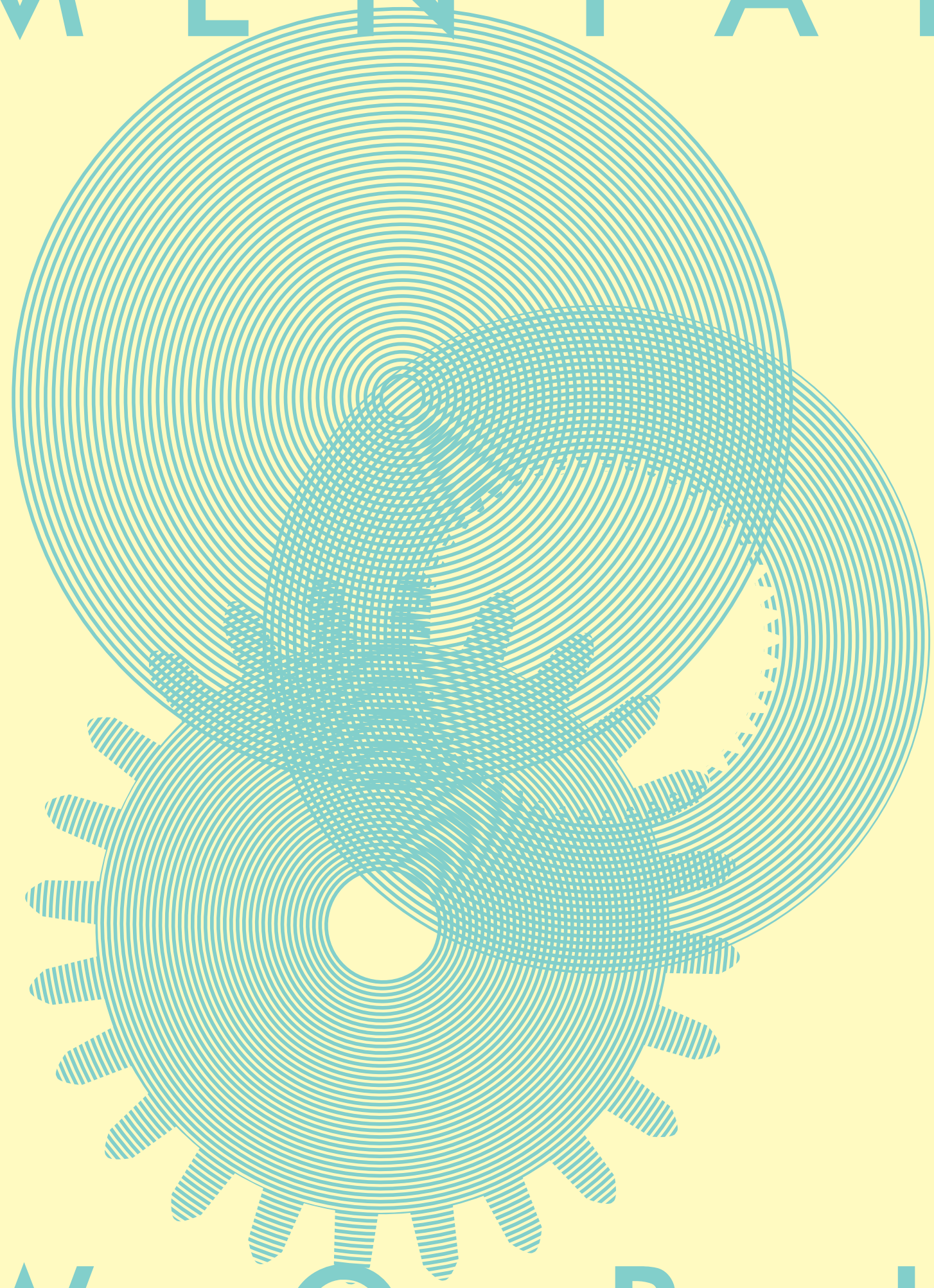
MENTAL



WORK

MENTAL WORK IS A SCIENTIFIC ART PROJECT THAT EXPLORES BOTH THE EXCITEMENT AND FEAR OF THE RAPID EVOLUTION OF NEUROSCIENTIFIC TECHNOLOGY IN OUR SOCIETY. IT WILL TAKE THE FORM OF AN ART-SCIENCE EXHIBITION, WEBSITE AND EVENTS SCHEDULED FROM SEPTEMBER 2017 TO JUNE 2018 AT THE ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE (EPFL) AND SWISSNEX IN SAN FRANCISCO. MENTAL WORK WILL THEN TRAVEL THROUGHOUT THE WORLD TO BE PRESENTED AT SCIENTIFIC MUSEUMS AND FESTIVALS, SWISSNEX LOCALITIES AND PARTNER UNIVERSITIES.

Connecting Brain and Machine

The exhibit harnesses technology developed in José Millán's EPFL laboratory in the field of brain-machine interfaces (BMI).

BMI is the process by which someone can send signals from his or her brain to a computer or a machine using a headset and dedicated software. The headset picks up the electrical activity of the brain using an array of electrodes in contact with the scalp, a process known as electroencephalography (EEG), a non-invasive technology that gives us a real-time map of brain activity.

One clinically-proven application of BMI is to train users, often paraplegic patients, to visualize hand or foot movement in order to activate distinct areas of the motor cortex. These signals can then be interpreted by the computer to make, for example, a wheel chair change direction. While still in a highly experimental phase, commercial applications for BMI are also being developed in the gaming, automobile and lifestyle sectors.

A One-of-a-Kind Collaboration Between Art and Science

Bringing BMI out of the lab raises challenges that can only be met by interdisciplinary collaboration.

Mental Work is pushing the boundaries of neurotechnology. Its team of scientists, artists, designers, and communicators are developing the necessary tools to introduce BMI to the general public for the first time. The project brings together neuroscience, experimental philosophy and the visual arts, and is unique in both ambition and intellectual scope.

The physical exhibit is comprised of spectacular mind-controlled kinetic sculptures that are visually and functionally inspired by slider cranks. These 19th century computing mechanisms were chosen because they were an essential technological step towards building the machines that have replaced much of the factory work previously done by hand. By juxtaposing these anachronistic elements, the exhibit aptly represents over two hundred years of man's relationship to technology in a thought-provoking and interactive experience.

EPFL Engages Society in Open Dialogue

Mental Work is to be one of first exhibits to be showcased at EPFL's new ArtLab building in September 2017.

The Mental Work exhibit will be shown at the ArtLab building on EPFL's campus from September to December 2017, and then will travel to California to be hosted by swissnex San Francisco. In the City by the Bay, Mental Work will be installed at swissnex's massive new space at Pier 17. A series of conferences, artist talks and workshops about neurotechnology, man-machine interaction and the future of technology will accompany the exhibit in both San Francisco and the Lake Geneva Region.

The main partners in Mental Work are EPFL Professor José del R. Millán, the artist Jonathon Keats, and Michael Mitchell, co-founder of the agency Paperboy. The project is supported by EPFL ArtLab and swissnex San Francisco, with funding from the Gerbert Rüf Foundation and the Swiss National Science Foundation.

THE VISITOR APPROACHES THE SCULPTURES AND PLUGS IN THE BMI DEVICE. SHE VISUALISES MOVING A PART OF HER BODY AND THE KINETIC SCULPTURE BEGINS ITS ELEGANT MECHANICAL MOTION.

1. Visualisation:
The visitor, after a brief training session, uses motor imagery as indicated by the instructions.

2. Brain activity:
Visualisation activates specific brain regions, generating electromagnetic waves.

3. Reading the signals:
These waves are picked up by the electrodes in the dry EEG helmet.

4. In motion:
The BMI translates these signals into a command to move the sculpture.

The data garnished from Mental Work will be made anonymous and shared with the scientific community.