# Smart laboratory software for pharmaceutical and biotech research reproducibility

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> "As this reproducibility crisis is becoming more public, people are seeing the need and understand that this is a multibillion dollar problem that we cannot afford to ignore."- Charles Fracchia

**CEOCFO:** *Mr. Fracchia, would you tell us the vision for BioBright?*
**Mr. Fracchia:** The vision for BioBright is to improve the reproducibility of biomedical research workflows by using software installed in pharmaceutical research environments.

**CEOCFO:** *What does that mean day-to-day?*
**Mr. Fracchia:** It means we provide software that we install in cutting-edge laboratories and pharmaceutical companies to help collect data that was not previously collected or was cumbersome to collect before. Day-to-day, our software engineers work to enhance the abilities of our software to continue to decrease reproducibility errors. Our business is customer centric and we work with scientists in these laboratories to collect the information needed in order to make significant improvements in their research.

**CEOCFO:** *What types of data can you review that was not doable in the past?*
**Mr. Fracchia:** One of the major challenges in biomedical research is that it is a heterogeneous environment when it comes to equipment or procedures that are being done. A biomedical research flow could entail fifteen different instruments over the course of multiple weeks to months. It may even include patients and their notes, the way they feel and the effects of their treatments. This heterogeneity of data is really the big challenge; software that allows us to collect the richness of data in a way that is a lot less cumbersome for both scientists and the person involved. If you think about the instruments people use today to do this, the lab and notebook really are the centerpiece. Paper notes are still used in most cases. Some people have used electronic versions but the problem is still the same in that when the scientists are recording data they are not doing the experiment or they are not interacting with the patient. Our software allows you to speak into a microphone and the data is analyzed and collected into a centralized record. This is one of the major components we look to further improve for our clients.

**CEOCFO:** *How do you help researchers become comfortable with that approach?*
**Mr. Fracchia:** The thing that makes us different and why our customers like us so much is my team and I come from some of the best laboratories in the world. We were those scientists taking notes and struggling with this type of workflow in the past. We built technology that takes into account all the little minutia that they do in the laboratory and automatically collects the associated data. The goal is to augment them. I try to stay away from the word automation because we do not actually automate the process but we enhance the scientists within their existing environments. That means the software can predict what you are likely doing and in most cases without pesky confirmation for every tiny minutia; we can guess a lot more than we could before.

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**CEOCFO:** *What about nuances of speech or regional differences in terminology? How is the automation system able to decipher these differences?*

**Mr. Fracchia:** That is at the core of what we provide and a giant step in our software's capability. It understands the scientific context of the experiment that you are in. It's common in the scientific world to use a number of acronyms and synonyms for the same chemical or reagent. We have designed our voice system to allow it to understand these synonyms and return probabilities as to what may be intended. In the very few cases where we are not sure, we can actually ask confirmation from the user and store the information for future reference. If you were to say "sub" and I may say "hoagie," those personal preferences can be stored.

**CEOCFO:** *Are there areas where BioBright would be more effective than others, and gain entry more easily?*

**Mr. Fracchia:** We have actually had a lot of success across the spectrum of more automated environments as well as less regulated environments in the biological research environments. We found that we got examples across the spectrum in environments where it is very research focused and where the process may change day to day but also very successful where environments where the process does not change day to day. The value that we bring is different depending on the research environment. Our system has the ability to capture all of the context and document that with very little burden on the user which otherwise would take hours and would be very difficult to collect. Our system then allows us to provide a quantitative understanding of what they did. We can even infer what they did solely from their actions. Those are two slightly different value propositions that stem from using the software in slightly different ways but they both represent significant value propositions.

**CEOCFO:** *According to your site, $28 billion is lost annually to reproducibility errors. Would you explain that?*

**Mr. Fracchia:** In the past few years, many peer review studies have been conducted in high profile journals, shining light on what is commonly referred to as reproducibility crisis. These studies highlight that close to 80% of all peer review research, focused in journals, is actually not reproducible. I could be doing an experiment that reports successful results and pass it on to you and more often than not you will not be able to make it work. That means a lot of time and money is wasted on materials and personnel involved in trying to get methods transferred from one person to another. This reproducibility crisis leads to problems in academia and the inconsistencies behind being able to trust data that is published. It affects pharmaceutical companies that have to rely on transferring such knowledge from their own employees and also from the wider scientific community and translate it into new drug targets. It costs an enormous amount as a result. That waste is estimated at$28 billion dollars per year in the US alone. If you read the actual paper that quotes this figure, they in fact talk about a range between $10 and $50 billion a year in the US alone. If you do the calculation, it looks like we may be wasting up to a thousand dollars per second of every year on this issue. This issue is accentuated by the fact that we only have a finite amount of resources that companies and individuals can devote to doing this research. It costs $1 billion and ten years on average for a pharmaceutical company to create a new drug and bring it to market. This means tackling diseases like ebola and infectious diseases are becoming a crippling predicament.

**CEOCFO:** *Are you still in the development and research stage?*

**Mr. Fracchia:** We are at an exciting and prosperous stage. It feels as though we are about to turn on the rocket booster and show commercial deployment over the next six months to a year. This is on the heels of our first deployment, funded by the Department of Defense, and more specifically DARPA which is the agency that funded the internet, the invention of GPS, and voice assistance projects such as SIRI. They funded us and we deployed platforms to enhance neuroscience workflow. This was part of the brain initiative that started a few years ago. We improved this particular workflow by twenty times. It is a game-changer for the field this was applied to. We have some exciting announcements coming later this year. We are motivated by that success and are now deploying commercially to a number of very large partners in the coming months and building partnerships across the industry to make sure we can provide this to as many people, labs and institutions as possible.

**CEOCFO:** *What has changed in your approach over time?*

**Mr. Fracchia:** I am an accidental CEO. I came from the academic environment and I have been passionate about this problem for the better part of five or six years. We are now in a place where we can show that we have demonstrated this platform. My role has changed dramatically over the last year from one of being an early inventor and driver on the technical force to now really making sure my employees, the fantastic people I work with, are as productive as they can be. I am becoming more of a supporting force rather than the scientific driving force. That has dramatically changed in the last year.

**CEOCFO:** *What will be the business model?*

**Mr. Fracchia:** We do a mix of software as a service and consulting services. Many of our customers ask for custom data sources to be integrated in our platforms, which we can do quickly through our integration contracts.

**CEOCFO:** *What has surprised you as the company has grown?*
**Mr. Fracchia:** The one thing that has surprised me is how much people are getting to understand the vision that was outlined early on in my thesis at MIT. It is now developed as a commercial product. As this reproducibility crisis is becoming more public, people are seeing the need and understand that this is a multibillion dollar problem that we cannot afford to ignore. A big surprise is how quickly people are responding to the urgency of this issue.

**CEOCFO:** *Why pay attention to BioBright right now?*
**Mr. Fracchia:** I think what is exciting on our end is that we have been very quiet. We are now starting to talk about concrete improvements that we can show. When you are able to completely change the game in a demonstrable way with the DARPA press release and improvement of 20X, it proves this can be done for all of the pharmaceutical and biotech industry. It will extend to academia eventually in due time. This touches on a common problem and not just commercially. It touches on our very ability to grow and to continue to survive as a species. I would never claim that we are the key to that but I think we have a tool that will allow us to change the way we think about tackling this problem.