UNIVERSITÉ DE GENÈVE

Bloxberg: The potential of an academic blockchain to provide trust in academic research results and diplomas

Dr. Jörn Erbguth

bloxberg Hub

THE ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE AND BLOCKCHAIN

Bloxberg

- Proof of Authority Blockchain
- Compatible to Ethereum
- Initiated by Max Planck Society
- Established 2019
- Founders:

Dr. Jörn Erbguth, jorn.erbguth@unige.ch

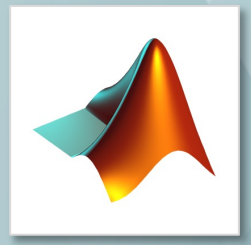
Bloxberg Association

- Munich based association under German law
- Supports the bloxberg blockchain
- Established in 2022 on Cyprus
- Members:

Dr. Jörn Erbguth, jorn.erbguth@unige.ch

Use-cases

- KnowLeger
- INPTDAT - The Data Platform For Plasma Technology
- The BISE Student Platform
- BarterMachine
- MatLab Integration
- Peer View Aggregation
- Seafile Integration
- SAIRA
- Student Voting System
- Keeper
- ECERT



Dr. Jörn Erbguth, jorn.erbguth@unige.ch

ECERT

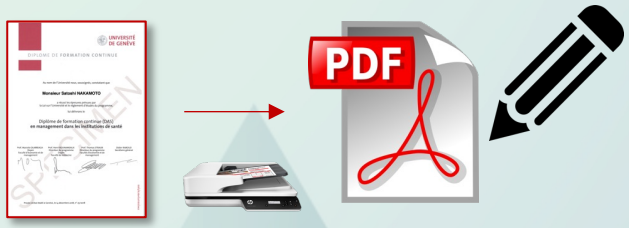
UNIVERSITÉ DE GENÈVE

GDPR-Compliant Long-Term Verification of Academic Titles using Blockchain

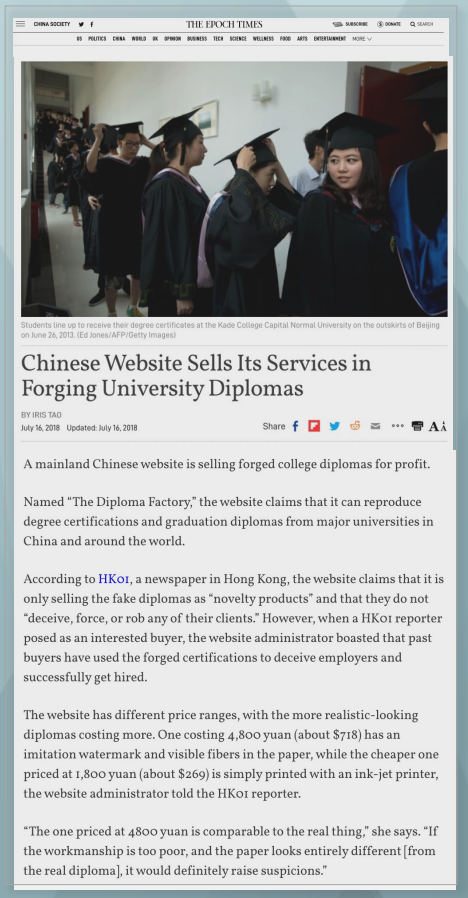
Dr. Jörn Erbguth, jorn.erbguth@unige.ch

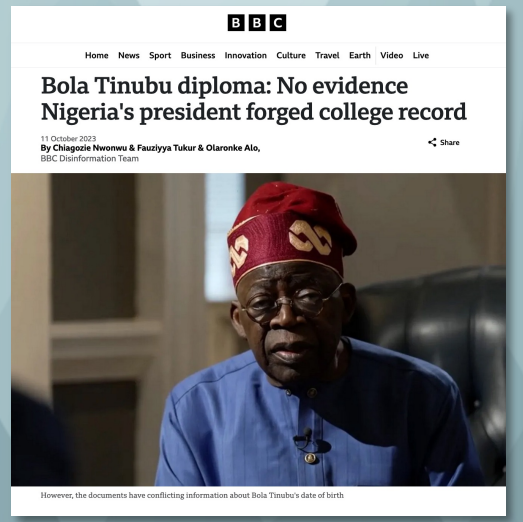
bloxberg Hub

Academic Titles are Easy to Forge



Scanned certificates can be edited





Dr. Jörn Erbguth, jorn.erbguth@unige.ch

Requirements

Credential needs to be verifiable

Dr. Jörn Erbguth, jorn.erbguth@unige.ch

Requirements

Credential needs to be revocable

Dr. Jörn Erbguth, jorn.erbguth@unige.ch

Requirements

Credential needs to remain verifiable,
when the institution no longer exists

Dr. Jörn Erbguth, jorn.erbguth@unige.ch

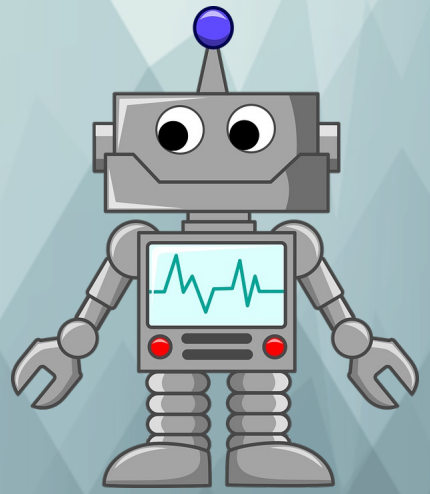
Requirements

Revocation needs to remain visible,
when the institution no longer exists

Dr. Jörn Erbguth, jorn.erbguth@unige.ch

Trust

Credential issuing institution



Autonomous automation

Trust in the confirmation of the institution

Is there a justification to provide that information?

No trust in the claim

Credential verifier

Dr. Jörn Erbguth, jorn.erbguth@unige.ch

How to Secure a University Degree?

Server of the University of Geneva

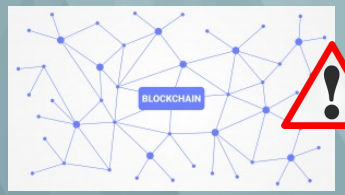
Validation through a server is only possible, as long as the server is running.

Privacy concerns because of tracking.

Qualified electronic Seal

Revocation of an individual electronic seal is not possible.

Certificates expire.



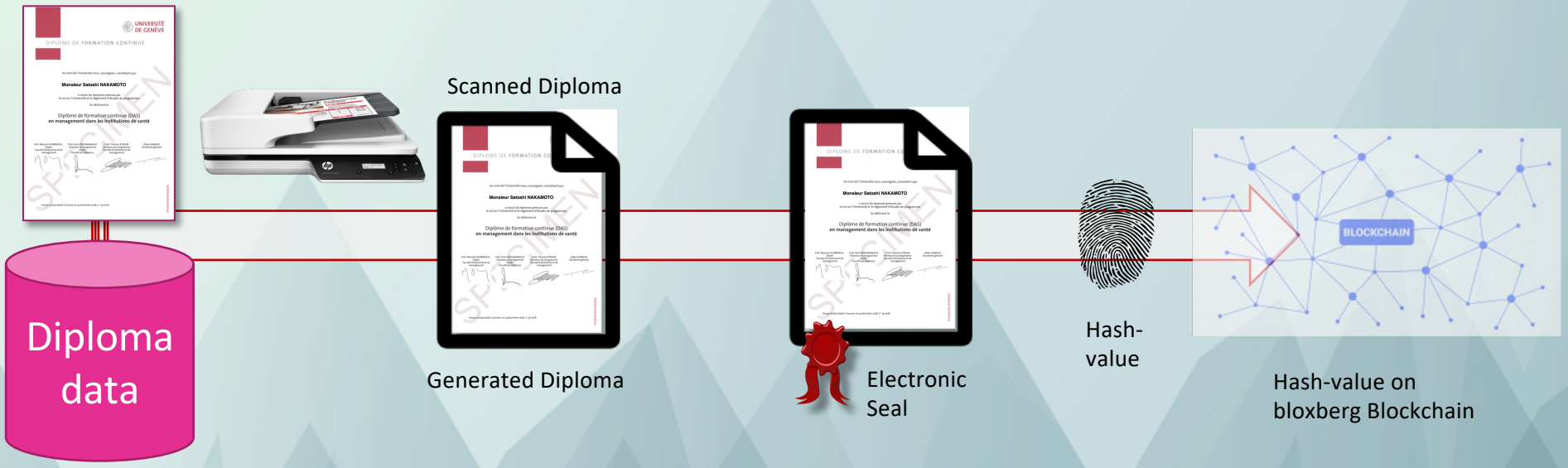
Blockchains are highly immutable.
If blockchain is outdated, migration needs to be possible.

Requirements

- Durability
- Security
- Autonomy
- Ergonomy
- Automation
- Legal Recognition
- Data Protection
- Revocability
- Integretability

Dr. Jörn Erbguth, jorn.erbguth@unige.ch

Combination of 3 Verification Techniques



Verification through a server of the University of Geneva, which also double-checks against the Blockchain

Verification of electronic seal

Direct verification against the blockchain

Dr. Jörn Erbguth, jorn.erbguth@unige.ch

Why this combination?
Why not Self-Sovereign Identity (SSI) wallets?

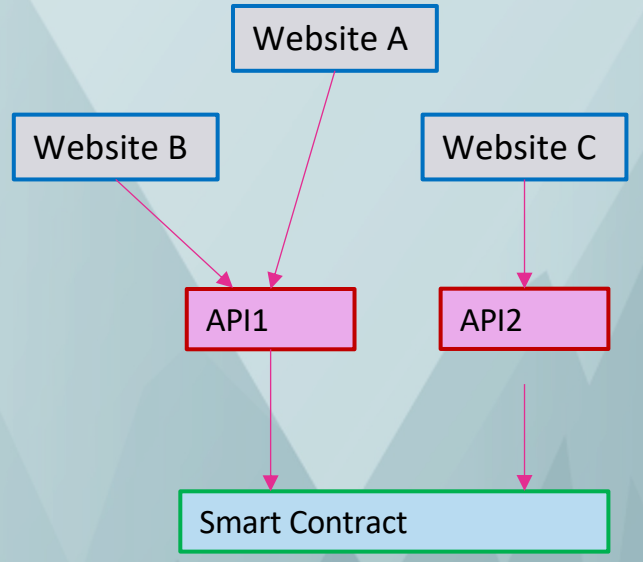
- Blockchain alone does not prove authenticity
- Qualified electronic seal is not revocable and needs constant time stamping
- No wallet requirement for students
- Optimized for privacy
  - Reduced risk of tracking
  - Can only be verified with a copy of the diploma

Dr. Jörn Erbguth, jorn.erbguth@unige.ch

Sharing of One Smart Contract

Synergies

- Cross-verification
- Common migration development
- Common governance



Dr. Jörn Erbguth, jorn.erbguth@unige.ch

Shouldn’t the revocation be stored off-chain?

Revocation list

…

….

…

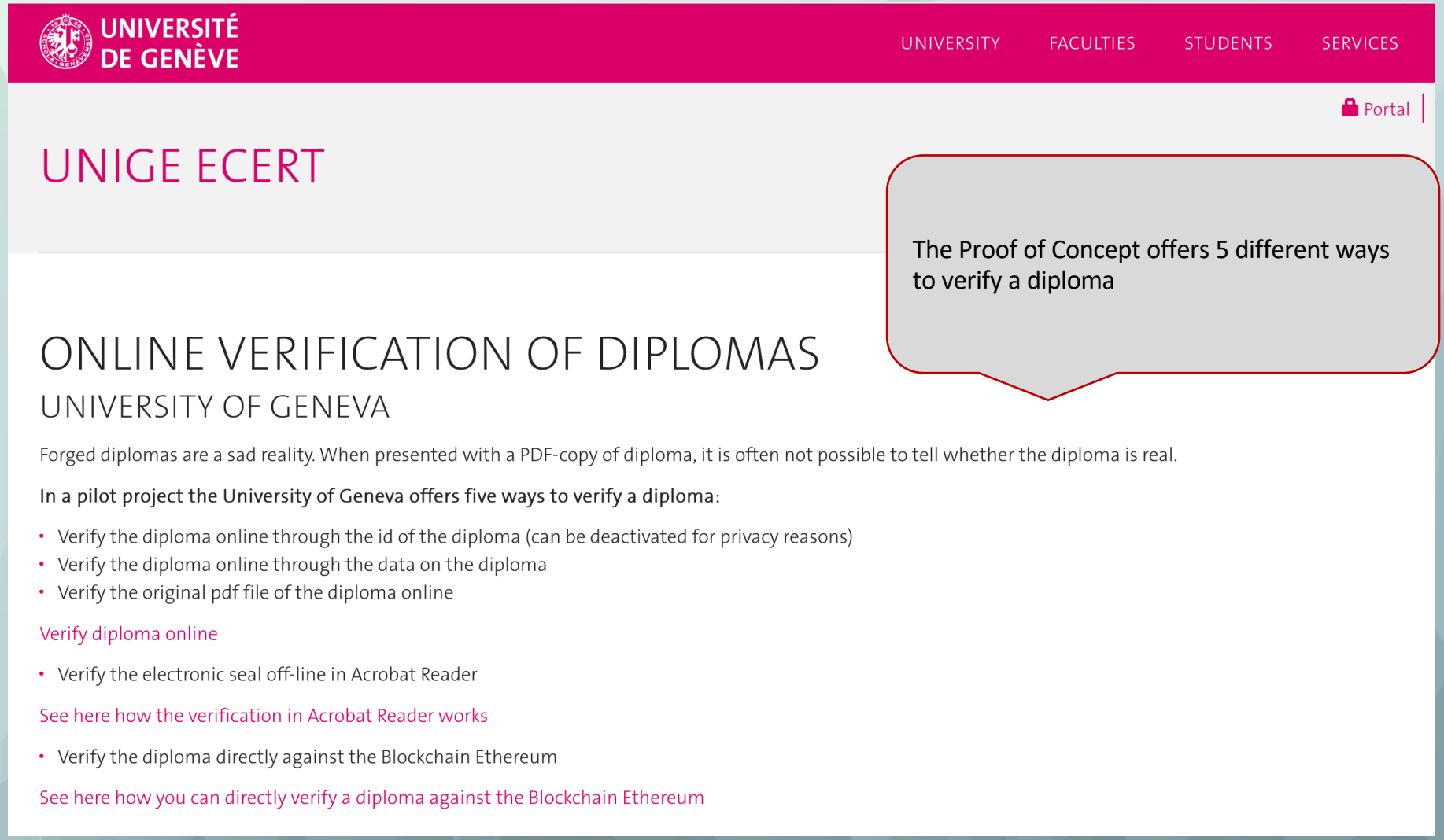
Revocation

…

…

Dr. Jörn Erbguth, jorn.erbguth@unige.ch

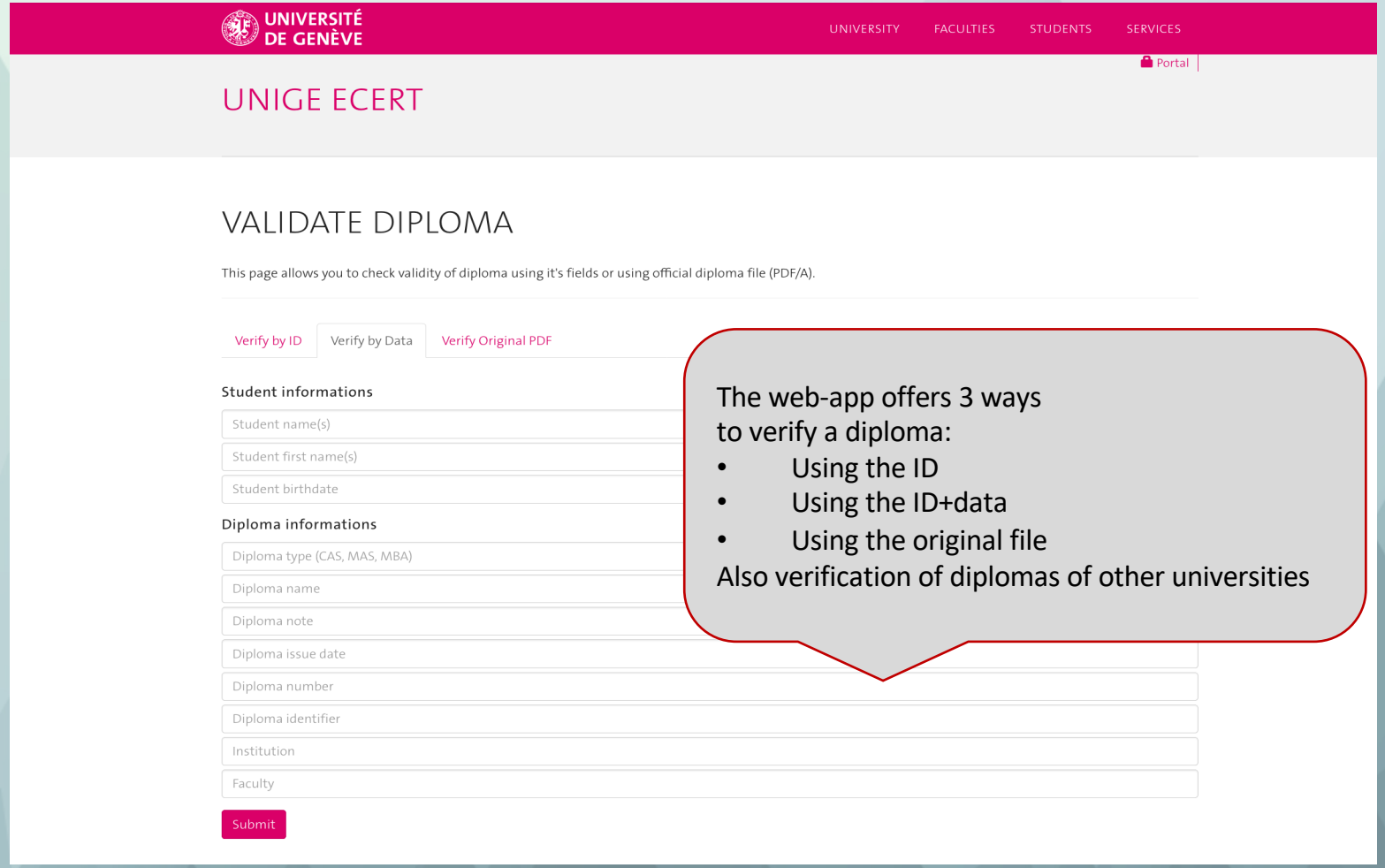
Verification possibilities



The Proof of Concept offers 5 different ways to verify a diploma

Dr. Jörn Erbguth, jorn.erbguth@unige.ch

Web-based verification



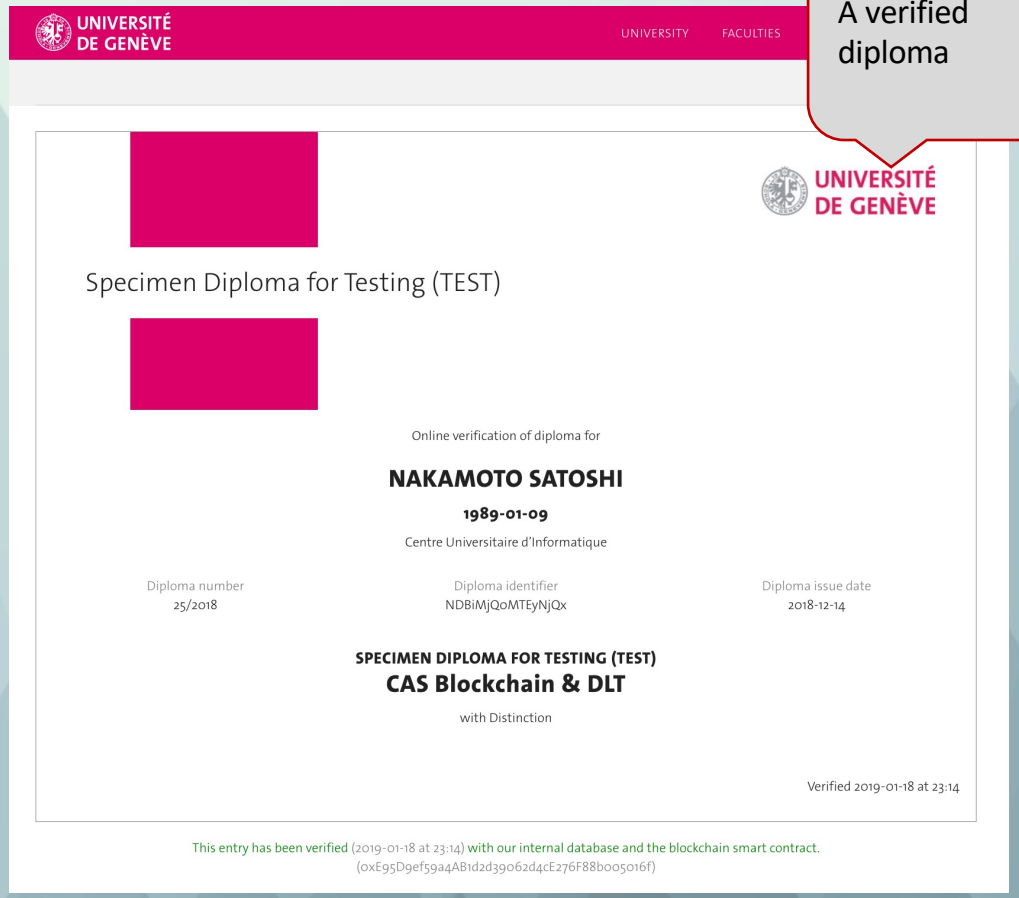
The web-app offers 3 ways to verify a diploma:

- Using the ID
- Using the ID+data
- Using the original file

Also verification of diplomas of other universities

Dr. Jörn Erbguth, jorn.erbguth@unige.ch

Verification result



A verified diploma

Verifications of diplomas from other universities do not show the details of the diploma!

Dr. Jörn Erbguth, jorn.erbguth@unige.ch

Thank you for your attention! Question?

UNIVERSITÉ DE GENÈVE

Evolving Crypto Regulatory Landscape in Europe

Monday, 13 May 6pm-7:30pm Geneva time (4pm UTC)

The FATF Recommendations, the EU Markets in Crypto Assets Regulation MiCAR, the planned revision of the ALMR and the AMLD6 are tightening the regulation of the crypto ecosystem within and outside the EU.

What are the implications for fundamental rights such as privacy and data protection, for innovation and for the existing crypto industry?

Register here: https://unige.zoom.us/meeting/register/u5clc-GgqzoqHNRtjPveexcNd1t2w0C0eQBc

UNIVERSITÉ DE GENÈVE

Dr. Nina-Luisa Siedler
Lawyer at the intersection of finance, high-tech & governance, Non Executive Director/Board Member thinkBLOCKtank

Simon Lelieveldt
Director, Financial History of Amsterdam, Regulatory and Compliance Consultant, more

Ismael Arribas
Collective Entrepreneur/ Convenor for ISO TC307 WG 3 Smart Contracts and their applications

Olga Stepanova, LL.M. (Berkeley)
Lawyer focused on Data Protection, IT Security and New Technologies, Partner at ByteLaw

Dr. Jörn Erbguth
University of Geneva, Member of the senate of the bloxberg association, board member of entscheidsuche.ch, Geneva Macro Labs and EDV-Gerichtstag

Prof. Jean-Henry Morin
Associate Professor of Information Systems, University of Geneva, Commission consultative en matière de protection des données, de transparence & d'archives publiques, Bloxberg Hub

bloxberg Hub
THE ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE AND BLOCKCHAIN

Dr. Jörn Erbguth, jorn.erbguth@unige.ch

bloxberg Hub