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Notice

2026/04/27

Special Lecture by Professor Akinori Yonezawa [Event Report]

From Curiosity About Language to Technology That Moves the World - Professor Akinori Yonezawa Reflects on Half a Century of Research

On April 24, 2026, the National Institute of Informatics (NII) hosted a special lecture by Professor Akinori Yonezawa titled "My Research Odyssey." Organized primarily for early-career faculty members, the event opened with remarks from Vice Director Satoh and was followed by Professor Yonezawa's reflections on five decades of software research. Approaching his 80th birthday, the professor spoke candidly about the messages he wishes to convey to young researchers through his career--a rare and invaluable occasion.

An Encounter with Language--A Student Captivated by Chomsky

At the opening of his lecture, Professor Yonezawa quoted the famous line from Wittgenstein--"Whereof one can speak, thereof one must speak clearly; whereof one cannot speak, thereof one must be silent"--and listed his research keywords: language, formal logic, concurrency, object orientation, and secure computing.

The roots of his research trace back to his undergraduate years at the University of Tokyo. A chance encounter with generative grammar during a Russian language class led him to pick up Noam Chomsky's Syntactic Structures. Struck by its clarity of English prose, he developed a deep fascination with language--a curiosity that would become the driving

force behind his lifelong work in programming language research.

In the Faculty of Engineering, he was inspired by Professor Shun'ichi Amari's course on information theory. During his master's program, he joined Professor Shigekazu Moriguchi's laboratory and completed a thesis implementing a theorem prover, engaging with both theory and implementation. He subsequently received a Japan Society for the Promotion of Science scholarship to study at MIT, where he attended seminars by luminaries such as Carl Hewitt and Barbara Liskov, and began his foray into the world of concurrent computing.

The Concept of "Concurrent Objects" and the ABCL Language Series

Around 1975, while at MIT, Professor Yonezawa conceived the notion of "concurrent objects." Everything in the real world exists simultaneously and interacts with one another--how could this inherent concurrency be expressed directly in a program? In response to this question, he proposed an approach in which "each element of the target world is represented as an object, and interactions between elements are expressed as asynchronous message passing."

He describes programming language research as resting on four pillars--design, implementation, semantics, and application--which he likens to a regular tetrahedron. In 1984, he developed ABCL/1, the world's first practical concurrent object language. This was followed by ABCL/R (reflective computation), ABCL/f (for massively parallel computers), and JavaGo (mobile objects)--a series of languages whose findings were presented at leading international conferences including OOPSLA.

At the time, critics argued that "concurrency consumes too much computing power and is impractical." Yet the professor was confident that "computing power will eventually catch up." Indeed, the concept of concurrent objects has become foundational infrastructure for large-scale modern systems--among them Second Life in virtual worlds, X (Twitter) and Facebook with their hundreds of millions of users, and NAMD, a molecular dynamics simulator for supercomputers.

Secure Computing--Toward Research That Protects Society's Infrastructure

Entering the 2000s, Professor Yonezawa shifted his research focus to information security. As computer viruses proliferated, threatening the very social infrastructure that society depends on, he led a project titled "Research on Methods for Realizing Secure Computing as Social Infrastructure," organizing approximately 35 researchers across six universities. The team conceived and implemented a three-layer safety net: a theory and verification layer (logical program analysis), a language and specification layer (secure programming language design), and an OS and infrastructure layer (secure runtime system design).

This research was selected as one of five studies recognized for their outstanding social contribution funded by Grants-in-Aid for Scientific Research in the 2004 White Paper on Education, Culture, Sports, Science and Technology. The other four selections were all by Nobel Prize laureates--making this recognition extraordinarily rare for the field of computer science.

A Message to Young Researchers

At the close of his lecture, Professor Yonezawa offered three messages to early-career researchers.

First, "do not sell computer science short." Although the field is younger than traditional disciplines like physics or chemistry, it now underpins virtually every aspect of society. He urged young researchers to pursue their work with confidence in its importance.

Second, "actively interact with the international research community." Drawing on his own experience, he emphasized that engaging in dialogue with researchers abroad is where seeds of new ideas are found, and where mutual inspiration flourishes.

Third, the value of "agreeing to disagree." He closed with a straightforward reminder not to be troubled when opinions differ, but rather to acknowledge those differences and move

forward.

Professor Yonezawa's words--delivered with unpretentious candor as he looked back on half a century of research--served as a source of deep encouragement for the young researchers who will shape the future of computer science.

Special Lecture by Professor Yonezawa: Presentation Materials (Chiba Institute of Technology, Center for Artificial Intelligence and Software Technology Research (STAIR Lab))

SPECIAL

Summary of NII 2026

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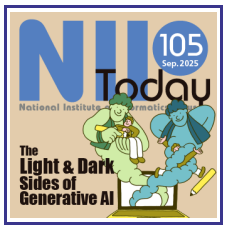

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National Institute of Informatics
2-1-2 Hitotsubashi, Chiyoda-ku, Tokyo 101-8430

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