

Leading Cancers Centers Launch New AI Learning Platform to Accelerate Cancer Research

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The Cancer AI Alliance (CAIA) — a research collaboration of top cancer centers and technology industry leaders — today announced the first scalable, federated learning platform for cancer research.

CAIA is made up of NCI-designated cancer centers Dana-Farber Cancer Institute, Fred Hutch Cancer Center, Memorial Sloan Kettering Cancer Center, and The Sidney Kimmel Comprehensive Cancer Center and Whiting School of Engineering at Johns Hopkins with financial and technical support from technology industry leaders Ai2 (Allen Institute for AI), Amazon Web Services (AWS), Deloitte, Google, Microsoft, NVIDIA and Slalom.

The new federated learning platform serves as the technological foundation of CAIA's aim to save more lives by enabling researchers and clinicians to train AI models that learn from participating cancer centers' millions of clinical data points while maintaining data security, privacy and adherence to regulatory and ethical standards.

"AI has the potential to help us make transformative leaps in cancer research and clinical care," said [Kevin Haigis](#), PhD Chief Scientific Officer at Dana-Farber Cancer Institute. "The CAIA collaboration brings together creative interdisciplinary teams of scientists across numerous domains to further harness AI technology in the pursuit of new discoveries for cancer patients across the world."

While federated learning — a machine learning method that preserves anonymity of individual data — has been gaining steam for nearly 10 years, adapting the technology for multi-institution use in cancer research has proved elusive due to significant technological, regulatory, patient privacy and data harmonization challenges, as well as the coordination effort necessary to bring together organizations of this scale and complexity.

Development of CAIA's platform was possible due to an intense focus on collaboration and a drive

for collective action across the participating cancer centers and technology companies, resulting in a unified technical, legal and governance structure.

The federated learning platform works like this: participating cancer centers implement federated learning technology at their institutions, each connecting to a centralized orchestration component of the platform. Using this architecture, AI models travel to each participating cancer center's secure data to learn from it locally, generating a summary of its learnings without individual clinical data ever leaving institutional firewalls. The insights gained from training the model on each cancer center's de-identified data are then aggregated centrally to strengthen the AI models to uncover patterns, maximizing the value of the collective knowledge base.

Enabling researchers to develop models on data from multiple cancer centers through a collaborative, federated learning ecosystem creates a paradigm shift from solving problems in isolation to solving them together. More importantly, these updated AI models could significantly improve health outcomes for cancer patients by revealing trends across more diverse populations and rare cancers.

Eight unique projects have been launched by researchers across the participating cancer centers. These initial projects aim to tackle some of oncology's most persistent challenges, from predicting treatment response to identifying novel biomarkers and analyzing rare cancer trends. The projects use the federated learning platform and structured, de-identified data from each of the participating cancer centers, which collectively provides a diverse and representative foundation of over 1 million patients for modeling and analysis.

The platform's true power, however, lies in its potential to scale up. Over the next year, CAIA plans to enable dozens of research models and add more cancer centers and technology collaborators to the alliance.

"With the launch of CAIA we have laid a critical foundation in the effort to accelerate new discoveries, and the combined data from our cancer centers can now power these innovative AI models," said [Eliezer Van Allen, MD](#), Chief of the Division of Populations Sciences at Dana-Farber Cancer Institute and the Chandra Nohria Family Chair for AI in Cancer Research. "We are excited to share these models with research centers across the nation and exponentially expand access to the data that will drive progress toward better diagnosis, treatment and outcomes for cancer patients everywhere."

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