Elevator Pitch / Executive Summary

We at MedWorks Medicine by Design provide an online collaborative platform through which we engage students, the public, and medical researchers in learning about and designing medicine computationally. We then process the information that is generated and use it to sell actionable knowledge to biotech and pharmaceutical companies which lowers their cost of making medicine by 20% on average, speeds up the medicine making process, and provides novel ideas for better medicines. We estimate a potential market of $800M, revenue. Our competitive advantage is a result of using advanced computational protocols and collective intelligence applied to designing medicine. Our methods lower the barriers involved in getting medicine to those who need it thereby opening up opportunities for new treatments and more precisely addressing diseases that currently have treatments.

Problem and Solution

The biotech/pharmaceutical industry is experiencing drastic declines in marketing truly novel medicines. To take one medicine from idea to market costs on average $1.8 billion, takes 13.5 years, and has a failure rate of 95%. These trends are increasing over time amid the fact that only 6% of theoretically addressable diseases have treatments available. Currently, evaluating ideas for new medicine is analogous to the beginning of the aerospace industry when every idea was subjected to trial and error in full-scale experiments incurring enormous failures and costs in the process. What is highly desirable to the biotech/pharmaceutical industry is a means of evaluating many ideas for medicine faster, cheaper, and more rationally than experimental processes alone provide. Such a solution would lower the cost of making medicine, expand existing markets, and open new market opportunities. We at MedWorks Medicine by Design offer this solution to the biotech/pharmaceutical industry. The foundation of our solution is the use of computers to quickly, inexpensively and insightfully model how medicine works in the body. We uniquely employ this technology through a platform that fosters a two-sided network. We distinguish the sides of this network as the “medicine designer” side and the “medicine maker” (biotech/pharmaceutical industry) side. The medicine designer side is composed of students, the public, and medical researchers. We offer an online, easy to use, game-like user interface which provides access to our computer models through the website *WeDesignMedicine.com*. Using this interface, the medicine designers visualize the target underlying a particular disease, create ideas for medicines that will neutralize this target, and share what they have created all in real-time. This experience of designing medicine enriches education, inspires participation in finding cures, and provides researchers with a powerful tool. We use our expertise in modeling disease targets to process the information that the medicine designers have generated into refined and actionable knowledge. We then work with medicine makers to utilize this knowledge at various stages of the medicine making process. By doing this, we tap into the collective problem solving efforts of the medicine designers in order to improve the medicine making capabilities of the medicine makers. In turn, the medicine makers purchase our services allowing us to provide the benefits of the user interface to the medicine designers.

Our Target Market

We will charge medicine makers $20K per project. This is reasonable considering their projects cost $2M each. Our target market includes small to medium size biotech and pharmaceutical companies as well as academic institutions. There are 4300 such entities. Each entity has about 10 projects per year. This makes our TAM about $800M/year. We estimate that about 10% of these entities don’t have Computer Aided Drug Design (CADD) in-house. So our SAM becomes $8M/year. If our SOM is 1% of that, this will lead to about $800K/year of revenue. 10% SOM will lead to $8M/year revenue.

Current Marketplace Solutions / Competitive Advantage

We classify our competition based on whether they use the following technology; 1) dynamic simulations, 2) distributed computing, and 3) collective intelligence. Only within the last 5 years have computers and computer algorithms become powerful enough to adequately model the

interaction of medicines with their disease targets, known as dynamic simulations. Since this time, our competitors (to include Schrodinger® and Nimbus Discovery®) have begun to offer their biotechnology and pharmaceutical clients knowledge generated from utilizing this technology. As powerful as this technology can be, however, it is necessary to employ many instances of it when designing a medicine, a requirement which can be prohibitive to realizing its full potential. We are similar to our competitors in that we use dynamic simulations to design medicine, however, our competitive advantage lies in how we enable this technology. Through the *WeDesignMedicine.com* user interface, medicine designers are able to run dynamic simulations within their browsers. This distributed computing allows the workload to be shared among the many users of the interface. A further advantage is that these users are actively engaging and sharing in the process of generating new ideas for medicine. In this way, we can leverage the collective intelligence of the medicine designers.

Business and Revenue Model

Our model has multiple revenue streams. Our initial revenue comes through donations from the public to help build *WeDesignMedicine.com.* We then get revenue through consultations to help incorporate the website into instruction($50/hr), and for consultations from medical researchers to use our tools for design ($50/hr). Using experimental confirmation to gain credibility, we then provide consulting services for small and medium size pharmaceuticals and biotech firms ($200/hr). We also get large contracts from these firms for their bigger projects, like HTS, High Throughput Screening ($20K per project).

Milestones

Our milestones consist of starting development in March 2014, doing an alpha-test in Q3 2014, beta test in Q4 2014, launch in Q1 2015, experimental validation in Q3 2015, consulting for biotech in Q1 of 2016, winning contracts in Q1 of 2017, break even in Q1 2018 (having 1% SOM), and exit Q1 2021(having 10% SOM). We are asking for $1.2M in Q1 2015, expecting $800K/year in 2018, and $8M/year starting in 2021.

Team Members and Contact Information

We share a dream of getting medicine to those who need it. Collectively, we have experience exceeding; 14 years of R&D in industrial and government labs (to include the pharmaceutical and computer modeling/engineering fields), 5 years practicing medicine, 10 years as educators within the University of California system (to include teaching assistant and associate instructor roles), and 10 years of graduate level research in the fields of chemistry and biophysics. Through these experiences, we have managed people, projects, and resources. We have overcome setbacks to accomplish difficult objectives.

Benjamin M. Samudio (CEO) served in the United States Air Force as a Medical Journeyman for 7 years. He earned a B.Sc. in Chemistry and recently completed a 15-month graduate student internship in CADD at the Novartis Institutes for Biomedical Research. He is currently a chemistry Ph.D. candidate, associate instructor, and Child Family Institute BD Fellow at UC Davis. Benjamin specializes in chemistry, medicine/pharmaceutical industry, and education.

Nithin Dhananjayan (COO) worked for Intel Corporation for 11 years, doing custom hardware and software development, and some project management. He earned an M.Sc. Electrical Engineering from Stanford University, a B.Sc. Computer Engineering, and a B.Sc. in Mathematics from Virginia Tech. He is currently a biophysics Ph.D. student at UC Davis, with a Designated Emphasis in Biotechnology, and Teaching Assistant in general and physical chemistry. He specializes in structural computational biology.

Kevin DeMarco (CTO) worked in Lawrence Livermore National Labs as Physical Sciences directorate and intern, where he worked on nuclear cross section simulation and analysis. He received an M.Sc. in Physics, and B.Sc. in Computer Science from the University of Central Florida. He is currently a biophysics Ph.D. student at UC Davis. He is focusing on protein folding, homology modeling, molecular dynamics, and drug design. He specializes in simulation and computational physics.