Exhibit A: Project Description
(Scope of Work, Special Requirements)

Project Title: Translational Science at the Neural Injury Center UM

Objective 1: Expand current clinical capabilities of the Neural Injury Center (NIC) and support translational research: The purpose of the NIC is to serve student-veterans and improve graduation rates. The parallel mission of the NIC is the formation of interdisciplinary research teams to study TBI and develop diagnostics and interventions for all TBI survivors. However, with over 600 veterans on the UM campus, the NIC is unable to keep pace with the increased requests for services. **Approach:** The primary objective is the expansion of a self-sustaining clinic at UM funded through insurance reimbursements, grants and participation in industry-led clinical research contracts. Funds from this proposal will be used to expand clinical neuropsychology services, chronic pain assessment, opthamology consulting, speech pathology services, and physical therapy. Also, the NIC will screen TBI subjects and provide them with the opportunity to enter the clinical research studies funded by this proposal. The funding in this proposal will also allow the Family Residency Program to utilize the NIC as an elective rotation in specialized TBI/Neurological conditions. The NIC will also serve as a consulting core for state physicians, particularly those in rural communities dealing with TBI. **Expected Outcomes:** The expected economic impact falls into three areas: 1) The NIC will increase support and rehabilitative services for student-veterans designed to increase graduation rates and enhance the probability of a successful transition from college to employment. 2) The clinic at the NIC will operate as a translational research center to screen and connect TBI subjects with the clinical studies listed in this proposal. This will aid in the successful validation of technology being developed by other members of the TBI consortium. 3) Attract new industry to the state through clinical research contracts with pharmaceutical and medical device companies.

Objective 2: Develop a comprehensive panel of objective tests to diagnose mild TBI (mTBI). **PIs:** Patel, Rau, Santos and Mohapatra: Diagnosis of severe TBI is well established, however, the diagnosis and recovery from mild TBI (mTBI) is based on outdated testing that, in many cases, fails to correctly assess the recovery of the brain. This puts individuals at-risk for repeated head injury while the brain is still actively healing, leading to long-term brain damage. The goal of this objective is the further development of a panel of tests in four areas designed to objectively assess brain healing after mTBI. **Approach:** We will recruit and test 50 non-TBI controls, and 50 mTBI subjects for these studies. 1) Eye movement and coordination are disturbed after TBI. The NIC has a specific instrument designed to measure abnormalities in oculomotor function (Neurokinetics I-Portal system). Using this system we will measure eye movement in both acute and chronic mTBI subjects as well as non-TBI controls for abnormalities. 2) After oculomotor testing, subjects will be tested using a proprietary stabilometry.balance testing device developed by Dr. Santos. This testing utilizes a novel method of assessing postural balance that can be used to detect subtle neuromotor dysfunction in mTBI subjects. 3) After the stabilometry/balance testing subjects will be assessed for memory fatigue using a novel testing protocol developed at The University of Montana by Drs. Rau and Patel. 4) These three measurements will be correlated with a panel of validated blood-based microRNA (miRNA) biomarkers that can be used to diagnose both acute brain damage and the chronic effects of mTBI (see Objective 3). The testing and further validation of microRNA biomarkers

outlined in this objective will enhance the value of the IP and will serve to accelerate the development of a clinical test panel for TBI. **Expected Outcomes:** We have preliminary data indicating that all four aspects of our protocol accurately detect significant differences between mTBI and non-TBI subjects. However, more subjects are needed to fully validate the protocol and technologies. Successful execution of this objective will provide us with sufficient clinical validation of our technology thereby facilitating the commercialization of this technology. The MUS owns the IP associated with both the stabilometry and the miRNA biomarkers and successful commercialization would provide long-term revenues for the MUS. Also, the data generated in the first year of this objective will be used to apply for further follow on grant funding through the Department of Defense Congressionally Directed Medical Research Program (CDMRP) program and the Department of Veterans Affairs.

Objective 3: Develop miRNA inhibitors to reduce neuropathology after TBI. **PIs:** Patel and Rau. In an animal model of TBI we have found widespread, abnormal expression of 11 microRNAs in the TBI brain. We also found abnormal expression of the 11 miRNAs in the plasma of TBI subjects after injury, suggesting that these 11 microRNAs are specifically upregulated after TBI. Interestingly, miRNAs are small inhibitory molecules that have been linked to the development of brain pathology in Alzheimer's and Parkinson's disease. Currently, the technology exists to create specific inhibitors that bind miRNAs thereby blocking their activity in the brain. **Approach:** We propose to use molecular techniques to develop inhibitors for a specific, patented set of 11 miRNAs linked to TBI. We will then test the miRNAs inhibitors, separately and in conjunction, in our animal model of TBI to determine if they reduce neuromotor dysfunction, cognitive impairment and neuronal death. If we are successful, we will immediately move to patent the technology as a novel molecular treatment for TBI. Once this is complete we will produce our panel of therapeutic inhibitors and make them available for other TBI researchers. **Expected Outcomes:** We expect that inhibiting abnormal miRNAs will reduce neuropathology from TBI. If successful, this objective will generate valuable IP for The University of Montana. This project will provide training for a neuroscience/molecular biology graduate student and will employ two technicians. The successful completion of this objective will help develop a new field of research tools and technologies for further application in TBI as well as other forms of neurodegenerative brain disease. The data generated in the first year of this objective will be used to apply for further follow on grant funding through the National Institute of Neurological Disorders and Stroke.

Objective 4: Complete the development of a computer-based cognitive training (CCT) system for TBI subjects with cognitive impairment. **PI:** Dr. Erik Guzik; **Company:** VAST Next Generation Learning. Divergent thinking (DT) has been recently linked with structure, function, and activation of the brain’s default mode network (DMN). Of great interest, recent research shows decreased activity and connectivity within the DMN in patients diagnosed with cognitive impairment, including those afflicted with cognitive decline and Alzheimer’s disease. Our hypothesis is that systematic computer-based cognitive training (CCT) focused on divergent thinking, and targeted to the brain network (DMN), provides a new, unexplored avenue to intervene in the cognitive impairment associated with TBI. **Approach:** VAST, a Missoula company, has previously initiated development of proprietary software algorithms to evaluate DT and creative thinking. Based on these algorithms, VAST will further develop a basic, prototype mobile TBI cognitive training application for mobile devices, consisting of 40 total DT

exercises, generated from two valid exercise types (verbal and figural responses) now utilized in DT assessment. Two test groups will then be created as part of this research to determine efficacy: (1) an experimental TBI group that receives pre/post testing and the DT-training as the intervention. (2) A control TBI group that receives pre/post testing, but no DT-training. The test battery will include accepted variables of cognitive functioning including recall, recognition, and verbal fluency. **Expected Outcomes:** We expect that mobile-based DT training will significantly improve cognitive ability and provide an innovative, non-drug therapy for treating TBI. Commercialization of VAST research will involve releasing the new cognitive training system for use on major mobile platforms, including iOS and Android devices. Commercial application of our research will include: (1) direct-to–consumer marketing of the new cognitive training system for use on both iOS and Android mobile platforms, and (2) marketing the training system to physicians as a new, innovative form of prescription-based treatment for patients with TBI. A DT-based cognitive training system will provide a readily available, original, patented, and research-based solution to cognitive impairment in TBI. We therefore project platform usage and revenue growth similar to that now realized by Lumosity: $24M within 5 years and a projected $131M within 10 years.

Objective 5: Complete the development and testing of a novel post-traumatic epilepsy diagnostic analysis program. **PI:** Alex Philp, Ph.D.; **Company:** N-SITE LLC Approximately 15-25% of individuals exposed to a TBI go on to develop post-traumatic epilepsy (PTE) as a result of the trauma. Currently, there is no reliable method for identifying which TBI subjects will eventually develop PTE. Furthermore, up to 70% of individuals that develop PTE are refractory to current anti-epilepsy treatments. The ability to identify individuals that are at risk for the development of PTE is crucial, as it would impact treatment decisions that could potentially alter the development of the epilepsy. Thus, the goal of this objective is to identify signature brain wave pattern(s) present in EEG recordings that indicate a high-risk for the development of PTE. **Approach:** This work will extend and transition prior research done by Dr. Poulsen with laboratory animals to human data. Dr. Westover at Harvard Medical School will provide N-SITE with 20 years of EEG data from Massachusetts General Hospital. The EEG data sets contain long-term monitoring of TBI subjects, including those that developed PTE and those that did not. These data will then be analyzed with the enhanced stream processing application (Eidos™) to detect, extract, classify, and visualize events with the potential precursor signatures in TBI subjects prior to the development of PTE. These prospective signatures will be identified and then custom detection capability will be generated that specifically targets the candidate patterns. This objective will enable the specific identification of individuals at high risk for developing PTE. **Expected Outcomes:** There is clear evidence that specific EEG patterns are predictive of epilepsy. However, a specific algorithm is needed to properly identify targets. N-SITE has the software technology to accomplish this task and the preliminary algorithm was developed in collaboration with UM and filed as a provisional patent through UM. Every hospital and clinic that performs follow on-care for TBI survivors will need this software to analyze the EEG results. Currently the software package, Eidos, is in beta testing and will be made available to UM and Neuroscience group as part of the in-kind package. Year 1 - Expand and extend the algorithm and software to incorporate human data and identify the EEG signal or biomarker indicative of epilepsy; Year 2 – second objective – expand and extend into clinical setting for evaluation and testing and real-time analysis.