Diversity in Research Paper Award

The DIRPA call invites applications for the **Best Diversity in Research Papers**, i.e. publications that consider diversity traits such as sex, gender, age, ethnicity, etc. in their specific field of research. Differentiating variables have been recognised to be relevant in brain research, robotics, and AI alike - from the level of stem cells to avoiding the replication of stereotypes due to the use of data without reflection.

Considering sex/gender has become a requirement by default for the **Horizon Europe programme**. Examples are outlined in the second "Gendered Innovations" policy report. For more information and examples see "DETAILS".

Submit your Paper

- The most outstanding papers will
  - be **promoted** at the **HBP website**, with a news feature shared in the **HBP social media channels** with several thousand followers
  - be **awarded** with a framed signed **certificate** of honour
  - be **presented** at the heart of a **webinar** to a large audience in a dedicated online event organised and promoted by the HBP and EBRAINS, where winners will discuss their research in context of diversity **with key-note speakers** Lutz Jäncke and Frances-Catherine Quevenco on 22/04/22
  - especially **early stage researchers** (ESR) will receive a **voucher** for an HBP event of choice.
- **Submit your paper until 17th January 2022** via https://forms.office.com/r/nnWGmyip3S
- Explore further information on the DEOC, HBP guiding materials at https://www.humanbrainproject.eu/en/about/gender-equality/

Contact:

Karin Grasenick, convelop cooperative knowledge design gmbh (karin.grasenick-at-convelop.at)

1.1.1 Selection criteria for the DIRPA

- Your paper must be open access, i.e., published or pre-print in an open access journal, and/or available via a repository/platform (such as BioRxiv, Zenodo, Academia, Researchgate, etc.). A short-communication is also considered as paper.
- The date of your publication is not restricted, but papers published more than three years ago may not sufficiently refer to the latest research (however they might be ground breaking in their own right).
- Please note that this call has a broader spectrum than "sex diversity": A paper might, depending on the field of research, address for example environmental factors, age and/or further variables. It might thereby consider the interaction of these variables with sex/gender (intersectional approach). As such, neurodiversity can also be a topic.

DIVERSITY AND INTERDISCIPLINARITY (80%):
This category rates if the paper identifies gaps in current research and addresses variables related to sex, gender, age, and further diversity traits. It follows a methodological approach to investigate differences and similarities. This category focuses on how diversity dimensions are considered and critically reflected in the paper (e.g., listing female and male study subjects is not rated as considering diversity in research content). In addition, the interdisciplinarity of the approach will be scored. Interdisciplinary research takes more time and effort but is expected to lead to innovative results.
Theory and Methods (50%) Diversity traits in the theoretical, methodical approach (the use of different diversity aspects as variables e.g. biological sex, gender, age, socio-economic factors, …) • Outstanding: Original and ground-breaking approach considering (multiple) variables • Excellent: Important and novel approach to include diversity aspects • Accomplished: Routine approach with good consideration of diversity • Not applicable: Research that is based on routine rather than novelty. Scientific quality standards not fully complied
Interdisciplinary character of the concept (30%) Integration of different disciplines • Outstanding: A significant breakthrough for interdisciplinary research • Excellent: An important contribution for interdisciplinary research • Accomplished: reflects a good interdisciplinary approach • Not applicable: Interdisciplinary approaches not described adequately, or not recognisable
Overall Quality (20%) Overall composition, clarity, consistency, and coherency of the paper
• Outstanding: Excellent composition and plausibility of the paper • Excellent: Good composition and plausibility of the paper • Accomplished: Adequate composition and plausibility of the paper • Not applicable: Poor or failed composition and plausibility of the paper

2. DETAILS

2.1 About the Human Brain Project

The **Human Brain Project** (HBP), as one of the three FET (Future and Emerging Technology) Flagship projects, is one of the largest research projects in the world. Starting in 2013, more than 500 scientists and engineers at over than 152 universities, teaching hospitals, and research centres across Europe come together to address **one of the most challenging research targets** – the human brain (HBP, https://www.humanbrainproject.eu/). The HBP is developing **EBRAINS** (https://ebrains.eu/), an innovative ESFRI infrastructure that will help neuroscientists and clinical researchers integrate **data and knowledge** about the brain across all levels of its spatial and temporal organisation. The HBP is not only set to transform neuroscientific research but also the **culture of collaboration**, bringing together resources and **interdisciplinary knowledge**.

The **Diversity and Equal Opportunities Committee** (DEOC) is an advisory body of the HBP, composed of HBP board members, leaders, scientist, technologists or managers engaged in the work for the HBP from different domains and thus constituting a microcosm of the HBP Consortium. This unique group of interdisciplinary perspectives is committed to enhance diversity and equal opportunities in the HBP.

The DIRPA was launched at the last physical HBP Summit in Athens, Feb. 2020. Additionally, convelop (Grasenick et.al.) in close collaboration with the HBP DEOC has developed guidelines and webinars to encourage and support scientists to integrate diversity traits in research design, conclusions and representation of results which has been proven to contribute to innovative insights.

2.2 Rationale

Considering sex/gender and other diversity aspects like e.g. age, ethnicity, culture, etc. has been recognized as relevant for new scientific insights. Therefore, it has become a requirement by default for the **Horizon Europe programme**. Examples are outlined in the second "Gendered Innovations" policy report (https://ec.europa.eu/info/news/gendered-innovations-2-2020-nov-24_en).

Scientists, particularly neuroscientists, have been criticised that their research questions and/or conclusions have been driven by biases and a lack of reflection, e. g. by extrapolating results achieved with one group of research subjects compared to other groups in disregard of potential differences between these groups. This neglect has led to the request to consider diversity in research more carefully, e. g. for research relevant for medical treatments or societal applications.

Hence, scientists have studied differences, especially sex differences in neuroscience (Jäncke, 2018). Most evidently sex chromosomes differ and can be traced down to the level of stem cells (Shah, 2014). They effect the production of hormones which again are measurable in the brain and influencing functional responses. (Cahill, 2014). *"For example, studies have demonstrated that cells and the central nervous systems of male and female mice react differently to chemical stressors with potentially severe consequences for drug design and treatments for brain diseases like Parkinson stroke. Neurodegenerative diseases such as multiple scleroses take different courses for women and men. For neuroscientists, sex can be a key variable that should be addressed not only when studying humans but also when working with animals and cell cultures"* (Grasenick, 2019).

Simultaneously, neuroscientists have been criticised for binary approaches, the false assumption that female and male brains are dimorphic. Based on such binary assumptions it has been argued that cognitive and emotional abilities, societal roles are biologically grounded (Rippon et.al, 2019). Eliot et. al. (2021) therefore recommend to "*Dump the 'dimorphism'*" and according to Joel et. al. (2015) "*human brains are comprised of unique 'mosaics' of features, some more common in females compared with males, some more common in males compared with females, and some common in both females and males.*"

Examples related to Artificial Intelligence (**AI**) show that it is not only essential to consider sex and gender, but also further diversity traits such as race or ethnicity: Facial recognition can be

discriminating based on characteristics such as race and gender and their intersections (Buolamwini & Gebru, 2018). Such inequalities stemming from AI technologies might even lead to exacerbating health care disparities when unintentionally perpetuating sex, gender and race biases (Zou & Schiebinger, 2021).

These examples show that binary approaches are too simplistic. Neuroscientists have been criticised for the false assumption that female and male brains are dimorphic. Based on such binary assumptions it has been argued that cognitive and emotional abilities, societal roles are biologically grounded (Rippon et.al, 2019). However, the neuroscience of sex differences has partially been interpreted incorrectly to promote such gender roles (Woolley, 2021). For this reason, intersectional approaches considering other diversity aspects such as age, ethnicity, socioeconomic background, etc. has been recognized as relevant for new scientific insights (EC, 2020b).

2.2.1 Definitions for Sex, Gender, Diversity

Sex and gender are often differentiated as binary categories, however the idea of two sexes is far too simplistic. The underlying assumption is that female-male differences are determined by biological factors (chromosome, hormones, body composition), ignoring their interplay with socio-economic and psychological factors (i.e., the effect of gender norms and roles) and further co-variables that might have had an impact on findings that appear of solely biological origin.

Sex refers to the **biological differentiation** between "male" and "female", determined by chromosomes, genes, hormones, and anatomy. However, the idea of two discrete sexes is too simplistic. The concept of "intersex" refers to a variety of conditions, in which the combination of sexual, anatomical and physiological factors does not fit to the typical definition of male and female (Ainsworth 2015, ISNA 2015).

The term **gender** refers to the **social construction of women, men and non-binary persons**: societies and cultures associate competences, behaviours and attitudes with a person's biological sex. **"Sex/Gender"** *has been used to raise awareness that that both categories are socially constructed and both effect the brain in a complex interplay (Kaiser, 2012).*

In general, **"diversity"** can be applied to a general term or abstract concept which, if disaggregated, can be operationalised in different ways (e.g. "material", "data", "robot" etc.). More specifically, **"diversity"** comprises the manifold traits, characteristics and differences of human subjects based on various dimensions. Some of these traits are inherent (e.g., sex, ethnicity, sexual orientation, body composition, physiology, age), some are acquired (e.g., skills, knowledge, technological literacy) and others are context related (e.g., different mobility needs in private and working context, social and economic background, working and living environment, lifestyle) (Grasenick, 2019a). Better understanding of what people have in common and what makes them different leads to great potentials for research outcomes and innovation (Hewlett 2013, Schiebinger 2014).

The European Commission (EC) prohibits discrimination on the following characteristics: sex, race, colour, ethnic or social origin, genetic features, language, religion or belief, political or any other opinion, membership of a national minority, property, birth, disability, age or sexual orientation.

References

Ainsworth, Claire (2015): Sex redefined; Nature Vol. 518 / 7539, News Feature. http://www.nature.com/news/sex-redefined-1.16943

Buolamwini, J., & Gebru, T. (2018). Gender shades: Intersectional accuracy disparities in commercial gender classification. Proceedings of Machine Learning Research, 81, 77-91. http://gendershades.org

Cahill, Lary(2014): Fundamental sex difference in human brain architecture. In: Proceedings of the National Academy of Sciences of the United States of America. Vol. 111, p. 577-578. DOI: 10.1073/pnas.1320954111

Eliot, Lise et. al. (2021): Dump the "dimorphism": Comprehensive synthesis of human brain studies reveals few male-female differences beyond size. In: Neuroscience and Biobehavioral Reviews, June 2021; Vol. 125, p. 667-697. DOI: 10.1016/j.neubiorev.2021.02.026

European Commission (2020a): Gendered Innovations 2: How inclusive analysis contributes to research and innovation. Brussels, 24.11.2020. DOI:10.2777/316197 URL https://ec.europa.eu/info/news/gendered-innovations-2-2020-nov-24_en [17.08.2021]

European Commission (2020b): Non-discrimination. URL: https://ec.europa.eu/info/aid-development-cooperation-fundamental-rights/your-rights-eu/know-your-rights/equality/non-discrimination_en [06.08.2020].

European Union (2021a): *Horizon Europe. Gender Equality*. DOI: 10.2777/410001

European Commission (2021b): Gender equality in research and innovation. URL: https://ec.europa.eu/info/research-and-innovation/strategy/strategy-2020-2024/democracy-and-citizens-rights/gender-equality-research-and-innovation_en [30.06.2021]

Grasenick, Karin (2019a): Research Guideline. "to be honest: funding opportunities changed how we approach gender and diversity in our research" https://www.humanbrainproject.eu/en/about/gender-equality/measures-and-materials/#_guidelines

Grasenick, Karin (2019b): Same, same – or different? Common Challenges in Neuroscience, AI, Medical Informatics, Robotics and New Insights with Diversity & Ethics. In: The Neuroethics Blog. URL: http://www.theneuroethicsblog.com/2019/09/same-same-or-different-common_10.html

ISNA 2015: Intersex Society of North America; http://www.isna.org/

Jäncke, Lutz (2018): Sex/gender differences in cognition, neurophysiology, and neuroanatomy. In: F1000Research 2018 (F1000 Faculty Rev): 805. DOI: http://dx.doi.org/10.12688/f1000research.13917.1

Joel, Daphna et.al (2015): Sex beyond the genitalia: The human brain mosaic. In: Proceedings of the National Academy of Sciences of the United States of America. Vol. 112, No. 50, p. 15468-15473. DOI: https://doi.org/10.1073/pnas.1509654112

Hewlett, Sylvia Ann; Marshall, Melinda; Sherbin, Laura (2013). How Diversity Can Drive Innovation, Harvard Business Review, December 2013; https://hbr.org/2013/12/how-diversity-can-drive-innovation

Kaiser, Anelies (2012) Re-Conceptualizing "Sex and "Gender" in the Human Brain. Zeitschrift für Psychologie, 220(2), 130–136 https://psycnet.apa.org/doiLanding?doi=10.1027%2F2151-2604%2Fa000104

Rippon Gina, Eliot Lise, Genon Sara, Joel Daphna (2021): How hype and hyperbole distort the neuroscience of sex differences. In: PLoS Biology, Vol. 19, No. 5. DOI: https://doi.org/10.1371/journal.pbio.3001253

Schiebinger, Londa (2014). Gendered innovations: harnessing the creative power of sex and gender analysis to discover new ideas and develop new technologies; Triple Helix 2014, 1:9 http://link.springer.com/article/10.1186/s40604-014-0009-7

Shah, Kalpit, McCormack, Charles E., & Bradbury, Neil A. (2014): Do you know the sex of your cells? In: American Journal of Physiology-Cell Physiology, Vol. 306, No.1, p. C3-C18. DOI: https://doi.org/10.1152/ajpcell.00281.2013

Woolley, Catherine S. (2021): His and Hers: Sex Differences in the Brain. In: Cerebrum, Winter edition, 15.01.2021. URL: https://dana.org/article/cerebrum-sex-differences-in-the-brain/ [17.08.2021]

Zou, J. & Schiebinger, L. (2021). Ensuring that biomedical AI benefits diverse populations. *EBioMedicine, 67*, 1-6. DOI: https://doi.org/10.1016/j.ebiom.2021.103358