The Quantu Study is recruiting patients diagnosed with Alzheimer’s Disease, mild cognitive impairment, and/or neuro-degenerative disorders and healthy controls, ages 18+, for daily activity tracking via wearables and/or a smart patch. Heartrate, steps walked, SpO2, and metrics of sleep duration and quality are currently being recorded. A subset of volunteers and patients are also providing clinical and blood samples for the biosays every 6 months.

### Quantitative Neurogenesis Assays

A quantitative understanding of how human neural stem cells (NSCs) communicate, form networks and function can point to new ways to optimize neuroprotective strategies. To that end, we are characterizing the dynamics of induced pluripotent NSCs (iNSC) self-organization during differentiation and how their networks both behave electrically and chemically. Single cell profiling enabled us to develop a spatial-temporal model of how single human neurons form in the context of a developing neuronal network, and the use of iNSCs allow us to apply the “Living Neural Networks” (LNN) functional assay to cells obtained from volunteers and patients with neurodevelopmental disorders and dementia, including those who behaviors are being tracked by wearable devices (ongoing work). In addition to the LNN’s ability to capture neurodevelopmental signatures across generations (Figure 7), Ongoing work includes predicting sleep quality metrics (e.g., REM duration) with and without neuroprotective strategies. To that end, we are developing novel bioassays (Table): the cortical organoid (C. Organoid) and ectoderm patterned (EM) assays, mAiF multiplexed immunofluorescence, MEA = multielectrode array, ctyNet = cytoNet software.

### References

- Britton et al., Nature 2016
- Pase et al., Neurology, 2017
- Shokri-Kojori et al., PNAS, 2018
- Weger et al., Nat Neurosci, 2017
- LNN functional assay to iNSCs enable us to apply the Living Neural Networks approach, two other human neurogenesis assays are being employed (Table): the cortical organoid (C. Organoid) and ectoderm patterned (EM) assays.