# Seiji Samukawa ／Professor ／Institute of Fluid Science

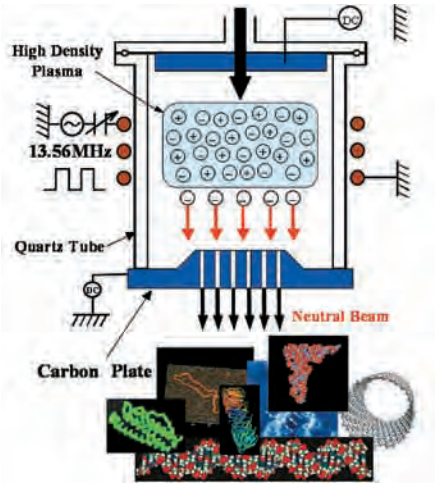
## Profile

Professor Seiji Samukawa received a BSc in 1981 and a PhD in 1992 from Keio University. He joined NEC Corporation in 1981, where he was the principal researcher of a group doing fundamental research on advanced plasma etching processes for sub-0.1-$\mu$m technology. Notably, he received the Ishiguro Award, the most distinguished prize given by NEC Corporation's Research and Development Group and Semiconductor-Business Group, for his work in applying a non-damaging plasma etching process to a mass-production line. Since 2000, he has been a professor at the Institute of Fluid Science at Tohoku University where he has done fundamental research on plasma etching, plasma CVD, neutral beam etching / deposition, new "Bio-nanoprocess" technology and their applications to ULSI, Micro Electro Mechanical Systems (MEMS), solar battery cell and innovative forward-looking nano-scale devices. His motto is, "Responsibility for research until it is completely finished." As a consequence of his excellent achievements, he has been assigned as "fellow" of The Japan Society of Applied Physics from 2008.

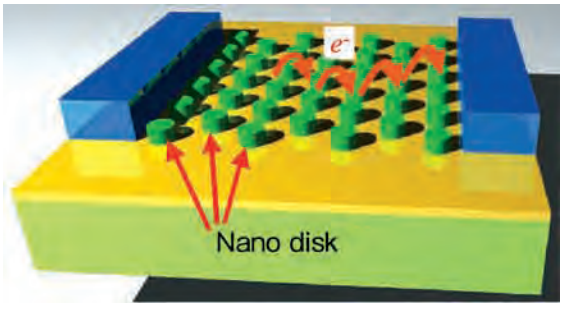
His significant scientific achievements have earned him many awards, including the Outstanding Paper Award at the International Conference on Micro and Nano-Technology (1997), the Best Review Paper Award (2001), the JJAP Editorial Contribution Award (2003), the Plasma Electronics Award (2004), the Best JJAP Paper Award(2008), the Fellow Award(2008) from The Japan Society of Applied Physics, the Distinguished Graduate Award from Keio University (2005), the Ichimura Award (2008) from the New Technology Development Foundation.

## Research Activities

Ultra-high-functional semiconductor devices like ULSI, TFT and solar cells support the products, such as intelligent and networked household appliances, that embody the IT revolution of the 21st century. These semiconductor devices are manufactured by thin-film material deposition and processing technologies that use microparticles such as electrons, atoms, molecules, ions and photons. There are many serious problems with the conventional semiconductor manufacturing process. Namely, exposure to ultraviolet light and the accumulated charge degrades the semiconductor devices. Professor Samukawa proposed excellent new technologies such as "pulse-time-modulated plasma" and "neutral beam," and put them to practical use. Through these efforts, he is working to develop ultra-precise microfabrication technologies to make highly functional thin films. His experiments with the introduction of bio-technology into futuristic nano-devices have resulted in the successful fabrication of ultra-fine nano-structure at the sub-10-nm level.




Fusion of Biotechnology and nanotechnology and Development of Innovative Forward-looking Nano-scale Devices Using Neutral Beam Etching




Defect-free 2D Nanodisk Array using Neutral Beam Etching Process and Development of Stochastically Resonance Device with the Electron Current Percolation Path.

## Message

On this earth with a history of some five billion years, what do people live for? People live to evolve, for without such effort life would cease to exist. It is important to always have a forward-looking attitude and strive to develop yourself. A true professional is a person with competence and skill and one who incessantly meets every challenge. Armed with a dream and the will to prevail, nothing is impossible. That's how people have survived and thrived from the ancient past to present. Until the day I die, I want to continue to meet every challenge. We only live once, so why don't we arm ourselves with a dream and together meet the stimulating challenges on the global horizon?