

WORCESTER POLYTECHNIC INSTITUTE PRACTICEPOINT

ADVANCING HEALTHCARE THROUGH CYBER-PHYSICAL SYSTEMS



PracticePoint is WPI's membership-based development and testing facility. The goal of this alliance space is to advance healthcare technologies and launch better medical cyber-physical systems through collaboration across the spectrum of product development and implementation; it is a resource for designing, prototyping, and evaluating various medical devices along with an associated consortium of academics, industry, healthcare professionals, and users/patients. This includes a wide spectrum from rehabilitative devices to surgical robotics.

The facility comprises point-of-practice clinical care scenarios, including a fully instrumented living space, state-of-the-art motion capture lab, 2-bed modular patient care suite, MRI imaging, and a fully functional operating room co-located with advanced manufacturing capabilities, including a wide array of 3D printing, CNC manufacturing, and electronics assembly equipment and test capabilities.

MRI Imaging Suite

Allows for real-time evaluation of MRI compatible robot performance inside an MRI bore and examination of image-guided therapies in phantom studies

- GE SIGNA Premier 3.0T MRI Scanner with powerful SuperG gradient technology and wide 70cm bore
- Advanced fMRI capabilities through NordicNeuroLab VR headset, Brainwave imaging package, and 48 Channel Head Coil
- A full suite of imaging coils including two 30 Channel Air Anterior coils for maximum flexibility, image quality, and subject comfort
- Pre-loaded software and scan sequences for advanced Vascular, Cardiac, Neuro, Orthopedic, Thoracic, Oncological, and Pediatric imaging

Patient Clinical Care Suites

Offers various technologies where users can test and train on the integration of new devices in a true-to-scale environment

Operating Room Suite:

- Hybrid imaging operating room with C-arm fluoroscope and CT reconstruction
- Motion capture room capabilities
- Powered reconfigurable OR table
- Standard OR medical gas (N₂, O₂, compressed air, vacuum, WAG)
- Boom-mounted OR lights and video display and recording system
- Minimally invasive surgery instrumentation including Stryker & Olympus rigid and flexible endoscopy systems, insufflation, light sources, and electrocautery
- Flexibly configurable research version Intuitive daVinci surgical robot (dVRK)
- Multi-camera closed circuit video monitoring and recording

ICU/NICU Suite:

- Patient monitoring, beds, and lifts
- Configurable to simulate any office setting

Rehabilitation and Assistive Care Suite

Enables the development/testing of exoskeletons, prosthetics, and rehabilitative robots and devices related to healthcare IoT, assistive and home care, aging in place, sleep, and telehealth

- Ceiling gantry for subject safety and support
- Instrumented residential setting for testing of smart home technologies
- Motion capture capabilities

Motion Capture Suite

High-end motion capture facility, allowing users to prototype new technologies and analyze the effect on gait and full-body motion

- 10 Camera Vicon Vantage motion capture system with Lock+ 64-channel ADC
- Vicon Vantage Vue for color video overlay

- Gait analysis track with two integrated AMTI OPT400600 force plates
- Delsys Trigno Wireless system with 8 Avanti EMG sensors containing integrated IMU, Bluetooth compatibility, and SDK/API support
- Configurable exercise equipment and obstacles to include doors and stairs
- Ability to connect to external ultrasounds and accelerometers

Neurotech Suite

Fully equipped suite with a host of imaging and user experience equipment enabling researchers to conduct a broad range of multimodal translational studies, from cross validation experiments to clinical trials

- Task-based functional MRI on the GE SIGNA Premier 3T scanner
- NIRX Functional Near-Infrared Spectroscopy Imaging System (MRI Compatible)
- Tobii Eye-Tracking System
- VivePro Virtual and Augmented Reality Systems
- Electroencephalography (EEG)
- Radio Frequency Shielded Acoustic Chamber

Confidential Offices and Conference Spaces

Collaboration areas and dedicated corporate pods are also available to provide convenient working spaces for on-site talent and innovations

- Ability to house product at facility, eliminating potential transportation damage
- Co-locate R&D in one facility
- Mass. company address for dedicated branded office space users
- Complete office functionality, floor equipped with all needed office equipment

Manufacturing and Testing Instrumentation Available for Users

Offering on-site mechanical and electrical fabrication facilities so that users can iterate designs quickly and efficiently

- Markforged Metal X, Markforged Mark Two, and Formlabs Form 2 printers for prototyping plastic, metal, and fiber-reinforced parts
- Mechanical fabrication and prototyping with Haas CNC mill, lathe, ProtoMAX small format waterjet cutter, and Universal Laser PLS6.150D 150W laser cutter
- Mixed signal oscilloscopes, function generators, and spectrum analyzers
- General purpose soldering stations and Nano Rework station
- Circuit board assembly with BGA rework system, and reflow oven
- RF electronics
- Acoustic/vibration/EMI chamber capabilities



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