

with a human heart



A research lab in India devoted to innovative application of biomedical engineering for alleviating human pain.

BY SANGITA THAKUR VARMA

In the mission statement of CGN Research Labs, what catches one's attention is its avowed policy vision to direct its "growth in the areas of biomedical engineering; to gather people and facilities that tend to augment these areas; to continuously build on these areas through education and knowledge assimilation...to contribute to human welfare by application of biomedical engineering in the research, design, manufacture, and sale of instruments or appliances that alleviate pain, restore health, and extend life."

The field of biomedical engineering is just coming into its own in India. CGN Research Labs is unique in its devotion to the promotion of cutting-edge research, technology and inno-

vation in a field that would add lustre to India's growth story. Dr C Jairaj Kumar, Director, R&D, and Chief Medical Officer of CGN Research Labs, is confident of the country increasing its presence in the field: "Majority of the medical equipments that we use are currently imported or non-Indian innovations. We do not have established Indian medical device innovations that rule international market. But this field offers huge potential with increasing promotional programmes aimed at encouraging Indian innovations. We are sure several Indian companies shall make their mark in medical device industry in the near future."

The researcher firmly believes that "established midsized medical device companies

in India must focus on pathbreaking innovations rather than making small technical improvements to their existing device.” This is the way for India to make its mark as an innovator of medical equipment on the global firmament.

CGN Research Labs was founded in 2010 by Dr Jairaj Kumar, Joint Managing Director of the company and C Satish Kumar, Chairman and Managing Director, with two inventions—the first was a device that uses the revolutionary chaos theory to diagnose diabetic neuropathy and the second a device called Thermo Scan, that was developed using a patented nanoparticle focal plane array. A recipient of Phillips Best Inventor Award in 2009, Dr Jairaj Kumar’s motivation for founding the company lay in his belief that “any innovation that addresses a significant problem shall certainly be a sustainable business.” The lab’s vision is to conduct pathbreaking research that reaches its end user. “We intend to commercialise our innovations and the company has an active marketing division,” informs Kumar.

Thermo Scan uses a non-invasive technology that is simple and painless. The scan performs a plethora of functions ranging from diagnosing early stage breast cancer, to imaging inflammatory pain, detecting diabetic vasculopathy at a very early stage to detecting sports injuries; thus it can help start treatment early and prevent further damage. The device employs an extremely user-friendly procedure. It takes only a few minutes to conduct the tests and is ergonomically designed for easy operation. It is a portable and compact device which renders razor-sharp thermal images and its high temperature accuracy guarantees precise data measurement. In 2011, CGN Labs was bestowed with the Best Medical Electronics Product of the Year Award for its Thermo Scan by India Semiconductor Association.

Conferred with a DST-Lockheed Martin Gold Medal in the year 2010, Kumar firmly believes in moving ahead. The research focus of CGN now is

“on diabetic foot. We have developed two products, the first one measures nerve damage and the second product detects vasculopathy,” says Kumar. Explaining the technology behind the invention, he says: “This technology is a new method for detecting diabetic neuropathy and predicting foot ulcer development. The technology would best be described as a diagnostic tool for measuring the progression of neuropathy (any neuropathy not limited to diabetes) and predicting foot ulcer development. It could also be useful for patient management for diseases like leprosy and multiple sclerosis in that all involve potential nerve damage.”

The technology involves both hardware and software algorithms. The key components of the hardware are the sensors on which the patient places his feet. The software allows the physician to pinpoint locations on the feet to assess. Its mechanism involves these sensors then being able to detect micro movements in the feet with very fine precision. With the device detecting and graphing the micro-movements,

the physician is then able to assess progression of neuropathy at pre-clinical stages and can adjust and tailor medications (or assess efficacy of medications being administered) and treatment regimens to proactively prevent foot ulcers from forming. The device can:

- diagnose neuropathy
- predict foot ulcer development and thereby prevent amputation (removal of fingers, etc)
- quantify the efficacy of medication

The author of over 50 international research papers, Kumar is the Editor in Chief of *Scientific Medicine*, an International peer reviewed medical journal. He is also the Associate Editor of prestigious international medical journals like *Australasian* (Australia) and *Cases* (UK), besides serving as referee and reviewer for several other international medical journals. Apart from contributing to the medical world in his research capacity, Dr Jairaj Kumar is also motivating young students in the field through his role as a teacher. He is a visiting professor at Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, and has collaborations with IIT Hyderabad, NRSA-ISRO Hyderabad, University of Munich, LMU, Germany and University of Missouri, USA. For CGN Research Labs it is not yet time to bask in glory.

Rigorous research is the adopted path for this upcoming research hub with a goal to “develop and manufacture a wide range of products and therapies with emphasis on providing a complete continuum of care to diagnose, prevent and monitor chronic conditions in the near future.” Speaking about future plans Dr Jairaj Kumar says, “We are now developing a home healthcare neuropathy device for patient self-monitoring and are working on developing a thermal imaging laparoscopic device.”

Another advancement that is sure to contribute to human welfare, biomedical research and engineering, and India’s profile as an emerging hub for cutting-edge innovation. ■

LAB VIEW

Name: CGN Research Labs Pvt Ltd

Founder: Dr C Jairaj Kumar

Mission: Application of biomedical engineering in the research, design, manufacture and sale of medical devices that alleviate human pain

Founded: 2010

Next: Self-monitoring neuropathy & thermal imaging laparoscopic devices

