**University of Leicester**

**Future 50 PhD Scholarship**

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| **Project Reference** | CMS Anjum |

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| **Additional Supervisor** |  |

**Section 2 – *Project Information***

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| **Project Title** | Electroencephalogram-driven AI composition and performance system for autistic and/or d/Deaf musicians. |
| **Project Highlights:** | 1. | Neural interactions of autistic and d/Deaf musicians |
| 2. | Construction of an EEG-driven AI for composition and performance |
| 3. | Wide and transformative impact on marginalised groups |
| **Project Summary**  |
| The project initiates a new form of digital musicianship that enables traditionally marginalised groups such as autistic people and deaf musicians to create and perform original music. It uses an EEG-driven AI to explore the individual sound worlds of the musicians and make connections between them. The system interprets neural performance metrics based on the musicians’ reactions to sensory stimuli. An algorithm then distributes the resulting sounds to provoke new reactions, implementing a feedback loop of unconscious creativity. The project builds upon a pilot study entitled *Digital Syzygies* (2022), led by Professor Andrew Hugill as part of the ‘Digital Scores’ project, funded by the European Research Council. The project is detailed here <http://www.digitalsyzygies.org.uk> In this Case Study, four remotely located autistic and/or d/Deaf musicians used a self-devised system in the manner described above. The resulting album and associated experiences (described in a blog and the research summary) amounts to a proof of concept.The aim of the proposed project is to develop a more sophisticated and robust system that can be rolled out to a much wider community of users. This requires a fully developed AI that enables real-time collaboration between musicians and that is trained on a wider array of EEG datasets. As well as the musical outputs, this would enable correlations between EEG and reported emotions and so illuminate the differences between autistic and neurotypical individuals. It would also provide more robust information about “flow” states (Csíkszentmihály, 1975) and the extent to which autistic individuals are more readily able to enter such states. The project would have a large and wide impact. The first target group is the participating musicians, whose own practice and lives may be transformed (as was demonstrated by *Digital Syzygies).* The next target group is the wider neurodivergent and deaf communities, with whom the participants are linked through extensive networks. The system could be deployed cheaply and robustly in such communities to enable a fuller expression. The final target group is the musical public at large, where it may demonstrate a new approach to music-making, transformed by computational AI technology and through co-creation untrammelled by conventional social interactions. |