

Advanced Computational Techniques and Technologies for Life Science Researchers

Healthcare
Cancer Drugs

CRIXlabs
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Jon Stenstrom
CEO

BIO:

Mr. Jon Stenstrom is Co-Founder of CRIXlabs, Inc., and serves as its Chief Executive Officer. Mr. Stenstrom is an inventor and entrepreneur in the healthcare space. He has led multi-functional teams on a wide variety of medical devices and commercial products during his time at a leading consulting engineering firm. He developed a novel brachytherapy device for the treatment of colon and cervical cancer in partnership with the UCSD Moores Cancer Center. Prior to CRIXlabs, Jon ran a profitable online business. He holds a Master of Engineering from San Diego State University focusing on bioengineering and technology commercialization.

About CRIXlabs:

CRIXlabs, Inc., a life science software company, has developed a platform technology for determining toxicity and distribution of drugs and actives in animals and humans. Our core technology, NuSilico™, leverages artificial intelligence, most notably pattern recognition, to create powerful computational models for researchers to accelerate the development of target therapeutics. CRIXlabs is a graduate of Rock Health, the leading digital health accelerator, based out of San Francisco, CA.

Interview conducted by:
Lynn Fosse, Senior Editor
CEOCFO Magazine

CEOCFO: Mr. Stenstrom, what was the vision when you started CRIXlabs and where are you today?

Mr. Stenstrom: The vision was to bring advanced computational techniques to the life science realm and leverage proven technologies from other industries to develop powerful tools for researchers looking to cure diseases such as cancer. This year we were able to conduct a study with 31 research institutes where we compared our computational models to 106 real world experiments, with unprecedented results, which is in the process of getting published. We also successfully attended Rock Health, the leading digital health incubator located in San Francisco and secured early investment from Kleiner Perkins, Mohr Davidow, Aberdare Ventures, Mayo Clinic, and AngelList.

CEOCFO: What are you doing that was not done before?

Mr. Stenstrom: Great question. Right now there is a crisis in drug development; respectable journals such as

Nature have been saying the traditional drug development process is too expensive and inefficient to survive. The problem is empirical testing. It takes too long to find out if ideas are the right direction, not to mention that late stage failures can be devastating for companies. We believe software is the future of drug development. We've developed animal and human models using the latest computational techniques used in other industries such as finance and real estate. These tools will allow researchers to identify the main parameters governing their new therapy and predict its effect before running experiments, which should significantly speed up the process.

CEOCFO: What has been the barrier?

Mr. Stenstrom: The idea of using software to speed up drug development has been around for some time now and has been talked about by a number of thought leaders. The first generation of modeling software, *in silico*, was what we call mechanistically-based models; basically looking at the body as a complex system of pipes with pressures and physical factors, all of which need to be accounted for to get an accurate prediction. Unfortunately, that method is extremely complex and has not proved extremely beneficial to speeding up the drug development process. We are approaching this problem using artificial intelligence, which is a newer technology. The barrier for the first generation of *in silico* tools was that these new technologies simply haven't been applied to this industry, until now. Our focus when we began was on nanoparticles and their behavior in the body.

CEOFO: Would you tell us about nanoparticles? What are they and where do they fit into CRIX?

Mr. Stenstrom: Nanoparticles are man-made small objects, thousands of times smaller than a human hair. These particles can be loaded with drugs or other agents and more effectively deliver the payload to specific areas in the body than just injecting the drug or agent by itself. Nanoparticles have many potential benefits for diagnosing and treating diseases such as cancer by delivering more toxic drugs to bad tumor cells and leaving good cells alone, which would reduce side-effects of these drugs. CRIXlabs has developed software that allows researchers to understand where these nanoparticles go in the body, what organs uptake the nanoparticles, and the ability to recommend the necessary changes to the design of nanoparticles to further enhance the desired target ability.

CEOFO: Would you tell us about your different simulators?

Mr. Stenstrom: We have developed a systematic way of rationally designing nanoparticles for specific targeting desires of researchers. We have 17 simulators right now. Each simulator delves into different processes by which nanoparticles are taken up by the body. We spoke to researchers and decided that the most effective means to speed up their development efforts was to put these simulators in the cloud for them to use.

CEOFO: Is the concept applicable to all nanoparticles?

Mr. Stenstrom: Yes. We have extensively looked at liposomes, iron oxide, gold, silver, PLGA, micelles and dendrimers. From our study we saw a correlation between our software predictions and experimental results to be between 0.87 and 0.97 depending on the nanoparticle type and quality of input data we received from researchers. Furthermore, we've also started looking at the behavior of drugs in the body.

CEOFO: Is there a certain progression in what you develop?

Mr. Stenstrom: I have a phenomenal team lead by our Chief Technical Officer, Dr. Shalini Ananda. Thousands of hours have been spent developing NuSilico™ and now we are looking for the right partners to truly utilize its full potential. As we continue having advance discussion with potential partners, we are able to implement the software for their specific needs.

CEOFO: Would you tell us a little bit more about the reaction and if there was an "aha" moment when people tried and realized it was going to work?

Mr. Stenstrom: My favorite case study involved a researcher in San Diego who wanted to reduce the amount of nanoparticles that were going to the liver by 5%. Up until then his nanoparticles were essentially loading the liver with an unhealthy amount of toxic drugs. He had already

"Right now there is a crisis in drug development; respectable journals such as Nature have been saying the traditional drug development process is too expensive and inefficient to survive." - Jon Stenstrom

spent 39 months and over \$3 million dollars searching for an answer and was running out of funds, so we offered to help. Being in an academic lab, he didn't have the full capabilities for making nanoparticles as a biotech or pharmaceutical company would, but we were able to run scenarios in our simulations to determine the best recommendation for his goals. We recommended the type of nanoparticle, size, and specific shape. With these inputs from us, it took him 4 months to create the nanoparticles, put them in mice, and observe the results. We didn't just reduce the amount of nanoparticles going to the liver by 5%, we reduced it by 13% and even saw 6% of nanoparticles going to the tumor, which is big. They are currently publishing the results, which makes us happy that we've contributed to the field in this short time.

CEOFO: Potentially, you have something very disruptive here!

Mr. Stenstrom: Yes, I believe we are going to see a greater shift in life

science for adopting these computational techniques to truly enhance further breakthroughs. Just recently the winners of the Nobel Prize in chemistry went to the computational researchers who laid the foundation with multiscale models for complex chemical systems; truly exciting stuff!

CEOFO: Where do you go from here? How do you go from the testing to making it a profitable product?

Mr. Stenstrom: We are playing in the landscapes of giant companies, so we need to leverage our ability to be adaptive and dynamic to continue developing products that add value to the industry. We have a number of deals in the pipeline right now and hope to see revenue by the end of the year. We are also looking in parallel industries such as cosmeceuticals and dermatology, where we have developed skin models that are garnering interest in the community.

CEOFO: Would they be getting one particular simulator or would they be getting a product where they could pick and choose? What would they actually be purchasing, leasing or licensing?

Mr. Stenstrom: It's dependent on their needs. How it's worked so far involves us talking in depth with researchers and executives to get a clear picture of their goals, then we set up an agreement to work closely with their researchers to implement the technology into their current processes, then we conclude with a licensing agreement.

CEOFO: Will it be customized for each case, will you eventually have more of an off-the-shelf offering?

Mr. Stenstrom: At this time we are exploring different strategies. Each client has different needs so that drives our implementation objectives.

CEOFO: You have personally been involved with a number of ventures prior to this. What have you learned about developing a company, developing a business, or working with a new concept that has been the most helpful now as the CRIX is growing and commercializing?

Mr. Stenstrom: Everything depends on your team. Make sure everyone is insanely passionate on the big picture of what impact you are doing, it helps motivate through the tough times. Second would be over communication within the team and embed that in the culture. A majority of startups fail due to founder drama and a way around that is to understand that no one is a mind reader, say your feelings and thoughts and say them often. Third would be to find great mentors who've done what you're trying to do. I was lucky to have picked up Steve Blank's "The Startup Owner's Manual," which I feel has saved us months if not years of time in this startup. Mentors are best in person, but until you get

them, books are a good substitute. Last and one of the most important would be your network. Just knowing the right person can be the difference between getting a deal signed and being left high and dry.

CEO CFO: What makes this aspect important to you personally?

Mr. Stenstrom: Great question. There are a number of factors for why I'm pursuing this. My family has known a number of people who've gone through cancer and watching them suffer with side effects was disheartening. I want to help enable the next wave of safer and more effective therapies and I believe that new com-

putational techniques is what's going to get us there.

CEO CFO: Why should CRIXlabs stand out?

Mr. Stenstrom: We have a technology that can determine the behavior of any drug or active in the skin or for any disease. This is our true value. We use artificial intelligence based technologies to determine exactly where drugs and beauty actives go in the body. So, this isn't limited to the treatment of cancer and we haven't even seen the true potential of the technology.

The logo for CRIXlabs features the word "CRIX" in a bold, teal-colored sans-serif font, followed by "labs" in a bold, black sans-serif font.

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