APPLICATIONS

- Neurodegenerative Diseases
- Mood Disorders
- Cognition & Attention
- Movement Disorders
- Sensorimotor Physiology
- Developmental Disorders

Neuroimaging Solutions

MEASURING MOVEMENT in MRI

MEASUREMENT

- Whole-hand Grasp
- Precision Force
- Ankle Force
- Force Tremor
- Rodent Forelimb Force

Measuring movement during functional magentic resonance imaging can be challenging. At Neuroimaging Solutions, **we produce custom fiber optic force transducers** for measuring forces produced inside the MRI scanning environment.

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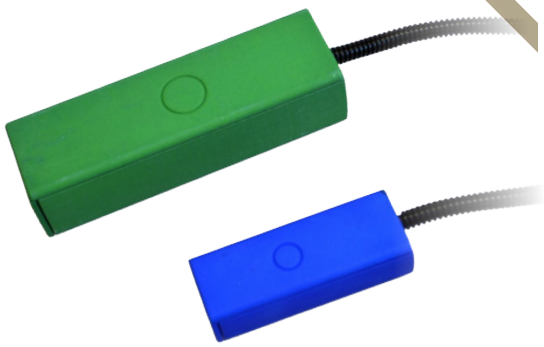
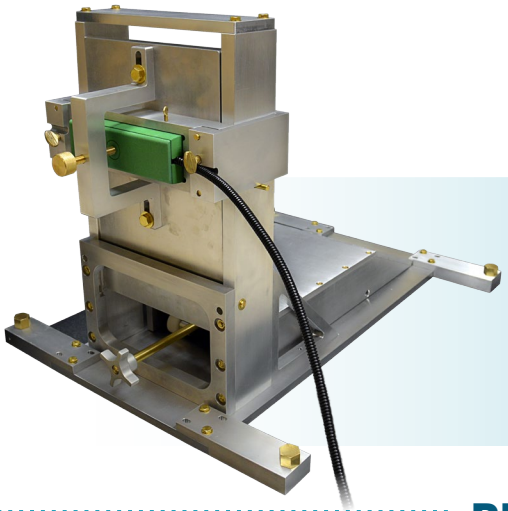
PRODUCT FEATURES

- All fiber optic sensors are hand-crafted using state-of-the-art fiber bragg grating technology
- Calibrated and linear in range
- Sensors are available in 700N, 150N, 50N, and 1N range
- Precisely measure isometric force contractions inside and outside of the MRI and MEG environment
- No interference on MRI and MEG signals
- 3D printed housing to protect and temperature insulate each sensor
- Upper and lower limb applications





PRECISE HUMAN FORCE PRODUCTION

How does it work?

1. Patient produces force against transducer
2. Force signal is transmitted via fiber optic wire to an interrogator outside the MRI environment.
3. Interrogator digitizes force data
4. Customized software collects force data and provides biofeedback

>> Inside the magnet, patients use the visual display to produce a variety of forces as chosen by the researcher

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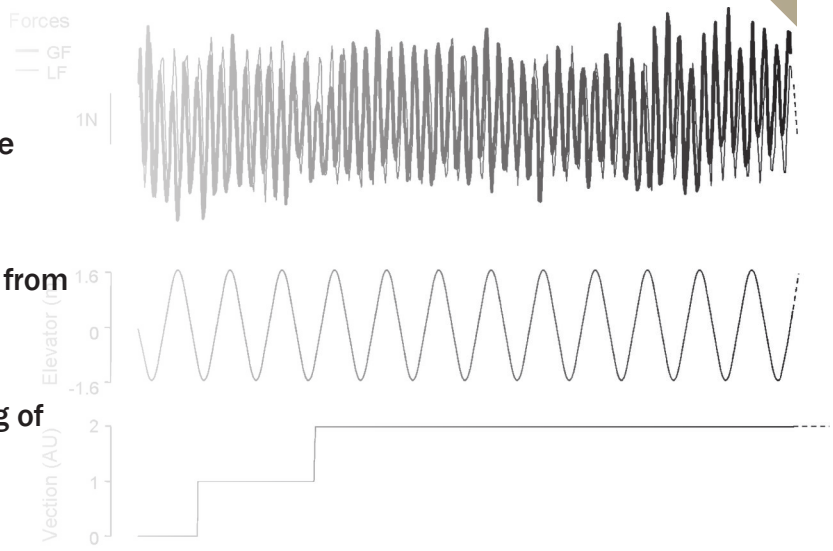
SOFTWARE

- Customize experimental paradigms by manipulating text files
- Precise control of the visual display to set the amplitude and duration of force production
- Record from multiple sensors at once
- Visual feedback can be driven by recordings from individual or multiple sensors
- High sampling frequency
- MRI trigger capability for precise timelocking of MRI data and experimental paradigm



What our customers say

"The Neuroimaging Solutions staff provided timely support and delivered a quality product."

~ Dr. Matthew Mosconi, University of Kansas
Clinical Child Psychology Program and Life Span Institute

"This technology opens several possibilities for research into sensorimotor control."

~ Dr. Daniel Corcos, Northwestern University Feinberg School of Medicine
Physical Therapy and Human Movement Sciences

"Precise measurement of force is just not available anywhere else using MRI compatible sensors."

~ Dr. Scott Frey, Washington University in St. Louis
Professor of Occupational Therapy and Neurology

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- Burciu RG, Ofori E, Shukla P, Planetta PJ, Snyder AF, Li H, Hass CJ, Okun MS, McFarland NR, Vaillancourt DE. (2015): **Distinct patterns of brain activity in progressive supranuclear palsy and Parkinson's disease**. Movement disorders: official journal of the Movement Disorder Society 30(9):1248-58.
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- Neely KA, Kurani AS, Shukla P, Planetta PJ, Wagle Shukla A, Goldman JG, Corcos DM, Okun MS, Vaillancourt DE. (2015): **Functional Brain Activity Relates to 0-3 and 3-8 Hz Force Oscillations in Essential Tremor**. Cerebral cortex 25(11):4191-202.
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