



HIGHLIGHTS OF THE YEAR

2019 was a productive year at Center for Music in the Brain (MIB) in terms of publications, international collaborations and outreach. We published a high number of peer-reviewed papers with an increasing impact on the field of neuroscience and music and effect on strategies for the use of music in the educational and health care systems in Denmark.

In 2019, the Predictive Coding of Music (PCM) model, which forms the theoretical basis of MIB, was featured in a review paper in the prestigious journal, *Trends in Cognitive Science*, and presented orally at The Predictive Brain Conference in Marseille in September. Our work on PCM at the *individual level* has resulted in a new direction of research at MIB, which focuses on understanding the predictive mechanisms involved in how music becomes meaningful when it is communicated *between humans*. Hence, in 2019 we suggested a new oscillator-based model for understanding brain processes related to interpersonal synchronization, which applies successfully to interpersonal tapping and the related brain responses. We are currently using musical improvisation as a model for studying non-verbal communication and creativity through music analyses, mathematical modelling, and with behavioural and neuroscientific experiments. Additionally, we published a paper in the high impact journal *elife*, now featured at videnskab.dk, showing how structure in music evolves over centuries, possibly millennia, partly through the process of intergenerational transmission, “adapting” to the brains of its users.

MIB’s basic research studies feed into our clinically oriented research branch with the work on understanding music as an interpersonal phenomenon bearing great potential for being translated into clinical applications. One of the highlights of 2019 was our publication in *Nature Communications* which used a prediction-based method to discover the dynamic choreography of different whole-brain networks across the wake-sleep cycle. We are translating this knowledge into research on music listening for sleep disorders. Other important clinical applications include listening interventions to improve mood and mental health, and to alleviate pain perception and cancer-related anxiety, active rehabilitation interventions in patients diagnosed with chronic lung disease and in patients with Parkinson’s disease, and recordings of music-related brain activity in cochlear implant-users.

MIB values international collaborations, and in 2019, we hosted a number of doctoral, postgraduate and undergraduate students from abroad and prominent guest speakers and collaborators, such as professors Martin Lotze, Petri Toiviainen, Edward Large, Eckart Altenmüller and Mari Tervaniemi. We also saw new national and international collaborations emerging. Our work on cortical feedback mechanisms performed with CNAP (AAU) in musculoskeletal pain in musicians was recently funded by the Lundbeck Foundation, and we initiated collaborations with Anne Caclin and Barbara Tilmann, University of Lyon recording EEG in amusics, as well as with Bob Knight at UC Berkeley using intracranial recordings to understand brain mechanisms of music memory.

This year saw the successful PhD defenses of Ole Adrian Heggli and Maria Celeste Fasano, who were part of the first brood of PhD students hired at MIB. Ole has continued in a postdoc position at MIB, while Maria Celeste has been employed as postdoc at the Department of Psychology at Aarhus University. In December, David Quiroga defended his thesis continuing his post-doctoral research at MIB, and we welcomed postdoc Alexandre Celma-Miralles from University Pompeu Fabra. In September 2019, Prof. Marcus Pearce had to move back to the UK for family reasons, but he remains an important collaborator and PhD supervisor at MIB.

In the spring of 2019, the scanners and technical staff of CFIN moved to Aarhus University Hospital in Skejby, and MIB and the rest of CFIN moved to a lovely old building at Nørrebrogade. After a short period with minor turbulence, we have now settled in and the collaboration with the technical staff works seamlessly.

Together with the Mariani Foundation lots of effort has gone into organising the upcoming Neurosciences and Music Conference taking place in Aarhus June 2020, to which we in 2019 received 300.000 DKK from the Lundbeck Foundation. We have planned an Aarhus Summer School to precede the conference with an impressive lineup of renowned speakers, including Professors Robert Zatorre, Virginia Penhune and David Huron, and exciting hands-on workshops. Unfortunately, both events have been postponed to 2021 due to the Covid-19 epidemic.