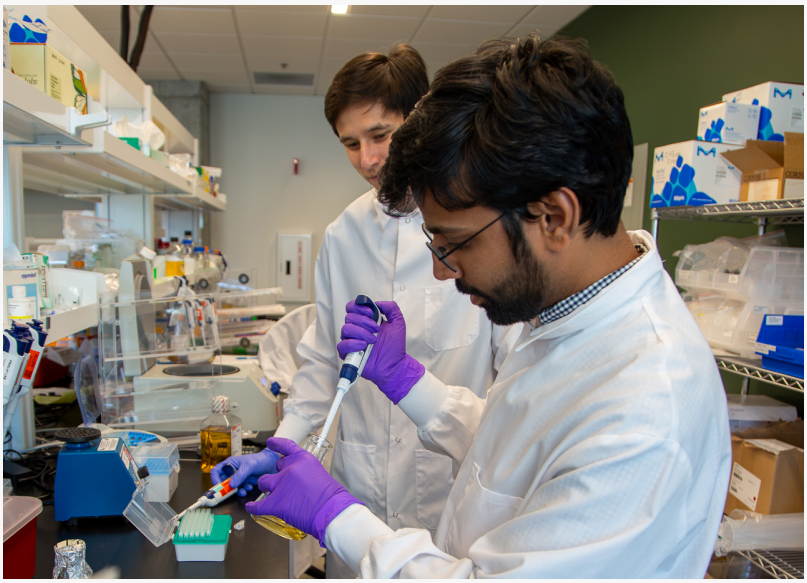
New AI BioDesign accelerator combines experimental biology and artificial intelligence to learn nature's design rules

The Allen Institute, University of Washington, and Fred Hutch Cancer Center will build AI models, datasets, and tools to accelerate biological design for health


Sud Pinglay, principal investigator with AI BioDesign

SEATTLE, WA, UNITED STATES, September 3, 2026 /EINPresswire.com/ -- "Endless forms most beautiful" was how Charles Darwin described the spectacular diversity of nature from which our current understanding of life emerged. But that diversity, which evolved over billions of years, is only a fraction of what could exist given the trillions of DNA sequences available in nature, suggesting that our natural world represents only a small slice of what could have been.

Today, AI BioDesign—a bold new collaborative accelerator that will use artificial intelligence, large-scale experiments, and open science to explore that uncharted design space—was announced. It is a collaboration between the Allen Institute, University of Washington and Fred Hutch Cancer Center.

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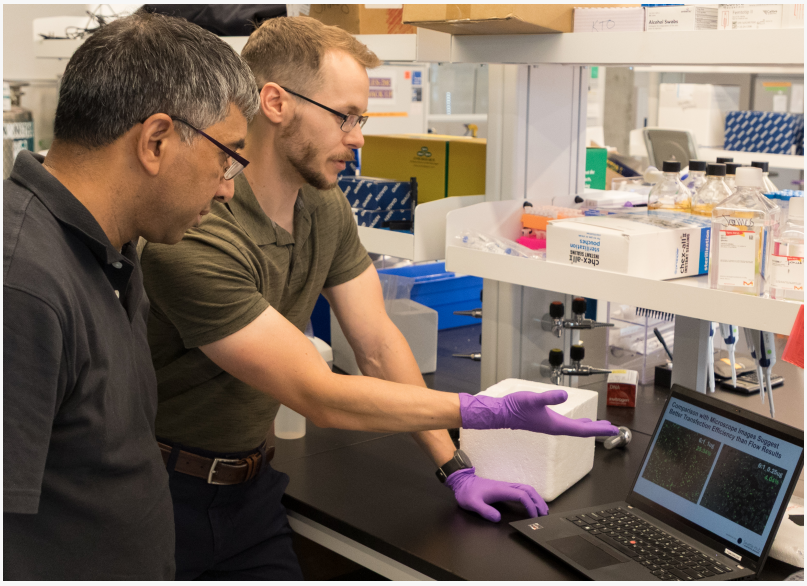
>
> *Rui Costa, president and CEO, Allen Institute*

Working together, the AI BioDesign team will generate open models, datasets, assays, and tools that scientists can use to create new biological solutions to improve human health, address environmental challenges, and spur advanced technologies. The goal is to learn and model the rules biology uses to build life, enabling the potential development of everything from new drugs to treat cancer and neurodegeneration, to enzymes that can break down plastics in the ocean, to

biological computers that use vastly less power than current silicon chips.

“For the first time, the speed of AI is beginning to match the experimental power of synthetic biology,” said Nobel laureate David Baker, lead scientific director of AI BioDesign, director of the UW Medicine Institute for Protein Design, and a Howard Hughes Medical Institute investigator. “That changes the question from ‘what has nature already made?’ to ‘what else is possible, and how can we test it?’ AI BioDesign can help turn that vast unknown into models that can help us solve some of humanity’s hardest problems.”



Jay Shendure, lead scientific director of AI BioDesign; scientific director of the UW Medicine Brotman Baty Institute for Precision Medicine; scientific director of the Seattle Hub for Synthetic Biology; and a Howard Hughes Medical Institute investigator

Supported by Fund for Science and Technology (FFST), a private foundation in the Paul G. Allen philanthropic ecosystem, AI BioDesign brings together complementary strengths across Seattle’s scientific ecosystem: the Allen Institute’s experience building large-scale, open-science platforms; the University of Washington’s expertise in synthetic biology and genome science, such as the Institute for Protein Design and UW Medicine Brotman Baty Institute for Precision Medicine; and Fred Hutch’s depth in cellular systems, genomics, and translational medicine.

“What excites me about AI BioDesign is that it brings together the right people and the right institutions at the right time to advance biological design with AI in the loop,” said Rui Costa, president and CEO of the Allen Institute. “The Allen Institute was built for this kind of work: big science, team science, and open science that creates resources entire fields can use. AI BioDesign combines this approach with AI models to guide which data we generate next, so experiments and models improve together in a continuous cycle of learning and testing. Ultimately, that can help us design new biological functions with greater precision.”

“AI BioDesign is exactly the kind of ambitious, collaborative science FFST was created to support,” said Marc Malandro, chief programs officer and co-lead at Fund for Science and Technology. “As a foundation, we’re looking for projects and to create environments of not just a single discovery but for multiple discoveries and platforms of knowledge that we can share openly.”

[How AI BioDesign will work: designing new building blocks of life]

AI BioDesign will create a continuous learning platform for biological design. AI models will

propose new biological designs, scientists will build and test those designs at scale, and the results will feed back into the models such that each round becomes more accurate and informative. Over time, this design-build-measure-learn cycle will help researchers move from trial and error toward more predictable biological engineering.

“Over the last two centuries, engineering has transformed the world at least three times: the Industrial Revolution, electrification and mechanization, and the digital revolution,” said Jay Shendure, lead scientific director of AI BioDesign, scientific director of the UW Medicine Brotman Baty Institute for Precision Medicine, scientific director of the Seattle Hub for Synthetic Biology, and a Howard Hughes Medical Institute investigator. “We believe engineering’s fourth act lies at the intersection of AI and biology. Biology is code that builds: DNA carries digital instructions, and cells turn those instructions into physical systems with extraordinary precision. AI BioDesign gives us a way to learn that instruction set more systematically, test it at scale, and begin designing new biological functions.”

[A distinct yet complementary approach to AI-powered biology]

AI BioDesign joins a fast-moving field. Around the world, teams are building foundation models, virtual-cell systems, lab-in-the-loop platforms, and AI-enabled discovery pipelines. AI BioDesign is designed to complement those efforts by creating an open, experimentally grounded research accelerator that produces reusable resources for the broader scientific community.

Its distinction lies in the combination of multiple modular models built from tractable biological problems; new data generated from designed biological sequences and perturbations; multiplex experiments that test many designs at once; and the open sharing of models, datasets, assays, reagents, and benchmarks.

“For me, biology is ultimately a design challenge,” said Sanjay Srivatsan, an AI BioDesign principal investigator and assistant professor at the Fred Hutch Cancer Center. “As part of AI BioDesign, our team plans to vastly scale up the number of genomic datasets available to researchers. We can then use AI to understand biological patterns in those datasets and use those patterns to inspire solutions to biological problems, such as designing cells that can remove cancer from the body.”

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