Masaar Dynamics
The platform for simulating biomolecules

In a nutshell
Masaar is building the simulation layer that enables faster development of better biologics. By biologics, we are referring primarily to protein-based molecules (peptide, nanobody, antibody, enzymes, ...). These are proteins that are developed primarily for therapy, but also for cosmetics, research, or industrial use. This simulation layer is delivered as a cloud platform where companies developing biologics can effortlessly run simulations for validating their designs and for providing dynamic context for their development efforts.

Why is our technology important?
The development of biologics has been facing a serious decline in R&D efficiency. Between the early 1990s and the early 2020s there has been an 8.4% year-over-year decline in new drugs per R&D $ spent. This phenomenon is not exclusive to biologics, it is a pharma industry wide problem that affects other drug formats including small drug molecules.

Generative AI (genAI) is poised to improve the efficiency of drug R&D by accelerating the design of new molecules. With genAI, we can generate millions of new designs with specified structural or functional properties against a disease target. However, we are still using classical wet lab experimental techniques to validate these designs. Thus, while the generation of a new drug design with genAI costs cents or single digit dollars, and can be done in minutes, lab validation costs hundreds to thousands of dollars, and extends over weeks to months.

Lab validation is the bottleneck for higher efficiency drug R&D today. To relieve this bottleneck, we need a validation method on par with design w.r.t. cost and time. Simulations have already started to offer this validation layer for small molecule development, with solutions coming from companies such as Schroedinger, OpenEye, and others . However, for biologics, no solutions that allow for the use of simulations for validating designs exist. Masaar is building the biologic simulation layer. Coupled with genAI for design, this simulation layer can massively increase the efficiency of drug R&D.

The benefits of our solution
Molecular simulations cost only a few to tens of dollars and can be completed within hours. When combined with genAI for design, this combination enables swift and cost-effective cycles of design and validation. This powerful pairing allows scientists to efficiently screen hundreds of thousands of potential designs to identify and refine the optimal candidate for a specific target. Consequently, wet lab experiments are reserved for the final validation stage, after a promising candidate has been identified. This approach significantly reduces risk and accelerates the development of drug candidates, fastening their progression to animal and clinical testing.
Another significant advantage is our ability to generate dynamic data. Proteins and other biomolecules operate in a dynamic fashion. Current generative AI (genAI) models, which are reaching their limits, have been trained primarily on static structural data (like images). The next evolution in biotech's genAI involves models that can comprehend and interpret dynamic interactions. To achieve this, these models need to be trained with dynamic data, which can only be effectively produced through simulations.
Finally, our solution is designed with the future in mind. The anticipated reduction in computational costs will ensure that our simulations become progressively more affordable, quicker, more precise, and widely applicable.

Keywords
Molecular Simulations, Computational Drug Design, Biotech, Cloud Computing, Pharma, R&D efficiency, Biologics, Protein Design, AI for Drug Design, Generative AI.

Founding Team
Moustafa Houmani is a chemical and bioengineer and a former YC founder. While working on his last company in the space of protein engineering, he identified simulations as an ideal validation method for biological designs before the lengthy and costly lab validation. However, there were no available platforms allowing such validation

Moe Haidar is a distinguished engineer and head of incubation at Nexthink, a Swiss unicorn. He has vast experience in platform development, hybrid platforms, computational infra, workflow and computational automation, as well as AI workflow integration. He developed Flow, the AI powered DEX workflow automation product that he converted from a hackathon winning idea to a multi-million automation product.

Get in touch
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