



# Mapping BIRAC BIG Innovator's Story

As they Kick start their  
**Entrepreneurial Journey**

Dream BIG, Sky is the Limit



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**Supported by:**

Biotechnology Industry Research Assistance Council, Department of Biotechnology, New Delhi, India

**Headed by:**

Dr. Mrutyunjay Suar, CEO KIIT TBI, KIIT Deemed to be University (DU), Bhubaneswar, Odisha

**BIG Coordinator:**

Dr. Namrata Misra, Head Bioinnovations, KIIT-TBI, KIIT-DU, Bhubaneswar, Odisha

**Compiled and Edited By (BIG Core Team members):**

Dr. Rajiv Kangabam, Manager-BIRAC BRTC, KIIT-TBI

Ms. Riya Roy, BIG Associate, KIIT-TBI

Mr. Arpan Ghosh, BIG Associate, KIIT-TBI

**Designed By:**

Mr. Saikat Gupta, Associate-Design & Campaign, KIIT-TBI



**Across  
Sectors  
Across  
Geographies**



# FOREWORD



A correction chair for cerebral palsy, a smart locomotory device for mobility-impaired patients, bioplastics from agro waste, a portable cold storage device to combat post-harvest loss, low-cost bone densitometer, a smart label for detection of packaged food, a device to prevent pressure ulcers, eco-friendly adult diapers, plant stem cell extract formulation for skin hyperpigmentation, novel drug against tuberculosis, multi-crop seed drill for agriculture, novel wound care solutions. To the average person, these might seem like science fiction. They're not. These and other equally innovative solutions are real, and on the cusp of becoming a part of our daily life. And all of these are being developed right here in India with the support of BIRAC, Government of India, launched Biotechnology Ignition Grant - BIG in July 2012 through which a seed grant of up to Rs. 50 lakhs is made available to individual and young student entrepreneurs and startups to demonstrate proof of concept and commercialisation of innovative technologies and products.

KIIT-TBI has been a BIG partner of BIRAC since 2014, and since then we have been witnessing a surge of interest both by innovators and startups in the broad field of biotechnology. We have close to 90 innovative projects across the country. As we continue to promote innovation and entrepreneurship, we realised that there are stories here that need to be told. Stories of the entrepreneurs and innovators who are trying to change the way things work and create a better society and a better life for all of us. A better life for those who need it the most, because many of these solutions have the potential to help the most marginalised population in our society.

This report highlights the dynamism in the field of biotechnology and celebrates the spirit of 27 innovators who have recently kick started their entrepreneurial journey with the support of BIRAC BIG Grant and are working on biotechnology innovations such as biomedical devices, agricultures, molecular therapeutics, plant-based stem cell, bioplastics, hybrid enzymes, among others. Filled with real leanings from trenches of startups, this catalogue would hopefully motivate prospective entrepreneurs and nurture a spirit of entrepreneurship amongst budding innovators in biotechnology.

We would like to extend our appreciation to all the BIG supported innovators who responded with tremendous enthusiasm in sharing their experiences and insights that have helped us shape this report. We aim to bring to the fore many more such initiatives for sharing the real-life journey of young entrepreneurs.

Be Simple, Humble & Grounded. Onward and Upward!

A blue ink handwritten signature, likely of Mrutyunjay Suar.

Mrutyunjay Suar, PhD  
CEO, KIIT TBI



## Dr. Steward Gracian

**Innovation:** Assistive Oral Care Device for long term bedridden elderly



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As a dentist, Dr. Steward always felt that there was a need to do something unique to provide oral care to the vulnerable population in India. With that in mind, in 2016, he quit his conventional job as a dental practitioner in a multispecialty dental hospital in Chennai and moved to rural Odisha to work on a short-term social impact project for children from tribal and marginalized communities. It was only during this time that he came across BIRAC's SIIP fellowship in association with KIIT TBI, Bhubaneswar. While doing a deep-dive as part of clinical immersion and visits to many hospitals and old age homes, he found that adequate oral care is one of the most neglected aspects in bedside care of elderly where India has approximately 3 million bedridden elderly and the caregiver ratio is 1:10. Therefore, caregivers face practical challenges in providing oral care for bedridden elderly because of their work burden. Furthermore, he observed that nurses still used the crude method of cotton and mouthwash for providing oral care for bedridden elderly. As a dentist, he realized that this approach is not only ineffective but also increases the transient bacteremia in the oral cavity. With the support of BIRAC, SIIP, and later BIG Grant he is developing an affordable Assistive Oral Care Device which can potentially redefine oral care for bedridden elderly and other dependent individuals. Dr. Steward says that the foundation on which the device would be built is simple and will provide a complete oral care support system for the geriatric and disabled population that does not have any dependency, be it on physical infrastructure or the availability of a trained clinical person. He and his team members are clear that the device they build would be of gold standard quality, low cost, and be applicable for use across the globe.

## Sruthi Babu

**Dhanvantri Biomedical Pvt. Ltd.**

**Innovation:** A smart locomotory device with a novel mechanism for defecation assistance



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Sruthi Babu, CEO, and founder of Dhanvantri Biomedical Pvt Ltd started her entrepreneurial journey straight after graduate school and believes the biggest gap when it comes to women turning entrepreneurs is the way girls are raised. She shared with us a story that puts things in perspective for many. She says “My mother did not have the opportunity to obtain a higher education degree, but she emphasized the value of education in my life. My teachers saw potential in me when I couldn’t see it myself. I could become who I am, as my father didn’t see me any differently for being a girl. The best gift he gave me was by setting the same standards and expectations of me that he would have for a son”. In 2016, after completing her bachelor of engineering degree in Biomedical Instrumentation from Avinashilingam University in Coimbatore, she knew she can become nothing else except an entrepreneur but did not know how to make a start. Luckily, she got selected for a social innovation immersion program (SIIP), a flagship program of BIRAC, Govt of India aimed towards finding innovative solutions to society’s most pressing social problems through biotechnological interventions and got incubated at KIIT TBI. During the course of clinical and rural immersion, she visited many hospitals and old age homes which inspired her to come up with a solution for mobility-impaired patients. With easy access to a wide range of mentors and prototyping facilities at KIIT TBI, she developed an alpha prototype of a smart convertible wheelchair cum bed with inbuilt defecation assembly to assist the mobility impaired patients to carry out their basic activities of daily living such as locomotion and defecation. And then, it was never looking back, consequently she got selected for the most sought-after grant among life science innovators called the BIRAC Biotechnology Ignition Grant in 2019 for product development. Ms. Sruthi sums it up when she says, “Let’s raise our daughters as equals. Believe in them, dream big for them and I am sure we’ll create more women entrepreneurs ‘in our homes’ and ‘out of our daughters’”.

## Prof. Rup Lal

PhiXgen Pvt. Ltd.



**Innovation:** Up-scaling and commercialization of 24-desmethyl rifampicin effective against major first line drug rifampicin resistant strains of *Mycobacterium tuberculosis*



It's widely believed that the most successful entrepreneurs are young. Bill Gates, Steve Jobs, and Mark Zuckerberg were in their early twenties when they launched what would become world-changing companies. Inconsistent with this believe, Prof Rup Lal who is a retired professor from Delhi University and now founder of startup PhiXgen Pvt Ltd believes that advancing age is a powerful feature, not a bug, for starting the most successful firms due to greater access to financial resources, deeper social networks, and most importantly years of research experience. Having over 35 years of strong and longstanding experience in teaching and research in various capacities at the University of Delhi, the 60-year-old scientist has done as much as anyone to improve our ability to read, write and edit the genome, the basic operating system of life. Along the way, he has mentored a generation of leading genetic researchers, sequencing and annotating more than 18 metagenomes from varied niches, filed many patents and authored or co-authored hundreds of scientific papers. He along with his few young students with an entrepreneurial bent of mind has successfully developed mutants producing novel analogs of rifamycin. Now, with BIRAC BIG support and KIIT TBI, the professor-student team want to upscale the production of novel 24-desmethyl-rifamycin that is more effective against MDR strains and rifampicin-resistant (RR) strains of *Mycobacterium*. Tuberculosis is one of the major infectious diseases that claim millions of lives worldwide. The drug will be 50 times more effective towards drug-resistant mycobacterial strains.

## Prameela Rao

**Innovation:** Eco-friendly adult diapers with antimicrobial properties and disease indicators based on natural fibers and hydrogels



Mrs. Prameela Rao who is widely known as 'Padwoman' of Karnataka and whose work has been appreciated by Bollywood actor like Akshay Kumar is one of our inspiring women entrepreneurs who has recently been supported by BIRAC, Government of India with the BIG Grant in aid. As Prameela Rao is also working as a lecturer in Government First Grade College in Kavoore, she is always closely connected with the girl students and their problems. Usually, women face a lot of problems during menstruation. In many cultures, menstruating women are treated as "impure". In order to get rid of such blind beliefs, Prameela Rao has decided to help women with the support of 'Kalpa Trust' who has been disbursing eco-friendly, hygienic sanitary pads under the name 'Swasthya' to women at free of cost from the past four years. But, Prameela clarifies that her entrepreneurial vision is not limited to sanitary napkins and she wants to solve real-life challenges. She is now in a quest to develop adult diapers. While taking care of her elderly father who had suffered a stroke and was bedridden for months, she found the adult diapers extremely expensive and that the market was dominated by foreign brands. With the support of BIRAC and KIIT TBI, she is now developing eco-friendly, elderly-friendly adult diaper and Urinary Incontinence (UI) pads with disease indicators which can be detected using urine. These adult diapers will have antimicrobial properties based on natural fibres and hydrogels with the potential to safely reuse multiple times. The product will be the first of its kind an early, self-detection tool for common diseases and can help elderly people in an efficient way to manage urinary incontinence. Her goal is to set up a low-cost sanitary diapers manufacturing unit in rural areas where people cannot afford to buy them.



## Shivani Gupta

Inochi Care Pvt. Ltd.



**Innovation:** A frugal multi therapeutic wound care solution for resource constraint healthcare settings



Shivani Gupta, Founder of Inochi Care and receiver of Star Women Entrepreneur award from BIRAC, says “I’ve always wanted to start my own company since I was in high school. In my high school yearbook, there was a section where students could write what they thought we might end up doing as a career. Mine said, ‘She’s going to start her own company’. That turned out to be true and I think the same could be said of my co-founders, starting a business was always something we all had in mind”. Backed by IIPME Grant, DBT-BIRAC, Department of Electronics and Information Technology, Stanford India Biodesign fellowship and KIIT TBI, and, among others, the entrepreneurs have been on a quest to address unmet needs in the healthcare industry by engineering innovative, high-quality MedTech devices for not just the Indian market but across the globe. An advanced wound healing device for resource constrain settings, which was a project funded by BIRAC under the BIG grant scheme, is also the first-of-its-kind a one-stop solution for four expensive discrete technologies used for wound healing namely, negative pressure wound therapy, oxygenation, saline wash, and antibiotic delivery. This indigenous patch system will be a frugal solution to replace different expensive solutions for different types of wound healing therapies and cut dependency on the imported products. Shivani’s advice to entrepreneurs starting out is: “Don’t do it alone. Have the courage to ask for help. When we started Inochi Care, we were hit by so many questions about tech, legal, and whatever, so I called anyone I thought might know the answers and asked them: ‘Hey, I have a problem, can you help?’ No-one turned me down or expected anything in return because they know they can call me if they need to. My other piece of advice: ‘Be nice and be helpful.’ There’s no such thing as a free lunch, but you’ll have the chance to repay it in a good way at some point”.

## Bijaynanda Panigrahi

BioPioneer Pvt. Ltd.



**Innovation:** A novel, cost-effective material with enhanced activity and thermostability: a new generation protease inhibitor for biotech industry.



Biotech start-ups are no longer the exclusive realm of tenured professors and scientists with decades of research experience under their belt, instead, freshly minted PhDs are skipping opportunity for higher studies to start their own biotech companies. One of these young biotech entrepreneurs is Bijayananda Panigrahi, co-founder of Biopioneer Pvt Ltd. He joined as a doctorate student, at the KIIT School of Biotechnology to study the role and mechanism of Protease inhibitors that play an important role in the Biotechnology Industry. When he started his research experiments, he found that commercially available protease inhibitors are made up of different organic molecules which are active against different enzymes. Furthermore, their storing condition, toxicity, high cost restricts their use for a wide range of applications. He realized that to answer his research question he has to develop a novel hybrid material containing flavonoids and metal as an efficient protease inhibitor for a wide range of protease enzymes. He now had a way to efficiently address his basic research questions, but he realized that his technology had major implications for a wide range of engineering of new or optimized protein inhibitors which had great opportunities both in academic research and in a variety of industries from industrial enzymes to pharmaceuticals. Not going to another lab for a postdoc was a difficult decision. Bijayananda says “On one hand I wanted to continue my scientific training with aspirations for a faculty position. I interviewed with a few labs but soon found out that many struggled with dwindling funding and often times a postdoctoral position was contingent on coming in with a grant award. I also had several friends who were quite unhappy with the postdoctoral experience. Starting a company offered the possibility of earlier independence to pursue a career track, learn a new set of skills essential in business and entrepreneurship while bringing a useful technology to the market that could benefit the society”. He further adds that for him while starting a business was always risky and uncertain, the BIRAC BIG program and the holistic incubation support provided by the KIIT TBI helped transitioning from the academic mindset that is very focused on your own technology and how great it is, to realizing that as a business. Customers don’t care at all about the technology. All they care about at the end of the day is what value does it brings to them.

## Sahil Jagnani

Primary Healthtech Pvt. Ltd



**Innovation:** Nanotechnology based affordable, portable and easy to use multi diagnostic point-of-care device for Kidney, Liver, Pancreas, and Thyroid disorders



As a B. Tech graduate from the Indian Institute of Technology Guwahati, Mr. Sahil Jagnani, Co-founder of Primary Health Tech Pvt Ltd always wants to implement problem-solving approach to come up with a solution which makes healthcare accessible to the last-mile population. After completion of his engineering, he gained experience in several tech-based startups for end-to-end supply chain management in B2C and B2B markets. During this phase, he realized that India has made a lot of progress in the software domain but there are very few startups who are committed to solve problems using the hardware solutions. India imports more than 90% of medical devices starting from small cuvettes to major chemicals which are costly and are outside the reach of common people. Further after networking with many mentors and clinicians in the healthcare domain, he observed that Non-Communicable Diseases (NCD) are one of the biggest problems in providing a good and healthy environment across the globe. Except for large hospitals or specialty centres, the ability to perform proper NCD diagnosis is absent in India. This is the case globally in all emerging markets. The conventional diagnostics face limitations with costly installation, dependency on highly-skilled manpower, and bulky-setups. With the increase in the number of patients with NCD, and specialized diagnostic facilities available are operable only in tertiary care centres, the reach of precision diagnosis is very poor. Thus, there was a need for a solution that gives the power to clinicians to carry out better diagnostics and help take quick decisions based on in-depth-validated information without the need of being present near the patient and be able to run this kind of comprehensive analysis in small and medium hospitals. To overcome this, a team of young enthusiastic entrepreneurs at Primary Health Tech Pvt Ltd under the mentorship of Dr. Dipankar Bandyopadhyay, Head of Center, Center of Nanotechnology and Professor, IIT Guwahati are currently developing an affordable, portable, multi-organ point-of-care diagnostic device, “Magic BOX” which shall provide quantitative estimations of the levels of bilirubin, albumin, creatinine, amylase, lipase, T3, T4, TSH, hemoglobin, urea, pH, Na, and K in the blood serum and/or urine. The device will enable the assessment of the health of heart, thyroid, kidney, liver, pancreas, and blood at the patient site. The size of the proposed Magic BOX kit will be of a smartphone so that it will be easy to handle and would provide real-time, high-quality diagnostics at 1/10th to 1/5th of the existing test costs. The device is also IoT enabled in a manner that the data will be transferred to cloud-data servers where the patient test history can be made available to doctors and AI enabled data machines can provide recommendations of the next steps, doctors or hospitals for treatment. In line with Atmanirbhar Bharat mission and with BIRAC and KIIT TBI support, the company aims to provide a real-time, high-quality diagnostic at an affordable price which can be a potential replacement for the high cost imported devices

**Dr. Rambabu Atluri**  
**Elvikon India Pvt. Ltd.**



**Innovation:** Printed Smart Label for detection of packaged food status



Dr. Rambabu Atluri, Director, Elvikon India Pvt Ltd has expertise in material chemist and PhD from the Department of Engineering Sciences Uppsala, Sweden. Before venturing his own startup, he had prior experience in handling R&D base innovation projects at various industries as well as projects of international coordination. What inspired him to start his entrepreneurial journey was to solve a global problem. i.e. Reduce Food Waste and Increase Food Safety!! Being a vegetarian, he finds it difficult to see a lot of animal slaughtering and meat waste and feel that today humans are misbalancing the complete circle of life with unnecessary food habits by growing billions of animals and wasting millions of meat. Global greenhouse emissions from wasted meat alone accounts to 1.5 times the entire aviation industry. In addition, he realized that food safety is a major issue as there is no traceability on the quality of food products from slaughtering to packaging and reaching to the consumer. Hence, with BIG grant, they are developing a smart label that monitors the packaged meat quality along the food value chain and indicates the best date for consumption thereby ensuring the food safety of meat products and eventually reducing the food wastage. The label can communicate with a smartphone and is a simple, innovative, cost-efficient, and food grade. The smart label is certainly the future of smart packaging to stop food wastage reduce animal breeding and slaughtering. To put it simply, Elvikon India has made it its mission to solve global problems like food waste and create a social impact in the community.

## Pooja Kumari Jha

Swayogya Rehab Solution Pvt. Ltd.

**Innovation:** A portable Biophysically stimulated Therapeutic device for persons with knee osteoarthritis.



Ms. Pooja Kumari Jha is a professional Prosthetist & Orthotist having completed her masters in prosthetics & orthotics from the Indian Spinal Injuries Centre at the Institute of Rehabilitation Sciences, New Delhi. She has more than two years of clinical experience working with mobility impaired individuals and rehabilitation of the elderly at CMC Vellore and Safdarjung Hospital, New Delhi. After which she was involved with an NGO working towards ensuring social security and empowerment of persons with disabilities. Ms. Pooja has previously designed a cost-effective system comprising functional electrical stimulation with ankle-foot orthosis for hemiparetic patients and been associated in a study to determine the effectiveness of wrist hand orthosis in the early stages of carpal tunnel syndrome among computer users. Her professional experience, passion and a keen interest in rehabilitation led her towards Social Innovation Immersion Program (BIRAC SIIP) at KIIT TBI. The fellowship made her go through a rigorous process of need identification, clinical immersion and evaluation. The most recurrent gap she observed was the lack of an effective treatment modality for patients suffering from osteoarthritis. Since completing the fellowship she founded Swayogya Rehab Solution Pvt Ltd with an aim to innovate cutting edge solutions for various orthosis problems that can be addressed with advanced engineering and technology. The innovative wearable assistive device for the elderly suffering from mobility impairment is a first step towards that endeavor with the support of BIRAC BIG grant and KIIT TBI. She expects to launch her first product in India within the next three years and her goal for the next five years is to have a full suite of orthosis and prosthetic care products. Pooja has always said that for her the tag of 'woman entrepreneur' is an unnecessary one. She needed no special treatment for being a woman. She just wants to be treated as equals when it came to solving problems, raising funds, and hiring people.

## Manoranjan Adhikari

Balasore Agro Pvt. Ltd.

**Innovation:** Innovated Multi-crop seed drill for sowing of Groundnut, Maize, Black/green gram, Soyabean etc. during the cultivation for small And marginal farmer



For many years, entrepreneurship has largely remained a big city phenomenon, even though a significant part of the population lives in smaller cities and rural areas. But this seems to be changing now as more people from smaller towns are trying their hand at starting up their own ventures. While startups in metros are mostly looking at consumer solutions, their peers from smaller towns seem to be solving more real problems that impact larger sections of the population. Take for instance Manoranjan Das Adhikari, who hails from a small town Balasore in Odisha, has proved that nothing can stop him from transforming his dreams into reality. With the believe in the fact that everything is possible; if there is a will to do that, Mr. Adhikari established a small fabrication unit in 2007 to repair various instruments and machinery used by the local farmers. 2013 was the turning point in his life when he registered his fabrication unit and took approval from Dept. of Agriculture, Govt. of Odisha to supply small agriculture machinery to marginal farmers. During this time, he identified a huge problem of farmers for seed sowing of groundnut, Bengal gram, green gram and pulse seed, etc. which navigated him to the way towards developing a single wow multi-crop seed drill for the groundnut and pulses which can significantly solve the problems faced by marginal farmers. In 2018, Mr. Adhikari started his company named Balasore Agro Pvt Ltd and got selected for the prestigious BIRAC BIG funding scheme for his innovation. The broader goal of the company is to set up a manufacturing unit of agricultural devices and machinery for the farmers of our nation and contribute to the Indian economy through agricultural produce.



## Ravindra Singh Khestri

Sumit Healthtech Pvt. Ltd.



**Innovation:** India's only end to end solution for organ transplant.



Ravindra's perspective towards life changed when he witnessed a sudden completely avoidable tragedy in his family when his brother died while waiting for an organ transplant. He did a thorough research study and realised that in India alone, hundreds died unnecessarily every year due to challenges underpinning organ transplantation. That year, Ravindra set out to develop a one-stop platform solution that would address the issue by assisting the patient and their family in every step of the organ transplant journey. The AI driven platform connects donor, receiver, hospitals, diagnostic labs, rehabilitation centers all in one base within the purview of legal organ transplant policies. In addition, it would engage them in constructive activities like counseling and skill development. His innovation has been recognized nationally by DIPP, MSME and Startup India and he has also been awarded the youth icon in 2018 by Chhattisgarh Government for his initiative and also awarded by Startup India, Think Raipur Program. Backed by, Biotechnology Industry Research Assistance Council (BIRAC), KIIT TBI, among others, the young entrepreneur from Chhattisgarh have been on a quest to develop innovative MedTech solutions to save precious human lives through his startup 'Sumit Healthtech Pvt Ltd'. Ravindra says "Put yourself in the shoes of someone waiting for a transplant. If you are willing to accept an organ donation, it is only right that you should be willing to donate the special gift of life to another family."

## Subrata Kumar Haldar

Halder Rehab Pvt. Ltd.



**Innovation:** Adjustable Postural Correction Chair : Cerebral Palsy



In 2018., President Ram Nath Kovind presented the National Awards for Empowerment of Persons with Disabilities, among the recipients was Subrata Kumar Haldar from Swami Vivekananda National Institute of Rehabilitation Training and Research (SVNIRTAR), Cuttack, Odisha who has been selected in the category of 'Best new cost-effective product development aimed at improving the lives of persons with disabilities'. Haldar was awarded for developing an adaptive seating device that promises to transform lives of children suffering from cerebral palsy (CP). The Postural Correction (PC) chair, as it is called, is an innovation that not only ensures postural improvement in CP children but also accommodates their physical growth and encourages changes in physical activity. It is cost-effective and at the same time provides a single therapeutic aid for all the different disabilities manifested in CP. Working as a Senior Occupational Therapist for more than a decade, he observed that Cerebral palsy is the most common locomotor disability in children with an estimated prevalence of 2.5-3 per 1,000 live births. It results in impaired muscle coordination and movements, but the disabilities vastly differ from child to child.

"The PC chair is one-of-its-kind in the world as it can be adjusted to all kinds of CP impairments and helps posture correction of different manifestations be it muscular weakness, paralysis, floppy and rigid limbs and necks or exaggerated reflexes. Further, it works long-term through the child's growth from 2 years to 10 years", said Haldar. Besides CP, the chair is also beneficial for down syndrome, spina bifida, brain injury or other neurological motor disabilities. The PC chair has been tested on over 30 children with very successful results and his patent application for this product has been accepted by the World Intellectual Property Organisation and it is expected to be granted soon. Though he had conceptualised the appliance long back, he started working on it recently in 2016 and now with the support of BIRAC BIG grant and KIIT TBI, the PC chair will go into mass-scale production and he is confident that by 2021 the PC chair will be ready to hit the market. Haldar states "It will cost only around Rs 7,000 to Rs 8,000 so that all sections of the society can afford".

## Dr. Lita Mohapatra

LosJovenes Clinillogical Pvt. Ltd.

**Innovation:** *Matricaria chamomilla L. Chamomile* nanospheres in the treatment of Skin Hyperpigmentation- a novel approach with stem cell extracts



Dr. Lita Mohapatra, Founder of LosJovenes Clinillogical Pvt Ltd is a cosmetologist with an MBBS and double Master of Medicine from Australia, & a Fellow in Aesthetic Medicine. She received Full Bright Scholarship from the University of New Castle Australia for her study in Medicine and later another scholarship from the Government of Australia to study aboriginal health. Being a clinician and an aesthetic medicine practitioner she always felt that there is a huge gap between availability of effective skincare products in India which has minimal side effects and is backed by reliable technology. Hence, after returning back to India she started her own startup and partnered with KIIT TBI for incubation and support to develop a novel plant stem cell extract formulation for reducing skin pigmentation with BIRAC-BIG funding. LosJovenes Clinillogical is currently under the R&D operations of skin regenerative deep science products and regenerative medicines based on plant stem cell nanotechnologies as platforms. She has received innumerable awards and accolades in her journey. A few of the commendable recognitions are the 'Times Health Icon Award' in July 2019, 'Excellence as Doctor in Aesthetic Medicine Award' in December 2019 and 'Top Inspiring Women Entrepreneur Award' in 2019 among others. To all women who aspire to be entrepreneurs someday, Dr. Lita has this one thing to say "Dream big! Prove your point right to the world and why they need your insight, knowledge and talent. Make them believe that you are the one who can bring them the best deals on the table. And last but not the least; follow your heart to conquer the world."

## Dr. Madhusudhan Bhat

### iHeal Innovations LLP

**Innovation:** Electrically Active Anti-Microbial Bandage for Wound Healing



Dr. Madhusudan Bhat's entrepreneur journey dates back to his PhD days at All India Institute of Medical Sciences, New Delhi while working on interdisciplinary research of nanomedicine. Right from fabricating nanoparticles for various applications, he always believed in the indigenous development of novel healthcare products using biotechnology. While looking at this space in India, he found that advanced wound care is quite nascent and opportunities to build a world-class brand product brand are abundant. Dr. Bhat feels, he is fortunate to have smart and well-meaning people to guide and more importantly support him in all endeavors right from the beginning. Prof Dinda, currently working as a Professor and officer-in-charge of Division of Renal, AIIMS New Delhi who was his PhD supervisor encouraged him to consider becoming an entrepreneur and to start a start-up "iHeal Innovations LLP" which focuses on developing affordable, effective bandage for wound healing with minimal intervention of chemotherapeutic/antibiotics. Under the BIRAC BIG Scheme and incubated at KIIT TBI, the team is currently developing a unique bandage called ElectraSA Bandage for wound healing which exploits the micro-current flowing through leachable/non-leachable conductive threads woven on silk fabric. Most of the burn wounds or bruises usually need frequent dressing, application/administration of antibiotics. However, this unique bandage demonstrates anti-microbial as well as pro-healing. iHeal Innovations envisages a future where contemporary knowledge of biomaterials, medicine and engineering will be integrated in designing novel solutions to address the huge unmet need in management of chronic infectious wounds. His advice to the budding entrepreneurs is simple, "One should build a minimal product with the most important features and take it to a hospital for patient testing. No amount of laboratory testing will get the product ready and the team needs to get real feedback from users at an early stage".

**Dr. Sanchita Mukherjee**  
**Rigel Bioenviron Solutions Pvt. Ltd.**



**Innovation:** Polyhydroxy alkanoate based bioplastics from agro waste

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Dr. Sanchita Mukherjee, an experimentalist turned entrepreneur and Founder Director of Rigel Bioenviron Solutions Pvt Ltd is addressing major environmental problems of agro-waste utilisation to produce biodegradable bioplastics using innovative solutions. Rigel Bioenviron Solutions Pvt Ltd is into processing raw industrial wastewater in a complete multi reactor system to produce PHB polymer for downstream applications. She is a technocrat, successfully running the teams converting evidence-based science to business opportunities with an intent to solve serious environmental issues in the country. It is her optimism; over 10 years of R&D experience from elite institutions of India, unwavering drive to translate research towards productisation and industry know-how that helped her to get support from BIRAC, BIG program for successful execution of industrial demo plant for pilot scale PHB production. Her core team comprised of Dr. Partha Chakravarty, Bioprocess expert and Mr. Mayur Ved, Plastic engineer and many established cross-functional industry players boosting the very proposition. Sanchita suggests to young entrepreneurs that “Unless it is your technology and you are from the domain, don’t dream to become an entrepreneur on borrowed ideas as it will be a futile attempt. Entrepreneurship in the biotech space is a serious and intense practice with high stakes involved and requires not just money but conviction, belief and grip on science”.

## Dr. Soumalya Mukherjee

TAN90 Thermal Solutions Pvt. Ltd.



**Innovation:** Portable Cold Storages with Proprietary Thermal Batteries to combat post Harvest Losses.



High capital and operational costs involved in cold storage logistics elevate the post-harvest loss which is one of the major problems the marginal farmers have been facing for decades. Tan90 Thermal Solutions Pvt Ltd, a spinoff, founded by Dr. Soumalya and two other PhD graduates from IIT Madras, challenging this status quo and working on portable cold storages that are run by proprietary thermal batteries. As compared to other solutions available in the market, these thermal batteries can be charged twice as fast, resulting in giving the end-users a faster turnaround time. It was during their doctoral studies when they felt the need to take innovations from labs to the field. Dr. Soumalya along with his team of complementary skill sets are committed towards the development of the rural segment of our society especially the marginal farmers. Team Tan90 says that “It wasn’t that we wanted to be independent or not have a boss, but purely that we were curious about what could be achieved, loved building products, and realised there was a real need for innovative software solutions. We understood that a farmers’ son doesn’t want to follow his parent’s footsteps. So, we are committed towards delivering simple technologies to the marginal farmers for efficient agricultural practices. With the support from BIRAC and handholding from our incubator KIIT-TBI we are pretty much sure that our technology will reach out to each and every farmer in the country, irrespective of his/her land-holding”.



## Asish Mohandas

Cureous Labs Pvt. Ltd.



**Innovation:** An effective device to detect and prevent pressure buildup in bedridden patients in order to prevent pressure ulcers.



Since childhood, Asish Mohandas always wanted to build new things, starting from small models in high school to science fair projects. That interest got him into pursuing bachelors in Mechanical Engineering and later Masters in Product Design from the Indian Institute of Technology (IIT) Kanpur. After being the recipient of a few prestigious accolades including the James Dyson Award in 2017 and the winner of many medical hackathons and design competitions, he realized the need for solving genuine healthcare problems is real and impactful. He then went on to do Biodesign Fellowship Programme from School of International Biodesign, AIIMS which was focused on Medical Product development. The exposure to real Indian healthcare system during the clinical immersion made him empathize with some of the genuine problems, which if solved can create a greater impact for the people. Cureous Labs was later founded in 2020 with the belief of changing the lives of people for better. With the support of BIRAC BIG Grant, they are currently involved in the development of an effective solution which can prevent the problem of bedsores affecting millions of bedridden populations. Asish says “We started our venture with the product development in our mind. Though we could scale up our technology to a significant level, but we had to face technical and financial hurdles. BIRAC and our BIG partner KIIT TBI supported and helped us in making our journey easy and targets achievable”.

## Dr. Sandeep Shetty

Eishita Healthtech Pvt. Ltd.



**Innovation:** The Save Appliance-an Innovative Device For Correcting Skeletal Class III Malocclusion



The founder of Eishita Healthtech Pvt Ltd, Dr. Sandeep Shetty is a Professor at Yenepoya Dental College and Adjunct Assistant Professor in U.N.C Dental School, Chapel Hill, U.S.A and among the finest Dental Surgeons in the city. It is during his 20 years of clinical experience; he identified a genuine problem with the appliances used to treat skeletal class III malocclusion. The management of skeletal class III malocclusion is considered as one of the most complex malocclusions to treat and involves devices which are uncomfortable and bulky for the patients. To get the better of this problem, he is currently developing “The Save Appliance” which is a maxillary protraction device and can be used in the correction of skeletal class III malocclusion with the deficient maxilla. This proposed device will overcome the drawbacks of existing devices by decreasing treatment time, increasing comfort, reducing the bulk and minimizing patients’ compliances. Additionally, this device can create a good social impact as it improves facial appearance and speech of the patient as well as contribute to a better psychological state and better social acceptability. Dr. Sandeep says “Being a clinician and meeting a large number of patients helped me to validate the unmet need. After about 6 months since we begin working on the prototype development, we started applying for funds and got incubated at the KIIT TBI as associate incubatees. We got the first success in the form of BIRAC BIG Grant for further development and validation of the maxillary protraction device in 2019. Through Eishita Healthtech, we have also started connecting with a large number of doctors to validate our ideas and also investors interested in the medical technology space”.

## Ashok Somasundsaram

**Innovation:** Innovation: Low cost Bone densitometer using back illumination camera array



A major issue in the healthcare industry is the lack of radiologists to complete a review of scans to allow for a medical problem to be diagnosed. It is a challenge that is especially acute in rural areas where there is a shortage of equipment as well as qualified personnel. Ashok Somasundaram who is an engineer, zeroed in on coming up with a low-cost bone densitometer using innovative back illumination camera array that can reduce the cost of the radiography imaging detector by more than 60% and also reduce the complexity of the movement mechanism. Their innovation is that instead of expensive X-Ray sensor, a back-illumination camera is used along with phosphor screen, lens and lead glass in particular order to produce X-ray image that is of sufficient quality to be used for estimating bone density. Many rural daily wagers have less bone density, if there is a low-cost bone densitometer this can be identified early and cured. Apart from entrepreneurship, the founders had a larger aim to provide quality healthcare to the people of India, especially in rural areas. As Ashok poignantly says, “The next big thing is to scale up. Taking our devices to all possible patients, all the people for whom this would have an impact. In short, to take it to the masses and ensure that there is an impact because of what we are doing. With support from BIRAC and through KIIT TBI we will definitely achieve our goal very soon”

## Nirmal Kumar

**Innovation:** A novel way to prevent Catheter Associated Urinary Tract Infection CAUTI



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While participating in a clinical-needs analysis programme run by the BioDesign Fellowship in 2018 at the School of International Bio-design, AIIMS Delhi, Nirmal Kumar with mechanical and plastic engineering background realised Catheter Associated Urinary Tract Infection [CAUTI] accounts for 34 percent of all hospitals acquired infections and results in excess morbidity, mortality and health care costs. Globally, every year over 10 million incidences, 241000 deaths, and USD 7.8 billion economic burden are associated with this infection. Research on HAI infection showed that in India alone, Over 1.8 million incidences and 43 thousand deaths occur every year. Further, 15-25 percent of hospitalized patients are required to use urinary catheters. Out of these, 3-7 percent have high risk of acquiring a CAUTI due to catheterization. He also found that a "Urodhiel" is the only product in UK which dislodges the biofilm or bacteria and reduces CAUTI only by 50 percent and the cost is also too high making it unaffordable to stock such devices at primary and rural healthcare centres. He was clear that there is a need to solve this big problem by taking an engineering approach by a combination of two proven technologies, i.e., UV irradiation and Surface Acoustic Wave. With the support of BIRAC BIG grant in aid and KIIT TBI, he is building a device that prevents both extraluminal and intraluminal routes of infection and most importantly not going to change current catheter system and procedure. UROVIB, a CAUTI prevention device can bring the biggest innovation in urinary catheter systems, since the invention of Foley catheter in 1930's. It will be the first device that targets to reduce 80 to 100 percent of the infections' burden and costs 50 percent less than the existing product. Nirmal plans to start a company soon, he quips, "The technology is very promising, but there are still countless technical and business challenges that need to be addressed, so there's still a lot up in the air". Nirmal's words of wisdom for current grad students who might be interested in making a transition like his is "Start building your network long before you think you need to because it takes a long time. One good way to do this is to get involved with Incubators and entrepreneurship fellowship programs that have networking and business mentoring opportunities".

## Dr. Koushik Chakrabarty

**Innovation:** Development of serum free and chemically defined media to generate and culture human pluripotent embryoid bodies



Dr. Koushik, currently a scientist at GROW Laboratory, Narayana Nethralaya, Bangalore, with over 15 years of R&D experience in stem cell biology, neuroscience and microbiology from elite institutions of India, Germany and Netherland; such as the Indian Institute of Science, National Institute of Mental Health and Neurosciences, the Ruhr University Rudolf Magnus Institute of Neuroscience, Utrecht University, Netherlands. With his vast experience in harnessing the human pluripotent embryoid bodies (EB) developed from pluripotent stem cells and with the support of BIRAC and KIIT TBI, he strives towards translating adult stem cell technologies prowess into clinical reality. Research on stem cell technology shows that embryoid bodies (EB) generated from stem cells is a common method for its biomedical applications. EBs is the pertinent platform for banking and utilization of the induced pluripotent stem cells iPSC technology. The market for iPSC-based therapies is growing rapidly in all spheres of the life science industry. However, there are very limited number of companies that exclusively focuses and caters to this rapidly growing segment. The key prerequisites for a broad application of EBs in the biopharmaceutical and biomedical sectors are to generate large quantities of highly purified EBs in standardised formats. In addition, the recently introduced regulations from the Food and Drug Administration and European Medicines Agency requiring the removal of serum and other animal-derived components in all bio-manufacturing processes. Currently, Stemcell Technologies Vancouver, BC, Canada is the sole global provider of Serum Free Medium (SFM) to culture EBs. Addressing this dearth of alternatives, Koushik is developing a cost-effective SF-CDM for generating and culturing EBs for its biopharmaceutical and clinical application and the product name is EBpro SF-CDM. Preliminary data comparing the commercial medium revealed it to be more consistent in generating EBs and retention of its critical features. With BIG grant, further optimization of the EBpro SF-CDM is being carried out to achieve optimal performance with the aim of streamlining pilot production processes and achieve consistency and predictability at a reduced cost.

## Shashank Ranebennur

Heilen Meditech Pvt. Ltd.

**Innovation:** Accurate Point-of-Care Quantification of Serum Creatine Kinase, Human Serum Albumin and KIM-1 for Easy and Rapid Diagnosis of Acute Kidney Injury



Shashank Ranebennur Nagaraj, a tech graduate and the founder of Heilen Meditech Pvt Ltd who always has been tinkering with new innovative solutions to the engineering problems. But only a couple of years ago, he realized that the diagnostic sector needs a lot of innovative and technological interventions to make it more efficient and sensitive at the same time. With his increasing interest in healthcare sector, he identified a major problem of Acute kidney injury (AKI) and its current diagnostic methods. AKI is the foremost origin of nephrology consultation and is associated with high mortality rates. To overcome this, and after several brainstorming sessions with mentors and clinicians, Shashank and his team at Heilen Meditech Pvt Ltd is now developing a point-of-care, portable and low-cost device for quantification of serum creatine kinase, human serum albumin and KIM-1 which will assist in rapid diagnosis of AKI and many other renal disorders. Mr. Shashank says that “With the support of BIRAC and our incubator KIIT TBI, we want to scale-up our business in India by partnering with care providers, channel partners, distributors and business associates who would join us in our journey. We wish to take this business globally by collaborating with strategic partners”.



## Dr. Sudhamani Muddada

Utopia Nutraceuticals Pvt. Ltd.



**Innovation:** A Novel Food Fortification Technology addressing Trace Metal Malnutrition Hidden Hunger



An upsurge in cases of malnourishment across the globe and its health impairments such as stunting, low immunity, cognitive losses, and reduced physical and mental capabilities, particularly among children in rural India inspired Dr. Sudhamani to venture into the nutrition business in 2019 and start his own venture Utopia Nutraceuticals Pvt Ltd and incubate at KIIT TBI. Reports suggest that over 70% of the Indian population still consumes less than half of the Recommended Dietary Allowance (RDA) endorsed micronutrients that can result from deficits in food supply or a poor-quality diet. Particularly, lack or shortage of trace metal Fe, Cu, Zn, Se, etc. intake through food can lead to malnutrition called 'Hidden Hunger'. Fortification of food with these trace metals is now considered as the best method for combating malnutrition at the global level. Currently, 79 countries have made it mandatory to fortify at least one major grain. In its mission to revolutionise India's sustainable food market, Utopia Nutraceuticals Pvt Ltd is currently developing a Cost-effective technology which involves the use of food grade microorganisms coupled with the trace metals for industrial production and commercialization of different fortified food products. The startup envisages for inclusion of local manufactured fortified foods in the Public Distribution System (PDS) and Mid-Day Meal Scheme, which can provide metal-dense food at an affordable cost to larger sections of the underserved communities. While sharing his experience he said "I failed in identifying the real opportunity when I started off my journey. One needs to leave behind the academic mind-set and get into the shoes of a real entrepreneur. In academic viewpoint, every piece of science is an exciting opportunity. However, building a sustainable enterprise needs a little detached approach towards science. Although I failed multiple times to get funding support through BIRAC BIG grant but eventually with the mentorship of BIRAC and KIIT TBI, I understood the bottlenecks in my technology, improved my business plan and eventually achieved what we have aimed for".

## Pijush Giri

**Innovation:** Highly biocompatible and injectable hydrogel for prevention of post-surgical adhesions



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India has been producing graduate engineers at breakneck speed over the years. But there are very few among these tech graduates who choose to start their own ventures. One such exceptional example is of Pijush Giri, an M. Tech graduate in Biomedical Engineering from NIT Rourkela, Odisha is one such new age entrepreneur who chooses to dive into the startup ecosystem right after the completion of his engineering. It was during his post-graduation days; he identified a very prominent problem of post-operative adhesion of the tissue with other tissue or organs which causes many complications and increases the therapeutic cost as well. But due to technical challenges, he couldn't figure out the correct framework to proceed with. To overcome this he started building his team with complementary skill sets and framed an idea to develop a hydrogel which can prevent post-surgical adhesion. This simple innovative idea bagged the BIG grant last year. Pijush understands that the entrepreneurial path towards success can be quite challenging but with the help and support from BIRAC mentors and holistic incubation support provided by KIIT TBI , he believes that he can overcome all these odds to create his own sustainable startup.

## Dr. Venkatesh Chelvam

RONCOV Diagnostic and Therapeutics Pvt. Ltd.



**Innovation:** Indigenous Targeted Radiopharmaceuticals for Detection and Therapy of Prostate Malignancy



The scientific and medical community comes up with breakthroughs that save lives, fighting illnesses and discovering new and better ways to live. And these breakthroughs are not just happening in heavily funded research centers; they are happening at startups headed by enthusiastic scientists as well. RONCOV Diagnostic and Therapeutics Pvt Ltd is one such company that is working on some cutting-edge science in cancer research. Founded in 2019 by a IIT Indore Professor, Dr. Venkatesh Chelvam, an organic chemist and a chemical biologist with interest in synthesis of anticancer natural products, diagnostic and therapeutic applications of new targeting ligands for cancers. Cancer research indicates that prostate cancer (Pca) ranks first in terms of cancer-related deaths among men in the United States whereas in India it ranks second or third among all cancers in Indian men as per the Indian Council of Medical Research (ICMR). Therefore, with the support of BIRAC BIG grant and KIIT TBI, RONCOV Diagnostic and Therapeutics Pvt Ltd is developing new PCa radiopharmaceuticals using indigenous technology which will result in production of accurate cost effective diagnostic and therapeutic tools that can detect and treat all stages of PCa. Dr. Chelvam says “It is a good idea to seek validation of the concept, product, service or methods by participating in grant applications and incubating at incubator like KIIT TBI where you connect with many mentors and listen to experienced players and avoid reinventing the wheel. Success is good and necessary for an entrepreneur, but failures teach lessons for a lifetime and make one stronger. So welcome failures and look for the lessons. Pivoting is a key asset of a successful entrepreneur”.

## Dr. Subhankar Kumar Singh

**Innovation:** Development of antigen detection-based novel and accurate diagnostic approach to detect leishmaniasis



Dr. Subhankar Kumar Singh is a Scientist at ICMR-Rajendra Memorial Research Institute of Medical Sciences, Patna. Being one of the leading parasitology researchers from India at present, with BIRAC BIG support and in collaboration with various international agencies, namely WHO/TDR, BMGF, DNDi, and DST, is working hard to translate his research findings in order to make an impact on the National Leishmania Control Program by the National Vector-Borne Disease Control Programme (NVBDCP), Government of India. While conducting his field survey across primarily healthcare centres in rural settings in Bihar, the state which is one of the worst VL affected areas in the world contributing more than 70% of total KA cases reported and India being one of the six countries which share 90% of global burden of VL, he realized that out of the 38 districts of Bihar, 34 are affected. The population at risk is 34.65 million, with 500 or more cases are detected annually. Working in the field of immunology for over 20 years and with a strong urge to harness the science for meeting the societal needs is the ultimate motivation for Dr. Subhankar to embark his entrepreneurial journey. He and his team is now developing a field based accurate, sensitive and cost effective rapid diagnostic tools that can detect disease in its mildest form which is significantly essential for effective control and reaching the goal of VL elimination. His suggestion to the young aspirants who would like to take up parasitology as a research interest, “Developed nations are mainly working on noncommunicable diseases such as cardiovascular, cerebrovascular, cancer, diabetes, and other metabolic disorders. Developing countries, on the other hand, are mainly dealing with communicable tropical diseases. Research in NTDs is growing up as a challenging and interesting aspect. Hence, young aspirants should also take up parasitology as a research interest”.

## Dr. Pritam Chattopdhyay

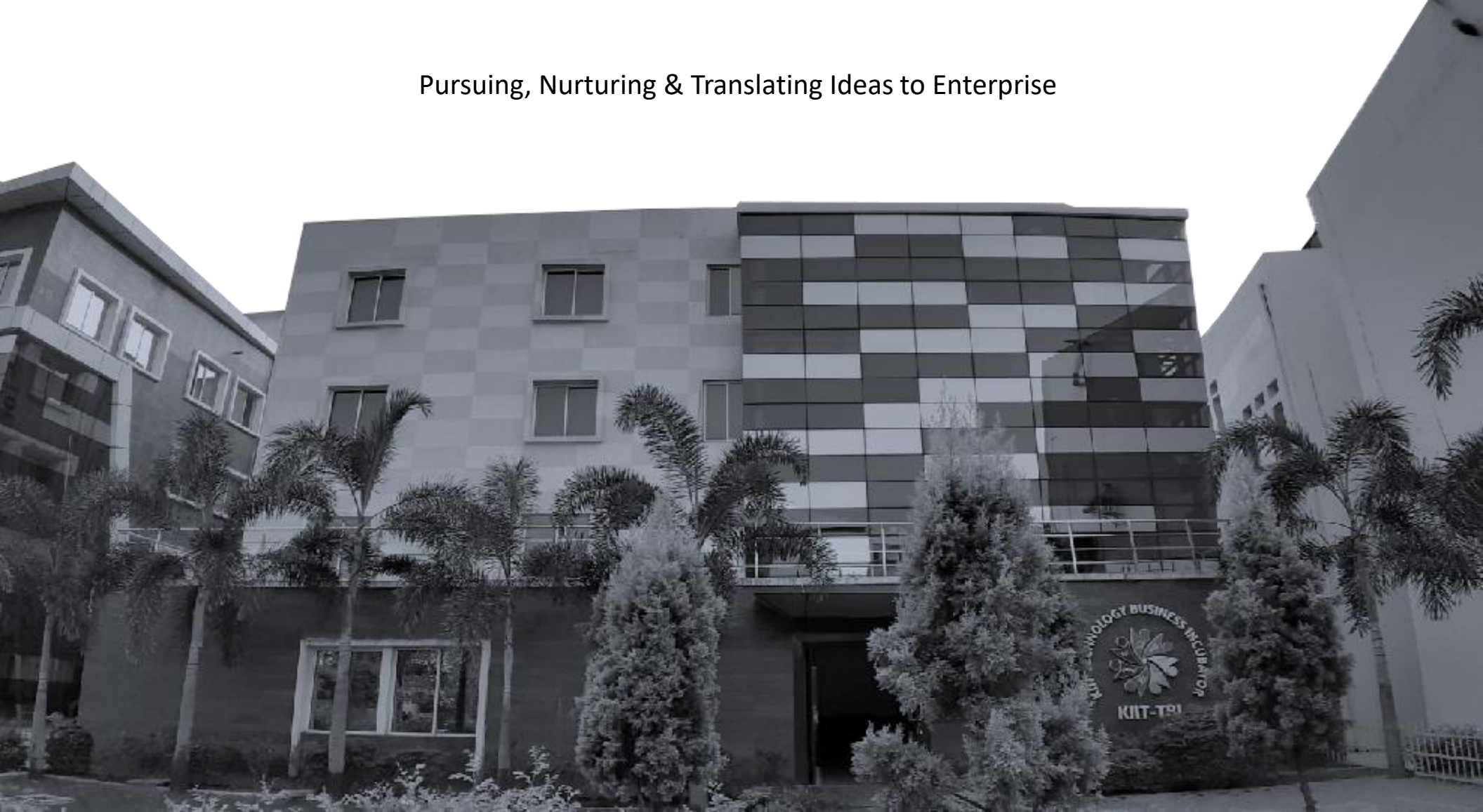
**Innovation:** Scale-up of Nature Identical Vanillin Production from Biotransformation of Agro-waste



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While startups has been brewing in major cities, the last few years have revealed an interesting trend – the rise of the tier-two cities as preferred startup destinations. Nestled in the mountains, the North Eastern Region (NER) of India is a treasure unleashed and is also fast emerging as a one-of-a-kind startup ecosystem. The youth of the northeastern region of the country comprising of eight states are no exception. Dr. Pritam Chattopadhyay, a biotechnologist by background, is one such example who is trying to leverage the uniqueness of the region in terms of the available raw material and human resources. Vanillin is a plant secondary metabolite and the main constituent of natural vanilla, which acts as an important flavouring and aromatic component used worldwide in food, beverage, confectionary, pharmaceutical, and cosmetics industries. Price variation and high consumer demand for natural flavours have moved towards vanillin production from natural resources. Vanillin production by applying biotechnological techniques such as microbial bioconversion of substrates like eugenol or ferulic acid is considered an alternative and economically feasible way of obtaining vanillin. Thus, it has gained much interest in recent years due to European and US legislation already classifying the product as ‘natural’. Against this backdrop, Dr. Pritam is developing a novel cost-effective technology utilising the agro waste abundant in NE region containing ferulic acid to produce bio-vanillin through microbial conversion rather than conventional chemical reagents. Thus, there is much potential in converting the waste into wealth and useful product. Dr. Pritam is one among the few people from NER who have received the BIRAC BIG grant and gained recognition for their endeavors. Recently BIRAC have also started a special call of BIG specific for North East region, to which Dr. Pritam remarks “BIRAC is certainly creating a supportive ecosystem for early-stage entrepreneurs from North-East India to help them scale up their businesses. Unique initiatives like BIRAC Regional Techno entrepreneurship Centre for impacting Northeast & East (BRTC at KIIT TBI) brought together the key stakeholders in the regional entrepreneurship ecosystem including start-ups, investors, mentors and subject matter experts to help unlock the huge potential of the North Eastern states by unleashing the innovative energy of the emerging entrepreneurs of the region. This would have multiple benefits – create many more employment opportunities, reduce or reverse migration of local youth, energise the local business ecosystem, help facilitate the socio-economic development of the region”.

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