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EBRAINS Summit 2025 Programme

Monday 8 December – Internal Day and PhD Networking Event

Time	Session	Description	Speakers
12:00-17:00	EBRAINS Internal Day		
12:00-13:00	Lunch		
13:00-17:00	EBRAINS PhD Networking Event	The PhD event will offer both scientific insight and career perspective, helping attendees connect with the broader research community and envision their future. The session will entail two success stories from current and former PhD students, a Scientific Keynote 'Building Methods for Neuroscience' by Rafael Yuste and an AMA panel with the speakers. The session will also have a presentation by Accelnet called 'Connecting Movement, Music, and Brain Health: Building an International Collaborative Future'. Discover how the Movement, Music, and Brain Health AccelNet fosters collaboration among neuroscientists, artists, engineers, policymakers, medical professionals, and students across the world. The session will highlight community-driven initiatives, hands-on workshops, art-based outreach, and shared data practices, while inviting student perspectives on shaping the network's future. The goal of the networking event is to provide PhD candidates with inspiration, practical insights, and a space for open dialogue.	• Rafael Yuste • Petrut Bogdan • Katya Zossimova • Yoshua E. Lima-Carmona
16:10-16:40	Coffee break		

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EBRAINS Summit 2025 Programme

Tuesday 9 December – Open to all: A Public Day for Brain Research and Innovation

Exhibition open from 09:00-17:45

Time	Session	Description	Speakers
09:00-10:00	Registration and morning coffee		
10:00-10:15	Advancing European Neuroscience through EBRAINS 2.0 – Legacy, Progress, and Future Impact		Kilian Gross
10:15-10:30	EUROHPC JU – State of Play		Anders Dam Jensen
10:30-11:00	Transforming Brain Research and Medicine		Katrin Amunts
11:00-11:30	EBRAINS as a driver for research and development in Europe	In this session, EBRAINS Joint CEO Philippe Vernier will highlight EBRAINS pivotal role in advancing research and innovation across Europe. As a digital research infrastructure at the forefront of brain research, EBRAINS empowers scientists with tools and data, fostering collaboration across disciplines and border. This session will underscore EBRAINS' contributions to European scientific leadership, its impact on health and technology sectors, and its strategic importance in shaping neuroscience.	Philippe Vernier
11:30-12:15	Neurotechnology: An upcoming revolution in science, medicine and society	The rapid development of neurotechnology, defined as methods to record or alter brain activity, will revolutionise science, medicine and the tech industry. In neuroscience, optical and nanoelectronic neurotechnological tools are enabling the systematic measurement and manipulation of brain activity in laboratory animals, providing deep insights into basic mechanisms of brain function. Similar tools, when applied to human patients, could	Rafael Yuste (Keynote Speaker)

		enable a better understanding of the pathophysiology of mental and neurological diseases, likely leading to new therapeutics. Non-invasive brain-computer interface technologies will enable the direct linking of our brain to external computational devices, algorithms or memory storage. These advances could provide a new avenue of innovation and business opportunity for the tech industry, and lead to the mental and cognitive augmentation of our species. The application of neurotech is therefore poised to have a transformative effect upon humanity, with profound ethical and societal consequences intersecting with basic human rights such as mental privacy, free will and personal identity. Moreover, Europe is ideally poised to capitalize on its deep bench of expertise in neurotechnology and, with efforts such as Spain Neurotech, could come to the forefront of this exciting field.	
12:15-13:30	Lunch (for registrants with full conference ticket)		
13:30-14:30	Medical data for enabling progress in healthcare in Europe and beyond	This panel, co-organised by EBRAINS and the INCF, will explore the key role of FAIR (Findable, Accessible, Interoperable, Reusable) medical data in advancing healthcare research and innovation. With contributions from experts in neuroscience and data infrastructure, the discussion will highlight the importance of collaborative frameworks and digital platforms – such as EBRAINS – that facilitate data sharing, integration and reuse across national and disciplinary boundaries. Focus will be placed on how curated, high-quality datasets can drive scientific advances and clinical translation in brain health. The session will be moderated by Prof. Jan Bjaalie.	• Petra Ritter • Jan Bjaalie • Rachel Brouwer • Mathew Abrams • Francis Jeanson
14:30-15:15	Epinov trial: Impacts and lessons learned	This session explores the implementation and preliminary outcomes of the EPINOV clinical trial, which integrates virtual brain twin technology to improve epilepsy surgery planning. Talks will cover what it takes to build a trial of this scale and complexity. Preliminary clinical results will be shared, alongside perspectives from both a patient and a neurosurgeon on the role of	• Viktor Jirsa • Huifang Wang • Nigel P. Pedersen • Jean-Marc Ferrier • Randy McIntosh

		neurotechnology in care. The session will conclude with a discussion on translating innovation into clinical practice and the infrastructure needed to scale such approaches effectively.	
15:15-15:45	Google Summer of Code	This session highlights two neuroscience open-source projects completed through Google Summer of Code (GSoC) 2024, where EBRAINS participated under the umbrella of the International Neuroinformatics Coordinating Facility (INCF), the official GSoC mentoring organization. The student presentations will feature "Transitioning from Simulation-Based Inference to Automatic MCMC for Virtual Brain Inference" and "Automating BIDS Dataset Registration into the EBRAINS Knowledge Graph."	• Mathew Abrams • Renqing Cuomao • Monica Paoletti
15:45:16:15	Coffee break		
16:15-17:00	Setting new standards in neurology in Europe	This session features three lectures exploring key frontiers in the field: emerging opportunities and challenges in neurology, advances in large-scale neuroimaging and medical AI, and the rapidly developing domain of cancer neuroscience.	• Frank Winkler • Masud Husain • Maurizio Corbetta
17:00-17:45	Welcome Reception - Grab a drink at the EBRAINS booth		
17:45-18:45	Your Brain on Beethoven - Artistic performance by AccelNet	Violinist Dr. Stella Chen (2019 Queen Elizabeth Competition winner and violin faculty at the Juilliard School) and internationally acclaimed concert pianist Dr. Mei Rui (Director of Music-in-Medicine, Principal Investigator and Assistant Professor of Neurosurgery at MD Anderson Cancer Center) will perform Beethoven’s iconic “Kreutzer" Sonata. During the performance, real-time Brain-Computer Interface mapping will display the violinist's and pianist's brain activity on stage, showcasing their neural activation and synchronisation as they perform.	• Stella Chen • Mei Rui • Jose L. Contreras-Vidal

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EBRAINS Summit 2025 Programme

Wednesday 10 December – Research Powered by EBRAINS

Exhibition open from 09:00-17:00

Time	Session	Description	Speakers
08:00-09:00	Registration and morning coffee		
09:00-09:05	Welcome		
09:05-09:30	User experience: Interfacing with neuroscience with MATLAB	This talk will highlight three core dimensions of usability and show how the MATLAB platform helps researchers overcome common barriers. First, we'll explore coding productivity—introducing computational notebooks and AI-assisted development. Second, we'll address usability of compute and data resources, including HPC integration, database access, and reproducibility best practices. Finally, we'll focus on usability in real-world workflows that require hardware control or deployment, with examples relevant to medical technology.	Shubo Chakrabarti
09:40-10:00	User talk: The 5M-Connectome Dataset: Multimodal Mapping of the Human Brain for Individualized Brain Modeling		Alessandra Bertoldo
	User talk: A Platform for Human Imaging for Translational Research in Neurological Disorders	This talk presents the Platform for Human Imaging (PHI), a new EBRAINS-integrated infrastructure designed to support translational research in neurological disorders. Built upon the Human Intracerebral EEG Platform developed at CHUV, PHI extends its capabilities to multimodal neuroimaging (structural, diffusion, and functional MRI; PET) as well as clinical and cognitive data. The platform provides secure, GDPR-compliant data management, automated ingestion, and standardized feature extraction through an	Lorenzo Pini

		ad-hoc app called “Multimodal Analytical Tool for Neuroimaging” (MATI v1.0). With over 1,700 patients’ datasets collected across European centers, PHI represents one of the largest harmonized neuroimaging repositories in Europe, enabling reproducible, AI-ready analyses and multi-center collaboration to accelerate the translation of connectome-based biomarkers into clinical practice.	
10:00-10:20	User talk: Differential predictability of cognitive profiles from brain structure in older males and females	Structural brain imaging parameters may successfully predict cognitive performance in pathological conditions but mostly fail to predict cognitive abilities in healthy older adults. One important aspect contributing to this might be sex differences. Behaviorally, older males and females have been found to differ in terms of cognitive profiles, which cannot be captured by examining them as one homogenous group. In the current study, we examined whether the prediction of cognitive performance from grey matter volumes (GMV) of all parcels from the Julich Brain Cytoarchitectonic Atlas, implemented in the EBRAINS Research Infrastructure, would benefit from the investigation of sex-specific cognitive profiles in a large population-based sample of older adults (1000BRAINS; N = 634; age range 55-85 years). Prediction performance was assessed using a machine learning (ML) approach. Targets represented a) a whole-sample cognitive component solution extracted from males and females, and b) sex-specific cognitive components. Results revealed a generally low predictability of cognitive profiles from region-wise GMV. In males, low predictability was observed across both, the whole sample as well as sex-specific cognitive components. In females, however, predictability differences across sex-specific cognitive components were observed, i.e. visual working memory (WM) and executive functions showed higher predictability than fluency and verbal WM. Hence, results accentuated that addressing sex-specific cognitive profiles allow a more fine-grained investigation of predictability differences, which may not be observable in the prediction of the whole-sample solution. The current findings emphasize the necessity for further investigation into sex-specific analyses of brain-behaviour associations in older	Christiane Jockwitz

		adults. Moreover, they may also be instrumental in adapting personalized prediction and simulation approaches, such as the virtual ageing brain (TVB), to predict cognitive decline.	
	User talk: Cohort amortized personalization: navigating privacy-utility trade-offs in digital twin infrastructure	This talk introduces Cohort-Amortized Personalization (CAP), a framework that addresses the tension between personalized virtual brain twin modeling and international data privacy regulations. CAP learns mappings from shareable cohort statistics to model parameters, enabling anonymous training on public infrastructure while maintaining personalized inference. Through two operational models—demonstrated with aging and epilepsy cohorts—we show how CAP navigates the privacy-utility trade-off compared to federated learning and synthetic data approaches, providing a practical pathway for scalable, GDPR-compliant neuroimaging infrastructure.	Marmaduke Woodman
10:20-10:40	User talk: A surface-based probabilistic atlas of human cortical cytoarchitecture	This talk describes a project to analyze the individual subjects in the Julich-Brain atlas using cortical surface-based techniques. The current atlas has 137 cytoarchitecturally defined cortical regions per hemisphere. We will describe the process of mapping these on to a cortical surface mesh model, creating a surface-based atlas, and applying the atlas to in vivo subjects. We compare the surface-based atlas to a volume-based atlas and show that surface-based gives more accurate results.	Douglas Greve
	User talk: EBRAINS as a Bridge Between Education and Research in Neuroscience: The EITN-EBRAINS Fall School Experience	This presentation describes how EBRAINS serves as a powerful platform for teaching computational neuroscience at the EITN-EBRAINS Fall School. Students engage directly with multiscale modelling tools—including NEST, NEURON, and The Virtual Brain—through hands-on tutorials and group projects. We discuss educational outcomes, project successes, and guidance for incorporating EBRAINS into future training initiatives.	Damien Depannemaecker
10:40-11:00	User talk: Bringing Marmoset to EBRAINS	The Marmoset@EBRAINS project focused on expanding the EBRAINS research infrastructure by incorporating a digital atlas of the common marmoset brain. This effort is driven by the marmoset's growing importance as a primate model for bridging the translational gap between human and rodent studies in neuroscience. At the	Piotr Majka

		same time, the project serves as a real-world test of the platform's core principles: flexibility, interoperability, and extensibility.	
11:10-11:45	EBRAINS Roadmap 2026-2036	In this session, EBRAINS Chief Science Officer Prof. Viktor Jirsa will present the community-driven initiative and steps that will define the scientific, clinical, and technological priorities guiding the evolution of EBRAINS as Europe's Digital Research Infrastructure for neuroscience. This initiative will ultimately deliver the EBRAINS Roadmap 2026-2036.	Viktor Jirsa
11:45-12:30	Converging Minds and the Evolution of Brains for Complex Cognition	The famous evolutionary biologist Stephen Jay Gould famously remarked that "...if the tape of life could be rewound under the same conditions, evolution could take a very different course, and the human mind would not arise again, even if life's tape could be replayed a thousand times". In contrast, his contemporary colleague Simon Conway Morris wrote that "convergence hints at the existence of a deeper structure to biology... The evolutionary routes are many, but the destinations are limited". Decades after this dispute, we increasingly discover that indeed the destinations of evolution are much more limited than previously assumed. At least, when it comes to cognition. Just take this: Great apes like chimpanzees command complex cognition and have a large neocortex. In comparison, birds like corvids and parrots have much smaller brains and no neocortex. This should cast a dim prospect on their cognitive abilities. But studies of the last two decades revealed that there is not a single cognitive ability of chimpanzees (brain weight 400g) that was not also demonstrated in corvids and parrots (brain weights 3-25g). How is that possible? This question keeps me awake because it challenges core assumptions on the evolution and the neural fundaments of complex cognition. Meanwhile I realized that I must travel back into the deep time of vertebrate evolution to find answers. This talk is about this journey.	Onur Güntürkün (Keynote Speaker)
12:30-13:45	Lunch		
13:45-14:30	Parallel session: Future Computing	EBRAINS computing services will empower users to scale their science on Europe's most powerful computers: the distributed EuroHPC JU environment. However, HPC architectures face	• Cathrin Stöver • Cezary Mazurek • Estela Suarez

		increasing challenges related to immense energy consumption and climate impact. As artificial intelligence (AI) and big data applications scale, relying solely on conventional methods is unsustainable. The panel will discuss the future of computing and how to progress towards a hybrid, collaborative ecosystem of complementary technologies moving beyond traditional von Neumann systems: Integrating quantum computing resources and opening the door to neuromorphic systems – hardware inspired by the brain.	• Johannes Schemmel • Mihai A. Petrovici • Thilo Werner
	Parallel session: Brain Modelling and simulation	This session will showcase how EBRAINS powers brain modelling and simulations by highlighting three case studies at different spatiotemporal scales. We will find our way from multicompartmental single-neuron simulations to large-scale networks and population-level whole-brain simulations. The examples will illustrate how EBRAINS can be used in both basic science and clinical research.	• Sacha van Albada • Fleur Zeldenrust • Astrid Correa • Jonathan Mapelli • Jan Fousek
14:30-15:15	Parallel session: AI for Neuroscience and Neuro AI	This session will explore the dynamic interplay between artificial intelligence and neuroscience, highlighting how AI methods are transforming the analysis of complex brain data and how insights from neuroscience can inspire the development of novel computational models.	• Rainer Goebel • Michael Tangermann • Mario Senden
	Parallel session: Joint AccelNet – EBRAINS session - Advancing Data Standards, Models and Neurotechnology for Arts-in-Medicine	Works of art don't just entertain, heal or console; they can also promote health, learning, and the development of more humane technologies. Moreover, advances in AI, brain-computer interfacing, and brain modeling enable the study of mechanisms by which the arts have an impact on brain activity and brain health. The panel will discuss challenges and clinical opportunities in advancing data standards, models and neurotechnology for advancing and personalizing arts-in-medicine and promote brain health.	• Jose L. Contreras-Vidal • Viktor Jirsa • Philippe Vernier • Manuela Filippa • Laura Y. Cabrera • Francesco Pavone
15:15-15:45	Coffee break		
15:45-16:45	Parallel session: Neurotechnology: Time for Europe?	This panel brings together leading researchers to discuss how Europe can take a stronger role in the rapidly advancing field of neurotechnology. As global initiatives drive breakthroughs in brain recording and modulation, the session will explore how coordinated	• Rafael Yuste • Pieter R. Roelfsema • Valentina Emiliani • Maria Asplund

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		European efforts can harness this momentum to boost neuroscience, medicine, and innovation.	• Barun Dutta
	Parallel session: Making Neural Data and Algorithms Interoperable Across the World	This session examines strategies for achieving interoperability among data, data platforms, analysis pipelines, and modeling tools across major international brain initiatives. Each initiative brings unique strengths—such as the comprehensive EBAINS platform, the U.S. BRAIN Initiative data archives and brainlife.io platform, and the marmoset and human data and tools from Japan's Brain/MINDS project. By integrating these complementary efforts, we aim to identify new opportunities to deepen our understanding of brain function and to accelerate translational research in clinical neuroscience. A key focus will be on how detailed circuit data and computational models derived from rodent, non-human and human primate research can inform large-scale brain models to better elucidate cognitive processes and neuropsychiatric disorders. The recent rapid advances in large language models (LLMs) and their interoperability via the Model Context Protocol (MCP) further open novel pathways for harmonizing diverse data formats, ontologies, species, biophysical scales, and geographic boundaries. In this session, speakers from Europe, the United States, Canada, and Japan will share their current initiatives and perspectives on promoting global data and tool interoperability, followed by an open discussion to brainstorm collaborative frameworks and future research directions.	• Viktor Jirsa • Kenji Doya • Jean-Baptiste Poline • Franco Pestilli
16:45-17:10	Best Abstract Awards		
17:15-20:00	Joint Poster Session EBRAINS-INCF and networking reception with drinks		
17:15-18:10	NeuroAI, circuits and cognition	The Virtual Brain (TVB) is the state-of-the art simulation environment for clinical applications, most prominently for epilepsy	• Walter Senn • Marmaduke Woodman

		treatment. TVB connects thousands of biophysical nodes by a realistic connectome, with a single node modeling the dynamics of interacting neurons. Yet, to capture the phenomenology of other mental diseases, such as Parkinson disease or schizophrenia, behavioral and cognition needs to be included. Walter Senn presents a whole-brain model built on multi-head self- and cross-attention modules with recurrent memories. Cortical micro- and macro-columns are shown to capture the structure of key-value memories, queried by sensory or intracortical inputs. Hippocampal memories are involved in context switching, while basal ganglia provide a reward-based selection of values. Marmaduke Woodman presents a roadmap to include self-attention nodes into TVB and extend this to a simulation infrastructure for mental diseases. The audience is welcome to brainstorm such a roadmap. 17:15 – 17:40 Walter Senn, "Multi-head self-attention in cortical circuits" 17:40 – 18:05 Marmaduke Woodman, “Cognitive modelling in The Virtual Brain” 18:05 —18:15 Discussion: "How to extend TVB towards mental diseases?"	

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EBRAINS Summit 2025 Programme

Thursday 11 December – Joint Day with INCF on FAIR and Open Neuroscience

Exhibition open from 09:00-13:00

Time	Session	Description	Speakers
08:00-09:00	Registration and morning coffee		
09:00-09:30	Welcome and About INCF	An introduction to the International Neuroinformatics Coordinating Facility (INCF), its mission, and ongoing efforts to advance global collaboration in neuroinformatics. This session will highlight INCF's activities and its long-standing relationship with EBRAINS—established during the Human Brain Project (HBP)—including joint initiatives and projects that continue to promote open, FAIR, and interoperable neuroscience.	• Randy McIntosh • Mathew Abrams
09:30-10:15	Test, Build, Apply: A Pragmatic Agenda for NeuroAI	Artificial neural network models have become powerful computational hypotheses of how the brain gives rise to cognitive behavior. State-of-the-art models are already decent predictors of the neural responses across sensory cortices and the human language network, driven by advances in AI task optimization. To systematize and accelerate such progress we are developing Brain Score, an open platform with >100 neural and behavioral benchmarks for automated model testing. The increasing scale of available brain data now offers an exciting opportunity to build models of unprecedented neural fidelity and coverage -- extending to multimodal, topographically organized systems. Beyond insights into healthy brain function, early results suggest these models can also predict neurological and psychiatric conditions, enabling novel AI-guided interventions. Taken together, NeuroAI is on an extremely promising path to revolutionize how we understand the brain.	Martin Schrimpf
10:15-10:30	Coffee break		

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10:30-12:00	Building Bridges between large-scale brain initiatives	The purpose of this session is to bring together the neuroscience research infrastructure providers to discuss the gaps, challenges, and opportunities for pooling resources and tap into each other's user base, thereby expanding the impact within the research community. The session will be divided into 3 discussion sessions. Each discussion session will be introduced by a specific repository who will introduce their service and the topic of the discussion session (i.e. gaps). Following the introduction, a panel of 3 speakers representing other infrastructures present will discuss the topic. Session 1: Gaps, moderated by JB Poline (NeuroBagel) Participants: Kenji Doya (Brain/MINDS), Florian Hutzler (Austrian NeuroCloud), Franco Pestilli (BrainLife). Session 2: Challenges, moderated by Maryann Martone (SPARC) Participants: Birgit Schaffhauser (MIP, HIP), Yaroslav Halchenko (DANDI Archive), Thomas Wachtler (G-Node). Session 3: Opportunities, moderated by Jan Bjaalie (EBRAINS) Participants: Cyril Pernet (Public Neuro), Petra Ritter (Health Data Cloud), Gard Thomassen (Services for Sensitive Data / TSD, University of Oslo)	• Jan Bjaalie • Maryann Martone • Mathew Abrams • Jean-Baptiste Poline • Yaroslav O. Halchenko • Birgit Schaffhauser • Florian Hutzler • Thomas Wachtler • Gard Thomassen • Kenji Doya • Franco Pestilli • Cyril Pernet • Petra Ritter
12:00-13:00	Lunch		
13:00-14:30	Neuroscience Education Plenary by INCF and EBRAINS Education Task Force	This session will introduce EBRAINS and INCF's efforts to democratise neuroinformatics and make tools and resources developed by the large-scale brain initiatives more classroom ready. In addition, an example of an EBRAINS resource used in education will be presented; and participants will be introduced to the NeurotechEU, the European University Alliance of Brain and Technology.	• Johannes Passecker • Maja Puchades • Mathew Abrams • Wim Scheenen
14:30-15:30	Sustainability of research infrastructure for decision makers	Ensuring the long-term sustainability of neuroscience research infrastructure is a strategic priority for decision makers across government, academia, and industry. Beyond initial investments, these infrastructures must be designed, governed, and maintained	• Jeanette Hällgren Kotaleski • Cyril Pernet • Mathew Abrams • Emma Green

		to deliver value to the research community and drive progress in our understanding of the brain in health and disease. This session will examine the challenges and opportunities of sustaining neuroscience infrastructures across four key dimensions: financial, technological, organizational, and societal. By addressing these dimensions together, participants will gain practical insights on balancing competing demands, anticipating future challenges, and embedding resilience into the infrastructures that support innovation in neuroscience.	
15:30-16:15	Ethics Dialogue: Navigating the boundaries of Informed Consent and AI in research	In the rapidly evolving landscape of scientific research, informed consent and artificial intelligence (AI) present complex ethical challenges. This session will feature a dialogue between two experts who will present their views on the current approach to data privacy, consent, and the role of AI in research. The discussion will encourage open, critical, and engaging conversation with the participants to critically examine the tension between research, innovation and ethics, offering a space for collaborative exploration of the dilemmas that face modern research. The session will be moderated by Jan Bjaalie.	• Susanne Schreiber • Hervé Chneiweiss
16:15-16:30	Closing		Katrin Amunts