Ainnocence Launches BioSynthAI Platform for AI-Driven Synthetic Biology Product Discovery

MOUNTAIN VIEW, CA, UNITED STATES, June 27, 2025 /EINPresswire.com/ -- Ainnocence, a next-generation biotech company specializing in AI-driven design, today announced the launch of its BioSynthAI™ platform, an advanced artificial intelligence solution for product discovery in the synthetic biology field. BioSynthAI™ leverages cutting-edge AI algorithms to optimize protein and enzyme activity through in-silico design, aiming to dramatically accelerate innovation across biopharmaceuticals and sustainable biotechnology. The launch comes at a time of rapid growth in synthetic biology – the global market was valued at $16.9 billion in 2024 and is projected to reach nearly $168 billion by 2035 (pharmiweb.com) – underscoring the strong demand for AI-driven solutions like BioSynthAI™.

> We are committed to advancing synthetic biology through the power of AI... BioSynthAI™'s launch is a major milestone in our mission to drive innovation for a more sustainable and healthier world."
>
> *Dr. Lurong Pan*

BioSynthAI™ is designed to streamline each stage of the synthetic biology development cycle. By integrating multi-omics data (genomic, proteomic, metabolomic, etc.) with expert biological models, the platform can design, simulate, and optimize biological systems significantly faster than traditional methods. Industry experts have suggested that intensive application of AI and automation could accelerate synthetic biology R&D timelines by as much as 20-fold, shrinking development cycles from a decade to mere months (jbei.org). BioSynthAI™ realizes this potential by delivering optimized genetic designs and strain improvements in as little as a few hours, with end-to-end project turnarounds ranging from hours to two weeks. This represents a drastic reduction in time compared to conventional wet-lab experimentation, enabling researchers and companies to go from concept to prototype with unprecedented speed.

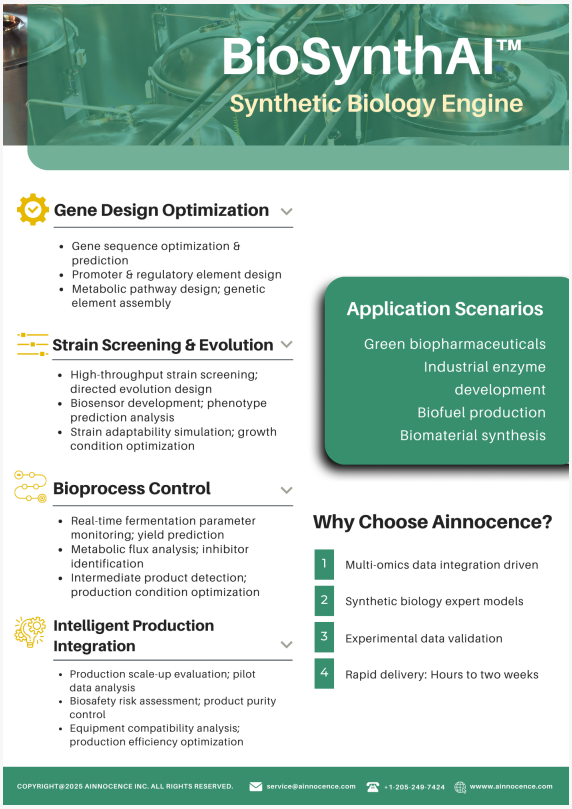
Key Application Areas

BioSynthAI™ is poised to drive breakthroughs across multiple sectors of synthetic biology. Key application areas include:

• Green Biopharmaceuticals: Designing and optimizing therapeutic proteins and vaccines with environmentally sustainable processes.

• Industrial Enzyme Development: Engineering high-efficiency enzymes for manufacturing, food

processing, and other industrial applications.
• Biofuel Production: Enhancing metabolic pathways in microbes to produce renewable biofuels (such as ethanol, biodiesel, or jet fuel) with higher yields and lower costs.
• Biomaterial Synthesis: Creating novel biomaterials and bio-based chemicals (e.g. bioplastics, biofibers) as sustainable alternatives to petrochemical products.



Ainnocence's BioSynthAI™ Synthetic Biology Engine — Accelerating Gene Design, Strain Optimization, and Bioprocess Control for Next-Generation Biomanufacturing

Core BioSynthAI™ Modules

The BioSynthAI™ platform comprises four core modules, each addressing a critical step in the synthetic biology pipeline:
• Gene Design Optimization: Uses AI-driven generative design to create and refine gene sequences or metabolic pathways for target molecules. This module explores billions of DNA or protein sequence variants to maximize performance traits such as enzyme activity, stability, and yield.
• Strain Screening & Evolution: Leverages machine learning to predict the best-performing microbial strains and simulate directed evolution. It rapidly screens virtual strain variations and identifies optimal candidates for producing the desired product, significantly reducing the need for exhaustive lab trials.
• Bioprocess Control: Employs artificial intelligence and automation to monitor and optimize bioprocess conditions in real time. From fermentation parameters to nutrient feed rates, this module adjusts process variables to ensure maximal efficiency and consistency in production.
• Intelligent Production Integration: Connects the R&D pipeline with manufacturing, using AI to translate lab-scale successes into industrial-scale production. This module integrates data from pilot runs and manufacturing systems, enabling seamless scale-up and tech transfer for commercial bioproduction.

Platform Strengths and Innovations

BioSynthAI™'s strength lies in its comprehensive, end-to-end approach to synthetic biology innovation. Notable features and innovations of the platform include:
• Multi-Omics Data Integration: The platform combines insights from genomics, transcriptomics, proteomics, metabolomics, and other omics data. This holistic view allows the AI to consider complex biological interactions and regulatory networks, leading to more accurate predictions and robust designs.
• Synthetic Biology Expert Models: BioSynthAIT™ is built upon models trained on vast datasets

and expert knowledge in synthetic biology and bioengineering. These domain-specific AI models incorporate known biochemical pathways, enzyme structures, and genetic design principles, giving the system a "knowledge base" of what typically works in biological systems.
• Experimental Data Validation Loop: Ainnocence has embedded a continuous validation mechanism in BioSynthAI™. Predicted designs (genes, enzymes, or strains) are experimentally synthesized and tested in Ainnocence's labs or partner facilities. The results are fed back into the AI models, allowing the platform to learn from real-world data and improving its predictive accuracy over time.
• Rapid Project Turnaround: The platform is optimized for speed. Thanks to cloud computing and algorithmic efficiency, BioSynthAI™ can analyze and evaluate billions of possibilities within hours. In practice, Ainnocence offers deliverables from initial design to validated prototype in as fast as a few hours up to about two weeks, depending on project complexity. This rapid turnaround empowers companies to seize market opportunities and iterate quickly on ideas that would otherwise take months or years.

"At Ainnocence, we are committed to advancing synthetic biology through the power of AI," said Dr. Lurong Pan, Founder and CEO of Ainnocence. "BioSynthAI™ embodies that commitment by dramatically accelerating the product discovery process for our partners. By harnessing multi-omics data and our expert AI models, we can optimize enzymes, pathways, and entire organisms with unprecedented speed and precision. Our goal is to enable researchers and companies to tackle complex biological challenges – from developing greener pharmaceuticals to creating sustainable biofuels – faster and more efficiently than ever before. BioSynthAI™'s launch is a major milestone in our mission to drive innovation for a more sustainable and healthier world."

About Ainnocence

Ainnocence is a California-based biotechnology company at the forefront of AI-driven design for drug discovery and synthetic biology. Founded in 2021, Ainnocence's radical AI platform is designed to minimize R&D risks and costs by up to 80%, and it boasts a computational capacity to screen up to 10 billion protein sequences or chemical compounds within hours (ainnocence.com). By dramatically reducing discovery times while maintaining high success rates, Ainnocence empowers pharmaceutical, biotech, and industrial partners to pursue ambitious "moonshot" projects. The company's AI technology has been used to accelerate the discovery of life-saving therapies and sustainable biomolecules, exemplifying Ainnocence's vision of AI as a catalyst for innovation in healthcare and environmental sustainability.

For more information about BioSynthAI™ and Ainnocence's services in synthetic biology, please visit www.ainnocence.com or contact info@ainnocence.com.

Lurong Pan, PhD
Ainnocence Inc
+1 205-249-7424
service@ainnocence.com