

Annual Report

2019

International Neuroinformatics
Coordinating Facility

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Message from the Directors

2019 was a year of progress, evolution, and validation for INCF. Significant strides were made towards making INCF a standards organization for neuroscience and to expand the network by implementing a new membership model, lowering the threshold to participation. INCF's evolution has been well-received by the community-at-large and should be considered a validation of the course change that was initiated in mid-2017.

The new INCF portal was designed, developed, and implemented during 2019 and launched at the INCF Assembly 2019 in Warsaw. New features include:

- Complete overhaul of the content
- Links between the standards and best practices (SBP) entity pages and TrainingSpace content implemented (subject area only; working to have specific to each SBP)
- Blog for news, events, commentaries, success stories, and jobs

In 2019, 6 prospective standards were submitted for endorsement and evaluated by the Standards and Best Practices (SBP) Committee: PyNN, NeuroML, NWB 2.0, odML, NIX, and NIDM. A poster on the standards and best practices endorsement process was presented at the US BRAIN Investigators Meeting in April 2019.

TrainingSpace 2.0 was developed and implemented in early 2019, and this version KnowledgeSpace and Neurostars have been integrated. During 2019, there were 3.267 users (45.8% return users) and 5.960 sessions

KnowledgeSpace 3.0 was launched in 2019 with new features such as a new frontend, enhanced backend, and wikipedia content integrated into the summary panel of the encyclopedia. The online Q&A forum Neurostars continues to gain in popularity. During 2019, there were 17.200 users viewing 765.000 pages.

The new membership model was approved by the Governing Board in late 2019 and includes options for academic and commercial groups as well as individual members. At the time of this report, 6 institutions and 5 companies had signed on for 2020. After a successful membership campaign at the Society for Neuroscience meeting in October, 209 individual members had signed up as well.

The INCF network has had an active year: in 2019 there were 7 active Special Interest Groups, one Working Group, 21 Google Summer of Code projects, 3 Google Season of Docs projects, and 10 ReproNim-INCF fellows supported.

In the CENTER-TBI project, two data releases made available through INCF-developed Neurobot in 2019. The functionality of Neurobot has been increased in response to user needs and outreach discussions.

The INCF network has had an active year: in 2019 there were 7 active Special Interest Groups, one Working Group, 21 Google Summer of Code projects, 3 Google Season of Docs projects, and 10 ReproNim-INCF fellows supported. There were also several events hosted by INCF:

- The "Making Open Neuroscience Infrastructures Interoperable (MONII)" workshop was hosted by the Canadian Node with support from the Secretariat in Montréal (March 2019)
- The Brains United workshop was hosted by the Dutch Node and the Secretariat in Warsaw (August 2019)
- The INCF Assembly 2020 hosted by the Polish Node in Warsaw, 31 August - 2 September 2019, and was composed of the main 2-day conference and 1-day of training, special interest groups meetings, and a hackathon. The Assembly welcomed 175 participants representing 22 countries and was supported by 15 sponsors.

In summary, 2019 activities were focused on further developing and expanding INCF resources and increasing community participation. 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 exciting year in 2020 in which we strive to increase our standards and best practices portfolio for neuroscience and expand the network further.

Helena Ledmyr
Director
Development & Communications

Mathew Abrams
Director
Science & Training

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 2019,

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



Australia

The Australian node is an initiative of the ARC Centre of Excellence for Integrative Brain Function (administered from Monash University), and works with Australian eResearch organizations, including the MASSIVE high-performance computing facility, to provide neuroinformatics research services to Australian neuroscientists. The Australian Node is a Governing Node of the INCF and is represented on the INCF Governing Board (voting Deputy Chair), Council for Training, Science and Infrastructure (2 voting members) and Infrastructure Committee (Chair).

The INCF Australian node represents Australian neuroinformatics efforts and promotes and prioritizes neuroinformatics on a national scale, including working on the development of tools and best practice for the storage, sharing and publishing of imaging data. The Australian node works with INCF globally to foster scientific collaboration, advancing training and coordinate the global development of neuroinformatics.

Activities in 2019

Australian Brain Data Commons

In 2019 a Working Group including stakeholders representing a range of academic research disciplines in the neurosciences and the private sector was established to determine the

requirements for a coordinated and internationally compatible national brain science data framework. The Australian Brain Data Commons (ABDC) Working Group comprises members of the Australian node of the INCF, the Executive Committee of the Australian Brain Alliance, a specialist in data infrastructure, and research experts with expertise covering cognitive neuroscience and psychology, MRI/PET/molecular imaging (human and animal), EEG/MEG, animal behavior/neuroethology data, microscopy, histology and gene expression, molecular neuroscience, electrophysiology and calcium imaging, neurogenomics and clinical data, computational neuroscience, and AI/machine learning.

The ABDC Working Group terms of reference specify the following objectives:

1. To map current data sharing standards in neuroscience research used by Australian laboratories.
2. To convene workshops and meetings to provide a forum for discussion and consensus-building around identifying the infrastructure, technical and human resources required to develop a culture in Australia of neuroscience data standards and sharing that satisfies the FAIR principles.
3. To educate the neuroscience community on how to re-use data for maximum benefit and to promote and support data sharing and standards implementation in the neuroscience sector in Australia.
4. To provide a representative group for information sharing and international collaboration via the International Brain Initiative and other appropriate international organizations.
5. To provide advice, via the Australian Brain Alliance, to the Australian Research Data Commons and Australian Government on issues related to neuroscience data standards and sharing.

The Working Group compiled information on current data standards and data sharing practices in Australia, as well as the range of software platforms used in Australia for data sharing in the different neuroscience sub-disciplines. Assessments were made of the national barriers that prevent wider adoption of FAIR data sharing. The Working Group also co-convened a national symposium on Data sharing: neuroscience, microscopy and experiments, on the 9th of October 2019 in Canberra.

The Australian Characterisation Commons at Scale Receives Funding

In partnership with 10 Universities, the Australian Research Data Commons has awarded Monash University \$2 million funding to lead the three-year Australian Characterisation Commons (ACCS) at Scale project.

The ACCS will deploy a Characterisation Commons (CC) for thousands of researchers who use characterization techniques, facility scientists who run instruments, and researchers using imaging collections, and will uplift

the research capability offered to industry. The outcome will be a rich ecosystem of computing systems, data repositories, workflows, and services, connected with instruments. It will coordinate the implementation of persistent identifiers (PIDs), schemas, and formats to manage findable, accessible, interoperable, and reusable (FAIR) data. And it will run a national training and outreach program that will both develop content and work in partnership with centers of excellence. The CC will underpin techniques including electron (EM) and light microscopy, magnetic resonance imaging (MRI), magnetoencephalography (MEG), electroencephalography (EEG), positron emission tomography (PET), X-ray CT, nuclear and synchrotron techniques, cytometry, secondary-ion mass spectrometry, X-ray diffraction, scattering techniques, and nuclear magnetic resonance (NMR).

A major sub-component of the project is the Biomedical Imaging Collections and Analysis stream that addresses the collections-based research being undertaken across the fleet of Australian imaging instruments, including those across the National Imaging Facility (NIF), medical research institutes and clinical sites. The subproject will underpin a large range of collections based neuroimaging projects.

Neuroinformatics High-Performance Computing Uptake

As a direct result of the partnership between the ARC Centre for Integrative Function and MASSIVE, neuroscience has grown to become the largest user community on the MASSIVE high-performance computing facility. As of December 2019 104 individual neuroscience research projects across Monash University, University of Queensland, University of Sydney, and Queensland Institute of Medical Research, and other sites, are using the MASSIVE facility for data processing and modeling.

Upcoming activities

Australian node to host 2020 Neuroinformatics Assembly in Seattle in August 2020, with the Allen Institute for Brain Science as co-host organization. The Australian node members Prof Marcello Rosa, Dr Wojtek Goscinski and Dr Ben Fulcher on the organizing committee.

Selected publications

Selected abstract and demonstration

T.G. Close, F. Sforazzini, P.G.D. Ward, Z. Chen, G.F. Egan, "Biomedical imaging analysis in arcana (Banana): a platform for collaborative development of neuroimaging analysis workflows", Organisation for Human Brain Mapping (Rome, June 2019).

Selected manuscript

T.G. Close, P.G.D. Ward, F. Sforazzini, W. Goscinski, Z. Chen, G.F. Egan, "A comprehensive framework to capture the arcana of neuroimaging analysis", Neuroinformatics (2019)

Node members

Professor Gary Egan, Deputy Chair, Governing Board

Professor Marcello Rosa, member, Council for Training, Science, and Infrastructure

Dr Wojtek Goscinski, Chair, Infrastructure Committee, Member, Council for Training, Science, and Infrastructure

Dr Ben Fulcher, member, Program Committee, INCF Assembly 2020

Webpages and webservice maintained by the Node

brainfunction.edu.au/research/neuroinformatics

cibf.edu.au

Belgium

The mission of the Belgian INCF node is

1. to maintain and grow an active Belgian community of users and developers in Neuroinformatics
2. to conduct training activities to support the Belgian and international Neuroscience community
3. to contribute to INCF activities according to the core competencies and research interests of the node

Activities in 2019

Prof. Daniele Marinazzo presented the rsHRF toolbox nitrc.org/projects/rshrf at the Open Science Room at OHBM.

Prof. Daniele Marinazzo co-organized BrainHack Networks and Network Neuroscience Satellite at NetSci 2019.

The group of Prof. Daniele Marinazzo shared time series and connectivity matrices on the EBRAINS - Knowledge Graph HBP platform for reproducible analyses of The Virtual Brain Tumor patient kg.ebrains.eu/instances/minds/core/dataset/v1.0.0/a696ccc7-e742-4301-8b43-d6814f3e5a44

Prof. Daniele Marinazzo co-organized BrainModes 2019 in Pokhara, Nepal

<http://www.physics.gsu.edu/dhamala/brainmodes2019.html>

Dr. Dimiter Prodanov maintained the Belgian node website and arranged for funding of the hosting.

GSOC 2019

The Belgian node sponsored three projects for GSOC 2019. Two projects completed successfully. The first project was mentored by Prof. Daniele Marinazzo and the second - by Dr. Dimiter Prodanov.

The Virtual Brain (TVB) Edu Pack for clinical case studies reports, student developer: Simone Liu neurostars.org/t/gsoc-project-idea-4-3-the-virtual-brain-tvb-edu-pack-for-clinical-case-studies-reports/3180

Final product: mlion0200.github.io/educase-tvb.github.io

Pytranslate – Maxima to Python Translator, student developer: Lakshya Agrawal

Project track: neurostars.org/t/gsoc-project-idea-17-maxima-to-python-translator/3429/11

Code repository: sourceforge.net/u/philomath/maxima_translate/ci/master/tree/share/pytranslate

Upcoming activities

Participation in IEEE WG P2794 Reporting Standards for in vivo Neural Interface Research (RSNIR) – Dr. Dimiter Prodanov

GSOC 2020

The Belgian node would sponsor three projects:

GSoc 2020 project idea 1: TVB: Improving personalized models of fMRI recordings including individual region-specific HRF in The Virtual Brain neurostars.org/t/gsoc-2020-project-idea-1-tvb-improving-personalized-models-of-fmri-recordings-including-individual-region-specific-hrf-in-the-virtual-brain/5737

GSoc 2020 project idea 23: Deep Learning using Geometric Features: neurostars.org/t/gsoc-2020-project-idea-23-deep-learning-using-geometric-features/5761/8

GSoc 2020 project idea 17: Cell Tracking using Geometrical Features:

neurostars.org/t/gsoc-2020-project-idea-17-cell-tracking-using-geometrical-features/5755

Selected publications

Van de Steen, F, R Krebs, N Colenbier, H Almgren, and D Marinazzo. 2020. "Effective Connectivity Modulations Related to Win and Loss Outcomes." *Neuroimage* 207. 116369 doi: [10.1016/j.neuroimage.2019.116369](https://doi.org/10.1016/j.neuroimage.2019.116369)

Almgren, H, F Van de Steen, A Razi, K Friston, and D Marinazzo. 2020. "The Effect of Global Signal Regression on DCM Estimates of Noise and Effective Connectivity from Resting State fMRI." *Neuroimage* 208. 116435, doi: [10.1016/j.neuroimage.2019.116435](https://doi.org/10.1016/j.neuroimage.2019.116435)

- Papadopoulou, M, K Friston, and D Marinazzo. 2019. "Estimating Directed Connectivity from Cortical Recordings and Reconstructed Sources." *Brain Topography* 32 (4): 741–752. doi: [10.1007/s10548-015-0450-6](https://doi.org/10.1007/s10548-015-0450-6)
- Van de Steen, F, L Faes, E Karahan, J Songsiri, P Antonio Valdés Sosa, and D Marinazzo. 2019. "Critical Comments on EEG Sensor Space Dynamical Connectivity Analysis." *Brain Topography* 32 (4): 643–654. doi:[10.1007/s10548-016-0538-7](https://doi.org/10.1007/s10548-016-0538-7)
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- He, B, L Astolfi, P A. Valdes-Sosa, D Marinazzo, A Palva, C G. Benar, C M. Michel, and T Koenig. 2019. "Electrophysiological Brain Connectivity. Theory and Implementation." *IEEE Transactions on Biomedical Engineering*: 1–1. In press.
- Pagani, M, A Bertero, A Liska, A Galbusera, M Sabbioni, N Barsotti, N Colenbier, D Marinazzo, M Luisa Scattoni, M Pasqualetti, and A Gozzi. 2019. "Deletion of Autism Risk Gene Shank3 Disrupts Prefrontal Connectivity." *Journal of Neuroscience*. In press.
- Krohova, J, L Faes, B Czipelova, Z Turianikova, N Mazgutova, R Pernice, A Busacca, D Marinazzo, S Stramaglia, and M Javorka. 2019. "Multiscale Information Decomposition Dissects Control Mechanisms of Heart Rate Variability at Rest and during Physiological Stress." *Entropy* 21 (5).
- Anzolin, A, P Presti, F Van de Steen, L Astolfi, S Haufe, and D Marinazzo. 2019. "Quantifying the Effect of Demixing Approaches on Directed Connectivity Estimated Between Reconstructed EEG Sources." *Brain Topography* 32 (4): 655–674. doi: [10.1007/s10548-019-00705-z](https://doi.org/10.1007/s10548-019-00705-z)
- Marinazzo, D, L. Angelini, M. Pellicoro, and S. Stramaglia. 2019. "Synergy as a Warning Sign of Transitions : the Case of the Two-dimensional Ising Model." *Physical Review E* 99 (4). doi: [10.1103/PhysRevE.99.040101](https://doi.org/10.1103/PhysRevE.99.040101)
- Nunez C, Elena Patricia, Jan-Niklas Antons, Daniele Marinazzo, and Jan Van Looy. 2019. "Mapping Attention during Gameplay : Assessment of Behavioral and ERP Markers in an Auditory Oddball Task." *Psychophysiology* 56 (7). doi: [10.1111/psyp.13347](https://doi.org/10.1111/psyp.13347)
- Van de Steen, F, Hannes Almgren, Adeel Razi, Karl Friston, and Daniele Marinazzo. 2019. "Dynamic Causal Modelling of Fluctuating Connectivity in Resting-State EEG." *Neuroimage* 189: 476–484. doi: [10.1016/j.neuroimage.2019.01.055](https://doi.org/10.1016/j.neuroimage.2019.01.055)
- Aerts, H, T Van Vrekhem, L Stas, and D Marinazzo. 2019. "The Interplay Between Emotion Regulation, Emotional Well-being, and Cognitive Functioning in Brain Tumor Patients and Their Caregivers : an Exploratory Study." *Psycho-oncology*. In press.
- Boonstra, T W., Luca Faes, J N. Kerkman, and D Marinazzo. 2019. "Information Decomposition of Multichannel EMG to Map Functional Interactions in the Distributed Motor System." *Neuroimage*. doi: [10.1016/j.neuroimage.2019.116093](https://doi.org/10.1016/j.neuroimage.2019.116093)
- Reid, A T., D B. Headley, R D. Mill, R Sanchez-Romero, L Q. Uddin, D Marinazzo, D J. Lurie, P A. Valdés-Sosa, S José Hanson, B B. Biswal, V Calhoun, R A. Poldrack, and M W. Cole. 2019. "Advancing Functional Connectivity Research from Association to Causation." *Nature Neuroscience* 22 (11): 1751–1760. doi: [10.1038/s41593-019-0510-4](https://doi.org/10.1038/s41593-019-0510-4)
- Pijnenburg, R., Scholtens, L.H., Mantini, D., Vanduffel, W., Barrett, L.F., van den Heuvel, M.P. (2019). Biological Characteristics of Connection-Wise Resting-State Functional Connectivity Strength. *Cereb Cortex*, 29 (11), 4646-4653. doi: [10.1093/cercor/bhy342](https://doi.org/10.1093/cercor/bhy342)
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- De Vitis, M., Breveglieri, R., Hadjidimitrakis, K., Vanduffel, W., Galletti, C., Fattori, P. (2019). The neglected medial part of macaque area PE: segregated processing of reach depth and direction. *Brain Structure & Function*, 224 (7), 2537-2557. doi: [10.1007/s00429-019-01923-8](https://doi.org/10.1007/s00429-019-01923-8) [Open Access](#)
- Fabbrini, F., Van den Haute, C., De Vitis, M., Baekelandt, V., Vanduffel, W., Vogels, R. (2019). Probing the Mechanisms of Repetition Suppression in Inferior Temporal Cortex with Optogenetics. *CURRENT BIOLOGY*, 29 (12), 1988–+. doi: [10.1016/j.cub.2019.05.014](https://doi.org/10.1016/j.cub.2019.05.014)
- Attili, B., Celen, S., Ahamed, M., Koole, M., Van Den Haute, C., Vanduffel, W., Bormans, G. (2019). Preclinical evaluation of [F-18]MA3: a CB2 receptor agonist radiotracer for PET. *BRITISH JOURNAL OF PHARMACOLOGY*, 176 (10), 1481-1491. doi: [10.1111/bph.14564](https://doi.org/10.1111/bph.14564)
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monkey and human. PLOS Biology. doi: [10.1371/journal.pbio.2006405](https://doi.org/10.1371/journal.pbio.2006405)

Sharma, S., Vanduffel, W., Mantini, D., Nelissen, K. (2019). Functional specialization of macaque premotor F5 subfields with respect to hand and mouth movements: A comparison of task and resting-state fMRI. Neuroimage. doi: [10.1016/j.neuroimage.2019.02.045](https://doi.org/10.1016/j.neuroimage.2019.02.045)

Li, X., Zhu, Q., Janssens, T., Arsenault, J., Vanduffel, W. (2019). In-vivo identification of thick, thin and pale stripes of macaque area V2 using sub-millimeter resolution (f)MRI at 3 Tesla. Cerebral Cortex, 29 (2), 544-560. doi: [10.1093/cercor/bhx337](https://doi.org/10.1093/cercor/bhx337)

Zhu, Q., Vanduffel, W. (2019). Submillimeter fMRI reveals a new layout of dorsal visual cortex in macaques, remarkably similar to New World monkeys. PNAS. doi: [10.1073/pnas.1805561116](https://doi.org/10.1073/pnas.1805561116)

Prodanov D, Integral representations and algebraic decompositions of the Fox-Wright Type of special functions, Fractal and Fractional, 3 (1), 4, 2019, doi: [10.3390/fractalfract3010004](https://doi.org/10.3390/fractalfract3010004)

Oral presentations

Daniele Marinazzo, BrainModes 2019 Pokhara main conference

Daniele Marinazzo, BrainModes 2019 Pokhara educational course

Daniele Marinazzo TVB Node 8 Marseille

Daniele Marinazzo Advanced methods for neuroimaging data analysis, Lille

Wim Vanduffel January 09, Optogenetic interrogation of the attention network in primates. Plenary keynote speaker, ABIM Champéry, Switzerland

Wim Vanduffel March 28. Sub-mm resolution fMRI in awake behaving monkeys at 3 Tesla Neuroimaging Meeting, Marseille, France

Wim Vanduffel March 28. How to drive cortical plasticity in monkeys. Institut de Neurosciences de La Timone, Marseille, France

Wim Vanduffel April 11. Novel approaches to compare fMRI signals across primate species. Comparative MRI meeting, Dusseldorf, Germany

Wim Vanduffel September, 16. Mesoscale fMRI at 3T in awake behaving monkeys. Mystery of the Brain: Science's Ultimate Frontier Symposium in honor of Prof. Nikos K. Logothetis. Tuebingen, Germany

Wim Vanduffel September, 25. Discovering the fine-scale functional organization of macaque cortex using mesoscale whole-brain mapping. IBRO symposium. Daegu, Korea

Wim Vanduffel September, 27. Optogenetic interrogation of the attention network in primates. Invited speaker ASHBI Seminar University Kyoto, Kyoto, Japan

Wim Vanduffel October, 12. High resolution mapping of primate visual cortex. IBS Conference on Neuroimaging, Suwon, Korea

Wim Vanduffel November, 29. How can you drive adult cortical plasticity in primates? CORTEX conference, Université de Lyon, France

Kiril Alexiev, T. Toshkov and D. Prodanov, Self-similar decomposition of digital signals, 2019 IEEE INISTA, Sofia, Bulgaria, pp. 1-6. doi: [10.1109/INISTA.2019.8778230](https://doi.org/10.1109/INISTA.2019.8778230)

Contact persons

Dimiter Prodanov, dimiterpp@gmail.com

Webpages/webservices currently maintained by the Node

Belgian node website: neuroinformatics.be

List of software tools, data sets, databases, web portals, online services that the Node provides: nitrc.org/projects/rshrf

Canada

The Canada Node is a Governing Node of INCF and is hosted by McGill University in Montreal, as well as a Toronto consortium consisting of the Rotman Research Institute, Baycrest Health Sciences Centre, the Krembil Centre for Neuroinformatics, CAMH and the Ontario Brain Institute.

The Canada Node develops tools and infrastructure for neuroinformatics, among them the Brain-CODE platform, the CAMH platform, the LORIS platform, the Neurohub platform, and the CBRAIN environment integrating high-performance computing resources. The Canadian Node is also active in developing training resources and events for neuroinformatics, reproducible neuroscience, and is committed to the principles of open science. Many of the node members are also participating in the Canadian Open Neuroscience Platform and in the development of its portal, allowing shared data distributed across Canada.

Activities in 2019

Funding

The Canada Node continued to receive funding for initiatives aligned with INCF's larger goals, including: the Canadian Open Neuroscience Platform (CONP) funded by Brain Canada, the Healthy Brains for Healthy Lives (HBHL) Initiative funded by the Canada First Research Excellence Fund and the Brain-CODE platform supporting the five independent disease programs in Cerebral Palsy, Epilepsy, Neurodevelopmental Disorders, Neurodegeneration and Major Depressive Disorders, funded by the Ontario Brain Institute.

Participation in INCF meetings and councils

Alan Evans (McGill) represents the Canada Node on the INCF Governing Board and participated in several calls during the year discussing among other things the development of the new INCF membership model. The Canada Node has a strong influence in INCF committees, where JB Poline (McGill) and Jane Roskams (UBC) chair the CTSI and TEC, respectively. Canadian representatives JB Poline and Samir Das participated in the CTSI meeting, the Brains United workshop, and the INCF Assembly in Warsaw, Poland, in August 2019. Alan Evans represented tINCF at the IBI coordinating body meeting in March 2019 in China. Canada also had representation on the following INCF committees:

- Tristan Glatard, Infrastructure committee
- Samir Das, SBP Committee
- Stephen Strother, CTSI member

Open science development

Considerable progress has been achieved with the Canadian Open Science mission, that complements INCF related standardization efforts. The design phase for the Canadian Open Neuroscience mission was initiated, with significant development accomplished. Numerous datasets have been curated using best practices developed with INCF backing. Most notably, the PreventAD dataset, a cohort of 500+ aging subjects enrolled in an Alzheimer's prevention study, has been organized in a manner that can be shared in an open manner. This process was particularly novel as it included obtaining open data sharing ethics approval and re-consent from patients. A consequence of this was the creation of an Open Data Sharing Ethics Framework that can be used as a model across Canada and throughout the scientific community.

The NeuroHub platform

The Canada node and INCF co-organized the "Making Open Neuroscience Infrastructures Interoperable" (MONII) workshop series, which has played a pivotal role in gathering users and functional requirements for the NeuroHub platform. The series has also provided a knowledge exchange opportunity for NeuroHub developers and developers of other large-scale neuroscience infrastructure projects. INCF develops, extends, and vets the standards used in the NeuroHub platform that ensures its adherence to the FAIR principles, thus making it a standardized, machine-readable platform.

ReproNim

The ReproNim Fellowship program is co-sponsored by INCF and is a full year Train-the-Trainer program which provides Fellows with conceptual and practical training in reproducible neuroimaging, as well as tailored support for individual syllabus development and implementation of reproducibility training in their home

institutions. In 2019, two Canadian researchers were awarded a fellowship: Greg Kiar and Elizabeth Levitis.

Google Summer of Code and Google Season of Docs

Google Summer of Code (GSoC) is a global program focused on bringing more student developers into open source software development. In 2019, two Canadian projects were awarded a GSoC slot with INCF as a mentoring organization: CBRAIN (mentors: Andrew Doyle and Shawn Brown) and LORIS (mentor: Christine Rogers). LORIS, again mentored by Christine Rogers, was also awarded a slot for Google Season of Docs, a program bringing the open source and technical writer communities together.

Canadian initiatives

Progress towards other specific Canadian initiatives has occurred in the following areas:

- The Virtual Brain takes a network approach on the largest scale: By manipulating network parameters, in particular the brain's connectivity, The Virtual Brain simulates its behavior as it is commonly observed in clinical scanners (e.g. EEG, MEG, fMRI).
- The Global Brain Consortium has curated EEG datasets that were made open in 2019. In parallel, standardization efforts for EEG data have been steadily enhanced. Through efforts to make millions of EEG datasets available for public analysis, an introductory set of a few hundred scans were released in 2019.
- The Global Brain Consortium met in Montréal on May 9-10 where the vision and goals for the organization were discussed, in addition to break out discussions on various aspects of EEG: data sharing, clinical care aspects, clinical research opportunities, and a general discussion on the role of funders in global collaborations.
- The open publishing platform (Aperture) was introduced at the Organization for Human Brain Mapping meeting in Rome in June 2019. Creating the technology to share all aspects of published data is the central theme and includes data publishing capabilities, as well as structured documentation, provenance and processing sharing infrastructure.
- In 2018, 4 years of monthly fBIRN phantom collections were completed across 13 3.0T Canadian Research MRI scanners to evaluate long term stability and equipment contributions to inter- and intra-subject variance in rs-fMRI for the (ONDRI) and the Canadian Biomarker Integration Network (CAN-BIND). This data was released as part of the Canadian Open Science mission prior to its presentation as part of an educational workshop at OHBM2019 in Rome.
- Development of training material. Members of the node participated in the development of the data carpentry brain imaging curriculum, with now three courses based on Jupyter notebook material.
- International Workshop organization: Making Open Neuroscience Infrastructures Interoperable (MONII v2.0, March 2019)

Node members

Quebec

Alan Evans, Canada Node coordinator (McGill, MNI)
 Samir Das (McGill, MNI)
 Jean-Baptiste Poline (McGill, MNI)
 Tristan Glatard (Concordia) Simon Duchesne (Laval)

Ontario

Stephen Strother (RRI, Baycrest, OBI) Tom Mikkelsen (OBI)
 Sean Hill (Krembil Centre for Neuroinformatics, CAMH)
 Ken Evans (Indoc research)
 Erin Dickie, CAMH
 Ali Khan, Western University

Selected publications

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- Keshavan A, Poline JB. From the Wet Lab to the Web Lab: A Paradigm Shift in Brain Imaging Research. *Front Neuroinform*. 2019 Mar 1;13:3. doi: 10.3389/fninf.2019.00003. eCollection 2019. Review. PMID: 30881299
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Botvinik-Nezer, R., Holzmeister, F., Camerer, C. F., Dreber, A., Huber, J., Johannesson, M., Kirchler, M., Iwanir, R., Mumford, J. A., Adcock, R. A., Avesani, P., Baczkowski, B. M., Bajracharya, A., Bakst, L., Ball, S., Barilari, M., Bault, N., Beaton, D., Beitner, J., ... Schonberg, T. (2020). Variability in the analysis of a single neuroimaging dataset by many teams. *Nature*, 582(7810), 84–88. <https://doi.org/10.1038/s41586-020-2314-9>

Contact person

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Webpages and webservice maintained by the Node

McGill Centre for Integrative Neuroscience (MCIN): mcin.ca

Twitter: @MCINation

Longitudinal Online Research and Imaging System (LORIS): loris.ca

CBRAIN: mcin-cnim.ca/technology/cbrain

Healthy Brains for Healthy Lives (HBHL): mcgill.ca/hbhl

Twitter: @HBHLMcGill

Canadian Open Neuroscience Platform (CONP): conp.ca

Twitter: @NeuroLibre

Brain-CODE: braincode.ca/

Ontario Brain Institute (OBI): braininstitute.ca

Twitter: @OntarioBrain

Rotman Research Institute (RRI):

baycrest.org/Baycrest/Research-Innovation/About-Us/Rotman-Research-Institute

Krembil Centre for Neuroinformatics: camh.ca/en/science-and-research/institutes-and-centres/krembil-centre-for-neuroinformatics



Samir Das giving a plenary lecture at the 2019 INCF Neuroinformatics Assembly in Warsaw

Czech Republic

In 2019 the Czech National Node for Neuroinformatics (CINN) continued its focus on building hardware and software infrastructure for research in electrophysiology, proposing and developing descriptions, methods and software tools for collection, annotation, pre/processing, analysis and interpretation of electrophysiological signals (especially from the human brain) together with other multidimensional health-related data, and investigating temporal context-aware approaches in active learning. The applied results were directed towards brain-computer interfaces (BCI) and human-machine interfaces (HMI).

Activities in 2019

The activities of the members of the Czech National Node included the following research and engineering topics in 2019: semi-automated EEG and PSG analysis, data preprocessing in the area of multidimensional (polysomnographic and electroencephalographic) long-term data, temporal context-aware approaches in active learning, semiautomatic annotation of sleep EEG signals, automatic sleep EEG pattern detection, design and implementation of methods and techniques for improvement of reliability of interactions between human subjects and artificial systems (HMI systems), standardization of electrophysiological data and metadata descriptions, application of machine and deep learning methods to electroencephalographic signals, testing of brain-computer interfaces for people with limited mobility, and development of on-line neurorehabilitation software tool.

The Node organized a workshop/hackathon related to electrophysiological data standardization efforts (together with G-Node and US-Node), it was held in March 2019 in Pilsen. A postdoc from the UTP Malaysia stayed at the neuroinformatics laboratory at the University of West Bohemia, other two UTP students arrived in November 2019 for the seven-month internship. The Node continued in cooperation within the Czech-Bavarian cross-border program on the projects "Brainwave driven assistance system for motor-impaired people" and "Use of modern information technologies for neurorehabilitation of patients with acquired brain damage". The cooperation with the National Institute of Mental Health in the Czech Republic focused on the methods of semi-supervised learning. The neuroinformatics laboratory was regularly open to the public through the excursions organized by the Faculty of Applied Sciences during 2019; the research results were also shown at several exhibitions.

Upcoming activities

The Node will focus on continuing its long term activities related to electrophysiological data standardization efforts. It is expected that specific data formats standardization efforts will finish in 2020. Collaborative activities with the Malaysian Node are also expanding (two Malaysian students are on the internship, Erasmus+ project was re-submitted, the joint project proposal is planned to be elaborated during 2020). The Node plans to organize several informal meetings of the Node members and workshops with researchers of the National Institute of Mental Health. A new project proposal focusing on motor neurorehabilitation based on brain activity (in cooperation between the University of West Bohemia and Czech Technical University) is prepared. The Node will also specifically focus on inference issues and overall use of conventional and spiking deep neural networks.

Selected publications

The scientific papers were published in the following journals: Journal of Neuroscience Methods, Journal of Neural Engineering, Neurology, Biomedical Signal Processing and Control and at some conferences, e.g., International Conference on Artificial Neural Networks, IEEE International Conference on e-Health and Bioengineering EHB 2019, and International Conference on Ubiquitous Computing and Ambient Intelligence UCAmI 2019.

Node members

The CNNN committee members are Václav Matoušek (chair), Petr Bouchner, David Coufal, Josef Faber, Irena Holečková, Karel Jelen, Vladimír Komárek, Lenka Lhotská, Jaroslav Machan, Vladimír Mařík, Mirko Novák, Václav Přenosil, Pavel Příbyl, Dušan Saiko, Miroslav Svítek, Petr Svoboda, Václav Šebesta, Karel Šonka, Miroslav Vala, and Zdeněk Votruba. Roman Mouček as the Node representative is active in CTSI.

Webpages and webservices maintained by the Node

The official Node web page: czech-neuroinf-node.kiv.zcu.cz.

The EEG/ERP portal (EEGbase), eegdatabase.kiv.zcu.cz, github.com/INCF/eeg-database.

PSGLab; a Matlab toolbox for processing of polysomnographic (PSG) data: bio.felk.cvut.cz/psglab.

Other neuroinformatics projects are hosted under the neuroinformatics group: github.com/NEUROINFORMATICS-GROUP-FAV-KIV-ZCU



An example of sleep spindles in C3-M2 channel (C3-M2) labeled by an expert (Expert) and detected by sleep spindle detectors (RMS, RPS, SIGMA, TEO); reliability of detection using an unsupervised method is expressed by the intensity of the blue color (more intense color represents more reliable result)

France

The main focus in 2019 was the relaunch of the node as a national network of researchers in neuroinformatics. The centerpiece of the relaunch was the GEANT workshop on “Data Management and Sharing in Neuroinformatics”, neuroinfo.fr/#!/workshops/geant2019 which took place in Marseille on May 21, was well attended, and which sparked valuable discussions.

Activities in 2019

In addition to the GEANT workshop mentioned above, members of most of the principal neuroinformatics research groups in France held a half-day meeting on 20th May to discuss possible actions and activities, and possible sources of funding for the French node.

Several node members participated in the annual INCF conference in Warsaw, with a keynote from Inserm researcher Henry Kennedy and an invited talk by Inria researcher Maureen Clerc.

Two projects to which the Node contributes - PyNN and NeuroML - were endorsed as INCF standards.

Upcoming Activities

Brainstorming on the development of infrastructure(s) for storing and sharing neuroscience data with questions about standardization, data structuration etc.

Selected publications

Appning: Animal Population Imaging RT Frontiers Neurosciences
frontiersin.org/research-topics/9138/appning-animal-population-imaging

Node members

See neuroinfo.fr/#!/people
Organizing committee members: neuroinfo.fr/#!/about

Contact persons

Andrew Davison, andrew.davison@unic.cnrs-gif.fr

Webpages and webservice maintained by the Node

neuroinfo.fr



Henry Kennedy from the French node giving a plenary lecture at the 2019 INCF Neuroinformatics Assembly in Warsaw

Germany

Activities of the German Node center around facilitating data access and data sharing in cellular and systems neuroscience. The Node develops tools and infrastructure for data storage, data access, and data sharing. The German Node is part of the National Bernstein Network Computational Neuroscience (bernstein-network.de).

Activities in 2019

In 2019, further enhancements of the G-Node data platform, GIN (gin.g-node.org) were introduced, including services for data format validation and automated data processing based on continuous integration technology. GIN provides services for data versioning, collaboration, and data publication with DOIs, and is interoperable with established technologies, tools and standards such as git, DataLad, BIDS. GIN is recommended data repository of eLife, Nature Scientific Data, and PLOS.

Additional enhancements were also introduced for the data and metadata formats NIX and odML. In a collaboration with the developers of the NWB format, converters between NIX and NWB were developed (<https://github.com/G-Node/nix-nwb>). A publication on the odmlTables software (github.com/INM-6/python-odmltables) was published (Sprengr et al 2019). G-Node tools and services were demonstrated at the Bernstein Conference 2019 (bernstein-conference.de), and at the INCF booth and the Neuroscience in Germany booth at the Society for Neuroscience Annual Meeting 2019.

The German Node provided services for abstract submission and publication for the INCF Congress Neuroinformatics 2019 (doi.org/10.12751/incf.ni2019) and the Bernstein Conference 2019 (doi.org/10.12751/nncn.bc2019).

The G-Node Advanced Neural Data Analysis Course, ANDA (g-node.org/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 and Thomas Wachtler. It was held April 1 – 18, 2019 in Jülich.

The 12th 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 September 2 – 7, 2019 in Camerino, Italy.

Upcoming activities

The G-Node Advanced Neural Data Analysis Course, ANDA2020, organized by Sonja Grün, Martin Nawrot and Thomas Wachtler, will be held April 14–30, 2020 at Haus Overbach, Jülich, Germany (www.g-node.org/anda). The German Node will provide abstract submission and hosting services for the Bernstein Conference 2020 (abstracts.g-node.org).

Selected publications

Sprengr J, Zehl L, Pick J, Sonntag M, Grewe J, Wachtler T, Grün S and Denker M (2019) odMLtables: A user-friendly approach for managing metadata of neurophysiological experiments. *Front. Neuroinform.* 13:62. doi: [10.3389/fninf.2019.00062](https://doi.org/10.3389/fninf.2019.00062)

Koutsou A, Sonntag M, Garbers C, Kellner CJ, Grewe J, Wachtler T (2019) Achieving reproducible data workflows: Lightweight tools for safe and efficient data management. *Göttingen Meeting of the German Neuroscience Society 2019*. nwg-goettingen.de/2019/upload/abstracts_pdf/T27-6B.pdf

Sonntag M, Koutsou A, Grewe J, Wachtler T (2019) From metadata to the semantic web: services for data annotation and findable data. *Neuroinformatics 2019*. doi: [10.12751/incf.ni2019.0062](https://doi.org/10.12751/incf.ni2019.0062)

Sonntag M, Koutsou A, Garbers C, Vanek J, Wachtler T (2019) Microservice infrastructure for continuous validation, processing and indexing of research data on an open platform. *Neuroinformatics 2019*. doi: [10.12751/incf.ni2019.0067](https://doi.org/10.12751/incf.ni2019.0067)

Sonntag M, Koutsou A, Vanek J, Kellner C, Garbers C, Grewe J, Wachtler T (2019) Lightweight tools for safe and efficient management, processing and validation of research data. *Bernstein Conference 2019*. doi: [10.12751/nncn.bc2019.0075](https://doi.org/10.12751/nncn.bc2019.0075)

Koutsou A, Sonntag M, Vanek J, Garbers C, Kellner CJ, Grewe J, Wachtler T (2019) How to spend less time on data management and more on the science: Open tools for efficient data organization, reproducible workflows, and collaboration. Program No. 252.22. 2019 Neuroscience Meeting Planner. Chicago, IL: Society for Neuroscience, 2019. abstractsonline.com/pp8/#!/7883/presentation/64256

Node members

Andreas Herz (Coordinator), Christian Kellner (Systems Developer), Achilleas Koutsou (Systems Developer), Willi Schiegel (Systems Administrator), Michael Sonntag (Systems Developer), Thomas Wachtler (Scientific Director), Tiziano Zito (Systems Administrator and Consultant)

Contact persons

Thomas Wachtler, Computational Neuroscience, Department of Biology II, Ludwig-Maximilians-Universität München. Email: wachtler@bio.lmu.de

Webpages and webservice maintained by the Node

G-Node Website: g-node.org

GIN data sharing platform: gin.g-node.org

Open data repository: doi.gin.g-node.org

Software: g-node.github.io

Conference abstracts services: abstracts.g-node.org

India

The Indian National Node for NeuroInformatics (INNNI) is now in its tenth year of activities. The Node has primarily been engaged in individual teaching, research and workshop activities in 2019.

Activities in 2019

Members of the India node and their lab researchers were involved in the following activities:

- Sixth edition of the international summer course on “Computational Approaches to Memory & Plasticity (CAMP@Bangalore)”. National Centre for Biological Sciences, Bangalore, June-July 2019.
- Semester-long subject course on “Neuroinformatics and Brain Imaging for Cognitive Science and Healthcare Technology” started for Undergraduate, Integrated Postgraduate and PhD level students of Science, Math/ Computing, Engineering and Humanistic Studies (psychology, linguistics). Indian Institute of Technology (I.I.T.), Varanasi, December 2019 onwards.
- Student participation at the PRIMatE Data Exchange (PRIME-DE) Global Collaboration Workshop on Primate Neuroscience, Wellcome Trust, London, U.K., September 2019.
- Symposium on “Plasticity of Developing Neural Circuits”, Thirty-Seventh Annual Conference of Indian Academy of Neurosciences, All-India Institute of Medical Sciences, New Delhi, November 2019.
- Tutorial on “Introduction to Neuroimaging”. Institute of Neuroscience, Kolkata (Calcutta) [affiliate institution of University of Calcutta], March 2019.
- Student Participation in IBRO-ICPBR Summer School of Primate Neurobiology at Laboratory of Comparative Neuroimaging, Institute of Neuroscience, Chinese Academy of Sciences, Shanghai, China, July 2019.
- Research interaction between Indian research staff and Traumatic Brain Injury Imaging investigators of the National Institute of Health (NIH), facilitated by ACR-2020, American College of Radiology, Washington DC, May 2019.
- Hands-on session at the Summer course on “Computational Approaches to Memory and Plasticity” at the National Centre of Biological Sciences (NCBS), Bangalore, June-July 2019.
- Practical classes at the Semester course on “Neuroinformatics and Brain Imaging for Cognitive Science and Healthcare Technology” at the Indian Institute of Technology (I.I.T.), Varanasi, December 2019 onwards.

Upcoming activities

Indian node members or their lab researchers would be engaged with the following activities:

- Seventh edition of the international summer course on “Computational Approaches to Memory & Plasticity (CAMP@Bangalore)”, National Centre for Biological Sciences, Bangalore, July 2020.
- SPARC Workshop on “Advances on Neuroimaging” (ANI), Indian Institute of Technology, Kanpur, February 2020.
- Symposium on Computational Neuroscience, Thirty-Eighth Annual Meeting of Indian Academy of Neurosciences, University of Hyderabad, Hyderabad, October 2020.
- AICTE Course on “Advances in Neurotechnology: Computational Neuroscience, Brain imaging and Neuroinformatics”, Indian Institute of Technology (I.I.T.), Varanasi, Autumn 2020.
- Oct. 2020: Thirty-Eight Annual Conference of Indian Academy of Neuroscience, at the University of Hyderabad. Post-Satellite Symposium at Ravenshaw University, Cuttack.

Selected publications

DDwivedi, S Chattarji, US Bhalla: Impaired Reliability and Precision of Spiking in Adults But Not Juveniles in a Mouse Model of Fragile X Syndrome. *eNeuro*, 6 (6): ENEURO.0217-19. 2019; DOI: doi.org/10.1523/ENEURO.0217-19.2019.

V Pareek, S Pal, V Subramanyam, PK Roy: Patterning of Corpus Callosum Integrity in Glioma Tumour

Observed by MRI, Journal of Neuro-Oncology, 144(1), 165-177 (2019). DOI: [10.1007/s11060-019-03217-9](https://doi.org/10.1007/s11060-019-03217-9)

A Bhatia, S Moza, US Bhalla: Precise excitation-inhibition balance controls gain and timing in the hippocampus. eLife, 8: 2019. DOI: [10.7554/eLife.43415](https://doi.org/10.7554/eLife.43415).

V Pareek, B Nath, PK Roy: Role of Neuroimaging Modality in the Assessment of Oxidative Stress. CNS & Neurological Disorders - Drug Targets, 18(5):372-381, 2019. DOI: [10.2174/1871527318666190507102340](https://doi.org/10.2174/1871527318666190507102340)

PK Roy: Shifting of Cerebral Networking Hubs to Limbic System during Peak Innovative Cognitive Processing. Proc. ACR-2019. 1-9. American College of Radiology, 2019. acr.org/-/media/acr/noindex/abstracts/2019/91_roy.pdf?la=en

Node members

The following institutions are members of the node (see map):

- All-India Institute of Medical Sciences, New Delhi (Rep: Manjari Tripathi).
- Amrita University, Quilon (Rep: Shyam Diwakar).
- Cellworks Limited, Bangalore (Rep: Shireen Vali).
- Centre of Behavioral & Cognitive Sciences, University of Allahabad (Rep: N. Srinivasan).
- Institute of Applied Biotechnology & Bioinformatics, Bangalore (Rep: N. Yathindra).
- Indian Institute of Information Technology, Bangalore (Rep: S Sadagopan).
- Indian Institute of Information Technology, Hyderabad (Rep: Abhijit Mitra).
- Indian Institute of Science, Bangalore (Rep: Govindan Rangarajan).
- Indian Institute of Science Education & Research, Pune (Rep: Pranay Goel).
- Indian Institute of Technology, Bombay (Rep: Rohit Manchanda).
- Indian Institute of Technology, Delhi (Rep: Basabi Bhaumik).
- Indian Institute of Technology, Madras (Rep: V.Srinivasa Chakravarthy).
- Indian Institute of Technology, Varanasi (Rep: Prasun Roy)
- Indian Statistical Institute, Bangalore (Rep: Kaushik Majumdar).
- Institute for Mathematical Sciences, Chennai (Rep: Gautam Menon).
- Indian Statistical Institute, Calcutta (Rep: Sumitra Purkayastha).
- Institute of Bioinformatics, Bangalore (Rep: Akhilesh Pande).
- International Centre for Theoretical Sciences, Bangalore (Rep: Arvind Kumar).
- National Brain Research Centre, Gurgaon (Rep: Arpan Banerjee).
- National Centre of Biological Sciences, Bangalore (Rep: Upinder S. Bhalla).
- National Inst. of Mental Health & Neurosciences, Bangalore (Rep: BS Shankaranarayana Rao).
- Sree Chitra Tirunal Inst. of Medical Science & Technology, Trivandrum (Rep: PS Mathuranath).
- Tata Institute of Fundamental Research, Bangalore (Rep: Seema Nanda).
- University of Hyderabad (Rep: Bapi Raju).

Contact persons

At present the Node representatives are Upinder S. Bhalla, National Centre for Biological Sciences (NCBS), Bangalore bhalla@ncbs.res.in and Prasun K. Roy, Indian Institute of Technology (IIT), Varanasi pkroy.bme@iitbhu.ac.in.

Webpages and webservice maintained by the Node

Summer program on "Computational Approaches to Memory and Plasticity": camp.ncbs.res.in

Semester course on "Neuroinformatics and Brain Imaging for Cognitive Science and Healthcare Technology": app.box.com/s/sibj39qpekofk3ktip3e8wy0lwp85eqf

Italy

The Italian Node was established in 2007 and is currently an active Associate Node within the INCF network. It consists of the Neuroinformatics Unit (NU) of the National Research Council, (CNR) Italy.

The Italian Node works on the development of tools for the molecular analyses and data sharing, software development based on hardware infrastructure and cloud computing dedicated to life science.

The Italian Node researchers are involved in many national and European neuro-biomedicine projects including: autism spectrum disorders, Multiple Sclerosis, epigenetics effects of BDNF mutations, spinal cord injury, Dravet syndrome. The main analytical approaches applied to these topics are: omics and multi-omics, gene networks, systems biology, single-cell transcriptomics, metagenomics, structure and binding, drug discovery, neuro-toxicology.

The Neuroinformatics manages a High-Performance Computing (HPC) and AI infrastructure for deep learning.

Activities in 2019

- Organization of the International Neurospine IV Workshop “Neuro-regeneration after brain and spinal cord injury- From cells to bioengineering and neuroinformatics applications. June 28, 2019, Rehabilitation Science Institute, University of Toronto, Canada
- Whole genome NGSequencing of DNA of patients with autism spectrum disorders processed with Chromium (10Xgenomics) and Illumina platforms (Interomics PB05 grant)
- Developing the 3 years project: “Integration of clinical and multi-omics multiple sclerosis data into a predictive algorithm of disease activity to accelerate personalized medicine” (achronym GR4MS) young research grant, Italian Ministry of Health (Grant GR-2016-02363997) sept. 2018-Aug. 2021
- Developing the 3 years project by European Project ERA PERMED 2018-233, GA 779282 ERA PERMED Joint Transnational Call 2018 “An integrated approach to predict disease activity in the early phases of multiple sclerosis” (FindingMS), June 2019 - May 2022
- Developing of the EU project GEMMA: “Genome, Environment, Microbiome & Metabolome in Autism: an integrated multi-omic systems biology approach to identify biomarkers for personalized treatment and primary prevention of Autism Spectrum Disorders” Acronym: GEMMA. The 5 years (Jan 2019-Dec 2023) project has been selected and financed by 14.2 mln Euro gemma-project.eu
- Participation in The INCF assembly, Sept. 1-2, 2019, Warsaw, Poland

Upcoming activities

The Italian node is continuing the development of the ongoing projects in 2020.

Selected publications

Di Nanni N, Bersanelli M, Cupaioli FA, Milanese L, Mezzelani A, Mosca E. Network-Based Integrative Analysis of Genomics, Epigenomics and Transcriptomics in Autism Spectrum Disorders. *Int J Mol Sci*. 2019 July 9;20(13). pii: E3363. doi: [10.3390/ijms20133363](https://doi.org/10.3390/ijms20133363).

Mosca E, Bersanelli M, Gnocchi M, Moscatelli M, Castellani G, Milanese L, Mezzelani A.

Network Diffusion-Based Prioritization of Autism Risk Genes Identifies Significantly Connected Gene Modules. *Front Genet*. 2017 Sep 25;8:129. doi: [10.3389/fgene.2017.00129](https://doi.org/10.3389/fgene.2017.00129). eCollection 2017.

Battaglia C, Venturin M, Sojic A, Jesuthasan N, Orro A, Spinelli R, Musicco M, De Bellis G, Adorni F Candidate Genes and MiRNAs Linked to the Inverse Relationship Between Cancer and Alzheimer’s Disease: Insights From Data Mining and Enrichment Analysis. *Front Genet*. 2019 Sep 24;10:846. doi: [10.3389/fgene.2019.00846](https://doi.org/10.3389/fgene.2019.00846). eCollection 2019.

Barbariga M, Vallone F, Mosca E, Bignami F, Magagnotti C, Fonteyne P, Chiappori F, Milanesi L, Rama P, Andolfo A, Ferrari G. The role of extracellular matrix in mouse and human corneal neovascularization. Sci Rep. 2019 Oct 3;9(1):14272. doi: [10.1038/s41598-019-50718-8](https://doi.org/10.1038/s41598-019-50718-8).

Node members

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Contact persons

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Webpages and webservice maintained by the Node

Italian node website: neuroinformatics.it
gemma-project.eu

Malaysia

In 2019 the Malaysia node's research focus was on brain analysis algorithms and workflows for functional near infrared spectroscopy (fNIRS), EEG and MRI data to address challenges in aging, mental stress and personalized learning.

Activities in 2019

The Malaysia node conducted a training course, an open colloquium, and a symposium in 2019:

- A summer school on Machine and Deep Learning for Biomedical Applications, on August 19-23
- Open Colloquium for Optical Topography on March 21 at the Universiti Teknologi PETRONAS, Malaysia
- The SIG for Aging co-organized a symposium meeting in Philippines on October 23-25: sites.google.com/site/brainconnects2019/home

Upcoming activities

On March 18, 2020, the Malaysia node, Centre for Intelligent Signal and Imaging Research (CISIR) and Universiti Teknologi PETRONAS (UTP), will organize the 2nd Open Colloquium for Optical Topography in Putrajaya, Malaysia. The colloquium serves as an academic gathering for intellectual discourse and networking by Optical Topography-Hub (OT-Hub) collaborators. This OT-Hub is a platform for exploration in OT-related technology and collaborative research on applied brain science. This colloquium will pave the way for both UTP and Hitachi's research capability and strength in applied brain science to support the rapid development in innovation and technology for the benefit of the society and nation.



Selected publications

Denoising of Neuronal Signal From Mixed Systemic Low-Frequency Oscillation Using Peripheral Measurement as Noise Regressor in FNIRS, Neurophotonic, doi: [10.1117/1.NPh.6.1.015001](https://doi.org/10.1117/1.NPh.6.1.015001)

Classification of Visual and Non-visual Learners Using Electroencephalographic Alpha and Gamma Activities, Frontiers in Behavioral Neuroscience, doi: [10.3389/fnbeh.2019.00086](https://doi.org/10.3389/fnbeh.2019.00086)

Neural Correlates of Eye Contact in Face-to-face Verbal Interaction: An EEG Based Study of Extraversion Personality Trait, PLOS ONE, doi: [10.1371/journal.pone.0219839](https://doi.org/10.1371/journal.pone.0219839)

Maritime Shift Workers Sleepiness Detection System With Multi-Modality Cues, IEEE ACCESS, doi: [10.1109/ACCESS.2019.2929066](https://doi.org/10.1109/ACCESS.2019.2929066)

EEG in classroom: EMD features to detect situational interest of students during learning, Multimedia Tools and Applications, doi: [10.1007/s11042-018-7016-z](https://doi.org/10.1007/s11042-018-7016-z)

Investigating Neurofeedback Protocols for Stress Mitigation: A Comprehensive Analysis of Different Stimulus Content, IEEE ACCESS, doi: [10.1109/ACCESS.2019.2944202](https://doi.org/10.1109/ACCESS.2019.2944202)

Exploring EEG Effective Connectivity Network in Estimating Influence of Color on Emotion and Memory, Frontiers in Neuroinformatics, doi: [10.3389/fninf.2019.00066](https://doi.org/10.3389/fninf.2019.00066)

Classification of Motor Function from EEG Signals based on Common Spatial Pattern and Wavelet Transform, Sensors, doi: [10.3390/s19224878](https://doi.org/10.3390/s19224878)

Anomaly Detection of Moderate Traumatic Brain Injury using Auto-regularized Multi-Instance One-Class SVM, IEEE Trans Neural Systems & Rehabilitation, doi: [10.1109/TNSRE.2019.2948798](https://doi.org/10.1109/TNSRE.2019.2948798)

Assessing Neural Compensation with Visuospatial Working Memory Load using Near-Infrared Imaging, IEEE Trans Neural Systems & Rehabilitation, doi: [10.1109/TNSRE.2019.2956459](https://doi.org/10.1109/TNSRE.2019.2956459)

Fractal Dimension and Power Spectrum of Electroencephalography Signals of Sleep Inertia State, IEEE ACCESS, doi: [10.1109/ACCESS.2019.2960852](https://doi.org/10.1109/ACCESS.2019.2960852)

A novel approach based on wavelet analysis and arithmetic coding for automated detection and diagnosis of epileptic seizure in EEG signals using machine learning techniques, Biomedical Signal Processing and Control, doi: [10.1016/j.bspc.2019.101707](https://doi.org/10.1016/j.bspc.2019.101707)

Cortical haemodynamic response measured by functional near infrared spectroscopy during a verbal fluency task in patients with major depression and borderline personality disorder, E BioMedicine, doi: [10.1016/j.ebiom.2019.11.047](https://doi.org/10.1016/j.ebiom.2019.11.047)

Contact persons

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Netherlands

The overall focus of the node was towards finding funding for the node's operations. Scientific topics covered are atlasing, data analysis, predictive neuroinformatics, neuroinformatics education. To expose the productivity of Dutch neuroinformatics to funding bodies, we posted a software catalog that contains 22 software packages or services with significant Dutch contributions. It is published on our website neuroinformatics.nl under the Software & Services heading (neuroinformatics.nl/drupal/?q=software).

Activities in 2019

Another initiative that we undertook together with INCF (co-organized by HBP and Flag-ERA project FIIND) is the organization of the workshop 'Brains United', to harmonize data and infrastructure built by the various large brain projects.

The INCF-hosted Scalable Brain Atlas was further extended with the Composer service, a new product that allows the user to load multiple datasets of different types (volume, image, morphology, scatter plot) into a brain atlas, and perform rudimentary alignment (figure: visualize Allen Brain Institute connectivity experiments from a selected source region). Together, the sites attract about 600 user sessions per week.

Node members

Timonidis N, Bakker R, Tiesinga P (2019) Predicting the mesoconnectome using multimodal data integration. Neuroinformatics 2019 Abstract. doi: 10.12751/incf.ni2019.0015

Bakker R, Tiesinga P (2019) Scalable Brain Atlas Composer: API for collaborative brain atlasing and visualization workflows. Neuroinformatics 2019 Abstract. doi: 10.12751/incf.ni2019.0055

Contact persons

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List of scientists who have been active within the node: neuroinformatics.nl/drupal/?q=who-is-who

Webpages/webservices currently maintained by the Node

Node page: neuroinformatics.nl/drupal

Software catalog: neuroinformatics.nl/drupal/?q=software

Composer service: scalablebrainatlas.incfc.org/composer

Norway

Norway has participated in the INCF since the organization was established in 2005. The Norwegian Node is supported by The Research Council of Norway and hosted by the University of Oslo (UiO) in partnership with 3 other institutions: The Norwegian University of Life Sciences (NMBU), The Norwegian University of Life Science and Technology (NTNU), and Akershus University Hospital (Ahus). As a Governing Node of the INCF, the Node is represented on the INCF Governing Board, Council for Training, Science and Infrastructure (2 voting members) and Infrastructure Committee.

The Node also works closely with the EU flagship Human Brain Project and takes an active role in establishing the new European research infrastructure EBRAINS and the International Brain Initiative.

Activities in 2019

Brain atlasing tools and resources

The Node has delivered support to users of tools and services for brain atlasing maintained by UiO. The tools and services include the Navigator3 data system and related neuroinformatic tools for organizing and managing high resolution image data and registering data to 3D brain atlases (including QuickNII), and a new release of the Waxholm Space rat brain atlas with a large number of brain structure delineations added (<https://ebrains.eu/>). The NTNU and UiO teams have shared and curated large collections of data from anatomical tract tracing experiments. The data are anchored to the Waxholm Space atlas of the rat and shared through the EBRAINS web portal (https://ebrains.eu). The effort includes data on projections of the orbitofrontal cortex, the insular cortex, and the posterior parietal cortex. A range of other projects in Norway has received support from the Node for data curation and use of the Waxholm Space atlas of the rat brain and related tools and analytical workflows. At the international level, funded by the EU flagship Human Brain Project (HBP), the Node delivers extensive data curation and brain atlasing services for research data from the HBP and other projects.

Dementia Disease Resource

The Node continues to grow the XNAT national database on Dementia Disease hosted by Ahus. This database contains MRI data processed for morphometric data and white matter, as well as FDG-PET and Amyloid-PET data. An established nation-wide collaboration secures a steady recruitment of new patients and controls as well as longitudinal follow-up of already included subjects. The database has been further developed to improve user interface and accessibility. The large clinical pre-dementia database made available through this effort will provide a major opportunity for investigating disease associations across multiple diagnostic domains (clinical data -> imaging data -> genomic data). Data model standardization and sharing through the use of ontologies and semantic layers are key ongoing activities.

Tools for modeling and analysis of electrical signals

The Node has maintained and further developed the neuroinformatics tools LFPy, ViMEAPy, ViSAPy, and hybridLFPy for bio-physics based modeling of electric potentials, generation of virtual spiking activity for evaluation of spike-sorting algorithms, and generation of LFPs generated by networks of spiking point neurons. The NMBU team has extended these tools to cover more functionalities and data modalities. The team has also published a landmark paper on the scientific case for brain simulations.

Training

The node collaborates with the Norwegian Research School in Neuroscience, NRSN. NRSN, funded by The Research Council of Norway is one of the national research schools, aiming to provide a comprehensive and up to date training for all PhD students in Neuroscience by combining and coordinating training activities that exist at the participating universities. The Node contributes with courses in all its activity areas. With the support of NRSN, the Node has initiated the development of a VR rat brain anatomy instruction, aimed to be

launched in 2020 by NTNU and UiO and included in future courses in brain atlasing.

Selected publications

Einevoll GT, Destexhe A, Diesmann M, et al(2019) The Scientific Case for Brain Simulations. *Neuron*. 102:735–744. doi:10.1016/j.neuron.2019.03.027

Hope TR, Selnes P, Rektorová I, ..., Fladby T (2019) Diffusion tensor and restriction spectrum imaging reflect different aspects of neurodegeneration in Parkinson's disease. *PLoS One*. 14:e0217922. doi:10.1371/journal.pone.0217922

Puchades MA, Csucs G, Ledergerber D, Leergaard TB, Bjaalie JG(2019) Spatial registration of serial microscopic brain images to three-dimensional reference atlases with the QuickNII tool. *PLoS One*. 14:e0216796. doi:10.1371/journal.pone.0216796

Yates SC, Groeneboom NE, Coello C, ..., Bjaalie JG (2019) QUINT: Workflow for Quantification and Spatial Analysis of Features in Histological Images From Rodent Brain. *Front Neuroinform*. 13:75. doi:10.3389/fninf.2019.00075

Node members

Professor Jan G. Bjaalie, UiO, Head of Node; Member, Infrastructure Committee; Member, Council for Training, Science, and Infrastructure

Professor Trygve Leergaard, UiO,

Professor Gaute Einevoll, NMBU, Member, Council for Training, Science, and Infrastructure

Professor Menno Witter, NTNU

Professor Tormod Fladby, Ahus

Contact persons

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Webpages and webservice maintained by the Node

incf.org/network/nodes/norway

incf.no

Poland

The main activities of the node involve computational neuroscience (especially dealing with sensory and motor systems, cognitive processes, and modeling neuroscience measurements), portal infrastructure, development of tools and methods for data analysis (mainly from electrophysiological and behavioral experiments), brain-machine interfaces, brain atlas infrastructure, developing novel algorithms for neuroinformatics, and education in neuroinformatics.

Activities in 2019

INCF PL node operates now under an umbrella of a consortium of 8 leading Polish research institutions forming the core of Polish NI community. We have organized the INCF Assembly in September 2019: neuroinformatics2019.org. The Assembly is the annual gathering of the INCF network and serves as its major outreach outlet for the network. The local organizers were Prof. Daniel Wójcik from the Nencki Institute of Experimental Biology, Polish Academy of Sciences and Prof. Jarosław Żygierewicz from the University of Warsaw, and has attracted hundreds of participants from the neuroinformatics community from around the globe.

Neuroinformatics related training continues in several places. The BSc and MSc curriculum in Neuroinformatics continues in a new infrastructure offered by the new building of Faculty of Physics, University of Warsaw (<http://neuroinformatyka.pl>). Interdisciplinary BSc program in "Cognitive sciences" with neuroinformatics components is continued at the Nicolaus Copernicus University in Toruń (kognitywistyka.umk.pl). A similar program is in place at the University of Warsaw (kognitywistyka.uw.edu.pl). MSc program in neurobiology at Jagiellonian University (Kraków) includes a course in computational neuroscience.

Node members

Poland is represented in CTSI by Prof. Daniel Wójcik. We estimate the number of people involved in neuroinformatics research and education as more than fifty.

Contact persons

Dr. Tomasz Piotrowski, Nicolaus Copernicus University

Webpages and webservice maintained by the Node

neuroinf.pl
braintech.pl
3dbar.org
service.3dbar.org

bit.ly/incf2015spring
brain.fuw.edu.pl/edu
neuroinflab.wordpress.com
marmosetbrain.org



Group picture from the 2019 INCF Neuroinformatics Assembly in Warsaw

Sweden

The INCF National Node of Sweden is coordinated from KTH Royal Institute of Technology in Stockholm. The current coordinator is Professor Jeanette Hellgren Kotaleski at the Department of Computational Science and Technology, School of Electrical Engineering and Computer Science, KTH. The Swedish Node functions as a distributed network of researchers.

Activities in 2019

The KTH members of the Swedish Node are since many decades working closely with researchers at Karolinska Institute (KI) that are interested in motor behavior, and also study diseases affecting that. The data-driven brain modeling activities taking place at KTH have gained a lot from these direct interactions with experimentalists and clinicians. More recently also Lund University and Umeå University have joined the collaborative efforts around data analysis and modeling of motor systems. These partners provide both MEG, fMRI as well as data from in vivo recordings of behaving mice.

The Swedish INCF Node members are very visible within SeRC, the Swedish e-science Research Center (e-science.se). SeRC involves the three large universities in Stockholm: KTH, KI and Stockholm University (SU) as well as Linköping University. Within SeRC a Brain-IT community exists, consisting of computational neuroscientists, brain theoreticians, neuroinformaticians, cognitive neuroscientists and psychologists from KTH, KI and SU (see e-science.se/people-and-research/mcps). Brain-IT is also a member of the SeRC training committee, through which an active interaction between the different universities will lead to joint PhD courses. We also include e-science approaches from the Brain-IT field into e.g. master level courses.

Likewise, as for Brain-IT within SeRC, the Swedish node members have formed a consortium called d-BRAIN, within a wider initiative denoted KTH Digital Future. A team with expertise from AI, data science, image processing, mathematics, experimental neuroscience, clinical medicine, and computational neuroscience have been brought together. The team consists of junior and senior researchers from KTH, KI and Karolinska Hospital (KS). The long-term goal of this collaborative effort is to develop an interdisciplinary approach to improve early diagnosis and prognosis for brain diseases, and to facilitate the development of therapies by combining computational modelling of the brain and advanced artificial intelligence (AI) based data analyses. The d-BRAIN initiative in collaboration with the Brain-IT community within SeRC will host the 8th Baltic-Nordic School on Neuroinformatics, BNNI 2020.

The Swedish Node can get supercomputer resources for brain simulations via the KTH Center for Parallel Computers. In addition, new collaborations with research groups in Sweden and outside are continuously building up through the involvement in the Human Brain Project (HBP). Sweden has four universities involved in HBP currently: Uppsala University, Linneus University, Karolinska Institute, and KTH.

As during earlier years, several Swedish researchers participate in the follow-up work on the earlier Taskforce on Multiscale Modeling by continuing to develop the MUSIC tool. MUSIC is also adopted by HBP, both for linking spiking models during run-time simulations, and also for linking between neuromorphic and neurobotics applications.

Node members

CTSI Swedish representatives

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Arvind Kumar, arvkumar@kth.se

Contact persons

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Webpages and webservice maintained by the Node

SeRC, the Swedish e-science Research Center e-science.se

Brain-IT network e-science.se/community/brain-it

EuroSPIN kth.se/en/studies/phd/joint-doctorate/eurospin



Swedish node representative Jeanette Hellgren Kotaleski and India node representative Upinder S. Bhalla

United Kingdom

Neuroinformatics UK has more than 600 members and is organized into three branches. The experimental branch, launched at the British Neuroscience Association's 2017 Festival of Neuroscience, is linked to their Special Interest Group in Neuroinformatics. The clinical branch is linked to the NHS CHAIN Technology Sub-group Computational Neurology. The technological branch, concerned with neuromorphic computing, artificial intelligence, and applications in industry, is in the process of being formed by colleagues from Manchester University.

Activities in 2019

- Threshold Networks workshop, July 22-24, Nottingham, 2019, maths.nottingham.ac.uk/plp/pmzsc/tnetworks/tnetworks.html
- UK Neural Computation conference 2019 Nottingham, 2019.neuralcomputation.uk
- Tutorial on MIIND at CNS2019, cnsorg.org/cns-2019-tutorials#T4
- Session on Computational Neuroscience at Computability in Europe 2019 at Durham
- Talk by Bruce Graham at 7th Baltic-Nordic School on Neuroinformatics BNNI 2019
- Modeling Healthy and Diseased Brain: From Dendrites to Neurons and Networks, web.lsmuni.lt/bnni2019/en

Upcoming activities

The UK Neural Computation conference 2020 in Sheffield, neuralcomputation.uk

Selected publications

de Kamps M, Lepperød M, Lai YM (2019) Computational geometry for modeling neural populations: From visualization to simulation. *PLoS Comput Biol* 15(3): e1006729. doi.org/10.1371/journal.pcbi.1006729

Richards BA Lillcrap TP Beaudoin P Bengio Y Bogacz R Christensen A Clopath C Costa RP de Berker A Ganguli S Gillon CJ Hafner D Kepecs A Kriegeskorte N Latham P Lindsay GW Miller KD Naud R Pack CC Poirazi P Roelfsema P Sacramento J Saxe A Scellier B Schapiro AC Senn W Wayne G Yamins D Zenke F Zylberberg J Therien D Kording KP, A deep learning framework for neuroscience. 2019. *Nat. Neurosci.*, 22:1761-1770.

doi: [10.1038/s41593-019-0520-2](https://doi.org/10.1038/s41593-019-0520-2)

Weerasinghe G Duchet B Cagnan H Brown P Bick C Bogacz R Predicting the effects of deep brain stimulation using a reduced coupled oscillator model. 2019. *PLoS Comput. Biol.*, 15(8):e1006575.

doi: [10.1371/journal.pcbi.1006575](https://doi.org/10.1371/journal.pcbi.1006575)

Möller M Bogacz R Learning the payoffs and costs of actions. 2019. *PLoS Comput. Biol.*, 15(2):e1006285.

doi: [10.1371/journal.pcbi.1006285](https://doi.org/10.1371/journal.pcbi.1006285)

Whittington JCR Bogacz R Theories of Error Back-Propagation in the Brain. 2019. *Trends Cogn. Sci.*, 23, 235-250
doi: [10.1016/j.tics.2018.12.005](https://doi.org/10.1016/j.tics.2018.12.005)

Giannakakis E, Han CE, Weber B, Hutchings F, Kaiser M. Towards simulations of long-term behavior of neural networks: Modelling synaptic plasticity of connections within and between human brain regions. *Neurocomputing*, 2020.

Kaiser M. Computational models and fundamental constraints can inform the design of synthetic connectomes. *Physics of Life Reviews*, 2019

Thornton C, Hutchings F, Kaiser M. The Virtual Electrode Recording Tool for EXtracellular Potentials (VERTEX) Version 2.0: Modelling in vitro electrical stimulation of brain tissue. *Wellcome Open Research*, 4:20, 2019.

Node members

Prof. Marcus Kaiser, University of Newcastle (Chair)
Dr Stephen Eglon, University of Cambridge (Co-Chair)
Leslie Smith, University of Stirling
J. Douglas Armstrong, University of Edinburgh
Rafal Bogacz, University of Oxford
Ingo Bojak, University of Reading
Stephen Coombes, Nottingham University
Piotr Dudek, Manchester University
Ari Ercole, University of Cambridge
Bruce Graham, University of Stirling
Marc de Kamps, University of Leeds
David Menon, University of Cambridge
Thomas Nowotny, University of Sussex
Rasmus Petersen, University of Manchester
Evelyne Sernagor, University of Newcastle
Angus Silver, University College London
V. Anne Smith, University of St. Andrews
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Webpages/webservices currently maintained by the Node

Official Node Page: neuroinformatics.org.uk
Twitter: twitter.com/neuroinfuk

INCF endorses community standards and best practices

INCF has implemented a formal procedure for evaluating and endorsing community standards and best practices in support of the FAIR principles. Our mission is to make neuroscience more open and FAIR, to ensure that research funds and efforts are well invested, and that neuroscientific findings are robust and replicable.

Quality community standards are necessary to make FAIR resources and processes work, but too many neuroscience communities lack robust standards or have competing incompatible standards. The rapid development of new techniques also means that there is a continuous need for new and updated standards, and that old standards need an active developer and user community keeping them up to date.

By endorsing standards, INCF wants to

- make it easy to find the best, most reliable standard appropriate for your research
- ensure recognition for community members investing their time and effort in standards

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 continued to promote the new endorsement process at SfN 2019 in Chicago, USA

Endorsed standards and best practices in 2019

The Brain Imaging Data Structure (BIDS) is a standard prescribing a formal way to name and organize MRI data and metadata in a file system that simplifies communication and collaboration between users and enables easier data validation and software development through using consistent paths and naming for data files. BIDS is strict regarding file organization, naming, and file metadata; but in order to support wide adoption, permits substantial flexibility in the details of how other dataset metadata are described within the standard. bids.neuroimaging.io



NeuroML is a simulator-independent, XML-based standardized model description language for computational neuroscience that provides a common data format for defining and exchanging descriptions of neuronal cell and network models. NeuroML focuses on models which are based on the biophysical and anatomical properties of real neurons, i.e. which include details of the detailed neuronal morphologies, the membrane conductances which underlie action potential generation and which are based on known anatomical connectivity. neuroml.org



PyNN is a simulator-independent language for building neuronal network models. The PyNN API aims to support modelling at a high-level of abstraction (populations of neurons, layers, columns and the connections between them) while still allowing access to the details of individual neurons and synapses when required. PyNN provides a library of standard neuron, synapse, and synaptic plasticity models which have been verified to work the same on the different supported simulators. PyNN also provides a set of commonly-used connectivity algorithms (e.g. all-to-all, random, distance-dependent, small-world) but makes it easy to provide your own connectivity in a simulator-independent way. neuralensemble.org/PyNN



INCF Special Interest and Working Groups

Through special interest groups (SIGs) and working groups, INCF facilitates community members with compatible areas of interests to coordinate around a research topic, tool, or resource. In SIGs, users and developers can connect with community members to work collaboratively to develop, refine, and implement community standards and best practices. All community members are welcome to join a SIG, regardless of their location in the world. SIGs also serve as forums for getting agreement and community buy-in or the use of standards and best practices.

Through working groups, INCF offers financial support to researchers focused on developing or extending existing standards. Working groups can be formed from within a SIG or independently. Working groups differ from SIGs in that they are formed for short-term groups formed to accomplish a specific mission or task with specific deliverables and milestones.

Active SIGs in 2019

Neuroinformatics for cell types. This SIG coordinates common efforts for defining and describing cell types across neuroscience, to reduce duplicate efforts and to improve interoperability and reuse of cell type-specific data collected across groups. incf.org/sig/neuroinformatics-cell-types

Neuroinformatics for Aging. This SIG is a community dedicated to the creation and application of neuroinformatics technologies to address clinical and wellness challenges in aging. incf.org/sig/neuroinformatics-aging

Neuroshapes: Open SHACL schemas for FAIR neuroscience data. This SIG aims to coordinate community efforts for the development of open, use case driven and shared validatable data models (schemas, vocabularies) to enable the FAIR principles (Findable, Accessible, Interoperable and Reusable) for basic, computational and clinical neuroscience (meta)data. incf.org/sig/neuroshapes-open-shacl-schemas-fair-neuroscience-data

Reproducibility and Best Practices in Human Brain Imaging. The SIG aim is to collect, compile, synthesize and distribute information from task forces working on the separate projects but with reproducibility in neuroimaging as an overarching theme. The task forces are: Brain Imaging Informatics (NIDASH), Brain Imaging Data Structure (BIDS), Neuroimaging Data Model (NIDM)

incf.org/sig/reproducibility-and-best-practices-human-brain-imaging

Standardized Representations of Network Structures. This SIG deals with the various tools and formats for creating and sharing representations of biological neuronal networks, and will work towards ensuring these are as interoperable and usable as possible for computational neuroscientists. incf.org/sig/standardised-representations-network-structures

Neuroimaging Quality Control (niQC). This SIG aims to develop standards and best practices for quality control of neuroimaging data, including standardized protocols, easy to use tools and comprehensive manuals. incf.org/sig/neuroimaging-quality-control-niqc



Working Group meeting at the 2019 INCF Neuroinformatics Assmebly in Warsaw, Poland

Current working group

FAIR Metadata Working Group. The aim of this working group is the harmonization of Common Data Elements (CDEs) for data discovery and metadata annotation.

Use cases addressed:

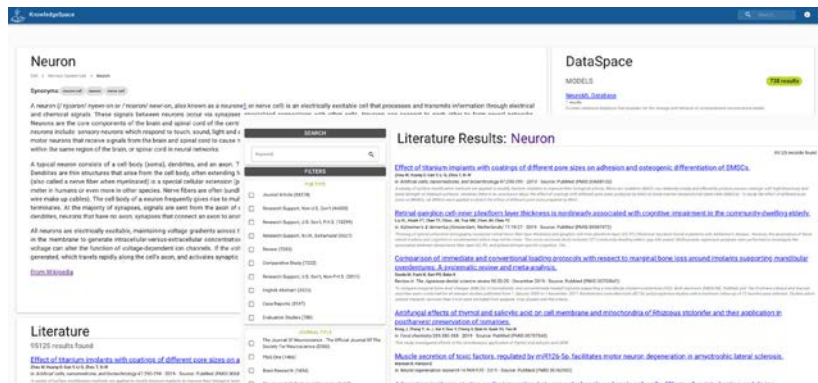
- mapping of data elements to corresponding CDEs as part of Neuroimaging Data Model (NIDM) tool development [work with the INCF SIG on Reproducibility and Best Practices in Human Brain Imaging]
- alignment of CDEs between projects such as the Longitudinal Online Research and Imaging System (LORIS) and Ontario Brain Institute Brain-CODE
- modeling of computational measures as CDEs, e.g., volumetric measures of brain structures provided by FreeSurfer

The group is working on a specification document for common data elements. Maryann Martone leads the group. incf.org/sig/fair-metadata-working-group

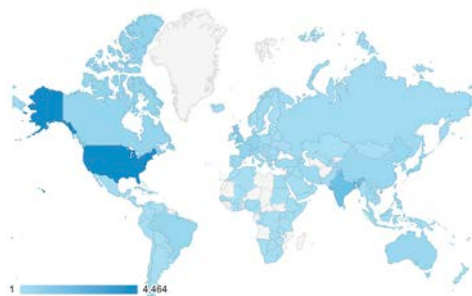
More information: incf.org/activities/standards-and-best-practices/incf-special-interest-groups

KnowledgeSpace

KnowledgeSpace is a community-based, data-driven encyclopedia for neuroscience that links brain research concepts to data, models, and the literature that support them. It was developed jointly by INCF, the Human Brain Project, and the Neuroscience Information Framework (NIF), a repository of global neuroscience web resources, including experimental, clinical, and translational neuroscience databases, knowledge bases, atlases, and genetic/genomic resources. KnowledgeSpace is a framework that combines general descriptions of neuroscience concepts found in wikipedia with more detailed content from NeuroLex, a dynamic lexicon of neuroscience concepts supported by NIF. It then integrates the content from those two sources with the latest neuroscience citations found in PubMed and data found in some of the world’s leading neuroscience repositories.



Screenshot from knowledge-space.org



Geographic distribution of KnowledgeSpace

During 2016 - 2019, KnowledgeSpace has made major progress towards its goal to be a globally used community-based, data-driven encyclopedia for neuroscience that links brain research concepts to data, models, and the literature that support them. Currently, KnowledgeSpace has an index of over 1,678,580 units of data and models coming from 14 different sources (Allen Brain Atlas, NeuroMorpho.org, Open Source Brain, Ion Channel Genealogy, PubMed, NeuroLex, ModelDB, GENSAT, NeuroDB, NeuroElectro, Blue Brain Project, Cell Image Library, Human Brain Project, and Brain Maps). During the period under review, KnowledgeSpace welcomed over 18,218 users from around the world during 40,534 sessions.

In 2019, KnowledgeSpace was integrated into TrainingSpace in order to link KnowledgeSpace data and models with links to appropriate tools and tutorials. In the near future, KnowledgeSpace will serve as an important interface between HBP and the US Brain Initiative due to the planned systematic population of KS with new content coming from the BRAIN Initiative Cell Census Network (BICCN, cell types in the mouse and human brain) and Stimulating Peripheral Activity to Relieve Conditions (SPARC, peripheral nervous system content).

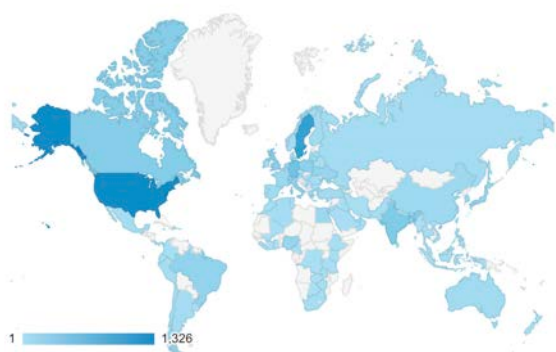
TrainingSpace

TrainingSpace, training.incf.org, is an online hub that makes multimedia educational content from courses, conference lectures, and laboratory exercises from some of the world's leading neuroscience institutes and societies more accessible to the global neuroscience community. It was developed in collaboration with the partners listed above. TrainingSpace provides users with study tracks for self-guided study, tutorials on tools and open science resources for neuroscience research, a Q&A forum (Neurostars), and access to publicly available datasets as well as links to literature references.

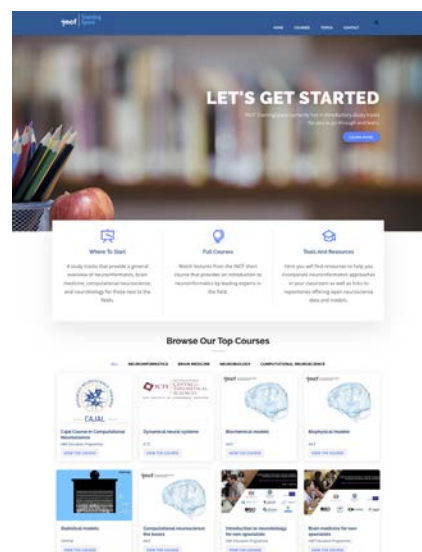
Since its launch in July 2018 to 2019, TrainingSpace has welcomed 3,582 users from around the world which resulted in 27,505 page views of its portfolio of over 300 lectures and tutorials.

TrainingSpace currently serves as the major repository of training materials for INCF, HBP, and The Virtual Brain. 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 include a summary, 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/lectures.

In 2019 TrainingSpace underwent a major redesign and significant content expansion (150 new lectures and tutorials) and was relaunched in March 2019 at the Society of Neuroscientists of Africa (SONA) conference in Lagos, Nigeria.



Geographic distribution of TrainingSpace



Screenshot from training.incf.org

Google Summer of Code

INCF participated for the 9th time as mentoring organization in the 2019 Google Summer of Code. This year 21 projects at a value of 14,4 kUSD were mentored by participants recruited from the Nodes and the wider community. 86% of the projects were successfully completed.

Project titles of accepted & completed projects in 2019

Member countries represented in mentoring the projects include UK (6), US (6), Romania (3), Belgium (3), Canada (2), India (2), Germany (2), Czech Republic (1), Netherlands (1), Portugal (1), France (1).

Students came from: India (8), Canada (3), Germany (3), UK (2), US (2), China (2), Israel (1).

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

Title	Student	Mentor
CBRAIN	Logan Martel	Andrew Doyle, Shawn Brown
Deep learning in Spiking Neural Networks using GeNN	Ajay Subramanaian	Thomas Nowotny, James Knight
Simulating bob_robotics models using Gazebo	Shinjan Mitra	Alex Dewar
Proposal for Continuous Workflows(version3)	Yijie Huang	Petr Jezek
Visualize a large Connectome in 3D using HTML5	Manoranjan Kumar Bharti	Lia Domide, Paula Popa
Reusable visualization tools for Jupyter	Umar Abdullahi	Lia Domide, Paula Popa
Demo Packages for clinical case studies reports	Shimeng Liu	Daniele Marinazzo, Hannelore Aerts
OSB conversion for a large-scale model of macaque visual cortex	Gili Karni	Jessica Dafflon, Padraig Gleeson
Nighres	Leevi Kerkelä	Julia Huntenburg, Pierre-Louis Bazin
Continuous Integration of Research Data	Mrinal Wahal	Michael Sonntag, Achilleas Koutsou
Running FindSim experiments on cloud servers	Hou Chen	Surbhit Wagle, Upi Bhalla
Model fitting	Aleksandra Teska	Marcel Stimberg, Dan Goodman
Cell Tracking using Geometrical Features	Karthik Nair	Dimiter Prodanov
Improve LORIS Automated Testing	Alexandra Livadas	Christine Rogers
Tedana	Monica Yao	Kirstie Whitake
Command-line	Ruslan Yermakov	Kirstie Whitaker
Modeling Neural Development with Braitenberg Vehicles	Stefan Dvoretzkii	Bradly Alicea
P2P File Sharing framework for PyOpenWorm	Jaideep Seth	Arnab Banerjee, Mark Watts
Semantic Image Processing for Developmental Data Science	Vinay Varma Nadimpalli	Bradly Alicea
Open Data for OpenWorm	Emily Thomas	Stephen Larson
Maxima to Python translator	Lakshya A Agrawal	Dimiter Prodanov, Robert Dodier

Google Season of Docs

Google Season of Docs is a global program that brings the open source and technical writer communities together. In 2019, the INCF network served as a mentoring organization that paired technical writers with developers of open source software to work on 3-month technical writing projects. During the 2019 Google Seasons of Docs cycle, 3 out of the 6 proposals submitted by INCF were accepted.

List of accepted Google Season of Doc projects 2019

- OpenWorm; Mentor: Bradley Alicea (OpenWorm, US)
- The Turing Way; Mentor: Kirstie Whitaker (Alan Turing Institute, UK)
- LORIS open neuroscience platform--removing barriers for users and contributors; Mentor: Christine Rogers (McGill University, Canada)

Neurostars

Neurostars is a question and answer site that serves the INCF network as a forum for knowledge exchange between national nodes and beyond; as a point of interaction between neuroscientists, software developers, and infrastructure providers; and as an integral resource in the network's training and mentoring initiatives. As part of the TrainingSpace suite, it provides community interaction and Q&A access to experts for students and teachers from around the world. In 2019 Neurostars grew to 1788 users submitting 4,900 posts and generating 829,000 page views.

During 2020, the Neurostars platform will be integrated into the INCF standards and best practices endorsement portal and serve as the mechanism in which community feedback will be recorded and preserved.

INCF Assembly 2019

The INCF Assembly 2019 was hosted by the Polish Node at the University of Warsaw in August. The Assembly comprised a 2-day conference program, 2 days of training activities, the Brains United workshop, and a hackathon. The Assembly welcomed 175 participants from 22 countries and was supported by 15 sponsors.

The lectures are available on the INCF YouTube channel: youtube.com/INCForg

The photos can be viewed on the INCF Flickr account: flickr.com/INCForg



Participants at the 2019 INCF Neuroinformatics Assembly in Warsaw, Poland

Traumatic Brain Injury collaboration

Collaborative European NeuroTrauma Effectiveness Research in Traumatic Brain Injury (CENTER-TBI) aims to better characterize TBI and identify the most effective clinical interventions, link patient profiles with effectiveness of treatments (toward “precision medicine”), and improve outcomes via comparative-effectiveness studies. The project has collected an unprecedented scale of data from 65 participating centers across 20 European countries, with data about 5400 patients being collected in the core study and 22760 in the Registry. INCF’s role in the project has been to develop a data/informatics platform, internationalization of the Common Data Elements, implement appropriate standards developed by the INCF network, and facilitation of novel analytical methods. INCF also played a lead role in coordinating CENTER-TBI’s international data curation task force. The project has recently been extended by a year until 2021 to allow further research using the data. INCF has received additional funding for the extension.

The INCF Neuroinformatics Data Collection Platform (NDCP) enables the collection, storage and sharing of clinical data related to the brain that was developed during a collaboration with CENTER-TBI, a large European project that aims to better characterize TBI and identify the most effective clinical interventions.

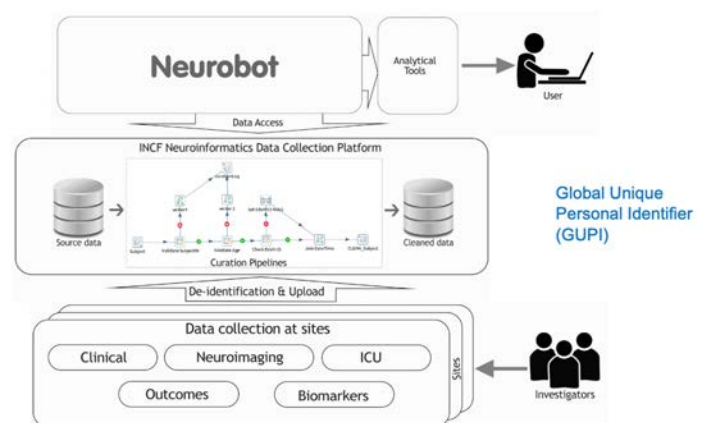
Specific objectives of the platform services are:

- integration of clinical records with imaging, high resolution ICU and biomarker data
- maintenance of a clinical data entry tools for collecting the patient records from hospitals
- catalog data and metadata collected using different tools.
- facilitate integrated data curation pipelines for transforming and curating data
- provide data access interfaces for querying and downloading the data
- integration with existing data analysis platforms

NDCP can be used for managing clinical data, high resolution ICU data, imaging data, cognition test reports, and biomarker/genomics data. The data is integrated from different data sources and data management systems, curated, annotated and associated with individual patients using a Global Unique Personal Identification number. The platform also has robust interfaces to download subsets of data in various formats. It also has the capability to integrate with different existing data analysis platforms.

2019 Project activities and progress

- continued support for the data collection platform and the data access tool
- ongoing data curation activities including coordination between researchers and implementation of curation pipelines within the data collection platform
- an enhanced data access tool (Neurobot) for researchers to access, download, and analyse the analysis-ready data from the Neuroinformatics platform
- incorporation, curation, and the availability of the second versions of both the core and registry datasets for analysis
- an updated and comprehensive data dictionary including the curation notes that is extended through the data access tool.



Schematic of NDCP

Neurobot

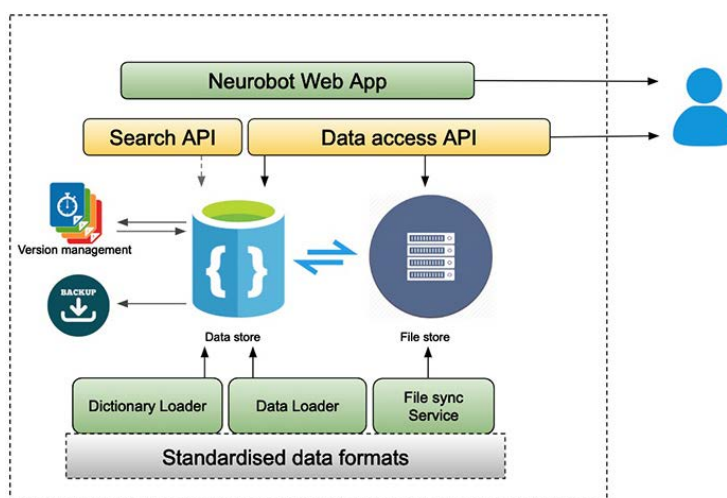
Most clinical data management tools are designed for efficient data acquisition and data processing; however, they often lack a usable data access interface. Neurobot, a lightweight data sharing application, was developed to provide user friendly data access interface that can be used for sharing a wide variety of versioned datasets. The data model behind Neurobot has a scalable backend and has been optimised for faster queries on large datasets.

For data managers, Neurobot offers an easy to use front-end to upload and manage data clinical data, dictionary, and any other documentation about the data. Personalized data access permissions can be configured, thus allowing managing sub-studies under the same deployment. For researchers or data analysts who access data, Neurobot allows free text search over the data and metadata to find the right data elements and download them; it also lets them create subsets of data that can be shared with other users or even add it to their publication. Finally, Neurobot provides public users with access to the dictionary information of the subset of data published by researchers. By separating data publishing and sharing tools from the data management platform, Neurobot provides the flexibility required for most large-scale clinical projects.

During 2019, further development of Neurobot has been performed. The enhancements include:

- user Interface(UI) enhancements
- roles and permission-based data access
- user groups
- inclusion of roles such as data owners and super admin
- admin interface for managing users, datasets and permissions
- provision to include data from sub-studies
- data management interface
- saving multiple searches and management
- API endpoints
- API keys management

The Resource Identifier (RRID) to include in the publications related to Neurobot is INCF-Neurobot, [RRID:SCR_017004](https://rrid.nlm.nih.gov/rrid/INCF-Neurobot).



Schematic of 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 community members and Secretariat staff participate in IBI Coordinating Body meetings and are involved in the following IBI Working Groups:

Maryann Martone, INCF Governing Board chair: Datasharing Working Group (co-chair)

Mathew Abrams, INCF Director: Inventory Working Group (participant)

Helena Ledmyr, INCF Director: Communications and Outreach Working Group (co-chair)



DAQORD

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. DAQCORD is initiated from the International Initiative for Traumatic Brain Injury Research (InTBIR) where INCF is an active participant. The goal is to capture key information about data acquisition, quality control measures, and curation in a tool that is linked to the dataset so that potential research collaborators can determine if the data meets their needs and expectations.

DAQCORD tool aims: to provide a framework/toolkit for robust study design (and electronic case report form- eCRF- design in particular) and quality management; to provide a framework by which early study plans can be systematically appraised (for example by funding organisations) in terms of their approach to data quality; and to provide a reporting framework with which to describe the steps taken to ensure data quality.



A new INCF membership model

In 2019, INCF worked hard to optimize the services we provide to the neuroscience community and has reshaped as an organization to a new, member-based model. We have expanded the ways the community can be active participants and contributors to our mission to develop, evaluate, endorse, and implement standards and best practices that embrace the principles of open, FAIR, and citable neuroscience.

INCF membership is now open to individuals, institutions, organizations, and companies who are interested in pushing reproducible neuroscience further and faster.

Membership benefits include discounts on events, products and platforms, the chance to nominate members for INCF committees, access to Working Group funding, industry collaborations, and to be a part of, and shape, the development of standards & best practices for neuroscience.

INCF provides:

- a forum where
 - neuroinformaticians can develop their skills, and search for others with needed skills
 - neuroscientists, informaticians, tool developers, and others can join together on common issues, and organize Special Interest Groups and Working Groups
 - infrastructure providers and tool developers can share experiences and develop their toolsets to match community needs
 - companies can take part in discussions and decisions around strategy for standards development and implementation
- neuroscience researchers with training in how to manage, share, and analyze their data
- funders with tools to implement and encourage open and FAIR practices in neuroscience projects

Detailed information about the different memberships and how to join can be found on incf.org/join



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 increase 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 Neuroinformatics 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 2020 here: incf.org/join-incf/connect-with-us

In 2019, INCF premiered a new promo video showcasing the importance of INCF and the need for standards and best practices in neuroscience, receiving high praise both within the INCF community and the wider neuroscience community. You can find the video here: youtube.com/INCForg

Presence at international conferences in 2019

- Center TBI general assembly in Antwerp, Brussels, 10-11 January
- Open Science Conference in Berlin, Germany, 19-20 March
- Society of Neuroscientists of Africa meeting, SONA, in Lagos, Nigeria, 24-28 March
- INCF/OBI/Neurotech to EEG event in Ontario, Canada, 25 March
- Making open neuroscience infrastructure interoperable workshop in Montréal, Canada, 27-29 March
- Research Data Alliance meeting in Philadelphia, US, 2-3 April
- EU workshop on brain imaging in Brussels, Belgium, 4-5 April
- US BRAIN investigators meeting in Washington DC, US, 11-13 April
- The BrainMind summit at MIT in Cambridge, US, 4-5 May
- Global Brain Consortium meeting in Montréal, Canada, 9-10 May
- Annual Canadian Neuroscience Meeting in Toronto, Canada, 22-25 May
- OHBM in Rome, Italy, 9-11 June. Joint booth with NITRC
- OCNS in Barcelona, Spain, 15-17 July
- IBRO in Daegu, Korea, 21-25 September
- Society for Neuroscience meeting in Chicago, US 19-23 October
- inTBIR meeting in Bethesda, US, 24-25 October
- Code Refinery workshop, 19-21 November



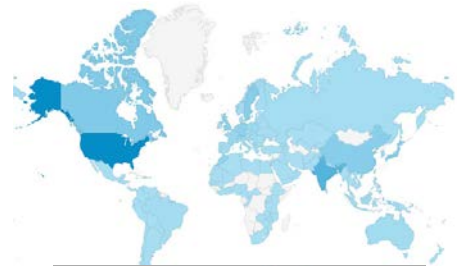
The INCF booth at Society for Neuroscience in Chicago, US, on October 19-23, 2019

INCF portal

In 2019 INCF launched a brand new version of our portal incf.org. It's now not only full of information about our activities and how you can get involved, it's also the place where our community can find a standard or best practice for a specific use case, submit their own standard for endorsement, or apply to form a working group to develop a new standard or extend an existing one. There's also information about our training activities and related services, and a new blog.

Portal

Users: 20322 +8,1%
 Sessions: 27400 +2,3%
 Avg. session duration: 01:40 min



United States	25.26%
India	12.94%
Canada	6.06%
China	5.11%
Sweden	5.05%

Sessions by country

INCF newsletter and social media

The INCF newsletter is distributed 4 times per year and had 1220 subscribers at the end of 2019. INCF also uses several other platforms for active outreach: Twitter, Facebook, LinkedIn and YouTube.

Platform	Followers	Views/engagements
Twitter	4000 +29,5%	1576400 +69,5%
Facebook	2630 +11%	1267 +54%
Youtube	1502 +10%	19309 -7%
LinkedIn	774 +18%	n/a



Screenshot of the new incf.org

Plans for 2020

- Convene meetings of the INCF Governing Councils
- Develop and launch the INCF Industry Advisory Council
- Recruit new academic and commercial members through the new membership model
- Continue to endorse community standards and best practices for neuroscience
- Develop the content of the INCF TrainingSpace and continue the development of training-related initiatives
- Continue the development of KnowledgeSpace
- Support interactions within the international community and encourage global collaboration
- Support dissemination of the outcomes and deliverables of the INCF network
- 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 the INCF Assembly 2020 in Seattle, US, and plan the organization of the INCF Assembly 2021
- Highlight the work of INCF and the global neuroinformatics community at international meetings
- 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
- Continue the development of strategic partnerships with synergistic and complementary organizations that can further the mission of INCF



The chair of the Governing Board, Maryanne Martone and the chair of the CTSI, JB Poline

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).

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

USA	Maryanne Martone (Chair), University of California San Diego
Australia	Gary Egan (Deputy Chair), Monash University
Canada	Alan C Evans, 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)

Council for Training, Science, and Infrastructure (CTSI)

Members

USA	JB Poline (Chair), McGill university
Sweden	Jeanette Hellgren Koteleski (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	Stephen Eglon, Cambridge University
USA	David Kennedy, University of Massachusetts

External advisor

USA	Helen Mayberg, The Mount Sinai Hospital
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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.

Members

Canada	Jane Roskams (Chair), University of British Columbia/CONP
France	Stephanie De La Rochefoucauld (Deputy Chair), IBRO
Austria	Alois Saria, Innsbruck Medical University/HBP
Germany	Thomas Wachtler, Ludwig Maximilian University of Munich
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
USA	Reza Abbasi-Asl, Allen Institute for Brain Science/IEEE
USA	Carlos Aizenman, Brown University/SfN



Members of the TEC committee

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 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

Standards and Best Practices Committee

The Standards and best practices (SBP) committee is one of the governing bodies of INCF. It consists of scientific representatives from both Governing and Associate Nodes. The SBP committee is responsible for coordinating the INCF standards and best practices endorsement scheme and has oversight over working groups funded by the network to develop, harmonize, and/or refine community standards and best practices.

Members

USA	Maryann Martone (Chair), University of California, San Diego
Australia	Wojtek Goscinski, Monash University
Canada	Samir Das, McGill University
Germany	Thomas Wachtler, Ludwig Maximilian University of Munich
Malaysia	Eric Tatt Wei Ho, Universiti Teknologi PETRONAS
Norway	Trygve Leergaard, University of Oslo
Sweden	Jeanette Hellgren-Kotaleski, Royal Institute of Technology
USA	David Kennedy, University of Massachusetts

Secretariat staff

During 2019, the INCF Secretariat employed the following persons.



Executive Director
Linda Lanyon, Ph.D.
(Leave March-October 2019)



Head of Development and Communications
Helena Ledmyr, Ph.D.
(Acting Executive Director March-October)



Head of Science and Training
Mathew Birdsall Abrams, Ph.D. MPH
(Acting Deputy Director March-October)



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
Visakh Muraleedharan, M.Sc.



Community Engagement Office
Malin Sandström, Ph.D.

Affiliated Researchers



Neuroinformatics Researcher
Mikael Djurfeldt, Ph.D.



Neuroinformatics Professor
Jeanette Hellgren Kotaleski, Ph.D.

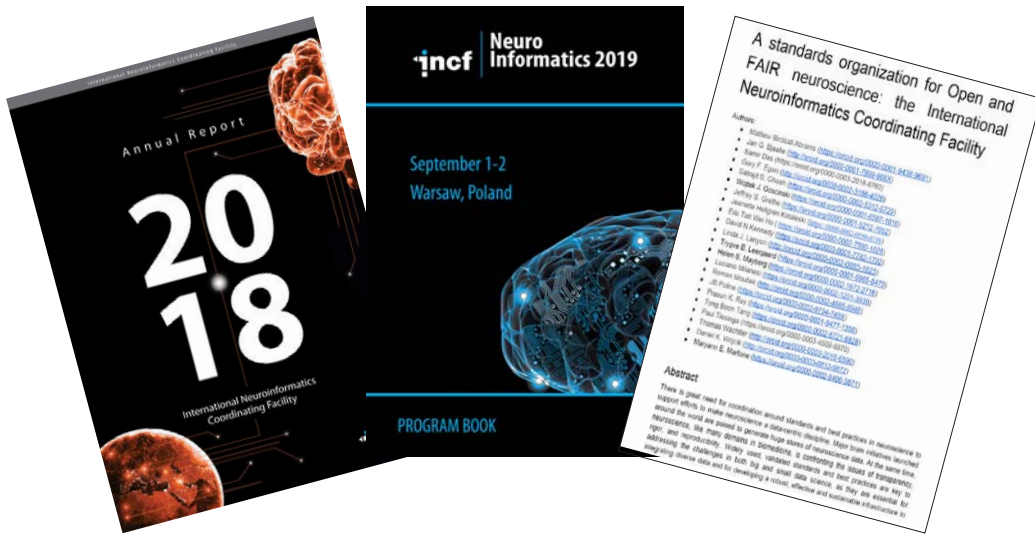


INCF Special Advisor
Sten Grillner, MD, Ph.D.

Publications and background material

Publications

- Annual Report 2018
- INCF Assembly program book 2019
- A standards organization for Open and FAIR neuroscience: the International Neuroinformatics Coordinating Facility DOI: [10.31219/osf.io/3rt9b](https://doi.org/10.31219/osf.io/3rt9b)



Newsletters



Summary financial report 2019 in kSEK, kUSD, and kEUR
Income statement December 31, 2019

Financial summary

Summary financial report 2019, in kSEK, kUSD and kEUR

	kSEK	kUSD	kEUR
Income			
Total income	7,954	854	762
Expenditure			
General Administration	-7,092	-761	-680
Secretariat Running Expenses	-418	-45	-40
Strategic Action Areas	-477	-51	-46
Training & Education	-264	-28	-25
Professional Services	-1,283	-138	-123
Externally Funded Projects	1,265	136	121
Total expenditure	-8,268	-887	-792
Depreciation	-108	-12	-10
Total expenses	-8,376	-899	-803
Financial net	357	38	34
Retained funds			
Retained funds 2018 balance carried forward	13,605	1,460	1,304
Change in retained fund 2019	-65	-7	-6
Wherof financial net 2019	357	38	34
Total retained funds 2019	13,540	1,453	1,298
Avarage exchange rate*		9.3170	10.4340

Financial contributions

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

Governing Member countries in 2019

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



