Special Anniversary Edition

# birac i3

*Ignite • Innovate • Incubate*

## birac @ 5 Impacting the Biotech Innovation Ecosystem


birac
Ignite Innovate Incubate
Biotechnology Industry Research Assistance Council
(A Government of India Enterprise)

March 2017
No. 1 | Vol. 4

# Chief Editor's Take

BIRAC turns 5 and it has been a wonderful journey in creating the foundation of a vibrant Indian biotechnology industry involving all stakeholders. In the last 5 years, we have launched several programs such as BIG, SPARSH, SBIRI and BIPP that have supported at least 300 startups to test their ideas and SMEs to validate their products and scale up for commercialization. Our social innovation program SPARSH has touched upon a range of focused issues such as maternal and child health, ageing, waste to energy, sanitation and precision agriculture.

The funding support combined with access to technical expertise has led to commercialization of at least 50 products and technologies and two dozen products are in the pipeline for eventual commercialisation. We have also established a network of bioincubators that have provided space for more than 200 startups to access mentorship and high end instrumentation. Our partnerships have helped us reach to the last mile for delivery as well as improve access for our startups and SMEs to the end-user.

Our commitment is to redouble our efforts, seek aligned partnerships such that we are able to scale and to build 2000 startups by 2020 and 50 bioincubators, a large pipeline of excellent product ideas, 150 top class TTOs which we hope will further energise the ecosystem leading to India becoming a global hub for bio-economy touching US$100 billion by 2025.

It is a pleasure to showcase this special issue of the birac e3 that highlights the perspectives from our well-wishers which will help us refine our way forward.

**Dr. Renu Swarup**
Senior Adviser/Scientist 'H', DBT, GoI. &
Managing Director, BIRAC

## in this issue




**Editorial Committee**

**Satya Prakash Dash**
Head, Strategy Partnerships & Entrepreneurship Development

**Chhaya Chauhan**
Manager (Research Analysis and Facilitation)

**Apoorva Bhatnagar**
Management Intern

Design, Production and Circulation :
Chiranjn Advertising, E-170, East of Kailash, New Delhi, Email : chiranjn@hotmail.com

# Leader

## Forging New Pathways to Scale

As we usher in the 5th Foundation Day of BIRAC, we pause to look back at what has been achieved, the gaps that still need bridging, the lessons we have learnt and how we can utilise our successes to spur us to amplify our impact and broaden our footprint.

The palette of our programs is colourful. We have designed and delivered programs that have been saltatory for development of biotech products aligned to the global goals of sustainable development. These products have impacted the lives of people, helping improve health, availability of nutritious food, help address energy needs and provide a cleaner environment.

A major consequence of BIRAC's life is the tangible change in the biotech culture of India through programs which have infused new energies in the biotech startup landscape through funding and incubation that has unleashed new entrepreneurial pathways amongst young innovators, in our research and academic institutes as well as in the industry.

BIRAC has rapidly established several partnerships. The Project Management Unit of the DBT-Bill & Melinda Gates Foundation has successfully implemented the Grand Challenges India program. Besides, BIRAC has initiated a host of partnerships that either involve co-funding for bio-innovation allow for access and mobility to our entrepreneurs to different platforms such that they can forge new partnerships and explore collaborative opportunities.

We now need to ponder about the future and the strategies for to scale. There are three components to scale up. These have been well-articulated by our Grand Challenges partners too, so they are of global relevance. We need to amplify the curation of entrepreneurial ideas, mentor startups through hurdles and finally broker enterprises through the pipeline of product development and last mile delivery. Indeed in all of this we will need partnerships and passionate people for our onward march to make India a global bioeconomy hub.

**Prof. K.VijayRaghavan**
Secretary, DBT, Govt. of India
& Chairman, BIRAC

**Dr. M. K. Bhan**
National Science Professor, IIT
& Former Secretary, DBT

Dr. M. K. Bhan served as Secretary, Department of Biotechnology, Government of India from March, 2004 to November, 2012. Dr. Bhan , a visionary, an eminent paediatrician and an acclaimed public health professional, was the driving force behind the thinking that led to setting up of several institutions, including BIRAC.

He is recipient of numerous awards such as Padma Bhushan 2013; Pollins Foundation Research Award 2003; Shanti Swarup Bhatnagar Award, 1990; National Ranbaxy Award, 1990 and Achar Gold Medal of the Indian Academy of Pediatrics, 1984.

During his decade long stint at DBT, he brought in new thinking and dynamism to the area of biotechnology. Dr. Bhan took time off to speak to birac e3 on completing five years of successful existence of BIRAC and about the future of BIRAC as he sees, and envisions.

## Great Nations Try New Designs and New Ways of Building Organisations for Sustained Excellence

**Q. How did BIRAC take shape?**

MKB: Indian science has attempted to create many institutions to promote science led innovation and entrepreneurship. Few have sustained excellence over time. We ask the question what could be the design of an innovation enabling agency that could remain excellent for long. Great nations try again and again, try new designs and new ways of building institutions. BIRAC originated from this perspective.

**Q. Could you please expand on the design philosophy behind BIRAC?**

MKB: When you make policy and as well as provide innovation services you create a certain difficulty and conflict. Policy making requires inclusiveness and patience while services for enabling innovation and entrepreneurship thrive when there is competition. BIRAC was created to add competition to the old and aging enablers. Its architecture itself created regional and peripheral centres that would provide each other competition in their ability to nurture the local and regional innovation ecosystems. You see that is how BIG and several other BIRAC programs are managed by many sub-agencies giving the end user a choice fundamental to promotion of service of quality.

It is a bridge between public intent and entrepreneurial spirit and ways of doing things. That's where BIRAC is strikingly different.

**Q. And how do you decipher the phrase "strikingly different"?**

MKB: Let me explain, in the older agencies the umbilical cord with the government remained very close and tight, in BIRAC there is a fine balance- the Government has enabled BIRAC to function as a company and the close relationship between BIRAC and the Government is by choice and not by compulsion.

This synergistic association was a result of a dialogue and stakeholder consultations that pointed that BIRAC gained from DBT's contacts and resources and vice versa. DBT found that it could do through BIRAC what would be difficult to do otherwise. It is a relationship by choice, it is a relationship of trust but not by authority. In other places such as in Public Sector Units, the umbilical cord is tight and never cut. Those agencies walk but could just as well run.

**Q. Are there any other spheres where BIRAC is different?**

MKB: Yes of course, for example in all other PSUs employees are government's servants but in BIRAC people are hired and nurtured like companies do. BIRAC employees are not afraid of engaging in a career where the only source of security is competence and performance.

Let me explain in detail. BIRAC grew from a perspective to achieve sustained excellence in nurturing innovations and entrepreneurship

this organisation should function like a company that knows how to compete, its policy for recruitment, promotion, retention and exit do enshrine this basic principle. Another way to look at this the following: Services provision must be based on competition and performance. In the design of BIRAC is a fundamental push and assurance for sustained excellence through leadership and performance by its people. One can imagine what our science institutions may have been like if they had been designed like BIRAC. Too much security promotes early aging.

**Q. And you feel this has wider relevance for science & translational institutions?**

MKB: Indeed, Indian institutions funded by the government are always asking for flexibility. The reason they are often denied that is because their design avoids the pressure to perform. BIRAC self-created that pressure and won the endorsement of the Government. The uniqueness of BIRAC is not that it promotes innovation, its uniqueness is how the organisation is set up, its design and architecture compels performance.

There is a fundamental principle here- Reform in governance must pay attention to design, flexibility must be earned in use of tax payer's money by linking the security of tenure with performance as the sole basis? In this also lies a lesson for our science led institutions?

**Q. What were the challenges when BIRAC was being seeded?**

MKB: The challenge was to clearly articulate the design of the organisation to financial and administrative systems of the approving authorities. The flexibility given to BIRAC is a reward for that clarity in design. Design and architecture of a governance system is critical to sustained high performance. People do not realise this how critical design is for sustained performance. It is attention to design and the ability to articulate this design that was critical.

**Q. How do you think BIRAC has connected to startups and SMEs and impacted the culture of doing things?**

MKB: BIRAC has a spirit of an enterprise. The startups and SMESs see the same freshness in BIRAC which is in them. BIRAC embodies the spirit and the energy of a startup. It has used and empowered others who serve startups to serve them better. In this regard, it has shown exemplary lack of self-possessiveness. BIRAC asks for autonomy and in turn it gives autonomy to all those it funds, its only expectation is performance from itself and from those it funds.

**Q. What has been the fundamental impact of BIRAC in the last 5 years?**

MKB: What separates out BIRAC is its responsiveness, it is timely, it is enthusiastic and it is infectious. BIRAC connects people and disciplines, it is a welcoming organisation, it is generous. Its accountability is not limited by the perspective of a grant but the largeness of the innovation ecosystem it is trying to create. Even the accountability framework shows a largeness of purpose.

It has created schemes that reach out to people throughout the innovation cycle. It brings young innovators and entrepreneurs in contact with the best scientists of India. It provides critique and feedback on their ideas and their approach in an articulate and comprehensive manner. It combines a review with a problem solving gap. BIRAC's reviewers are often told that critique and not criticism is our way. Critique is like diagnosis and what good is a physician that does not help treat after diagnosis.

**Q. What other subtexts of the narratives are emerging through the BIRAC experiment?**

MKB: BIRAC is also thriving because it receives lots of love and acknowledgement from the communities. Our scientific community has generally been purist and shied away from interaction with industry, unsure of whether such interactions fit in with their values. BIRAC has promoted academia and industry interactions in a manner that celebrates innovation and inventiveness more than profits. It has shifted the subject of innovation and entrepreneurship as an instrument of nation building. It has brought a freshness in the way academia and industry interact.

**Q. How will BIRAC's relevance evolve in the future?**

MKB: The more this world succeeds, the more problem it solves, however fresh issues will always crop. Therefore, organisational ability to solve problems must be a long term capability. Progress expands universe and without science, invention, innovation and entrepreneurship we cannot keep pace and we might always fall short of promise.

**Q. So we need more BIRACs? Can BIRAC model be replicated?**

MKB: The world faces so many challenges that we may need 100 BIRACs in our endeavour to change India's life. It can be replicated if this essence of BIRAC in its design is understood leading to intelligent design of other organisations. Thank you and good luck!

# Biotech industry

## How to reach the USD 100 bn Target

**Prof. G. Padmanaban**
Former Director at IISc, Bangalore

Professor Padmanaban Govindarajan is a renowned biochemist and a pioneer in Indian biotechnology. Currently, he holds the NASI-Platinum Jubilee Chair and is Honorary Professor at the Indian Institute of Science, Bangalore.

He was Director of the Indian Institute of Science during 1994-98.

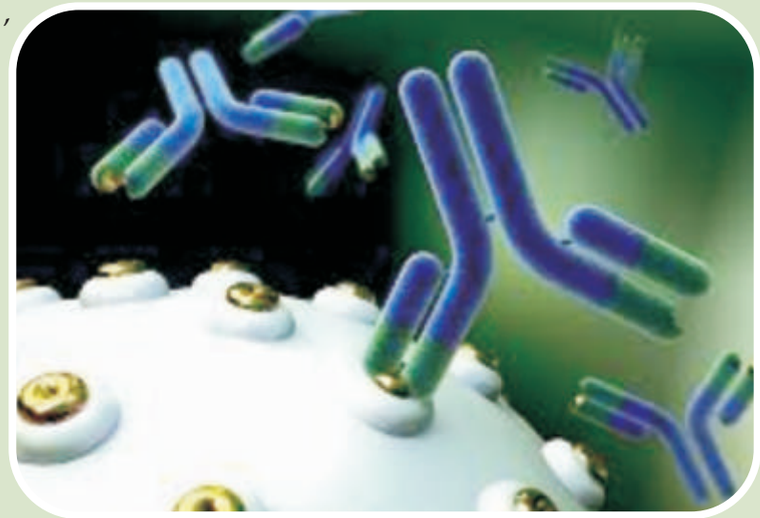
Professor Padmanaban is the recipient of many prestigious honors and awards. Notable ones are: Padma Shri (1991) and Padma Bhushan (2004); Sarma Memorial Award (SBC); Shanti Swaroop Bhatnagar Award (CSIR); Bhasin Award in Biotechnology; Ranbaxy Award and many others.

He has played an immense role in mentoring BIRAC with his intellectual guidance in supporting and spurring entrepreneurial temper in young biotechnologists.

Sustained government funding in R&D to academic institutions in the area of life sciences has indeed helped to build infrastructure, human resource and capability, leading to an improvement in the quality of scientific research in the country, as assessed in terms of research publications. However, it has required a paradigm shift to fund industry directly to make progress in translation research leading to Biotech products. It all started with SBIRI (Small Business Innovative Research Initiative), launched in 2005 as a PPP (Public-Private-Partnership) model. This has led to the establishment of BIRAC (Biotechnology Industry Research Assistance Council) as a section 8 , not-for-profit company of the Department of Biotechnology in 2012, where many more schemes have been added to provide a path for proof-of-principle to mature into commercial products and processes. An exciting addition to the list of schemes under BIRAC is the Biotechnology Ignition Grant (BIG), where young potential entrepreneurs can pursue innovative ideas to generate proof of principle in 18 months. It is heartening that the number of BIG projects in the running is reaching 200, approved from a total of around 1500. Many have already graduated to SBIRI funding. No wonder that BIRAC efforts have already led to around 50 products for commercialization. The total number of entrepreneurs created, workshops held, Incubation space created, IPs generated and the various linkages established are all very impressive. All these have contributed to a valuation of Indian Biotech industry comprising of 800 companies at USD 11 bn and accounting for 2% of global Biotech industry. But, how to make it USD 100 bn by 2025 ?

Biopharma accounts for 64% of the total revenues. In particular India is surging ahead with biosimilars in the familiar path of generics in the drug market. The opportunity for biosimilars is huge and India is still making less than 10 primary molecules

with 50 brands. Interestingly, vaccines constitute the biggest chunk, around 40%. But, in terms of pricing, vaccines would be at the bottom of the spectrum, although having high societal relevance. At the other end of the spectrum would be monoclonal antibodies (MABs), unaffordable to most Indians. In between, there are a huge lot of products, including blood products (recombinant or otherwise), growth factors, enzymes, interferons, cytokines etc. MABs require complex technologies of making hybridomas, phage display, B cell cloning, recombinant DNA technology to amplify light and heavy chains and expression in bacterial or mammalian cell lines (CHO cell lines), scale up and purification. I am not sure we have all these technologies functional in any one location. Perhaps, the industry is licensing out a couple of clones and then taking them forward. But, I feel we need to make a concerted effort to get into MAB technology, since the scope is very large and revenues substantial. The BIRAC experience indicates that many start ups have the upstream technologies of lab-level cloning, expression and purification. The challenges for these companies are to get investments, scale up to pilot-plant scale, large scale purification, regulatory compliance and clinical trial. In my opinion the big Pharma (by Indian standards) should take up this challenge. I would like to suggest that big Pharma should invest, acquire, support the small and medium Biotech companies in the field and create an eco-system to make MABs. FICCI/CII should interact with BIRAC and create a partnership and a PPP model can establish unique capabilities to make MABs and rapidly expand the list of Biosimilars.



BIRAC has access to all the Biotech companies and also to over 700 scientists, a core being involved in evaluation, site visits, monitoring and mentoring of the knowledge-based Biotech companies. I firmly believe that one strategy to reach the USD 100 bn mark would be to have a major thrust in the biopharma sector, especially MABs and other biosimilars, through the small Biotech-Pharma consortium. Next to biopharma would be bioagri sector. To reach the goal of USD 100 bn, I feel the edible oil sector should be targeted. India imports edible oil to the tune of Rs 65000 crore (amount indicated for 2015-2016). If any dent can be made in terms of increased productivity through technology intervention, transgenic or otherwise, in mustard and cotton, the targeted goal of Biotech industry would be in sight. Mustard oil and cotton seed oil ( a by-product from Bt cotton seeds) may hold the key. One would argue that many other sectors of Biotech are equally important. While, it is necessary to move forward in all segments, specific goals cannot be attained without a targeted approach. Targeting specific segments of biopharma and bioagri along with a progressive movement in all other segments would help India to reach its fiscal and societal goals in Biotech industry .

# BIRAC Can Help India Transform into Global Biotech Innovation Hub

**Dr. Kiran Mazumdar-Shaw**
Chairperson & Managing Director
Biocon Limited

Dr. Kiran Mazumdar-Shaw, a pioneering biotech entrepreneur, is the Chairperson and Managing Director of Biocon, Asia's leading bio-pharmaceuticals enterprise, which she founded in 1978. She has inspired entrepreneurs of all generation with her vision and commitment for innovation and affordability in delivering world-class therapeutics to patients globally.

She has been recognized with many awards such as the Padma Shri (1989), the Padma Bhushan (2005) and many others.

Ms Mazumdar-Shaw holds key positions in various industry, educational, government and professional bodies.

India is today a biotechnology hot spot with the size of its bio-economy estimated at USD 35 billion. The biotechnology industry in India has come a long way since the late Seventies when I started Biocon. Over the years, entrepreneurs have developed innovative technologies to launch a wide variety of products with applications in healthcare, diagnostics, agriculture, industry etc. Leveraging the power of biotechnology, India has achieved critical mass in recombinant technology based agricultural and pharmaceutical products. The country has thus emerged as the world's largest vaccines producer, global scale insulin manufacturer and the largest supplier of genetically modified cotton globally.

The success of India's biotechnology industry can be traced to the pioneering spirit of entrepreneurs who were supported by the government through various schemes and incentives. The Department of Biotechnology (DBT) was set up under the Ministry of Science and Technology in 1986, when there was hardly any seed and venture funding to support the industry's entrepreneurial ambitions. The creation of the DBT led to several far-reaching initiatives to fund R&D efforts and entrepreneurship, primary among them was the setting up of the Biotechnology Industry Research Assistance Council (BIRAC) in 2011.

A first-of-its-kind initiative, BIRAC was mandated to strengthen and empower the innovation capacities of biotechnology entrepreneurs and provide an enabling ecosystem. Over time, BIRAC has emerged as the largest source of early stage funding for first-time or existing biotechnology entrepreneurs. BIRAC's efforts to build the biotechnology innovation ecosystem in the country have led it to support over 100 new startups, close to 350 companies and over 500 projects. BIRAC has contributed to the generation of over 100 patents and the commercialization of nearly 30 products \ technologies in the past few years.

BIOTECHNOLOGY IN INDIA: INITIAL YEARS

Up until the mid-1980s, Biocon was the lone biotechnology company pursuing an innovation-led business. The establishment of the DBT in 1986 was a decisive step towards creating a roadmap for biotechnology in India. As a pioneer in the industry, I was privileged to be invited to DBT's Task Force. The focus of the first phase was on creating an academic ecosystem for biotechnology and thereby developing the required human capital to support this emerging sector. A number of Departments of Biotechnology were created at selected universities.

The DBT also initiated a regulatory framework for the biotechnology industry, promulgating guidelines for conducting research and developing products for commercial use. Recombinant technologies were at the fulcrum of regulations covering largely vaccines, genetically modified crops and biopharmaceuticals.

In 1990, the government set up the Small Industries Development Bank of India (SIDBI) for the promotion, financing and development of micro, small and medium enterprises (MSMEs) in India. SIDBI introduced low-interest debt instruments, which in today's parlance is like seed funding, which helped companies like ours to scale up.

Given that biotechnology is a high-risk, capital-intensive, and IP-led business with long gestation period, biotechnology startups failed to show up on the radars of venture funds. Seeing this, the Indian government came forward to provide seed capital and risk capital to biotechnology startups which were keen to take forward their ideas to the market. Between 2005 and 2008, the DBT initiated two flagship funding schemes - the SBIRI (Small Business Innovation Research Initiative) and BIPP (Biotechnology Industry Partnership Program) - to provide capital in the form of soft loans and grants for biotechnology innovation. These two flagship schemes helped ignite the R&D appetite of the Indian biotechnology industry.

Soon, Bangalore emerged as the biotech hub of India with 1000's of biotech clusters mushrooming in the city, with several research institutions like IISc, NCBS, IBAB, JNCASR etc. and over 10,000 research scientists based here it became a fertile ground for innovation.

Then in 2011, the Government of India took a landmark decision to create a unique organisation, BIRAC, which would consolidate all industry funding schemes.

BIRAC: DELIVERING ON ITS MANDATE

The mandate given to BIRAC was to focus on a wide range of initiatives straddling risk capital, targeted funding, technology transfer, intellectual property (IP) management and mentoring schemes aimed at helping businesses scale up. Central to the objectives of BIRAC was to drive innovation excellence in biotechnology companies and make them globally competitive.

In keeping with this mandate, BIRAC introduced several pioneering initiatives that resulted in the emergence of a vibrant entrepreneurial ecosystem for the biotechnology sector.

Among the several schemes started by BIRAC, the Biotechnology Ignition Grant (BIG) scheme served a catalysing role in helping several life sciences startups. Business concepts funded by BIG were diverse and cutting edge, from diagnostics for tuberculosis and cancer, to biofuels from sea weed, synthetic biology, nanotechnology-based drug delivery and bio-scaffolds.

BIRAC's BioNEST program helped create 15 world-class bioincubators to provide incubation space, mentor networks, instrumentation facilities, IP and technology management support.

BIRAC also joined hands with the Bill & Melinda Gates Foundation, Wellcome Trust and USAID to provide collaborative funding for innovations in the areas of maternal and child health, agriculture and nutrition, sanitation and infectious diseases.

LOOKING AHEAD

Already a major hub, India has all that it takes to become a global biotechnology leader. This will not only spur economic growth and provide much needed jobs, but will also ensure that we find answers to modern day challenges in healthcare, energy, food security, and for the environment. However, biotechnology's promise and India's potential can be realized only if the government, industry and academia work together to facilitate innovation. We need to create an optimal ecosystem that enables India's evolution into the preferred destination for biotechnology innovation. BIRAC has a key role to play in this regard.

While BIRAC has contributed to encouraging biotechnology startups, the expected scale-up has not happened. Several biotechnology startups and SMEs that launched potentially transformative technological solutions have been constrained to do so in a piecemeal fashion through pilot projects.

BIRAC will need to do more to catalyse the innovation driven biotechnology industry by promoting entrepreneurship, industry-academia interaction and providing venture capital. Biotechnology is a new frontier for India and BIRAC can contribute to synchronising resources, plans, policies and priorities with a vision to build a USD 100 billion bioeconomy in India by 2025.

# Creating Impact through Partnership

**Dr. Steven Buchsbaum**
Deputy Director, Discovery and Translational Sciences, BMGF

Dr. Steven Buchsbaum currently serves as deputy director of Discovery and Translational Sciences at Bill & Melinda Gates Foundation (BMGF). He leads the team's efforts to expand the Grand Challenges family of grant programs with special focus on Maternal & Child Healthcare and associated partnerships to enhance their impact.
Prior to joining the foundation in 2005, he served as the Founding Director of the Office of Chemical, Biological, Radiological, Nuclear and Explosive Defense in the Homeland Security Advance Research Projects Agency of the Department of Homeland Security. He has also held positions as a program manager in the Defense Advanced Research Projects Agency and in the U.S. State Department as the Science and Technology Officer for South Asia. Prior to federal service, he held positions at various Institutes and Organizations .

A little over five years ago, we at the Gates Foundation were exploring ways to tap into the vast potential of Indian innovation and scientists, to solve not only challenges in India, but more broadly contribute to health and development solutions around the world. We were looking for a chance to partner with a body with which we could define the most pressing problems, select the best ideas and innovators to solve them, and provide combined funding and support to these innovators to help accelerate the fruits of their research towards impact. We explored many options with regard to partnering with the Department of Biotechnology (DBT). At that time the Biotechnology Industry Research Assistance Council better known as BIRAC, only existed as a promise of the future, a nimble organization that would be an amalgamation of the Indian government and a private non-government organization. A promise that would bring forth the best of both worlds to challenge scientists in India to better serve their fellow citizens. By the time we had come to a shared vision and signed a new agreement with the DBT, on July 18, 2012, we were happy to find that a fledgling BIRAC now existed.

Our agreed-to approach on our partnership was to place our shared trust that of both the Gates Foundation and DBT-into this new organization and create a Program Management Unit which would be capable of operating at the highest standards of excellence and managing this partnership. With this, we at the Gates Foundation had the privilege of being the first international funder of the DBT and both our organizations were catapulted in to a race to bring this new experiment to life. We started our partnership to launch two Grand Challenges simultaneously – one focused on tapping Indian expertise for new technologies to improve the toilets (the Reinvent the Toilet Challenge (RTTC) and a second, looking to chart new ways to link

agricultural innovations to nutritional outcomes. We found, we had many challenges in creating the new Unit, such as learning to work together, developing approaches to align our goals and our business processes. Despite the odds, there was a great deal of excitement about the work and a lot of promise and faith in what this could ultimately yield. For the first few months we found ourselves taking advantage of the time difference to work around the clock; when our colleagues in India finished their day they would pass on the work to us in Seattle, where at the start of our day we would continue the cycle, making sure that progress did not stop, again passing on what we had been accomplished to the folks in India at the end of our shift.

Both the initiatives provided important and specific results. A case in point is the early work on RTTC which created opportunities for new Indian sanitation technologies to be showcased at the 2014 reinvent the Toilet Fair. The fair brought innovators and decision makers from around the globe to help chart a course for better sanitation for India. But in addition to specific examples of progress, perhaps more importantly, working together laid the foundation for the long-lasting and effective partnership that exists today. At the five-year mark, the DBT–Gates Foundation partnership has grown into Grand Challenges India, with an outstanding team and joint sponsorship from DBT, the UK's Wellcome and the Gates Foundation. The partnership boasts of a robust set of priority initiatives, partnerships with the UK's DFID, USAID and Grand Challenges Canada around specific initiatives and perhaps most exciting of all – a very bright future and strong prospects of meeting the original goal - to encourage Indian scientists to solve not only challenges in India, but more broadly contribute to health and development solutions around the world.

# Joining Hands for Creating New Entrepreneurial Pathways

**Ms. Deepanwita Chattopadhyay**
Chairman & CEO
IKP Knowledge Park

My association with BIRAC predates its incorporation as a Company. I was fortunate to be part of the Management cum Advisory Board of the Biotechnology Industry Research Assistance Program (BIRAP) of the Department of Biotechnology, a programme run in partnership with the Association of Biotech Led Enterprises (ABLE) and the Biotech Consortium India Limited (BCIL). BIRAP was formed in October 2008 as a pilot programme with industry partnership to explore and establish the foundation of an autonomous, dynamic, flexible and futuristic organisation that would support the growth of the biotech industry in India. Dr. Renu Swarup invited stakeholders from academia, industry and consulting services to rigorous brainstorming sessions in order to understand the needs and expectations of the sector. Industry, especially SMEs and Innovative startups, needed government support to succeed. The stakes were high, and several people felt it was their collective responsibility to work with the government to evolve an enabling structure. The inclusive decision making process gave the biotech community a sense of ownership and endearment. This I feel scripted the way BIRAC would function, through partnerships and continuous engagement.

Dr. M. K. Bhan, Former Secretary, DBT and Chairman of the Management cum Advisory Board, in one of the meetings said, to distinguish itself from other Government agencies, BIRAC should map, measure and nurture the biotech industry through skill augmentation, capacity building and part funding to enable it to leapfrog. His words ring in my ears as I look at the achievements of BIRAC on its 5$^{th}$ anniversary.

I would classify BIRAC's engagement into three broad activities, namely, ecosystem development, innovation funding and policy & stakeholder engagement, including international partnerships. The work done in each of these areas could bear very substantial results in such short periods, due to the vision of the BIRAC management and the untiring dedication of the team it has nurtured. While all the three areas were important and had to be taken up in parallel right from the beginning, the critical element that stood out in every conversation with stakeholders when BIRAC started was the lack of funding for early stage innovations. While the SBIRI scheme was there for some time and BIPP was launched in 2009 to fund and nurture innovations in the industry, the sector needed BIRAC to fund early stage technology risk in a more focused manner. BIRAC responded to the challenge by systematically launching several early stage funding schemes from 2012 onwards, learning and improving each year, and venturing into more high risk and under served domains, be it funding for technologies for the bottom of the pyramid, affordable healthcare, out-of-the-box ideas, or gap funding in seed round equity and supporting high-growth innovative companies.

IKP Knowledge Park is proud to be a partner of BIRAC in six programmes, spanning the entire gamut of activities, from Innovation Mapping and IP services through the BIRAC Regional Innovation Centre (BRIC) at IKP, Incubation, Training and Capacity Building through BioNEST, Innovation Grant funding through the Biotechnology Ignition Grant (BIG), Early-stage Equity funding through SEED programme, to two Grand Challenges programmes with international partners, the Bill and Melinda Gates Foundation and USAID. While each of these initiatives has been impactful in its own way, what, according to me, really shook up the life sciences sector was the Biotechnology Ignition Grant (BIG) Scheme launched by BIRAC in 2012. As one of the BIG partners of BIRAC I clearly see a transformative change in the mindset of innovators and the innovation culture in the country. This I believe would go a long way in encouraging Indian innovators to work on the most challenging problems in a IP driven, long gestation regulated sector like life sciences and bring about game-changing innovations. For the best ideas, you now have BIRAC on your side.

# Invigorating Biotech Entrepreneurship

**Dr. Taslimarif Saiyed**
Director & COO
Centre for Cellular and Molecular Platforms,
NCBS-TIFR, Bangalore

I am delighted to write this piece for birac@3 and share our wonderful working experience that C-CAMP has had with BIRAC in last five years. Thank you for this opportunity. In many ways, BIRAC's journey in five years has significant impact on how C-CAMP has built up its strengths in innovation and entrepreneurship.

**Early ties:**

For C-CAMP, working with BIRAC began when it was represented as BIRAP (Biotechnology Industry Research Assistance Programme) at Dept. of Biotechnology (DBT). Establishment of BIRAC was a brave but well thought through experiment, largely to address the need to have a dedicated agency/platform to promote cutting-edge translational research, industrial research, productization and commercialization in the field of biotechnology. I can distinctly remember learning about BIRAP from DBT, Academia and Industry leaders like Prof. M. K. Bhan, Prof. K. VijayRaghavan, Dr. Swarup, Prof. S. Ramaswamy (the then CEO@C-CAMP, C-CAMP Board Member) and Dr. Shrikumar Suryanarayan (the then President at ABLE, MD@Sea6Energy, Hon ED@C-CAMP). The excitement at that time couldn't be missed and most importantly for C-CAMP, this coincided when C-CAMP began its dedicated efforts to build up its strength in innovation and entrepreneurship.

**Incubating the incubator at C-CAMP**

A formal engagement with BIRAC started with BIRAC's BISS scheme, which aimed to set up a high-end incubation facility at C-CAMP. This came about, when Dr. Bhan, after listening to some ideas from me, asked me to go to Hyderabad and present incubation proposal to BIRAC's incubation committee. At this time, C-CAMP had not begun formal incubation activities, except, Strand LifeSciences's Hepatotoxicity project funded under BIPP. Setting up this incubation facility in close association with BIRAC helped C-CAMP to learn the ropes quickly. The incubation facility, BioNest now houses nearly 13-14 start-ups with as many as 60-70 people from these start-ups. BISS, now BioNest, has as many as 20 BioNests (Bio-Incubators) across India, playing the role of nurturing ground for young start-up and innovations.

**Did we begin igniting together ?**

This was followed by what has become one of the most successful partnerships i.e. BIG (Biotechnology Ignition Grant Scheme), where BIRAC based on its ability to absorb feedback from others, announced BIG scheme to fund ideas from start-ups and individuals for proof of concept studies. Not many places around the globe had done so and this was truly an experiment. At that time, what came as a surprise and now it seems like a masterstroke, was BIRAC's decision to invite three organizations C-CAMP, IKP and FITT as BIG partners for this initiative. The broad mindset was apparent from its first meeting, where even all details about BIG scheme were discussed with its partners, including processes, strategy etc. For a government agency to work this closely with external organization is still unheard of and very remarkable. I firmly believe that this inclusion approach and entrusted responsibility became strong motivation for BIG partners to take off as its own initiative for national outreach, selection, implementation and most importantly mentorship for success of BIG start-ups. BIG's success was so much that in couple of years, two more organizations, KIIT and Venture Center, were added as BIG partners. If my numbers are not far off, BIG has supported nearly 200 such young ideas, start-ups, innovators before their proof of concept stage. Even for the strongest critic, it would be difficult to deny BIG's success in spurring entrepreneurship culture addressing vital unmet needs. C-CAMP has been able to fund and mentor nearly 70 innovative start-ups through BIG scheme. Some of C-CAMP start-ups have been able to secure Series A funding, a rare early success in the field of biotechnology. At the same time, there are at least 6 or more start-ups who have been able to bring their products to market, again an indication of significant early success.

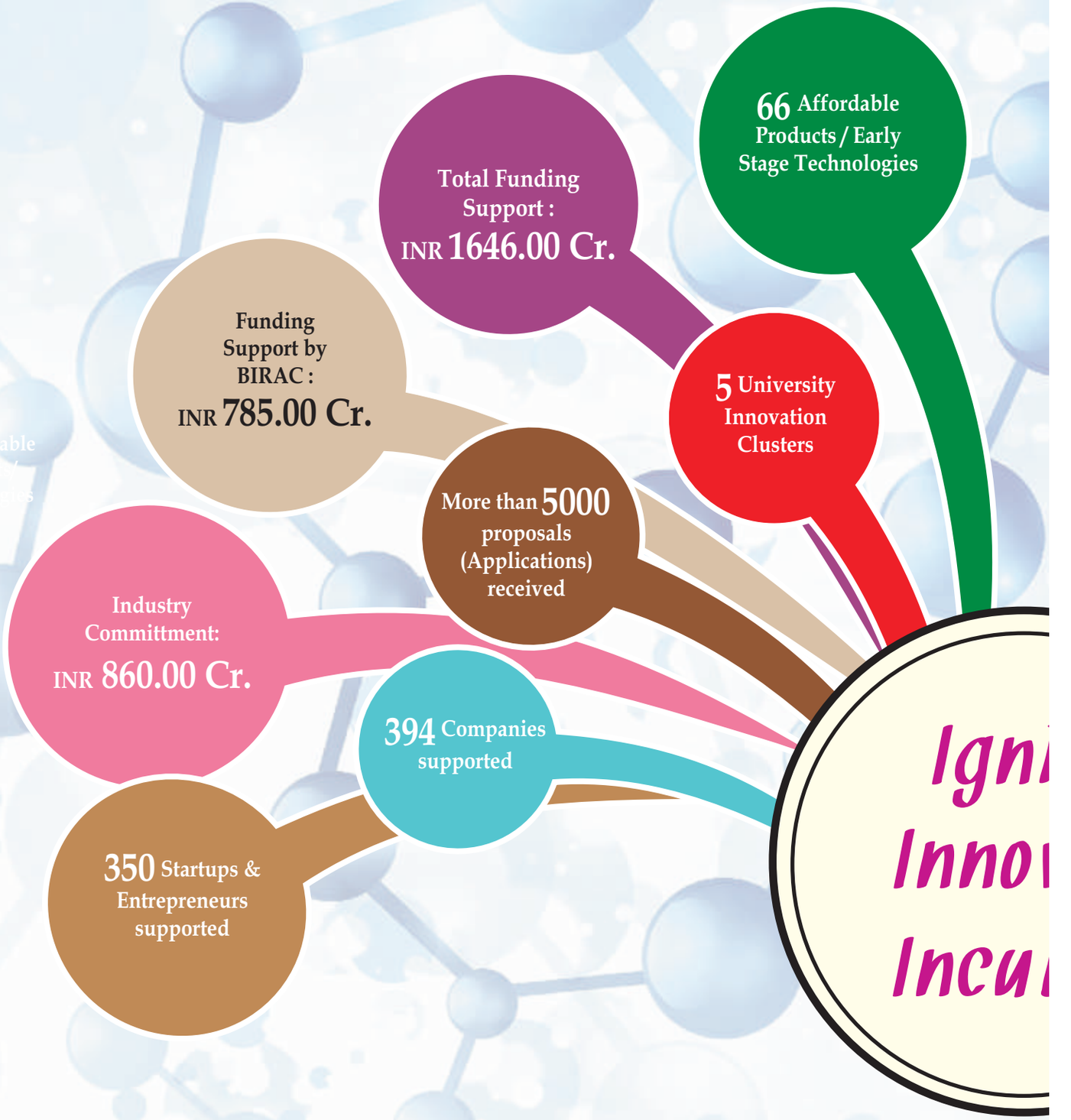
**Long-term Impact on C-CAMP**

With these ties, C-CAMP has been able to build a strong base in promoting deep science based innovations and expanded further with its ties with Ministry of MSME for funding start-ups and has been recently selected for support by NITI Aayog's Atal Innovation Mission Scale-up Support for incubation. Early BIRAC ties also helped to begin building a solid innovation environment around one of the most thriving academic hubs in India i.e. Bangalore LifeScience Cluster (NCBS, inStem and C-CAMP). All of these wouldn't have happened without early stage support from BIRAC.

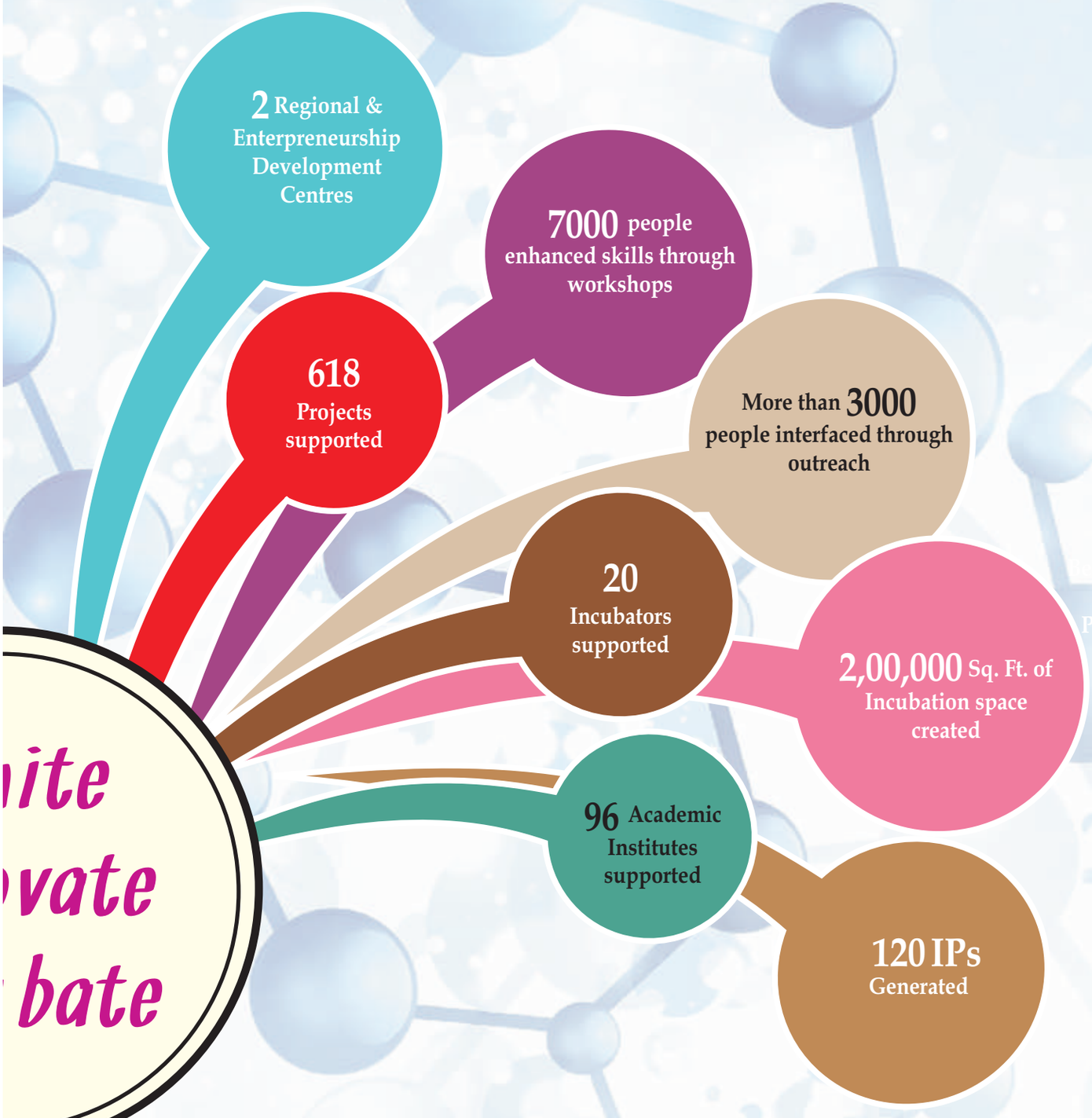
We deeply appreciate this close partnership with BIRAC. These early ties and close partnership with BIRAC has significantly contributed to C-CAMP become one of the most exciting biotechnology innovation ecosystem hubs.I would like to acknowledge BIRAC leadership and BIRAC officers for their continuous support.

Looking forward to many more years of working together to foster cutting-edge innovations.

# The BIRA


66 Affordable Products / Early Stage Technologies
Total Funding Support : INR 1646.00 Cr.
Funding Support by BIRAC : INR 785.00 Cr.
5 University Innovation Clusters
More than 5000 proposals (Applications) received
Industry Committment: INR 860.00 Cr.
394 Companies supported
350 Startups & Entrepreneurs supported
Igni
Inno
Incu

# C Impact




*ite*
*vate*
*bate*

## Journey with BIRAC has been from good to great

**Dr. Mrutyunjay Suar**
CEO, KIIT TBI
(KIIT Technology
Business Incubator) & Director,
School of Biotechnology, KIIT

Ideation of BIRAC was remarkable focusing on creating a biotech innovation ecosystem where installation of new enterprises induces a high level of innovation and dynamism. Biotechnology has incredible opportunity for growth. The emerging biotech sector of India, by 2025 is expected to grow about US $100 billion. This accelerating growth is not impossible with the support of government in providing the necessary opportunities in terms of funding and infrastructure. BIRAC has created a road map and taken steps to attract the talented and enthusiastic scientific workforce. KIIT TBI's journey with BIRAC has been with a purpose. BIRAC has played a tremendous role in our successful journey to create a biotech innovation ecosystem in Eastern and North-eastern India.

KIIT -TBI association with BIRAC has been four years old and in this short span of time we were able to ignite the biotech entrepreneurial culture by inviting innovative research ideas that has commercial viability from potential entrepreneurs and innovators against BIRAC funding programmes like BIG, SPARSH and SIIP. Importantly, till date, KIIT Bioincubator has supported 26 BIG grantee and 4 SIIP fellows. Innovators are able to ultimately transform their innovative ideas into real business. Amongst 26 biotech innovators, 10 of them have registered their companies and 4 are in process.

Numerous innovations from our incubators and our association with BIRAC in creating biotech innovation ecosystem were lauded by the external committees. We have tremendously progressed during these years. BIRAC started a movement for building biotech innovation ecosystem and KIIT- TBI is taking it forward.

BIRAC has trained us by organizing programmes/ workshops to inspire, develop, mobilize and improve the start-ups and academic spin off who are strategic assets of the bioincubator. Our partnership with BIRAC has been a learning experience. Team BIRAC have provided unstinting support every time we looked up.With the BIG initiative we could attract the students, faculty and other innovators and provide them with incubation support including well equipped office and laboratory space, hand-holding through workshops, seminars for training, mentoring on product planning, market intelligence, intellectual property management and also networking for availing seed grants from private and government sectors. All of these are a huge support for any start up. KIIT-TBI made a concerted effort to work towards fulfilling BIRAC's mandate of "Empowering and Enabling the Innovation Ecosystem" in the Biotechnology Sector.

KIIT-TBI's association with BIRAC have been successful to propagate innovation led start up culture in the biotech sector, in other words creating an innovation ecosystem. This innovation led start up culture has been evolving in the biotech sector impacting immensely on Indian economy at global level in terms of employment and revenue. The steps we have taken together have impacted all the sectors of biotechnology viz., agritech, food tech, medical diagnostic and devices, biopharma etc. by making new leaders of business, generating jobs and creating enterprises.

We are excited and look forward for more impact that our collective contribution will have on future of life sciences/biotechnology in Orissa and around North-east India and across India.

# BIRAC and Venture Center: A shared journey in innovation and entrepreneurship promotion

**Dr. V. Premnath**
Director
Venture Center, CSIR-NCL, Pune

As BIRAC celebrates its 5th Foundation Day, the innovation ecosystem for biotech and bioengineering stands energized, transformed, enriched and hopeful. And Venture Center is happy to have been part of this important journey. The shared dreams and aspirations combined with the collective hard work and perspiration necessary for building the foundations to realize those dreams has made this journey enjoyable, inspiring and productive. Happy Birthday, BIRAC!

We live in times where innovation emerging from scientific discoveries and capabilities has become the focus of governments and increasingly, people trained in the sciences are being asked to create value for society in greater quantity, quality and frequency. In a global world, there is increasing understanding that science-led innovation is key to the future of the economy and society. There is also a realization that entrepreneurship is probably the most promising vehicle for delivering innovation in a sustainable and scalable manner. India too is in the midst of this wave. Fortunately, in certain sectors pioneering Indian organizations like BIRAC and Venture Center have anticipated the wave and started laying the foundations in preparation.

An innovation ecosystem for fostering science-led innovation needs to be especially rich, dense and diverse. BIRAC has tried to nurture various aspects of this ecosystem at a National level. The more tangible and visible aspects include funding options, innovation fellowships, bio-incubation facilities, regional centers, events etc. However, there are also valuable, intangible aspects of eco-system development that should not be forgotten. These include the hope that young and budding biotech entrepreneurs feel, the confidence and excitement nurtured by success stories and stories of (ad)venture, and the pipeline being created for various other ecosystem players (such as investors) to act, participate and flourish. An entrepreneur venturing into a business sector or an investor investing in a sector often needs to see a continuum in the ecosystem ahead of him/her in the journey of commercialization. If there are gaps in the ecosystem (right in front or far ahead in the future), the entrepreneur and/or investor will hesitate entering that sector. For Biotech in India, BIRAC has tried to create that continuum in the innovation ecosystem. And by presenting an example of the Biotech sector, it has also inspired several other government departments to explore similar models. This in my view is a valuable contribution for the Nation.

Venture Center (located at CSIR-NCL, Pune) has been closely partnering BIRAC in several programs – Bioincubator Support Scheme, Social Innovation Immersion Programme, Biotech Ignition Grant, BIRAC SEED Fund and others. In each of these programs, both organizations have discussed opportunities to contribute, shared notes and methods, explored synergies and demonstrated new and effective implementation models. Venture Center has gained tremendously from the complementing initiatives of BIRAC so much so that it is today India's leading inventive enterprises incubator and recipient of the National Award for TBIs for 2015 from the President of India. The rapid scaling of activities at Pune and richness of offerings for entrepreneurs would have been very difficult without the National initiatives of BIRAC. BIRAC's initiatives and programs have helped Venture Center to focus its attention on the primary task of mentoring and incubation support.

If the journey so far has been rewarding, the journey ahead looks both challenging and promising.The needs of India's innovation ecosystem for the Biotech sector are changing. While the focus so far was rightly on creating the pipeline of innovations and startups (which will be a continuing need), the future is going to be all about graduating these innovations and startups into viable and scalable businesses. The models for doing this (for example, strategic partnerships between firms) can be very different than those that nurture nascent ideas. The resource support, partnerships and networks needed to realize this will also be different. The Nation will need to learn rapidly those models and BIRAC can show the way. It is also clear that the Nation needs to find more ways to leverage the massive public investment in R&D and direct it towards innovation and entrepreneurship goals. BIRAC can again help support new initiatives in this domain. Two other areas, I think BIRAC should explore are (a) Focused public-private entities (note: not projects and not government research labs) working to solve the most pressing problems of society with the government helping close the viability gap and (b) New, nimble models of scaling and delivering products and solutions with a "technology push" approach especially where India has a chance of global leadership.

These are exciting times for the innovation management and entrepreneurship development community in India. I am sure BIRAC will make seminal contributions in the coming years. With our missions aligned with BIRAC, Venture Center shall be happy to build the future together with BIRAC.

## BIRAC – an emerging support giant

**Dr. Anil Wali**
Managing Director
FITT, IIT DELHI

It was nearly five years ago that the Department of Biotechnology, Govt. of India created Biotechnology Industry Research Assistance Council (BIRAC) - a not-for profit enterprise. This was a platform designed to strengthen the biotechnology innovation eco-system in the country. Apparently, it was a bottom-up approach – to capture innovative ideas, enable research translation and enhance partnership with industry for technology commercialization. Besides the various Govt. support programs already in existence, BIRAC adopted a pro-active partnership model to make an impact and effectively scale-up its operations through unique schemes and programs. It's here that engagement with various eco-system, stakeholders and organizations like Foundation for Innovation and Technology Transfer (FITT) can be considered as important.

For FITT, working with BIRAC has been a value-accretive partnership throughout. Being the foremost technology transfer and industry interface organization form academia in India, partnership with BIRAC in it's Biotechnology Ignition Grant (BIG) program was an important milestone for FITT. The partnership with BIRAC has been a natural fit for FITT in it's wide repertoire of activities. Through BIG support, FITT has been able to shape the dreams of scores of innovators and start-ups in the country. BIRAC's has also supported FITT to strengthen it's bioincubation capacity at IIT Delhi. Aside of some complementarity in their objectives, we see a great cultural similarity in the working of BIRAC and FITT – having a similar set of organizational values and operational ethos. This has good significance as the establishment of FITT by ITT Delhi predates creation of BIRAC by nearly two decades. Nonetheless, FITT has relished the experience of working with BIRAC for five years now, and the partnership is growing strong. FITT sees robustness in the network and support architecture created by BIRAC as it leverages the unique strengths of its partners to reach out to innovators and industry. FITT looks forward to extending and expanding it's engagement with BIRAC which is gradually emerging as an innovation support giant in the biotechnology space in the country. On the occasion of it's 5th foundation day, FITT likes to wish BIRAC a great journey ahead.

# Partnering to Build Global Biotech Companies

**Dr. Dhananjaya Dendukuri**
CEO & Co-Founder
Achira Labs

I had returned to India after finishing my PhD in the US and first interacted with Dr. Renu Swarup and team in 2009 when we were in the idea stage of our company. We weren't ready to seek funding till 2012 and my first impression of BIRAC when I visited Delhi for a grant application meeting was how modern its office in Defence Colony looked, a breath of fresh air compared to the typical sarkari office in India. My positive impressions were only reinforced when I saw how the entire grant process was technically rigorous, fair, transparent and relatively hassle-free. I have now had several interactions over the years with the BIRAC team as they have played a crucial role in Achira's journey and growth from its early days. As a BIG grantee from the first batch of the program in 2012, I also have a 5 year perspective on both how we have benefitted from BIRAC and BIRAC's own progress as an organisation.

Achira has been supported through both the BIG scheme and through two BIPP awards. The grants have helped us make the journey from idea to proof-of-concept to pilot commercials on India's first microfluidics-based diagnostic technology. The BIG grant helped us hire a key team member and also build the capabilities to make our own DNA based reagents (aptamers) inside the company. Our first BIPP grant helped us build the ability to work with complex samples like whole blood and separate them into their constituent elements on a microfluidic chip. Our 2nd BIPP grant has helped us take our immunoassay product through clinical validation and pilot commercials. The technical review comments and rigor of the funding process only strengthened our ideas in all these projects.

The support from BIRAC has been both direct and indirect. While the funding helped us make key hires, purchase equipment and pay for consumables, we have also indirectly benefited in two important ways. First, the credibility built by successfully going through BIRAC's thorough review process has helped us raise other private funds. Second, BIRAC's meetings and networks have helped us meet and benefit from other companies who are undertaking parallel journeys to us.

As we at Achira have worked incredibly hard to build a new hardware technology platform in India, I reflect on the number of different binary risk elements that we have had to deal with – from building our own materials chemistry that can do sensitive biological assays, to mass manufacturing microfluidic devices in India to designing and building our own instruments in large numbers. This is not the kind of risk that financial investors alone want to deal with. BIRAC's support has been vital in this regard. The lack of true risk capital has impeded generations of Indians from taking up truly innovative projects and ideas, especially those involving significant capital investment like biotechnology.

While we have created immensely successful software companies, we need to germinate technology clusters in other areas like hardware to truly diversify risk and reach our potential. It is here that BIRAC's work has been crucial.

As part of Achira's journey, I also think of the dozens of Indian vendors, suppliers and consultants that have partnered with us and most importantly of the patients, doctors and lab owners who will ultimately benefit from having access to affordable diagnostics. BIRAC has therefore had a role in not just enabling Achira but in helping build this entire ecosystem. The same is doubtless true of the hundreds of other companies that BIRAC has supported over the years. We now have a set of innovative companies that have further created a network and a virtuous cycle around them. This will only help build the momentum towards India achieving a leadership position in biotechnology.

Successful Indian companies of the past have usually started as trading companies that have evolved to manufacturing companies that may then do research and innovation as an after thought. My fervent hope is that BIRAC has enabled the reversal of this process so we can build truly innovative, global biotechnology companies from India. I think that is the most important contribution of BIRAC. The biotechnology journey in India is still in its infancy. While we have big dreams, there are also large systemic challenges to overcome. The leadership and organisation at BIRAC has built a strong foundation for future growth. I hope they are backed with even stronger funding support to enable the next generation of innovative companies to come out. I also hope that BIRAC turns out to be the catalyst and role model across different government funding programs to create a sustainable, growing environment for innovative companies that are focused on solving problems both for India and globally.

# A gaze into the future for BIRAC

**Dr. Radha Rangarajan**
Co-Founder & CEO
Vitas Pharma

BIRAC turning five is a significant landmark, not just for the organization but for the life sciences ecosystem at large. For entrepreneurs wanting to test ideas and start companies, BIRAC is the first port of call. With its diverse funding schemes, BIRAC has something for everyone, a choice that did not exist in the past. In fact, my own journey as an entrepreneur took shape, in large part, due to support from the BIPP and BIG schemes that BIRAC introduced- in some instances we were the amongst the first to respond to the call-for-proposals for a new scheme. Today, Vitas Pharma, the company I Co-Founded has a portfolio of 3 NCE programs and 2 diagnostic products to address the problem of multidrug resistant infections. We have received grants through the BIG, BIPP and BIRAC-Wellcome Trust schemes.

BIRAC funding schemes have a strong focus on innovative translational research. They recognize that entrepreneurs through the companies they found, can bridge the distance between an academic laboratory and the market and thus address India's specific needs. Further, BIRAC schemes have been dynamic and responsive. For example, in the early days, the BIPP scheme had a loan component. Even with a low interest rate, debt servicing is a difficult proposition, particularly as revenue generation and loan repayment are not always in step for products with long development cycles. That changed, with feedback from the entrepreneurs, and the loan component for Grants up to 50 lakhs was removed. Another example is the CRS scheme. In India, academia and industry tend to work in isolation, with virtually no opportunity for synergizing energies. The CRS scheme provides academics with funding and the freedom to pick industry partners. It enables industry to dive deep into the academic partner's science and for both partners to establish proof-of-concept. Finally, BIRAC has shown that public-private partnerships do work. Historically, public funds were reserved for academic researchers. BIRAC has shown that entrepreneurs creating value through innovation, can responsibly use public funds.

How do I see BIRAC evolve over the next five years? BIRAC needs to create a blueprint for its own "Mars mission" and work assiduously towards achieving it. BIRAC has spawned a few hundred enterprises in its first five years, with products at different stages of development. BIRAC has an aerial view of these new technologies. It must now gaze into a crystal ball and pick those technologies that can be successful commercially and at the same time, address some of India's most pressing needs. BIRAC must think boldly and be ambitious. The goal should be to take innovative products all the way to the market.

To kick start this new phase, BIRAC will have to re-think its own funding. The size of the pot and the mechanism of funding will both need to be vastly different from the previous phase. BIRAC may need to go to markets to raise money and supplement the Government's contribution. The public-private fund, like a private equity fund, could invest in companies (equity model) that are aligned with BIRAC's overall mission. Key to successfully driving this phase will be selecting the right technologies and priority areas and ensuring sufficient funds. Of course, the mix of companies and products should cover a spectrum so that the risk is averaged over the portfolio. An innovation fund of this nature, could catalyze investment in science and technology in India, at a level not seen before.

Lastly, the innovation ecosystem in the life sciences needs continuous interactions with the DCGI, ICMR and other government agencies. My hope is that as BIRAC's canvass expands, the linkages with these agencies also strengthen, so that investee companies are able to test their products in India more easily.

# Energizing Startups Dreams

**Sh. Mainak Chakraborty**
Director & Co-CEO
GPS Renewables

Bioenergy, the space GPS Renewables is in, isn't a very VC friendly one. This is something that we were well aware of while taking the entrepreneurial plunge, 6 years back. Coming from middle-class backgrounds, we didn't have any capital either, except for some savings from our jobs. To worsen things, we didn't have any academic or business experience in the biosciences domain. Yet, we took the plunge. This was because we saw a humungous opportunity and a big technology gap at the heart of it. To address this, we felt what was needed was a lot of cross-disciplinary engineering and business creativity, which are our strengths. As far as the financial risk of this plunge was concerned, we consciously downplayed it. We decided to pool in whatever savings we had for our proof-of-concept, and went ahead with the belief that we would work out something once the pilot started yielding the desired results. For translating our concepts to a real product, we had no choice but to start from scratch on the academic front (read chemistry and microbiology). We were fortunate in getting a lot of free support from friends with expertise in related domains. While our pilot project kept shaping up well in this adhoc fashion, we still didn't have a clear strategy for funding the future research part. We had a seed-fund offer by mid-2012, but we could not have used it for research. Yet, we kept going. One can call this phase of ours as being very-foolhardy. We prefer calling it being-interesting-and-brave. Maybe there's not much of a difference between the two. In either case, it didn't matter much.

We had started off with our pilot project in Bangalore in 2011 and by mid-2012 we had started running out of funds. More importantly, we realized the need for expanding the scope of what we were doing, which in turn meant a whole suite of expensive test equipment, multiple test reactors, a comprehensive wet-lab facility, etc., which most of the business incubators didn't offer. And equity money at this stage, even if available, would have been very expensive. We knew that building the necessary technology pieces would take time, and thus equity funding wasn't the way to go about this idea. This is when we started actively scouting for research grants/soft-loans. This led us to BIPP, which in turn led us to an advertisement for a workshop on grant writing by BIRAC, which was to be held in Hyderabad on 10th July, 2012. Even though BIPP didn't seem to make much sense for us, we decided to participate in the workshop. We were actually looking for some grant which was meant for much earlier stage ideas/startups, but as people say, "Do or Die"! All this while we were blissfully unaware of a landmark event which would eventually change the course of the Indian biotech space – the launch of the Biotech Ignition Grant. The BIRAC workshop turned out to be our lives' best case of serendipity as this is when we came to know about this amazing initiative called BIG. BIG was love at first sight/sound. The moment we heard about BIG, we knew this was exactly what we were looking for. The fact that we had just 5 days for completing the application was a different story (the deadline for the first ever BIG call was 15$^{th}$ July, 2012). The next thing we did was rush for Bangalore the very same night, ditching the IPR session, and what followed were back-to-back sleepless nights to complete our application on time. It's been over 4 1/2 years since then. It feels amazing to see where BIG and BIRAC are today. As far as we are concerned, while we have a long way to go, we have taken a number of significant baby steps alongside. This ranges from commercializing our "BIG" idea, to building an impressive client list with names such as Infosys, Taj, ITC hotels, Akshaya Patra, to taking our solution beyond India (Bangladesh, USA, and soon Sweden). While our "BIG" solution is in auto-pilot mode today, as we venture into a new technology territory, we have taken the support of BIRAC once again - this time in the form of BIPP - as BIRAC was the lone wolf in India ready to support yet another crazy idea of ours. Thanks BIRAC for doing so, and keeping the dreamer in us alive.

# BIRAC: An Anchor for the Biotech Family

**Dr. Abhay Shendye**
Executive Director
Swasti Agro and
Bioproducts Pvt. Ltd.

An innovator is surrounded by several normal people. At least in the initial phase of the innovator, almost all of them are pretty convinced that the innovator is living in the fool's paradise. It is precisely at this stage, BIRAC offers the much needed helping hand. The BIG and SPARSH schemes encourage the innovators to test their idea in a structured way, with financial support and mentoring. Milestone based release of funds keeps the innovator on track. Failures accepted, success rewarded with further support through SBIRI, BIPP schemes. This is the most wonderful model of supporting early innovators.

The team Swasti had 15 years experience of working as an enterprise without sufficient capital. Though eligible, Swasti did not apply for BIG grant till BIG 4. We wanted to build a solid case in the market even before applying for this initial grant. All the teething troubles of identification of the right technology were sorted out by boot strapping, and with BIG funding we could generate revenue of INR 3 Cr in 3 years. BIG funding is not meant for market development. But it empowers innovators with resources to scientifically validate the technology. Because we had prior touch with the end beneficiaries, had worked with them you show some utility of our approach, with the very initiation of the scientific validation started generating pull for our products.

Swasti team members attended all the conferences and get-together functions organized by BIRAC in the last two years. This is a great platform bringing many like minded people together. This gives a chance to interact with people working in diverse areas and trying to solve the same problems (e.g. funding, statutory requirements) in different ways. One gets a 360 degree view of each of the problem and stimulates the innovators to look for different innovative solutions to their specific issues. It is awesome opportunity to learn from peers. I still remember the session on "Valley of sudden death". I am sure each of the innovators must have related to one such session that was of great relevance to their stage.

BIRAC has single handedly built the eco-system for start-ups in the field of biotechnology. The interactions with the members of BIRAC team have always been very easy and informal. The community developed at BIRAC is just a larger family for me and the Swasti team.

## Bytes by BIRAC Entrepreneurs

"Not only has the BIG grant given us access to capital for developing our solution, the association with BIRAC has been instrumental in getting us in front of industry leaders, be it for mentorship or for product feedback. Being affiliated to an organization, such as BIRAC, adds tremendous credibility to a young firm, such as Lattice."

Chayan Chatterjee, Lattice Innovations

"Viravecs Labs appreciate how BIRAC could see our vision in making our product market ready and confidently funded us at the right time to keep us going. KIIT-TBI at Bhubaneswar (our BIG partner) and CCAMP at Bangalore (where we incubate) polished our thoughts from science to business; none of which would have been possible without BIRAC's association at all levels. We are thankful to BIRAC, KIIT-TBI & CCAMP in our journey from being individual scientific researchers to entrepreneurs!"

Rohan Kamat, Viravecs Labs

# Bytes by BIRAC Entrepreneurs

BIRAC has been a tremendous support in terms of initial stage grants, such as BIG-2012 followed by SBIRI-2013, and mentorship to a stage where we became investor ready.

Tuhin Bhowmik,
Pandorum Technologies

Being the only POC stage fund, BIRAC-BIG has reduced risks in taking the first step towards being an entrepreneur by providing an ecosystem that enables us to bridge gap between lab research and developing earliest stage of 'commercialization-ready' innovation. A successful POC would be a gateway to technology commercialization or to first round of funding.

**Renuka Diwan,**
**BioprimeAgri solutions**

Theramyt Novobiologics received the Biotech ignition grant (BIG) from BIRAC, DBT, GOI during 2014. Theramyt's R&D program has been tremendously helped through this incubation.

Maloy Ghosh,
Theramyt Novobiologics

Funding and opportunities to interact with leaders from government, regulators, mentors provided by BIRAC helped us get competent engineers, industrial designers, researchers etc on board and propelled Jeevtronics from an idea to a product company.

**Ashish Gawade,**
**Jeevtronics**

BIRAC helped turn Module's scientific ideas into reality. Module owes a lot of its success to BIRAC.

**Sachin Dubey,**
**Module Innovations**

Strand life Sciences has started DBT funded BIPP project at CCAMP facility in August 2011. CCAMP which is supported by BIRAC, provides world-class infrastructure facility for experimental biological work.It is a great pleasure to work in such a scientifically vibrant atmosphere.

**Sonali Das,**
**Strand Life Sciences**

BIRAC has given me the potential to explore and validate a novel idea that can have significant impact to resource low settings. It also gives the direction to take it forward both through mentoring and funding.

**Geetanjali Radhakrishnan,**
**Adiuvo Diagnostics**

BIG grant has proven to be a boon to Orthocrafts. It has helped us not only to build the prototype but also form important networks. The smooth process at BIRAC has helped us to build the product in short time span.

**Piyush Joshi,**
**Orthocrafts Innovations**

BIRAC fund amount that I received has given impetus & direction to my background of research and development which enabled me to take a leap of faith towards entrepreneurship and gain confidence in converting concept to a commercially viable product & reach out to the masses creating a greater societal impact.

Mihir Mehta,
Green Pyramid Biotech

BIRAC leveraged the risky idea of mine to develop a platform technology for Drug Delivery. It not only backed me with the funding support to convert my dream to reality, fancy idea into a real prototype but it introduced me to the ecosystem of entrepreneurship and pushed me to reinvent and nurture the entrepreneurial side of me.

Nusrat Sanghamitra,
CyCaOncoSolutions

Sea6 Energy has benefited enormously by coming to C-CAMP. Almost all of Sea6 Energy's current and future collaborators (Novozymes, Cellworks, and UAS etc.) are located in Bangalore. Thus C-CAMP and BIRAC have been the tremendous support throughout for us.

Shrikumar Suryanarayanan,
Sea6 Energy

BIRAC's vision in bringing innovative solution in unmet social and medical needs has nurtured and given life and expression to a new wave of Indian bio-entrepreneurs. Many of the exciting early stage biotech-companies in this country wouldn't have happened had it not been for the BIG scheme, that has provided the impetus for young scientists to leave their comfort zone and venture into the world of entrepreneurship.

AnandAnandkumar,
Bugworks Research

We love the idea of a place like CCAMP which supported by BIRAC. Its a place with access to sophisticated infrastructure to do life science work. We are happy to be part of such a stimulating environment, and have like-minded people to interact with. It is also wonderful to have such approachable people running the place.

Janani Venkitraman,
Biomoneta Research

inDNA has been incubating in KIIT TBI since 2013 and has received tremendous support from Bioincubator scheme. Apart from seed fund support we have received continuous mentoring in areas of entrepreneurship, instrument and facility support. We acknowledge and owe our growth's biggest support to KIIT Bioincubator and BIRAC.

Birendra Banerjee,
inDNA Lifesciences

Adit Bioscience Pvt. Ltd is Biotech startup registered in 2015. We are engaged in the business of research and development of (R&D) activities in improvement of dairy farming sector. In this venture, BIRAC has supported grant-in-aid under BIG scheme in 2016. Now, we are operating at KIIT-TBI Bioincubator, Bhubaneswar. We are looking forward to take this opportunity to solve some of the unresolved issues in breeding technology.

Anuja Patnaik,
Adit Bioscience

After years of being a true bred clinician, my association with BIRAC with the BIG BIRAC grant for the last few years has helped rediscover the scientist in me. My project, aimed at developing a tear based diagnostic assay for glaucoma, funded by BIRAC has given me the opportunity to expand my knowledge and service to the community apart from bridging the gap between research and bedside translation into the clinics.

Aparna Rao


## Grand Challenges India

# Achieving Healthy Growth through Agriculture and Nutrition'

**Program Management Unit at BIRAC**

The Program Management Unit housed at BIRAC (PMU-BIRAC), was created in collaboration between the Department of Biotechnology (DBT) and the Bill and Melinda Gates Foundation (BMGF) to jointly administer the Grand Challenges India framework (GCI). PMU-BIRAC works closely with strategic partners to identify and support scientific and technological opportunities with clearly articulated governance and implementation principles. This unit is also supported by USAID & Wellcome.

The Grand Challenges India (GCI) is a mission-directed research approach collaboratively supported through a Memorandum of Understanding (MoU) between the Department of Biotechnology (DBT), Ministry of Science and Technology, Government of India (GoI), Bill and Melinda Gates Foundation (BMGF) and United States Agency for International Development (USAID) to improve public health and beyond. Research efforts under this initiative cater to national and societal needs, and are aimed at accelerating progress and ensuring that advanced technologies should reach the developing countries that need them the most.

Since its inception, three calls have been launched under the GCI initiative.

The first initiative **'Achieving Healthy Growth through Agriculture and Nutrition',** launched under GCI frame work funded a portfolio five of Indian-led pilot projects. These projects seek to target the relationship between agriculture, nutrition, and health to reduce high incidence of low birth weight, early stunting and wasting among Indian infants through a variety of interventions.

**FSM, Chennai**

Faecal Sludge Management 4th International Conference held in Chennai during February 2017. FSM4 gathered approximately 1200 delegates, from around 60 countries, working in the sector,

including utilities, service providers, cities, governments, academics, scientists, consultants, donors and industries, to support and strengthen the global initiative of disseminating sustainable solutions for Faecal Sludge Management. The FSM conferences focuses to identify and share sustainable and innovative solutions for Faecal Sludge as one of the biggest urban problems in developing countries. FSM4 will focus on scaling up the practice and innovative solution happening throughout the globe and that includes three Tracks:

1. Research
2. Case Studies
3. Industry & Exhibition

This is very well known to the sector players that almost 2.7 billion people worldwide rely on onsite sanitation so this is very obvious that we have to deal with the septic tank and pit latrine sludge management. But, in reality to manage the faecal sludge properly and safely, there is no management system available as on date. In the absence of any proper management system, simply Faecal Sludge is dumped hazardously and it leads to environment and health implications. Keeping faecal sludge out of the environment is a major challenge for achieving universal sanitation access. This issue can be dealt with by creating suitable infrastructure and public services for Faecal Sludge Management (FSM), to ensure proper treatment and disposal of faecal matter, resulting in a safer environment for everyone. Identifying FSM an important and serious matter is itself an achievement. In the year 2011, a global platform was created for discussion on FSM so that the challenges related to FSM can be addressed. The focus was given to formulate policy recommendations that promote best practices, share and brainstorm potential solutions and to identify lessons learned in how to make Faecal Sludge Management an integral part of sanitation service delivery.

Success of FSM Program depends on the success and acceptance of the public and FSM programs requires that decisions to be made are based on available data and research papers. Hence, documenting the research on FSM and its outcome

*Case Study - VeggieLite- Conjunction of Agriculture, Nutrition and Health for Inclusive Development of Women from eKutir, Odisha*

*Mr. Suvankar Mishra, led the project with the idea to showcase a for-profit intervention that can foster behavioral change in purchases of nutritious food produce and in turn positively benefit smallholder farmers.*

*The project used a quasi-experimental design with baseline and end line measures over the period of a year in urban and rural households in the state of Odisha, aimed to increase consumption of healthy vegetables, and improve the livelihood of small farm holders, particularly women. The project partners, McGill Center for the Convergence of Health and Economics (MCCHE) and Daisa Enterprises, Quebec Canada helped define the monitoring and evaluation metrics and also led field research, enumeration, and coordination.*

*The total number of farmers, approximately 1,350, engaged in the intervention received agricultural support products and services through the agri-entrepreneurs, who by now were well trained with farmer mobilization, procurement, and marketing methodologies and ICT usage.*

*A digital platform was used extensively on field with pre-fed knowledge in the tools and timely field support to the agri-entrepreneurs helped them deliver services effectively to farmers. Detecting the effects of VeggieLite on urban consumers was more challenging, particularly given the different consumer options available and the greater difficulty in tracking consumer – purchasing behaviour in urban India.*

*Based on the success of this pilot program, the team is ready to expand the project to attain sustainability and scaling within Odisha and plans to replicate it in new states within India. The project will be sustained from revenues from sales of produce, and incentive funding from public and private partners in the healthcare sector.*

*A women beneficiary of the VeggieLite program of eKutir in Orissa, under the Achieving Health Growth through Agriculture and Nutrition call under Grand Challenges India*

is pivotal. The main focus of FSM research results that are applicable for low and middle income countries, includes aspects such as Characterization of Faecal Sludge and Technologies for the treatment / disposal of Faecal Sludge.

Case studies and lessons learned from practical experiences of providing and managing FSM services and infrastructure presented during the FSM4. These will be examples of successful FSM at scale in low and middle income countries, along with lessons learned from successes and failures in places where city FSM operations are still developing.

FSM relevant products and services across the entire FSM chain exhibited to provide an outreach platform. It provides a physical space for suppliers and customers of FSM solutions to interact, demonstrate practical evidence, disseminate information and build alliances. The product and services highlighted will be relevant to FSM specifically and not sanitation in general. This includes options/solutions for safe capture and containment, Monitoring and Evaluation of FSM, Emptying and Transportation, FSM Capacity Development, Treatment and Reuse, Programs, Regulations and Financing of FSM, Planning and Communication Tools for FSM and Business Models for FSM.

Dr. Chandra Madhavi & Ms. Anjana Seshadri represented PMU-BIRAC team at FSM conference.

Most importantly 2 projects which were sanctioned under Reinvent Toilet challenge program, India sponsored by DBT, BMGF were selected for Oral Presentation at FSM as follows.

1. Effect of Environmental Parameters on the Treatment of Human Fecal Waste by Black Soldier Fly Larvae, IIT Roorkee.
2. Field testing of off-grid, self-sustained, modular, electronic toilet for slums, with solar energy for Indian weather and integrated with mixed waste processing unit, with water, energy/ fertilizer recovery, Eram Scientifics, Trivandrum.

**Grand Challenges Explorations – India (GCE-India)**

A call was launched on 15th January, 2017 with 13 problem statements for 45 days. The appilcation submission process closed on 28th February, 2017. Intensve outreach through roadshow were done in Andhra Pradesh, Telangana, Madhya Pradesh, Delhi, Gujarat, Rajashtan and Karnataka. 156 applications received which are under primary evaluation through blinded review process.

**Knowledge Integration and Translational Platform**

Knowledge Integration and Translational (KnIT) Platform has been devised to provide evidence and experience-based guidance on how to accelerate progress, equity, impact in maternal and child health & nutrition.

A meeting was organised on 20th January 2017 to discuss on formation of an alliance to lead support over all Nutrition related programs and related health interventions at Rajasthan. It was emphasized that this allia ce will endeavor to pilot, all departments and agencies which are in some or the other way engaged with Nutrition (specific and sensitive projects) and subsequently health related issues under one umbrella. The alliance will appreciate existing efforts on nutrition through developing a system for robust data collection, analysis and reporting.

**Healthy Birth, Growth and Development Knowledge integration India (HBGDki India)**

PMU-BIRAC team, primarily responsible for governance, executed 11 MoUs with various science agencies, resolving data contributors' queries, contributing in getting more collaborators on board to building a stronger HBGDki India community, milestone-driven monitoring of the program, coordination between data contributors and local data management team among others.

# " Creating the Enablers"

## BioNEST Conclave

BIRAC celebrated its I[st] BIONEST Conclave to mark the five years of its continuous support to Bioincubators and startups. The I[st] BIONEST Conclave was organized on 30[th] and 31[st] January, 2017 at India Habitat Center, Lodhi Road, New Delhi. The Conclave was attended by approx. 100 participants from Incubation fraternity, startups, Industry, Academia, Bioparks and members from National and International organizations.

The forum provided opportunities to discuss on topics ranging from policies on incubation, operationalization, sustainability, models of incubation to evolution of incubators.


The Inaugural address included recorded messages by Prof. K VijayRaghavan, Secretary DBT and Chairman BIRAC and Dr. MK Bhan, National Science Professor, IIT-Delhi & Former Secretary, DBT delivered the address to the incubation fraternity. Keynote address was given by Dr. Sanjeevi Carani, Department of Medicine, Karolinska Institute, Sweden. He gave a detailed perspective of Cluster Development activities in Sweden in and around Karolinska Institute. The BIRAC journey towards nurturing ecosystem was presented by Dr. Renu Swarup, MD, BIRAC and Sr. Adviser DBT.

## WORKSHOP ON BIO-ENTREPRENEURSHIP, GRANT-WRITING & INTELLECTUAL PROPERTY MANAGEMENT

### 10[th] February, 2017, SINE, IIT, Bombay

A total of 102 participants registered and they took active part during discussions in various sessions of the workshop.

The workshop kick-started by Prof. Milind Atrey (Professor-in-charge, SINE) and the key speakers were Ms. Poyni Bhatt (COO, SINE), Dr. Satya Prakash Dash (Head, SPED, BIRAC), Dr. Shirshendu Mukherjee (Mission Director, PMU, BIRAC), Mr. Chirag Tanna (Director, INK IDEE), Dr. Raj Hirwani (Director, CSIR-URDIP), Dr. Vinita Jindal (Senior Manager-IP&TM, BIRAC). Diversified areas of IP Management, Drafting, Patent Specifications, Patentable Subject Matters, different types of patent searches and their importance for research and business in creating startup innovation ecosystem etc. were discussed by the eminent speakers.

### 19th December 2016, ICGEB, New Delhi

Prof. Dinakar Salunke (Director, ICGEB) inaugurated the program. Following this a plenary talk was given by Dr. Renu Swarup (Senior Adviser, DBT & MD, BIRAC).

The key speakers included Dr. Satya Prakash Dash (Head, SPED, BIRAC), Dr. Sanjay Saxena (Head, Investment, BIRAC), Dr. J.K Batra (Director, NII), Dr. Pankaj Parashar (BIG Grantee) from Cutting Edge Medical Devices. Ms. Rajeshwari Hariharan (Founder, Rajeshwari & Associates), Ms. Chitra Arvind (Principal Associate, Rajeshwari & Associates) and Ms. Vindhya (Sr. Associate, L & S ) talked upon patent procedures, patent protection and filing process in India and abroad; and patentable subject matter.

# BIRAC PROGRAMMES

## SITARE (Students Innovations for Advancement of Research Explorations)

***BIRAC SRISTI GYTI AWARDS:*** Aimed at supporting the innovations and creativity at grass root level among the university students, including individual innovators.

## eYUVA (Encouraging Youth for Undertaking Innovative Research through Vibrant Acceleration)

- ***University Innovation Clusters (UIC):*** UIC initiative seeks to create an entrepreneurial culture in the Universities and help students to take their novel ideas to proof of concept.
- ***SIIP (Social Innovation Immersion Fellowship):*** A fellowship programme that builds the next generation of social entrepreneurs by helping them 'immerse' and interface with communities to identify gaps and then work on bridging the gaps through an innovative product or service offering.

## Discovery, Early and Late Stage Funding

- ***BIG (Biotechnology Ignition Grant):*** Biotechnology ignition Grant (BIG) is available to scientists, entrepreneurs from research institutes, academia and startups, to stimulate commercialization of research discoveries by providing very early stage grants to help bridge the gap between discovery and invention.
- ***SPARSH (Social Innovation Programme for Products Affordable & Relevant to Societal Health):*** SPARSH combines social innovation and biotechnology for the well-being of the society by helping, identify and support cutting edge innovations towards affordable product development with potentially significant social impact. SPARSH provides support in the form of impact funding and fellowships.
- ***SBIRI (Small Business Innovation Research Initiative):*** It is the early stage, innovation focussed PPP initiative to support incremental R&D in the area of Biotechnology to facilitate innovation and risk taking by SMEs
- ***BIPP (Biotechnology Industry Partnership Programme):*** BIPP seeks to provide support for early to late stage high risk biotech R&D by industry and/or accelerate commercialization of new indigenous technologies.
- ***CRS (Contract Research Scheme):*** CRS scheme supports academic institutes to take forward research leads through a validation and translation cycle by the industry. Funding is in the form of grant given to both the academic as well as the industrial partner.

## BIRAC BioNEST (BIRAC – Bioincubation: Nurturing Entrepreneurs for Scaling up Technology)

- Birac's Flagship programme which has created 15 world-class bio-incubators to provide incubation space, mentor networks, instrumentation facilities, IP and technology management support.

## Collaborative Funding

- ***Indo-French Centre for the Promotion of Advanced Research (CEFIPRA):*** Support high quality bilateral research, encourage and enable Indo-French collaboration between public, private research groups, industry, clinicians and end-users in the domain of red biotechnology.
- ***Wellcome Trust, UK:*** Support innovations in translational medicine in the domain of diagnostics for infectious diseases.
- ***Grand Challenges India (GCI):*** A consortium of DBT, Bill & Melinda Gates Foundation, Wellcome Trust, USAID, and BIRAC, focussing on supporting innovations in the areas of maternal and child health, agriculture and nutrition, sanitation and infectious diseases.
- ***USAID and IKP Knowledge Park:*** Support for new diagnostic tools for TB, with funding commitment of INR 5 crores for 3 years.
- ***Horticulture Innovation Australia (HIA):*** BIRAC-HIA Joint funding programme for supporting innovative technologies and solutions for sustainable and productive horticulture at a global level.
- ***NESTA, UK:*** BIRAC partnership with Nesta, a charity organization in UK, is aimed at supporting Discovery Awards Programme for innovators working for innovative diagnostics for anti-microbial resistance (AMR).
- ***Industry Innovation programme on Medical Electronics (IIPME):*** BIRAC in partnership with DeitY (Department of Electronics and Information technology) launched IIPME for supporting innovations in medical electronics and med devices sector.

## Equity Funding

- ***Seed (Sustaining Enterprise and Entrepreneurship Development) Fund:*** Financial equity based support to start ups and enterprises through bio-incubators for scaling enterprises.
- ***Ace (Accelerating Enterprises) Fund:*** A Fund of Funds to scale-up R&D and innovation in biotechnology domains of sectors such as healthcare, pharma, medical devices, agriculture, sanitation and many more.

## FORTHCOMING CALL FOR PROPOSALS

**BIPP & SBIRI (15 February - 31 March)**

For further information please contact:
**Biotechnology Industry Research Assistance Council (BIRAC)**
1st Floor, MTNL Building, 9, CGO Complex, Lodhi Road, New Delhi-110003, INDIA
Tel: + 91-11-24389600 I Fax: + 91-11-24389611
E-mail: BIRAC.dbt@nic.in I Web: www.BIRAC.nic.in