BioCloud

Neuromorphic Insilico Drug Discovery Platform

BioCloud is a science-focused technology platform that will significantly advance the discovery of human therapeutics.

It is the world's first insilico discovery platform designed by biology to optimize the entire drug discovery process; from target identification and elimination to in-silico forced degradation and dissolution modeling.

The strategic objectives are to:

- Enhance Discovery Performance
- Optimize Research Risk Management
- Increase Execution Success
- Mitigate Research Risk Costs

Intelligent Interaction & Information Discovery

BioCloud will provide a significant change in scientists' ability to analyze and visualize data to obtain a better understanding of natural phenomena by providing:

- New ways to manage massive amounts of data from observations and scientific simulations,
- Integration of powerful analysis tools directly into the database,
- Improved forms of scientist-computer-data interaction that support visualization and interactivity,
- Active data, notification, and workflows to enhance the multi-stage data analysis among scientists distributed around the globe, and;
- Transformation of scientific communication and publishing.

Contents

Global Regulatory Compliance

A key component of the BioCloud Insilico Discovery Platform is our Global Regulatory Architecture (GRA) which provides guidance to each process stream according applicable regulatory requirements. The guidance issued by every major regulatory body was comprehensively interpreted and will be codified within BioCloud in order to ensure compliance at every step, including the contentious and infamously vague guidance issued in 21-CFR-11 by the FDA in the United States.

The GRA will also comply with cGLP and cGCP guidance, where applicable.

The GRA will consist of a global compliance pattern repository and a quality framework library that includes guidance for Six Sigma, ISO 9000 and others. Specific regulatory and/or quality filters will be applied to the compliance evaluation criteria selected for each research project and will be dynamically overlaid on the base process models within BioCloud to guide all discovery activities according to the criteria selected.

Performance metrics are calculated and validated against test & evaluation criteria in order to optimize process streams and report potential compliance deviations.

In-Silico Dissolution Modeling

Dissolution is the only indicator of continuing dosage form performance batch-to-batch over time and there has been a dramatic increase in use to document bioequivalence execution of the dissolution procedure in accordance with cGMP's and with principles of sound metrologic science.

BioCloud will provide the ability to simulate dosage form performance in a highly compressed timeframe over traditional methods with a high degree of accuracy by drawing upon a comprehensive chemical and biological compound pattern repository.

Unifying Platform

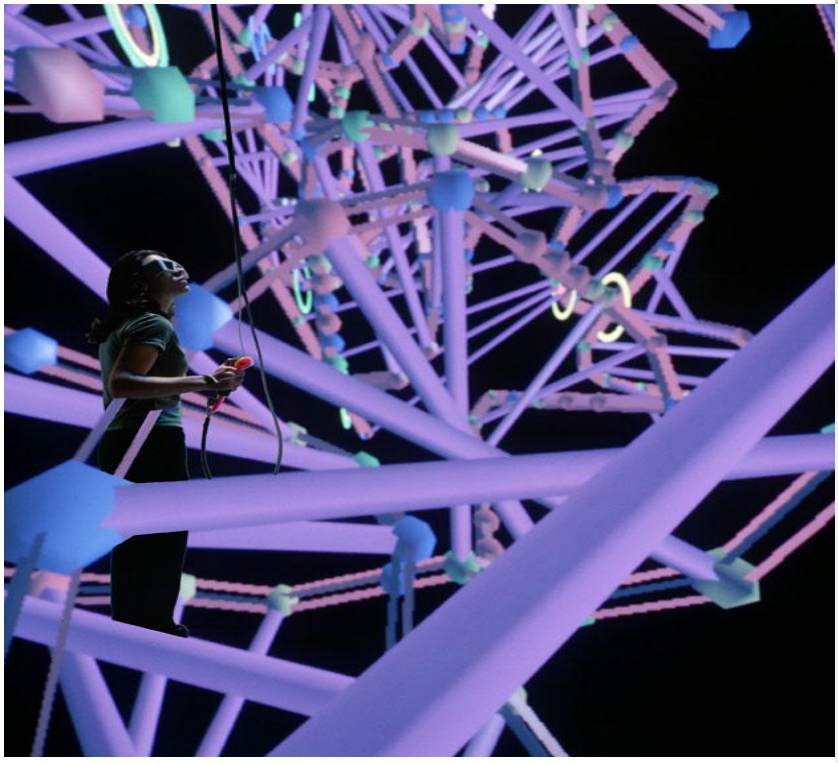
A key design attribute of the BioCloud architecture is the Unifying Platform which will consolidate and normalize biological and chemical data from multiple public and private sources. The Unifying Platform is the first stage of optimization in that it restructures the datasets to exploit the capabilities of the cloud architecture and provides maximum throughput on the Extreme Factory™ High Performance cloud-computing platform.

Much of what is contained within the Unifying Platform is pre-loaded into cache which virtually eliminates database calls and thus, provides a dramatic increase in overall performance. Models that once required 30 days or longer to process can now be evaluated in milliseconds with far more accuracy and consistency.

Discovery Process Stream Models

Countless man-hours were spent analyzing, documenting, optimizing and codifying base-level discovery process streams in order to design an adaptive workflow engine that will guide discovery activities and refine its own pattern repository for continual optimization of the discovery process workflow.

The process pattern repository will be utilized by various components of BioCloud to optimize process efficiency and eliminate redundancy in geographically dispersed research teams.



Resource & Process Optimization

From our inception, it was a strategic goal to optimize the efficiency by which large-scale biological computational modeling was performed. Through a tedious structural analysis and decomposition of thousands of samples, we identified numerous areas where the structure of the models could be improved upon in order to optimize the complex multi-dimensional computation associated with in-silico drug discovery.

Additionally, when we analyzed the discovery process workflows, numerous deficiencies were identified in the base-level process streams and more specifically, in the “informal” processes that occur among members in a research group, especially those that are geographically dispersed. Through a comprehensive analysis of affinity relationships we identified additional opportunities to optimize work streams through collaborative modeling capabilities and process segmentation.

The solution however, required the design of our own system management and optimization capabilities. BioCloud will contain an agent-based process monitor that continually feeds performance metrics back to the resource scheduler to anticipate computational requirements based upon the complexity of the models and the number of variants being requested by members of the research team.

The process analyzer agent will monitor process performance against the base-process pattern repository in order to identify improvements and eliminate redundant process steps. It will also provide guidance based upon the regulatory requirements defined by the Global Regulatory Architecture.

Insilico Forced Degradation Modeling

BioCloud's insilico forced degradation modeling capabilities will simulate external stresses to screen compound stabilities for rapid selection and elimination. Longer term storage simulations can also be modeled for inclusion in filings and submissions to regulatory bodies.

Insilico degradation modeling can include various stresses, including;

- pH (acid/base): Chemical processes are often catalyzed by the presence of acids and bases. The simulated exposure of materials to these can therefore accelerate insilico degradation reactions and provide early indications of possible instabilities with reasonable predictability.
- Temperature: BioCloud will simulate the temperature-variance of diffusion coefficients, population of crystal vacancies, creep rates, and many other thermally-induced processes/reactions.

BioCloud will also simulate other stresses such as Light, Oxidation and Concentration.

Insilico forced degradation modeling can provide early insights to the likely stability of a compound and conserve precious research dollars. The models will provide predictive degradation capabilities of scientifically relevant probability using a sophisticated hybrid Markov process algorithm.

Silicon Genomics

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Summary

Silicon Genomics strives to serve the scientific community and society by providing innovative technologies that aid researchers in transforming the promise of science and biotechnology into therapies that have the power to restore health or even save lives.

BioCloud was designed to help our clients move scientific breakthroughs from in-silico discovery to the lab through the clinic to the marketplace and to support other aspects of their business. Our clients' success depends on superior scientific and technological innovation and BioCloud is leading the practice of in-silico discovery.

However, we compete against time and past performance to rapidly achieve high quality results and cannot be lulled into complacency by previous achievements. Silicon Genomics is committed to continuing the rapid evolution of BioCloud and a mindset that the best is never good enough when it comes to developing the tools to facilitate the development of life-saving human therapeutics.

Silicon Genomics is leading innovation in the field of discovery optimization and advancing the current state of high performance neuromorphic cloud computing for institutions engaged in functional genomics and other computationally intensive drug discovery activities.

The company is tapping the power of scientific discovery and technological innovation to advance the practice of insilico discovery in order to dramatically improve the quality of people's lives.

Silicon Genomics is pioneering the development of novel cloud-based applications of insilico discovery and is designing the industry's first fully validated Cloud-based computing architecture dedicated exclusively to drug discovery. The company is setting the performance standard for insilico scientific discovery and innovation.

Silicon Genomics is an entrepreneurial, science-focused, technology-driven enterprise dedicated to helping scientists identify the causes and find cures for serious illness. Our goal is to dramatically improve people's lives by providing researchers with the tools to identify the cause of disease and to develop innovative therapeutics.