ICGEB

The ICGEB Mandate: to provide a Centre of excellence for research, training and technology transfer to industry in the field of biotechnology, to promote sustainable global development

International Centre for Genetic Engineering and Biotechnology

80+ Signatory States, 60+ Member States
3 Components: Trieste (Italy) – New Delhi (India) - Cape Town (South Africa)
a network of 40+ Affiliated Centres

Developing knowledge
The mandate of the ICGEB is (from its Statute):

a) To promote international co-operation in developing and applying peaceful uses of genetic engineering and biotechnology, in particular for developing countries;

b) to assist developing countries in strengthening their scientific and technological capabilities in the field of genetic engineering and biotechnology;

c) to stimulate and assist activities at regional and national levels in the field of genetic engineering and biotechnology;

d) to develop and promote application of genetic engineering and biotechnology for solving problems of development, particularly in developing countries;

e) to serve as a forum of exchange of information, experience and know-how among scientists and technologists of Member States;

f) to utilize the scientific and technological capabilities of developing and developed countries in the field of genetic engineering and biotechnology; and

g) to act as a focal point of a network of affiliated (national, sub-regional and regional) research and development centers.
ICGEB action

• Cutting-edge **scientific research** in its laboratories in Trieste, New Delhi and Cape Town

• Advanced **training** supported by long- and short-term fellowships for PhD students and post-docs

• Organisation of **Meetings, Courses and Workshops** at the international level

• Competitive **research grants** for scientists in Member Countries, including Early Career Return Grants

• **Technology transfer** to industry for the production of biotherapeutics and diagnostics
Previous involvement of ICGEB


*Increased technical cooperation and assistance, including training programs to developing countries in the use of biosciences and genetic engineering for peaceful purposes through active association with United Nations institutions, including the International Centre for Genetic Engineering and Biotechnology (ICGEB).*

- Member of the UN Interagency Committee on Bioethics
- Member of the SA Standing Committee on Biosafety and Biosecurity to raise awareness of biorisks and promote the conduct of safe science
- Participation to high level technical meeting and conferences e.g. 2016 AU Commission conference on UNSC Resolution 1540 in Africa; UN Security Council Subcommittee on the same resolution; UNSCR 1540 Civil Society Forum etc.
- Lead partner of the South African Government in reviewing the current state of biosafety and biosecurity in South Africa to provide evidence based scientific advice to policy makers
- GMOs public awareness events and dedicated program to policy makers and regulators
Art. X: General challenge: dual use

- Biotechnology provides means to address key themes in:
  - Nutrition,
  - Health,
  - Environment and
  - Energy;

- The same biotechnology means can be used to develop biological weapons.
Specific challenges and opportunities at ICGEB

- **Training:** freedom of research does not mean that researchers are free to do whatever they want! Therefore dedicated training schemes for ICGEB Member States that include basic knowledge on Article X as well as dual use would help the capillary dissemination of the concepts, raising local awareness;

- **Advocacy and Outreach:** safe use of biotechnology and dual use notion spread at national, regional, and international level by specific initiatives targeting different audience (practitioners, researchers but also ministries officials) within ICGEB meetings and courses;

- **Monitoring:** taking advantage of the existing network of the national, sub-regional and regional research and development centers affiliated to the ICGEB in its 63 Member States;

- **Detection:** develop detection tools to actively detect potential threats in combination with training and monitoring actions to be implemented in Europe, Africa and Asia within the 3 Components (IT; SA; IN)
The Arturo Falaschi ICGEB Fellowship Program offers long and short-term fellowships for scientists from ICGEB Member States to perform research in Trieste, New Delhi or Cape Town.

**ICGEB PhD**: aim at the *Doctor Philosophiae* (PhD) degree in the life sciences. The title is awarded through a number of academic institutions of international standing: The Open University (UK), the International School for Advanced Studies (SISSA) in Trieste, the Jawaharlal Nehru University in New Delhi and the University of Cape Town in South Africa.

**ICGEB postdoc**: to highly motivated scientists wishing to pursue postdoctoral research in ICGEB laboratories.

**Short-term fellowships**: for Pre-doctoral and Postdoctoral studies in ICGEB laboratories to fund ongoing collaborative research between scientists from ICGEB Member States and research groups at ICGEB, with the aim of facilitating access to the latest research techniques and to strengthen capacity building.

**Scientific Mobility for Advanced Research Training (SMART)**: to promote the mobility of researchers between ICGEB Member States (i.e. South-South cooperation).
Fellows on board 2017 (101+ 231* total)

Europe (31+33*)
- Bulgaria (1)
- Croatia (3)
- Poland (2)
- Italy (17+33*)
- Serbia (4)
- Slovenia (4)
- Turkey (4)

Asia (28+177*)
- China (1)
- Bangladesh (4)
- Bhutan (1)
- India (15+177*)
- Malaysia (2)
- Nepal (1)
- Pakistan (2)
- Sri Lanka (1)
- Viet Nam (2)

Latin America (14)
- Argentina (1)
- Brazil (1)
- Cuba (2)
- Costa Rica (2)
- Mexico (3)
- Peru (3)
- Venezuela (2)

Middle East (3)
- Iran (1)
- Libya (1)
- Syria (1)

Africa (25+21*)
- Burundi (1)
- Cameroon (5)
- Egypt (4)
- Kenya (1)
- Nigeria (11)
- South Africa (21*)
- Sudan (1)
- Tanzania (1)
- Tunisia (1)

* on external grants
ICGEB eLearning Showcase
A portfolio of curriculum-based modules encompassing the biosafety of genetically modified organisms, and related matters in biosecurity, public health, natural resource management, biocontrol and bioremediation.

Associates
ICGEB is pleased to be providing modules from the portfolio to the following Associates:
The Portfolio offers an interactive learning experience that actively engages users through dynamic videos, interactive tests, exercises with reinforcement feedback and illustrative case studies. The Portfolio is made available to various audiences through a password-protected portal that delivers the course content, administers preliminary and final exams, and provides the administrative infrastructure to register users and track their progress through the modules.

Presented below are the modules currently available in the portfolio. Please click on those that you wish to explore further, and remember, do ask for a trial of any that peak your interest.
Specific challenges

- **Training**: freedom of research does not mean that researchers are free to do whatever they want. Therefore training schemes for ICGEB fellows from Member States that include basic concepts of dual use would help the capillary dissemination of the concept;

- **Advocacy and Outreach**: safe use of biotechnology and dual use notion spread at national, regional, and international level by specific initiatives targeting different audience (practitioners, researchers but also ministries officials) within ICGEB meetings and courses;

- **Monitoring**: taking advantage of the existing network of the national, sub-regional and regional research and development centers affiliated to the ICGEB in its 63 Member States;

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ICGEB Meetings & Courses

**ICGEB Meeting:** organized at the ICGEB Components, 250-300 participants, invited speakers and selected oral presentations, poster sessions, registration fee.

**ICGEB Workshop:** organized in Member States, 80-120 participants from laboratories working on a focused topic, oral and poster sessions.

**ICGEB Course:** theoretical and/or practical, 25-50 participants and 5-10 instructors.

**ICGEB & The Future of Science:** 1-2 days, involving 2-6 high profile leaders in the field. May involve working groups on current hot topics of particular public relevance and/or examine in a public context novel scientific developments that will impact on our society, with open communication to media and the general public.

**Sponsorship of other meetings:** financial contribution towards a scientific meeting organized in a Member State on a topic of relevance to the ICGEB mandate.
ICGEB Meetings & Courses

Total from 1989 ≈500 events and ≈23,000 participants
Participants to RNAvirus@ICGEB

LATIN AMERICA (139)
- Argentina: 47
- Brazil: 14
- Chile: 4
- Colombia: 6
- Costa Rica: 11
- Cuba: 7
- Mexico: 18
- Panama: 3
- Peru: 11
- Uruguay: 7
- Venezuela: 7
- Nicaragua: 4

EUROPE (55)
- Croatia: 1
- Italy: 18
- Poland: 6
- Serbia: 1
- Slovenia: 2
- Austria: 2
- Belgium: 2
- Czech Republic: 2
- Finland: 2
- France: 9
- Germany: 1
- Greece: 2
- Spain: 1
- Sweden: 1
- UK: 5

AFRICA (14)
- Egypt: 7
- Nigeria: 2
- Sudan: 3
- Tunisia: 2

ASIA (69)
- China: 1
- India: 45
- Iran: 3
- Iraq: 1
- Pakistan: 3
- Russian Federation: 2
- Sri Lanka: 2
- Syrian Arab Republic: 1
- Thailand: 1
- Turkey: 10

- Japan: 4
- Korea: 1
Specific challenges

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CRP - ICGEB Research Grants

> 460 grants
~19 million Euro

over 1800 applications evaluated

Funds allocated 2015: 732 k€
Average per grant: 45.8 k€
**Specific challenges**

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ICGEB research

TRIESTE HQ - 18 Research Groups (≈200 researchers)

<table>
<thead>
<tr>
<th>Department</th>
<th>Leader</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacteriology</td>
<td>V. Venturi</td>
</tr>
<tr>
<td>Biotechnology Development</td>
<td>M. Baralle</td>
</tr>
<tr>
<td>Biosafety</td>
<td>W. Craig</td>
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<tr>
<td>Cardiovascular Biology</td>
<td>S. Zacchigna</td>
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<tr>
<td>Cellular Immunology</td>
<td>F. Benvenuti</td>
</tr>
<tr>
<td>Human Molecular Genetics</td>
<td>F. Pagani</td>
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<tr>
<td>Industrial Biotechnology</td>
<td>G. Degrassi</td>
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<tr>
<td>Molecular Cardiology</td>
<td>F. Loffredo</td>
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<tr>
<td>Molecular Hematology</td>
<td>D. Efremov</td>
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<tr>
<td>Molecular Immunology</td>
<td>O. Burrone</td>
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<td>Molecular Medicine</td>
<td>M. Giacca</td>
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<td>Molecular Pathology</td>
<td>E. Buratti</td>
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<tr>
<td>Molecular Virology</td>
<td>A. Marcello</td>
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<tr>
<td>Mouse Molecular Genetics</td>
<td>A.F. Muro</td>
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<tr>
<td>Neurobiology</td>
<td>F. Feiguin</td>
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<td>Protein Networks</td>
<td>M.P. Myers</td>
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<tr>
<td>RNA Biology</td>
<td>F.E. Baralle</td>
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<tr>
<td>Tumour Virology</td>
<td>L. Banks</td>
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CAPE TOWN – 4 Research Groups (≈30 researchers)

<table>
<thead>
<tr>
<th>Department</th>
<th>Leader</th>
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<tbody>
<tr>
<td>Biosafety Unit</td>
<td>D. N. Obonyo</td>
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<tr>
<td>Cancer Genomics</td>
<td>L. Zerbini</td>
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<tr>
<td>Cancer Molecular and Cellular Biology</td>
<td>I. Parker</td>
</tr>
<tr>
<td>Cytokines and Disease</td>
<td>F. Brombacher</td>
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</table>

NEW DELHI - 25 Research Groups (≈400 researchers)

<table>
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<th>Department</th>
<th>Leader</th>
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<tbody>
<tr>
<td>Integrative Biology</td>
<td>S. S. Yazdani</td>
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<tr>
<td>Metabolic Engineering</td>
<td>SK Rhode</td>
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<tr>
<td>Omics of Algae</td>
<td>P. Jutur</td>
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<tr>
<td>Systems Biology for Biofuel</td>
<td>S. Srivastava</td>
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<tr>
<td>Transcriptional Regulation</td>
<td>N.S. Bhavesh</td>
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<tr>
<td>Translational Bioinformatics</td>
<td>D. Gupta</td>
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<tr>
<td>Yeast Biofuel</td>
<td>N. Gaur</td>
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<tr>
<td>Molecular Medicine</td>
<td>D. Kumar</td>
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<tr>
<td>ICGEB-EMORY Vaccine Program</td>
<td>A. Chandele</td>
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<tr>
<td>Malaria Biology</td>
<td>P. Malhotra</td>
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<td>Malaria Drug Discovery</td>
<td>D. Sahal</td>
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<tr>
<td>Membrane Protein Biology</td>
<td>A. Arulandu</td>
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<tr>
<td>Parasite Biology</td>
<td>R. Tuteja</td>
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<tr>
<td>Parasite Cell Biology</td>
<td>A. Mohmmmed</td>
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<tr>
<td>Recombinant Gene Products</td>
<td>N. Khanna</td>
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<td>Structural Parasitology</td>
<td>A. Sharma</td>
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<td>Translational Health</td>
<td>R. Nanda</td>
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<td>Vector Borne Diseases</td>
<td>S. Sunil</td>
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PLANT BIOLOGY

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<tr>
<td>Crop Improvement</td>
<td>M. K. Reddy</td>
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<tr>
<td>Nutritional Improvement of Crops</td>
<td>T. Kaul</td>
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<tr>
<td>Plant Insect Interaction</td>
<td>S. Nair</td>
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<tr>
<td>Plant RNAi Biology</td>
<td>N. Sanan-Mishra</td>
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<tr>
<td>Plant Stress Biology</td>
<td>S. L. Singla-Pareek</td>
</tr>
<tr>
<td>Plant Transformation</td>
<td>S. Leelavathi</td>
</tr>
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ICGEB research

Cardiovascular disorders
regeneration, gene therapy, miRNA

Infectious diseases
Malaria, HIV, Dengue, TB,
Trypanosomiasis, Leishmanioisis,
Toxoplasmosis, crop diseases,
Vectors’ biology

Cancer
HPV, angiogenesis, cancer genetics/genomics

Neurodegeneration
ALS, dementia, Alzheimer, Parkinson

Genetic diseases
Gene therapy, splicing correction, immunodeficiencies

Plant biology
crop improvement, stress resistance, bio-inoculants

Environment
Bioremediation

Energy
POC testing for resource-limited settings

“Accurate diagnostics have the potential to affect health care decisions to a degree well out of proportion to their cost. It has been estimated that diagnostics account only 2% of the cost of health care, but affect 60-70% of treatment decisions. In resource-limited settings, the impact of diagnostic tests that can be provided at the immediate point-of-care (a point-of-care test, or POCT) is potentially even greater, because the alternative to a POCT may be no diagnostic support at all”.

*Bringing the lab to the patient: developing POC diagnostics for resource-limited settings. A report from the American Academy of Microbiology (2011).*

**WHO** criteria for the ideal diagnostic test **ASSURED**: Affordable, Sensitive, Specific, User-friendly, Rapid and Robust, Equipment-free (or minimal) and Deliverable to end users.

Summary of challenges and opportunities at ICGEB

- **Training:**
  - Training the next generation of scientists on the responsibility of dual use;
  - E-learning portfolio;

- **Advocacy and Outreach:**
  - Meetings and courses in member states;

- **Monitoring:**
  - Identify facilities (public and private) located in our constituency capable of accessing and manipulating potential BW;
  - Regional Research Centers;

- **Detection:**
  - Develop portable devices for specific detection of potential BW;
  - Identify new threats from current biotechnological developments;
Thank you

Alessandro Marcello
Head, Molecular Virology
marcello@icgeb.org
+39 040 3757384
http://www.icgeb.org