Kinarm insight in motion

NHP Kinarm™ Exoskeleton Lab

A versatile research facility to study sensory, motor and cognitive function

"Kinarm is a broad-based, versatile research facility that allows users to develop and design their own behavioural tasks to study sensory, motor and/or cognitive function."

– Dr. Stephen Scott, Professor, Centre of Neuroscience Studies, Queen's University and Inventor of Kinarm

Quick Facts

- Sophisticated platform to monitor and manipulate NHP upper limb
- Totally redesigned in 2014 for bilateral control and full access to head
- Consistent use of 2-D robotic paradigm between NHP and human systems guarantees translation from lab to clinical research
- "Arms-free" restraint chair with wide range of adjustability

Complete Research Lab

Designed by neuroscientists for neuroscientists, the NHP Kinarm Exoskeleton Lab lets you start collecting data immediately.

A standard system includes:

- One/two Kinarm Exoskeleton robot(s) for the upper limb
- 2D virtual/augmented reality display
- Dexterit-E™ experimental control software and hardware

NHP-Human Compatibility

The NHP Kinarm exactly replicates our Human Kinarm Exoskeleton providing de-risked translation of basic research paradigms from NHP to humans; and basic research (NHP or human) to clinical research – especially important in drug/therapy development.

Dual Function Robots

Each Kinarm robot can be used as an exoskeleton for the shoulder and elbow leaving the hand free to interact with objects in the environment.

2D Virtual/Augmented Reality

Standard system includes 24" diagonal 2D virtual/augmented reality display for natural, intuitive presentation of visual stimuli.

Easy To Use and Powerful

System includes Dexterit-E™ behavioural control and data acquisition software, which combines the power of a real-time operating system with the ease of a Windows™-based interface. Demonstration tasks can be used immediately for data collection. Custom Task Programs can be created using high-level graphical programming tools.

System Specifications

- Real-time control and data acquisition at 1kHz
- Peak torque pulse of 4Nm at shoulder, 3Nm at elbow (~8N at the hand)
- Feedback resolution of 0.0006°, (~3 microns at the hand) with optional secondary encoders (0.006° /25 microns without)
- End-point mechanical stiffness of 19,500 N/m with secondary encoders or 7,900 N/m without.
- 24" diagonal (4:3 aspect) usable workspace
- 16-bit Digital to Analog channels, plus 24 Digital I/O
- Fits wide range of NHP sizes (~4.5-14 kg – maximum collar ID of 4")
- Minimum lab footprint 8'x8' (bilateral)

Components of NHP Kinarm Exoskeleton Lab

- One or two motorized Kinarm Exoskeleton robot(s) for either right and/or left-handed investigation
- Workstation and visual display for presentation of 2D virtual targets in the actual plane of limb motion
- "Arms-free" NHP restraint chair with adjustable seat, footrest, belly-rest, back-rest, hip-restraints
- Interface to external data acquisition system (analog and digital outputs)
- Dexterit-E data acquisition and experimental control software
- Computer systems to run Dexterit-E (including a real-time computer for precise and safe action)
- A library of Simulink® blocks to assist with rapid custom Task Program creation (MATLAB® and Simulink® must be purchased separately)
- Unlimited Dexterit-E Explorer™ downloads for data visualization

Controlling Kinarm Lab with Dexterit-E™

Dexterit-E provides a friendly, easy-to-use user interface for controlling a Kinarm Lab.

Custom Tasks can be created and implemented with a Kinarm Lab to probe a broad range of sensory, motor and cognitive functions. To create a Custom Task, users program their task using Simulink® and Stateflow® high level graphical programming tools.

Demo Tasks

• Visual Guided Reaching – task to monitor basic motor skills

• Reaching During Unpredictable Force Fields - task to study motor learning/adaptation

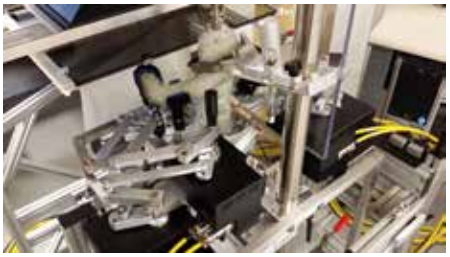
• Position Control Task

Parameter Control

Task parameters can be modified in tables (e.g. size, color, location of targets, number of trials in the task, order and repetition of trials, etc.)

NHP Kinarm Lab in Bimanual Configuration

The system was totally redesigned in 2014 to enable full bimanual use of the work-space and provide full access to the head for neural recordings.



Kinarm™ is a trademark of BKIN Technologies Ltd., developers of next-generation, objective assessment systems to quantify sensory, motor and cognitive performance.

Kinarm™

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