Neuroinformatics (2025) 23:36
https://doi.org/10.1007/s12021-025-09736-3

EDITORIAL

International Collaborations at the Intersection of Brain Sciences and Artificial Intelligence

John Darrell Van Horn[1,2] · Emiliano Ricciardi[3]

In recent years, as in many scientific disciplines, the rapid evolution of artificial intelligence (AI) and computational methodologies has irrevocably transformed the landscape of neuroscience. In the brain sciences, we simply do not collect less data – we only seem to desire for still more (Van Horn & Toga, 2014). The ever-expanding repertoire of neuroimaging techniques and multisite brain-mapping initiatives, once confined to isolated laboratories, now enjoys the benefits of openly shared data and global partnerships. Such international collaborations, exemplified by initiatives between, for example, the United States and Italy among many others, are not only encouraging the development of innovative analytical methods but are also underpinning educational programs and resource sharing strategies that promise to unlock the mysteries of brain structure, function, and connectivity. This editorial concerns the multifaceted contributions of AI-driven methods to brain sciences, the inherent conflicts of interest that may arise given the dual objectives of commercial AI development and pure scientific inquiry, and why international partnerships stand as a crucial element for sustained advancement in this domain.

At the heart of this transformation is the convergence of neuroimaging data types — from structural/functional magnetic resonance imaging (MRI) and diffusion tensor imaging (DTI) to electroencephalography (EEG) and positron emission tomography (PET) — with sophisticated computational tools that leverage machine learning, deep learning, and other AI paradigms. This confluence is now catalyzing an era of unprecedented discovery, enabling brain mappers to decode complex patterns in neural representation and connectivity (Lettieri et al., 2024), infer causal relationships within intricate brain networks (Newman et al., 2024), and forecast predict disease progression with remarkable accuracy (Pasternak et al., 2024; Tascedda et al., 2024). Yet, as these methodologies advance, so too do the challenges. The data volumes produced by modern neuroimaging techniques are enormous, the computational workload could become difficult to be sustained, and the complexity of the signals necessitates robust, nuanced analytical frameworks that can manage heterogeneity in spatial, temporal, and spectral domains. Herein lies one of the principal motivations for international collaborations: the pooling of resources, methodological and theoretical expertise, and diverse datasets enables a more comprehensive and globally representative understanding of brain function and pathology.

The significance of international partnerships is perhaps best illustrated by the growing body of work emerging from collaborations between the US and European countries, particularly Italy (Wright et al., 2024). Italian neuroscience research institutions have long been at the forefront of neuroimaging and computational neuroscience (Stoianov et al., 2022; Federici et al., 2023; Idesis et al., 2024; Leone et al., 2024), and their collaboration with American counterparts are beginning to facilitate interest in the cross-pollination of ideas and techniques that neither side could have achieved independently. For instance, recent joint research initiatives by the National Science Foundation (NSF) in the US and the Ministry of University Research (MUR) in Italy are seeking the development of advanced machine learning algorithms, examples of which might integrate multimodal imaging data with genetic and behavioral metrics. These integrative initiatives would prove essential in teasing apart the neurobiological comprehension of novel and complex topics in perception (e.g., the functional organization of sensory deprived people; Setti et al., 2023) or in affective

✉ John Darrell Van Horn
jdv7g@virginia.edu

1 Department of Psychology, University of Virginia, Charlottesville, VA 22903, USA

2 School of Data Science, University of Virginia, Charlottesville, VA 22903, USA

3 IMT School for Advanced Studies Lucca, Piazza San Francesco, Lucca, LU 19 - 55100, Italia

Published online: 21 June 2025

neuroscience (Schiller et al., 2024), and multifactorial etiologies of pathological conditions (Cauda et al., 2018).

Such collaborations are not merely about technical synergy; they are also about both cultivating a shared educational framework that nurtures the next generation of neuroscientists and computational experts (Van Horn, 2016) and promoting novel and robust theoretical frameworks. From one side, international academic partnerships allow students and researchers to access a broader spectrum of training opportunities, ranging from intensive summer schools and workshops to full-fledged collaborative research projects that cross national boundaries. Educational exchanges are invaluable for creating an internationally savvy workforce, adept in both neuroscience and data science, ensuring that future researchers are equipped to tackle increasingly complex questions about brain function (Abrams & Van Horn, 2024). In this way, international partnerships act as a crucible for innovation, where diverse perspectives converge to produce solutions that are both scientifically robust and broadly applicable. Equally, the field of neuroimaging, as in several science disciplines - has faced criticisms for a lack of impactful research that meaningfully advances our understanding of complex neural processes in recent years (Frith, 2020; Kozlov, 2023). This perceived stagnation underscores the necessity for a renewed focus on neuroimaging and AI to drive forward model-driven and theoretically solid studies (Gandolfi et al., 2025). For instance, integrating sophisticated neuroimaging techniques with the predictive power of AI can pave the way for more refined models (e.g., 'brain digital twins') that encapsulate the dynamic complexities of brain function (D'Angelo & Jirsa, 2022; Tortora et al., 2025). Approaches like this are not only crucial for unveiling new scientific insights but are also essential in shifting the current research paradigm from predominantly data-driven to more hypothesis-driven methodologies. This shift is vital for generating transformative discoveries that can lead to practical applications in understanding brain physiology and neuropsychiatric conditions.

However, the integration of AI into brain sciences presents a number of challenges. AI algorithms, by their very nature, require vast amounts of data for training and validation, and the performance of these models is often enhanced by the involvement of commercial entities with significant resources. The interests of AI developers, who operate within competitive and profit-driven markets, can sometimes conflict with the goals of unbiased scientific inquiry. There exists a risk that the development of AI tools may be steered by market dynamics rather than the imperatives of scientific advancement. Such potential conflicts of interest necessitate a careful balancing act. It is imperative that international collaborations maintain rigorous standards of transparency and ethical oversight, ensuring that the deployment of AI in neuroscience adheres to the highest scientific and ethical norms. Collaborative frameworks which include academic institutions, governmental agencies, and industry partners can help mitigate these risks by promoting open data sharing, reproducibility, and the democratization of methodological advances. Furthermore, by leveraging shared infrastructures, these collaborative frameworks can also not only enhance efficiency but also minimize the environmental impact associated with redundant or isolated efforts (Soutera et al., 2024). This is especially pertinent in the context of high-performance computing and large-scale data analyses prevalent in neuroimaging research.

Considerable excitement exists for the utilization of AI in analyzing neuroimaging data to detect early signs of neurodegenerative diseases. In collaborative projects spanning multiple countries, researchers have used deep learning techniques to integrate disparate datasets, yielding predictive models that outperform traditional statistical methods. However, the results tend to be more of a statement about the computational model itself and provide little actual insight into an understanding about the brain. In such instances, a concerted effort is needed to ensure that these algorithms are continuously refined and validated within specific clinical populations, rather than being optimized simply for the purposes of model performance, *per se*. Likewise, the presence of demographic or regional make-up of the data may severely limit the true generalizability of results. The integration of diverse international datasets is not only a scientific necessity but also a moral imperative, ensuring that the benefits of AI-driven diagnostics are equitably distributed across different populations.

The promise of AI in neuroscience extends beyond clinical diagnostics to include a deeper understanding of brain connectivity and the fundamental principles governing neural computation. Advanced computational techniques have enabled the mapping of the brain's connectome with unparalleled detail, revealing the intricate web of synaptic connections that underlie cognitive processes. Initiatives, such as the Human Connectome Project (Rosen et al., 2010; Van Essen et al., 2013), the Adolescent Brain and Cognitive Development (ABCD) Study (Chaarani et al., 2021) have benefitted enormously from the shared expertise of researchers from across different cultural and scientific backgrounds. Collaborative endeavors foster an environment where methodological innovations can be rapidly disseminated and adopted, ensuring that new insights are not siloed within individual labs or national boundaries. The integration of AI with neuroimaging has potential as a catalyst for a more holistic and integrated approaches to understanding the brain - transcending traditional disciplinary and geographic divides.

The benefits of international collaboration are also evident in the realm of resource sharing and infrastructure development (Pernet et al., 2023). High-performance computing resources, large-scale data storage systems, and specialized imaging equipment are expensive and often beyond the reach of single institutions. By forging international partnerships, research centers can pool their resources to create shared platforms that support large-scale, multisite studies. This pooling of resources can be particularly beneficial in countries where scientific research funding is limited, allowing these regions to participate more fully in international scientific discourse and innovation. Such collaborative infrastructures are critical for managing the voluminous datasets generated by modern neuroimaging studies and for performing the computationally intensive analyses that are required for advanced AI applications. Furthermore, shared infrastructures help standardize data acquisition and processing protocols across different sites (Poldrack et al., 2024, Onicas et al., 2022), thereby improving the comparability and reproducibility of research findings.

Educational opportunities emerging from international collaborations and activities are also valuable in fostering an interdisciplinary approach to neuroscience (Craddock et al., 2016; Katz et al., 2018; Van Horn et al., 2018). Universities and research institutions across the globe are increasingly offering joint degree programs, exchange opportunities, and collaborative research projects that span the fields of neuroscience, computer science, and data analytics. These initiatives help break down traditional academic silos and cultivate a generation of researchers who are fluent in both biological and computational languages. The development of new course curricula integrating neuroscience with advanced data science techniques is a key factor in ensuring that emerging scientists are capable of leveraging AI to address complex questions about brain function and dysfunction (Juavinett, 2024). Transdisciplinary training is essential not only for advancing scientific knowledge but also for developing practical applications that can improve human health and well-being.

The integration of AI and neuroimaging within an international collaborative framework is not without its logistical and ethical challenges, however. Data sharing across international borders raises complex issues related to privacy, consent, ethical use, and costs of human subjects data (Van Horn, 2024). Different countries often have varying regulations regarding data protection and the use of medical data in research, necessitating the establishment of robust legal and ethical frameworks that facilitate cross-border collaboration while safeguarding individual rights (Mondschein and Monda 2019). Moreover, the standardization of data formats, annotation protocols, and analytic pipelines remains a significant and ever-changing hurdle (Rehm et al., 2021; Kim et al., 2023). Addressing these challenges requires a concerted effort from all stakeholders—researchers, policymakers, and industry partners alike—to develop internationally recognized standards and best practices (Pernet et al., 2020). The establishment of such frameworks is not only a technical necessity but also a demonstration of the commitment of the global neuroscience community to conducting research that is both ethically sound and scientifically rigorous.

Academic research today faces mounting challenges that threaten its very foundation, from threats to funding streams to the encroachment of government and commercial interests that risk skewing the time-honored process of critical thinking scientific inquiry. The unprecedented explosion of data and rapid advancements in AI and neuroimaging, while heralding a new era of discovery, also exacerbate these vulnerabilities by demanding ever-higher investments in sophisticated technology and data infrastructure. As political and market-driven forces increasingly dictate research priorities, the pressure mounts on academic institutions to reconcile such mounting constraints with the ethical imperative for unbiased, rigorous investigation. Now, more than ever, forging global research partnerships is essential. By pooling resources, sharing expertise, and establishing unified ethical and methodological standards—as seen in successful collaborations like those between the US and Italy—we can not only mitigate the risks of isolated, underfunded efforts but also ensure that transformative scientific discoveries remain a shared, inclusive pursuit.

Despite present challenges, the momentum behind international collaborations in the intersection of brain sciences and AI continues to grow. Emerging consortia are setting a precedent for how complex, multi-dimensional datasets can be leveraged to yield insights that were previously unattainable (Redolfi et al., 2023). The collaborative research environment fosters an atmosphere of shared responsibility and mutual benefit, where the collective expertise of a global community is harnessed to address some of the most pressing questions in neuroscience. A cooperative model is likely to serve as a blueprint for future initiatives which seek to integrate AI and the neurosciences, generally, ensuring that advancements in brain science are not only rapid but also equitable and inclusive.

In conclusion, the integration of AI with neuroimaging and other brain-related data modalities represents an important shift in how we seek to understand brain structure, function, and connectivity (Fesce, 2024). International collaborations, exemplified by partnerships between the United States and Italy, among others in Europe, Asia, and Latin America, are proving indispensable in driving methodological innovation, fostering educational initiatives, and enabling the sharing of resources on an unprecedented scale. However, the changing political climate, interests of commercial AI developers, and academic researchers necessitate vigilance and ethical oversight to ensure that scientific inquiry remains unbiased and broadly beneficial. As we look to the future, the ongoing synergy between global partners will undoubtedly catalyze further breakthroughs in our understanding of the brain, ultimately leading to improved diagnostics, therapeutics, and a deeper appreciation of the neural underpinnings of human behavior. The success of these collaborative endeavors will serve not only as a testament to the power of international cooperation but also as a point of reference for the responsible and effective integration of AI in the pursuit of neuroscientific knowledge.

Acknowledgements The authors wish to thank the faculty, students, and staff of the University of Virginia Department of Psychology, the School of Data Science, and the IMT Scuola Alti Studi in Lucca.

Author Contributions Each author contributed to the editorial conception, preparation, read, and provides their approval of the final manuscript.

Funding The authors declare that no funds, grants, or other support were received during the preparation of this manuscript.

Data Availability No original or re-used data are presented in this work.

Declarations

Ethics Approval/Consent to Participate/Consent to Publish This work did not involve research using human participants, their data, or biological material. As such, Consent to Participate/Consent to Publish are not applicable.

Competing Interests Dr. Van Horn is the Editor-in-Chief of *Neuroinformatics* (Springer-Nature) for which he receives an annual remuneration. Dr. Ricciardi is Vice-Rector for Didactics and Director of the PhD Program in 'Cognitive, Computational and Social Neurosciences', IMT School for Advanced Studies Lucca, Tuscany. The authors have no relevant corporate financial or non-financial interests to disclose.

References

Abrams, M., & Van Horn, J. D. (2024). Bridging the gap: How neuroinformatics is Preparing the next generation of neuroscience researchers. *Neuroinformatics*, *22*(4), 619–622.

Cauda, F., Nani, A., Manuello, J., Premi, E., Palermo, S., Tatu, K., Duca, S., Fox, P. T., & Costa, T. (2018). Brain structural alterations are distributed following functional, anatomic and genetic connectivity. *Brain*, *141*(11), 3211–3232. PMC: PMC6202577.

Chaarani, B., Hahn, S., Allgaier, N., Adise, S., Owens, M. M., Juliano, A. C., Yuan, D. K., Loso, H., Ivanciu, A., Albaugh, M. D., Dumas, J., Mackey, S., Laurent, J., Ivanova, M., Hagler, D. J., Cornejo, M. D., Hatton, S., Agrawal, A., Aguinaldo, L., Ahonen, L., Aklin, W., Anokhin, A. P., Arroyo, J., Avenevoli, S., Babcock, D., Bagot, K., Baker, F. C., Banich, M. T., Barch, D. M., Bartsch, H., Baskin-Sommers, A., Bjork, J. M., Blachman-Demner, D., Bloch, M., Bogdan, R., Bookheimer, S. Y., Breslin, F., Brown, S., Calabro, F. J., Calhoun, V., Casey, B. J., Chang, L., Clark, D. B., Cloak, C., Constable, R. T., Constable, K., Corley, R., Cottler, L. B., Coxe, S., Dagher, R. K., Dale, A. M., Dapretto, M., Delcarmen-Wiggins, R., Dick, A. S., Do, E. K., Dosenbach, N. U. F., Dowling, G. J., Edwards, S., Ernst, T. M., Fair, D. A., Fan, C. C., Feczko, E., Feldstein-Ewing, S. W., Florsheim, P., Foxe, J. J., Freedman, E. G., Friedman, N. P., Friedman-Hill, S., Fuemmeler, B. F., Galvan, A., Gee, D. G., Giedd, J., Glantz, M., Glaser, P., Godino, J., Gonzalez, M., Gonzalez, R., Grant, S., Gray, K. M., Haist, F., Harms, M. P., Hawes, S., Heath, A. C., Heeringa, S., Heitzeg, M. M., Hermosillo, R., Herting, M. M., Hettema, J. M., Hewitt, J. K., Heyser, C., Hoffman, E., Howlett, K., Huber, R. S., Huestis, M. A., Hyde, L. W., Iacono, W. G., Infante, M. A., Irfanoglu, O., Isaiah, A., Iyengar, S., Jacobus, J., James, R., Jean-Francois, B., Jernigan, T., Karcher, N. R., Kaufman, A., Kelley, B., Kit, B., Ksinan, A., Kuperman, J., Laird, A. R., Larson, C., LeBlanc, K., Lessov-Schlagger, C., Lever, N., Lewis, D. A., Lisdahl, K., Little, A. R., Lopez, M., Luciana, M., Luna, B., Madden, P. A., Maes, H. H., Makowski, C., Marshall, A. T., Mason, M. J., Matochik, J., McCandliss, B. D., McGlade, E., Montoya, I., Morgan, G., Morris, A., Mulford, C., Murray, P., Nagel, B. J., Neale, M. C., Neigh, G., Nencka, A., Noronha, A., Nixon, S. J., Palmer, C. E., Pariyadath, V., Paulus, M. P., Pelham, W. E., Pfefferbaum, D., Pierpaoli, C., Prescot, A., Prouty, D., Puttler, L. I., Rajapaske, N., Rapuano, K. M., Reeves, G., Renshaw, P. F., Riedel, M. C., Rojas, P., de la Rosa, M., Rosenberg, M. D., Ross, M. J., Sanchez, M., Schirda, C., Schloesser, D., Schulenberg, J., Sher, K. J., Sheth, C., Shilling, P. D., Simmons, W. K., Sowell, E. R., Speer, N., Spittel, M., Squeglia, L. M., Sripada, C., Steinberg, J., Striley, C., Sutherland, M. T., Tanabe, J., Tapert, S. F., Thompson, W., Tomko, R. L., Uban, K. A., Vrieze, S., Wade, N. E., Watts, R., & Weiss, S. (2021). Wiens, B. A., Williams, O. D., Wilbur, A., Wing, D., Wolff-Hughes, D., Yang, R., Yurgelun-Todd, D. A., Zucker, R. A., Potter, A., Garavan, H. P. and Consortium, A. Baseline brain function in the preadolescents of the ABCD Study. Nat Neurosci 24(8): 1176–1186, PMC: PMC8947197.

Craddock, R. C., Margulies, D. S., Bellec, P., Nichols, B. N., Alcauter, S., Barrios, F. A., Burnod, Y., Cannistraci, C. J., Cohen-Adad, J., De Leener, B., Dery, S., Downar, J., Dunlop, K., Franco, A. R., Froehlich, S., Gerber, C., Ghosh, A. J., Grabowski, S. S., Hill, T. J., Heinsfeld, S., Hutchison, A. S., Kundu, R. M., Laird, P., Liew, A. R., Lurie, S. L., McLaren, D. J., Meneguzzi, D. G., Mennes, F., Mesmoudi, M., O'Connor, S., Pasaye, D., Peltier, E. H., Poline, S., Prasad, J. B., Pereira, G., Quirion, R. F., Rokem, P. O., Shi, A. Z. S. S., Strother, Y., Toro, S. C., Uddin, R., Van Horn, L. Q., Van Meter, J. D., Welsh, J. W., R. C. and, & Xu, T. (2016). Brainhack: a collaborative workshop for the open neuroscience community. Gigascience 5: 16, PMC: PMC4818387.

D'Angelo, E., & Jirsa, V. (2022). The quest for multiscale brain modeling. *Trends in Neurosciences*, *45*(10), 777–790.

Federici, A., Bennett, C. R., Bauer, C. M., Manley, C. E., Ricciardi, E., Bottari, D., & Merabet, L. B. (2023). Altered neural oscillations underlying visuospatial processing in cerebral visual impairment. Brain Commun 5(5): fcad232, PMC: PMC10489293.

Fesce, R. (2024). Old innovations and shifted paradigms in cellular neuroscience. *Frontiers in Cellular Neuroscience*, *18*, 1460219. PMC: PMC11371623.

Frith, U. (2020). Fast lane to slow science. *Trends in Cognitive Sciences*, *24*(1), 1–2.

Gandolfi, D., Mapelli, J., & Puglisi, F. M. (2025). Editorial: Brain-inspired computing: from neuroscience to neuromorphic electronics for new forms of artificial intelligence. Front Neurosci 19: 1565811, PMC: PMC11850306.

Idesis, S., Allegra, M., Vohryzek, J., Perl, S. Y, Metcalf, V. N, Griffis, C. J, Corbetta, M., Shulman, L. G, & Deco, G. (2024). Generative whole-brain dynamics models from healthy subjects predict functional alterations in stroke at the level of individual patients. *Brain Commun*, *6*(4), fcae237. PMC: PMC11285191.

Juavinett, A. L. (2024). Integrating Programming into Neuroscience Courses. J Undergrad Neurosci Educ 22(2): A99-A103, PMC: PMC11396174.

Katz, D. S., Allen, G., Barba, L. A., Berg, D. R., Bik, H., Boettiger, C., Borgman, C. L., Brown, C. T., Buck, S., Burd, R., de Waard, A., Eve, M. P., Granger, B. E., Greenberg, J., Howe, A., Howe, B., Khanna, M., Killeen, T. L., Mayernik, M., McKiernan, E., Mentzel, C., Merchant, N., Niemeyer, K. E., Noren, L., Nusser, S. M., Reed, D. A., Seidel, E., Smith, M., Spies, J. R., Turk, M., Van Horn, J. D., & Walsh, J. (2018). The principles of tomorrow's university. F1000Res 7: 1926, PMC: PMC6338243.

Kim, Y., Joshi, A. A., Choi, S., Joshi, S. H., Bhushan, C., Varadarajan, D., Haldar, J. P., Leahy, R. M., & Shattuck, D. W. (2023). BrainSuite BIDS App: Containerized Workflows for MRI Analysis. bioRxiv, PMC: PMC10055125.

Kozlov, M. (2023). Disruptive' science has declined - and no one knows why. *Nature*, *613*(7943), 225.

Leone, F., Caporali, A., Pascarella, A., Perciballi, C., Maddaluno, O., Basti, A., Belardinelli, P., Marzetti, L., Di Lorenzo, G., & Betti, V. (2024). Investigating the impact of the regularization parameter on EEG resting-state source reconstruction and functional connectivity using real and simulated data. *Neuroimage*, *303*, 120896.

Lettieri, G., Handjaras, G., Cappello, E. M., Setti, F., Bottari, D., Bruno, V., Diano, M., Leo, A., Tinti, C., Garbarini, F., Pietrini, P., Ricciardi, E., & Cecchetti, L. (2024). Dissecting abstract, modality-specific and experience-dependent coding of affect in the human brain. *Science Advances*, *10*(10), eadk6840. PMC: PMC10923499.

Mondschein, C. F., Monda, C. The EU's General Data Protection Regulation (GDPR) in a Research Context. Fundamentals of Clinical Data Science., Kubben, P., Dumontier, M., & Dekker, A. (2019). Cham (CH): 55–71.

Newman, B. T., Jacokes, Z., Venkadesh, S., Webb, S. J., Kleinhans, N. M., McPartland, J. C., Druzgal, T. J., Pelphrey, K. A., & Van Horn, J. D. (2024). and Consortium, G. R. Conduction velocity, G-ratio, and extracellular water as microstructural characteristics of autism spectrum disorder. PLoS One 19(4): e0301964, PMC: PMC11023574 Determined Health, and BlackThorn Therapeutics, has received research funding from Janssen Research and Development, serves on the Scientific Advisory Boards of Pastorus and Modern Clinics, and receives royalties from Guilford Press, Lambert, Oxford, and Springer. This does not alter our adherence to PLOS ONE policies on sharing data and materials. Other authors declare no conflicts of interest.

Onicas, A. I., Ware, A. L., Harris, A. D., Beauchamp, M. H., Beaulieu, C., Craig, W., Doan, Q., Freedman, S. B., Goodyear, B. G., Zemek, R., Yeates, K. O., & Lebel, C. (2022). Multisite Harmonization of Structural DTI Networks in Children: An A-CAP Study. Front Neurol 13: 850642, PMC: PMC9247315.

Pasternak, M., Mirza, S. S., Luciw, N., Mutsaerts, H., Petr, J., Thomas, D., Cash, D., Bocchetta, M., Tartaglia, M. C., Mitchell, S. B., Black, S. E., Freedman, M., Tang-Wai, D., Rogaeva, E., Russell, L. L., Bouzigues, A., van Swieten, J. C., Jiskoot, L. C., Seelaar, H., Laforce, R. Jr., Tiraboschi, P., Borroni, B., Galimberti, D., Rowe, J. B., Graff, C., Finger, E., Sorbi, S., de Mendonça, A., Butler, C., Gerhard, A., Sanchez-Valle, R., Moreno, F., Synofzik, M., Vandenberghe, R., Ducharme, S., Levin, J., Otto, M., Santana, I., Strafella, A. P., MacIntosh, B. J., Rohrer, J. D., & Masellis, M. (2024). Longitudinal cerebral perfusion in presymptomatic genetic frontotemporal dementia: GENFI results. *Alzheimers Dement*, *20*(5), 3525–3542. PMC: PMC11095434.

Pernet, C., Garrido, M. I., Gramfort, A., Maurits, N., Michel, C. M., Pang, E., Salmelin, R., Schoffelen, J. M., Valdes-Sosa, P. A., & Puce, A. (2020). Issues and recommendations from the OHBM COBIDAS MEEG committee for reproducible EEG and MEG research. *Nature Neuroscience*, *23*(12), 1473–1483.

Pernet, C., Svarer, C., Blair, R., Van Horn, J. D., & Poldrack, R. A. (2023). *On the Long-term Archiving of Research Data Neuroinformatics* 21(2): 243–246.

Poldrack, R. A., Markiewicz, C. J., Appelhoff, S., Ashar, Y. K., Auer, T., Baillet, S., Bansal, S., Beltrachini, L., Benar, C. G., Bertazzoli, G., Bhogawar, S., Blair, R. W., Bortoletto, M., Boudreau, M., Brooks, T. L., Calhoun, V. D., Castelli, F. M., Clement, P., Cohen, A. L., Cohen-Adad, J., D'Ambrosio, S., de Hollander, G., de la Iglesia-Vayá, M., de la Vega, A., Delorme, A., Devinsky, O., Draschkow, D., Duff, E. P., DuPre, E., Earl, E., Esteban, O., Feingold, F. W., Flandin, G., Galassi, A., Gallitto, G., Ganz, M., Gau, R., Gholam, J., Ghosh, S. S., Giacomel, A., Gillman, A. G., Gleeson, P., Gramfort, A., Guay, S., Guidali, G., Halchenko, Y. O., Handwerker, D. A., Hardcastle, N., Herholz, P., Hermes, D., Honey, C. J., Innis, R. B., Ioanas, H. I., Jahn, A., Karakuzu, A., Keator, D. B., Kiar, G., Kincses, B., Laird, A. R., Lau, J. C., Lazari, A., Legarreta, J. H., Li, A., Li, X., Love, B. C., Lu, H., Marcantoni, E., Maumet, C., Mazzamuto, G., Meisler, S. L., Mikkelsen, M., Mutsaerts, H., Nichols, T. E., Nikolaidis, A., Nilsonne, G., Niso, G., Norgaard, M., Okell, T. W., Oostenveld, R., Ort, E., Park, P. J., Pawlik, M., Pernet, C. R., Pestilli, F., Petr, J., Phillips, C., Poline, J. B., Pollonini, L., Raamana, P. R., Ritter, P., Rizzo, G., Robbins, K. A., Rockhill, A. P., Rogers, C., Rokem, A., Rorden, C., Routier, A., Saborit-Torres, J. M., Salo, T., Schirner, M., Smith, R. E., Spisak, T., Sprenger, J., Swann, N. C., Szinte, M., Takerkart, S., Thirion, B., Thomas, A. G., & Torabian, S. Varoquaux, G., Voytek, B., Welzel, J., Wilson, M., Yarkoni, T. & Gorgolewski, K. J. (2024). The past, present, and future of the brain imaging data structure (BIDS). *Imaging Neuroscience*, *2*, 1–19. https://doi.org/10.1162/imag_a_00103

Redolfi, A., Archetti, D., De Francesco, S., Crema, C., Tagliavini, F., Lodi, R., Ghidoni, R., Wheeler-Kingshott, G., Alexander, C. A. M., D. C. and, & Angelo, D., E (2023). Italian, european, and international neuroinformatics efforts: An overview. *European Journal of Neuroscience*, *57*(12), 2017–2039.

Rehm, H. L., Page, A. J. H., Smith, L., Adams, J. B., Alterovitz, G., Babb, L. J., Barkley, M. P., Baudis, M., Beauvais, M. J. S., Beck, T., Beckmann, J. S., Beltran, S., Bernick, D., Bernier, A., Bonfield, J. K., Boughtwood, T. F., Bourque, G., Bowers, S. R., Brookes, A. J., Brudno, M., Brush, M. H., Bujold, D., Burdett, T., Buske, O. J., Cabili, M. N., Cameron, D. L., Carroll, R. J., Casas-Silva, E., Chakravarty, D., Chaudhari, B. P., Chen, S. H., Cherry, J. M., Chung, J., Cline, M., Clissold, H. L., Cook-Deegan, R. M., Courtot, M., Cunningham, F., Cupak, M., Davies, R. M., Denisko, D., Doerr, M. J., Dolman, L. I., Dove, E. S., Dursi, L. J., Dyke, S. O. M., Eddy, J. A., Eilbeck, K., Ellrott, K. P., Fairley, S., Fakhro, K. A., Firth, H. V., Fitzsimons, M. S., Fiume, M., Flicek, P., Fore, I. M., Freeberg, M. A., Freimuth, R. R., Fromont, L. A., Fuerth, J., Gaff, C. L., Gan, W., Ghanaim, E. M., Glazer, D., Green, R. C., Griffith, M., Griffith, O. L., Grossman, R. L., Groza, T., Auvil, J. M. G., Guigo, R., Gupta, D., Haendel, M. A., Hamosh, A., Hansen, D. P., Hart, R. K., Hartley, D. M., Haussler, D., Hendricks-Sturrup, R. M., Ho, C. W. L., Hobb, A. E., Hoffman, M. M., Hofmann, O. M., Holub, P., Hsu, J. S., Hubaux, J. P., Hunt, S. E., Husami, A., Jacobsen, J. O., Jamuar, S. S., Janes, E. L., Jeanson, F., Jene, A., Johns, A. L., Joly, Y., Jones, S. J. M., Kanitz, A., Kato, K., Keane, T. M., Kekesi-Lafrance, K., Kelleher, J., Kerry, G., Khor, S. S., Knoppers, B. M., Konopko, M. A., Kosaki, K., Kuba, M., Lawson, J., Leinonen, R., Li, S., Lin, M. F., Linden, M., Liu, X., Liyanage, U., Lopez, I., Lucassen, J., Lukowski, A. M., Mann, M., Marshall, A. L., Mattioni, J., Metke-Jimenez, M., Middleton, A., Milne, A., Molnar-Gabor, R. J., Mulder, F., Munoz-Torres, N., Nag, M. C., Nakagawa, R., Nasir, H., Navarro, J., Nelson, A., Niewielska, T. H., Nisselle, A., Niu, A., Nyronen, J., O'Connor, T. H., Oesterle, B. D., Ogishima, S., Wang, S., Paglione, V. O., Palumbo, L. A. D., Parkinson, E., Philippakis, H. E., Pizarro, A. A., Prlic, A. D., Rambla, A., Rendon, J., Rider, A., Robinson, R. A., Rodarmer, P. N., Rodriguez, K. W., Rubin, L. L., Rueda, A. F., Rushton, M., Ryan, G. A., Saunders, R. S., Schuilenburg, G. I., Schwede, H., Scollen, T., Senf, S., Sheffield, A., Skantharajah, N. C., Smith, N., Sofia, A. V., Spalding, H. J., Spurdle, D., Stark, A. B., Stein, Z., Suematsu, L. D., Tan, M., Tedds, P., Thomson, J. A., Thorogood, A. A., Tickle, A., Tokunaga, T. L., Tornroos, K., Torrents, J., Upchurch, D., Valencia, S., Guimera, A., Vamathevan, R. V., Varma, J., Vears, S., Viner, D. F., Voisin, C., Wagner, C., Wallace, A. H., Walsh, S. E., & Williams, B. P. (2021). M. S., Winkler, E. C., Wold, B. J., Wood, G. M., Woolley, J. P., Yamasaki, C., Yates, A. D., Yung, C. K., Zass, L. J., Zaytseva, K., Zhang, J., Goodhand, P., North, K. and Birney, E. GA4GH: International policies and standards for data sharing across genomic research and healthcare. Cell Genom 1(2), PMC: PMC8774288.

Rosen, B., Wedeen, V., Van Horn, J. D., Fischl, B., Buckner, R., Wald, L., Hamalainen, M., Stufflebeam, S., Roffman, J., Shattuck, D. W., Thompson, P. M., Woods, R. P., Freimer, N., Bilder, R. M., & Toga, A. W. (2010). The Human Connectome Project. Organization for Human Brain Mapping Annual Meeting. Barcelona, Spain.

Schiller, D., Yu, A. N. C., Alia-Klein, N., Becker, S., Cromwell, H. C., Dolcos, F., Eslinger, P. J., Frewen, P., Kemp, A. H., Pace-Schott, E. F., Raber, J., Silton, R. L., Stefanova, E., Williams, J. H. G., Abe, N., Aghajani, M., Albrecht, F., Alexander, R., Anders, S., Aragon, O. R., Arias, J. A., Arzy, S., Aue, T., Baez, S., Balconi, M., Ballarini, T., Bannister, S., Banta, M. C., Barrett, K. C., Belzung, C., Bensafi, M., Booij, L., Bookwala, J., Boulanger-Bertolus, J., Boutros, S. W., Brascher, A. K., Bruno, A., Busatto, G., Bylsma, L. M., Caldwell-Harris, C., Chan, R. C. K., Cherbuin, N., Chiarella, J., Cipresso, P., Critchley, H., Croote, D. E., Demaree, H. A., Denson, T. F., Depue, B., Derntl, B., Dickson, J. M., Dolcos, S., Drach-Zahavy, A., Dubljevic, O., Eerola, T., Ellingsen, D. M., Fairfield, B., Ferdenzi, C., Friedman, B. H., Fu, C. H. Y., Gatt, J. M., de Gelder, B., Gendolla, G. H. E., Gilam, G., Goldblatt, H., Gooding, A. E. K., Gosseries, O., Hamm, A. O., Hanson, J. L., Hendler, T., Herbert, C., Hofmann, S. G., Ibanez, A., Joffily, M., Jovanovic, T., Kahrilas, I. J., Kangas, M., Katsumi, Y., Kensinger, E., Kirby, L. A. J., Koncz, R., Koster, E. H. W., Kozlowska, K., Krach, S., Kret, M. E., Krippl, M., Kusi-Mensah, K., Ladouceur, C. D., Laureys, S., Lawrence, A., Li, C. R., Liddell, B. J., Lidhar, N. K., Lowry, C. A., Magee, K., Marin, M. F., Mariotti, V., Martin, L. J., Marusak, H. A., Mayer, A. V., Merner, A. R., Minnier, J., Moll, J., Morrison, R. G., Moore, M., Mouly, A. M., Mueller, S. C., Muhlberger, A., Murphy, N. A., Muscatello, M. R. A., Musser, E. D., Newton, T. L., Noll-Hussong, M., Norrholm, S. D., Northoff, G., Nusslock, R., Okon-Singer, H., Olino, T. M., Ortner, C., Owolabi, M., Padulo, C., Palermo, R., Palumbo, R., Palumbo, S., Papadelis, C., Pegna, A. J., Pellegrini, S., Peltonen, K., Penninx, B., Pietrini, P., Pinna, G., Lobo, R. P., Polnaszek, K. L., Polyakova, M., Rabinak, C., Richter, H., Richter, S., Riva, T., Rizzo, G., Robinson, A., Rosa, J. L., Sachdev, P., Sato, P. S., Schroeter, W., Schweizer, M. L., Shiban, S., Siddharthan, Y., Siedlecka, A., Smith, E., Soreq, R. C., Spangler, H., Stern, D. P., Styliadis, E. R., Sullivan, C., Swain, G. B., Urben, J. E., Van den Stock, S., Kooij, J. V., van Overveld, M. A., & Van Rheenen, M. (2024). T. E., VanElzakker, M. B., Ventura-Bort, C., Verona, E., Volk, T., Wang, Y., Weingast, L. T., Weymar, M., Williams, C., Willis, M. L., Yamashita, P., Zahn, R., Zupan, B. and Lowe, L. The Human Affectome. Neurosci Biobehav Rev 158: 105450, PMC: PMC11003721.

Setti, F., Handjaras, G., Bottari, D., Leo, A., Diano, M., Bruno, V., Tinti, C., Cecchetti, L., Garbarini, F., Pietrini, P., & Ricciardi, E. (2023). A modality-independent proto-organization of human multisensory areas. *Nat Hum Behav*, *7*(3), 397–410. PMC: PMC10038796.

Souter, N. E., Bhagwat, N., Racey, C., Wilkinson, R., Duncan, N. W., Samuel, G., Lannelongue, L., Selvan, R. & Rae, C. L. (2024). Measuring and reducing the carbon footprint of fMRI preprocessing in fMRIPrep." *Human Brain Mapping*, *45*(12), e70003. PMC: PMC11345634.

Stoianov, I., Maisto, D., & Pezzulo, G. (2022). The hippocampal formation as a hierarchical generative model supporting generative replay and continual learning. *Progress in Neurobiology*, *217*, 102329.

Tascedda, S., Sarti, P., Rivi, V., Guerrera, C. S., Platania, G. A., Santagati, M., Caraci, F., & Blom, J. M. C. (2024). Advanced AI techniques for classifying Alzheimer's disease and mild cognitive impairment. Front Aging Neurosci 16: 1488050, PMC: PMC11638155.

Tortora, M., Pacchiano, F., Ferraciolli, S. F., Criscuolo, S., Gagliardo, C., Jaber, K., Angelicchio, M., Briganti, F., Caranci, F., Tortora, F., & Negro, A. (2025). Medical Digital Twin: A Review on Technical Principles and Clinical Applications. J Clin Med 14(2), PMC: PMC11765765.

Van Essen, D. C., Smith, S. M., Barch, D. M., Behrens, T. E., Yacoub, E., Ugurbil, K., & Consortium, W. U. M. H. (2013). The WU-Minn human connectome project: An overview. *Neuroimage*, *80*, 62–79. PMC: PMC3724347.

Van Horn, J. D. (2016). Opinion: Big data biomedicine offers big higher education opportunities. Proc Natl Acad Sci U S A 113(23): 6322–6324, PMC: PMC4988614.

Van Horn, J. D. (2024). *Editorial: on the Economics of Neuroscientific Data Sharing Neuroinformatics* 22(1): 1–4.

Van Horn, J. D., & Toga, A. W. (2014). Human neuroimaging as a Big Data science. Brain Imaging Behav 8(2): 323–331, PMC: PMC3983169.

Van Horn, J. D., Fierro, L., Kamdar, J., Gordon, J., Stewart, C., Bhattrai, A., Abe, S., Lei, X., O'Driscoll, C., Sinha, A., Jain, P., Burns, G., Lerman, K., & Ambite, J. L. (2018). Democratizing data science through data science training.*Pacific Symposium On Biocomputing. Pacific Symposium On Biocomputing* 23: 292–303, PMC: PMC5731238.

Wright, B., de Guida, S., Garlaschelli, D., Brown, D., Tribastone, M., Riccaboni, M., Cecchetti, L., Guadagni, G., Paggi, M., Gili, T., Setti, F., Elce, V., Federici, A., Van Horn, J. D., & Ricciardi, E. (2024). Report on the Conjoint Workshop: IMT Scuola Alti Studi and the University of Virginia School of Data Science LibraOPEN https://doi.org/10.18130/y50y-ks25