

2008–2010

# Strategy Overview

*to choose, define, and organize actions  
and achieve results*



The complexity of the brain – perhaps the most intricate living structure to have yet evolved – is amazing. Better insight into its structure and function is essential for investigating the origin of devastating neurological and psychiatric diseases and improving their treatments. Furthermore, thorough knowledge of the brain, the most effective information processor known to exist, is increasingly a vital source to be utilized and adapted in innovative technology and engineered systems. Therefore, understanding the brain impacts not only science and technology but also economy and society.

Neuroinformatics combines neuroscience and informatics research to develop and apply the advanced tools and approaches that are essential for major advances in understanding the structure and function of the brain.





## **Neuroinformatics Is Interdisciplinary**

A key element to successfully comprehend the nervous system is the integration of brain research with physical sciences and information technology, making it possible to utilize the collection of data and knowledge along with analysis and modeling to decipher the human brain.

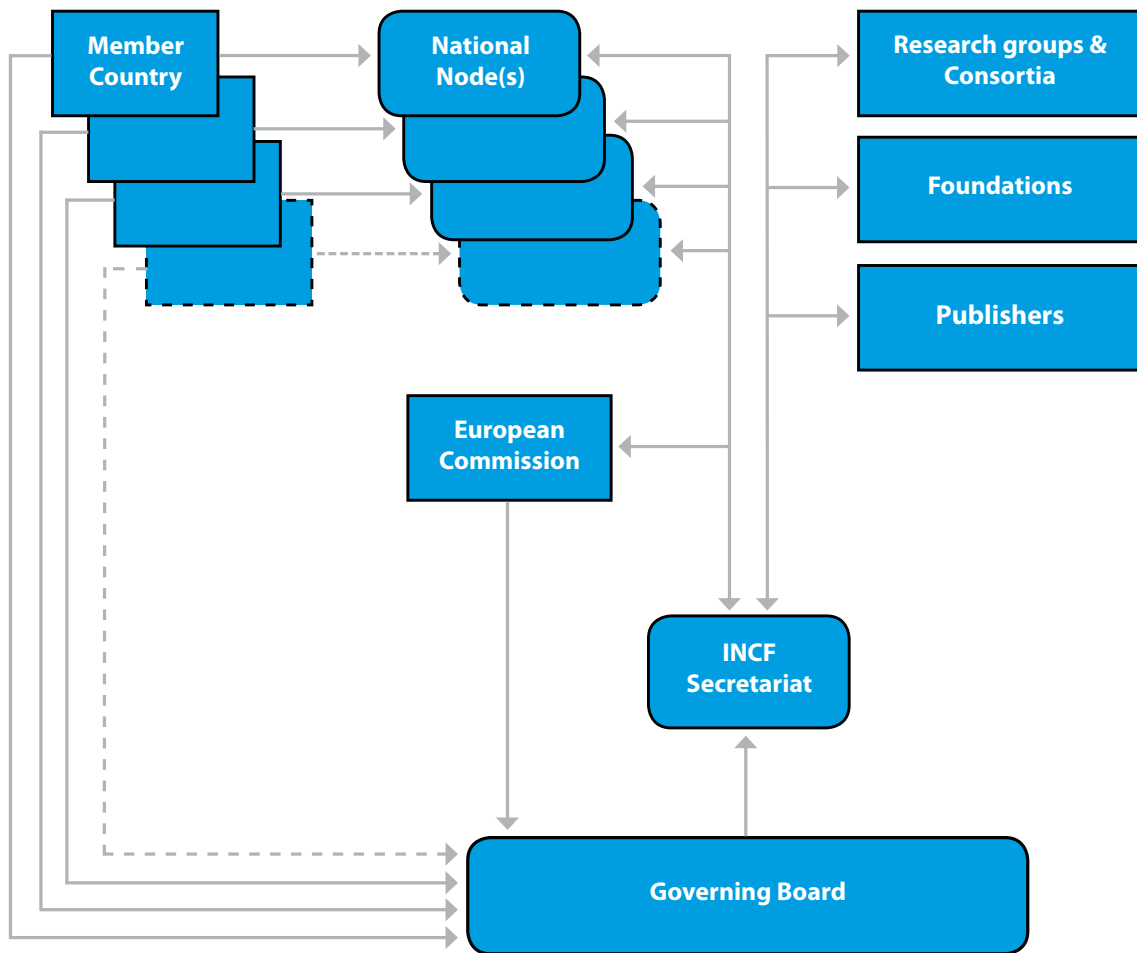
Neuroinformatics is at the forefront of this integration as the emerging field aims to develop and apply the advanced tools and approaches essential to major progress in understanding the structure and function of the nervous system.

## **Neuroinformatics Requires Global Coordination**

Using the most sophisticated technologies, current approaches in neuroscience research have produced exceedingly large numbers of highly individualized studies and generated enormous quantities of heterogeneous data from different levels of study and modalities of examination, ever increasing at higher levels of granularity.

To successfully understand the nervous system, the scientific community should openly share these fractionated data and integrate them into a broad, new knowledge to ensure efficient and maximum use of resources. Thus, it is now necessary to develop and create shared facilities of (i) neuroscience data and knowledge bases, (ii) analytical and modeling tools, and (iii) computational models.

Neuroinformatics has transpired to meet these challenges and needs. This new discipline particularly necessitates interdisciplinary collaboration under international cooperation. Accordingly, the International Neuroinformatics Coordinating Facility (INCF) is established through the Global Science Forum of the Organization for Economic Co-operation and Development (OECD) to develop neuroinformatics infrastructure and to coordinate and facilitate the global development of the field. With its Secretariat at Karolinska Institutet and the Royal Institute of Technology in Stockholm, Sweden, INCF achieves its missions worldwide with its National Nodes in participating countries across the globe.



*The structure of the INCF organization*

## The INCF Organization

The **Secretariat** is the central facility of INCF, responsible for the execution of scientific and administrative activities and for the implementation of INCF work program. It assists the nodes in reaching their goals and plays a proactive role in furthering neuroinformatics.

The **Governing Board** is the means by which the participating countries make collective decisions on all matters relating to INCF.

The **National Nodes** are facilities, networks, or other mechanisms, funded by national sources. The nodes are established for the purpose of coordinating and facilitating activities within a country providing an interface to the Secretariat. Furthermore, they participate in the formulation and implementation of INCF work program.

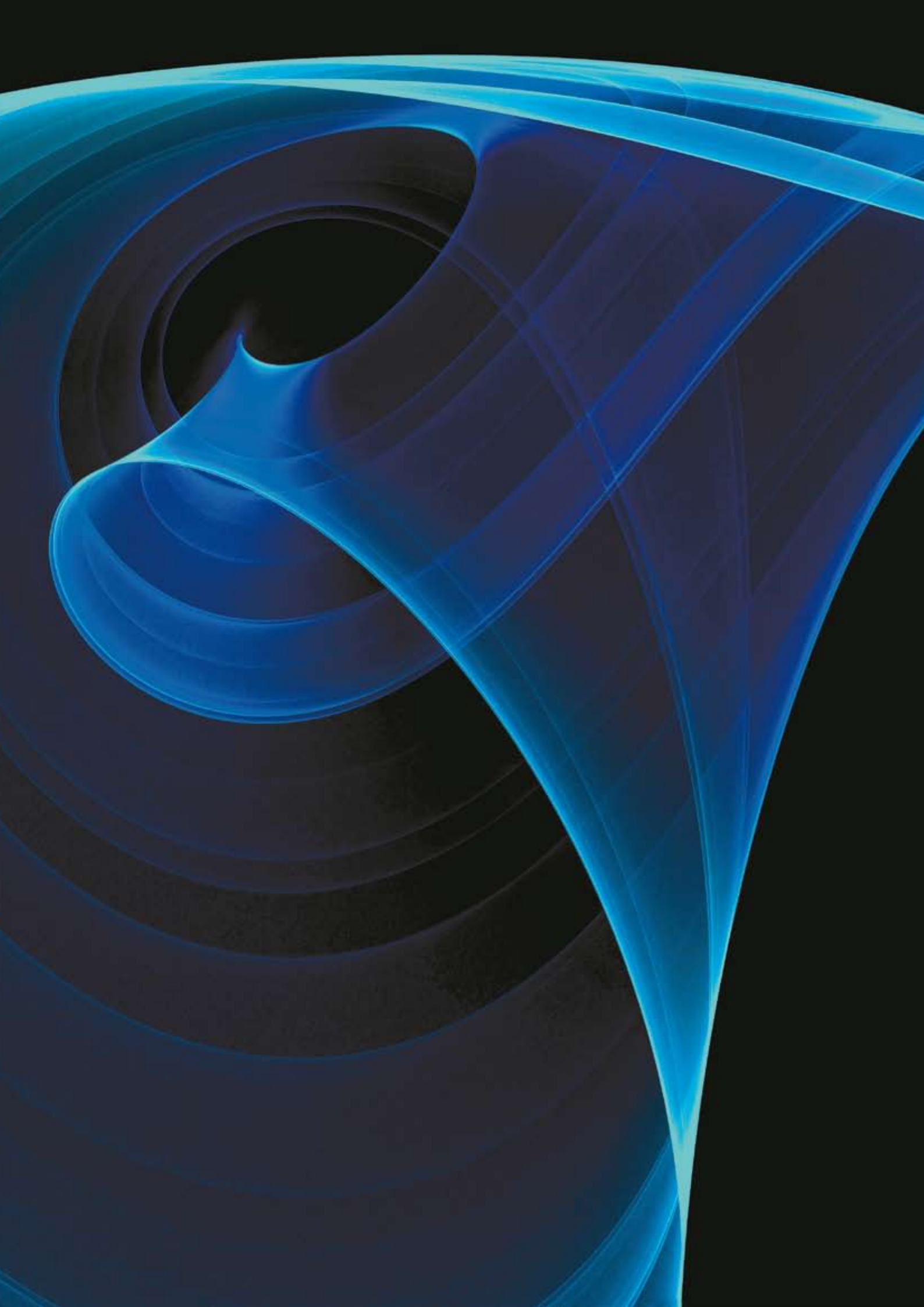
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### INCF Secretariat



### INCF National Nodes

- coordination of tasks
  - analyses and recommendations
  - infrastructure developments
  - international, interdisciplinary training
  - standards, guidelines, and ontologies
  - portal to resources
- specialized developments
  - national infrastructure
  - national training
  - dissemination
  - contributions to coordinated efforts
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## **Vision**

INCF will catalyze and coordinate the global development of neuroinformatics comprehensively in the neuroscience community. This will result in a rapid development of brain science and advances of information technology. Neuroinformatics will ultimately contribute to new therapeutic methods for disorders of the nervous system, and bio-inspired technology will gain inspiration from the many ingenious neural information processing systems.

## **Mission**

- To foster scientific interaction for discovery and innovation and facilitate the flow of information and knowledge between researchers in both academia and industry
- To serve as a credible and sustainable global network for developing, maintaining, and evaluating internationally coordinated neuroinformatics activities and infrastructures for standards, guidelines and references
- To facilitate training for producing highly skilled neuroinformatics researchers worldwide

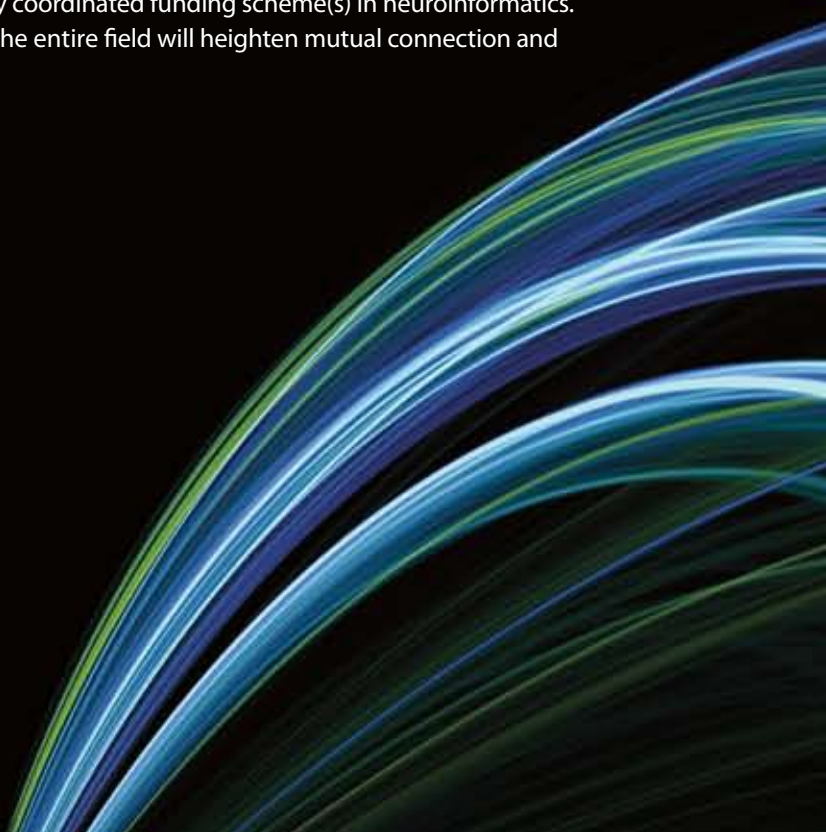
## **Values**

- Openness – INCF activities are open to all researchers who can contribute to neuroinformatics at the international level
- Neutrality – INCF priorities and directions are based solely on the collective benefit of science and research, with global brokerage being an important function of INCF
- Stability and Lasting Accountability – INCF-participating countries value and directly invest in sustainable products, services, and programs
- Result Orientation – INCF criteria for action are results and deliverables to fulfill the mission
- Global Excellence – INCF benchmarks for all activities are state-of-the-art and best-practice in both academia and industry
- Leadership and Innovation – INCF innovative approaches help to gain and maintain international leadership in supporting neuroscience research.

## Strategic Goals

To accomplish the INCF mission, it is vital to seize two opportunities that are increasingly evident: the potential of global, large-scale research enterprises and the trends of scientific production. Furthermore, INCF National Nodes are essential for developing INCF activities at all levels and for contributing to the growth of a sustainable INCF portfolio.

As a newly founded international organization, INCF has set the following strategic goals, while promoting visibility in the scientific research community:

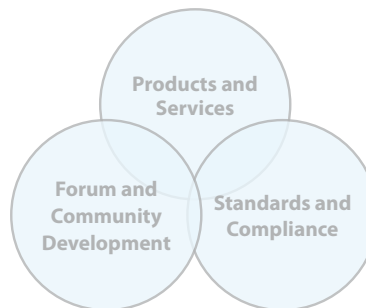
- Facilitate global communication and coordination in neuroinformatics and institute a portal-of-portals service with information, resources, and community platforms. The INCF Neuroinformatics Portal will function as the foremost channel for access to resources and interactions within the neuroscience community.
  - Drive the establishment and adoption of standards and guidelines for data format, terminology, ontology, interoperability, collaboration, documentation, quality assurance, and related issues. These efforts will strengthen INCF provision of databases, reference services, and software tools.
  - Expand partnerships with journals, funding agencies, scientific associations, and industry to encourage scientific collaborations at pre-publication stages, assist development of non-traditional merit evaluation in the field, and boost funding efficiency in scientific research enterprises. These significant partnerships will strengthen INCF reputation and authority in neuroinformatics and beyond.
  - Introduce innovative, interdisciplinary training programs in neuroinformatics to improve existing curricula. Education for future generations will ensure continuing excellence for INCF.
  - Promote new INCF memberships with creative forms of participation. The expansion will fasten the basis for future growth of INCF scientific activities.
  - Instigate and possibly spearhead internationally coordinated funding scheme(s) in neuroinformatics. INCF roles in pursuing continuous funding to the entire field will heighten mutual connection and benefits with the research community.
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**As the measurable steps towards achieving the above strategic goals, the objectives for 2008 – 2010 will be:**

- Continue topical workshops to facilitate networking, community interaction, and knowledge interchange. The resulting analysis and recommendations will serve as the basis for further INCF activities.
- Contribute to the release of cutting-edge infrastructure product(s) and service(s) for targeted user groups via the INCF Neuroinformatics Portal. The product(s) and service(s) will demonstrate INCF capabilities from problem identification to solution implementation.
- Form high-profile partnerships for infrastructure provision and coordination. The alliance will exemplify INCF strategic cooperative relations to key actors in science and technology in general.
- Establish operational structures to deliver standards and guidelines in neuroinformatics and to promote their adoption in the community. This reference-setting effort will facilitate community data and tools sharing and openness.
- Present INCF at leading scientific conferences, as well as in prestigious journals and appropriate media for the general public, and organize a high profile INCF congress in neuroinformatics. The heightened visibility will enhance the INCF role of global coordination in concert.
- Investigate the current needs and best practice for training courses in neuroinformatics globally. The fact-finding efforts will prepare the foundation for future improvements on educational activities in the field.

## Coordinated Action

The general types of INCF actions are synergetic, as illustrated below. These action areas support each other for mutual added value. Resources are allocated on the basis of their respective activities.



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### Action Areas

### Representative Activities

Products and Services	<ul style="list-style-type: none"><li>· software development</li><li>· web service operation and hosting</li><li>· user support</li></ul>
Forum and Community Development	<ul style="list-style-type: none"><li>· topical INCF workshops</li><li>· INCF congress</li><li>· networking actions to build community and facilitate exchanges via INCF portal</li></ul>
Standards and Compliance	<ul style="list-style-type: none"><li>· development, evaluation, and promotion of technical standards, guidelines, nomenclatures, and ontologies</li><li>· establishment, coordination, and promotion of protocols, legal frameworks, quality references, and publishing initiatives for neuroinformatics research and handling of neuroscience data</li><li>· evaluation and approbation of standards compliance in software development and neuroscience research</li></ul>

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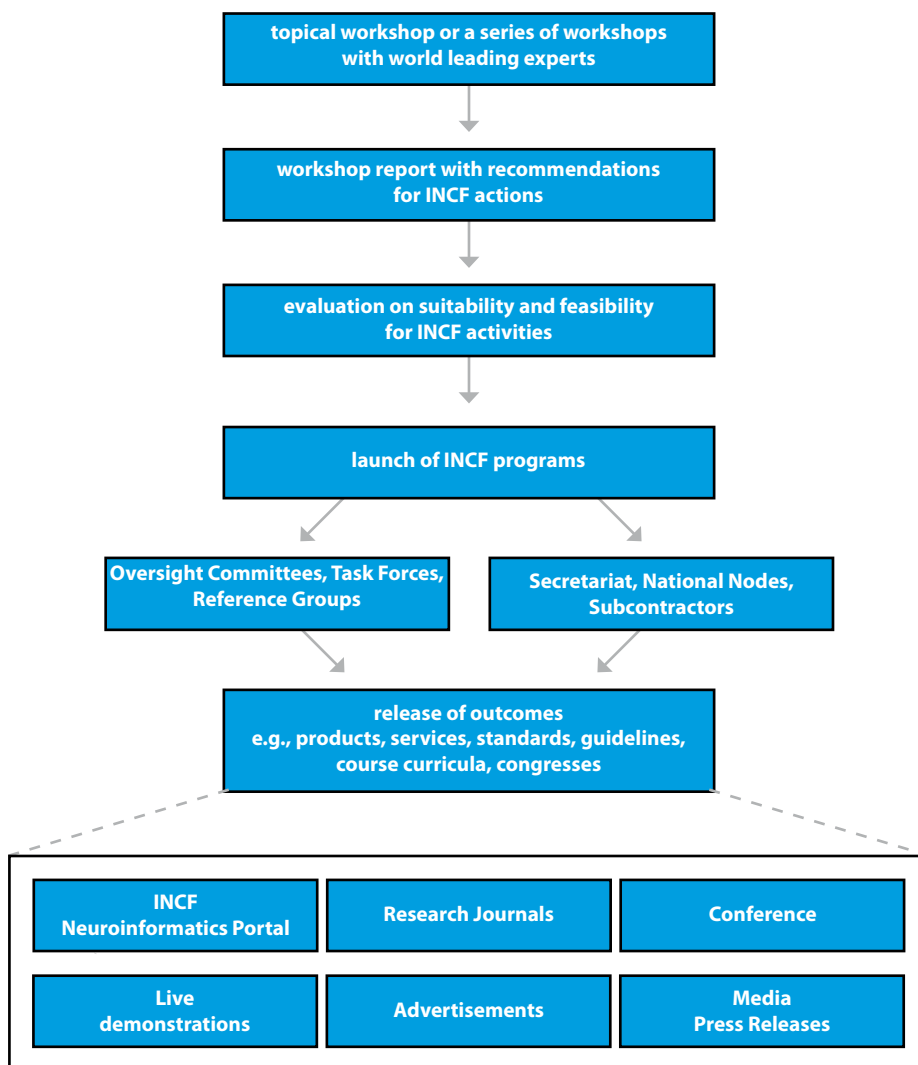
## Multidisciplinary Program

All actions are organized under selected programs dedicated to specific domain areas of neuroinformatics. INCF programs represent long-term strategic undertakings to address issues of high importance to the neuroscience community. They are client-centric with the following characteristics:

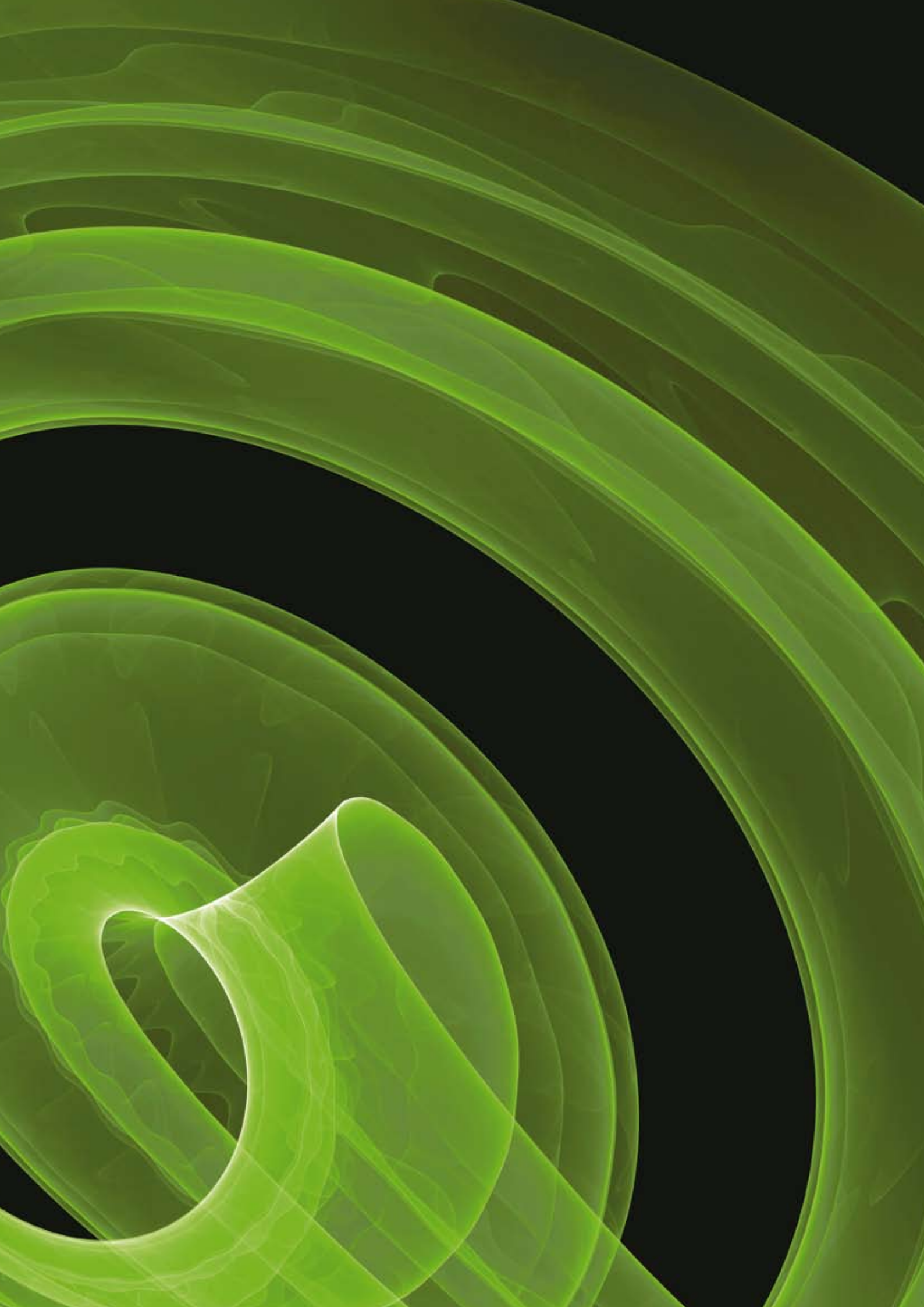
- They span over a relative long period of time;
- They target well-defined groups of stakeholders and clients;
- They aim to actively solve identified problems by actions such as provision of products, services, and information; and
- They have defined annual budgets.

## Transparent Process

All INCF programs are initiated following a transparent process that is need-driven based on topical community requirements analysis by INCF worldwide network components. The main steps are illustrated as follows:



In order to deliver the maximal satisfaction to the neuroscience community worldwide, all INCF activities and processes are regularly monitored by the Governing Board of INCF, which represents INCF participating countries.



## **Concluding Remarks**

INCF capability to seize the opportunity for coordination of global efforts in neuroinformatics will set the stage for enhancing the quality of life and revolutionizing science and technology throughout the world.

A direct impact of a better understanding of the brain is the amelioration and prevention of nervous system disorders. The Global Burden of Disease Study, conducted by the World Health Organization, the World Bank, and Harvard University, predicts that nervous system disorders would rank first in the 21st century in both the numbers of individuals affected and the burden to family members and society. Even today, the costs for nervous system disorders are ten times higher than those associated with cancer.

Full insights into the brain mechanisms, and thus their applications to technological developments, will also directly contribute to the economic growth and social progress resulting from brain-inspired innovations in science and engineering.

The relatively small investment by the international community in developing neuroinformatics will have enormous benefits and paybacks through the efficiency achieved by INCF global coordination.

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