

COMPANY

Novartis Institutes for  
BioMedical Research (NIBR)

INDUSTRY

Pharmaceutical

ISV

Nanome



CASE STUDY

# Collaborating for coronavirus drug discovery

A global drug-discovery team at Novartis is working to address current and future pandemics with help from Nanome and Oculus.



## How Novartis is accelerating early-stage drug discovery with solutions from Nanome and Oculus.

Novartis Institutes for BioMedical Research (NIBR) is a global team of scientists that discovers drugs to eliminate disease and alleviate illness. The team is currently working to address some of the world's biggest public health challenges: finding medicines to combat COVID-19 as well as future forms of the coronavirus that could cause the next pandemic.

The drug discovery process is expensive and lengthy — it takes around ten years to bring a drug to market. Wilian Cortopassi, Senior Expert I in Data Science at NIBR Emeryville, spends his days using computational tools to better understand how drug candidates may interact with critical protein structures in the human body.

To be more productive and help find effective drugs, his team analyzes complex 3D molecular information and comes up with hypotheses that are testable. “To analyze the results in the field, we need to use state-of-the-art tools designed for the job of looking at and interacting with complex three-dimensional objects” he says.

### Improving visualization and analysis with virtual reality

Early-stage drug researchers have traditionally been forced to use 2D representations of 3D molecules to do their work and share their hypotheses with colleagues, many of whom—like medicinal chemists and biologists—do not have the same expertise when it comes to viewing complex molecular structures. Researchers like Cortopassi used to create PowerPoint presentations to show different views of molecular structures, or they would show 3D proteins on 2D computer screens.

Things began to change in 2016, when Director of Structural Biology, Glen Spraggon at the Genomics Institute of the Novartis Research Foundation (GNF) in La Jolla (a NIBR research institute), put on an Oculus headset and tried a demo of Nanome's VR software to help his team members better understand the 3D protein structures as well as where drugs bind to activate or deactivate protein targets, thereby modulating the disease. Shortly thereafter, NIBR and Nanome began working together to evolve Nanome's solution.



Viktor Hornak, Associate Director at NIBR Cambridge says, “With advances in structural biology, bigger and more complex biomolecular structures are being solved. These 3D structures are difficult to analyze on flat 2D monitors. In VR, one can observe these structures as real 3D objects. The immersion is amazing – one can even step into the molecule and look at it from inside, which was simply impossible using our older 3D visualization technologies. In addition, in VR, all of the space around you becomes your computer screen. We can use all that space for visualizing many different types of data in our discovery research, which is incredibly useful for finding patterns and relationships in the complex and dense information we are working with nowadays.”

Glen Spraggon adds that VR is enabling NIBR to elicit more ideas from different types of scientists. When he first brought in team members to put on Oculus headsets and try the Nanome proof of concept, he says, “There was a certain point where they grabbed the protein and stretched it out and peered inside. And that was it. We realized that VR is a great solution for turning people from passive observers to interacting participants.”

Spraggon says that now, chemists and even biologists are getting into VR, generating ideas, and figuring out why a hypothesis isn't supported by the data. “That's game-changing for what we do,” he says. “Visualization in real 3D versus a flat screen transforms things, and it helps accelerate the process of discovery.”

### Superpowers of VR

VR delivers unique capabilities that give enterprises a competitive edge.

#### Top 3 VR superpowers for Novartis:



Real-time collaboration



Time Efficiencies



Possible, Impossible Scenarios

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**VR with Nanome and Oculus has the power of improving our communication for this critical decision-making process.”**

Wilian Cortopassi  
Senior Expert I in Data Science  
NIBR Emeryville



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Viktor Hornak  
Associate Director  
NIBR Cambridge

Nanome continues to work with NIBR to ensure that their software meets researchers' most pressing needs. “The global pandemic caused many organizations to rethink their remote work solutions. Drug Discovery scientists working on life-changing research not only needed a better method to visualize and interact with their data but also improve their ability to communicate with each other at a global scale,” says Edgardo Leija, Nanome CXO and Co-Founder. “We’re developing a platform that takes all of this into consideration and are proud to be a part of a collaboration that is making a significant impact worldwide.”

### **Keeping collaboration going during the pandemic**

Oculus Quest headsets have also delivered important collaboration benefits now that the NIBR team members are working remotely from their homes in the U.S. and Switzerland. The devices have no wires and they don’t need to be attached to a PC, so anyone on the team can simply put one on and quickly join a virtual space to work with colleagues around the world.

“We need to work in a fast-paced way and minimize mistakes,” says Cortopassi. “We are now able to collaboratively discuss structural insights for COVID-19 drug discovery while working from home. VR with Nanome and Oculus has the power of improving our communication for this critical decision-making process.”