



**Biotechnology Industry Research  
Assistance Council (BIRAC)**

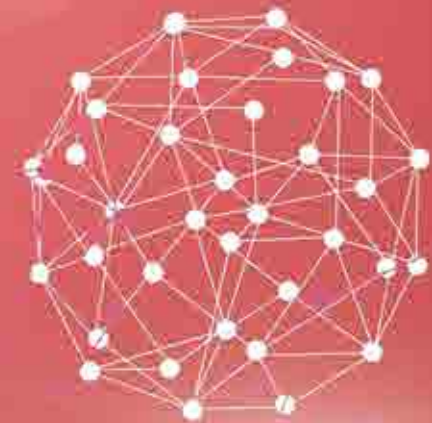
(A Govt. of India Enterprise)

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Photo Courtesy: M. K. K. K.

*Seating*  
**Bio-Entrepreneurship**  
Foundation for Sustainable Future



**Biotechnology Industry Research  
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# About BIRAC

A not-for-profit Section 8, Schedule B, Public Sector Enterprise, set up by the Department of Biotechnology (DBT), Government of India as an Interface Agency to strengthen and empower the emerging Biotech enterprise to undertake strategic research and innovation, addressing nationally relevant product development needs

## Vision

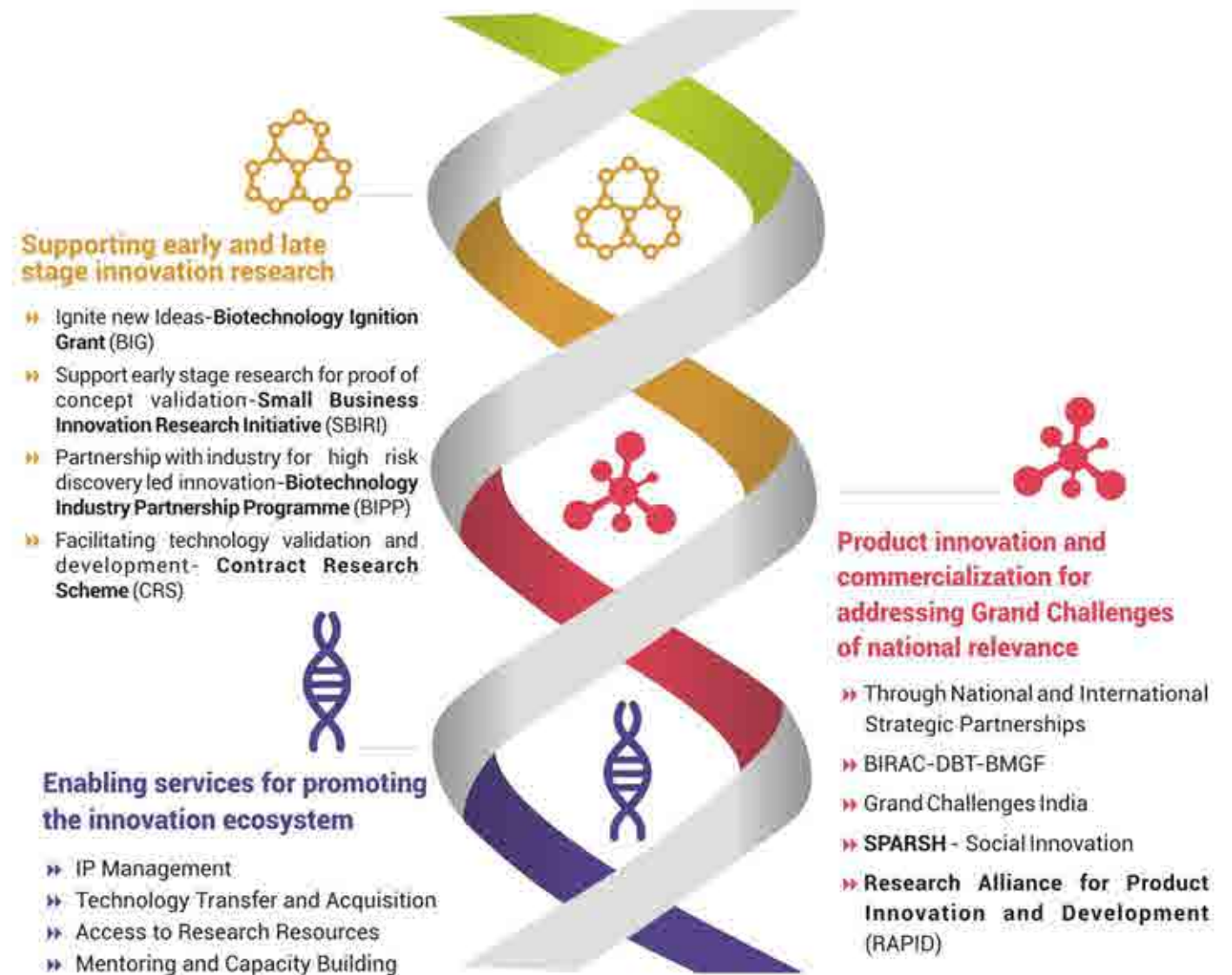
"To Stimulate, foster and enhance the strategic research and innovation capabilities of the Indian biotech industry, particularly start ups and SME's, for creation of affordable products addressing the needs of the largest section of society"

## BIRAC Key Strategies

- Foster innovation and entrepreneurship
- Promote affordable innovation in key social sectors
- Empowerment of Start ups & small and medium enterprises
- Contribute through partners for capability enhancement and diffusion of innovation
- Enable commercialization of discovery
- Ensure global competitiveness of Indian enterprises

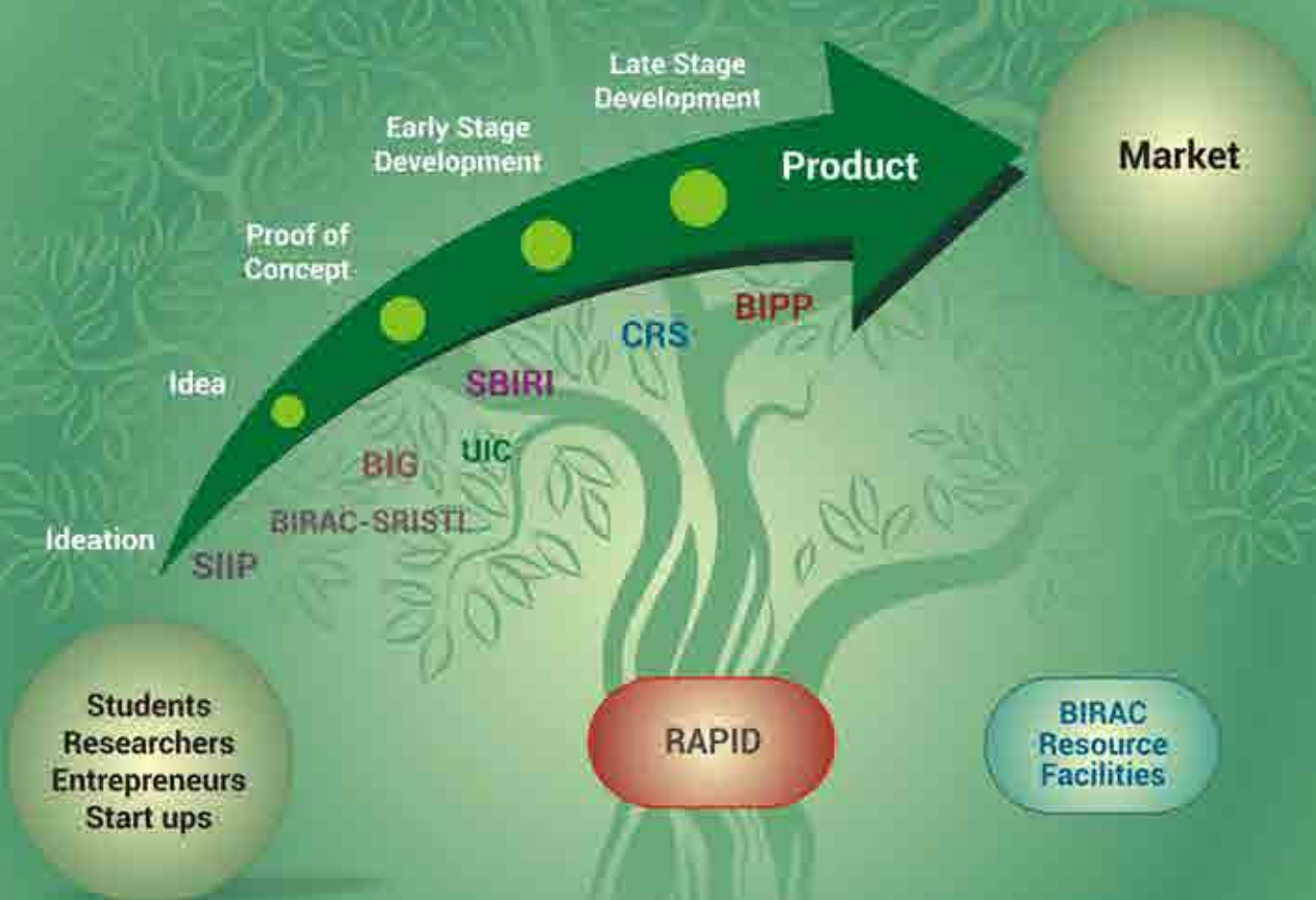
*BIRAC'S aim is to play a transformative and catalytic role in building a US\$100 billion Indian bioeconomy. We believe that the agents of change for building the Indian bioeconomy would be biotech startups & SMEs and hence our focus is on raising their capabilities, connecting them to global & local stakeholders such that they achieve global excellence*

## BIRAC's Role and Activities





# Driving Product Development



# Empowering the Enterprise





# Start up India

BIRAC understands that the key to solving myriad challenges faced nationally & globally, will be provided by Biotech startups that are buzzing with novel ideas, which have the power to positively transform healthcare, food & nutrition, energy and environment. BIRAC through several of its flagship programmes has fashioned a vibrant biotechnology startup culture in India. BIRAC intends to foster 2000 biotech start ups by 2020.



Indian start ups, including BIRAC supported ones, with Hon'ble PM Shri Narendra Modi in California



BIRAC entrepreneurs at 1<sup>st</sup> BIG Conclave



BIRAC entrepreneurs at University of Cambridge, UK

# BIG: Energizing the Biotech Start ups

# BIG

Kick Starting Entrepreneurship

- BIG is the flagship start up funding programme of BIRAC which provides the right admixture of fuel and support to young start ups and entrepreneurial individuals
- Funding grant of upto INR 5 million to best in class innovative ideas to build and refine idea to proof of concept
- Support to 170 ideas in 7 calls (biannual call announcement: January & July)
- Encourages all forms of entrepreneurship- academic (faculty, postgraduates, PhDs and postdoctoral scholars), first time entrepreneurs, young biotech start ups
- Focused mentorship and management by five BIG partners
- Access to national & global experts, mentors, and accelerators
- Opportunity for BIG Grantees to attend, connect and network at the flagship Ignite bootcamp of the University of Cambridge's Judge Business School, UK
- Community of BIG alumni and access to platforms such as BIG Conclave, BIRAC Innovators Meet, Healthcare Summits and hands-on-training workshops



## Small steps to BIG Impact

- Total no. of proposals: 1430
- Total number of projects supported: 170
- Total Funds committed: ~INR 70 cr
- Individuals to Start up Conversion: 47
- Total Number of Start ups Supported: 104
- Nos. of Start ups that have follow-on funding: 20
- Employment Generated: 553
- Women Entrepreneurs: 28
- IP Generated: >65





# Bio-incubation: World Class incubators for next generation of global biotech companies

BIRAC through its flagship Bio-incubation Support programme (BIS) has created 15 world-class bio-incubators that provide multitude of support from office space to access to top end instrumentation & mentor networks

- 15 bio-incubators that provide office space, wet lab facilities as well as tinkering labs
- Bio-incubators located at biotech parks (6), IITs (3), Academic Institutions (4), Bio-clusters (2)
- More than 200 start ups and entrepreneurial individuals have received support and are strategizing for global impact
- 175000 sq. ft of incubation area supported

- High end instrumentation includes NMR, LCMS, Next Generation Sequencing, Chromatography, Cell culture labs, confocal microscopy, CNC machines, 3D printers, amongst several other top end scientific instruments
- INR 146.00 crores sanctioned under the programme
- Jobs created through Incubator Support: 75



# Fertilising Innovative Ideas in Academia

## University Innovation Cluster (UIC): Building Innovation Pathways in Universities

- A unique experiment in creating an innovation centre that functions as a hub and connects the university to the world outside drawing upon the linkages with local, regional and national industries
- 30 Innovation Fellows at 5 UICs conducting industry relevant R&D, testing ideas for proof-of concept
- An incubation space of 2500 sq. ft at each UIC
- Industry participation for training, mentoring, sponsored research, IP and technology management



## BIRAC Regional Innovation Centre (BRIC): Understanding the Southern Clusters- Mapping for Policy Interventions

- BIRAC established a regional centre at IKP Knowledge Park, Hyderabad to map and analyse how biotech clusters have formed in Southern India especially Bangalore, Hyderabad, Chennai and Thiruvananthapuram. Extensive mapping of the clusters has been completed by primary and secondary data

- BRIC extends multitude of support to startups such as mentoring, IP and technology transfer: 30 IP reports, 1 technology transfer
- Numerous workshops for knowledge transfer and networking opportunities: 4 Technology Show days, 6 half day workshops, 8 Networking meetings organised



## BIRAC-SRISTI Gandhian Young Technology Innovation: Nurturing Young Innovators In-Situ

- BIRAC partners with SRISTI at IIM-Ahmedabad to identify potential entrepreneurial ideas in academic institutions with possible future impact
- BIRAC provides mini-seed funds of INR 1.5 million over two years to 15 ideas by student teams with academic mentors to carry out R&D in-situ
- 100 nascent ideas with micro funding of INR 1 lakh

## BIRAC Ideathon: An Ideation Day for Changing the World

- A focused idea generating day for student teams to dig, excavate and refine an idea on a relevant theme
- On the spot business advice & access to BIRAC's platform meeting
- Awards and one month mentoring by BIRAC partners



# Skill India: Skilling the next generation of knowledge experts

## BIRAC Workshops: Information & Hands on Training

BIRAC organises several hands-on training and regulatory workshops that help the start ups and SMEs to understand the changing milieu of national and global regulatory systems and strategise for regulatory approvals. In the previous year, BIRAC and its partners conducted several workshops in relevant regulatory issues such as *Demystifying Indian Drug Regulations for New Drug Approvals*, *Regulatory Requirements for Bio-Pharmaceuticals* and *Downstream Processing of Recombinant Proteins and other Biomolecules and Membrane Separation*.

Total nos. of beneficiaries: > 200



## Grant Writing & IP Sensitization Workshops: Raising Awareness for IP Protection & Reaching out to the world

BIRAC conducts several workshops where experts in the field conduct interactive and hands-on training on proper grant writing skills and IP sensitization. These forums also provide an opportunity for BIRAC to connect with new stakeholders- students, academia, industries and the State Governments. BIRAC conducted sensitization workshops at Kolkata, IISER Bhopal, IIT Chennai and BITS Pilani Goa campus

Total nos. of beneficiaries: >240



# Weaving Social Innovation & Biotechnology together



Social Innovation Programme for Products Affordable & Relevant to Societal Health

*Touching a billion lives*



- BIRAC launched SPARSH in 2013 with the aim to develop innovations that would create direct impact in the society in the near to medium term future. The programme combines biotechnology R&D and social innovation. The first two calls focused on maternal & child health and the third call in 2015 sought innovations in waste to energy including sanitation thus aligning with the Swachh Bharat Mission.
- The range of projects include Microfluidics based On chip Real Time PCR Device for Neonatal and Maternal health to a POC device for detection of antibiotic sensitivity of uropathogens in human urine while others look into nutrition and probiotics
- In 1<sup>st</sup> call, out of 110 proposals 10 product development projects were supported as well as 4 SIIP partners were selected. In the 2<sup>nd</sup> call, out of 61 proposals, 6 product

development projects were supported. In the 3<sup>rd</sup> call, out of 44 proposals, 4 product development and 1 SIIP centre was supported

- Social Innovation Immersion Programme (SIIP) Fellowships SIIP is 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

No of beneficiaries: 16 product development + 14 SIIP Fellows  
 Funds Committed in Sparsh: INR 11.7 cr  
 Funds Committed in Affordable development Component: INR 8.5 cr  
 Funds Committed in SIIP: INR 3.2cr

## SIIP Partners



Low-Cost Technology for probiotic products



Device for detection of antibiotic sensitivity in urine



# Pioneering the Scaling of the Biotech R&D Innovation System: SBIRI & BIPP

**SBIRI: The link between early & late stage development**



- SBIRI, inspired by the US SBIR, is India's first biotech focused PPP funding scheme which was launched by DBT in 2007
- SBIRI aims at funding high risk innovative R&D

beyond the proof-of-concept

- Support to over 200 companies in multitudes of innovative projects covering all areas of cutting edge biotechnology
- Exciting new technologies developed over the years: 5 new technologies and products were developed last year such as conversion of Benzaldehyde to Phenylacetylcarbinol (PAC) with improved efficiency on scale of 4000 litres and Stem Cell Implant Bio-complexes for Periodontal Tissue Regeneration



Palm size ECG detection by Cardea



Treatment for diabetic foot ulcer healing by Galbonax of NovaLead

**BIPP: Launchpad for scaling high risk innovations for commercialization**



- Helps de-risk innovative projects through a PPP model - cost shared between industry and BIRAC. This fosters industry's inclination for high end innovation
- Over 146 companies supported that are striving to bring new products into the market thus boosting 'Make in India'
- Fostering emergence of new products and technologies such as development of HPV Vaccine, clinical trials of Galbonax™ for treatment of diabetic foot ulcers to development of novel cocktail of cellulolytic enzymes for deconstruction of lignocellulosic feedstocks

## The Impact of SBIRI & BIPP

- Total number of beneficiaries 346
- BIRAC disbursement amounting to INR 423.58 crores
- 121 collaborative projects, out of which 108 are between industry & academia and 13 between industry-industry
- Products/technologies: SBIRI (13), BIPP (16)
- Early stage technologies: SBIRI (08), BIPP (17)
- Employment Generated in FY 2015-16: 263
- 29 products and technologies developed

# Contract Research Scheme (CRS): Focused Segue for Academia-Industry Partnerships

- Provides an enabling platform for academia and industry to collaborate
- Support provided to academia for validation of novel leads and translation while industry joins in as a validation partner
- IP rights stay with academia
- 18 projects ranging from Discovery of genome-wide SNPs and its use in developing a reference linkage map and association

analysis in castor to Pre-clinical toxicology studies and Phase I clinical trial with PvDBP11, a novel recombinant vaccine candidate for Plasmodium vivax malaria

Impact of CRS :

Total projects supported: 18  
No. of Academia/research institutes: 21  
No. of industries: 17  
Funds Committed: INR 28 cr

# Diverse Models of Industry - Academia Connect

Industry led with or without academic partners

• BIPP  
• SBIRI

Public sector driven, industry supported

• BISR

Consortia with both public and private sector working for a common goal

• RAPID



# Nurturing the roots of Biopharma Discovery

BIRAC recognises the immense potential that exists in the biopharma sector and has kickstarted two programmes that aim to address the roots of developing novel biopharma drug candidates.

**Early Translation Accelerator (ETA):** BIRAC strategized to build Early Translation Accelerators (ETAs) to focus on catalyzing transformation of nascent academic discoveries (publications/patents) with possible commercial and societal impact into economically viable enterprise and technologies. Each ETA is envisaged to collaborate with academic investigators, engage industry and leverage international translation ecosystems. While commercialization of early stage technologies is a difficult task, creating a translational component to establish proof-of-concept/validation is a significant step towards attracting industry to take these validated technologies towards further development.

The ETA in the area of healthcare was set up at C-CAMP and the first project is in progress. BIRAC is planning to set up ETAs in other areas also

**Mission for accelerating discovery research to early development of Biologicals (National Biopharmaceutical Accelerator Programme)** BIRAC realizes that there is an immense opportunity in next generation biologics and biopharmaceuticals which has been a leading area of global R&D efforts which involves cutting edge interdisciplinary science and application. BIRAC is strategizing to contribute to making India a global hub for design and development of novel, affordable, effective and efficacious biopharmaceutical products. BIRAC aims to provide, through a mission led approach, cutting edge skills of scientific leadership through industry-academia collaboration in this important R&D space. BIRAC has set up Program Proposal Management Unit (PPMU) for the analysis of the landscape of biologics strength in India, identify gaps and implement a focused pilot programme 'Product Development Partnership' in biopharmaceuticals



## Industry Innovation Programme on Medical Electronics (IIPME) in partnership with Department of Electronics & Information Technology, Government of India:

*Boosting the interface of healthcare & electronics*

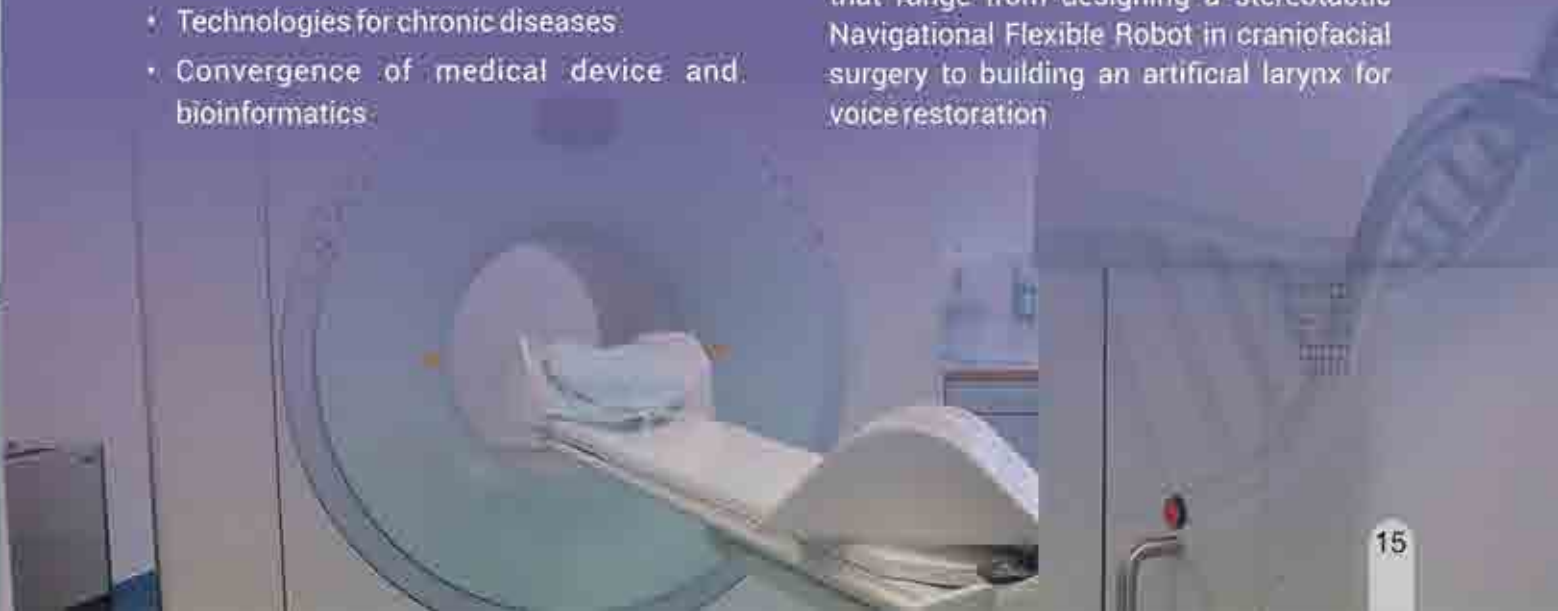


Aims to support cutting edge technologies in multi-disciplinary areas of Medical Electronics

### Focus

- Imaging and navigation
- Technologies for chronic diseases
- Convergence of medical device and bioinformatics

- Increasing the outreach through Medical electronics
- In the first call (May 2015), out of 118 LoIs, a total of 15 projects (both idea to PoC & transition to scale) have been supported that range from designing a stereotactic Navigational Flexible Robot in craniofacial surgery to building an artificial larynx for voice restoration





# Aligning Partnerships for National & Global Impact



# Co-funding Partnerships



## DBT-BIRAC-Bill & Melinda Gates Foundation: Pioneering Grand Challenges in India

- BIRAC is the Project Management Unit in this trilateral partnership amongst DBT, BMGF & BIRAC. USAID has also joined the partnership. The collaboration strives to work in the areas of maternal and child health, agriculture and nutrition, sanitation and infectious diseases

### Three calls have been announced:

- Achieving healthy Growth through Agriculture and Nutrition:** was launched on 28th August 2013 and four projects have been supported, such as models of integrated farming systems for enhancing household diet diversity and models for ensuring nutritional & food security to Indian women through community level implementation of Domestic Solar Conduction dryer
- Reinvent the Toilet Challenge:** the call was launched on 2nd October 2013 and six projects have been supported
- All Children Thriving:** the call was launched in January 2015 & 7 Projects have been supported
- Total 18 projects supported in three calls

## BIRAC-Wellcome Trust, UK: wellcome trust Focus on Translation Medicine

BIRAC has collaborated with Wellcome Trust, a global charity organization of UK, to scout and support innovations in translational medicine in the domain of diagnostics for infectious diseases



The objective of this initiative is to fund translational research projects to deliver safe and effective healthcare products for India at affordable costs though collaborative research

Two proposals, point-of-care assay system for the detection of blood borne infections and bench-side molecular assay for detection of carbapenem resistant gram negative bacteria, have been shortlisted for funding from the first call



## BIRAC-CEFIPRA : Leveraging Indo-French Expertise

BIRAC has joined hands with CEFIPRA - the Indo-French Centre for Promotion of Advanced Research in India to support high quality bilateral research, encourage and enable Indo-French collaboration between public, private research groups, industry, clinicians and end-users. Under this initiative, BIRAC has implemented two partnership programs, one together with CEFIPRA and the French Embassy (2014-2015) and another with Bpifrance financing (2015-2016)

In the 1st call two projects were selected in the areas of molecular diagnostics for CVD. The 2nd call focused on Molecular diagnostic for prediction of Alzheimer's & other dementia assisting technologies for mobility of physically challenged & Biomaterials and cell engineering for health applications. The call for proposals with Bpifrance financing is in the area of digital health





### **BIRAC-IKP-USAID-BMGF : Joint Partnership in Rapid Diagnostics for TB**



BIRAC is supporting new diagnostics for TB in collaboration with IKP Knowledge Park and USAID. The joint call, launched in December 2015, for proposals aimed at supporting new and improved diagnostics for TB. The duration of the program is for 3 years, with a funding commitment of INR 5 crores, spread over two phases. Six proposals have been selected for funding in the first phase of the program i.e. in 2015-16. Three promising projects with demonstrated proof of concept (after one year) will be selected for second phase in 2016-17

The proposals range from filter paper based method of MTB sample collection to detection of MTB infection by X-ray scattering of hair and nail



### **BIRAC-USAID: Partnership in Wheat**

BIRAC is supporting a project on "Improved wheat for heat tolerance and climate resilience" which addresses an extremely important area of crop biotechnology under the RAPID initiative in

collaboration with USAID with a funding commitment of INR 8.7 crores for five years. The goal of the proposed project is to develop high yielding heat tolerant wheat cultivars for the Indo-Gangetic plains which will aim to address food security issues due to increasing population, poor soil quality and water stress

### **BIRAC-Horticulture Innovation**

#### **Australia (HIA): Promoting Horticulture sustainable Horticulture**



BIRAC and HIA has planned to collaborate for a joint funding programme for supporting innovative technologies and solutions for sustainable and productive horticulture at a global level

#### **BIRAC-Nesta : Targeting Antimicrobial Resistance NESTA...**

BIRAC and Nesta, a charity organization in UK, have initiated the collaborative measures to populate the innovators' pipeline for competing in the coveted Longitude Prize—a challenge programme having a prize fund of 10 Million Pound, to help solve the problem of global antibiotic resistance.

# Partnerships for Networks, Platforms & Market Access

### **BIRAC-UKTI (UK Trade & Investment): Expanding the horizon for Indian Entrepreneurs**



BIRAC & UKTI entered into an MoU to be Knowledge Partners for boosting the innovation capabilities of the Indian and British biotech/life science industry and foster collaborations between the two countries

The partnership intends to create new knowledge networks and strengthen existing networks for connecting the Indian and the EU/UK ecosystem to leverage the focused expertise available at various locations



### **BIRAC-Lords Education and Health Society (LEHS), through its WISH Initiative: Scaling the Innovations**

BIRAC and LEHS have joined hands to scale up the BIRAC supported innovations into the Primary Healthcare system through the SCALE initiative of LEHS

#### **The objectives of this partnership are to:**

- Combine the focused efforts of BIRAC and LEHS towards accelerating innovation and

enterprise scale up for sustainable healthcare delivery systems in primary healthcare

- Handhold the innovations in healthcare ecosystem so as to translate them into affordable solutions for improved access and quality of primary healthcare

### **BIRAC-Tekes : Enhancing Competitiveness**



BIRAC has signed a Letter of Intent with Tekes - Finnish Funding Agency for Innovation, to explore opportunities for improving competitiveness of Indian and Finnish industries through promoting collaboration in different phases of knowledge innovation chain



### **BIRAC-TISS: Mentoring Innovators and Assessing Impact**

- BIRAC and Tata Institute of Social Sciences (TISS) have come together to mentor the social innovators supported by BIRAC, so as to help them evolve in the social entrepreneurship arena
- TISS will also support BIRAC in assessing the impact of its social innovation initiatives and strengthen the impact of the same



# The BIRAC IMPACT



# Make in India: Quality, Accessibility Affordability

**Affordable Fluorescence Reader** to detect multiple infections simultaneously in remote settings



**Fibroheal** for burn wound management. In use at AIIMS, New Delhi



**Aina** to measure blood glucose, HbA1C, lipids (HDL, LDL, TrG), Creatinine and Haemoglobin



**Photo Dynamic Therapy (PDT) Laser System** for cancer treatment



**ROTAVAC®** India's first indigenously developed oral Rotavirus Vaccine



**Pandyflu®** H1N1 Pandemic influenza vaccine



**A rapid POC diagnostic kit** with micro PCR for Diagnoses of Malaria, Dengue & Typhoid



**Maxio** Device for tumor ablation. Marketed and secured USFDA clearance



**ONCOSCAN** Digital Oncopathology Slide Scanner Offers complete digital pathology solution with ease of operations, scalability, security at an affordable cost



**PCR kit for Aquaculture industry** Robust & Economical Indigenously single tube nested PCR kit for WSSV, IHNV & YHV



**Albucel** - for restoration and maintenance of circulating blood volume



**Globucel** - plasma protein replacement therapy (IgG) for immune deficient patients



**Merkel Haptic** - affordable mannequin for effective CPR (Cardiopulmonary Resuscitation) Training



Microfluidics based detection of thyroid disorders, fertility, diabetes and infectious disease



Smartphone based retinal imaging system





# The Way Ahead

Scale and deepen entrepreneurial activities to foster 2000 startups by 2020. Align with the stated policy goals of National Biotechnology Development Strategy 2015-2020 and with *Start up India* as well as *Make in India* programmes

Establish and strengthen 50 incubators, 150 tech-transfer offices

Establish & expand BIRAC Regional Innovation Centres and create BIRAC Regional Entrepreneurship Centre

Operationalise Incubator Seed Fund and BIRAC Equity AcE Fund

Connect start ups & SMEs to national and global stakeholders and platforms through partnerships - help them access technical and business mentors, create new market opportunities for product diffusion and facilitate understanding of regulatory landscapes

Amplify efforts for early discovery and translation in academia and industry in all areas of biotechnology. Densify bridges between academia and industry resulting in increased collaboration to solve societal problems through innovation

Communicate the strengths and opportunities in the Indian biotechnology sector to national and global audience. Highlight success to build 'Brand India' as a top destination for global R&D in biotechnology



*BIRAC remains committed to build a collaborative scientific enterprise that aims to make India the top global destination for cutting edge R&D and manufacturing in biotechnology thus boosting 'Make in India'. BIRAC aims to transform the Indian biotechnology landscape by unleashing the untapped entrepreneurial potential thus deepening 'Start up India'. BIRAC would usher new pathways for collaboration that leads to creation of a truly transformative Indian Bioeconomy*

