University of Pittsburgh

School of Medicine
Department of Neurological Surgery
Brain Trauma Research Center

200 Lothrop Street, Suite B400
Pittsburgh, Pennsylvania 15213
Phone: (412) 648-9654
Fax: (412) 648-2057
Email: **kriegerd@upmc.edu**

October 6, 2014

Dear Council Members:

Our group has been funded by the Department of Defense to develop and evaluate a comprehensive patient-centered approach to clinical management of head injury in veterans and active duty military personnel. Each patient volunteer will be thoroughly evaluated by a team of physicians and neuropsychologists using anatomic and functional measures including both a standard and an individually tailored neuropsychological battery, MR brain imaging, MR spectroscopy, white matter tractography, PET, and magnetoencephalography (MEG) functional brain imaging,. This testing will be obtained over a 36 hour period at the end of which the team will meet to decide on treatment recommendations. There is a 30 hour window during which the processing and analysis of the MEG recordings must be completed in order to be available for the deliberations at the adjudication meeting.

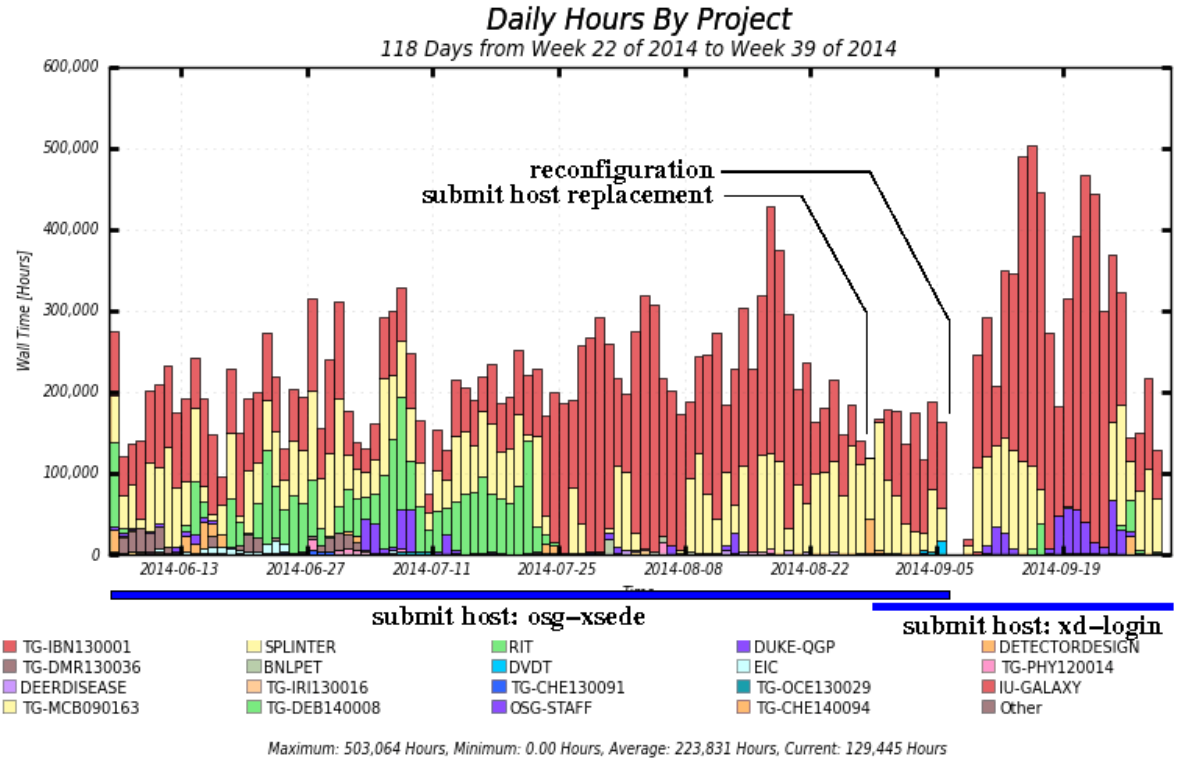

Fig 1. *Total completed coreHours/day are shown for opportunistic users over 4 months. Prior to replacement of osg-xsede with xd-login, submit host throughput was limited repeatedly by scratch disk performance. This limitation has not recurred since the reconfiguration of the new submit host. Note that in the time since the replacement there have been several days when the total throughput handled by the submit host markedly exceeded our requested 360,000 coreHours.*

For each study we will record ≈40 minutes of MEG. Processing this data will require ≈360,000 coreHours on the grid. To accomplish this within the time constraints, we request priority access to 15,000 cores continuously for 24 hours. The critical period for doing the calculation will begin at about 8 PM EST Tuesday night. We anticipate a total of 50 such studies beginning in November, 2014 and extending over the next 2 years. Our request therefore is for ≈15% of the current grid capacity for one 24 hour period out of each 2 weeks.

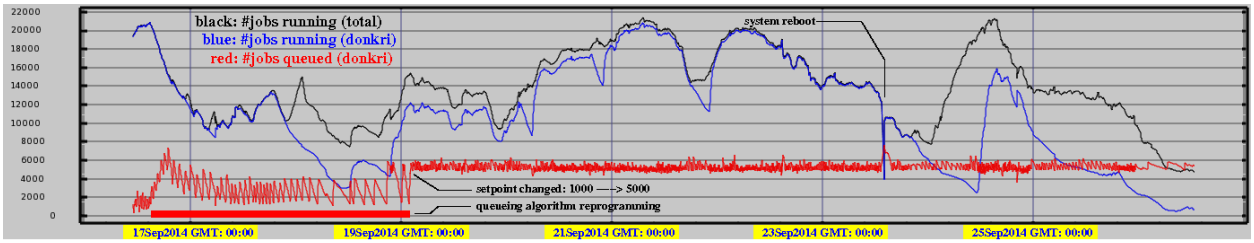

Fig 2. *The number of jobs running and queued through the xd-login submit host is shown for 10 days following the system reconfiguration. Note that (1) the number of our jobs (blue) exceeds the requested 15,000 for many hours repeatedly during this period and (2) the queueing control mechanism (red) is quite stable over more than an order of magnitude change in the number of jobs running through the host (black).*

Our experience to date as an opportunistic user provides good information regarding key practical considerations:

1. The submit host through which the jobs will be processed can handle the throughput (Figure 1).
2. The processing stream for our jobs scales from end to end to efficiently fulfill the necessary throughput (Figure 2).

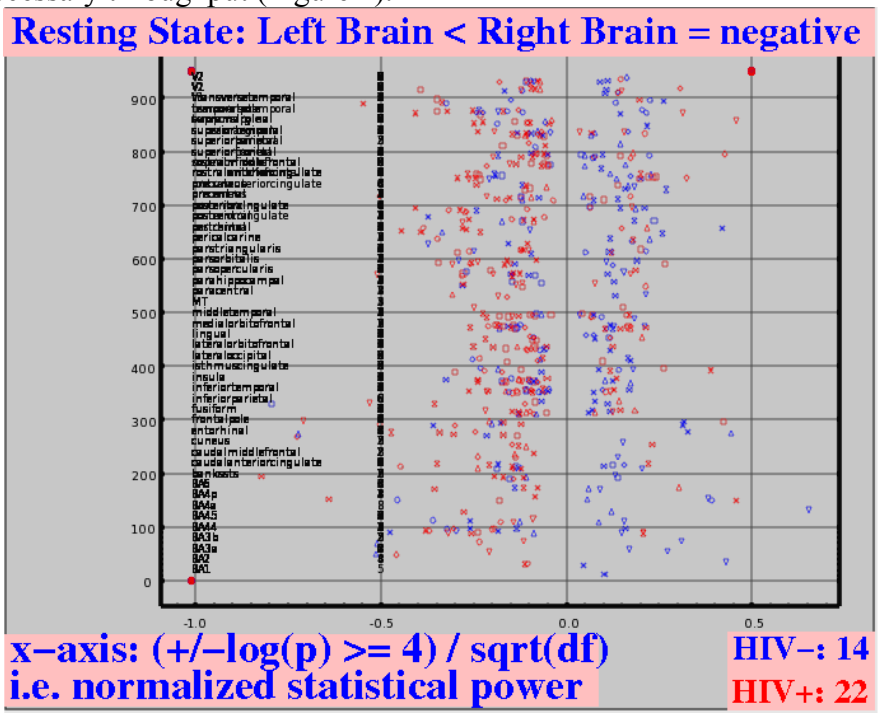

Fig 3. *Specific cortical brain regions in the preponderance of sero-positive HIV patients (red) demonstrate left/right differences in neuroelectric activity which are opposite to those shown by sero-negative controls (blue). Many of these sero-positive patients demonstrate mild cognitive impairment on neuropsychological testing, comparable to our head injury population.*

Figure 3 shows recent MEG results which demonstrate the value of fusing anatomic, MEG, and neuropsychological findings.

Thank you for considering this request. I'm happy to provide additional information and to respond to questions.

Best regards,

Don Krieger, Ph.D.
University of Pittsburgh
Department of Neurological Surgery
(412)521-4431 cell/text
kriegerd@upmc.edu