

Owkin

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# Pioneering AI to accelerate medical research

Owkin is building a federated research ecosystem that is fueling collaborative research around the world while preserving patient privacy and data security.

As the world responds to COVID-19, speed and collaboration in clinical research have never been more important. The challenge is how to empower researchers to draw insights from millions of patients' multimodal data points without compromising data privacy and protection.

Owkin's solution is to bring academic and pharmaceutical industry researchers together in a federated research environment. Here, the company's proprietary infrastructure and artificial intelligence (AI) technologies enable researchers to train machine learning (ML) models on distributed data at scale across multiple medical institutions without centralizing the data.

"We are connecting the dots between raw medical data and patient outcomes, to unveil breakthrough R&D insights from a global hospital network that result in better treatments for patients, developed more quickly and at a lower cost," said Thomas Clozel, co-founder and CEO of Owkin.

Owkin was co-founded in 2016 as a French-American startup by Thomas Clozel, a clinical research doctor and former assistant professor in clinical hematology, and Gilles Wainrib (CSO), PhD, a pioneer in the field of AI in biology. The company has grown rapidly to around 100 staff, including AI data scientists, federated learning researchers, privacy and traceability developers, infrastructure engineers, biological and clinical experts, and is based in the USA, UK and France.

## Federated learning technology

Owkin connects several of the largest medical research centers and pharmaceutical companies in Europe and the USA within a federated research ecosystem (Fig. 1). Owkin has developed four key components to build this ecosystem: Owkin Loop (the network), Owkin Connect (the technology infrastructure), Owkin Studio (the AI software tool) and Owkin Lab (the expertise).

Owkin Connect is a privacy-preserving, traceable, secure technology that allows the company to connect with research centers in the Owkin Loop network. Using Owkin Connect's federated learning approach, the data do not move, only algorithms travel. This enables insights from the data to be collectively shared while guaranteeing privacy for patients and compliance with data ownership.

Researchers participating in the Loop network can use the AI platform, Owkin Studio, to collaborate with data scientists to annotate datasets and build and interpret ML models. They can access AI algorithms and a catalog of data enrichment, outcome prediction and patient identification ML models. The AI software tools developed by Owkin can handle data from a wide range of modalities, including

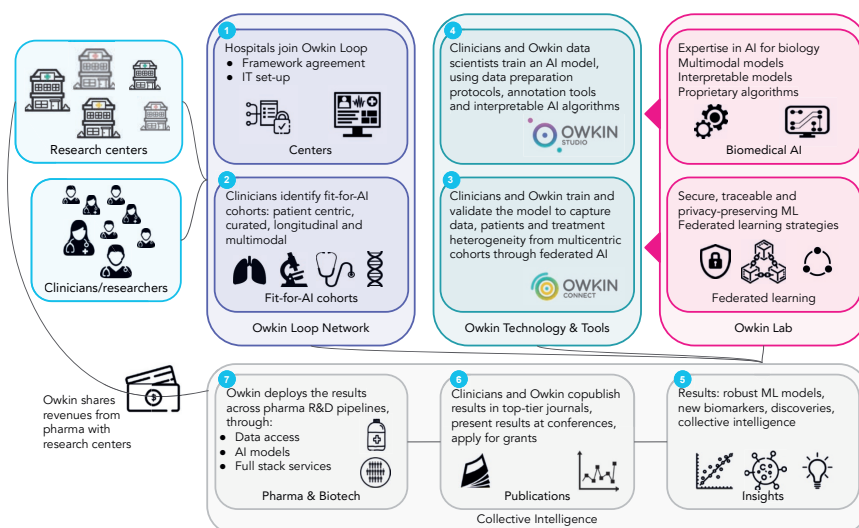


Fig. 1 | Owkin federated research ecosystem. A network connecting several large medical research centers and pharmaceutical companies in Europe and the USA.

digital pathology, radiology reports, genomic data and clinical descriptors and outcomes. The final component is Owkin Lab, which provides access to Owkin's team of experts in AI and biology.

The research matrix has already led to many fruitful research collaborations, such as the development of MesoNet, an ML model able to better predict and explain overall survival in patients with mesothelioma, which outperforms current pathology practices.

## Faster drug development

Biotechnology and pharmaceutical companies can use Owkin's research platform to help understand why drug efficacy varies from patient to patient, enhance the drug development process and identify the best drug for the right patient at the right time.

Biopharma can work with Owkin through all stages of the drug R&D process. For companies that want to develop their own models, Owkin can facilitate access to real-world data by therapeutic area through its data connect service. The next step includes access to Owkin's off-the-shelf models. Alternatively, Owkin's data scientists can work with companies to develop bespoke models for specific research questions. These models can be implemented through Owkin's full-stack service at all stages of pharmaceutical drug development.

To illustrate the benefits of this approach, Owkin recently collaborated with a large pharma company to understand patient response to immunotherapy in a specific cancer. During the first phase of the project, Owkin's data scientists conducted

a feasibility study using the client's proprietary clinical trial data. The initial ML model and results were promising. The next phase involved extending the project to real-world data from the Owkin Loop network. Owkin identified hospitals in the Loop network that held data for patient cohorts relevant to the therapeutic area and treatment in question. It was then able to use federated learning to train the model across these institutions without having to aggregate the data.

As a result, the final model benefited from both the pharma proprietary clinical trial data and real-world data from the Loop network. "Owkin's research ecosystem is built for collaboration: connecting siloed research cohorts, enriching clinical trial data with multimodal patient data, to gain collective medical intelligence," said Anna Huyghues-Despointes, Head of Strategy and Marketing.

Ultimately, Owkin's federated research movement can accelerate the clinical research process in a way that offers protected data for patients, exhaustive traceability of computations for institutions, maximum collaboration for researchers and predictive power for data scientists.

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