Sensor
KINESIS CORPORATION

CREATING THE NEW STANDARD

in diagnostic medicene

"An experiment is a question which science poses to Nature, and a measurement is the recording of Nature's answer."

– MAX PLANCK, 1858 TO 1947
Theoretical Physicist

SENSOR-KINESIS

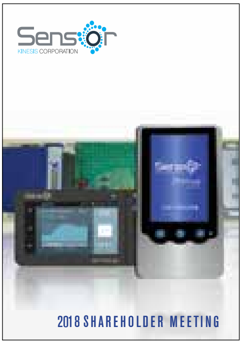
Sensor-Kinesis Corp. ("SKC") is a development stage medical device technology company that is creating a proprietary, flexible microbiosensor integrated computer chip capable of detecting specific biomarkers for targeted disease pathogens. This biosensor technology is being developed to detect and measure biological data and translate it into digital information for analysis and storage. The resulting pathogenic detection can then be immediately shared via any smart device through the cloud to the appropriate treating or management organization.

As a result, our proprietary innovation allows physicians, healthcare organizations, and individuals the ability to detect disease and other detractors to our health at the earliest stage possible. The applications for this technology is both universal and versatile encompassing all social industries including healthcare, infectious disease, food safety, and more.

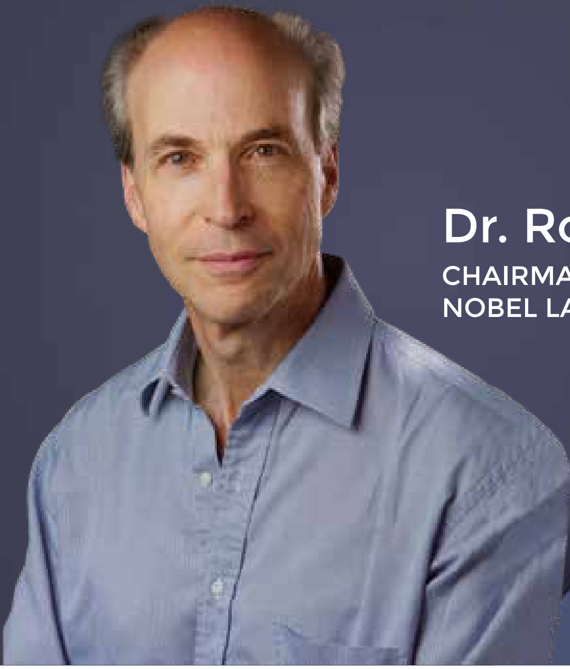
on the **COVER**

SKC's Primus® and Optikus® Biosensor Readers

SKC's has developed the first version prototypes for its commercial handheld biosensor reader. Shown here are both the first stage version, named Primus®, and the next-generation device called Optikus® with the original biosensor development reader in the background. The current devices integrate all the envisioned functionality for a low-cost, portable handheld device capable of using a prepared biosensor chip to detect a targeted pathogenic biomarker and display the results within minutes.



to our shareholders



Dr. Roger Kornberg
CHAIRMAN and
NOBEL LAUREATE

"I would like to begin my letter with some very exciting news. 2018 was an exceptional year for SKC. The company accomplished significant milestones towards the development and commercialization of our biosensor technology. The most important of these were the validation of our technology for commercial applications and the establishment of the Limit-of-Detection capability of the platform.

SKC's vision has been focused on its fundamental DNA level linking human biology and the digital domain. The company believes that this concept will become an essential point of connectivity in the upcoming Fourth Industrial Revolution we are beginning to see unfold. Bridging the human point-of-care diagnostic vacuum with cloud connectivity and big data informatics at digital speed is the mainstay of our application. Democratizing diagnostic medicine has never been closer to a commercial reality as it is in 2018, and our technology will make it happen. The disposable one-time use cartridge will link billions of smart phones via the cloud to a physician or hospital network, with diagnostic test result creating a business model which is agile and viral. "

"When Sensor-Kinesis was founded, the mission statement was the development of new biosensing modalities. This past year, and continuing into 2019, we have looked at several parallel electrical sensor technologies for molecular amplification. Utilizing cyclic voltammetry in an electrochemical cell, we are experimenting with sending liposomes carrying ions to a potentiostat sensor, that when burst, could yield femtogram resolution.

A new biochemical probe combined with novel sensor architecture employing carbon nanotube FETs, Gallium Nitrate FETs, or high mobility electron transistors are just some of the research efforts conducted in my lab in Menlo Park.

SKC is embarked on an exciting path of redefining the field of diagnostic medicine. 2019 will see us approaching new horizons in this venture."

Frank Adell

FOUNDER and
CHIEF EXECUTIVE OFFICER

Josh Shachar

FOUNDER and CHIEF INNOVATION OFFICER

"The ability to make crucial and accurate decisions based on real time data is critical to patient care. Sensor-Kinesis Corporation (SKC) is answering this need with the development of a platform point-of-care-device. Our goal is to help healthcare workers be able to obtain and interpret data in minutes, rather than hours, with the accuracy and specificity of much more time-consuming assays. Our first two markers will be on troponin, used for determining presence of a cardiac infarct, and HIV. With these two assays, SKC will demonstrate the ability to detect the elevation of a protein in pg/ml, and the presence of a viral pathogen, such as HIV. Each of these two tests by themselves will change the landscape of healthcare diagnostics. However, the beauty of the SKC technology is that it is a platform that can be applied to almost every disorder where is an elevation in DNA, protein, or cellular particle. We are extremely optimistic that our technology will prevail over all other developments in this increasingly competitive landscape, leading to novel and disruptive strategies that will enhance the welfare of our patients."

"In the field of diagnostic device development, it is remarkable that an enterprise can be summed up by a single concept: the "Limit of Detection" (LOD). The limit of detection defines the biochemistry, electronic scheme, computational biology and analytics, as well as disease models and exit strategies for the technology platform. The LOD encapsulates the content of our work efforts, from the chemists to the engineers, to achieve the mandated goal set forth by FDA guidelines.

The value of our biochemical probe is derived from its ability to discern consistently without false positive or negative the concentration of a biological species, be it virus, protein, DNA or RNA. For all these target analytes, the device must be able to resolve, with statistical confidence, a range of 8-40 picograms of mass in a volume of one milliliter.

In summary our goal in achieving a LOD resolution of 8-40 pg/ml will be the nexus by which our technology's entry into the commercial marketplace will create not only strategic advantage, but a change in the diagnostic standard as we know it.

Dr. Thomas Chen

FOUNDER and
CHIEF NEUROSURGEON OFFICER


GOING WHERE NO ONE
HAS GONE BEFORE

SCENE: Surface of alien planet. Dr. McCoy and Spock are examining blast marks on shuttlecraft as Captain Kirk comes into view carrying the body of a crew member.

KIRK

Bones, Spock. Help me.

Kirk puts body on ground as Dr. McCoy and Spock rush over.

MCCOY

What happened Jim.

KIRK

I don't know. I found him in the clearing over there.

Dr. McCoy takes out medical tricorder and passes it over the crewman's body.

MCCOY

Elevated heart rate and body temperature, kidney function failing, signs of deep tissue radiation exposure. Jim this man is dying.

KIRK

What do we do Bones.

McCoy injects crewman with tranquilizer

MCCOY

I can stabilize him but we need to get him back to the ship.

Kirk pulls out his communicator.

KIRK

Transporter. Emergency transport two to Sick Bay.

Transporter beam shimmers and transports Dr. McCoy and the crewman to the Enterprise's Sick Bay.

Creating A New Paradigm

Though the above is not an actual scene from the 1960's groundbreaking Star Trek series, the imagery it invokes is all too familiar even to this day. Ever since Gene Roddenberry first envisioned his futuristic world, the ideas that were distant fantasy at that time have driven much of the innovation that is a reality now.

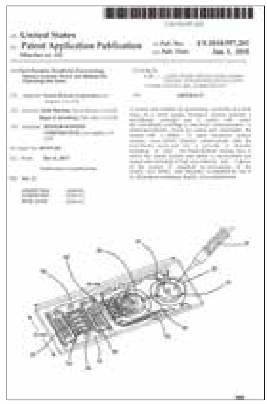
Many scientists still give credit to the show for having inspired development in areas such as voice recognition, mobile communication, and wireless computing. Still the one technology that has eluded inventors and engineers has been the device that Dr. McCoy wielded so casually throughout the original series and all its iterations since; the medical tricorder. With just a pass of his hand over an area of interest, the tricorder was able to produce immediate information about the subject's composition, vital statistics and specific cause of concern whether it was a rare alien virus or the internal damage caused by a Klingon phaser.

> *"Creating a real-world medical tricorder has been one of the Holy Grails of medical advancement."*

Ever since that time, creating a real-world medical tricorder has been one of the Holy Grails of medical technology advancement. In 2012, the Qualcomm Foundation along with XPRIZE offered a $10 million prize to anyone who could develop a device that would emulate Star Trek's medical tricorder by being able to diagnose a set of 13 medical conditions independent of a healthcare professional or facility, while also continuously measuring five vital signs. In 2017, a $2.6 million award went to the appropriately named Final Frontier company for its DxtER technology. The technology fell far short of the capabilities of Dr. McCoy's tricorder but the competition showed the continued interest that scientists, engineers, and indeed, every person has in seeing the creation of a portable device that can quickly and effectively diagnose the presence of any health issue at the touch of a button. Sensor-Kinesis Corporation (SKC) has proven that the vision of such a device is not only possible, but the delivery of this technology is a near-future reality.

With the filing of its first patent in 2009, SKC has been singular in its focus to create the world's first handheld, portable, low-cost medical technology capable of providing earliest-stage detection of disease pathogens. Through its research and development efforts, SKC has been able to show that its unique biosensor technology can accurately detect the presence of disease biomarkers at a level that has not been possible in a portable system to date.

With proof of concept established, the first prototype reader constructed, and the major engineering completed for the disposable biosensor chip, SKC has the goal line in sight of being able to bring a first generation product to market. At its current development level, the SKC biosensor technology has been able to accurately identify pathogens of interest at a level of 4ng./ml. To add perspective to this, a nanogram is one billionth of a gram. A dollar bill weighs about 1 gram. So, imagine cutting that bill into 1000 pieces and then taking one of those pieces and cutting it into 1000 smaller pieces. Now take one of those and cut it into another 1000 pieces and take four of those pieces and stir them into four drops of water and try to find



SKC has filed ten patents related to its biosensor technology IP. The latest is shown above.

them. Or another way of looking at it, imagine a swimmer in an Olympic size swimming pool. You could spot them very quickly, but now increase the pool size to be ten thousand times larger and one begins to understand the incredible concentration scale of detection that SKC has been able to achieve thus far.

At this stage, there are many potential commercial applications that SKC could target, but though its focus has been singular through the years, SKC vision has not. Upon the realization of what SKC's biosensor technology was capable of doing, it became apparent that the vision for the application and the impact this technology could be one of the major keys to bringing about the democratization of medicine for everyone.

Since the beginning of modern medicine, disease treatment has always been in the hands of physicians who have the skill and understanding to diagnose and facilitate healing. Over the past century the growth of a population with critical needs for immediate disease diagnostic and care has become so big that being able to procure deliver effective diagnostic care and treatment has become much more difficult and complex. As technology becomes more sophisticated and costlier diagnostics and treatment for many common life-threatening disease states has had to become more centralized to highly metropolitanized areas leaving those in need with the choice of either traveling to a medical center, sending test and diagnostic

Democratizing Medicine

According to the most recent World Health Organization report, 400 million people do not have access to essential healthcare services and 6% of people in low- and middle-income countries are tipped into or pushed further into extreme poverty because of health spending.

SKC's vision is to tip help the scale back to level by providing everyone access to affordable and effective diagnostic treatment that can allow every individual to gain more control over their healthcare needs.

samples into a remote facility for analysis, or just going without care. For those that are able to seek diagnostic treatment, there is still the barrier between time to detect and cost of detection which often means that actionable results arrive either when a disease state has significantly advanced or the cost of diagnostics and the treatment for advanced disease care no longer is affordable even with insurance and public safety nets.

In being able to create a device that will allow not just the trained health specialist, but virtually anyone with a connected device to be able to quickly diagnose a potential disease state and receive immediate actionable quantitative results, will finally level the playing field for everyone to be able to take control of their own health needs.

This democratization of medicine in the area of disease diagnostics has implications for a paradigm shift that will be no less an impact than those brought on by the industrial revolution and the information age. Indeed, the ability to bridge the biologic world to the digital domain and connect the two to the global Internet-of-things remains one of the last major frontiers to be achieved.

In the area of changing the diagnostic standard of care, SKC's biosensor technology now sits at the forefront of innovation in being able to finally make this dream a reality.

OPTIKUS® v1 - A look at the future of diagnostic medicine

OPTIKUS® is SKC's latest design iteration for the portable biosensor reader. Several new improvements are being considered in this concept for the reader. Chief among these is the inclusion of the next-generation biosensor and improved microfluidics which will provide a Level-of-Detection standard into the picogram range through a new process that virtually doubles the current biosensor's resolution.

the biosensor

The core of SKC's technology lies with its proprietary innovation of a wholly new biosensor chip technology. The SKC biosensor is an integrated, flexible computer chip whose primary function is to detect specific pathogenic biomarkers of interest and display reliable data on the presence and quantity of that biomarker in a known sample.

That information can then be linked via any smart device and shared through cloud technology allowing for diagnostic and therapeutic action to be initiated. The applications for the SKC biosensor chip technology are both universal and versatile encompassing a wide array of industries including healthcare, infectious disease, food safety, pharmaceuticals, medical device, agriculture, laboratories, bio-defense, and commercial transport.

What before has required a real-world lab with massively expensive equipment, highly specialized technicians and all the requisite communication and delivery infrastructure to produce targeted disease diagnostics, SKC has now reduced to a virtual lab-on-a-chip (LOC). SKC's biosensing modality automates the entire biochemical sequence of detecting the presence of a targeted pathogen's biomarker suspended within a minute fluid assay such as blood, saliva, or urine, and detects, measures, analyzes and reports the results in a matter of minutes, all while costing a fraction of what a traditional lab test would cost.

"SKC has reduced what traditionally required a real-world lab to a virtual Lab-On-A-Chip."

Though modern laboratories have the ability to detect pathogenic diseases at very low concentrations, being able to bring these very small Levels-of-Detection (LOD) and Time-of-Detection (TOD) into a functioning handheld portable device has been beyond the realm of market-feasible engineering. SKC's research and development has been able to make significant breakthroughs in these areas and is currently capable of detecting pathogenic biomarkers down to a LOD of 4ng/ml in a matter of minutes.

The impact this poses for real-world applications is stunning and dramatic. Even at this LOD and TOD limit, a device of this nature could feasibly detect HIV antibodies far in advance of any symptomatic display of the disease, or the presence of a disease contagion such as Ebola long before it has a chance to spread to potential epidemic or pandemic proportions.

SKC's current target of interest is in the detection of Troponin, a protein produced by the body which is integral to muscle contraction but in high levels is a major indicator of pending cardiac episodes such as a heart attack. Currently someone with a concern of having a heart attack has to be transported to a hospital where a diagnostic test for elevated levels of Troponin is run. Depending on the results, which generally can take two or more hours to complete, the treating physician must wait before they are able to take whatever measures are needed. Regardless of whether the person is having a heart attack or not, valuable time and resources must be brought to bear to come to a point where effective prognostic healthcare can be initiated. For the person who is just having a symptomatic experience of a heart attack but whose source might just be indigestion, they have now incurred a substantive expense of money and time just to be sent home with a bill and an antacid.

But what if effective diagnostics for Troponin could be done by an EMT upon arrival to the patient, or if this test could be performed by the individual himself. The savings in time and money to be able to move from symptom onset to treatment is radically reduced.

Such an advance illustrates the power of fast, portable biosensing. No longer is a test or medical device limited to the regime of preventative medicine or diagnostics, but it can also be an integral part of a life-saving medical emergency process.

While SKC's achievements to this LOD and TOD are clearly substantive, the goal of the company is to bring the biosensor's ability to detect pathogens down an additional two orders of magnitude.

In the coming year, SKC is targeting a resolution of detection of 50pg/ml. This would bring the biosensor's capabilities to that of what can only be done in highly specialized ELISA and PCR wet labs.

In the case of ELISA's fluorescent tagging, detection of a pathogen generally requires a minimum of 24 hours to prime a sample, incubate it overnight, wash, and then re-incubate the sample before it can be finally processed under a fluorescent optical sensing device. Add to this the time of sample collection, transport to the facility, processing of test results, report production and delivery of results, and an ELISA test can easily take a week or more to be accomplished. In the case of a contagion such as Zika or Ebola, that type of time-frame means not simply the life or death of the sampled patient, but the potential lives of thousands and more who may become infected during this time.

For those that live in less developed or harder to reach areas of the globe, development of SKC's envisioned biosensor reader will bring a life-changing ability from a diagnostic standpoint to assure and maintain the health of its population as assuredly as those in the heart of any western metropolis.

PRIMUS® v1 - SKC's First Generation Handheld Biosensor Reader

PRIMUS® is SKC's prototype for the portable biosensor reader. PRIMUS® proved that all the components necessary for a fully functional technology capable of providing reliable diagnostic information on a pathogen of concern could be miniaturized and work in a small handheld device in a Time-to-Detection time-frame of minutes rather than days.

microfluidics

2018 saw major advancements in SKC's development of its Micro Fluidic Chamber (MFC) for the biosensor platform. If the Biosensor is the heart of the platform, then the MFC is the engine and circulatory system for the technology.

In simplest terms, the MFC provides the system by which a sample fluid can be introduced and prepared internally before being efficiently moved across the surface of the biosensor in order for pathogen detection to take place.

For a device that must be handheld and portable, it is necessary to take all of the components of the full-scale lab system and miniaturize it to disposable cartridge the size of a small thumb drive. The necessary steps of introduction, separation, mixing, conjugation, detection and cleanup must be able to exist in tandem with one another on a miniature Lab-on-a-Chip configuration that will allow the average to simply insert a sample and obtain a measurement without needing external laboratory equipment or personnel.

Miniaturization of the majority of the components required for such a device is fairly straightforward, but when dealing with the scales required for pathogen detection at the levels SKC is developing, it becomes a very convoluted math, physics and engineering problem. In addition to the problem of moving a sample across a biosensor in a manner which will produce repeatable, reliable results; a process which in essence is a mechanical biologic mechanism, the MFC has to also be able to separate and prepare a complex sample assay. In the case of SKC's current target of detecting Troponin, the blood sample must be filtered to separate the whole cells from the plasma fluid. From there the filtered sample must be mixed with a buffer reagent and mass-amplified nanoparticles that have the specific Troponin antibody attached before the sample is then passed over the antibody-conjugated biosensor surface. Once detection and measurement have taken place, the sample then has to move into a disposal well and surface

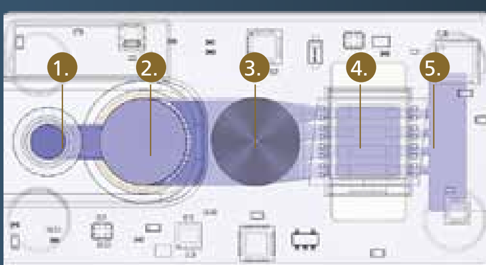
> *"SKC's microfluidic chamber represents a revolution in design for its biosensor technology."*

of the biosensor flushed to remove any unconjugated particles. The challenge is immense.

In designing a functioning microfluidic device, scale becomes a major impediment to what seems a natural law of physics in fluid movement that a fluid unimpeded will flow. In microfluidics, the inertia of a fluid is much greater than any force naturally felt on the fluid, and as a result fluid can resist flow even if there is nothing in front of it.

The Microfluidic Chamber

SKC has created a revolutionary new concept in microfluidic architecture for its portable biosensor technology. SKC has miniaturized all the components necessary to take a sample form intake to disposal storage in a design no larger than silver dollar.

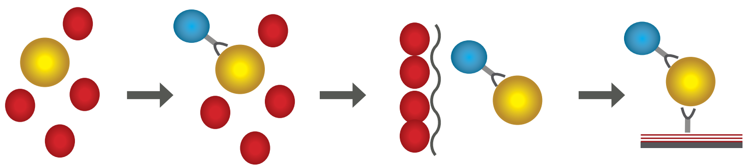


1. Intake Septum – Fluid sample is injected at this point.
2. Mixing Chamber – Mass amplified antigen and buffer is mixed into the sample solution.
3. Separation Chamber – Sample is filtered to separate the bonded analyte from the blood serum.
4. Biosensor Plate – Sample is transported over the sensing lanes in the biosensor for detection of the pathogenic biomarker analyte.
5. Disposal Storage – The sample is moved to a waste storage container once detection is complete.

As the biosensor works by detecting pathogenic molecules in a sample solution by allowing these molecules to bind with their corresponding antibodies, optimizing the ability for this to occur is the key to the effectiveness of the technology. The Level-of-Detection (LOD) currently achieved by SKC is 4ng/ml, which is equivalent to throwing a life preserver to that one swimmer who is somewhere in the midst of 10,000 Olympic-size swimming pools. The scale of the target pathogen to the volume of solution it is in, is tremendous. Now consider that the life preserver must get to the swimmer in a matter of minutes and the problem becomes even more complicated. Either the ability of the life preserver to come in contact with the swimmer has to be increased or the visibility of the swimmer to be seen by the person with

Going With The Flow

The Micro Fluidic Chamber is the engine that moves a minute assay of a pathogen of interest from its original state to a position of detectability by the biosensor.



the life preserver has to be magnified.

When faced with such a multiform problem, one thing is clear, absolutely no amount of engineering can change the laws of physics. No invention will ever allow an object to fall to the ground faster than the laws of gravity dictates, and no amount of manipulation will force the bonding of a pathogenic antigen to its corresponding antibody to occur faster than dictated by the antibody-antigen association rate. Indeed, doing so would negate any usable detection to be done. In developing an answer to this problem, SKC has worked a multi-phase solution that allows for viable detection to occur. The first in essence, was to increase the visible size of the antibodies. Through a completely unique process of mass amplification that binds the small antibodies to much larges magnetic-bead nanoparticles, SKC has effectively increased the visibility of the antibodies to the analyte of interest by 1000 fold. It is like standing the antibodies on the shoulders of giants. The ability for the anti-body and the antigen to see and bind to each other is tremendously enhanced.

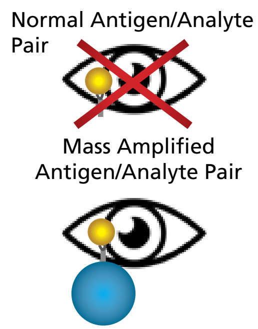
The second area of concern was to create a controlled, predictable, and repeatable flow of the sample solution after conjugation has occurred to move across the biosensor target plane in order for detection to occur. In an ELISA-based test, attraction of the antigen to the antibody occurs in a sample that is completely motionless. The antigen is allowed to diffuse, or settle in the solution to the antibody at the bottom of the cell tray. Though effective, this is one of the main reasons why an ELISA test takes so long. When building a biomedical device where one of the three major engineering requirements is time to detection, the need for a novel microfluidic solution is apparent.

To this end, SKC has created a fluid-control system that allows the sample solution, and the antigens within it, to be first mixed with the mass-enhanced antibodies in an efficient manner that optimizes binding to create the complex bead needed for detection by the biosensor. The flow dynamic then creates a constant flow pressure across the biosensor where a magnetic field can pull the complex beads down where they can be captured by the antibodies that are conjugated on the surface of the sensor. This process optimizes the number of antigen/antibody bindings to happen in a short period of time. Indeed, the chance of exposure of the antigen to the capture radius of the antibody for detection by the biosensor is increased to 98% effectiveness.

Though refinements continue, this year saw the development the MFC from theory, to design, to first generation prototypes. With the biggest hurdles met, the challenge this year is to refine the MFC's engineering to its most efficient economic design in order to support lowering the LOD levels into the 50pg/ml range. In addition, SKC is now working with manufacturers to be able to scale the production of the MFC for mass production.

Why Mass Amplification?

SKC has created a novel approach to pathogen detection using mass amplification of the antigen. Though the ability to bind an antigen to its corresponding analyte is straight forward enough, making that bonded pair visible to detection is like finding a needle in a haystack, except that this needle is more than a thousand times smaller than a single human hair. By first binding the antigen to a particle that is much greater in size and weight, SKC has made detection of the pathogenic biomarker possible at a level that meets the standard for clinical relevancy.



Lowering The Noise

Because of scale, trying to detect a pathogen is far more difficult than trying to detect a visible object in normal size ranges; for example, a specific coin in a pile of change. Since the basis for SKC's biosensor uses acoustic (sound) energy for detection, at the molecular level any sound energy produced by surrounding objects can create distortion, or noise that will skew any results. SKC's engineering team has made tremendous progress in finding ways to reduce this noise in order to make accurate and reliable detection a reality.

Detection of an object is impeded by the amount of noise surrounding it.

Finding ways to remove undesired and unrelated noise is needed to make detection possible.

Even after removing unrelated noise, detection can be hampered by any noise of a similar nature.

Elimination of all non-target noise is the goal of SKC in optimizing its detection efficacy.

SKC'S Engineering Team continues to make progress in finding ways to eliminate or minimize all non-target specific noise for optimizing detection results. This includes:

- Mechanical contacts
- Electrical contacts Jitter specifications of the RF source and clock
- Cables and connections
- RF source shielding
- Sensor IDT design
- Waveguide design
- Buss layer design/thickness

biology and chemistry

Optimizing the ability for a pathogen of interest to be detected by SKC's biosensor technology is the primary task of SKC's Biology and Chemistry Lab. The team's sole focus is on how to best enhance the ability for corresponding antigens and antibodies to bind together to maximize their detectability by the biosensor.

The principle behind the SKC biosensor platform is to detect a change in a wave phase of a signal that travels through the biosensor and is attenuated by the buildup of a target of interest on the sensing surface. Similar to the concept of measuring how the energy of an ocean wave that is rolling across open water is changed when it encounters an obstruction such as a pier, the impedance that such a disruption creates is measurable and calculable. The size and shape of the pier creates a unique resistive force to the incoming wave that causes it to slow and lag behind the waves that don't interact with the pier. SKC's biosensor technology functions in a similar way in that a known acoustic wave travels across the biosensor that is modulated when it interfaces with the conjugated antigen/antibodies on the sensor that impede the wave. The difference from what is transmitted and what is received, known as the phase differential, is the detection mechanism by which the SKC biosensor works.

"SKC has proved that detection of a pathogen in a portable handheld device in a time-frame far shorter than current ELISA and PCR modalities allow is possible."

Measuring resistance seems a simple enough physics problem. Indeed, all of our electronics from the outlet in your home to the most sophisticated of computers are based on understanding how electrical flow can be manipulated by creating resistance to its property to move from source to ground. When we enter into the molecular realm though, we are presented with an entirely new set of challenges. Though understanding of this realm is comprehensive, the application of usable nanotechnology that is capable of interfacing with some of the smallest objects in the universe, individual proteins, remains a forefront in technological development.

SKC's team has made great strides in the preceding years in taking existing research and application for pathogen detection and bringing it from working theory to practical application and testing in order to validate the biosensor concept. Testing in 2017 proved that SKC's biosensor was consistently able to detect the presence of a specific biomarker, in this case hemagglutinin, which green-lighted the point of care diagnostic project which had been established as the company's first product for point-of-entry to market.

Focus was moved to developing the functionality of the biosensor to detect a pathogen of interest that would prove a viable first step path to commercialization. After internal discussion amongst the management and the clinical advisory board, the company decided to focus its efforts on the detection of human cardiac troponin (cTn), a protein which is integral to muscle contraction but in spiked concentrations indicates infarction, or heart failure. Though the chemistry and biology of the protein is well understood from an antigen/antibody standpoint, being able to take that understanding to allow the biosensor to detect and quantify it posed several problems.

Although measuring the presence of a conjugated antigen/antibody pair is simple enough when the concentration of these is extremely high in a given sample, SKC's goal of being able to not only detect the presence but the quantity of that pair at a diagnostic level of even 4ng/ml proved to be challenging. The mass weight of a single bonded antigen/antibody is approximately 300 kilodaltons, or 2×10-20 of an ounce. As you can imagine, the resistance that something so small has on any moving force is minuscule. It became very apparent that a method needed to be found that would amplify the mass signal of the bonded antigen/antibody in order for the signal impedance to be distinct enough to be detected on our chip

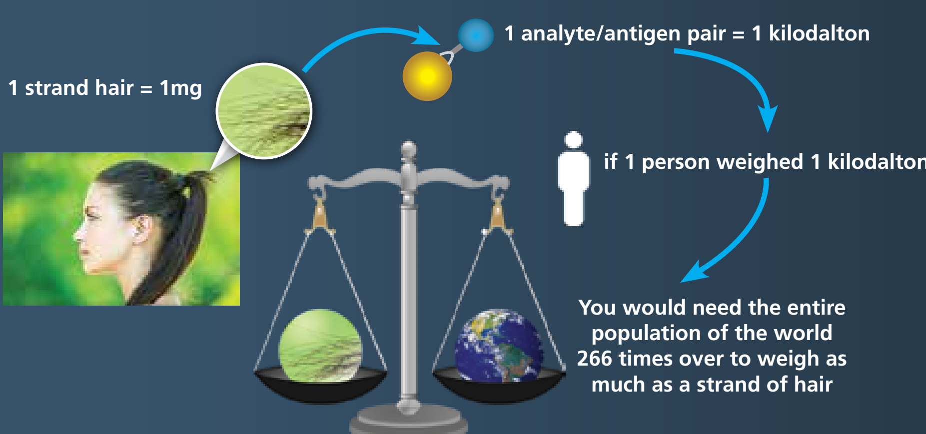
2018 saw the advancement of this issue manifest in two major ways. The first was determining the feasibility that mass amplification could be done in a manner which would work with the biosensor. To this end, the team began working with gold nanoparticles as a foundation for mass amplification. A gold nanoparticle is a small gold crystalline participle approximately 10 nanometers in size, to which capture antibodies are bound. When bound to a troponin, the mass of the complex increases thousands of times, allowing for a vast increase in the mass contribution of a single troponin molecule. The mass amplification was a fundamental biochemical development that unlocked orders

Sizing Things Up

In trying to comprehend the complexity SKC's engineers face for creating a new standard for diagnostic medicine, understanding the scale of the world in which they are working is important. Although at this cellular and molecular level, it becomes very hard to make meaningful comparisons. As an example, let's look at the very core challenge that the biosensor must perform; counting how many antigen/antibody pairs are in a known solution volume in order to extrapolate the level of pathogen infection that may exist in an organism.

At this level a molecule's weight is measured in units called kilodaltons. A typical antigen/antibody bonded pair weighs around 300 kilodaltons. To put that in perspective, a single human hair weighs about one micro-gram. To create the same mass with bonded antigen/antibody pairs you would need more than two trillion of these amassed in one place to weigh as much as that single strand of hair; and even then you would not be able to see that collection with the naked human eye.

By putting this in perspective, one has to be amazed at the ability and dedication the SKC Engineering Team is bringing to creating the vision for the SKC Biosensor technology platform.

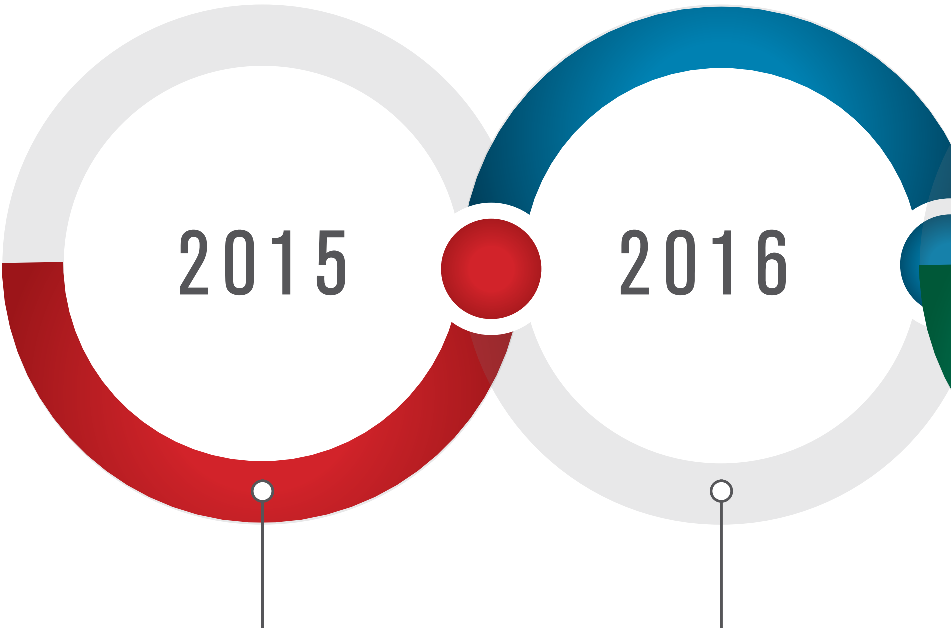


of magnitude of potential for the biosensor in a way that hadn't been achieved before. This development has driven the development of the microfluidic as well, as conjugating a gold nanoparticle to a cTn molecule is not trivial, especially when the time restrictions we have placed on the testing protocol are factored. But advancements in surface chemistry techniques in our Los Angeles lab, and genetically modified antibodies that express an increased propensity for capture created in our Menlo Park lab, have allowed for a process that has been refined to function as needed in timescales that allow the biosensor to meet the Time-to-Detection standard that had been established.

The second major advancement was the discovery that by utilizing magnetic nanoparticles, the analyte could be drawn to the sensor surface by using electromagnets that could eliminate diffusion timescales entirely. The team, having a breadth of experience with magnetics and nano-ferritic materials, quickly adapted the gold nanoparticle conjugation scheme, but instead utilized magnetic nanoparticles that could be modulated in the fluid sample by the use of magnets. Additionally, the magnetic nanobeads, also had the advantage of being even larger than the gold nanoparticles, allowing for a greater mass amplification of the analyte on the sensor.

Research in the second half of 2018 has been on the testing of a variety of magnetic nanobeads to determine which of these would prove the best candidate for the application. Using HIV expression proteins known as GP24 that are present in the body at the initial onset of HIV exposure, the team has been able to identify candidates that can be conjugated with a target antibody to create a measurable phase shift when placed on the surface of the biosensor. During the final quarter of 2018, the team hopes to finish initial testing of the nanobeads for the GP24 diagnostic scheme using the SAW to establish a limit of detection for the particles. Once complete, the focus of the biology team for the first half of 2019 will be on optimizing the chemistry for the affinity bonding of troponin as well.

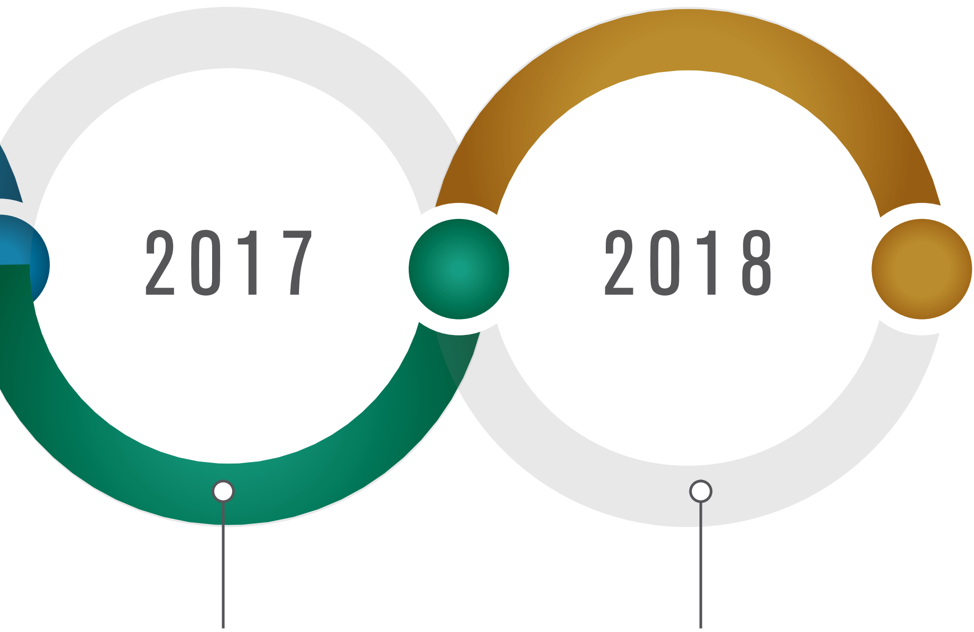
milestones **achieved**



- SKC files for incorporation
- Begins consolidation of IP for patents and technology protection
- Initial feasibility studies commence on biosensor platform
- Executive management team created for development of business and research strategy

- Receives $20M funding from TACO Ventures
- Forms strategic alignments with:
  - Stanford University *Research*
  - SCRIPPS Research *Research Partnering*
  - U.S. National Lab *Biosensor Development*
  - XEROX *ACARB R&D*

Since its founding in 2015, SKC has continued to make tremendous strides forward in its pioneering work for developing its biosensor technology. Far from a complete listing, here are some of the milestones that have been met so far.



2017

- Creation of development labs in Los Angeles, Menlo Park and Inglewood
- Finalized all initial research for Proof-of-Concept protocols
- Established the standards needed for LOD and TOD thresholds
- Validated biosensor's ability to consistently detect virus (hemagglutinin)
- Built clean room facility at LA lab to facilitate MFC production
- Created first generation prototype for handheld reader named PRIMUS®

2018

- Validated ability of the biosensor to detect pathogenic biomarkers (troponin and HIV) accurately at a level of 4ng/ml
- Developed method for mass amplification of antigen using gold nanoparticles
- Expanded mass amplification technique to include magnetic nanobeads
- Refined design of microfluidic chamber for optimized flow control of sample from introduction to disposal
- Began development of OPTIKUS® reader to facilitate the lowering of LOD to 50pg/ml level

going **forward**

SKC has established a set of very high goals for its development progress path for the first half of 2019. Although refinement and development for market commercialization of its current biosensor technology platform will continue to be a large area of focus, the primary goal of the engineering teams will be in bringing the biosensor's LOD threshold from its current 4ng/ml to a diagnostic standard of between 50 to 100 picograms per milliliter.

Q1 – Q2 GOALS

- Finish development of new RF Loop for compatibility with 650 MHz biosensor
- Refine assay testing on 325 MHz biosensor
- Conduct detection studies of HIV and troponin with existing biosensor using magnetic beads.
- Finalize new RF circuit system to begin validation.
- Begin production and mechanical optimization of the 650 MHz biosensor chip.
- Begin validation of 650 MHz biosensor
- Finalize development and prototype of new disposable microfluidic cartridge to include on-board blood separation, magnetic propulsion, and delivery of analytes payload to sensor surface


SKC Network
20%
Auto Test
In Progress
SAVE
Sensor
OPTIKUS

sensor-kinesis executive team

SKC's Executive Team is comprised of high-experience individuals who have accumulated substantive track records of success in their specific fields of endeavor. Their dynamic and targeted focus has allowed SKC to meet all the challenges of bringing a wholly new medical technology innovation from concept to pre-market readiness. The company is now well-positioned to take that success from the lab to the marketplace to provide no less than a paradigm shift in the field of early-disease diagnostic detection.

Chris **Bissell**
CHIEF FINANCIAL OFFICER

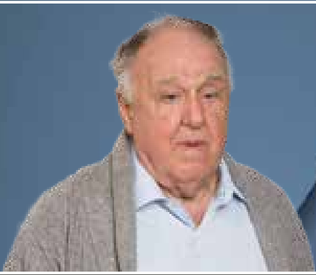
Daniel **Dawes**
CHIEF IP OFFICER

Dr. Ian **Welsford**
CHIEF REGULATORY OFFICER

Darci **Diage**
REGULATORY and COMPLIANCE MANAGER

skc scientific advisory board

The SKC Scientific Advisory Board provides strategic guidance and direction for the company's research and engineering programs. The Board plays a key role in guiding and prioritizing SKC's investment and serves as a critical liaison between the company and leaders in the relative medical and business communities. SKC's Scientific Advisory Board is led by well recognized scientists and researchers who have vast expertise in their fields and who are recognized as important influencers in their respective fields. The entire Board is committed to advancing the SKC mission.



Dr. Richard A. Lerner

PROFESSOR OF IMMUNOCHEMISTRY
THE SCRIPPS RESEARCH INSTITUTE

Dr. Gary Schoolnik

PROFESSOR OF MEDICINE
STANFORD MEDICAL SCHOOL

Dr. Alan Wu

CHIEF OF CLINICAL CHEMISTRY
AND TOXICOLOGY
SAN FRANCISCO GENERAL HOSPITAL

Dr. Darren Branch

PRINCIPAL MEMBER OF TECHNICAL STAFF
U.S. NATIONAL LABORATORIES

skc operations
and administrative team

Sensor-Kinesis is very proud of its operations and administrative team members who are central to helping assure the critical day-to-day operations and fiscal responsibility to our Shareholders.





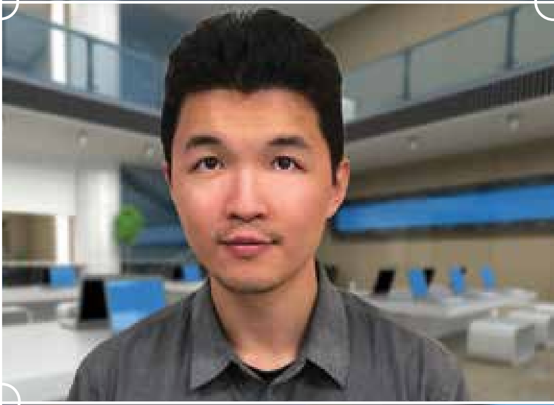

los angeles

engineering and product development team

The Los Angeles Lab's primary responsibility is in the design and development of the SKC Biosensor technology. All engineering and testing for the major components of the biosensor and the reader are first visioned and prototyped here. This includes the creation and miniaturization of the biosensor's functionality, the microfluidic chamber, the sample-analysis software and all the reader's support systems such as the User interface, Wi-Fi communication and system storage. The LA Lab is also in charge of all validation and verification testing of the Biosensor platform, and works hand-in-hand with the Menlo Park Lab to optimize the biochemical sequencing and surface modification strategies to increase the device's resolution in its effort to create the world's first portable, low-cost medical device technology for the earliest-stage detection of disease pathogens.

menlo park
biology and chemistry research team

SKC's Menlo Park lab is tasked with the development of genetically modified antibodies that are engineered to express a higher affinity for a selected target. Using state of the art genetic expression technologies, combined with modern biochemical refining techniques, the Menlo Park lab is able to create new antibodies for use with the biosensor that allow for a greater propensity of capture thereby allowing for a greater resolution of our device as more and more target pathogenic biomarkers are bound. The lab is also developing biochemical linker technologies for use with the biosensor platform. Current efforts are being focused on development of human cardiac troponin subcomplex I for the diagnosis of early-stage cardiac events such as heart attacks.


xerox

Sandia National Laboratories

The Scripps Research Institute

University of California

USC University of Southern California

Harvard University

UC San Diego

Stanford University

strategic
partners

Sensor-Kinesis has developed stro
organizations and companies fron
Each relationship at its core sha
goal partnering in the vision of SI
Partners and Affiliate Companies
by providing shared knowledge, a

affinity
companies

ong strategic relationships with
n a wide spectrum of expertise.
ares technology and long-term
KC's biosensor. SKC's Strategic
help move SKC's work forward
nd research for market growth.

our facilities

SKC has invested deeply in creating the best facilities to allow our engineering team the ability to work at the highest level to ensure the success of our vision.

Los Angeles Clean Room

UV Oven used to cure microfluidic components to prevent contamination

Robotic assembly workstation for fabrication of microfluidic components

Microfluidic printer allows for rapid prototyping of fluidic cartridges for testing and development

Lab transit corridor follows stringent clean room protocol

Fabrication workstation for assembly of mechanical parts for use in the MFC and reader

High magnification microscope capable of looking at fluorescent tags attached to mass particles

Photolithography device for creating fluidic masks and prototyping new sensor technologies.

Laser cutter allows production of parts for prototyping to be made in-house

ENA Network Analyzer for measuring various spectrum parameters of electrical networks

A view of the Menlo Park Lab production and research workstations

Menlo Park Research Lab

Glovebox for handling hazardous samples provides protective isolation for the lab

Fluorometer used for measuring fluorescence parameters such as intensity and wavelength distribution

Precision laser cutting tool for prototyping PCB boards

Cold case storage for holding biosamples and other test liquids in day-to-day biochemical validation

SAFE HARBOR STATEMENT

The information in this brochure contains forward-looking statements. These statements relate to future events or our future financial performance. In some cases, you can identify forward-looking statements by hearing terminology such as “may”, “should”, “expects”, “plans”, “anticipates”, “believes”, “estimates”, “predicts”, “potential” or “continue” or the negative of these terms or other comparable terminology.

These statements are only predictions and involve known and unknown risks, uncertainties and other factors that may cause our or our industry’s actual results, levels of activity, performance or achievements to be materially different from any future results, levels of activity, performance or achievements expressed or implied by these forward-looking statements.

Although we believe that the expectations reflected in the forward-looking statements are reasonable, we cannot guarantee future results, levels of activity, performance or achievements. Except as required by applicable law, including the securities laws of the United States, we do not intend to update any of the forward-looking statements to conform these statements to actual results.

Sensor
KINESIS CORPORATION

T: 310-641-2700 • **F:** 310-641-2702 • **E:** info@sensor-kinesis.com • **W:** Sensor-kinesis.com

Corporate Office
6053 W Century Blvd.
Suite 1000
Los Angeles, CA 90045

Engineering and Product Development Lab
10524 S La Cienega Blvd
Inglewood, CA 90304

Biology and Chemistry Lab
3475 Edison Way,
Menlo Park, CA 94025