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Employment & Professional Activities:

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|-------------------|---|
| 2008.04 – present | Chief Senior Scientist, Electronics Research Center, HCRL,
responsible R&D of Si nano-technology devices and physics |
| 1998.09 – 2008.03 | Senior Researcher, ULSI Research Dept., HCRL,
responsible for R&D of advanced CMOS and CMOS related devices |
| 1997.10 – 1998.09 | Visiting Industrial Fellow, University of California, Berkeley
responsible for research on ultra-short-channel MOSFETs fabrication process
and device physics |
| 1986.04.01 | Joined Central Research Laboratory, Hitachi, Ltd. ('HCRL')
responsible for R&D on short-channel MOSFET fabrication process and device
physics and MOS related devices |

Education:

- | | | |
|---------|-------|---|
| 2003.07 | Ph.D. | University of Tokyo, Grad. School of Engineering, Dept. of Electronics
Engineering: "Insights of Performance Improvements of deep-submicron
MOSFETs regarding device structural considerations" |
| 1986.03 | M.Sc. | University of Tokyo, Grad. School of Engineering, Dept. of Reaction Chemistry |
| 1984.03 | B.Sc. | University of Tokyo, Faculty of Engineering, Dept. of Reaction Chemistry |

Professional Affiliations & Activities:

Senior Member, Institute of Electrical and Electronics Engineers, Inc. (IEEE) and IEEE Electron Devices Society; Member, Japan Society of Applied Physics; Member, Institute of The Institute of Electronics, Information and Communication Engineers (IEICE)

2009-present	Editor, JJAP*
2008-2009	Short Course Organizer, Symposium on VLSI Technology
2007-present	Member of Delegation, JSAP**
2006-present	Program Committee member on CMOS Devices/Device Physics, SSDM***
2003-present	Member of Sub-working Group on Process Integration and Device Structure, ITRS****
2003	Tutorial Speaker, IEDM***** Short Course
2002-2003	Technical Program Sub-Committee member on CMOS Devices, IEDM
2002	Panelist, Rump Session of Symposium on VLSI Technology
2001	Invited speaker, IEDM
1999-2001	Program Committee member on Advanced Silicon Devices and Device Physics, SSDM

*JJAP: Japanese Journal of Applied Physics

**JSAP: Japan Society of Applied Physics

***SSDM: International Conference on Solid State Devices and Materials

****ITRS: International Technology Roadmap for Semiconductor

*****IEDM: International Electron Devices Meeting

Silicon Nano-technology

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Abstract

To stimulate the social innovation under the severe constrain imposed by the fact that the earth's environment has limits, Silicon Nano-technology has been attracted a great deal of attention. This is because the sophisticated silicon fabrication process will open up opportunities to provide precise manufacturing with the small dimension which was impossible so far.

In this lecture, after a brief overview of current Si ULSI technology, advanced topics of Silicon process technologies and device physics will be discussed.

The topics will cover:

- Carrier mobility enhancements
 - Strained channel
 - Three-dimensional channel
- Issues of new gate dielectric materials
- New challenge of Si devices
- Issues of statistical fluctuation of carriers and impurities

The aim of this lecture is to inform physical images of Silicon Nano-technology with certain quantitative validity through advanced topics.