Beautiful minds: How these scientists are getting science out of laboratories and into daily lives - The Economic Times

Beautiful minds: How these scientists are getting science out of laboratories and into daily lives

By *J Vignesh*, ET Bureau | 27 May, 2016, 06.13AM IST

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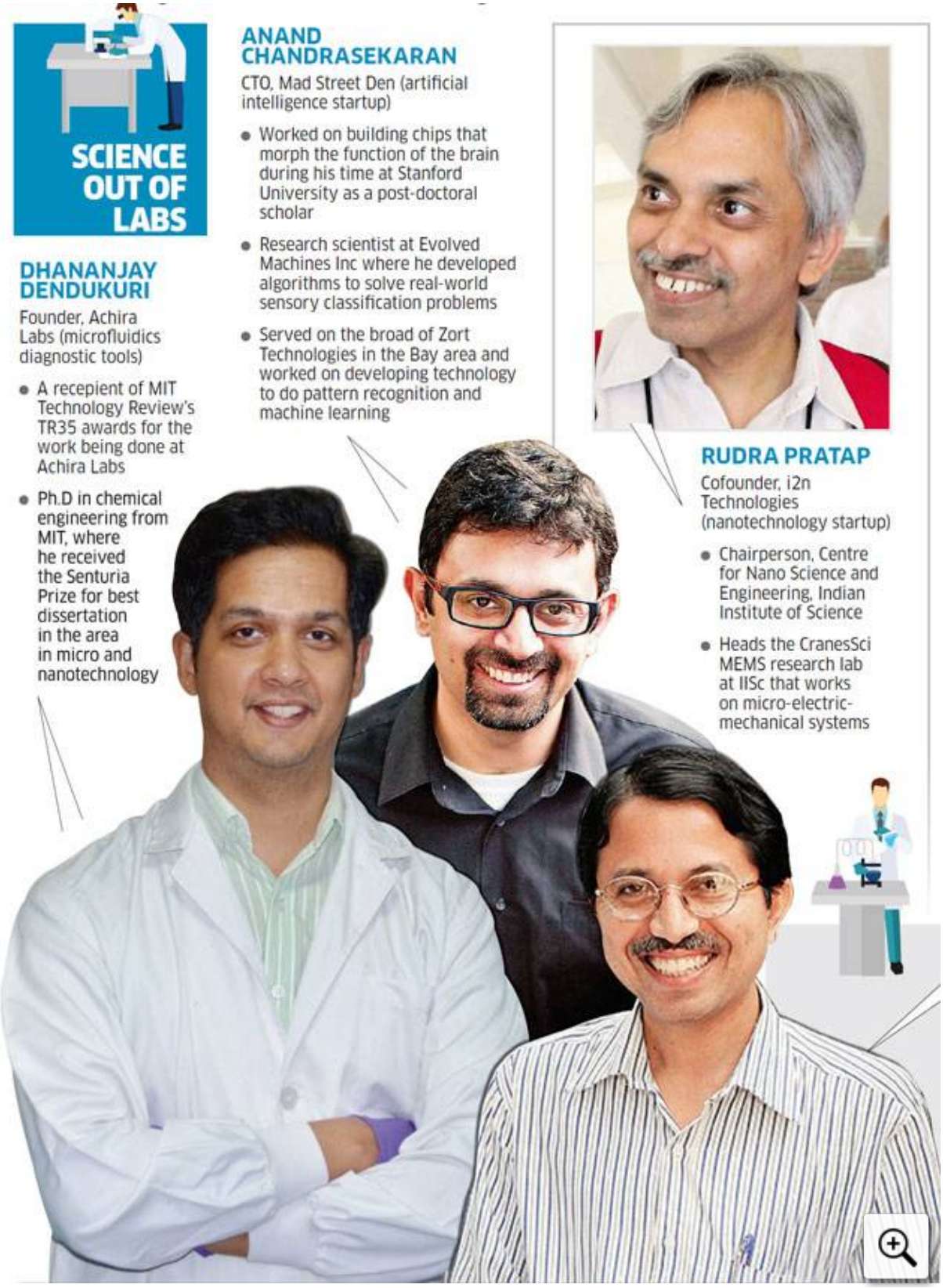
Getting science out of laboratories and into daily lives is a big challenge for researchers in India . The rise in startup activity has helped ease this and a number of scientists are building new ventures. ***J Vignesh*** *explores the field*

Pandorum Technologies has developed a 3D-printed bio-tissue that mimics the functioning of a human liver.From starting as a two-member team , it has now assembled a multi-functionary team.

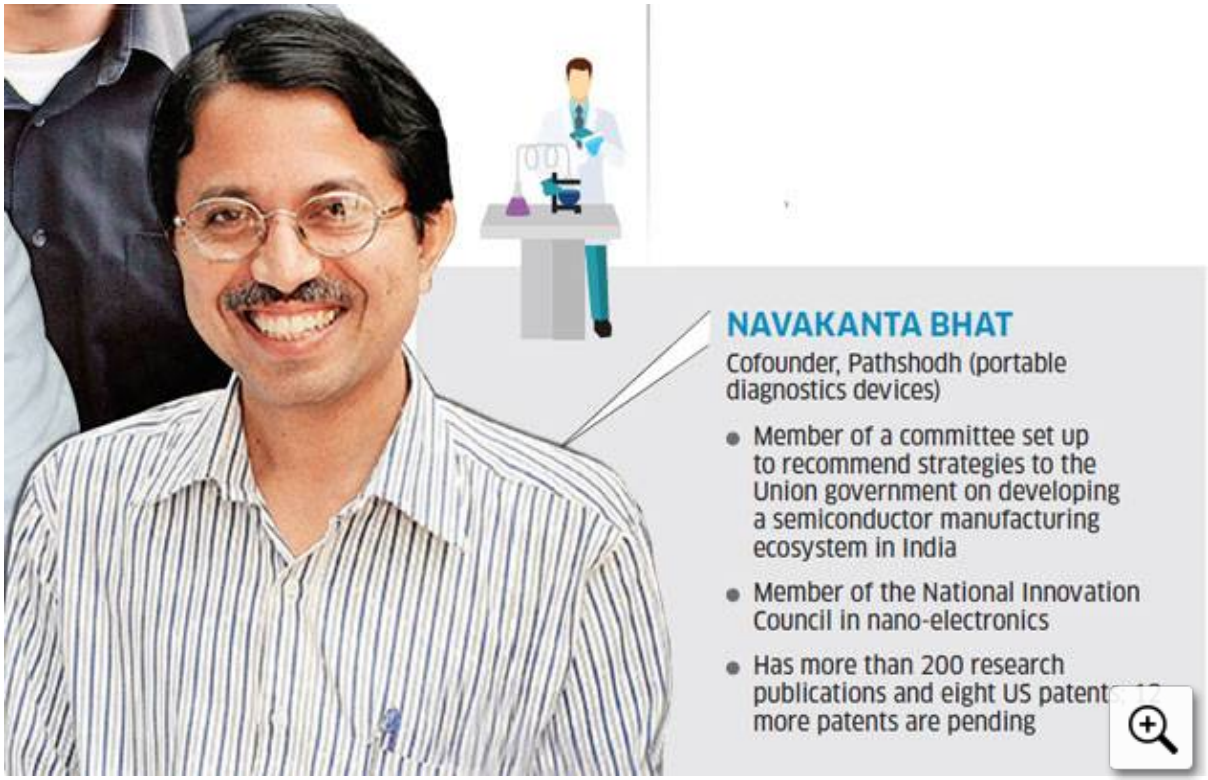
When Rudra Pratap returned to India in 1996 after a Ph.D from Cornell University to join the Indian Institute of Science as a professor, he was astonished to find no one working on micro-electro-mechanical systems. The technology , which deals with making miniaturized mechanical and electromechanical devices, was emerging as a hot area of research in the developed world. Pratap eventually, and painstakingly, built the country's first MEMS laboratory within the IISc with grants from Bengaluru-based Cranes Software.

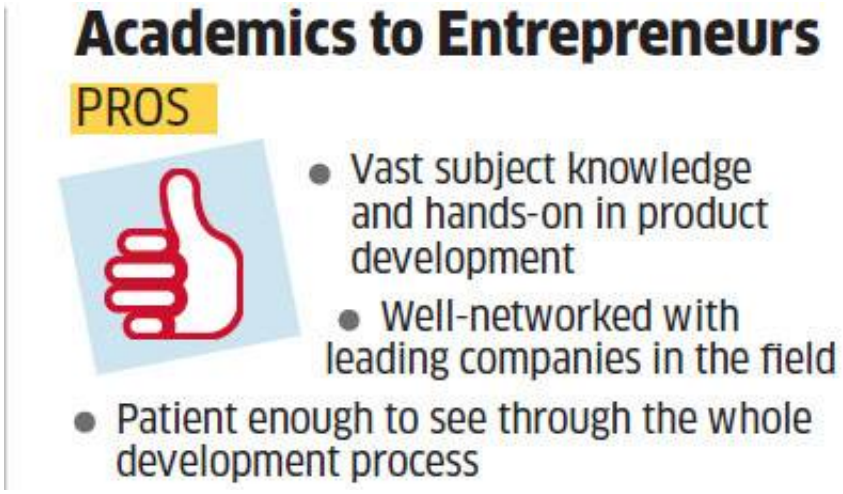
Before long, Pratap and a core group of professors decided to build another lab for deeper research in related fields. The Centre for Nano Science and Engineering lab, established within the IISc in 2011 at a cost of Rs 120 crore, has more than 140 Ph.D students, published hundreds of papers, and filed 40-50 patents. Importantly, CeNSE has incubated three startups , including

Pratap's nanotechnology startup, i2n Technologies.



If Pratap was the academician who took the entrepreneurial route from within the IISc, Anand Chandrasekaran, cofounder of artificial intelligence startup Mad Street Den, chose to leave the environs of an academic setup—Ph.D at Stanford University followed by stints a scientific research think-tanks—and us . his skills as a brain researcher to solve "real world problems." "We moved to India because we wanted to experiment (with real world problems). We used Ashwini's (wife and cofounder) savings on this," said Chandrasekaran. "She was the one with the savings. I was an academic, the underpaid slave labour of the world."





Jokes apart, these men are answers to what has been plaguing Indian research for long—an inability to translate lab research into useful, market .ble products. "This country has

CONS

- Tend to search for perfection, elongating the development process
- Need to adjust to life outside the confines of a research lab
- Need to learn the ropes managing a business–be nimble, take risks

The amount of time you would spend on administrative job is always a distraction, but it is something that you will have to do. Being responsible to an investor, shareholder is different from being responsible to a boss... That change is a big shift

DHANANJAY DENDUKURI,
Founder, Achira Labs

been doing very well in research (but) unfortunately, it is driven by individuals with the mindset of publishing papers. But that's not the end goal of research. The end goal of research is to create something useful for society," said Pratap. "What has prevented this from happening is that whatever results they get, there's a much harder path of translating that into technology that can be made useful. The chasm is too big."

Academics-turned-entrepreneurs have always been around but they have been a small set of highly motivated individuals brave enough to venture into the complex world of business-building. Now, the global buzz around startups, a supportive government and an ecosystem that thrives on new ideas are providing that extra thrust to encourage supposedly reclusive academics to come out and build technologies that can better society.

"Institutes now have much better policies to enable students and faculties to start companies," said Navakanta Bhat, professor at the IISc's electrical

communication engineering department and cofounder of Pathshodh, a maker of portable diagnostics devices. Bhat is on a year's leave from the institution. "IISc has enabled it so that I can focus on the company. Even after that, if I continue to be with the IISc, I can put away a certain fraction of my time to continue doing startup-related activities. That's a big administrative interventional policy. It is very common in the US." In addition to premier institutions and governments, a number of independent establishments have emerged that nurture entrepreneurship focused on scientific research.

IKP Knowledge Park is one such. It runs a business incubator focused on medical and life sciences startups. "We provide lab spaces. We offer funding. In some cases, we also fund them through grants, which comes even before seed investment. We enable the startups by giving them a peer community to interact with and act as a sounding board. We help with intellectual property searches. We review it, look at competitors and also work with government to advice on policy. We also help in hiring," said Vikraman Venu Saranyan, chief operating officer at IKP-EDEN, the incubator.

The Centre for Cellular and Molecular Platforms is another one. C-CAMP incubates life-sciences startups and helps the best ones secure government grants. "There has to be a problem, like say, affordability, accessibility (that a startup is looking to solve); there has to be a broad need," said Taslimarif Saiyed, COO at C-CAMP. "The team has to take it to the next level in terms of business and has to have a mechanism to test the solution. We have roughly 15-20 researcher-led companies."

An academician hell-bent on converting ideas into products is akin to a magician with many a trick up his sleeve, thanks to tons of research done over the years. Take G Jagadeesh, associate professor at IISc's department of aerospace engineering. He is simultaneously working on various seemingly unrelated ideas—injecting DNA into cells to aid in genetic material manipulations; needleless drug delivery; artificial insemination in cows; and inducing antioxidants into tea leaves. All these ideas stem from his area of expertise: Shockwaves. These waves are associated with bodies that fly faster than the speed of sound, thereby dissipating kinetic energy. His startup Superwave Technologies is in advanced talks with oil companies to take their research to the market.

ABDULLAH CHAND, TUHIN BHOWMICK AND ARUN CHANDRU

Pandorum Technologies (3D tissue printing)

- The founders in 2010 won first prize at the All India Biotechnology Entrepreneurship Student Team Contest, which encouraged them to launch Pandorum. It was organized by the Association of Biotechnology Led Enterprises and the government's Department of Biotechnology

- Achieved a major milestone in tissue engineering in 2015 by 3D printing liver tissues that mimic the human liver
- This year, won the Karnataka government's Bio-excellence Award (Emerging company of the year)

"One model of entrepreneurship we want to try out is to give intellectual capital, which is our patents and our ideas, (to partner companies). The relevant industries are not only willing to fund this but also come on board because this ecosystem does not exist in India to a large extent," said Jagadeesh. Pandorum Technologies has developed a 3D-printed bio-tissue that mimics the functioning of a human liver. From starting as a two-member team five years ago, it has now assembled a multi-functionary team. "All of us are academic-

entrepreneurs. This helps because this is a very fast-moving field and you need to be abreast with the happenings," said chief executive Arun Chandru, a Ph.D in aerospace engineering.

But all is not magic. A lot of time and effort goes into coming up with useful technologies. It usually takes years and years of hardcore research. "In high-tech research, for (an idea) to reach to fruition, it takes at least two generations of Ph.D students," said Bhat of Pathshodh. "So, the first generation, we had headway. I recruited one more to broaden the horizon, to really look beyond and improvise the technology and also include more tests."

Similarly, Chandrasekaran of Mad Street Den experimented in diverse areas including gaming and robotics before deciding on what to focus on for this startup. For now, it is fashion . "For a year-and-half we were building infrastructure and experimenting. We went around and spoke to everybody. This propelled a lot of conversations. We spoke to investors, potential customers and all. It was not something that happened overnight," he said. If ideas take time, getting used to being an entrepreneur is another big ask for academicians. "The amount of time you would spend on administrative job is always a distraction, but it is something that you will have to do," said Dhananjay Dendukuri, an academic turned founder of Achira Labs, a maker of microfluidics diagnostic tools. "Being responsible to an investor, shareholder is different from being responsible to a boss... That change is a big shift."

Vinay Viswanathan, co-creator of the indigenous handheld computer, Simputer, in the early 2000s, said academics can now be more surefooted when they want to start a business, unlike earlier, and so they should. "We had to get permission from IISc (where he was a professor) to do it, to make provisions for these things to happen. The current set of people do not have that problem because the mechanism is in place. It's wonderful it has happened."