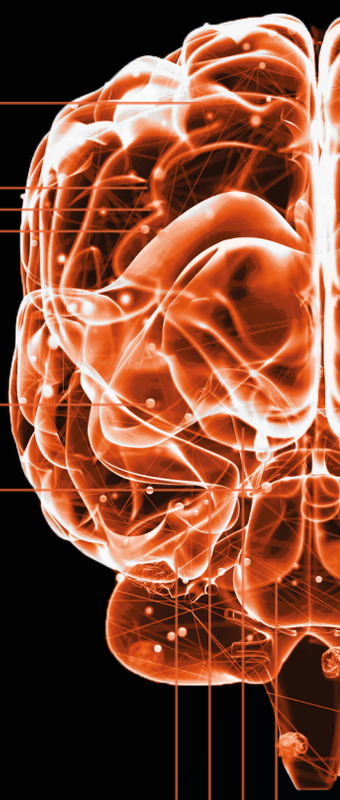


Annual Report

2018

International Neuroinformatics Coordinating Facility

incf

Contents

"We look forward to another inspiring year in 2019 in which we will endorse more standards and best practices for neuroscience and continue to deliver key products and coordination services for the international neuroscience community."

Message from the Director

I am pleased to present the INCF Annual Report for 2018.

In 2018, the INCF Network consisted of 16 Nodes (6 Governing, 9 Associate, 1 Observer) across 4 continents, a Secretariat hosted by the Karolinska Institute in Sweden, and a broad range of global collaborators.

2018 saw a major milestone for INCF: the launch of the international standards and best practices (SBPs) endorsement process early in the year (doi.org/10.31219/osf.io/3rt9b). BIDS (Brain Imaging Data Structures) was the first SBP to be endorsed and was announced in November, and several more have been endorsed and submitted for review since then. The endorsement process includes a 60-day period of public comment. INCF continues to support the development and extension of SBPs and other resources through community-driven initiatives including our Special Interest Groups. At the time of this report there are a total of 8 active SIGs.

At the Society for Neuroscience meeting in November, INCF launched TrainingSpace, the online hub for training and educational materials for neuroinformatics. Collaborations with many relevant organizations have been established in order to develop TrainingSpace in an internationally-inclusive manner and incorporate suitable content from around the world. Among its other training activities, INCF participated for the 8th time as a mentoring organization in the 2018 Google Summer of Code, 16 projects were funded by Google and successfully completed at a value of 70k USD (see page 15).

Together with partners at the Human Brain Project and Neuroscience Information Framework, INCF has continued to develop the KnowledgeSpace encyclopedia for neuroscience. KnowledgeSpace now comprises almost 2 million data items from 14 international sources (see page 13).

INCF arranged a number of events in 2018: the Canadian Node held the first in a series of annual workshops on "Making open neuroscience infrastructures interoperable" in Montréal. The Secretariat hosted the INCF Brain Summit, the first in a series of annual meetings to bring together the world's large brain projects with a focus on system and data interoperability, and a workshop to develop a community with infrastructural interests around the theme of sustainability.

The Neuroinformatics Assembly was hosted by the Canadian Node in Montréal in August and comprised the main 2-day conference and 2 days of workshops and courses. The event welcomed 220 participants from 17 countries, and was sponsored by 14 organizations and companies.

INCF hosted a very successful booth with demonstrations at the Society for Neuroscience meeting in San Diego, USA. At this meeting INCF also organized and chaired a professional development workshop on FAIR neuroscience with 6 international speakers from academia, publishing and private sector. We also hosted a booth at the Federation of Neuroscience Societies in Europe (FENS) meeting in Berlin, Germany, and sponsored the first tool demonstration session at the Organization for Human Brain Mapping meeting in Singapore. INCF Secretariat staff also attended or presented at many other relevant international meetings.

INCF participated as a member of the initial coordinating body of the International Brain Initiative (IBI) throughout 2018, with particular focus on data standards and sharing, as well as communications.

INCF continues to participate in CENTER-TBI, a large-scale international project funded by the European Commission and led by teams in Belgium and the UK, to better characterize and identify treatments for traumatic brain injury (TBI). The latest version of the CENTER-TBI dataset has 4509 core subjects and 22849 registry subjects. INCF provides the Neuroinformatics Data Collection Platform for the project and has helped to coordinate data curation. Analysis of the curated data began in 2018, using INCF's Neurobot data extraction tool.

In summary, 2018 activities were focused on establishing processes for INCF to become a standards and best practices endorsing authority for neuroscience, global outreach, coordination and engagement of the neuroscience and neuroinformatics communities, including support of Special Interest Groups, delivering TrainingSpace, KnowledgeSpace, and the CENTER-TBI informatics platform. The INCF Network aims to be a source of neuroinformatics expertise for the global neuroscience community and provide world-class knowledge and coordination resources. We look forward to another inspiring year in 2019 in which we will endorse more standards and best practices for neuroscience and continue to deliver key products and coordination services for the international neuroscience community.

Linda Lanyon

Executive Director

National Nodes

INCF's core community consists of the Governing and Associate Nodes. The Governing Nodes contribute financially to INCF and sustain its activities, and set the agenda for global neuroinformatics through representation on the Governing Board.

INCF supports its National Nodes in developing their national networks and local neuroinformatics activities. During 2018, development activities have included tele- and video conferences between the Nodes and the Secretariat, support in sourcing grants and developing grant applications, and promotion of Node activities and expertise to the wider scientific community using INCF's various channels and activities (including social media, newsletter, demos and socials at scientific events).

In addition to Node-Node collaborations, our Nodes and community are increasing their collaborations with and within the large-scale brain projects.

During 2018, INCF has continued to engage Nodes in dialogue regarding INCF strategy for and the role of community in INCF's activities. The former Node workshops have been merged into the INCF Assembly.

Governing Nodes	Associate Nodes	Associate Nodes	Observer
Australia	Belgium	Netherlands	India
Canada	Czech Republic	Poland	
Japan	France	UK	
Norway	Germany	USA	
Malaysia	Italy		
Sweden			

Poster session at the 2018 INCF Assembly in Montréal, Canada on August 9-10

Workshops and scientific meetings

Below are highlights of the activities in the INCF Nodes. Full reports are available on incf.org.

Australia

The Australia Node coordinated and organized a Neuroinformatics Infrastructure Workshop, co-located at the INCF Assembly 2018 on the August 8, in Montréal, Canada. This initiative was seeded by discussions at the INCF Council for Science, Technology and Infrastructure, and the Infrastructure Sub Committee.

Neuroscience research that adheres to the principles of FAIR (Findable, Accessible, Interoperable and Reusable) is dependent on computing infrastructure. The goal of this workshop was to bring together and build an active community of practice of cyber infrastructure and eResearch providers who share an interest in underpinning excellent neuroscience. The workshop attracted over 20 participants from key infrastructure provides including, NITRC, MASSIVE, Canada Open Neuroscience Platform, CBRAIN, Allen Brain Institute, Monash Biomedical Imaging, GIN, NIF, and the INCF, and also included industry participation from Dell.

Canada

The INCF Assembly 2018 was hosted by the Canada Node at McGill University in Montréal on August 9-10. The conference was preceded by a hackathon on August 7-8, and complemented by numerous workshops. Both of these events served to further the causes of data sharing and open science. Participants from diverse spheres attended the conference, including partners from private industry, who were interested in Deep Learning Techniques and Big Data initiatives underway in the scientific domains. Read more about the INCF Assembly on page 16.

Japan

The J-Node actively participated in presentations at the INCF Assembly 2018 in Montreal, August 9-10, and in a demo at the INCF booth at the Society for Neuroscience 2018 in San Diego, US, November 3-7.

As a series since 2015, J-Node Hackathon 2018 was held at Wako and Shonan Village, September 4 and 21-23.

On October 14-16, the 18th Japan-China-Korea Joint workshop NBNI 2018 was organized at Cheju, Korea.

The J-Node organized the international workshop, 6th INCF Japan Node International Workshop Advances in Neuroinformatics at RIKEN on December 20-21, with the main theme being neuroinformatics infrastructure and technologies for open neuroscience.

Node activities at a glance

9 current collaborations

10 workshops

12 training events

17+ projects mentored

National Nodes

Malaysia

The Malaysia Node conducted 2 training courses; "EEG Analysis Fundamentals: Hands-on with MATLAB" and "Summer School Medical Imaging: Machine Learning and Deep Learning for Medical and Biomedical Applications". They are also planning a Open Colloquium on Optical Topography and its applications for March 2019.

The SIG Neuroinformatics for Aging co-organized a symposium meeting in Singapore on June 22. sites.google.com/site/brainconnects2018/home

Norway

The Norwegian Node is contributing to the Neuroinformatics Platform of the EU Horizon 2020 Human Brain Project. During 2018, the Node worked to increase awareness of available resources, consolidate and maintain existing national neuroinformatics resources, stimulate long-term utilization of resources, train young neuroscientists, stimulate data sharing, and demonstrate added value through strategic proof-of-concept projects.

A new collaboration has been initiated on the development of an educational tool using a VR-based representation of the rodent brain, to be implemented in 2019.

Trygve Leergaard, Camilla Blixhavn and Jan Bjaalie held the course "Neuroscience data integration through use of digital brain atlases" with 17 participants, at the Institute of Basic Medical Sciences, UiO, on June 17-18: uio.no/studier/emner/medisin/med/IMB9345

Simen Tennøe, UiO, presenting at the 2018 INCF Assembly in Montréal, Canada on August 9-10

Gaute Einevoll (Organizer and speaker). Modeling and analysis of extracellular potentials as a tutorial at CNS*2018, Allen Institute, Seattle, US, July 13-18.

Gaute Einevoll gave a faculty lecture titled "Neuroscience with both hands: Bridging scales with mathematics" at the 6th Baltic-Nordic Summer School on Neuroinformatics (BNNI 2018), Ventspils, Estonia, on June 14-16.

Simen Tennøe, Geir Halnes, Gaute Einevoll. "Uncertainpy: A Python toolbox for uncertainty quantification and sensitivity analysis of computational neuroscience models". Oral presentation at the INCF Assembly 2018 in Montreal on August 9-10.

Sweden

In the Swedish Node, during the last year, a large brain imaging facility for basic research is started up at SU (SU Brain Imaging Centre, SUBIC; su.se/subic), and several collaborative projects, combining modelling and data analysis are in the starting up phase following the inclusion of SUBIC brain researchers into the SeRC Brain-IT network. The Brain-IT members are working towards enhancing e-science approaches to address the investigation of brain plasticity phenomena over different temporal and spatial scales. Here crucial e-science components that are important for multi-scale modelling of brain plasticity are in development.

The Swedish Node also co-organized the Swedish branch of Global BrainHack 2018 which was held on May 4 at the INCF Secretariat in Stockholm, Sweden.

Participants at the Swedish branch of Global Brainhack 2018, hosted at the INCF Secretariat in Stockholm Sweden on May 4

National Nodes

Belgium

Members of the Belgian Node participated in the workshop for the launch of the INCF seed funded ENBIT, organized workshops on MRtrix3 Workshop in Antwerp and Paris, co-organized BrainHack Networks and Network Neuroscience Satellite at NetSci 2018. The Node also sponsored three projects for GSOC 2018, of which two were completed successfully. BrainHack Ghent 2018 was co-organized with the Belgian Node on May 7-8 at Ghent University, Belgium. The aim of the event was to collaborate on projects, meet new researchers, learn, and share knowledge on data mining and brain research. brainhackghent.github.io

Prof. Daniele Marinazzo co-organized BrainHack Networks and Network Neuroscience Satellite at NetSci 2018.

Prof. Daniele Marinazzo participated in the inauguration of the Cuban School for Cognitive Aging with the NeuroTechSchool 2018. Photos and videos can be viewed here: neurotechschool.cneuro.cu

Czech Republic

The effort to develop a standardized electrophysiology data format was supported by the cooperation with the G-Node and US-Node. Two node members together with J-Node and G-Node members participated in the hackathon organized by the G-Node in Munich and the subsequent Bernstein workshop "Practical approaches to research data management and reproducibility". The Czech Node members have also completed training material describing the complete lifecycle of electroencephalography/event-related potential (EEG/ERP) data obtained from human subjects, supported by INCF training seed funding.

France

The French Node has relaunched a national network of researchers in neuroinformatics. An organizing committee was formed, and a new website developed. A French Node workshop will be held in Marseille in March 2019, with a focus on data management and data sharing in neuroscience. The principal objective of the French National Node of the INCF is to facilitate interactions between neuroinformatics researchers within France, and to act as a link between global INCF activities and local scientists, in collaboration with other actors in neuroinformatics.

Germany

The German Node continues to improve its data sharing platform, The G-Node Infrastructure, which is now a recommended data repository for Nature, Scientific Data, and PLOS.

The collaboration with the Japan and Czech Nodes on common formats for EEG data and metadata continued with a workshop and hackathon held in Munich with participants from the Czech Republic, Japan and Germany. In addition, Michael Denker and Thomas Wachtler organized a workshop "Practical approaches to research data management and reproducibility" at the Bernstein Conference 2018, which included speakers from the Czech Node (Roman Moucek), the J-Node (Hiroaki Wagatsuma), the US Node (Sharon Crook), and others: bit.ly/2Gi9fIs

The G-Node Advanced Neural Data Analysis course, ANDA is a two-week course introducing students to advanced techniques in data analytics and hands-on experience in the analysis of multichannel electrophysiology data, organized by Sonja Grün, Martin Nawrot, Yifat Prut and Thomas Wachtler. It was held on March 5-22, in Jülich. g-node.org/anda

The 11th edition of the summer school "Scientific Programming in Python", organized by Tiziano Zito and others in collaboration with the University of Camerino, Italy, was held on September 3-8, in Camerino, Italy.

India

The India Node held the course "CAMP@Bangalore" on July 1-16 at the National Centre for Biological Sciences, Bangalore, India: camp.ncbs.res.in/camp2018

Poland

The Polish INCF Node now operates under an umbrella of a consortium of 8 leading Polish research institutions forming the core of Polish NI community. They organized a meeting of INCF PL Node in September 2018 in Krakow. Apart from neuroinformatics research, plans were outlined by each lab and new collaborations established among Polish neuroinformatics teams, plans of expansion of activities of INCF PL were discussed and are being currently put in practice, e.g., by on-line live streaming of NI-related seminars held at various labs, as well as open-source sharing of materials and code of NI-related projects being developed within INCF PL Node community incf.org/network/nodes/incf-pl-meetup-in-krakow-september-18

UK

The UK Node has published two new tools, the Virtual Electrode Recording Tool for EXtracellular Potentials (VERTEX; doi.org/10.12688/wellcomeopenres.15058.1) and meaRtools: An R package for the analysis of neuronal networks recorded on microelectrode arrays (doi.org/10.1371/journal.pcbi.1006506).

Polish Node demo in the INCF booth at Society for Neuroscience in San Diego, US, on November 3-7, 2018

During 2018 the focus of Secretariat activities has been on implementation of the new strategic focus on the endorsement of standards and best practices, growth of the INCF Network, assisting the Nodes community, management and development of TrainingSpace, KnowledgeSpace, and the Center-TBI projects, and many forms of outreach, communication and community coordination.

INCF endorses community standards and best practices

The process for the endorsement of standards and best practices (SBPs) was launched by the Council for Training, Science, and Infrastructure (CTSI) in March. BIDS (Brain Imaging Data Structures) was announced in November to be the first INCF-endorsed SBP, and several more have been endorsed and submitted for review since then.

The INCF SBP endorsement process enables the community to propose

1. an existing SBP
2. the extension of an existing SBP, for example to support additional data types, or
3. the development of a new SBP

INCF supports the FAIR (Findable Accessible Interoperable Reusable) principles, and endorsed SBPs are required to comply with these principles. INCF provide financial support to working groups in categories 2 and 3 listed above.

INCF seeks to serve the global neuroscience community by providing materials, expertise, training, and SBPs for:

- scientists seeking to improve their science through neuroinformatics, who will benefit from a coordinated network of tools and expertise
- current infrastructure providers so they can do their jobs better and participate in the global network
- those seeking to add new capacity to the network

Contact: standards@incf.org, more info: incf.org/activities/standards-and-best-practices

INCF promoted the new endorsement process at SfN 2018 in San Diego, USA

INCF Special Interest and Working Groups

Special Interest Groups (SIGs) are open to anyone to join and are formed by volunteer scientists who come together to coordinate and work on areas of interest to them. SIGs are intended to be broad and independent and can be used to build community consensus and support around standards and tools.

Working Groups (WGs) are short-term groups of people working to develop or extend a specified standard or best practice under a defined timeline. Participants are volunteers but the activities of the group are funded.

During 2018, five Special Interest Groups and one Working Group have been active, two more SIGs have been organizing and preparing for launch, and one SIG has been inactive and awaiting more members. Most active SIGs held a meeting at the INCF Assembly in Montréal.

More information: incf.org/activities/standards-and-best-practices/incf-special-interest-groups

Active SIGs in 2018

INCF SIG on Neuroshapes: Open SHACL schemas for FAIR neuroscience data

Chairs: Sean Hill, Krembil Centre for Neuroinformatics, CAMH, Andrew Davison, CNRS, Mohameth Sy, Blue Brain Project, EPFL

The SIG has produced data models (schemas and vocabularies). Tools are developed, maintained and shared through the group's GitHub account; github.com/INCF/neuroshapes. This repository currently contains data models developed and adopted by the Human Brain Project community and the Blue Brain Project. They are tested using the Blue Brain Nexus Knowledge Graph. A web domain (shapes-registry.org) has been secured to offer a web interface to search and provide persistent access to the schemas.

INCF SIG on Reproducibility and Best Practices in Human Brain Imaging

Chairs: JB Poline, McGill University, David Kennedy, University of Massachusetts, Chris Gorgolewski, Stanford University

This SIG formed from a handful of earlier INCF SIGs, all working in the areas of neuroimaging and reproducibility. The SIG aim is to collect, compile, synthesize and distribute information from task forces working on separate projects but with reproducibility in neuroimaging as an overarching theme. There are 3 working groups within this SIG:

- Brain Imaging Informatics. This group is composed of members from the former INCF Neuroimaging Task Force and serves as the larger group that bridges between the working groups of the SIG. (e-mail: incf-nidash@googlegroups.com)
- Brain Imaging Data Structure (e-mail: bids-discussions@googlegroups.com)
- The Neuroimaging Data Model (NIDM) is a collection of specification documents that define extensions the the W3C PROV standard for the domain of human brain mapping. NIDM uses provenance information as means to link components from different stages of the scientific research process from dataset descriptors and computational workflow, to derived data and publication. (e-mail: incf-nidash-nidm@googlegroups.com)

INCF SIG on Quality Control Protocols for Neuroimaging Data

Chairs: Stephen Strother, Rotman Research Institute, Baycrest Hospital, Pradeep Raamana, Rotman Research Institute

The SIG held its first organizational meeting on 8 August 2018. The SIG plans to manage projects through subcommittees and/or working groups. The first will be the CTSI inventory working group.

INCF SIG on Standardized Representations of Network Structures

Chair: Padraig Gleeson, UCL

The motivation for this SIG is the ongoing development of complex data-driven models of neuronal networks, as well as the emergence of general purpose software packages and standardized formats to make it easier to build, specify and share such networks. To encourage researchers to use these common tools and formats (and ultimately create and disseminate higher quality models) the SIG has gathered together developers creating these packages to share code and ideas, to encourage interoperability and have a forum for users and developers to find out about the state of the art and to contribute to a better ecosystem of tools and standards in this area.

INCF SIG on Neuroinformatics for Aging

Chairs: Eric Tatt Wei Ho, U Teknologi PETRONAS, Toshi Nakai, National Center for Geriatrics & Gerontology

The SIG is dedicated to the promotion of aging neuroscience and informatics to neurotechnologies in the Asia Pacific region through the organization of annual scientific workshops, "BrainConnects", involving neuroscientists, neuropsychiatrists/psychologists, neuroinformaticians, neuroengineers, neurologists, and geriatricians. By finding and matching expertise to project needs of each member group/country, we explore the direction of tool development, analysis techniques, and knowledge sharing among the participating countries. Clinicians and researchers from each member country will discuss important applications and expected outcomes in aging. Our meeting provides a platform for researchers in aging neuroscience to define new collaborative research projects to bid for joint funding from national funders.

INCF SIG on Neuroinformatics for Cell Types

Chairs: Maryann Martone, UCSD, Shreejoy Tripathy, University of British Columbia, Tom Gillespie, UCSD

The goal of the SIG is to provide a venue for the open and inclusive development of shared terminologies for describing cell types in neuroscience. The group will develop best practices for defining new cell types based on novel measurement techniques. Various cell type use cases will be compiled, and they will be connected to existing and newly developed ontological tools. The SIG will also make suggestions for how shared terminologies can be used to guide experiments for bridging between cell types defined by orthogonal modalities. The output of the SIG will be white papers outlining the group's discussions and recommendations.

Working groups

INCF Metadata Standardization/Harmonization Working Group

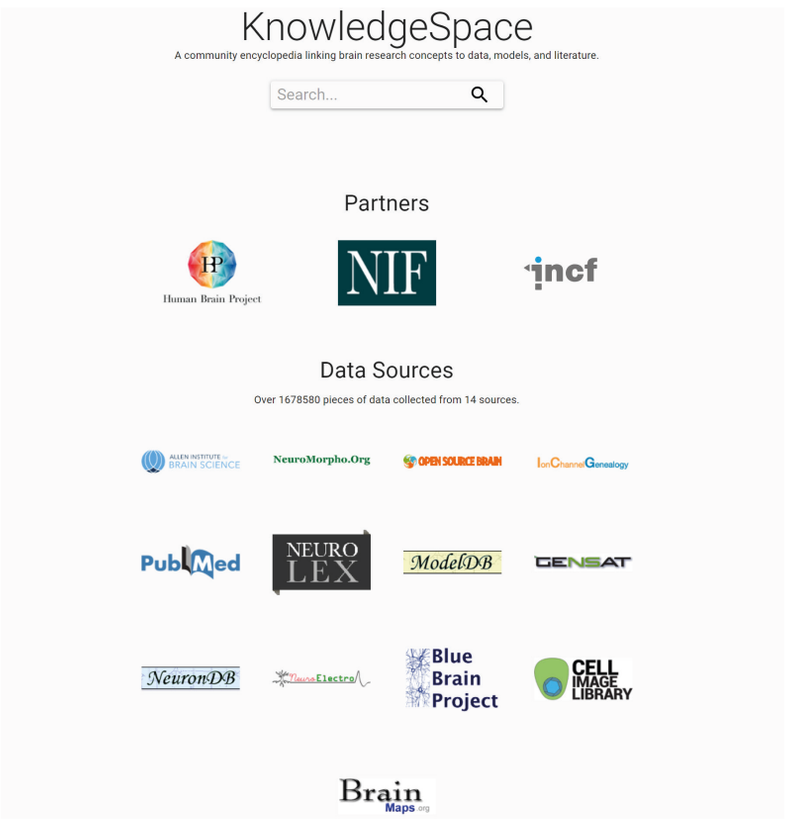
Chair: Jeffrey Grethe, UCSD

The SIG was formed and held its first meeting during INCF/MNI Neuroinformatics Workshop at McGill University on March 21-23, 2018. Since that workshop, the SIG has focused on harmonization of Common Data Elements (CDEs) for data discovery and metadata annotation. During the Neuroinformatics 2018 hackathon, the SIG met with the NIDM working group from the INCF SIG on Reproducibility and Best Practices in Human Brain Imaging. An initial semantic model for CDE harmonization is currently being finalized.

KnowledgeSpace

KnowledgeSpace is a community-based encyclopedia for neuroscience that links brain research concepts to data, models, and the literature that support them. It provides a unique, global interface between current brain research concepts and the data, models, and literature that support or weaken their definition. During 2018, KnowledgeSpace had an index of over 839,000 data and models coming from 12 of the world's leading neuroscience repositories such as PubMed, NIF, and Wikipedia, and welcomed 4764 international users (top 10 countries: US, India, France, UK, Germany, Canada, Brazil, Italy, China, and Japan).

KnowledgeSpace working group members:
Tom Gillespie, UCSD
Jeffrey Grethe, UCSD
Maryann Martone, UCSD
Pradeep George, INCF
Chris Fitzpatrick, INCF
Mathew Abrams, INCF



Screenshot from knowledge-space.org

TrainingSpace

TrainingSpace is an online hub that aims to make neuroscience educational materials more accessible to the global neuroscience community. It is developed in collaboration with International Brain Research Organization, Federation of European Neuroscience Societies, Institute of Electrical and Electronics Engineers, Human Brain Project, Big Data to Knowledge INCF, and iNeuro Initiative. As a hub, TrainingSpace provides users with access to:

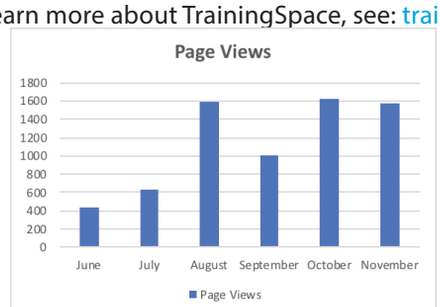
- multimedia educational content from courses, conference lectures, and laboratory exercises from some of the world's leading neuroscience institutes and societies
- study tracks to facilitate self-guided study
- tutorials on tools and open science resources for neuroscience research
- a Q&A forum via NeuroStars
- a neuroscience encyclopedia, KnowledgeSpace, that provides users with access to over 1.000.000 publicly available datasets as well as links to literature references and scientific abstracts

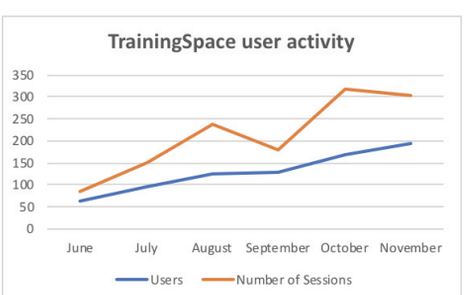
Topics currently included in TrainingSpace include: general neuroscience, clinical neuroscience, computational neuroscience, neuroinformatics, computer science, data science, and open science. All courses and conference lectures in TrainingSpace include a general description, topics covered, links to prerequisite courses if applicable, and links to software described in or required for the course, as well as links to the next lecture in the course or more advanced related courses. In addition to providing resources for students and researchers, TrainingSpace also provides resources for instructors, such laboratory exercises, open science services, and access to publicly available datasets and models.

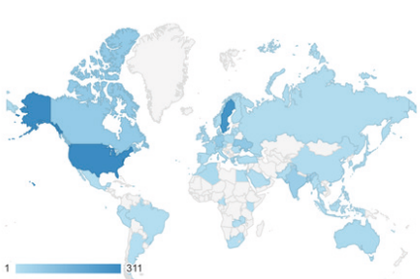
During 2018, TrainingSpace had several focused releases at neuroscience conferences between June to November 2018; during this period, TrainingSpace had:

- 718 users (44.9% return users)
- 1273 sessions were conducted
- 6904 page views
- bounce rate 41.48%
- top 10 countries viewing TrainingSpace: US, Sweden, Ukraine, Canada, Germany, India, Greece, France, UK, and Austria.

To learn more about TrainingSpace, see: training.incf.org







TrainingSpace activity by country

Google Summer of Code

INCF participated for the 8th time as mentoring organization in the 2018 Google Summer of Code. This year 17 projects at a value of 70 kUSD were mentored by participants recruited from the Nodes and the wider community. 16 projects were successfully completed.

Member countries represented in mentoring the projects include US (5), Canada (2), UK (4), Belgium (3), Netherlands (1), Romania (2), Czech Republic (1), Spain (1).

Students came from: Australia (1), Canada (1), Germany (2), Hungary (1), India (5), Nigeria (1), Portugal (1), Taiwan (1), UK (1) and US (2).

Project titles of accepted & completed projects in 2018

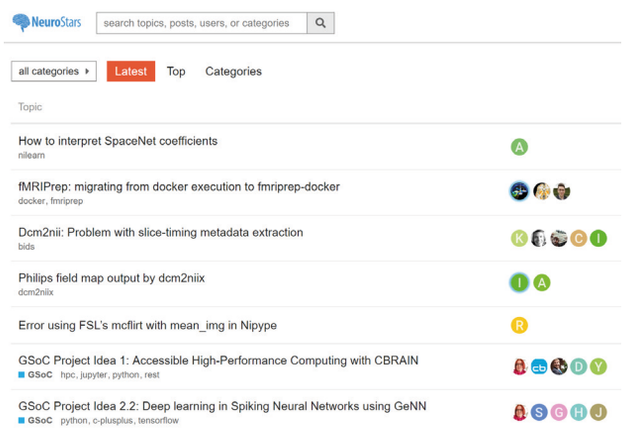
The GSoC student selection process in 2018 involved 32 project proposals, and around 50-80 students who registered in order to take part in initial project discussions with potential mentors.

More info: incf.org/activities/training/google-summer-of-code

Title	Student	Mentor(s)
Dynamic Signal Processing Workflow Designer	Joey Pinto	Petr Jezek
Packaging the virtual brain for the modern world	Umar Parooq	Lia Domide, Mihai Andrei
Monitor Sensors signal in 2D and 3D	Xiangxiu Meng	Paula Popa, Lia Domide
Modular Machine Learning and Classification Toolbox for ImageJ	Sanjeev Dubay	Dimiter Prodanov, Sumit Vohra
Building a portable open pipeline to detect the hemodynamic response function at rest	Madhur Tandon	Daniele Marinazzo
Building high-resolution 3D models of brain vasculature	Laura Bilicz	Pierre-Louis Bazin, Christopher Steele, Julia Huck
Implementation of Two Neural Mass Models on the Open Source Brain Platform	Jessica Dafflon	Padraig Gleeson
Contextual Geometric Representations of Cultural Behavior (separate implementation)	Sam Felder	Bradly Alicea
Contextual Geometric Representations of Cultural Behavior (separate implementation)	Cheng-Hsun Hsueh	Bradly Alicea
Building a Neural Network Animation tool using Python and Blender	Alona Sakhnenko	Jamie Knight, Thomas Nowotny
A PyNN interface to GeNN	Anton Komissarov	Jamie Knight, Thomas Nowotny, Michael Schmuker
Physics-based XML Model building for mosaic embryogenesis of Caenorhabditis elegans	Arnab Banerjee	Bradly Alicea
Add support for Neurodata Without Borders 2.0 to Geppetto	Afonso Pinto	Matteo Cantarelli, Giovanni Idili
Increasing usability for Maxima	Hanye Wei	Dimiter Prodanov, Robert Dodier
Importing NeuroML morphologies into Brian	Kapil Kumar	Marcel Stimberg, Dan Goodman
MRI Defacing Detector	Wazeer Zulfikar	Chris Gorgolewski, Andrew Doyle
Easy BIDS: Starter Kit for Brain Imaging Data Structure	Patrick Park	Kirstie Whitaker, Dora Hermes, Elizabeth DuPre

Neurostars

Neurostars is a question and answering site hosted by INCF since 2014. In 2017, the site was migrated to use Discourse, a popular open-source forum platform. In the last year, Neurostars has grown to have 739 users submitting over 4,100 posts. The site is also a resource to the broader community, as the site generated over 918,000 page views in 2018. In 2019, we are continuing to grow the community by utilizing it in the INCF Google Summer of Code, as well as integrating it with our TrainingSpace and KnowledgeSpace initiatives.

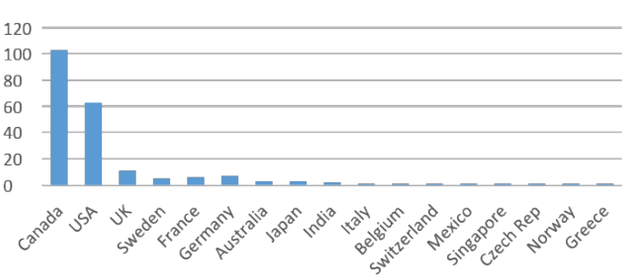


Screenshot from Neurostars.org

INCF Assembly 2018

Report prepared in collaboration with Joanne Clark, Administrative Director, Ludmer Centre, Canada

The largest to date, the 2018 INCF Assembly in Montréal, Canada, hosted by our Canada Node at McGill University, was by all accounts a success. The main conference included 18 presenters, featuring today's leaders in AI and neuroinformatics, and two panel discussions. 220 people attended the main 2-day conference, 33% were women and 55% were students and postdocs. Over 200 attended pre- and post-conference training workshops (123 participants), the hackathon (78 participants), and four Special Interest Group (SIG) meetings (80 participants) focused on increasing collaborations. Specific trainings included a 2-day Virtual Brain Workshop (47 participants), a 1-day Advance Data Discovery in Neuroscience Workshop (28 participants), a half-day Open Source Brain Workshop (12 participants), a half-day Computing Infrastructure Workshop (participants 15), and a 1-hour LORIS/CBRAIN trainings (20 participants). The hackathon, organized by MCIN/Ludmer PhD students, Greg Kiar and Elizabeth DuPre, brought together scientists and programmers from around the world. In the traditional model for scientific research, data has been closely protected, code may be available on request but is often unusable, and research is published in for-profit journals (the higher the impact factor the better!). Open science proposes to overturn all of this and INCF plays a central role in making open science a reality within the neuroscience community.



Countries represented at the 2018 INCF Assembly in Montréal on August 9-10

As noted in a NeurotechX blog post by McGill PhD student Thomas Funck, "Exploring open science and brain modelling: a visit to Neuroinformatics 2018", the call to take up 'open science' was ever-present at the INCF Assembly 2018. Half of the conference program focused on some aspect of open science, with titles such as: "Reproducibility and rigor in computational neuroscience". There was the pre-conference meetings to set up common naming conventions for brain imaging files and the talk on "Harmonizing clinical trial metadata to accelerate reverse translation"; both represent massive and important challenges to interoperability and standardizing data collection and sharing. Addressing the research reproducibility crisis, INCF is also promoting the call for all data to be Findable, Accessible, Interoperable, and Reusable – the FAIR standards – hence, the conferences included multiple discussions but also a use-case presentation on "Accelerating biomedical discovery with FAIR'. These standards are vital aspects of research because of the many technical and ethical (e.g., how to protect patient confidentiality when sharing data) problems that need to be solved before open science can become a practical option for researchers. T Funck commented that open science, by the end of the conference, wasn't a utopian, slightly hippy ideal, but rather the only realistic solution to a whole host of problems facing science.

Recognizing that biotech and pharma companies need to be more engaged with neuroinformatics development and researchers more attuned to make research tools accessible to industry, the Ludmer Centre organized a special business panel session featuring neuroinformatics researchers who had transitioned their work to small start-ups and representatives from medium and large corporations. The panellists addressed industry-supported research, the transition from academic research to business –from building their own start-ups to joint-business partnerships– and establishing non-profit services, among others. Experts also discussed the role of intellectual property (IP) in a space that is heading toward more open-source development.

You can find the talks on our YouTube channel: youtube.com/INCForg

All the photos from the INCF Assembly 2018 can be viewed on our Flickr account: flickr.com/INCForg

Participants at the 2018 INCF Assembly in Montréal on August 9-10

Traumatic Brain Injury collaboration

The CENTER-TBI (Collaborative European NeuroTrauma Effectiveness Research in TBI) project aims to improve the care for patients with traumatic brain injury (TBI). The project aims to better characterize TBI as a disease, describe it in a European context and identify the most effective clinical interventions for managing TBI. The study forms part of the larger global initiative InTBIR (International Initiative for Traumatic Brain Injury Research), with projects currently ongoing in Europe, the US and Canada.

INCF's role in the project is to i) develop and implement the open standard platform for collection, storage, analysis and sharing of the clinical data and ii) to facilitate the development of novel techniques for computational characterization and analysis of TBI including advanced biostatistics and machine learning techniques for advanced data analysis.

2018 Project activities and progress

- in 2018, INCF continued supporting the Neuroinformatics platform for collecting, managing and sharing the data for CENTER-TBI study. This included data from clinical forms, high resolution data from ICU devices and CT/MRI images
- the latest version of CENTER-TBI dataset with 4509 core subjects and 22849 registry subjects data was released through Neurobot on 25th January 2019
- significant improvements have been made in data collection, especially identifying and retrieving the missing data. INCF also continued working with different partners in structuring study data and integrating the data from different sources into the informatics platform
- in order to facilitate data curation, the Secretariat continued to coordinate efforts by the Data Curation Task Force, which comprises clinical, statistical, technical and modeling experts.
- further enhancement of Neurbot, the data access and management tool developed by INCF has been done in order to accommodate different versions of data. This will also enable researchers to access data from different data repositories in the future
- in the TBI Data Analytics Workshop held in University of Antwerp, over 110 research proposals were presented by researchers who will be using data provided through INCF-Neurobot
- based on the experience gained from managing the CENTER-TBI data, in an effort to promote high quality data and improve the data sharing for the future, a new initiative called Data Access Quality & Curation for Observational Research Designs (DAQCORD) has been started. This was initiated from the International Initiative for Traumatic Brain Injury Research (InTBIR) and INCF participated in first meeting convened by National Institutes of Health (NIH) and One Mind. More details can be found at daqcord.org
- initiatives have been started in finding resources and funding to explore integration between the INCF data access platform and the Medical Informatics Platform (MIP), an analysis platform developed under the Human Brain Project (HBP). The aim is to connect data from different European TBI studies and to enforce data standards at different data repositories to make the data findable, accessible and interoperable

Neurobot

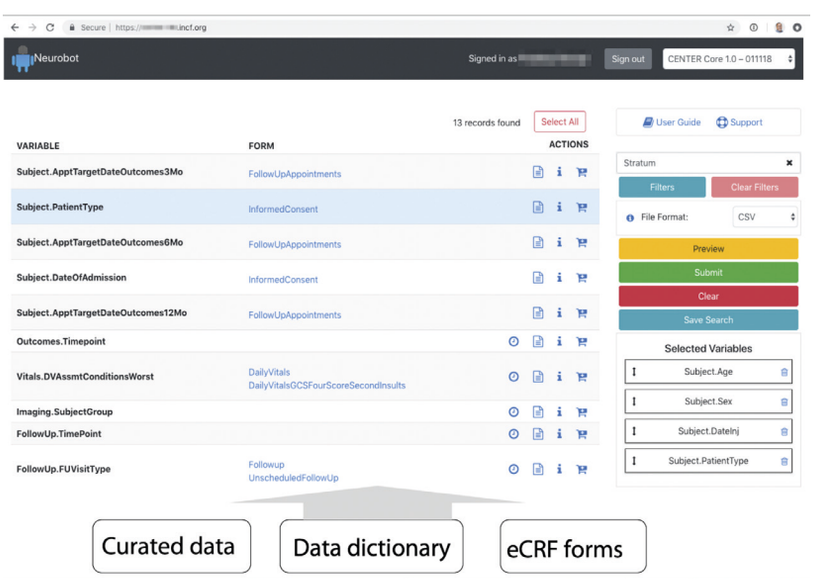
Neurobot is a clinical study data management tool developed by the International Neuroinformatics Coordinating Facility (INCF). Neurobot was developed based on the needs of the researchers participating in CENTER-TBI, a large European project that aims to improve the care for patients with Traumatic Brain Injury (TBI). The aim of the tool is to easily search and find the study variables with the associated information and export the study data for further analysis. In addition to the clinical data, the associated imaging and ICU data are currently available through Neurobot. Links are provided to large data files such as imaging and high-resolution ICU data, and they are combined with the clinical data of the individual patients based on the Global Unique Personal Identifier (GUPI).

During 2018, further development of Neurobot has been performed. The enhancements include User Interface (UI) enhancements, extending the data dictionary within Neurobot, development of user manuals and provision to include different dataset versions.

The current key features of the Neurobot includes

- free text search across form name, section and variable name for the users to search variables rapidly
- provision for the users to find the forms the variables are associated with
- faster and easier selection of variables
- filtering based on categories
- data dictionary details on tool tip against variables providing meta information, possible values, labels and description to understand the variable better.
- multiple data export options (json, csv)
- option to save a set of selected variables for sharing
- provision to have multiple datasets and versions

The Resource Identifier (RRID) to include in the publications related to Neurobot is INCF-Neurobot, RRID:SCR_017004.



Screenshot from Neurobot

International Brain Initiative, IBI

The International Brain Initiative, a consortium of researchers working on brain initiatives around the world, was established in recognition of the fact that the individual initiatives are engaged in an effort so large and complex that even with the unprecedented efforts and resources from public and private enterprise, no single initiative will be able to tackle the challenge to better understand the brain. The initial members of the consortium include the U.S. BRAIN Initiative, the E.U. Human Brain Project, the Korea Brain Project, the Japan Brain/MINDS Project, Israel Brain Technologies, and the Australian Brain Alliance. The Consortium is coordinated by the Kavli Foundation, assisted by INCF, the Australian Brain Alliance, and IBRO.

INCF participated in all IBI coordinating body meetings, and working groups for the Inventory Project (Mathew Abrams), Data Sharing and Standards (Linda Lanyon co-chair), and Communications and Outreach (Helena Ledmyr co-chair). Secretariat staff also assisted with organizing the IBI website and promo video launch event "Brain Bash" at the Society for Neuroscience meeting in San Diego, CA, USA, in November.

Meetings attended

- South Korea, 10-22 May
- Geneva, 28 July
- La Jolla, 2 November

INCF produced the IBI posters displayed at the launch event in San Deigo

Resources

INCF provides several resources for facilitating neuroscience research: training in neuroinformatics, publications services, and an online community-developed, data-driven encyclopedia for neuroscience. Many further tools and resources are available from the INCF portal at incf.org/resources

Publication services

INCF works with publishers and journals to facilitate and improve the process of publishing research results.

Neuroscience Peer Review Consortium, NPRC

INCF manages NPRC, a cross-publisher alliance of neuroscience journals that accept manuscript reviews from other NPRC journals. NPRC is open to any neuroscience journal that is indexed by MEDLINE, and entails no cost or work, and provides a payoff in reduced work for authors, reviewers, and editors. At the time of this report, 60 neuroscience journals have signed the NPRC agreement. In 2018, NPRC worked to increased awareness of the consortium with active outreach online as well as in person at international conferences.

F1000 channel

INCF has a community channel on the F1000 platform, which provides an affordable, open publishing channel to capture research from the INCF Assembly and workshops, plus research articles from the neuroinformatics field. Articles are published using F1000Research's immediate publication and transparent peer review model, without limitation on article size, type, or perceived impact. In 2018, 4 new articles were published on the channel.

Resource Identification Initiative

The Resource Identification Initiative is designed to improve scientific reproducibility by helping researchers sufficiently cite the key resources used to produce the scientific findings reported in the biomedical literature, using unique Research Resource Identifiers (RRIDs) that are consistent across publishers and journals. A diverse group of collaborators are leading the project, including NIF and the Oregon Health & Science University Library, with the support of the NIH and INCF.

Tools and data repositories

The INCF network develops products and services that facilitate neuroscience research. These tools solve problems such as lack of standards, or limitations imposed by incompatibilities between commonly used tools. Lists of tools and data repositories can be found at incf.org/resources, and many software projects from INCF and our community are on GitHub (github.com/INCF).

Neuroinformatics software and data resources, are shared by the INCF community through repositories including the NITRC Registry, NITRC Image Repository, NITRC Computational Environment, and Open Source Brain whose community forums have a global audience.

Outreach

The INCF community comes together at the INCF Assembly, workshops and meetings, and at various other international conferences in neuroinformatics and neuroscience. INCF also functions as a mentoring organization in Google Summer of Code. Find out where to meet us during 2019 here: incf.org/network/connect-with-us/meet-us-at-conferences

Presence at international conferences in 2018

- Peer Review Conference in Chevy Chase US, 6-9 February
- HBP Gender Conference in Madrid, Spain, 9 March
- International Open Science in Berlin, Germany, 12-14 March
- Interoperability workshop in Montréal, Canada, 21-23 March
- Sage Bionetworks Assembly in Seattle, US, 19-21 April
- Brain Summit in Stockholm, Sweden, 24-25 April
- FENS in Berlin, Germany, 7-11 July: booth with demonstrations, IBI social
- Global Inventory workshop in Washington DC, US. July 23-25
- Nordic Open Science in Stockholm, Sweden, 15-16 November
- Society for Neuroscience in San Diego, US, 3-7 November: booth with demonstrations, professional development workshop, neuroinformatics social, IBI social
- European Brain Council in in Brussels, Belgium, 20-21 November: presentation of INCF
- OBI/Nature workshop "Redefining Neurodegeneration" in Toronto, Canada , 4-6 December

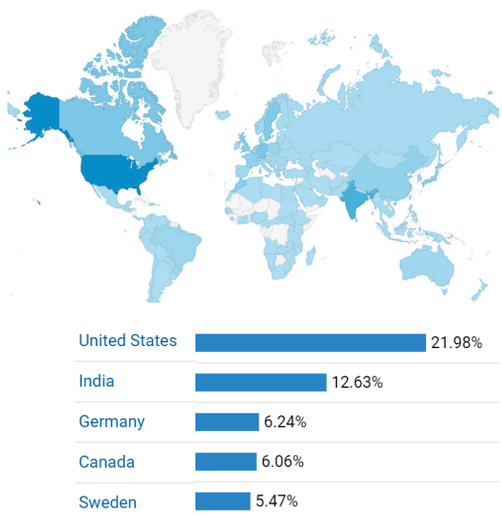
The INCF booth at Society for Neuroscience in San Diego, US, on November 3-7, 2018

INCF portal

The INCF portal, incf.org, conatins information about the structure and activities of INCF, and lists resources available to the community. The content is continuously updated as community evolves and our resources develop.

Portal

Users: 18785	+25,2%
Sessions: 26775	+11,5%
Avg. session duration: 01:35 min	

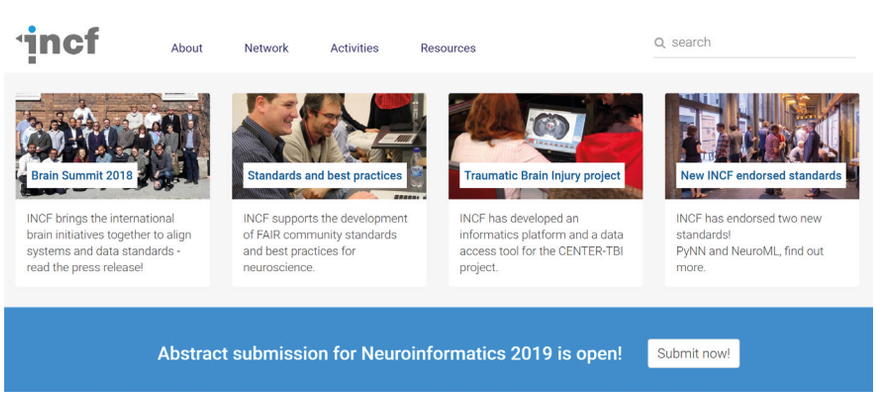


Sessions by country

INCF newsletter and social media

The INCF newsletter is distributed 4 times per year and had 988 subscribers at the end of 2018. INCF also uses several other platforms for active outreach: Twitter, Facebook, LinkedIn and YouTube.

Platform	Followers	Views/engagements
Twitter	3087 +26,7%	929500 +66,7%
Facebook	2369 +10,4%	821 -30,4%
Youtube	1367 +23,5%	20788 +33,2%
LinkedIn	655 +12,9%	n/a



Screenshot of incf.org

Plans for 2019

- Convene meetings of the INCF Governing Board, Council for Training, Science and Infrastructure, Infrastructure Committee, and Training and Education Committee
- Continue to endorse community standards and best practices for neuroscience
- Develop the content of the INCF TrainingSpace, a hub that integrates global community resources for the provision of neuroinformatics training
- Continue the development of training-related initiatives to the benefit of the international community, working with collaborators
- Continue the development of KnowledgeSpace, a community-based encyclopedia for neuroscience, together with the Human Brain Project, Neuroscience Information Framework and other collaborators
- Support interactions within the international community and encourage collaboration in the INCF Special Interest Groups and within community collaboration platforms including Github and Neurostars
- Support dissemination of the outcomes and deliverables of the INCF SIGs via scientific publications, other communications, training activities and the INCF Portal
- Support the development of Node funding proposals
- Continue to act as coordinator for the development of standards for data capture, novel clinical data analytics and neuroinformatics platform build for CENTER-TBI, working in collaboration with CENTER-TBI participants
- Host Neuroinformatics 2019 in Warsaw, Poland in September
- Plan the organization of Neuroinformatics 2020
- Highlight the work of INCF and the global neuroinformatics community at the meetings of the Brain Summit in Warsaw, Canadian Neuroscience Association in Toronto, OHBM in Rome, Nordic Neuroscience in Helsinki, OCNS in Barcelona, IBRO in Daegu and Society for Neuroscience in Chicago
- Continue to develop INCF outreach actions to increase visibility and build community, with special reference to the development and endorsement of standards and best practices
- Promote INCF's new Portal and maintain INCF's online presence in social media and other channels, and continue to promote the Neuroinformatics mailing list
- Continue to work with the Neuroscience Peer Review Consortium (NPRC) to develop and promote this service
- Continue the development of strategic partnerships with synergistic and complementary organizations that can further the mission of INCF
- Form new collaborations with relevant industry
- Advance INCF outreach actions to new members

INCF Governance

The INCF Governing Members have decision-making power for the organization through the INCF Governing Board. The governance structure also includes a Council for Training, Science, and Infrastructure (CTSI), a Training and Education Committee (TEC), and an Infrastructure Committee (IC).

The Governing Board has met once in person this year (April in Stockholm), twice by teleconference (October & November) and two members attended a "town hall" evening meeting with members of the CTSI and Secretariat present in Montral for Neuroinformatics 2018 in August.

Governing Board

The INCF Governing Board comprises representatives from the Governing Members and is the means by which collective decisions regarding INCF are made. The European Union is also represented on the Board as an observer.

Members

Japan	Keiji Tanaka (Chair), RIKEN Brain Science Institute
Australia	Gary Egan (Deputy Chair), Monash University
Canada	Jean-Baptiste Poline, McGill University
Japan	Yukiko Goda, RIKEN Brain Science Institute
Malaysia	Tong-Boon Tang, Universiti Teknologi Petronas
Norway	Alexandra Bjørk-Skaflestad, Research Council of Norway
Sweden	Pontus Holm, Swedish Research Council
European Commission	Mark Goldammer, Andreas Holtel (Observers)

Participants at the Brain Summit 2018 in Stockholm, Sweden on April 23-25

Council for Training, Science, and Infrastructure (CTSI)

The Council for Training, Science and Infrastructure (CTSI) met in person twice this year (April in Stockholm, August in Montreal), and 4 times by teleconference. The CTSI has formed two additional committees this year: Standards and Best Practices; FAIR. The CTSI Chair is Maryann Martone (USA) and Deputy is Jeanette Hellgren (Sweden). From 2019 the Chair will be JB Poline (Canada). Jeanette Hellgren remains as Deputy until 2020.

Members

USA	Maryann Martone (Chair), University of California San Diego
Sweden	Jeanette Hellgren Kotaleski (Deputy Chair), Royal Institute of Technology
Australia	Wojtek Goscinski, Monash University
Australia	Marcello Rosa, Monash University
Belgium	Wim Vanduffel, KU Leuven
Canada	Samir Das, McGill University
Canada	Stephen Strother, Rotman Research Institute, Baycrest Hospital
Czech Rep	Roman Moucek, University of West Bohemia
Finland	Marja-Leena Linne, Tampere University of Technology
France	Andrew Davison, CNRS
Germany	Thomas Wachtler, Ludwig Maximilian University of Munich
India	Prasun Roy, National Brain Research Centre
Italy	Luciano Milanese, Institute of Biomedical Technologies, National Research Council
Japan	Yoko Yamaguchi, RIKEN, and Teiichi Furuichi, Tokyo University of Science
Japan	Teiichi Furuichi, Tokyo University of Science
Korea	Soo-Young Lee, KAIST
Malaysia	Eric Tatt Wei Ho, U Teknologi PETRONAS
Malaysia	Fabrice Meriaudeau, U Teknologi PETRONAS
Netherlands	Paul Tiesinga, Radboud University
Norway	Jan Bjaalie, University of Oslo
Norway	Gaute Einevoll, Norwegian University of Life Sciences
Poland	Daniel Wojcik, Nencki Institute of Experimental Biology
Sweden	Erwin Laure, Royal Institute of Technology
UK	Marcus Kaiser, Newcastle University
USA	David Kennedy, University of Massachusetts

Mathew Abrams, Jeanette Hellgren Kotaleski and Maryann Martone at the 2018 INCF Assembly in Montréal, Canada on August 9-10

Training & Education Committee (TEC)

The INCF Training and Education Committee (TEC) recommends INCF strategic direction in relation to training. The TEC is composed of representatives from INCF National Nodes and from representatives from our strategic alliance partnerships with IBRO, FENS, iNeuro Initiative, HBP, OHBM, and the BD2K Training Initiative. During 2018, the TEC formed 2 new strategic partnerships with the Canadian Open Neuroscience Platform (CONP) and the Institute of Electrical and Electronics Engineers (IEEE), supported 5 external training courses, and had oversight over the development of TrainingSpace.

2018 Supported Courses

- Open Source Brain Workshop
- Virtual Brain Workshop
- STREET FAIR: A bring-your-own-data hackathon in support of FAIR principles in the field of neurological trauma
- Data Analysis for Neuroscience
- Malaysian Neurosinformatics School

Members

Canada	JB Poline (Chair), University of California, Berkeley/OHBM
France	Stephanie De La Rochefoucauld (Deputy Chair), IBRO
Austria	Alois Saria, Innsbruck Medical University/HBP
Canada	Jane Roskams, University of British Columbia/CONP
Germany	Thomas Wachtler, Ludwig Maximilian University of Munich
Japan	Hidetoshi Ikeno, University of Hyogo
Lithuania	Ausra Saudargiene, Vytautas Magnus University
Norway	Gaute Einevoll, Norwegian University of Life Sciences
Poland	Daniel Wojcik, Nencki Institute of Experimental Biology/FENS
USA	William Grisham, University of California, Los Angeles/iNeuro Initiative
USA	Ariel Rokem, University of Washington
USA	Jack Van Horn, University of Southern California/BD2K Training Initiative

Infrastructure Committee (IC)

The INCF Infrastructure Committee formed in 2016 with representatives from Governing and Associate Nodes. The Committee oversees INCF's infrastructural activities including development standards and best practices that promote interoperability between platforms, and facilitating community infrastructure and portal initiatives. The Infrastructure Committee held a workshop to build community around the issue of infrastructural sustainability, in Montreal in August, and met twice by teleconference. The Chair is Wojtek Goscinski (Australia) and Deputy is Thomas Wachtler (Germany).

Members

Australia	Wojtek Goscinski (Chair), Monash University
Germany	Thomas Wachtler (Deputy Chair), Ludwig Maximilian University of Munich
Canada	Tristan Glatard, Concordia University
Norway	Jan Bjaalie, University of Oslo
Sweden	Erwin Laure, Royal Institute of Technology
USA	David Kennedy, University of Massachusetts

Secretariat staff

During 2018, the INCF Secretariat employed the following persons.

Executive Director
Linda Lanyon, Ph.D.

Head of Development and Communications
Helena Ledmyr, Ph.D.

Head of Science and Training
Mathew Birdsall Abrams, Ph.D. MPH

Event Officer/Administrative Assistant
Rosa Cusato-Sörnäs, B.Sc.

Communications Support Officer
Louise Erixon

Dataspace Technical Lead
Chris Fitzpatrick, M.Sc.

TBI Project Manager
Pradeep George, MBA

HR & Community Support Officer
Lotta Johansson, M.SC.

Administrative Assistant
Carola Järlebrant

Financial Accountant
Henrik Lindström

Bioinformatics System Integrator, TBI Project
Visakh Muraleedharan, M.Sc.

Scientific Funding Officer
Christopher Pickering, Ph.D.

Community Engagement Officer
Malin Sandström, Ph.D.

Affiliated Researchers

Neuroinformatics Researcher
Mikael Djurfeldt, Ph.D.

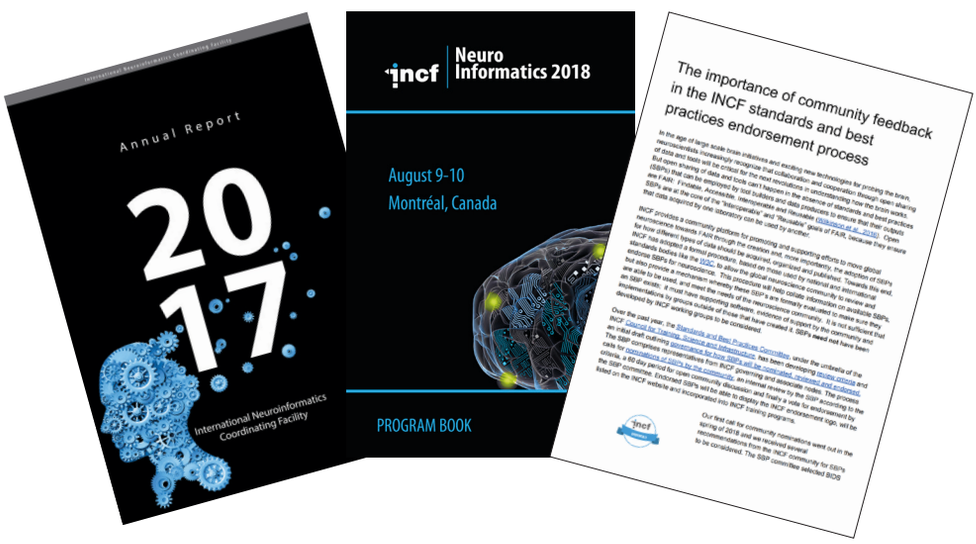
Neuroinformatics Professor
Jeanette Hellgren Kotaleski, Ph.D.

INCF Special Advisor
Sten Grillner, MD. Ph.D.

Publications and background material

Publications

- Annual Report 2017
- INCF Assembly program book 2018
- The importance of community feedback in the INCF standards and best practices endorsement process
  Maryann Martone, F1000 Research 12 September, 2018 doi.org/10.7490/f1000research.1116069.1



Newsletters

Financial summary

Summary financial report 2018 in kSEK, kUSD, and kEUR
Income statement December 31, 2018

Financial summary

Summary financial report 2018, in kSEK, kUSD and kEUR

	kSEK	kUSD	kEUR
Income			
Total income	**10 913**	**1 203**	**1 057**
Expenditure			
General Administration	-3 256	-359	-315
Secretariat Running Expenses	-412	-45	-40
Strategic Action Areas	-1 491	-164	-144
Training & Education	-795	-88	-77
Professional Services	-4 150	-458	-402
Externally Funded Projects	29	3	3
Total expenditure	-10 075	-1 111	-976
Depreciation	-115	-13	-11
Total expenses	**-10 190**	**-1 124**	**-987**
Financial net	-33	-4	-3
Retained funds			
Retained funds 2017 balance carried forward	12 899	1 422	1 249
Change in retained fund 2018	691	76	67
Wherof financial net 2018	-33	-4	-3
Total retained funds 2018	**13 590**	**1 499**	**1 316**
Avarage exchange rate*		9,0690	10,3280

Financial contributions

INCF is financially supported by its Governing Member countries to sustain coordination activities around global development of neuroinformatics.

Governing Member countries in 2018

Australia
Financial contribution provided by Australian Research Council Centre of Excellence for Integrative Brain Function

Canada
Financial contribution provided by McGill University

Japan
Financial contribution provided by RIKEN Brain Institute

Malaysia
Financial contribution provided by Universiti Teknologi Petronas

Norway
Financial contribution provided by the Norwegian Research Council

Sweden
Financial contribution provided by The Swedish Research Council

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