

Format

# **Functional Role of Sleep and Its Causal Effect on Memory Consolidation in Humans**

## **Project Leader**

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## **Faculty Members Involved in this Project**

### **1. Objective**

#### **This project is aimed at:**

Determining the functional role of sleep and its causal effect on the consolidation of human memory is crucial to an understanding of the mechanism by which we memorize facts and events in our daily life. We are studying the neuronal basis for memory processing (in both humans and non-human primates), using a variety of techniques including functional magnetic resonance imaging (fMRI), psychophysics, and electrophysiology. In this project, we will be focusing on human brain-wide network dynamics during sleep, as a key to memory consolidation. By combining high-field MRI and other techniques such as EEG, tCS, TMS and ultrasound, we aim to clarify the functional/causal role of sleep regarding the recall of facts/events.

### **2. Project Outline**

#### **To achieve the above aims, the project will consist of the following phases:**

- (a) development of high spatiotemporal measurement of brain-wide neuronal activity in humans;
- (b) analysis of brain activation during nap/sleep regarding memory consolidation; and
- (c) determining the causal effect of brain stimulation during nap/sleep on memory consolidation.

### **3. Expected Performance**

#### **In this project, the successful candidate would be expected to:**

- (a) publish two or more research papers by the completion of his/her 3-year PhD course;
- (b) develop the ability to conduct research independently; and
- (c) work as a teaching or research assistant.

### **4. Required Skills and Knowledge**

#### **The successful candidate for this project will have the following knowledge and skills:**

- (a) good English communication and writing skills;
- (b) strong research background in neuroscience or related areas; and
- (c) familiarity with Matlab and/or Python, and statistical methods—programming skills would be a plus.

## **References**

See

<https://researchmap.jp/takeda.masaki>

## **See my webpage:**

<https://sites.google.com/view/takeda-lab/HomeEN?authuser=0>

**See our admission guidelines:**

[https://www.kochi-tech.ac.jp/english/admission/ssp\\_aft19oct/ssp\\_application\\_guideline.html](https://www.kochi-tech.ac.jp/english/admission/ssp_aft19oct/ssp_application_guideline.html)

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