**Equipment**

**UW Biomagnetism Lab**

**Dr. Wakai**

Magnetically shielded room (MSR). The MSR is comprised of two separate shields, each consisting of 0.25” aluminum and 0.080” high magnetic permeability alloy. The shield separation on all sides is 6.7”,except on the side that accommodates the door, where it is greater. The nominal inner dimensions are 10’x10’x8’ (lxwxh). The room was fabricated by Lindgren RF Enclosures and incorporates several unique features, including a pneumatic sliding door with an air bladder that expands to provide a much tighter seal than a hinged door. A small aperture allows direct observation and communication with the subject. The MSR sits on shock mounts that minimize vibrations. The measured shielding performance is excellent. Magnetic field attenuation is 44 dB at 0 Hz, 56 dB at 0.1 Hz, 64 dB at 1 Hz, >85 dB at 10 Hz and above.

Tristan 624 Biomagnetometer (Tristan Technologies, Inc., San Diego). The Tristan 624 is a 21-channel vector MCG system, which measures all 3 components of the magnetic signal at 7 locations in a hexagonal arrangement. The channels are configured as first-order gradiometers with 2.0 cm diameter, 3 cm channel-to-

channel separation, and 8 cm baseline that measure the z-gradient of the magnetic field. The magnetic field resolution is 4-6 fT/(Hz)1/2. This system is designed for simultaneous fMCG/ultrasound recording. The channels are concentrated in a smaller area to facilitate ultrasound scanning, and the transducer can be stabilized by a custom mount attached to the dewar. The device was developed in an SBIR project involving Tristan Technologies and the UW Biomagnetism Lab. In March 2016, the Tristan 624 became the first fetal MCG device to receive FDA clearance.

Magnes II Biomagnetometer (4D Neuroimaging, Inc., San Diego). The Magnes II is a dual sensor MEG/MCG system, consisting of a 37-channel floor-standing unit and a 37-channel ceiling-mounted unit. Each unit covers a circular area of diameter 14.4 cm. The signal channels are configured as first-order gradiometers with 2.0 cm diameter, 5.0 cm baseline, and magnetic field resolution <10 fT/(Hz)1/2. Eight reference channels are available for measuring ambient noise. The system comes complete with all required accessory equipment for magnetic source imaging studies, including data acquisition hardware and software, computer display and analysis software, sensor position indicator, calibration phantom, patient observation system, and patient table.

Optically-pumped magnetometers (QuSpin, Inc.). We have acquired a set of 8 sensors. Each sensor can record the z and y component of the magnetic field, providing a total of 16 independent signal channels. The magnetic field resolution is 10 fT/(Hz)1/2 and the signal bandwidth is 150 Hz. The sensors are modular, allowing them to be used individually or in a user-configured array. The control electronics consists of a single compact unit that enables the user to tune the sensor, digitize the signal, and transmit the data to a PC via a USB interface.

M-Turbo Echo/Doppler portable ultrasound scanner (Sonosite, Inc) with pulsed Doppler and color Doppler

capability, tissue harmonic imaging, OB and cardiac software analysis packages and transducers, ECG input, mini-docking station, Sony UP 895 MD Video Printer, and all necessary cabling.