# Univ. of Tokyo　Ishikawa Watanabe Laboratory

## 研究紹介／ Introduction

We strive towards realizing high-speed, intelligent systems (recognition-action systems) that exceed human capabilities. To this end, we have developed sensory functionality corresponding to a human's five senses, hierarchical parallel processing corresponding to how our brains process information, and dynamic manipulation corresponding to the human motor system. This technology is applied throughout four main research themes.

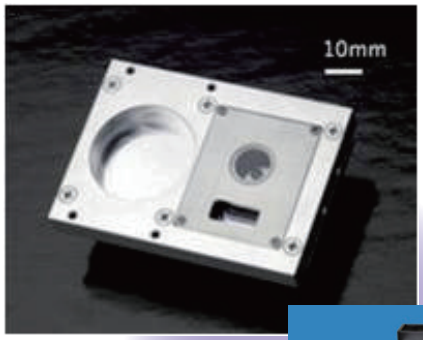
## センサフュージョン／ Sensor Fusion

We have developed an ultra high-speed robot system with adaptable recognition-action abilities, based on Dynamics Matching. Exploiting the characteristics of this system, we have proposed and implemented a range of entirely new manipulation skills. Various high-speed, dynamic and dexterous manipulations skills have been achieved using a high-speed robot arm, high-speed hand, and visual and tactile sensory feedback.

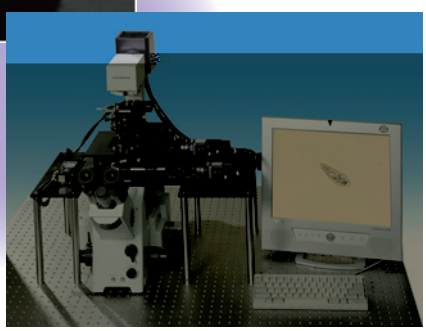
スローイン
バ
Throwing-Batting

Pen spinning

## ダイナミックイメージコントロール／ Dynamic Image Control




ルフレンズ
Dynamorph Lens



ッグ
Motile microorganism tracking

We propose new technology that presents, in an easily observable manner, phenomena that cannot be perceived by the human eye. This is achieved by controlling optical, illumination and processing systems with super-human speed and precision in response to various phenomena exhibiting dynamical behavior. Concretely, motile microorganism tracking, high-speed variable lens, and high-speed gaze control system have been developed.

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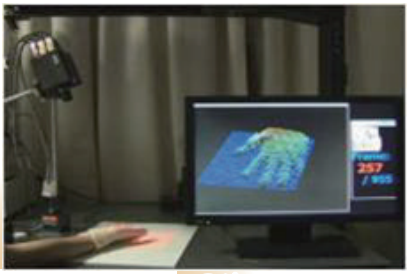
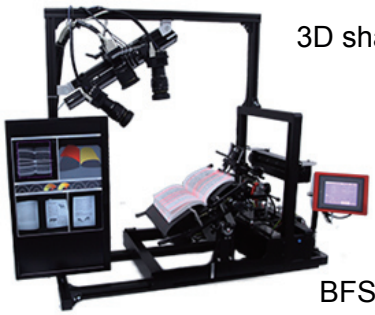
## ビジョンアーキテクチャ／Vision Architecture



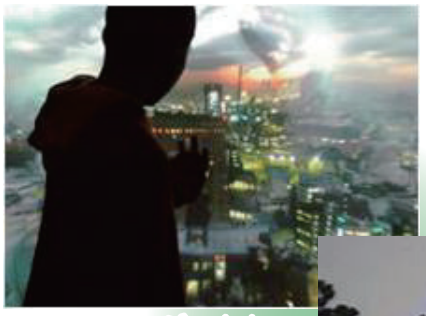
3D shape measurement

We focus on practical research to explore new applications in various fields by using high-speed image sensing that is superior to the human eye. We have studied ultra high-speed image processing at 1,000 fps using VLSI technology and parallel processing, and exploited this in applications such as high-speed 3D sensing.



BFS-Auto

## メタ・パーセプション／Meta Perception



Khronos Projector

Sticky Light

We coined the term "Meta Perception" to describe technologies that will enable humans to communicate in new ways with each other. Using systems possessing capabilities surpassing those of humans, we have developed applications in areas such as Human-Computer Interaction, Media-Art etc.

Please refer to the followings for further information.

Website:
English: http://www.k2.t.u-tokyo.ac.jp/index-e.html
We upload research contents as needed.

Booklet:
http://www.k2.t.u-tokyo.ac.jp/Booklet/all.pdf
We compile research achievements into a book (162 pages).

YouTube Channel:
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