

EXTERNAL REVIEW OF MCMASTER INSTITUTE FOR MUSIC & THE MIND

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EXTERNAL REVIEW BOARD MEMBERS

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MANDATE OF REVIEW

An External Review Board (ERB) of scientists was established to prepare a 5-year evaluation of the McMaster Institute for Music and Mind through reading the Institute report and interviewing a wide range of individuals associated with the Institute. The ERB has prepared this report assessing its current accomplishments and performance, identifying our view of weaknesses and opportunities, and providing concrete recommendations to build on the past success of the Institute.

INSTITUTE MISSION AND MANDATE CONTEXT AND OVERVIEW

The McMaster Institute for Music and the Mind (MIMM) is a multidisciplinary group of researchers, health practitioners, industry partners and the arts dedicated to pushing the boundaries of our understanding of music, the brain and health. Since 2006, it has produced seminal research on the fundamental neural basis of music perception and production across the lifespan as it relates to health, creativity, social interaction, and child development. Under the direction of Professor Laurel Trainor, a distinctive component of MIMM is the LIVELab (Large Interactive Virtual Environment) — a building, unique in the world, for neuroscientific and behavioral study of the experience of performance, be it music, dance, or any form of human communication. Established in 2014, The term “LIVELab” captures the distinct ability of the facility to conduct controlled studies of natural performances from the perspective of the performers, audience, and their interactions. The big data (e.g., brain waves, bodily motion, heart rate) arising from such studies of multiple persons simultaneously can address questions of enormous scope ranging from the power of music in impacting well being to the nature of effective leadership in groups. LIVELab also serves as a public performance space and venue for demonstrating the nature of research that investigates the human perception and production of music, visual and motor components. More than a useful research infrastructure, LIVELab is a way of introducing the public (e.g., school children, concert attendees) to research, and to current knowledge about perception and performance. Functionality of the facility relies on the work of a Technical Director (who operates all the equipment), a communications and lab manager, and a study coordinator and stage manager, in addition to the work of the Director. An additional technician has recently been hired, and several other members of the Science Faculty staff assist with communications and fundraising. User fees contribute to the support of the personnel, and these fees

which are realistic (in the sense that the services provided are compensated appropriately) are nevertheless outside the capacity to pay of many faculty members with good ideas. Nevertheless, an enormous number of exciting projects are underway and several have resulted in peer-reviewed journal publications.

INSTITUTE PERFORMANCE

Strengths

1. The ERB unanimously finds Professor Trainor to be an exceptionally strong director. She is overseeing an incredibly broad array of projects, ranging from basic science to applied and community-based research. She has also built a very strong core group of staff and early career researchers, many of whom are supported by grant funding.
2. The ERB applauds the scientific merit especially of research studies from the LIVElab; these are well-respected and unique within the field.
3. The ERB sees strengths in the unique infrastructure that MIMM and the LIVElab offer for interdisciplinary collaboration, spanning psychology and neuroscience, engineering, mathematics, and audiology and clinical neuroscience, as well as the arts and humanities.
4. The ERB finds that MIMM and the LIVElab are exceptionally strong in community outreach, frequently (when not in pandemic) offering tours and concerts for the community in Hamilton and beyond.
5. The ERB finds the application of basic science to health outcomes, such as in hearing (audiology) and music therapy, to be a major strength of the Institute.
6. The ERB observes an overall positive culture of cohesion and collaboration within the core group of staff (Dan Bosnyak, Sally Stafford, Susan Marsh-Rollo), who are uniquely qualified for their roles. Dr. Dan Bosnyak is especially well-qualified for the demanding role of Technical Director.
7. Similarly, the ERB finds strengths in the postdoctoral researchers, graduate students, and undergraduates, who appear engaged and collaborative, while also being strong researchers who are capable of independent work.
8. The ERB applauds the institute's engagement of undergraduate researchers in music cognition, as the presence of MIMM and LIVElab at McMaster University provides a unique and inspiring opportunity for an education and training with a music cognition specialization at the undergraduate level that is unparalleled in the world.

Weaknesses

1. The primary challenge faced by the MIMM is funding. Concerns about funding take a disproportionate amount of time and for the most part the burden of sustaining the Institute has fallen on the Director's shoulders, rather than being a shared responsibility across Institute PIs and the University.

2. A related weakness is that it is not possible to give the administrative and technical staff assurances of stable long-term employment. The Institute has been very fortunate to find highly dedicated staff who are willing to work in such circumstances. Several key staff members seemed to the ERB to be under-compensated, and are persisting in the face of such disadvantage in part out of loyalty to the institute and love of the work.
3. The Technical Director seems unnecessarily constrained in not being able to apply for grants as PI, and not having managerial responsibility for the technical staff.
4. There are several concerns about the long-term suitability of the current organizational model. Several key roles, including the Director and Technical Director, have a tremendous amount of knowledge about the culture and technology of the LIVELab in particular, and it is a concern that if they were to become unavailable, that there would be a significant knowledge gap. Put another way, these are extraordinarily talented people who have gained the knowledge necessary to make the best use of LIVELab resources, and as a consequence they become irreplaceable.
5. Relatedly, It is not clear if there is a succession plan in place for who would lead MMIM and LIVELab should the Director retire. We did not come away with a clear sense of a 'number two' who was in position and being groomed for this. It is entirely possible that no one person could replace the current Director, and that such responsibilities would need to be shared more formally across a group of investigators.
6. Multiple respondents wished for more cohesion and communication across the broader membership of MMIM. There is one annual conference (Neuromusic) that provides the primary venue for the group to get together, though participation is not unanimous, and there is a lack of more regular meetings. In contrast, while Music Cognition journal club-style meetings appear to be more regular, these draw from graduate students in the Department rather than the MMIM interdisciplinary membership.
7. Several respondents felt that the full capacity of the LIVELab was not being used, primarily due to staffing limitations.
8. It was clear that the initial years of funding (provided in part by the related CFI IOF) enabled essentials, such as subsidized piloting time in the LIVELab to establish procedures for the new facilities, that encouraged the broader use of the lab. Currently, the cost was noted as prohibitive by some (though not all) affiliated researchers.
9. Equipment (e.g., computers, motion capture hardware/software) will need to be renewed in the next five years.
10. Music is typically associated with arts and humanities, yet the Faculty solely responsible for MIMM is Science, despite the engagement of Arts Faculty members, particularly several in the Department of Music. While MIMM is a feather in the cap of McMaster University and the Faculty of Science, the current organizational structure does not allow Arts to support or take credit for MIMM.

Opportunities

1. Given the unique capabilities of the LIVELab and the expertise of MIMM researchers, the ERB sees opportunity for MIMM to pursue new research directions and funding targets in areas such as architectural acoustics, the music industry, neuromarketing, and the broader tech industry.
2. The ERB sees the potential for an expansion of industry funding and donations with the goal of building a multimillion endowment to support MIMM in the long term.
3. There is potential benefit of increased long-term support and commitment to staff positions either through the University or the province of Ontario, particularly for positions such as Technical Director and a MIMM-specific fundraising administrator.
4. The ERB sees the importance of building a culture of shared support for MIMM and the LIVELab, where the faculty members in MIMM are expected to share the responsibility of raising external funding in support of MIMM and the LIVELab research.
5. Given the highly complex and rich data sets that can be generated through studies at the Live Lab, and the current need for additional resources to analyze data, MIMM has an opportunity to develop an open access data repository where data sets could be stored, shared, and analyzed in new ways by other researchers within and outside of MIMM.
6. The ERB sees an opportunity to enhance large-scale collaboration and further engage a broader national and international community of researchers. Given the uniqueness of the facility and the expertise, lowering the barriers for researchers to become more involved (in terms of offering help with logistics, process, pilot testing, questions that can be asked, tools for data processing) could promote further collaboration and a culture of grant-writing among MIMM researchers at and outside of McMaster.

Threats

1. The long term sustainability of the MMIM and LIVELab are threatened if key individuals in the core team were to leave, become incapacitated or lose funding.
2. The long-term stability of the Music Department at McMaster was a concern raised by several respondents.
3. The structure of research institutes such as MMIM is vulnerable in a way that departments do not tend to be.
4. The alignment of MIMM with Science (i.e., excluding Arts and Humanities) places a facility for the study of music on a less balanced foundation than seems ideal, if one were designing a foundation from the ground up. This is to take nothing away from the extraordinary insight of the Faculty of Science to support, encourage, and grow MIMM as it has.

RECOMMENDATIONS:

1. We strongly feel that this is a world-class group with an unparalleled facility and that it deserves recognition as such at University and wider levels, with consequent financial and logistical commitments to its sustainability. It is not an exaggeration to call it **a national treasure**.
2. We suggest continued strengthening of recent Faculty-level administrative support for strategy, and specialized fundraising, which was noted by multiple respondents as a valuable first step in this direction.
3. We suggest that the Technical Director be made a hard-funded permanent staff position, with manager-level responsibility, and that the position be made one that could actively apply for grants.
4. We suggest that a plan be made for succession, that would include a search for a scientist (or small group) with the vision and dedication to becoming a long-term leader of the MMIM and LIVELab. Ideally, a job ad would target a person (or persons) whose background and interests would align with the use of the LIVELab facilities. Such a search is better done sooner than later, in order to work closely with the current Director. Indeed it is our experience that in organizations such as the MMIM/LIVELab with a visionary founder, it can be ideal for them to retire *_as Director_* well before retiring from the university in order to give the new generation the chance to take the reins while still being in the wings to help.
5. We suggest that there are more frequent opportunities to allow the larger MIMM membership and students to connect, beyond the Neuromusic conference. Suggestions include an annual social and strategic retreat, quarterly meeting/lunch, more regular opportunities for trainees to interact across laboratories (a monthly trainee event), and that the MIMM-wide journal club be brought back.
6. We suggest that a culture of distributed responsibility for supporting MMIM through grants be developed.
7. We suggest that funding be raised specifically to subsidize pilot testing and experiment development, as this will ease the barrier to using the LIVELab by e.g. providing the ability to feasibly collect pilot data to support grants.
8. We suggest that funding be raised, perhaps through a new CFI grant, to revitalize the equipment for the next decade.
9. We suggest that continued effort be made to pass on technical aspects of carrying out a study at the LIVELab, such as through videos, step-by-step procedures, and training for researchers.
10. We suggest that a digital library system for data and procedural archiving be established such that the rich data collected in LIVELab can serve more than the individual researcher or research group who collected it. Such data may also serve the training of HQP. This is not to suggest that those who collect and

report data would stand to lose anything, but rather stand to gain through the heightened value of their efforts.

11. We suggest a review of the University organizational structure responsible for MIMM to determine whether the current sole weight on the Faculty of Science might be expanded to other Faculties whose members can and do benefit from MIMM and LIVELab. More specifically in addition to members in the Faculty of Science, research is being conducted by members of all five other Faculties. A rebalancing and extension of financial responsibility for MIMM, including the music/humanities dimension, could provide the stable foundation on which to ground the brilliant interdisciplinary potential that lies ahead for MIMM, LIVELab and McMaster.

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