<div align="center">**Memorandum of Understanding**</div>

This Memorandum of Understanding (the Memorandum) is made on this _____, by and between _____, of _____, _____, _____, (the Parties) respectively, hereafter referred to as (the Concussion Neuroimaging Consortium) for the purpose of achieving the objectives of _____ (the Project).

Purpose
The purpose of the Memorandum is to provide the framework for any future contract involving funding for the study of concussion in student athletes using neuroimaging and other neuroscience, behavioral, or clinical metrics.

The key **objectives** of the Brain Concussion Neuroimaging Consortium include:
- Consolidation of leading brain science/brain imaging experts and efforts aimed at identification of imaging "biomarkers" of concussion and athletes at risk for traumatic concussion;
- Development of advanced MR imaging techniques to measure physiological and neuropsychological alterations after concussion;
- Development and validation of advanced MR assessment tools aimed at detecting pathophysiological biomarkers of sports-related concussion;
- Development of a standardized, MR-evidenced based and platform independent Operational Manual for acquisition and processing brain imaging data;
- Synthesis of multi-modal neuroimaging measures to provide quantitative metrics of neural health that can be used longitudinally;
- Integration of neuroimaging measures with mathematical metrics of behavior to aid medical intervention and prognosis assessment;
- Development of model-based assessment, prediction, and management based on imaging in the nervous system;
- Creation of longitudinal benchmark data related brain imaging measures for prognostication of long-term deficits induced by concussive blows;
- Establishment of partnership with MRI vendors, pharmaceutical and other companies as a critical component for research on neurological structure, function and treatment brain injured patients;
- Secure funding for development of residency programs and fellowships for medical professionals in charge of treatment of concussed athletes;
- Endow faculty, postdoctoral fellow, medical residents or graduate training lines in one or more of the core consortium's initiatives associated with MR assessment and management of concussion;
- Demonstration of proof-of-concept and production of solid imaging data necessary to support large-scale funding requests from major private and federal funding entities, including NFL, NIH, NHL, NSF, DOD and VA.

Cooperation
The purpose of forming the Partners in Brain Concussion Neuroimaging Consortium is to develop and operationalize advanced techniques for diagnosing and treating concussion.

To achieve this end will require cooperation from many different scientists from several schools, sharing their data, knowledge and insight. The parties to this memorandum agree to work in the spirit of cooperation with each other to achieve these ends.

Obligations of the Partners

The Parties to the Brain Concussion Neuroimaging Consortium acknowledge that no contractual relationship is created between them by this Memorandum, as stated in the Enforceability section of the Memorandum. Nevertheless, the Parties agree to work together in the true spirit of partnership to ensure that there is a united visible and responsive leadership of the Project and to demonstrate financial, administrative and managerial commitment to the Project by means of the following individual services:

Organization	Service
Northwestern University	MRI data, imaging analysis, mathematical psychology
Penn State	MRI, Virtual Reality, blood biomarkers, sensors
Univ of Nebraska	MRI, high-density ERP, Eye tracking, endocrine, genetics
Michigan State University	MRI pulse sequence and physics, MRI data, image data analysis, neuropsychological data, neuro-ophthalmology, vestibular and eye movement measurement, side-line neurological evaluation.
Purdue University	MRI, neurocognitive and head collision data; statistical signal processing; telemetry and protective equipment; athletic training
The Ohio State University	MRI data and analysis, psychological wellbeing, cognitive assessment, mathematical psychology

Resources

Each organization that is a party to this memorandum, agrees to contribute existing data and expertise to the development of funding for a consortia project, and then share data and expertise developed in the course of a collaborative project for the benefit of all participating organizations. All shared data will be anonymized per current standards in the field.

Communication Strategy

Conference calls and other digital communication strategies will be employed for regular contact between consortia members, along with in person visits to sites on a regular basis at the point funding develops.

Confidentiality

Signatories to this memorandum agree not to share sensitive information with parties or organizations not affiliated with the Brain Concussion Neuroimaging Consortium. All data collected by members will be anonymized before sharing, including upload of data to recognized national databases.

Enforceability

It is understood this Memorandum is a statement of intent that is in no way legally binding unto any of the Parties. This memorandum is not intended to, and does not create, any legally enforceable contractual rights or obligations between the signatories.

Liability
No liability will arise or be assumed between the Partners as a result of this Memorandum.

Signatories (The official signature page is available only upon request.)

Name (signed & printed):	Institution:	Date:
Julian Bailes, M.D.	NorthShore University HealthSystem	1/16/2015
Stephen Bravo, M.D.	University of Central Florida	1/19/2015
Hans Breiter, M.D.	Northwestern University	1/15/2015
David Kaufman, D.O.	Michigan State University	12/10/2014
Zhong-Lin Lu, Ph.D.	The Ohio State University	12/10/2014
Dennis L. Molfese, Ph.D.	University of Nebraska-Lincoln	11/21/2014
Todd Parrish, Ph.D.	Northwestern University	1/15/2015
Semyon Slobounov, Ph.D.	Penn State University	11/20/2014
Thomas Talavage, Ph.D.	Purdue University	12/10/2014
David Zhu, Ph.D.	Michigan State University	12/10/2014