PROTEIN ENGINEERING GLOBAL

27-28 October
Silicon Valley, USA

Developments in Protein Engineering

An interview with panelist:

Maria Lucas
CEO
Zymvol

Please introduce Zymvol and please talk about your history?

I founded ZYMVOL in 2017 alongside Dr. Emanuele Monza and Dr. Victor Gil, both of whom I had met while working as a researcher at the Barcelona Supercomputing Center. ZYMVOL is a biotech company specialized in the design, development and application of molecular modeling software to enzyme discovery and optimization.

From the very beginning, we were able to achieve sales with clients from Europe and, later on, from USA and Asia, securing our spot in the market and further improving our technology to guarantee time and cost-effective enzyme services.

Now, four years have passed and ZYMVOL keeps growing stronger. We've gone from being a small, 4 person team, to being 20 people. We've run more than 30 industrial projects and secured 2.2M€ from public funds to keep improving our technology. And we will soon open our first office in Boston, as part of our business expansion strategy through the US.

Since then, we've also expanded our business model from service-based (offering companies enzyme search and in silico design services) to also selling our first proprietary enzyme products.

Our hope is that this will bring us closer to our goal of democratizing green chemistry throughout the industry, making enzyme solutions the smartest choice to switch to sustainable processes and production.

What is the most significant development in protein engineering in the last three years?

The protein engineering field is in constant evolution and continuously we are hearing about amazing advances in the different approaches that surround this area.

Most recent and noteworthy, I would say DeepMind's release of AlphaFold 2.

ZYMVOL

Produced by: Kisaco Research

It truly has shaken the protein engineering landscape and has proved the enormous potential of AI in pushing science forward.

Our simulations rely on 3D models of proteins, which are often not available experimentally. Thanks to Alphafold2's advances, it is now possible to determine the fold of a large protein through computation instead of costly experimental crystallization. If we add artificial intelligence to the continuous development of better and quicker computers, we think that this is just the beginning of what will be the future of computational protein engineering.

Besides, continuous effort to improve high throughput screening (along with the dropping in gene synthesis prices) is yielding really interesting possibilities, like those relying on chip or droplets protein production and expression.

As a business, what are your proudest projects over the years – please provide examples

We're currently taking part in several really interesting public funded projects, so it's hard to highlight only one.

To give a few examples, we are participating in the BioInspireSensing Project, which aims to produce a new generation of healthcare implantable biosensors detecting pressure, temperature and acidity.

Another one would be the Smartbox Project, where we aim to develop innovative ways of transforming biomass into added-value byproducts, providing solutions to decouple our economy from fossil feedstocks. Publications are currently being prepared, so stay tuned for details.

Besides, we have also made interesting achievements working with our customers. Unfortunately, we cannot disclose the projects, but the most challenging include discovering multiple enzymes for non-natural reactions and even engineering residual activity into a non-active enzyme.

What makes you a great company, the "partner of choice" within the Protein Engineering field, and why?

To me, it all boils down to this: we are dedicated to democratizing the use of Green Chemistry in the industry, and to do this, we must make enzyme engineering accessible to all. This means smarter tech, cost and time-efficient methodologies and truly understanding our customers needs.

I believe we have the expertise and the technological means to achieve great results. Our technology has proven to significantly reduce development times and lab work, plus achieve success rates of over 75% thanks to the use of precise simulations.

I'm also really proud of our team: everyone in our R&D team has a PhD and extensive experience in computational enzyme engineering, molecular modeling, machine learning, AI..., and they really bring value to each project they participate in; together with the experts in business,

administration, sales and marketing, we support our customers every step of the way.

What are your thoughts on the current landscape of Life Sciences (particularly protein engineering) given the world (economy / Covid) at present? How do you think this will affect the industry and the way we operate?

If there's something that the COVID pandemic has taught us is the fragile equilibrium in which our global activity rests. Millions of people's lives have been disrupted and it's all due to a new virus.

The life sciences, as well as many other industries, have had to re-adapt and innovate in a very short time period, but with the added responsibility of being one of the key players in bringing a solution to the pandemic. In this unprecedented scenario, agility has been crucial. On the other hand, our society is demanding a more accountable economy, deeply linked to another huge challenge: fighting climate change. I believe that protein engineering is now in a key position to demonstrate, across different disciplines, that it is also part of the solution. In the healthcare sector, it is helping to accelerate the development of new medicines and therapies; in the chemical sector, it is rising as the alternative to develop greener products by reducing resource expensure and reducing the production of unwanted byproducts. Not to mention the impact protein engineering is having in many recycling processes.

I think we do not have any other option than to advance to a more sustainable lifestyle, and the increasing number of solutions that are emerging already rely on protein engineering to develop new products and processes.

What do you feel is the most significant development in Pharmaceuticals / Medical Devices / Biotech?

I wouldn't be able to choose only one. It is the combination of developments in different areas like computational sciences and molecular biology that is leading to an explosive growth in solutions. If I had to select some significant developments, that would be the incorporation of artificial intelligence and machine learning technologies, combined with proliferation of biological data, that are enabling solutions like:

- Acceleration of directed evolution of enzymes, that is boosting the appearance of green solutions in a wide range of areas such as pharma or biotech
- Mapping and engineering cells, tissues or even organs

That are leading to applications like:

- Meat produced without animals
- Prevention and treatment of diseases (Precision medicine)
- Bio based materials with application in medical devices

To learn more about developments and innovations within the protein and enzyme engineering industry join us on the 27-28 October in SIlicon Valley.