

Q&A with Dr. Tania Martin-Mercado, President and CEO of Phronetik providing Genomic Testing, IT Services, Sequencing and Bioinformatics to Government and Private Sector Organizations using Artificial Intelligence to advance Clinical Research, Scientific Discovery and Healthcare



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CEOCFO: Dr. Martin-Mercado, what is the concept behind Phronetik?
Dr. Martin-Mercado: The name Phronetik is an amalgamation of the Greek words “phronesis,” which means wisdom, or capability of rational thinking, good judgment and practical virtue and “kinetic,” to move. With the advancement of technology and genomics, we want to make sure that

as we move forward, we are doing so with wisdom, applying ethics and fairness to what we are doing. That is a personal belief in not allowing the excitement around technology and medical advancement shadow the human side of its application. That being said, Phronetik provides genomics, biotechnology and IT services to government and private sector organizations. The government historically allocates the most money on scientific research, and Phronetik is a federal government contractor.

CEOCFO: Would you explain how the concern and the ethical approach comes into play day to day?

Dr. Martin-Mercado: Currently, significant attention has been given to breakthroughs in genetic engineering to fight, and in some cases, eliminate disease. Discussions and research around genetic modification for a healthier population benefits many on a global scale. CRISPR has made it very easy and cost effective to conduct this type of research in laboratories across the world. Where it becomes unethical is when genetic engineering is used to perfect the human race or force the presence of certain genetic attributes that would be considered desirable depending on what social construct you are a part of. Innovation, new technologies and ideas are what make scientific research ‘fun’, yet we must be careful to account for negative side effects or malicious intent. These concepts may seem to come from science fiction stories, but when considering how far we have come and the advancements made, fiction quickly turns into reality.

CEOCFO: Would you give us an example of typical engagements in the different areas you work?

Dr. Martin-Mercado: It really depends on the contract or project sponsor, or client. For example, our last government contract involved the collection and analysis of human microbiome, host genetic and transcriptomic profiles and behavioral analysis of study participants. This study was entirely sponsor-driven, meaning they clearly indicated what information they would like to derive from the study, the purpose of the study, the scope of it, and where we can provide added value. This includes applying machine learning algorithms and predictive analytics to further dive into the resultant data from the study. This is actually a lot of fun! During our last contract, our team built the predictive models that integrated the behavioral, metabolic, genetic and microbiome profiles across the study participants, and contributed to all the manuscripts that resulted from this research. It is at the sponsor’s discretion and we usually participate in research

that has not been published or is in the process of being published. This allows our security and data protection services to shine as well.

CEOFCO: *How do you conduct a project differently? What are you doing that sets your organization apart?*

Dr. Martin-Mercado: We are providing a holistic approach to translational and clinical research with the goal of advancing scientific discovery and healthcare. With any research study Good Clinical Practices (GCP) and Standard Operating Procedure (SOP) will be intact. Every great study must be reproducible and have solid data to back up findings, and any researcher knows this. We like to partner with our clients to dive deeper into the study by trying new techniques or solutions and applying machine learning, predictive analytics and cognitive services to see if we can pull out patterns. Several of our data scientists like to use readily available APIs, as well as create new algorithms using a number of tools. We customize our approach to a study to make the data “pop” and uncover previously undiscovered information. There is artistry and creativity in data science, genomics, and biotech, and we try to bring that vision and alternative approach to our clients.

CEOFCO: *How can you tell when AI has it right, the tipping point so that you can feel confident to use a particular algorithm for the result?*

Dr. Martin-Mercado: It is in evidence. You want something to be repeatable because what can be repeated can create a pattern. Introduce new variables into an existing pattern and a new, previously unanticipated pattern may result. In practical terms, this is really the key. What we all want is to prevent, not just react, to healthcare issues in our lives and the lives of our loved ones. In order to be successful at this we must evaluate existing diseases, how those diseases adapt, thrive, mutate, and perhaps die, to learn how to combat and/or eliminate them. The elimination of disease not only exists in the vaccines and medications that kill them, but in our lifestyle and environment – what are we doing to help or prevent disease spread, or mutation, from a population and individual perspective? These are the questions I have, and that many researchers and scientists have and are trying to answer. There is no “one” answer. That is where artificial and augmented intelligence continues to grow. The evidence is not only presented to the researcher or audience, but ideally the AI learns from the evidence, creating answers to more questions, perhaps even uncovering questions that have not been asked yet. It all starts with what is repeatable.

CEOFCO: *How do you reach out to potential customers and how do people find you?*

Dr. Martin-Mercado: We are still in the “startup phase”. Biotechnology companies seem to have their own lifecycle, and we are well within that cycle. We do as much free advertising as possible, and we also respond to public solicitations from the government such as RFQs, RFPs and RFIs to let the government know our company is out here, tiny but powerful. That is usually how we approach the government and private organizations in general. We also partner with several universities to expand our lab capabilities and give us access to new researchers and interns.

CEOFCO: *What have you learned about dealing with the government as you have started this process?*

Dr. Martin-Mercado: We are women-owned, veteran-owned and other great, small-business set-asides, but what sets us apart is that we are all of these things in the science and technology sector. There are not many biotechnology companies run by women, much less Veterans, unfortunately, and I would love to see that change. I am still amazed at the number of people who think Veterans are all the same and have low regard for us. The number of people that approach me with “You’re a Veteran? AND you went to Columbia University? AND you have a PhD?” is astounding. I had one gentleman who only saw my title and last name, assumed I was male, and said out loud, “Wow, you’re a woman,” and it took everything in me not to respond with “Yes, and we vote too!” It’s not what they’re saying, but the disbelief and (in some cases) disdain in *how* they’re saying it – but that is a rant for another day. While on one hand, our government set-asides are great differentiators, on the other hand, it makes our entry point that much harder just to be taken seriously. We are not huge like other biotechnology companies that have thousands of employees and a long past performance history with the National Institutes of Health, Veteran’s Health and other national and state government entities. I have learned that it takes undying, unwavering persistence in the face of a lot of people saying “no”, or just ignoring you completely. Our size makes us extremely agile, and we can pivot quickly. To that point, we are working on proprietary artificial intelligence so that we can be proactive when approaching government entities and research institutions. Our focus is to be able to say, “Phronetik offers this unique product and service, and no one else does”. We are not there yet, but we are en route with our product development.

CEOFCO: *How do you stay ahead or up to date with the science and the technology since you are working in two areas, both of which have advancements every time you blink?*

Dr. Martin-Mercado: This might be somewhat obvious, but science and technology genuinely interest me. I love looking for and reading about new innovations, advancements and ideas. One of the best free resources is actually LinkedIn

because I can see what is going in the biotechnology space on an international level. That is another key: looking outside of the United States to see what other countries are doing, how they are doing it and what their results have been. Not every country has the barriers that the United States does, so in some cases new, and sometimes controversial, techniques are being done elsewhere. Gene editing and manipulation are actively researched and current trials are taking place. It is so interesting to see the results, positive and negative. You are not going to turn on mainstream news and see these discoveries. You have to seek it out, and for me this is very easy because I am so interested in it.

CEOCFO: *What are you surprised we can do today with technology and what are you surprised we cannot do yet?*

Dr. Martin-Mercado: I am impressed with how far breast cancer research has come. My mother passed away from breast cancer and she suffered from it through the 80s. Look how far we have come since 1980! I have gotten some of the DNA tests done to see if I am genetically predisposed. Genetic testing for breast cancer was not discussed with my mother in the 80s. We had no family history of it, so even if it was it would not have occurred to my mom or anyone else to get tested. It may seem that everyone talks about breast cancer. It is one of the most researched diseases out there, but just between the 80s and today, look how far we have come with genetic testing and individualized treatment. It is amazing to me because I have seen the progress in my lifetime. I am not even halfway through my life, under an ordinary set of circumstances, so these advancements are amazing. What I am waiting to see (and if you do a general search of this, it is being actively worked on) more augmented intelligence in surgery. I am waiting to see robotic surgery become commonplace. I think we are very close to that. I say augmented because there does need to be a human factor there. You cannot take away intuitiveness (where despite evidence to the contrary, a course of action is 'right'), and it cannot be programmed - not right now anyway. I am waiting for that and I think it will come sooner rather than later, where simple outpatient procedures are done by a robot, with some physician supervision. Imagine how many more surgeries could be done? I can also see how this will eventually be a more cost-effective option.

CEOCFO: *How is business at Phronetik?*

Dr. Martin-Mercado: We ebb and flow like any other small business. Right now, we are in the process of responding to some exciting government opportunities under the NIH. We do not respond to all of them because sometimes even I can tell that something is too big and we are out-gunned by our competition, but there are a few out there that we are targeting. We are simultaneously working on our proprietary artificial intelligence engine currently under development. As I said before, we are en route, and I'm excited about our direction.

