

Submission in Response to NSF CI 2030 Request for Information

DATE AND TIME: 2017-04-05 16:40:35

PAGE 1

REFERENCE NO: 293

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Research Domain, discipline, and sub-discipline

Neuroscience

Title of Submission

Transfer of large data files

Abstract (maximum ~200 words).

In order to manage the preferable local storage of data to be shared, investments in local (University-wide) cyberinfrastructure are required.

Question 1 Research Challenge(s) (maximum ~1200 words): Describe current or emerging science or engineering research challenge(s), providing context in terms of recent research activities and standing questions in the field.

Our current research focuses on brain electric activity during sleep and associated cognitive processes. Such investigations require /will require monitoring of subjects (humans and small mammals) during long periods of sleep, and from multiple brain regions/superficial sites. Behavioral performance and electrophysiological activity are analyzed in relation to one another. Advances on underlying mechanisms and neuroanatomical pathways of the neurophysiological activities related to memory consolidation have been made, especially in the last 20 years, yet e.g., by interrogation of specific neurophysiological pathways it is now possible to gain more specific understanding of underlying mechanisms, relevant for basic research as well as for diagnostic and therapeutic purposes for diseases involving cognitive impairment.

Question 2 Cyberinfrastructure Needed to Address the Research Challenge(s) (maximum ~1200 words): Describe any limitations or absence of existing cyberinfrastructure, and/or specific technical advancements in cyberinfrastructure (e.g. advanced computing, data infrastructure, software infrastructure, applications, networking, cybersecurity), that must be addressed to accomplish the identified research challenge(s).

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PAGE 2

REFERENCE NO: 293

Investigation of electrophysiological activity during sleep requires long recording times (up to 24 h with multiple channels and sampling rates > 1 kHz). With increasing technological developments on the recording side, generated data volume is increasing. Aside from storage and backups, data sharing is becoming more relevant. Following is a short note on perceived requirements and/or challenges: Movement of large data sets from local storage to an access point for data sharing is becoming more relevant. This data access point we envision is best at the local university, since we find it important to know to whom our data will go. Specifically, data alone is not of much use. In part lengthy explanations are relevant to enable sensible analyses of data. Therefore also password protected access is appropriate. To manage this (for each individual data set) on the IT side (together with other maintenance procedures, e.g. cybersecurity) additional support for the University's IT department (manpower and financial) would be necessary. Considering the size of data files in ongoing experiments, after five years the capacity of our present Departments' server would be required just for data sharing (ca. 10 TB).

Consent Statement

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