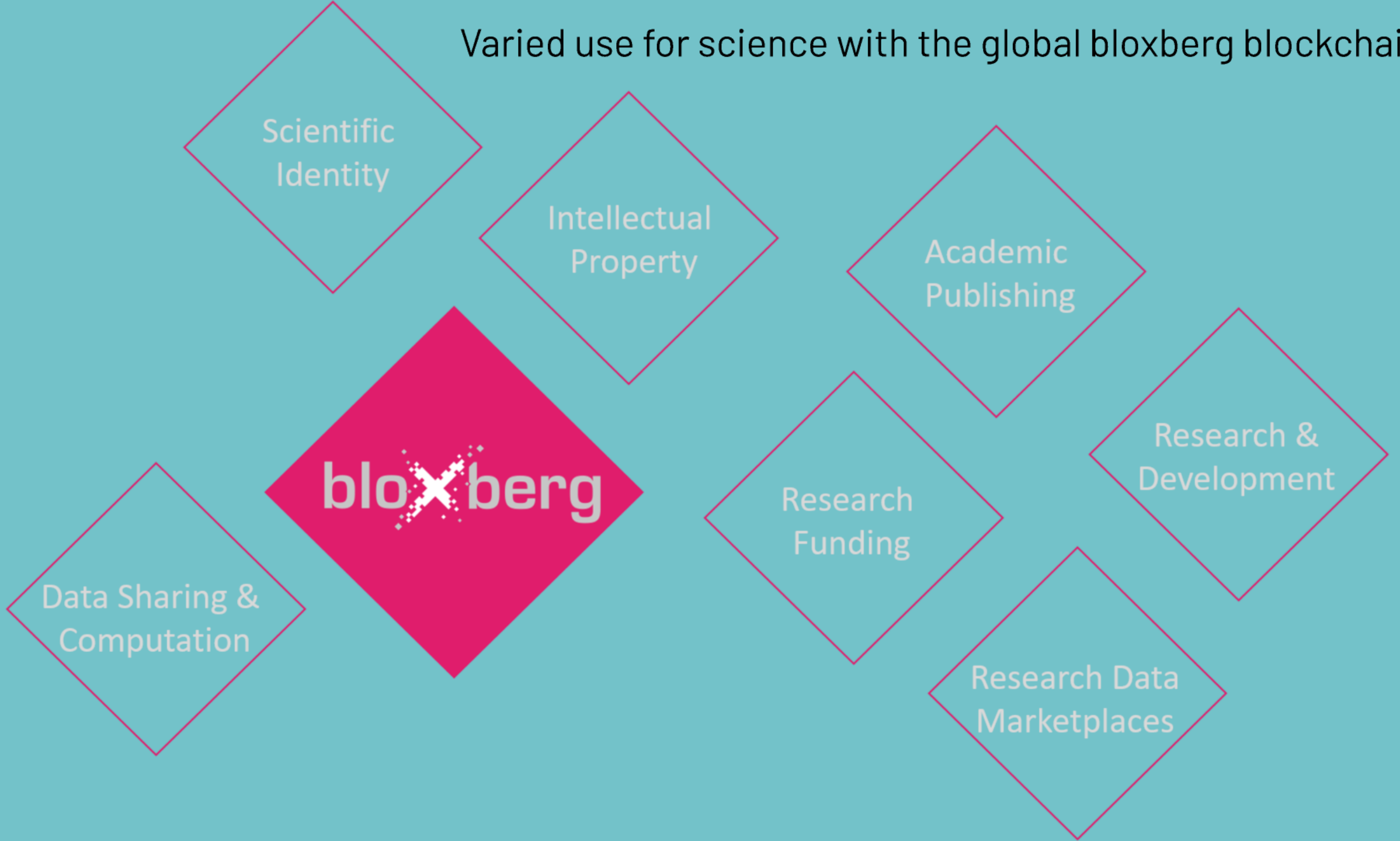
OUTLOOK



Next Steps:

- **Transition phase until fall 2023: Consortium members become association members**
- **Renewal of the bloxberg infrastructure**
- **Introducing a tokenomics for bloxberg**

Varied use for science with the global bloxberg blockchain



Next Steps:

- **Transition phase until fall 2023: Consortium members become association members**
- **Renewal of the bloxberg infrastructure**
- **Introducing a tokenomics for bloxberg**



BLOXBERG

The blockchain for Science

Sandra Vengadasalam
Friederike Kleinfercher
Max Planck Society | bloxberg Founder

