2023 Annual Research Day Poster Sessions – April 19th, 2023

Session/Poster#	Presenter
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Enabling integrity and metadata provenance of neuroscience research artifacts using Open Science Chain

In neuroscience, large amounts of experimental and imaging data are produced in a wide variety of formats and are utilized to develop data-driven computational models for elucidating neuronal and network functions. Investigators whose research involves sophisticated processing of large amounts of these multimodal data require techniques to ensure its integrity, especially when trying to build upon prior research work done by other scientists. This research work explores integrating neuroscience workflow software called the Neuro-Integrative Connectivity (NIC) tool that processes and analyzes large-scale neurophysiology data, such as EEG data, to generate functional brain networks in neurological disorders with Open Science Chain (OSC) cyberinfrastructure platform where the integrity and metadata provenance information of the scientific artifact is stored and managed in a consortium blockchain. The NIC tool consists of two components with the first component focused on neurophysiology data pre-processing and transformation into an ontology annotated JSON format that supports brain functional network analysis. The second component of the NIC tool supports multiple signal coupling models, including linear and non-linear regression correlation measures, using either signal frequency or amplitude values. The NIC tool records provenance metadata describing the sampling rate, signal montage, etc associated with specific brain function events. This research integrates OSC with NIC to capture provenance metadata corresponding to the components defined in the NIC framework for reproducibility. Provenance information of the data is sent to the OSC blockchain. The OSC blockchain identifier will be used during dissemination steps, including the publication of results and data sharing with collaborators. Future research includes exploring the integration of OSC with ModelDB to track integrity and metadata provenance related to the reuse of computational neuroscience models.