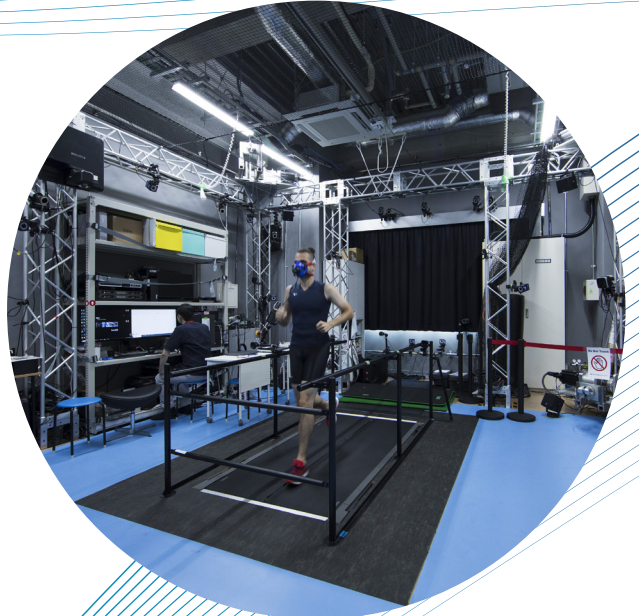


RiHSA

Research Institute on Human and Societal Augmentation

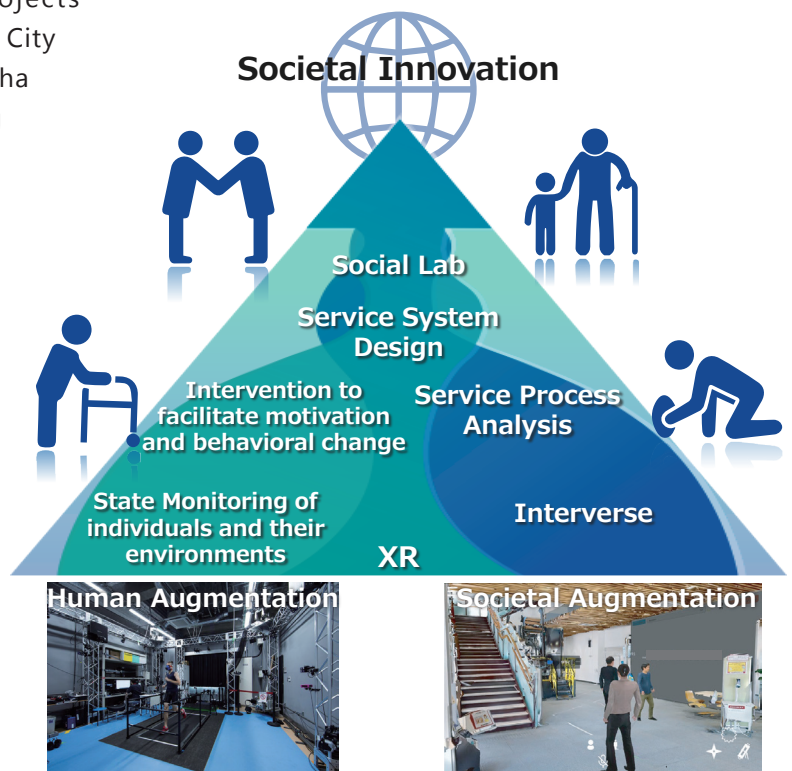


About Research Institute on Human and Societal Augmentation

The Research Institute on Human and Societal Augmentation (RIHSA) is a research unit dedicated to promoting research and development from two perspectives: individual human augmentation and the augmentation of service and societal systems. Its goal is to realize societal innovation that contributes to maintaining and improving human capabilities, optimizing the quality of life and work, reducing social costs, transforming industries, and enhancing societal sustainability. This research unit integrates XR (X Reality) technology, which merges real and virtual environments, to construct new societal structures through "Interverse Technology." It also employs "State Monitoring Technologies" to measure and evaluate the conditions of individuals and their environments, and "Intervention Methods" that facilitate motivation and behavioral change, optimizing the interaction between individuals and society. Additionally, RIHSA develops "Service Design Methodologies" to design and improve social systems and services and supports industry-academia-government-citizen collaboration through "Social Labs."

RIHSA actively collaborates with multiple research units, including the Integrated Research Center for Well-being, Integrated Research Center for Self-Care Technology, and Sensing Technology Research Institute, engaging in interdisciplinary research and the practical demonstration and implementation of technologies in society. Taking advantage of being based in the "Kashiwa-no-ha area," where co-creation activities between industry, academia, government and the private sector are active, RIHSA has established the Kashiwa-no-ha Citizen Advisor system. It also participates in various initiatives as a partner organization of the Kashiwa-no-ha Urban Design Center (UDCK), engaging in projects such as the Kashiwa-no-ha Smart City Consortium, and the Kashiwa-no-ha Life Science Frontier, strengthening its collaboration with the local community.

Through these diverse initiatives, RIHSA aims to contribute to solving social issues while harmonizing humanity, society, and technology. It continuously explores new approaches to building a sustainable and inclusive society.



Co-Augmenting Humanity and Society

Organization



Director
KURATA Takeshi, Ph.D.



Deputy Director
TAKENAKA Takeshi, Ph.D.



Deputy Director
OKUMA Takashi, Ph.D.



AIST Fellow
MOCHIMARU Masaaki, Ph.D.



Principal Research Manager
KOJIMA Kazuhiro, Ph.D.

Research Group

Augmented Living Technology Research Group

Group Leader
TANAKA Hideyuki, Ph.D.



Personalized- and Standardized Intervention Based Operation Research Group

Group Leader
KOBAYASHI Yoshiyuki, Ph.D.



Interverse Research Group

Group Leader
ICHIKARI Ryosuke, Ph.D.



Socio-Digital Service System Research Group

Group Leader
WATANABE Kentaro, Ph.D.



Kinetic Informational Dynamics Research Group

Group Leader
MURAI Akihiko, Ph.D.



Smart Textile Co-Creation Research Group

Group Leader
MURAI Akihiko, Ph.D.

Cooperative Research Laboratory

Komatsu-AIST Human Augmentation Cooperative Research Laboratory

Leader, TAKAMATSU Nobumasa

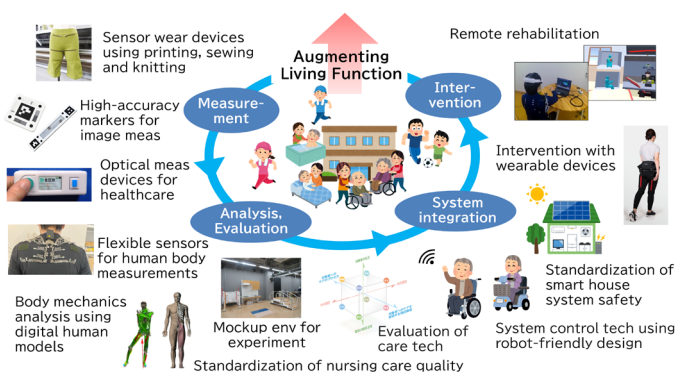
RICOH-AIST KIBS Cooperative Research Laboratory

Leader, HARADA Toru

Augmented Living Technology Research Group

Group Leader : TANAKA Hideyuki, Ph.D.

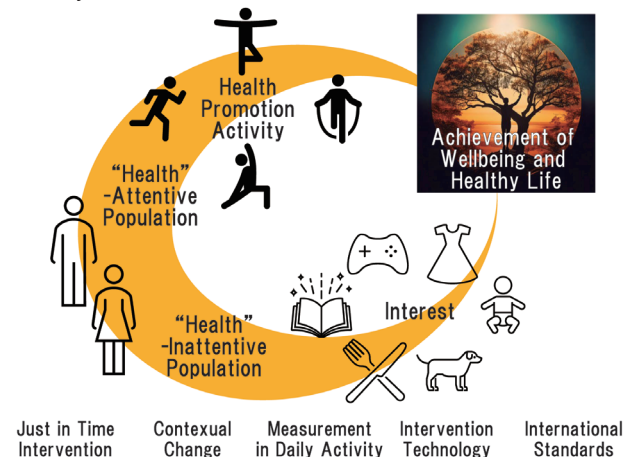
We conduct research and development of assistive technologies for nursing care, manufacturing, and daily life, aiming to enhance human capabilities and quality of life (QOL). Our work includes sensors based on novel measurement principles, AI-driven analysis, and systems for remote rehabilitation and gait support. We also develop evaluation methods for care technologies and robotic assistive devices and promote international standards for care quality and smart home safety. Through collaboration with industry, academia, and care providers, we aim for early implementation and social deployment to address aging-related challenges.



Personalized- and Standardized Intervention Based Operation Research Group

Group Leader : KOBAYASHI Yoshiyuki, Ph.D.

Personalized-, Standardized-Intervention Operation Research Group (PSIBORG) is dedicated to developing technologies that contribute to the achievement of individual wellbeing and healthy lives. For those who may not have a direct interest in health itself, we aim to create a society in which people can naturally improve their health through engagement with other areas that interest them. Beyond conducting experiments in the laboratory, we also collect data from daily life settings and work in collaboration with relevant organizations to develop practical technologies that can be truly implemented in society.



Interverse Research Group

Group Leader : ICHIKARI Ryosuke, Ph.D.

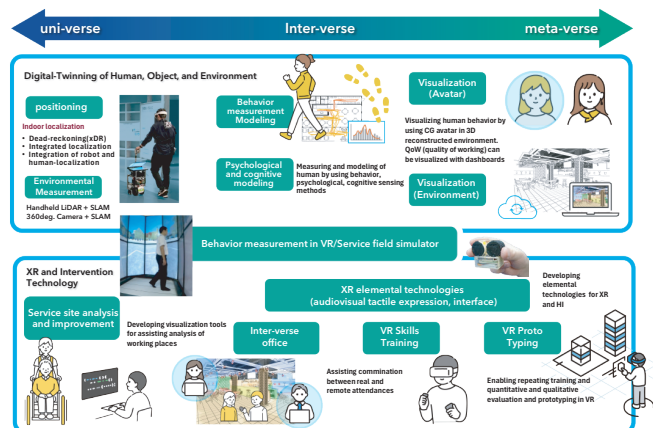
The Interverse Research Group explores ways to integrate the physical world with cyberspace to return value to the real world. Our work focuses on:

• Digital Twin Development

We develop digital twin technologies to precisely replicate people and environments, including indoor positioning, behavior modeling, and psychological approaches to understanding internal states.

• XR-Based Interventions

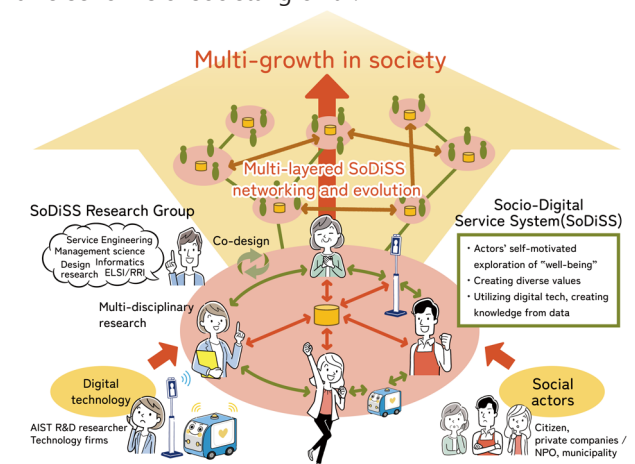
We develop XR technologies to overcome real-world constraints, enhance service environments, create Interverse-style offices, and support workplace training and prototyping.



Socio-Digital Service System Research Group

Group Leader : WATANABE Kentaro, Ph.D.

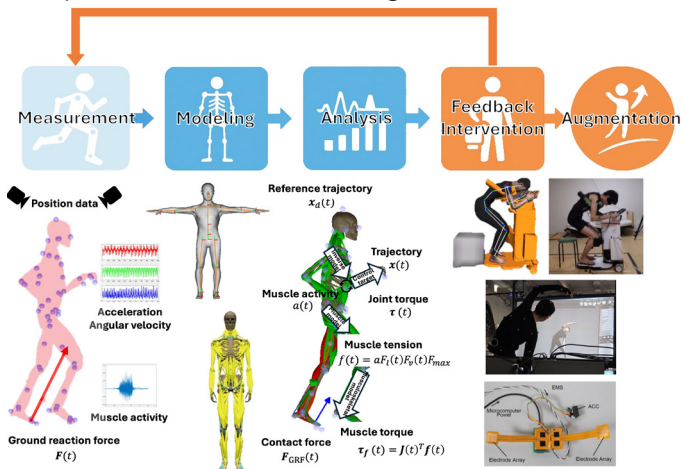
A socio-digital service system refers to a framework in which diverse societal actors collaboratively envision desirable futures ("well-being") and autonomously and cooperatively work toward achieving that well-being by leveraging digital technologies and data. This group promotes transdisciplinary research to develop, implement, and deploy methods and technologies that support the design, construction, and operation of such systems grounded in the societal challenges. Furthermore, by facilitating collaboration and network-building across industries and regions, the group contributes to enabling diverse forms of societal growth.



Kinetic Informational Dynamics Research Group (KInDRG)

Group Leader : MURAI Akihiko, Ph.D.

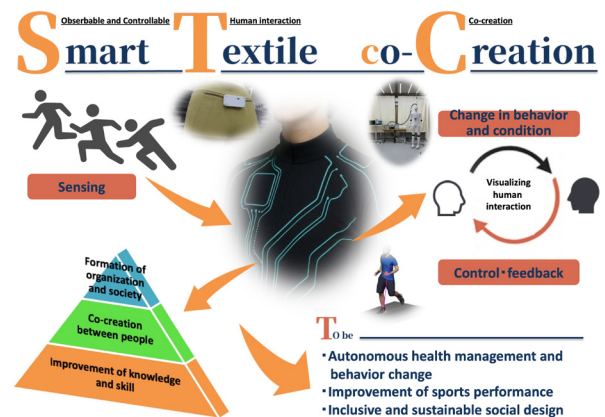
Kinetic Informational Dynamics encompasses not only the physical properties of human motion, biomechanics, and physiology, but also the time-series changes and dynamic interactions between individuals and their environments. This research group aims to accurately and continuously measure and analyze such kinetic information in real-world contexts, and to systematize it through mathematical modeling. By precisely capturing human states, behaviors, and interactions, we design feedback and intervention strategies that enhance and transform motor and sensory functions. Our goal is to develop technologies that support adaptive and functional human augmentation.



Smart Textile Co-creation Research Group

Group Leader : MURAI Akihiko, Ph.D.

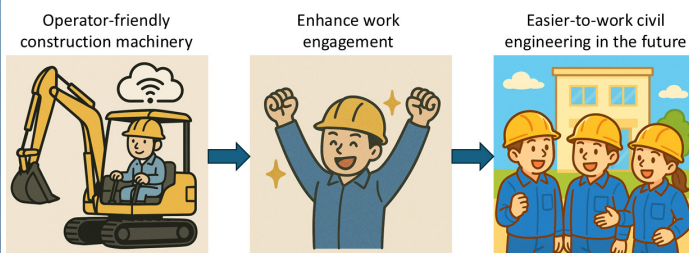
Smart Textile Co-Creation Research Group explores the potential of “smart textiles”—textiles capable of sensing and control—as interactive interfaces between humans and their environments. Our mission is to drive transformation in both individuals and society through co-creation, fostering collaboration across diverse fields of knowledge, technologies, organizations, and people. Focusing particularly on areas closely related to the human body, such as medicine and sports, we promote joint initiatives through partnerships among academia, industry, and government—especially with regional companies. Our goal is to create successful case studies that connect academic research to technological innovation and practical implementation in society.



Komatsu-AIST Human Augmentation Cooperative Research Laboratory

Leader : TAKAMATSU Nobumasa

Research and development are being conducted on Human Augmentation technologies that enhance the collaboration between user-friendly construction machinery and their operators. Improving safety, reducing fatigue, and increasing productivity for construction machinery operators are expected to foster a sense of accomplishment and enhance their work engagement. In addition, research is underway on the servitization of these technologies to contribute to the realization of future civil engineering worksites that offer more comfortable and sustainable working conditions.



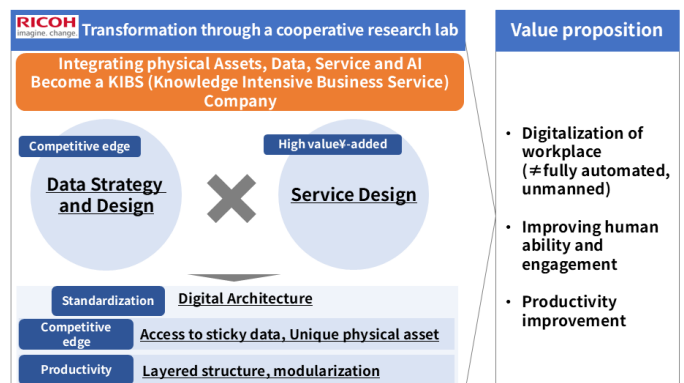
RICOH-AIST KIBS Cooperative Research Laboratory

Leader : HARADA Toru

RICOH KIBS[®] Lab conducts the research and development of methodologies and technologies to maximize intellectual productivity based on service engineering. This lab promotes the development and implementation of high added-value solutions in diverse workplaces. More concretely, the lab creates data-driven service values through “dissemination of business-specific AI agents”, “development of knowledge-based data businesses,” and “operational optimization and new value creation through digital modelling of business processes.”

Moreover, the lab disseminates Japan-made “knowledge intensive digital services” to the world through international standardization of its achievement.

* KIBS Knowledge Intensive Business Service

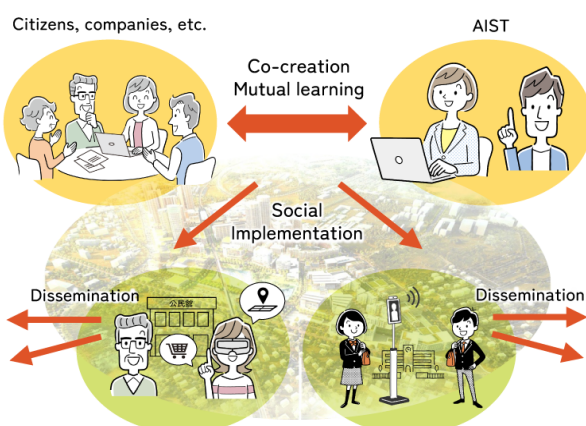


“Social lab”: R&D through regional co-creation

WATANABE Kentaro, Ph.D.

AIST Kashiwa Center positions itself as a “Social Lab” that promotes regional co-creation-based research, development, and social implementation in collaboration with local residents and organizations in the Kashiwa-no-ha area, where the research hub is located. To date, it has worked with the local citizen co-creation program “Minna no Machizukuri Studio” to envision a future city for older adults, which led to the development of concepts for senior-supportive smart housing environments for aging in place.

The center has also advanced research and development involving the community in areas such as local transportation and health promotion. Additionally, it operates the “Kashiwa Living Lab,” a support hub for the development and implementation of robotic care devices, and promotes their adoption in cooperation with local care facilities and welfare-focused universities. RIHSA will further accelerate innovation through regional co-creation.



Research and Development of Interverse Technology to Augment Communication

OKUMA Takashi, Ph.D.

The project aims to simultaneously promote the well-being and economic development of people throughout society by creating new communication spaces that deeply connect the real and virtual worlds. In particular, we believe it is important to focus on technologies that extend people's communication and return the value created in the virtual world to the real world.

For example, we will investigate how technology can support activities that provide services in the real world by enabling people who want to work in a comfortable office and people who want to work remotely from the comfort of their homes to work as a team through communication in an office on the interverse.

In this way, by developing technologies to further enrich communication between participants in the space known as the Interverse, which combines the real and virtual worlds, constructing experimental systems that utilize such technologies, and working to resolve ethical, legal, and social issues, we aim to activate the relevant markets and produce socially We aim to produce useful results.

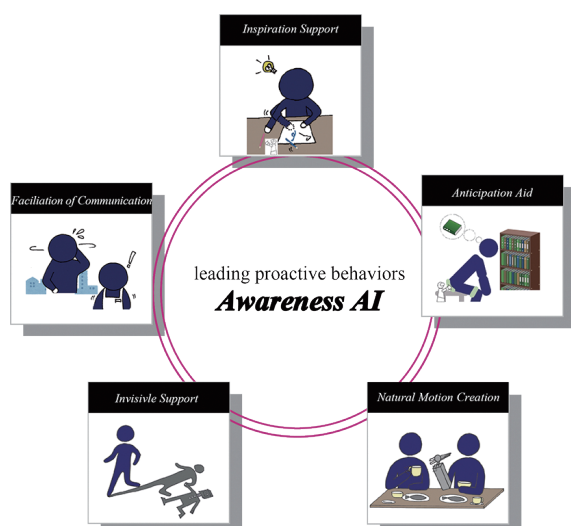


Moonshot R&D Goal 3 R&D Projects

Awareness AI Robot System for leading proactive behavior improvement

MURAI Akihiko, Ph.D.

It would be great if we could improve our health in our daily lives without having to go to a gym. Research to date has gradually revealed that various health problems originate in the actions we take in our daily lives. In our moonshot R&D project, we are developing an Awareness AI system that could detect such health problems in our daily lives and provide us with appropriate awareness using robot technology. For example, we dream a future in which a robot can detect the onset of muscle weakness while shopping for dinner at the supermarket, and suggest a menu that provides adequate nutrition for your current physical condition. We aim to implement this system as an unprecedented health diagnosis and intervention system.



Multisensory XR-AI Technology Platform for Remote Healthcare

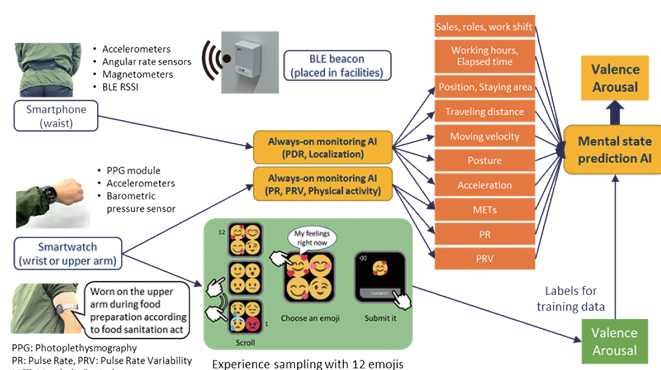
KURATA Takeshi, Ph.D.

The main objective of this research is to establish a "multi-sensory XR-AI technology platform" to alleviate spatio-temporal, economic, and cognitive constraints by enabling remote processes of healthcare services. The project is working on precise motion measurement using MR3 wear incorporating high-sensitivity and low-hysteresis strain sensors, remote haptic interaction using MR3 mannequins combined with hanger-reflex devices, self-efficacy enhancement using illusion in VR rehabilitation, reciprocal care to support motivation among multiple users, and prediction of mental state for always-on monitoring.

We are conducting research and development for each of the following services: rehabilitation targeting the upper limbs and specific health guidance. In addition, we envision expanding applications to support services for health and productivity management (management that balances productivity and QoW) and human capital management.



This joint research (AIST, Kyoto University, The University of Tokyo, Seiko Epson Corporation, eveRehab, Inc.) is supported by a project, JPNP21004, commissioned by NEDO.



Always-on monitoring: Predicting daily physical and mental status



Research Institute on Human and Societal Augmentation

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Graduate School of Frontier Sciences, The University of Tokyo
- Applied Service Engineering Laboratory, Master's and Doctoral Program in Intelligent and Mechanical Interaction Systems,
Degree Programs in Systems and Information Engineering, Graduate School of Science and Technology, University of Tsukuba
- Cognitive Interaction Design Laboratory, Master's and Doctoral Program in Psychology,
Graduate School of Comprehensive Human Sciences, University of Tsukuba
- Department of Electrical and Electric Engineering, Tokyo University of Agriculture and Technology
- Digital Human Laboratory, Division of Information Science, Graduate School of Science and Technology,
Nara Institute of Science and Technology