

# AI, Blockchains, and DAOs



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**BIGCHAIN**<sup>DB</sup>

# Intro to Blockchains & DAOs





# Blockchain: A Special “Spreadsheet in the Sky”

What's special:

- no one owns it
  - anyone can add to it
  - no one can delete from it
- 
- Writing to a blockchain is like etching in stone.
  - Which allows us to issue assets, and transfer them



# Or, Blockchain: A Distributed Database with Special Characteristics

What's special:

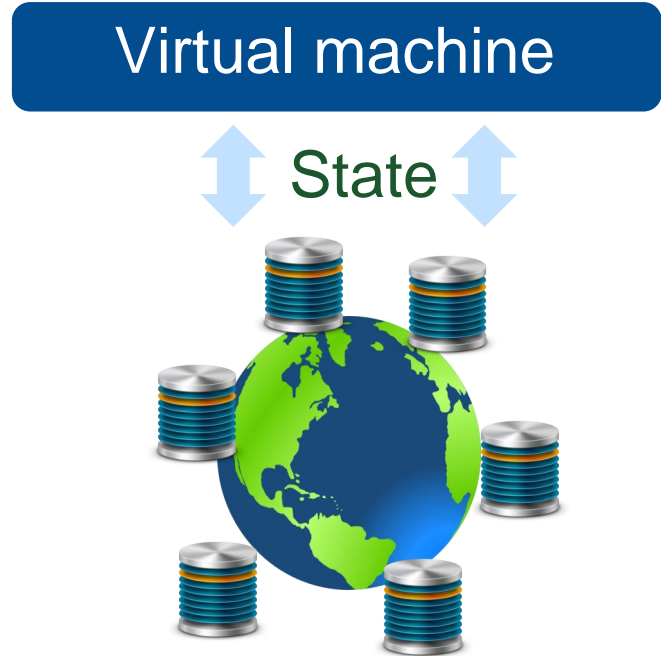
- **Decentralized:** no single entity owns or controls it. E.g. via federation
- **Immutable:** more tamper-resistant than usual. E.g. via hashing.
- **Assets:** assets can “live” on the DB. E.g. protocol to issue & transfer asset
- **(Sometimes) Open membership:** anyone can validate without showing identity. E.g. via Sybil tolerance



# What if you used a blockchain to store *state* of a state machine?

Then you get  
**decentralized processing.**

aka “smart contracts”



# What if you used a blockchain to store *state* of a state machine?

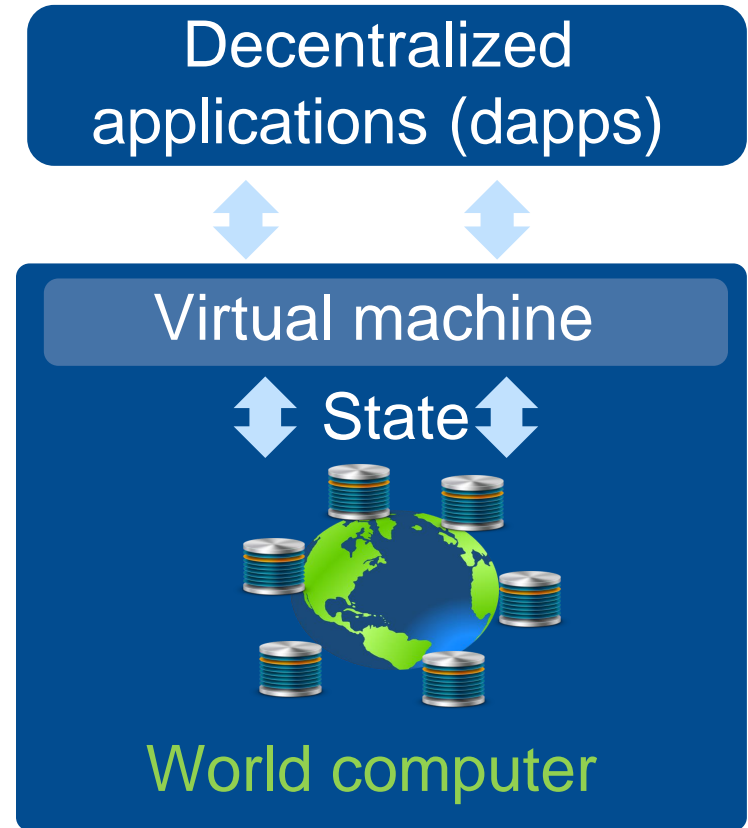
Then you get  
decentralized processing.

And you can build a

**world computer**

having decentralized processing,  
storage, and communications

(Yes, this is the vision of Ethereum!)

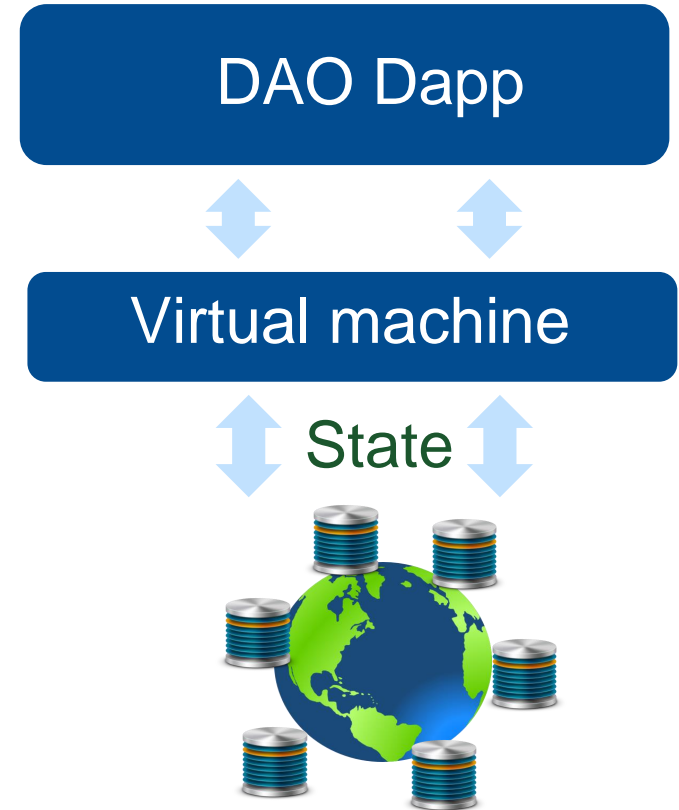


# DAO: Decentralized Autonomous Organization

DAO: a computational process that

- runs autonomously,
- on decentralized infrastructure,
- with resource manipulation.

It's code that can *own* stuff!



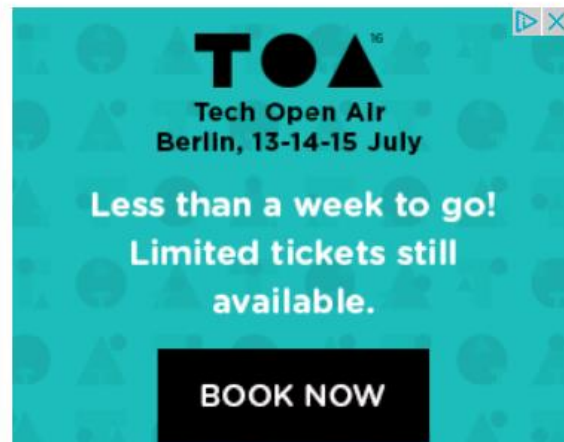
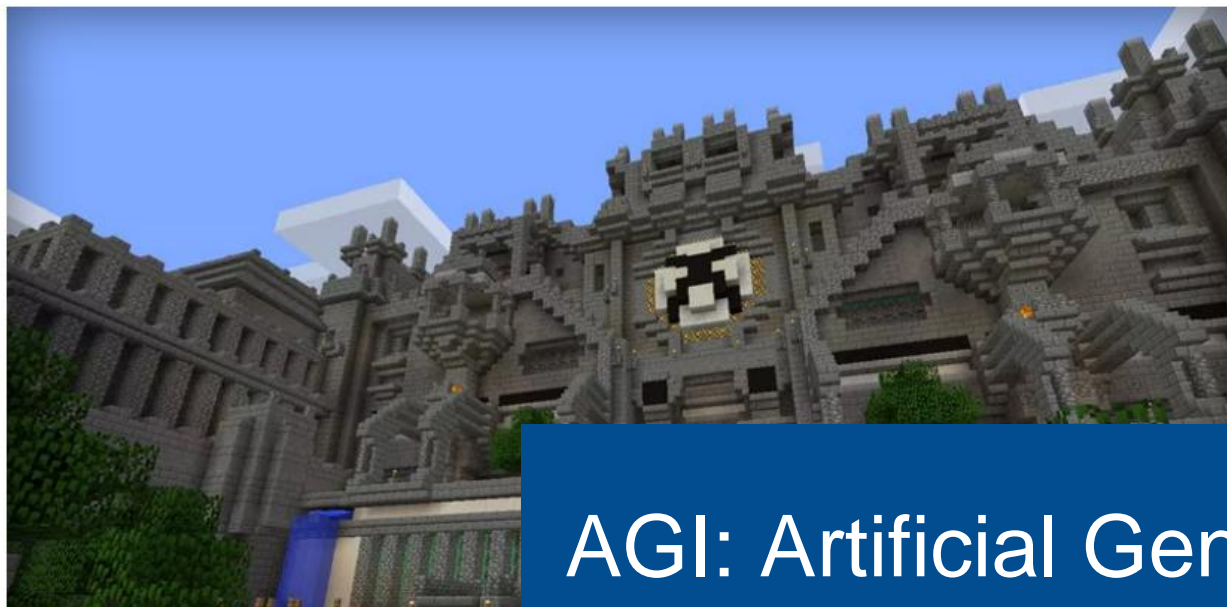


# Review of AGI

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# Microsoft will now let anyone test their AI creations in Minecraft

By [Russell Brandom](#) on July 8, 2016 10:36 am [Email](#) [@russellbrandom](#)

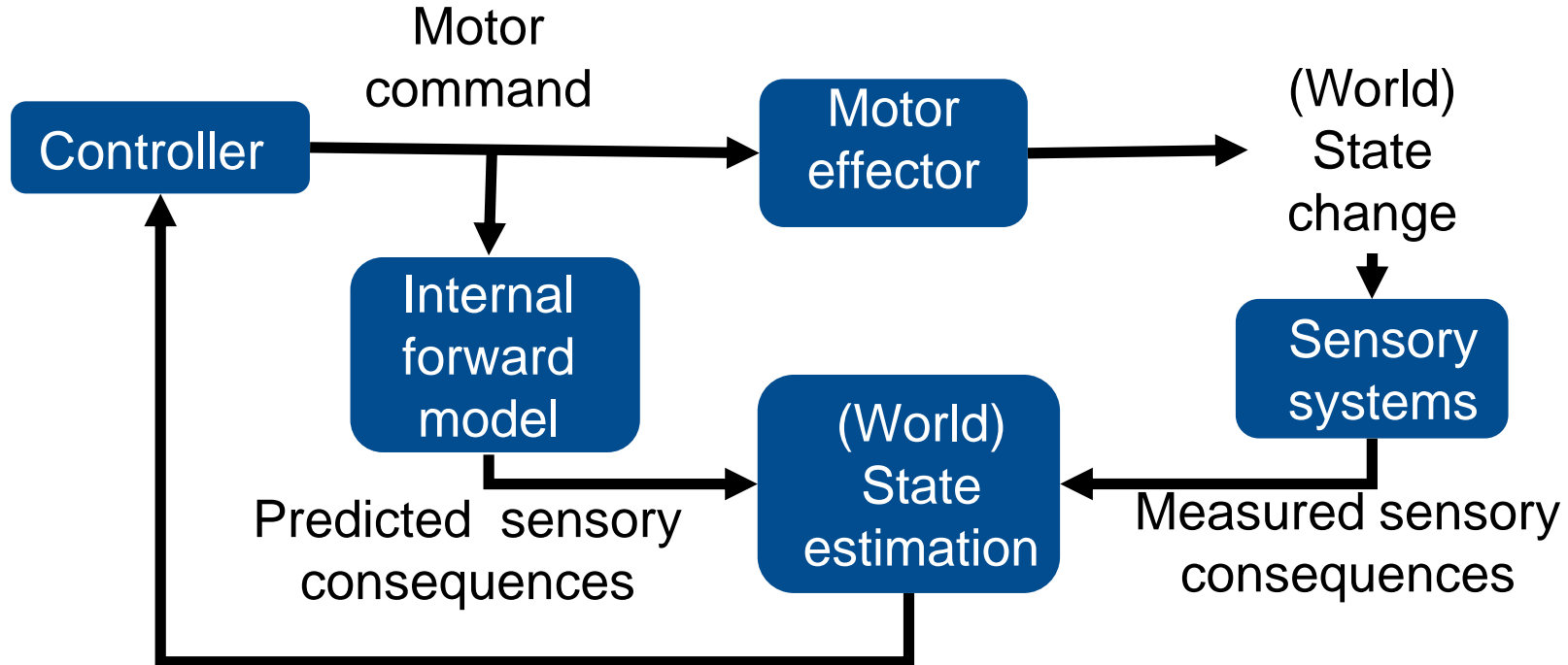


## AGI: Artificial General Intelligence

# AGI: Artificial General Intelligence

## AI meets Feedback Control System

Update internal state based on estimate of world state

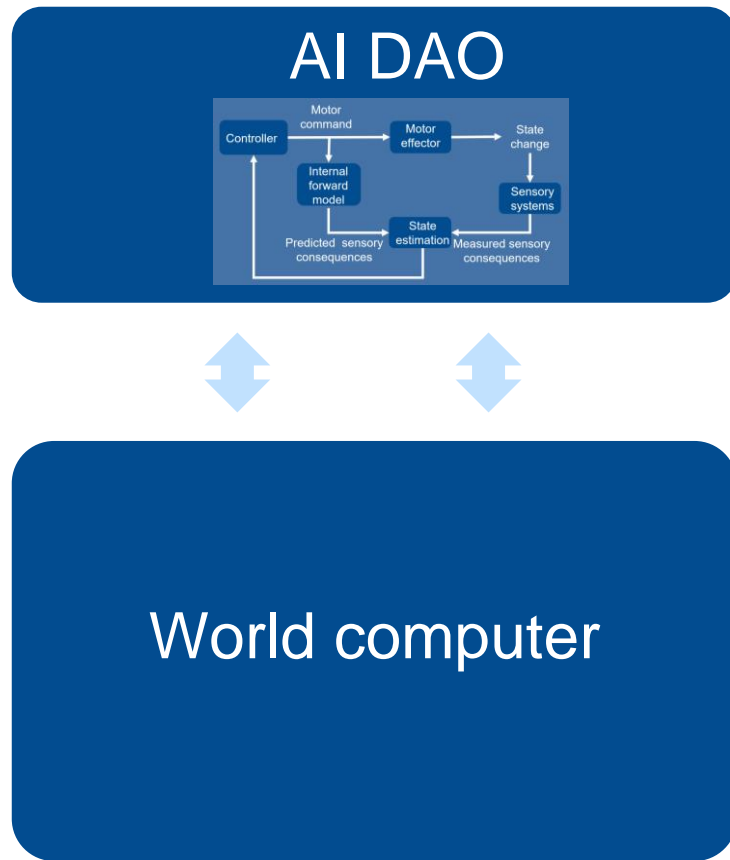


AI DAOs: How

# AGI on a DAO?

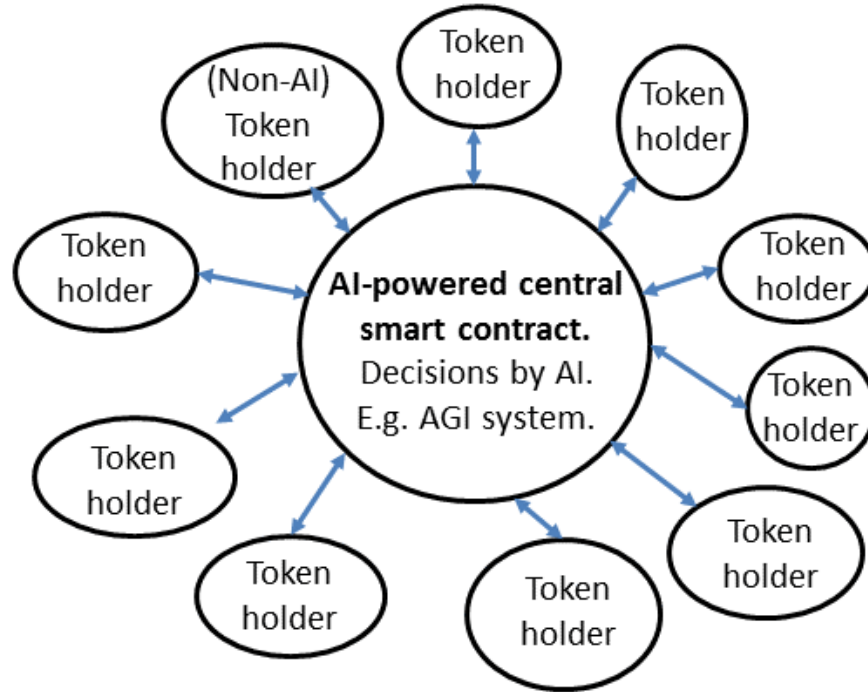
AI entity is a feedback control system. That is, AGI.

Its feedback loop would continue on its own, taking inputs, updating its state, and actuating outputs, with the resources to do so continually.

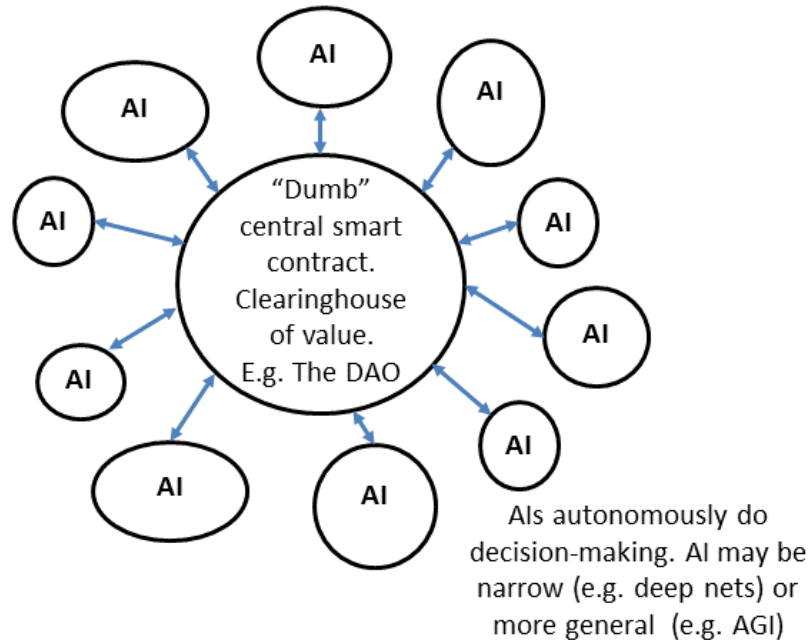




# AI DAO Arch 1/3: AI at the Center of the Smart Contract

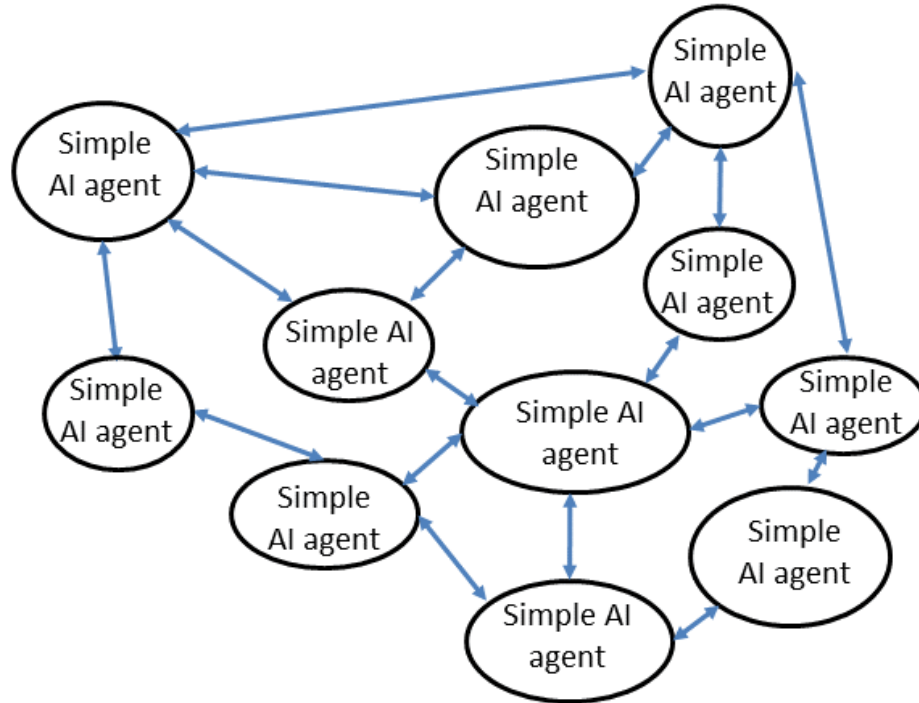


# AI DAO Arch 2/3 : AI at the *Edges* of the Smart Contract



# AI DAO Arch 3/3 : Swarm Intelligence

Many dumb agents with emergent AI complexity

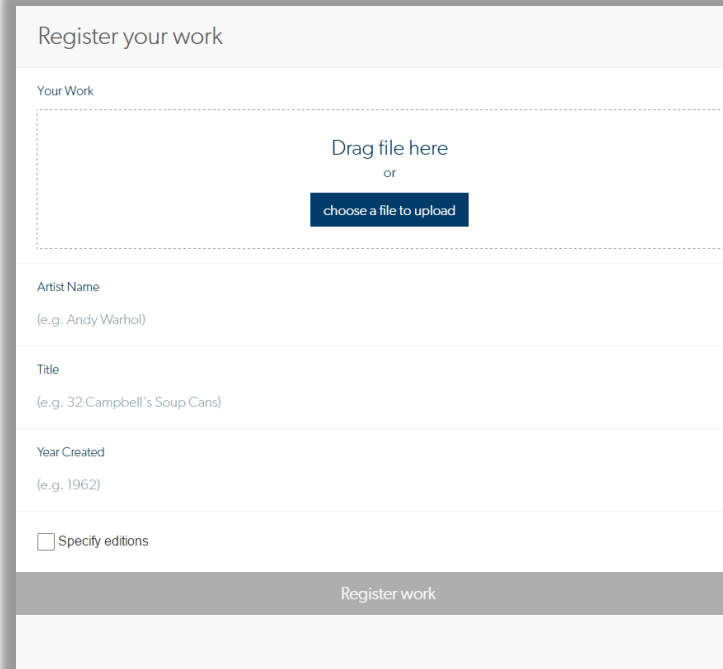


Emergent higher-level complexity.  
E.g. simple AI agents are ants, but complex swarm behavior emerges

# Towards an Example: Blockchain for Artists using [ascribe.io](https://ascribe.io)

# Register a work

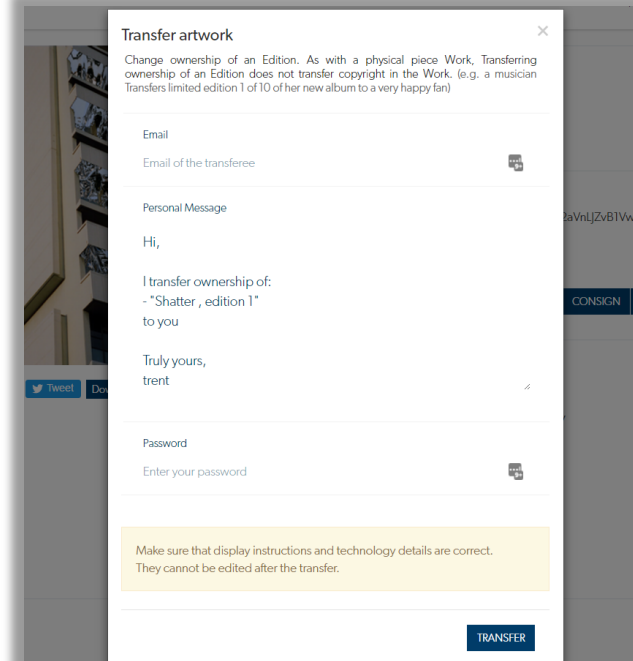
Like uploading to Dropbox  
“Claim authorship”



The screenshot shows a web form titled "Register your work". It has a section for "Your Work" with a large dashed box for a file upload. Inside the box, it says "Drag file here" and "or", with a blue button below that says "choose a file to upload". Below this are three input fields: "Artist Name" (with a hint "(e.g. Andy Warhol)"), "Title" (with a hint "(e.g. 32 Campbell's Soup Cans)"), and "Year Created" (with a hint "(e.g. 1962)"). There is a checkbox labeled "Specify editions". At the bottom is a grey button labeled "Register work".

# Transfer a work

Like sending an email  
“Bequeath rights”



The screenshot shows a web form titled "Transfer artwork" with a close button in the top right. It contains a paragraph of text explaining the transfer process. Below this are three input fields: "Email" (with a hint "Email of the transferee"), "Personal Message" (with a hint "Hi,"), and "Password" (with a hint "Enter your password"). Each field has a small icon on the right. Below these fields is a yellow warning box that says "Make sure that display instructions and technology details are correct. They cannot be edited after the transfer." At the bottom right is a blue button labeled "TRANSFER".



# Certificate Of Authenticity

As of 30 November 2015, 17:36:00 GMT, Masha (Maria) McConaghy is the owner.  
To verify current owner, please visit <http://ascr.be/1luAQpo>



DOLLAR  
EURO  
SWISS FRANCS  
JEFF KOONS  
BITCOIN

## Currency

Date: 2014  
Edition: 3 of 100  
Created by: Dan Perjovschi  
Owner: maria.mcconaghy@yahoo.com

## ARTWORK DETAILS

Artwork ID: 17uZBwSbLG8Xy3vRRMWzF5PMjFVNc1tkQ2  
File: currency-2014.jpg (499 KB)

## PROVENANCE/OWNERSHIP HISTORY

Apr. 30, 2015, 12:36:19 - Registered by mail@cointemporary.com  
May. 01, 2015, 09:46:08 - Transferred to admin  
May. 08, 2015, 13:04:59 - Transferred to trent  
Nov. 27, 2015, 19:35:14 - Transferred to maria.mcconaghy@yahoo.com

## CRYPTOGRAPHIC STAMP

Use the summary and signature below to authenticate this certificate:  
<http://ascr.be/1Sr45Q>

Summary: Dan Perjovschi\*Currency\*3/100\*2014\*2015Apr30-12:36:19

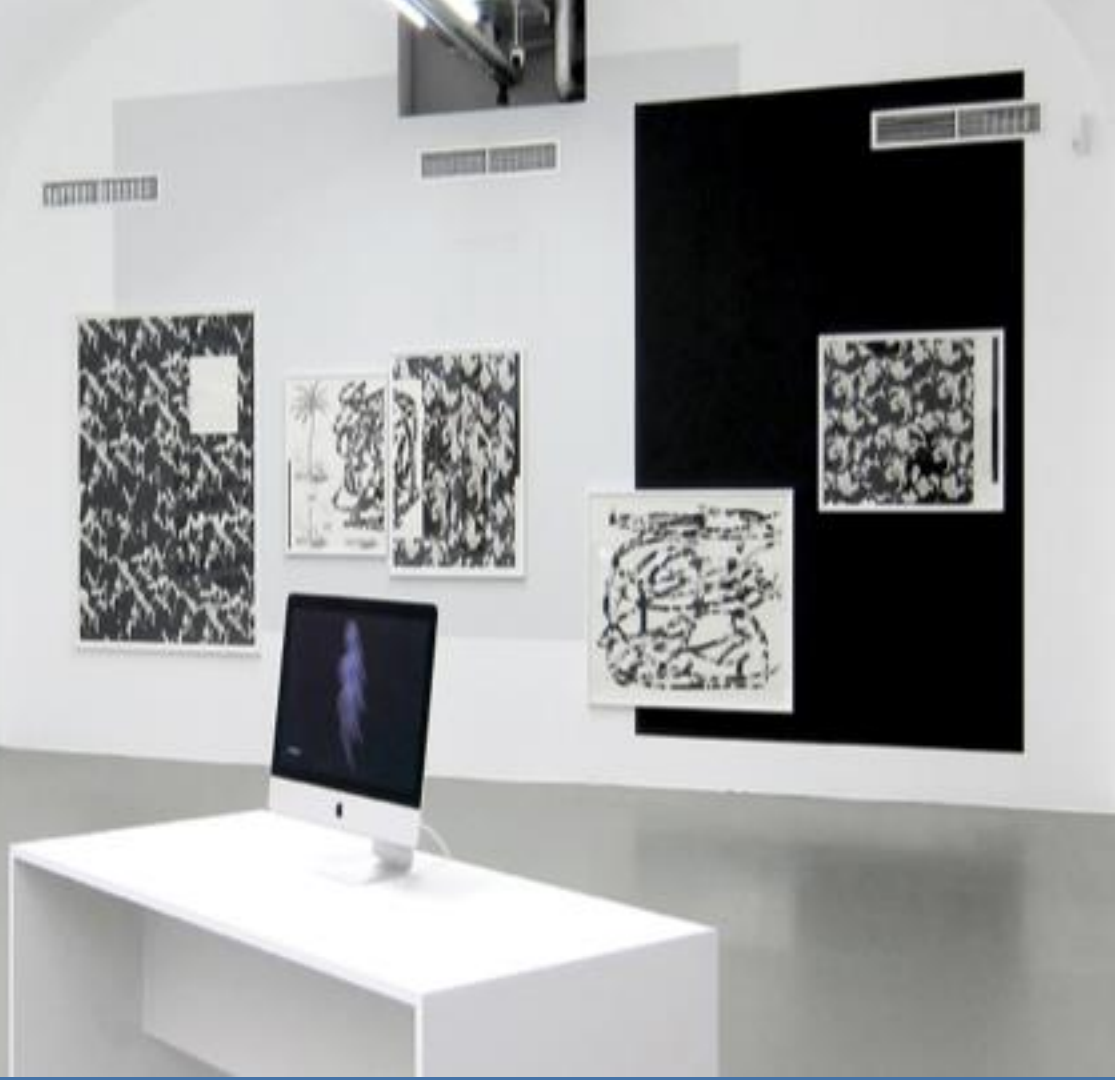
Signature: 438B24CE06182FA3AA82BC285F867D03FB73F3BCC0F73FDBA6  
EC2BFF7088E011E60355B7DC75D5745A9D5CA2A8115512FF835  
C4ABEF6869BF6A991668A820F3FB03A48C6A9E05834716F6500  
68E8E07E5266620BA815948DC265605D23FAF016CB46ACD4BC  
BE75F08D0DEBD7AF55E4CB085B9A0A14583F135D8B399121B24  
ED1L

Blockchain-backed,  
digitally signed COA

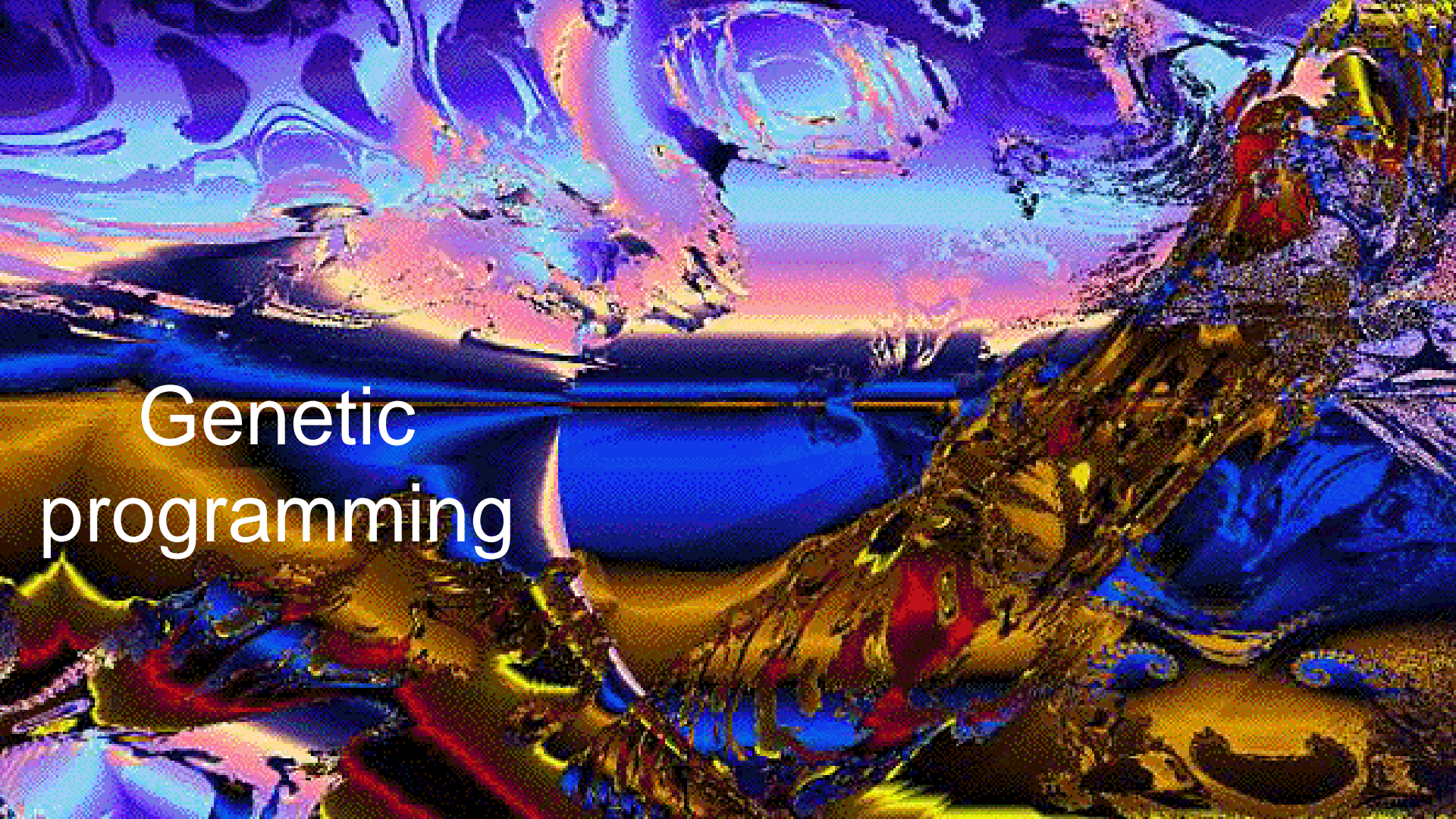
cribe®

THE WORK DISPLAYED IN THE VIENNA BIENNALE  
IS PROVIDED BY THE THIRD PARTY INDICATED  
AS THE ARTISTS. ULRICH NAUSNER DOES NOT  
CREATE THIS WORK, VOUCH FOR ITS ACCURACY,  
OR GUARANTEE THAT IT IS THE MOST RECENT  
WORK AVAILABLE FROM THE ARTISTS. THE MAK  
(A) EXPRESSLY DISCLAIMS THE ACCURACY,  
ADEQUACY, OR COMPLETENESS OF ANY EXHIBITION  
AND (B) SHALL NOT BE LIABLE FOR ANY CHANGE  
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RELIANCE THEREON. NEITHER ULRICH NAUSNER  
NOR ANY OF THE ARTISTS WILL BE LIABLE FOR  
ANY DAMAGES RELATING TO YOUR PERCEPTION  
OF THE WORK PROVIDED HEREIN.

MAK Vienna



# Towards an Example: AI Creativity



# Genetic programming



Deep learning



# Deep learning, with seed images for subject and for style



+



=



Example: The ArtDAO

# Algorithm for The ArtDAO

1. Run AI art engine to generate new image, using GP or deep
2. Claim attribution in blockchain, using ascribe
3. Create multiple editions, using ascribe
4. Post editions for sale onto a marketplace, using Getty (centralized), or OpenBazaar (decent.)
5. Sell the editions. \$ goes to ArtDAO using built-in cryptocurrency like Ether. IP go from ArtDAO using ascribe.
6. Repeat! Create more art, sell it, get wealthier

# Algorithm for The ArtDAO

1. Run AI art engine to generate new image, using GP or deep
2. Claim attribution in blockchain, using ascribe
3. Create multiple editions, using ascribe
4. Post editions for sale onto a marketplace, using

Over time, if ArtDAO makes more money from sales than from generating new art, then it will **accumulate wealth**.

# More applications of AI DAOs

- Already: visual fine art
- Similar: logos & themes for startups
- Then: 3D designs, music, videos, film, ...



# Angles to Approach AI DAOs from

- **DAO → AI DAO.** Start with DAO, add AI. E.g. Plantoid, DAOs for governance
- **AI → AI DAO.** Start with AI, add DAO. E.g. numer.ai
- **SaaS → DAO → AI DAO.** Most SaaS models could be run as DAOs. Then add AI. E.g. website analytics SaaS.
- **Physical service → AI DAO.** E.g. Uber adds self-driving, then self-*owning* cars

# Adaptation of the ArtDAO 1/2

- **Auto adapt at the market level.** It creates more of what humans buy, and less of what humans don't buy. Perhaps with some variance for diversity.
- **Auto adapt at the art-work level.** Here, a human influences the creation of an artifact. For example, it presents four variants of a work, and a human clicks on a favorite. After 10 or 50 iterations, it will have a piece that the human likes, and purchases.
- **Human-based adapt at the code level.** Here, humans put in new smart contract code (and related code in 3rd party services), to improve ArtDAO's ability to generate art and amass wealth.

# Adaptation of the ArtDAO 2/2

- **Auto adapt at the code level.** Here, the ArtDAO modifies its own code, in hopes of improving.
  - It creates a copy of itself, changes that copy's code just a little bit, and gives a tiny bit of resources to that new copy.
  - If that new copy is bad, it will simply run out of resources and be ignored.
  - But if that new copy is truly an improvement, the market will reward it, and it will be able to amass resources and split more on its own.
  - Over time, ArtDAO will spawn more children, and grandchildren, and the ones that do well will continue to spread. We end up with a mini-army of AI DAOs for art.
  - If buyers are DAOs too, it's a network of DAOs, leading to swarm intelligence
- We can extrapolate way further. It gets crazy, quickly. It could get out of control, especially if not bound to art.
- A simple ArtDAO allows us to “idea-inoculate” so we're ready for the scarier stuff coming soon

# Summary

- AI DAOs are not science fiction; they are something we could build today.
- AI is a powerful, and dangerous, technology on its own. DAOs are a powerful, and dangerous, technology on their own.
- AI DAOs could be way bigger than AIs on their own, or DAOs on their own. AI gets its missing link: resources; DAO gets its missing link: autonomous decision-making. The potential impact is multiplicative.
- Let's ask the tough questions now.