

RESOURCES

FACILITIES: Specify the facilities to be used for the conduct of the proposed research. Indicate the performance sites and describe capacities, pertinent capabilities, relative proximity, and extent of availability to the project. Under "Other," identify support services such as machine shop, electronics shop, and specify the extent to which they will be available to the project. Use continuation pages if necessary.

Laboratory: The Functional MRI Laboratory houses a state-of-the-art, research-dedicated 3T GE Signa human MRI scanner and is fully equipped for functional imaging studies with behavioral stimulation and response collection devices, patient/research volunteer waiting, dressing and training rooms, computational support facilities, and a fully equipped workshop for coil and phantom construction (see detailed description below). Immediately adjacent is the In Vivo MRI Laboratory, which houses a 7T, 31cm bore animal MRI unit.

Clinical: N/A

Animal: N/A

Computer: The Functional MRI Laboratory computing environment consists of two multiprocessor Linux servers with over 3 terabytes of disk storage. The Lab will also have a network of approximately 15 Linux workstations, including two that have been designated for use by general users of the Lab. A wide variety of commercial and custom software is available on these systems for processing functional MRI data.

Office: Office space and a research administrator are available to support the fMRI laboratory.

Other: N/A

MAJOR EQUIPMENT: List the most important equipment items already available for this project, noting the location and pertinent capabilities of each.

Functional MRI Laboratory

The University of Michigan Functional MRI Laboratory is an interdepartmental collaborative facility that reports to the University's Office of the Vice President for Research. It is located in the Bonisteel Interdisciplinary Research Building on the University of Michigan North Campus, has two dedicated parking spots for research subjects, and is connected by high-speed networks to laboratories on the campuses of the university. The fMRI Laboratory is co-directed by Douglas C. Noll, Professor of Biomedical Engineering and John Jonides, Professor of Psychology. Other facility staff include Prof. Luis Hernandez, Ph.D., lab manager Scott Peltier, Ph.D., a computer administrator, a research administrator, and a research technologist. The facility has office space for faculty, students and post-docs, dedicated subject preparation and training areas, a workshop for coil and phantom construction, and scanner room.

The Functional MRI Laboratory is equipped with a research-dedicated 3.0 T GE MRI scanner at the EXCITE II software and hardware release level. It has a high performance gradient system (peak 40 mT/m, slew rate 150 T/m/s) and 8-channel receiver capabilities with both a quadrature head coil and an 8-channel head array coil. This scanner has a full set of functional imaging capabilities, including single-shot imaging (spiral and EPI), automated shimming, and real-time image reconstruction and processing. There are two stimulus presentation systems for functional MRI studies: 1) a BrainLogics digital projector and fiber optic button response system (Psychology Software Tools, Inc.) and 2) a NordicNeuroLab VisualSystem with integrated eye-tracking. Auditory stimulation is available through MR compatible stereo headphones (Resonance Technologies, Inc.). Support for a full range of other physiological measures is available, including cardiac, respiration, and galvanic skin resistance. The functional MRI Laboratory also has a MagStim transcranial magnetic stimulation (TMS) system capable of both single-pulse and repetitive (rTMS) stimulation. The MRI system also has MR spectroscopy (MRS) pulse sequences and a broadband RF subsystem and appropriate preamplifiers/switches for performing ^1H , ^{31}P , and ^{129}Xe MRS.

The Functional MRI Laboratory provides preliminary preprocessing for fMRI data including image reconstruction with corrections for susceptibility distortions, slice-timing correction for event related fMRI studies, and movement correction. The lab has two 4-processor linux servers with over a 1.3 terabytes of storage to support research operations and two linux workstations are available for use for processing fMRI data for pilot and other small projects. Software packages available at fMRI lab systems include gcc, g++, MATLAB, IDL, SPM, AIR, FSL and variety of custom packages for creating archival CD-ROM storage and data management..

7T *In Vivo* MRI Laboratory

The 7T *In Vivo* MRI Laboratory is a small animal imaging facility located in the Bonisteel Interdisciplinary Research Building on the University of Michigan N. Campus. Construction and installation was completed in Fall 2009 and the system became operational in December 2009. The system was purchased using an NIH High End Instrumentation award (1 S10 RR 22974-01). This system has a 31 cm bore and has 3 gradient system for larger animals, rats and mice, respectively, and supports a full range of MRI pulse sequences, including echo planar imaging and diffusion tensor imaging. The system has include 4 transmit channels for parallel excitation and 4 receive channels along with several array coils for parallel imaging. Full physiological monitoring, animal holders, rapid animal positioning systems, and an animal heater are available. The 7T *in vivo* Imaging Facility will be located adjacent to the University of Michigan Functional MRI Laboratory, with a workshop equipped for RF coil and phantom construction.