ArcaScience

Seek more, discover better

Cutting-edge AI for data analysis & interoperability

for life science

Why ?

Enhance drug development, scale with your innovations, predict & prevent risks

Embracing a data-centric approach can be tough for Life Science Organizations. Accessing and targeting vital information buried in huge volumes of data is one of the biggest challenges of our time.

Data Interoperability coupled with analysis assisted through AI is a unique and powerful way of fully leveraging these vital data for the drug development continuum.

In order to dramatically increase your productivity and activate massive data intelligence, ArcaScience is the only startup to date that has succeeded in combining two solutions, data federation and data analysis, to make full use of biomedical data from massive datasets.

Solving worldwide biomedical targeting, identifying adverse event, mastering data interoperability down to the thinnest form of information for extraction and visualization, are the main goals enabled by ArcaScience ecosystem.

"**Knowledge shared is power multiplied**" wrote famous inventor of the first integrated circuits, Robert Noyce. In pharmaceutical companies, knowledge is often hidden, buried under masses of all kinds of data respecting standards or not. Each year, these data grow immensely and it concerns all kinds of documents, from the scientific paper to the patent, from the preclinical data to the Real World Evidence, all the way through Clinical reports & trials and following.

For such businesses, the key to empowering their processes and improving their results is to identify, leverage and drill-down to reach any valuable information, in order to gather it, generate modelisations, comparisons and automatic reports. Getting to know what these precious data are about and make an optimized use of it will lead to a better drug development, funding, approvals and ultimately, gains in productivity and efficiency through their very own R&D

Artificial Intelligence Optimization (AIO) is the key for enhancing drug development, reaching research breakthroughs, and securing market share improvements through more efficient analysis, reporting, clinical trial and collective intelligence.

In order to assess knowledge and leverage its real power, companies need to use intelligent systems based on NLP (Natural Language Processing) and advanced NLU (Natural Language Understanding) that are heavily fine-tuned for handling biopharmaceutical issues, dynamics and language.

Unstructured data are interpreted through deeply trained Machine Learning algorithms and made operable. Ambiguity cannot be an option, that's why our algorithms can handle the deepness of biopharma's language and deliver constructive knowledge with the highest level of data capability.

ArcaScience developped its approach with its customers and is weekly rolling-out AI models, each time showing better efficiency than what has been done previously.

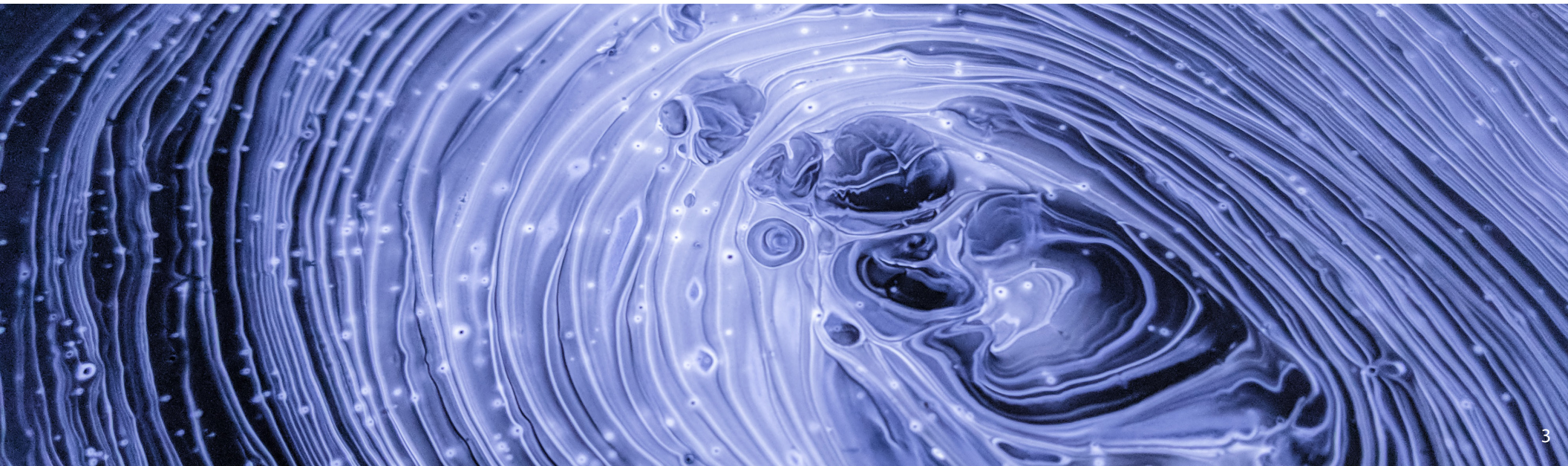
Catch a glimpse over what is possible with ArcaScience's AIO when it comes to increasing power through shared knowledge. See how this platform offers intuitive data management and agility researchers and IT departments often asks for.

The aim of this document is to give insights over ArcaScience's AI architecture and AI Generator's value when used to its full potential within a biopharmaceutical company.

See how data coming from R&D, reports, clinical trials, failed experiments, unexploited databases etc., when structured, federated, crunched, extracted, modelled, used and shared with the highest level of precision, can bring drug development to the next level.

“Arcascience has been a very good investment since the beginning thanks to its ability to leverage long forgotten information out of massive datasets, leading us to ***save thousands of hours*** *of reproducing failed experiments, aggregating biostatistics & identifying potential patient pools for clinical developments.”*

Global Head R&D oncology at a top 5 Big Pharma company



THE TOPICS

CONTENT

ARCASCIENCE'S KEY BENEFITS

SAVE
15X TIME
TARGET VALIDATION

SAVE
$MILLIONS
SUBCONTRACTING

SAVE
1,6MONTH/YEAR/PERS
DATA FEDERATION

ACCESS
4X TIMES
MORE DATAPOINTS

Achieving complete end-to-end control of biomedical information is ArcaScience's mission from the begining, These metrics were measured during our ArcaScience Efficiency Study (2016-2020). This is why we are one of the only companies to produce a solution that combines state-of-the-art data management and data analysis technologies.

... as proven with :

Europaisches Patentamt
European Patent Office
Office européen des brevets

NASA

gsk

SANOFI

Inserm

ICM
Institut du Cerveau et de la Moelle épinière

AI Generator's Stack

From target validation for Translational science use cases to biomarkers identifications, all the way through benefit-risk assessment & pharmacovigilance automation, each leveraged by one of our AI models :

- Arca DL — DEEP LEARNING
- Arca PM — POST-MARKETING
- Arca PP (Patient Profile) — PATIENT PROFILING
- Arca PV — PHARMACOVIGILANCE
- Arca R&D — CLINICAL DVLPMTS
- Arca TS — TRANSLATIONAL SCIENCE

ARCASCIENCE'S USE CASES

RWE & Precision Medecine

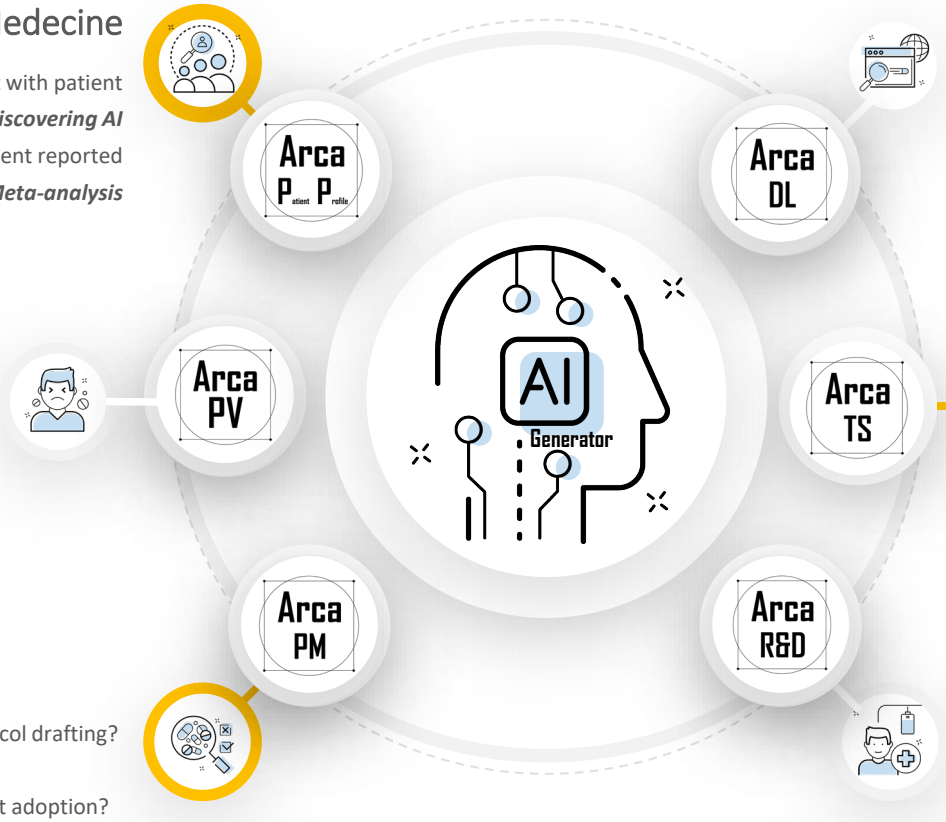
- How can I discover biomarkers to assist with patient stratification? ***Biomarker Discovering AI***
- How can I use RWE to understand patient reported outcomes? ***Automatic rendering of Meta-analysis***

Pharmacovigilance

- How can I monitor my molecule's effects? ***Wide-range smart Signal Detection***
- How can I spend less time reporting? ***Automatic filling & rendering of PSURs***

Market Validation

- How can I simplify my protocol drafting? ***Protocol autofill***
- How to maximize my patient adoption? ***Patient Profile analysis***



State of the art

- What secondary data targets this molecule/biomarker/etc. ? ***State-of-the-art report***
- Can we predict safety issues before the phase 1? ***Predictive safety***

Pre-Clinical

- What is this molecule's potential for clinical development? ***Translational Science***
- Can we predict safety issues? ***Predictive safety***

Clinical Development

- How can I reposition this molecule? ***Drug repositioning***
- Where can I find specific patients? ***Patients recruitment***
- What is the potential benefit/risk of this drug? ***Efficiency prediction***

"Only after a month, spending a couple of days with ArcaScience saved us **the yearly price of the solution itself !** The money we spent before on data we already had is phenomenal, and we managed to generate massive value out of it through their unique AI systems"

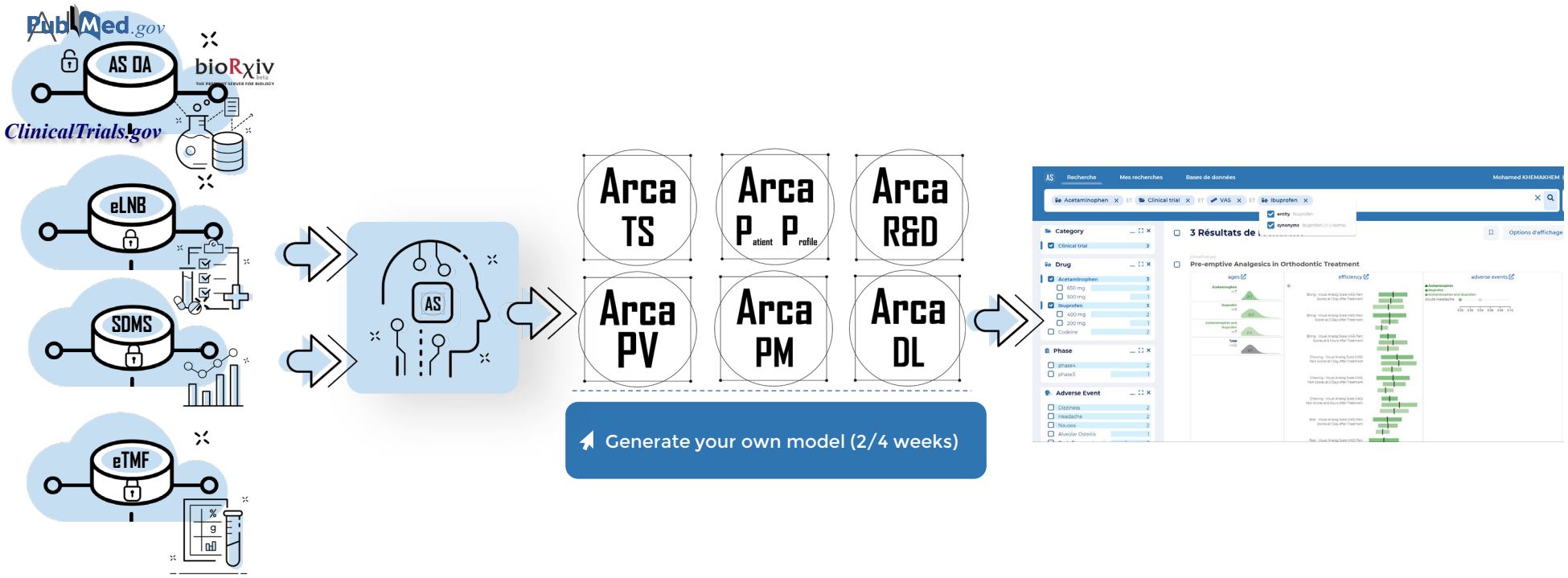
Top 10 pharma customer

BIG DATA CONVERTED INTO ACTUAL POWER

What's our secret sauce?

Fully integrated gold-standard generator ;

or how to develop scalable, clean and powerful



DATA FEDERATION

Secondary Data (Pubmed ; Clinical Trials ; Next-Gen repositories : Genbanks and many others)

Primary Data (SMDS ; eLNB ; CARS ; CLIMS ; LIMS ; PIMS; eTMF ; SMR ; CTSM ; CMC ; IDMP ; PLM)

DATA MANAGEMENT

Deep Parsing
Deep Structuring
Complex Ontology Matching

AS AI GENERATOR

Adverse events
Dosages
Efficiency Indicators
Biomarkers
Chemical properties
PK/PD (Pharmacokinetic/Pharmacodynamic)
Patient profile (inclusion/exclusion criterias)
Specialized Voc. (Ontology population)
[Technical Roadmap]

AS EXPLORE

Modeling / visualization
Dataset building
Targeted Extraction
Contextualization
Toxicity predictions
QSP Datasets
Digital Twin extrapolation
PSUR / CIOMS / PGR
Signal Detection Dashboard
Deep Bibliography
Knowledge Graphs

Use Case : Improve drug safety with AI-assisted adverse events targeting and extracting from pre-clinical, clinical, and post-marketing data

To guarantee the security of existing drugs, thorough testing is completed from pre-clinical safety and toxicology analysis in animal researches, to clinical in human subjects, and afterward in the post-marketing / pharmacovigilance environment to search for signals across the widest patient-profile database, enriched thanks to AS AI. At each stage, information is extracted from unstructured text: safety reports, scientific literature, patient safety reports, posters, various clinical data, public data coming from online sources, web-based media, and conferences. We then provide a robust decision-making solution to many of our clients, showing great efficiency & decisive effects when choosing to push a candidate into a phase 1 after analysing its potential in a translational science project, or when our client had to switch gallenic forms, from a topic application to a inhaling solution after revealing and analysing real world datasets. If a variation is suspected, we go on with FDA's recommendations:

- Understand the sources of variation
- Detect the presence and degree of variation
- Understand the impact of variation on the process and ultimately on product attributes
- Control the variation in a manner to commensurate with the risk it represents to the process and the product

A significant number of our clients are profiting from the power of ArcaScience AI to look for adverse events outside of already known AESIs (Adverse Event of Special Interest) and leverage the newly accessible unstructured and gathered data into profitable, organized information that can be quickly visualized and dissected, at each stage all through the safety lifecycle of a drug.

For instance, ArcaScience AI has been used to streamline adverse events related to specific dosages, routes of administration and environments in the case of antihistaminic abnormal adverse events. Analysts can likewise scan clinical records for specific AEs, code the impacts found, and monitor drug affiliations/potentiation/association. Our specialized AI (AS PV) dashboard's capabilities helps pointing out differentiation between new signals, another one being already monitored and reported through a special history, the absence of an alteration, or a gap in the reporting of an adverse event.

Arca PV

Use Case : Accelerate drug repurposing, starting from a 1044 suspected candidate list through AEs & efficiency assessment

Which molecule crosses the blood brain barrier? Can it cure glioblastoma? What are its side effects?

In order to find answers to these questions and help patients better live their very heavy pathological burden, we trained AI models to answer each of the previous questions based on :

- Clinical trials
- Articles (peer-reviewed and non-peer reviewed)
- Pre-clinical studies
- Medical reports
- Any relevant data (even posters)

In the end, we reached 3 different candidates for treatment

TARGETED DATAPOINTS

Pharmacokinetic/pharmacodynamic

Symptoms

Adverse events showing suspected efficiency

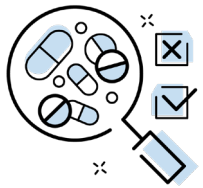
Common chemical properties

Any other property processed

Common efficacy indicator

BENEFITS

3 times more datapoints



21% R&D time saved yearly

Retargeting costs divided by 9

Use Case : Federate databases across 4 different countries & fill data gaps

We need to meet the regulatory requirements to get our drug validated, but we lack national and international information to easily match with the regulator's expecations

In order to capture information needed for regulatory validation, we gathered numerous categories of relevant data available locally and in other languages

- Clinical data (trials, reports, protocols and Individual Patient Reports)
- Industrial documentation (qualification plans, PPQs, etc.)
- Articles (peer-reviewed and non-peer reviewed)
- Pre-clinical studies

TARGETED DATAPOINTS

Pathological burden

Targeted population

Adverse Events

Epidemiological biostatistics

RWE Efficiency indicators

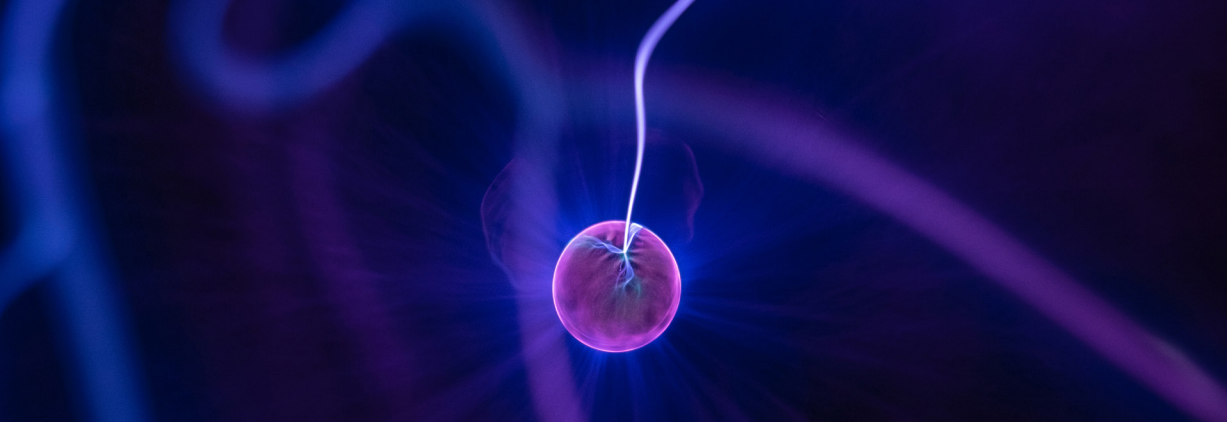
In the end, we optimized the exploration of data coming from 4 different sites by 76% and automated meta-analysis generation for accelerating phase 4 alogn with indirect comparisons

BENEFITS

10 times more datapoints

75% time saved data managing

100% ROI after 16 weeks

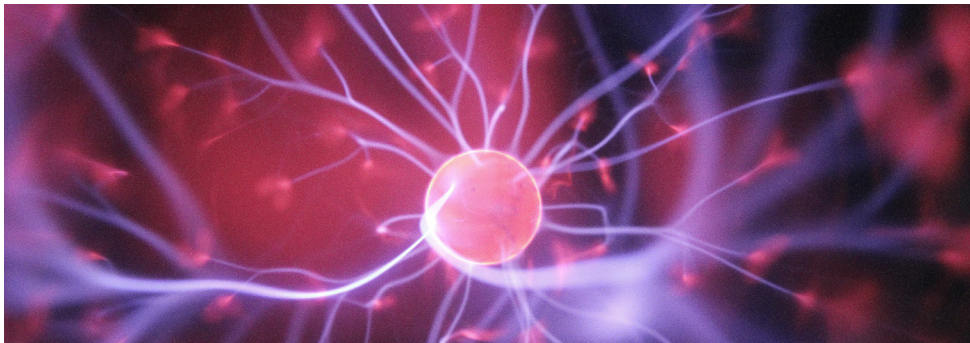


SECURITY & ADVANCED SERVICES

Preserving the integrity of the existing data structures and their privacy is a crucial aspect for integrating a new software in an established work environment. AS AI ensures a smart and safe platform upon plugging it on top of existing data infrastructures to leverage their contents. Consequently AS Explore, being build on top of that, enables a super-efficient top-down information retrieval through smart queries focused on capturing data points :

- **Merge**, **Aggregate** and **curate** documents into special databases and edit it automatically
- Dive into **ArcaScience Open Database**, our **60+ million biomedical database**
- **Multilingual Search** for dosages, chemicals, molecules, biomarkers, adverse events, by phases, targets, and much more
- Generate new **meta-analysis** instantly & optimize **clinical trial protocol design**
- Compare & predict **drug efficiency** on basis of indicators, real world evidence pooled assumptions, efficiency marker screening & simulations
- Quote, share **clinical trials** (CDISC / OMOP / FHIR compliant) and create datasets
- **Bind your newly deeply-qualified datasets with QSPs, Digital Twin solution or *in silico* systems to achieve therapeutic breakthrough**
- Find **specific skills** on the network (featuring companie's HR and open applications)

End-users, as well as the IT department, are both winners thanks to our AI-based ecosystem. User requirements are met faster with enormous gain in time and velocity, and IT managers become more data driven and consequently positive contributors to the solution.



Conclusion

ArcaScience AI is a game changer for companies drowning in data and unable to cope with and exploit unstructured and semi-structured information. We build top-of-the-art technologies in order to leverage knowledge and turn your sleeping power into a unique competitive advantage through several AI models, fine-tuned to your own cases and databases.

End-users will inherit a powerful tool without ever guessing the sophistication of what's under the hood, and the company will see the overall effect of properly exploited knowledge and how it effectively unlock its power.

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