

Well-being Engine

CONCEPT BOOK



Aoyama Gakuin University

📍 **Aoyama Campus** 4-4-25 Shibuya, Shibuya Ward, Tokyo ZIP:150-8366
📍 **Sagamihara Campus** 5-10-1 Fuchinobe, Chuo Ward, Sagamiara, Kanagawa Prefecture ZIP:252-5258
🌐 <https://www.aoyama.ac.jp/>

Aoyama Gakuin University

THE SALT OF THE EARTH,
THE LIGHT OF THE WORLD

Next-generation Well-being Initiative at Aoyama Gakuin University

Well-being
Engine

Considering collaborative research both in Japan and overseas

Aoyama Gakuin University is originated from Aoyama Gakuin, which was formed by the merging of three schools founded by missionaries dispatched from the Methodist Episcopal Church in the United States in 1874. Currently comprising 10 faculties and 12 graduate schools, Aoyama Gakuin University has become a leader in higher education in Japan.

Aoyama Gakuin University has been selected for the "2016 Private University Research Branding Project" and has been strengthening its university-wide structures to steadily execute the project in 5 years. In this project, we define the social framework that enables all people to live in a state of physical, mental and social well-being as "Next-generation Well-being." From that viewpoint, we are aiming to build a system that provides optimal services tailored to individuals, in contrast to existing uniform services treating them as a group.

Specifically, we will conduct society implementation in collaboration with local governments, domestic companies, and universities that we have previously collaborated with in industry-government-academia projects, particularly in the fields of health and welfare, knowledge and education, and skills training. Furthermore, we will conduct demonstration experiments in collaboration with research teams in overseas universities to build model cases in other countries and expand overseas. Based on these efforts, we aim to establish "Next-generation Well-being" as the research brand of our university. Please look forward to the future development of this project.

President of Aoyama Gakuin University
Yoshikazu Miki



Vice President
Osamu Hashimoto



Reform with a focus on the internationalization of the College of Science and Engineering

The College of Science and Engineering, Aoyama Gakuin University was founded in 1965 and celebrated its 52nd anniversary in 2017. I am very heartened to see the graduates we have dispatched into the world active in such diverse fields now. Currently, some 2,800 undergraduate and graduate students are enrolled in the College of Science and Engineering, and we have built a comprehensive education and research system with about 140 faculty members. Recently, we have been promoting curriculum reforms to respond to the rapid internationalization as follows: (1) From 2013, the English curriculum is structured into three skill levels and new students study in small classes according to proficiency, (2) In 2014, *Science and Engineering International Program* and *Advanced Science and Engineering Implementation Program*, etc. were launched, offering many lectures in specialized subjects in English. Also, (3) From September 2017, fall enrollment is conducted for foreign students entering the Graduate School of Science and Engineering, and a curriculum offering education and research instruction entirely in English was prepared.

Together with these reforms, we believe that the "Next-generation Well-being" project, which has been selected for the Private University Research Branding Project, will greatly enhance the research brand of not only the College of Science and Engineering but also our university.

Aiming at realization of Next-generation Well-being

The College of Science and Engineering, Aoyama Gakuin University has made many achievements in various fields of research since its establishment in 1965.

Facing an increasingly diversified society, since 2016 we have conducted research to realize Next-generation Well-being, in which humans are seen as individuals rather than as a group, and information technology (IT) is utilized to provide various services individually.

This includes systems, devices and teaching materials for people to live a more prosperous life, centering on the fields of health and welfare, knowledge and education, and skills training. The Sagamihara Campus of the College of Science and Engineering is playing the role of an engine for the creation of Next-generation Well-being, and is working to foster new engineers and researchers in the field of science and technology for the 21st century.

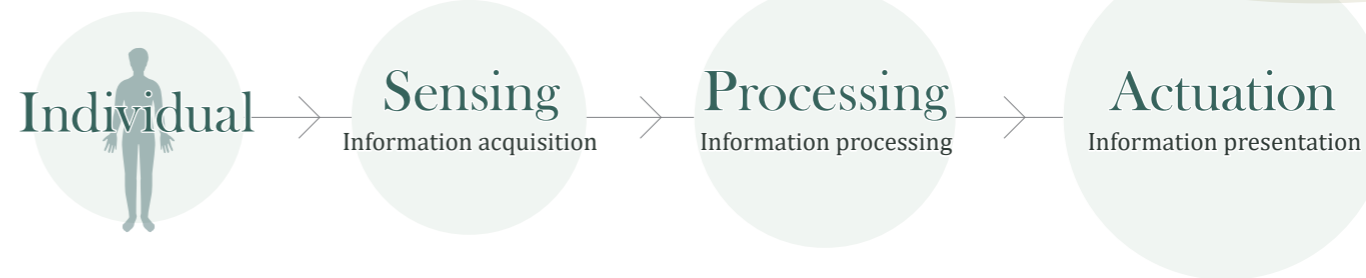
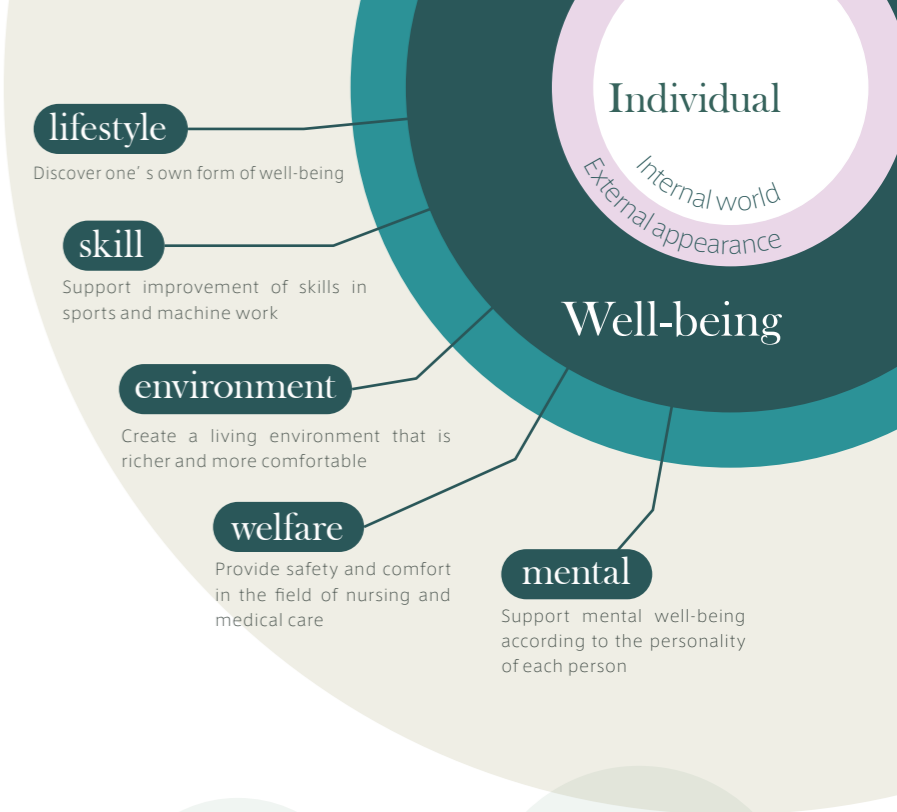
What is well-being?

Experiencing health and abundance from physical, mental and social perspectives.

The College of Science and Engineering, Aoyama Gakuin University is researching five technologies in order to realize Next-generation Well-being that leads to a society in which individuals can live with abundance and vitality.

Method of promoting research on Next-generation Well-being

We are conducting research to extract data from people, environment and space by information technology (IT), visualize it as numerical values and information, and present it in order to enrich the lives of people.



lifestyle

Well-being in daily life

Interest is growing on the use of information on our mind and body in order to lead a more comfortable and healthy life. We are working on a variety of studies on biological information invisible to the naked eye leveraging information technology (IT).



We use pedometers, heart rate monitors and thermometers in conjunction with smartphones to manage physical health by capturing cardiovascular and respiratory signals, or to display psychological states in order to promote communication.

To prevent strain on the body, sensors are incorporated into a mattress to measure biological information such as heartbeat, breathing and turning during sleep. This enables us to estimate sleep quality and improve lifestyle habits.



Well-being
Engine

Modeling technology experiment

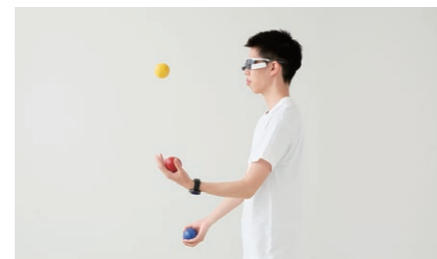


This is a miniature factory for learning factory management technologies in the automobile manufacturing industry. Using the computer, students can experience hands-on the flow of goods such as machining, setup, assembly and inspection, and visualize the production schedule based on a Gantt chart (process operation control table), and find points to improve.

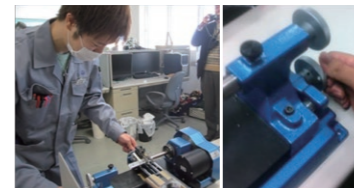
skill

Well-being in skill improvement

The skills of athletes and engineers have been considered impossible to express by numerical values because they are something sensuous. We are conducting research to visualize them as teaching materials to train successors and improve their skills.



Using wearable sensors and fixed-point observation cameras, we capture data on body motion and form during dance, juggling and sports for analysis. Based on this, we support the efficient acquisition of skills and improvement.



We analyze data on the motion of workers, machine sounds during work, the shape of finished products, etc. at company manufacturing sites. This helps to learn skills in a short period of time and facilitates human resource development.

environment

Environments for well-being

In what way can air conditioning be used to make the room comfortable without using energy wastefully? We are investigating ways to create environments that enable us to be more comfortable in various living situations, from the perspective of not only the management of temperature and humidity, but also industrial and systems engineering.



Using information technology (IT) to perform analysis from various points of view such as air conditioning and heat mechanisms, air conditioning management, and business management systems, we reduce costs and energy wastage to realize a safe and comfortable living room environment.

PICO-BAND hand-warming device



The indoor thermal environment that feels comfortable differs according to the individual. This wearable heating device supports indoor thermal comfort. It was worn on the wrist and promotes an effect of spread-

ing thermal sensation from the hand to the whole body. We are also conducting research and development to link the device with air-conditioning equipment.

welfare

Well-being in care work

Japan is a super-aged society that has surpassed other countries in this respect. Various approaches of nursing care are being studied. We are engaging in research with the aim of cooperation with hospitals and nursing care facilities leveraging information technology (IT) to enable both the elderly and their families to live a healthy and affluent life.



We are researching and developing a monitoring system that films the daily life of parents living far away by a camera installed in their house and represents them with avatars*, and a surveillance system using cameras with a 360-degree field of vision in the hospital.

*An animated alter ego that represents the user in the virtual space of a computer network.



Above: Care receiver avatar
Left: Care provider avatar

mental

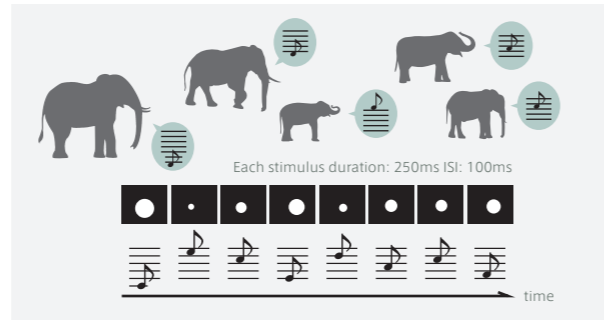
Psychological well-being

Mental stress is a major problem in modern societies. In order to quantify mental stress, we are researching sensitivity, which is a response characteristic of the human mind and body, from an engineering perspective.



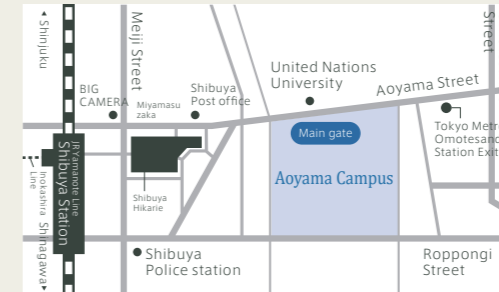
We analyze various biological signals such as brain waves, cerebral blood flow, electrocardiogram, blood pressure, eardrum temperature, skin temperature, blinking, body motion, etc. in an integrated manner to clarify human sensitivity.

We study various perceptual and cognitive characteristics such as the way the prediction of the size of objects and high- and low-pitched sounds differ according to the individual.



Using cognitive psychology methodology, we conduct fundamental research to clarify individual differences and commonalities in perception and cognition, and to construct systems tailored to individual characteristics and situations.

Aoyama Campus

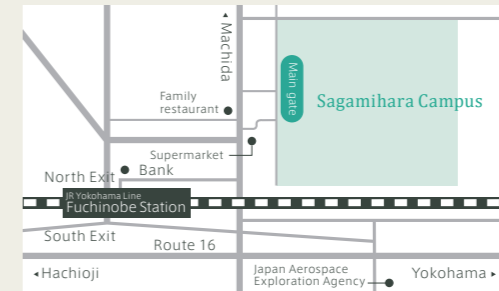


4-4-25 Shibuya, Shibuya Ward, Tokyo ZIP:150-8366

10 minutes on foot from Shibuya Station on the JR Yamanote Line, JR Saikyo Line, Tokyu Line, Keio Inokashira Line, Tokyo Metro Fukutoshin Line, etc.

5 minutes on foot from Omotesando Station on the Tokyo Metro Ginza Line, Chiyoda Line or Hanzomon Line

Sagamihara Campus



5-10-1 Fuchinobe, Chuo Ward, Sagamihara, Kanagawa Prefecture ZIP:252-5258

7 minutes on foot from Fuchinobe Station on the JR Yokohama Line

Inquiries

Research Support Division, Sagamihara Campus Administration Department

☎ 042-759-6056 ✉ kenkyuusien@aoymagakuin.jp