



# Investigating Neurological Diseases by Robotic Agent

## Project Motivation & Objectives

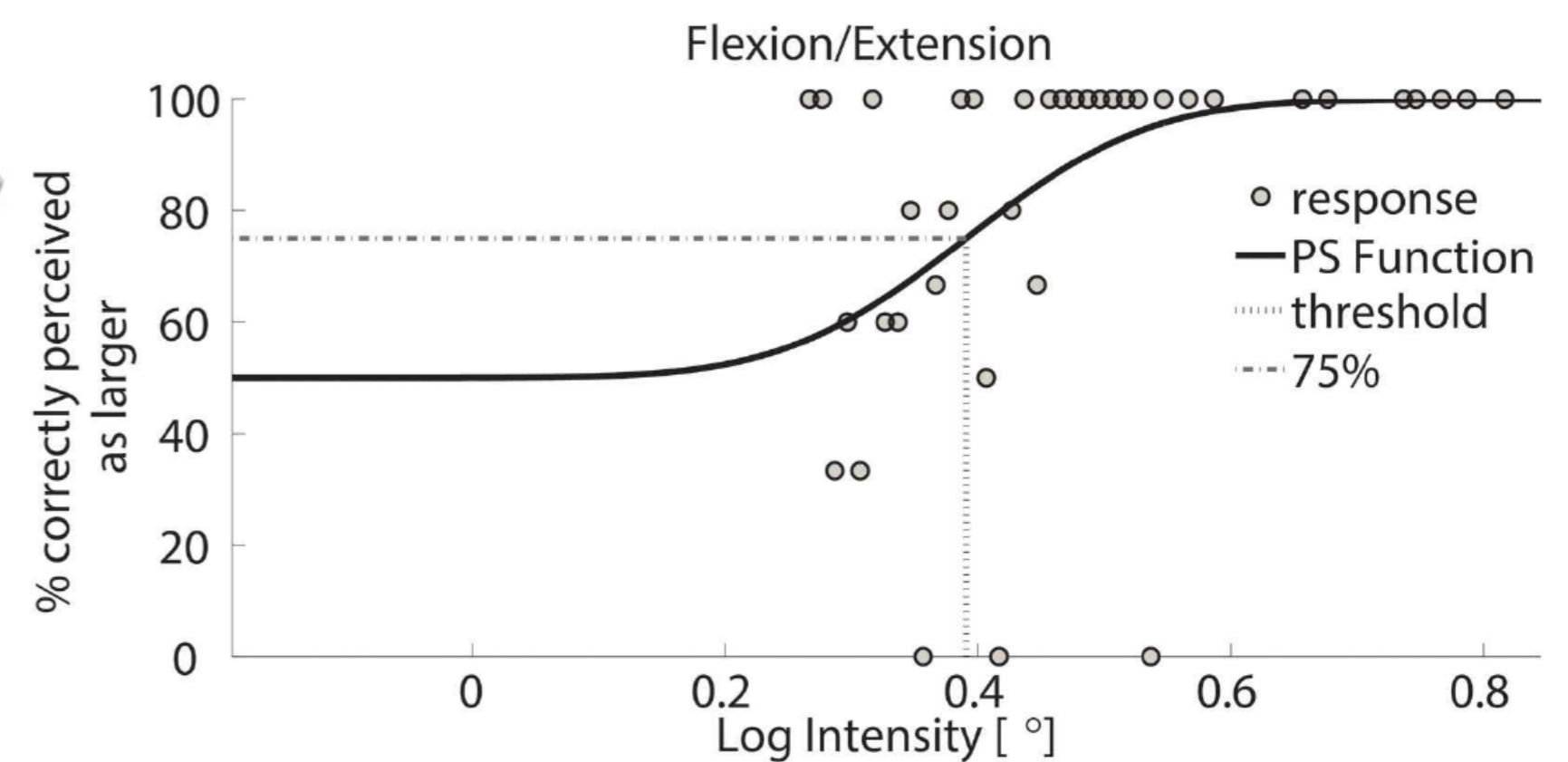
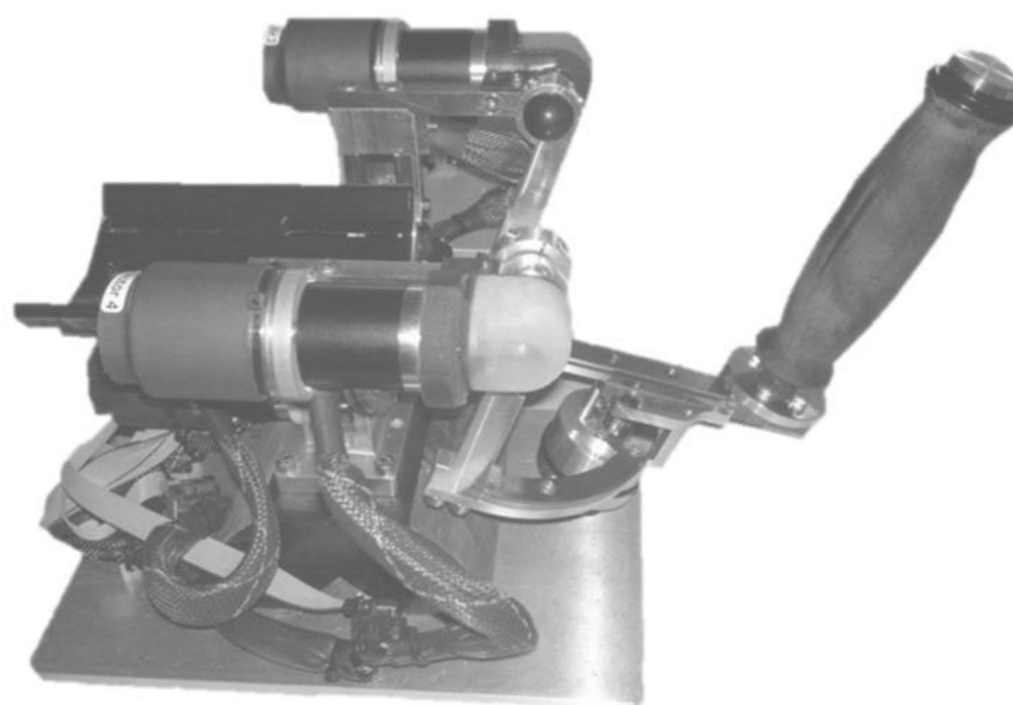
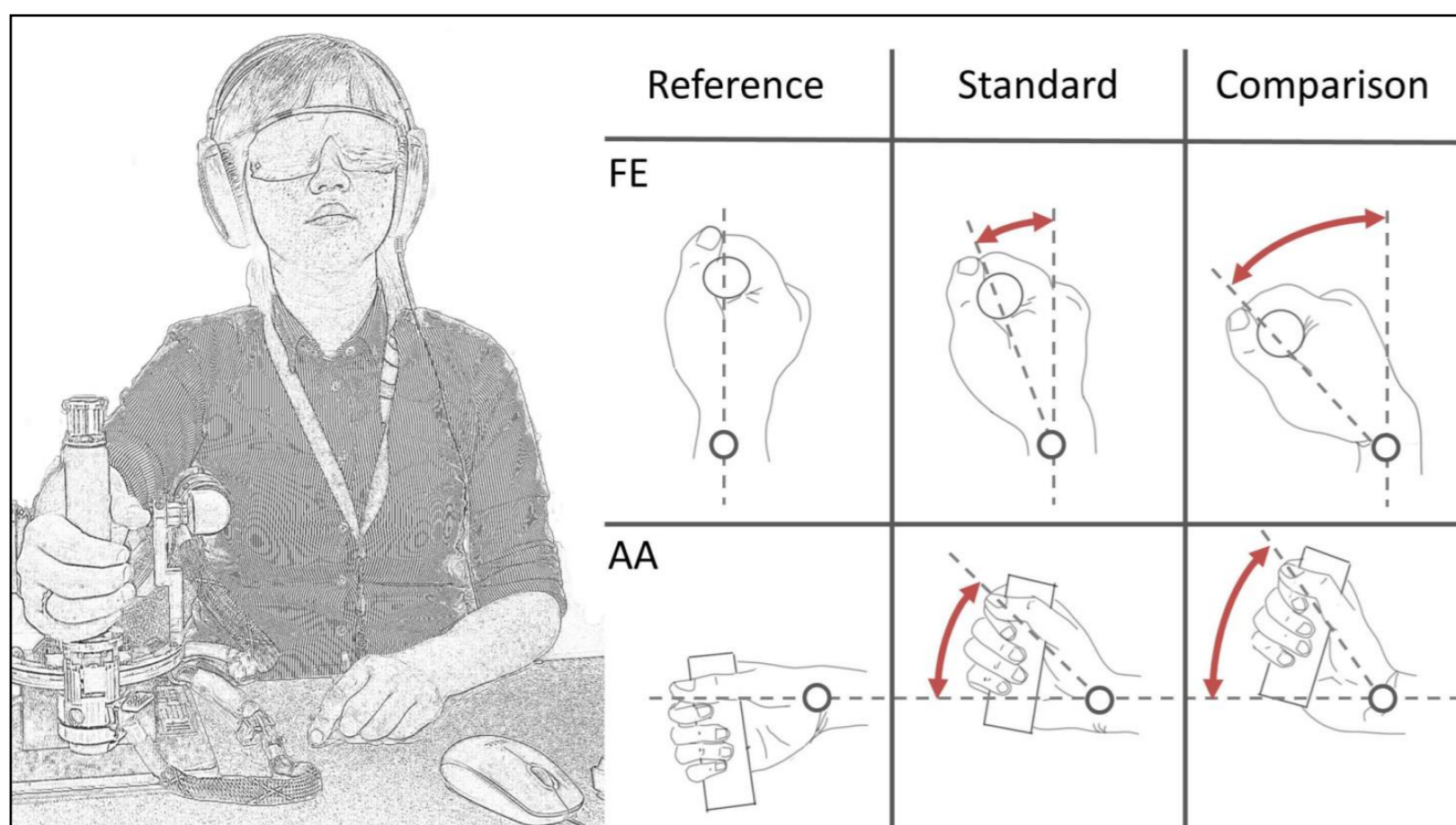
Several robots have been created to assist with therapeutic training of the wrist, with a main goal of restoring motor control. However proprioceptive impairment may be detrimental to motor recovery, and assessment of proprioceptive dysfunction provides prognostic factor in recovery and long-term functional outcomes after stroke.

This project:

- Proposes a standard paradigm for determining proprioceptive discrimination thresholds in human upper limb
- Evaluates the feasibility of a wrist robot system to determine proprioceptive discrimination thresholds for the different DoFs of the wrist
- Defines the mandatory characteristics of other robots
- Provides for the first time norm data on acuity of the healthy dominant and non-dominant human wrist
- Aims to fully characterize the wrist proprioceptive acuity

## Methodology

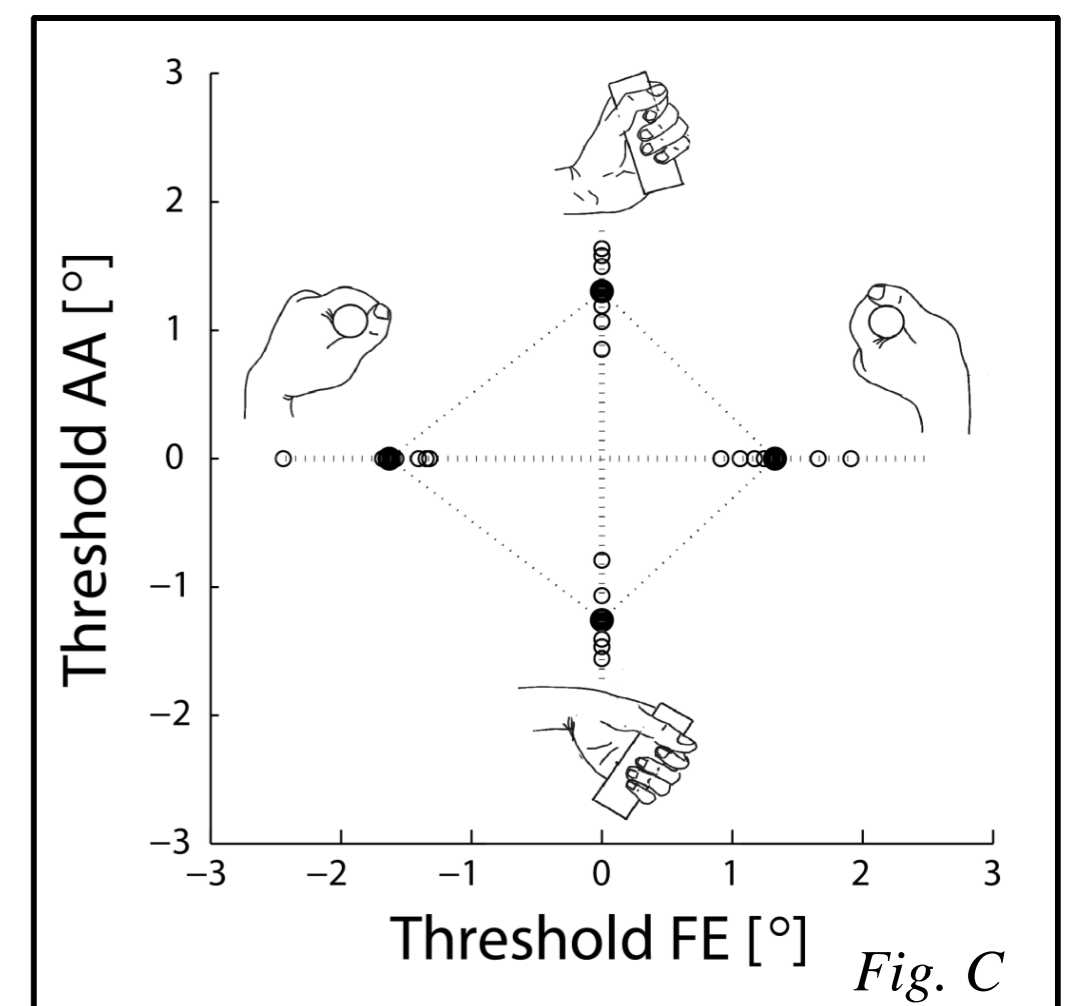
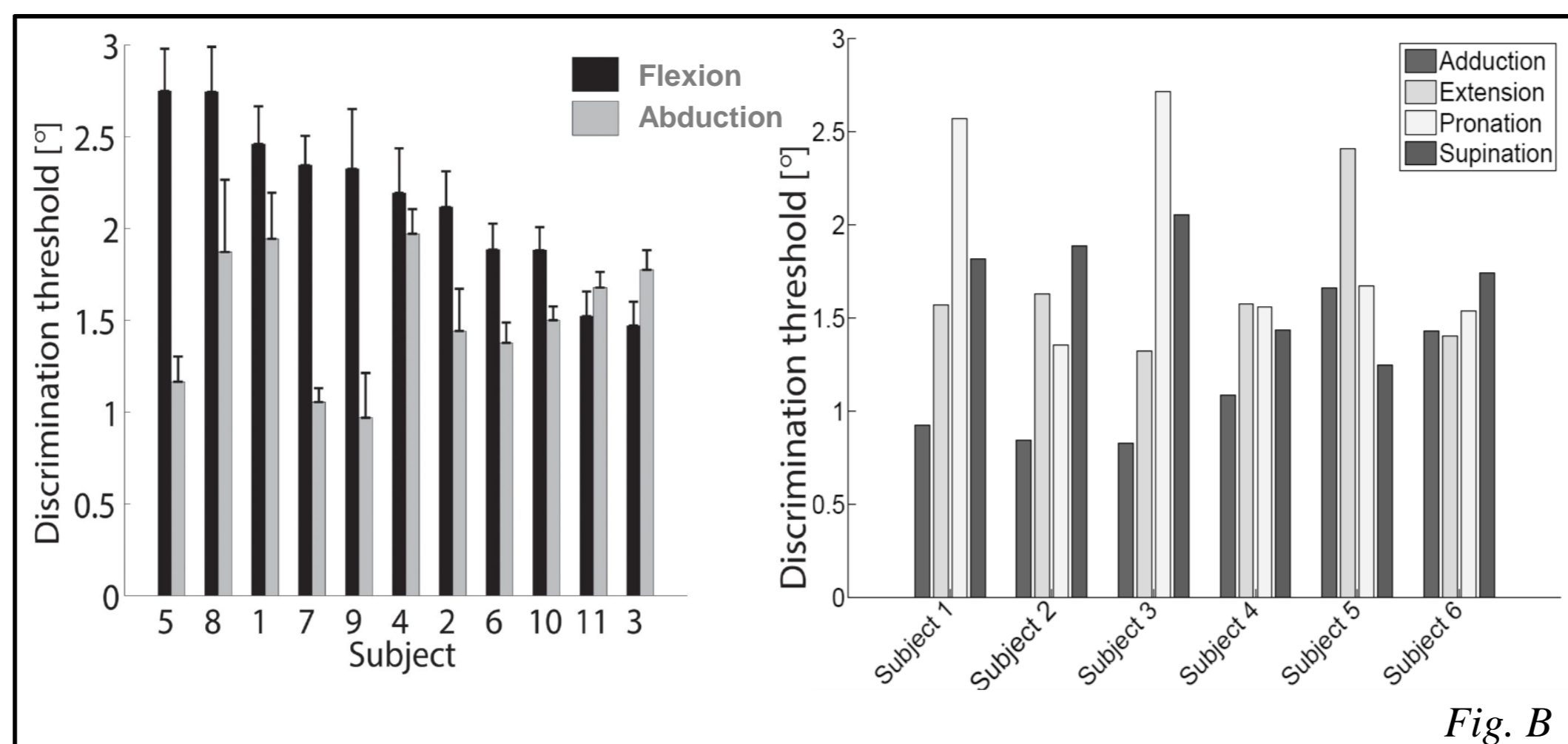
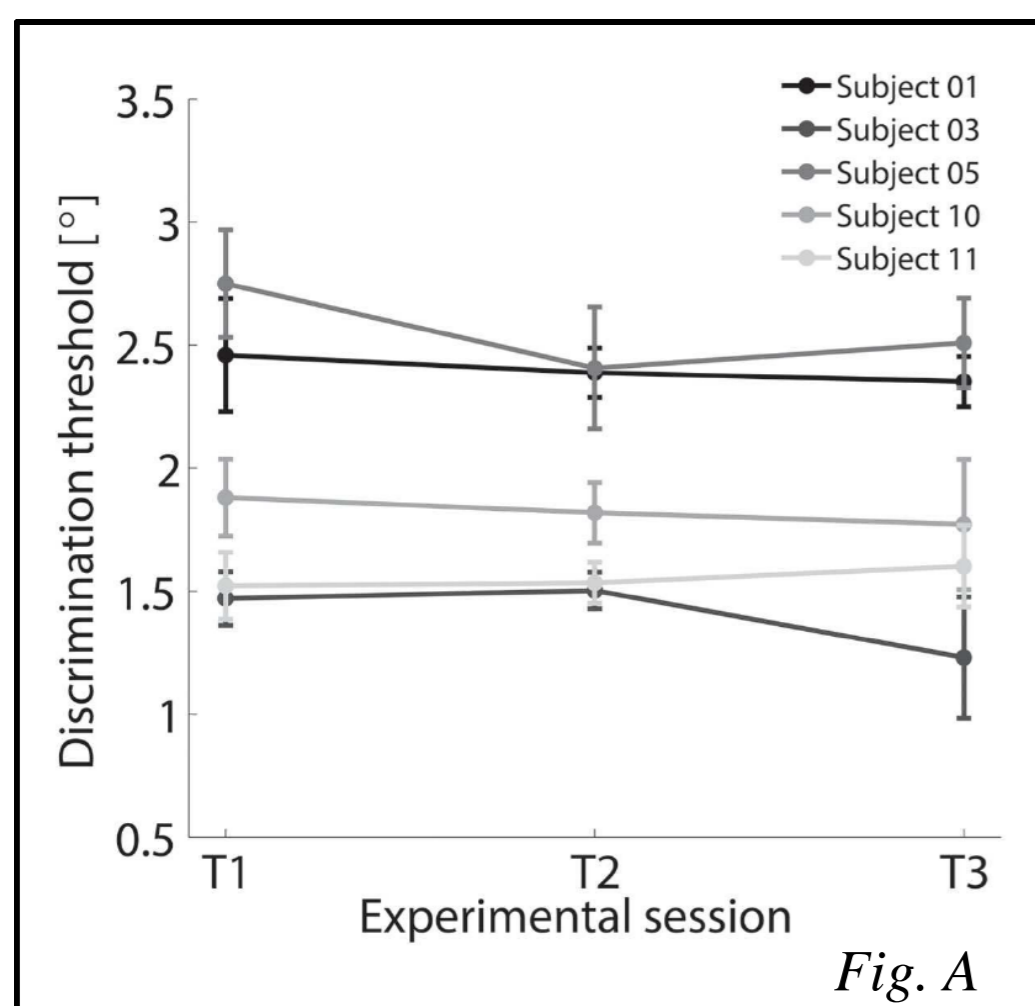
We determined the *discrimination threshold* between two movements of different amplitude (*Standard* and *Comparison*). The threshold, that represents a measure of *acuity*, is the minimum level of stimulation that a person can detect 75-percent of the times.



## Results

The technology can generate robust and reliable measures of proprioceptive function (Fig. A).

We obtained acuities for the different degrees of freedom of the dominant wrist (Fig. B) and non-dominant wrist (Fig. C).



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