

Alexis Emelianoff and Jérémie Voix: Agile Seed Fund Final Report  
April 3, 2024

The Agile Seed Grant was used for the following purposes:

First, I was able to attend an IEEE Magnetics conference in Dallas, Texas from October 25-November 5, 2023. I presented a mini concert with my magnetic turntables 'Spirit of Light'. The Agile grant covered ground transportation, registration and meals during the stay, and a Canada Arts Council grant covered flight travel and lodging. (\$1,215 CAD total)

Second, we purchased several materials and pieces of equipment:  
-Galfenol: a specialized magnetostrictive material to be used experimentally for power harvesting in wearable audio devices  
-Neodymium magnets for use in magnetic oscillators  
-A 6-channel Zoom recorder for recording magnetic activities and equipment  
-various other materials to be used in experiments.  
(\$1,785 CAD total)

The main goal of the project was achieved, but the plan had to be adjusted. It takes time to form collaboration relationships and organize the resources for further work. We had to extend the deadline but are glad that CIRMMT was willing to accommodate the delays.

Originally, we planned to apply to the National MagLab in the US for some preliminary magnetoacoustic experiments. The proposal process proved to be too long and difficult, so I decided to present at the conference to network and meet potential collaborators. Rather than proposing 'experimental experiments' to a government facility, it is much better to form direct connections with university and industry labs.

I had many conversations with other participants who mostly appreciated the work I presented and were interested to engage, but were perhaps unfamiliar with sound art or uncertain of how to participate. So far I was able to make a visit to the lab at UC Denver, Colorado with Barry Zink, in January 2024, to exchange more on our respective work and to make some recordings of equipment in the lab. I used binaural and inductive microphones to probe around an evaporating tower used to fabricate spintronic devices; in particular there was an ion pump which emanated EM fields worthy of being recorded. Barry appreciated my experimental interests and was interested to arrange some future visits with me at other universities in Colorado.

Another contact I made was Vivek Amin from Indiana University. Besides conducting research in theoretical spintronics, he gives a course called Physics of Music, discussing the scientific principles used in electronic and acoustic musical instruments. Vivek has invited me to visit IU in the fall to give a talk and-or concert, which is especially interesting because of the music community at IU.

There were of course some interesting challenges that presented themselves during this time. There is a language barrier between highly specialized disciplines even within an already specialized field. Scientists have difficulty imagining new uses for magnetic outside of established protocol ("what exactly did you want to do with our equipment?? This is a secret government facility"...) Or understanding why it's useful to pursue this, or even what is sound art...? Do academic have extra time or resources to dedicate to experimental/speculative purposes? Then of course there are the human factors, of connecting with the interests of others and convincing them to participate.

Benefits for the CIRMMT community:  
representation at a scientific conference which has never witnessed a musical application of magnetism.

Advancing research within the CRITIAS lab and connecting with new networks; the Agile grant also helped the collaboration between myself and CRITIAS (as I became their artist-in-residence during this academic year), and gave more weight to the possibility of continuing an artist-in-residence program at ÉTS.

Connecting with other researchers interested in the physics of music and sound, especially Vivek Amin at IU.

Supporting an independent artist (myself) in presenting work to a new audience, creating future opportunities and advancing highly specialized research. At the IEEE conference, I discovered many intriguing topics in magnetism such as imaging techniques and materials for actuators.

More benefits will come in the future; we see this 'Seed' grant as just an opportunity to grow magnetoacoustics work. Public events such as concerts, conference talks and artist talks will follow as well as grant applications.

We are very grateful for the support from CIRMMT and are satisfied with the outcome of the research project. Thank you for the initiative!