

# Greening human brain mapping: sustainability and environment action at OHBM 2021

Dr Charlotte L Rae

School of Psychology, Pevensey Building, University of Sussex, Falmer, BN1 9QH, UK,  
Telephone: +44(0)1273 877084, Email: c.rae@sussex.ac.uk, Twitter: @NeuroRae

## ABSTRACT

The OHBM Sustainability and Environment Action Special Interest Group was founded in 2020 to raise awareness of, and ultimately seek to reduce, the environmental impacts of neuroimaging research. At the OHBM 2021 online meeting, we held a symposium, Open Science Room panel, and roundtable discussion on future meeting formats. In this invited editorial on activities at the OHBM 2021 conference, as outgoing SEA-SIG Chair, I outline our contributions to the 2021 meeting and future aspirations for the SIG.

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## THE OHBM SUSTAINABILITY AND ENVIRONMENT ACTION SPECIAL INTEREST GROUP

The Earth is in the midst of a climate crisis and ecological emergency. Our human brain mapping research activities play a part in driving these problems, from the energy used in our neuroimaging analyses to our travel footprints (1). However, as professional scientists, we are also in the privileged position to assess – and therefore address – our climate and ecological responsibilities (2).

In the context of increasing global recognition that all citizens and societies must take action for protecting the environment, we founded the OHBM Sustainability and Environment Action Special Interest Group ([SEA-SIG](#)), with the aim of addressing the environmental impact of neuroimaging research activities. Since 2020, we have grown from 25 petition-signers for registering the new SIG to a committee of 12 members and [3 working groups](#), numbering nearly 50 human brain mappers, all working to raise awareness on and ultimately reduce the environmental footprints of neuroimaging research.

Our first working group, the Neuroimaging Research Pipelines team, is tackling sustainability in neuroimaging research pipelines by working towards integrating sustainability tools such as [carbon trackers](#) in common

neuroimaging tools like fMRIPrep and benchmarking popular pipelines on their environmental footprints. Ultimately, we aim to propose best practices for sustainable neuroimaging, including data set re-usage and open science workflows (follow our progress on the Neuroimaging Research Pipelines working group [GitHub page](#)). Our Annual Meeting working group is campaigning to make the OHBM meeting more sustainable, for example, by improving conference centre practices and by considering alternative approaches to the carbon-intensive aviation that comes from international in-person meetings, such as hybrid. Our third working group, the Education and Outreach team, is developing educational resources to enable the human brain mapping community to understand how we can make our research and academic lives more sustainable and seeking to involve neuroimagers in ongoing work and discussions around these crucial issues.

## SEA-SIG EVENTS AT OHBM 2021

With the online OHBM 2021 Annual Meeting being our first outing as a new SIG, we were delighted to have the opportunity to share our work with OHBM colleagues and how they can make a difference through our series of SEA-SIG events.

## ORIGINAL RESEARCH ARTICLE

Our OHBM 2021 activities started with our Open Science Room panel discussion on 'Saving time and resources: Open science and sustainability', hosted by the OS-SIG. This was attended by over 100 neuroimagers who were keen to find out ways in which open neuroimaging is already helping save the planet – such as by 'Reducing, Recycling, and Reusing' data – and where we need to refine practices and procedures – such as by addressing the fossil fuel energy costs of open repository data centres and whether to share raw data, intermediary pre-processing files, or end-stage results.

Our flagship symposium 'How Can Scientists Respond to the Climate Emergency? A Guide from the SEA-SIG' came to the Planet Brain main auditorium the next day. Our speakers were five activist-academics who had been campaigning for sustainability in research, conferences, universities, and teaching. We were lucky to be joined by a special guest, climate scientist [Milan Klöwer](https://twitter.com/milankloewer) (<https://twitter.com/milankloewer>), who told us, 'It's happening, it's us, it's bad, we can fix it' – outlining in no uncertain terms just how much of an emergency we really are in – from floods in Europe to wildfires in Australia and heatwaves in the United States – but that if we act quick, we can prevent the most catastrophic outcomes of runaway climate chaos.

We then turned to taking action in science and academia. I covered environmental issues in neuroimaging research pipelines, such as the energy consumption of big data analysis, while [Anne Urai](#) highlighted the huge carbon footprint that (pre-Covid) in-person international conferences entail – using data from Milan Klöwer's excellent assessment of different meeting formats and their carbon costs (3). One key statistic is that meeting online – as we did at OHBM 2021 – cuts a conference's carbon footprint by 99.99% compared to an international in-person meeting, equating to thousands of tonnes of CO<sub>2</sub> – although, of course, we need to consider many other intersectional factors in meeting format, such as accessibility and impact on different career stages (see (4)).

Next, [Adam Aron](#) recounted his [campaign to electrify the energy supply at the multi-campus University of California](#) and get the institution off fracked methane gas, a highly polluting fossil fuel. Adam highlighted 'the responsibility of all of us in our institutions, to push our institutions' from representation on university senates to petitioning for pension and finance divestment from fossil fuel companies, and the banks that support them. Finally, [Clare Kelly](#) described her personal journey in facing up to the gravity of the climate and ecological emergencies and no longer able to sit on the sidelines, developing a revolutionary interdisciplinary module for undergraduates at Trinity College Dublin on the psychology of the climate crisis. Equipping the next generation of university graduates with a deep understanding of the psychological drivers of climate change and barriers to action is

critical. Clare flagged that all of us can incorporate these issues in our teaching, such as by using climate and environmental examples in our statistical demonstrations.

We much enjoyed discussing the questions raised by audience members in the symposium chat, which ranged from the differential impact of low-carbon conference models on early career researchers versus established colleagues to whether it is down to us to take action or solving environmental crises is the role of governments (of course it's both!).

One of our responsibilities as professional scientists is to reduce the footprint of the annual meeting, in particular by lowering emissions from members flying to OHBM. Our roundtable discussion 'What should a sustainable post-Covid annual meeting look like?' sought to hear views and feelings on potential alternative meeting formats, from fully online to hybrid, biennial (meeting every other year), hub (in which attendees travel to their nearest regional 'hub'), and more. Although everyone at the roundtable recognised the urgent need to reduce our conference transport emissions, we noted that the session was attended by only some demographics (e.g. those with existing interests in this area) – and so we plan to continue these conversations more widely with the council, staff in the Executive Office, and the membership at large. Our *Annual Meeting* working group is currently using feedback from the roundtables to inform these conversations and dialogues, including a report for OHBM Council on a sustainable vision for the annual meeting going forward. Do get in touch with us to share your thoughts on how we can best reduce the annual meeting's footprint, while enabling us to connect deeply and meaningfully internationally and at all career levels.

Together with the Brain-Art SIG, we launched a competition for neuro-artists to design a new SEA-SIG logo, the winner of which was announced at our social: many thanks to [Judith Bilgorai](#) for our gorgeous new identity, now in use on our [Twitter account](#) and [website](#)! During our social, we also enjoyed watching some environmental short films together and connecting with neuroscientists around the world on sustainability. We find that hearing others who care about these critical issues too is a very helpful and cathartic antidote to the barrage of bad news on the environmental catastrophes we face.

## LOOKING FORWARD: OHBM 2022 AND BEYOND

With that in mind, we are really looking forward to Glasgow 2022 and continuing our work to engage OHBM members in conversation around what we need to do to save the planet – and ourselves. We are planning a new symposium, another roundtable discussion, and a plant-based picnic in the park – and hybrid activities too, as we are keen to support and facilitate the participation of

colleagues who are not able to travel in person. It will likely be my only in-person OHBM meeting until 2026, as I stopped flying for environmental reasons seven years ago.

We plan on sharing tips and advice on getting to Glasgow via train, wherever possible, because travelling by train rather than plane [saves up to 90%](#) of the carbon emitted by plane (5). We also hope to set up a train-based social and networking scheme, so OHBM attendees can enjoy each other's company en route. In the meantime, if there is a green initiative you think SEA-SIG, or OHBM more widely, should be working on, do get in touch.

Follow SEA-SIG on Twitter [@OhbmEnvironment](#) and see the [SEA-SIG website](#) for how to get involved in our work. The planet needs you!

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