

## Creating new environmental industries using SoC technology and nano-size sensor technology



### Overview

We shall conduct joint research, involving both industry and academia, on technologies which integrate SoC technology with nano-size sensor technology. This work shall be based on the knowledge foundation of Kitakyushu Science and Research Park, and the "information" and "environment" technologies accumulated by industries in the region. Our aim is to create a technology innovation cluster for creating new environmental industries which lead the way into the 21st century.

### Cluster Headquarters

- President ..... Koichi Sueyoshi (Mayor, the City of Kitakyushu )
- Project Director ..... Takao Kageyama
- Chief Scientist (CS) ..... Toyoki Kunitake (Vice President, the University of Kitakyushu)
- Deputy Chief Scientist (CS) ..... Satoshi Goto (Professor, Graduate School of Information, Production and Systems, at Waseda University)
- Science and Technology Coordinators Mitsuhiko Tamura, Toshihiko Ohta

### Core Organization

Kitakyushu Foundation for the Advancement of Industry, Science and Technology (FAIS:pronounced "face")

### Participating Research Organizations

(Bold: Core Research Organizations)

Industry···Nippon Steel Chemical Co.,Ltd., Zenrin Co., Ltd., NEC Corporation, TOSHIBA Corporation, Hitachi ULSI Systems Co., Ltd., Matsushita Electric Industrial Co., Ltd., Renesas Technology Corp., Shinnikka Environmental Engineering Co., Ltd., Asahi Technion Co., Ltd., ENG Co., Ltd., Jedat Innovations Inc., Kokura Synthetic Industries, Ltd., AR'S Co., Ltd., and others  
 Academia···**Kyushu Institute of Technology, The Univ. of Kitakyushu, Waseda Univ.**, Kyushu Univ., The Univ. of Occupational and Environmental Health, Cranfield Univ.



Project Director

**Takao Kageyama, Ph.D.**

### Pioneering Environmental Technology with ECO & SoC

Colleagues have gradually gathered in the area centered on Kitakyushu Science and Research Park, inspired by the dream of cloning Silicon Valley near the Hibiki and Genkai Seas off the west coast of Japan. Semiconductor fabrication plants and industries related to semiconductor manufacturing are concentrating in Kyushu, so much so that Kyushu is sometimes called "Silicon Island". Within Kyushu, information industries with design capabilities are concentrating in the Kitakyushu/Fukuoka region, and a wide-area cluster is being formed. In Kitakyushu, the strength of the region is its concentration of technology relating to the environment (i.e. pollution control technology and environmental remediation technology). Kitakyushu Human Technology Cluster will exploit SoC technology and nano-size sensor technology to create new industries based on the environment, as powerful new applications of semiconductors for the future. To build a base for commercialization, 50 patents have been filed so far, and there have already been some outstanding results, like establishment of a biochip venture, and commercialization of computer aided design software (a product of joint research which won the LSI of the Year 2003 Award for Excellence sponsored by the Semiconductor Industry News). In the future, we will accelerate our efforts to develop new industries through wide-ranging teamwork with firms in the region and by integrating basic technologies into systems, so we hope you too will join this group of colleagues who are making their dreams come true.

*Takao Kageyama is a former executive chief engineer of the electron devices company at NEC Corporation, Tokyo, Japan.*

## Outline of the Joint Research by Industry, Academia and Government

We will create new environmental industries by combining three sensing technologies (environment, life/safety, health) which enable access to the environment with SoC technology, and by cooperating with local companies in Kitakyushu which have developed recycling and environmental remediation technology. New semiconductor technology, produced by SoC research involving Japanese companies, will accelerate the Silicon Sea-Belt Fukuoka concept and create new product lines.

### ●Development of sensing technology for understanding the environment

This development will exploit new ideas and technologies, like: microprocessors for providing notification of environmental changes in the atmosphere, soil or hydrosphere; environmental image sensing for providing notification of changes in the living/social environment; and biosensors for providing notification of health/medical information using changes in enzyme function or expressed proteins.

### ●Development of ubiquitous sensor networks enabling interaction with the environment

Wireless sensor SoC (equipped with low power consumption and micro power generation capability) shall be combined with environment sensors to provide environmental information from a wide area in local, on-site time. We aim to develop and use transmission (wireless) technology to serve as the basis for environment sensing technology.

### ●Development of SoC for achieving next-generation dreams

For information appliance applications, we shall develop environmentally aware, highly functional, state of the art SoC technology, like low power consumption, built-in micro power generation, variable configurability, new memory and computer aided design technology, and SoC for mobile devices. By combining these with sensor technology, we will connect with development of technology for high-functionality instrumentation equipment.

