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Illumina Wins Virtual Cell Challenge, Powered by Billion Cell Atlas

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The unique biological dataset combined with a new CellularAI algorithm wins Illumina a first-place finish in the 2026 Virtual Cell Challenge, hosted by Arc Institute

SAN DIEGO, Nov. 19, 2026 /PRNewswire/ -- Illumina, Inc. (NASDAQ: ILMN) today announced that its BioInsight AI Lab won the 2026 Virtual Cell Challenge, hosted by Arc Institute. The company's results were powered by data from Illumina's Billion Cell Atlas and a new cellular response prediction algorithm, CellularAI, which produced highly accurate predictions of cellular responses to genetic perturbations in unseen cell types. The first-place performance underscores how unique, large-scale data and AI innovation can unlock biological discovery and is part of the company's ambition to build leading virtual cell models for understanding biology.

"The Billion Cell Atlas is quickly becoming a foundational dataset that we believe can help advance the field toward a future of predictive biology," said Rami Mehio, senior vice president and general manager of BioInsight at Illumina. "We applaud Arc Institute for convening the world's leading innovators in this space toward ambitious breakthroughs like virtual cell modeling. Today's achievement demonstrates the composition and quality of the dataset and shows what can be achieved when the right biological data is coupled with the right models. The Billion Cell Atlas is positioned to help unlock critical breakthroughs for drug discovery, drug repurposing, and understanding the mechanism of action."

The Billion Cell Atlas is the world's largest genome-wide genetic perturbation dataset, capturing how individual cells respond to genetic changes via CRISPR across more than 200 disease-relevant cell lines. The data is being generated by Illumina in a consortium with select pharmaceutical partners. Together with the Billion Cell Atlas, CellularAI can be used to predict how cells respond to genetic perturbations. An open-source version of the algorithm, released today, gives researchers a window into the methodology behind the Virtual Cell Challenge results.

Researchers will be able to observe perturbation responses at scale with their data, predict responses in cell types that have not yet been experimentally tested with CellularAI, and test resulting hypotheses experimentally through direct CRISPR capture capabilities in the Illumina Single Cell Preparation workflow. Together, the data and the CellularAI algorithm can unlock a broad range of applications, including validating targets from human genetics, modeling disease-relevant cell types and conditions, and elucidating drug mechanisms of action.

The 2026 Virtual Cell Challenge, hosted by Arc Institute, asked teams to predict knockdown responses in unseen cell lines, working only from the cells' unperturbed state. Illumina's results were scored against hidden experimental data generated by Arc. Of the approximately 1500 competitors, the predictions of CellularAI most closely matched real, validated experimental results across a wide range of biologically meaningful metrics.

The BioInsight AI Lab at Illumina is run by vice president of Artificial Intelligence Kyle Farh, MD, PhD. The winning Virtual Cell Challenge team included Kishore Jaganathan, PhD, Eyal Ben-David, PhD, Atreyo Pal, PhD, and Aniketh Janardhan Reddy, PhD.

Learn more about CellularAI here.

Learn more about how Illumina is expanding the Billion Cell Atlas here.

Use of Forward-looking statements

This release may contain forward-looking statements that involve risks and uncertainties. Among the important factors to which our business is subject that could cause actual results to differ materially from those in any forward-looking statements are: (i) challenges inherent in developing, validating, and advancing artificial intelligence models and related technologies, including CellularAI; (ii) our ability to realize the anticipated benefits and potential applications of the Billion Cell Atlas, CellularAI, and other artificial intelligence technologies, including their potential to advance biological research and drug discovery; and (iii) the performance, utility, acceptance, and adoption of CellularAI and related technologies, which may or may not meet our expectations and those of researchers and customers, together with other factors detailed in our filings with the Securities and Exchange Commission, including our most recent filings on Forms 10-K and 10-Q, or in information disclosed in public conference calls, the date and time of which are released beforehand. We undertake no obligation and do not intend to update these forward-looking statements, to review or confirm analysts' expectations, or to provide interim reports or updates on the progress of the current quarter.

About Illumina
Illumina is improving human health by unlocking the power of the genome. Our focus on innovation has established us as a global leader in DNA sequencing and array-based technologies, serving customers in the research, clinical, and applied markets. Our products are used for applications in the life sciences, oncology, reproductive health, agriculture, and other emerging segments. To learn more, visit illumina.com and connect with us on X, Facebook, LinkedIn, Instagram, TikTok, and YouTube.

Contacts
Investors:
Illumina Investor Relations
858-291-6421
IR@illumina.com

Media:
Christine Douglass
PR@illumina.com

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